

Test Report

In accordance with FCC Rules and Regulations, Volume II, Part 2 and to Part 87

Sub-part 2.1033 (c)(1):

Name and Address of Applicant: AeroAntenna Technology, Inc.

20732 Lassen Str.

Chatsworth, CA, USA 91311

Manufacturer: AeroAntenna Technology, Inc.

Test Laboratory/Issuer: AeroAntenna Technology, Inc.

Test Location: AeroAntenna Technology, Inc.

Product Type: Geosynchronous Orbit Aeronautical Mobile Satellite Services
Aircraft Earth Station Equipment

Model Number: AT1595-13/BT1595-13

(c)(2) **FCC ID:** A6LAT1595-13

(c)(3) **Instruction Manuals:** See attached.

(c)(4) **Type of Emission:** BPSK, QPSK, QAM

(c)(5) **Frequency Range:** 1626.5MHz – 1660.5MHz

(c)(6) **Power Rating:** 0.3 Watts (Variable)

EIRP Rating: 100 Watts (Variable)

(c)(7) **Maximum Allowed Power:** 60 Watts

Maximum Allowed EIRP: 2000 Watts

(c)(8) **Voltages and Currents in all RF Elements:**

Voltage = 28V $\pm$ 12V

Current (quiescent @28V) = 0.35A

(c)(9) **Tune-Up Procedure:** See attached exhibits.

(c)(10) **Circuit Diagram and Description:** Circuitry providing suppression of emissions and limiting output power

(c)(11) **Label Information:** See attached exhibits.

(c)(12) **Photographs:** See attached exhibits.

(c)(13) **Digital Modulation Description:** N/A

(c)(14) **Test and Measurement Data:** Follows.

Engineer:

Alex Sissoev

Sr. Electronics R&D Engineer, AeroAntenna Technology, Inc.



Date of Report: September 24th 2015

Table of Contents

Test Report.....	1
Test Results Summary.....	4
Carrier Output Power And Conducted Spurious Emissions.....	5
Test Procedure.....	5
BPSK 1626.5MHz Conducted Spurious Emissions	6
BPSK 1643.5MHz Conducted Spurious Emissions	8
BPSK 1660.5MHz Conducted Spurious Emissions.....	10
QPSK 1626.5MHz Conducted Spurious Emissions.....	12
QPSK 1643.5MHz Conducted Spurious Emissions.....	14
QPSK 1660.5MHz Conducted Spurious Emissions.....	16
QAM 1626.5MHz Conducted Spurious Emissions.....	18
QAM 1643.5MHz Conducted Spurious Emissions.....	20
QAM 1660.5MHz Conducted Spurious Emissions.....	22
Field Strength Of Radiated Spurious Emissions.....	24
Test Procedure.....	24
Test Steps.....	25
Maximum EIRP Level @1626.5MHz.....	26
Maximum EIRP Level @1643.5MHz.....	27
Maximum EIRP Level @1660.5MHz.....	28
BPSK 1626.5MHz Radiated Spurious Emissions.....	29
BPSK 1643.5MHz Radiated Spurious Emissions.....	30
BPSK 1660.5MHz Radiated Spurious Emissions.....	31
QPSK 1626.5MHz Radiated Spurious Emissions.....	32
QPSK 1643.5MHz Radiated Spurious Emissions.....	33
QPSK 1660.5MHz Radiated Spurious Emissions.....	34
QAM 1626.5MHz Radiated Spurious Emissions.....	35
QAM 1643.5MHz Radiated Spurious Emissions.....	36
QAM 1660.5MHz Radiated Spurious Emissions.....	37
Occupied Bandwidth.....	38
Test Procedure.....	38
BPSK 151.2ksps @ 1626.5MHz Occupied Bandwidth.....	39
BPSK 151.2ksps @ 1643.5MHz Occupied Bandwidth.....	40
BPSK 151.2ksps @ 1660.5MHz Occupied Bandwidth.....	41
QPSK 151.2ksps @ 1626.5MHz Occupied Bandwidth.....	42
QPSK 151.2ksps @ 1643.5MHz Occupied Bandwidth.....	43
QPSK 151.2ksps @ 1660.5MHz Occupied Bandwidth.....	44
QAM 151.2ksps @ 1626.5MHz Occupied Bandwidth.....	45
QAM 151.2ksps @ 1643.5MHz Occupied Bandwidth.....	46
QAM 151.2ksps @ 1660.5MHz Occupied Bandwidth.....	47
Frequency Stability (Temperature and Voltage Variation).....	48
Test Procedure.....	48
Appendix A.....	51
AT1595-13 Attenuation.....	51
Appendix B.....	53
List Of Equipment.....	53
Appendix C.....	54
Test Setup Photographs.....	54

Illustration Index

Illustration 1: Conducted Spurious Emissions Test Setup.....	5
Illustration 2: BPSK 1626.5 MHz carrier power.....	6
Illustration 3: BPSK 1643.5 MHz carrier power.....	8
Illustration 4: BPSK 1660.5 MHz carrier power.....	10
Illustration 5: QPSK 1626.5 MHz carrier power.....	12
Illustration 6: QPSK 1643.5 MHz carrier power.....	14
Illustration 7: QPSK 1660.5 MHz carrier power.....	16
Illustration 8: QAM 1626.5 MHz carrier power.....	18
Illustration 9: QAM 1643.5 MHz carrier power.....	20
Illustration 10: QAM 1660.5 MHz carrier power.....	22
Illustration 11: Radiated Emissions Test setup diagram.....	24
Illustration 12: Spectrum @ 2nd harmonic frequency.....	29
Illustration 13: Spectrum @ fundamental frequency.....	29
Illustration 14: Spectrum @ 4th harmonic frequency.....	29
Illustration 15: Spectrum @ 3rd harmonic frequency.....	29
Illustration 16: Spectrum @ 2nd harmonic frequency.....	30
Illustration 17: Spectrum @ fundamental frequency.....	30
Illustration 18: Spectrum @ 4th harmonic frequency.....	30
Illustration 19: Spectrum @ 3rd harmonic frequency.....	30
Illustration 20: Spectrum @ 2nd harmonic frequency.....	31
Illustration 21: Spectrum @ fundamental frequency.....	31
Illustration 22: Spectrum @ 4th harmonic frequency.....	31
Illustration 23: Spectrum @ 3rd harmonic frequency.....	31
Illustration 24: Spectrum @ 2nd harmonic frequency.....	32
Illustration 25: Spectrum @ fundamental frequency.....	32
Illustration 26: Spectrum @ 4th harmonic frequency.....	32
Illustration 27: Spectrum @ 3rd harmonic frequency.....	32
Illustration 28: Spectrum @ 2nd harmonic frequency.....	33
Illustration 29: Spectrum @ fundamental frequency.....	33
Illustration 30: Spectrum @ 4th harmonic frequency.....	33
Illustration 31: Spectrum @ 3rd harmonic frequency.....	33
Illustration 32: Spectrum @ 2nd harmonic frequency.....	34
Illustration 33: Spectrum @ fundamental frequency.....	34
Illustration 34: Spectrum @ 4th harmonic frequency.....	34
Illustration 35: Spectrum @ 3rd harmonic frequency.....	34
Illustration 36: Spectrum @ 2nd harmonic frequency.....	35
Illustration 37: Spectrum @ fundamental frequency.....	35
Illustration 38: Spectrum @ 4th harmonic frequency.....	35
Illustration 39: Spectrum @ 3rd harmonic frequency.....	35
Illustration 40: Spectrum @ 2nd harmonic frequency.....	36
Illustration 41: Spectrum @ fundamental frequency.....	36
Illustration 42: Spectrum @ 4th harmonic frequency.....	36
Illustration 43: Spectrum @ 3rd harmonic frequency.....	36
Illustration 44: Spectrum @ 2nd harmonic frequency.....	37
Illustration 45: Spectrum @ fundamental frequency.....	37
Illustration 46: Spectrum @ 4th harmonic frequency.....	37
Illustration 47: Spectrum @ 3rd harmonic frequency.....	37

Illustration 48: Radiated Emissions Test setup diagram.....	38
Illustration 49: Occupied Bandwidth.....	39
Illustration 50: Occupied Bandwidth.....	40
Illustration 51: Occupied Bandwidth.....	41
Illustration 52: Occupied Bandwidth.....	42
Illustration 53: Occupied Bandwidth.....	43
Illustration 54: Occupied Bandwidth.....	44
Illustration 55: Occupied Bandwidth.....	45
Illustration 56: Occupied Bandwidth.....	46
Illustration 57: Occupied Bandwidth.....	47
Illustration 58: Frequency vs. Temperature Test setup.....	48
Illustration 59: Carrier frequency at -55 °C.....	49
Illustration 60: Carrier frequency at 0 °C.....	49
Illustration 61: Carrier frequency at 85 °C.....	49
Illustration 62: Carrier frequency at 25 °C.....	49
Illustration 63: Carrier frequency: 16V power supply.....	50
Illustration 64: Carrier frequency: 28V power supply.....	50
Illustration 65: Carrier frequency: 40V power supply.....	50
Illustration 66: 10MHz - 1026.5MHz.....	51
Illustration 67: 1526.5MHz - 1559.0MHz.....	51
Illustration 68: 1585.0MHz – 1605.0MHz.....	51
Illustration 69: 1559.0MHz – 1585.0MHz.....	51
Illustration 70: 1614.0MHz - 1625.5MHz.....	52
Illustration 71: 1605.0MHz – 1614.0MHz.....	52
Illustration 72: 1800.0MHz - 18000MHz.....	52
Illustration 73: 1735.0MHz – 1800.0MHz.....	52

Test Results Summary

Specification	Test Name	Pass/Fail or N/A	Comments
2.1046, 87.131	Carrier Output Power	Pass	Conducted and radiated
2.1051, 87.139(i)(1)	Unwanted Emissions	Pass	Conducted and radiated
2.1053	Field Strength of Spurious Radiation	Pass	
2.1049, 87.139(i)(3)	Emission Masks (Occupied Bandwidth)	Pass	
2.1047	Audio Low Pass Filter (Voice Input)	N/A	The EUT does not contain an audio input
2.1047	Audio Frequency Response	N/A	The EUT does not contain an audio input
2.1047	Modulation Limiting	N/A	The EUT does not contain an audio input
2.1055, 87.133(a)	Frequency Stability (Temperature Variation)	Pass	The EUT does not itself generate RF frequency
2.1055, 87.133(a)	Frequency Stability (Voltage Variation)	Pass	The EUT does not itself generate RF frequency

Carrier Output Power And Conducted Spurious Emissions

Test specification: 2.1051, 87.139(i)(1)

Test Procedure

The EUT was connected directly to a spectrum analyzer using a 30dB attenuator to verify that the UUT met the requirements for spurious emissions. The signal generator was setup to transmit BPSK, QPSK, and QAM modulated signals at 151.2ksps. The RBW was set according to the requirements of 87139 (i)(1). The dBc limit, the AT1595-13 rejection, and corrected power were summed together to determine the necessary dBm value of the EUT to provide a system rejection greater than the IC/FCC limit. This value was compared to the measured value to ensure compliance to the specification, which is expressed as the margin.

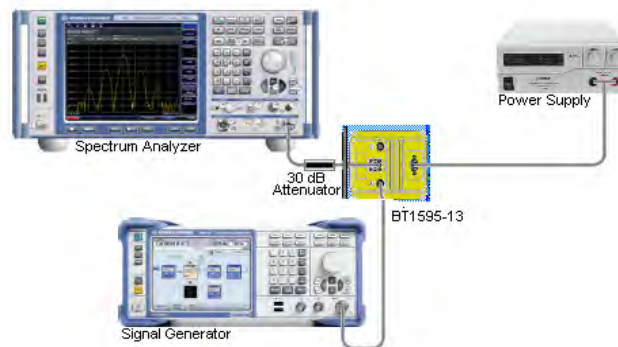
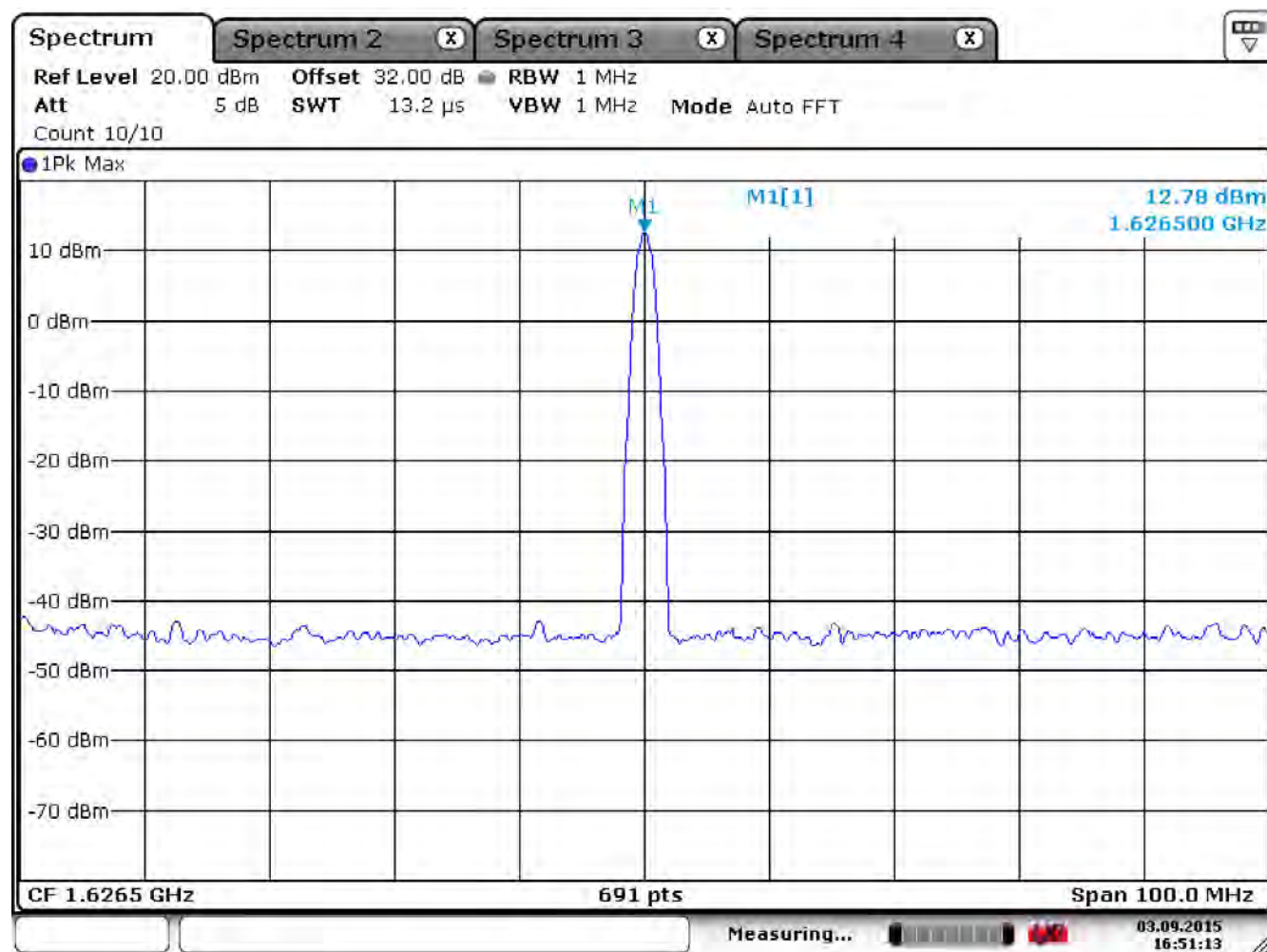


Illustration 1: Conducted Spurious Emissions Test Setup

BPSK 1626.5MHz Conducted Spurious Emissions



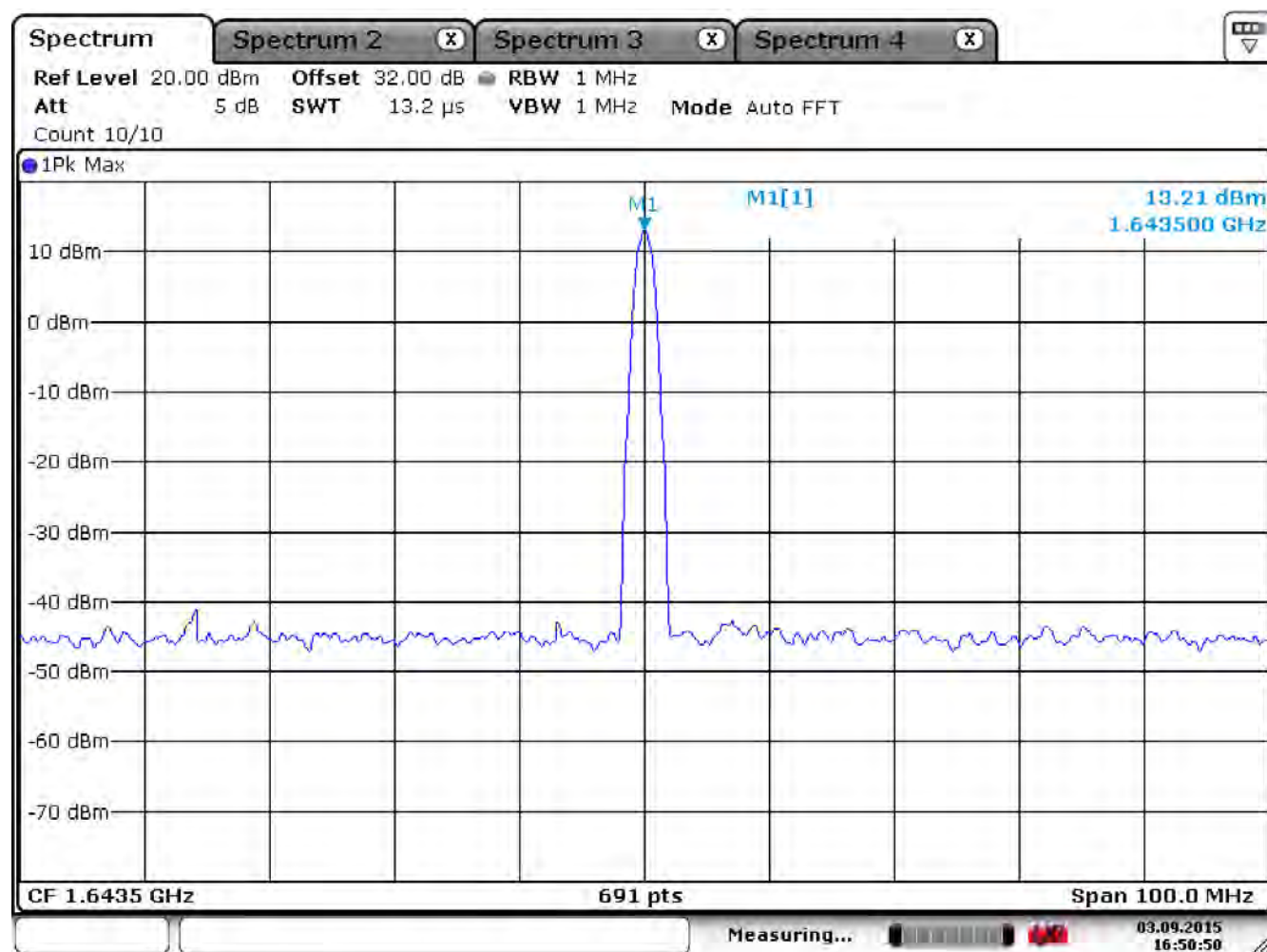
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Illustration 2: BPSK 1626.5 MHz carrier power.

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1626.5MHz	0.02	12.78	60	Pass

Frequency (MHz)	Mask Limit (dBc)	RBW (kHz)	AT1595-13 Rejection (dB)	Carrier Power (dBm)	Pass Level (dBm)	Measured Level (dBm)	Margin (dB)	Status
0.10 to 1026.5	-135	4	120	12.78	-2.22	-83.01	-80.79	PASS
1026.5 to 1525	-135	4	110	12.78	-12.22	-83.01	-70.79	PASS
1525 to 1559	-203	4	117	12.78	-73.22	-83.01	-9.79	PASS
1559 to 1585	-155	1000	107	12.78	-35.22	-82.49	-47.27	PASS
1585 to 1605	-143	1000	108	12.78	-22.22	-82.49	-60.27	PASS
1605 to 1610	-117	1000	91	12.78	-13.22	-82.49	-69.27	PASS
1610 to 1610.6	-95	1000	91	12.78	8.78	-82.49	-91.27	PASS
1610.6 to 1613.8	-49	1000	91	12.78	54.78	-82.49	-137.27	PASS
1613.8 to 1614	-95	1000	91	12.78	8.78	-82.49	-91.27	PASS
1614 to 1660	-70	4	4.5	12.78	-52.72	-66.15	-13.43	PASS
1660 to 1670	-19.5	20	4.5	12.78	-2.22	-100.97	-98.75	PASS
1670 to 1735	-60	4	4.5	12.78	-42.72	-66.15	-23.43	PASS
1735 to 18000	-105	4	118	12.78	25.78	-66.15	-91.93	PASS

BPSK 1643.5MHz Conducted Spurious Emissions



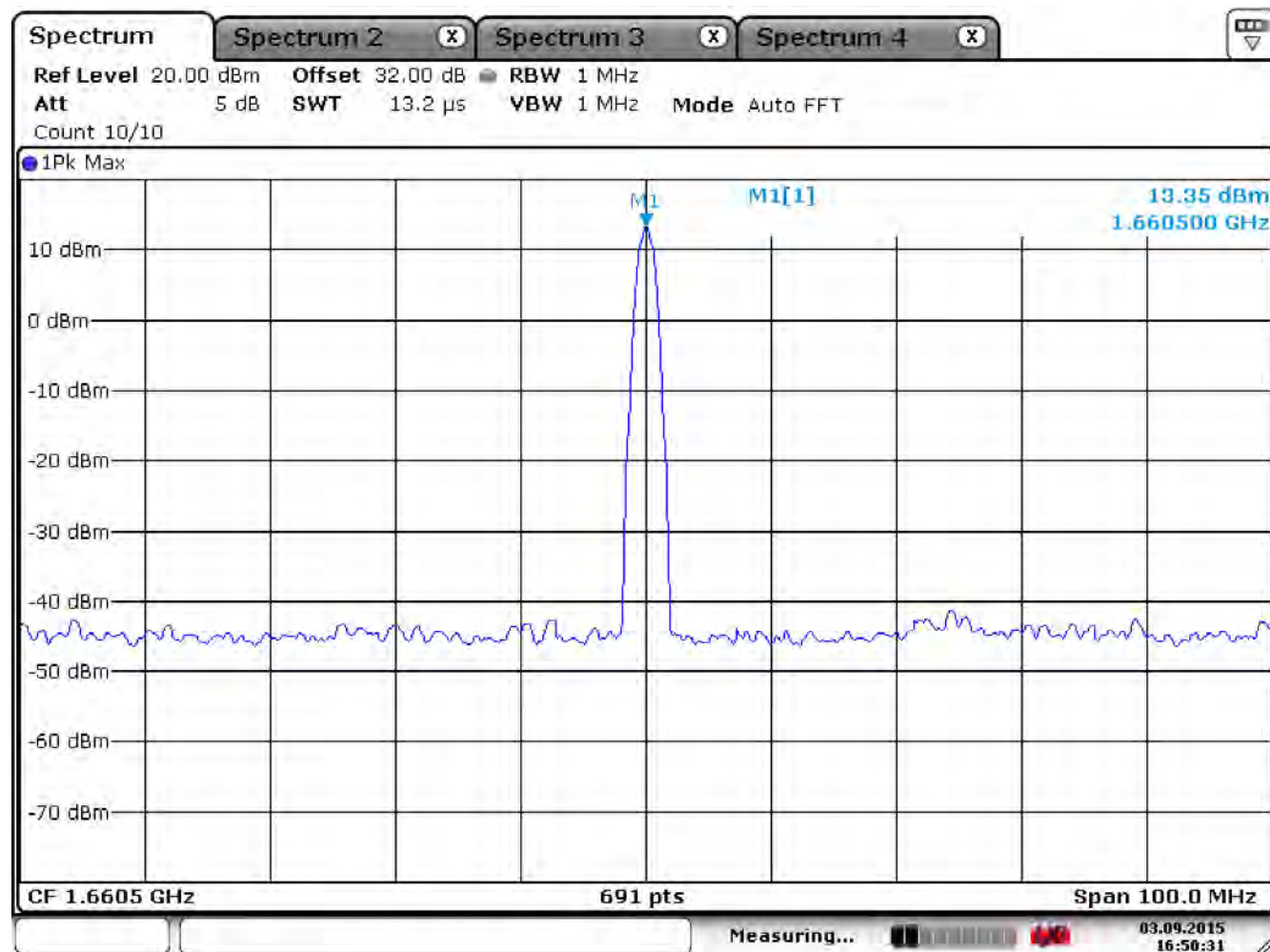
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Illustration 3: BPSK 1643.5 MHz carrier power.

