



LSRESEARCH, LLC

Wireless Product Development

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ENGINEERING TEST REPORT # TR 314378 C

LSR Job #: C-2204

Compliance Testing of:

A500 Talkman

Test Date(s):

April 30 and May 1, 5, 6, 8, 9, 18, 19, 27, 28 2015

August 7, 2015

Prepared For:

Voccollect, Inc.

703 Rodi Road

Pittsburgh, PA 15235

This Test Report is issued under the Authority of: Adam Alger, EMC Engineer

Signature:

Date: 8-7-15

Test Report Reviewed by:

Tom Smith, VP EMC Test Services

Signature:

Date: 7-1-15

Report by:

Adam Alger, EMC Engineer

Signature:

Date: 6-30-15

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Prepared For: Voccollect, Inc.

Report: TR 314378 C

LSR: C-2204

Name: A500 Talkman

Model: TAP802-01

Serial: Eng. Sample

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LS Research, LLC in Review

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:



A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope of Accreditation

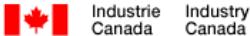
A2LA Certificate Number: 1255.01



Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948

FCC Registration Number: 90756



Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-212 – Issue 1

File Number: IC 3088-A

On file, 3 and 10 Meter OATS based on RSS-212 – Issue 1

File Number: IC 3088



U. S. Conformity Assessment Body (CAB) Validation

Validated by the European Commission as a U. S. Competent Body operating under the U. S./EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility –Council Directive 2004/108/EC (formerly 89/336/EEC, Article 10.2).

Date of Validation: January 16, 2001

Validated by the European Commission as a U.S. Notified Body operating under the U.S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Telecommunication Equipment – Council Directive 99/5/EC, Annex V.

Date of Validation: November 20, 2002

Notified Body Identification Number: 1243

Prepared For: Vocollect, Inc.	Name: A500 Talkman
Report: TR 314378 C	Model: TAP802-01
LSR: C-2204	Serial: Eng. Sample

1.0 Summary of Test Report

In April-August 2015 the EUT, A500, was tested and MEETS the following requirements:

Operation in the 5.15 – 5.25 GHz band

FCC Rule Part	IC Standard	Test Description	Measurement Procedure	Test Result
15.407 (a)(1)(iv)	RSS-247 Section 6.2.1	Power Limits	ANSI C63.10-2013 Section 12.3	Pass
15.407 (a)(1) (iv)	RSS-247 Section 6.2.1	Power Spectral Density	ANSI C63.10-2013 Section 12.5	Pass
15.407 (a)(5)	RSS-247 Section 6.2.1	26dB / 99% Bandwidth	ANSI C63.10-2013 Section 12.4	Pass
15.407 (b)(1)	RSS-247 Section 6.2.1	Undesirable emissions Limit	ANSI C63.10-2013 Section 12.7	Pass
15.407 (b)(6)	RSS-GEN	Spurious Emissions below 1GHz & AC Mains	ANSI C63.10-2013 Section 12.7	Pass
15.407 (b)(7)	RSS-GEN	Restricted Bands	ANSI C63.10-2013 Section 12.7	Pass
15.407 (g)	RSS-GEN	Frequency Stability	ANSI C63.10-2013 Section 6.8	Pass
15.109	RSS-GEN	Receive Mode (Digital Device) Radiated Emissions	ANSI C63.4-2014 Section 8	Pass

Prepared For: Vocollect, Inc.

Name: A500 Talkman

Report: TR 314378 C

Model: TAP802-01

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Operation in the 5.25 – 5.35 GHz and 5.47 – 5.725 GHz bands

FCC Rule Part	IC Standard	Test Description	Measurement Procedure	Test Result
15.407 (a)(2)	RSS-247 Section 6.2.2	Power Limits	ANSI C63.10-2013 Section 12.3	Pass
15.407 (a)(2)	RSS-247 Section 6.2.2	Power Spectral Density	ANSI C63.10-2013 Section 12.5	Pass
15.407 (a)(5)	RSS-247 Section 6.2.2	26dB / 99% Bandwidth	ANSI C63.10-2013 Section 12.4	Pass
15.407 (b)(2) & (3)	RSS-247 Section 6.2.2	Undesirable emissions Limit	ANSI C63.10-2013 Section 12.7	Pass
15.407 (b)(6)	RSS-GEN	Spurious Emissions below 1GHz & AC Mains	ANSI C63.10-2013 Section 12.7	Pass
15.407 (b)(7)	RSS-GEN	Restricted Bands	ANSI C63.10-2013 Section 12.7	Pass
15.407 (g)	RSS-GEN	Frequency Stability	ANSI C63.10-2013 Section 6.8	Pass
15.407 (h)(1)	RSS-247 Section 6.2.2	Transmit Power Control (TPC)	N/A**	N/A**
15.407 (h)(2)	RSS-247 Section 6.3	Dynamic Frequency Selection	Note 2	Pass ²
15.407 (h)(2)(ii)	RSS-247 Section 6.3	Channel Availability Check Time	N/A*	N/A*
15.407 (h)(2)(iii)	RSS-247 Section 6.3	Channel Move Time	Note 2	Pass ²
15.407 (h)(2)(iv)	RSS-247 Section 6.3	Non-Occupancy period	Note 2	Pass ²
15.109	RSS-GEN	Receive Mode (Digital Device) Radiated Emissions	ANSI C63.4-2014 Section 8	Pass

* : The EUT is a client device

** : The EUT has an EIRP of less than 500mW.

Note 2: Not covered in this test report. See DFS report.

Prepared For: Vocollect, Inc.	Name: A500 Talkman
Report: TR 314378 C	Model: TAP802-01
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Operation in the 5.725 – 5.85 GHz band

FCC Rule Part	IC Standard	Test Description	Measurement Procedure	Test Result
15.407 (a)(3)	RSS-247 Section 6.2.4	Power Limits	ANSI C63.10-2013 Section 12.3	Pass
15.407 (a)(3)	RSS-247 Section 6.2.4	Power Spectral Density	ANSI C63.10-2013 Section 12.5	Pass
15.407 (a)(5)	RSS-247 Section 6.2.4	26dB / 99% Bandwidth	ANSI C63.10-2013 Section 12.4	Pass
15.407 (b)(4)	RSS-247 Section 6.2.4	Undesirable emissions Limit	ANSI C63.10-2013 Section 12.7	Pass
15.407 (b)(6)	RSS-GEN	Spurious Emissions below 1GHz & AC Mains	ANSI C63.10-2013 Section 12.7	Pass
15.407 (b)(7)	RSS-GEN	Restricted Bands	ANSI C63.10-2013 Section 12.7	Pass
15.407 (g)	RSS-GEN	Frequency Stability	ANSI C63.10-2013 Section 6.8	Pass
15.407(e)	RSS-247 Section 6.2.4	Minimum 6dB bandwidth	ANSI C63.10-2013 Section 11.8	Pass

2.0 Test Facilities

All testing was performed at:

LS Research, LLC
W66 N220 Commerce Court
Cedarburg, Wisconsin, 53012 USA

LS Research, LLC is accredited by A2LA (American Association for Laboratory Accreditation) to the requirements of ISO/IEC 17025, 2005 “General Requirements for the Competence of Calibration and Testing Laboratories”.

LS Research, LLC’s scope of accreditation includes all test methods listed herein, unless otherwise noted.

Prepared For: Vocollect, Inc.

Name: A500 Talkman

Report: TR 314378 C

Model: TAP802-01

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3.0 Client Information

Manufacturer Name:	Vocollect, Inc.
Address:	703 Rodi Road Pittsburg, PA 15235
Contact Person:	Brian Sutton

3.1 Equipment Under Test (EUT) Information

The following information has been supplied by the applicant.

Product Name:	A500 Talkman
Model Number:	TAP802-01
Serial Number:	Eng. Sample
FCC ID:	MQO-TAP802-01
IC:	2570A-TAP80201

3.2 Product Description

802.11 a/n device using HT20 channels

3.3 Modifications Incorporated In the EUT for Compliance Purposes

None noted at time of test

3.4 Deviations & Exclusions from Test Specifications

None noted at time of test

3.5 Additional Information

EUT programmed for continuous transmit or receive on selectable channel and data rate (modulation) using hyper terminal program connection via programming port on EUT.

Prepared For: Vocollect, Inc.	Name: A500 Talkman
Report: TR 314378 C	Model: TAP802-01
LSR: C-2204	Serial: Eng. Sample

4.0 Conditions of Test

Environmental:

Temperature: 20-25° C
Relative Humidity: 30-60%
Atmospheric Pressure: 86-106 kPa

Mains Voltage: 120VAC 60Hz

Battery Voltage: 3.7 V

5.0 Test Equipment

All test equipment is calibrated by a calibration laboratory accredited by A2LA to the requirements of ISO 17025. For a complete list of test equipment and calibration dates, see Appendix A. Unless otherwise noted, resolution bandwidth of measuring instrument used during testing for given frequency range, see below.

Frequency Range	Resolution Bandwidth
9 kHz – 150 kHz	200 Hz
150 kHz – 30 MHz	9 kHz
30 MHz – 1000 MHz	120 kHz
Above 1000 MHz	1 MHz

6.0 Conformance Summary

The EUT was found to MEET the requirements as described within the specification of FCC Title 47, CFR Subpart E Part and 15.109, 15.207, 15.107 as well as RSS-247 Issue 1 and RSS-GEN Issue 4.

If some emissions are seen to be within 3 dB of their respective limits:

As these levels are within the tolerances of the test equipment and site employed, there is a possibility that this unit, or a similar unit selected out of production may not meet the required limit specification if tested by another agency.

LS Research, LLC certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specifications. The results in this Test Report apply only to the item(s) tested on the above-specified dates. Any modifications made to the EUT subsequent to the indicated test date(s) will invalidate the data herein, and void this certification.

Prepared For: Vocollect, Inc.	Name: A500 Talkman
Report: TR 314378 C	Model: TAP802-01
LSR: C-2204	Serial: Eng. Sample

Appendix A – Test Equipment



Date : 28-Apr-2015 Type Test : Radiated and RF Conducted Job # : C-2204
 Prepared By : Adam Alger Customer : Vocollect Quote # : 314378

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	10/19/2014	10/19/2015	Active Calibration
2	EE 960088	8GHz MXE Spectrum Analyzer	Agilent	N9038A	MY51210138	1/9/2015	1/9/2016	Active Calibration
3	AA 960078	Log Periodic Antenna	EMCO	93146	9701-4855	1/19/2015	1/19/2016	Active Calibration
4	AA 960150	Biconical Antenna	ETS	3110B	0003-3346	1/22/2015	1/22/2016	Active Calibration
5	EE 960146	Std. Gain Horn Ant. w/preamp	Adv. Micro / EMC	WLA622-4 / 3160-09	123001	8/20/2014	8/20/2015	Active Calibration
6	AA 960137	Standard Gain Horn Ant.	EMCO	3160-10	69259	8/20/2014	8/20/2015	Active Calibration
7	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	6/20/2014	6/20/2015	Active Calibration
8	EE 960159	0.8 - 21GHz LNA	Mini-Circuits	ZVA-213K-S+	740411007	6/20/2014	6/20/2015	Active Calibration
9	AA 960161	Highpass Filter	K&L Microwave	11SH10-8000	2	2/6/2015	2/6/2016	Active Calibration
10	EE 960161	26.5-40GHz LNA	Ducommun Tech	ALN-33144030	1103717-01	8/20/2014	8/20/2015	Active Calibration
11	AA 960137	Standard Gain Horn Ant.	EMCO	3160-10	69259	8/20/2014	8/20/2015	Active Calibration



Date : 7-Aug-2015 Type Test : AC Emissions Job # : C-2204
 Prepared By : Adam Alger Customer : Vocollect Quote # : 314378

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960162	LISN - 15A	COM-POWER	LI-215A	191969	7/24/2015	7/24/2016	Active Calibration
2	EE 960088	8GHz MXE Spectrum Analyzer	Agilent	N9038A	MY51210138	1/9/2015	1/9/2016	Active Calibration

Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

Name: A500 Talkman

Model: TAP802-01

Serial: Eng. Sample

Appendix B – Test Data
B.1 – RF Conducted Emissions

Manufacturer	Vocollect, Inc.
Test Location	LS Research, LLC
Rule Part	FCC Subpart E IC RSS-247
General Measurement Procedure	ANSI C63.10 Section 6.7
General Description of Measurement	A direct measurement of the transmitted signal was performed at the antenna port of the EUT via a cable connection to a spectrum analyzer. An attenuator was placed in series with the cable to protect the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings there by allowing direct measurements, without the need for any further corrections. The EUT was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source.

Prepared For: Vocollect, Inc.	Name: A500 Talkman
Report: TR 314378 C	Model: TAP802-01
LSR: C-2204	Serial: Eng. Sample

B.1.1 – RF Conducted – Fundamental Bandwidth

Manufacturer	Vocollect, Inc.
Date	5-28-15
Operator	Adam A
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.407 (a)(5) & (e) RSS-247 Section 6
Specific Measurement Procedure	ANSI C63.10-2013 Section 12.4 & 11.8
Additional Description of Measurement	Peak detector used
Additional Notes	Continuous transmit modulated used for this test.

**Table
UNII-1**

Mode (802.11)	Mode (Mbps)	Channel	Frequency (MHz)	99 % BW (MHz)	EBW (MHz)
a	6	36	5180	16.63	22.27
		40	5200	16.59	22.53
		48	5240	16.62	22.08
n	6.5	36	5180	17.77	23.90
		40	5200	17.69	23.55
		48	5240	17.69	22.95

UNII-2A

Mode (802.11)	Mode (Mbps)	Channel	Frequency (MHz)	99 % BW (MHz)	EBW (MHz)
a	6	52	5260	16.63	23.01
		60	5300	16.59	22.78
		64	5320	16.63	23.48
n	6.5	52	5260	17.71	23.89
		60	5300	17.73	23.25
		64	5320	17.74	24.89

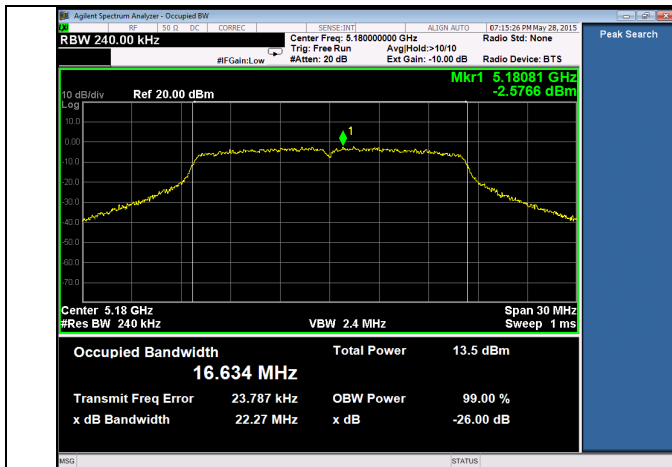
UNII-2C

Mode (802.11)	Mode (Mbps)	Channel	Frequency (MHz)	99 % BW (MHz)	EBW (MHz)
a	6	100	5500	16.63	23.67
		116	5580	16.79	25.23
		140	5700	16.76	26.53
n	6.5	100	5500	17.84	24.80
		116	5580	17.93	26.19
		140	5700	17.82	25.05

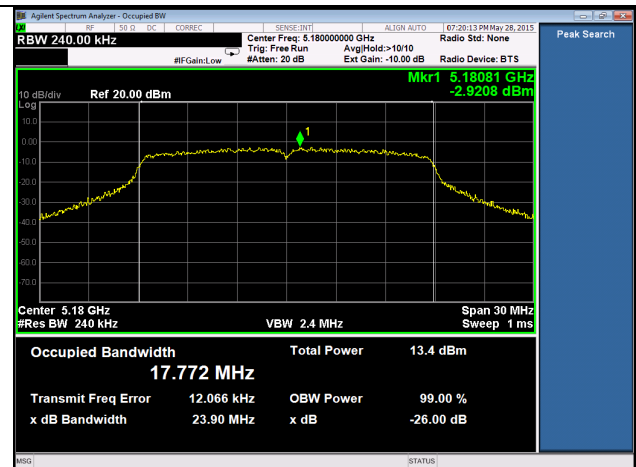
UNII-3

Mode (802.11)	Mode (Mbps)	Channel	Frequency (MHz)	DTS BW (MHz)	99 % BW (MHz)	EBW (MHz)
a	6	149	5745	15.48	16.58	23.31
		157	5785	15.94	17.07	29.50
		165	5825	15.16	17.08	29.36
n	6.5	149	5745	15.83	17.78	23.93
		157	5785	15.08	18.06	29.23
		165	5825	14.63	18.08	28.25

