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## 5.1.6. Radiated Emissions

5.1.6.1. Transmitter Radiated Spurious Emissions (above 1 GHz); Peak Field Strength Measurements; and Radiated Band Edge Measurements – