FCC / IC Test Report

FOR:
Vocollect Inc.

Product Description:
A wireless device with Bluetooth 2.0 + EDR and 802.11a/b/g/n WLAN Radios

Model:
A710 (TAP910-01), A720 (TAP920-01), A730 (TAP930-01)

FCC ID: MQO-TAP900-01

FCC CFR47 Part 15.407, subpart E

TEST REPORT #: VOCOL-002-15001_UNII_UPDATE

DATE: 2016-01-26

***CETECOM* Inc.**
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CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

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1 Assessment

The following device meets the applicable criteria of FCC CFR47 15.407 for the U-NII-3 Band affected by the 5 GHz U-NII (R&O) FCC 14-30 released: April 1, 2014 which becomes mandatory after June 2nd 2016.

Company	Description	Model #
Vocollect Inc.	A wireless device with Bluetooth 2.0 + EDR and 802.11a/b/g/n WLAN Radios	TAP910-01, TAP920-01, TAP930-01

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2016-01-26	Compliance	Franz Engert (Compliance Manager)	Digitally signed by Franz Engert DN: cn=Franz Engert, c=US, o=CETECOM, ou=Complience, email=franz.engert@cetecom.com

Responsible for the Report:

Date	Section	Name	Signature
2016-01-26	Compliance	Douglas Antioco (EMC Engineer)	Douglas Antioco 2016.01.26 19:24:01 -08'00'

The test results of this test report relate exclusively to the test item specified in Section3.
CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Compliance Manager:	Franz Engert
Responsible Project Leader:	Douglas Antioco

2.2 Identification of the Client

Applicant's Name:	Vocollect Inc.
Street Address:	703 Rodi Road
City/Zip Code	Pittsburgh, PA
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as Client
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Model:	TAP910-01, TAP920-01, TAP930-01
HW Version :	USI
SW Version :	V10
FCC-ID:	MQO-TAP900-01
Product Description:	WLAN module
Technology/ Type(s) of Modulation:	802.11a/n
Modes of Operation	Client in all UNII sub bands
Channel Bandwidths	20 MHz
Operating Frequency Ranges (MHz)/ Channels:	5150-5250 MHz 5250-5350MHz 5470-5725 MHz 5725-5850 MHz
Antenna Info	Internal Antenna; Documented maximum antenna gain (5GHz): 4.3dBi
Rated Operating Voltage / Power Supply:	Li-ion Battery (Removable) 3.145V (min)/ 3.7 (nom)/ 4.255 (max)
Operating temperature range:	Tmin: -20°C / Tmax:+50°C
Test Sample:	Production
Other Radios included in the device:	• Bluetooth 2.0 + EDR

3.2 Identification of the Equipment under Test (EUT)

EUT #	Serial Number	Model	HW Version	SW Version	Notes/Comments
1	6315370015	A710 (TAP910-01)	USI	V10	Conducted RF Sample
	6215380008	A720 (TAP920-01)	USI	V10	Conducted RF Sample
	5915370150	A730 (TAP930-01)	USI	V10	Conducted RF Sample

3.3 Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Serial Number
-	-	-	-	-

3.4 Environmental conditions during Test:

The following environmental conditions were maintained during the course of testing:
Ambient Temperature: 20-25°C
Relative humidity: 40-60%

3.5 Dates of Testing:

2016-01-19 to 2016-01-22

3.6 Test mode of operation:

Mode	Data rate (Mbps)	Modulation scheme
802.11n	6.5Mbps	OFDM/BPSK

3.7 Testing notes:

When applicable, the EUT was configured to continuously transmit at maximum power on the low, middle and high channels in the U-NII-3 band using a software tool that is not available to the end user.

4 Subject of Investigation

The following device was evaluated against the criteria affected by the 5 GHz U-NII (R&O) FCC 14-30 released: April 1, 2014 which becomes mandatory after June 2nd 2016. The intention of this testing and report is to prove compliance to the “new rules” according to FCC 15.407 in combination with the report which is currently on file with the FCC.
Test report no.:
2013095DTS (Rhein Tech Laboratories, Inc., dated 2013-07-25)

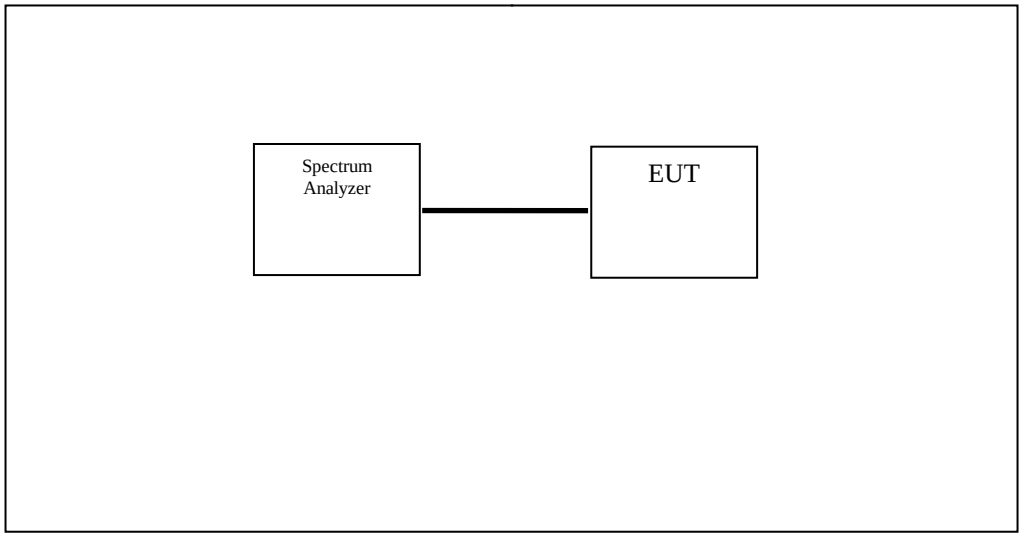
5 Summary of Measurement Results

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
15.407 b	Out Of Band EIRP Emission	Nominal	802.11n	■	☐	☐	☐	Complies
15.407 a	Max Conducted Power Spectral Density (PSD)	Nominal	802.11n	■	☐	☐	☐	Complies

Note: NA= Not Applicable; NP= Not Performed.

6 Measurements

6.1 Conducted Measurement Setup

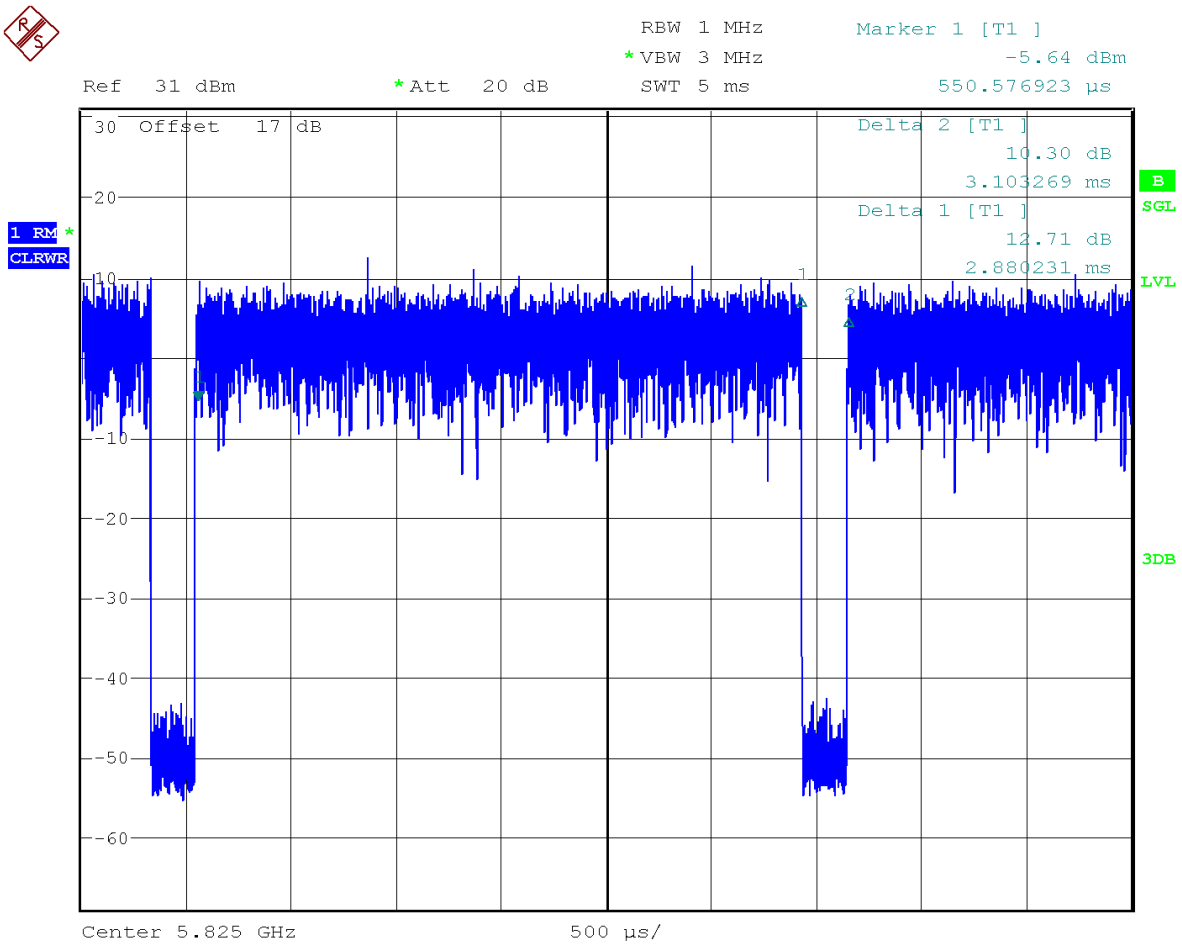


6.2 Measurement Uncertainty

	Uncertainty in dB Conducted measurement
standard deviation k=1	0.63
95% confidence interval in dB	1.24
95% confidence interval in dB in delta to Result	+-0.7dB

6.3 Duty Cycle Correction

For RMS measurements, the duty cycle correction factor was added per FCC KDB 789033 D02 General UNII Test Procedures New Rules v01 Section II B point 2.



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Duty Cycle: 2.88/3.10= 92.9%

Duty Cycle Correction Factor (for Power Averaging)
DCCF= 10*log(1/0.929)= 0.32 dB

7 Out Of Band EIRP Emission

7.1 References:

789033 D02 General UNII Test Procedures New Rules v01 Section II G 6 c)

7.2 Test Setup:

See 6.1.1

For the low band edge and below Channel 149 has been used, for high band edge and above 165 has been used.

The EUT was configured to continuously transmit at maximum power on the low, middle and high channels in the U-NII-3 band using a software tool that is not available to the end user.

The following correction factor is noted in the spectrum analyzer plot in section 7.5.