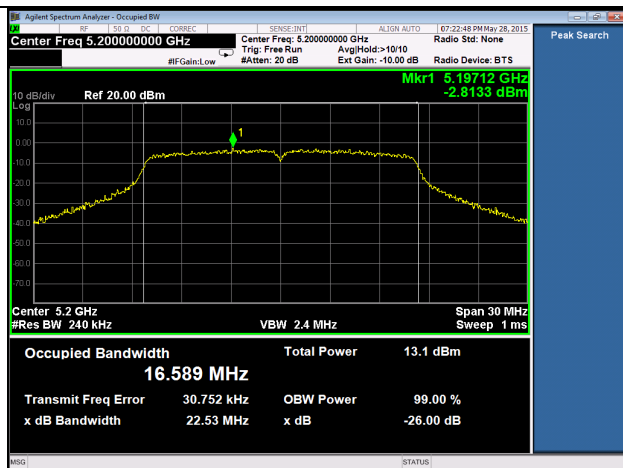
Plots – UNII-1



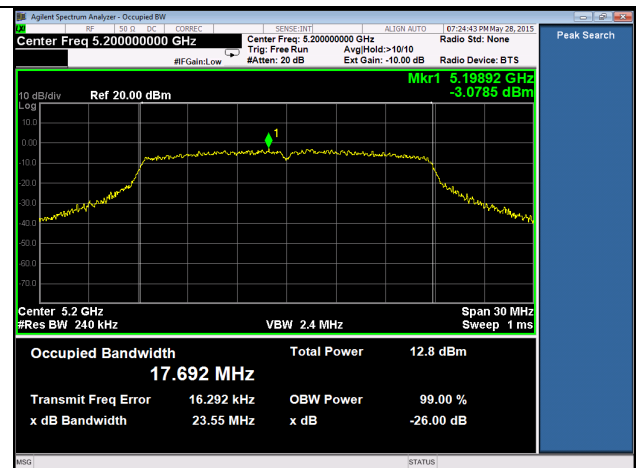
Channel 36 – 802.11a



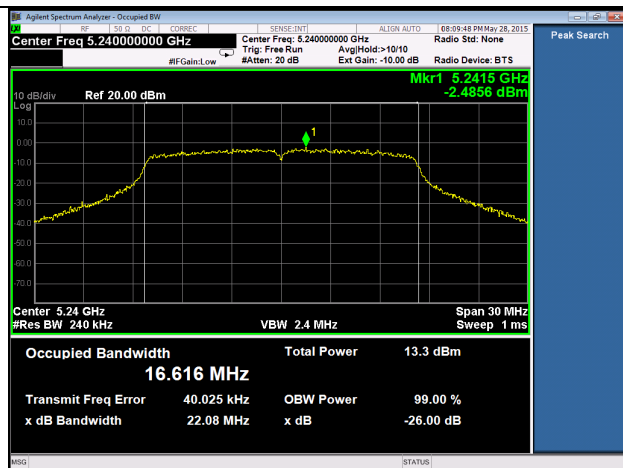
Channel 36 – 802.11n



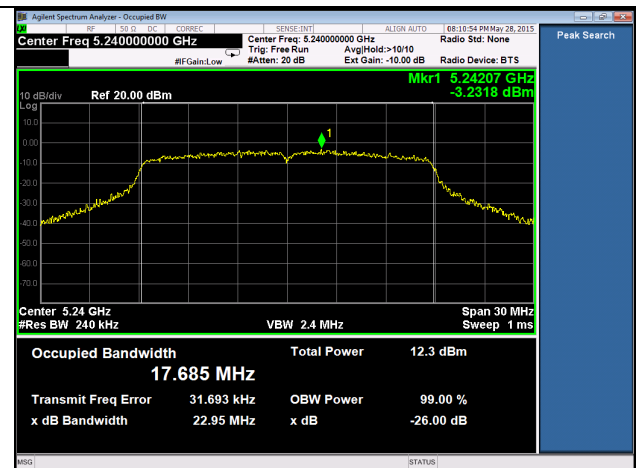
Channel 40 – 802.11a



Channel 40 – 802.11n

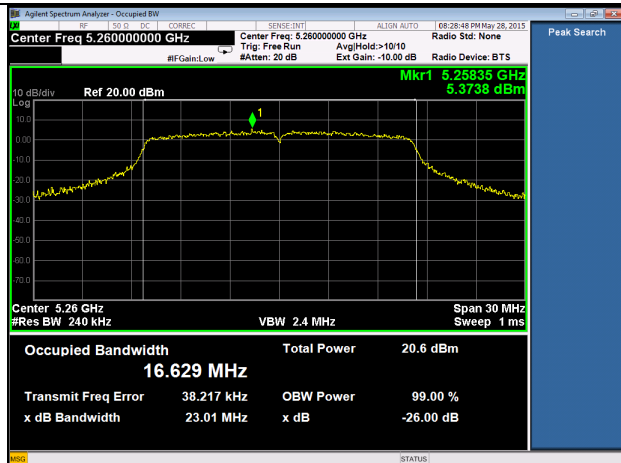


Channel 48 – 802.11a

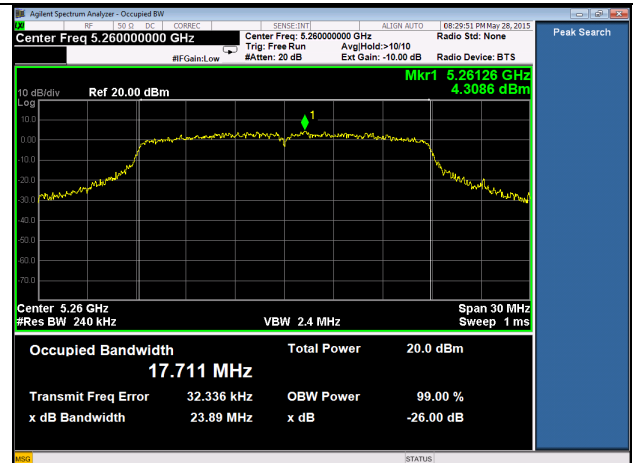


Channel 48 – 802.11n

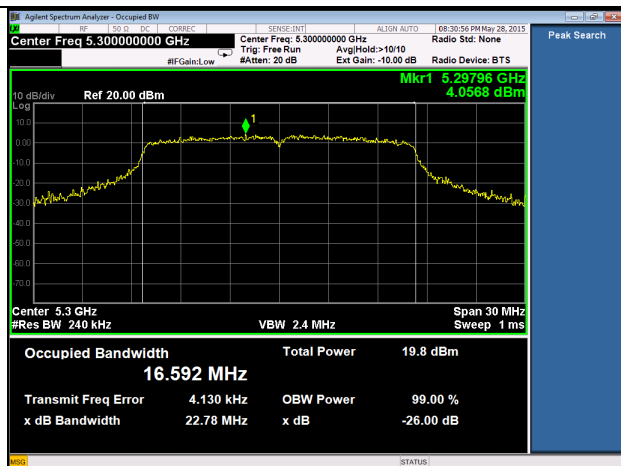
Plots – UNII-2A



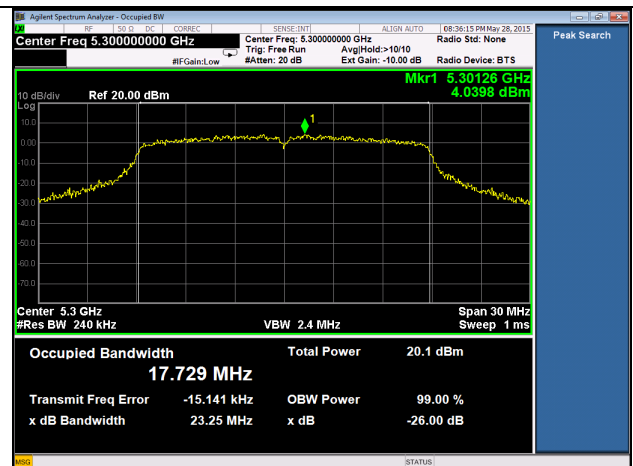
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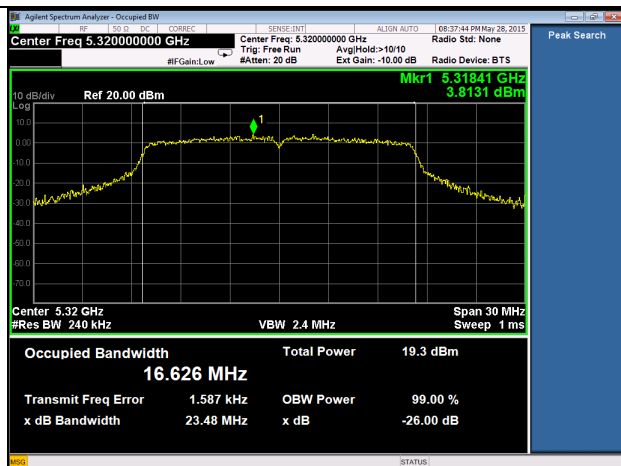
Channel 52 – 802.11n



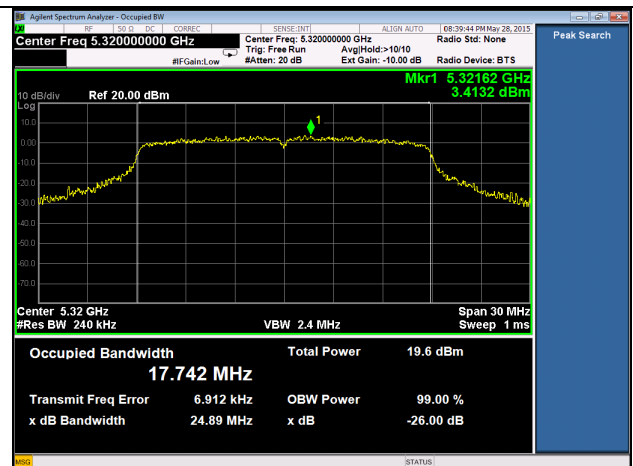
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Channel 60 – 802.11n

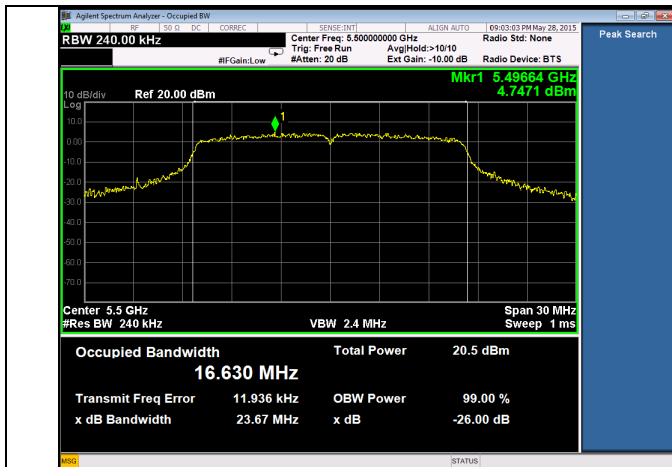


Channel 64 – 802.11a

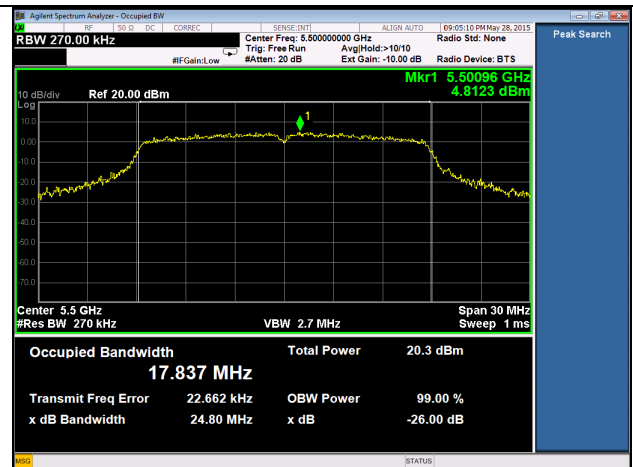


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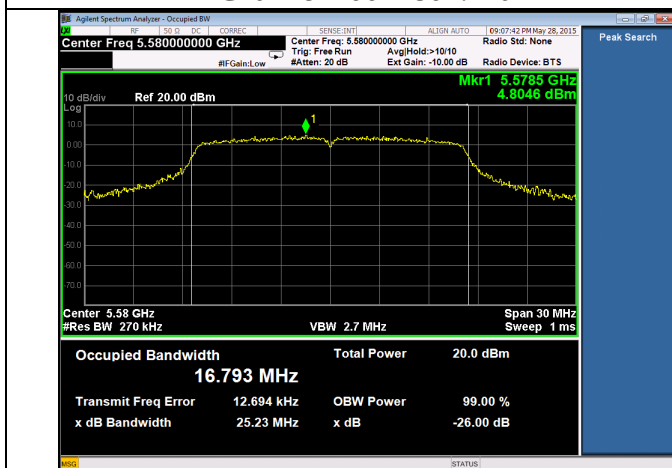
Plots – UNII-2C



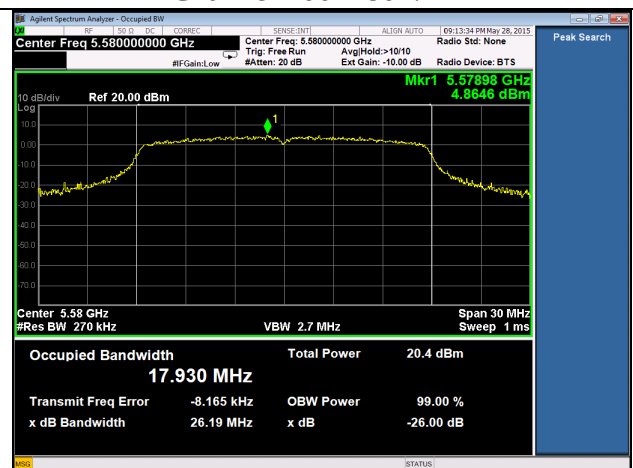
Channel 100 – 802.11a



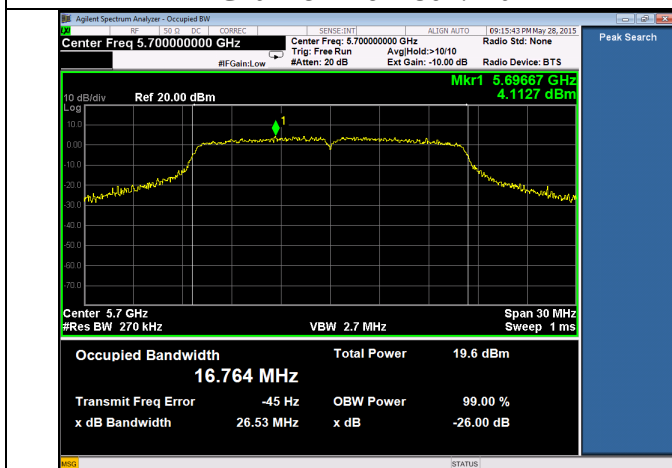
Channel 100 – 802.11n



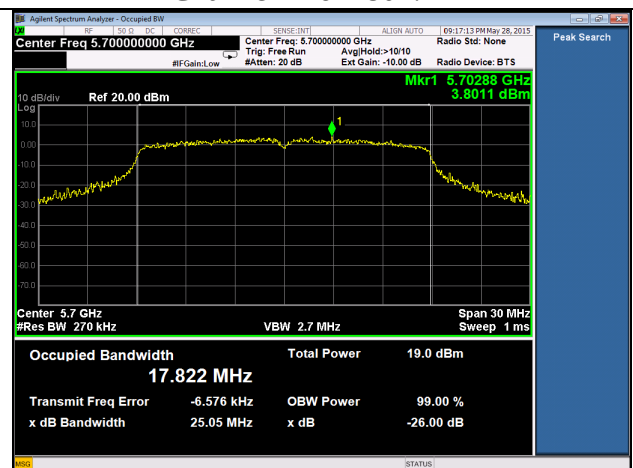
Channel 116 – 802.11a



Channel 116 – 802.11n

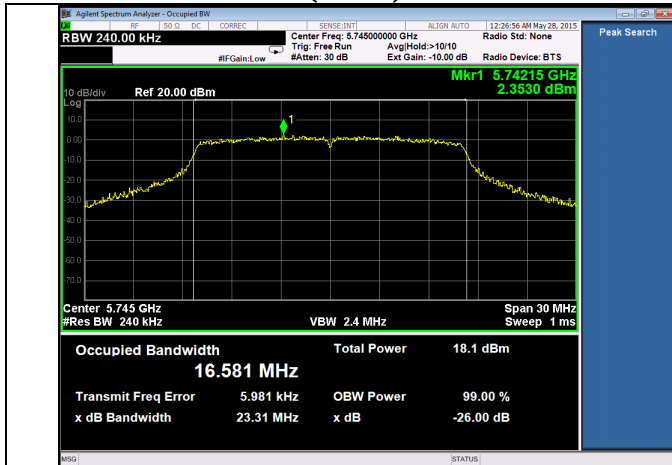


Channel 140 – 802.11a

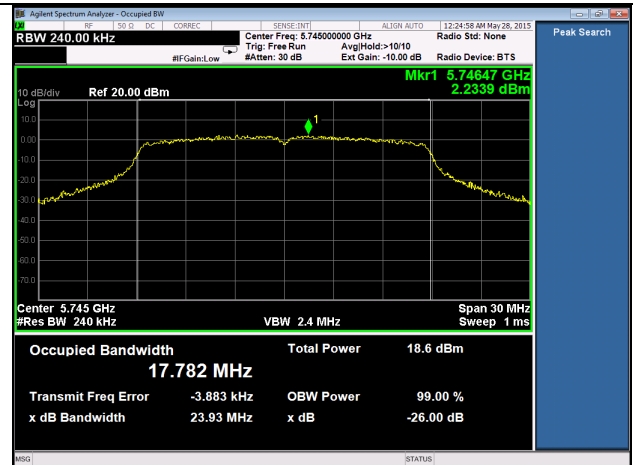


Channel 140 – 802.11n

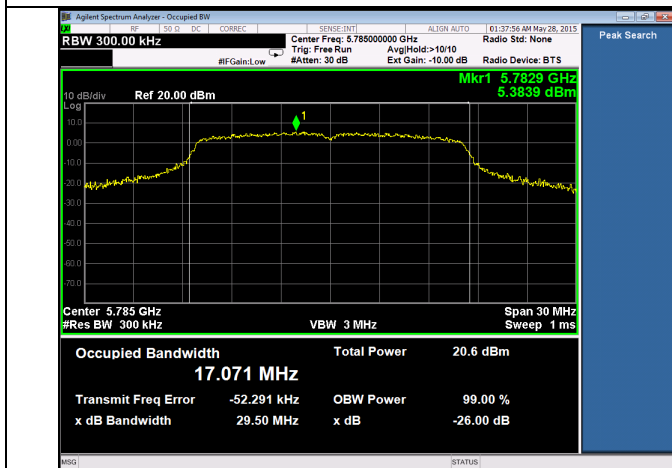
Plots – UNII-3 (EBW)



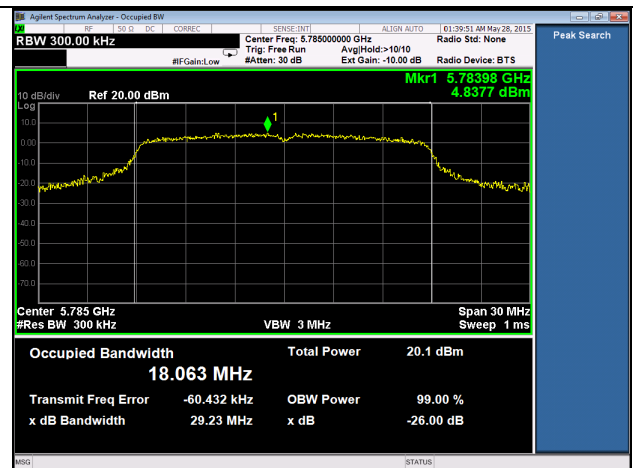
Channel 149 – 802.11a



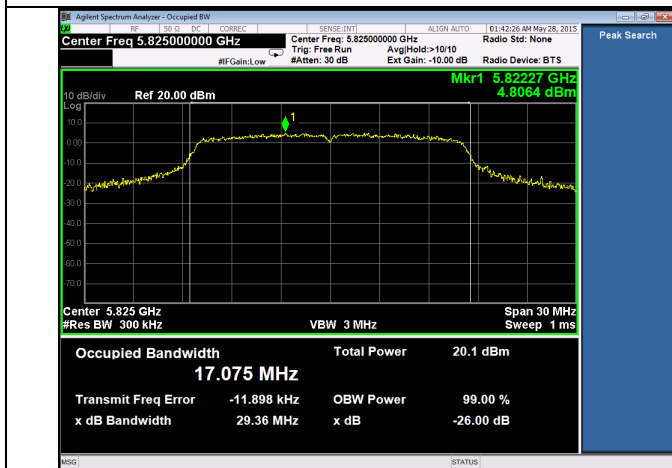
Channel 149 – 802.11n



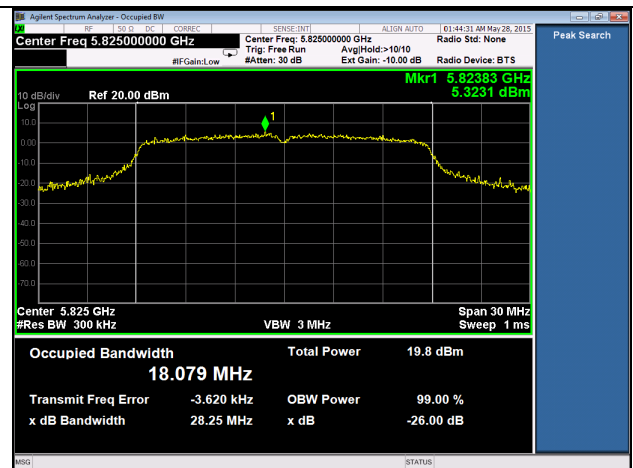
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Channel 157 – 802.11n

