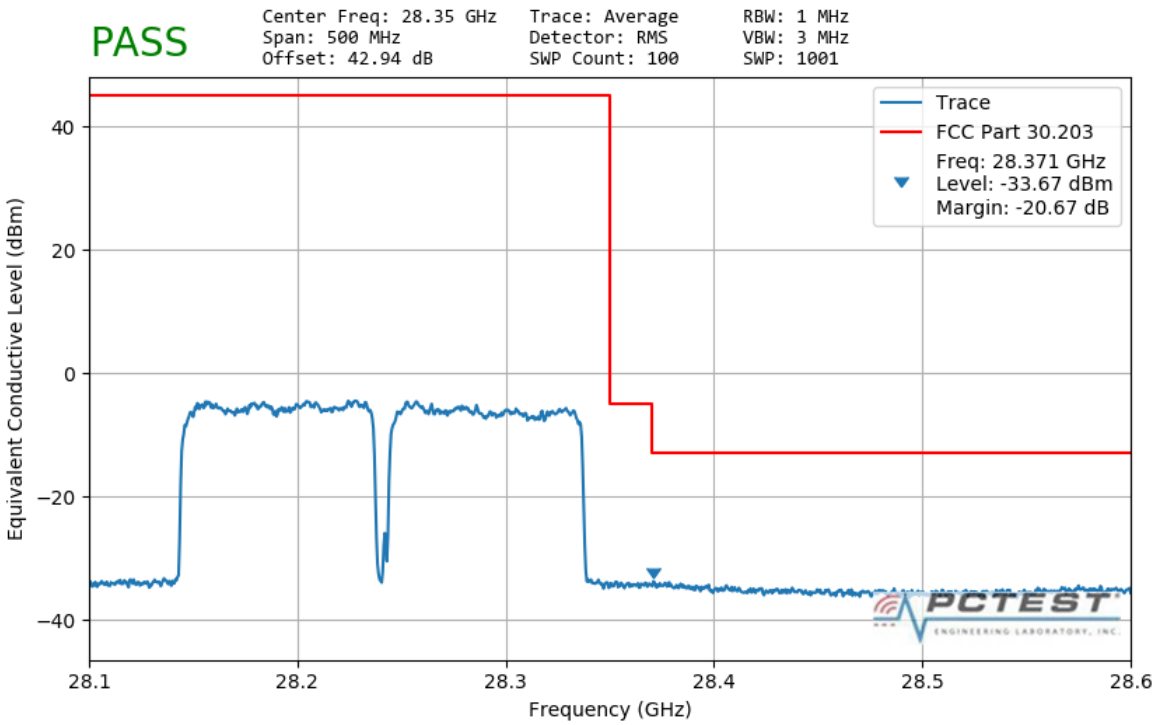
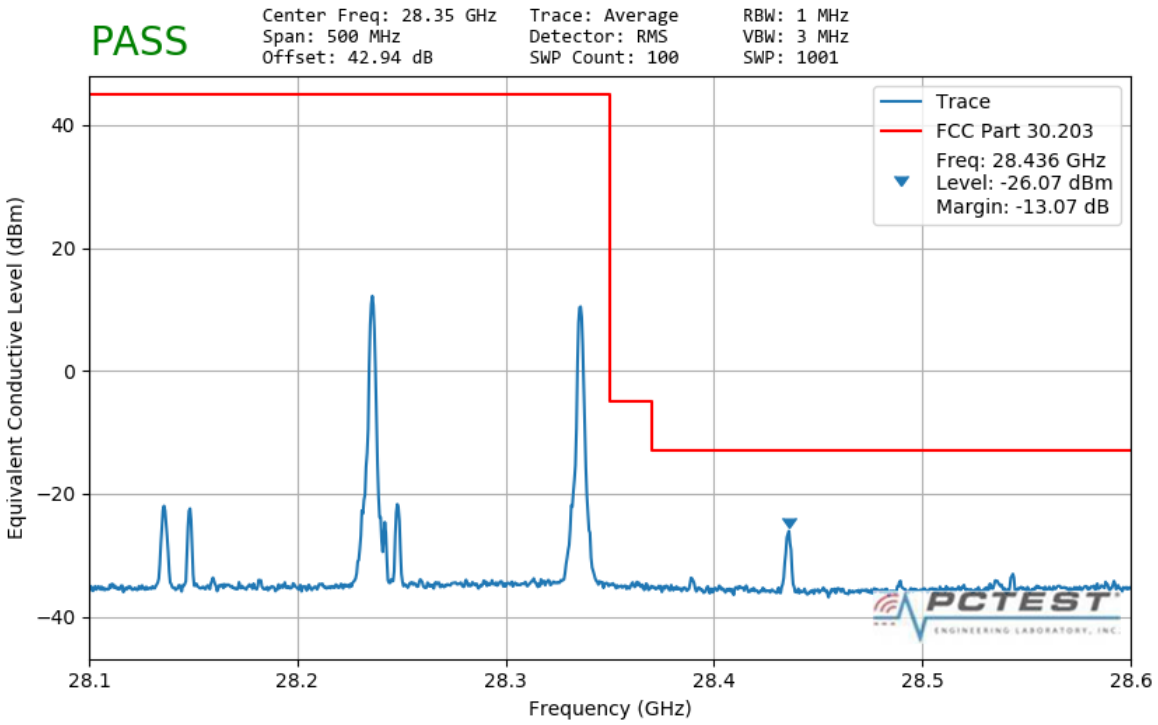
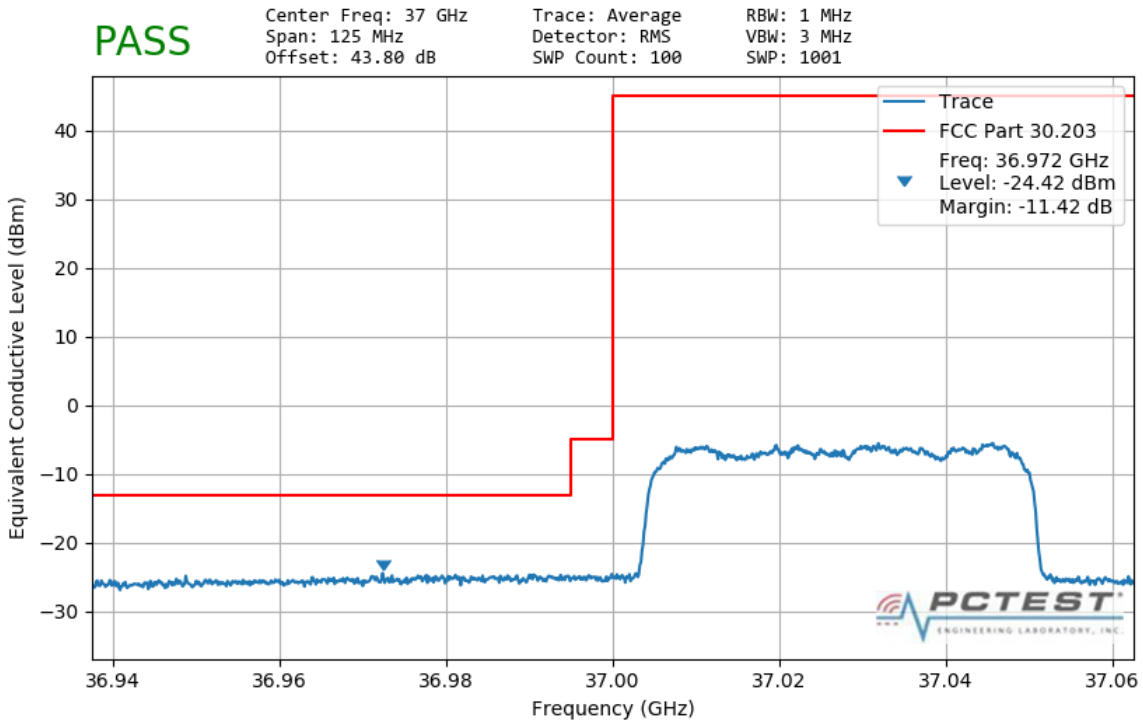


Plot 7-279. Ant4 Upper Band Edge (100MHz-2CC – QPSK Full RB)

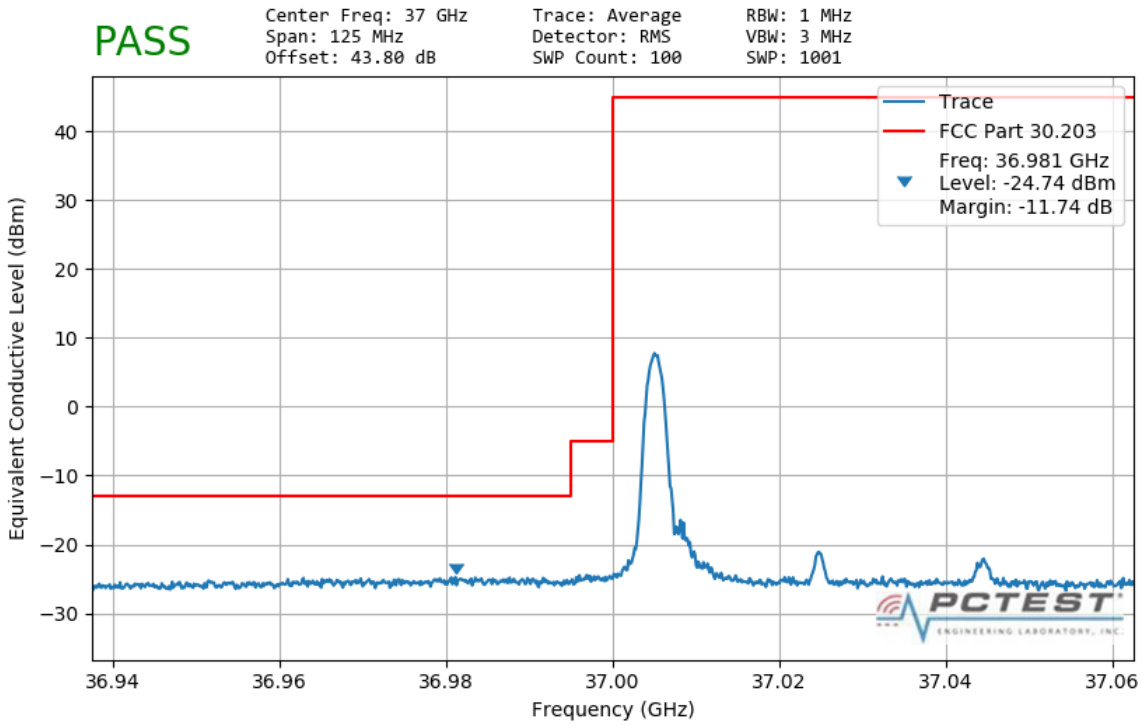


Plot 7-280. Ant4 Upper Band Edge (100MHz-2CC – QPSK 1 RB)

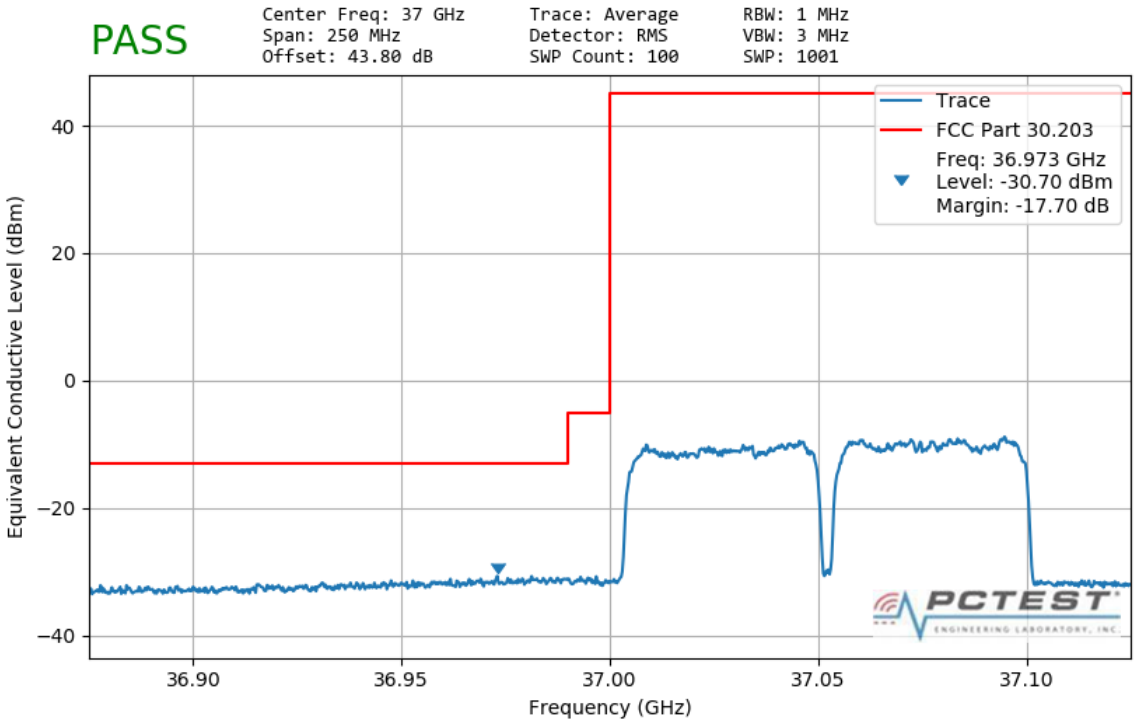
Band n260 - MIMO



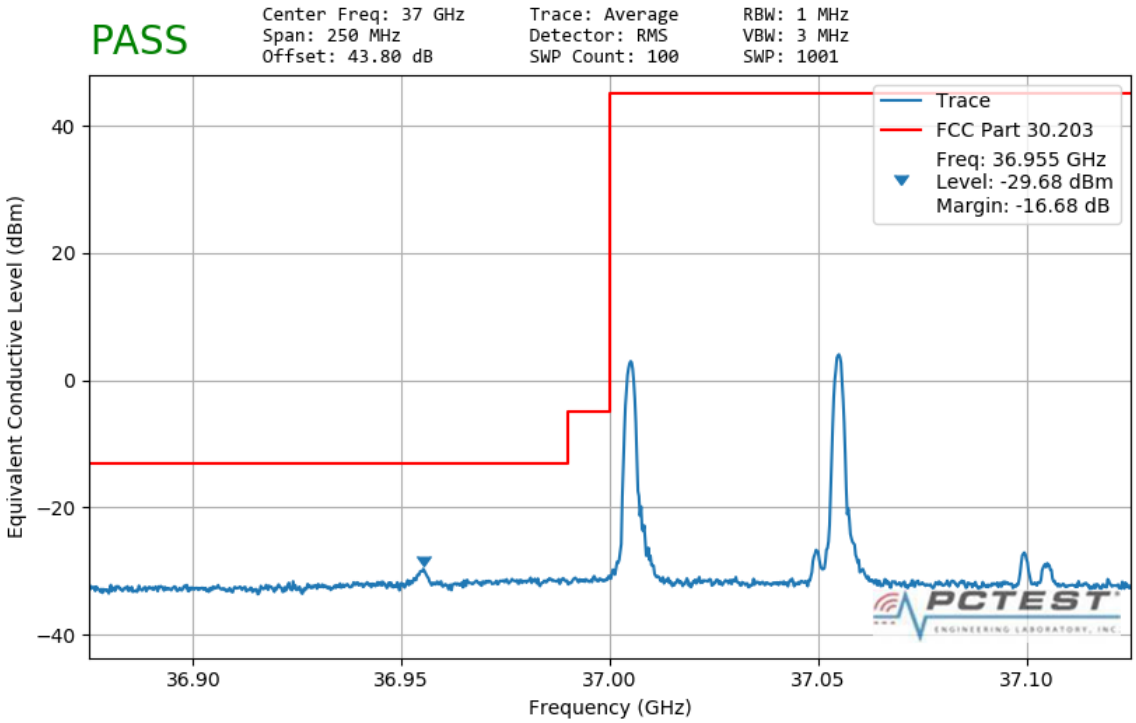
Plot 7-281. Ant1 Lower Band Edge (50MHz-1CC – QPSK Full RB)



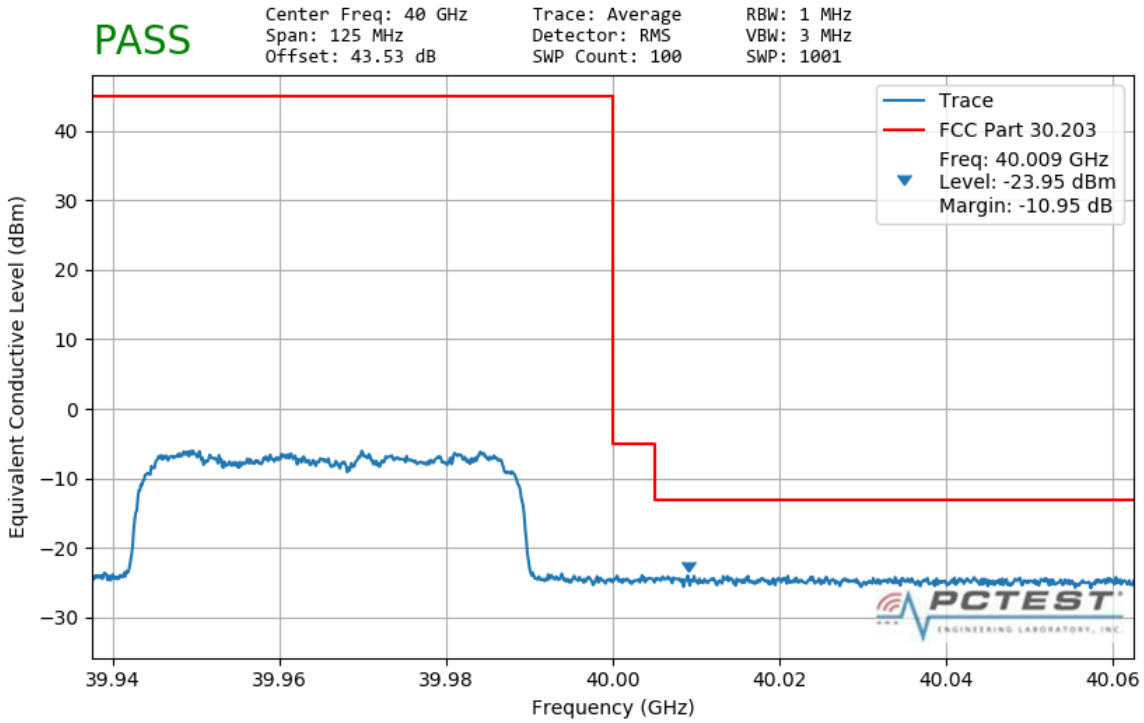
Plot 7-282. Ant1 Lower Band Edge (50MHz-1CC – QPSK 1 RB)



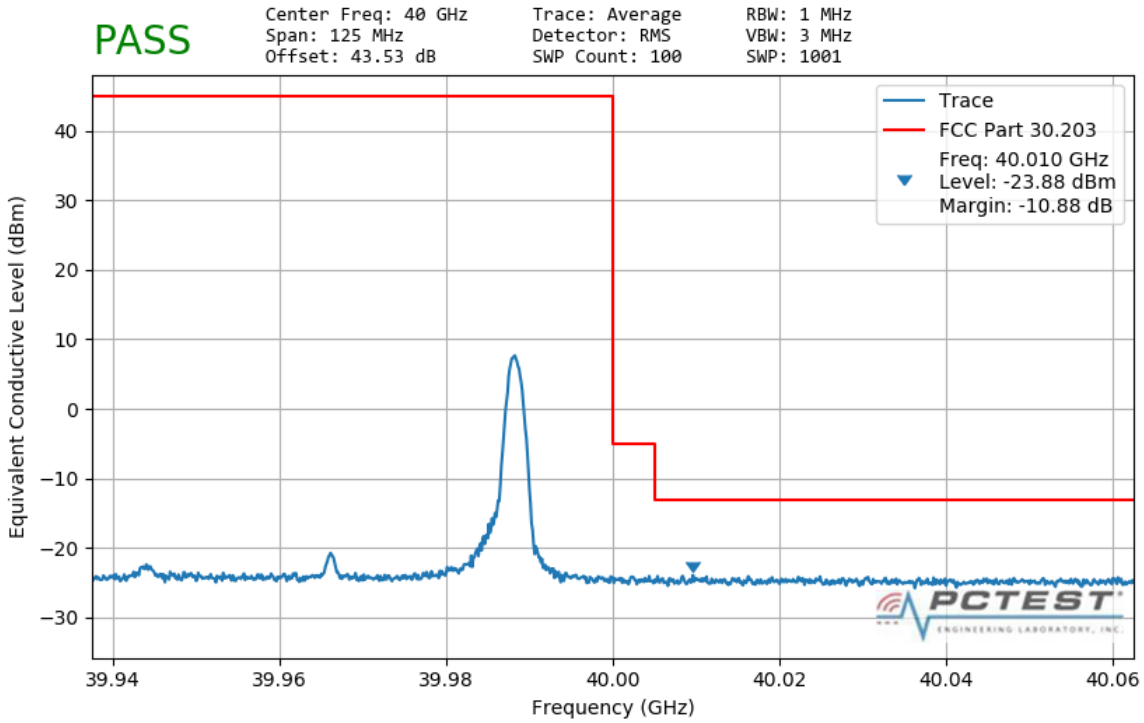
Plot 7-283. Ant1 Lower Band Edge (50MHz-2CC – QPSK Full RB)



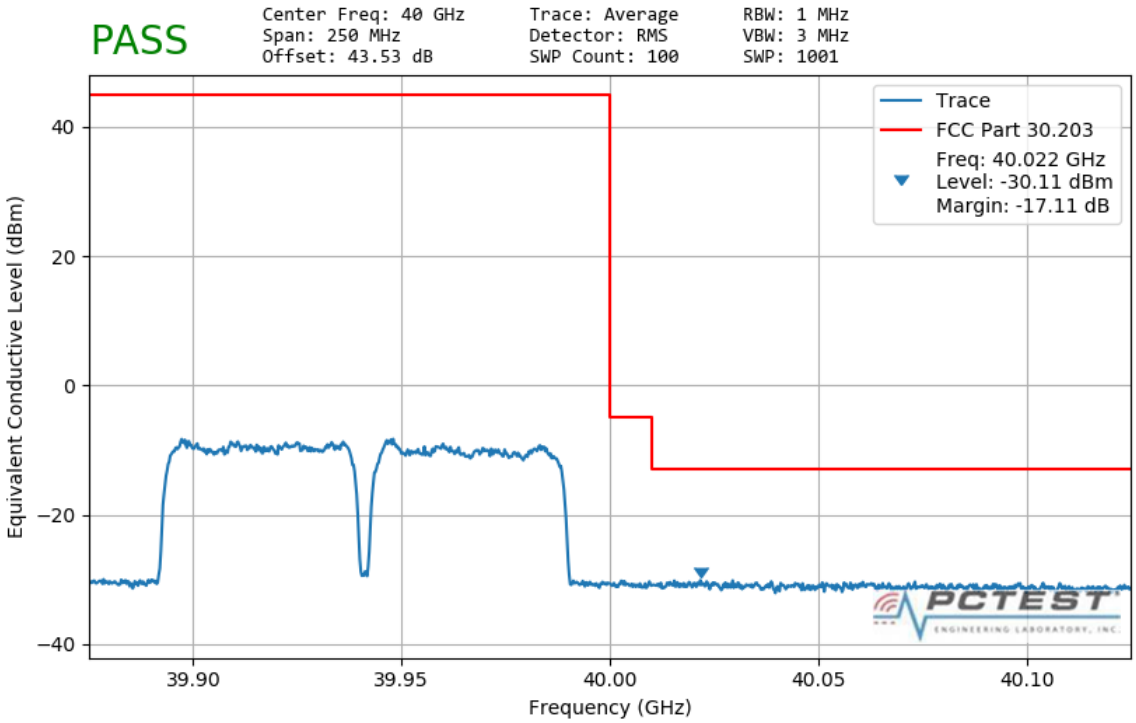
Plot 7-284. Ant1 Lower Band Edge (50MHz-2CC – QPSK 1 RB)



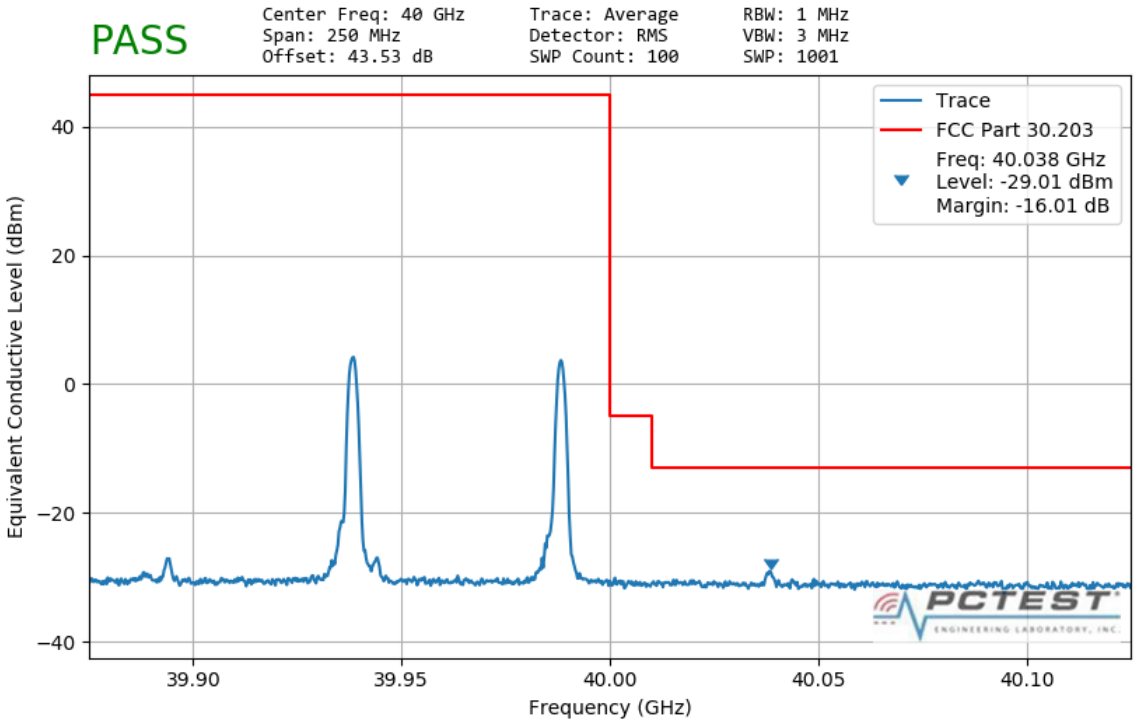
Plot 7-285. Ant1 Upper Band Edge (50MHz-1CC – QPSK Full RB)



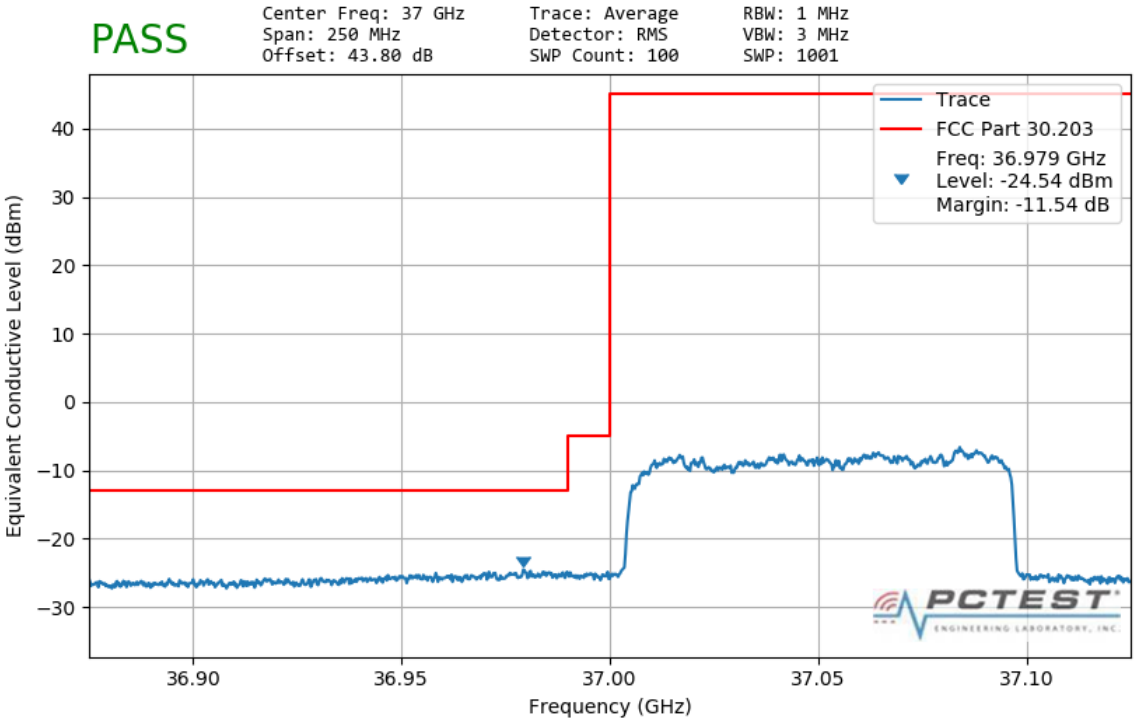
Plot 7-286. Ant1 Upper Band Edge (50MHz-1CC – QPSK 1 RB)



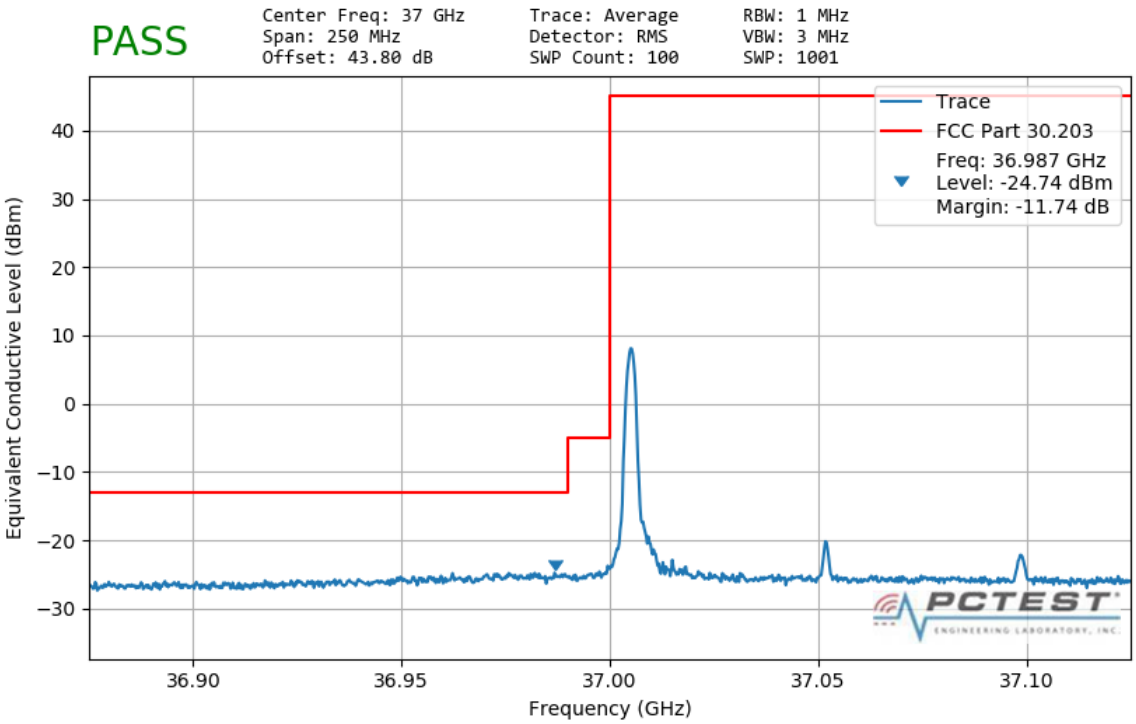
Plot 7-287. Ant1 Upper Band Edge (50MHz-2CC – QPSK Full RB)



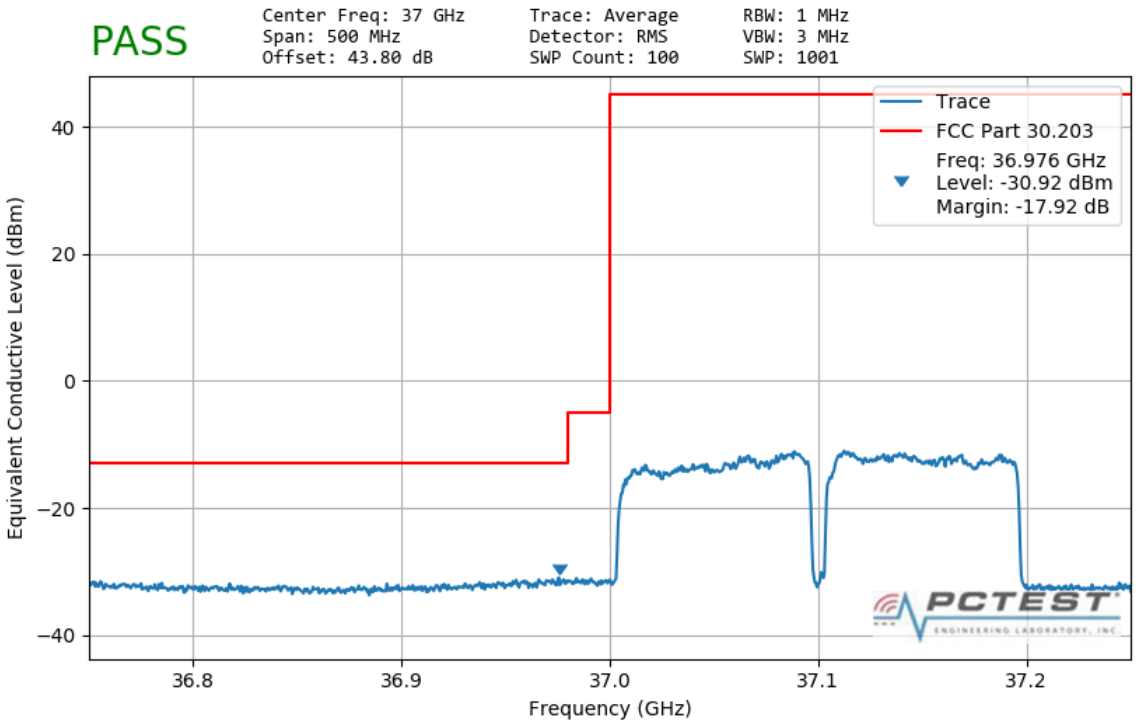
Plot 7-288. Ant1 Upper Band Edge (50MHz-2CC – QPSK 1 RB)



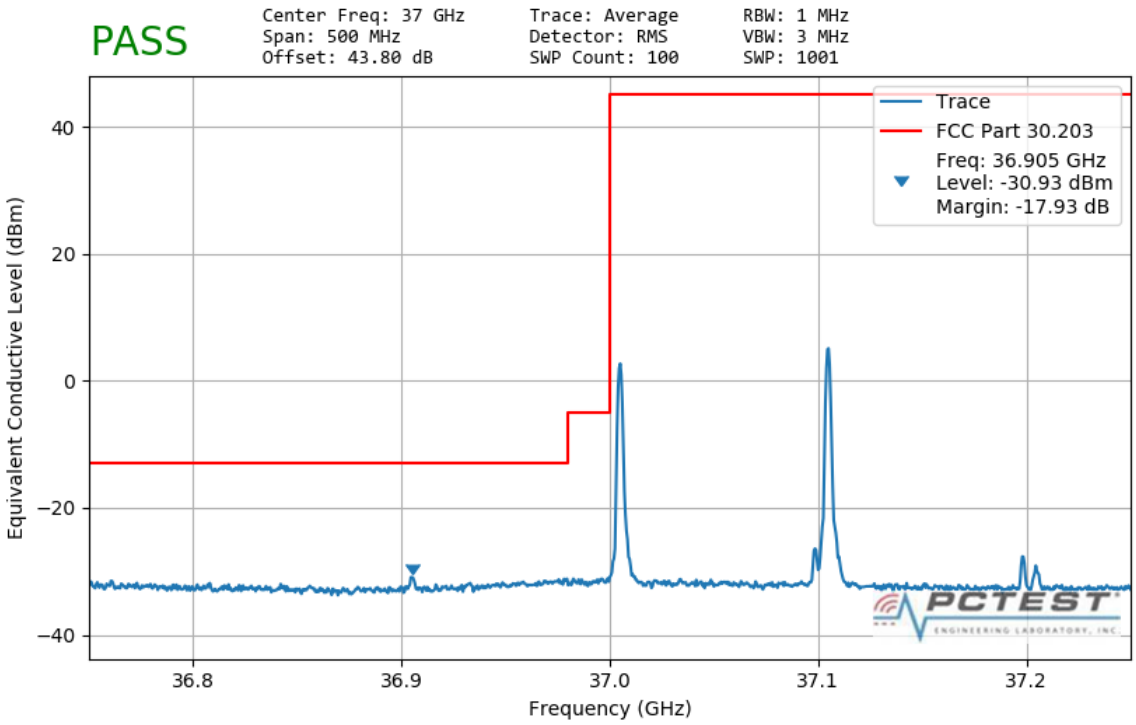
Plot 7-289. Ant1 Lower Band Edge (100MHz-1CC – QPSK Full RB)



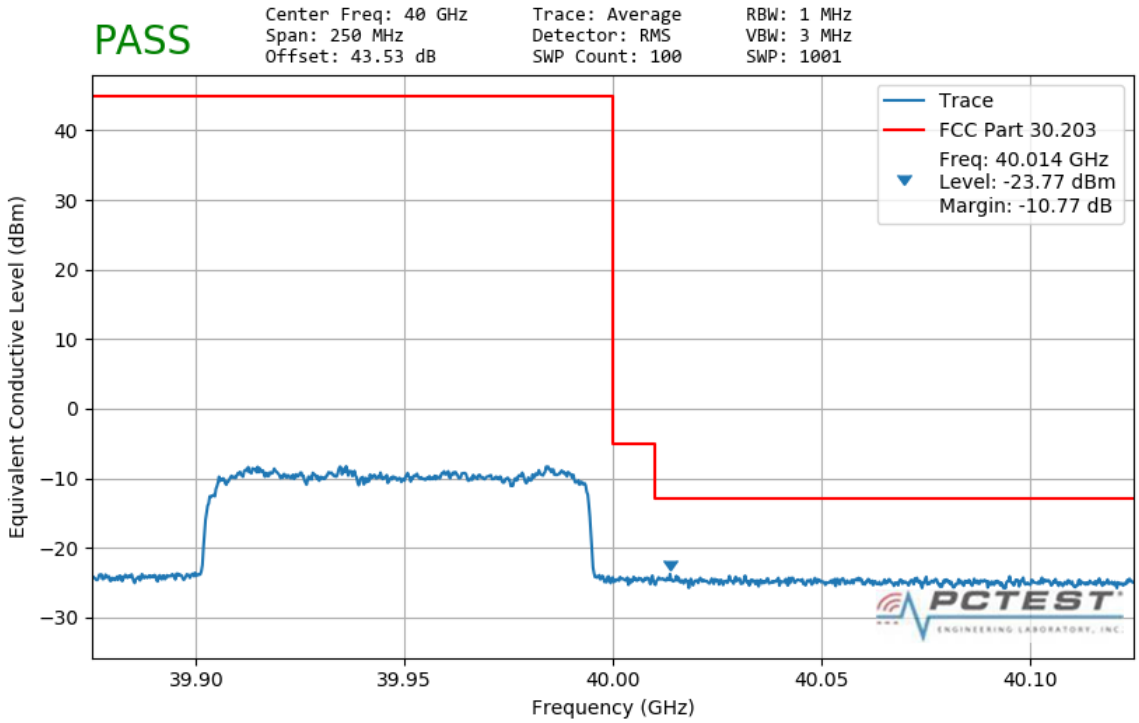
Plot 7-290. Ant1 Lower Band Edge (100MHz-1CC – QPSK 1 RB)



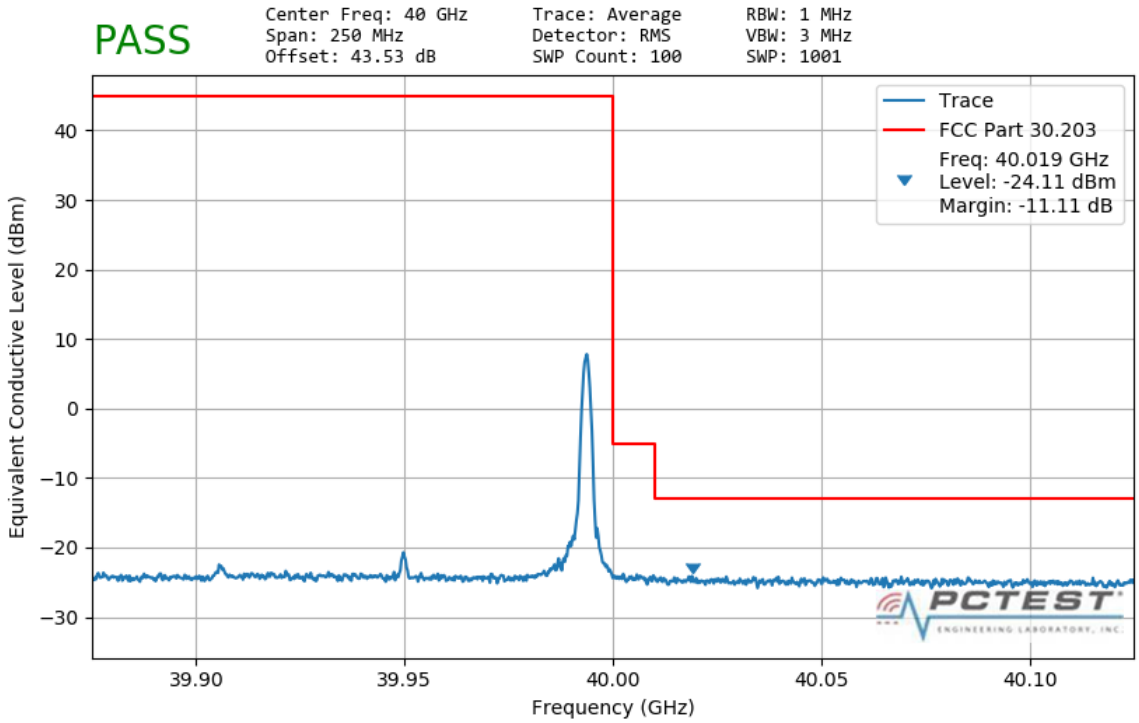
Plot 7-291. Ant1 Lower Band Edge (100MHz-2CC – QPSK Full RB)



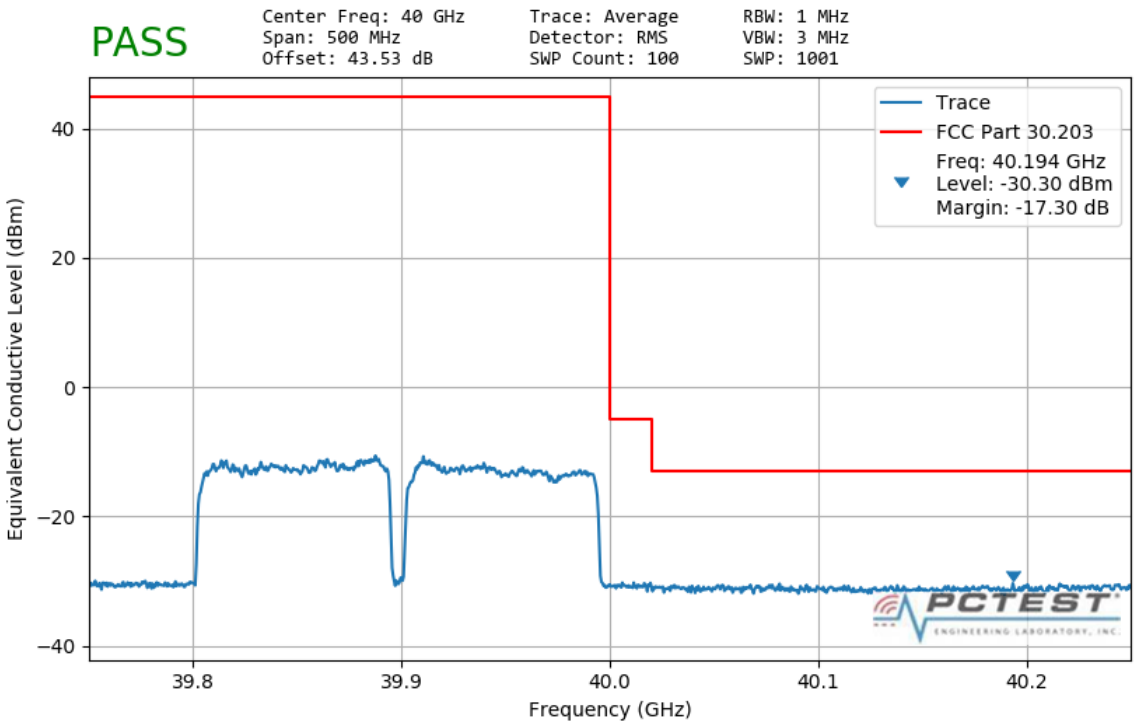
Plot 7-292. Ant1 Lower Band Edge (100MHz-2CC – QPSK 1 RB)



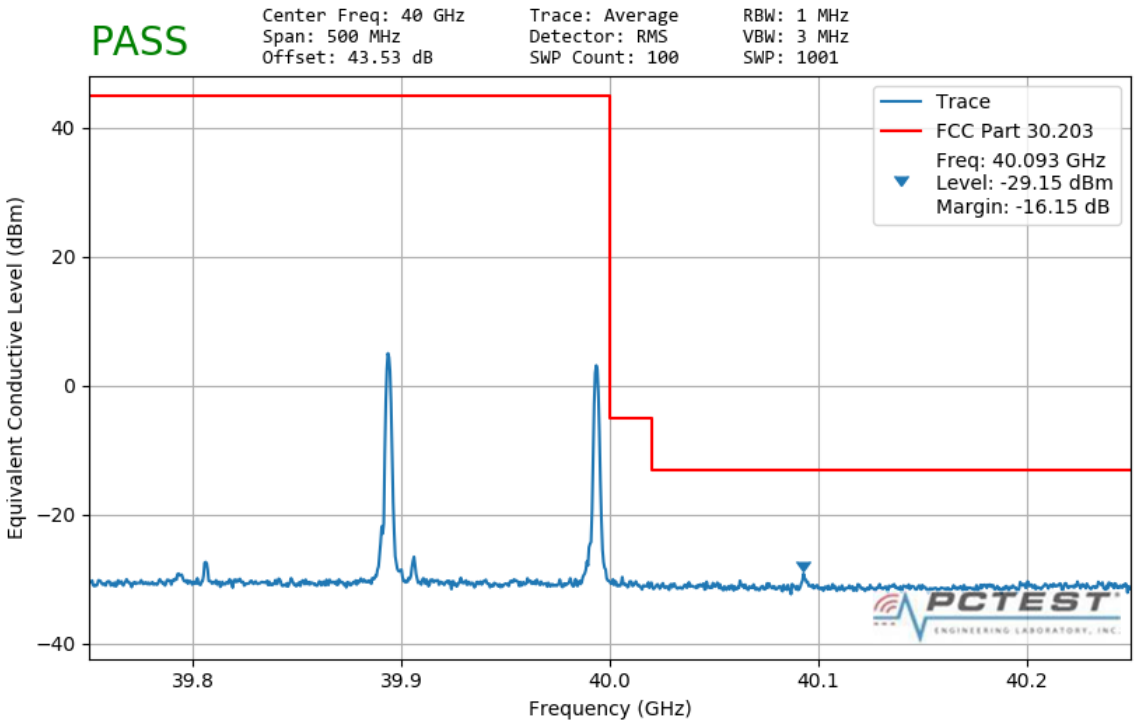
Plot 7-293. Ant1 Upper Band Edge (100MHz-1CC – QPSK Full RB)