Correction Factor: 15 dB Attenuator + 4.3 dBi Antenna Gain +1.7 dB Cable Loss + 0.3 dB DCCF= 21.3 dB

7.3 Verdict:

PASS

7.4 Results:

7.4.1 A710 (TAP910-01)

Frequency Range	Applicable Limit	Verdict
5500MHz to 5715MHz	-27dBm/MHz RMS power during active transmission	PASS
5715MHz to 5725MHz	-17dBm/MHz RMS power during active transmission	PASS
5850MHz to 5860MHz	-17dBm/MHz RMS power during active transmission	PASS
5860MHz to 6000MHz	-27dBm/MHz RMS power during active transmission	PASS

7.4.2 A720 (TAP920-01)

Frequency Range	Applicable Limit	Verdict
5500MHz to 5715MHz	-27dBm/MHz RMS power during active transmission	PASS
5715MHz to 5725MHz	-17dBm/MHz RMS power during active transmission	PASS
5850MHz to 5860MHz	-17dBm/MHz RMS power during active transmission	PASS
5860MHz to 6000MHz	-27dBm/MHz RMS power during active transmission	PASS

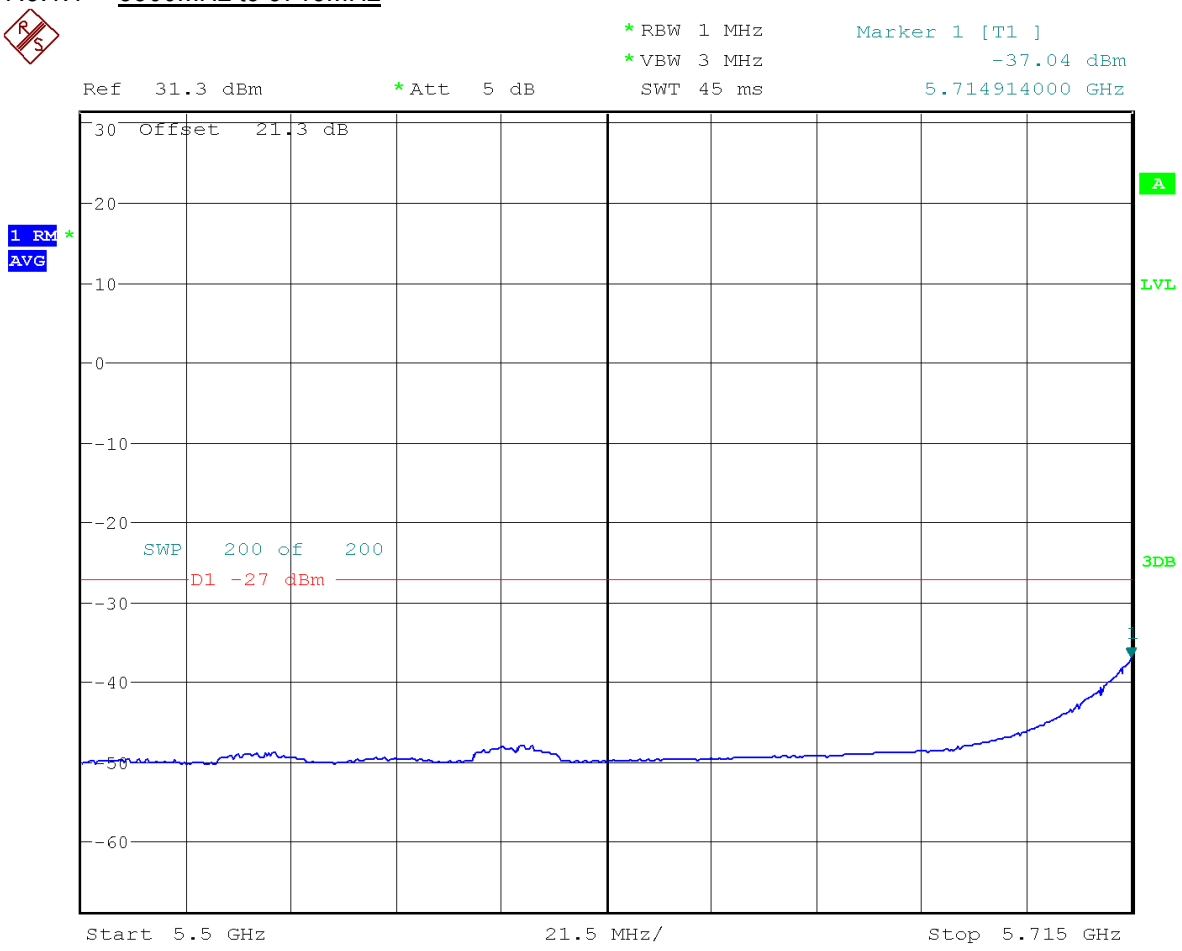
7.4.3 A730 (TAP930-01)

Frequency Range	Applicable Limit	Verdict
5500MHz to 5715MHz	-27dBm/MHz RMS power during active transmission	PASS
5715MHz to 5725MHz	-17dBm/MHz RMS power during active transmission	PASS
5850MHz to 5860MHz	-17dBm/MHz RMS power during active transmission	PASS
5860MHz to 6000MHz	-27dBm/MHz RMS power during active transmission	PASS

7.5 Plots

7.5.1 A710 (TAP910-01)

7.5.1.1 5500MHz to 5715MHz



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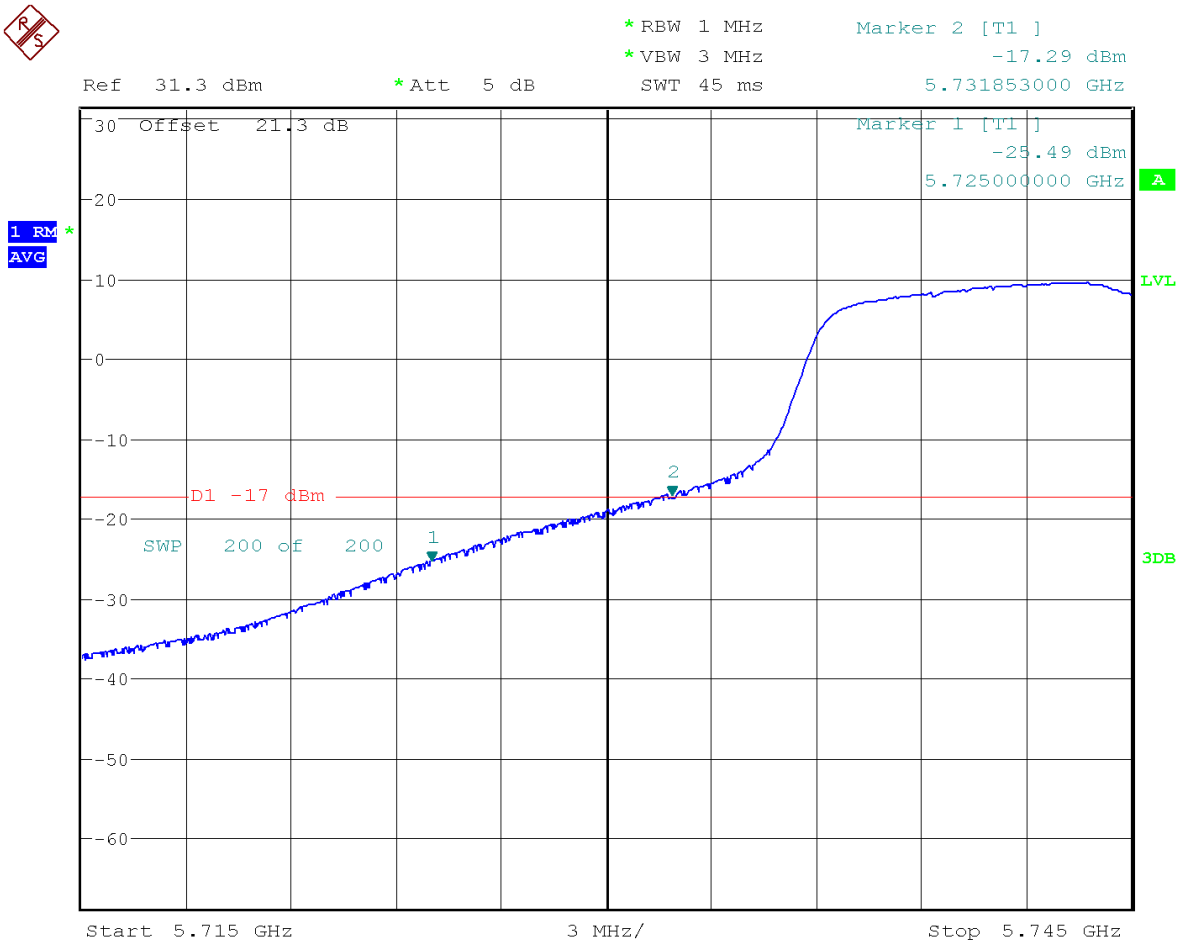
7.5.1.2 5715MHz to 5725MHz



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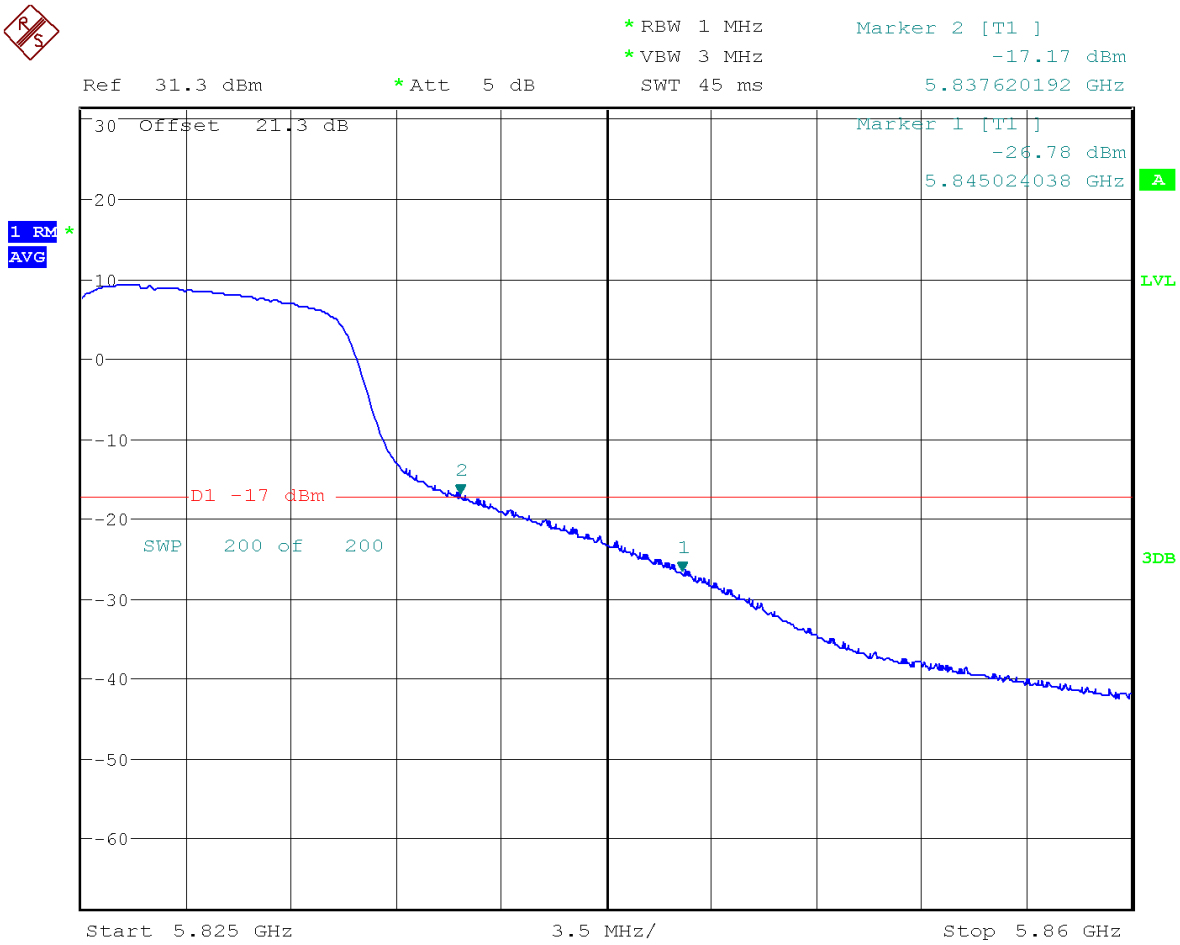
7.5.1.3 5825MHz to 5860MHz