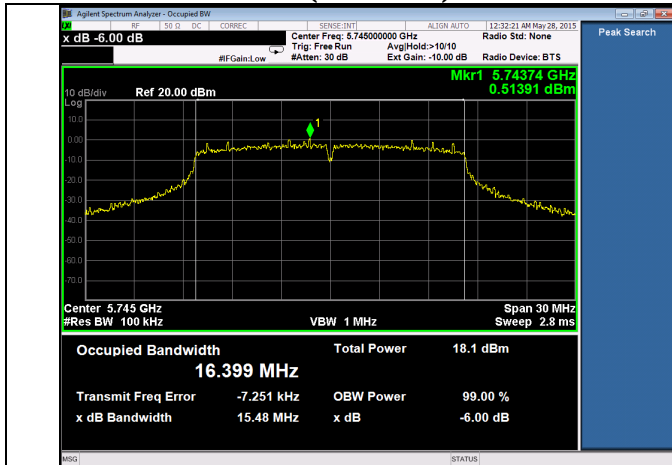


Channel 165 – 802.11a

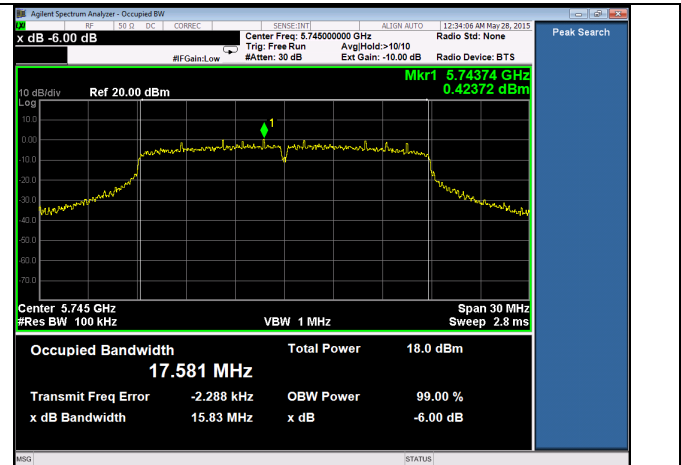


Channel 165 – 802.11n

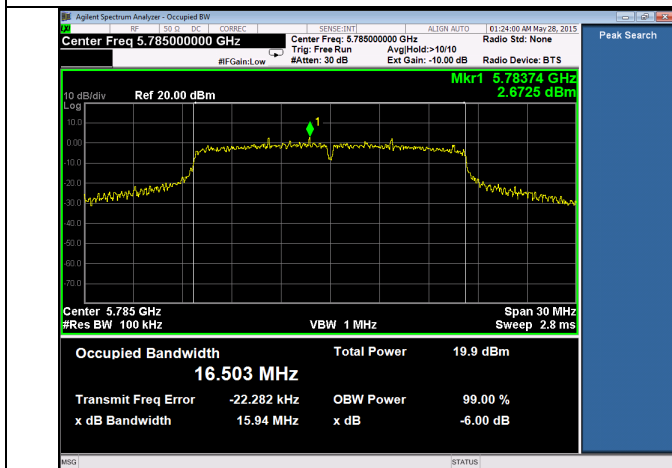
Plots – UNII-3 (DTS BW)



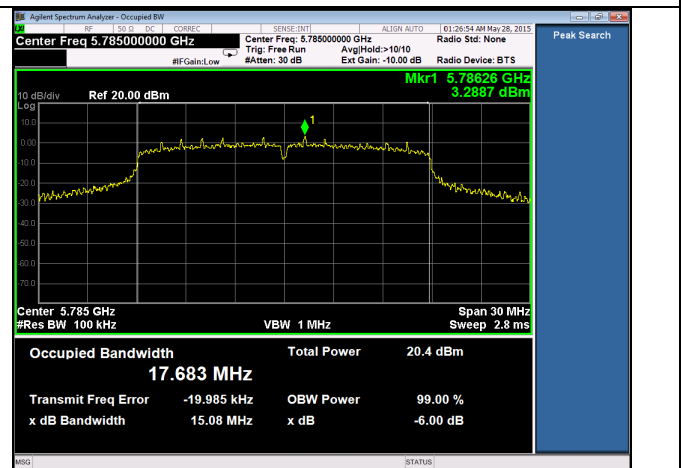
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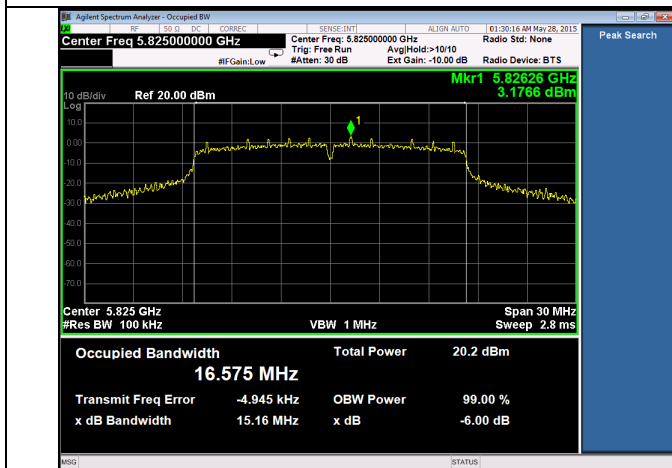
Channel 149 – 802.11n



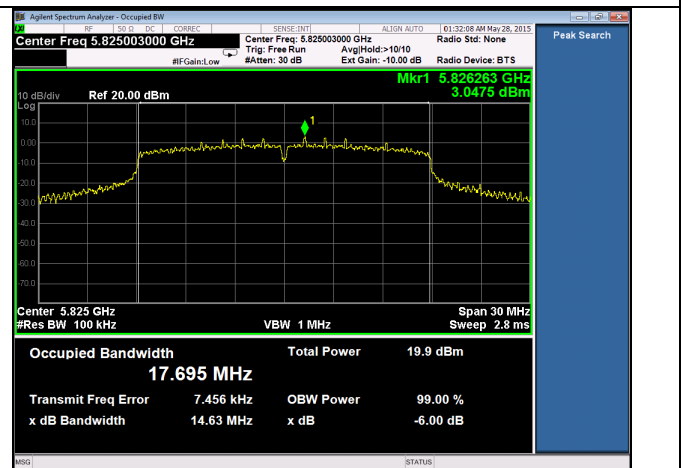
Channel 157 – 802.11a



Channel 157 – 802.11n



Channel 165 – 802.11a



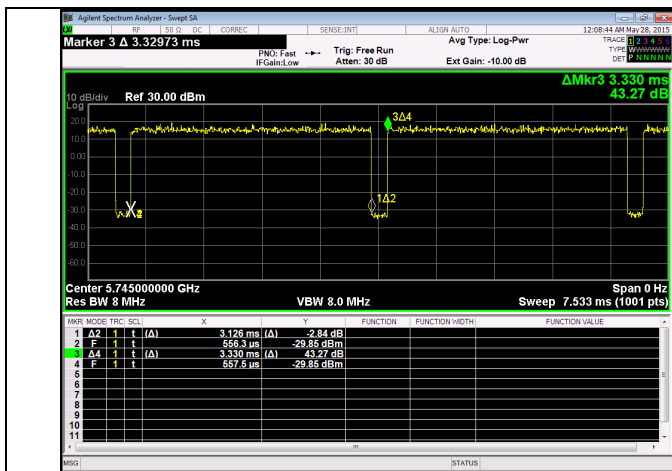
Channel 165 – 802.11n

B.1.2 – RF Conducted – Duty Cycle

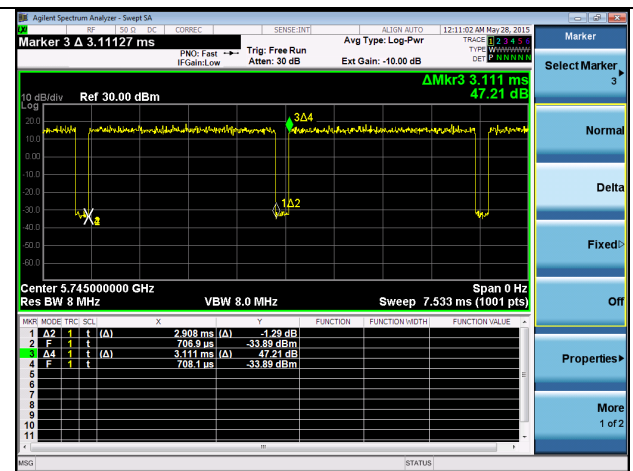
Manufacturer	Vocollect, Inc.
Date	5-27-15
Operator	Adam A
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	N/A
Specific Measurement Procedure	ANSI C63.10-2013 Section 12.2
Additional Description of Measurement	RF Conducted Measurement
Additional Notes	1. Duty cycle consistent between all channels.

Table

Mode (802.11)	Mode (Mbps)	On-time (ms)	Total Time (ms)	Duty Cycle	Duty Cycle Correction	1/Duty Cycle	Sweeps
a	6	3.126	3.33	0.94	0.27	1.07	107
n	6.5	2.908	3.111	0.93	0.29	1.07	107



Channel 149 – 802.11a



Channel 149 – 802.11n

Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

Name: A500 Talkman

Model: TAP802-01

Serial: Eng. Sample

B.1.3 – RF Conducted – Fundamental Power and Spectral Density

Manufacturer	Vocollect, Inc.
Date	5-28-15
Operator	Adam A
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.407 (a)(1)(iv) & (a)(2) & (a)(3) IC RSS-247
Specific Measurement Procedure	ANSI C63.10-2013 Section 12.3 & 12.5
Additional Description of Measurement	Average methods used
Additional Notes	Continuous transmit modulated used for this test.

Prepared For: Vocollect, Inc.	Name: A500 Talkman
Report: TR 314378 C	Model: TAP802-01
LSR: C-2204	Serial: Eng. Sample

Table

UNII-1

Mode (802.11)	Channel	Frequency (MHz)	99 % BW (MHz)	EBW (MHz)	Meas Power (dBm)	Duty Cycle Correction (dB)	Avg Power (dBm)	Meas PSD (dBm)	Duty Cycle Correction (dB)	PSD (dBm/MHz)
a	36	5180	16.63	22.27	6.564	0.275	6.84	-3.898	0.275	-3.62
	40	5200	16.59	22.53	6.268		6.54	-4.098		-3.82
	48	5240	16.62	22.08	6.029		6.30	-4.252		-3.98
n	36	5180	17.77	23.90	6.213	0.293	6.51	-4.532	0.293	-4.24
	40	5200	17.69	23.55	6.137		6.43	-4.569		-4.28
	48	5240	17.69	22.95	5.802		6.10	-4.707		-4.41

FCC: Power Limit = 250 mW = 23.98 dBm = Pass

FCC: PSD Limit = 11 dBm/MHz = Pass

IC: Power Limit = $10 + 10 \cdot \log(99\% \text{ BW}) = 22.17 \text{ dBm} = \text{Pass}$

IC: PSD Limit = 10 dBm/MHz EIRP = Pass

UNII-2A

Mode (802.11)	Channel	Frequency (MHz)	99 % BW (MHz)	EBW (MHz)	Meas Power (dBm)	Duty Cycle Correction (dB)	Avg Power (dBm)	Meas PSD (dBm)	Duty Cycle Correction (dB)	PSD (dBm/MHz)
a	52	5260	16.63	23.01	13.785	0.275	14.06	3.432	0.275	3.71
	60	5300	16.59	22.78	13.467		13.74	3.09		3.36
	64	5320	16.63	23.48	13.081		13.36	2.598		2.87
n	52	5260	17.71	23.89	13.518	0.293	13.81	2.744	0.293	3.04
	60	5300	17.73	23.25	13.243		13.54	2.603		2.90
	64	5320	17.74	24.89	12.936		13.23	2.303		2.60

FCC: Power Limit = lesser of 250 mW or $11 \text{ dBm} + 10 \cdot \log(\text{EBW}) = 250 \text{ mw} = 23.98 \text{ dBm} = \text{Pass}$

FCC: PSD Limit = 11 dBm/MHz = Pass

IC: Power Limit = $11 + 10 \cdot \log(99\% \text{ BW}) = 23.17 \text{ dBm} = \text{Pass}$

IC: PSD Limit = 11 dBm/MHz = Pass

IC: PSD EIRP Limit = $17 + 10 \cdot \log(99\% \text{ BW}) = 23.17 \text{ dBm} = \text{Pass}$

Note: Channel 52 PSD/MHz meets IC PSD/MHz EIRP limit of 5150-5250 MHz band with peak gain of 3.49 dBi at 5260 MHz.

UNII-2C

Mode (802.11)	Channel	Frequency (MHz)	99 % BW (MHz)	EBW (MHz)	Meas Power (dBm)	Duty Cycle Correction (dB)	Avg Power (dBm)	Meas PSD (dBm)	Duty Cycle Correction (dB)	PSD (dBm/MHz)
a	100	5500	16.63	23.67	13.585	0.275	13.86	3.145	0.275	3.42
	116	5580	16.79	25.23	13.048		13.32	2.536		2.81
	140	5700	16.76	26.53	12.714		12.99	2.217		2.49
n	100	5500	17.84	24.80	13.425	0.293	13.72	2.821	0.293	3.11
	116	5580	17.93	26.19	12.901		13.19	2.162		2.46
	140	5700	17.82	25.05	12.459		12.75	1.681		1.97

FCC: Power Limit = lesser of 250 mW or $11 + 10 \cdot \log(\text{EBW}) = 250 \text{ mW} = 23.98 \text{ dBm} = \text{Pass}$

FCC: PSD Limit = 11 dBm/MHz = Pass

IC: Power Limit = $11 + 10 \cdot \log(99\% \text{ BW}) = 23.17 \text{ dBm} = \text{Pass}$

IC: PSD Limit = 11 dBm/MHz = Pass

IC: PSD EIRP Limit = $17 + 10 \cdot \log(99\% \text{ BW}) = 23.17 \text{ dBm} = \text{Pass}$

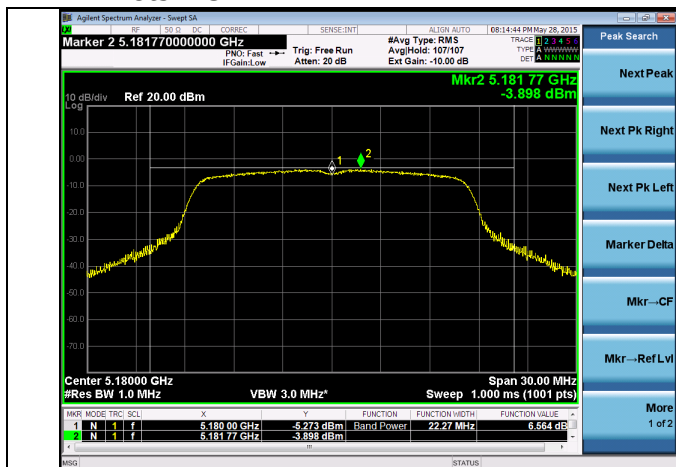
UNII-3

Mode (802.11)	Channel	Frequency (MHz)	DTS BW (MHz)	99 % BW (MHz)	EBW (MHz)	Meas Power (dBm)	Duty Cycle Correction (dB)	Avg Power (dBm)	Meas PSD (dBm)	Duty Cycle Correction (dB)	PSD (dBm/MHz)
a	149	5745	15.48	16.58	23.31	11.592	0.275	11.87	1.117	0.275	1.39
	157	5785	15.94	17.07	29.50	13.538		13.81	3.178		3.45
	165	5825	15.16	17.08	29.36	13.179		13.45	2.516		2.79
n	149	5745	15.83	17.78	23.93	11.433	0.293	11.73	0.78	0.293	1.07
	157	5785	15.08	18.06	29.23	13.304		13.60	2.733		3.03
	165	5825	14.63	18.08	28.25	13.086		13.38	2.421		2.71

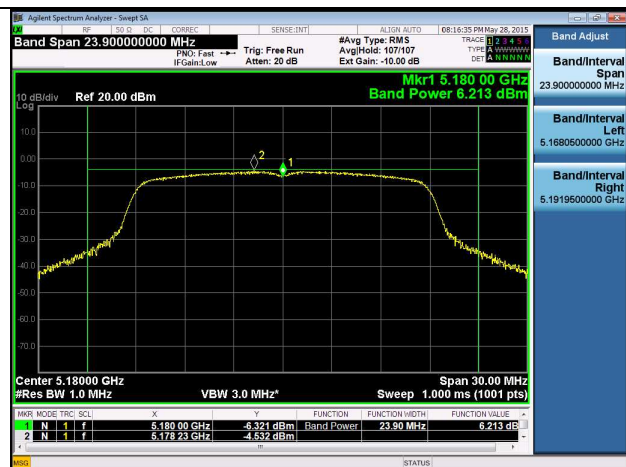
FCC / IC: Power Limit = 1 W = 30 dBm = Pass

FCC / IC: PSD Limit = 30 dBm/500 kHz = Pass

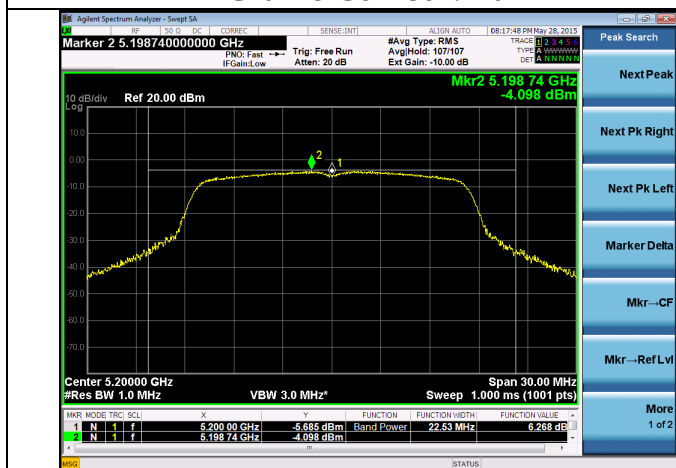
Plots – UNII-1



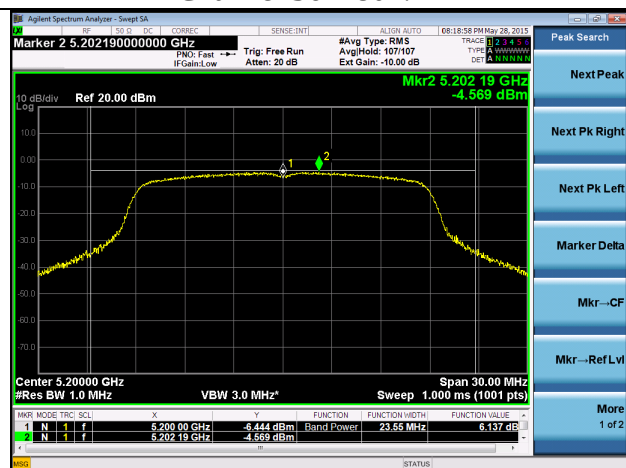
Channel 36 – 802.11a



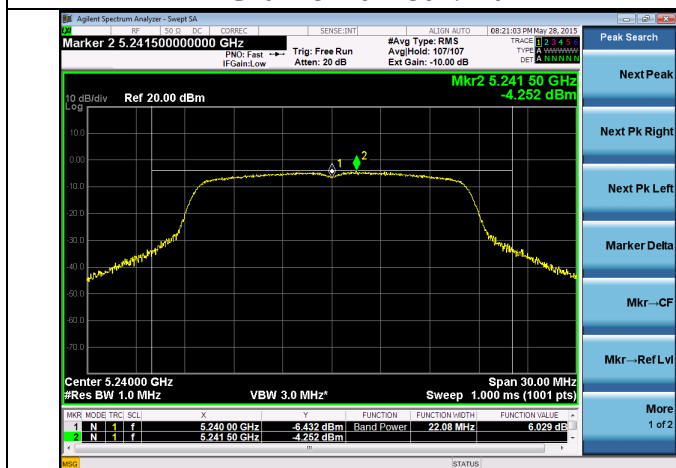
Channel 36 – 802.11n



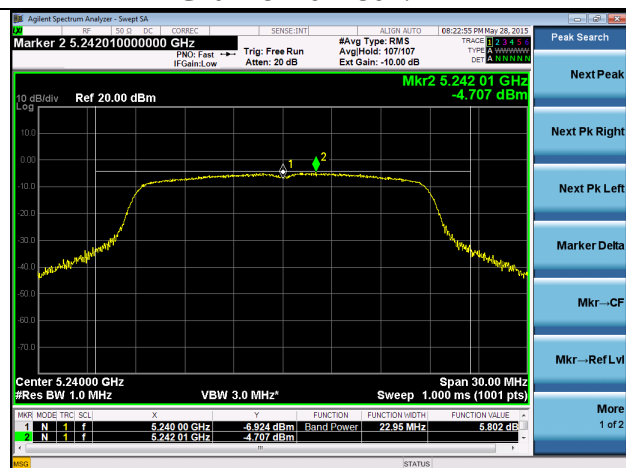
Channel 40 – 802.11a



Channel 40 – 802.11n



Channel 48 – 802.11a



Channel 48 – 802.11n

Prepared For: Vocollect, Inc.

Report: TR 314378 C

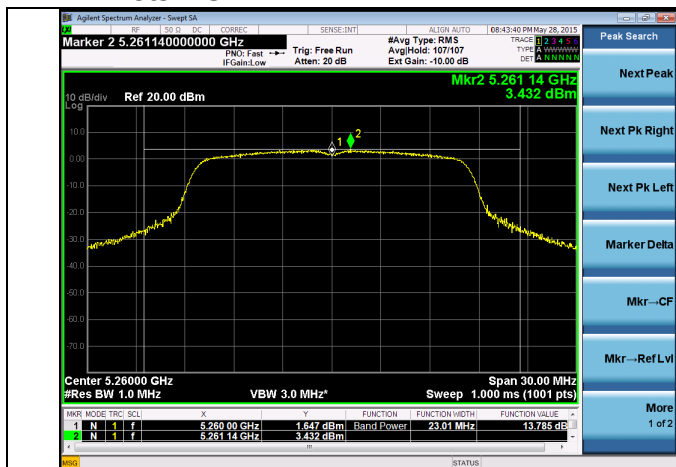
LSR: C-2204

Name: A500 Talkman

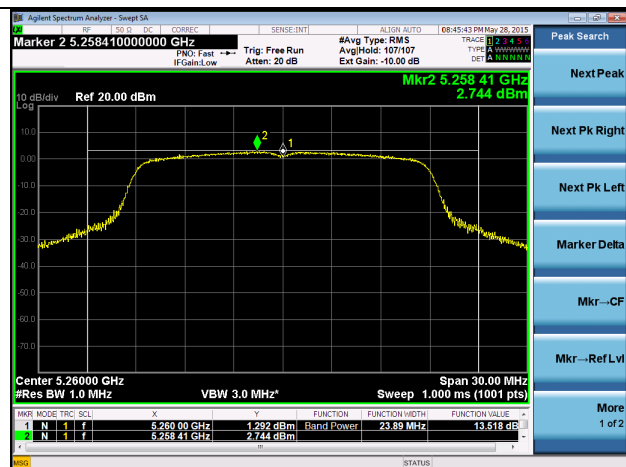
Model: TAP802-01

Serial: Eng. Sample

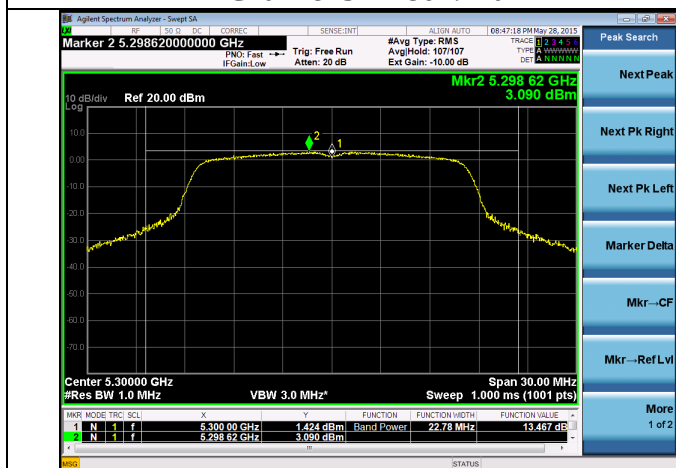
Plots – UNII-2A



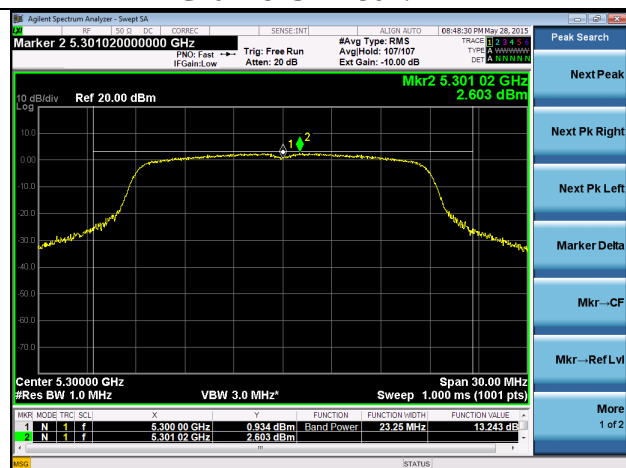
Channel 52 – 802.11a



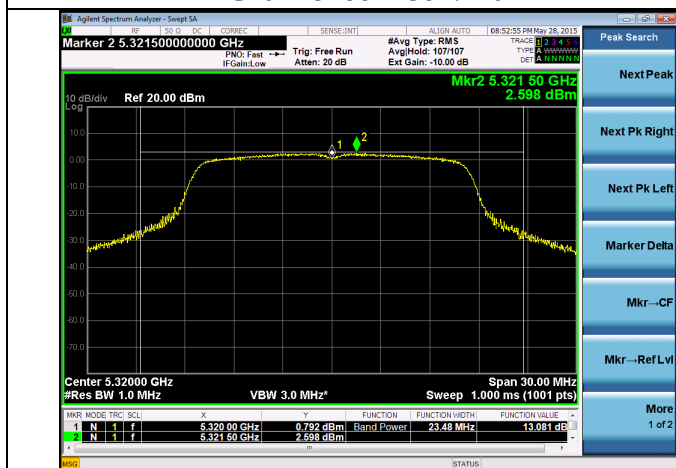
Channel 52 – 802.11n



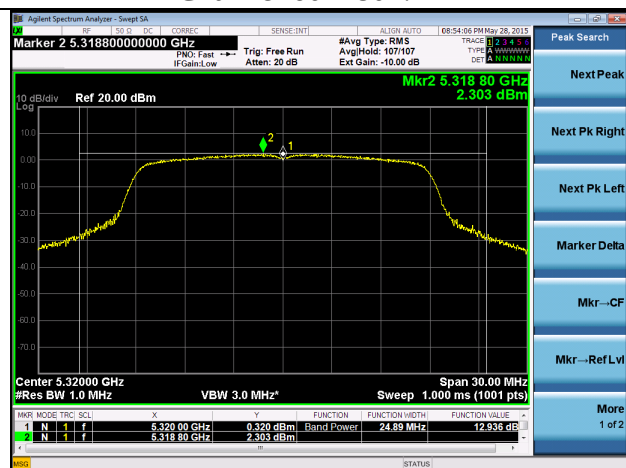
Channel 60 – 802.11a



Channel 60 – 802.11n



Channel 64 – 802.11a



Channel 64 – 802.11n

Prepared For: Vocollect, Inc.

Report: TR 314378 C

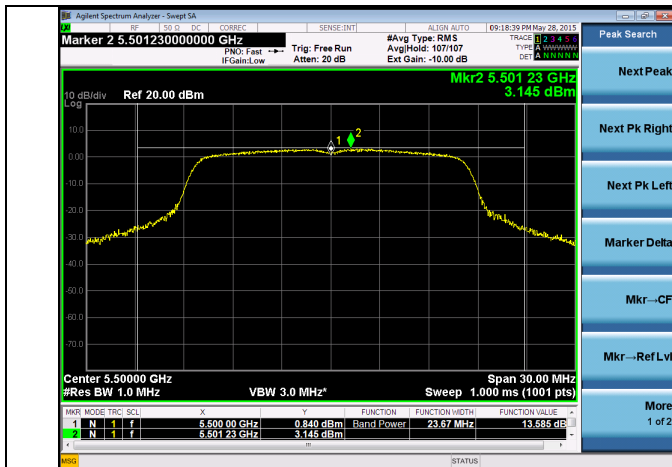
LSR: C-2204

Name: A500 Talkman

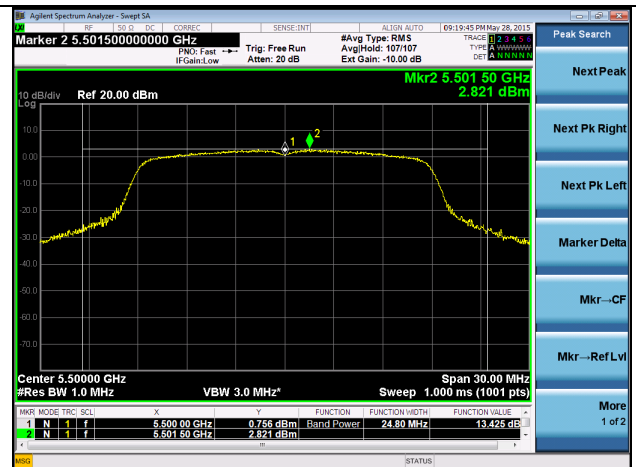
Model: TAP802-01

Serial: Eng. Sample

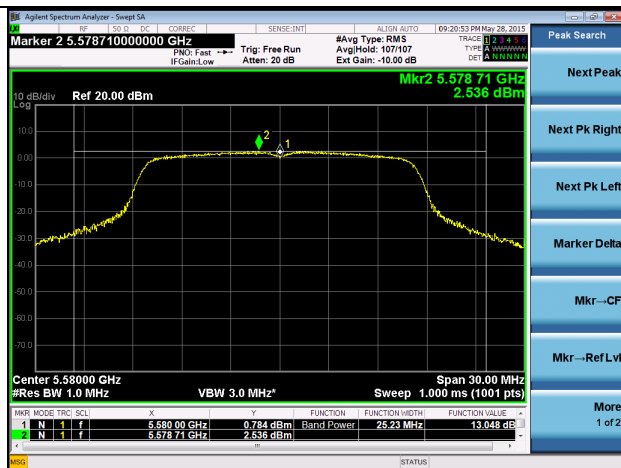
Plots – UNII-2C



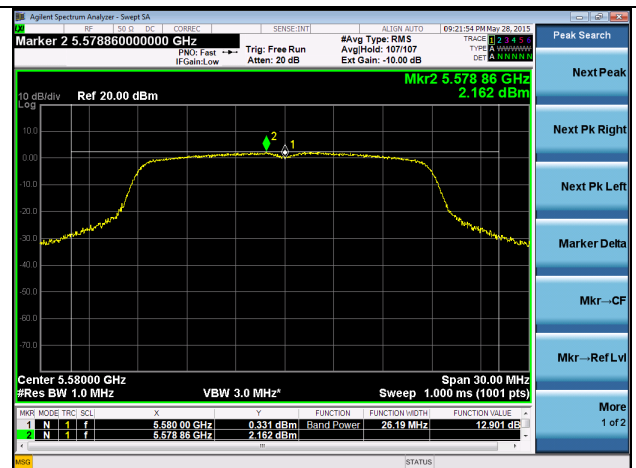
Channel 100 – 802.11a



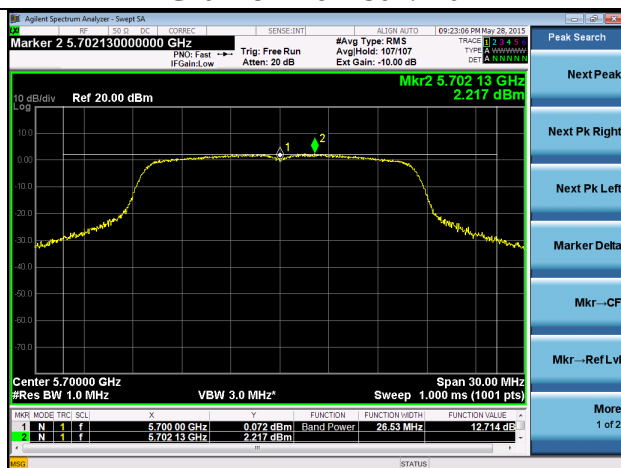
Channel 100 – 802.11n



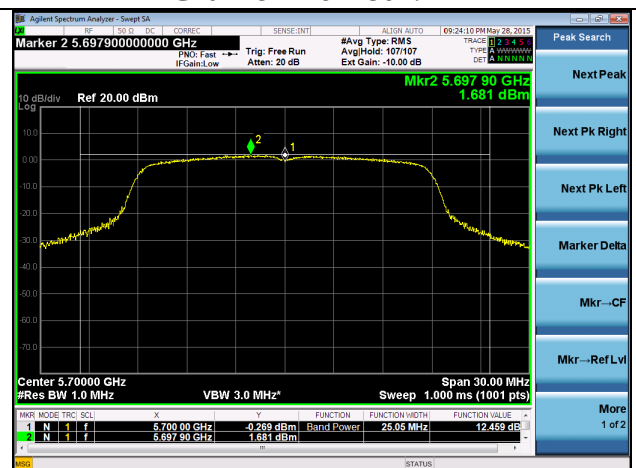
Channel 116 – 802.11a



Channel 116 – 802.11n



Channel 140 – 802.11a



Channel 140 – 802.11n

Prepared For: Vocollect, Inc.

Report: TR 314378 C

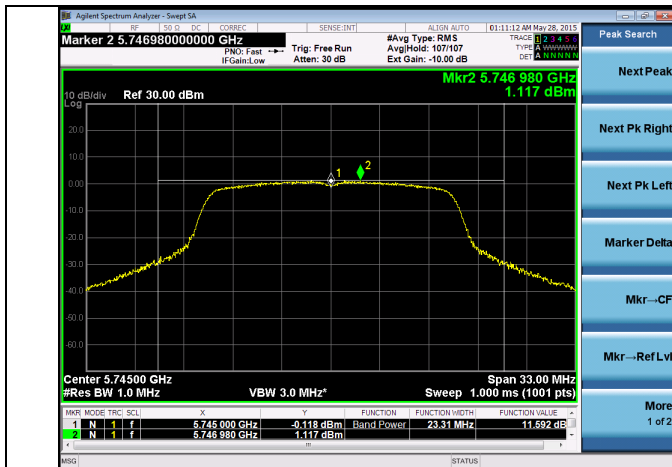
LSR: C-2204

Name: A500 Talkman

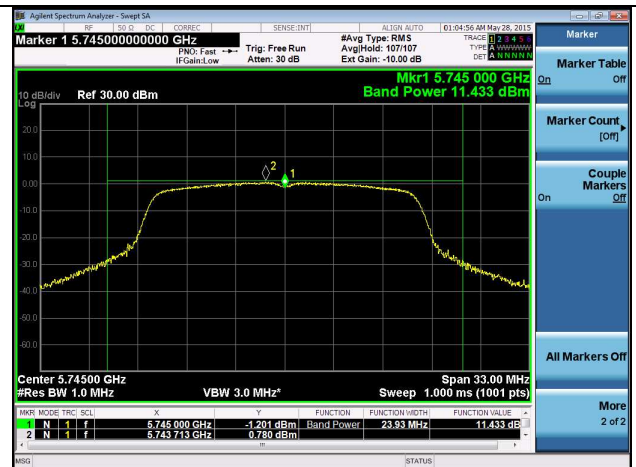
Model: TAP802-01

Serial: Eng. Sample

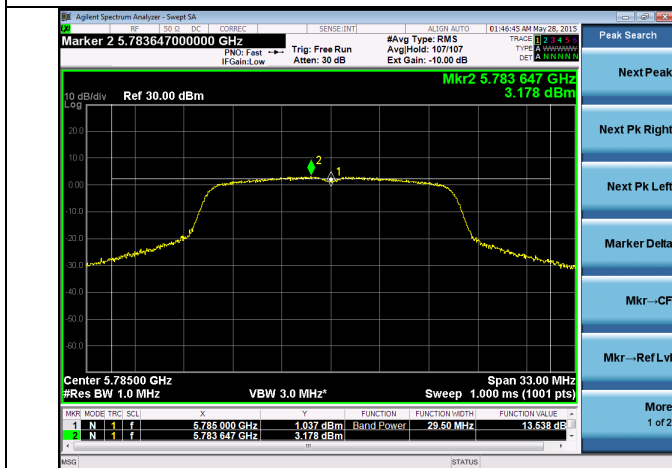
Plots – UNII-3



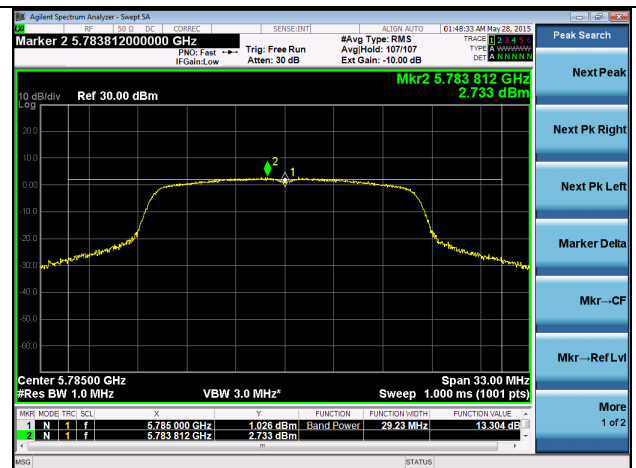
Channel 149 – 802.11a



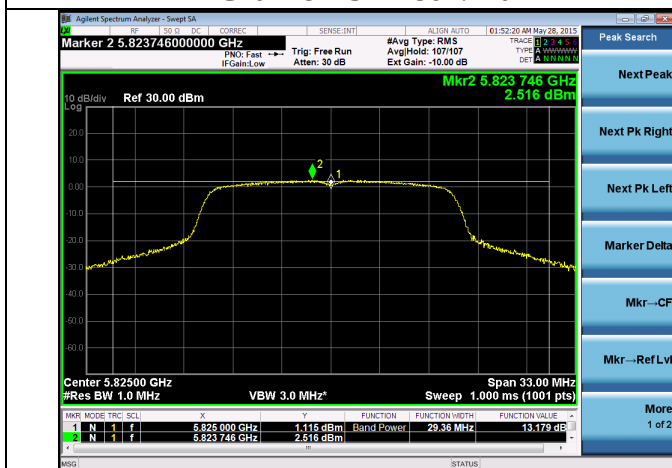
Channel 149 – 802.11n



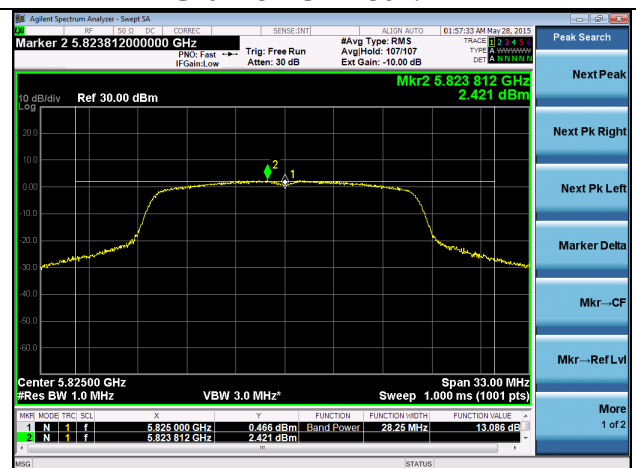
Channel 157 – 802.11a



Channel 157 – 802.11n



Channel 165 – 802.11a



Channel 165 – 802.11n

Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

Name: A500 Talkman

Model: TAP802-01

Serial: Eng. Sample

B.1.4 – RF Conducted – Frequency Stability

Manufacturer	Vocollect, Inc.
Date	5-28-15
Operator	Adam A
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.407 (g) IC: RSS-GEN
Specific Measurement Procedure	ANSI C63.10-2013 Section 6.8
Additional Description of Measurement	RF Conducted Measurement
Additional Notes	The power and frequency stability of the device was examined as a function of the input voltage available to the EUT. A Spectrum Analyzer was used to measure the RF output power and frequency at the appropriate frequency markers. Power was supplied by an external bench-type DC power supply and was varied from the nominal. The power was then cycled On/Off to observe system response. No unusual response was observed, the emission characteristics were well behaved, and the system returned to the same state of operation as before the power cycle. Below is data showing stability of the fundamental frequency. Continuous transmit un-modulated used for this test. EUT does not operate below 3.15-4.26 VDC, 3.7 VDC nominal EUT operates over temperature range -30°C to +50°C