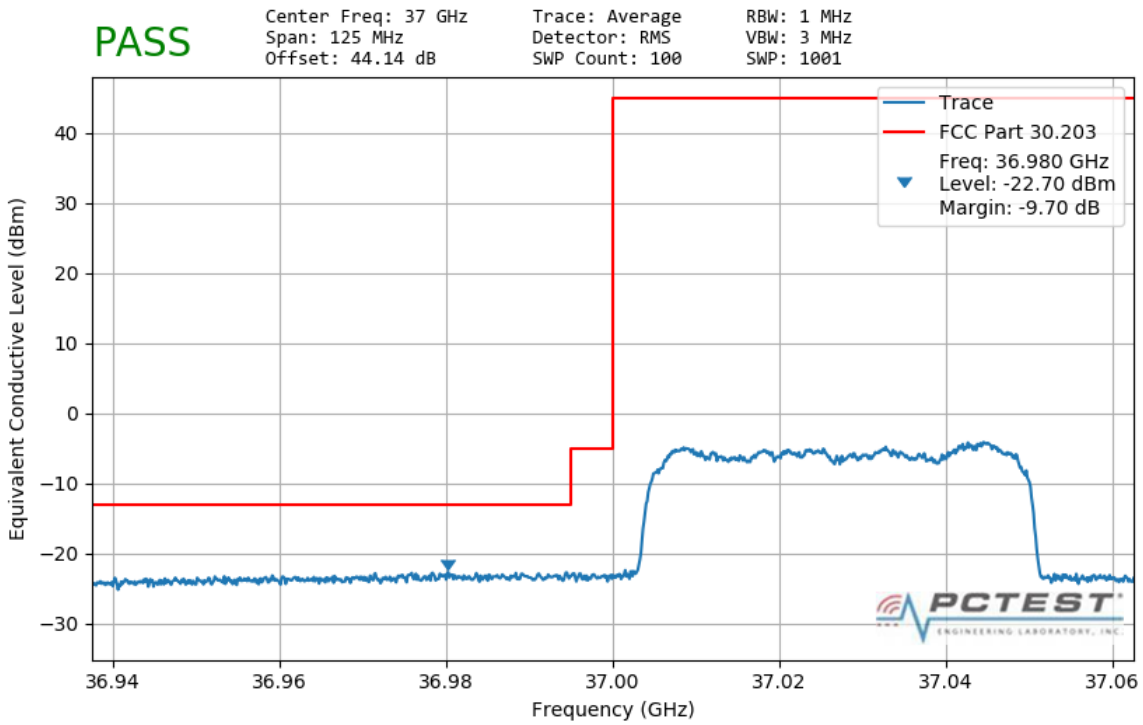
Plot 7-294. Ant1 Upper Band Edge (100MHz-1CC – QPSK 1 RB)



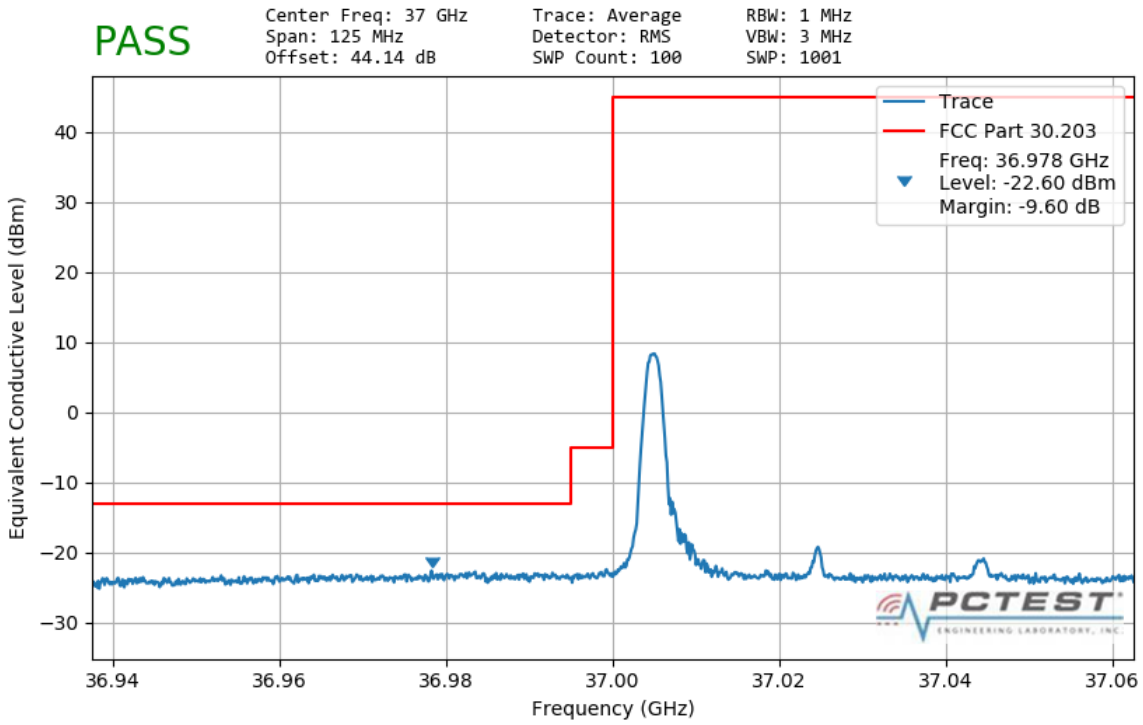
Plot 7-295. Ant1 Upper Band Edge (100MHz-2CC – QPSK Full RB)



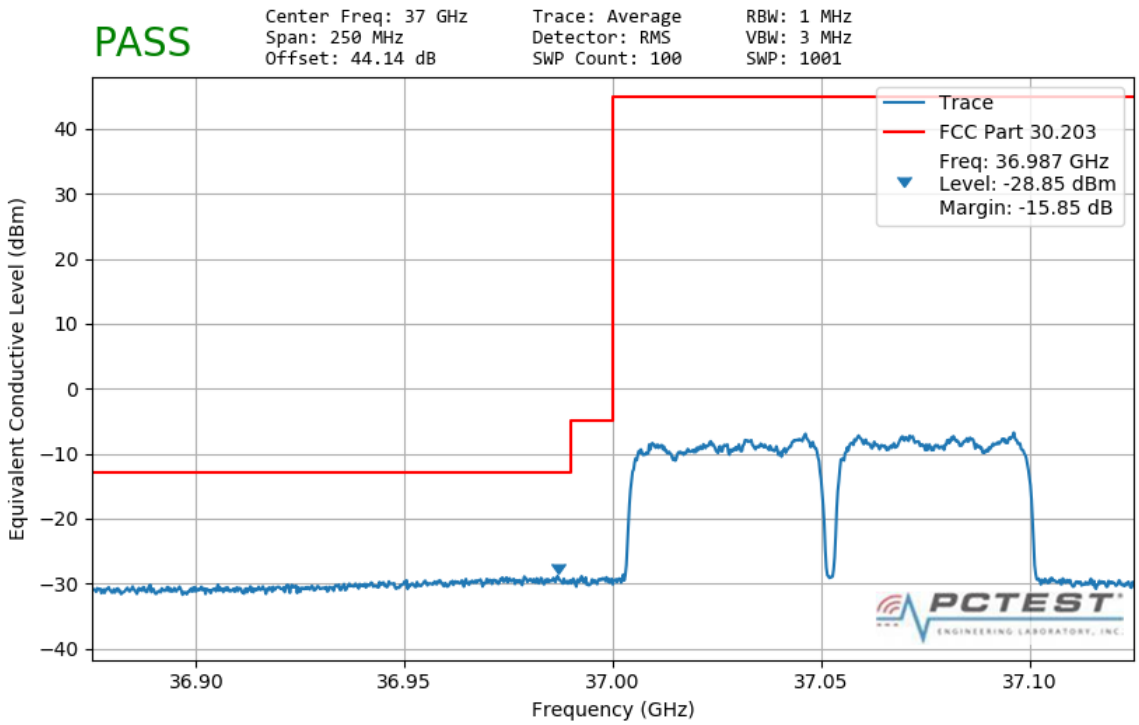
Plot 7-296. Ant1 Upper Band Edge (100MHz-2CC – QPSK 1 RB)



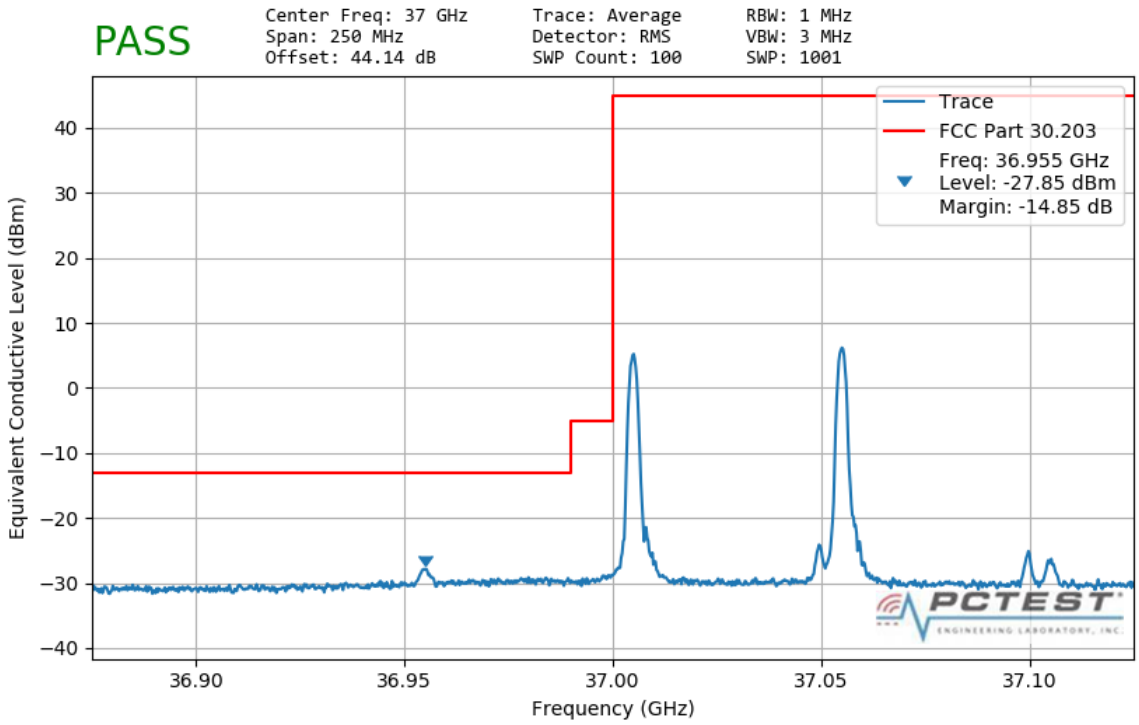
Plot 7-297. Ant2 Lower Band Edge (50MHz-1CC – QPSK Full RB)



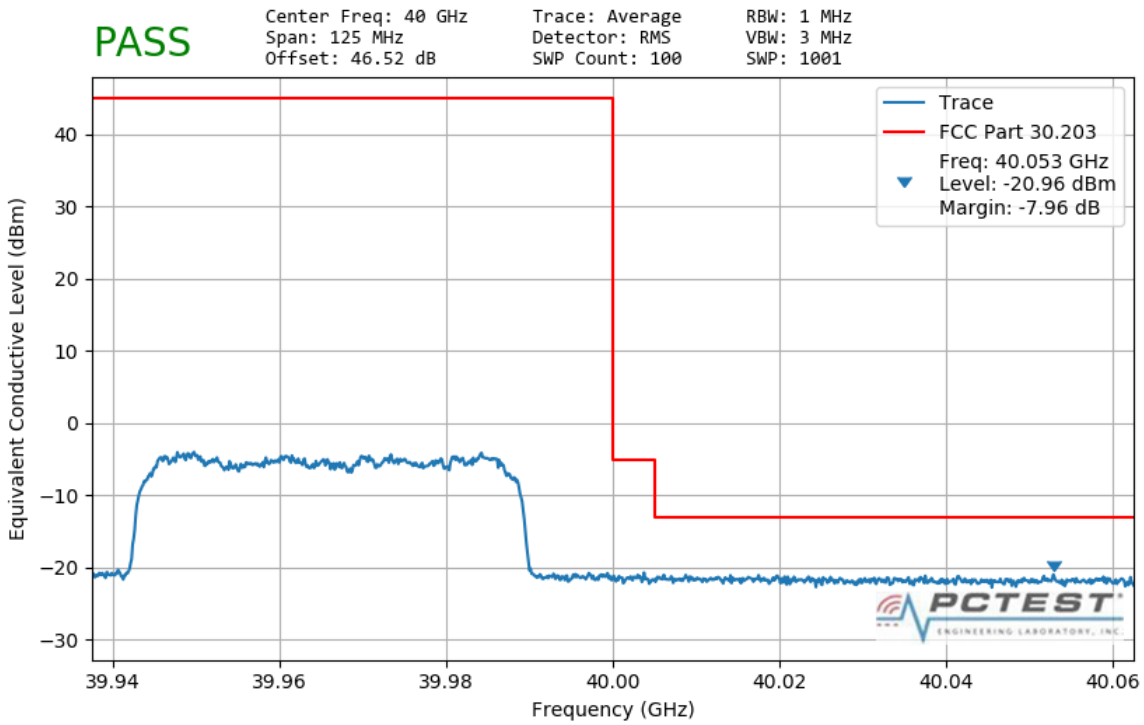
Plot 7-298. Ant2 Lower Band Edge (50MHz-1CC – QPSK 1 RB)



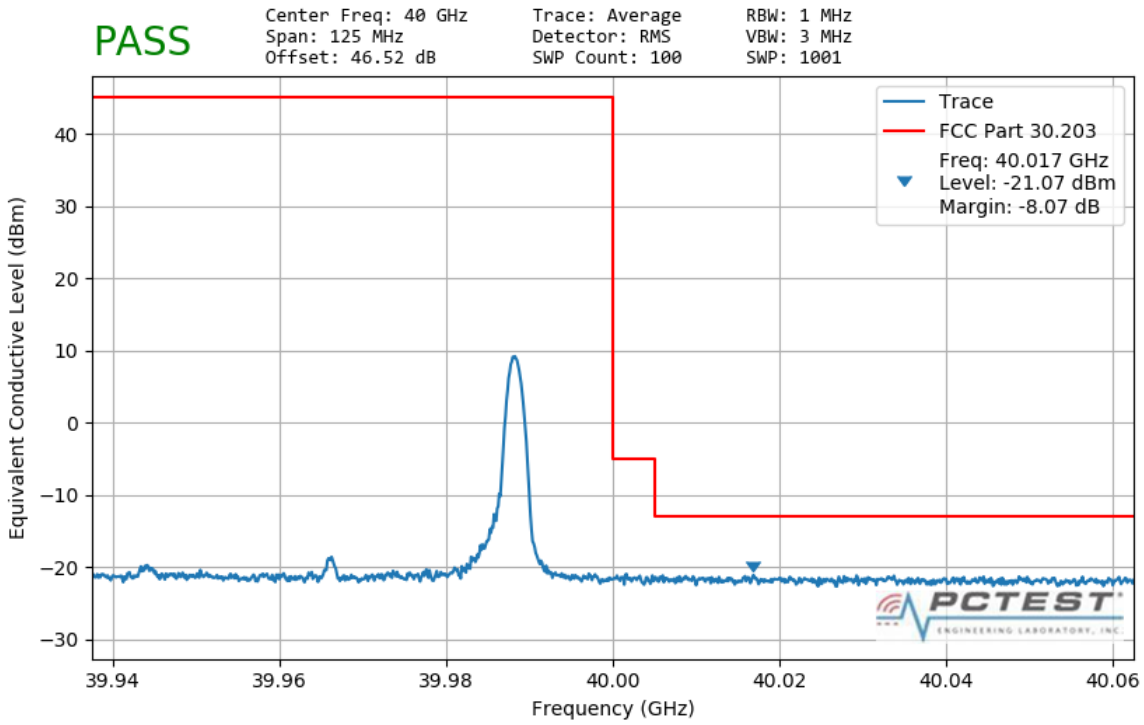
Plot 7-299. Ant2 Lower Band Edge (50MHz-2CC – QPSK Full RB)



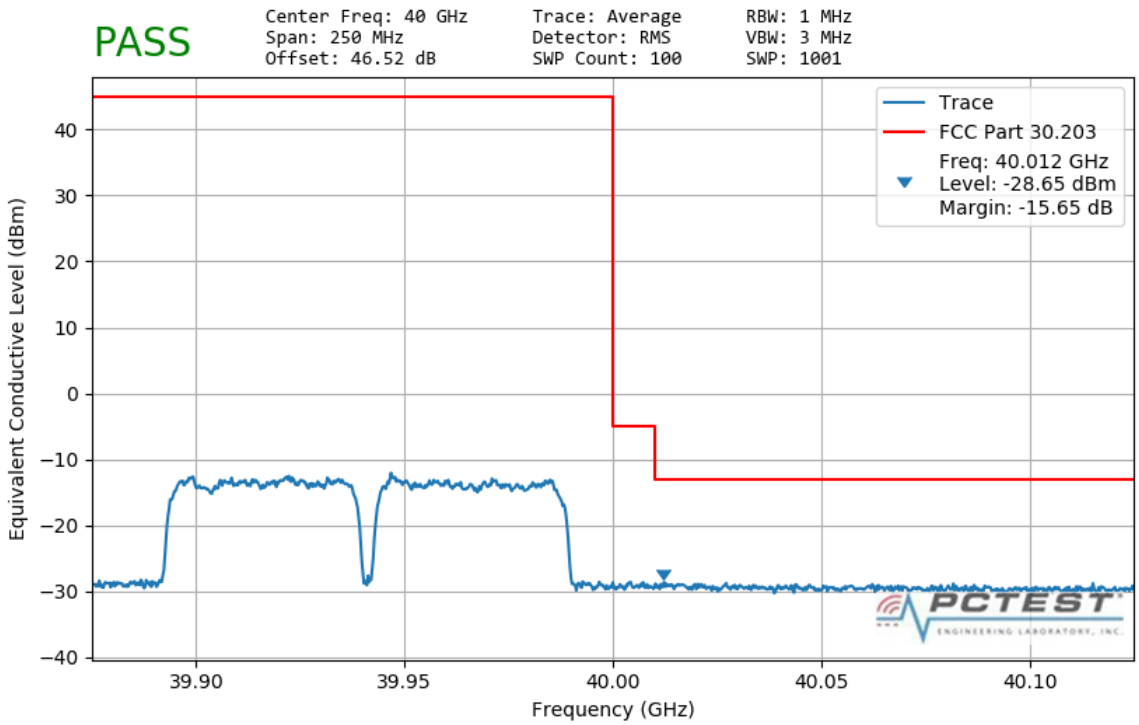
Plot 7-300. Ant2 Lower Band Edge (50MHz-2CC – QPSK 1 RB)



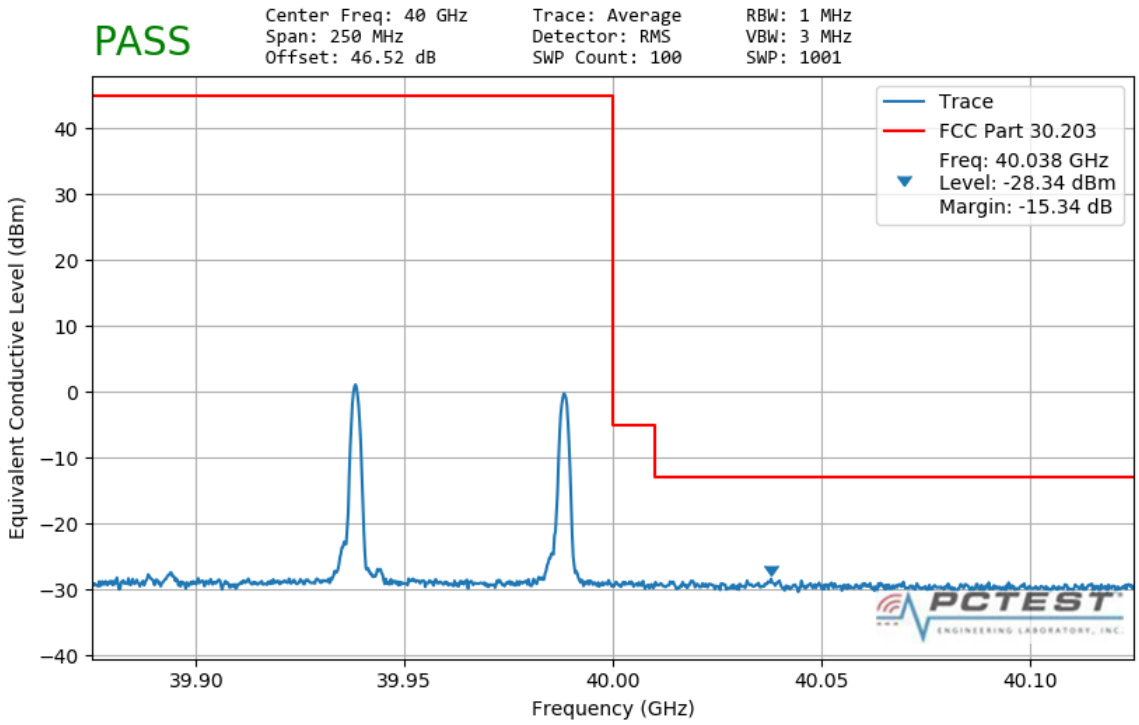
Plot 7-301. Ant2 Upper Band Edge (50MHz-1CC – QPSK Full RB)



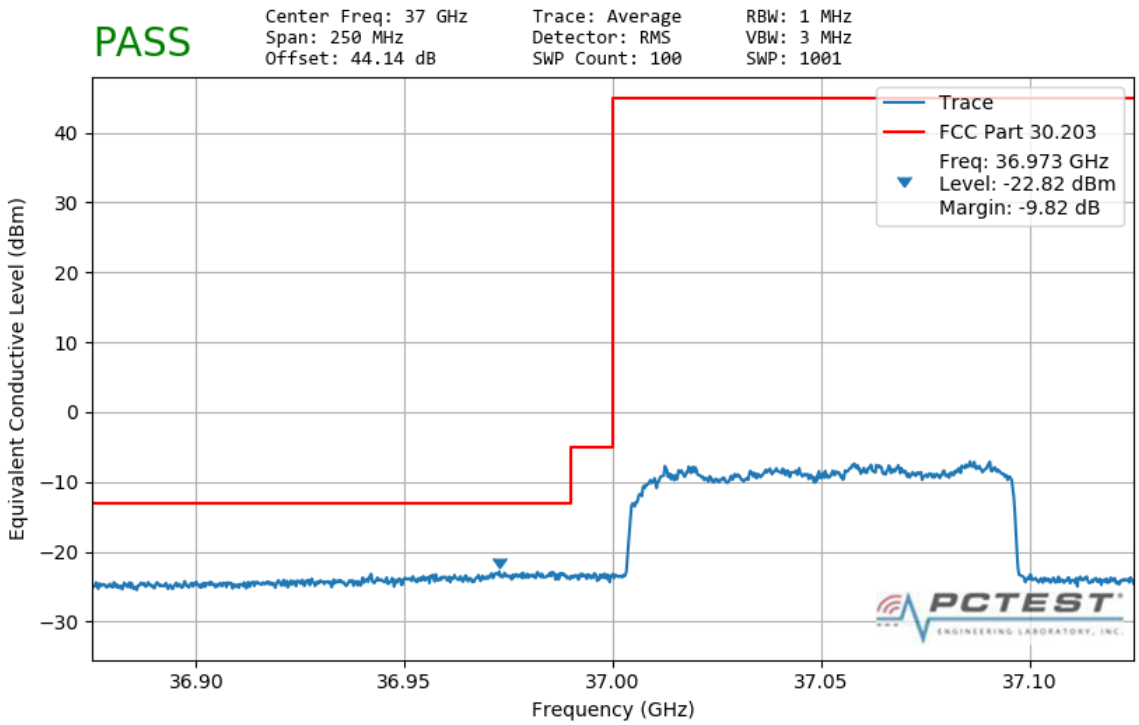
Plot 7-302. Ant2 Upper Band Edge (50MHz-1CC – QPSK 1 RB)