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1643.5MHz	0.02	13.21	60	Pass

Frequency (MHz)	Mask Limit (dBc)	RBW (kHz)	AT1595-13 Rejection (dB)	Carrier Power (dBm)	Pass Level (dBm)	Measured Level (dBm)	Margin (dB)	Status
0.10 to 1026.5	-135	4	120	13.21	-1.79	-80.92	-79.13	PASS
1026.5 to 1525	-135	4	110	13.21	-11.79	-80.92	-69.13	PASS
1525 to 1559	-203	4	117	13.21	-72.79	-80.92	-8.13	PASS
1559 to 1585	-155	1000	107	13.21	-34.79	-82.9	-48.11	PASS
1585 to 1605	-143	1000	108	13.21	-21.79	-82.9	-61.11	PASS
1605 to 1610	-117	1000	91	13.21	-12.79	-82.9	-70.11	PASS
1610 to 1610.6	-95	1000	91	13.21	9.21	-82.9	-92.11	PASS
1610.6 to 1613.8	-49	1000	91	13.21	55.21	-82.9	-138.11	PASS
1613.8 to 1614	-95	1000	91	13.21	9.21	-82.9	-92.11	PASS
1614 to 1660	-70	4	4.5	13.21	-52.29	-75.29	-23	PASS
1660 to 1670	-19.5	20	4.5	13.21	-1.79	-100.8	-99.01	PASS
1670 to 1735	-60	4	4.5	13.21	-42.29	-75.29	-33	PASS
1735 to 18000	-105	4	118	13.21	26.21	-66.53	-92.74	PASS

BPSK 1660.5MHz Conducted Spurious Emissions



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Illustration 4: BPSK 1660.5 MHz carrier power.

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1660.5MHz	0.02	13.65	60	Pass

Frequency (MHz)	Mask Limit (dBc)	RBW (kHz)	AT1595-13 Rejection (dB)	Carrier Power (dBm)	Pass Level (dBm)	Measured Level (dBm)	Margin (dB)	Status
0.10 to 1026.5	-135	4	120	13.35	-1.65	-80.9	-79.25	PASS
1026.5 to 1525	-135	4	110	13.35	-11.65	-80.9	-69.25	PASS
1525 to 1559	-203	4	117	13.35	-72.65	-80.9	-8.25	PASS
1559 to 1585	-155	1000	107	13.35	-34.65	-82.15	-47.5	PASS
1585 to 1605	-143	1000	108	13.35	-21.65	-82.15	-60.5	PASS
1605 to 1610	-117	1000	91	13.35	-12.65	-82.15	-69.5	PASS
1610 to 1610.6	-95	1000	91	13.35	9.35	-82.15	-91.5	PASS
1610.6 to 1613.8	-49	1000	91	13.35	55.35	-82.15	-137.5	PASS
1613.8 to 1614	-95	1000	91	13.35	9.35	-82.15	-91.5	PASS
1614 to 1660	-70	4	4.5	13.35	-52.15	-67.68	-15.53	PASS
1660 to 1670	-19.5	20	4.5	13.35	-1.65	-100.62	-98.97	PASS
1670 to 1735	-60	4	4.5	13.35	-42.15	-67.68	-25.53	PASS
1735 to 18000	-105	4	118	13.35	26.35	-67.68	-94.03	PASS

QPSK 1626.5MHz Conducted Spurious Emissions

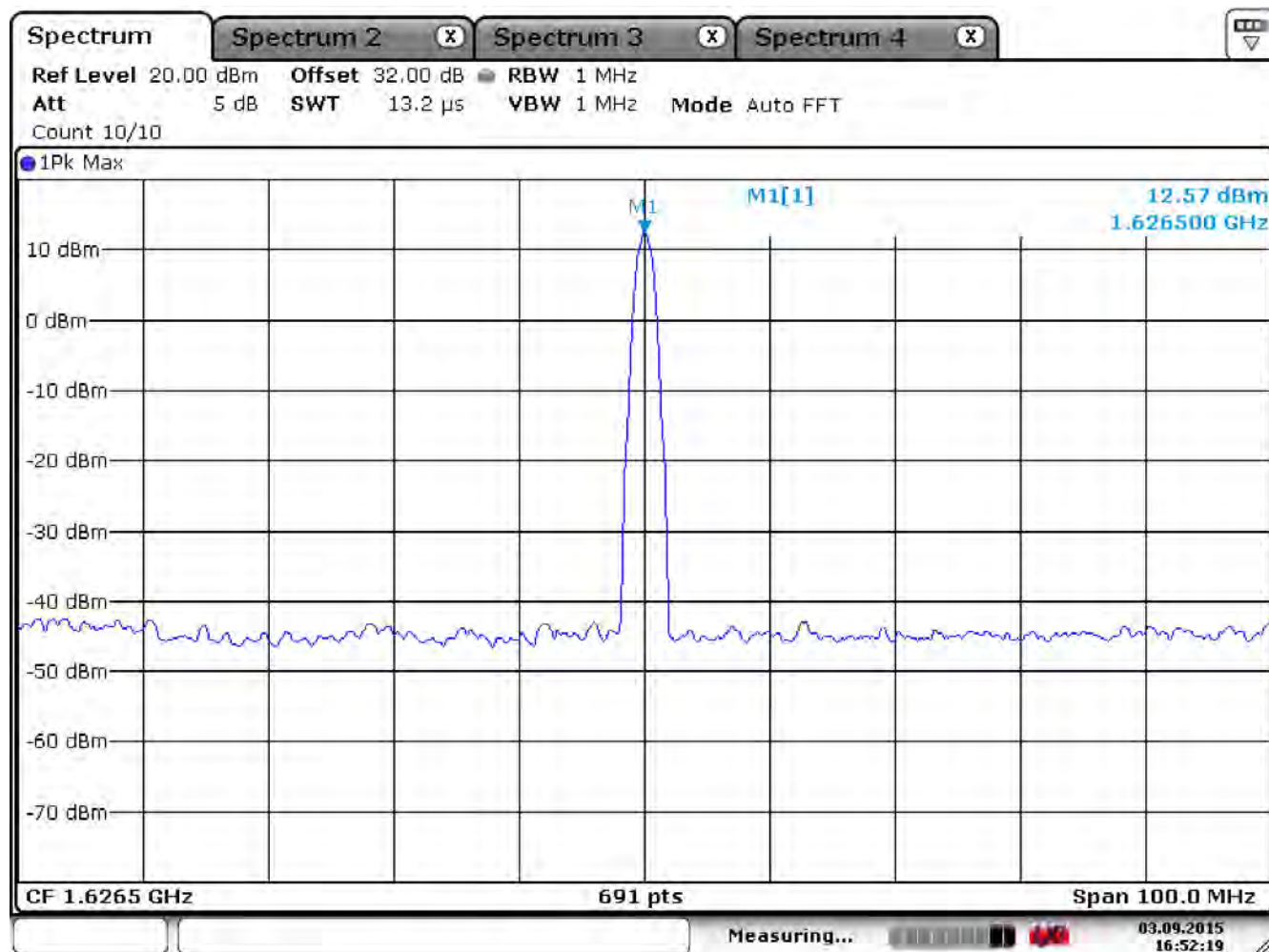
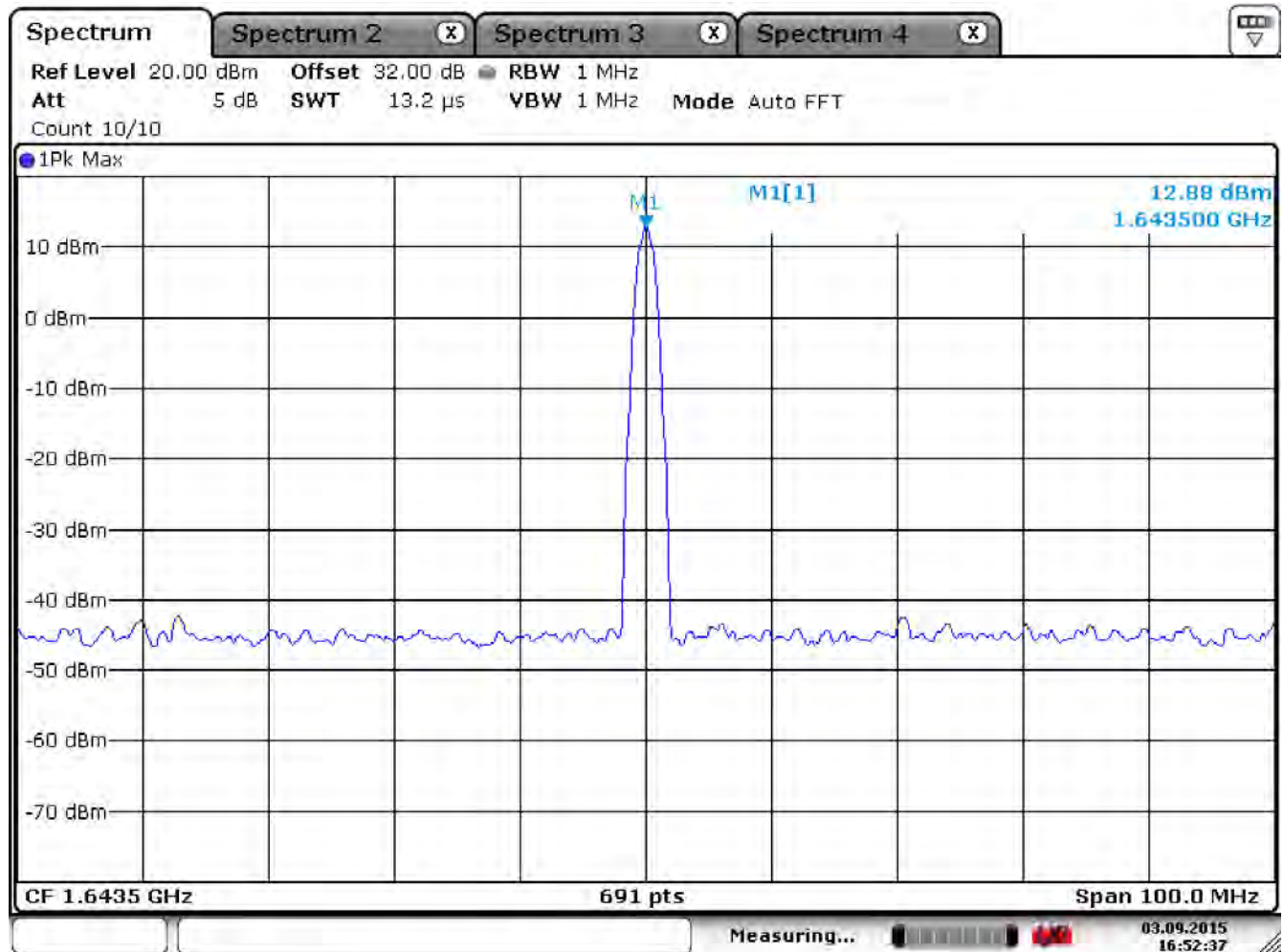


Illustration 5: QPSK 1626.5 MHz carrier power.

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1626.5MHz	0.02	12.57	60	Pass

Frequency (MHz)	Mask Limit (dBc)	RBW (kHz)	AT1595-13 Rejection (dB)	Carrier Power (dBm)	Pass Level (dBm)	Measured Level (dBm)	Margin (dB)	Status
0.10 to 1026.5	-135	4	120	12.57	-2.43	-82.32	-79.89	PASS
1026.5 to 1525	-135	4	110	12.57	-12.43	-82.32	-69.89	PASS
1525 to 1559	-203	4	117	12.57	-73.43	-82.32	-8.89	PASS
1559 to 1585	-155	1000	107	12.57	-35.43	-82.22	-46.79	PASS
1585 to 1605	-143	1000	108	12.57	-22.43	-82.22	-59.79	PASS
1605 to 1610	-117	1000	91	12.57	-13.43	-82.22	-68.79	PASS
1610 to 1610.6	-95	1000	91	12.57	8.57	-82.22	-90.79	PASS
1610.6 to 1613.8	-49	1000	91	12.57	54.57	-82.22	-136.79	PASS
1613.8 to 1614	-95	1000	91	12.57	8.57	-82.22	-90.79	PASS
1614 to 1660	-70	4	4.5	12.57	-52.93	-66.55	-13.62	PASS
1660 to 1670	-19.5	20	4.5	12.57	-2.43	-99.9	-97.47	PASS
1670 to 1735	-60	4	4.5	12.57	-42.93	-66.55	-23.62	PASS
1735 to 18000	-105	4	118	12.57	25.57	-66.55	-92.12	PASS

QPSK 1643.5MHz Conducted Spurious Emissions



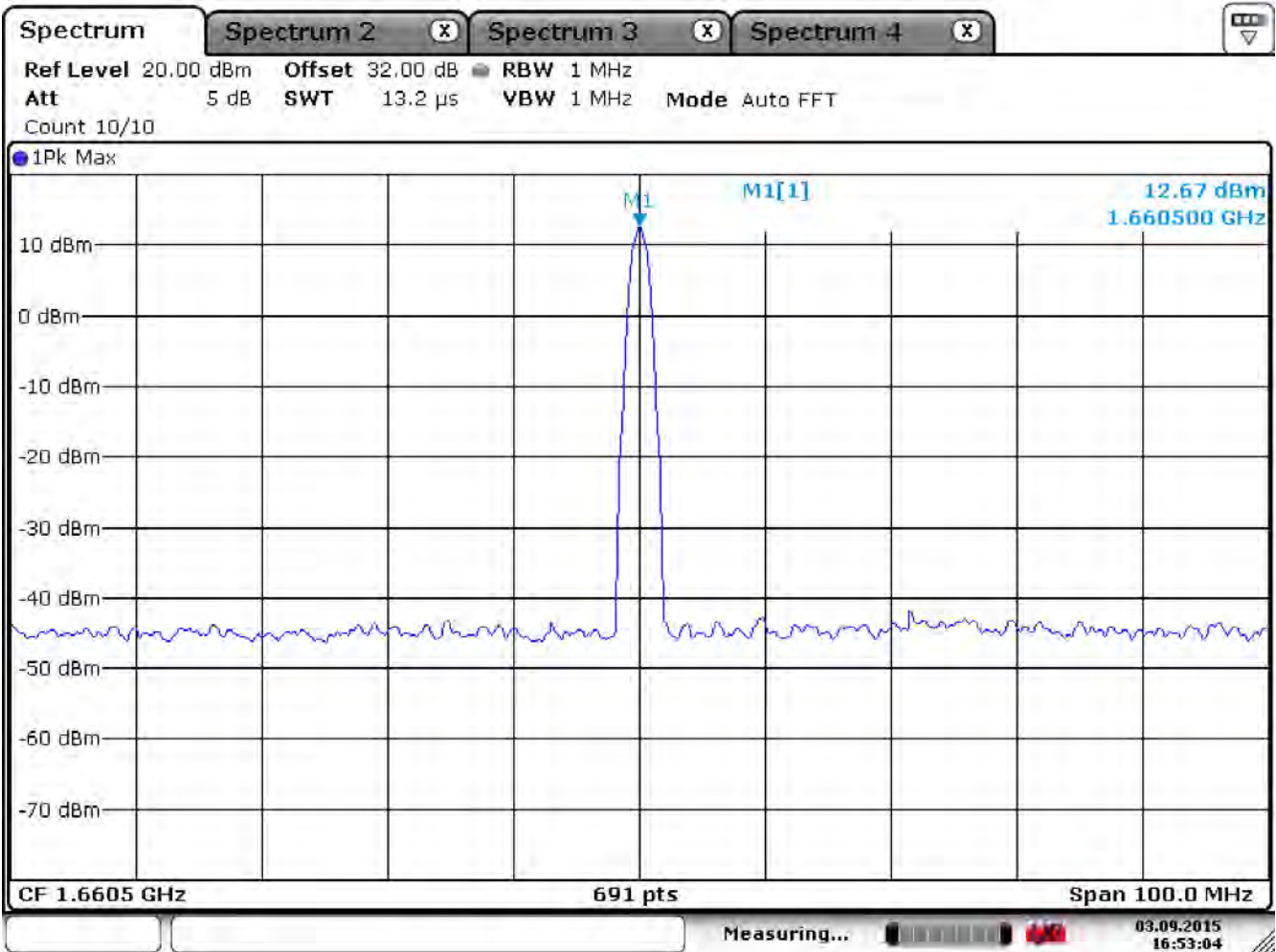
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Illustration 6: QPSK 1643.5 MHz carrier power.

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1643.5MHz	0.02	12.88	60	Pass

Frequency (MHz)	Mask Limit (dBc)	RBW (kHz)	AT1595-13 Rejection (dB)	Carrier Power (dBm)	Pass Level (dBm)	Measured Level (dBm)	Margin (dB)	Status
0.10 to 1026.5	-135	4	120	12.88	-2.12	-81.08	-78.96	PASS
1026.5 to 1525	-135	4	110	12.88	-12.12	-81.08	-68.96	PASS
1525 to 1559	-203	4	117	12.88	-73.12	-81.08	-7.96	PASS
1559 to 1585	-155	1000	107	12.88	-35.12	-82.59	-47.47	PASS
1585 to 1605	-143	1000	108	12.88	-22.12	-82.59	-60.47	PASS
1605 to 1610	-117	1000	91	12.88	-13.12	-82.59	-69.47	PASS
1610 to 1610.6	-95	1000	91	12.88	8.88	-82.59	-91.47	PASS
1610.6 to 1613.8	-49	1000	91	12.88	54.88	-82.59	-137.47	PASS
1613.8 to 1614	-95	1000	91	12.88	8.88	-82.59	-91.47	PASS
1614 to 1660	-70	4	4.5	12.88	-52.62	-74.85	-22.23	PASS
1660 to 1670	-19.5	20	4.5	12.88	-2.12	-101	-98.88	PASS
1670 to 1735	-60	4	4.5	12.88	-42.62	-66.95	-24.33	PASS
1735 to 18000	-105	4	118	12.88	25.88	-66.95	-92.83	PASS

QPSK 1660.5MHz Conducted Spurious Emissions



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Illustration 7: QPSK 1660.5 MHz carrier power.