Channel	Frequency (MHz)	+22°C			+50°C			-30°C			Frequency Drift (Hz)
		3.15 VDC	3.7 VDC	4.26 VDC	3.15 VDC	3.7 VDC	4.26 VDC	3.15 VDC	3.7 VDC	4.26 VDC	
		Frequency (Hz)	Frequency (Hz)	Frequency (Hz)	Frequency (Hz)	Frequency (Hz)	Frequency (Hz)	Frequency (Hz)	Frequency (Hz)	Frequency (Hz)	
40	5200	5199993980	5199994011	5199993995	5199993970	5199994044	5199993985	5199993977	5199994013	5199993988	74
60	5300	5299993855	5299993860	5299993871	5299993856	5299993865	5299993874	5299993875	5299993869	5299993873	20
100	5500	5499993666	5499993645	5499993654	5499993661	5499993630	5499993655	5499993677	5499993622	5499993651	55
140	5700	5699993420	5699993419	5699993437	5699993415	5699993420	5699993447	5699993440	5699993437	5699993477	62
161	5805	5804993289	5804993298	5804993283	5804993278	5804993288	5804993276	5804993283	5804993254	5804993251	47

Channel	Frequency (MHz)	+22°C			+50°C			-30°C		
		3.15 VDC	3.7 VDC	4.26 VDC	3.15 VDC	3.7 VDC	4.26 VDC	3.15 VDC	3.7 VDC	4.26 VDC
		Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)	Power (dBm)
40	5200	-1.3	-1.3	-1.3	-1.5	-1.5	-1.5	-1.1	-1.1	-1.1
60	5300	-0.3	-0.3	-0.3	-0.5	-0.5	-0.5	0.0	0.0	0.0
100	5500	5.3	5.3	5.3	5.1	5.1	5.1	5.4	5.4	5.4
140	5700	2.3	2.3	2.3	2.1	2.1	2.1	2.5	2.5	2.5
161	5805	6.1	6.1	6.1	5.8	5.8	5.8	6.2	6.2	6.2

Prepared For: Vocollect, Inc.	Name: A500 Talkman
Report: TR 314378 C	Model: TAP802-01
LSR: C-2204	Serial: Eng. Sample

B.2 – Transmitter Radiated Emissions

Rule Part(s)	FCC: 15.407 / 15.205 / 15.209 IC: RSS-GEN			
Measurement Procedure	ANSI C63.10 – 2013 Section 12.7			
Test Location	LS Research, LLC – FCC/IC Listed 3 meter Chamber			
Test Distance	See data section			
EUT Placement	Above 1 GHz: 150 cm height non-conductive table above reference ground plane covered with absorbers Below 1 GHz: 80 cm height non-conductive table above reference ground plane			
Frequency Range of Measurement	Biconical: 30-300 MHz	Log Periodic Dipole Array: 300-1000 MHz	Double-Ridged Waveguide Horn: 1-18 GHz	Standard Gain Horn: 18-26GHz
Measurement Detectors	30-1000MHz RBW: 120 kHz VBW: At least 300 kHz		1 - 40 GHz: RBW : 1MHz VBW: At least 3 MHz Peak VBW: 30 Hz Average	
Description of Measurement	1) The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are preformed. The data is gathered and reported as the corrected values. 2) The EUT is placed on a non-conductive pedestal centered on a turn-table in the test location with the antenna at the test distance from the EUT 3) Maximum radiated RF emissions are determined by rotation of azimuth and scanning the sense antenna between 1 and 4 meters in height using both horizontal and vertical antenna polarities. Maximized levels are manually noted at degree values of azimuth and at sense antenna height.			
Example Calculations	Reported Measurement data = Raw receiver measurement + Antenna Correction Factor + Cable factor (dB) - amplification factor (when applicable) + Additional factor (when applicable)			

Limits:

Frequency (MHz)	3 m Limit (μV/m)	3 m Limit (dBμV/m)	Type
30-88	100	40.0	Quasi-Peak
88-216	150	43.5	Quasi-Peak
216-960	200	46.0	Quasi-Peak
Above 960	500	54.0	Average (>1 GHz)

Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

Name: A500 Talkman

Model: TAP802-01

Serial: Eng. Sample

B.2.1 – Radiated Band-Edge

Manufacturer	Vocollect, Inc.
Date	5-8, 5-18, 5-19 2015
Operator	Adam A
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.407 / 15.205 / 15.209 IC RSS-247 Section 6 / RSS-GEN
Measurement Procedure	ANSI C63.10-2013 Section 12.7
Test Distance	3 meter
EUT Placement	150 cm height non-conductive table centered on turn-table , absorbers covering ground plane
Detectors	Final Measurements: RBW 1 MHz, 3 MHz (Detector = Peak or RMS w/ trace average)
Additional Notes	1) EUT maximized in orientation, azimuth, and antenna height with maximum results reported.

Example Calculation:

Limit (dBμV/m) – Reading (dBμV/m) = Margin (dB)

-27 dBm/MHz + 95.2 (Conversion to dBμV/m) = 68.2 dBμV/m

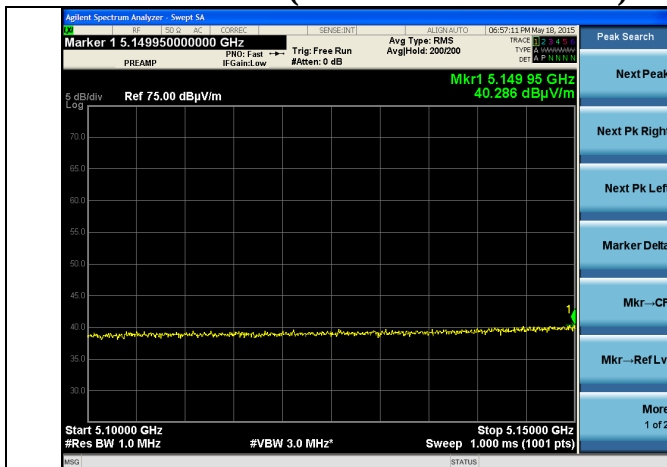
-17 dBm/MHz + 95.2 (Conversion to dBμV/m) = 78.2 dBμV/m

Table

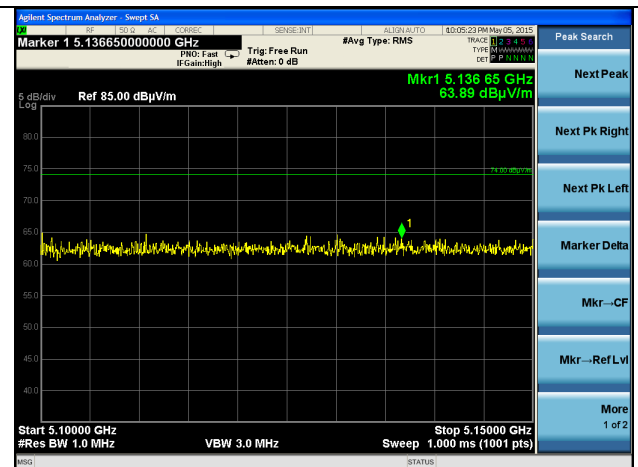
Mode (802.11)	Channel	Frequency (GHz)	Measurement Type	Reading (dBμV/m)	Duty Cycle Correction (dB)	Corrected Reading (dBμV/m)	Limit (dBμV/m)	Margin (dB)
a	36	5.14995	RB Average	40.286	0.275	40.561	54.0	13.4
n		5.14895	RB Average	40.443	0.293	40.736	54.0	13.3
a		5.13665	RB Peak	63.890	0.0	63.890	74.0	10.1
n		5.11115	RB Peak	64.280	0.0	64.280	74.0	9.7
a	64	5.35020	RB Average	49.193	0.275	49.468	54.0	4.5
n		5.35008	RB Average	49.342	0.293	49.635	54.0	4.4
a		5.35138	RB Peak	65.081	0.0	65.081	74.0	8.9
n		5.35040	RB Peak	65.902	0.0	65.902	74.0	8.1
a	100	5.45902	RB Average	45.232	0.275	45.507	54.0	8.5
n		5.45993	RB Average	45.983	0.293	46.276	54.0	7.7
a		5.45995	RB Peak	60.731	0.0	60.731	74.0	13.3
n		5.45930	RB Peak	61.271	0.0	61.271	74.0	12.7
a		5.46965	-27 dBm/MHz	63.793	0.0	63.793	68.2	4.4
n		5.46869	-27 dBm/MHz	65.772	0.0	65.772	68.2	2.4
a	140	5.72555	-27 dBm/MHz	65.996	0.0	65.996	68.2	2.2
n		5.72575	-27 dBm/MHz	65.870	0.0	65.870	68.2	2.3
a	149	5.72375	-17 dBm/MHz	74.334	0.0	74.334	78.2	3.9
n		5.72489	-17 dBm/MHz	74.047	0.0	74.047	78.2	4.2
a		5.71473	-27 dBm/MHz	61.349	0.0	61.349	68.2	6.9
n		5.71276	-27 dBm/MHz	60.506	0.0	60.506	68.2	7.7
a	165	5.85239	-17 dBm/MHz	72.061	0.0	72.061	78.2	6.1
n		5.85007	-17 dBm/MHz	71.365	0.0	71.365	78.2	6.8
a		5.86112	-27 dBm/MHz	62.630	0.0	62.630	68.2	5.6
n		5.86079	-27 dBm/MHz	62.099	0.0	62.099	68.2	6.1

Plots

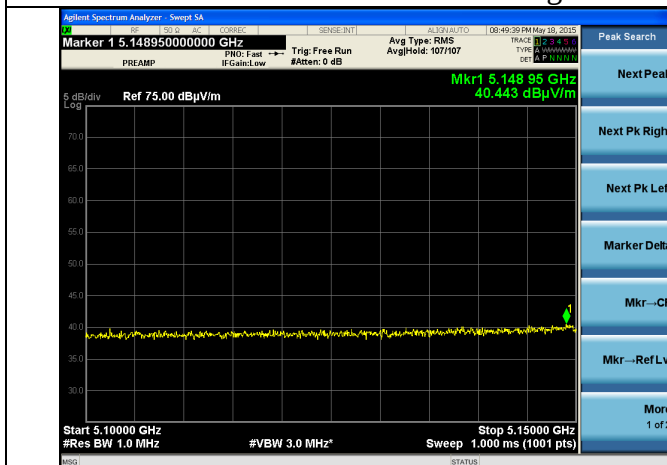
5.1-5.15 GHz (Restricted Band Limits)



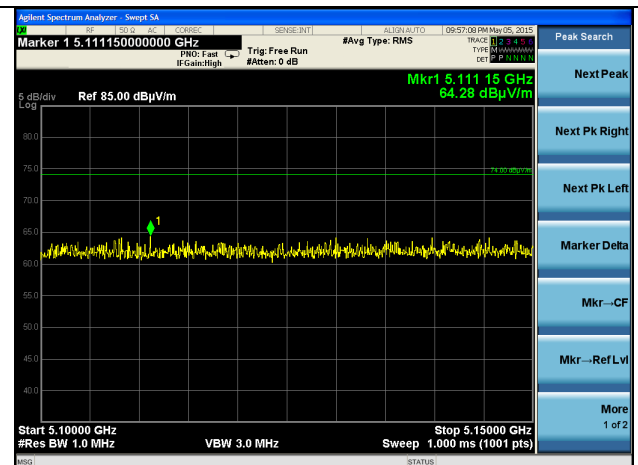
Channel 36 – 802.11a – Average



Channel 36 – 802.11a – Peak



Channel 36 – 802.11n – Average



Channel 36 – 802.11n – Peak

Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

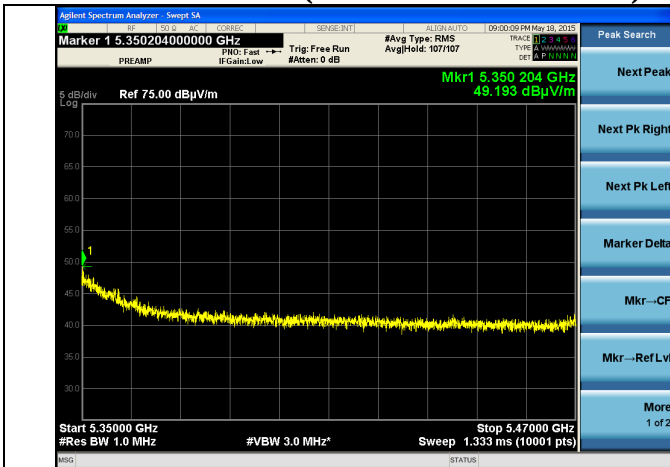
Name: A500 Talkman

Model: TAP802-01

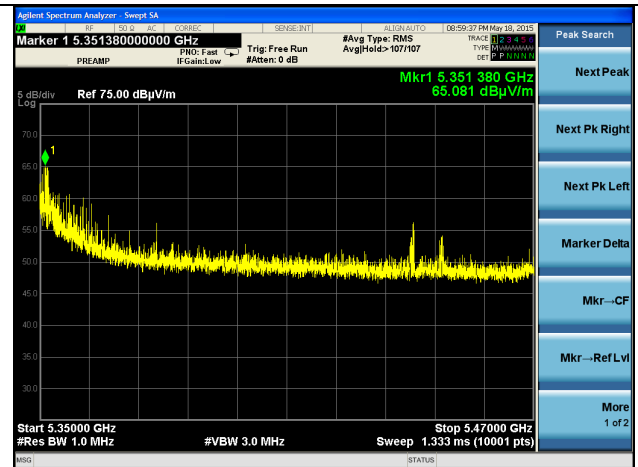
Serial: Eng. Sample

Plots

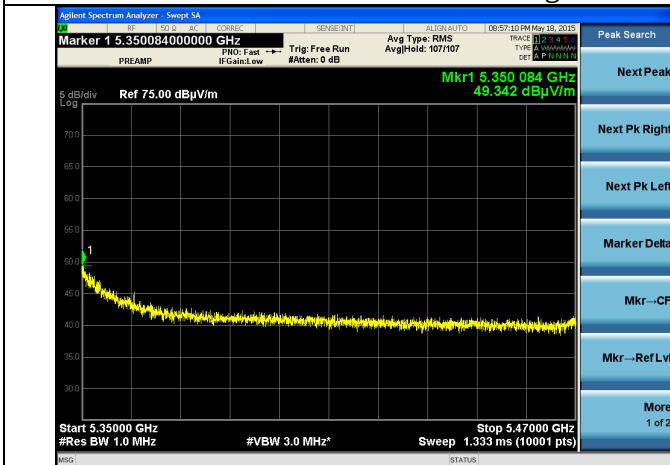
5.35-5.47 GHz (Restricted Band Limits)



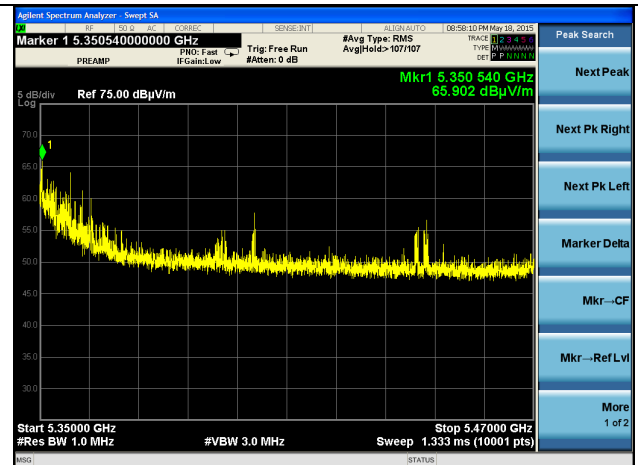
Channel 64 – 802.11a – Average



Channel 64 – 802.11a – Peak



Channel 64 – 802.11n – Average



Channel 64 – 802.11n – Peak

Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

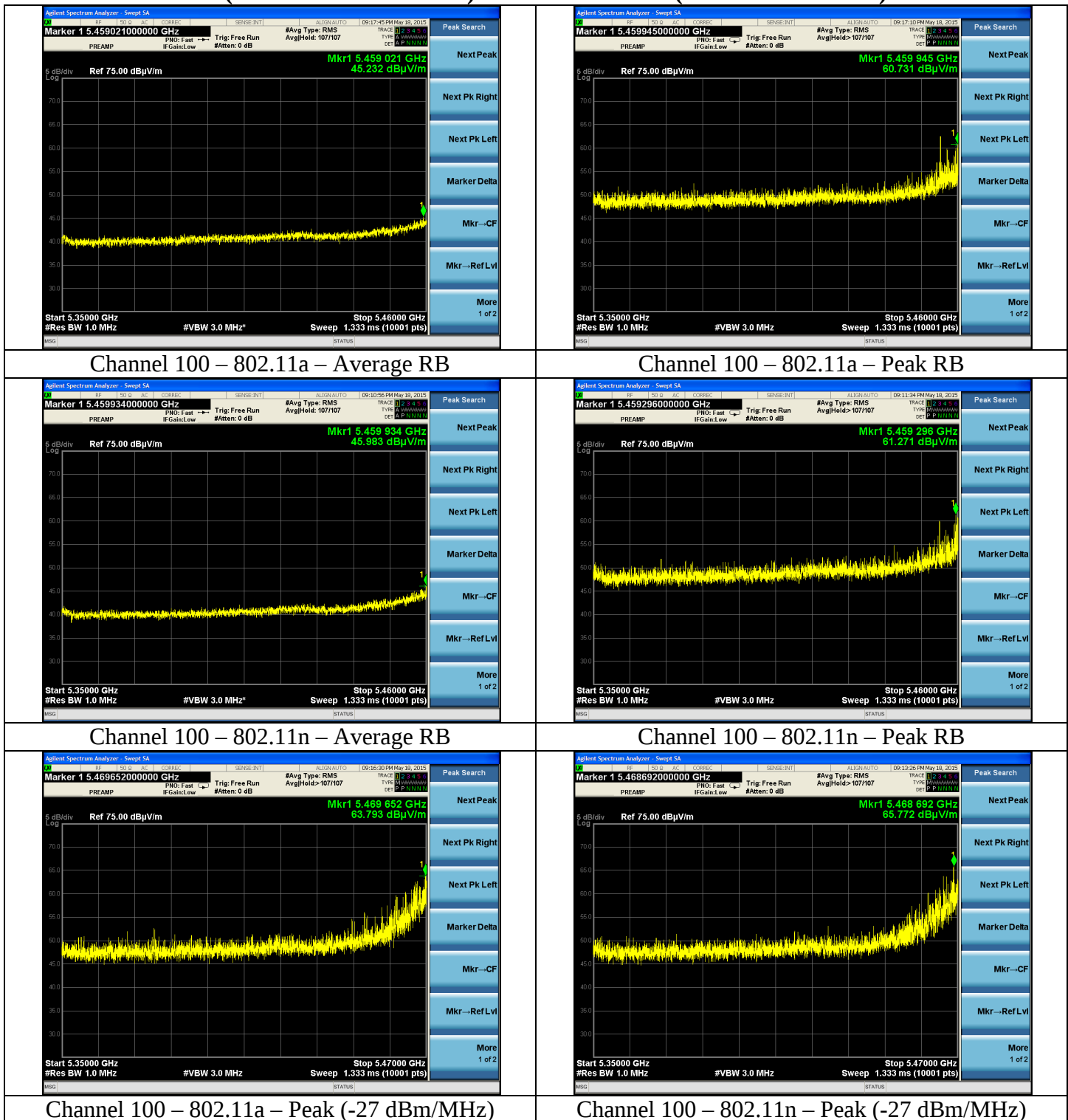
Name: A500 Talkman

Model: TAP802-01

Serial: Eng. Sample

Plots

5.35-5.46 GHz (Restricted Band Limits) and 5.35-5.47 GHz (-27 dBm/MHz limit)



Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

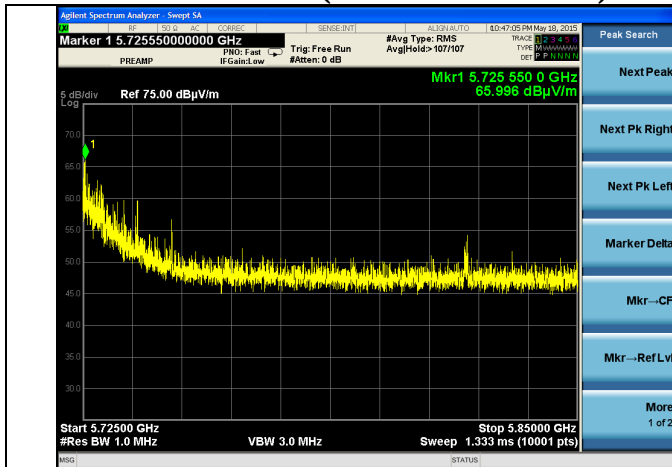
Name: A500 Talkman

Model: TAP802-01

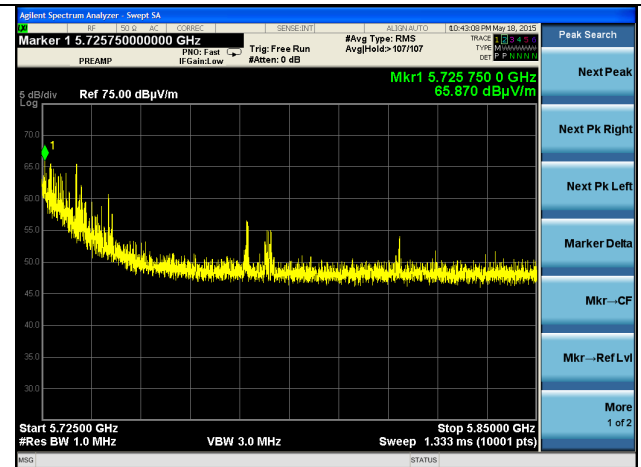
Serial: Eng. Sample

Plots

5.725-5.85 GHz (-27 dBm/MHz limit)

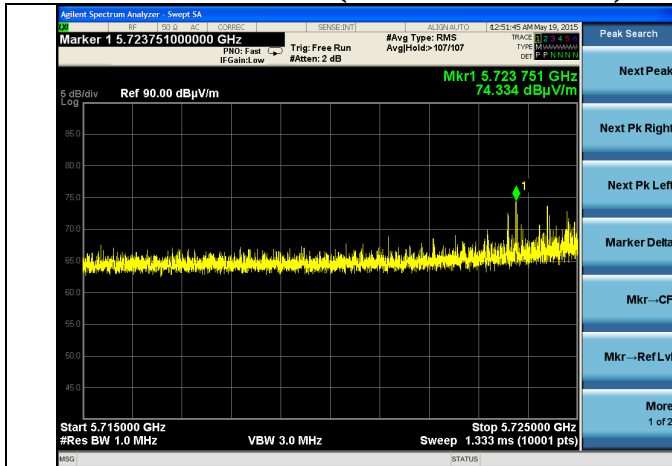


Channel 140 – 802.11a – Peak

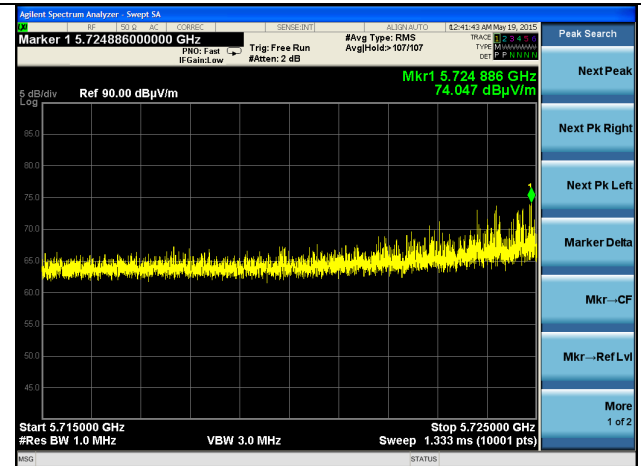


Channel 140 – 802.11n – Peak

5.715-5.725 GHz (-17 dBm/MHz limit)

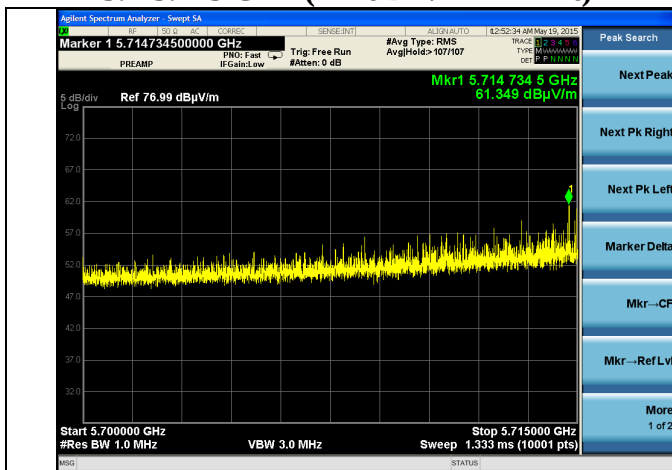


Channel 149 – 802.11a – Peak

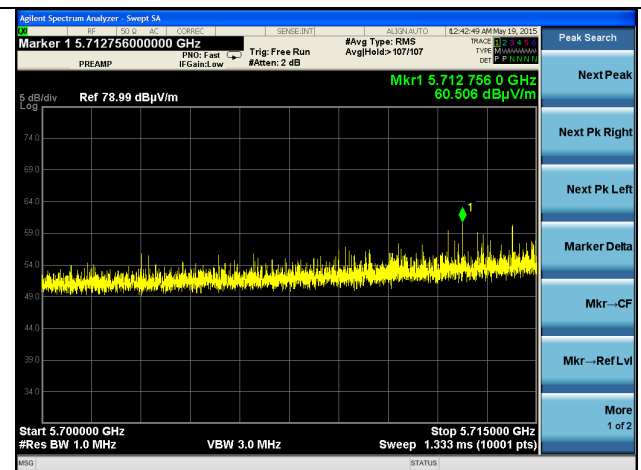


Channel 149 – 802.11n – Peak

5.7-5.715 GHz (-27 dBm/MHz limit)



Channel 149 – 802.11a – Peak



Channel 149 – 802.11n – Peak

Prepared For: Vocollect, Inc.

Report: TR 314378 C

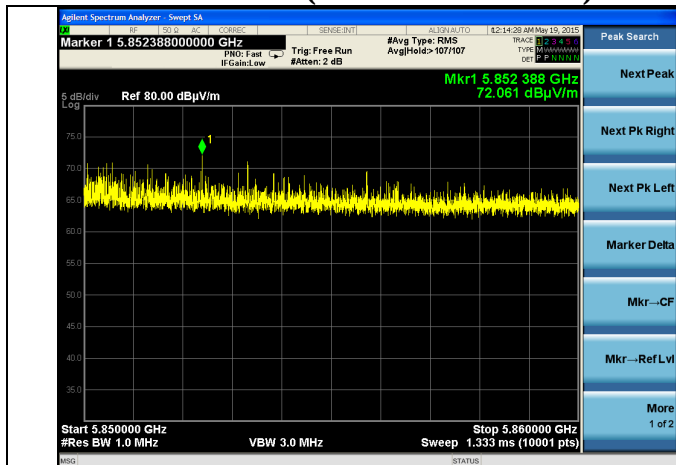
LSR: C-2204

Name: A500 Talkman

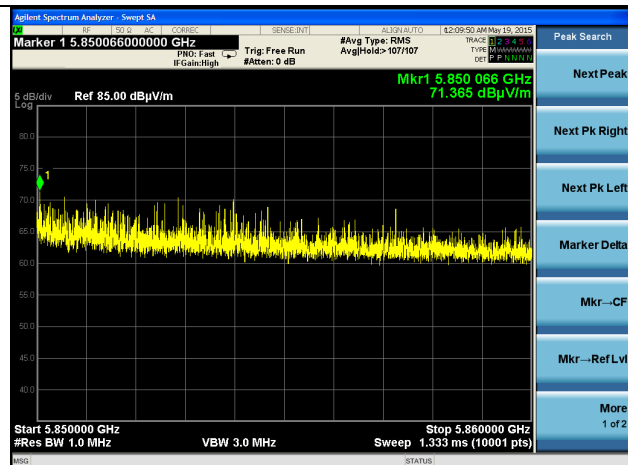
Model: TAP802-01

Serial: Eng. Sample

5.85-5.86 GHz (-17 dBm/MHz limit)

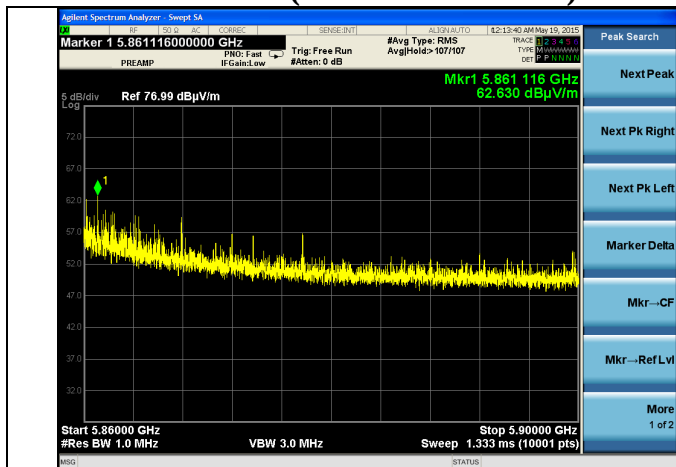


Channel 165 – 802.11a – Peak

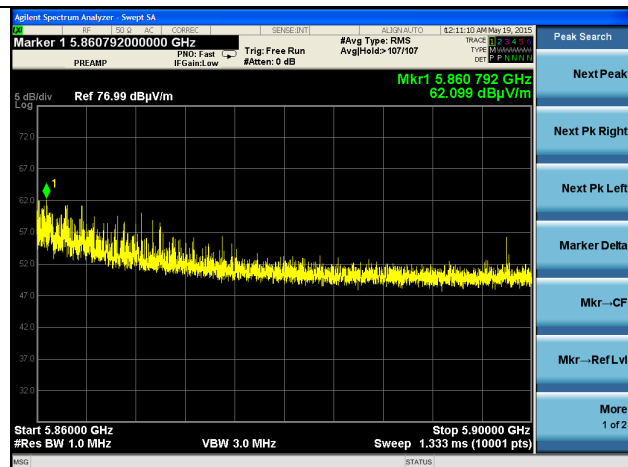


Channel 165 – 802.11n – Peak

5.86-5.9 GHz (-27 dBm/MHz limit)

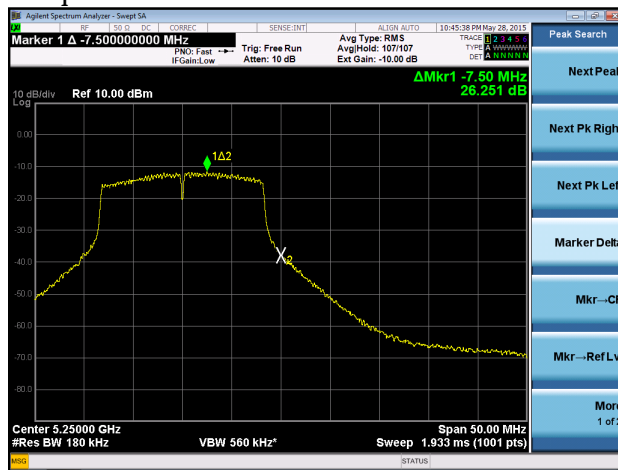


Channel 165 – 802.11a – Peak



Channel 165 – 802.11n – Peak

Note: Channel 48 meets IC requirement for 26 dBc at 5250 MHz



Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

Name: A500 Talkman

Model: TAP802-01

Serial: Eng. Sample

B.2.2 – Radiated Emissions (1-40 GHz)

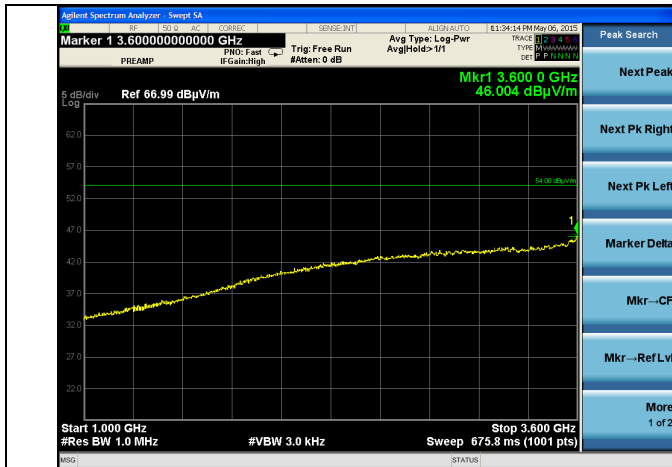
Manufacturer	Vocollect, Inc.
Date	5-1, 5, 6, 18, 19 2015
Operator	Adam A
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.407 / 15.205 / 15.209 IC RSS-247 Section 6 / RSS-GEN
Measurement Procedure	ANSI C63.10-2013 Section 12.7
Test Distance	3 meter
EUT Placement	150 cm height non-conductive table centered on turn-table , absorbers covering ground plane
Detectors	Final Measurements: Peak
Additional Notes	1) EUT maximized in orientation, azimuth, and antenna height with maximum results reported. 2) No emissions found associated with transmit channel or modulation.

Example Calculation:

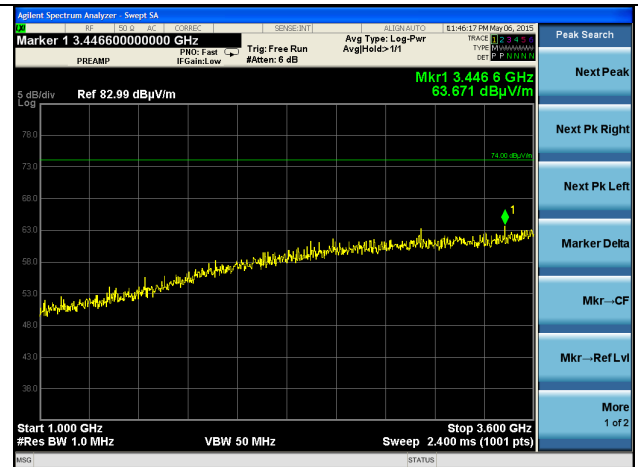
Limit (dBμV/m) – Reading (dBμV/m) = Margin (dB)

Prepared For: Vocollect, Inc.	Name: A500 Talkman
Report: TR 314378 C	Model: TAP802-01
LSR: C-2204	Serial: Eng. Sample

Plots 1-3.6 GHz

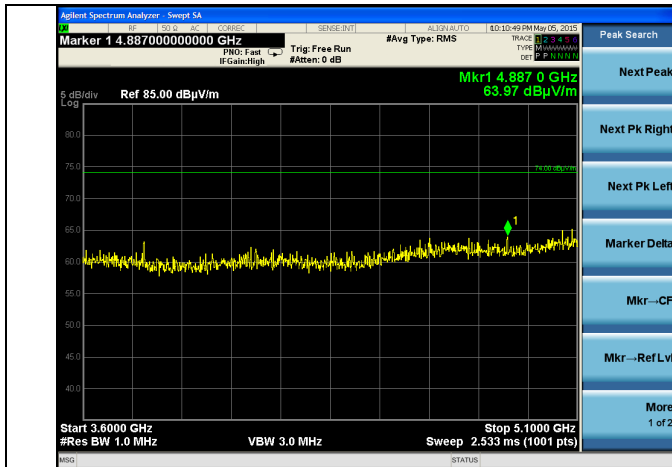


Reduced VBW

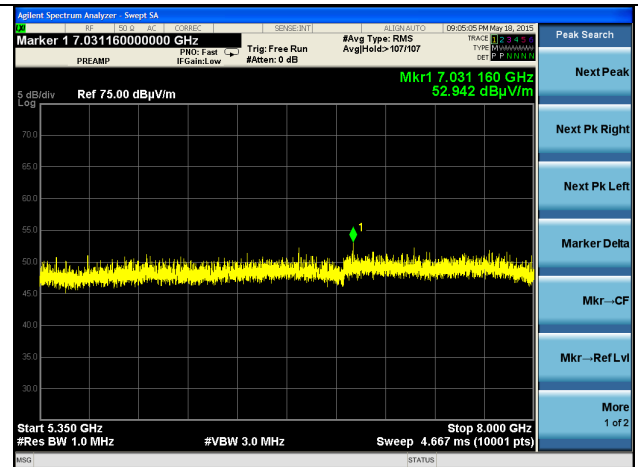


Peak

UNII-1

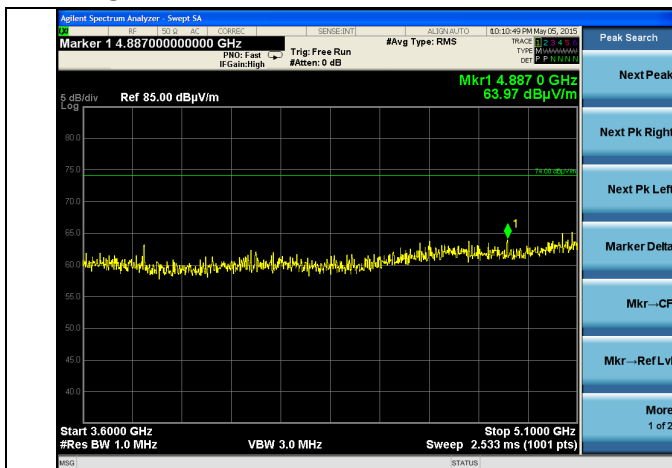


3.6-5.1 GHz - Channel 36

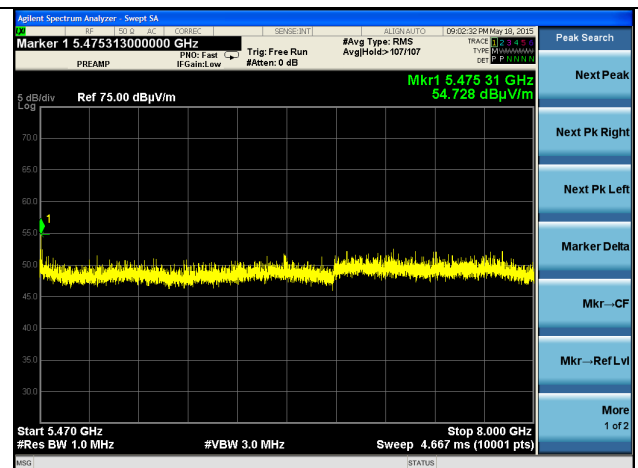


5.35-8 GHz - Channel 48

UNII-2A



3.6-5.1 GHz - Channel 52



5.47-8 GHz - Channel 64

Prepared For: Vocollect, Inc.