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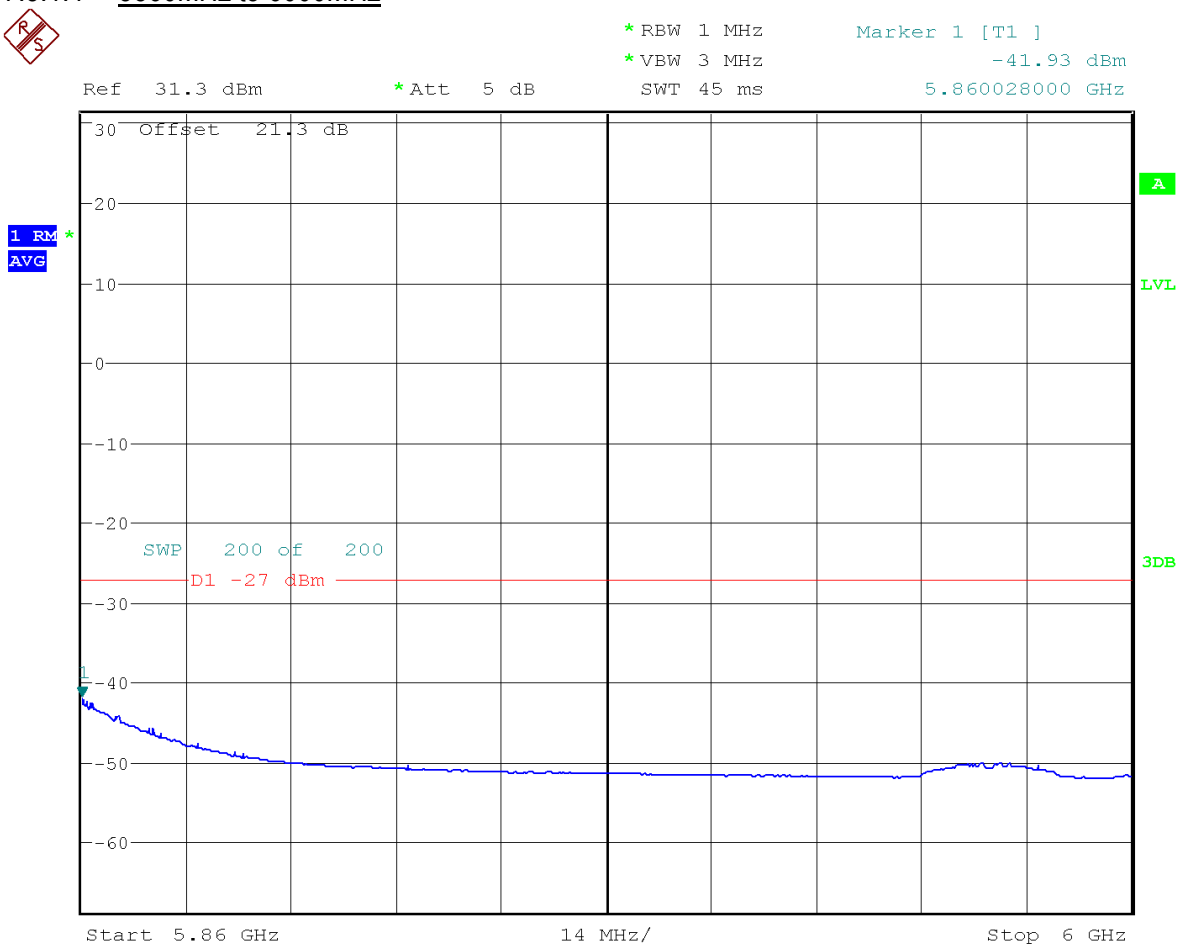
7.5.1.4 5860MHz to 6000MHz



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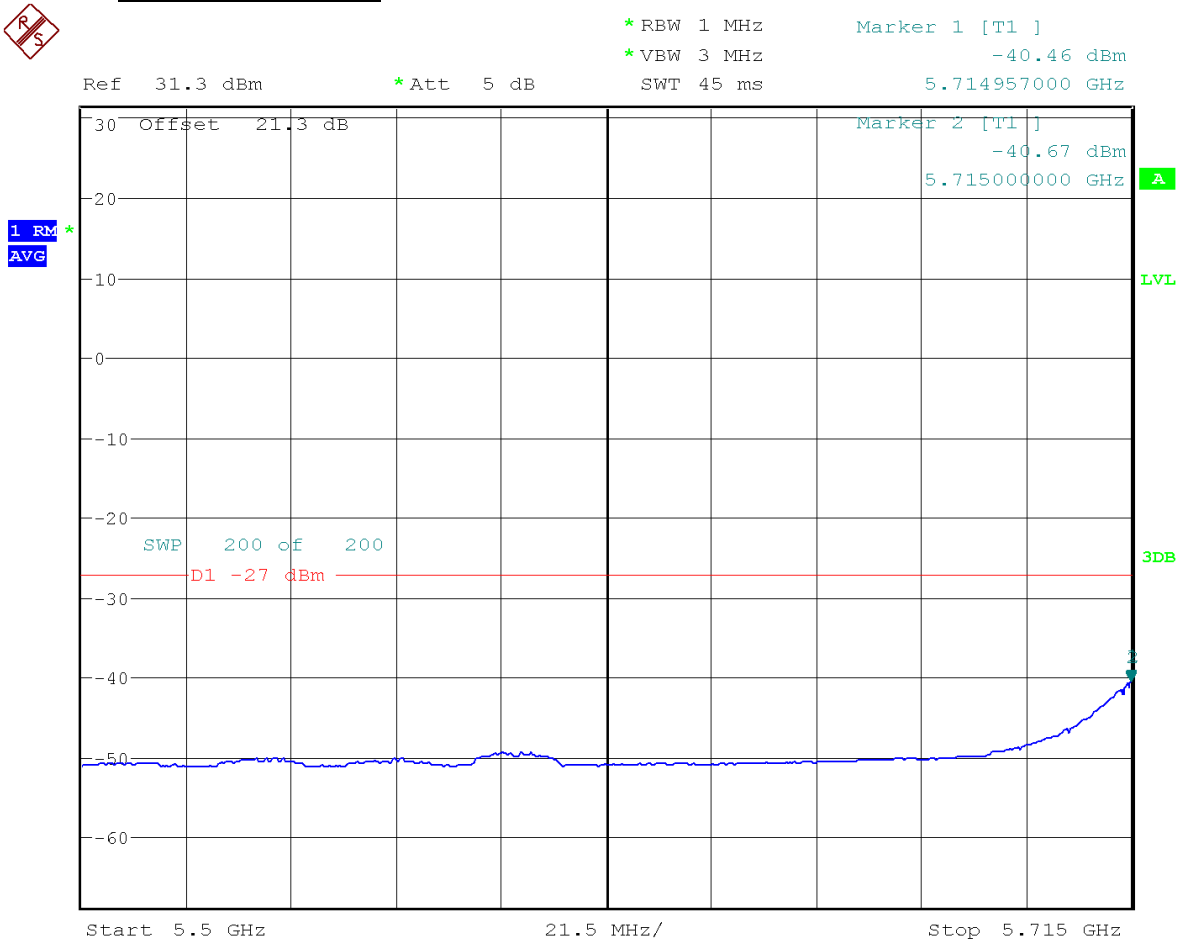
7.5.2 A720 (TAP920-01)

7.5.2.1 5500MHz to 5715MHz



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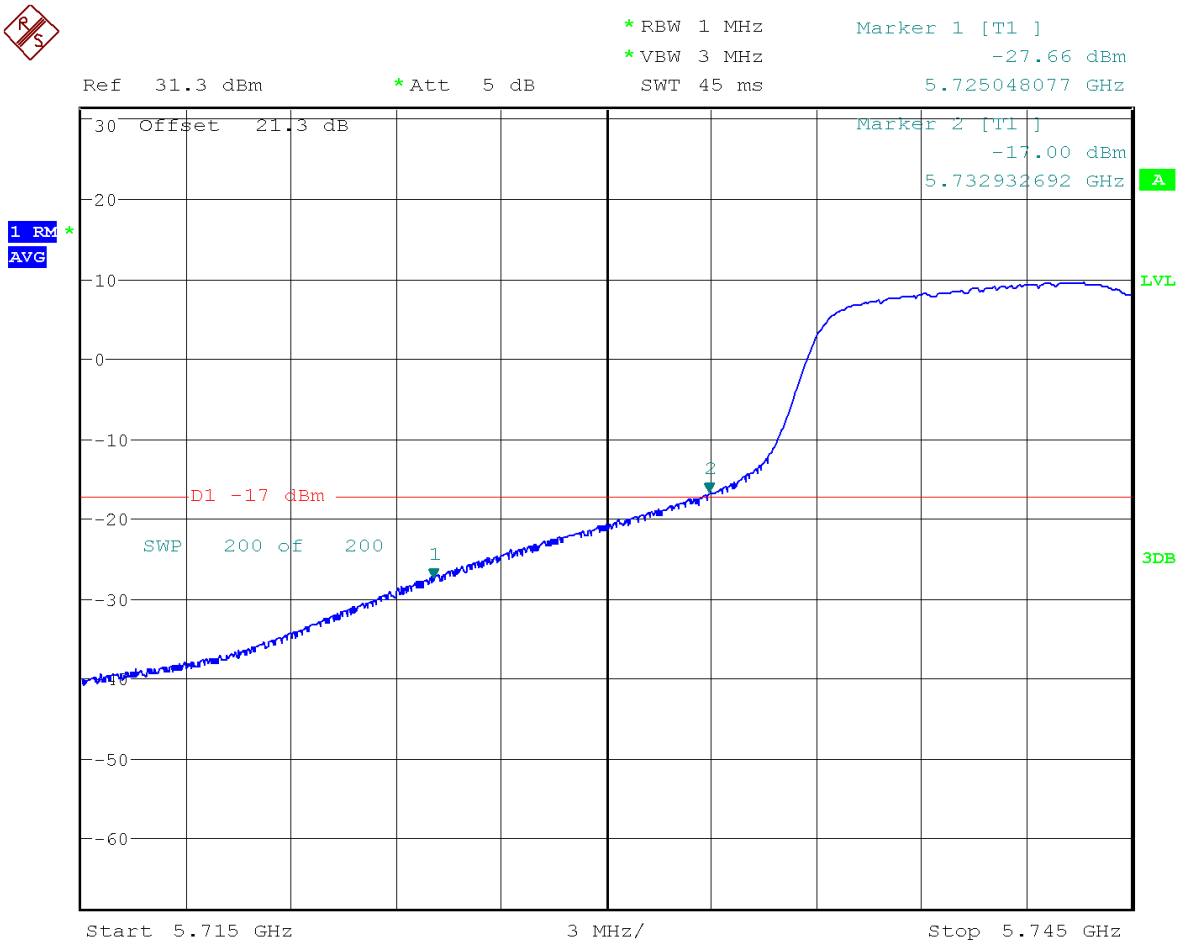
7.5.2.2 5715MHz to 5725MHz