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1660.5MHz	0.02	12.67	60	Pass

Frequency (MHz)	Mask Limit (dBc)	RBW (kHz)	AT1595-13 Rejection (dB)	Carrier Power (dBm)	Pass Level (dBm)	Measured Level (dBm)	Margin (dB)	Status
0.10 to 1026.5	-135	4	120	12.67	-2.33	-81.61	-79.28	PASS
1026.5 to 1525	-135	4	110	12.67	-12.33	-81.61	-69.28	PASS
1525 to 1559	-203	4	117	12.67	-73.33	-81.61	-8.28	PASS
1559 to 1585	-155	1000	107	12.67	-35.33	-82.46	-47.13	PASS
1585 to 1605	-143	1000	108	12.67	-22.33	-82.46	-60.13	PASS
1605 to 1610	-117	1000	91	12.67	-13.33	-82.46	-69.13	PASS
1610 to 1610.6	-95	1000	91	12.67	8.67	-82.46	-91.13	PASS
1610.6 to 1613.8	-49	1000	91	12.67	54.67	-82.46	-137.13	PASS
1613.8 to 1614	-95	1000	91	12.67	8.67	-82.46	-91.13	PASS
1614 to 1660	-70	4	4.5	12.67	-52.83	-74.52	-21.69	PASS
1660 to 1670	-19.5	20	4.5	12.67	-2.33	-101.19	-98.86	PASS
1670 to 1735	-60	4	4.5	12.67	-42.83	-66.45	-23.62	PASS
1735 to 18000	-105	4	118	12.67	25.67	-66.45	-92.12	PASS

QAM 1626.5MHz Conducted Spurious Emissions

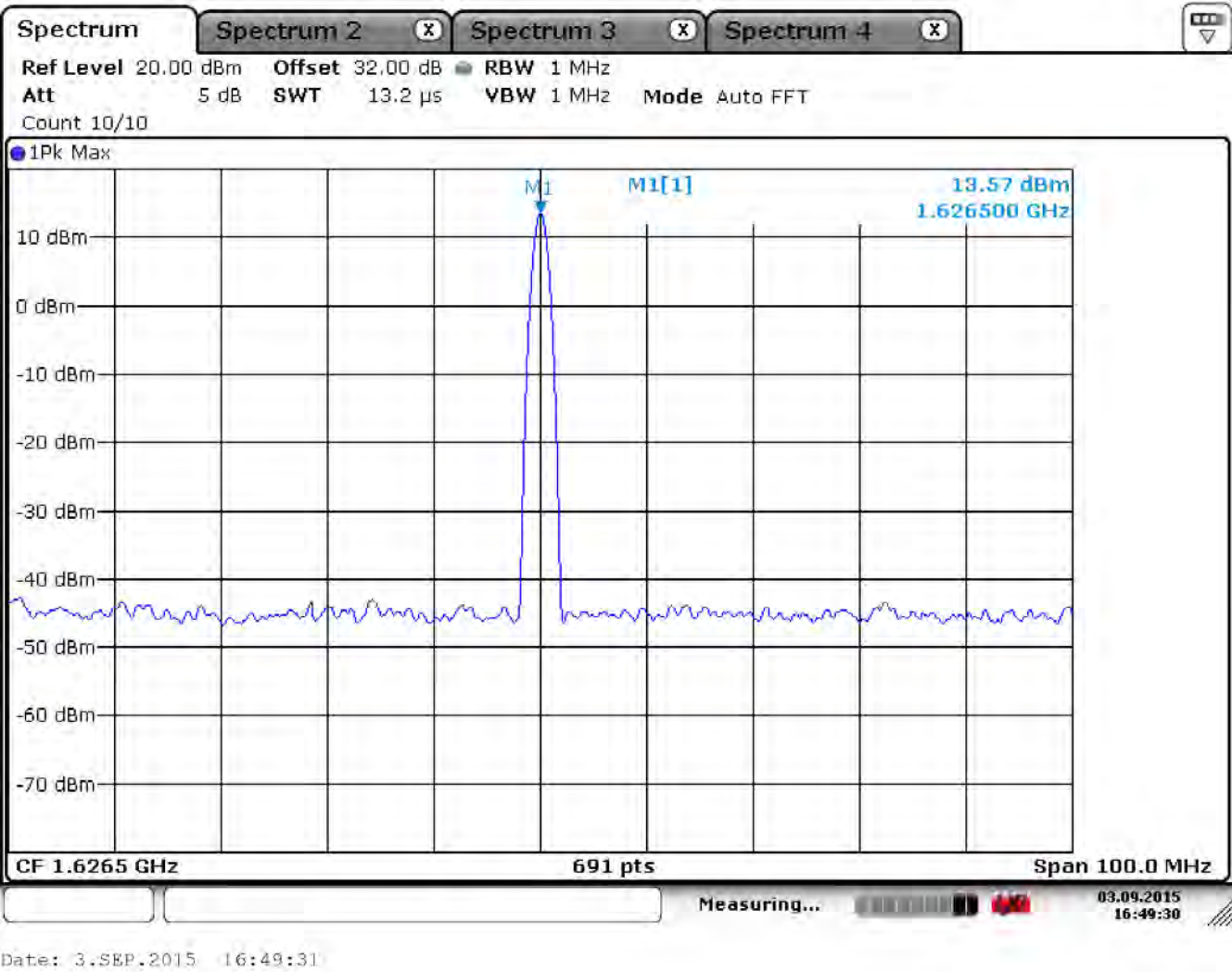
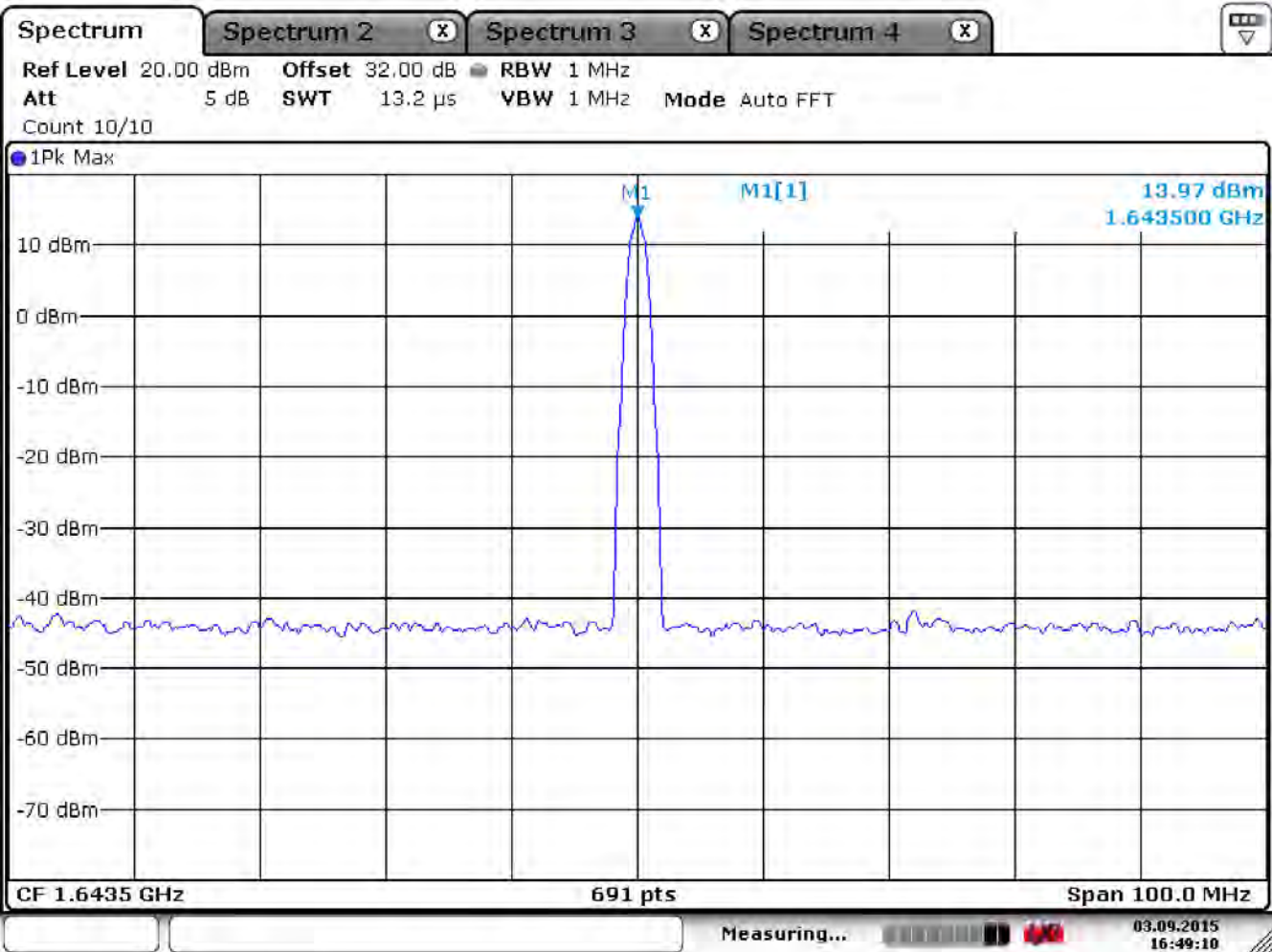


Illustration 8: QAM 1626.5 MHz carrier power.

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1626.5MHz	0.02	13.57	60	Pass

Frequency (MHz)	Mask Limit (dBc)	RBW (kHz)	AT1595-13 Rejection (dB)	Carrier Power (dBm)	Pass Level (dBm)	Measured Level (dBm)	Margin (dB)	Status
0.10 to 1026.5	-135	4	120	13.57	-1.43	-82.25	-80.82	PASS
1026.5 to 1525	-135	4	110	13.57	-11.43	-82.25	-70.82	PASS
1525 to 1559	-203	4	117	13.57	-72.43	-82.25	-9.82	PASS
1559 to 1585	-155	1000	107	13.57	-34.43	-82.32	-47.89	PASS
1585 to 1605	-143	1000	108	13.57	-21.43	-82.32	-60.89	PASS
1605 to 1610	-117	1000	91	13.57	-12.43	-82.32	-69.89	PASS
1610 to 1610.6	-95	1000	91	13.57	9.57	-82.32	-91.89	PASS
1610.6 to 1613.8	-49	1000	91	13.57	55.57	-82.32	-137.89	PASS
1613.8 to 1614	-95	1000	91	13.57	9.57	-82.32	-91.89	PASS
1614 to 1660	-70	4	4.5	13.57	-51.93	-74.79	-22.86	PASS
1660 to 1670	-19.5	20	4.5	13.57	-1.43	-100.85	-99.42	PASS
1670 to 1735	-60	4	4.5	13.57	-41.93	-66.39	-24.46	PASS
1735 to 18000	-105	4	118	13.57	26.57	-66.39	-92.96	PASS

QAM 1643.5MHz Conducted Spurious Emissions



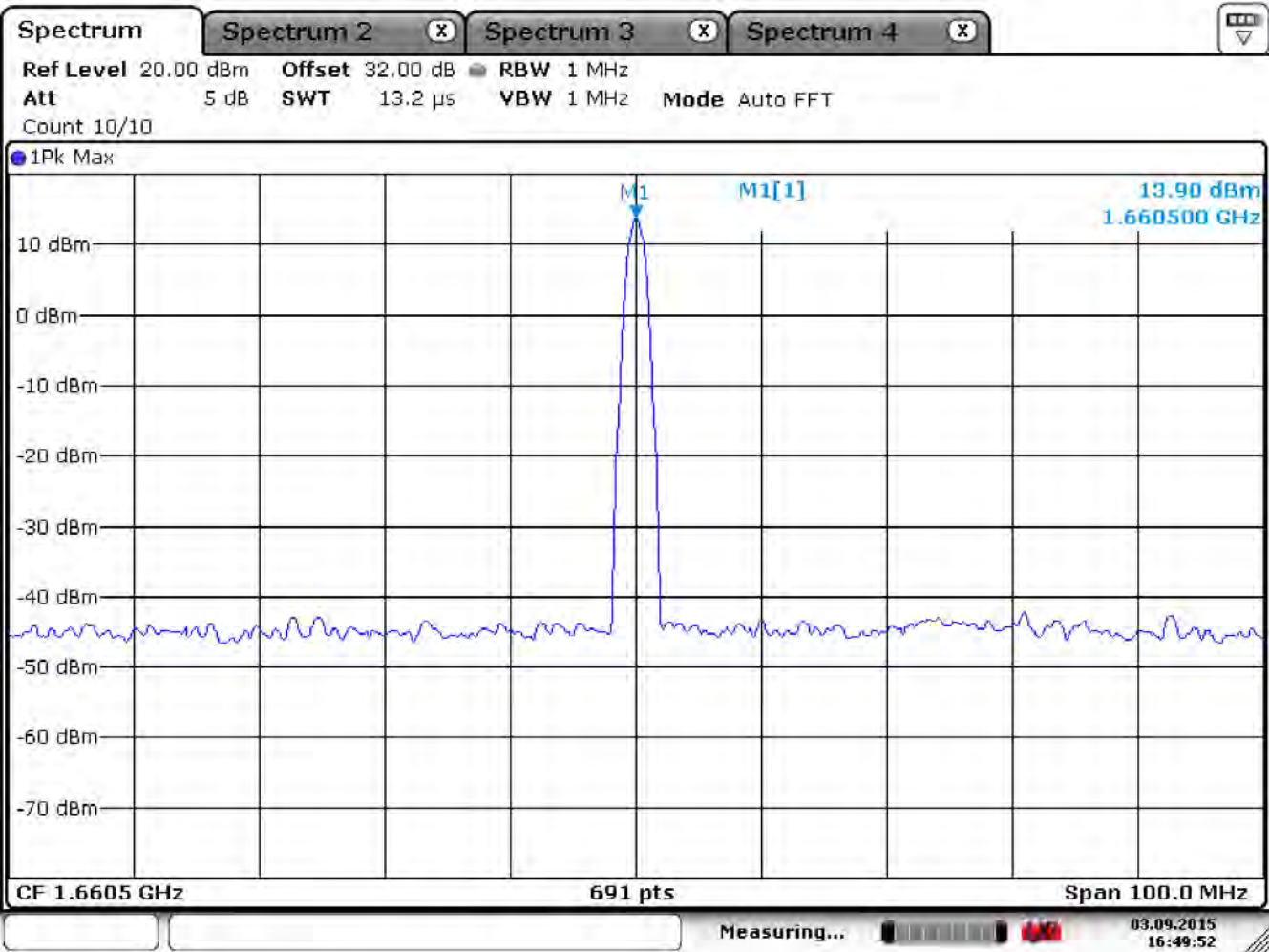
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Illustration 9: QAM 1643.5 MHz carrier power.

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1643.5MHz	0.02	13.97	60	Pass

Frequency (MHz)	Mask Limit (dBc)	RBW (kHz)	AT1595-13 Rejection (dB)	Carrier Power (dBm)	Pass Level (dBm)	Measured Level (dBm)	Margin (dB)	Status
0.10 to 1026.5	-135	4	120	13.97	-1.03	-81.23	-80.2	PASS
1026.5 to 1525	-135	4	110	13.97	-11.03	-81.23	-70.2	PASS
1525 to 1559	-203	4	117	13.97	-72.03	-81.23	-9.2	PASS
1559 to 1585	-155	1000	107	13.97	-34.03	-82.7	-48.67	PASS
1585 to 1605	-143	1000	108	13.97	-21.03	-82.7	-61.67	PASS
1605 to 1610	-117	1000	91	13.97	-12.03	-82.7	-70.67	PASS
1610 to 1610.6	-95	1000	91	13.97	9.97	-82.7	-92.67	PASS
1610.6 to 1613.8	-49	1000	91	13.97	55.97	-82.7	-138.67	PASS
1613.8 to 1614	-95	1000	91	13.97	9.97	-82.7	-92.67	PASS
1614 to 1660	-70	4	4.5	13.97	-51.53	-75.13	-23.6	PASS
1660 to 1670	-19.5	20	4.5	13.97	-1.03	-100.37	-99.34	PASS
1670 to 1735	-60	4	4.5	13.97	-41.53	-67.56	-26.03	PASS
1735 to 18000	-105	4	118	13.97	26.97	-67.56	-94.53	PASS

QAM 1660.5MHz Conducted Spurious Emissions



Date: 3.SEP.2015 16:49:52

Illustration 10: QAM 1660.5 MHz carrier power.

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1660.5MHz	0.02	13.90	60	Pass

Frequency (MHz)	Mask Limit (dBc)	RBW (kHz)	AT1595-13 Rejection (dB)	Carrier Power (dBm)	Pass Level (dBm)	Measured Level (dBm)	Margin (dB)	Status
0.10 to 1026.5	-135	4	120	13.9	-1.1	-81.8	-80.7	PASS
1026.5 to 1525	-135	4	110	13.9	-11.1	-81.8	-70.7	PASS
1525 to 1559	-203	4	117	13.9	-72.1	-81.8	-9.7	PASS
1559 to 1585	-155	1000	107	13.9	-34.1	-82.72	-48.62	PASS
1585 to 1605	-143	1000	108	13.9	-21.1	-82.72	-61.62	PASS
1605 to 1610	-117	1000	91	13.9	-12.1	-82.72	-70.62	PASS
1610 to 1610.6	-95	1000	91	13.9	9.9	-82.72	-92.62	PASS
1610.6 to 1613.8	-49	1000	91	13.9	55.9	-82.72	-138.62	PASS
1613.8 to 1614	-95	1000	91	13.9	9.9	-82.72	-92.62	PASS
1614 to 1660	-70	4	4.5	13.9	-51.6	-74.83	-23.23	PASS
1660 to 1670	-19.5	20	4.5	13.9	-1.1	-101.37	-100.27	PASS
1670 to 1735	-60	4	4.5	13.9	-41.6	-66.54	-24.94	PASS
1735 to 18000	-105	4	118	13.9	26.9	-66.54	-93.44	PASS

Field Strength Of Radiated Spurious Emissions

Test specification: 2.1053

Test Procedure

The EUT (BT1595-13 with AT1595-13) were connected inside the anechoic chamber as illustrated bellow:

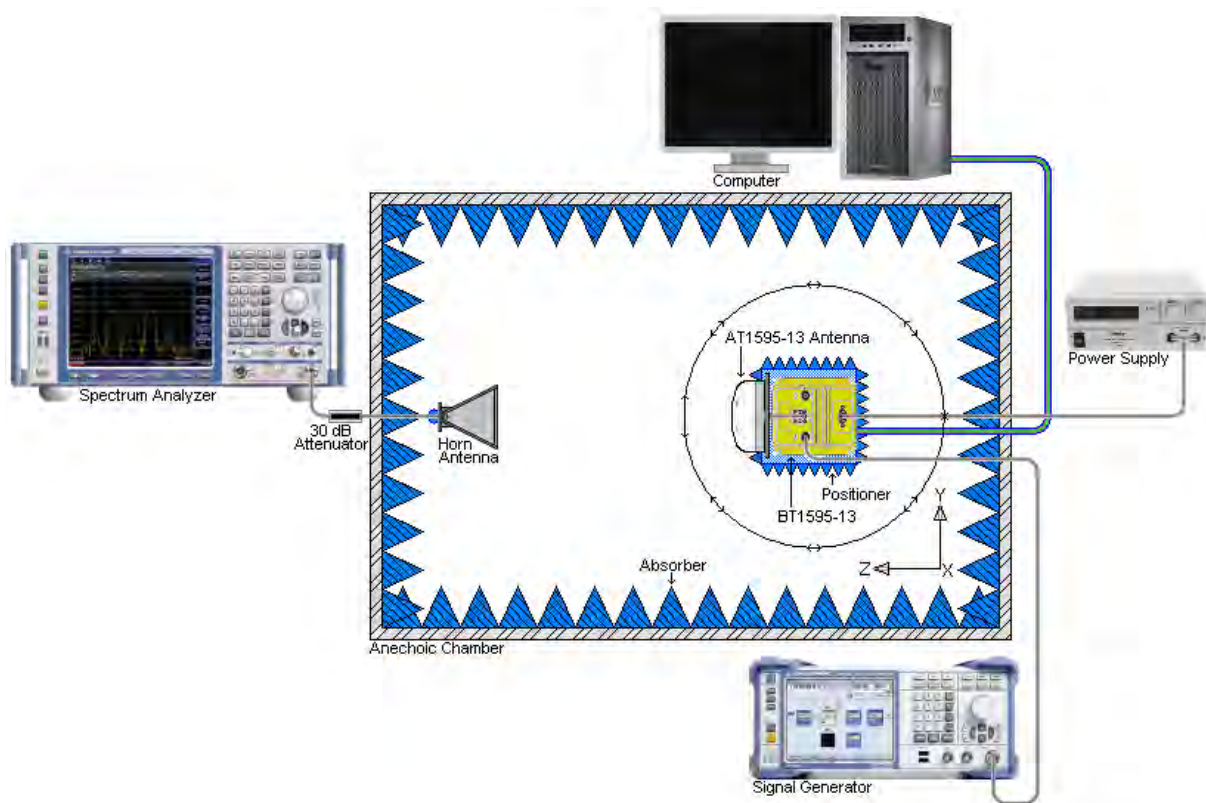


Illustration 11: Radiated Emissions Test setup diagram.

The receiving (probe) Standard Gain Horn antenna was placed 2.77 meters away from the EUT, which was attached to a spherical positioner system.

The probe antenna position can be adjusted along its polarization axis.

Test Steps

Connect the equipment as illustrated

Adjust the spectrum analyzer for the following settings:

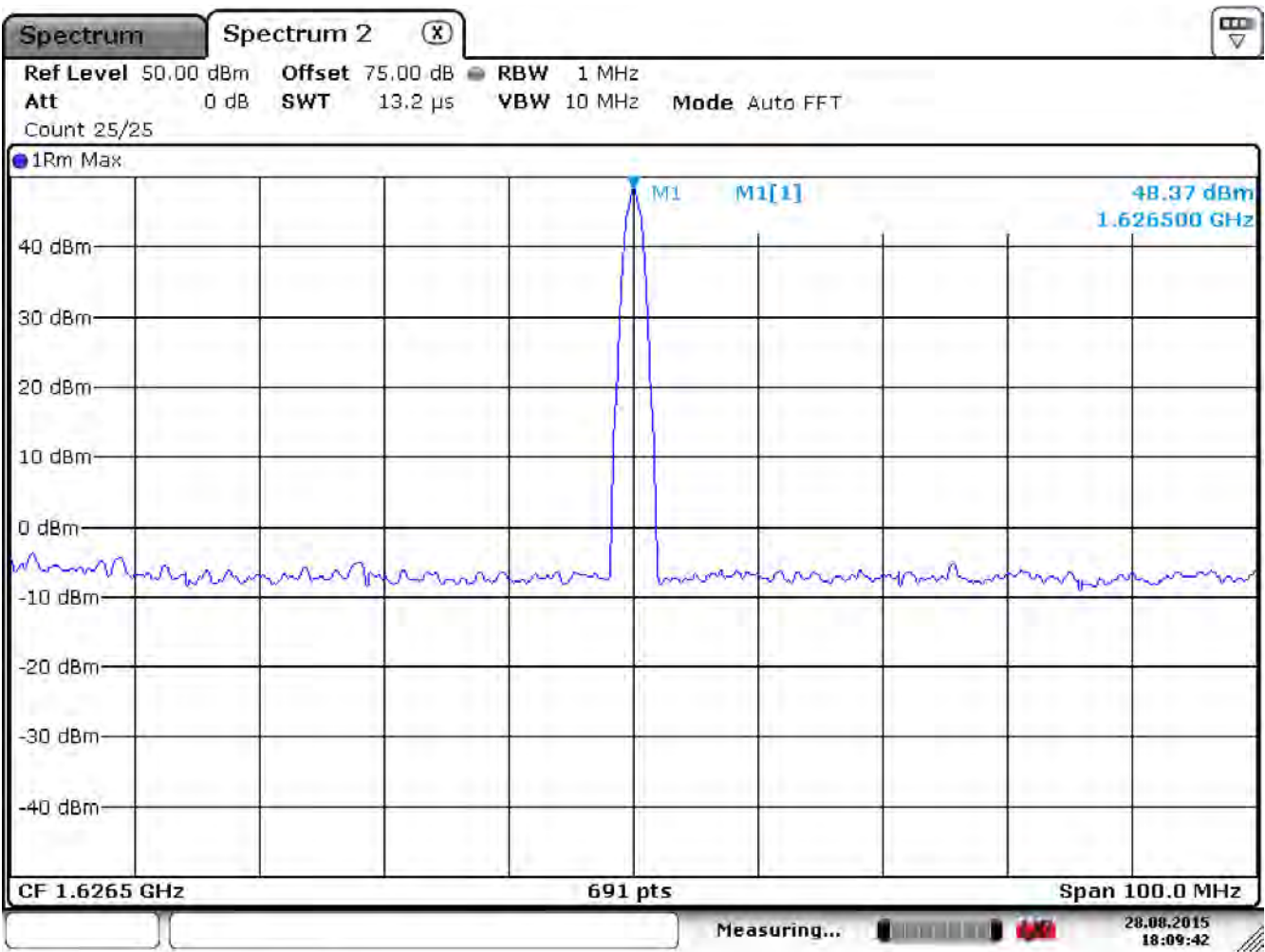
- 1) Resolution Bandwidth 100 kHz (<1 GHz), 1 MHz (> 1GHz).
- 2) Video Bandwidth ≥ 3 times Resolution Bandwidth, or 30 kHz
- 3) Sweep Speed 2000 Hz/second
- 4) Detector Mode = Mean or Average Power

Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into the AT1595-13 front end antenna unit. For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved.

Measurements were made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to the occupied test bandwidth

For each spurious frequency, rotate the EUT around the full sphere (360° Azimuth vs. 360° Elevation) to obtain a maximum reading on the spectrum analyzer with the probe antenna at horizontal and vertical polarity. Repeat this procedure for each probe polarization to obtain the highest possible reading. Record this maximum reading.

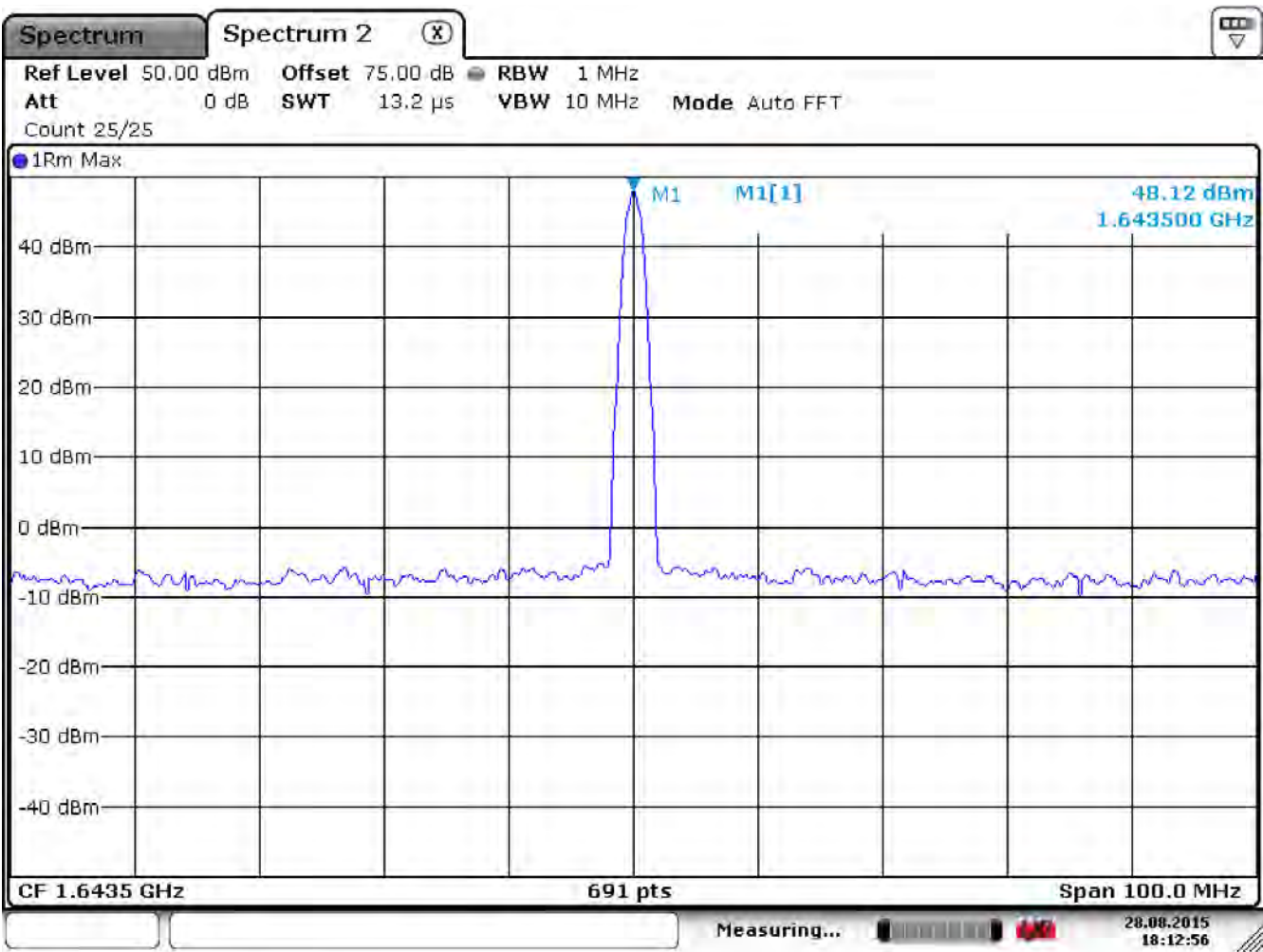
Maximum EIRP Level @1626.5MHz



Date: 28.AUG.2015 18:09:43

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1626.5MHz	68.71	48.37	2000	Pass

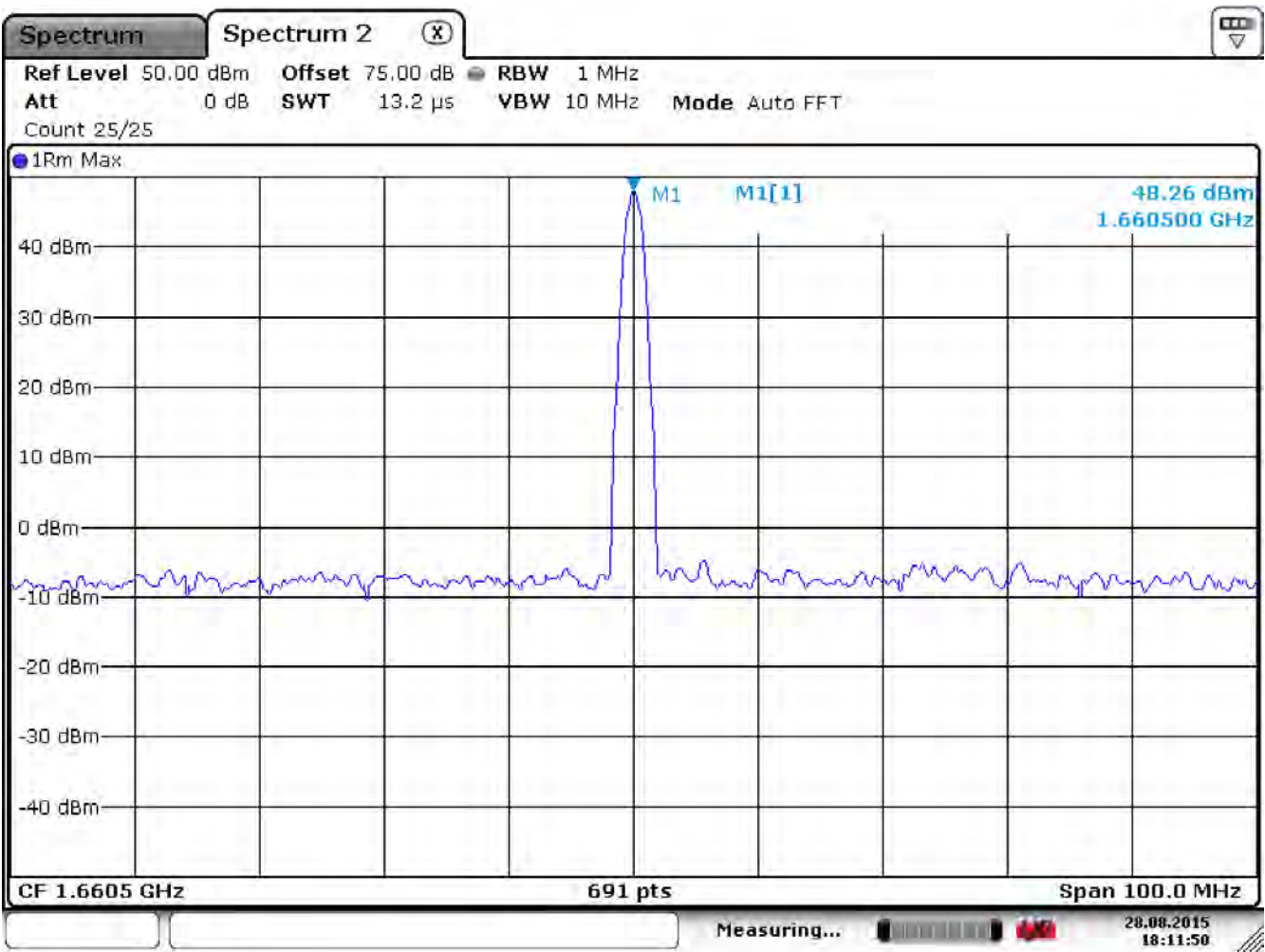
Maximum EIRP Level @1643.5MHz



Date: 28.AUG.2015 18:12:57

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1643.5MHz	64.86	48.12	2000	Pass

Maximum EIRP Level @1660.5MHz



Date: 28.AUG.2015 18:11:51

Tuned Frequency	Power (W)	Power (dBm)	Limit (W)	Result
1660.5MHz	66.99	48.26	2000	Pass

BPSK 1626.5MHz Radiated Spurious Emissions



Illustration 13: Spectrum @ fundamental frequency.

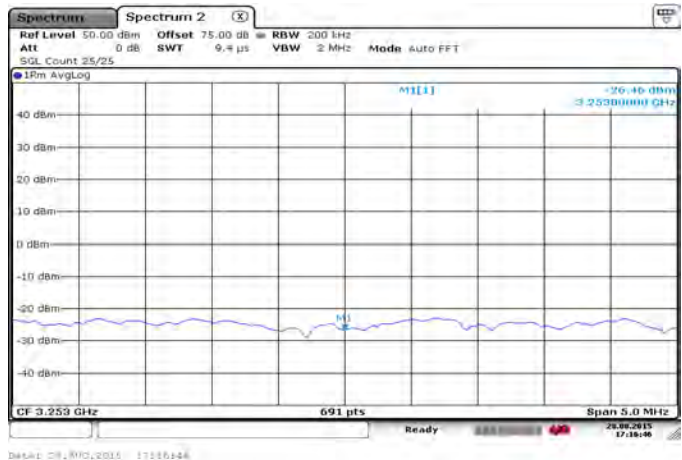


Illustration 12: Spectrum @ 2nd harmonic frequency

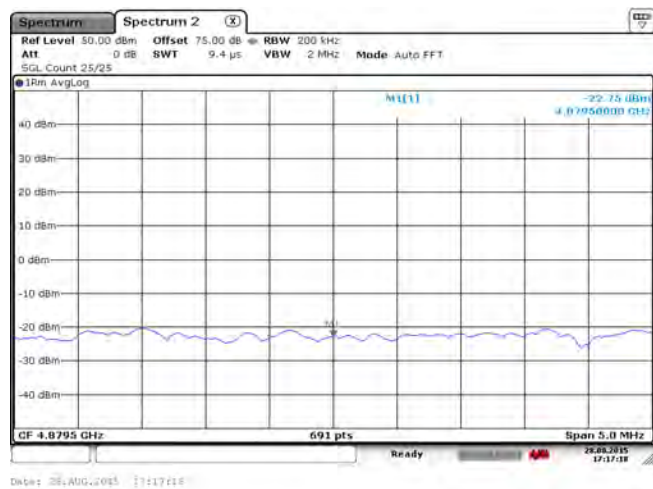


Illustration 15: Spectrum @ 3rd harmonic frequency.

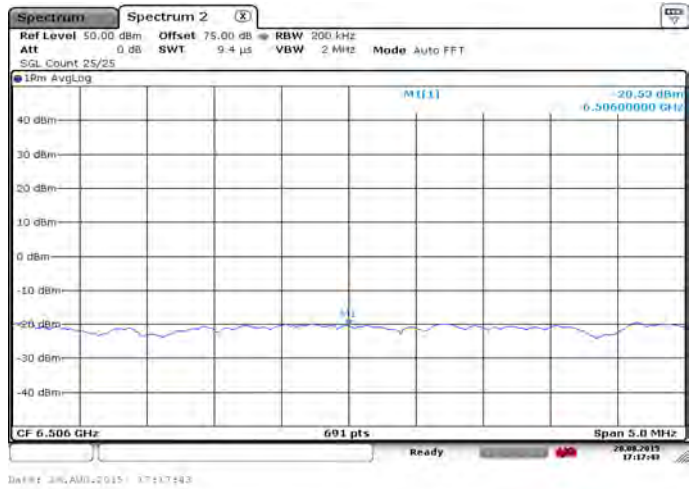


Illustration 14: Spectrum @ 4th harmonic frequency.

Frequency (MHz)	Measured Level (dBm)	Mask Limit (dBm)	Result
3253.0	-26.46	-13	Pass
4879.5	-22.75	-13	Pass
6506.0	-20.53	-13	Pass

BPSK 1643.5MHz Radiated Spurious Emissions

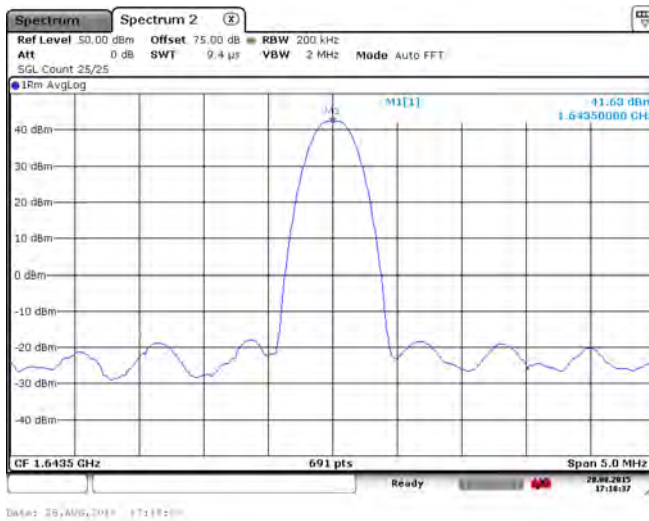


Illustration 17: Spectrum @ fundamental frequency.

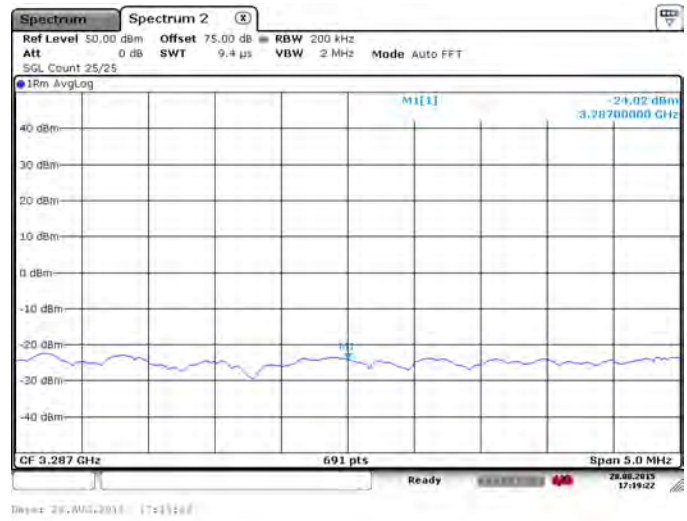


Illustration 16: Spectrum @ 2nd harmonic frequency

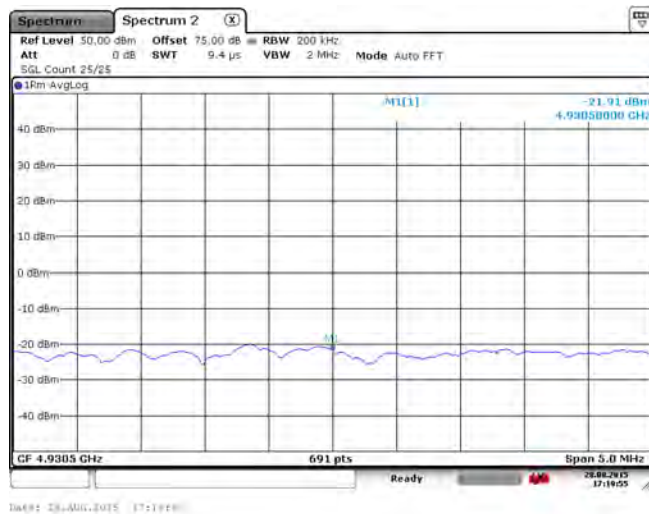


Illustration 19: Spectrum @ 3rd harmonic frequency.

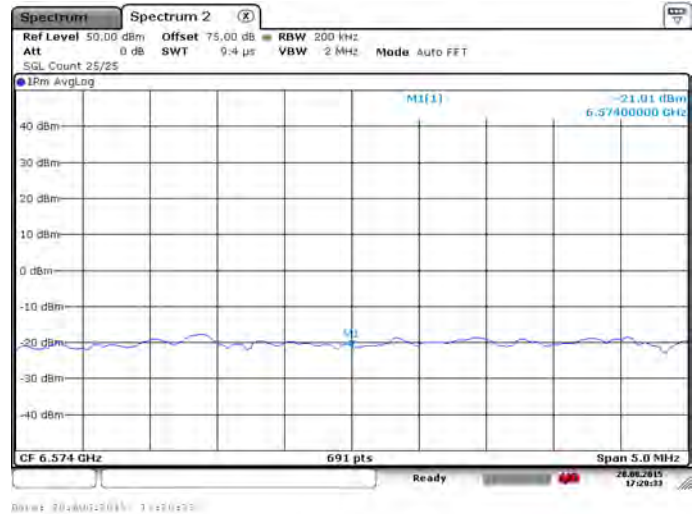


Illustration 18: Spectrum @ 4th harmonic frequency.

Frequency (MHz)	Measured Level (dBm)	Mask Limit (dBm)	Result
3287.0	-24.02	-13	Pass
4930.5	-21.91	-13	Pass
6574.0	-21.01	-13	Pass

BPSK 1660.5MHz Radiated Spurious Emissions

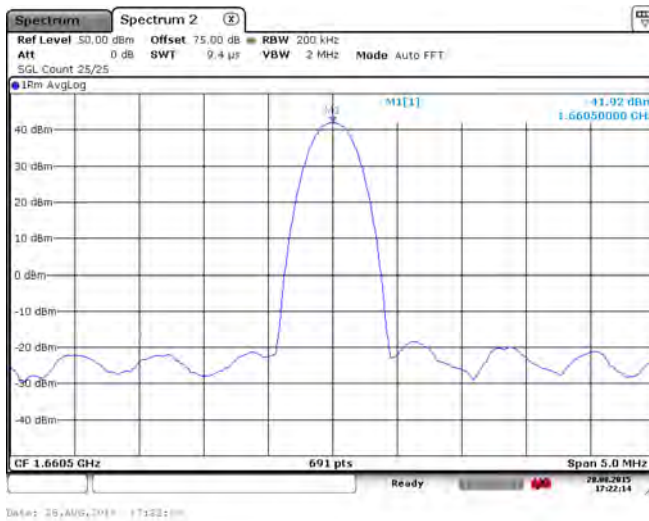


Illustration 21: Spectrum @ fundamental frequency.

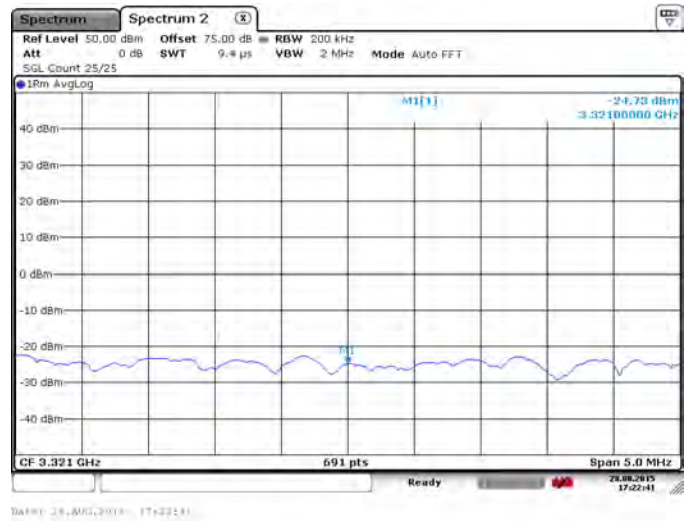


Illustration 20: Spectrum @ 2nd harmonic frequency

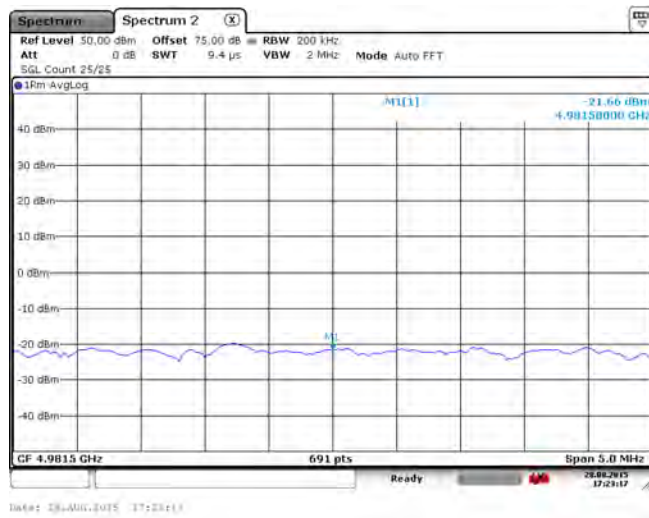


Illustration 23: Spectrum @ 3rd harmonic frequency.

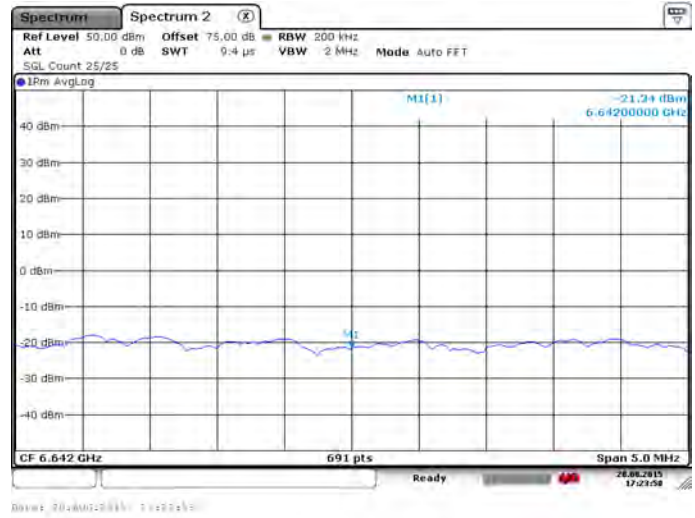


Illustration 22: Spectrum @ 4th harmonic frequency.