Report: TR 314378 C

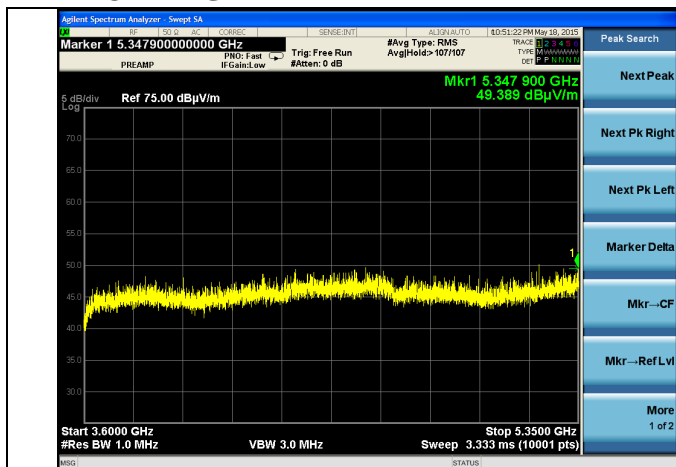
LSR: C-2204

Name: A500 Talkman

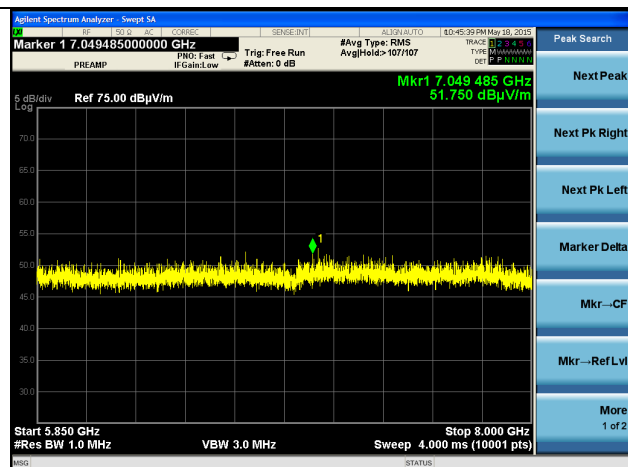
Model: TAP802-01

Serial: Eng. Sample

UNII-2C

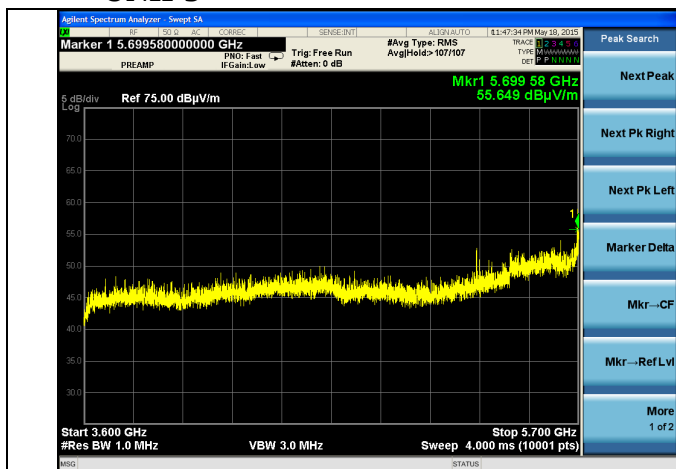


3.6-5.35 GHz – Channel 100

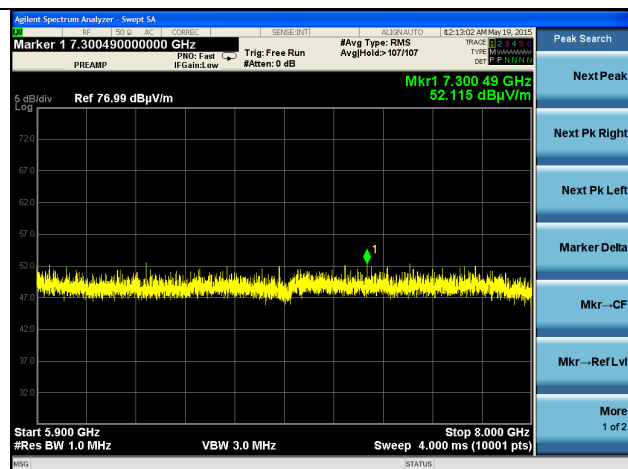


5.85-8 GHz – Channel 140

UNII-3



3.6-5.7 GHz – Channel 149



5.9-8 GHz – Channel 140

Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

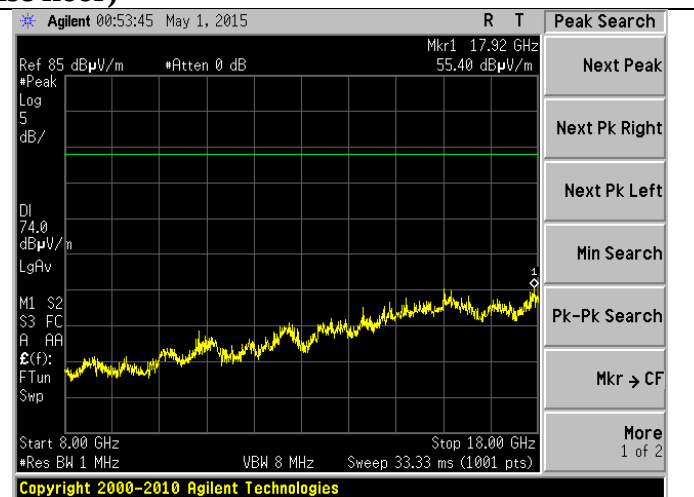
Name: A500 Talkman

Model: TAP802-01

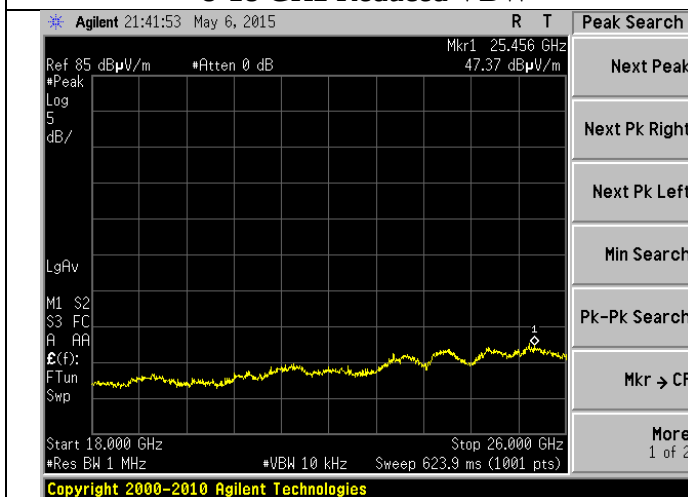
Serial: Eng. Sample

Plots

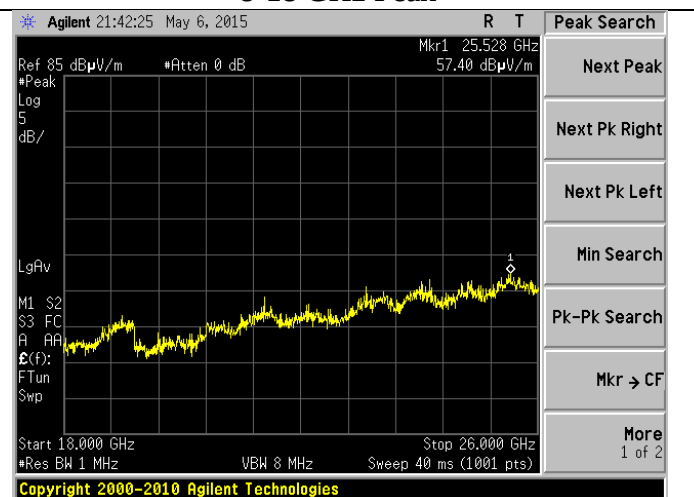
8-40 GHz (No emissions found above system noise floor)



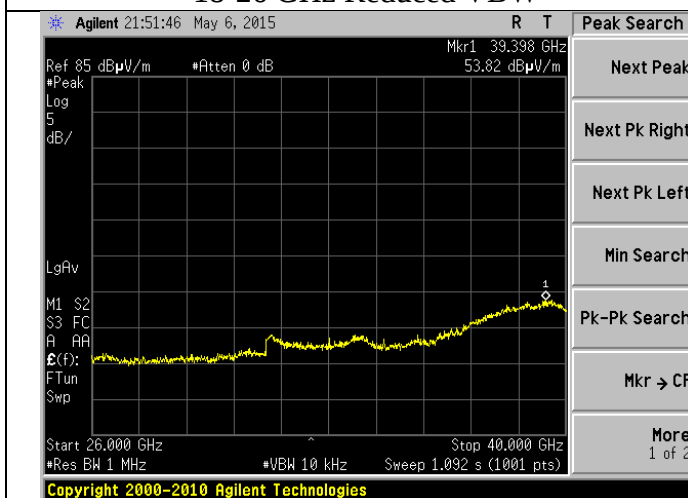
8-18 GHz Reduced VBW



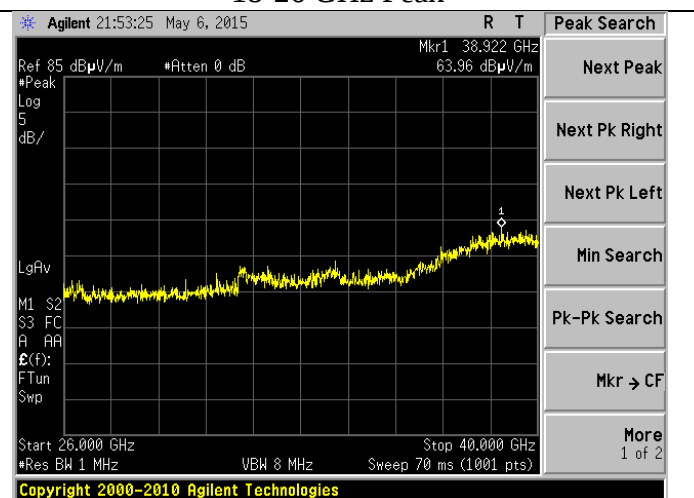
8-18 GHz Peak



18-26 GHz Reduced VBW



18-26 GHz Peak



26-40 GHz Reduced VBW



26-40 GHz Peak



Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

Name: A500 Talkman

Model: TAP802-01

Serial: Eng. Sample

B.2.3 – Radiated Spurious Emissions Transmit Mode (30-1000 MHz)

Manufacturer	Vocollect, Inc.
Date	5-8, 5-9 2015
Operator	Adam A
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.407/ 15.205 / 15.209 IC RSS-247 Section 6 / RSS-GEN
Measurement Procedure	ANSI C63.10-2013 Section 12.7
Test Distance	3 meter 30-1000 MHz
EUT Placement	80 cm height non-conductive table centered on turn-table (no absorbers on ground plane)
Detectors	Peak; RBW 120 kHz
Additional Notes	1) Tested in continuous transmit modulated mode with EUT in three orientations at maximum power. 2) Emissions not effected by channel or modulation.

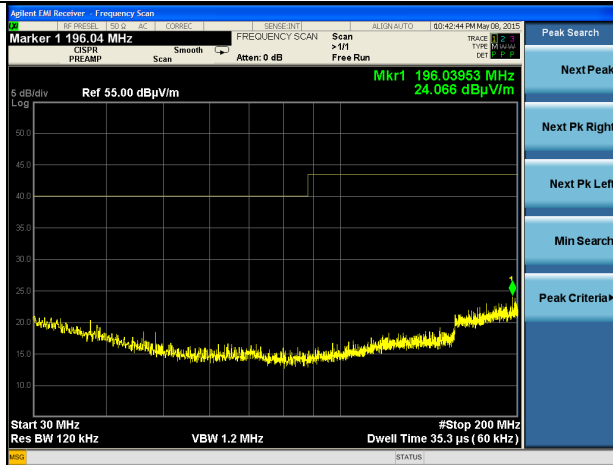
Example Calculation:

Limit (dBμV/m) – Reading (dBμV/m) = Margin

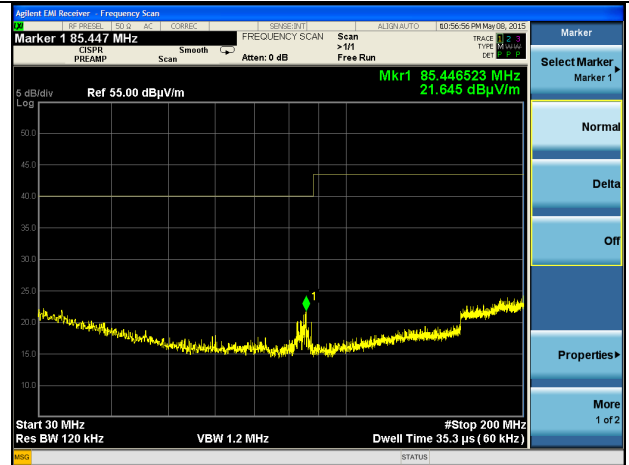
Table

Frequency (MHz)	Antenna Polarity	Azimuth (degree)	Height (cm)	Peak Reading (dBμV/m)	Quasi-Peak Limit (dBμV/m)	Margin (dB)	Comment
85.86	Horizontal	187	202	22.27	40.0	17.7	Not related to transmitter
196.03	Vertical	0	100	24.06	43.5	19.4	Noise Floor
988.12	Horizontal	0	100	35.01	54.0	19.0	Noise Floor
862.47	Vertical	0	100	34.22	46.0	11.8	Noise Floor

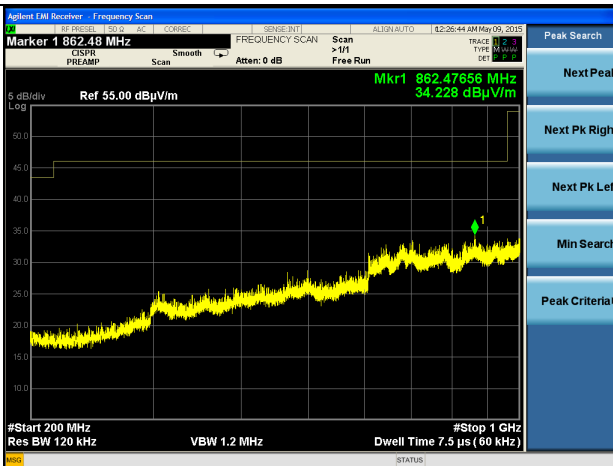
Plots



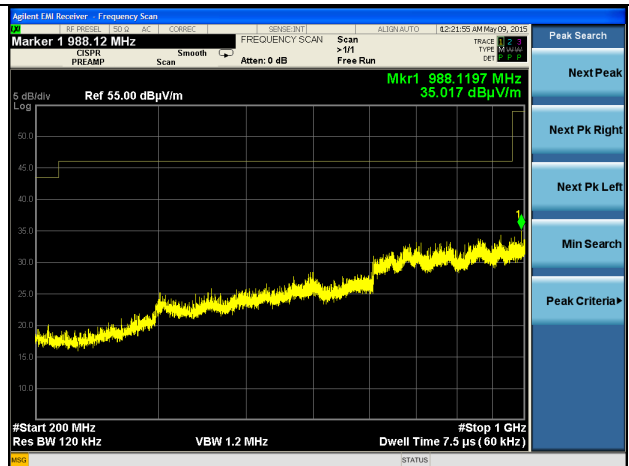
30-200 MHz Vertical



30-200 MHz Horizontal



200-1000 MHz Vertical



200-1000 MHz Horizontal

B.3 – Radiated Emissions in Receive Mode

Rule Part(s)	FCC: 15.109 IC RSS-GEN			
Measurement Procedure	ANSI C63.4-2014 Section 8			
Test Location	LS Research, LLC – FCC/IC Listed 3 meter Chamber			
Test Distance	See data section			
EUT Placement	Above 1 GHz: 80 cm height non-conductive table above reference ground plane covered with absorbers Below 1 GHz: 80 cm height non-conductive table above reference ground plane			
Frequency Range of Measurement	Biconical: 30-300 MHz	Log Periodic Dipole Array: 300-1000 MHz	Double-Ridged Waveguide Horn: 1-18 GHz	Standard Gain Horn: 18-26GHz
Measurement Detectors	30-1000MHz RBW: 120 kHz VBW: At least 300 kHz		1 - 40 GHz: RBW : 1MHz VBW: At least 3 MHz Peak VBW: 30 Hz Average	
Description of Measurement	1) The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are preformed. The data is gathered and reported as the corrected values. 2) The EUT is placed on a non-conductive pedestal centered on a turn-table in the test location with the antenna at the test distance from the EUT 3) Maximum radiated RF emissions are determined by rotation of azimuth and scanning the sense antenna between 1 and 4 meters in height using both horizontal and vertical antenna polarities. Maximized levels are manually noted at degree values of azimuth and at sense antenna height.			
Example Calculations	Reported Measurement data = Raw receiver measurement + Antenna Correction Factor + Cable factor (dB) - amplification factor (when applicable) + Additional factor (when applicable)			

Limits:

Frequency (MHz)	3 m Limit (μV/m)	3 m Limit (dBμV/m)	Type
30-88	100	40.0	Quasi-Peak
88-216	150	43.5	Quasi-Peak
216-960	200	46.0	Quasi-Peak
Above 960	500	54.0	Average (>1 GHz)

Prepared For: Vocollect, Inc.