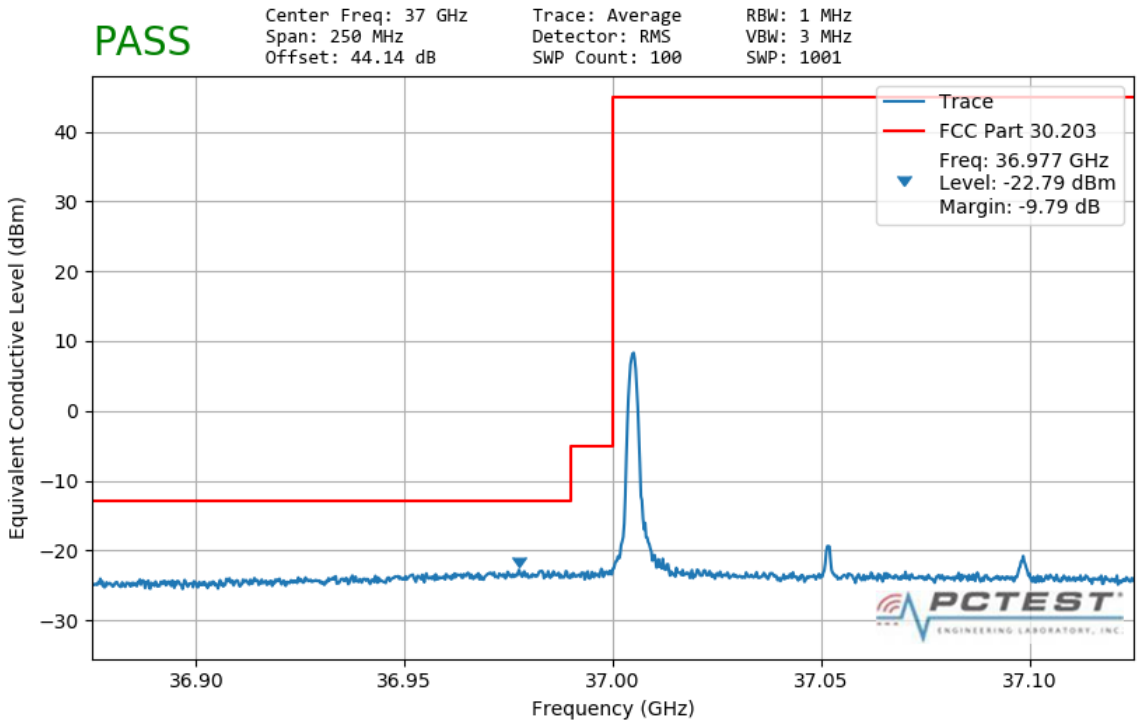
Plot 7-303. Ant2 Upper Band Edge (50MHz-2CC – QPSK Full RB)



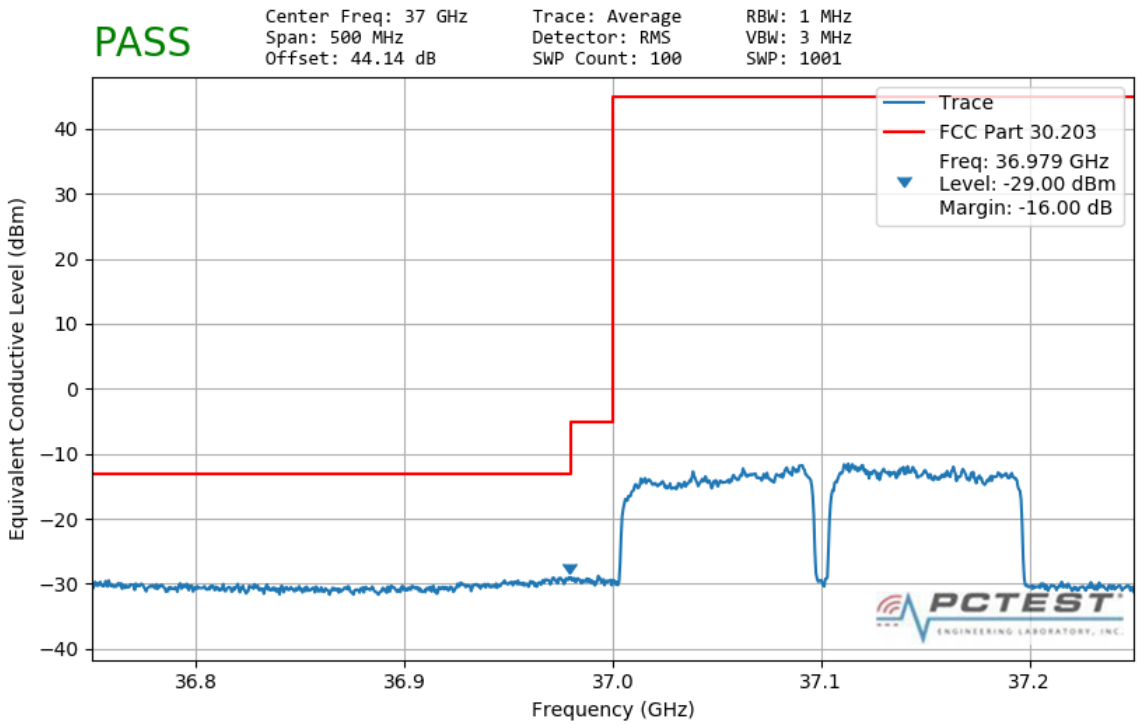
Plot 7-304. Ant2 Upper Band Edge (50MHz-2CC – QPSK 1 RB)



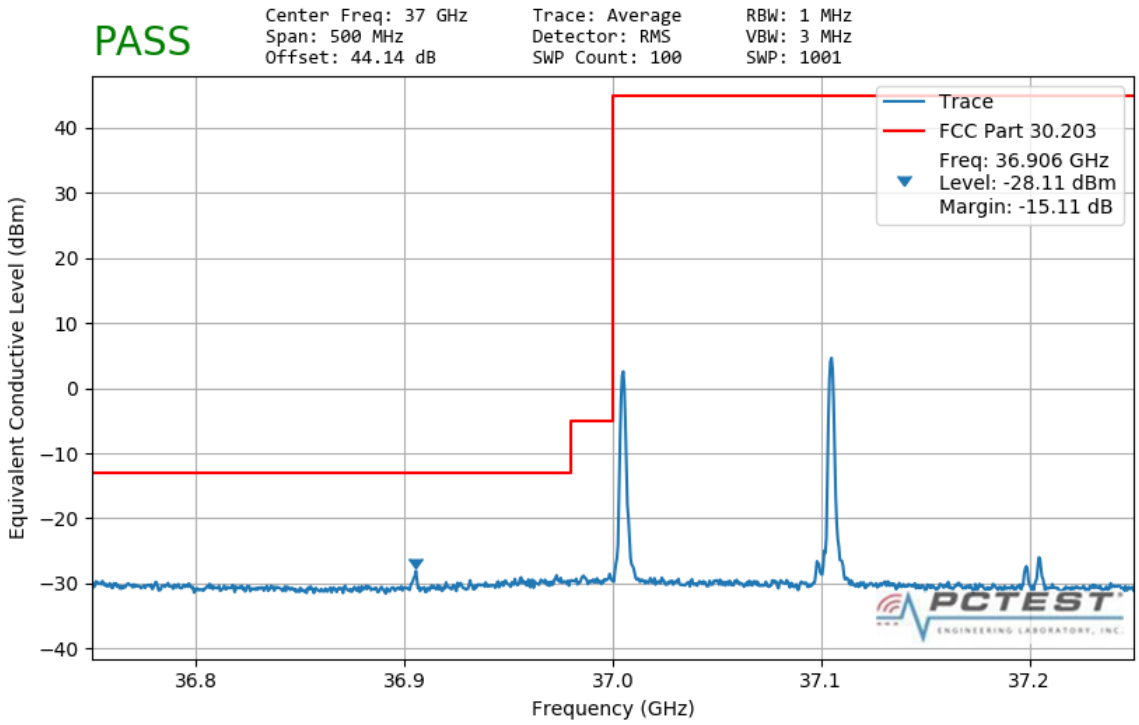
Plot 7-305. Ant2 Lower Band Edge (100MHz-1CC – QPSK Full RB)



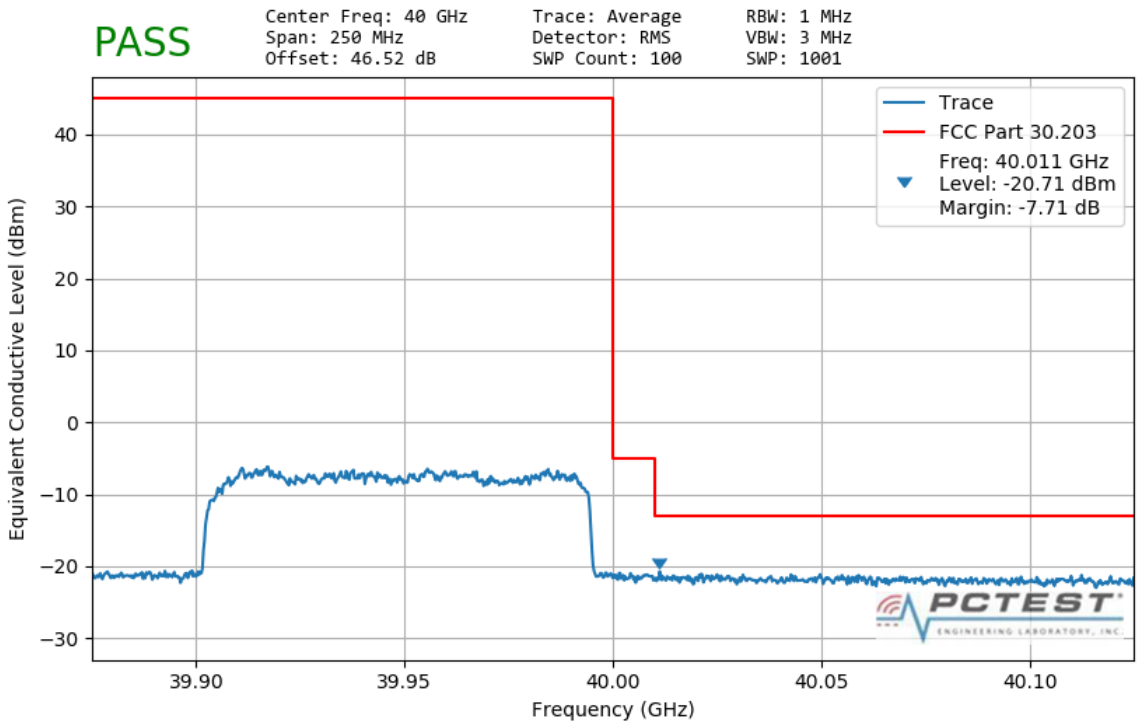
Plot 7-306. Ant2 Lower Band Edge (100MHz-1CC – QPSK 1 RB)



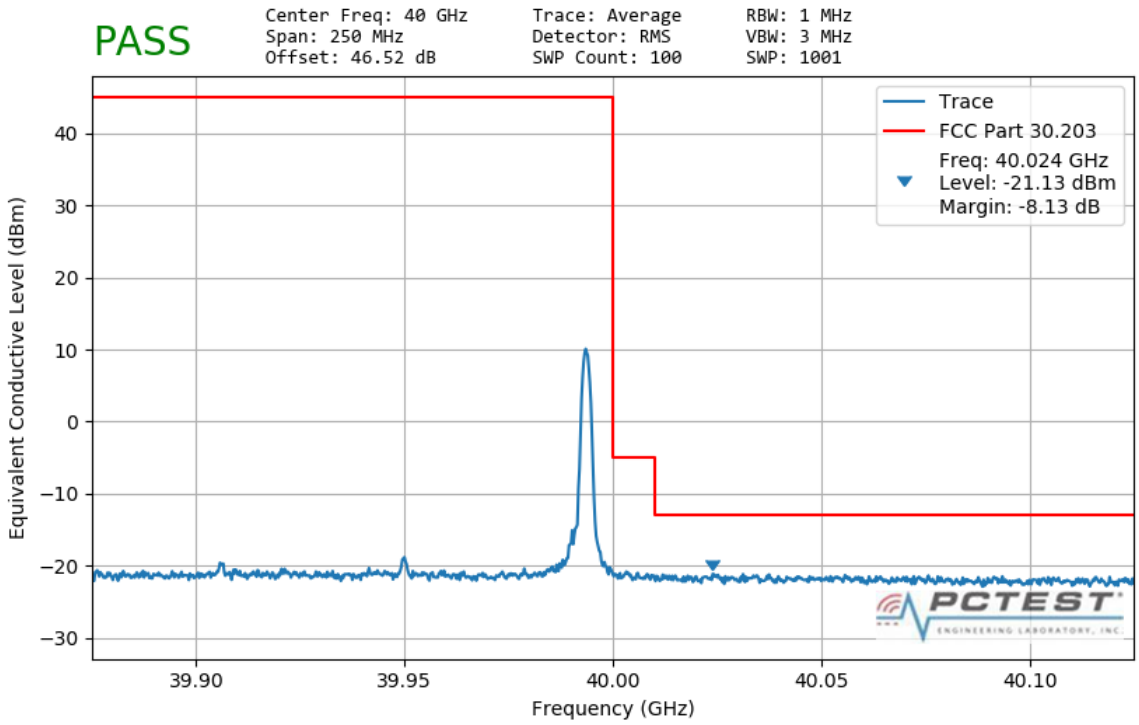
Plot 7-307. Ant2 Lower Band Edge (100MHz-2CC – QPSK Full RB)



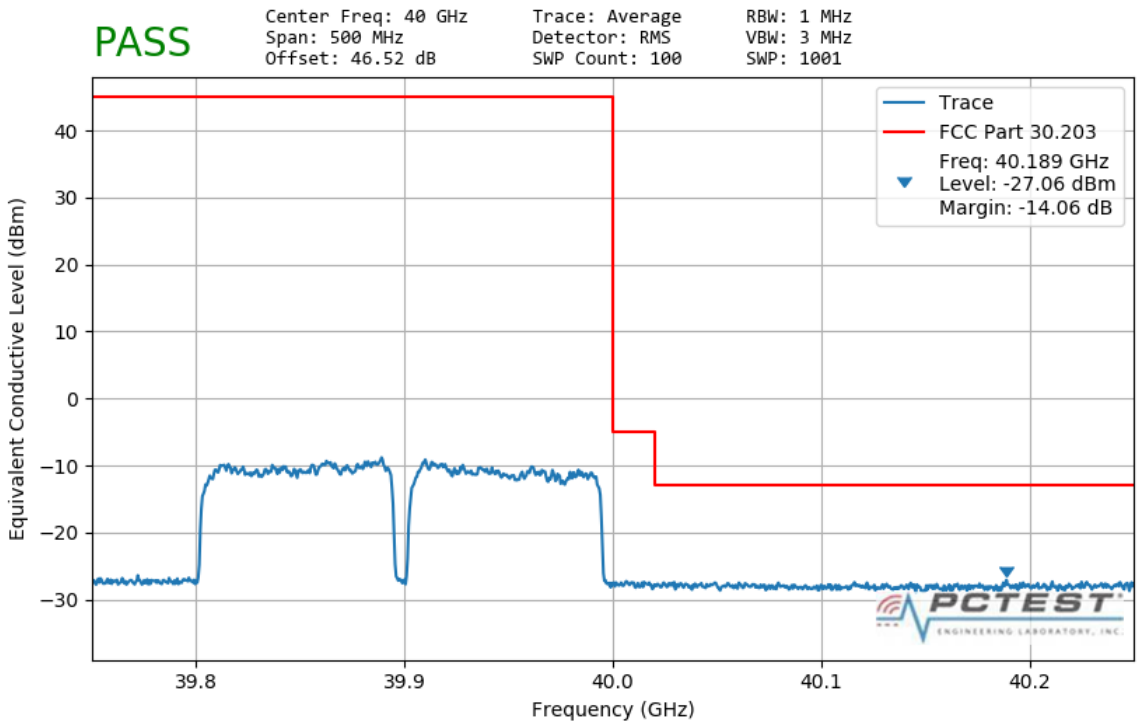
Plot 7-308. Ant2 Lower Band Edge (100MHz-2CC – QPSK 1 RB)



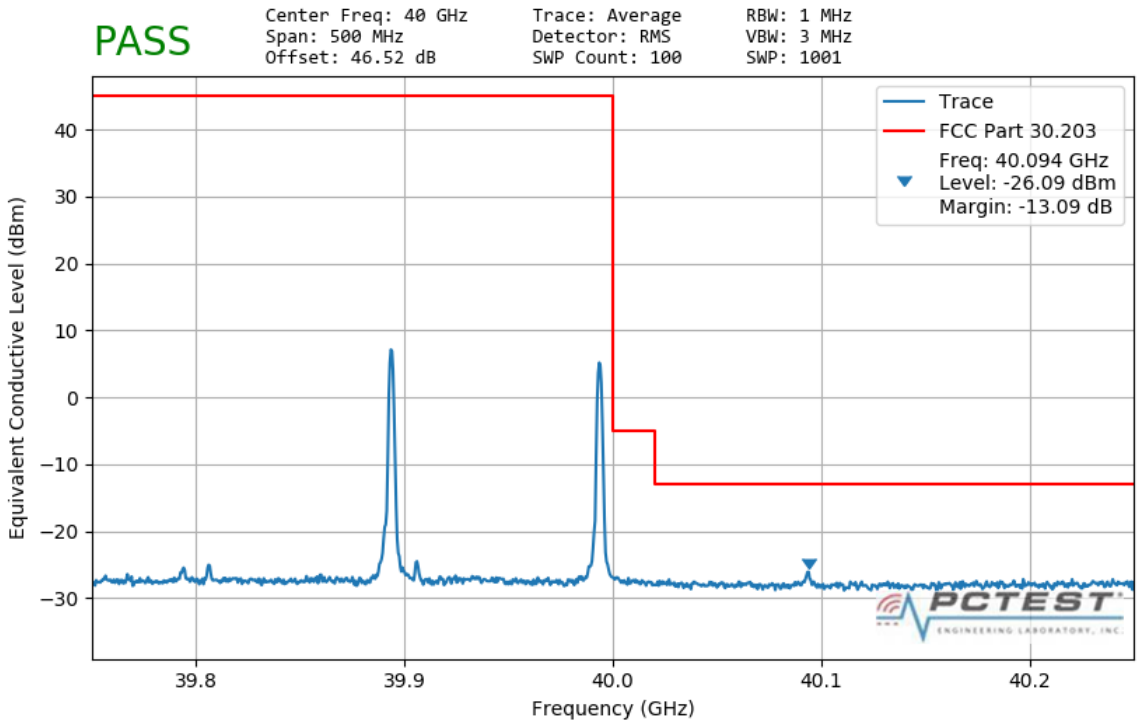
Plot 7-309. Ant2 Upper Band Edge (100MHz-1CC – QPSK Full RB)



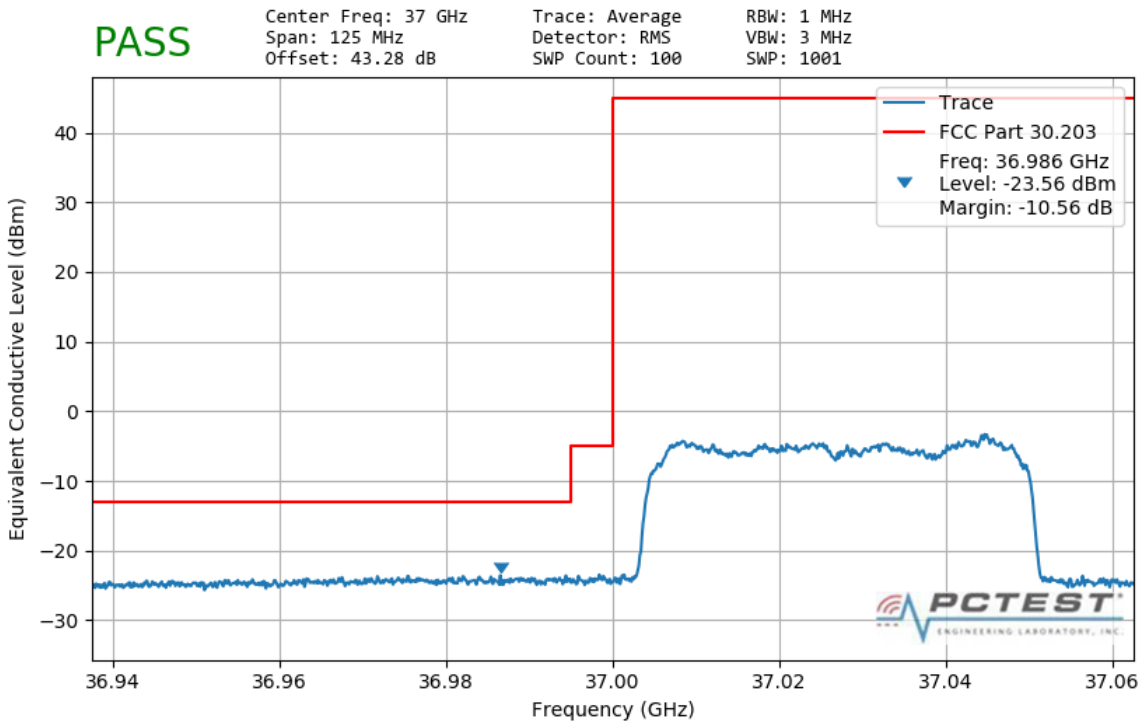
Plot 7-310. Ant2 Upper Band Edge (100MHz-1CC – QPSK 1 RB)



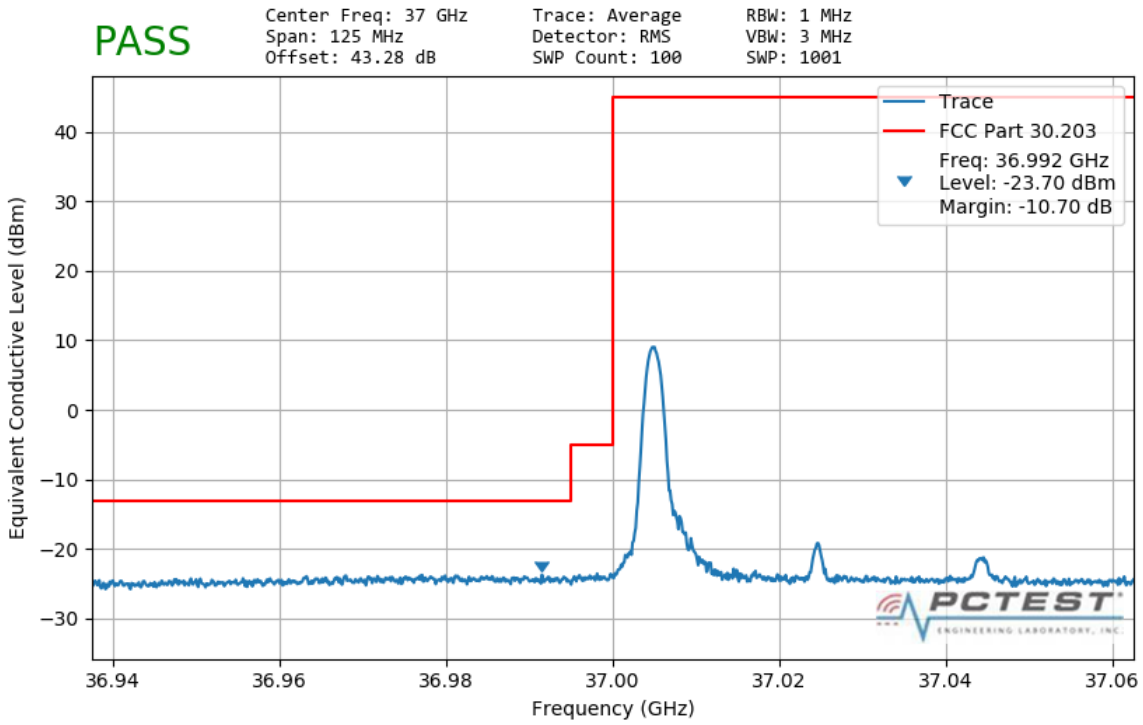
Plot 7-311. Ant2 Upper Band Edge (100MHz-2CC – QPSK Full RB)



