TIMCO ENGINEERING, Inc.

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FCC PART 90 TEST REPORT
&
RSS 111 TEST REPORT
4940-4990MHz

APPLICANT	**RAJANT CORPORATION**
	400 EAST KING STREET MALVERN PA 19355-3258 USA
FCC ID	**VJA-F50NPRO**
IC	**7382A-F50NPRO**
MODEL NUMBER	**F50NPRO**
PRODUCT NAME & DESCRIPTION	MINI PCI RADIO CARD
DATE SAMPLE RECEIVED	9/27/2016
FINAL TEST DATE	10/24/2016
TESTED BY	Cory Leverett
APPROVED BY	Sid Sanders
TEST RESULTS	☒ PASS ☐ FAIL

Report Number	Version Number	Description	Issue Date
1961AUT16TestReport_	Rev1	Initial Issue	10/25/2016
	Rev2	Administrative Update	11/15/2016

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

Summary

The device under test does:

☒ Fulfill the general approval requirements as identified in this test report and was selected by the customer.

☐ Not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669

Tested by:
Name and Title: Cory Leverett , Project Manager/Testing Technician

Date: 10/25/2016

Reviewed and approved by: _____
Name and Title: Sid Sanders, Engineer

Date: 10/25/2016

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GENERAL INFORMATION

EUT Specification

EUT Description	MINI PCI RADIO CARD
FCC ID	VJA-F50NPRO
IC	7382A-F50NPRO
Model Number	F50NPRO
Operating Frequency	4940 – 4990MHz
Test Frequencies	4945, 4950, 4965, 4980, 4985 MHz
Type of Emission	OFDM, 16-QAM, 64-QAM, 256-QAM
Channel Bandwidth	10MHz, 20MHz 9M25W7D, 18M6W7D
Antenna Gain	Omni 6 dBi
Software version	Minimum firmware version 11.13
EUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ DC Power 52 VDC (POE Supply)
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☐ Pre-Production
	☒ Production
Type of Equipment	☐ Fixed
	☒ Mobile
	☐ Portable
Test Conditions	The temperature was 24-26ºC with a relative humidity of 50 - 65%.
Modification to the EUT	None
Test Exercise	The EUT was operated in a normal mode.
Regulatory Standards	FCC CFR 47 Part 2, 90 RSS 111 Issue 5, RSS-GEN Issue 4
Measurement Procedures	ANSI C63.4: 2014 KDB 971168 D01 v02r02
Test Facility	**Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.**

SUMMARY OF THE TEST RESULTS

Rule Number	Description of Test	Results
FCC §2.1046 FCC § 2.1046, 90.205(p),90.1215(a)(1) RSS Gen § 6.12 RSS 111 § 4.1	Power Output	Pass
FCC §2.1049, 90Y RSS 111 § 5.3	Occupied Bandwidth	Pass
FCC § 90.1215(a)(2) RSS Gen § RSS 111 §4.2	Power Spectral Density	Pass
FCC § 90.1215(e) RSS 111 § 5.4	Peak Excursion	Pass
FCC §2.1051 FCC § 90.210(m) RSS Gen § 6.13 RSS 111 § 5.5	Conducted Spurious Emission at the Antenna Terminals	Pass
FCC §2.1053 FCC § 90.210(m) RSS Gen § 6.13 RSS 111 § 5.5	Radiated Spurious Emissions	Pass
FCC § 2.1055 FCC § 90.213 RSS Gen § 6.11 RSS 111 § 5.2	Frequency Stability	Pass

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OCCUPIED BANDWIDTH

FCC Reference: FCC Part 2.1049

IC Reference: RSS-GEN section 6.6, RSS-111 section 5.3

Test Method: KDB 971168 D01 Section 4.2 and Notes Below

Results: Meets Requirements

Notes:

1. 15 dB of external attenuation and RF cable were used to connect measurement equipment to the RF output ports of EUT. The insertion loss of this measurement path was calibrated prior to testing and a transducer factor generated into the measurement equipment.

1. The EUT was transmitting at maximum power with ≥98% duty cycle during the test

2. The data rate 6 Mbps was selected for testing on the basis of being the worst case. Three places in the band on both antenna chains were investigated with minimal differences in the occupied bandwidth, only one antenna chain and channel is reported.

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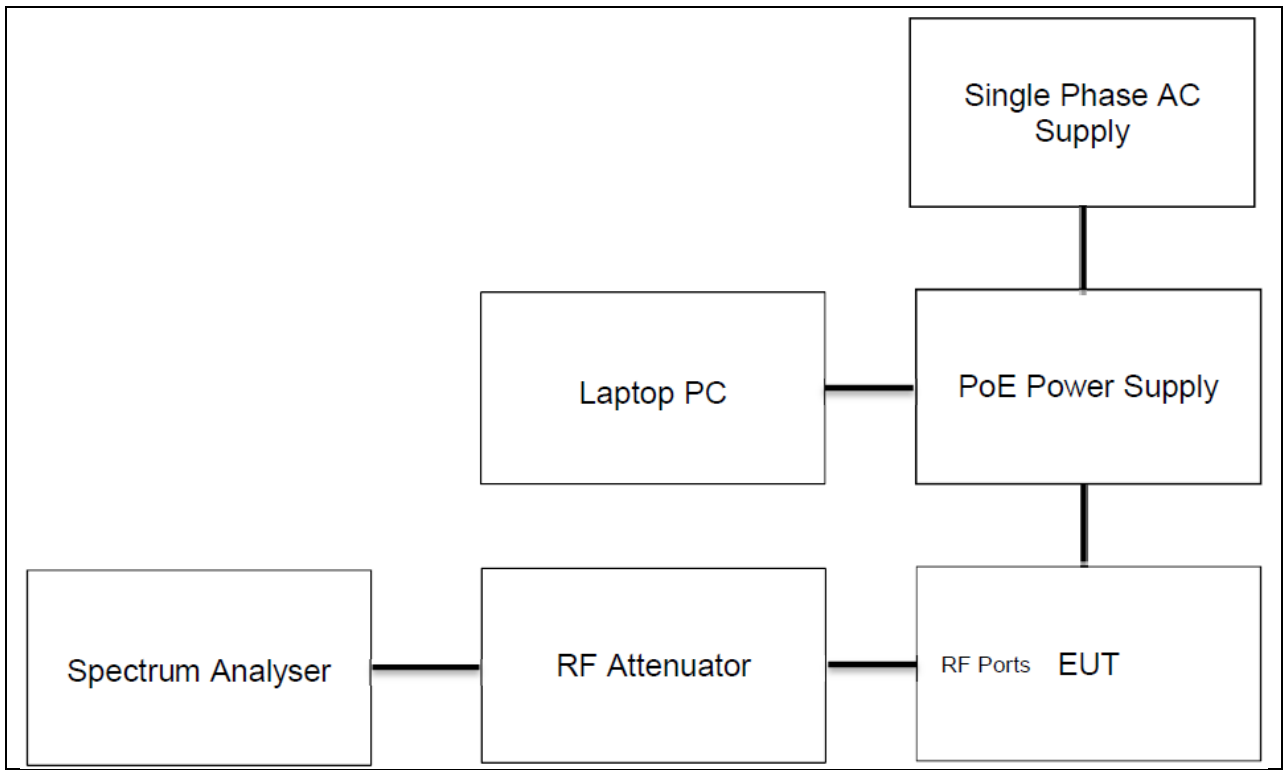
OCCUPIED BANDWIDTH

Test Setup:



Test Data: Measurement Results Table

Channel Bandwidth (MHz)	Center Frequency (MHz)	Resolution Bandwidth (KHz)	Video Bandwidth (KHz)	99% Occupied Bandwidth (MHz)
10	4965.0	300	1000	9.71
20	4965.0	300	1000	17.98

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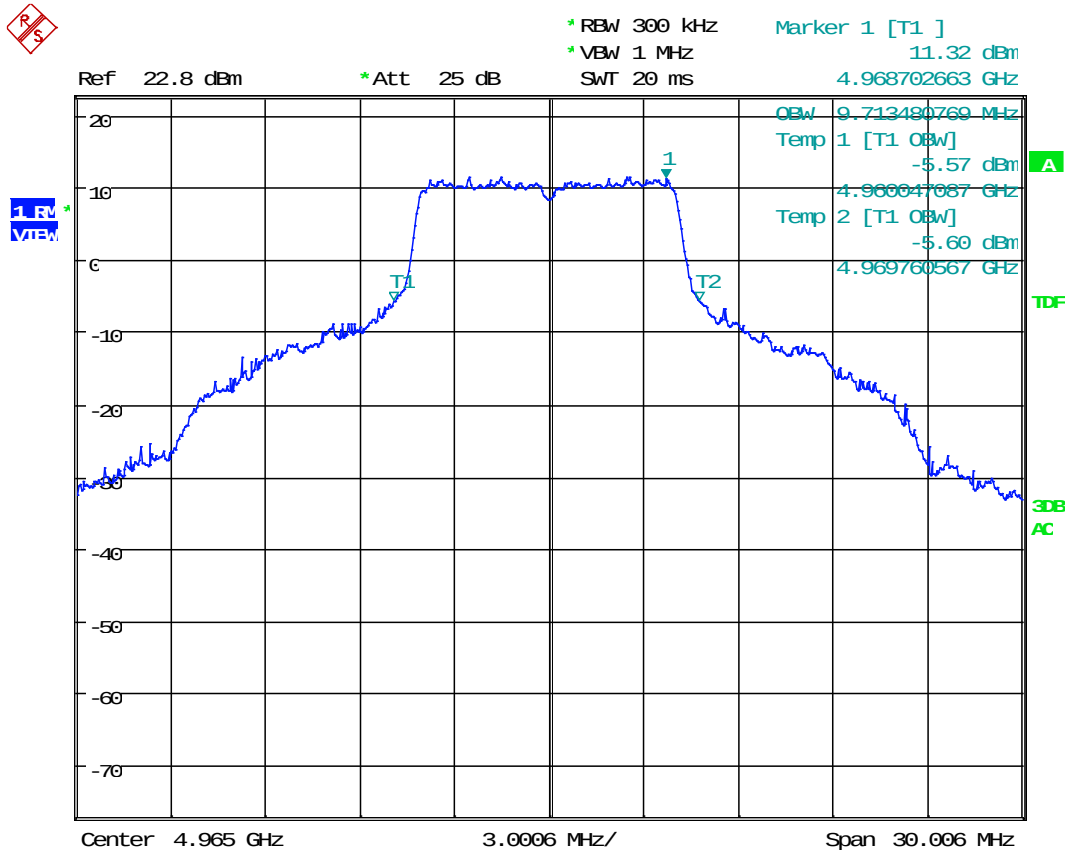
OCCUPIED BANDWIDTH

Test Data: 10 MHz Bandwidth Port A Plot



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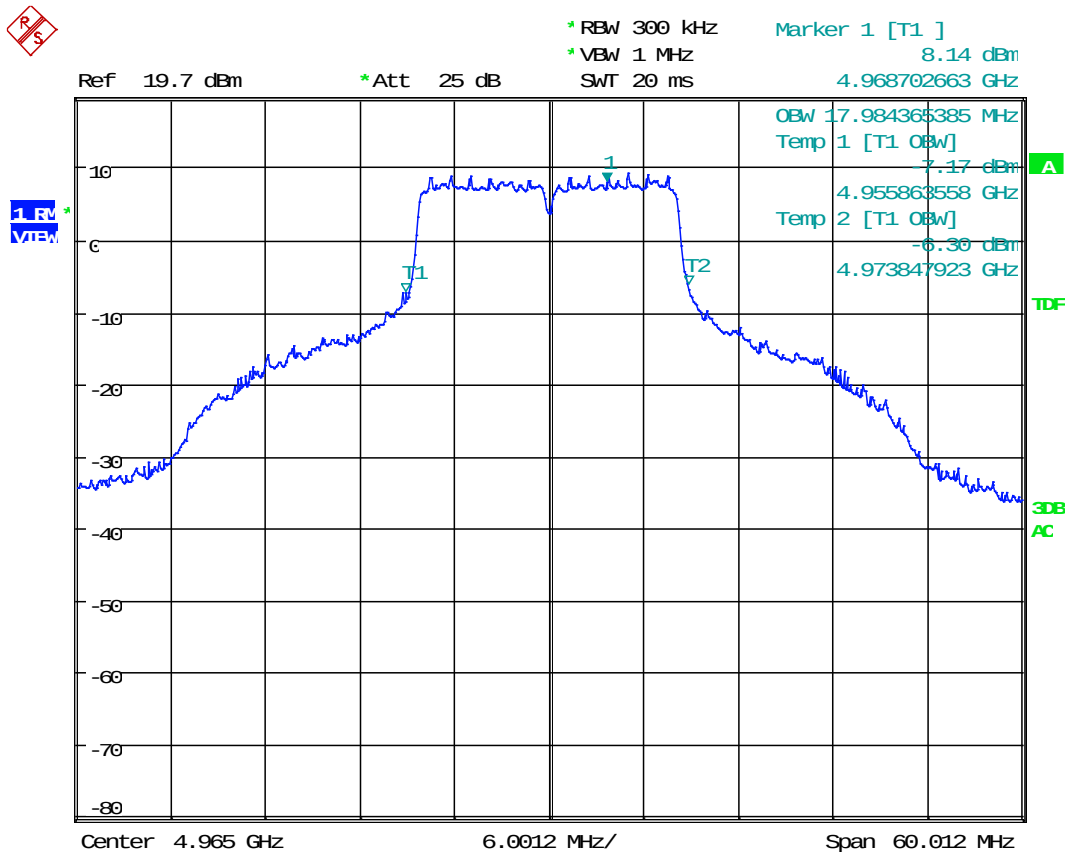
OCCUPIED BANDWIDTH

Test Data: 20 MHz Bandwidth Port A Plot



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POWER OUTPUT

FCC Reference: FCC Part 2.1046, 90.205(p), & 90.1215(a)(1)

IC Reference: RSS-GEN section 6.12, RSS-111 section 5.3, & 5.3.1

Test Method: KDB 971168 D01 Section 5.2.1 and Notes Below

Results: Meets Requirements

Notes:

1. 15 dB of external attenuation and RF cable were used to connect measurement equipment to the RF output ports of EUT. The insertion loss of this measurement path was calibrated prior to testing and a transducer factor generated into the measurement equipment.

2. The measurement equipment is calibrated in terms of an RMS-equivalent voltage.

3. Power is measured using trace averaging over 100 sweeps during a period of continuous transmission.

4. The EUT was transmitting at maximum power with ≥98% duty cycle during the test.

5. The data rate 6 Mbps was selected for testing on the basis of being the worst case. Three places in the band on both antenna chains were investigated for each channel bandwidth.

6. No reduction in power limits were required, the EUT is authorized for use with omnidirectional antenna with a gain of 6 dBi.

7. Power from both antenna ports was combined using the measure-and-sum method stated in FCC KDB 662911 D02.

8. The power output tests were performed simultaneously with the power spectral density measurements. A table of results is provided in this section and the plots can be found in the power spectral density section of this test report.

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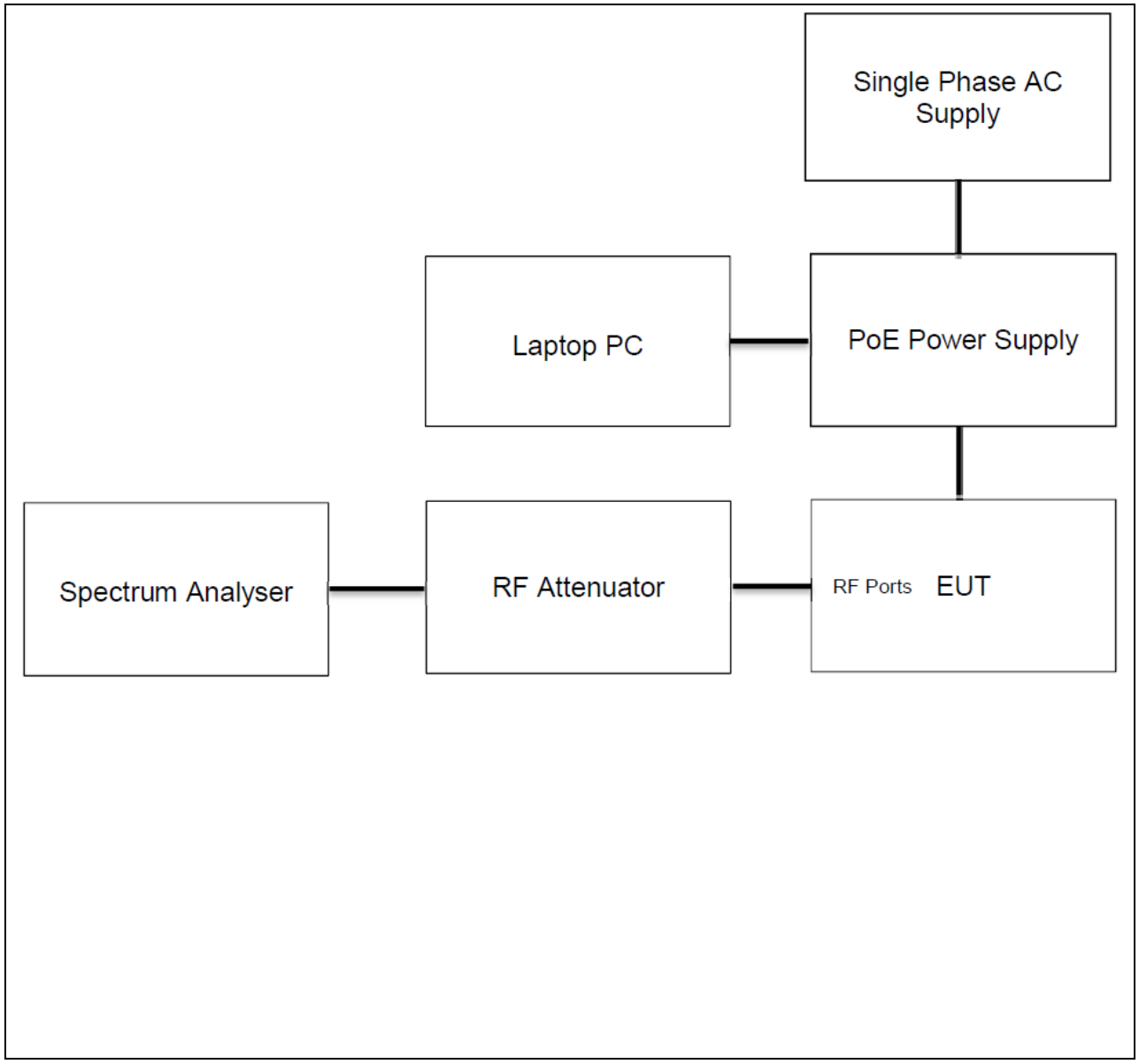
POWER OUTPUT

Test Setup:



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POWER OUTPUT

Test Data: Measurement Results Table

Power Output								
Freq (MHz)	Bandwidth (MHz)	Data Rate (Mbps)	P_{cond1} (dBm)	P_{cond2} (dBm)	P_{total} (mW)	P_{total} (dBm)	Limit (dBm)	Margin (dB)
4945.0	10	6	19.8	19.6	186	22.7	30.0	7.3
4965.0	10	6	19.4	19.7	181	22.6	30.0	7.4
4985.0	10	6	19.2	19.9	179	22.5	30.0	7.5
4950.0	20	6	19.1	19.1	163	22.1	33.0	10.9
4965.0	20	6	18.9	19.3	162	22.1	33.0	10.9
4980.0	20	6	19.0	19.3	164	22.2	33.0	10.8

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POWER SPECTRAL DENSITY

FCC Reference: FCC Part 2.1046, 90.205(p), & 90.1215(a)(2)

IC Reference: RSS-GEN section 6.12, RSS-111 section 5.3, & 5.3.1

Test Method: KDB 971168 D01 Section 5.4.1 and Notes Below

Results: Meets Requirements

Notes:

1. 15 dB of external attenuation and RF cable were used to connect measurement equipment to the RF output ports of EUT. The insertion loss of this measurement path was calibrated prior to testing and a transducer factor generated into the measurement equipment.

2. The measurement equipment is calibrated in terms of an RMS-equivalent voltage.

3. Power is measured using trace averaging over 100 sweeps during a period of continuous transmission.

4. The EUT was transmitting at maximum power with ≥98% duty cycle during the test.

5. The data rate 6 Mbps was selected for testing on the basis of being the worst case. Three places in the band on both antenna chains were investigated for each channel bandwidth.

6. No reduction in power limits were required, the EUT is authorized for use with omnidirectional antenna with a gain of 6 dBi.

7. Power from both antenna ports was combined using the measure-and-sum method stated in FCC KDB 662911 D02.

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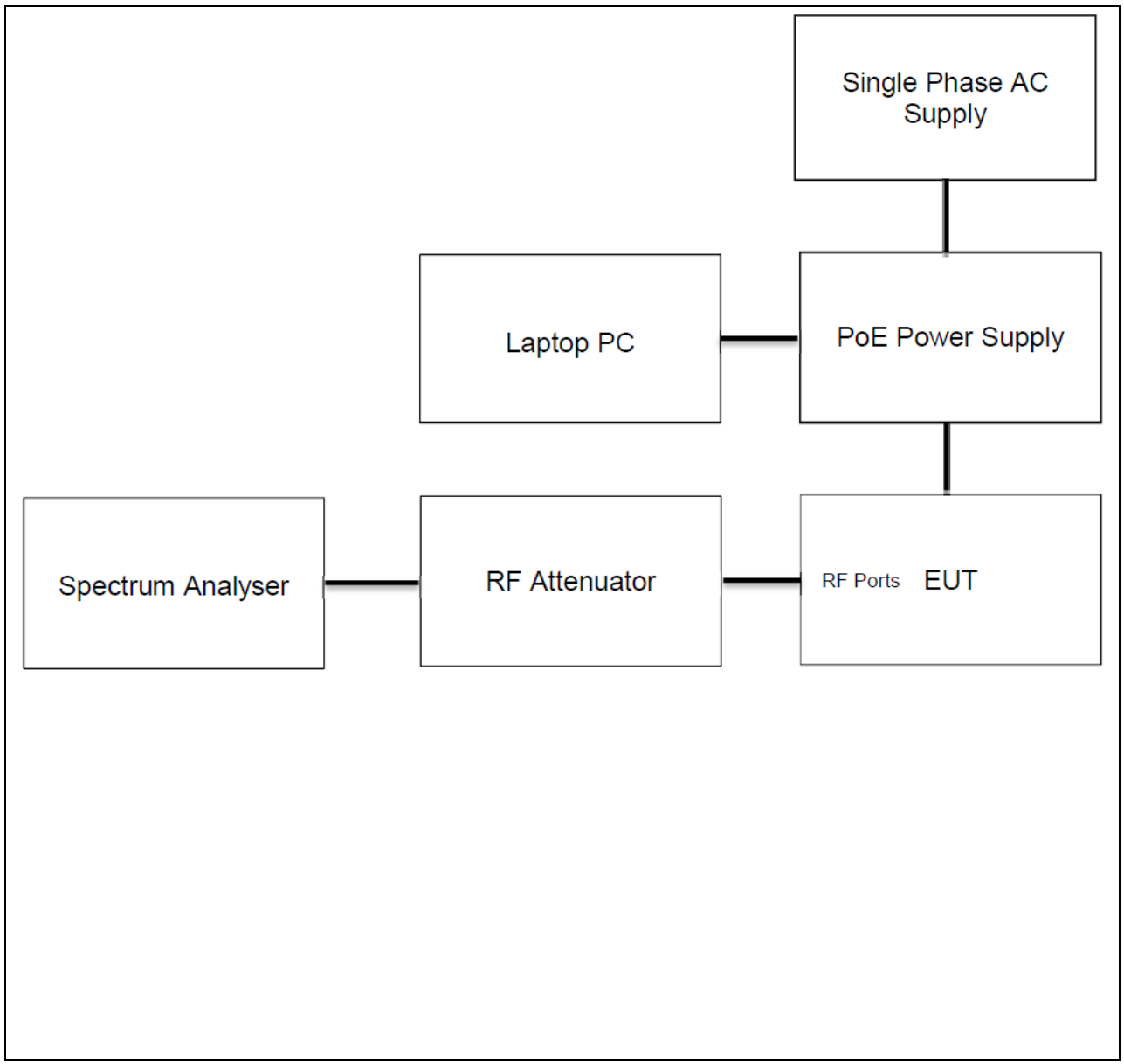
Test Setup:



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POWER SPECTRAL DENSITY

Test Data: Measurement Results Table

Peak Power Spectral Density							
Freq (MHz)	Bandwidth (MHz)	Data Rate (Mbps)	P_{cond1} (dBm/MHz)	P_{cond2} (dBm/MHz)	P_{total} (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)
4945.0	10	6	12.5	12.3	15.4	21.0	5.6
4965.0	10	6	12.1	12.4	15.3	21.0	5.7
4985.0	10	6	11.9	12.6	15.3	21.0	5.7
4950.0	20	6	9.0	9.3	12.2	21.0	8.8
4965.0	20	6	9.1	9.5	12.3	21.0	8.7
4980.0	20	6	9.1	9.6	12.3	21.0	8.7

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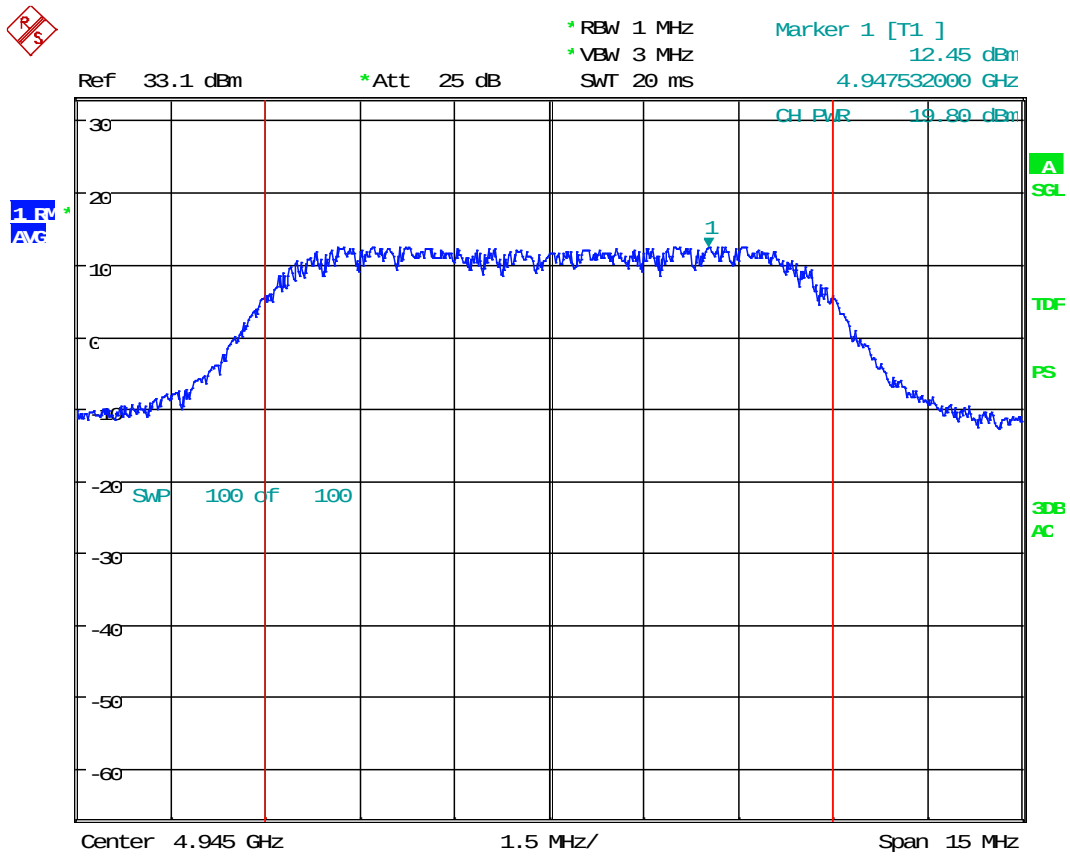
POWER SPECTRAL DENSITY

Test Data: 10 MHz Bandwidth Port A Low Channel Plot



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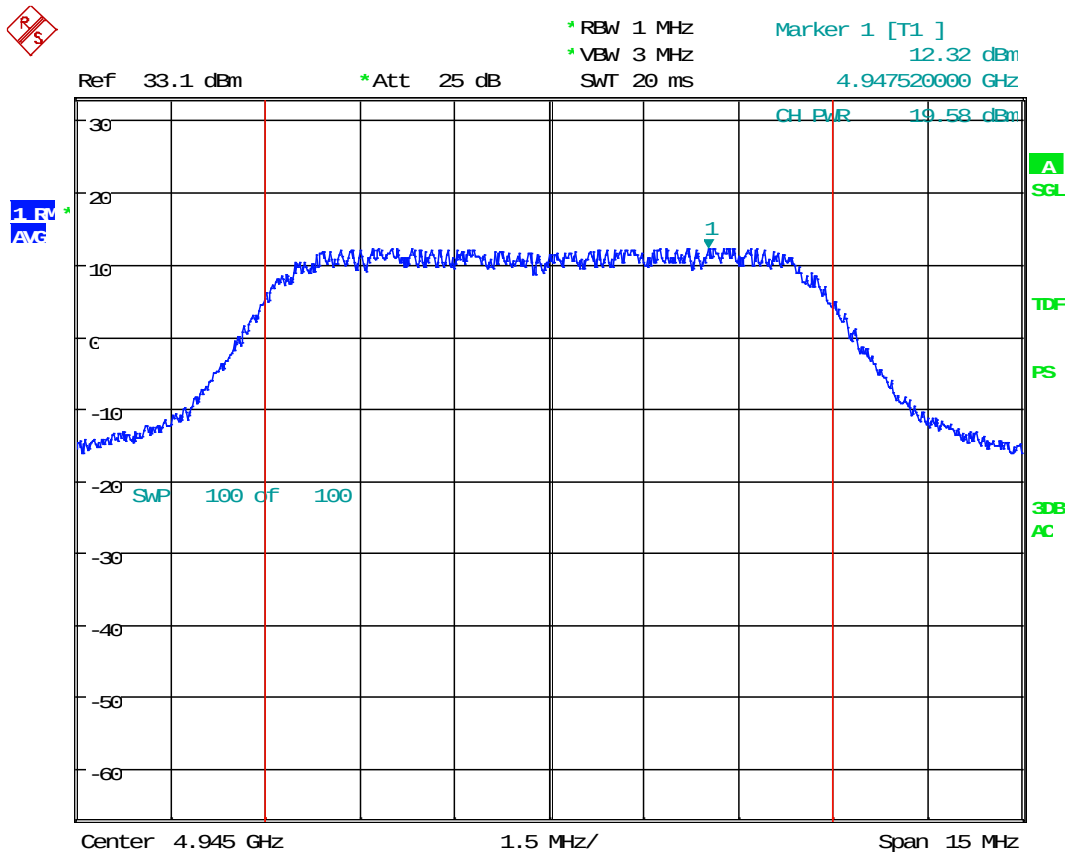
POWER SPECTRAL DENSITY

Test Data: 10 MHz Bandwidth Port B Low Channel Plot



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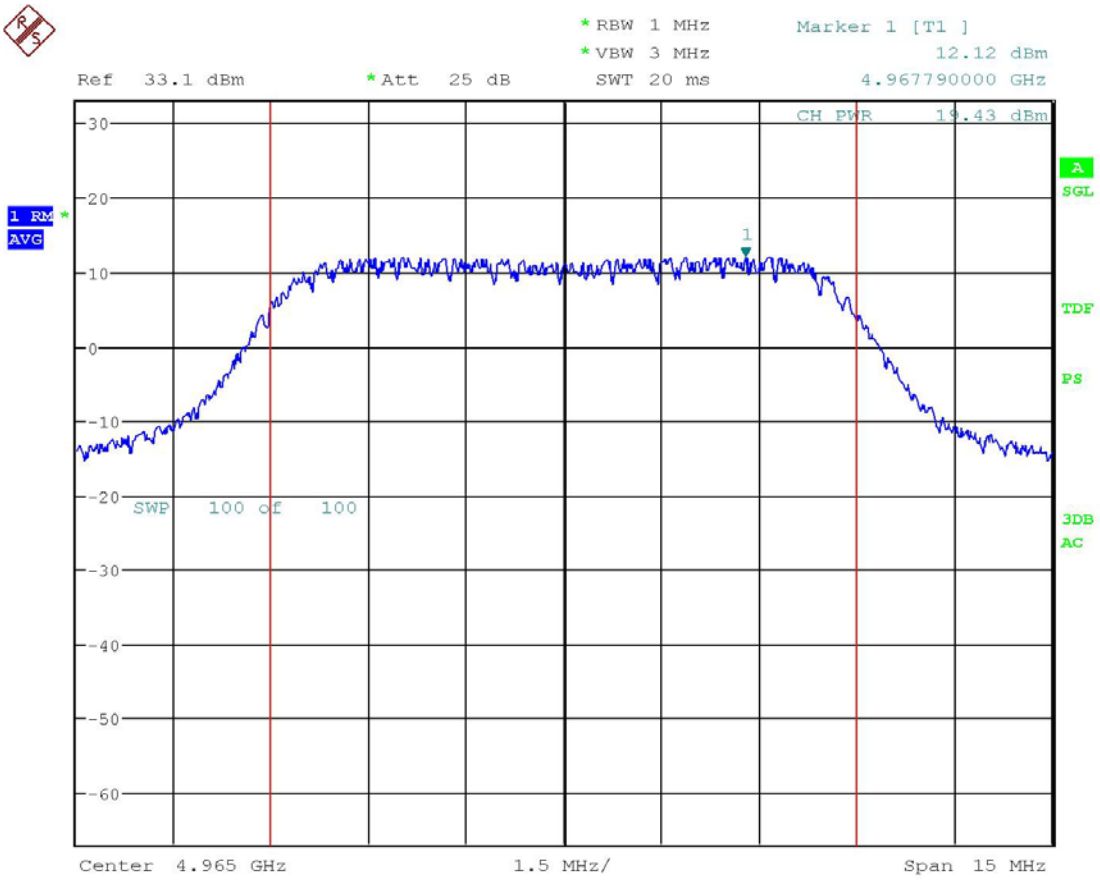
POWER SPECTRAL DENSITY

Test Data: 10 MHz Bandwidth Port A Middle Channel Plot



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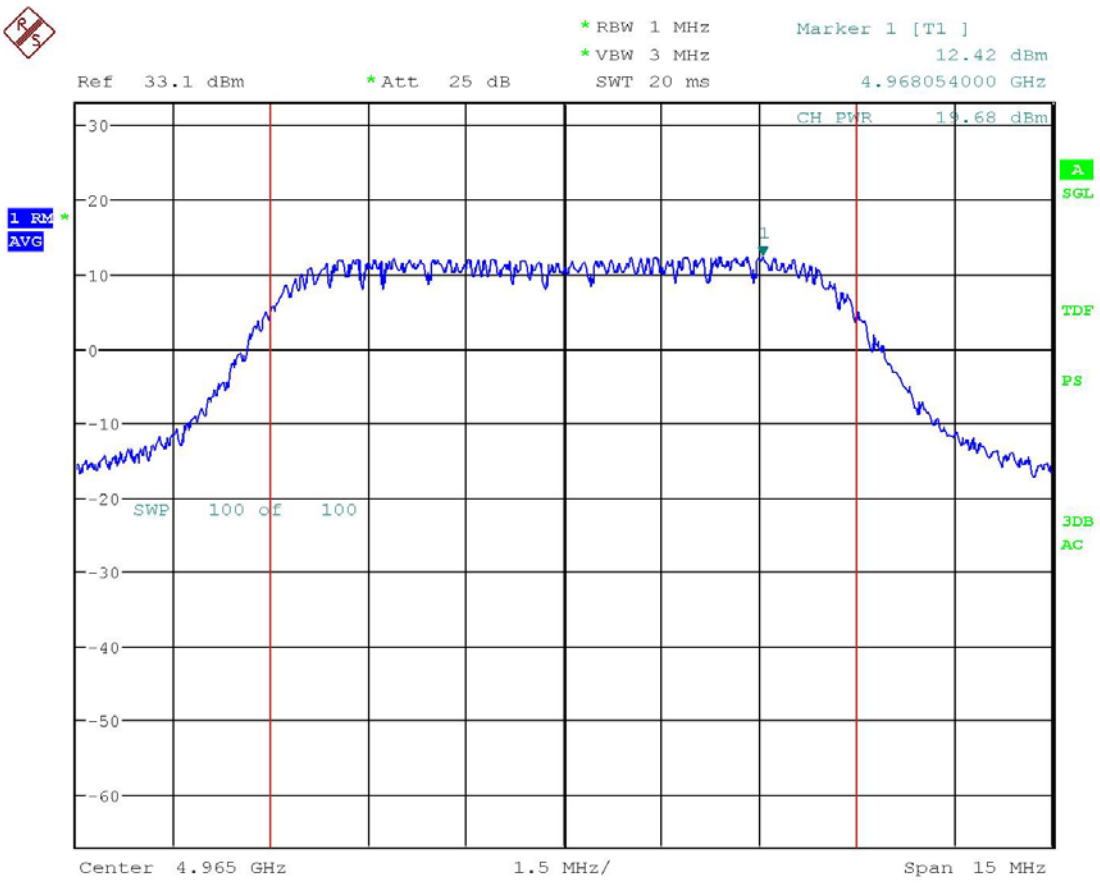
POWER SPECTRAL DENSITY

Test Data: 10 MHz Bandwidth Port B Middle Channel Plot



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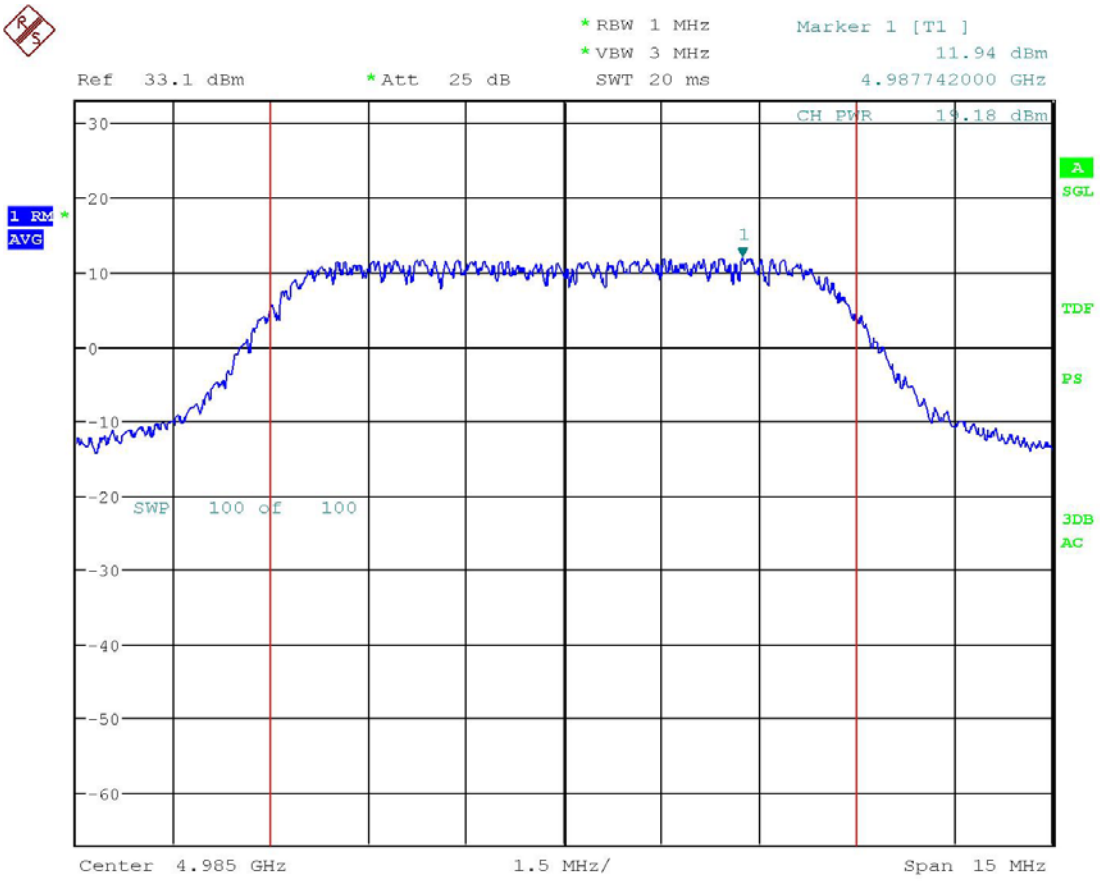
POWER SPECTRAL DENSITY

Test Data: 10 MHz Bandwidth Port A High Channel Plot



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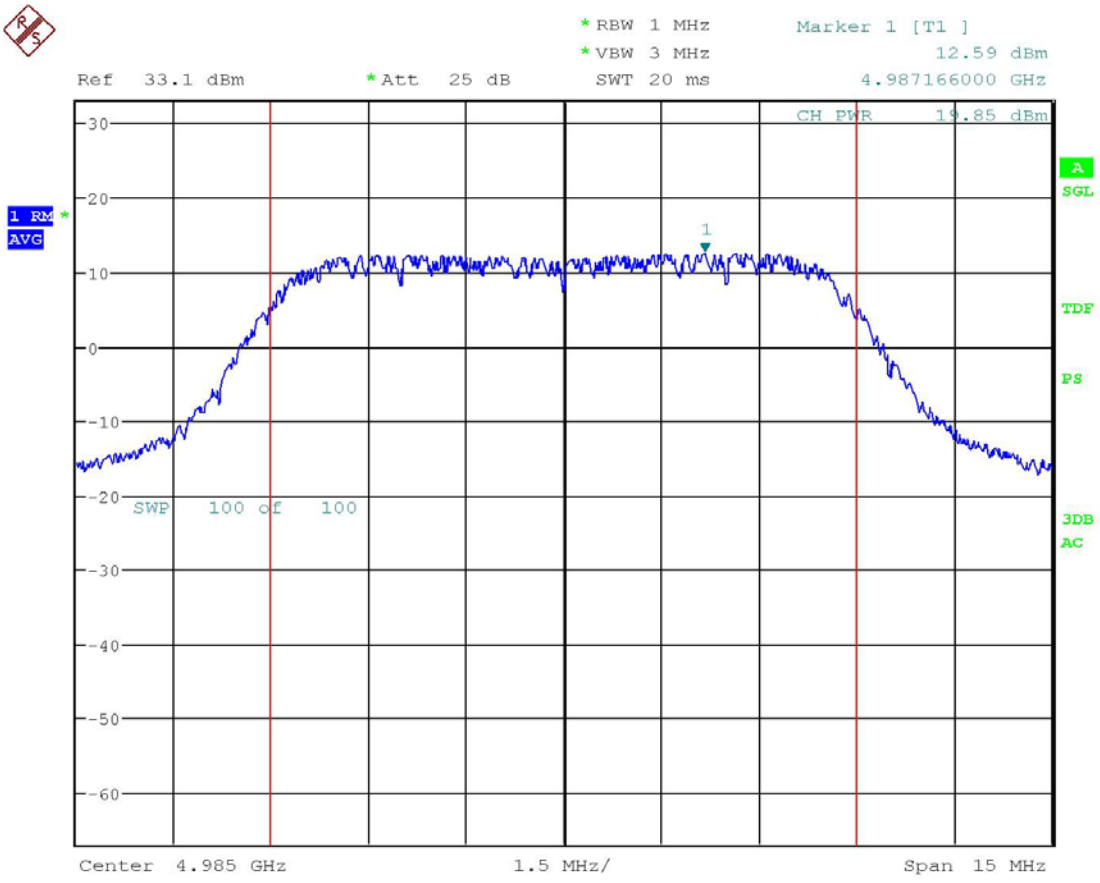
POWER SPECTRAL DENSITY