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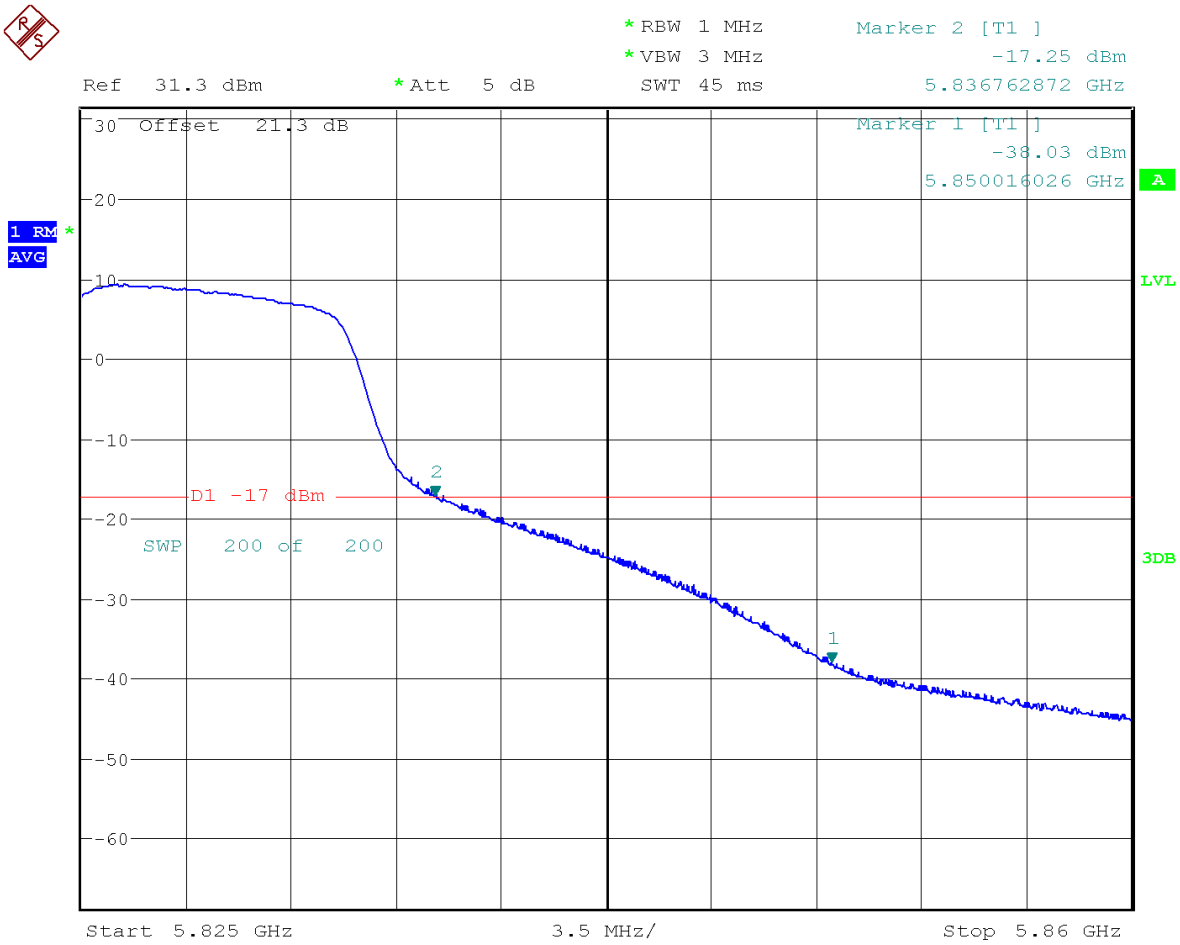
7.5.2.3 5825MHz to 5860MHz



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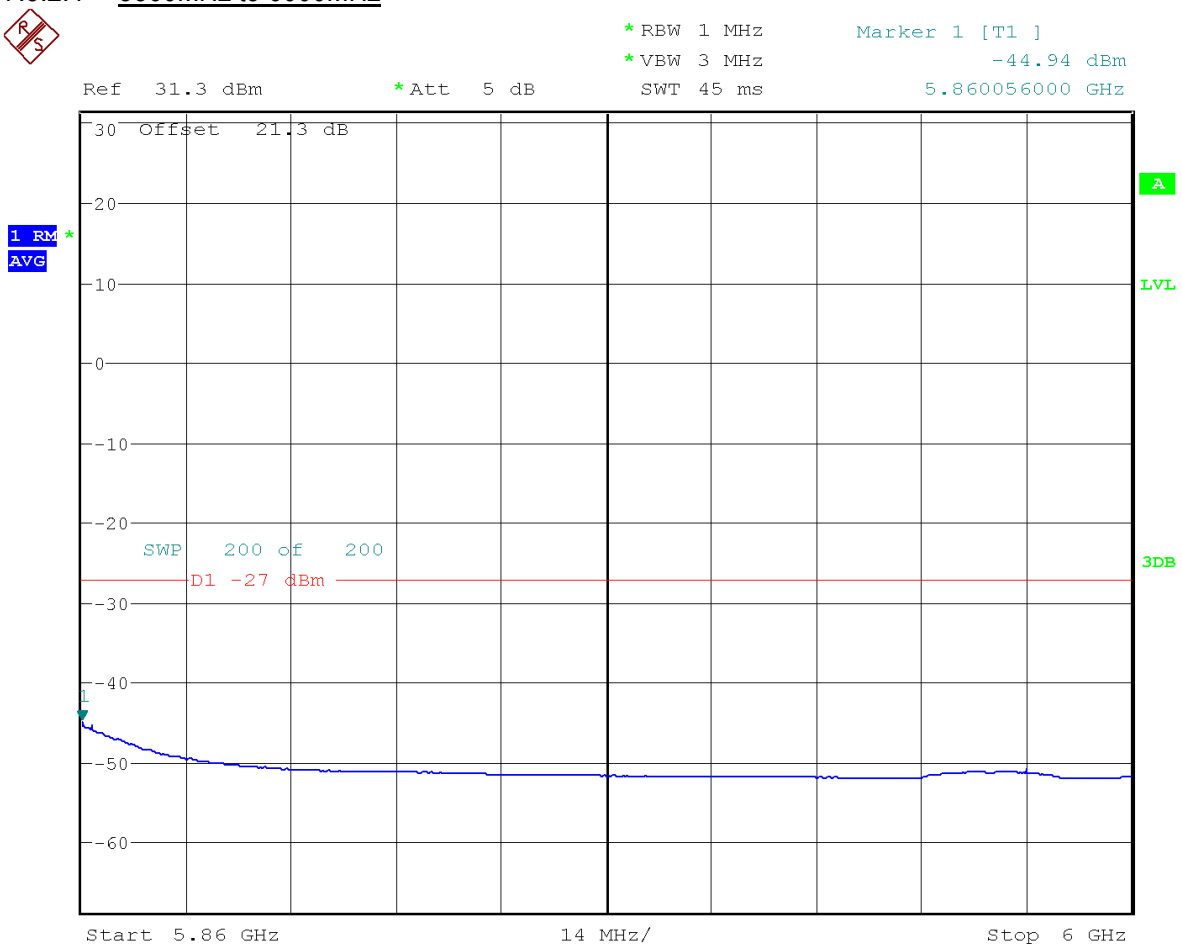
7.5.2.4 5860MHz to 6000MHz



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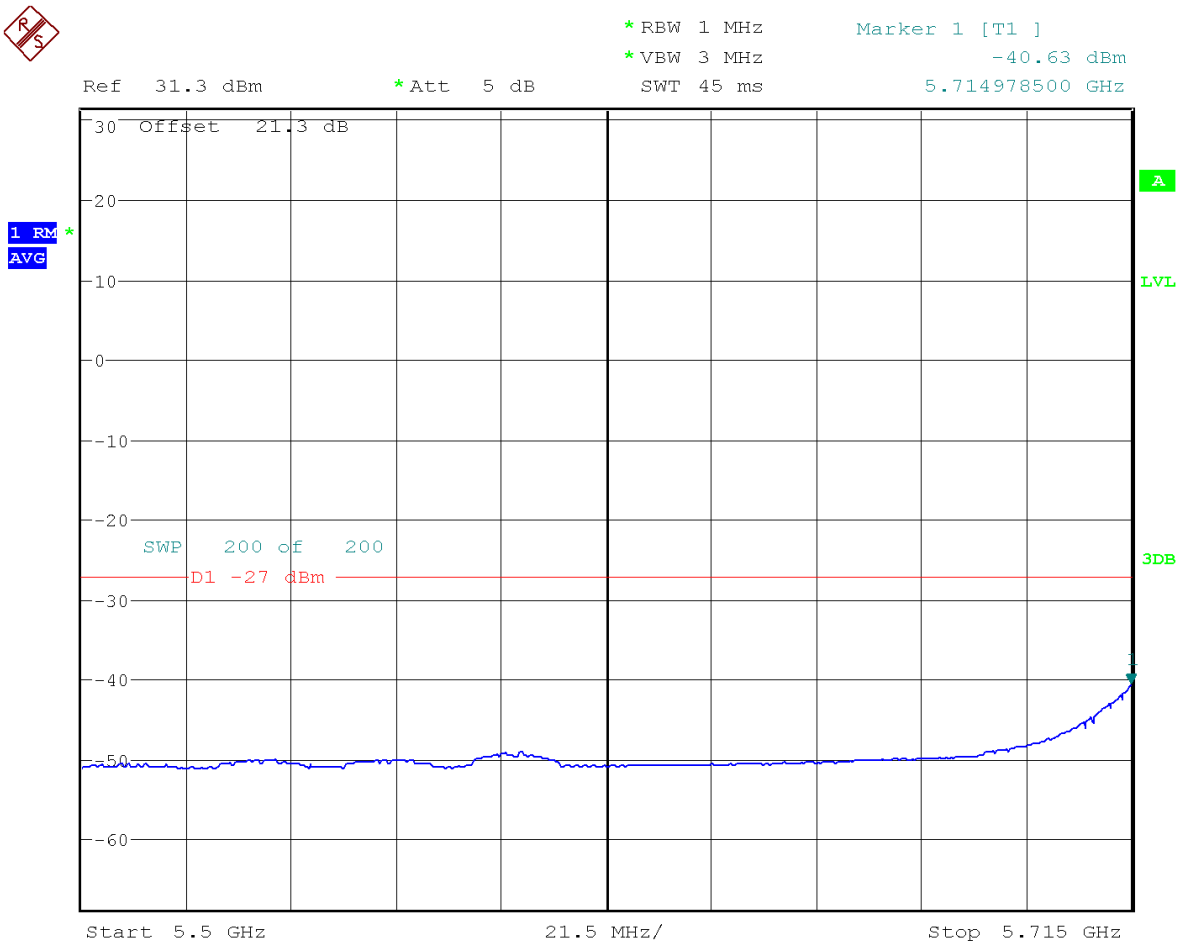
7.5.3 A730 (TAP930-01)

7.5.3.1 5500MHz to 5715MHz



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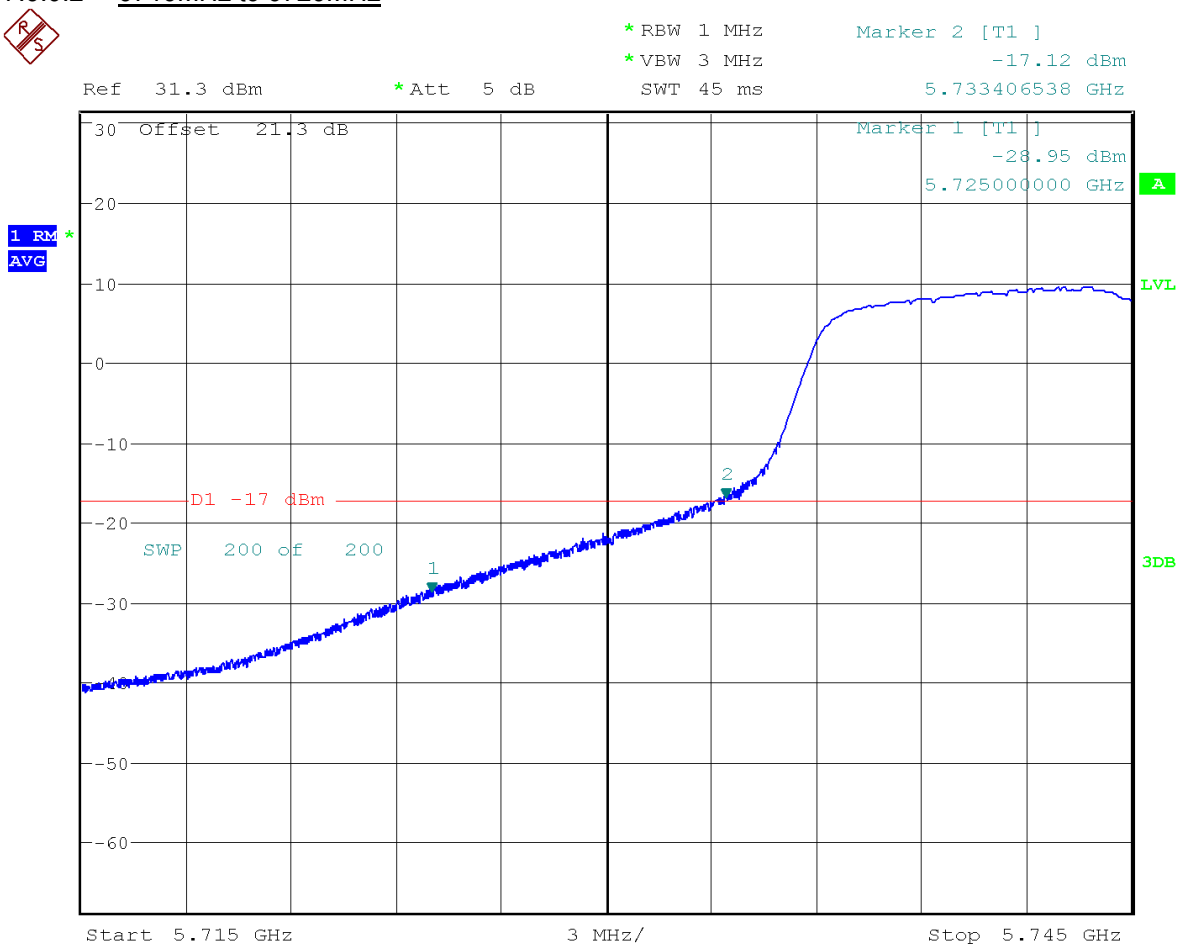
7.5.3.2 5715MHz to 5725MHz