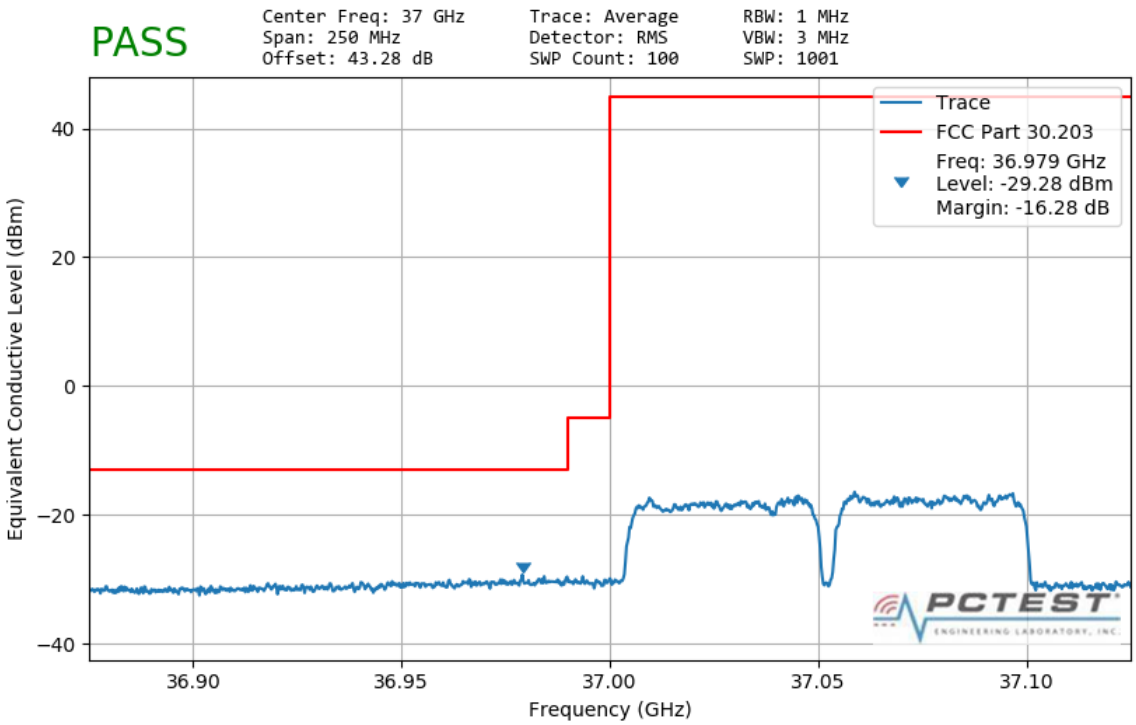
Plot 7-312. Ant2 Upper Band Edge (100MHz-2CC – QPSK 1 RB)



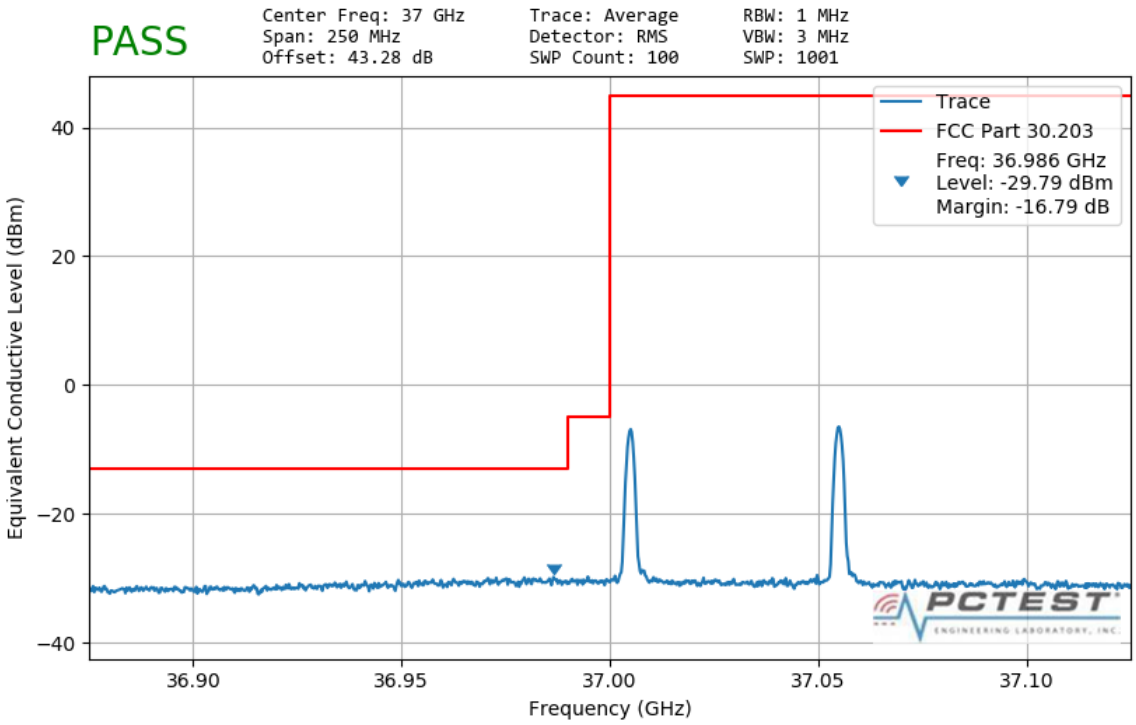
Plot 7-313. Ant3 Lower Band Edge (50MHz-1CC – QPSK Full RB)



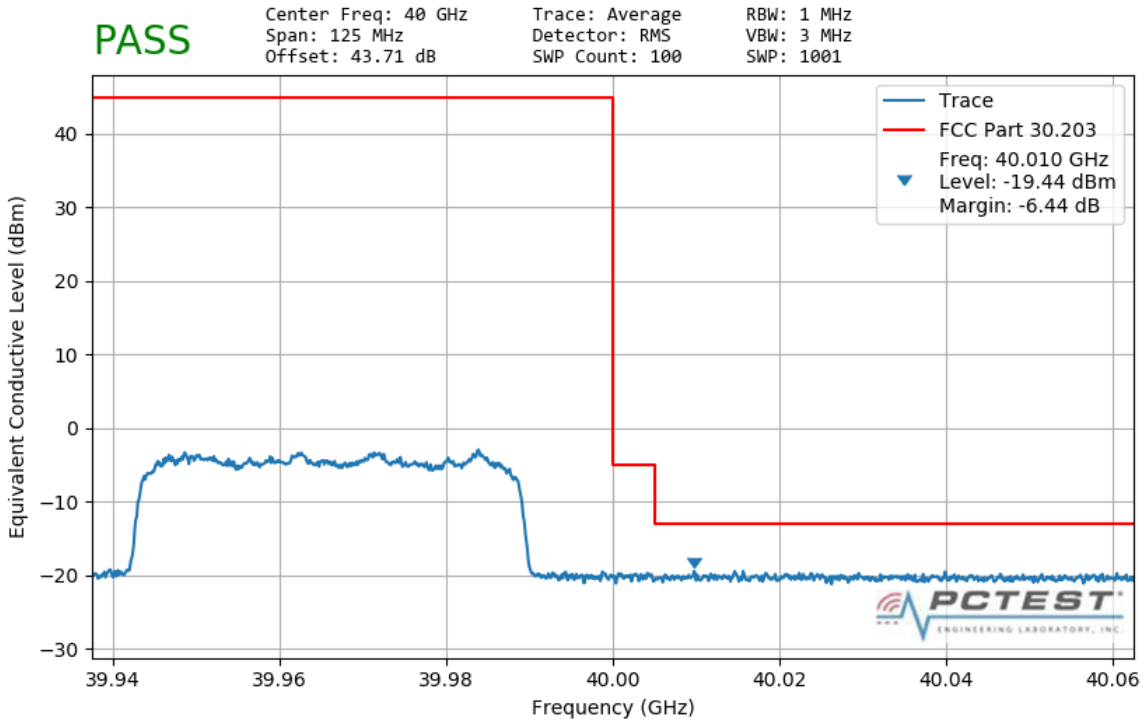
Plot 7-314. Ant3 Lower Band Edge (50MHz-1CC – QPSK 1 RB)



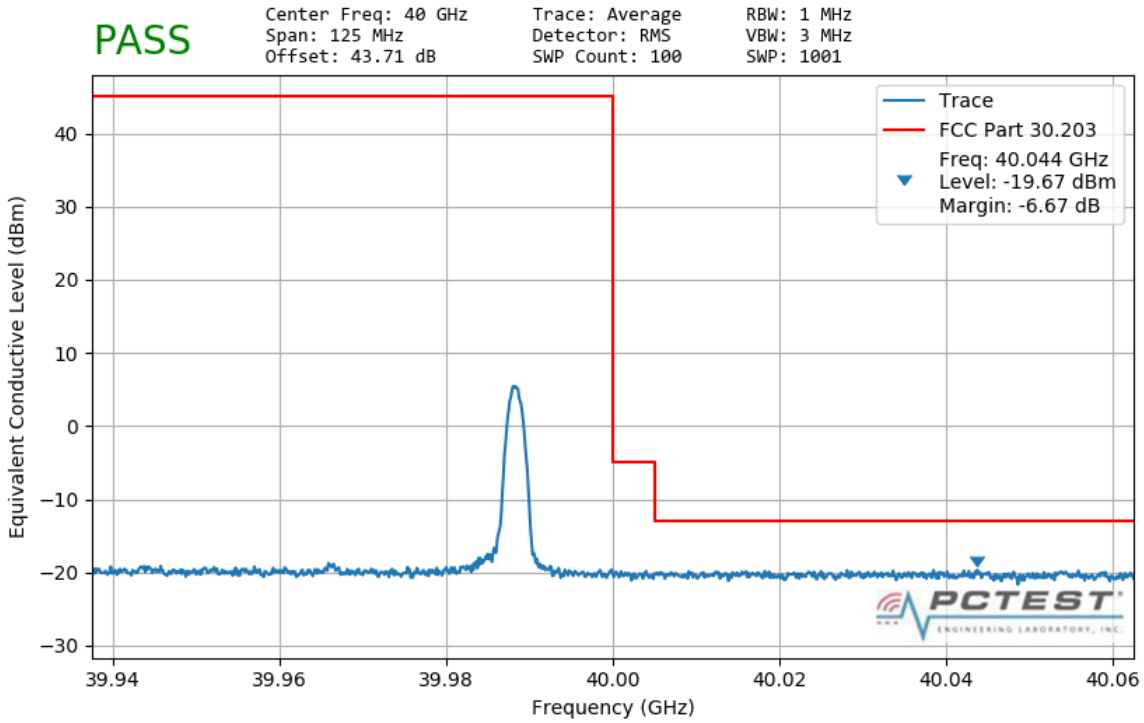
Plot 7-315. Ant3 Lower Band Edge (50MHz-2CC – QPSK Full RB)



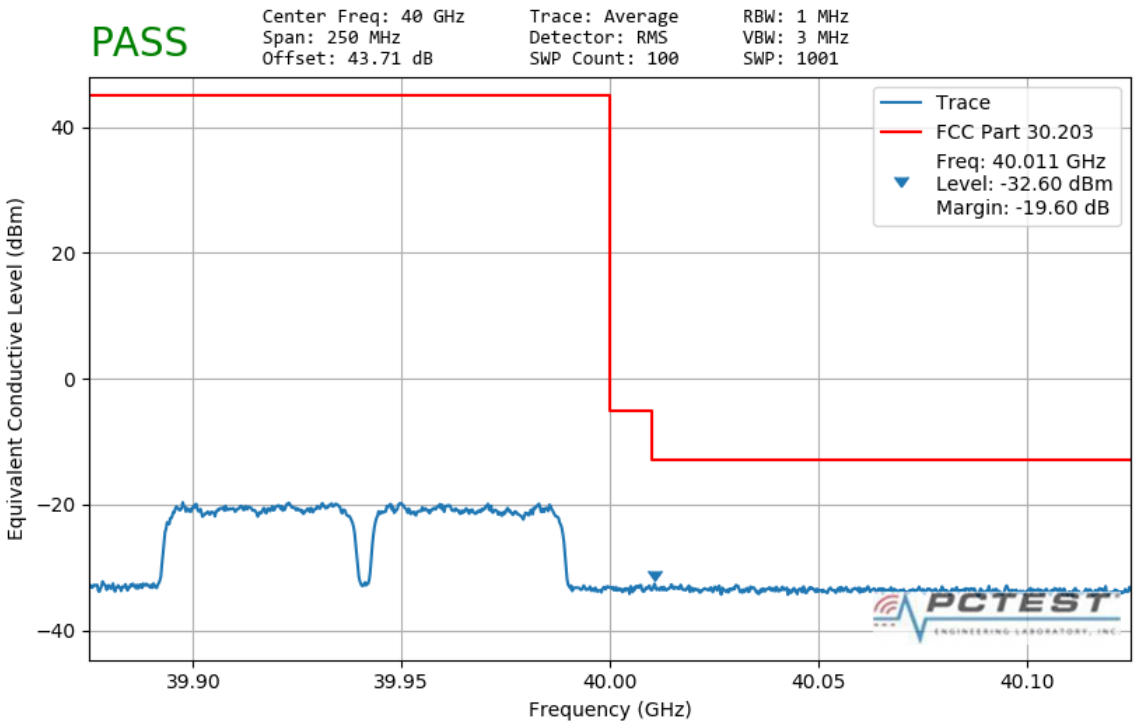
Plot 7-316. Ant3 Lower Band Edge (50MHz-2CC – QPSK 1 RB)



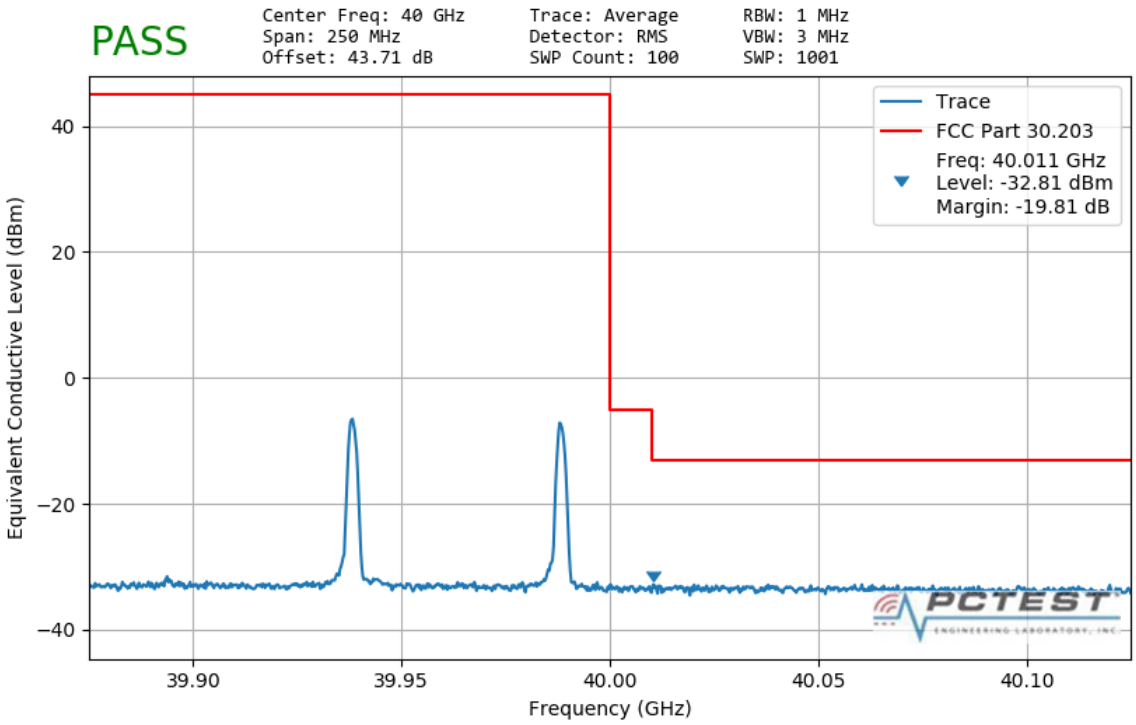
Plot 7-317. Ant3 Upper Band Edge (50MHz-1CC – QPSK Full RB)



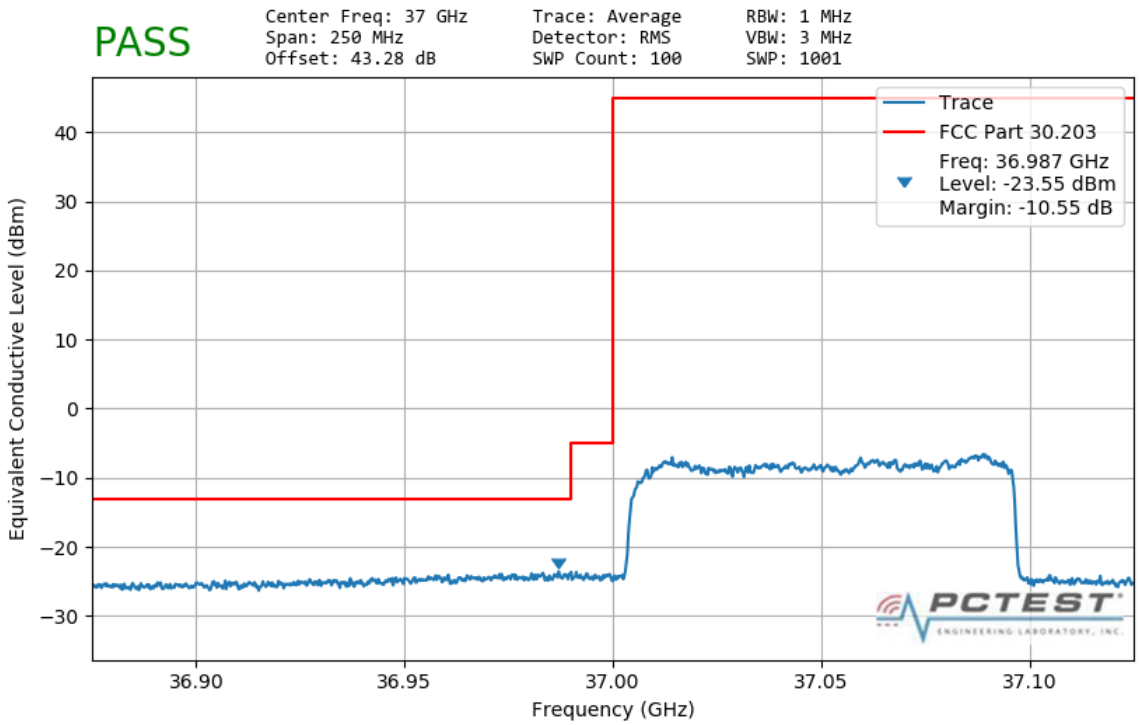
Plot 7-318. Ant3 Upper Band Edge (50MHz-1CC – QPSK 1 RB)



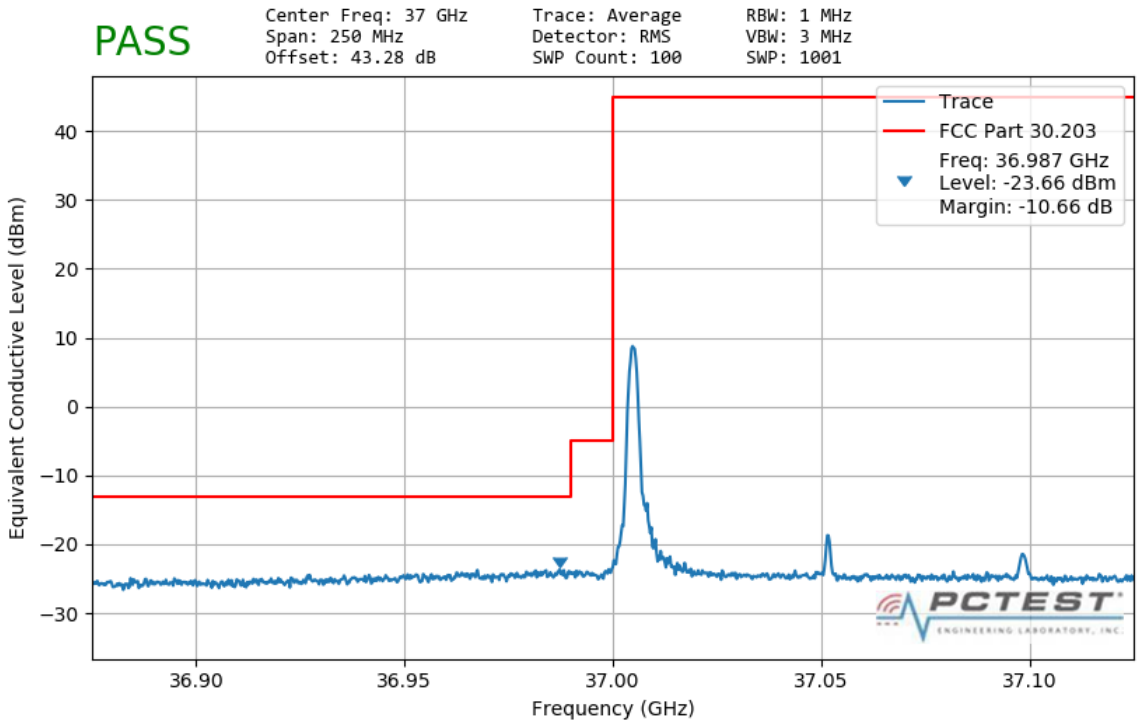
Plot 7-319. Ant3 Upper Band Edge (50MHz-2CC – QPSK Full RB)



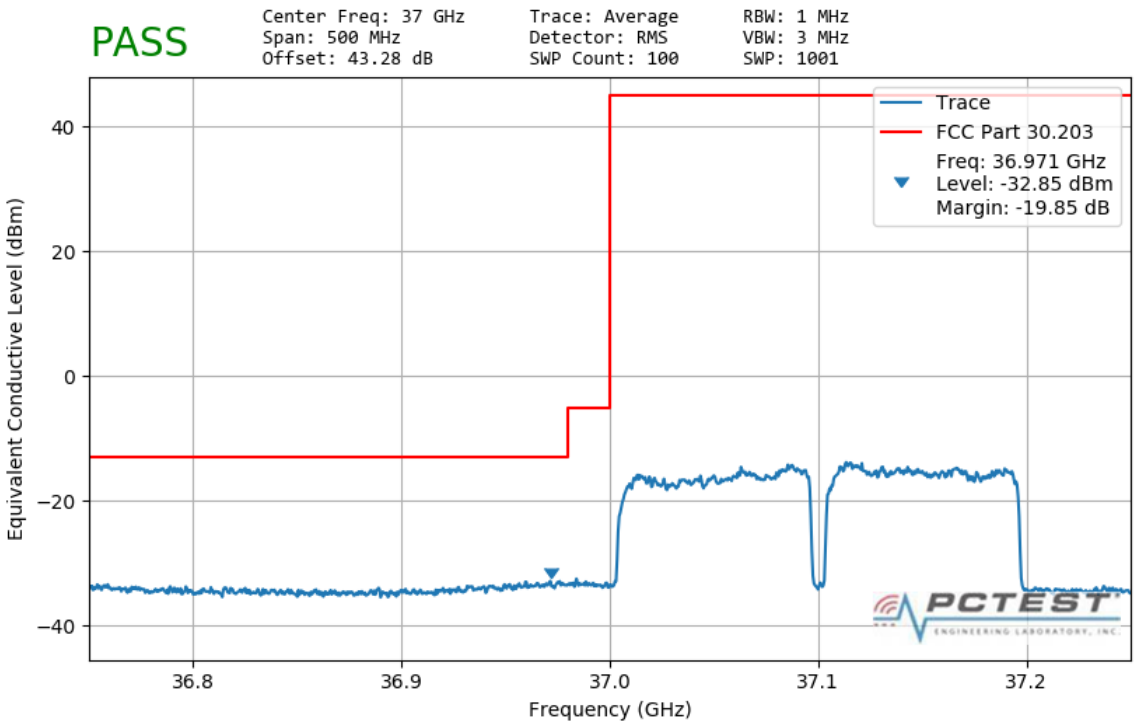
Plot 7-320. Ant3 Upper Band Edge (50MHz-2CC – QPSK 1 RB)



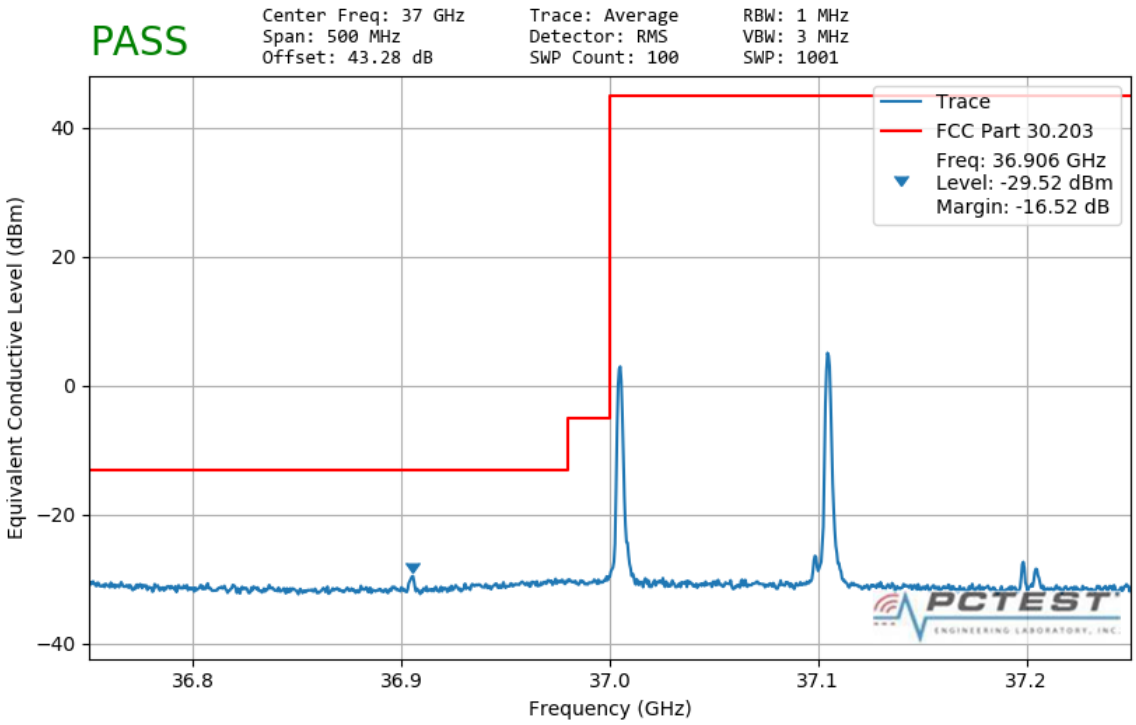
Plot 7-321. Ant3 Lower Band Edge (100MHz-1CC – QPSK Full RB)



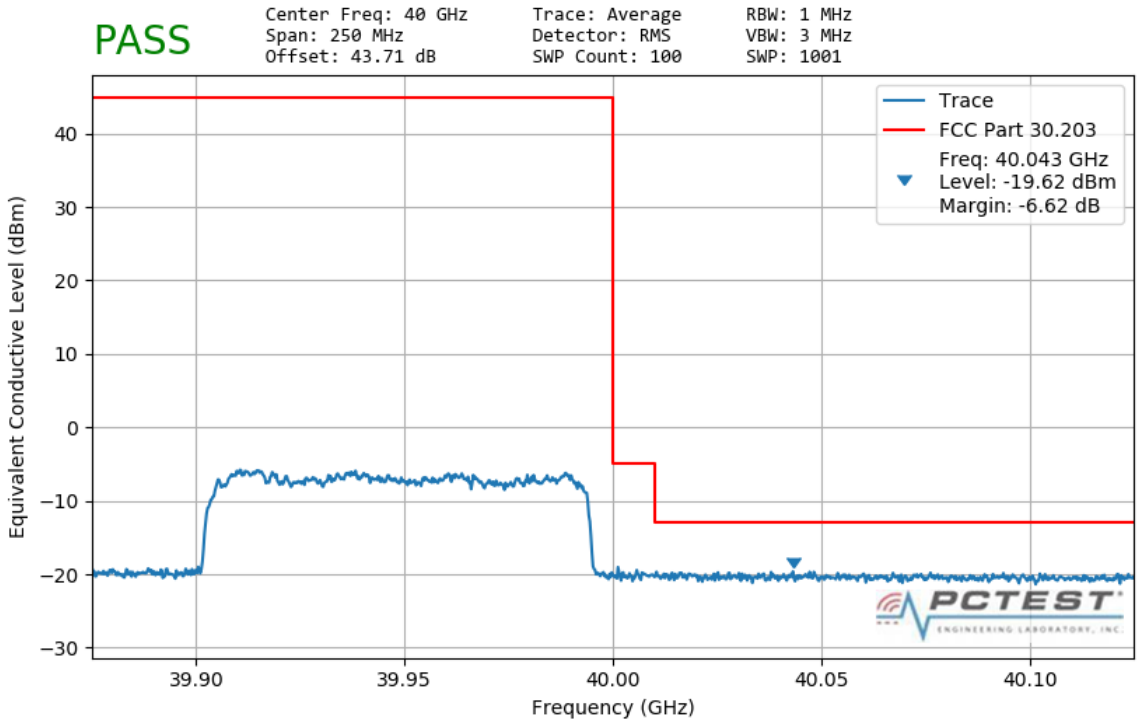
Plot 7-322. Ant3 Lower Band Edge (100MHz-1CC – QPSK 1 RB)



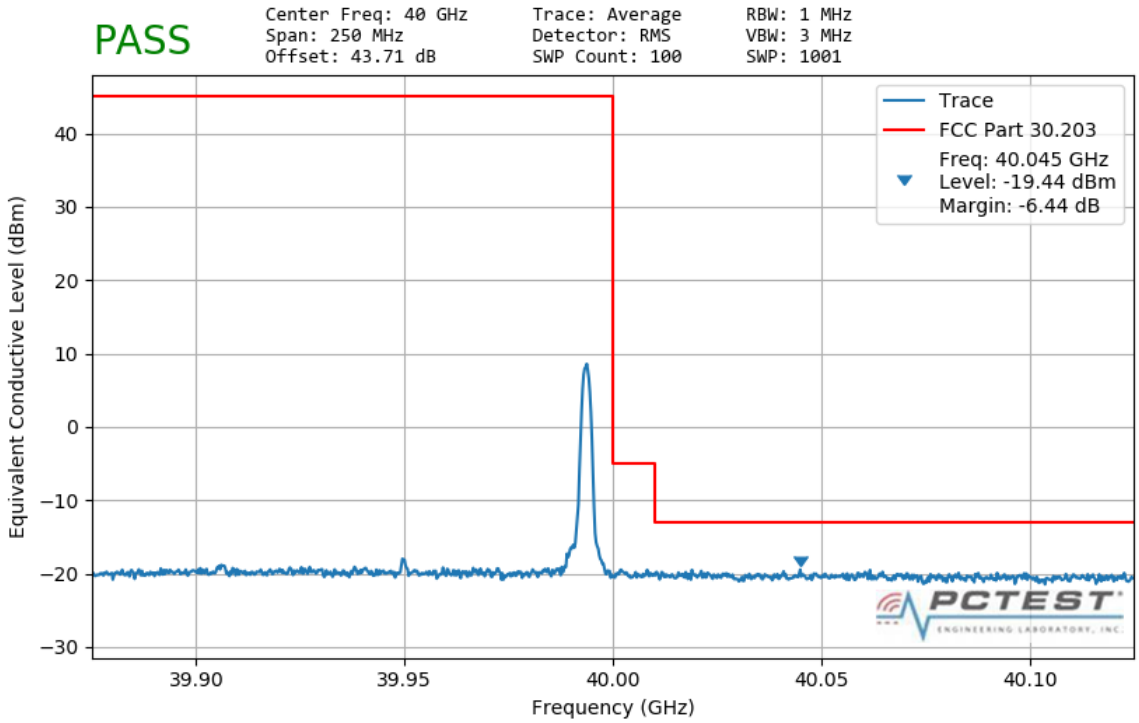
Plot 7-323. Ant3 Lower Band Edge (100MHz-2CC – QPSK Full RB)



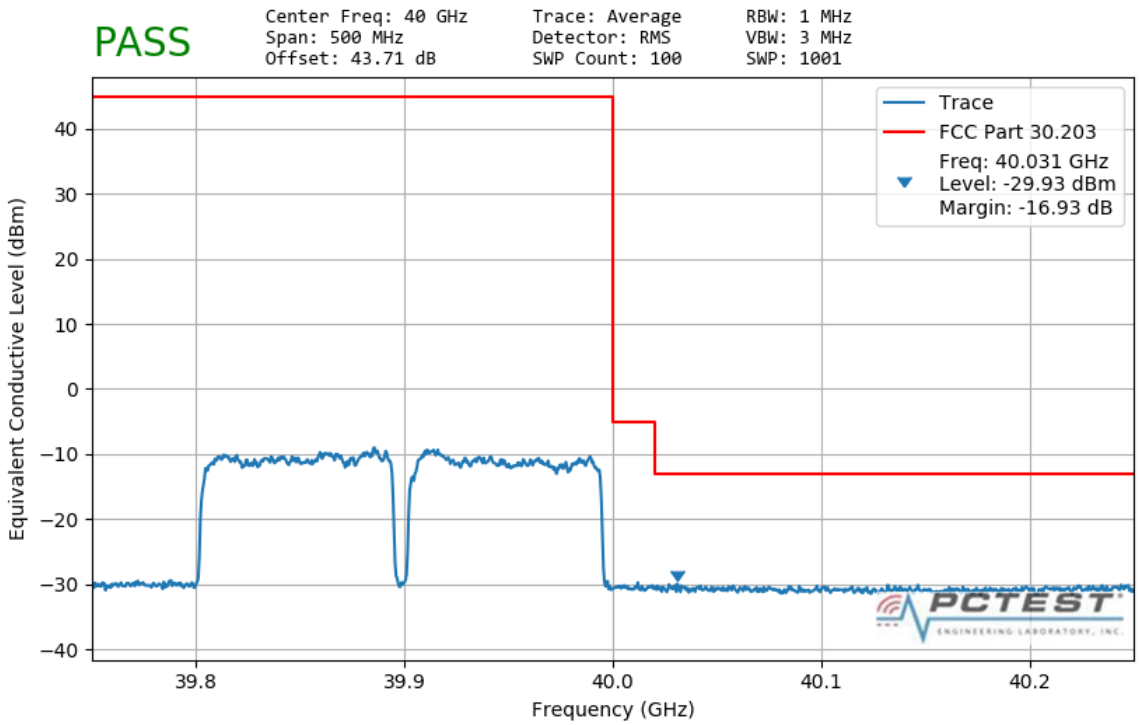
Plot 7-324. Ant3 Lower Band Edge (100MHz-2CC – QPSK 1 RB)



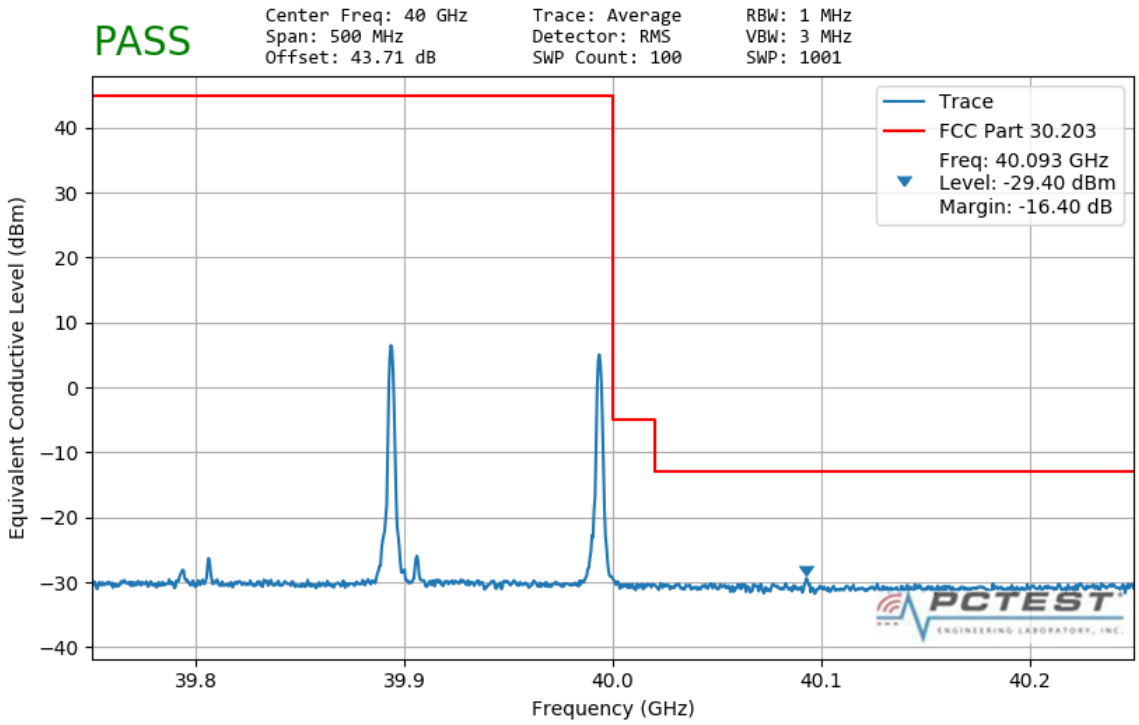
Plot 7-325. Ant3 Upper Band Edge (100MHz-1CC – QPSK Full RB)



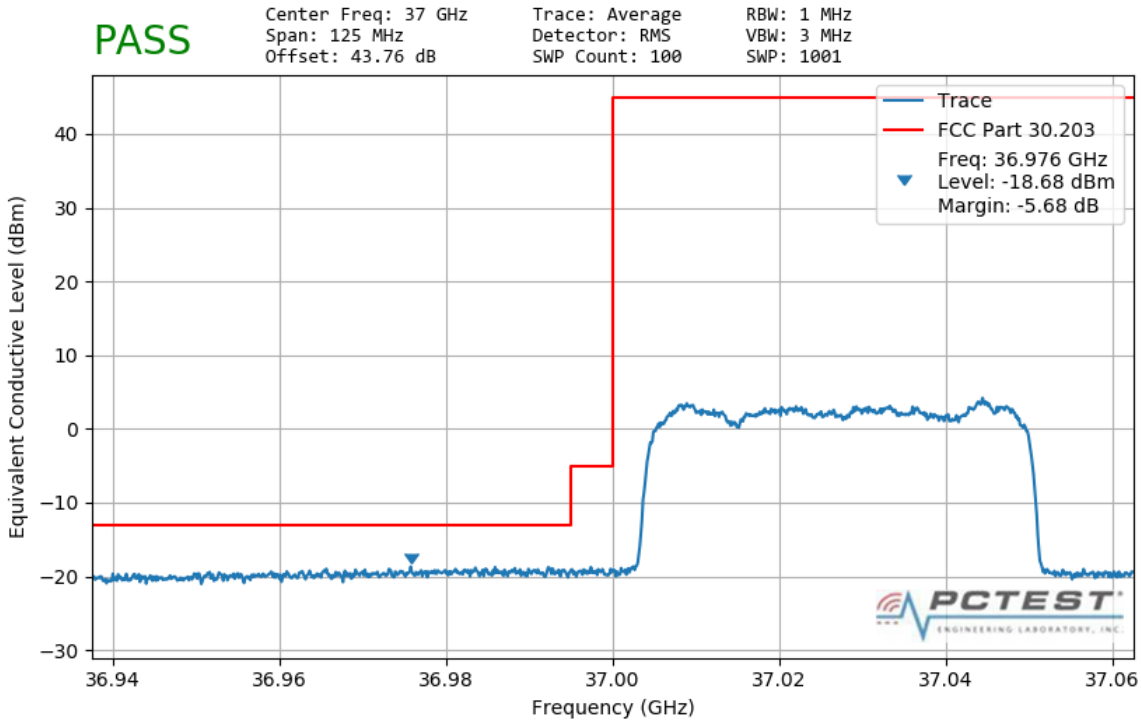
Plot 7-326. Ant3 Upper Band Edge (100MHz-1CC – QPSK 1 RB)



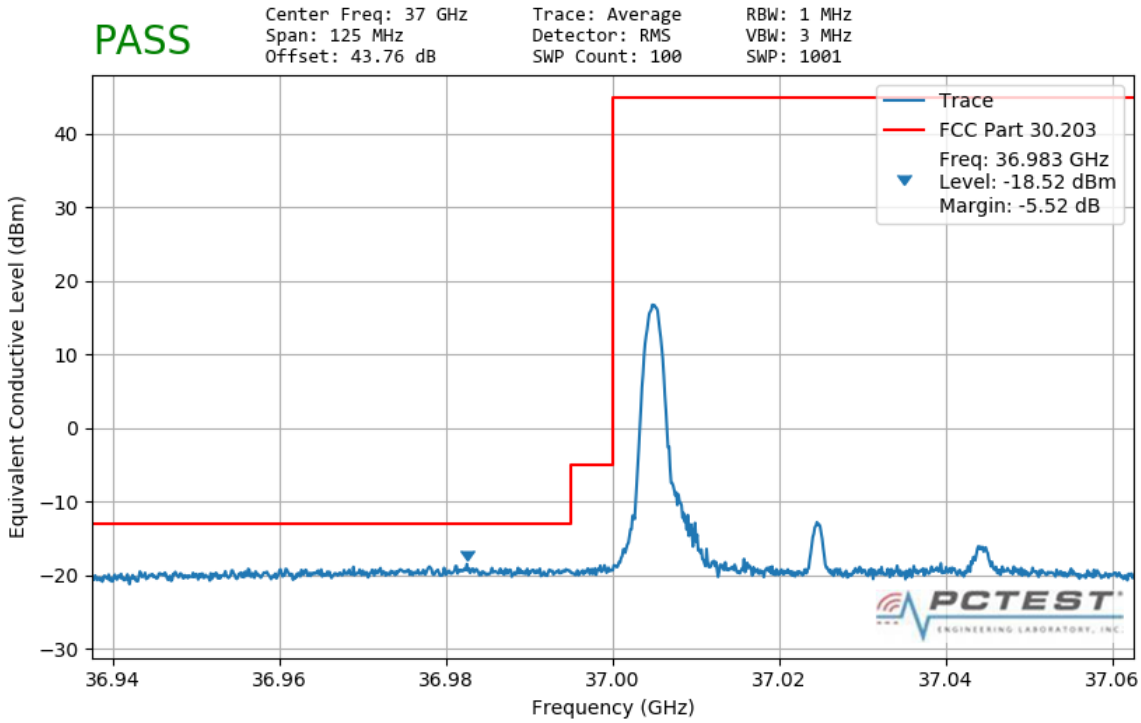
Plot 7-327. Ant3 Upper Band Edge (100MHz-2CC – QPSK Full RB)



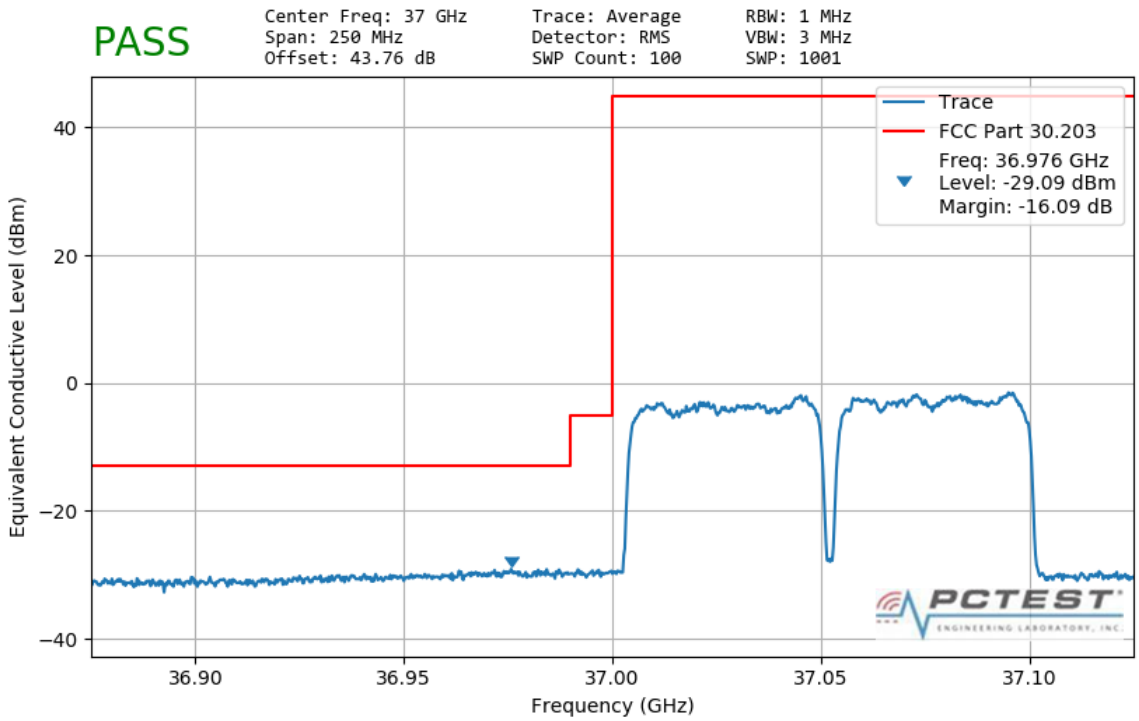
Plot 7-328. Ant3 Upper Band Edge (100MHz-2CC – QPSK 1 RB)