Test Data: 10 MHz Bandwidth Port B High Channel Plot



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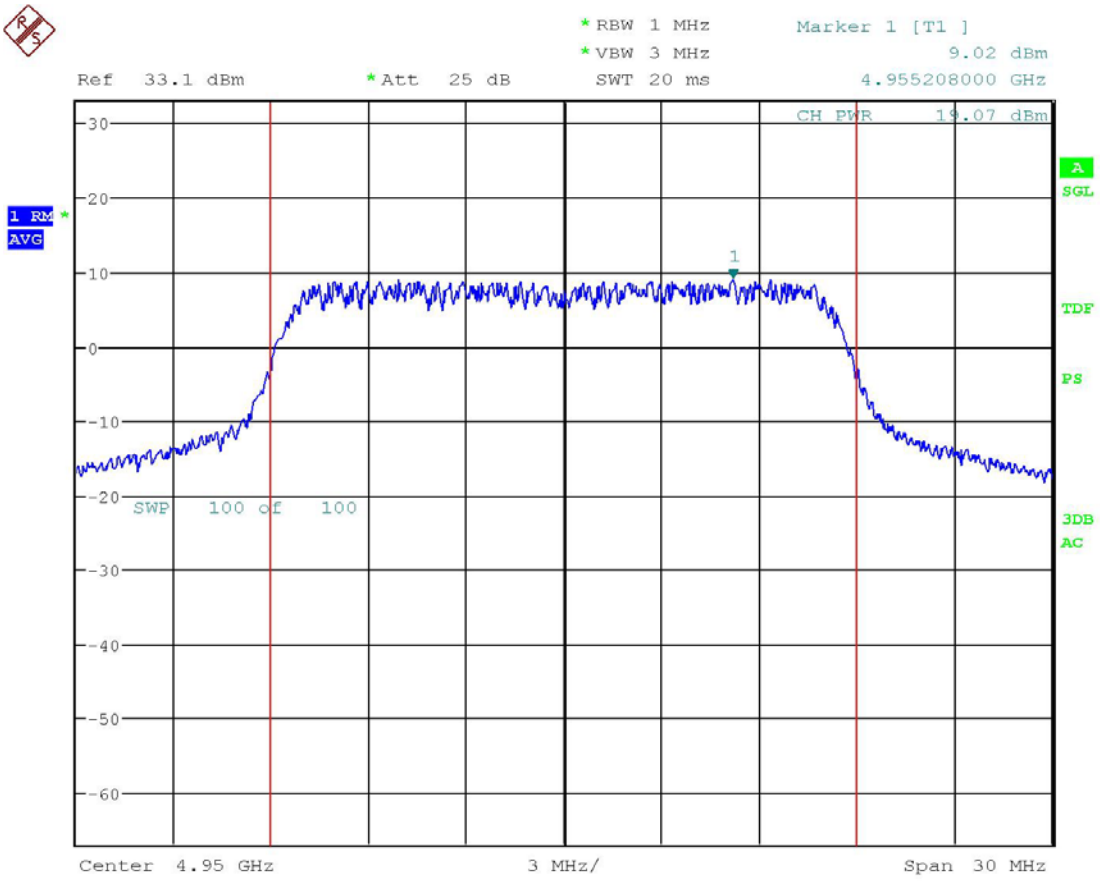
POWER SPECTRAL DENSITY

Test Data: 20 MHz Bandwidth Port A Low Channel Plot



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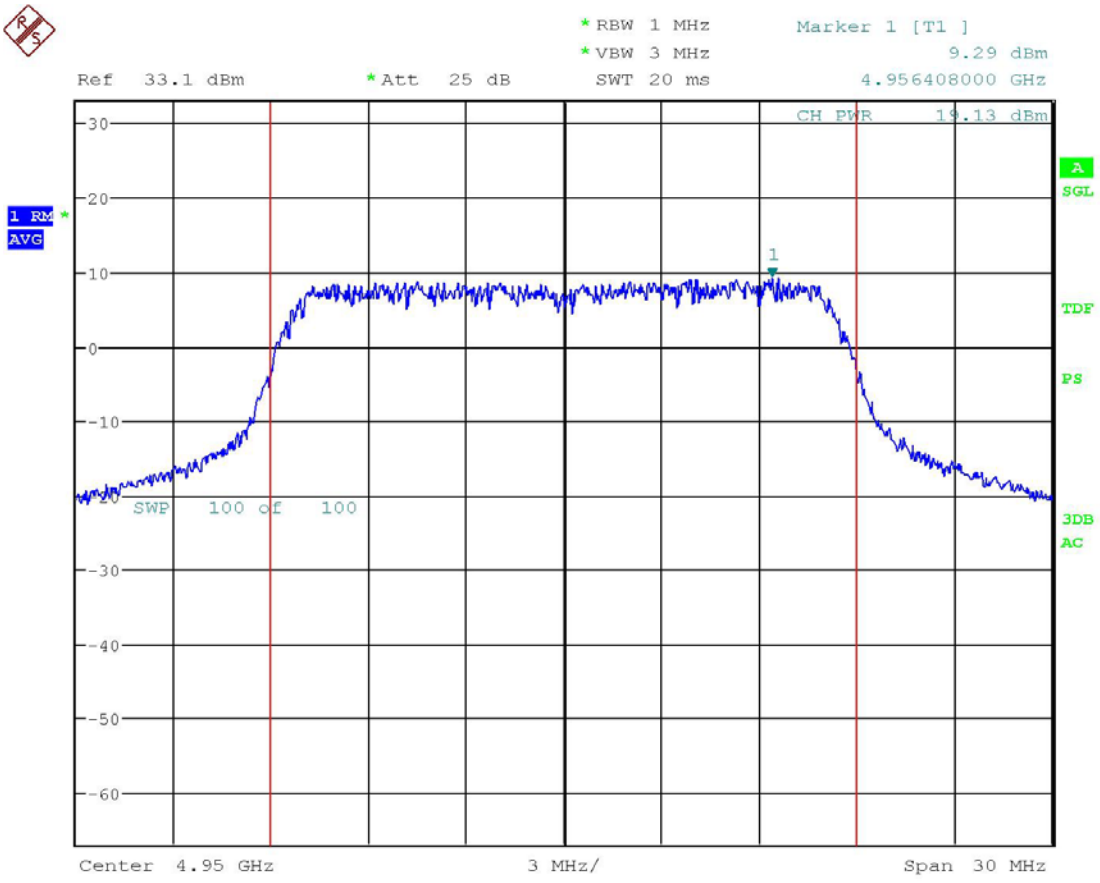
POWER SPECTRAL DENSITY

Test Data: 20 MHz Bandwidth Port B Low Channel Plot



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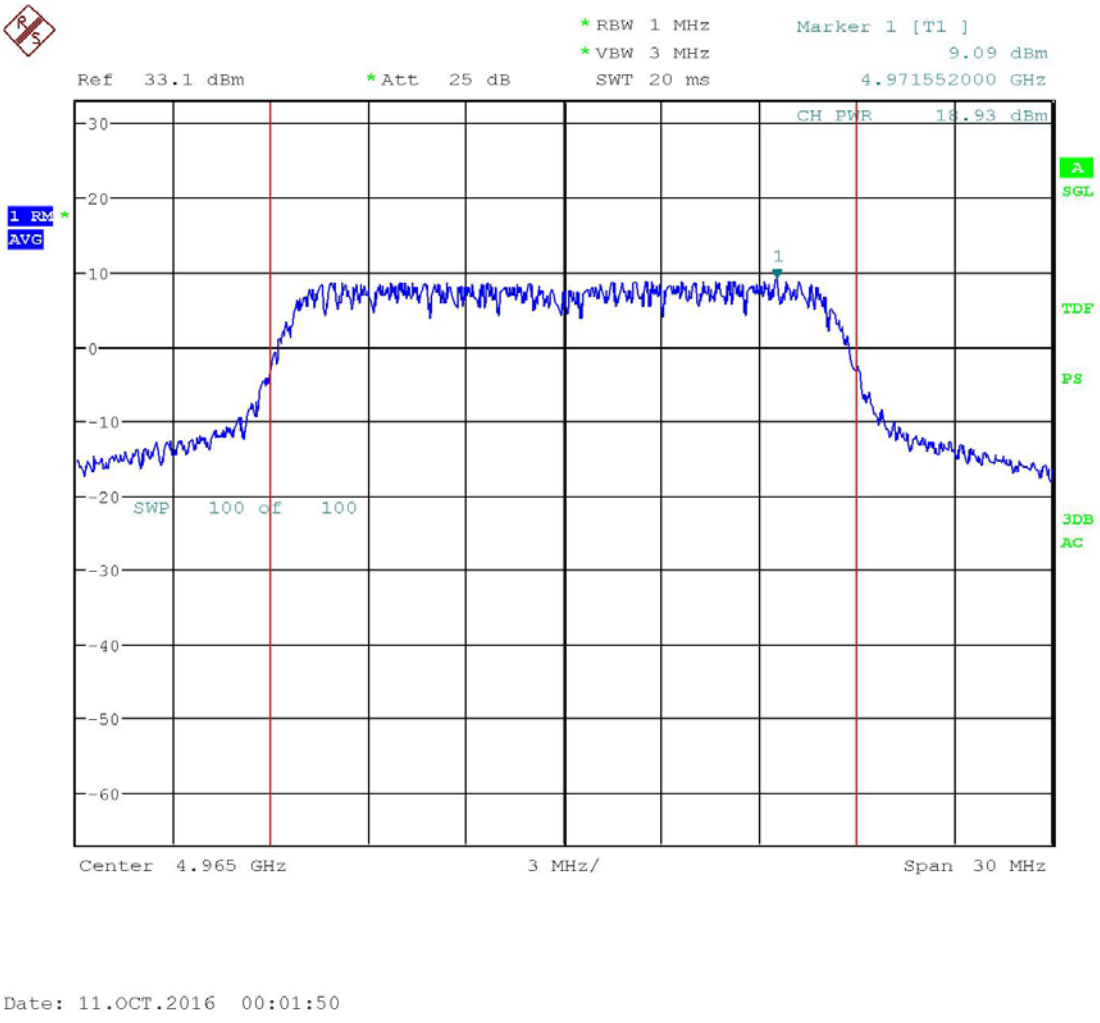
POWER SPECTRAL DENSITY

Test Data: 20 MHz Bandwidth Port A Middle Channel Plot



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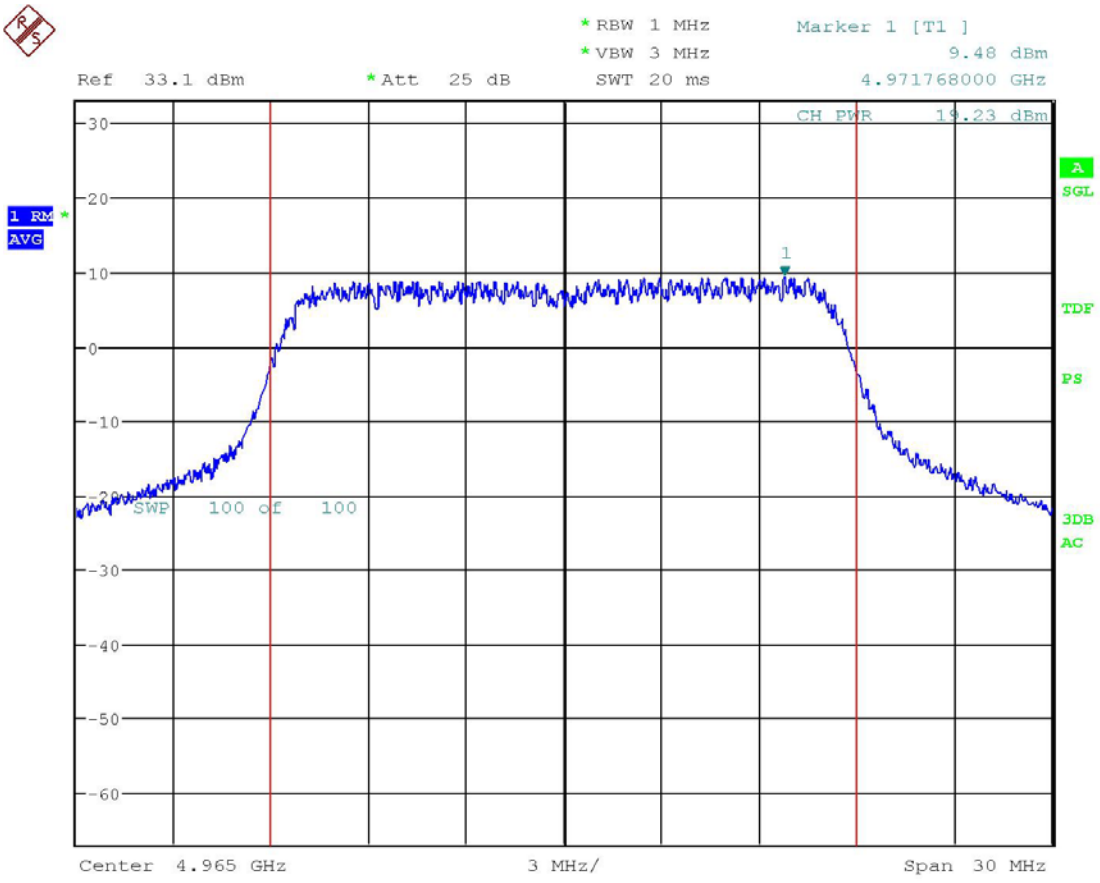
POWER SPECTRAL DENSITY

Test Data: 20 MHz Bandwidth Port B Middle Channel Plot



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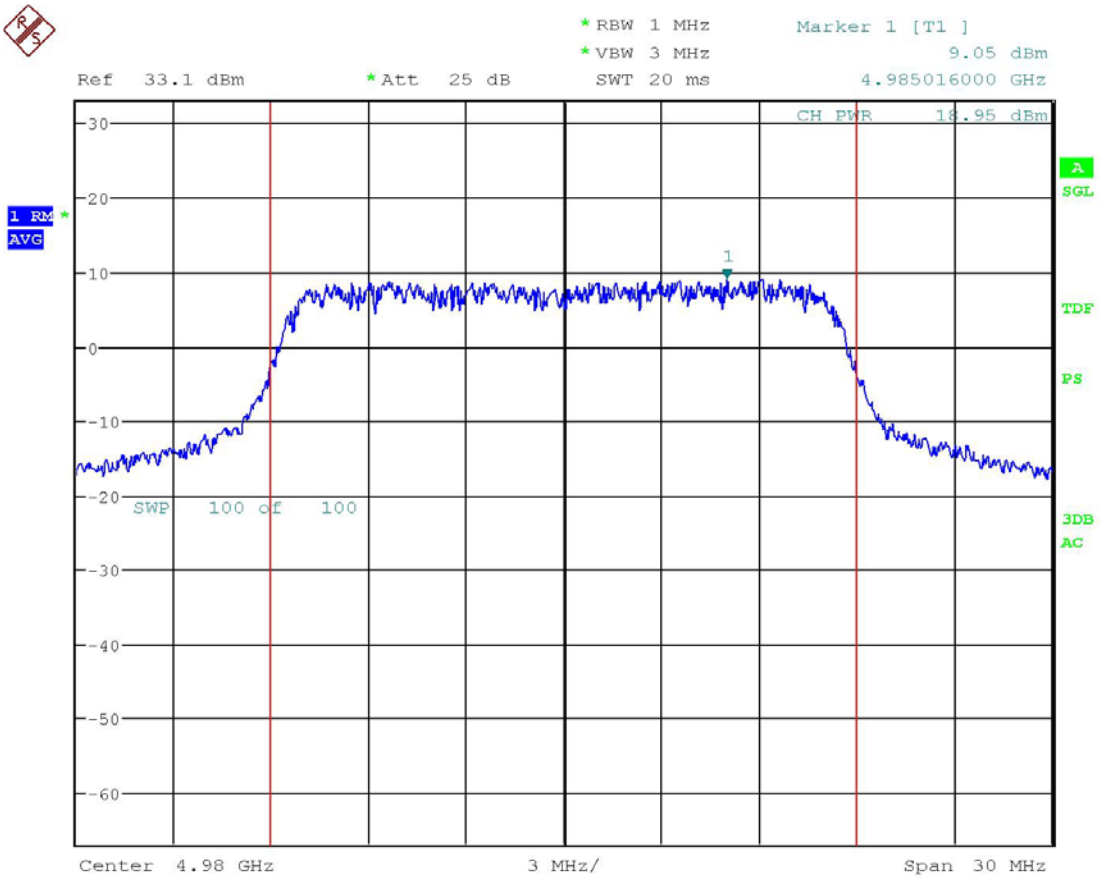
POWER SPECTRAL DENSITY

Test Data: 20 MHz Bandwidth Port A High Channel Plot



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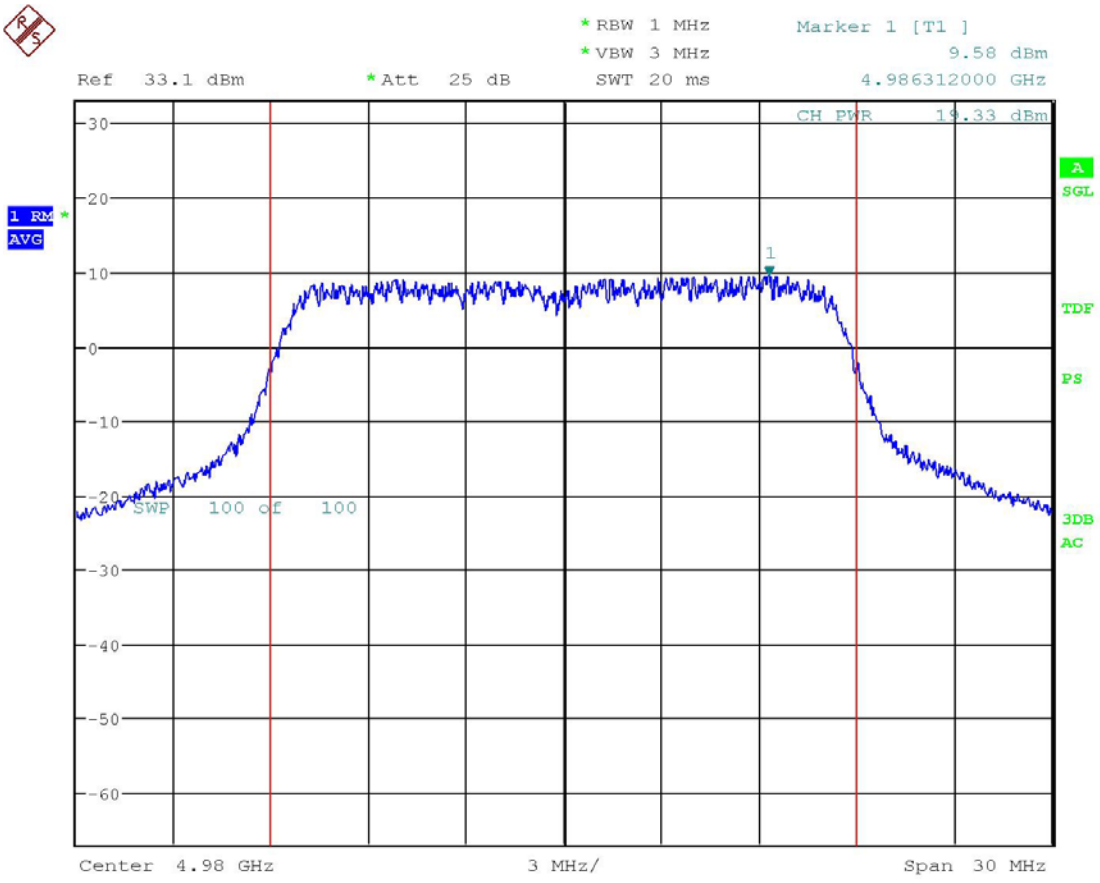
POWER SPECTRAL DENSITY

Test Data: 20 MHz Bandwidth Port B High Channel Plot



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PEAK EXCURSION

FCC Reference: FCC Part 90.1215(e)

IC Reference: RSS-111 section 5.4

Test Method: KDB 971168 D01 Section 5.7.1 and Notes Below

Results: Meets Requirements

Notes:

1. 15 dB of external attenuation and RF cable were used to connect measurement equipment to the RF output ports of EUT. The insertion loss of this measurement path was calibrated prior to testing and a transducer factor generated into the measurement equipment.

2. The EUT was transmitting at maximum power with ≥98% duty cycle during the test.

3. The data rate 6 Mbps was selected for testing on the basis of being the worst case. Three places in the band on both antenna chains were investigated for each channel bandwidth.

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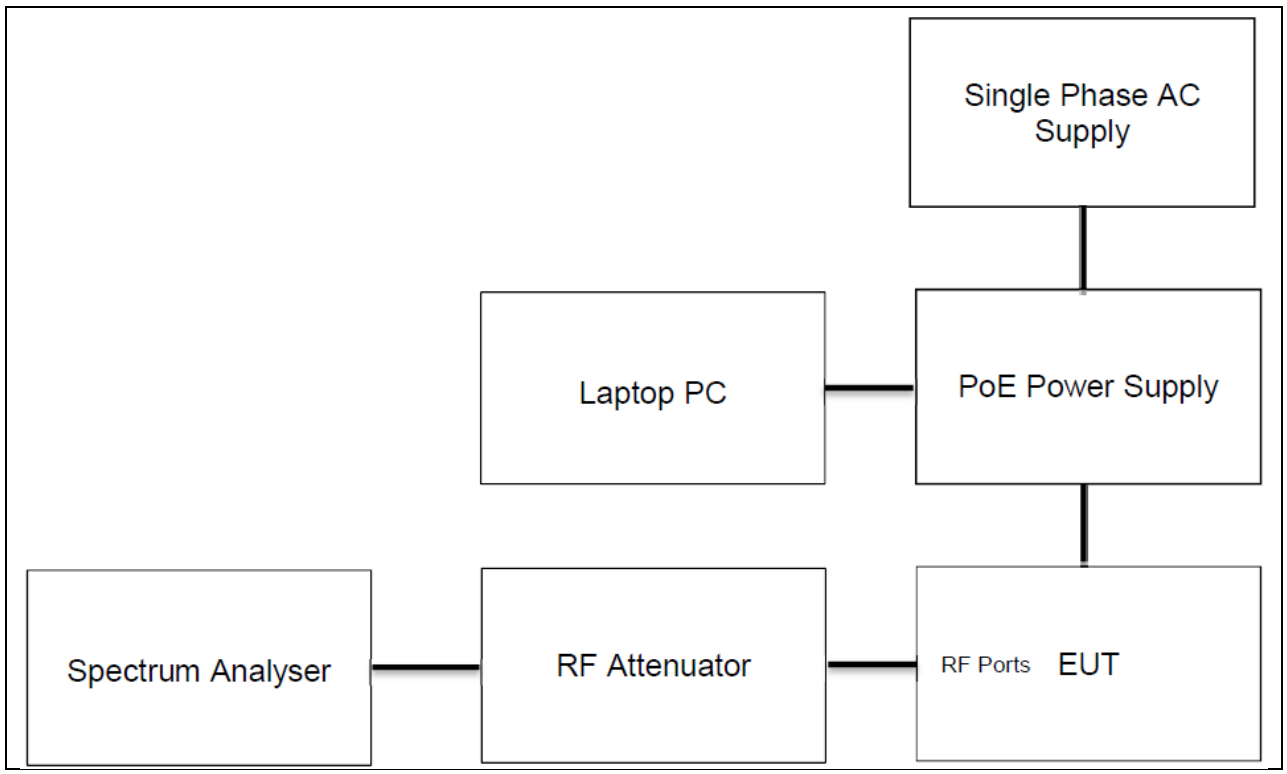
PEAK EXCURSION

Test Setup:



Test Data: Measurement Results Table

Channel Bandwidth (MHz)	Center Frequency (MHz)	Resolution Bandwidth (MHz)	AQT (ms)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
10	4965.0	1	1	7.98	13	5.02
20	4965.0	1	1	7.64	13	5.36

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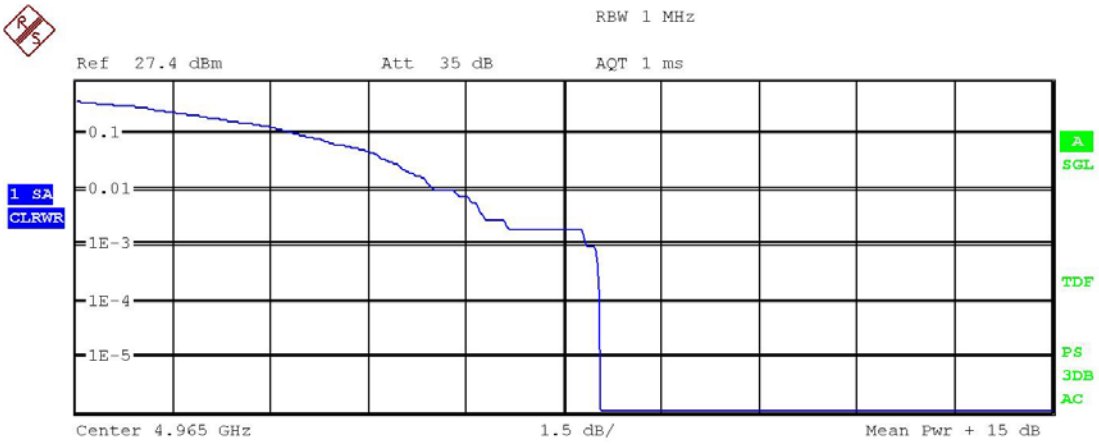
PEAK EXCURSION

Test Data: 10 MHz Bandwidth Port A Plot



Complementary Cumulative Distribution Function
NOF samples: 1000, Usable BW: 852kHz

	Trace 1
Mean	9.80 dBm
Peak	17.85 dBm
Crest	8.05 dB
10 %	3.46 dB
1 %	5.79 dB
.1 %	7.98 dB
.01 %	8.05 dB

Date: 10.OCT.2016 23:30:36

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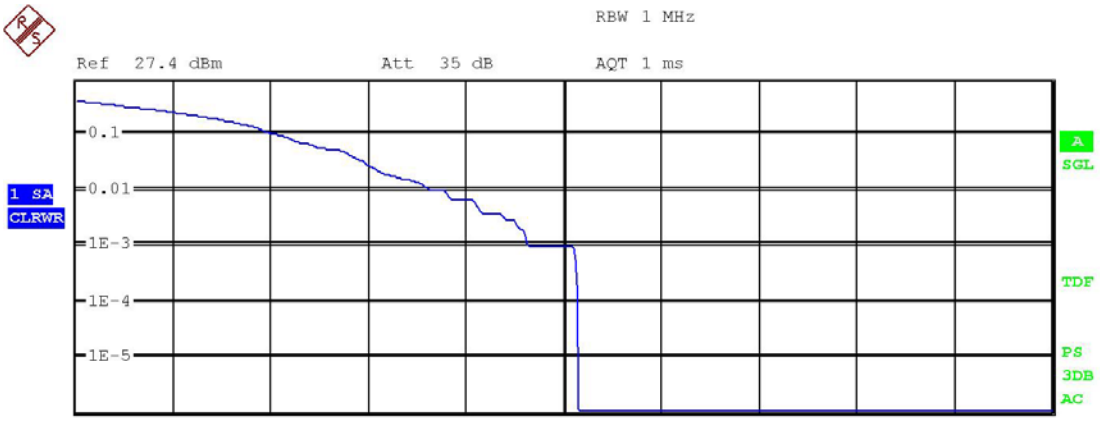
PEAK EXCURSION

Test Data: 20 MHz Bandwidth Port A Plot



Complementary Cumulative Distribution Function
NOF samples: 1000, Usable BW: 852kHz

	Trace 1
Mean	5.41 dBm
Peak	13.13 dBm
Crest	7.72 dB
10 %	3.15 dB
1 %	5.67 dB
.1 %	7.64 dB
.01 %	7.74 dB

Date: 11.OCT.2016 00:05:00

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CONDUCTED EMISSION MASK

FCC Reference: FCC Part 2.1051, 90.210 (m)

IC Reference: RSS-GEN section 6.13, RSS – 111 section 5.5

Test Method: KDB 971168 D01 Section 4.2 and Notes Below

Results: Meets Requirements

Notes:

1. 15 dB attenuator and RF cable were used to connect measurement equipment to the RF output ports of EUT. The insertion loss of this measurement path was calibrated prior to testing. A transducer factor was then compensated into the measurement results

2. The EUT was transmitting at maximum power with ≥98% duty cycle during the test

3. The data rate 6 Mbps was selected for testing on the basis of being the worst case. Three places in the band on both antenna chains were investigated for each channel bandwidth with minimal differences. Only one antenna port is reported.

4. Power is measured using trace averaging over 100 sweeps during a period of continuous transmission.

5. The 0 dB reference level in the unwanted emission mask is the maximum in-band power spectral density measured in terms of average power in the equipment's channel bandwidth

6. The unwanted power spectral density emissions are also measured using the same resolution and video bandwidths used in measuring the reference in-band power spectral density

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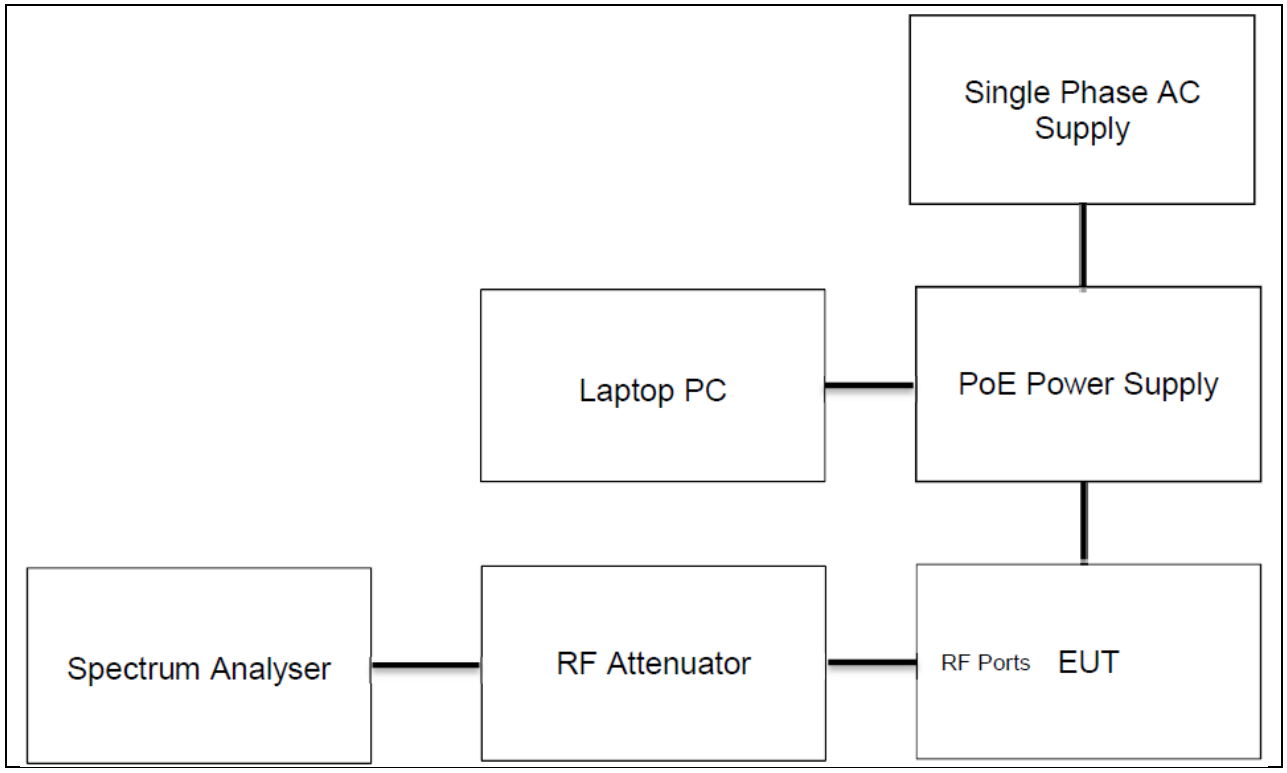
CONDUCTED EMISSION MASK

Test Setup:



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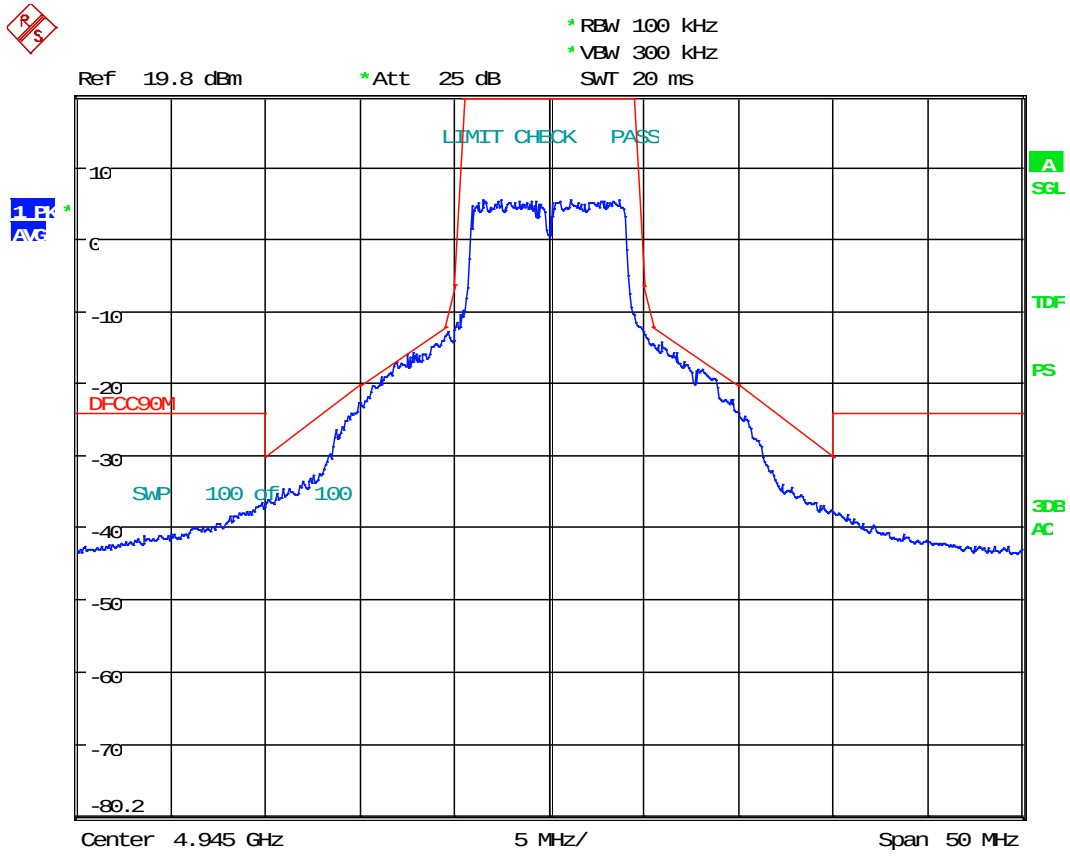
CONDUCTED EMISSION MASK

Test Data: 10 MHz Bandwidth Port A Low Channel Plot



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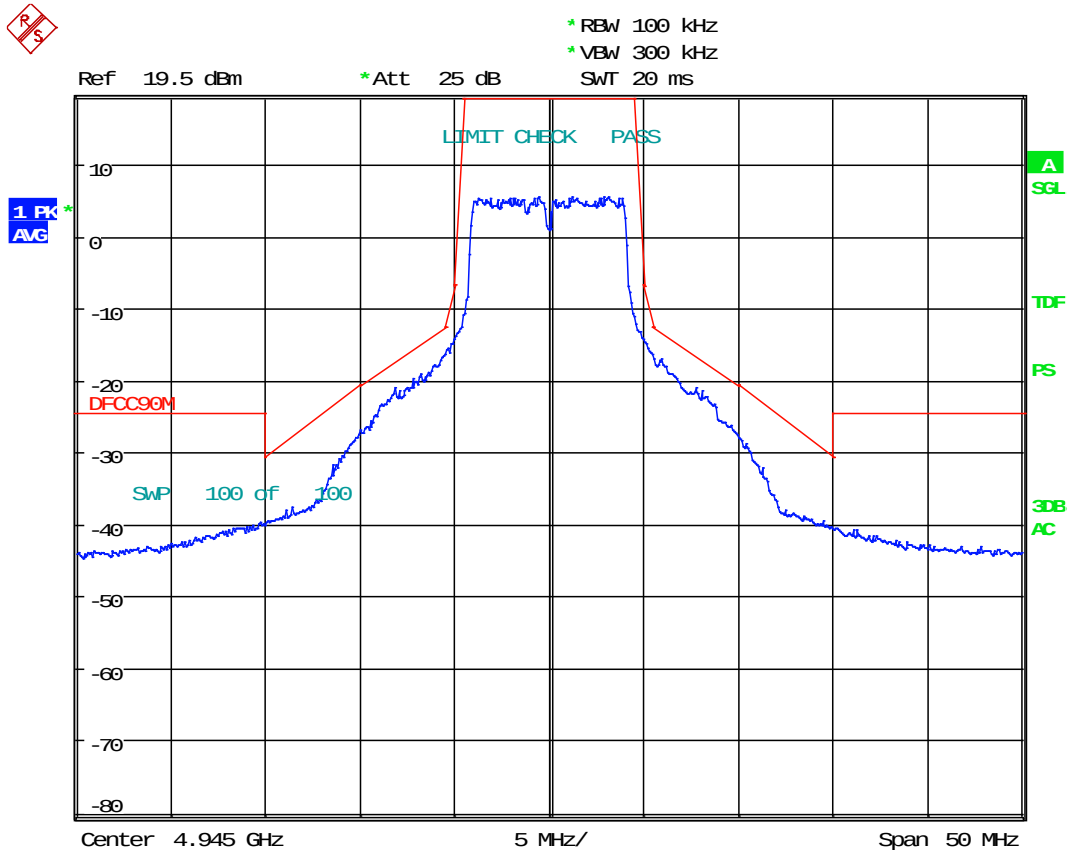
CONDUCTED EMISSION MASK

Test Data: 10 MHz Bandwidth Port B Low Channel Plot



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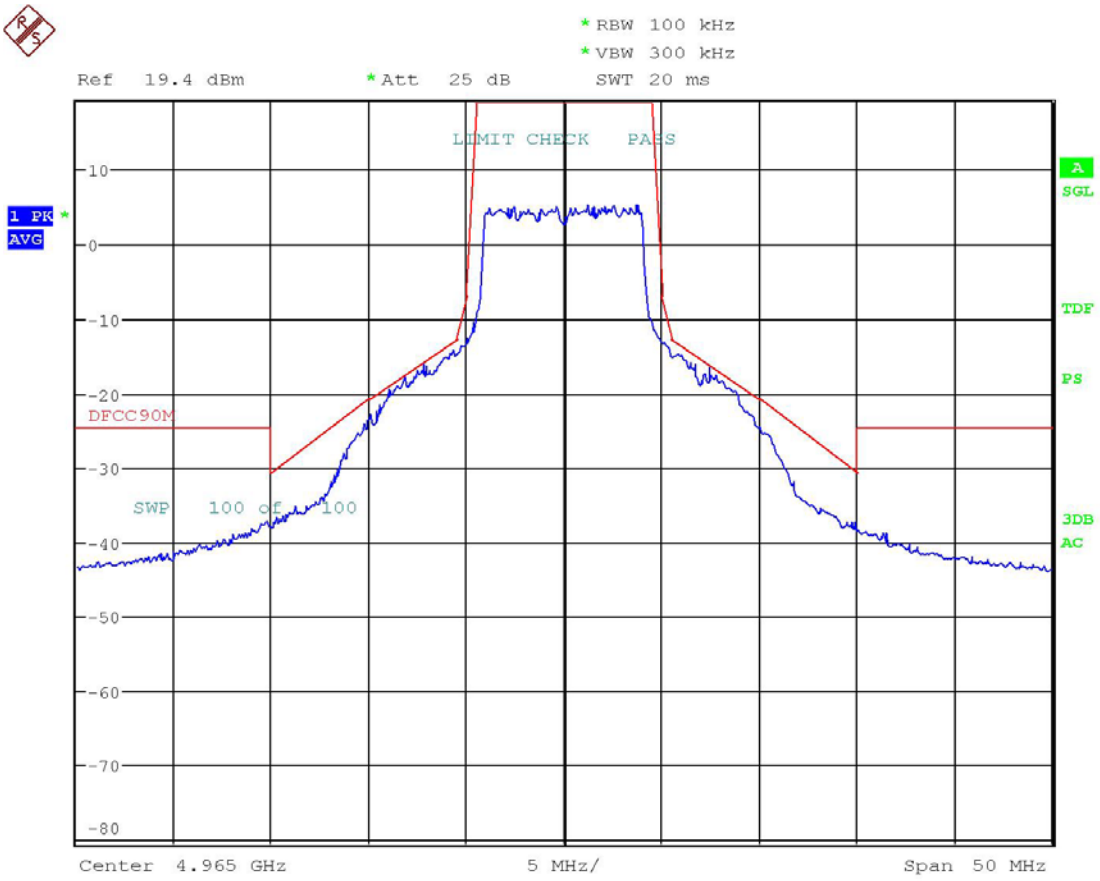
CONDUCTED EMISSION MASK

Test Data: 10 MHz Bandwidth Port A Middle Channel Plot



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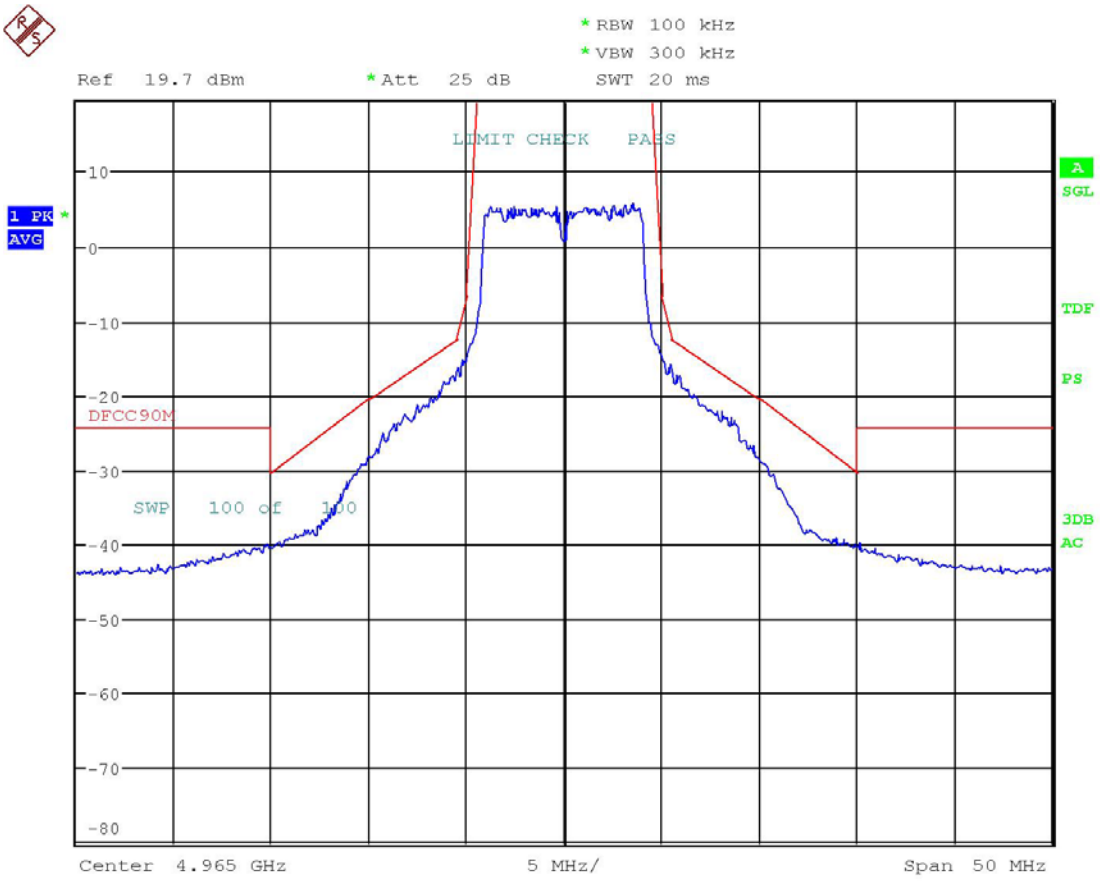
CONDUCTED EMISSION MASK

Test Data: 10 MHz Bandwidth Port B Middle Channel Plot



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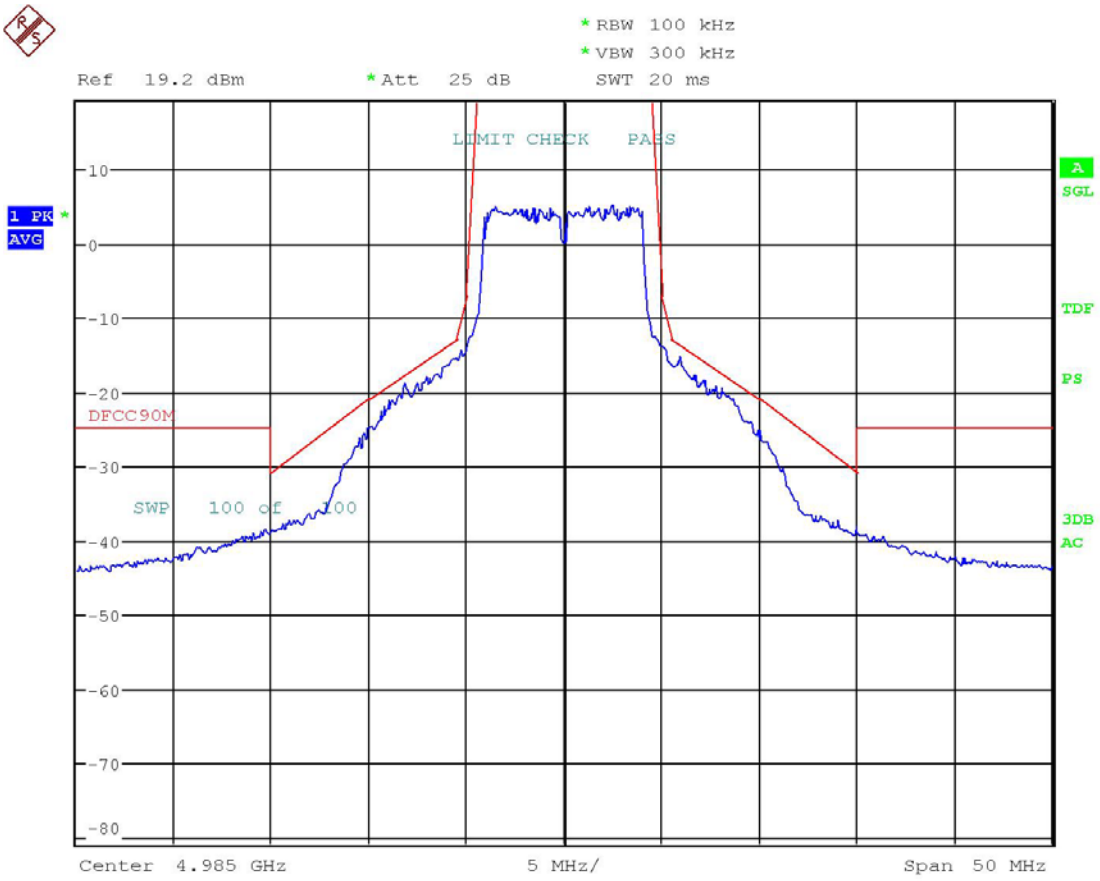
CONDUCTED EMISSION MASK

Test Data: 10 MHz Bandwidth Port A High Channel Plot



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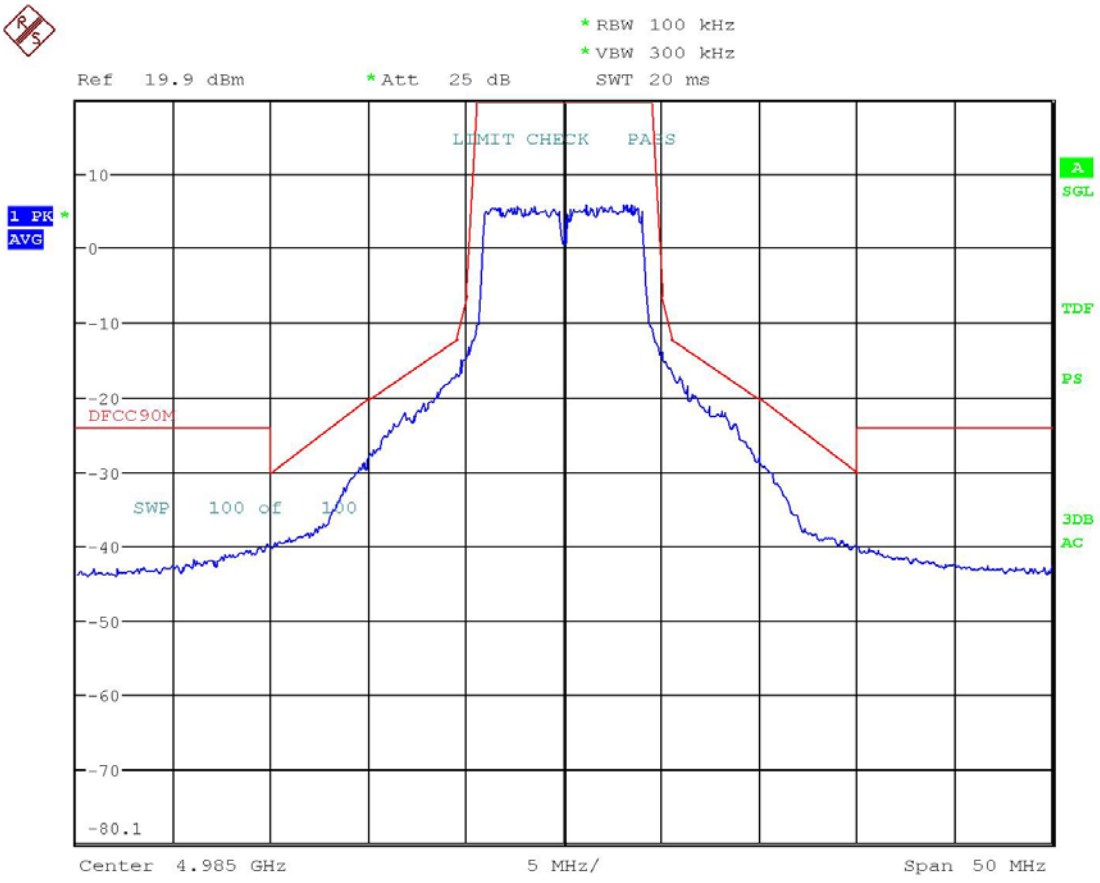
CONDUCTED EMISSION MASK

Test Data: 10 MHz Bandwidth Port B High Channel Plot



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CONDUCTED EMISSION MASK

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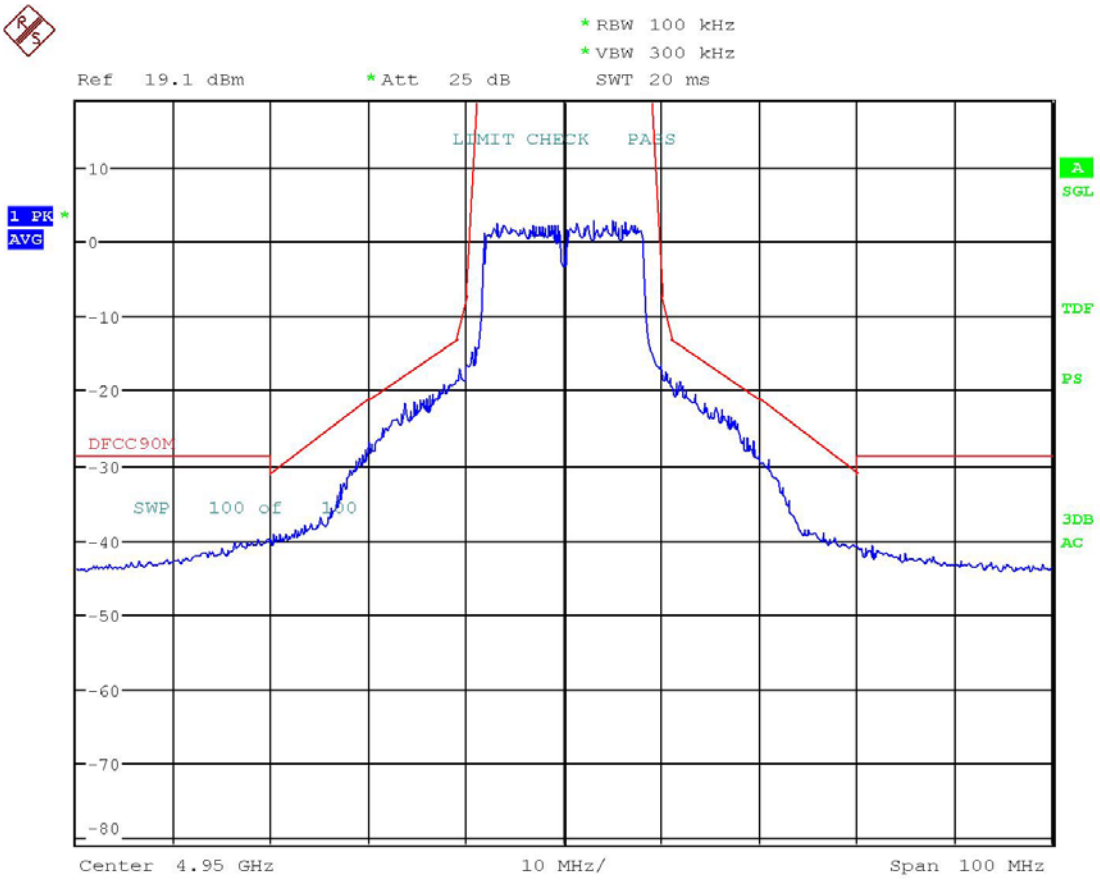

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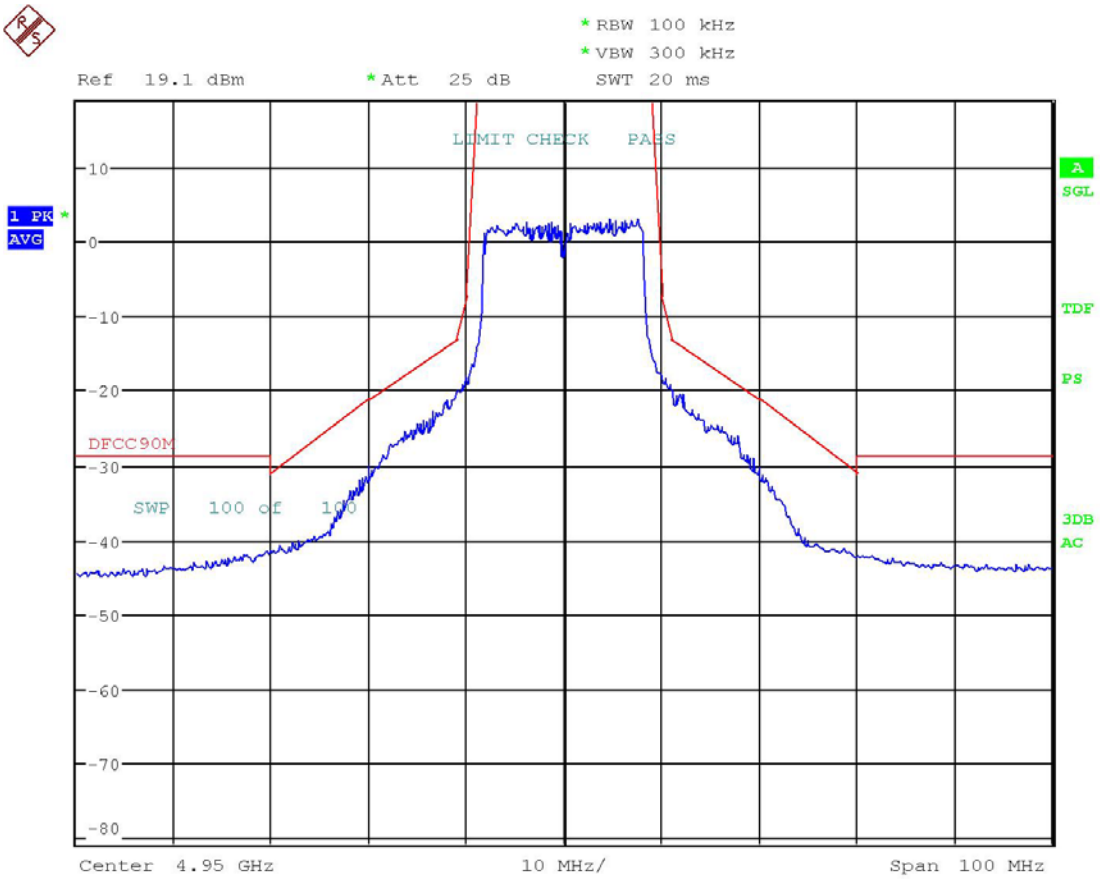
CONDUCTED EMISSION MASK

Test Data: 20 MHz Bandwidth Port B Low Channel Plot



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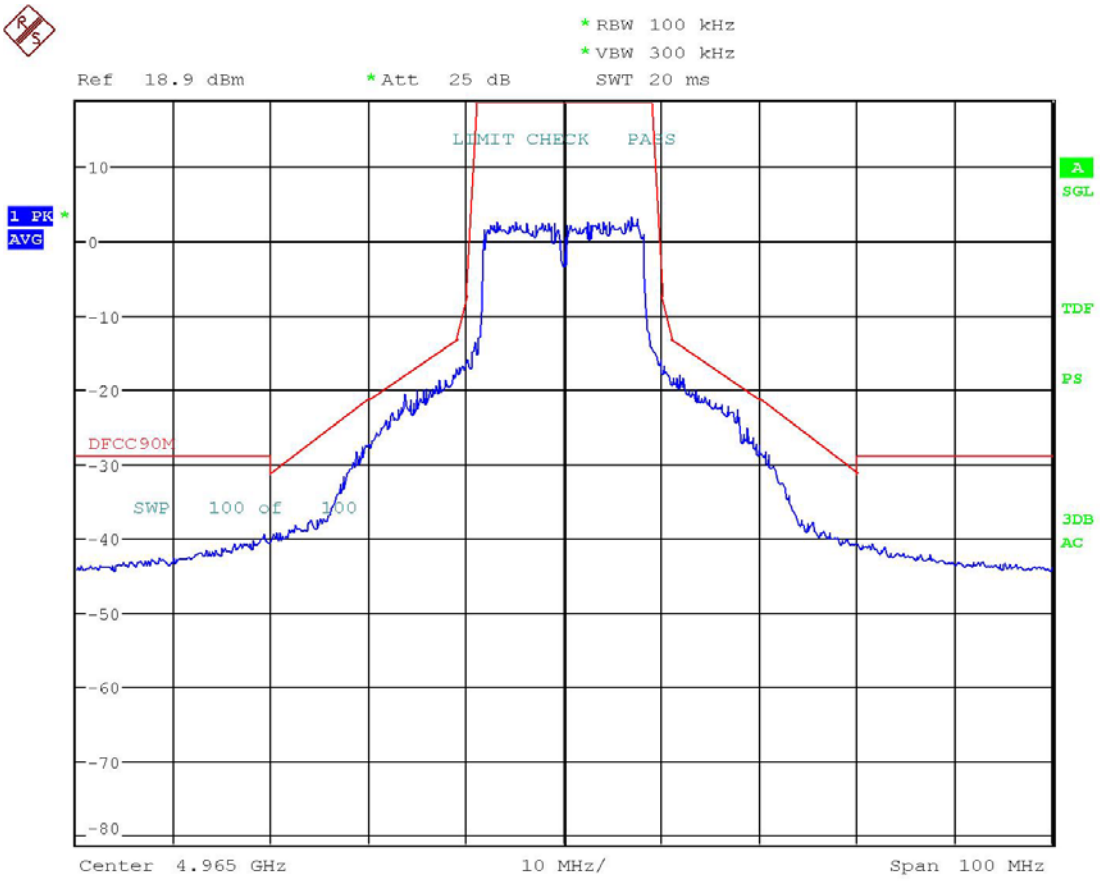
CONDUCTED EMISSION MASK

Test Data: 20 MHz Bandwidth Port A Middle Channel Plot



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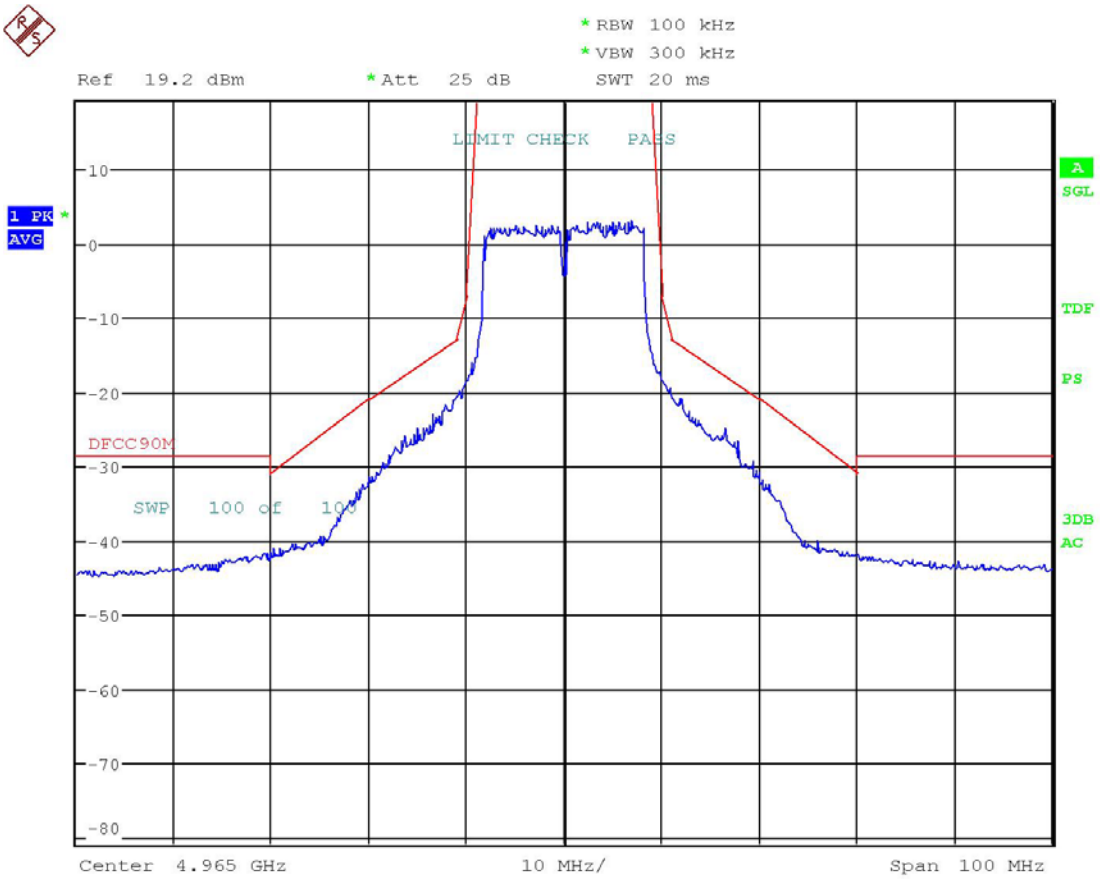
CONDUCTED EMISSION MASK

Test Data: 20 MHz Bandwidth Port B Middle Channel Plot



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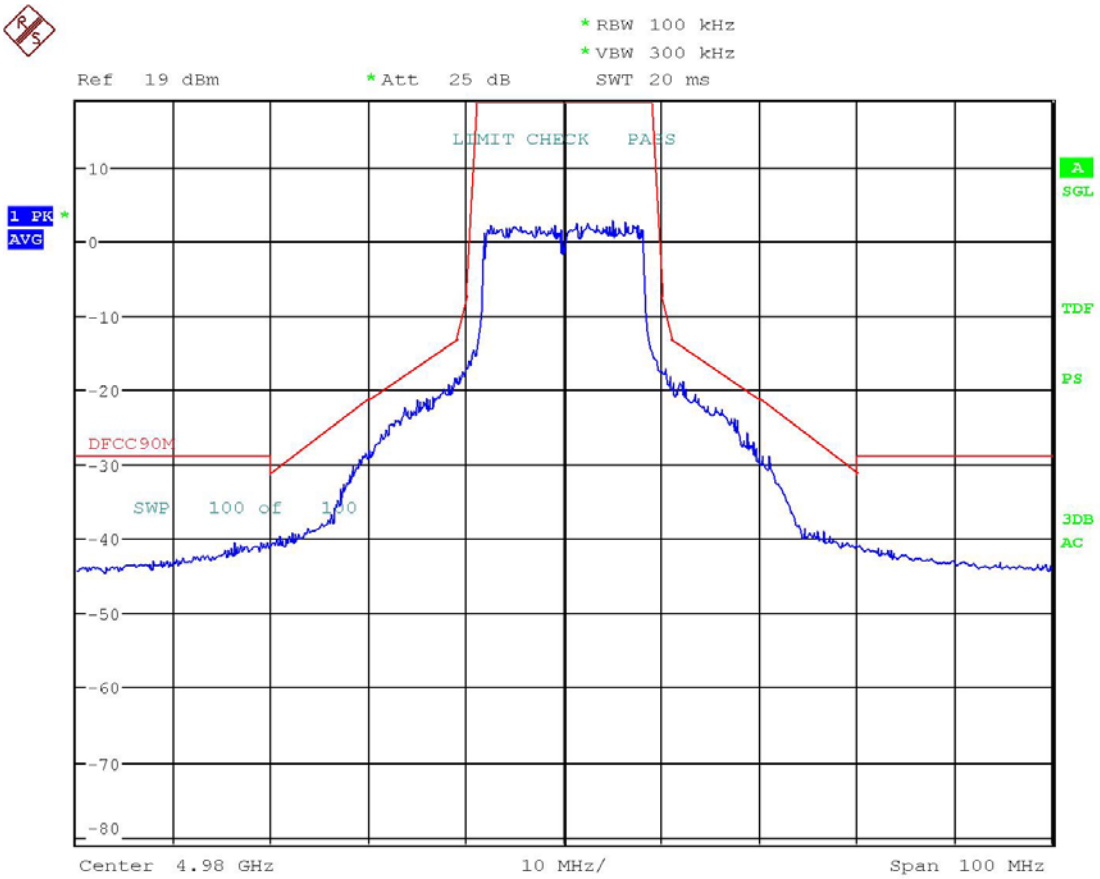
CONDUCTED EMISSION MASK

Test Data: 20 MHz Bandwidth Port A High Channel Plot



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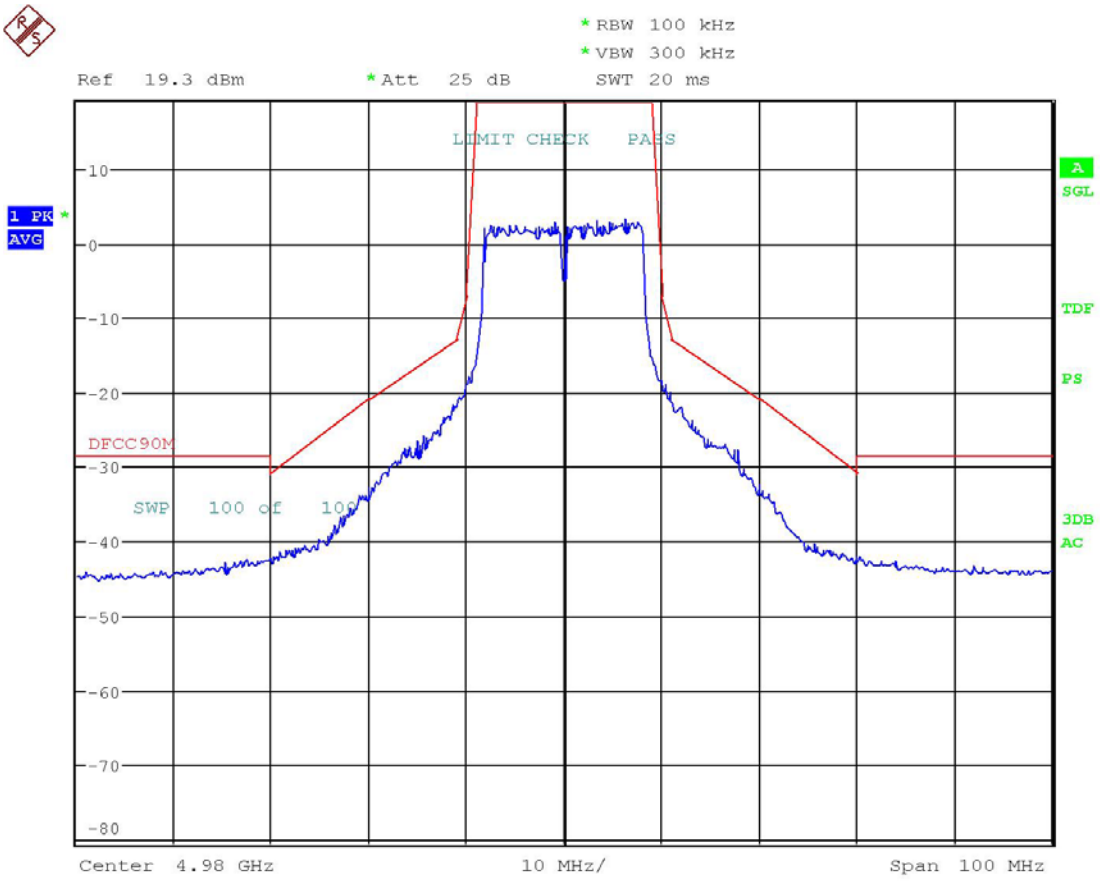
CONDUCTED EMISSION MASK

Test Data: 20 MHz Bandwidth Port B High Channel Plot



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CONDUCTED SPURIOUS EMISSIONS

FCC Reference: FCC Part 2.1051, 90.210 (m)(6)(7)

IC Reference: RSS-GEN section 6.13, RSS-111 section 5.5

Test Method: KDB 971168 D01 Section 4.2 and Notes Below

Results: Meets Requirements

Notes:

1. 3 dB of external attenuation, 5 GHz notch filter, 18 GHz high pass filter, and RF cable were used to connect measurement equipment to the RF output ports of EUT. The insertion loss of this measurement path was calibrated prior to testing and a transducer factor generated into the measurement equipment.

2. The measurement equipment is calibrated in terms of an RMS-equivalent voltage.

3. Power is measured using trace averaging over 100 sweeps during a period of continuous transmission.

4. The EUT was transmitting at maximum power with ≥98% duty cycle during the test.

5. The data rate 6 Mbps was selected for testing on the basis of being the worst case. Three places in the band on both antenna chains were investigated for each channel bandwidth. The worst case configuration is reported.

6. Power from both antenna ports was combined using the measure-and-sum method stated in FCC KDB 662911 D02.

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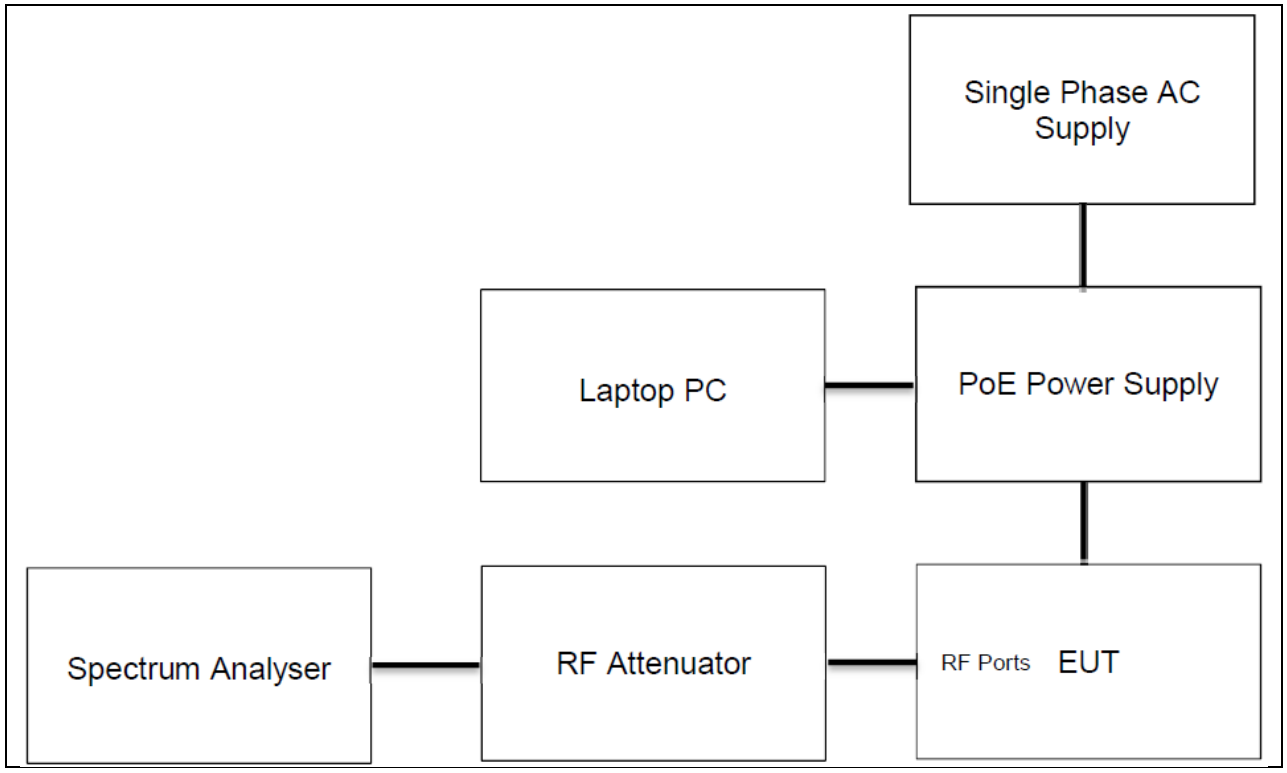
CONDUCTED SPURIOUS EMISSIONS

Test Setup:



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CONDUCTED SPURIOUS EMISSIONS

Test Data: Measurement Results Table

Conducted Spurious Emissions						
Tuned Freq (MHz)	4945.0	Bandwidth (MHz)		10.0	Power (W)	0.186
Emission Freq (MHz)	P_{cond1} (dBm)	P_{cond2} (dBm)	P_{total} (dBm)	Emission Level (dBc)	Emission Limit (dBc)	Margin (dB)
3299.7	-47.6	-48.3	-44.9	67.6	47.7	19.9
5265.5	-38.8	-35.2	-33.6	56.3	47.7	8.6
6578.2	-41.9	-41.4	-38.6	61.3	47.7	13.6
9890.0	-42.3	-37.4	-36.2	58.9	47.7	11.2
14835.0	-46.2	-37.9	-37.3	60.0	47.7	12.3

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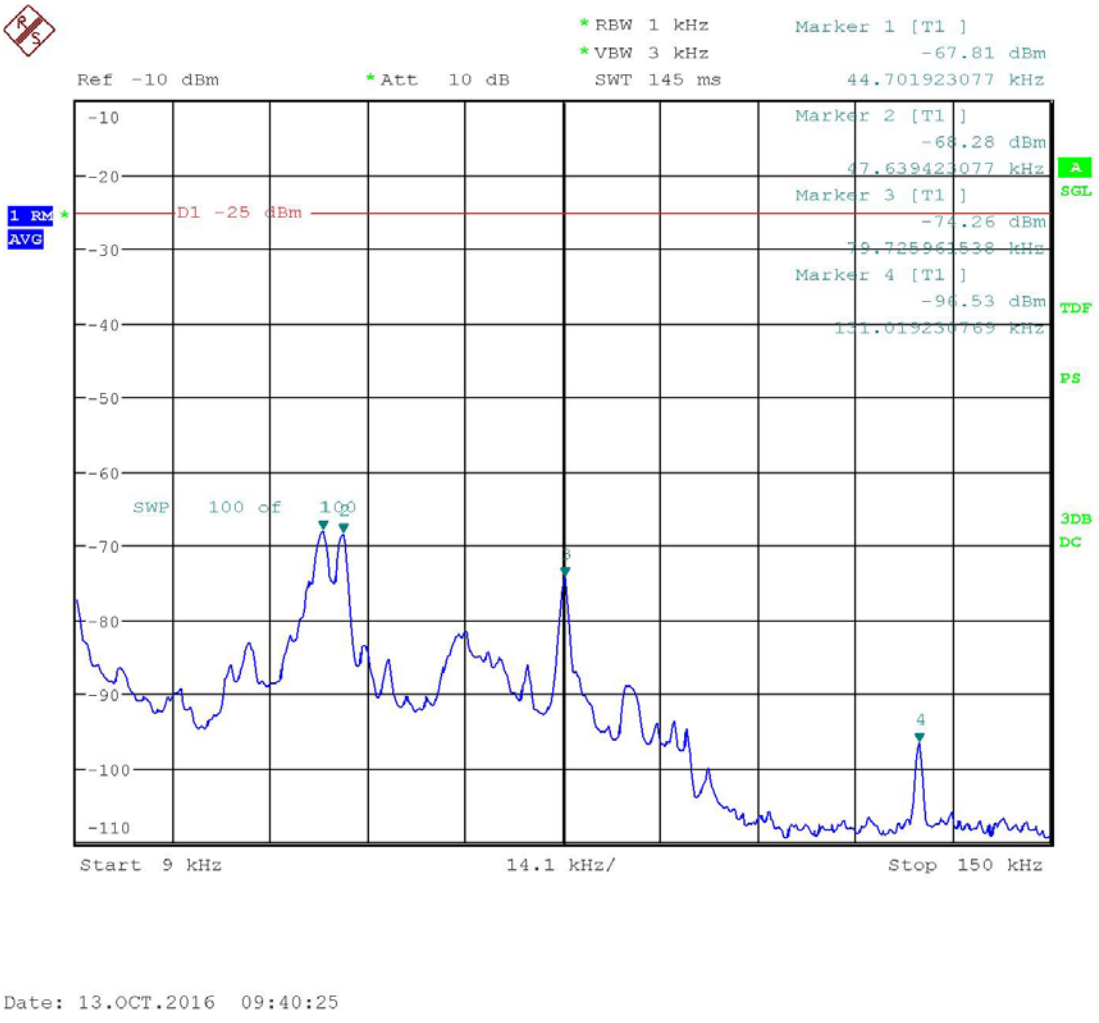
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port A Low Channel Plot 1



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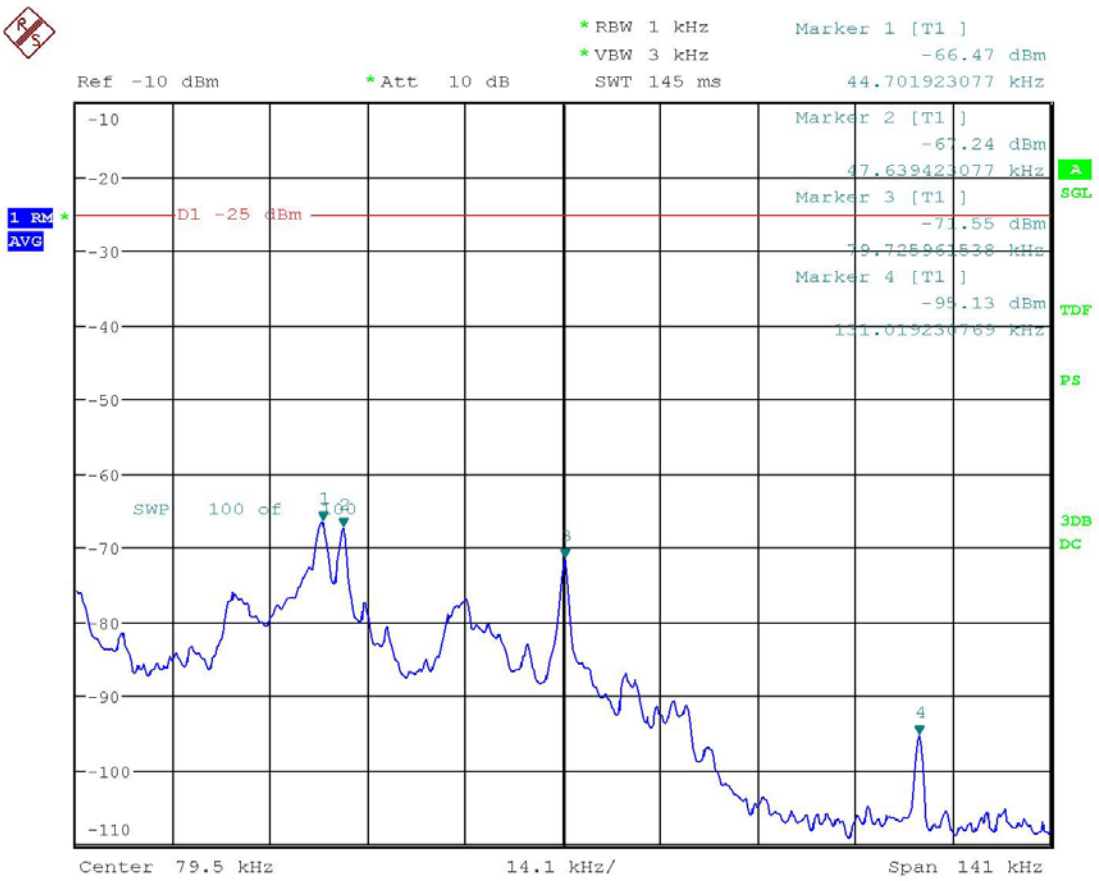
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port B Low Channel Plot 1



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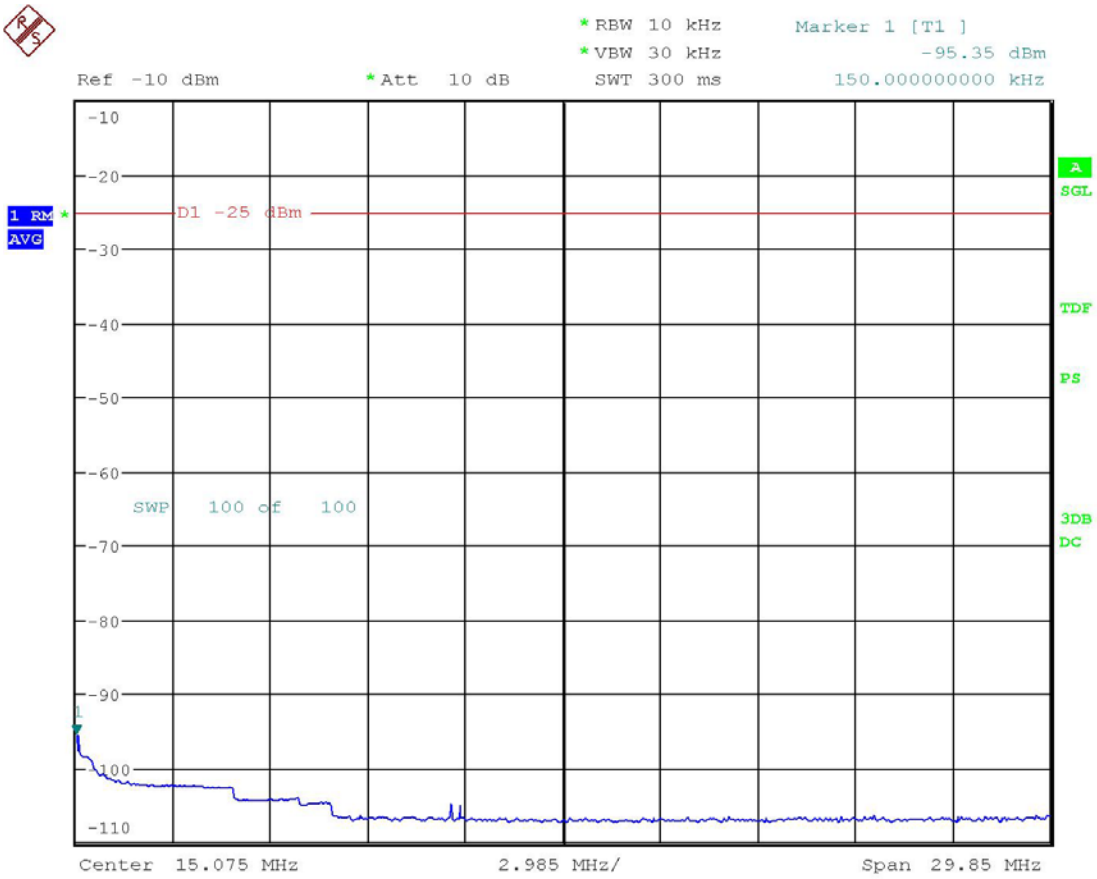
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port A Low Channel Plot 2



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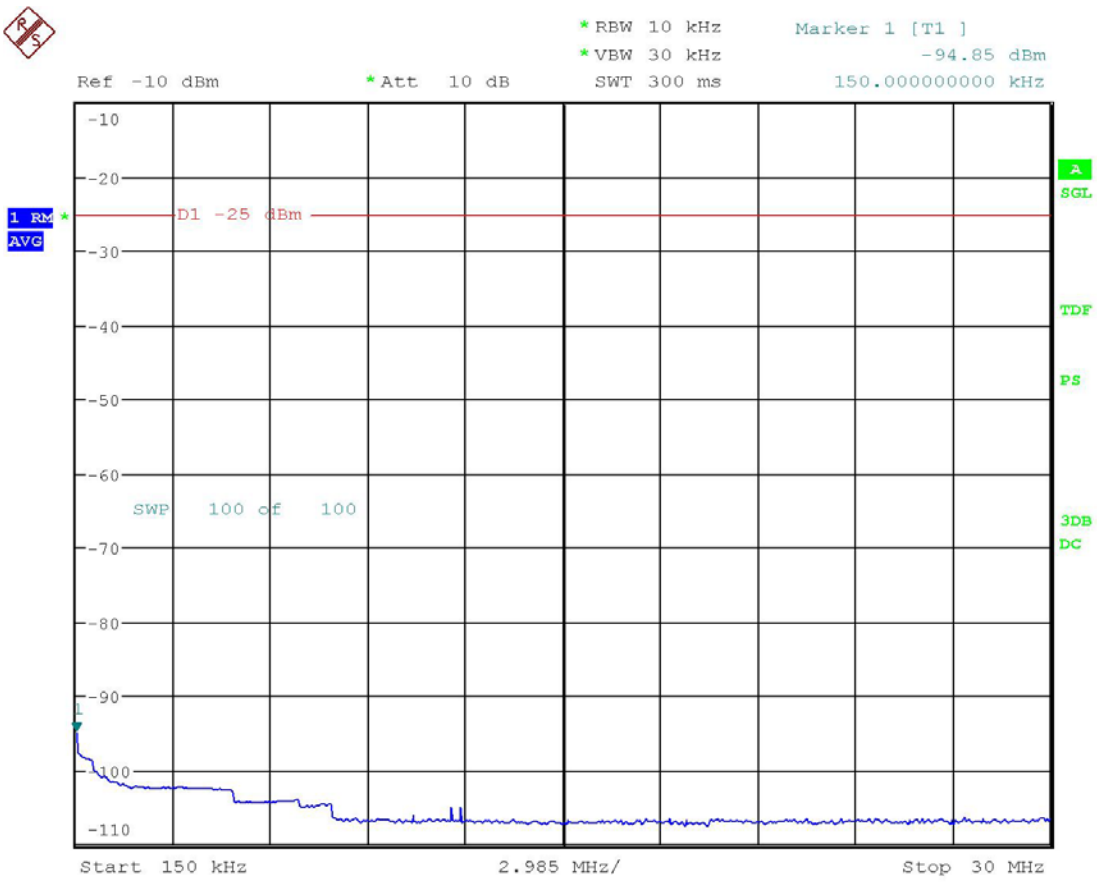
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port B Low Channel Plot 2



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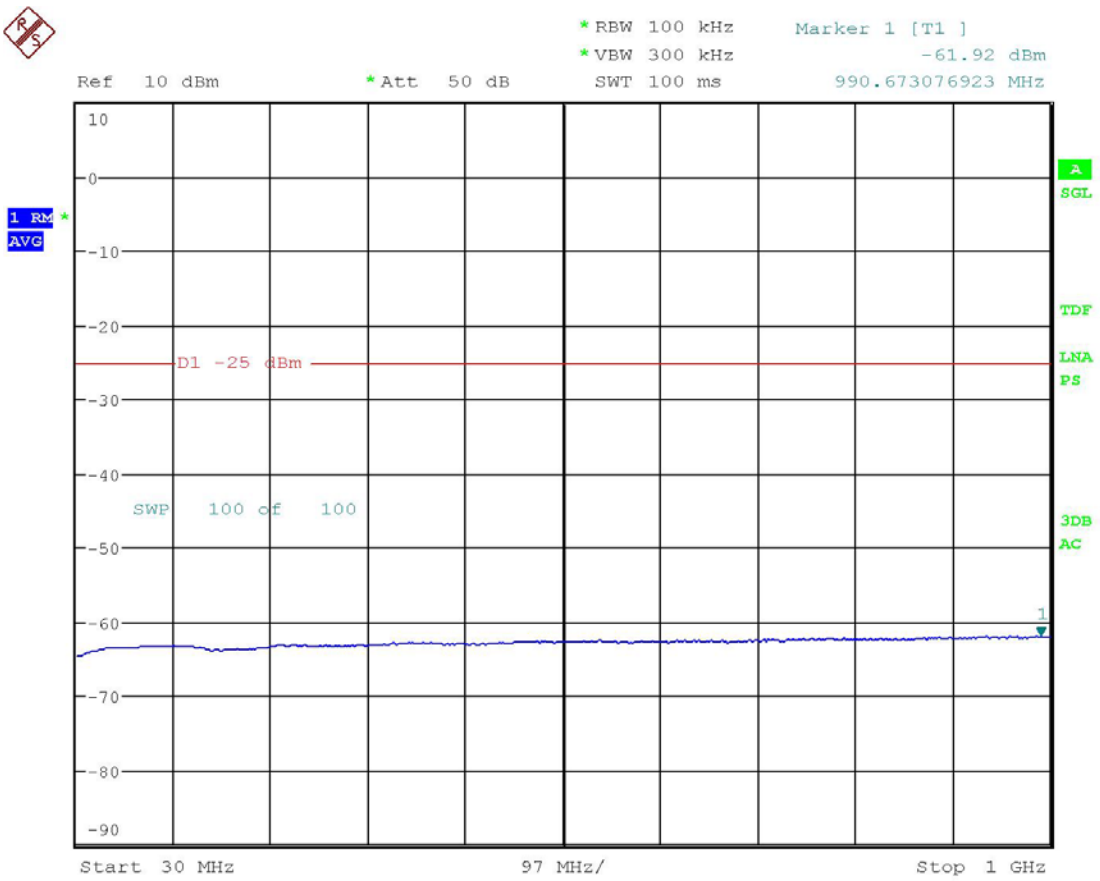
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port A Low Channel Plot 3



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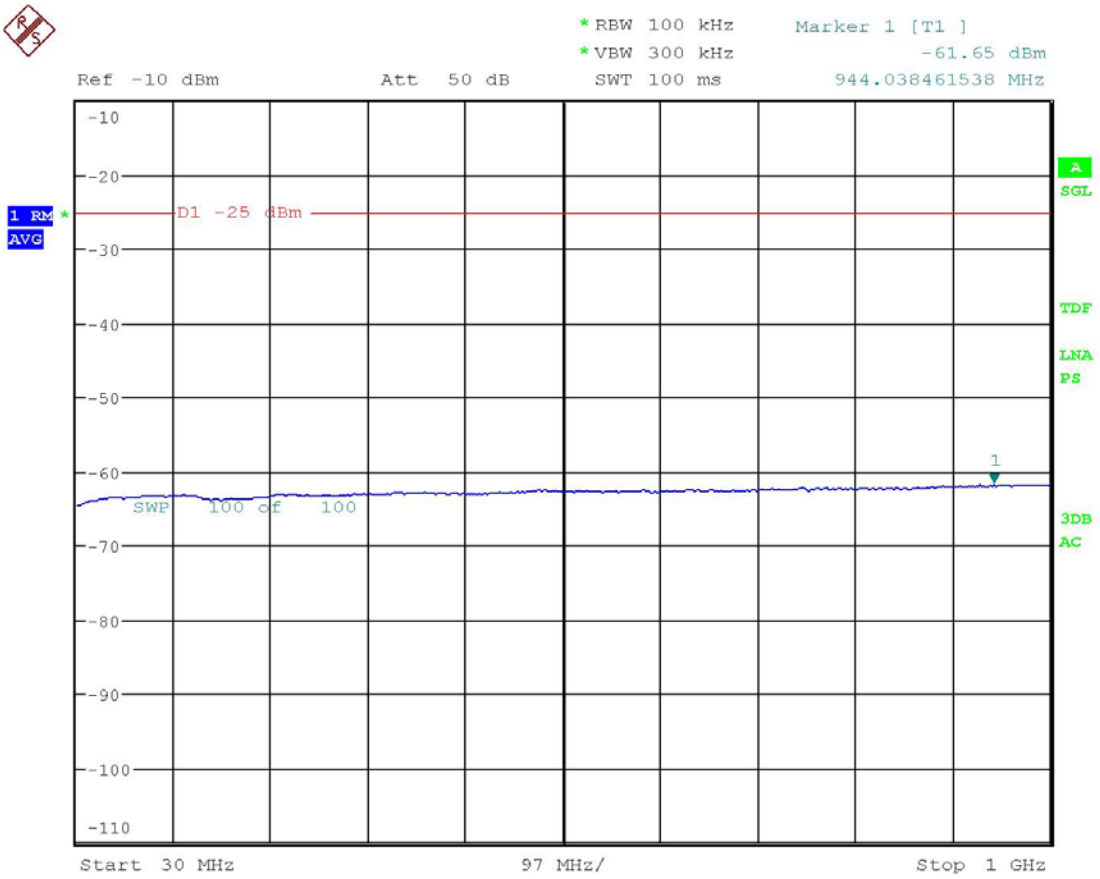
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port B Low Channel Plot 3



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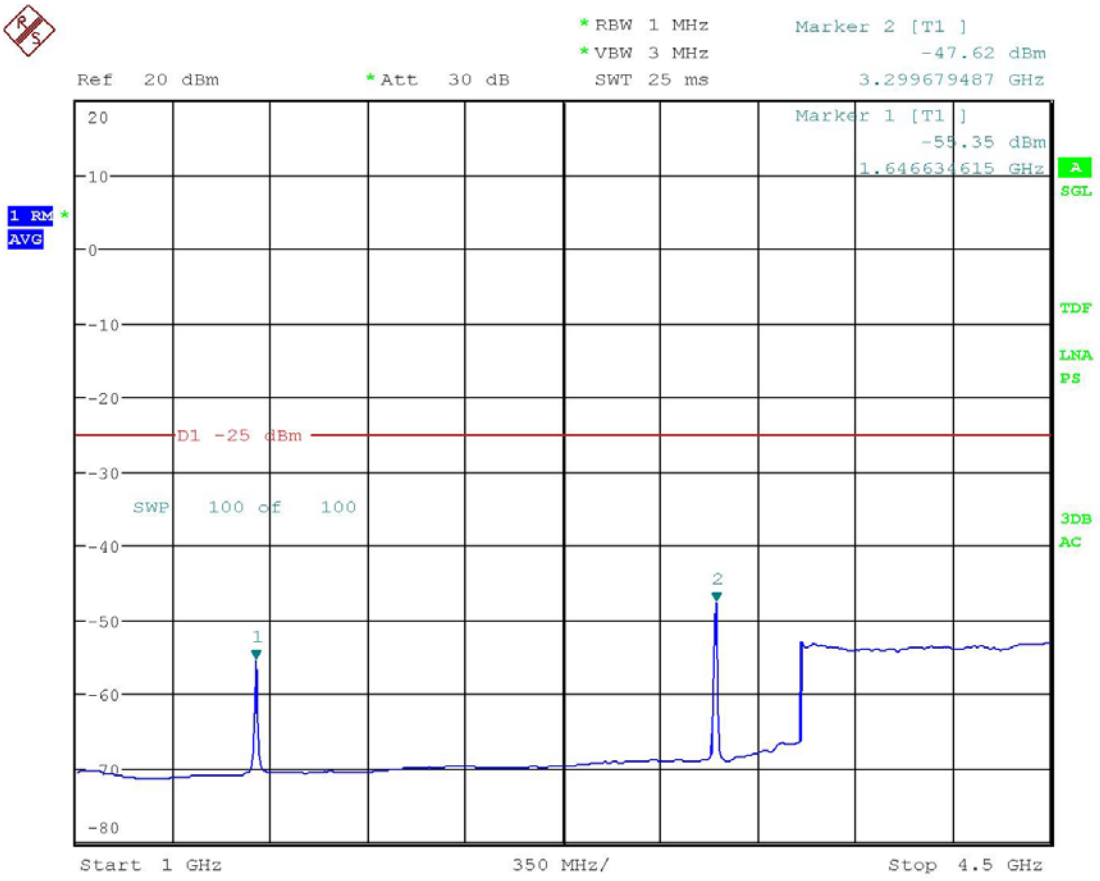
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port A Low Channel Plot 4



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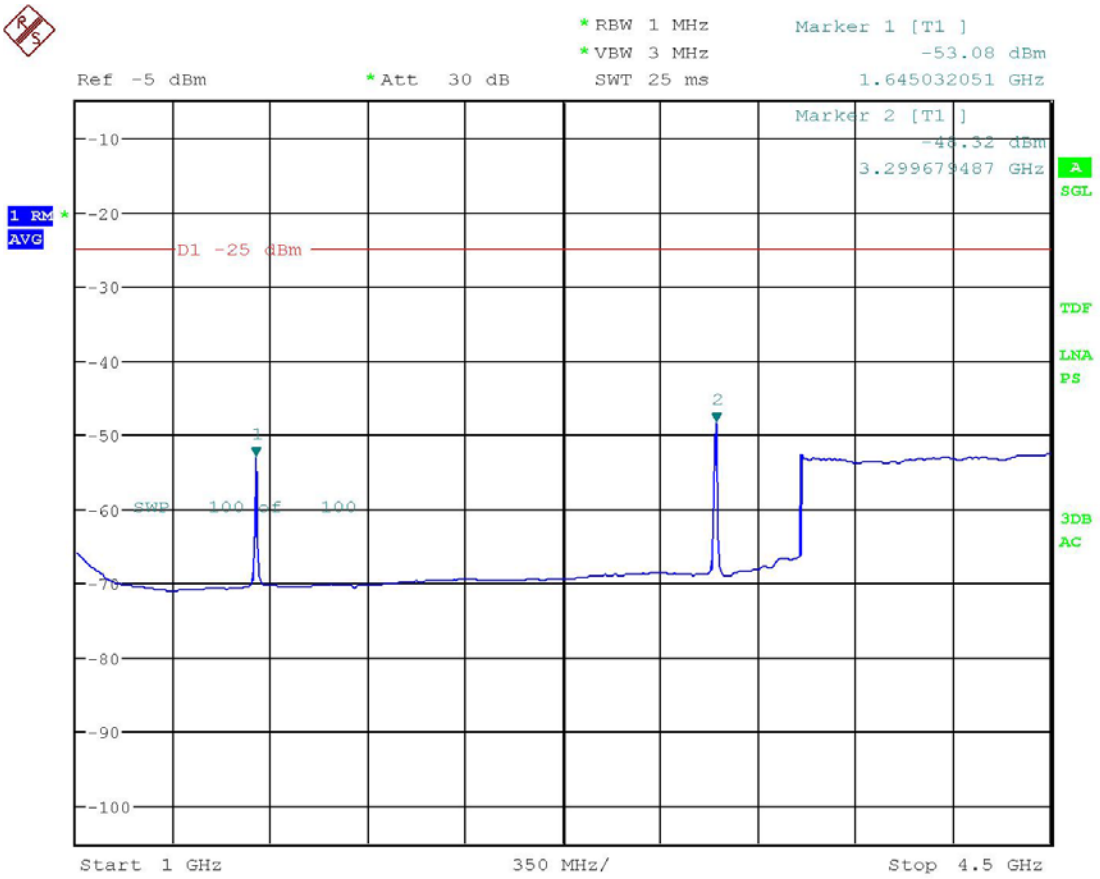
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port B Low Channel Plot 4



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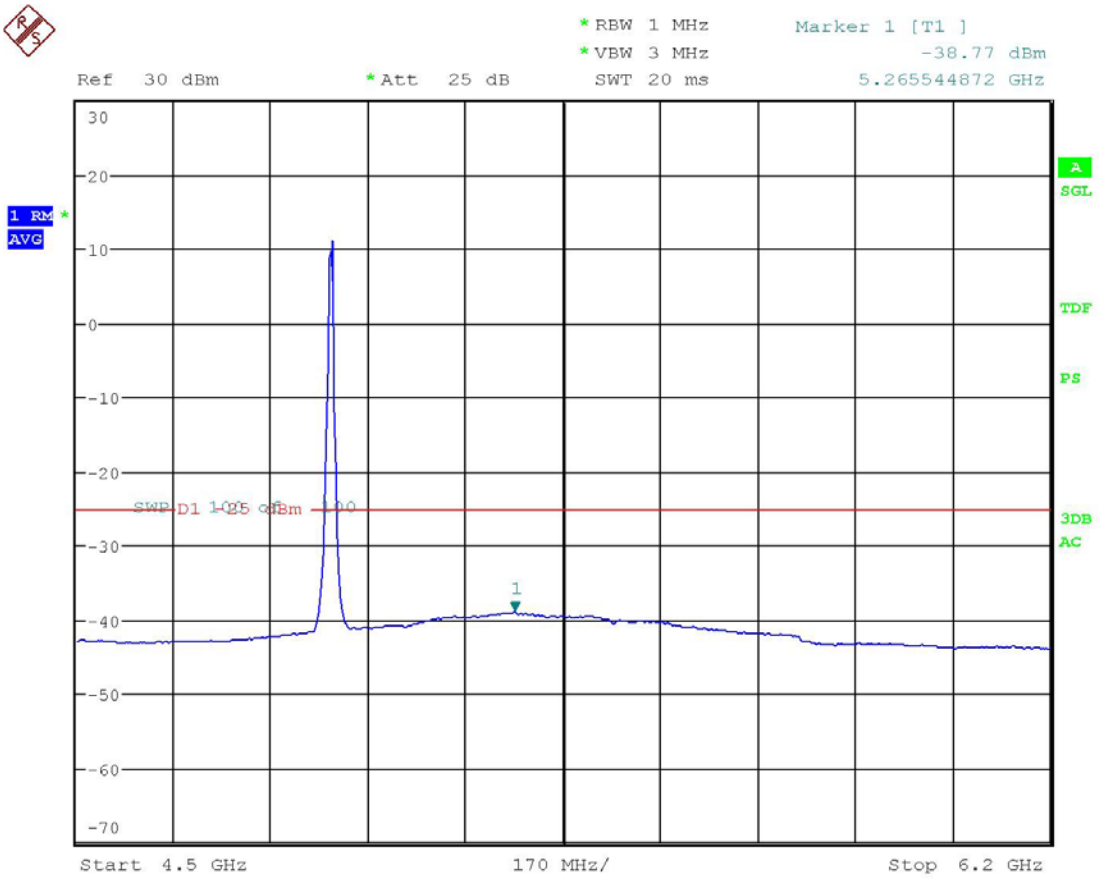
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port A Low Channel Plot 5



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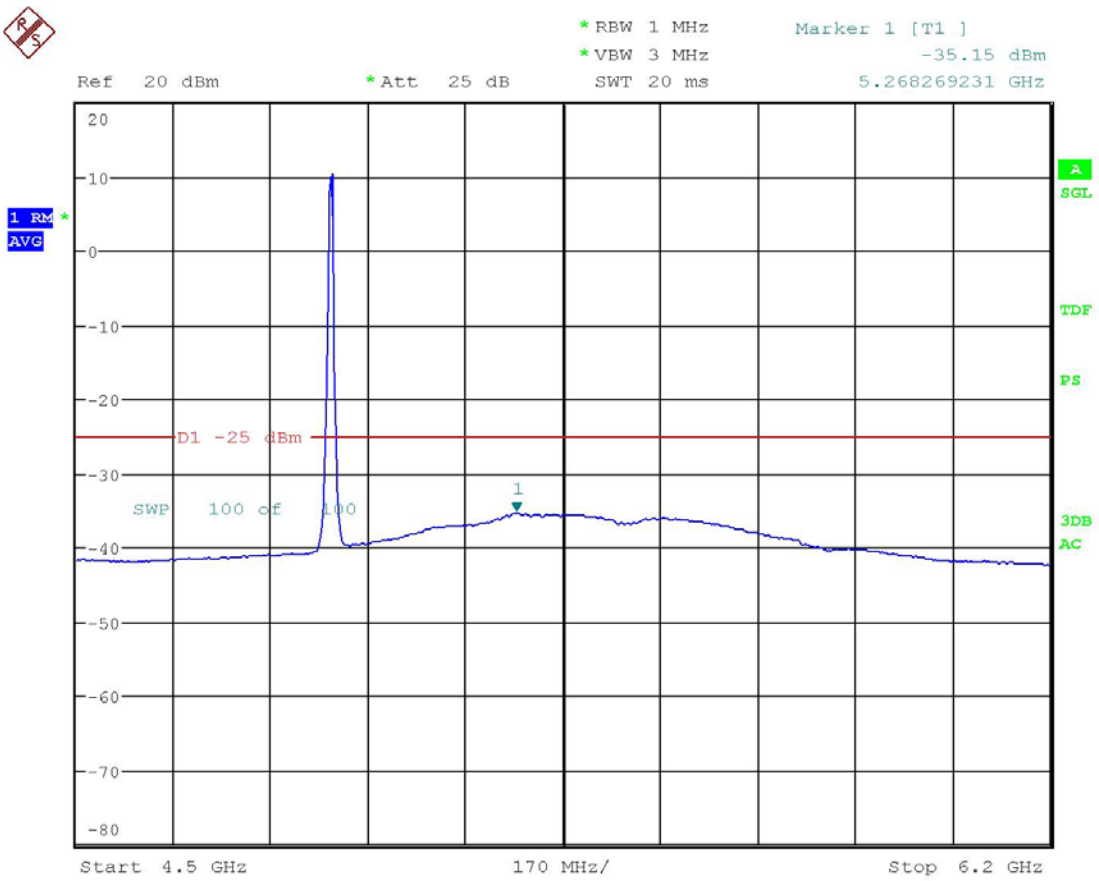
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port B Low Channel Plot 5



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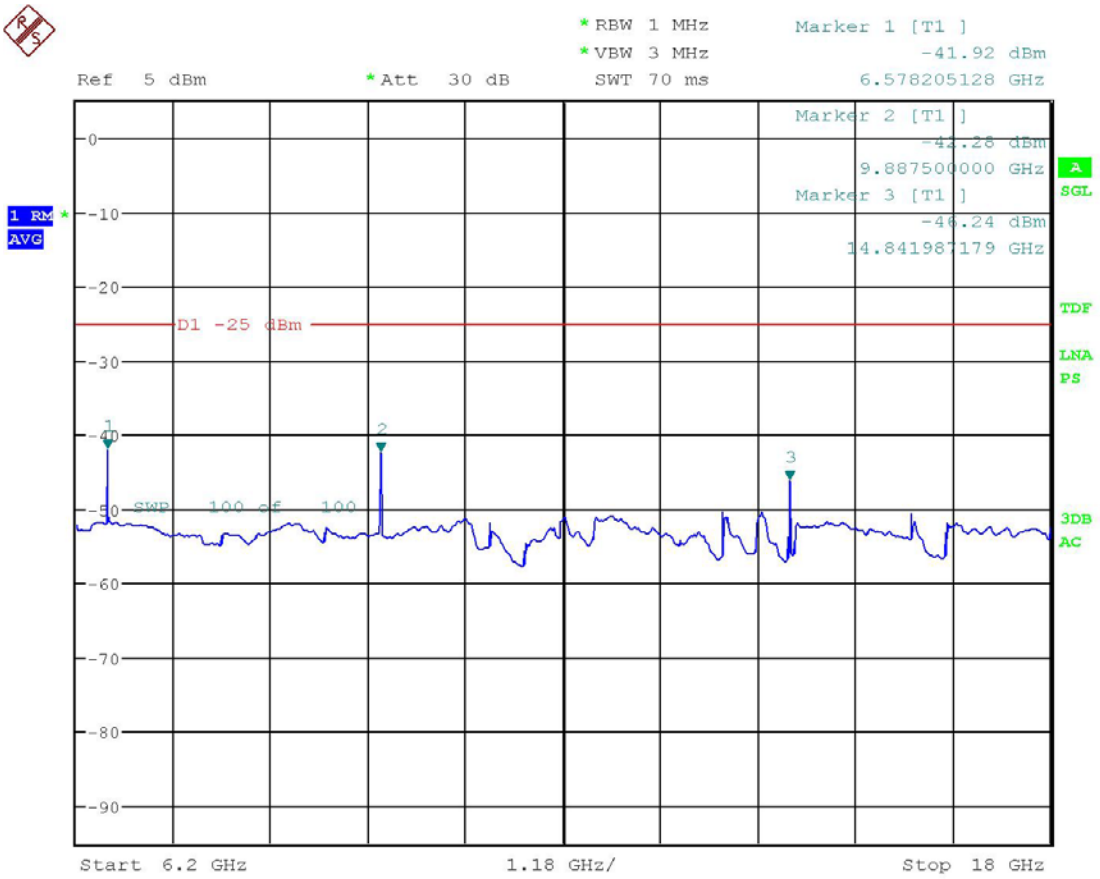
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port A Low Channel Plot 6