Frequency (MHz)	Measured Level (dBm)	Mask Limit (dBm)	Result
3321.0	-24.73	-13	Pass
4981.5	-21.66	-13	Pass
6642.0	-21.34	-13	Pass

QPSK 1626.5MHz Radiated Spurious Emissions

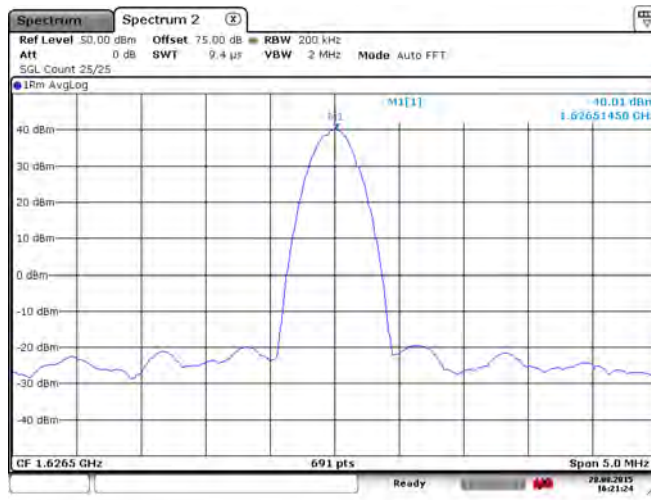


Illustration 25: Spectrum @ fundamental frequency.

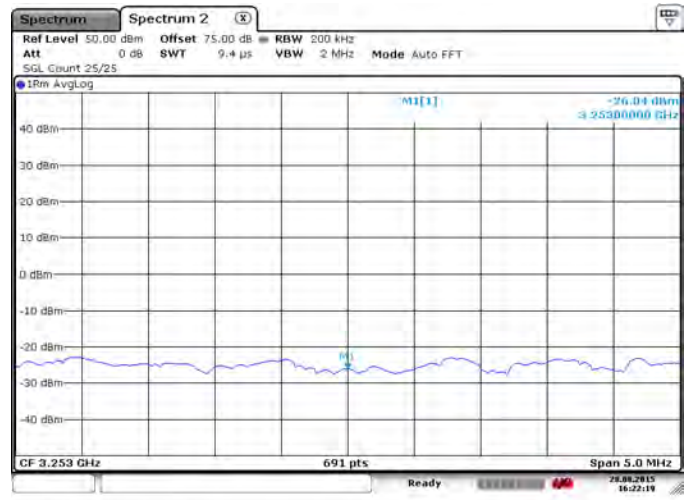


Illustration 24: Spectrum @ 2nd harmonic frequency

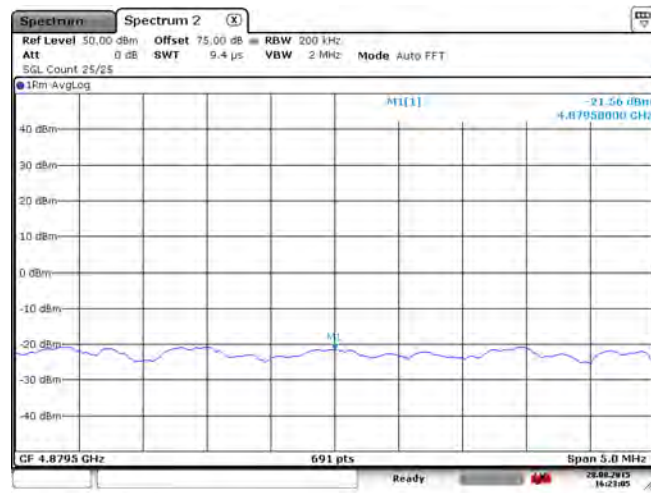


Illustration 27: Spectrum @ 3rd harmonic frequency.

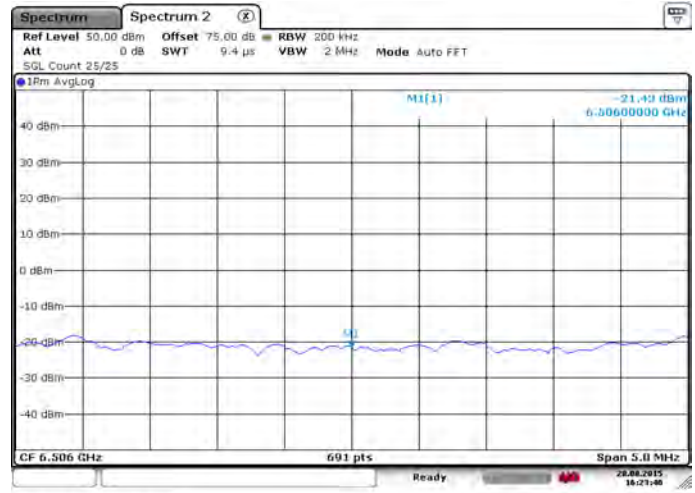


Illustration 26: Spectrum @ 4th harmonic frequency.

Frequency (MHz)	Measured Level (dBm)	Mask Limit (dBm)	Result
3253.0	-26.04	-13	Pass
4879.5	-21.56	-13	Pass
6506.0	-21.43	-13	Pass

QPSK 1643.5MHz Radiated Spurious Emissions

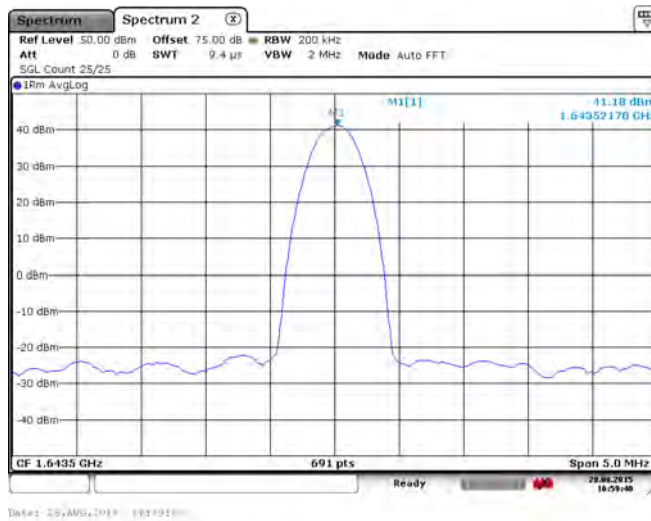


Illustration 29: Spectrum @ fundamental frequency.

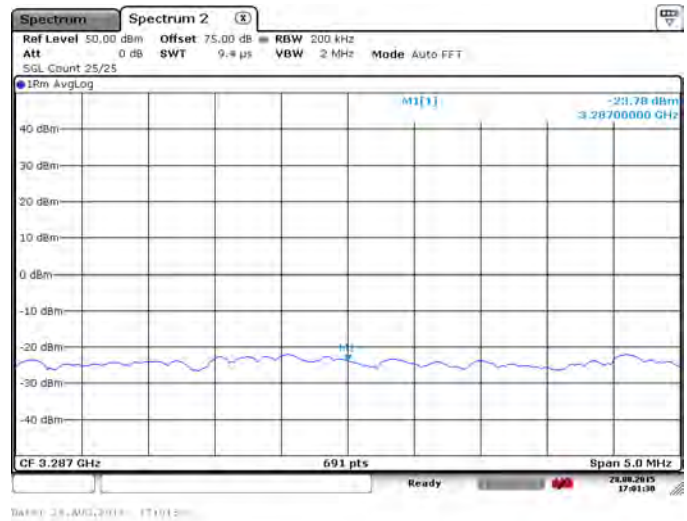


Illustration 28: Spectrum @ 2nd harmonic frequency

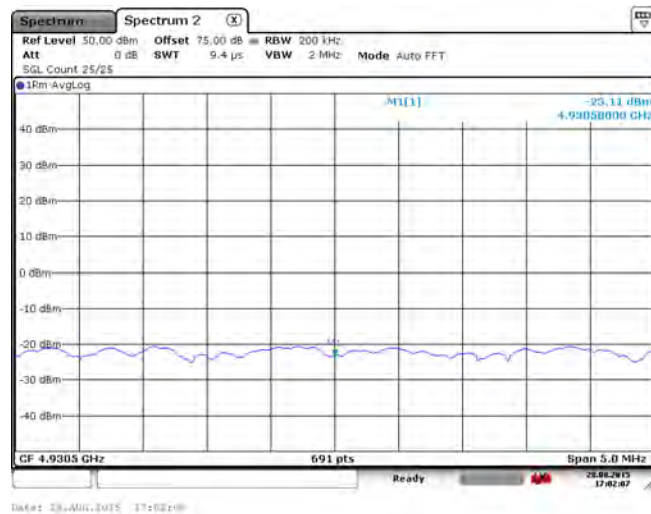


Illustration 31: Spectrum @ 3rd harmonic frequency.

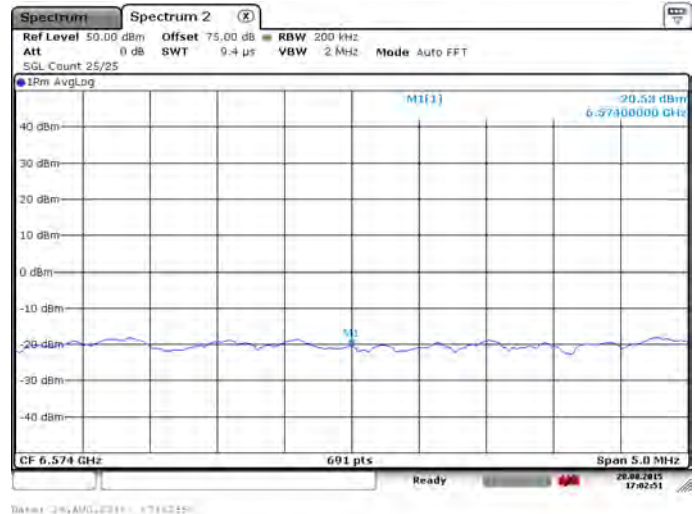


Illustration 30: Spectrum @ 4th harmonic frequency.

Frequency (MHz)	Measured Level (dBm)	Mask Limit (dBm)	Result
3287.0	-23.78	-13	Pass
4930.5	-23.11	-13	Pass
6574.0	-20.53	-13	Pass

QPSK 1660.5MHz Radiated Spurious Emissions

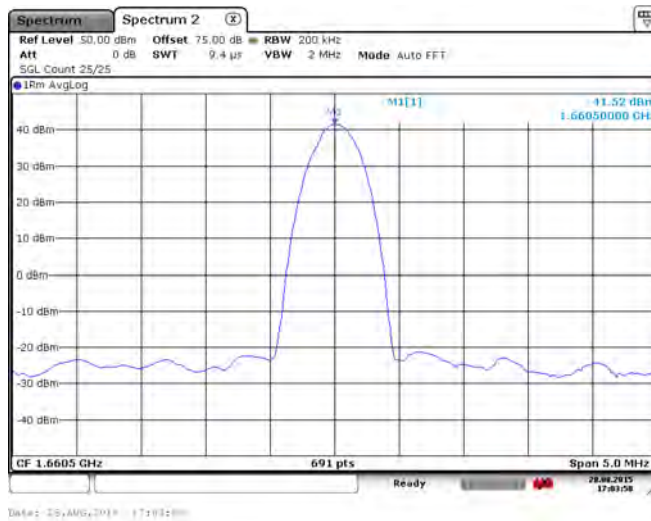


Illustration 33: Spectrum @ fundamental frequency.



Illustration 32: Spectrum @ 2nd harmonic frequency

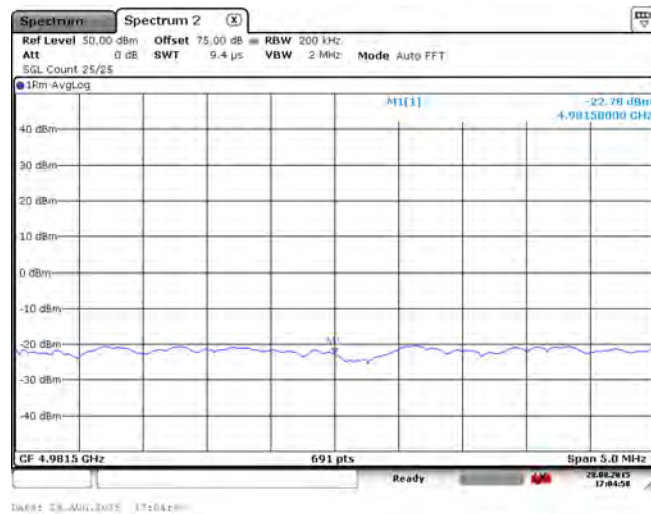


Illustration 35: Spectrum @ 3rd harmonic frequency.

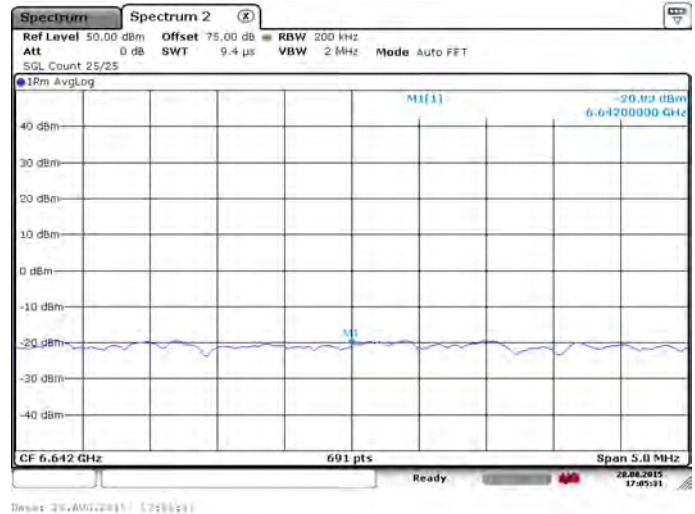


Illustration 34: Spectrum @ 4th harmonic frequency.

Frequency (MHz)	Measured Level (dBm)	Mask Limit (dBm)	Result
3321.0	-24.81	-13	Pass
4981.5	-22.78	-13	Pass
6642.0	-20.83	-13	Pass

QAM 1626.5MHz Radiated Spurious Emissions

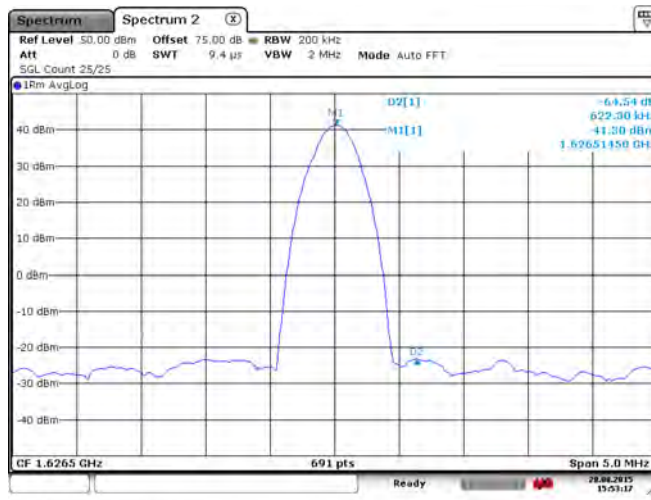


Illustration 37: Spectrum @ fundamental frequency.

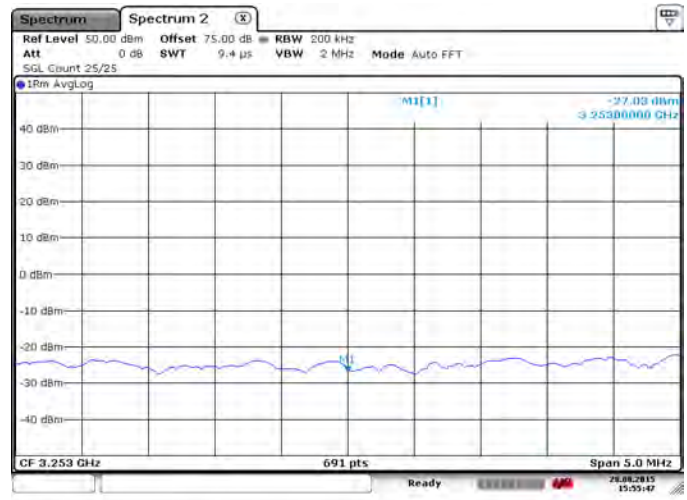


Illustration 36: Spectrum @ 2nd harmonic frequency

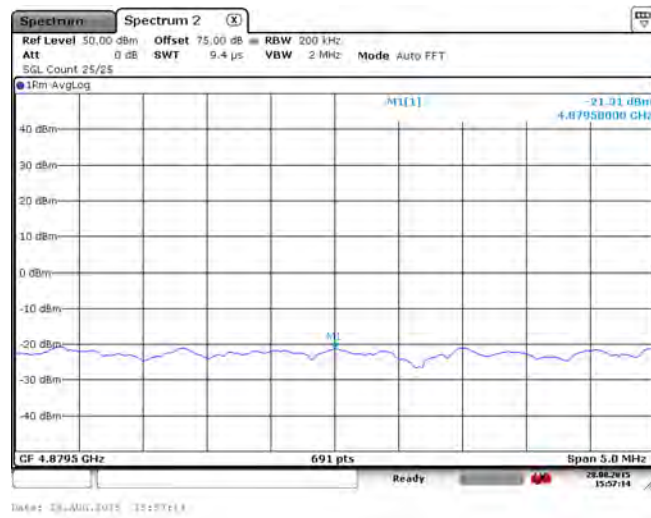


Illustration 39: Spectrum @ 3rd harmonic frequency.

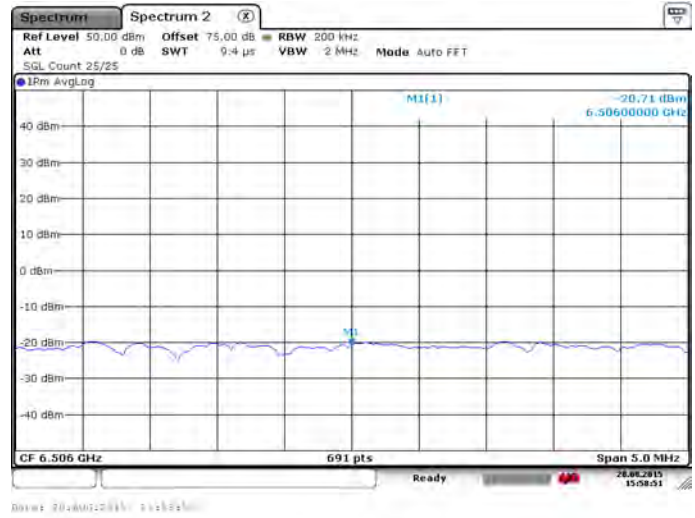


Illustration 38: Spectrum @ 4th harmonic frequency.

Frequency (MHz)	Measured Level (dBm)	Mask Limit (dBm)	Result
3253.0	-27.03	-13	Pass
4879.5	-21.31	-13	Pass
6506.0	-20.71	-13	Pass

QAM 1643.5MHz Radiated Spurious Emissions

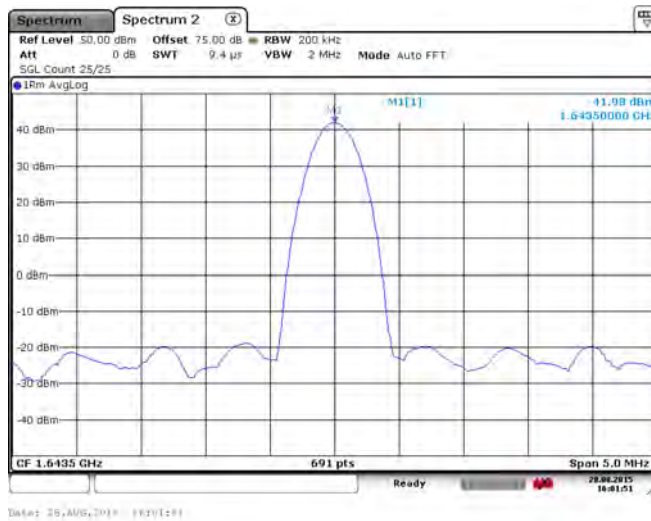


Illustration 41: Spectrum @ fundamental frequency.

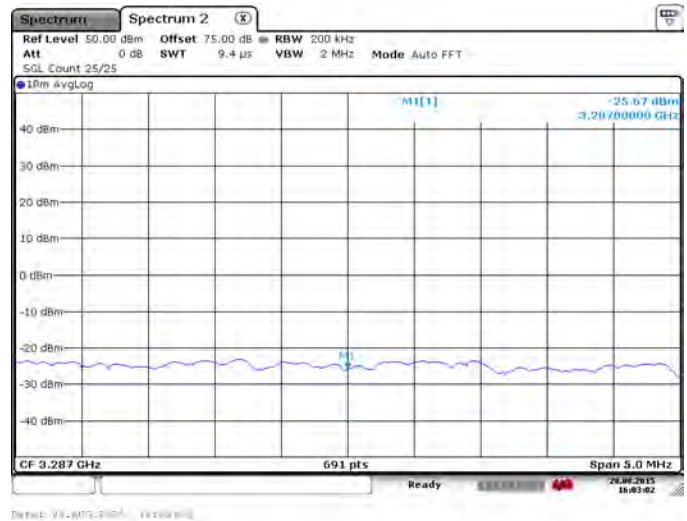


Illustration 40: Spectrum @ 2nd harmonic frequency

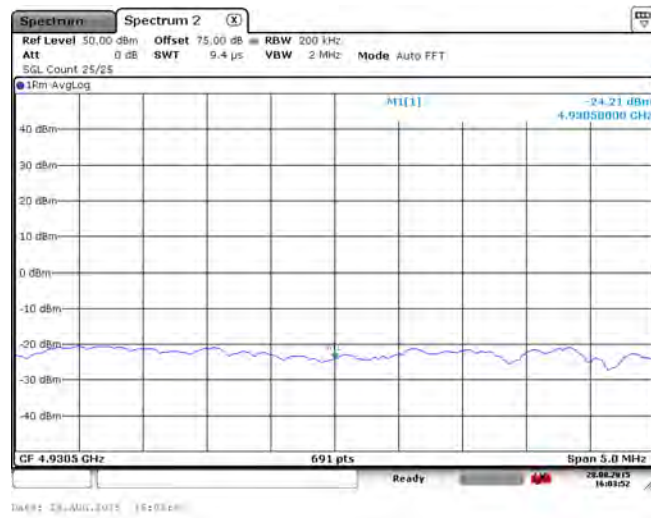


Illustration 43: Spectrum @ 3rd harmonic frequency.