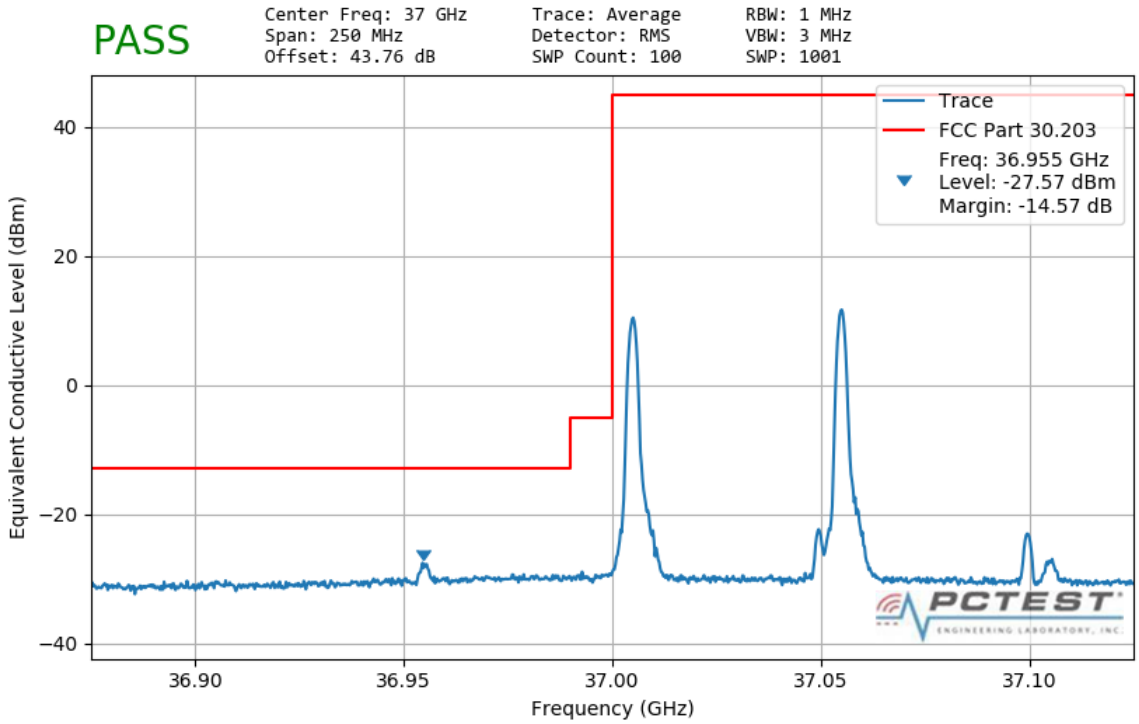
Plot 7-329. Ant4 Lower Band Edge (50MHz-1CC – QPSK Full RB)



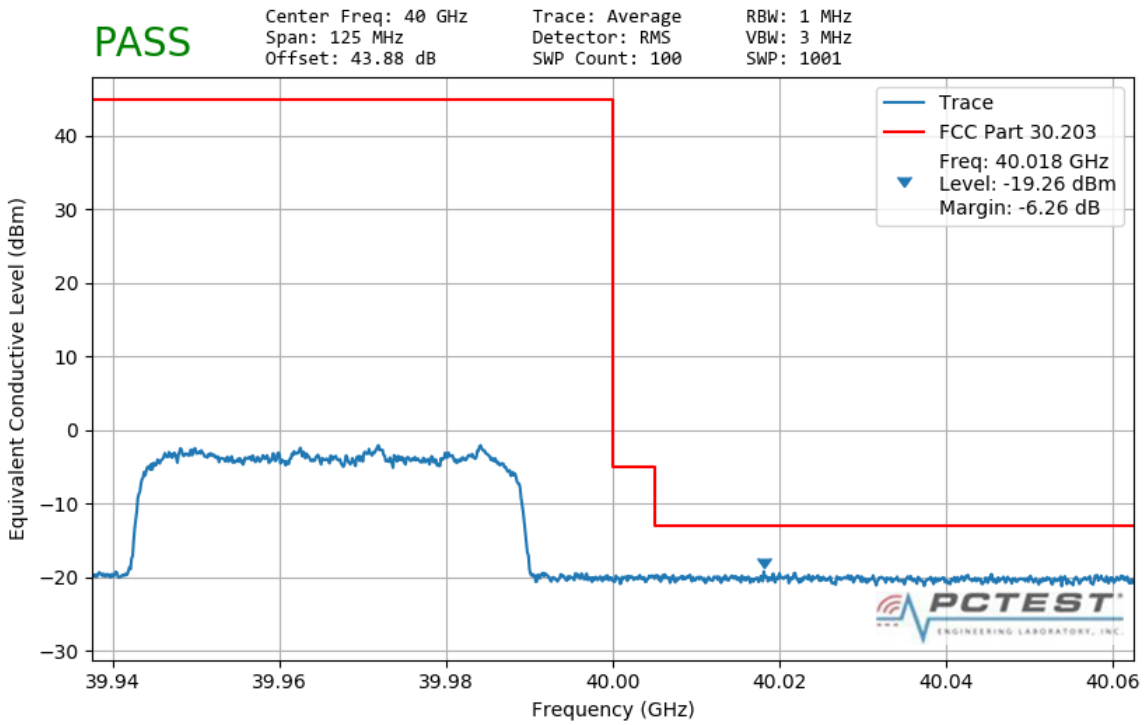
Plot 7-330. Ant4 Lower Band Edge (50MHz-1CC – QPSK 1 RB)



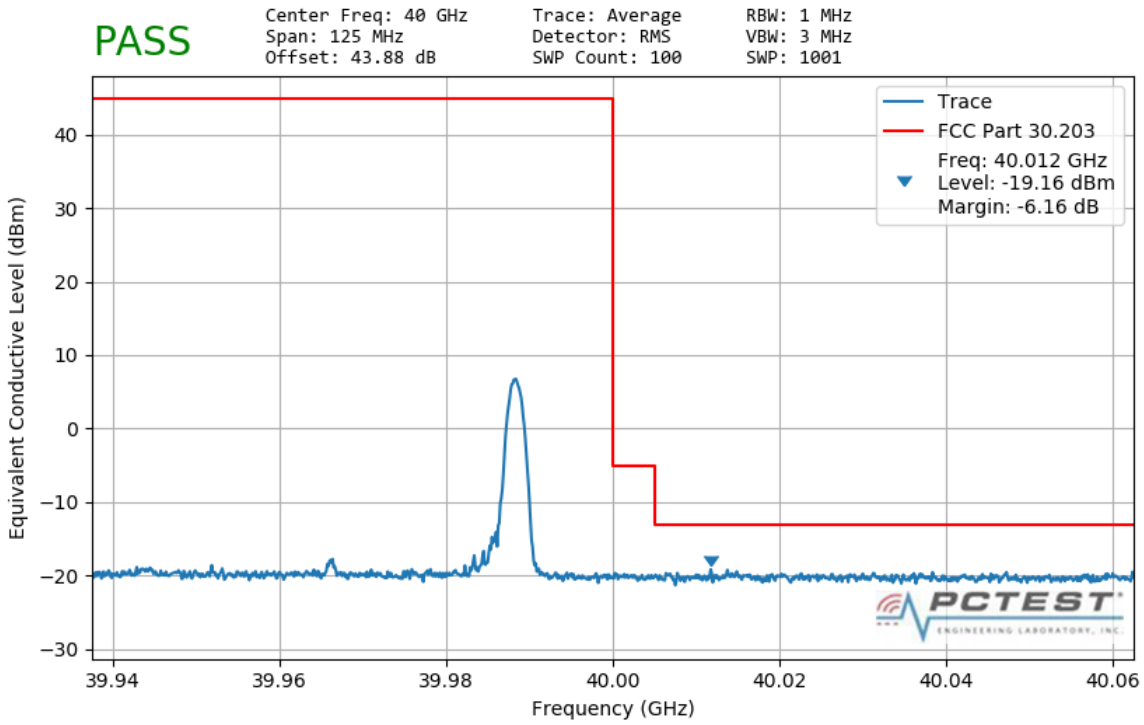
Plot 7-331. Ant4 Lower Band Edge (50MHz-2CC – QPSK Full RB)



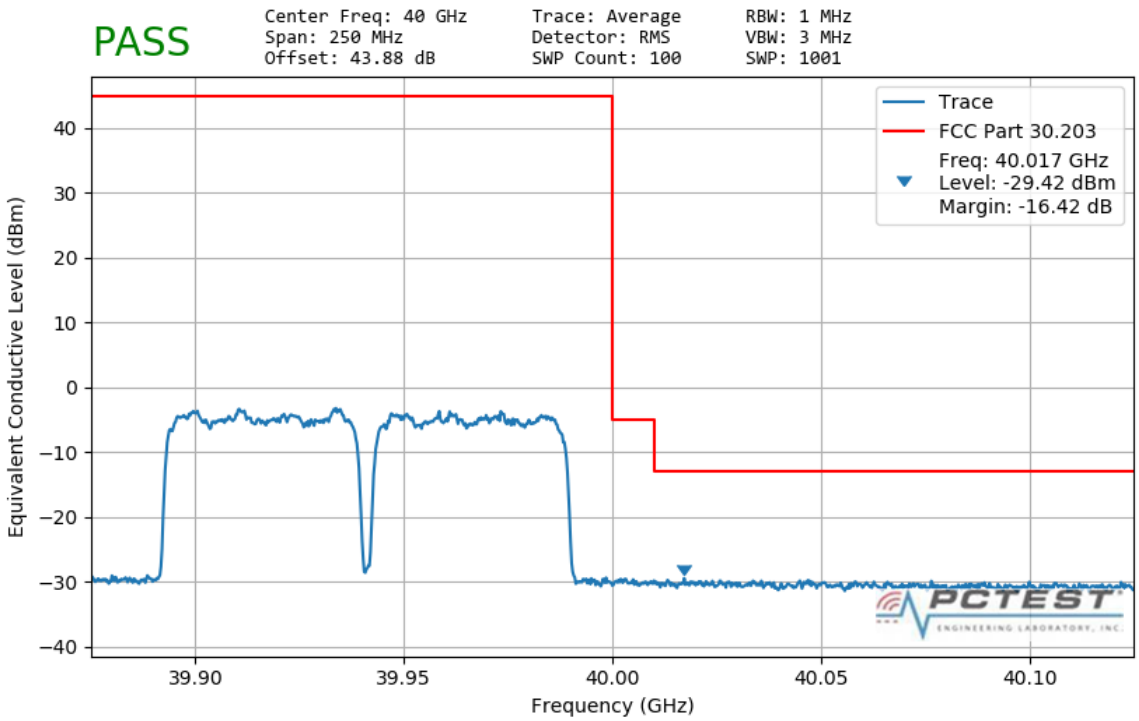
Plot 7-332. Ant4 Lower Band Edge (50MHz-2CC – QPSK 1 RB)



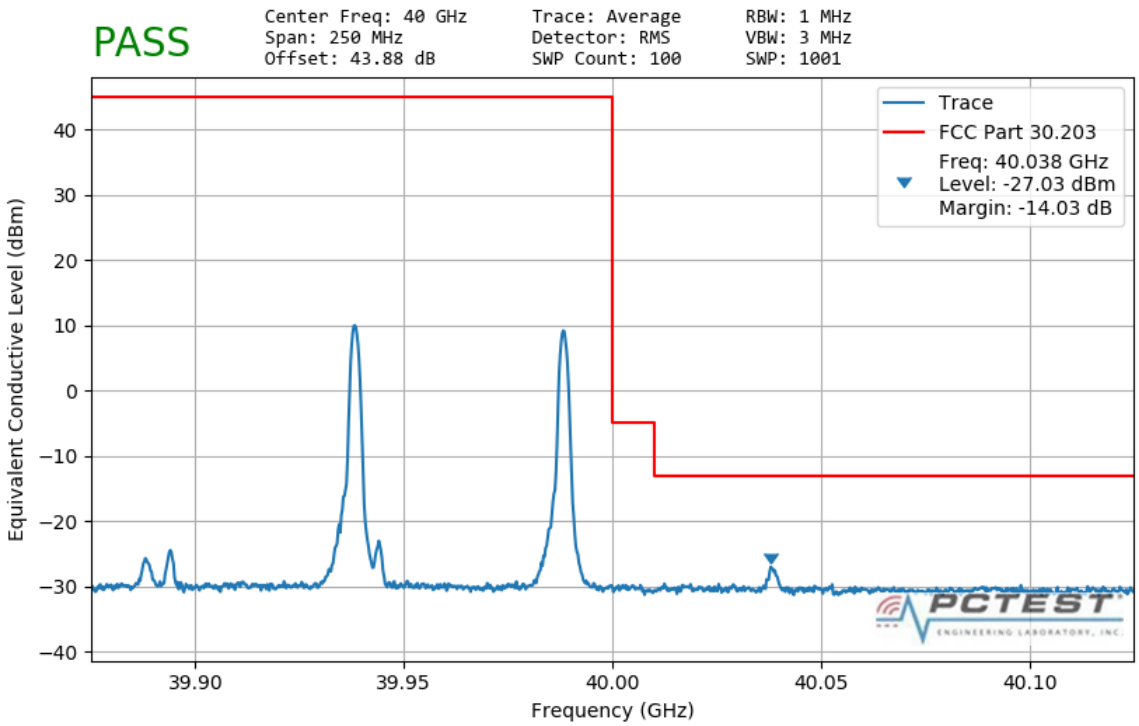
Plot 7-333. Ant4 Upper Band Edge (50MHz-1CC – QPSK Full RB)



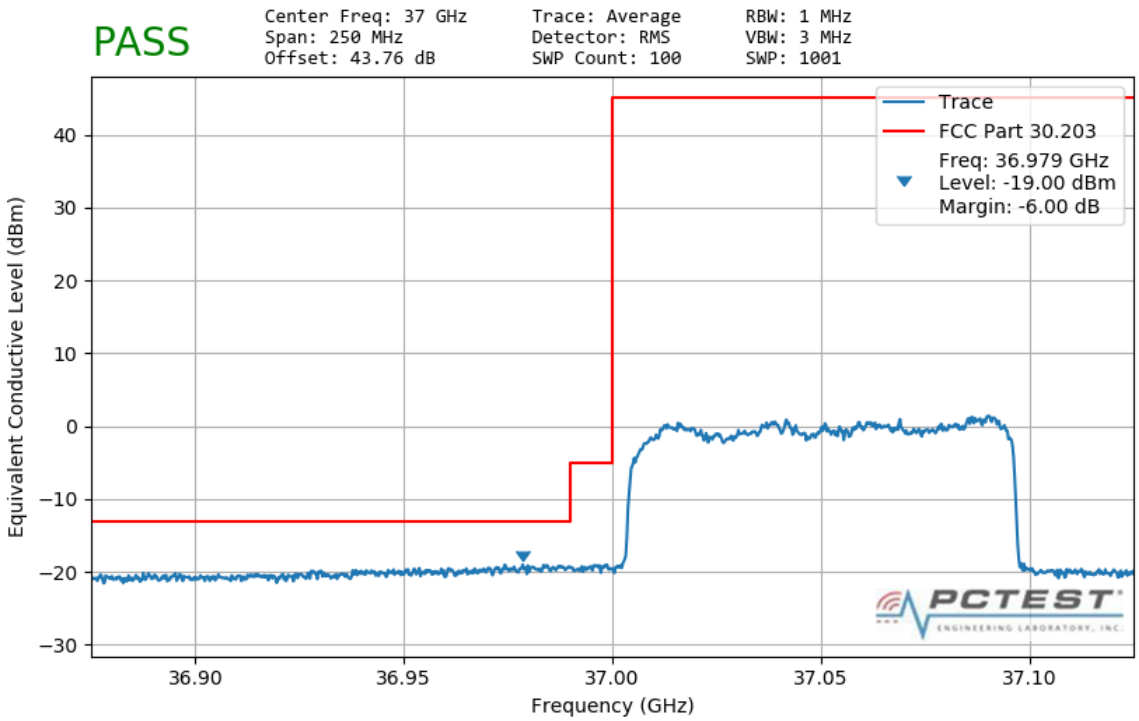
Plot 7-334. Ant4 Upper Band Edge (50MHz-1CC – QPSK 1 RB)



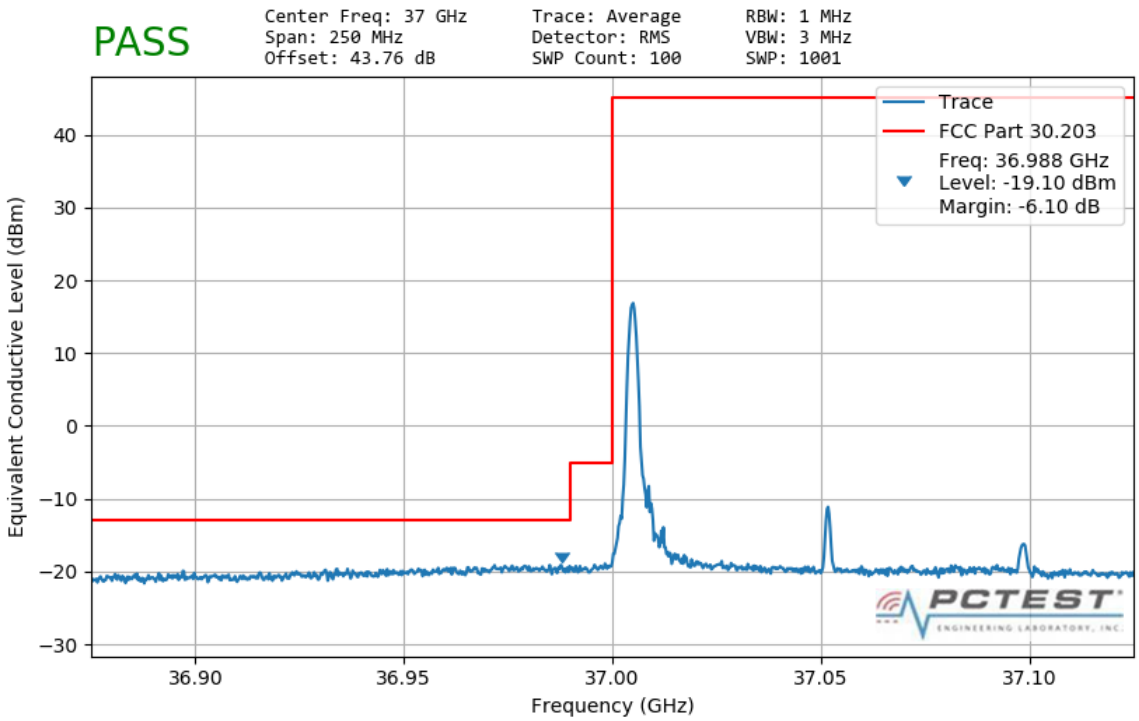
Plot 7-335. Ant4 Upper Band Edge (50MHz-2CC – QPSK Full RB)



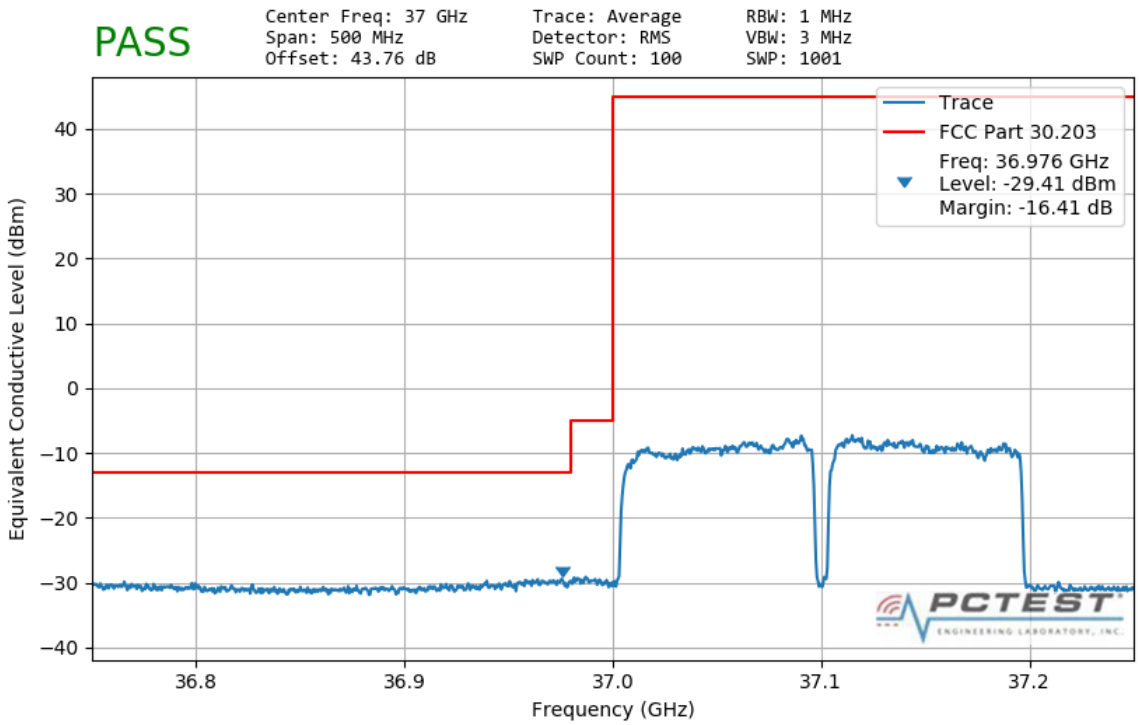
Plot 7-336. Ant4 Upper Band Edge (50MHz-2CC – QPSK 1 RB)



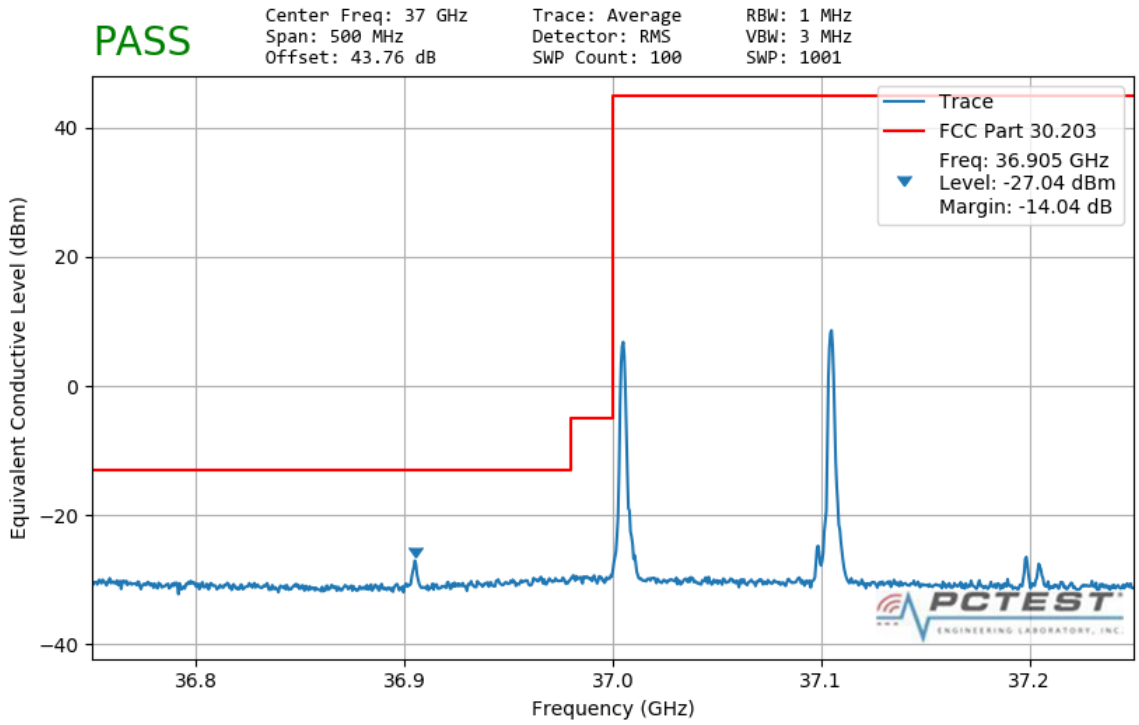
Plot 7-337. Ant4 Lower Band Edge (100MHz-1CC – QPSK Full RB)