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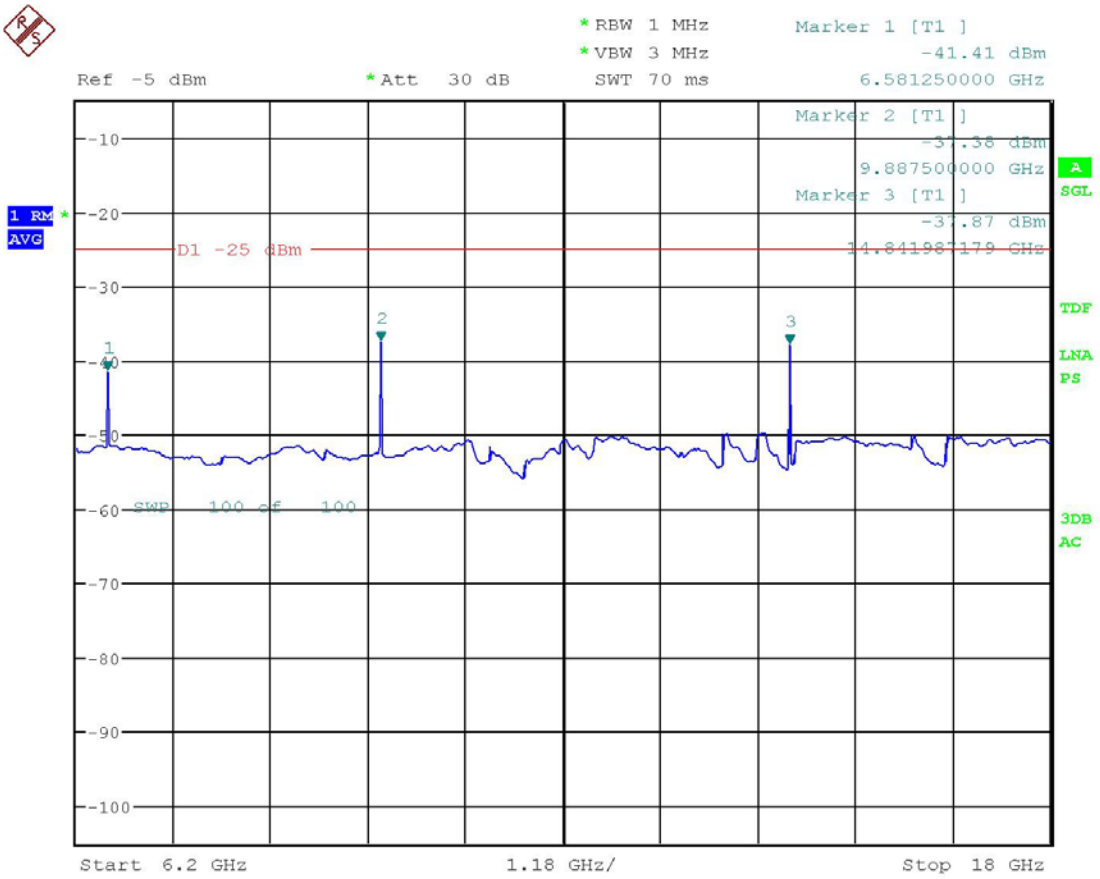
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port B Low Channel Plot 6



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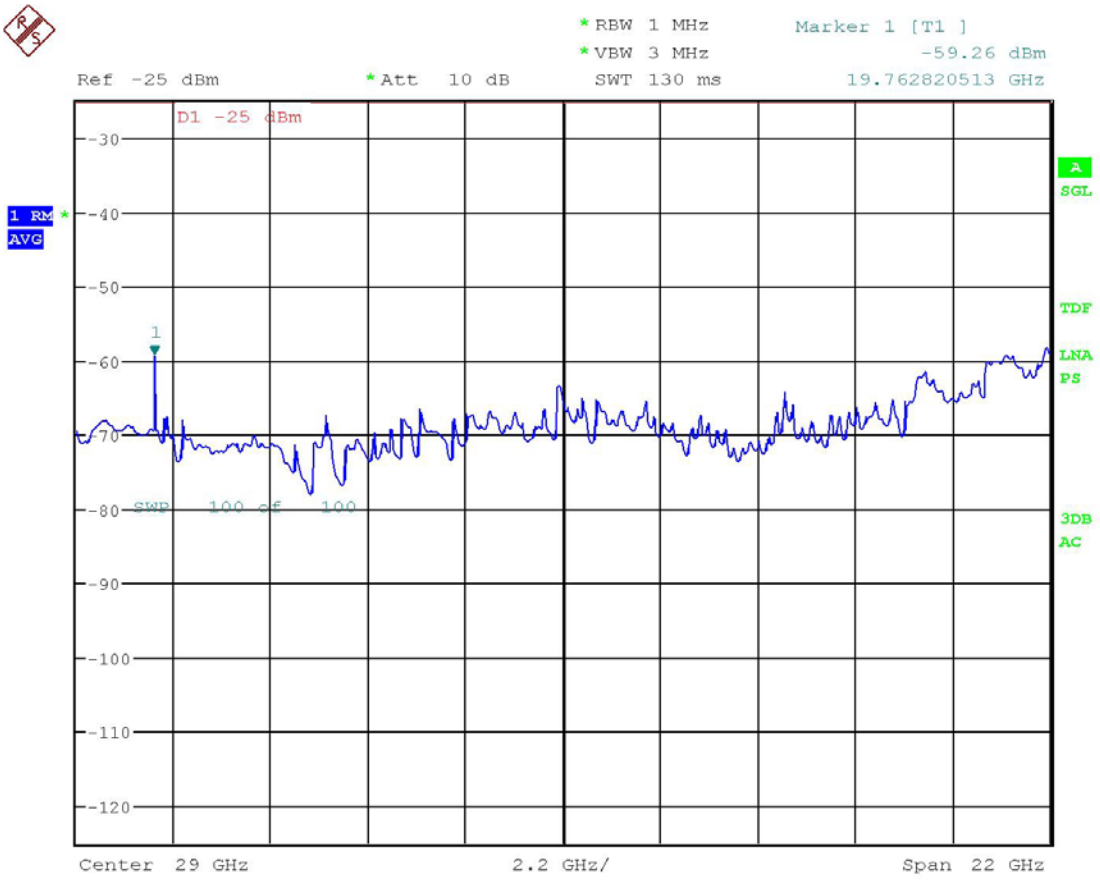
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port A Low Channel Plot 7



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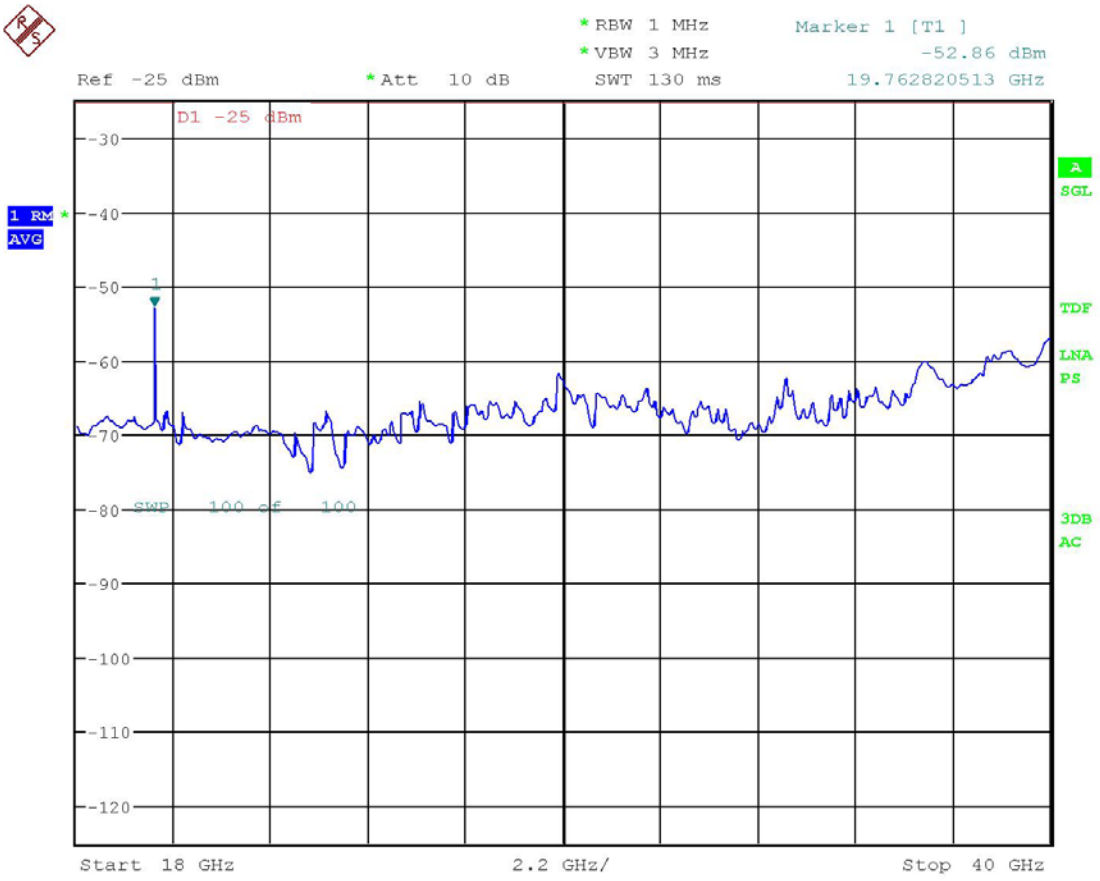
CONDUCTED SPURIOUS EMISSIONS

Test Data: 10 MHz Bandwidth Port B Low Channel Plot 7



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RADIATED SPURIOUS EMISSIONS

FCC Reference: FCC Part 2.1053, 90.210 (m)(6)(7)

IC Reference: RSS-GEN section 6.13, RSS-111 section 5.5

Test Method: KDB 971168 D01 Section 4.2 and Notes Below

Results: Meets Requirements

Notes:

1. Measurements below 7 GHz were performed at a distance of 3 meters, above 7 GHz a measurement distance of 1 meter was used. All measurements were performed in a semi-anechoic chamber.

2. The EUT was transmitting at maximum power with ≥98% duty cycle during the test

3. The data rate 6 Mbps was selected for testing on the basis of being the worst case. Three places in the band on both antenna chains were investigated with minimal differences in the occupied bandwidth, only one antenna chain and channel is reported.

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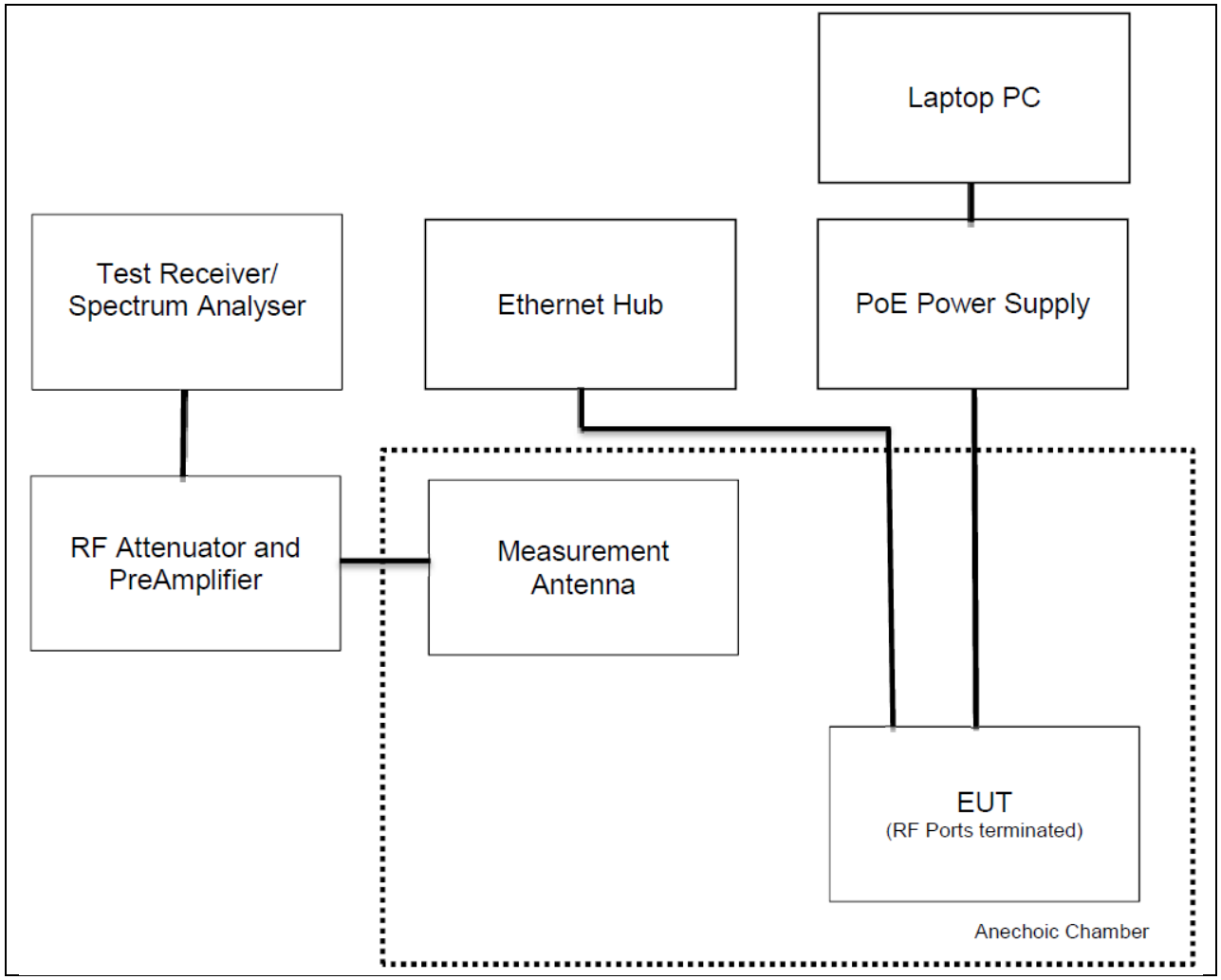
RADIATED SPURIOUS EMISSIONS

Test Setup:



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RADIATED SPURIOUS EMISSIONS

Test Data: Measurement Results Table

Radiated Spurious Emissions					
Tuned Freq (MHz)	4945.0	Bandwidth (MHz)	10.0	Power (W)	0.186
Emission Freq (MHz)	Polarity (H/V)	ERP (dBm)	Level (dBc)	Limit (dBc)	Margin (dB)
100.00	V	-33.8	56.5	47.7	8.8
233.33	H	-37.7	60.4	47.7	12.7
9890.00	H	-31.8	54.5	47.7	6.8
14835.00	V	-32.1	54.8	47.7	7.1
19780.00	V	-33.8	56.5	47.7	8.8
24725.00	V	-34.3	57.0	47.7	9.3

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FREQUENCY STABILITY

FCC Reference: FCC Part 2.1055

IC Reference: RSS-GEN section 6.11, RSS-111 section 5.2

Test Method: KDB 971168 D01 Section 4.2 and Notes Below

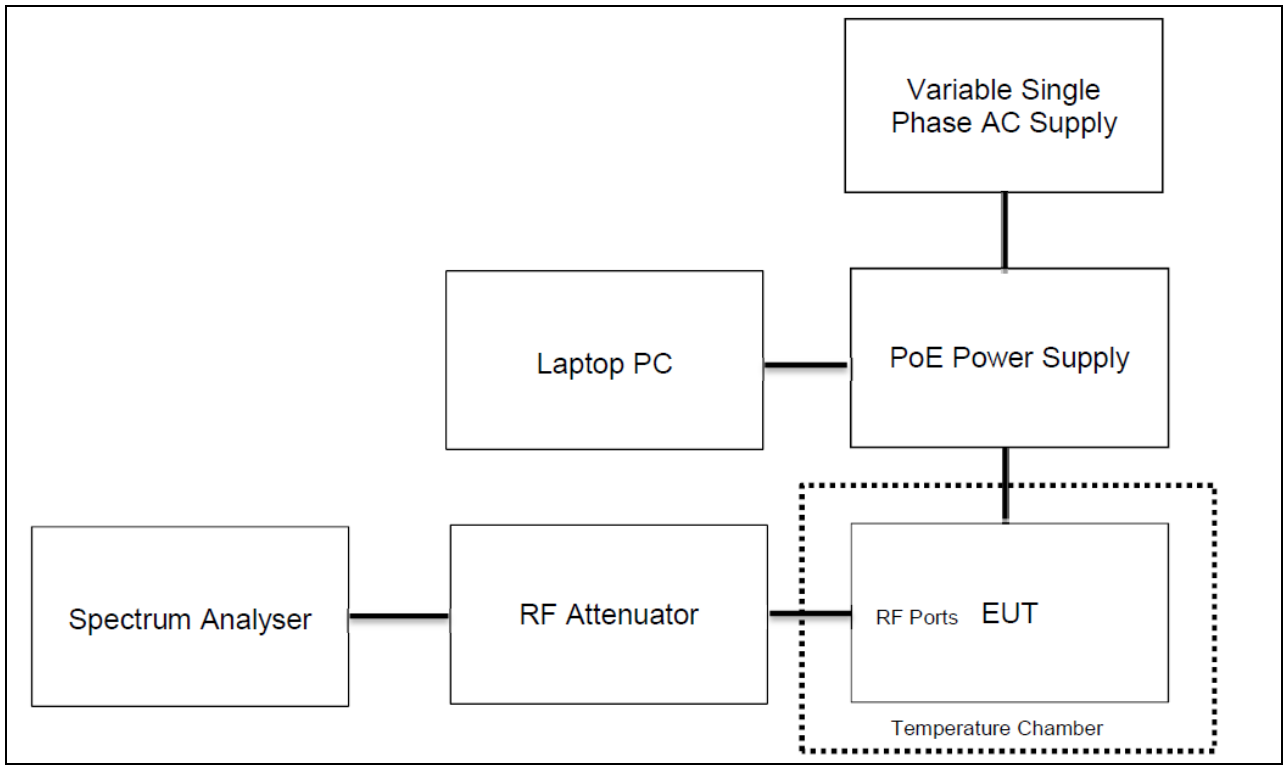
Results: Meets Requirements

Notes:

1. The EUT was transmitting at maximum power with ≥98% duty cycle during the test

2. The data rate 6 Mbps was selected for testing on the basis of being the worst case. Three places in the band on both antenna chains were investigated with minimal differences in the occupied bandwidth, only one antenna chain and channel is reported.

Test Setup:



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FREQUENCY STABILITY

Test Data: Measurement Table

Nominal Voltage (VAC)		120	Assigned Frequency (MHz)		4945.0
Temp (°C)	Voltage (VAC)	fl (MHz)	fh (MHz)	fc (MHz)	Deviation (PPm)
25	102	4940.81563	4949.12024	4944.967935	-6.5
25	120	4940.84770	4949.12024	4944.983970	-3.2
25	138	4940.81563	4949.12024	4944.967935	-6.5
50	120	4940.81563	4949.12024	4944.967935	-6.5
40	120	4940.84770	4949.12024	4944.983970	-3.2
30	120	4940.84770	4949.12024	4944.983970	-3.2
20	120	4940.87976	4949.12024	4945.000000	0.0
10	120	4940.87976	4949.15230	4945.016030	3.2
0	120	4940.87976	4949.15230	4945.016030	3.2
-10	120	4940.87976	4949.12024	4945.000000	0.0
-20	120	4940.81563	4949.08818	4944.951905	-9.7
-30	120	4940.75150	4949.02405	4944.887775	-22.7

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EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Band Reject Filter 5.6 GHz	Micro-Tronics	BRM50716-02	-G008	05/13/16	05/13/18
Attenuator K 6dB 2W DC-40	Narda	4768-6	1044-3	06/25/15	06/25/17
Antenna: Biconical 1096 Chamber	Eaton	94455-1	1096	07/14/15	07/14/17
Antenna: Log-Periodic 1122	Electro-Metrics	LPA-25	1122	07/14/15	07/14/17
Temperature Chamber LARGE	Tenney Engineering	TTRC	11717-7	09/01/16	09/01/18
Antenna: Standard Gain Horn 18.0-26.3 GHz	Systron Donner	DBE-520-20	Not Serialized	NA	NA
Antenna: Standard Gain Horn 26.5-40.2 GHz	Systron Donner	DBD-520-20	Not Serialized	NA	NA
Antenna: Standard Gain Horn 12.4-18.0 GHz	ATM	62-442-6	D262108-01	NA	NA
CHAMBER	Panashield	3M	N/A	04/25/16	12/31/17
Antenna: Double-Ridged Horn/ETS Horn 2	ETS-Lindgren Chamber	3117	00041534	02/25/15	02/25/17
EMI Test Receiver R & S ESIB 40 Screen Room	Rohde & Schwarz	ESIB 40	100274	08/16/16	08/16/18
Software: Field Strength Program	Timco	N/A	Version 4.0	NA	NA
Antenna: Active Loop	ETS-Lindgren	6502	00062529	11/18/15	11/18/17
Hygro-Thermometer	Extech	445703	0602	06/30/15	06/30/17
Type K J Thermometer	Martel	303	080504494	10/26/15	10/26/17
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	04/01/16	04/01/18
Coaxial Cable - Chamber 3 cable set (Primary)	Micro-Coax	Chamber 3 cable set (Primary)	KMKM-0244-01; KMKM-0670-00; KFKF-0198-01	08/08/16	08/08/18
High Pass Filter 18GHz	Micro-Tronics	HPS18771	-002	5/13/16	5/13/18
Attenuator K 3dB 2W DC-40G	Narda	4768-3	1023-2	06/25/15	06/25/17
Attenuator N 20dB 2W DC-13G	Narda	757C	30201	05/22/15	05/22/17
Attenuator N 20dB 2W DC-13G	Narda	777C	36124	05/22/15	05/22/17
Attenuator K 6dB 2W DC-40G	Narda	4768-6	1044-2	06/25/15	06/25/17
Bore-sight Antenna Positioning Tower	Sunol Sciences	TLT2	N/A		
Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	01/04/16	01/04/18

*EMI RECEIVER SOFTWARE VERSION
The receiver firmware used was version 4.43 Service Pack 3
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MEASUREMENT UNCERTAINTY

State of the measurement uncertainty – TIA 603-D June 2010

The data and results referenced in this document are true and accurate. The measurement uncertainty was calculated for all measurements listed in this test report according To CISPR 16–4 or ENTR 100-028 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: "Uncertainty in EMC Measurements" and is documented in the Timco Engineering, Inc. quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.
Hereafter the best measurement capability for Timco Engineering, Inc. is reported:

Test Items	Measurement Uncertainty	EN 300 Limits	Notes
RF Frequency	± 69.5 Hz	$\pm 1X10^{-7}$	(1)
RF Conducted Power	±0.93dB	±0.750dB	(1)
Conducted spurious emission of transmitter valid up to 40GHz	±2.36dB	±4.0dB	
Radiated RF Power	±1.4dB	±6.0dB	
Maximum frequency deviation: Within 300 Hz and 6kHz of audio freq. Within 6kHz and 25kHz of audio Freq.	 ±1.88% ±2.04%	 ±5.0% ±3.0dB	
Deviation Limitation	±1.29%	±5.0%	
Adjacent channel power	±1.47dB	±5.0dB	(1)
Radiated emission of transmitter valid up to 18GHz	±3.96dB	±6.0dB	
Temperature	±1.0°C	±1.0°C	(1)
Humidity	±5.0%	±10.0%	
Valid up to 1 GHz for the RF parameters unless otherwise stated			

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

END OF REPORT

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