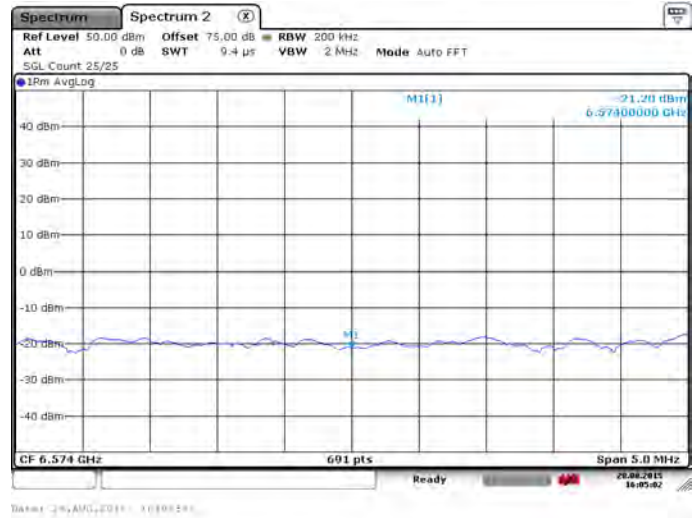


Illustration 42: Spectrum @ 4th harmonic frequency.

Frequency (MHz)	Measured Level (dBm)	Mask Limit (dBm)	Result
3287.0	-25.67	-13	Pass
4930.5	-24.21	-13	Pass
6574.0	-21.20	-13	Pass

QAM 1660.5MHz Radiated Spurious Emissions

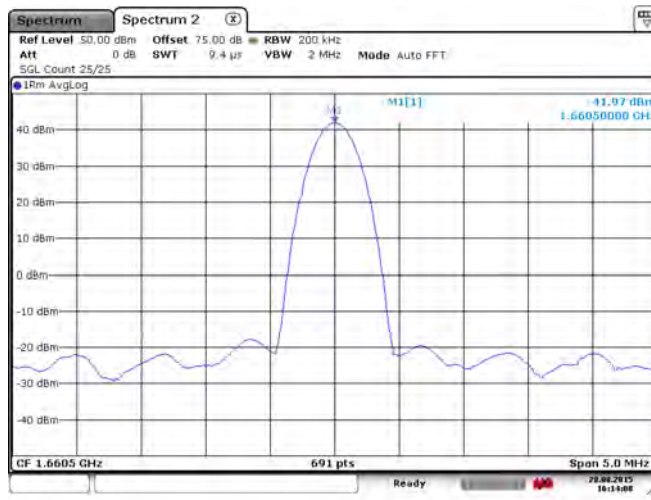


Illustration 45: Spectrum @ fundamental frequency.

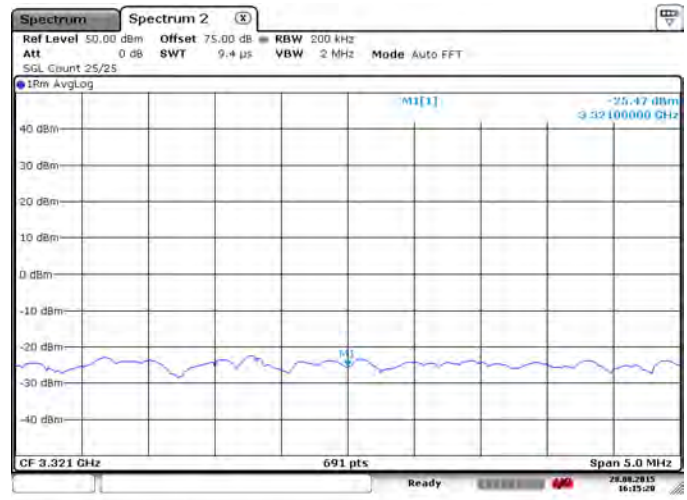


Illustration 44: Spectrum @ 2nd harmonic frequency

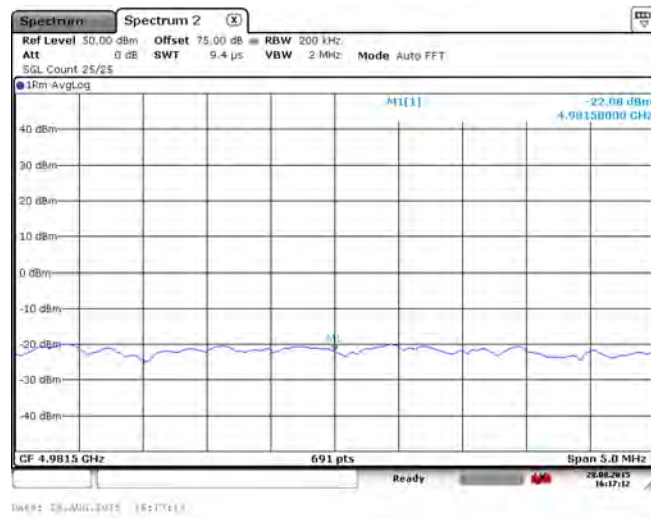


Illustration 47: Spectrum @ 3rd harmonic frequency.

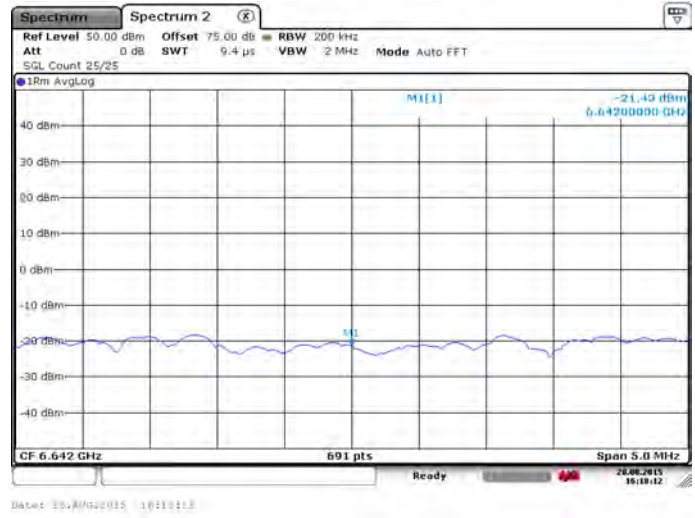


Illustration 46: Spectrum @ 4th harmonic frequency.

Frequency (MHz)	Measured Level (dBm)	Mask Limit (dBm)	Result
3321.0	-25.47	-13	Pass
4981.5	-22.08	-13	Pass
6642.0	-21.43	-13	Pass

No other emissions were detected.

Occupied Bandwidth

Test specification: 2.1049, 87.139(i)(3)

Test Procedure

The EUT (BT1595-13 with AT1595-13) were connected inside the anechoic chamber as illustrated bellow:

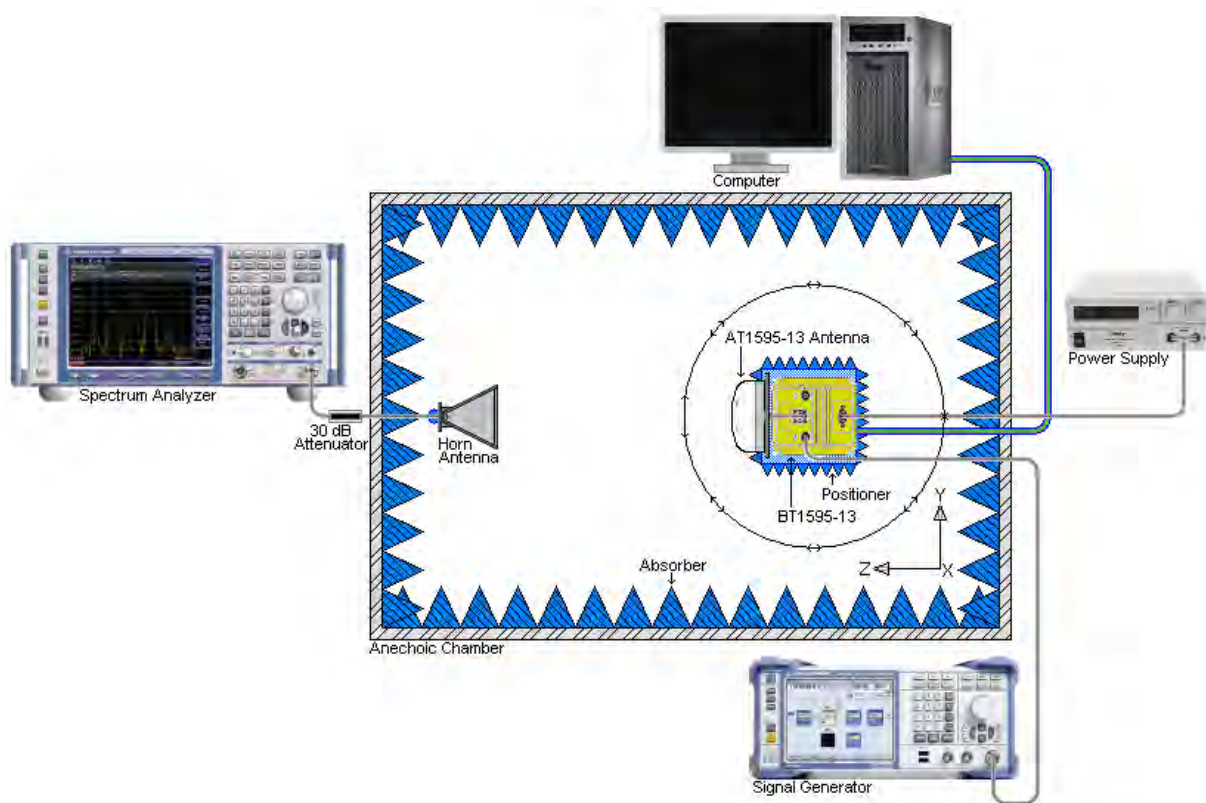


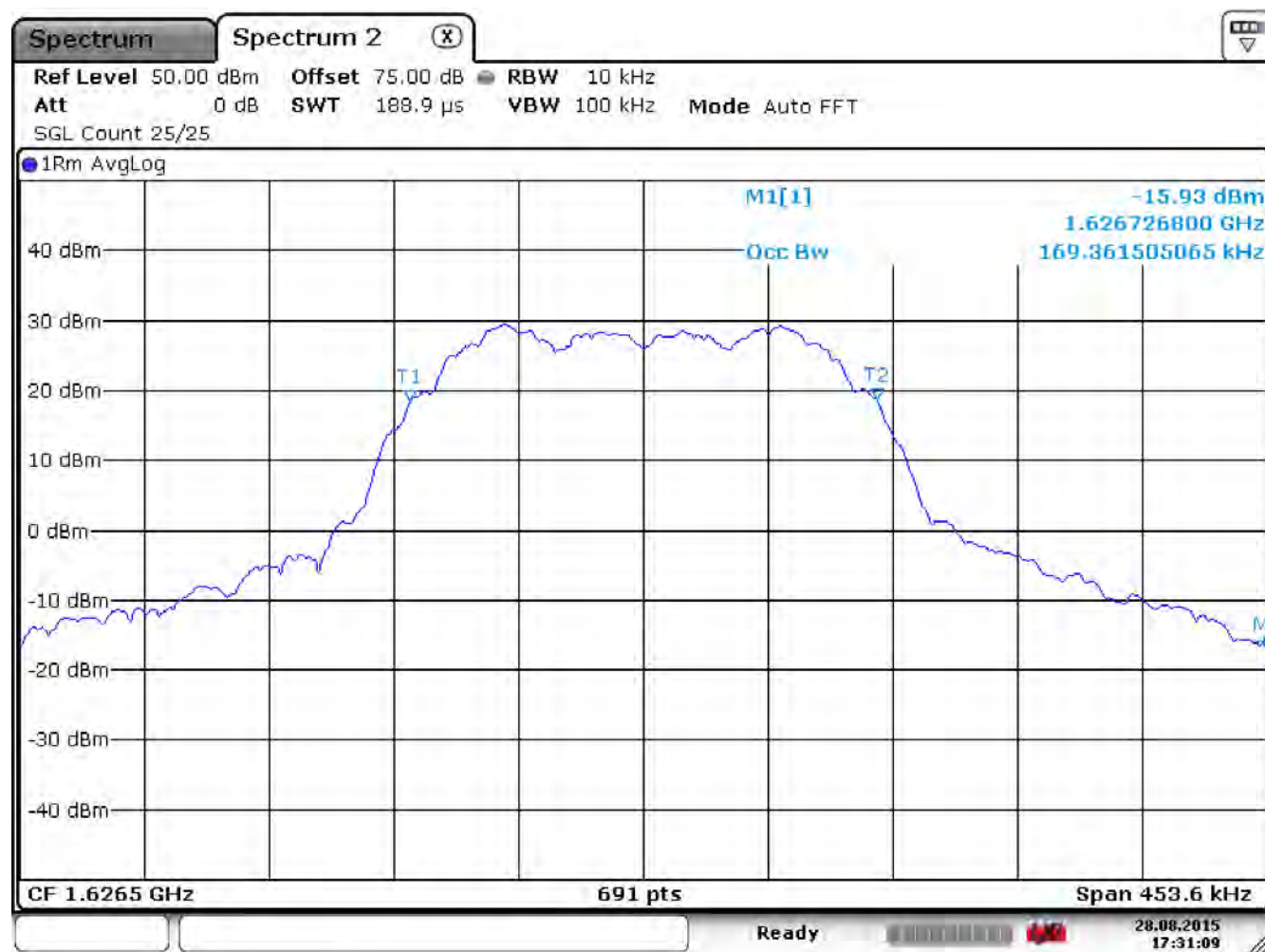
Illustration 48: Radiated Emissions Test setup diagram.

The receiving (probe) Standard Gain Horn antenna was placed 2.77 meters away from the EUT, which was attached to a spherical positioner system.

The probe antenna position can be adjusted along its polarization axis.

The EUT itself does not specify the TX channel bandwidth. Therefore the EUT was tested to show that there is no significant occupied bandwidth widening due to any EUT non-linearities instead.

BPSK 151.2ksps @ 1626.5MHz Occupied Bandwidth

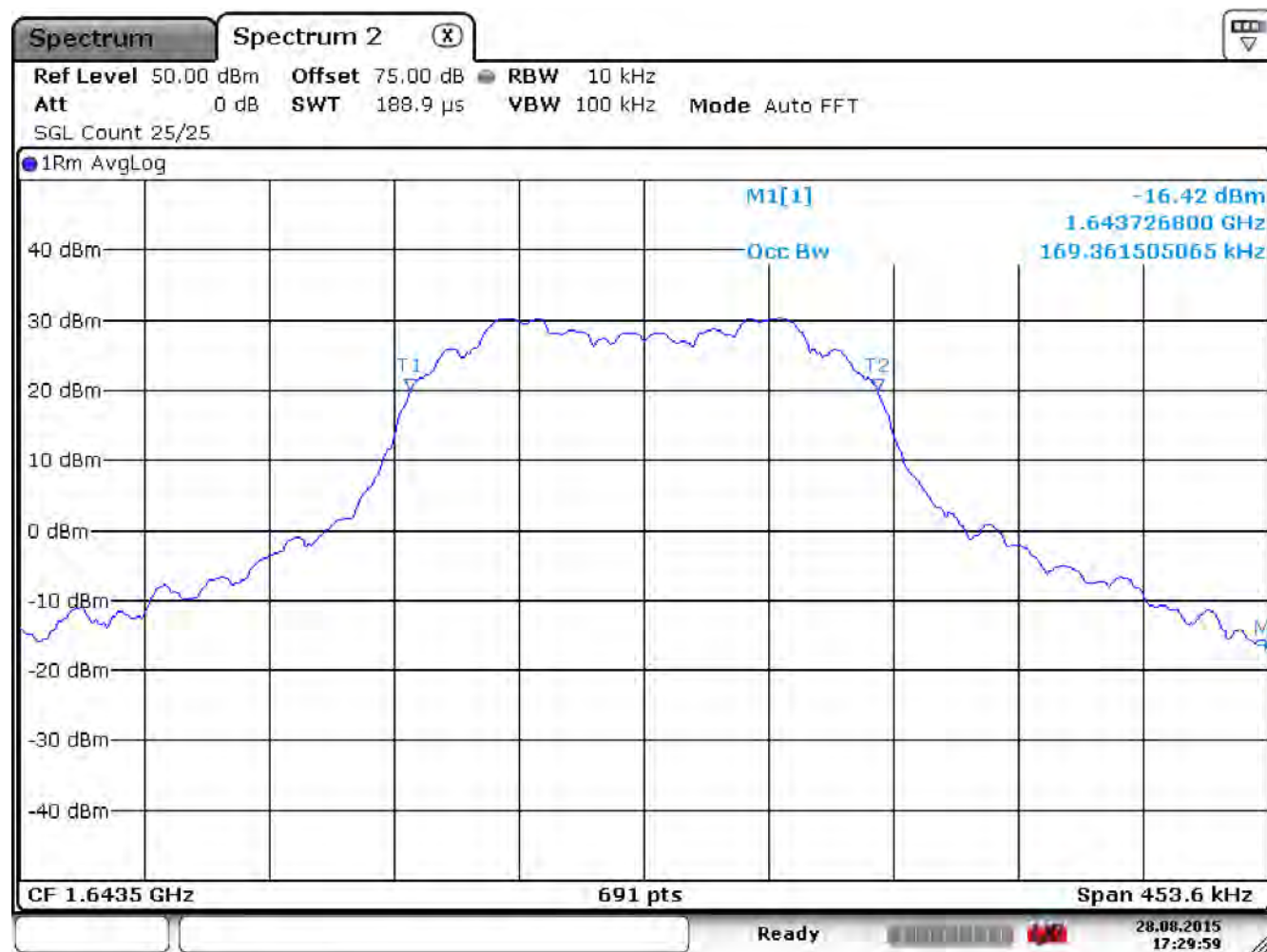


Date: 28.AUG.2015 17:31:08

Illustration 49: Occupied Bandwidth.

Frequency (MHz)	Occupied Bandwidth (kHz)
1626.5	169.36

BPSK 151.2ksps @ 1643.5MHz Occupied Bandwidth

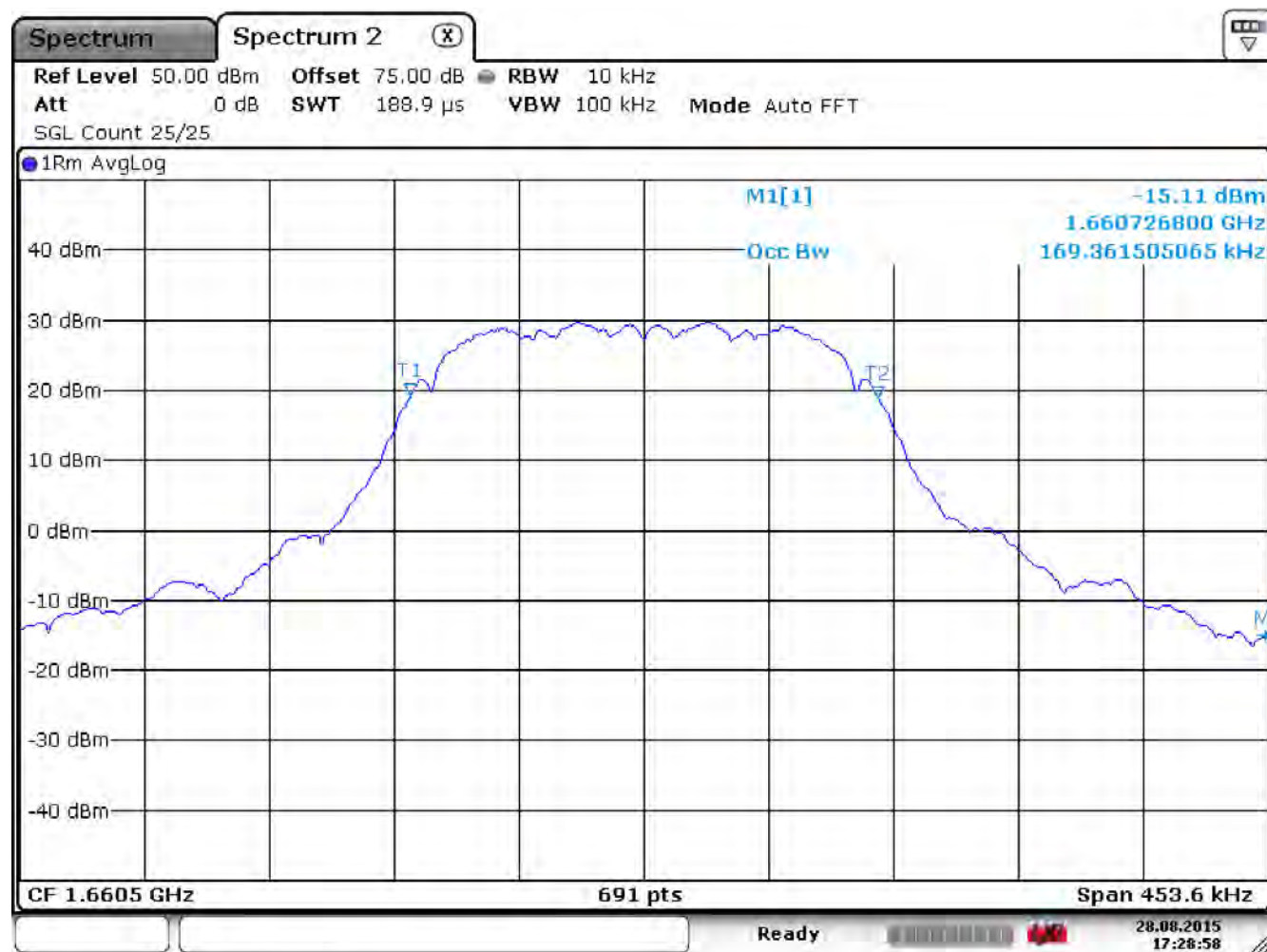


Date: 28.AUG.2015 17:29:59

Illustration 50: Occupied Bandwidth.