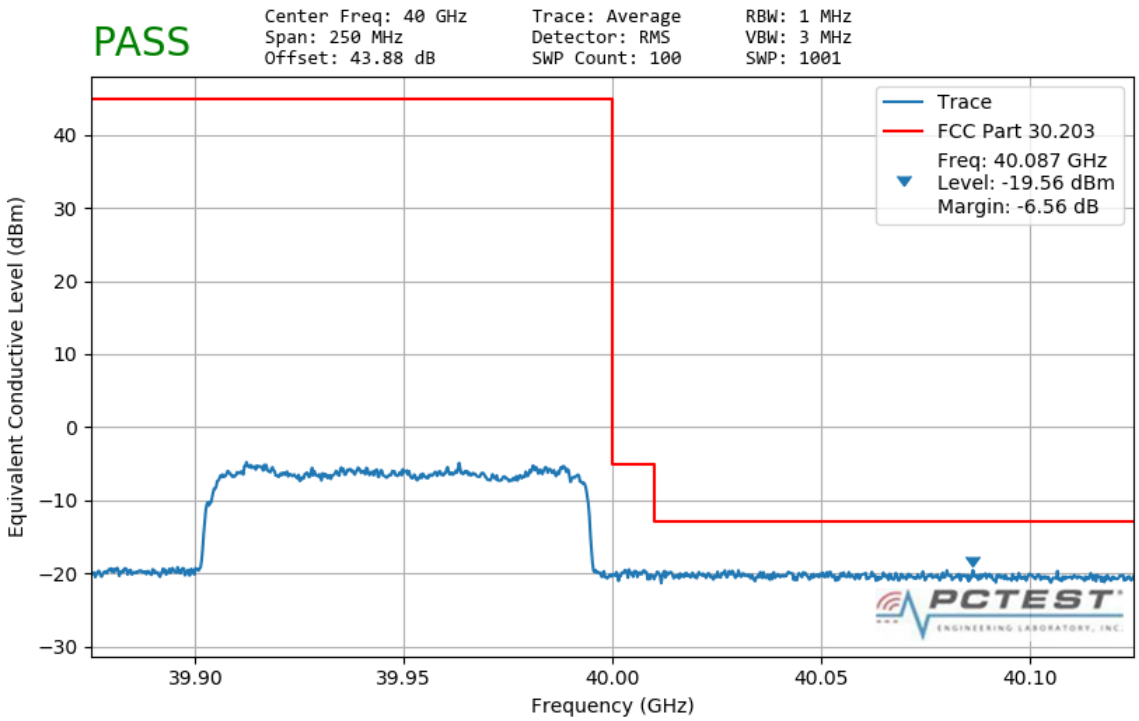
Plot 7-338. Ant4 Lower Band Edge (100MHz-1CC – QPSK 1 RB)



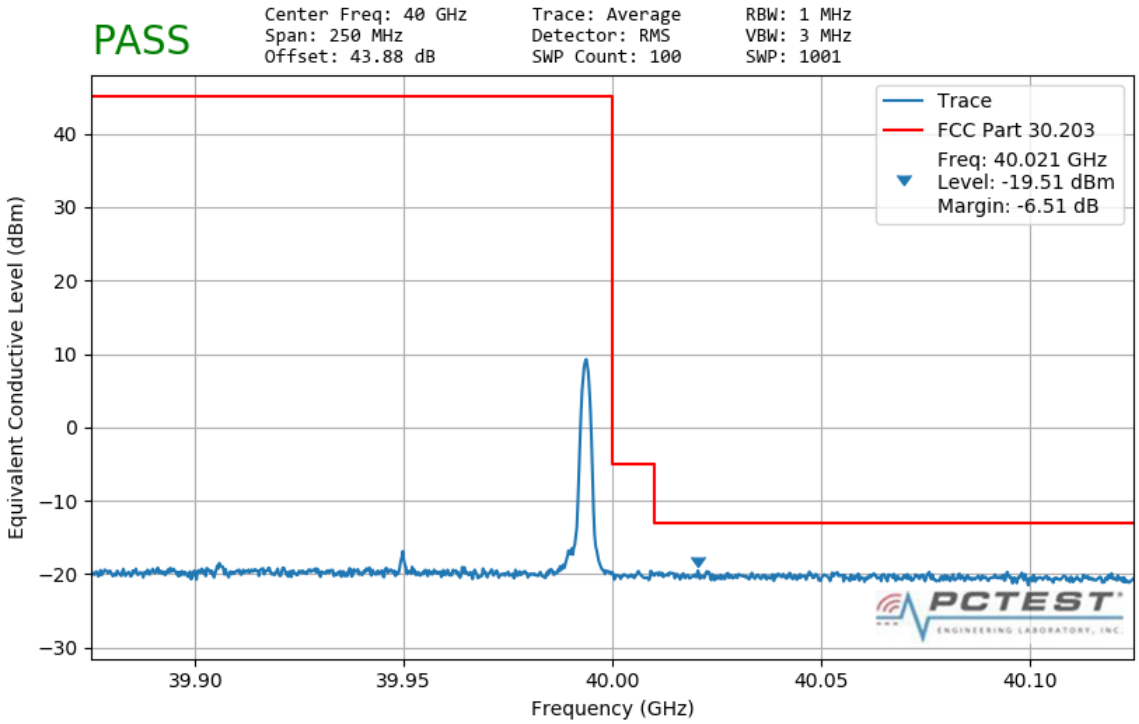
Plot 7-339. Ant4 Lower Band Edge (100MHz-2CC – QPSK Full RB)



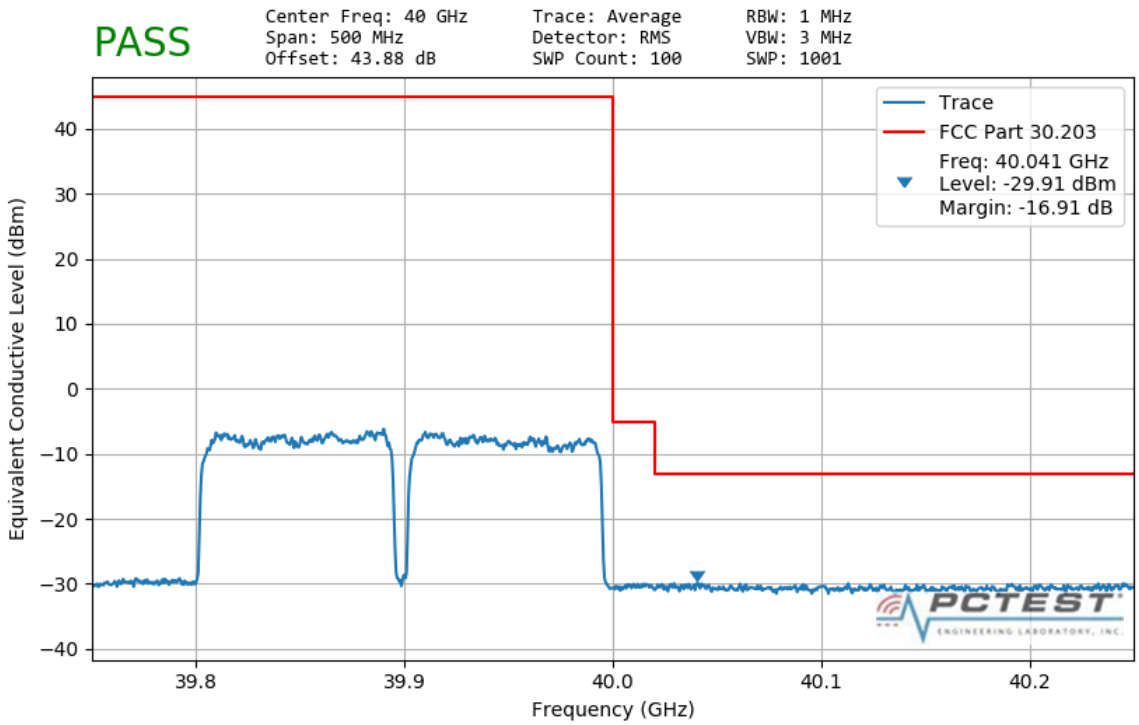
Plot 7-340. Ant4 Lower Band Edge (100MHz-2CC – QPSK 1 RB)



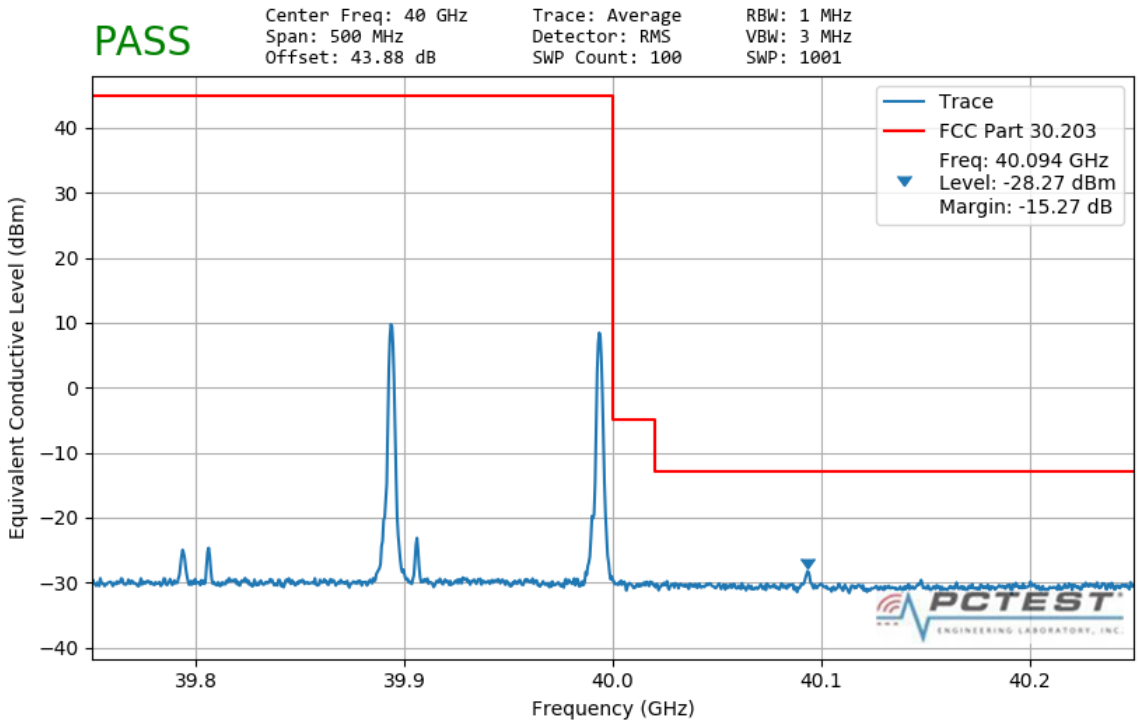
Plot 7-341. Ant4 Upper Band Edge (100MHz-1CC – QPSK Full RB)



Plot 7-342. Ant4 Upper Band Edge (100MHz-1CC – QPSK 1 RB)



Plot 7-343. Ant4 Upper Band Edge (100MHz-2CC – QPSK Full RB)



Plot 7-344. Ant4 Upper Band Edge (100MHz-2CC – QPSK 1 RB)

7.6 Frequency Stability / Temperature Variation

§2.1055

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Test Procedure Used

ANSI C63.5-2015 Section 5.6
KDB 842590 D01 v01 Section 4.5

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

The EUT was measured using horn antenna connected to a spectrum analyzer. The EUT was placed inside an environmental chamber. Using a foam plug, the horn antenna measured the frequency of the fundamental signal.

Test Notes

The Frequency Deviation column in the table below is the amount of deviation measured from the center frequency of the Reference measurement (first row).

Frequency Stability Measurements (Band n261)

§2.1055

OPERATING FREQUENCY:	27,922,080,000	Hz
CHANNEL:	2077867	
REFERENCE VOLTAGE:	4.19	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.19	+ 20 (Ref)	28,107,080,000	0	0.0000000
100 %		- 30	27,705,080,000	402,000,000	1.4397208
100 %		- 20	28,218,080,000	-111,000,000	-0.3975349
100 %		- 10	27,866,080,000	241,000,000	0.8631162
100 %		0	27,737,080,000	370,000,000	1.3251162
100 %		+ 10	27,979,080,000	128,000,000	0.4584186
100 %		+ 20	28,065,080,000	42,000,000	0.1504186
100 %		+ 30	27,782,080,000	325,000,000	1.1639534
100 %		+ 40	28,031,080,000	76,000,000	0.2721860
100 %		+ 50	27,671,080,000	436,000,000	1.5614883
BATT. ENDPOINT	3.79	+ 20	27,816,080,000	291,000,000	1.0421860

Table 7-157. Frequency Stability Data (n261)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

Frequency Stability Measurements (Band n261)

§2.1055

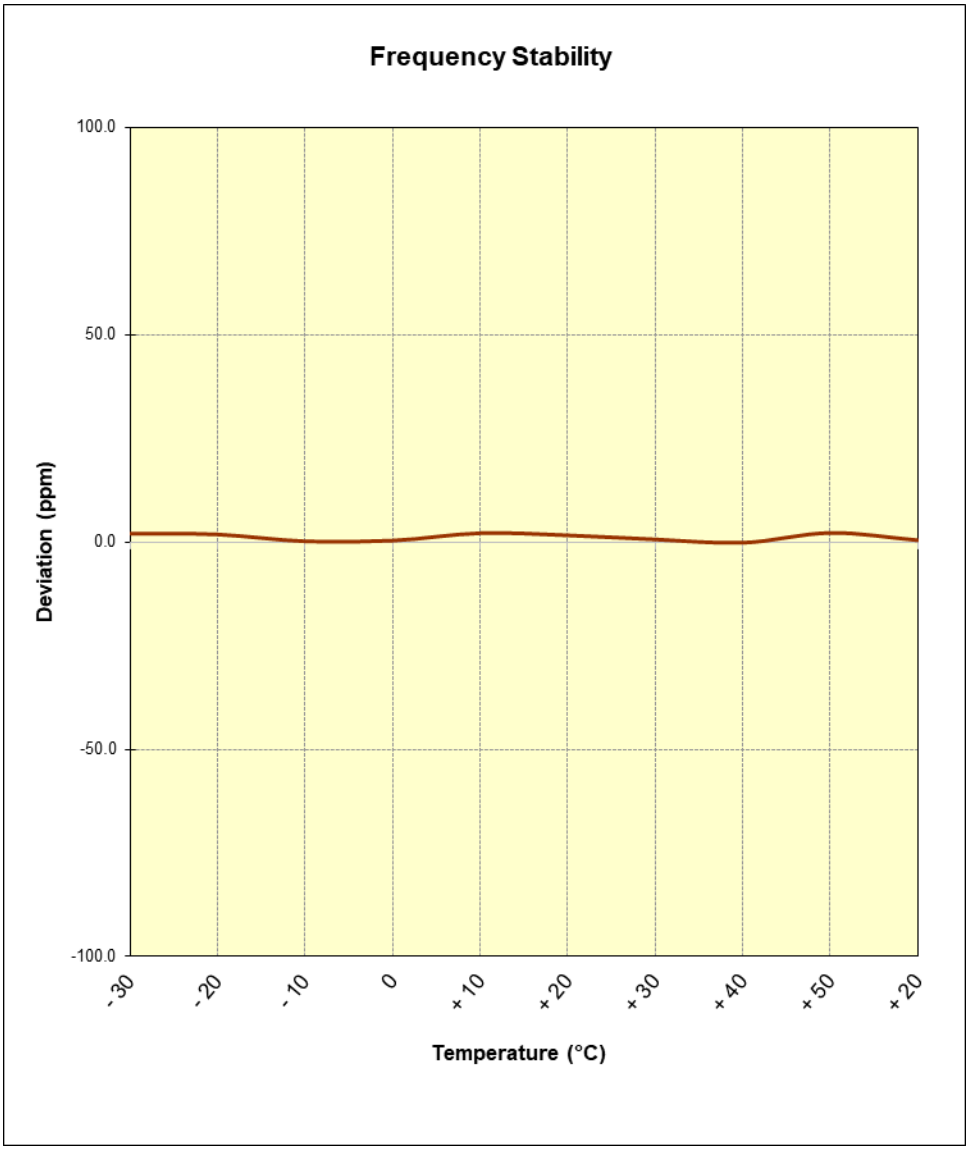


Table 7-158. Frequency Stability Graph (n261)

Frequency Stability Measurements (Band n260)

§2.1055

OPERATING FREQUENCY:	38,495,520,000	Hz
CHANNEL:	2254091	
REFERENCE VOLTAGE:	4.19	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.19	+ 20 (Ref)	38,522,520,000	0	0.0000000
100 %		- 30	38,317,520,000	205,000,000	0.5325295
100 %		- 20	38,630,520,000	-108,000,000	-0.2805521
100 %		- 10	38,752,520,000	-230,000,000	-0.5974721
100 %		0	38,669,520,000	-147,000,000	-0.3818626
100 %		+ 10	38,739,520,000	-217,000,000	-0.5637020
100 %		+ 20	38,614,520,000	-92,000,000	-0.2389888
100 %		+ 30	38,303,520,000	219,000,000	0.5688974
100 %		+ 40	38,453,520,000	69,000,000	0.1792416
100 %		+ 50	38,637,520,000	-115,000,000	-0.2987361
BATT. ENDPOINT	3.79	+ 20	38,747,520,000	-225,000,000	-0.5844836

Table 7-159. Frequency Stability Data (n260)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

Frequency Stability Measurements (Band n260)

§2.1055

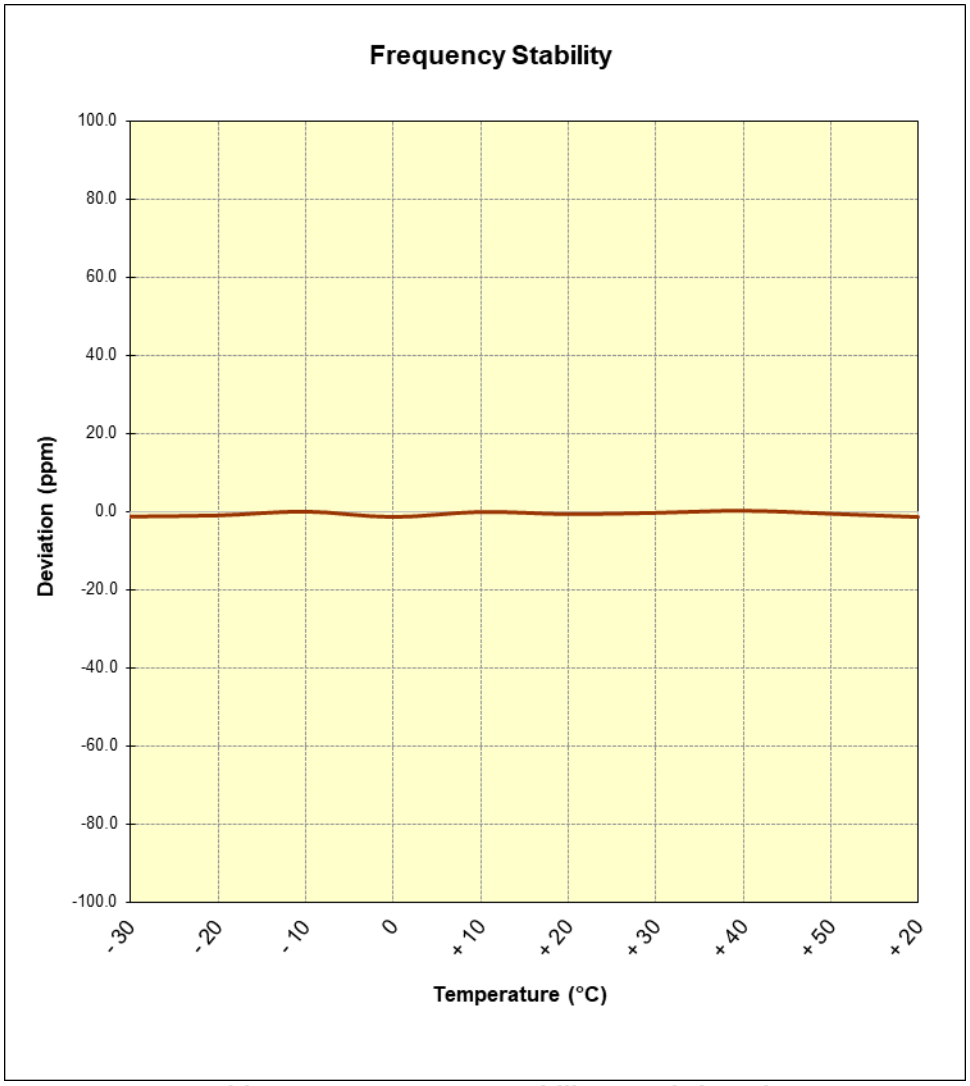


Table 7-160. Frequency Stability Graph (n260)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG986U** complies with all the requirements of Part 30.

9.0 APPENDIX A

9.1 VDI Mixer Verification Certificate

Virginia Diodes, Inc
979 2nd St. SE
Suite 309
Charlottesville, VA 22902
Phone: 434-297-3257
Fax: 434-297-3258

Certificate of Conformance

To: PCTEST Engineering Laboratory
7185 Oakland Mills Road
Columbia, MD 21046
United States

From: Virginia Diodes, Inc
979 2nd St. SE
Suite 309
Charlottesville, VA 22902

Packing List No: 193065 **Today's Date:** 10/02/19

Quantity Shipped	Unit	Description	Order-Job Number
1	EA	VDIWR19.0SAX WR19SAX / SN: SAX 411	19329-01

The VDI product(s) in this shipment meet(s) the guidelines for performance specifications established in accordance with the corresponding Purchase Order. Data presented in the User Guide, where applicable, has been obtained in accordance with VDI's Quality Management System. All instruments, used to obtain data, which require calibration have been calibrated with equipment traceable to the National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI).

Authorized Signature
Virginia Diodes, Inc

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Virginia Diodes, Inc
979 2nd St. SE
Suite 309
Charlottesville, VA 22902
Phone: 434-297-3257
Fax: 434-297-3258

Certificate of Conformance

To: PCTEST Engineering Laboratory
6660-B Dobbin Road
Columbia, MD 21045
United States

From: Virginia Diodes, Inc
979 2nd St. SE
Suite 309
Charlottesville, VA 22902

Shipping Date: 05/14/18 **Today's Date:** 05/14/18

Quantity Shipped	Unit	Description
1	EA	VDIWR12.0SAX WR12SAX - Spectrum Analyzer Extension Module / SN: SAX 252

The VDI product(s) in this shipment meet(s) the guidelines for performance specifications established in accordance with the corresponding Purchase Order. Data presented in the User Guide, where applicable, has been obtained in accordance with VDI's Quality Management System. All instruments, used to obtain data, which require calibration have been calibrated with equipment traceable to the National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI).

Authorized Signature
Virginia Diodes, Inc

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Virginia Diodes, Inc
979 2nd St. SE
Suite 309
Charlottesville, VA 22902
Phone: 434-297-3257
Fax: 434-297-3258

Certificate of Conformance

To: PCTEST Engineering Laboratory
6660-B Dobbin Road
Columbia, MD 21045
United States

From: Virginia Diodes, Inc
979 2nd St. SE
Suite 309
Charlottesville, VA 22902

Shipping Date: 05/08/18 **Today's Date:** 05/08/18

Quantity Shipped	Unit	Description
1	EA	VDIWR8.0SAX WR8.0SAX - Spectrum Analyzer Extension Module; SN: SAX 253.

The VDI product(s) in this shipment meet(s) the guidelines for performance specifications established in accordance with the corresponding Purchase Order. Data presented in the User Guide, where applicable, has been obtained in accordance with VDI's Quality Management System. All instruments, used to obtain data, which require calibration have been calibrated with equipment traceable to the National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI).

Authorized Signature
Virginia Diodes, Inc

Virginia Diodes, Inc
979 2nd St. SE
Suite 309
Charlottesville, VA 22902
Phone: 434-297-3257
Fax: 434-297-3258

Certificate of Conformance

To: PCTEST Engineering Laboratory
6660-B Dobbin Road
Columbia, MD 21045
United States

From: Virginia Diodes, Inc
979 2nd St. SE
Suite 309
Charlottesville, VA 22902

Shipping Date: 05/21/18 **Today's Date:** 05/22/18

Quantity Shipped	Unit	Description
1	EA	VDIWR5.1SAX WR5.1SAX - Spectrum Analyzer Extension Module; SN: SAX 254.

The VDI product(s) in this shipment meet(s) the guidelines for performance specifications established in accordance with the corresponding Purchase Order. Data presented in the User Guide, where applicable, has been obtained in accordance with VDI's Quality Management System. All instruments, used to obtain data, which require calibration have been calibrated with equipment traceable to the National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI).

Authorized Signature
Virginia Diodes, Inc

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