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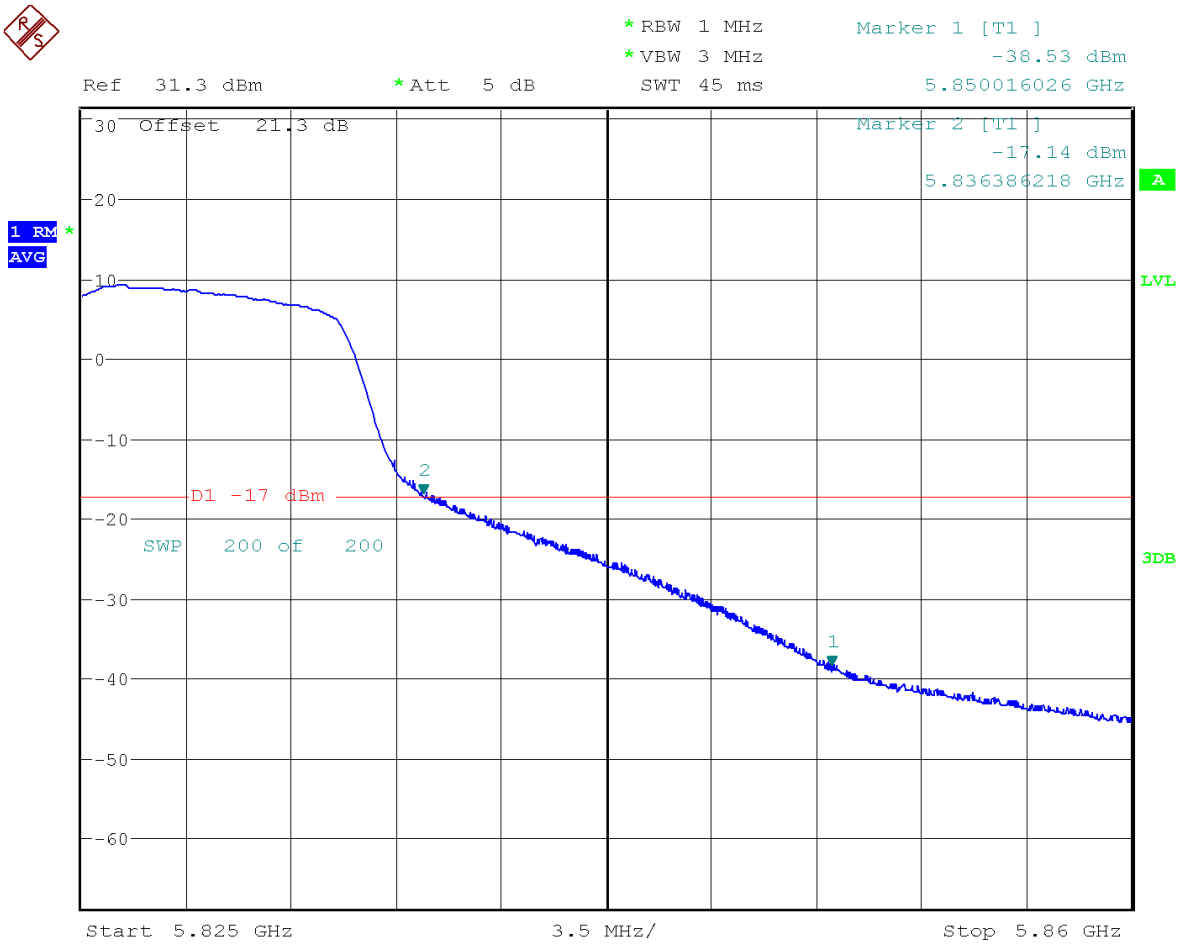
7.5.3.3 5825MHz to 5860MHz



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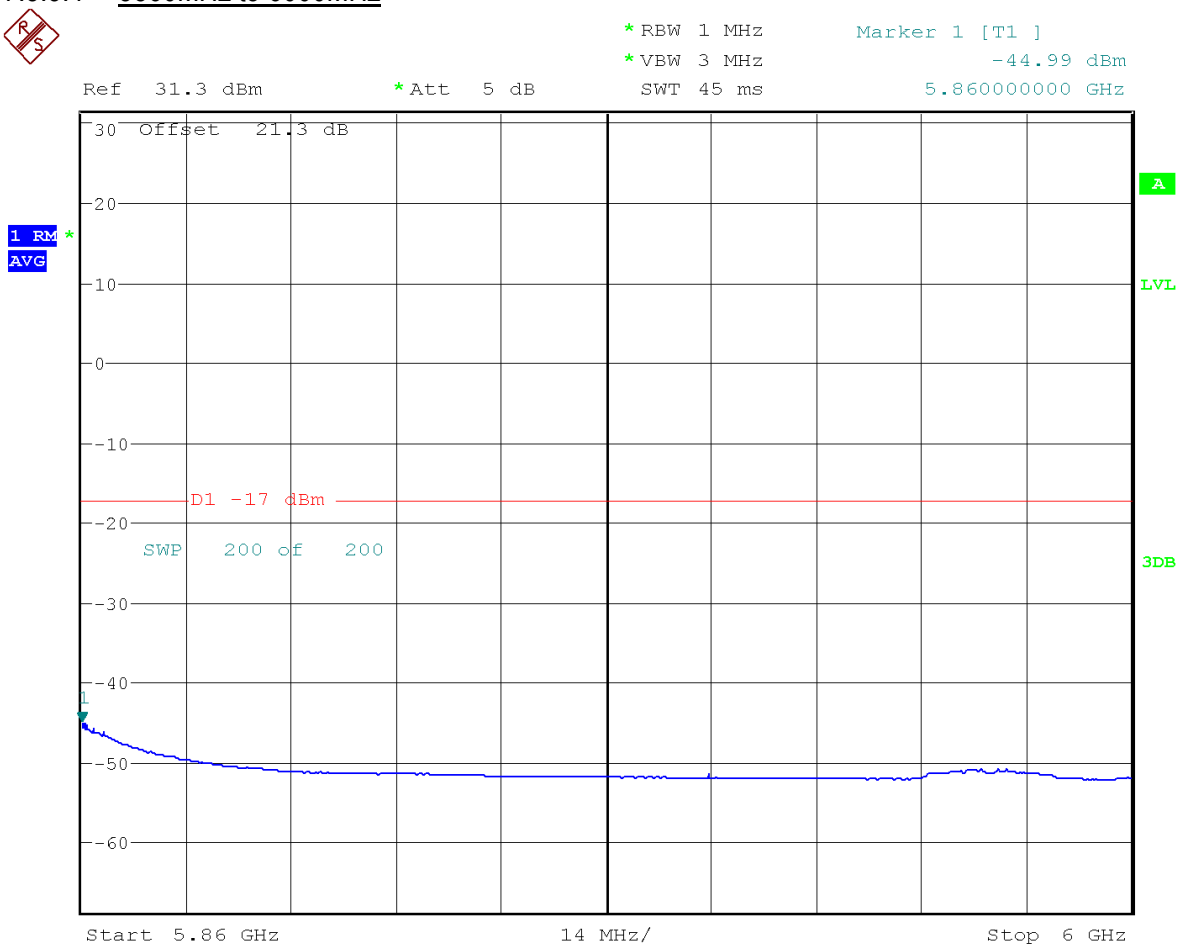
7.5.3.4 5860MHz to 6000MHz



Date: 20.JAN.2016 19:02:00

8 Power Spectral Density

8.1 References:

789033 D02 General UNII Test Procedures New Rules v01 Section II F

8.2 Test Setup:

See 6.1.1

The EUT was configured to continuously transmit at maximum power on the low, middle and high channels in the U-NII-3 band using software that is not available to the end user.

Channels 149, 157 and 165 have been used to cover low, mid and high channel of the band under investigation.

The following correction factor is noted in the spectrum analyzer plots in section 8.5.

Correction Factor: 15 dB Attenuator +1.7 dB Cable Loss + 0.3 dB DCCF= 17.0 dB

8.3 Verdict:

PASS

8.4 Results:

A710 (TAP910-01)

Frequency Range	Applicable Limit in dBm/500kHz	Highest measured Value	Verdict
Channel 149	30	2.55 dBm	PASS
Channel 157	30	2.50 dBm	PASS
Channel 165	30	2.25 dBm	PASS

A720 (TAP920-01)

Frequency Range	Applicable Limit in dBm/500kHz	Highest measured Value	Verdict
Channel 149	30	2.55 dBm	PASS
Channel 157	30	2.50 dBm	PASS
Channel 165	30	2.25 dBm	PASS