Frequency (MHz)	Occupied Bandwidth (kHz)
1643.5	169.36

BPSK 151.2ksps @ 1660.5MHz Occupied Bandwidth

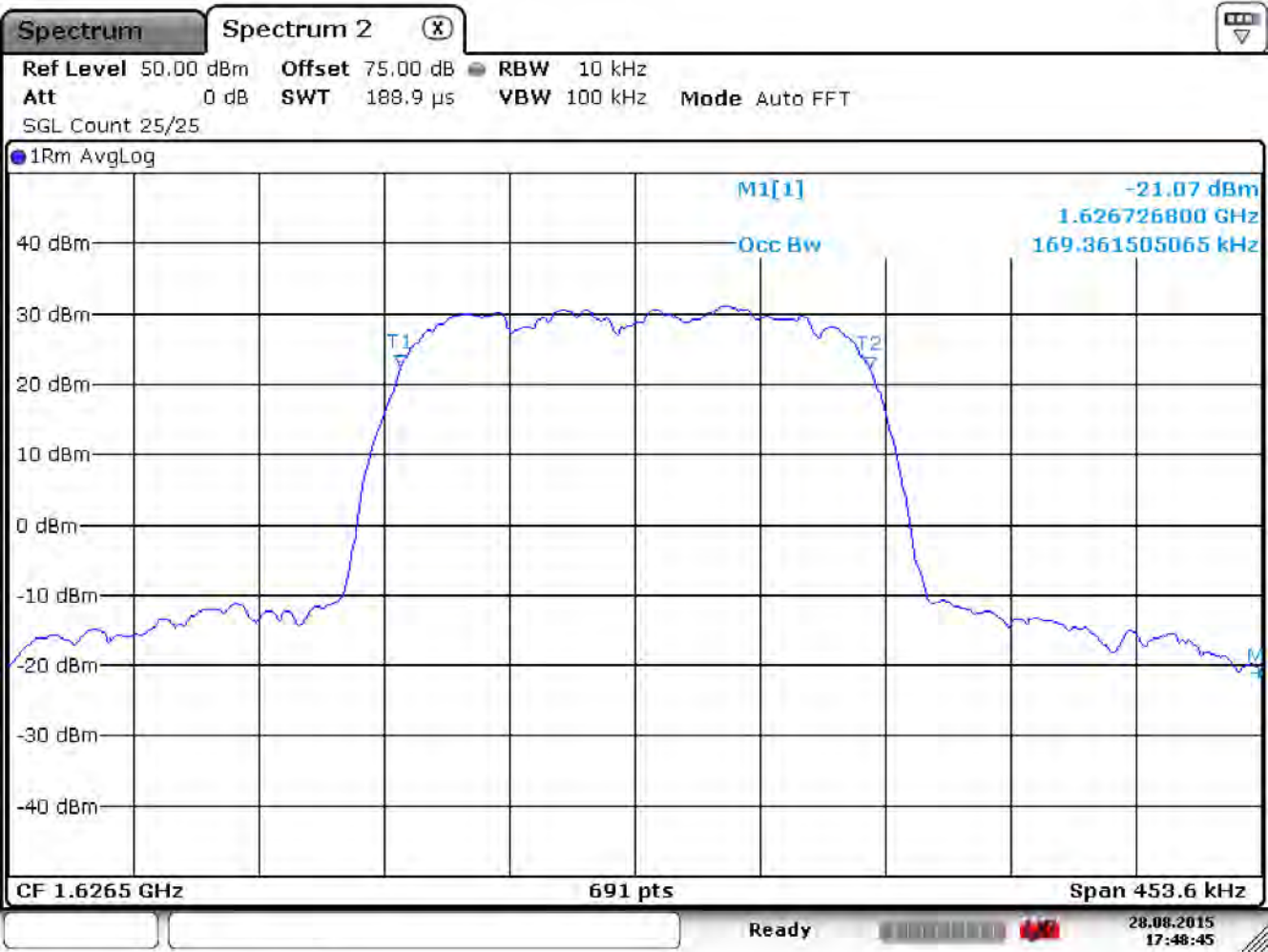


Date: 28.AUG.2015 17:28:58

Illustration 51: Occupied Bandwidth.

Frequency (MHz)	Occupied Bandwidth (kHz)
1660.5	169.36

QPSK 151.2ksps @ 1626.5MHz Occupied Bandwidth

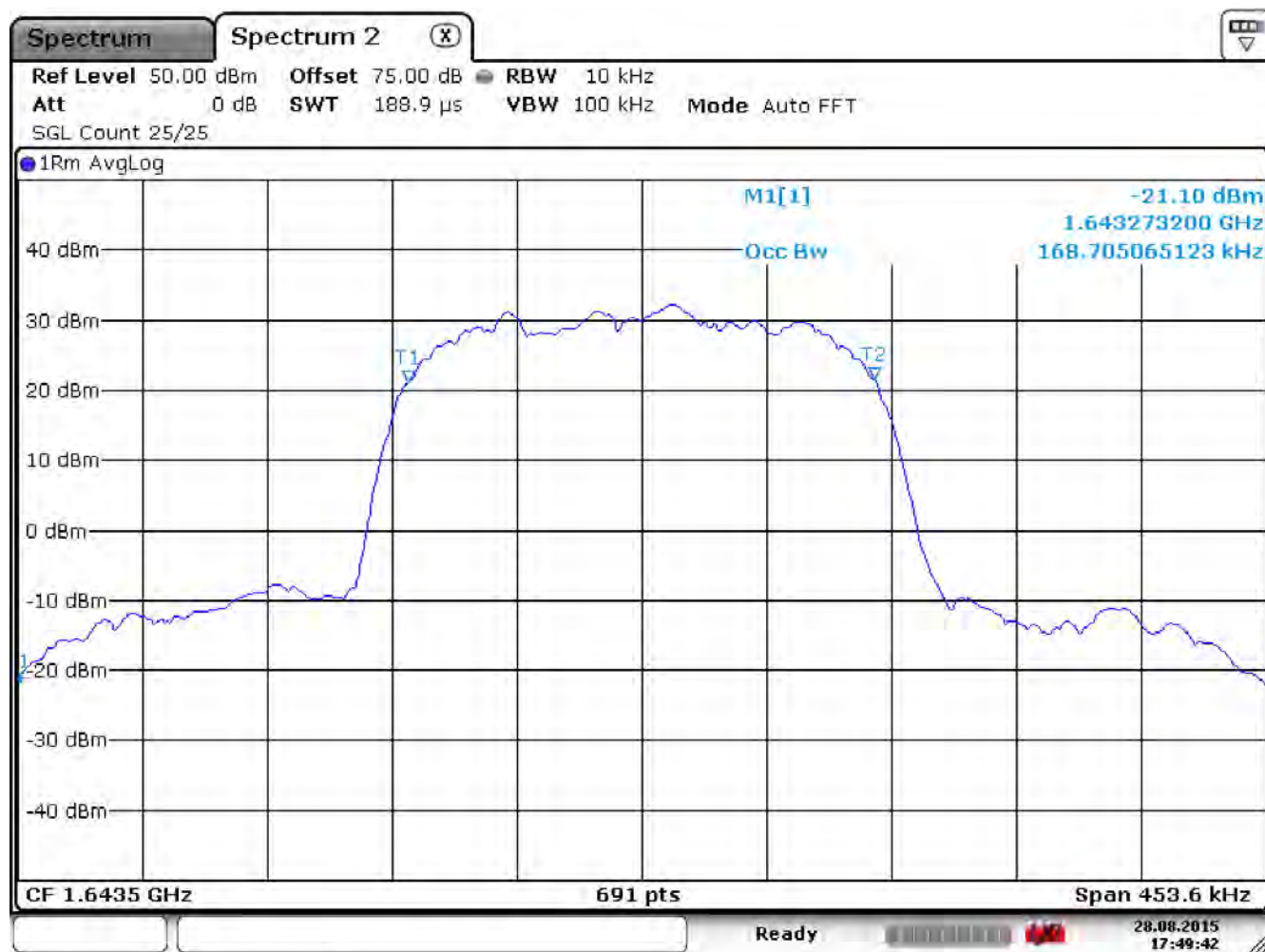


Date: 28.AUG.2015 17:48:45

Illustration 52: Occupied Bandwidth.

Frequency (MHz)	Occupied Bandwidth (kHz)
1626.5	169.36

QPSK 151.2ksps @ 1643.5MHz Occupied Bandwidth



Date: 28.AUG.2015 17:49:42

Illustration 53: Occupied Bandwidth.

Frequency (MHz)	Occupied Bandwidth (kHz)
1643.5	168.71

QPSK 151.2ksps @ 1660.5MHz Occupied Bandwidth

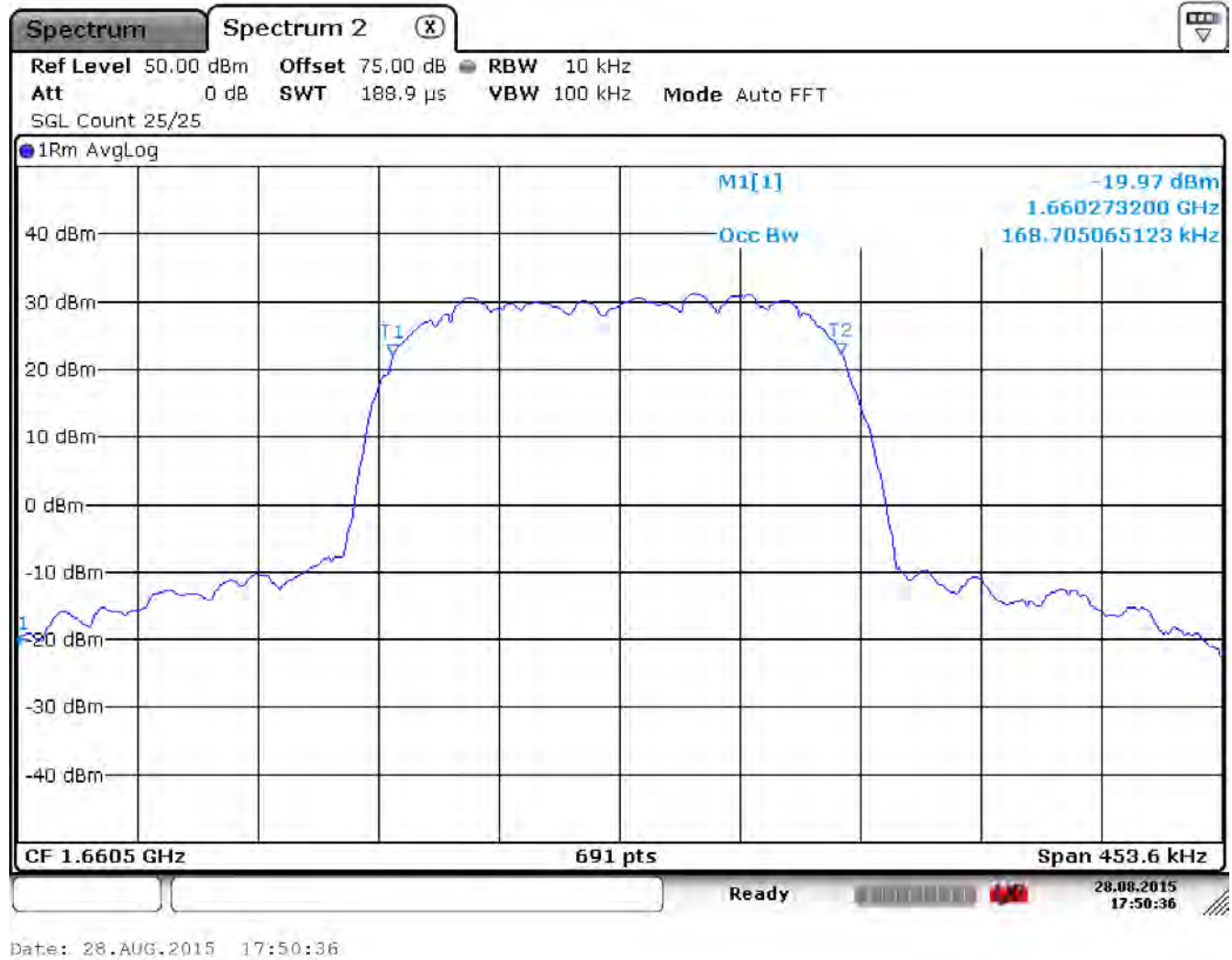
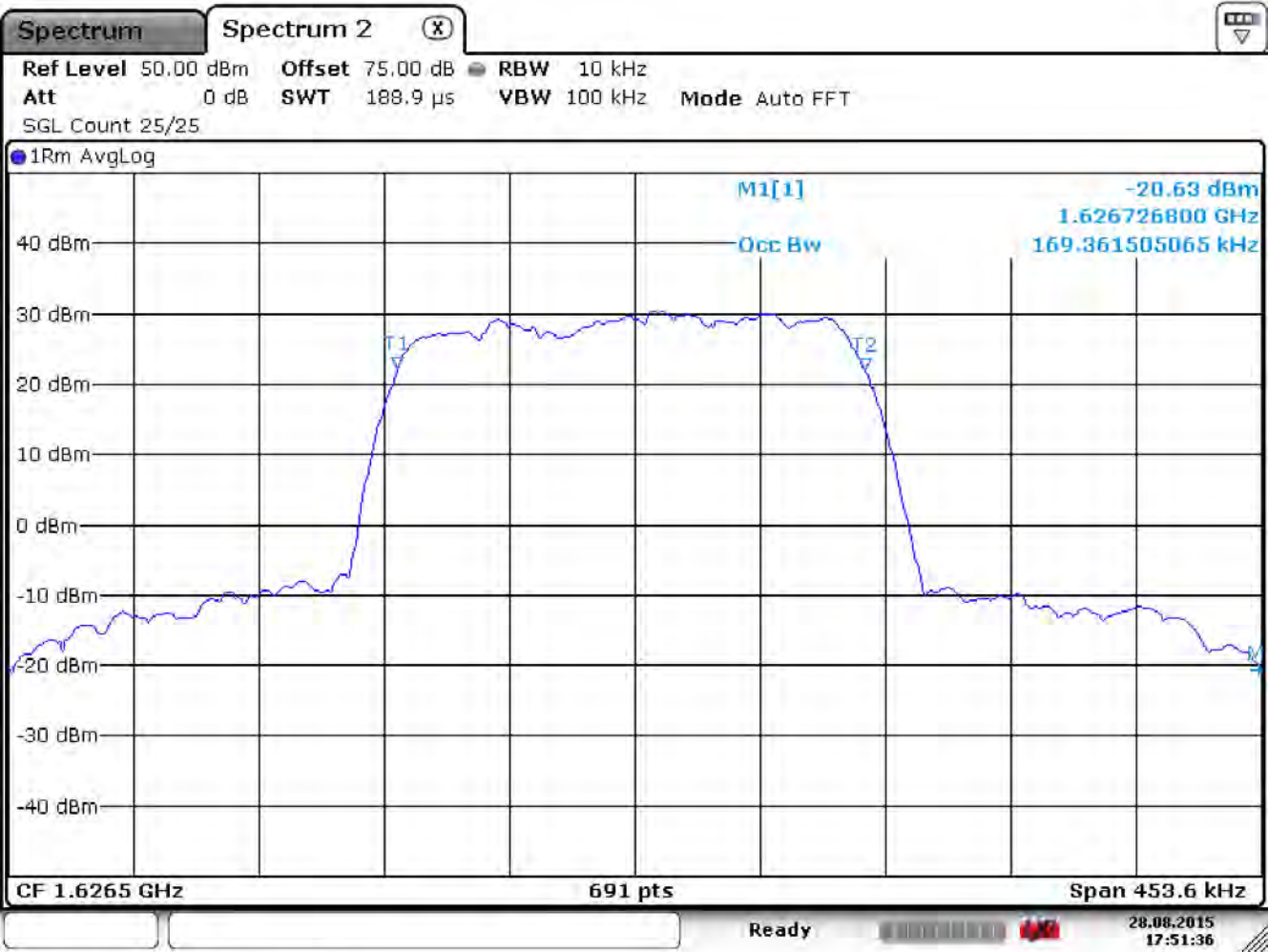


Illustration 54: Occupied Bandwidth.

Frequency (MHz)	Occupied Bandwidth (kHz)
1626.5	168.71

QAM 151.2ksps @ 1626.5MHz Occupied Bandwidth

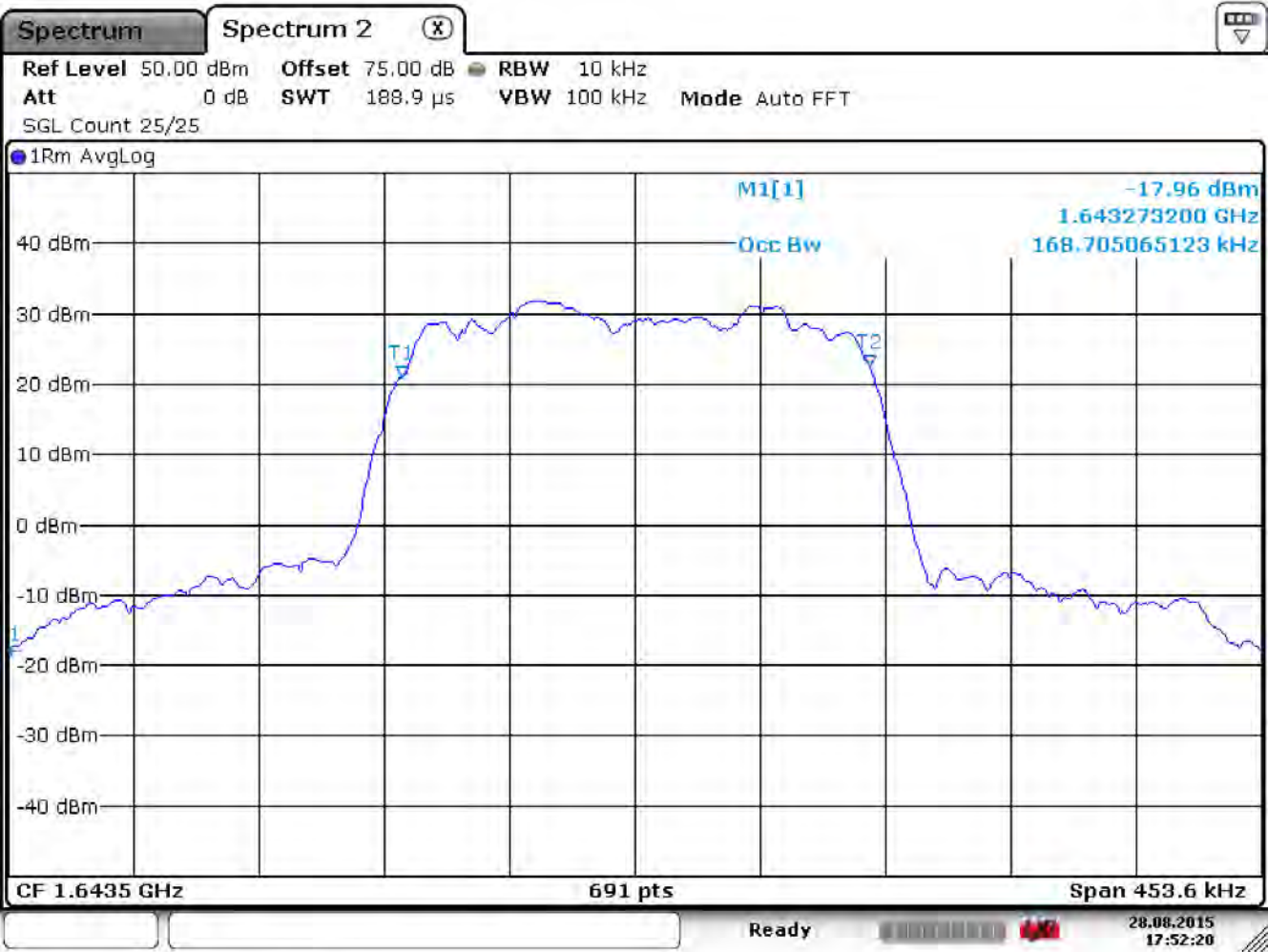


Date: 28.AUG.2015 17:51:36

Illustration 55: Occupied Bandwidth.

Frequency (MHz)	Occupied Bandwidth (kHz)
1626.5	169.36

QAM 151.2ksps @ 1643.5MHz Occupied Bandwidth

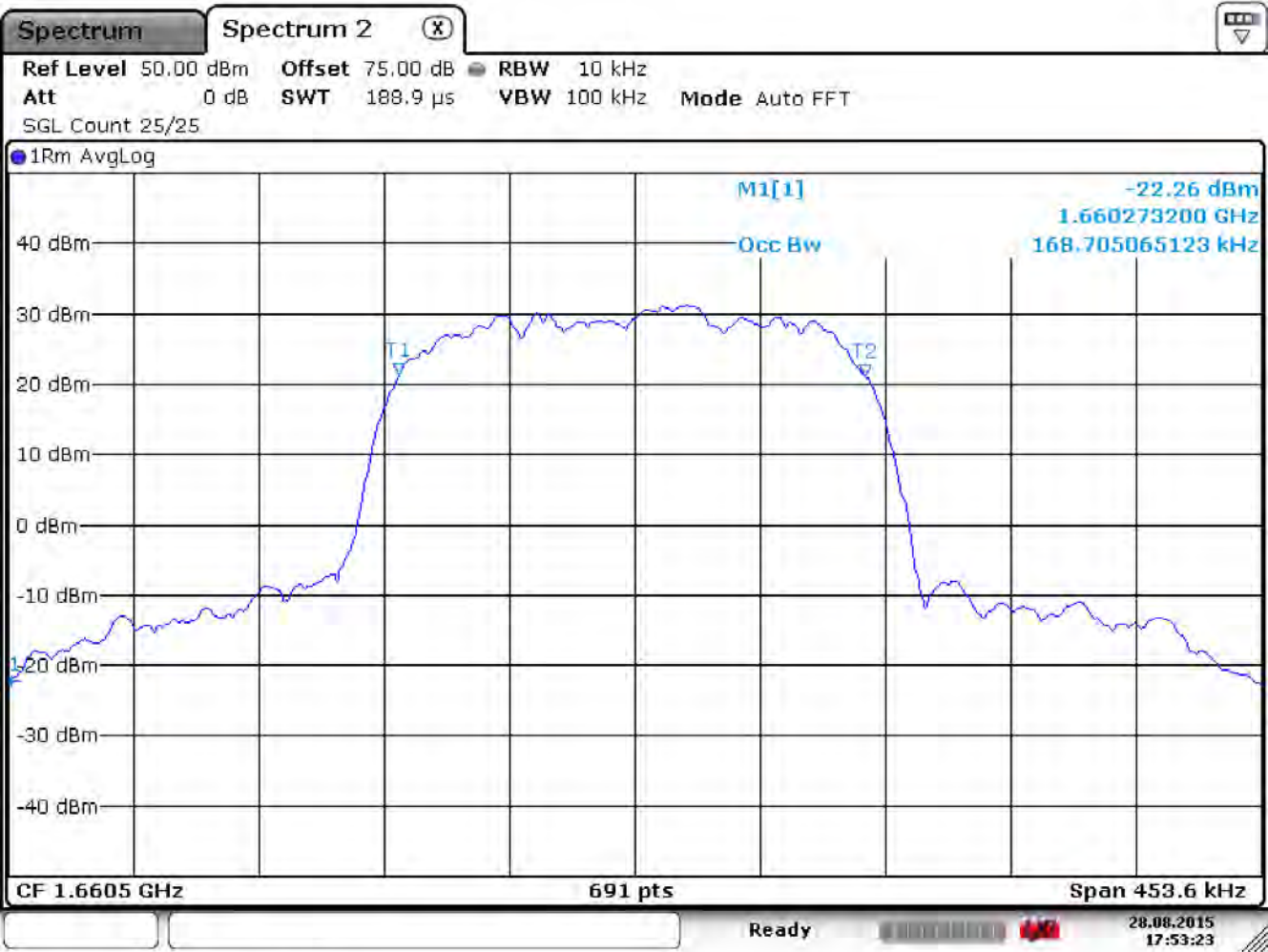


Date: 28.AUG.2015 17:52:19

Illustration 56: Occupied Bandwidth.