Name: A500 Talkman

Report: TR 314378 C

Model: TAP802-01

LSR: C-2204

Serial: Eng. Sample

B.3.1 – Radiated Spurious Emissions Receive Mode (30-1000 MHz)

Manufacturer	Vocollect, Inc.
Date	5-8, 5-9 2015
Operator	Adam A
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.109 IC RSS-GEN
Measurement Procedure	ANSI C63.4-2013 Section 8
Test Distance	3 meter 30-1000 MHz
EUT Placement	80 cm height non-conductive table centered on turn-table (no absorbers on ground plane)
Detectors	Peak; RBW 120 kHz
Additional Notes	1) Tested in continuous receive mode with EUT in three orientations 2) Emissions not effected by channel

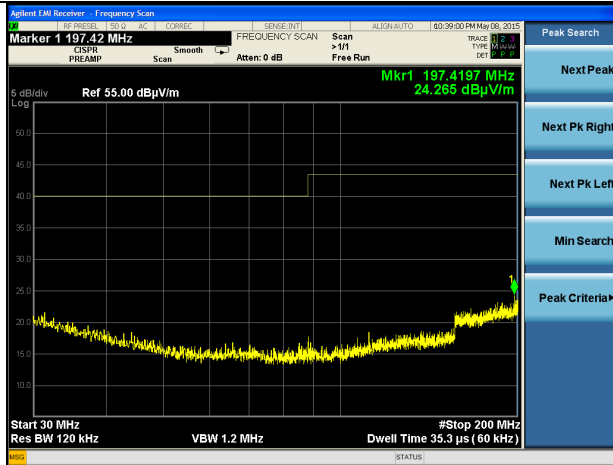
Example Calculation:

Limit (dBμV/m) – Reading (dBμV/m) = Margin

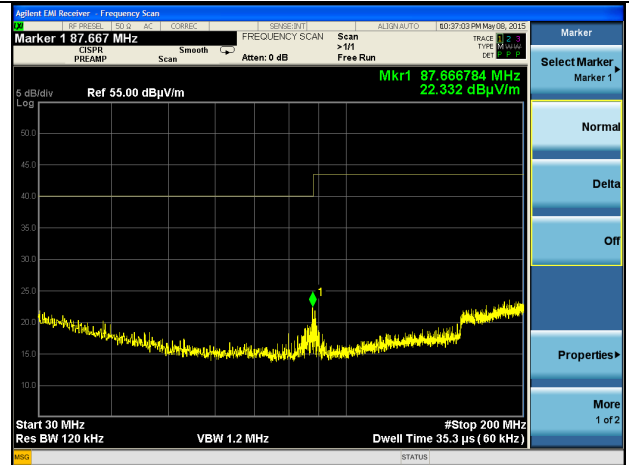
Table

Frequency (MHz)	Antenna Polarity	Azimuth (degree)	Height (cm)	Peak Reading (dBμV/m)	Quasi-Peak Limit (dBμV/m)	Margin (dB)	Comment
85.86	Horizontal	187	202	22.27	40.0	17.7	Not related to transmitter
197.42	Vertical	0	100	24.26	43.5	19.2	Noise Floor
934.72	Horizontal	0	100	34.02	46.0	12.0	Noise Floor
919.42	Vertical	0	100	33.74	46.0	12.2	Noise Floor

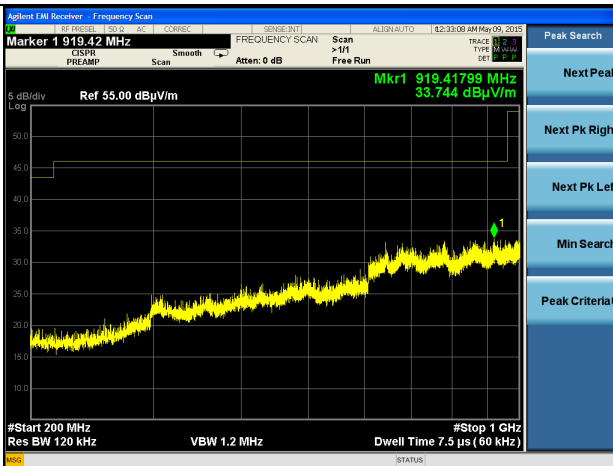
Plots



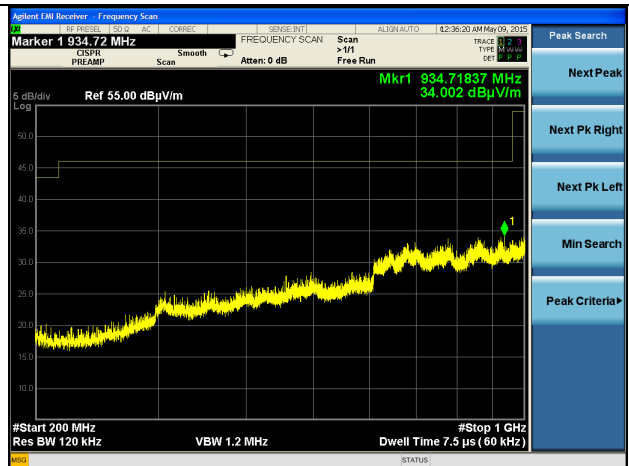
30-200 MHz Vertical



30-200 MHz Horizontal



200-1000 MHz Vertical



200-1000 MHz Horizontal

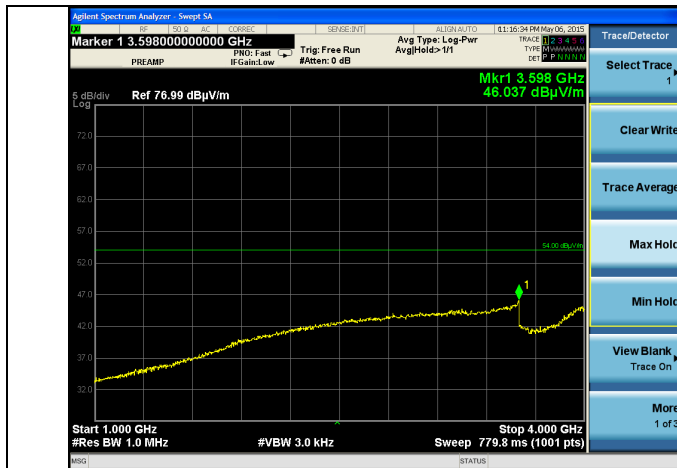
B.3.2 – Radiated Spurious Emissions Receive Mode (1-26 GHz)

Manufacturer	Vocollect, Inc.
Date	4-30, 5-6 2015
Operator	Adam A
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.109 IC RSS-GEN
Measurement Procedure	ANSI C63.4-2013 Section 8
Test Distance	3 meter 1-18 GHz 1 meter 18-26 GHz
EUT Placement	80 cm height non-conductive table centered on turn-table (absorbers on ground plane)
Detectors	Peak; RBW 120 kHz
Additional Notes	1) Tested in continuous receive mode with EUT in three orientations 2) Emissions not effected by channel 3) No emissions found above system noise floor

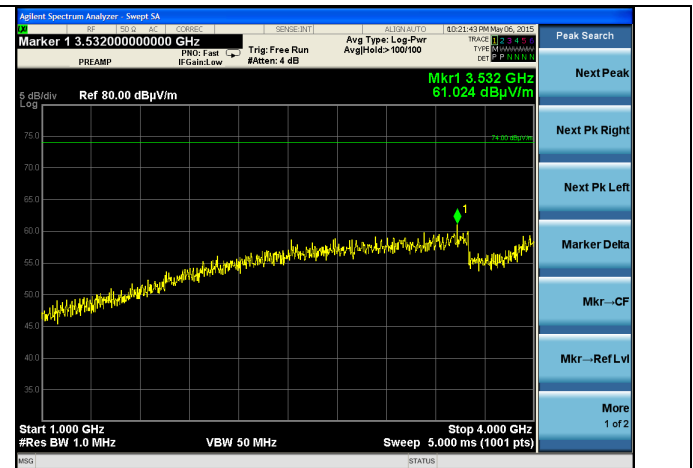
Example Calculation:

Limit (dBμV/m) – Reading (dBμV/m) = Margin

Plots



1-4 GHz (Reduced VBW)



1-4 GHz (Peak)

Prepared For: Vocollect, Inc.

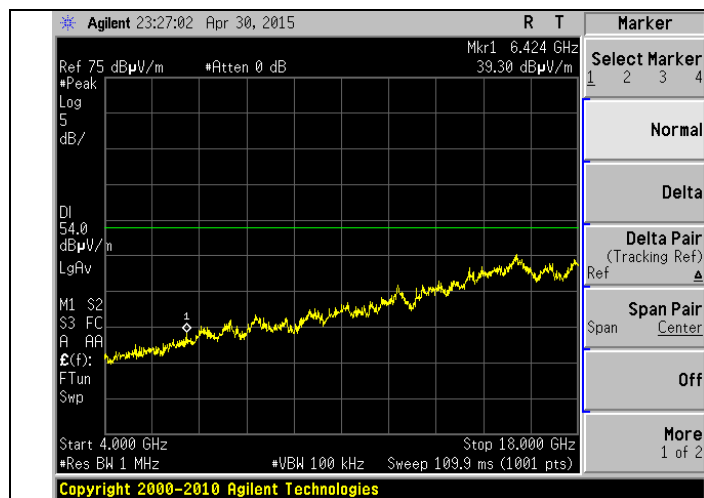
Report: TR 314378 C

LSR: C-2204

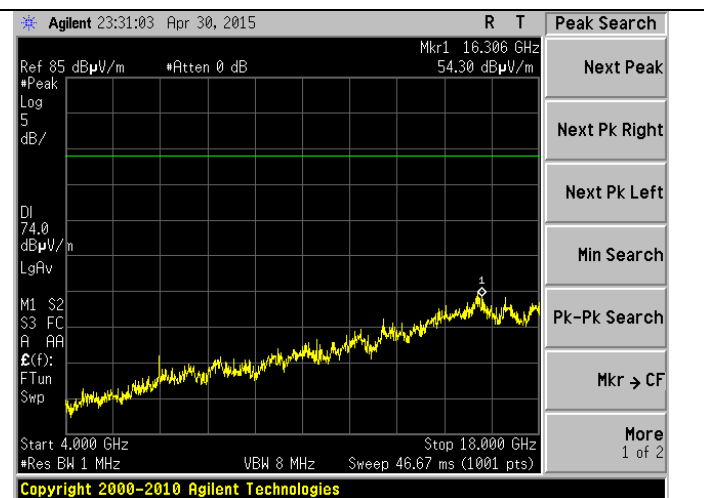
Name: A500 Talkman

Model: TAP802-01

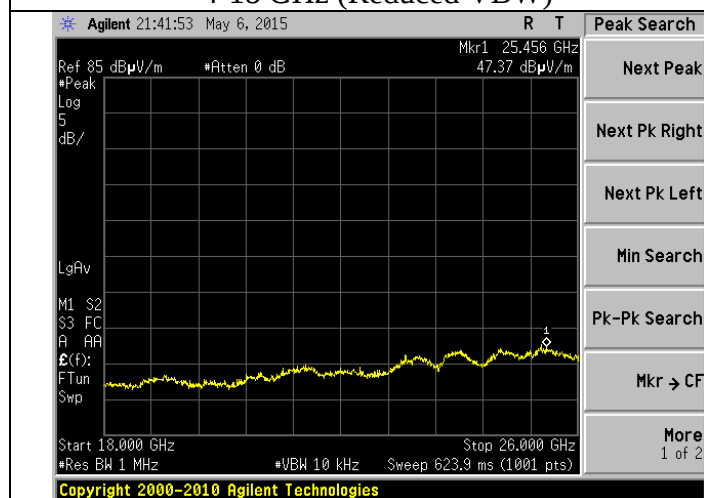
Serial: Eng. Sample



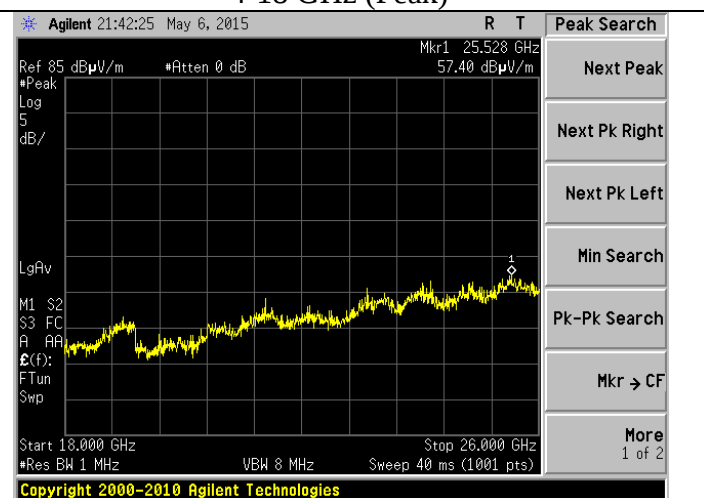
4-18 GHz (Reduced VBW)



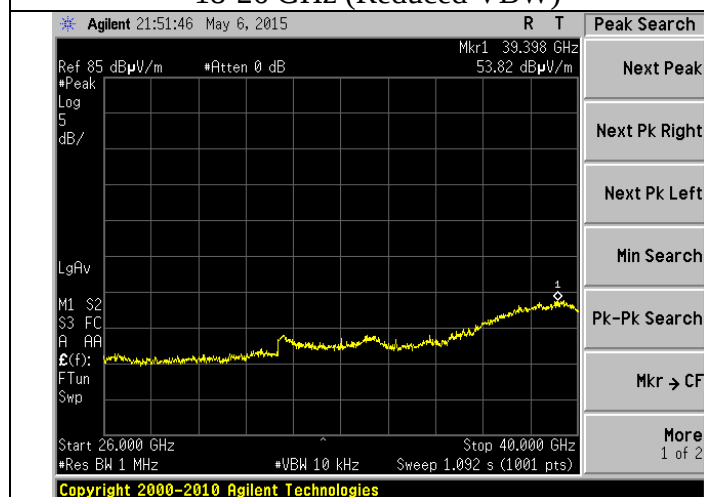
4-18 GHz (Peak)



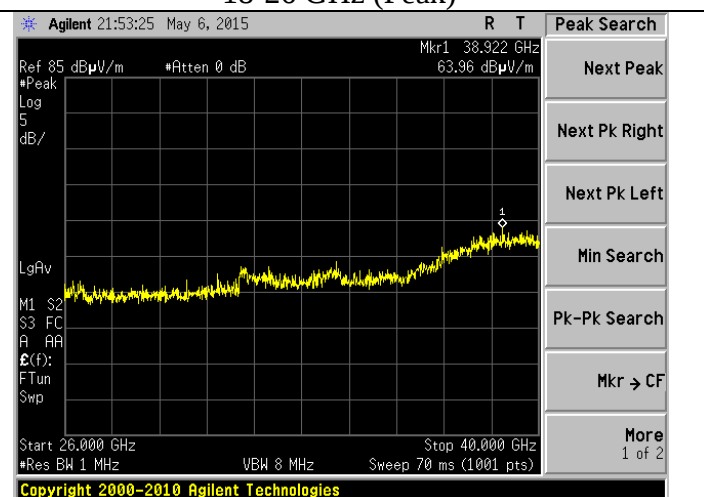
18-26 GHz (Reduced VBW)



18-26 GHz (Peak)



26-40 GHz (Reduced VBW)



26-40 GHz (Peak)

Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

Name: A500 Talkman

Model: TAP802-01

Serial: Eng. Sample

B.4 – AC Mains Conducted Emissions

Rule Part(s)	FCC: 15.207 / 15.107 IC: RSS-247 / RSS-GEN
Measurement Procedure	ANSI C63.4 - 2014 ANSI C63.10 – 2013
Test Location	LS Research, LLC – Conducted Emissions Area
Test Voltage	120 VAC 60 Hz
EUT Placement	80 cm height non-conductive table above reference ground plane
Frequency Range of Measurement	150 kHz – 30 MHz
Measurement Detectors	Peak, Quasi-Peak, Average RBW: 9 kHz VBW: At least 27 kHz
Description of Measurement	1) The LISN, cable, limiter, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed. The data is gathered and reported as the corrected values. 2) The EUT is placed on a non-conductive pedestal at appropriate distance from ground planes and plugged into LISN. The LISN used has the ability to terminate the unused port with a 50Ω (ohm) load when switched to either L1 (line) or L2 (neutral). 3) Maximum emissions are determined with peak detector and measurements at select points are made with quasi-peak and average detectors. Results are recorded and compared to limit.
Example Calculations	Reported Measurement data = Raw receiver measurement + LISN Factor + Cable factor (dB) + Additional factor (when applicable)

Limits of Conducted Emissions at the AC Mains Ports:

Frequency Range (MHz)	Class B Limits (dBμV)	
	Quasi-Peak	Average
0.150 -0.50 *	66-56	56-46
0.5 – 5.0	56	46
5.0 – 30	60	50
* The limit decreases linearly with the logarithm of the frequency in this range.		

Prepared For: Vocollect, Inc.	Name: A500 Talkman
Report: TR 314378 C	Model: TAP802-01
LSR: C-2204	Serial: Eng. Sample

B.4.1 – AC Mains Conducted Emissions

Manufacturer	Vocollect
Date	8-7-15
Operator	Adam A
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	15.207 / 15.107 / RSS-GEN
Measurement Procedure	ANSI C63.4 - 2014 ANSI C63.10 - 2013 Section 6.2
Test Voltage	120 VAC 60 Hz
EUT Placement	80 cm height non-conductive table, 40 cm from vertical ground plane
Detectors	Peak; RBW 9 kHz Quasi-Peak and Average
Additional Notes	1) Tested in continuous transmit and receive with no significant difference between operating channels.

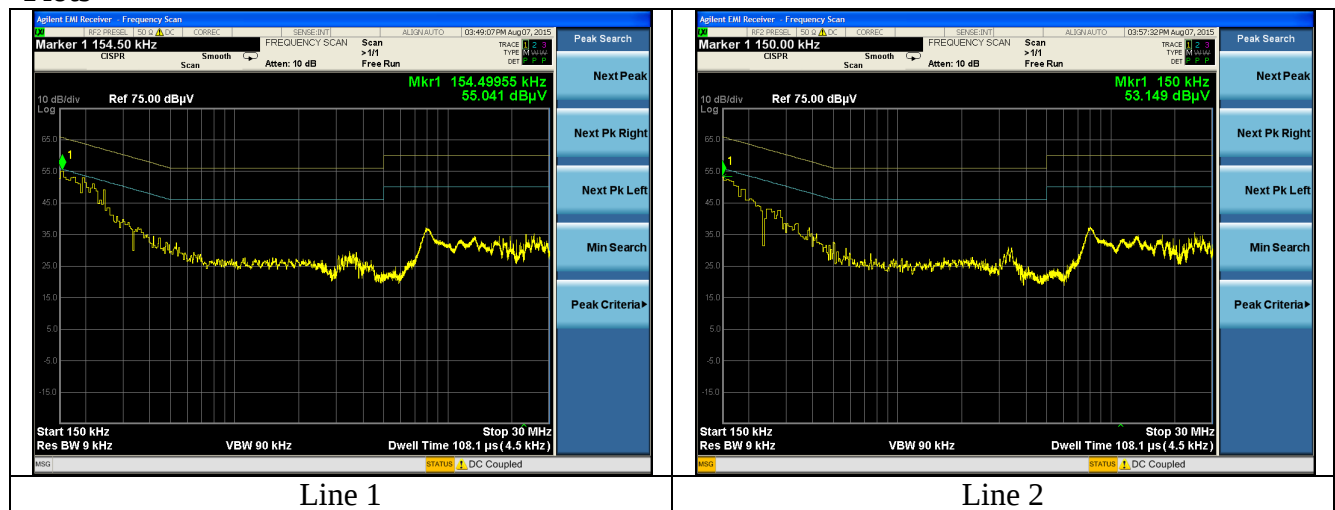
Example Calculation:

Margin (dB) = Limit (dBμV) – Reading (dBμV)

Table

Frequency (MHz)	Line	Peak Reading (dBμV)	Quasi-Peak Reading (dBμV)	Average Reading (dBμV)	Q-Peak Limit (dBμV)	Quasi-Peak Margin (dB)	Average Limit (dBμV)	Average Margin (dB)
0.154	1	55.6	48.2	34.6	65.8	17.6	55.8	21.2
0.195	1	53.3	44.1	31.7	63.8	19.7	53.8	22.1
0.218	1	50.5	42.5	30.6	62.9	20.4	52.9	22.3
0.150	2	54.5	47.6	29.2	66.0	18.4	56.0	26.8
0.190	2	50.1	42.5	24.3	64.0	21.5	54.0	29.7
0.276	2	42.2	35.5	22.7	60.9	25.4	50.9	28.2

Plots



Prepared For: Vocollect, Inc.

Report: TR 314378 C

LSR: C-2204

Name: A500 Talkman

Model: TAP802-01

Serial: Eng. Sample

Appendix C - Uncertainty Summary

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of $k=2$.

Table of Expanded Uncertainty Values, (K=2) for Specified Measurements

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.82 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.88 dB
Radiated Emissions	3-Meter Chamber, Horn Antenna	4.85 dB
Absolute Conducted Emissions	Agilent PSA/ESA Series	1.38 dB
AC Line Conducted Emissions	Shielded Room/EMCO LISN	3.20 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	2.05 Volts/Meter
Conducted Immunity	3 Volts level	2.33 V
EFT Burst, Surge, VDI	230 VAC	54.4 V
ESD Immunity	Discharge at 15kV	3200 V
Temperature/Humidity	Thermo-hygrometer	0.64° / 2.88 %RH

Appendix D - References

Publication	Year	Title
FCC CFR Parts 0-15	2015	Code of Federal Regulations – Telecommunications
RSS-247 Issue 1	2015	Digital Transmissions Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS-GEN Issue 4	2014	General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing Unlicensed Wireless Devices

END OF REPORT

Date	Version	Comments	Person
6-30-15	V0	Initial Draft Release	Adam A
7-1-15	V1	Final Release	Adam A
7-23-15	V1a	TCB Comments Addressed	Adam A
8-7-15	V1b	Added AC Emissions	Adam A

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