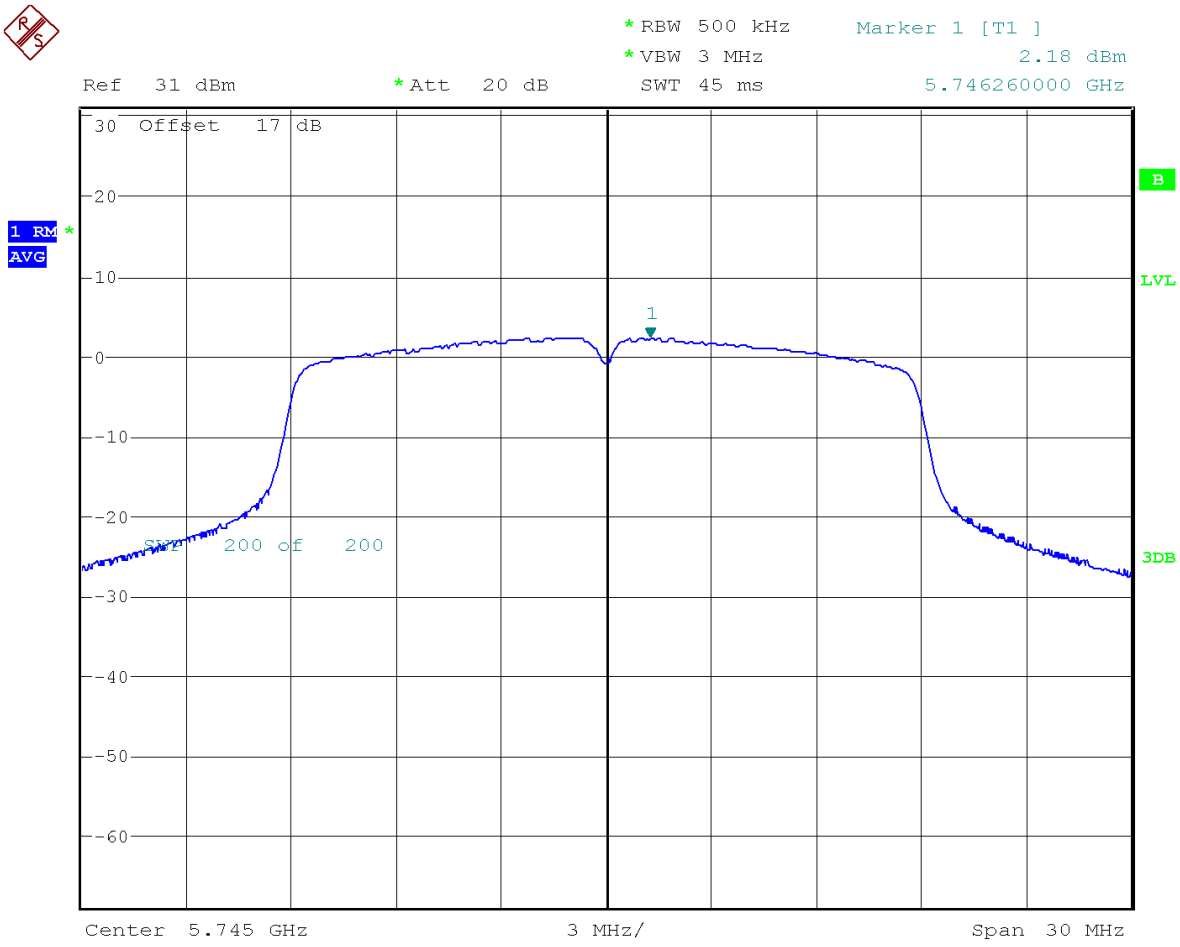
A730 (TAP930-01)

Frequency Range	Applicable Limit in dBm/500kHz	Highest measured Value	Verdict
Channel 149	30	2.55 dBm	PASS
Channel 157	30	2.50 dBm	PASS
Channel 165	30	2.25 dBm	PASS

8.5 Plots

8.5.1 A710 (TAP910-01)

8.5.1.1 PSD Channel 149



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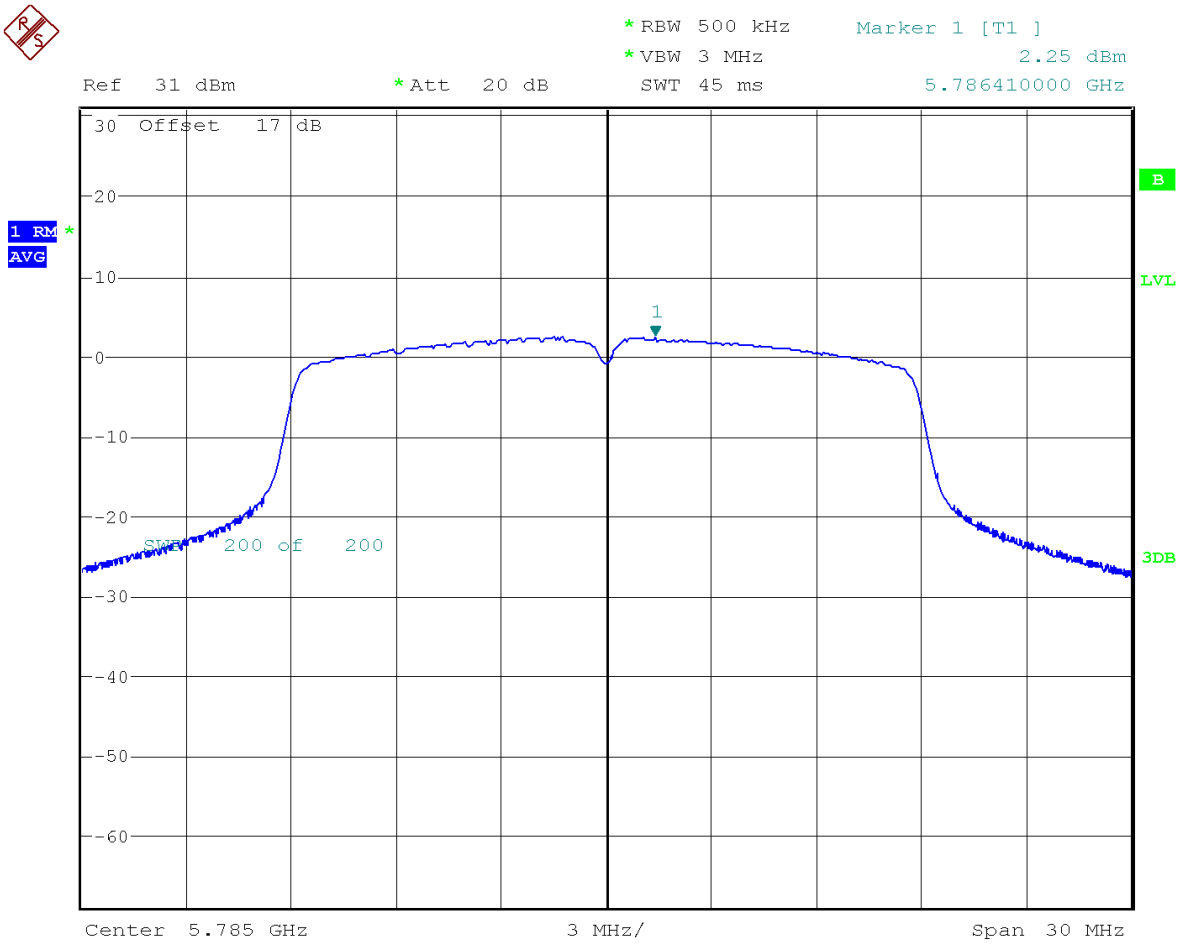
8.5.1.2 PSD Channel 157



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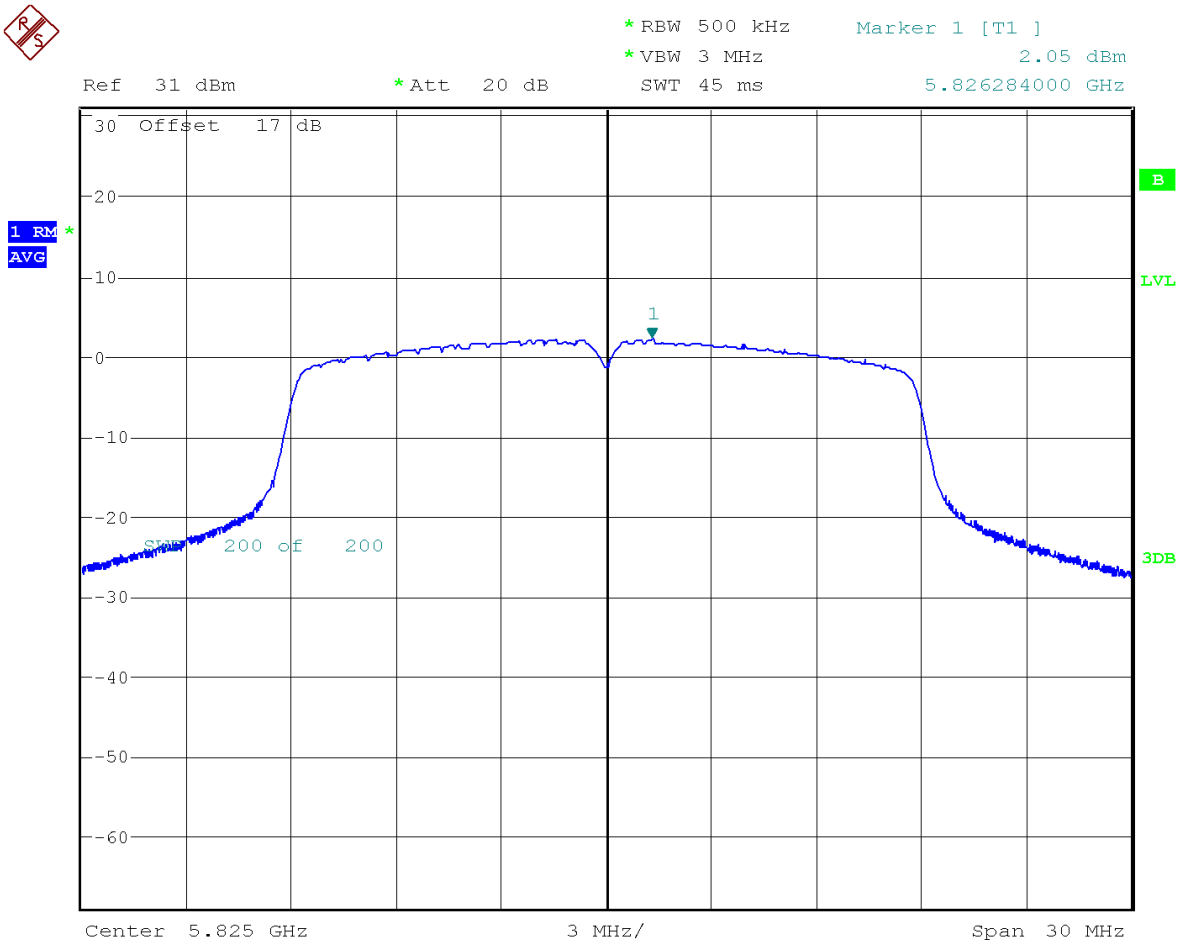
8.5.1.3 PSD Channel 165



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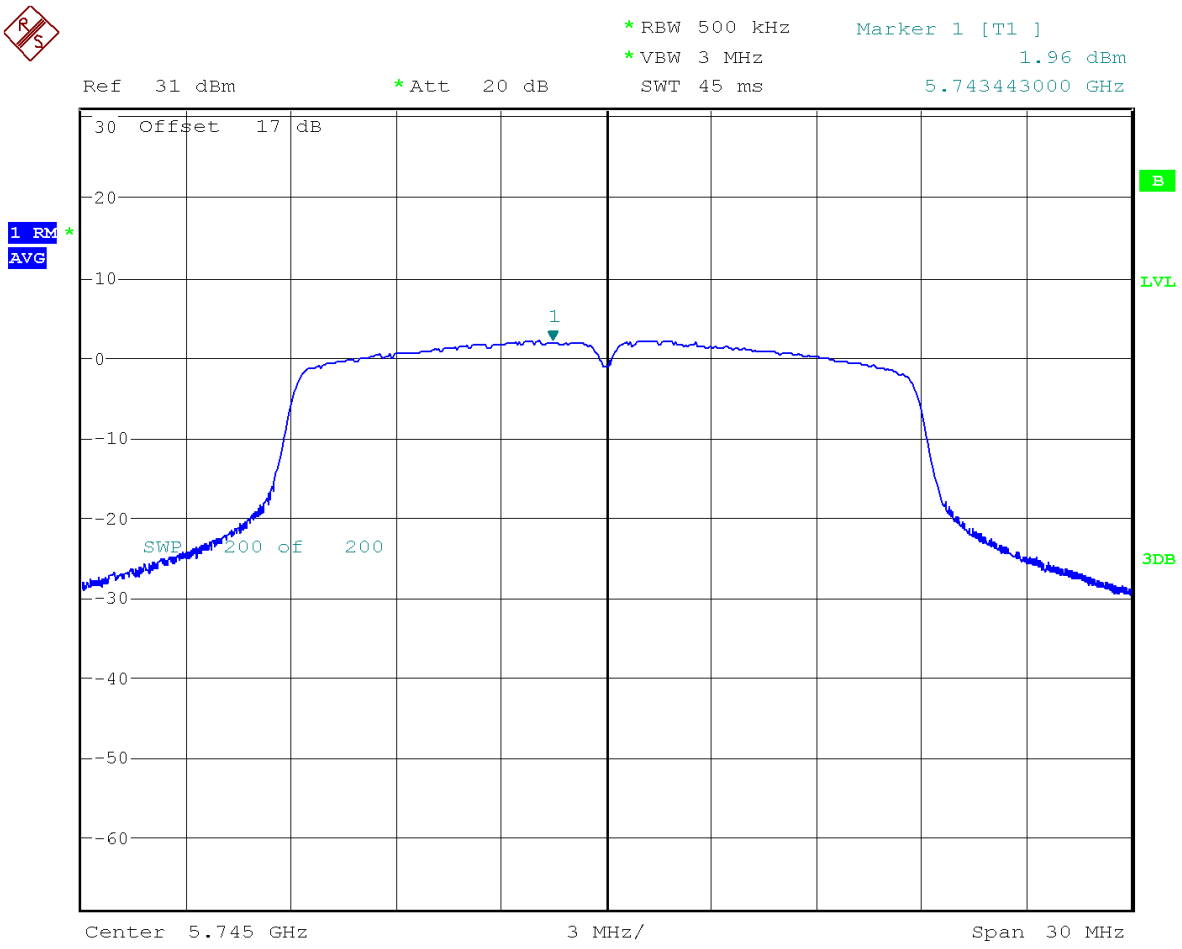
8.5.2 A720 (TAP920-01)

8.5.2.1 PSD Channel 149



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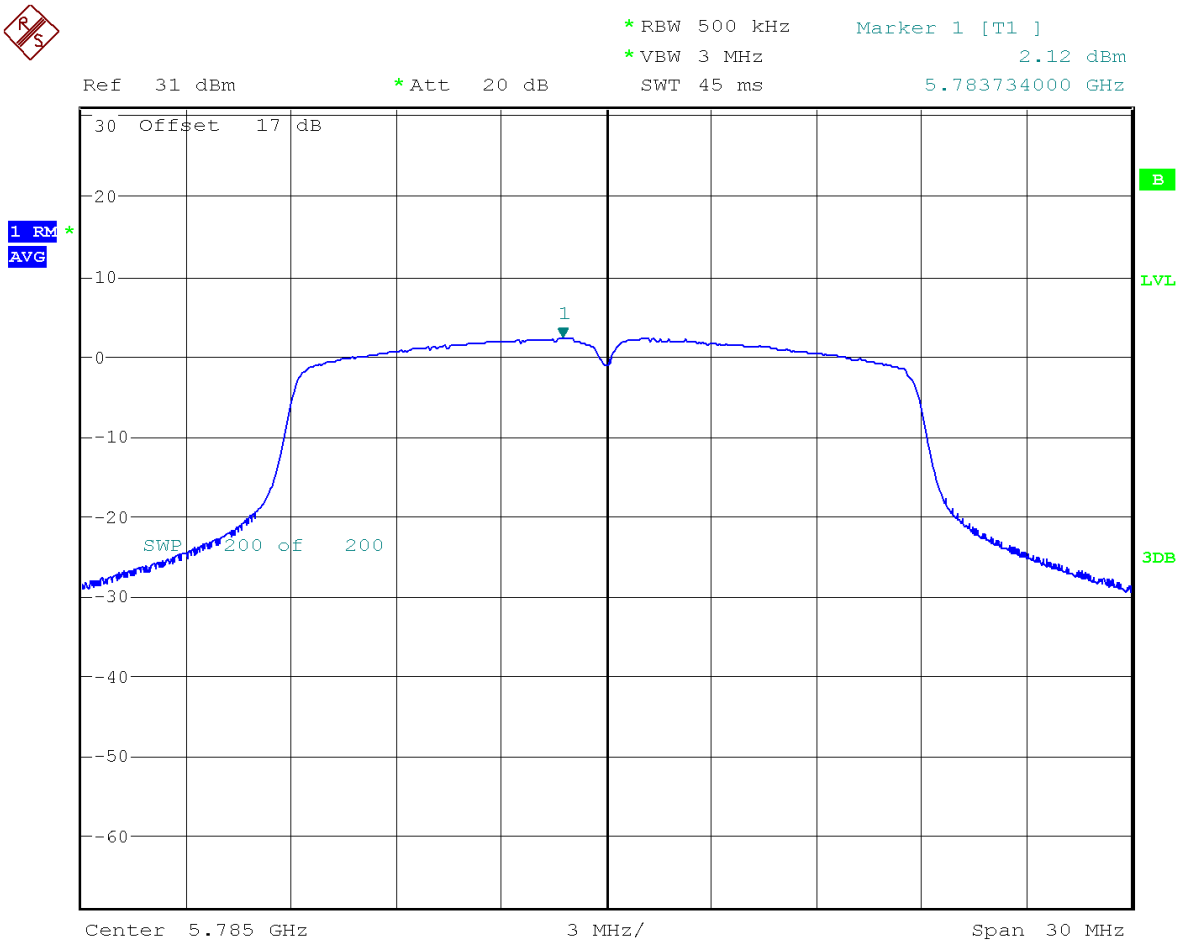
8.5.2.2 PSD Channel 157



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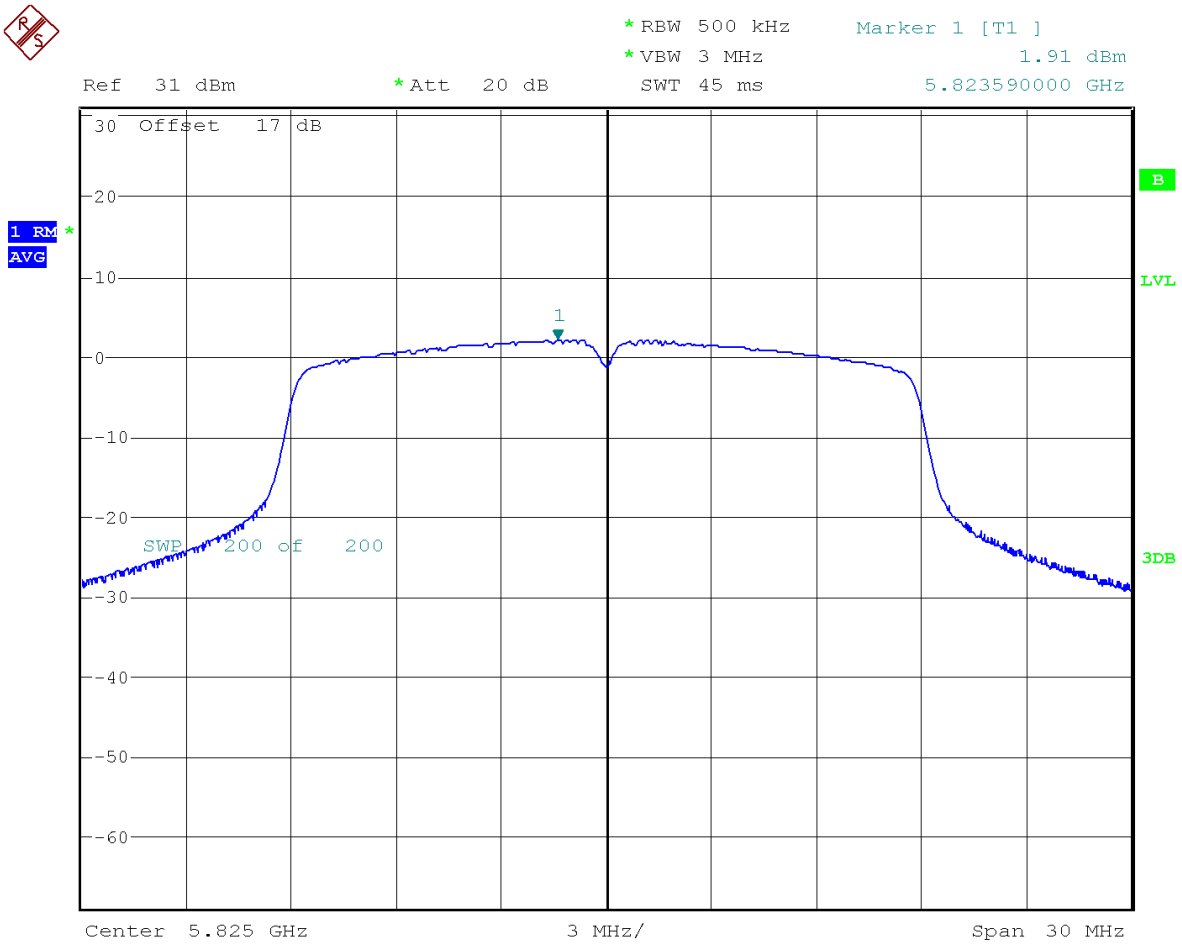
8.5.2.3 PSD Channel 165



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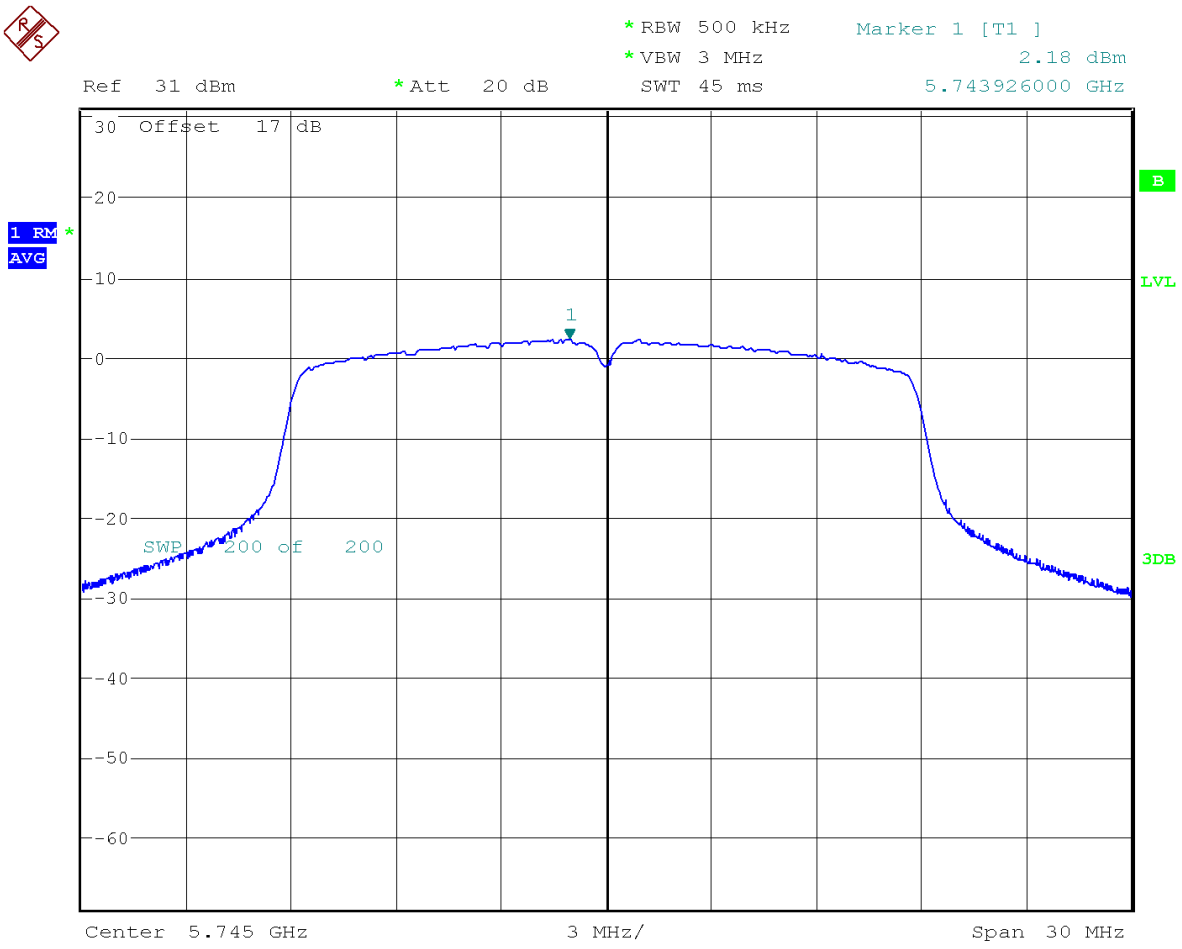
8.5.3 A730 (TAP930-01)