Frequency (MHz)	Occupied Bandwidth (kHz)
1643.5	168.71

QAM 151.2ksps @ 1660.5MHz Occupied Bandwidth



Date: 28.AUG.2015 17:53:22

Illustration 57: Occupied Bandwidth.

Frequency (MHz)	Occupied Bandwidth (kHz)
1660.5	168.71

Frequency Stability (Temperature and Voltage Variation)

Test specification: 87.133(a)

Test Procedure

EUT (BT1595-13 with AT1595-13) was placed inside shielded temperature chamber. The temperature was varied between -55 °C and +85 °C at a rate of 10 °C/min with at least 30 min of constant (soaking) temperature at the data collection points. The EUT itself does not generate carrier frequencies and does not modulate the TX signal. The spectrum was monitored to insure no detectable non-linearity increase due to temperature variation. The EUT features temperature gain stabilization control circuitry.

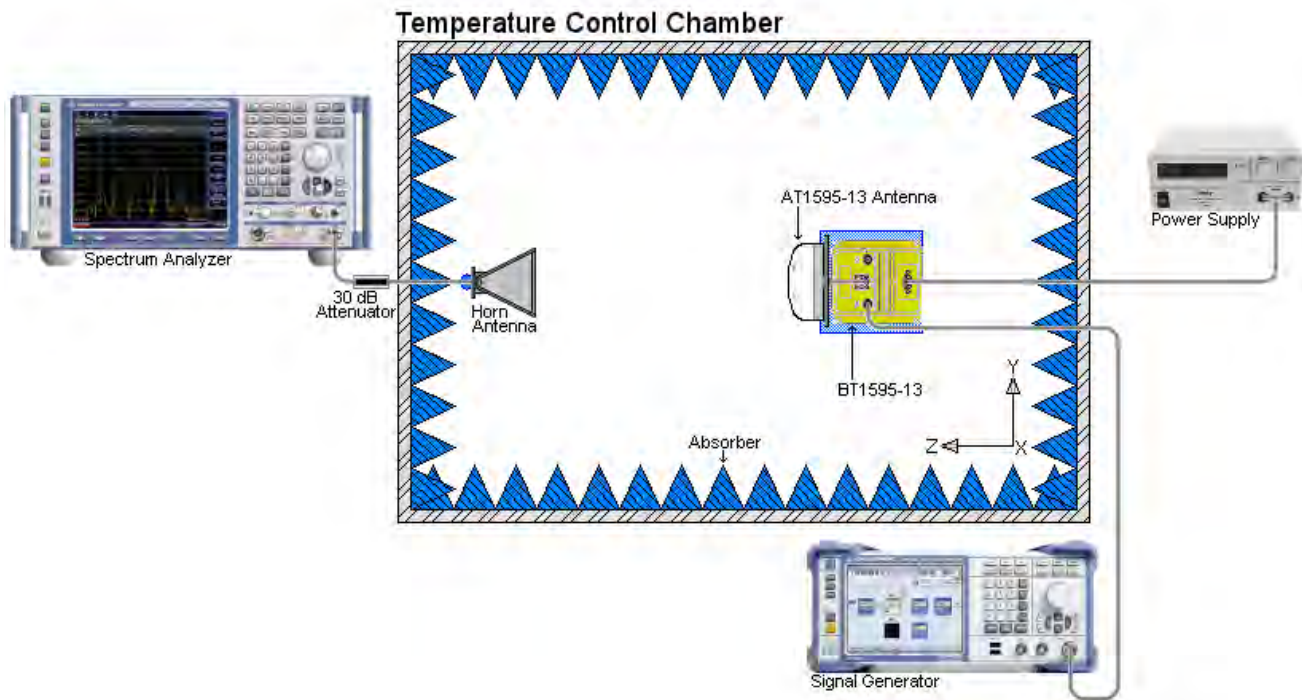


Illustration 58: Frequency vs. Temperature Test setup.

Spectrum Analyzer Span and RBW settings were adjusted to capture <10Hz (0.01ppm) frequency deviation.

The Signal Generator was set to output 1643.5MHz carrier signal at all temperatures and supply voltages.

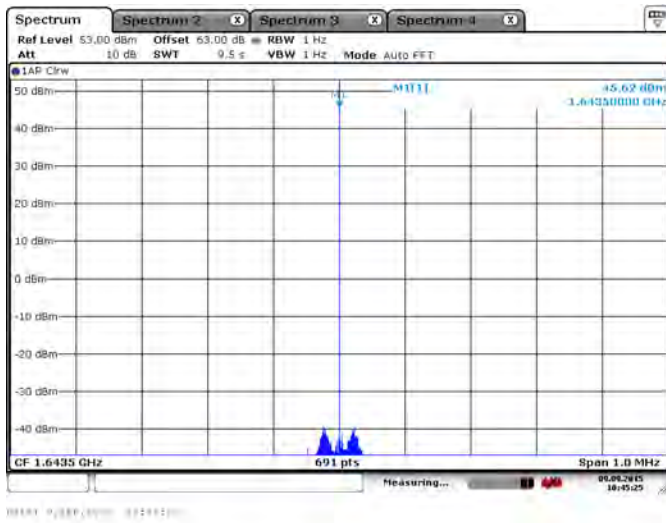


Illustration 59: Carrier frequency at -55 °C.

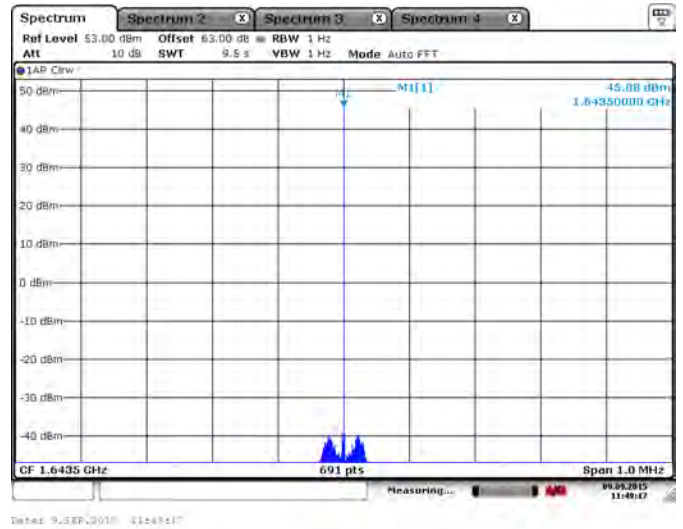


Illustration 60: Carrier frequency at 0 °C.

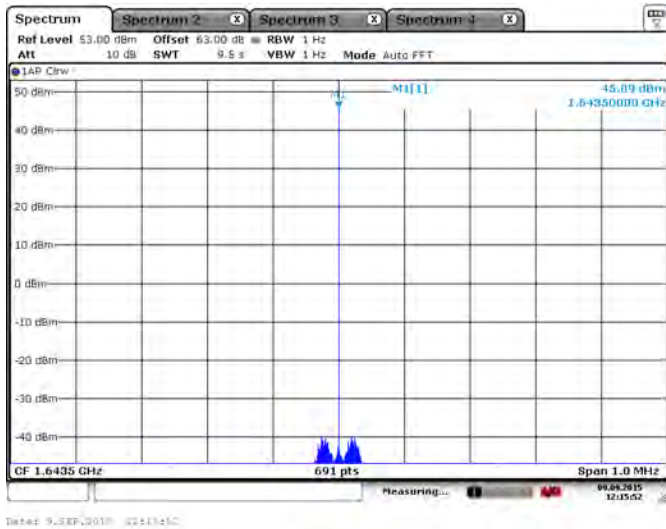


Illustration 62: Carrier frequency at 25 °C.

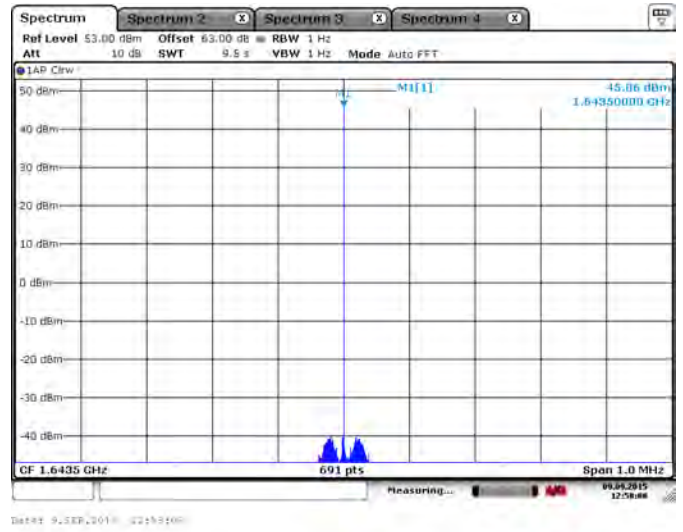


Illustration 61: Carrier frequency at 85 °C.

Temperature (°C)	Deviation (ppm)	Result
-55	<0.01	Pass
0	<0.01	Pass
25	<0.01	Pass
85	<0.01	Pass

The voltage variation was tested at room temperature (25 °C) with power supply varied from 16V to 40V. Spectrum Analyzer Span and RBW settings were adjusted to capture <10Hz (0.01ppm) frequency deviation. The Signal Generator was set to output 1643.5MHz carrier signal at all temperatures and supply voltages.

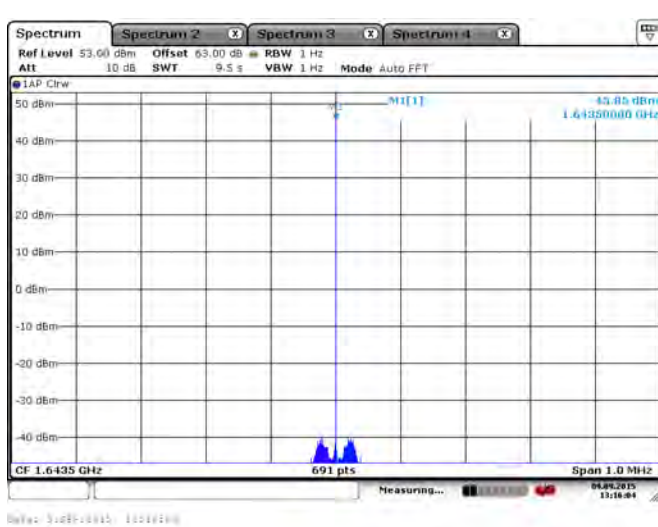


Illustration 63: Carrier frequency: 16V power supply.

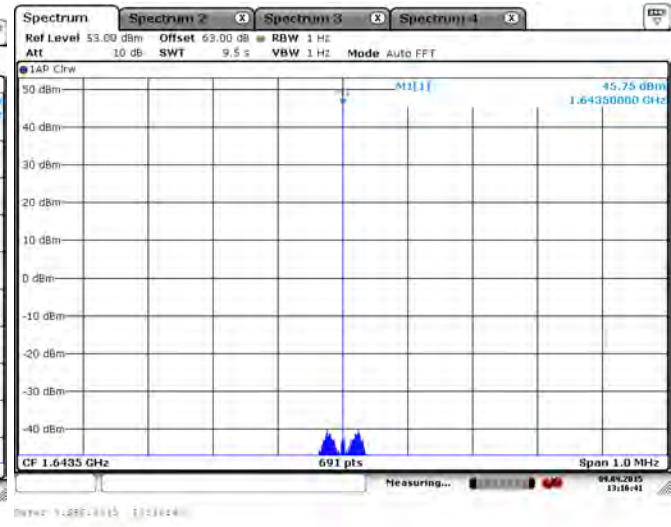


Illustration 64: Carrier frequency: 28V power supply.

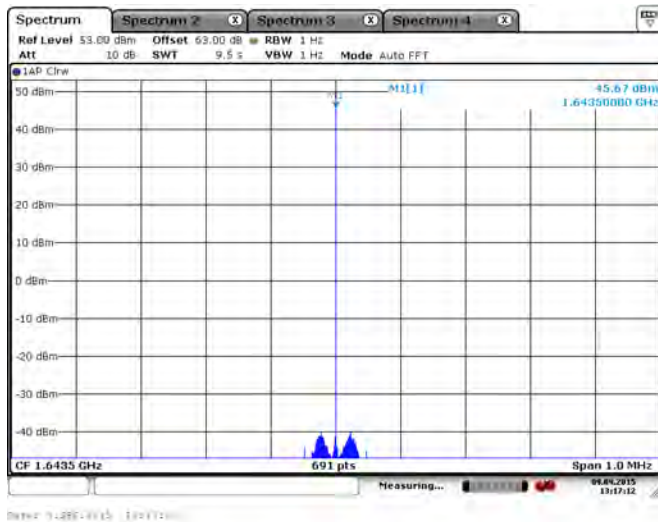


Illustration 65: Carrier frequency: 40V power supply.

Supply Voltage (V)	Deviation (ppm)	Result
16	<0.01	Pass
28	<0.01	Pass
40	<0.01	Pass

Appendix A

AT1595-13 Attenuation

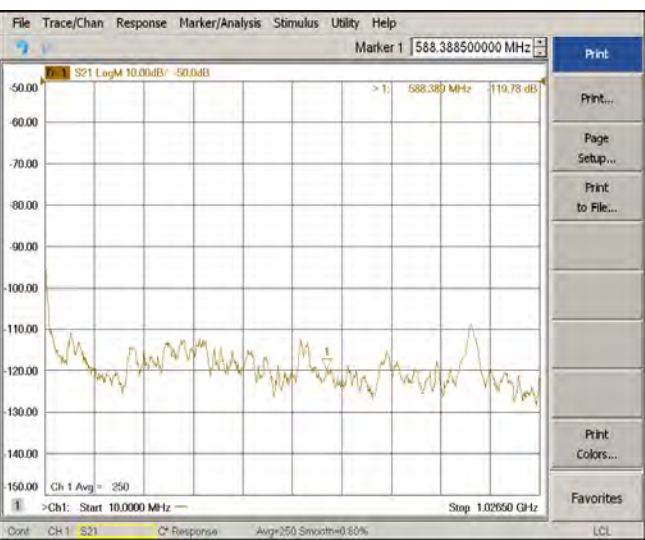


Illustration 66: 10MHz - 1026.5MHz

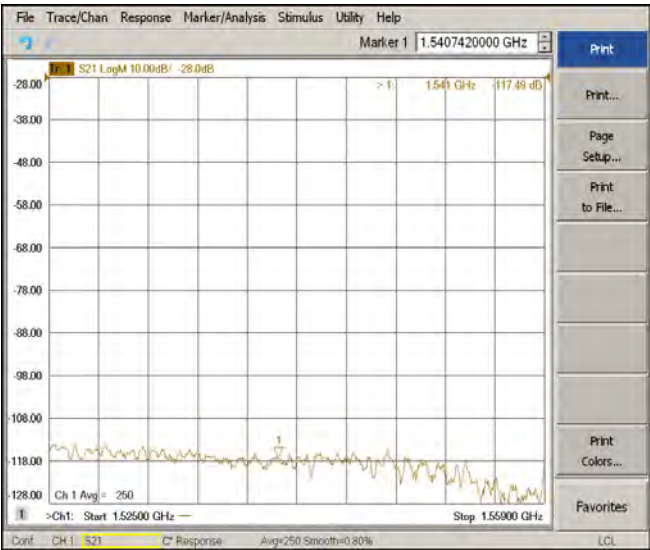


Illustration 67: 1526.5MHz - 1559.0MHz

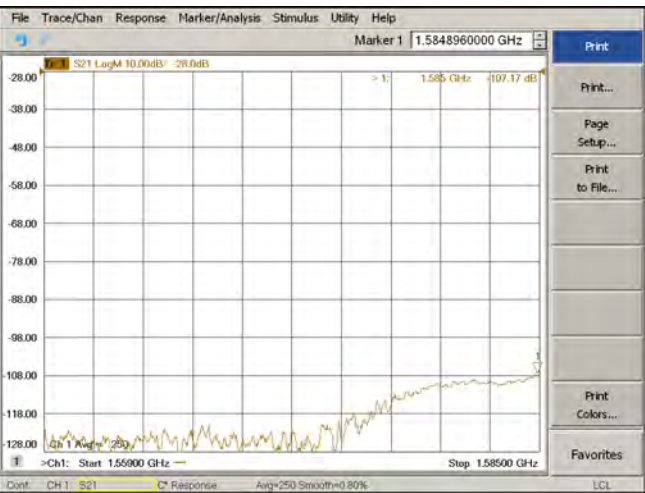


Illustration 69: 1559.0MHz – 1585.0MHz



Illustration 68: 1585.0MHz – 1605.0MHz

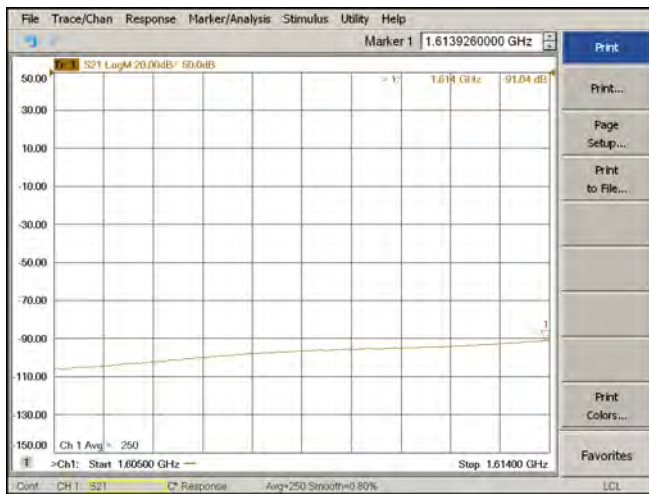


Illustration 71: 1605.0MHz – 1614.0MHz

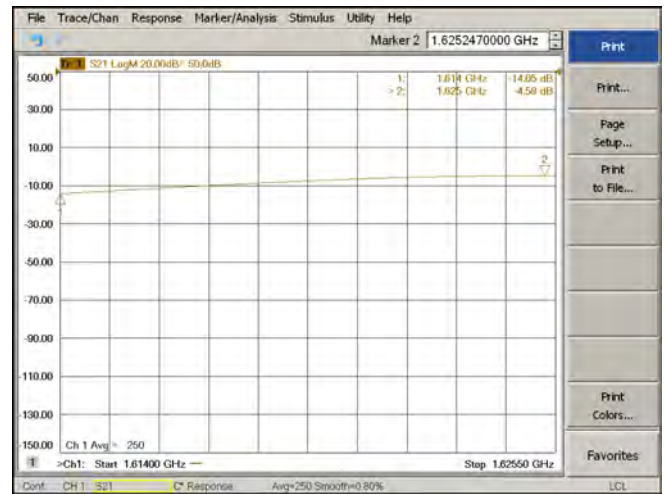


Illustration 70: 1614.0MHz - 1625.5MHz

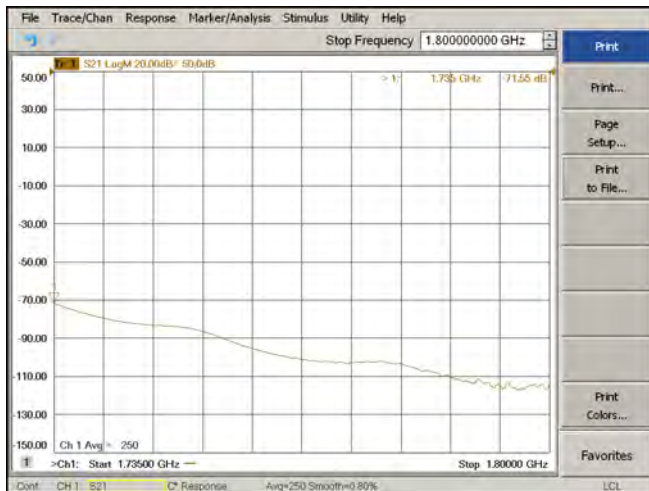


Illustration 73: 1735.0MHz – 1800.0MHz

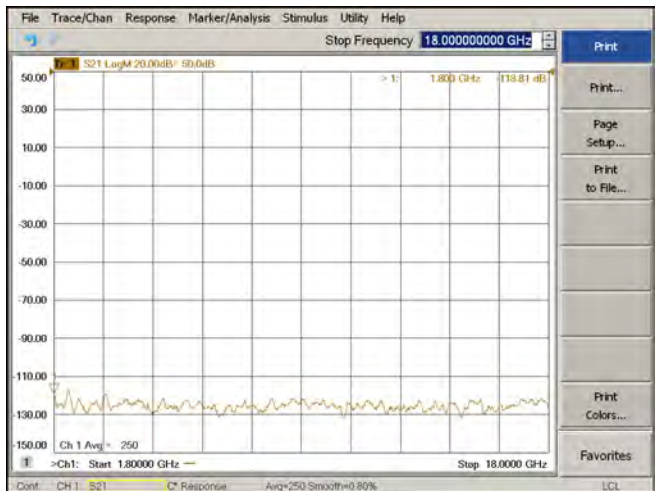


Illustration 72: 1800.0MHz - 18000MHz

Appendix B

List Of Equipment

Equipment	MODEL	ASSET NUMBER	SERIAL NUMBER	CALIBRATION DUE
POWER SUPPLY	72-7660	AT1867	G121002267	10/28/2016
SPECTRUM ANALYZER	FSVR40	AT2121	1311.0006K40-100910-DT	10/28/2015
SIGNAL GENERATOR	SMBV100A	AT2120	1407.6004K02-256548-BF	10/28/2015
HORN ANTENNA	SAS-571	AT2022	1464	8/18/2016
30 dB ATTENUATOR	VAT-30+	NA	NA	Calibrated at test time