8.5.3.1 PSD Channel 149



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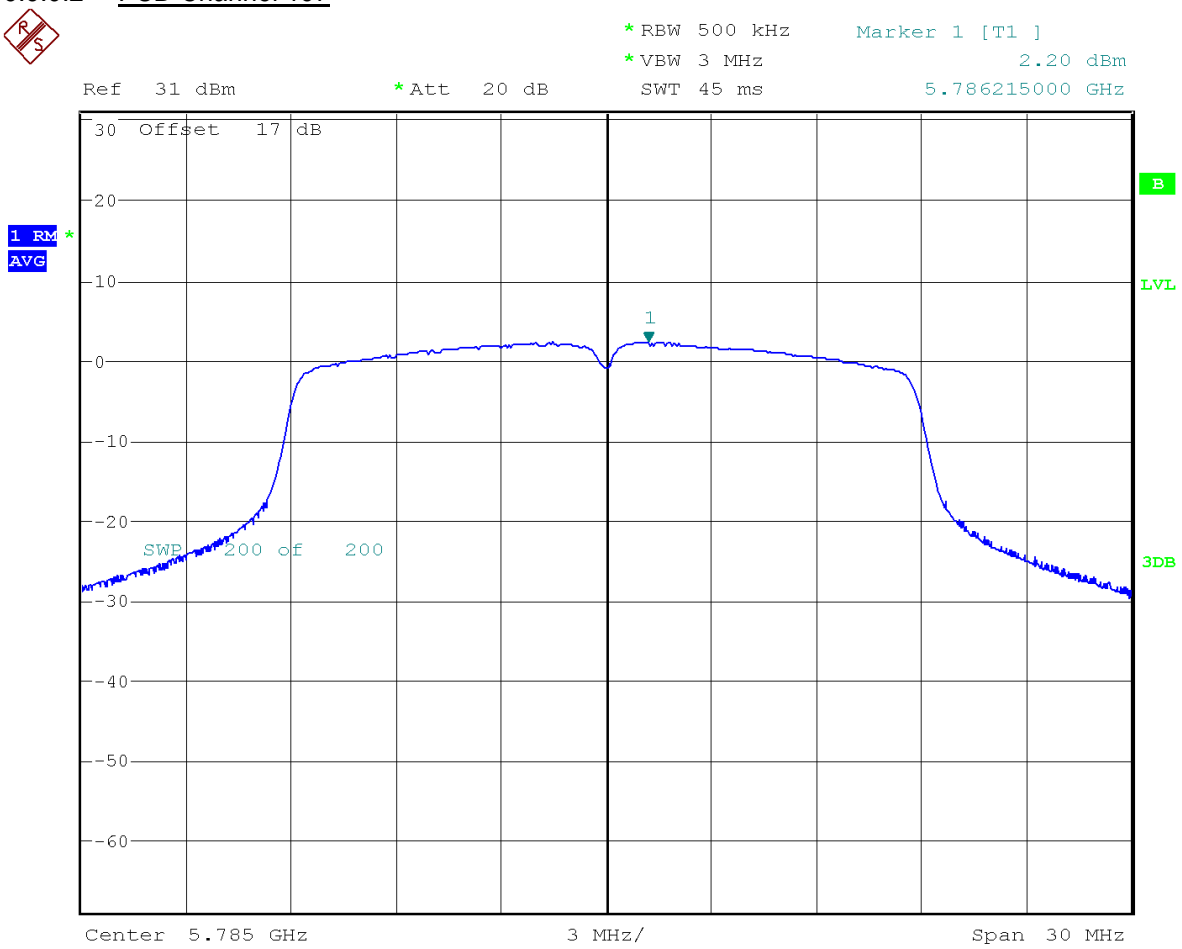
8.5.3.2 PSD Channel 157



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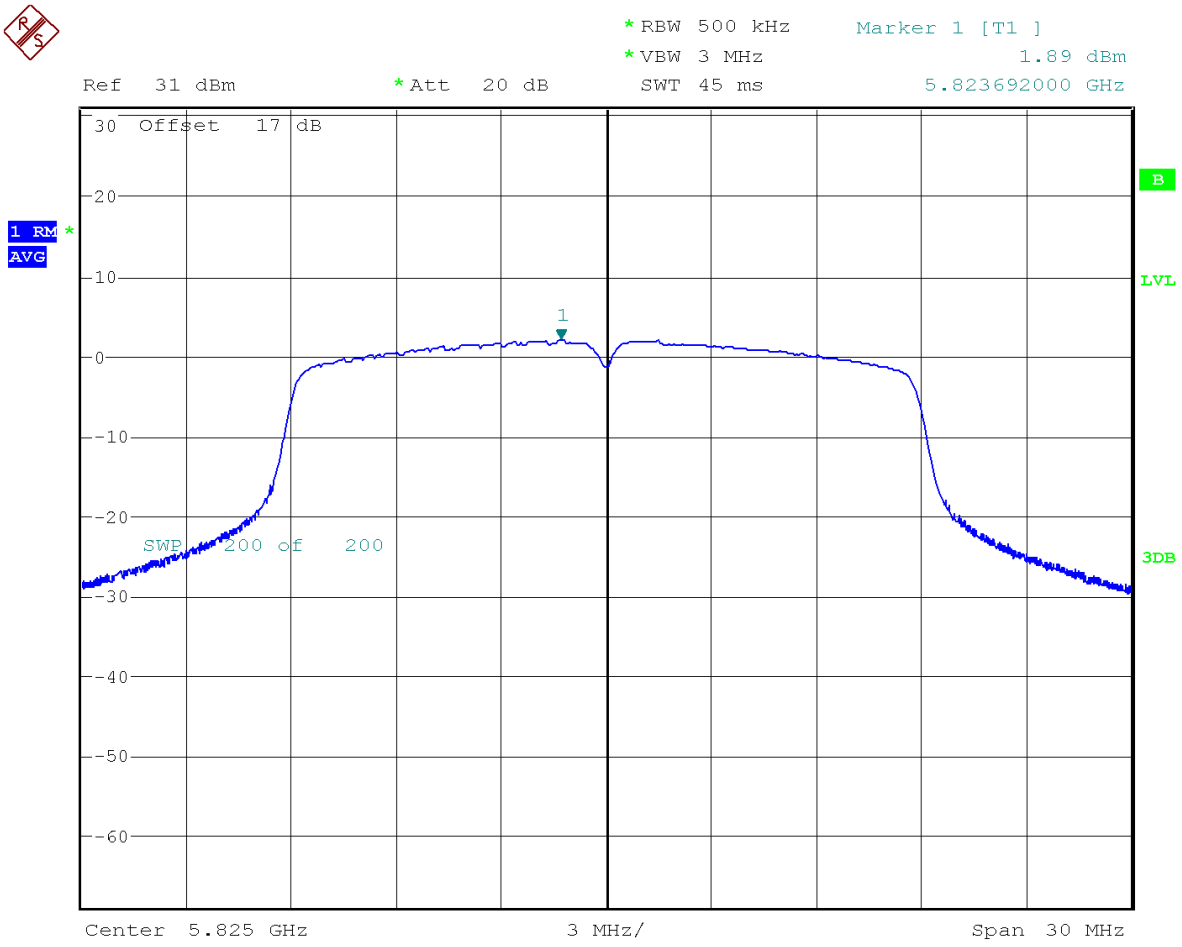
8.5.3.3 PSD Channel 165



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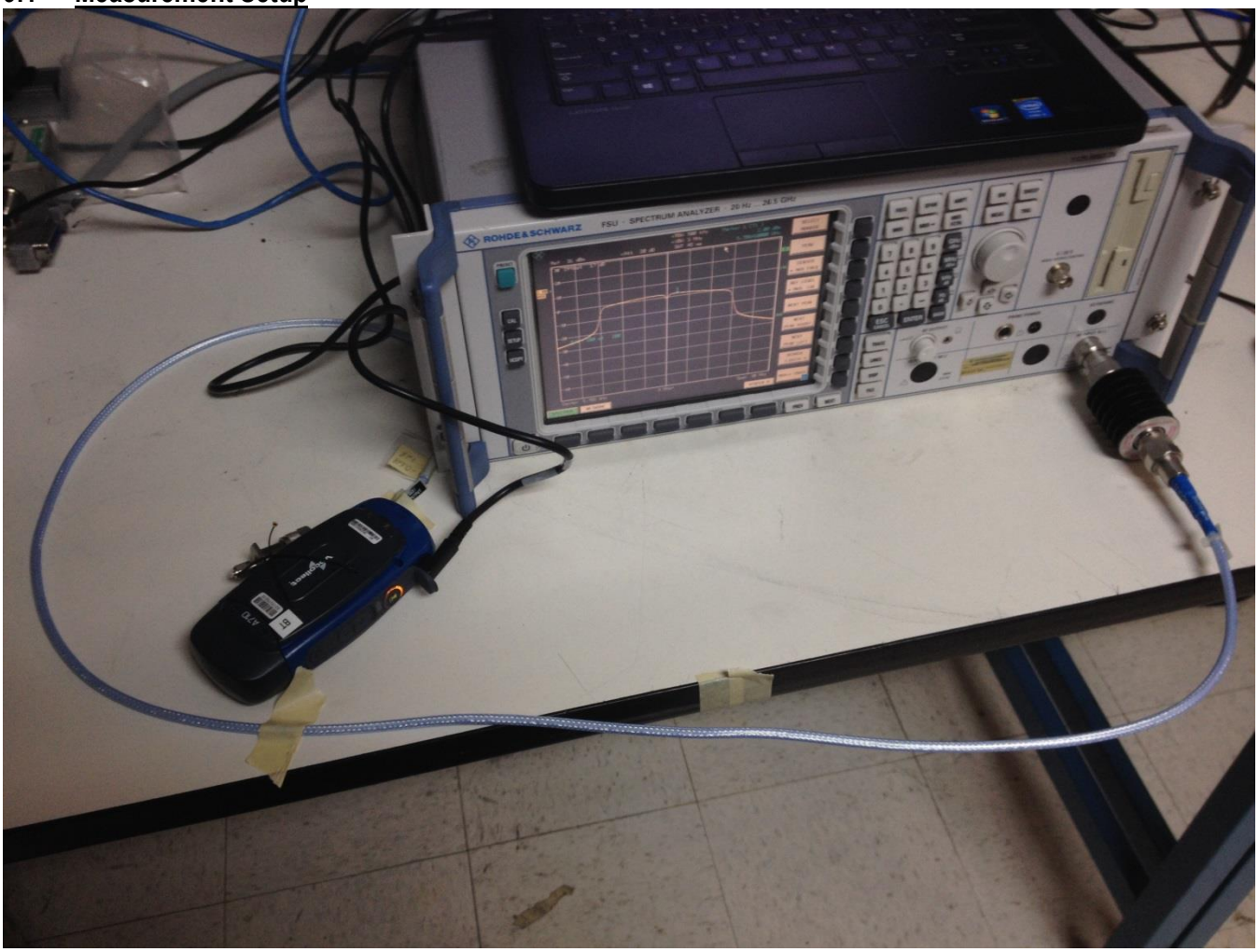
9 Setup Pictures

9.1 Measurement Setup



10 Test Equipment and Ancillaries used for tests

No.	Equipment Name	Manufacturer	Type/model	Serial No.	Cal Date	Cal Interval
1	Spectrum Analyzer	Rohde&Schwarz	FSU 26.5	100189	August 2015	3 Years

11 Revision History

Date	Report Name	Changes to the report	Report prepared by
2016-01-26	VOCOL-002-15001_UNII_UPDATE	First Version	Douglas Antioco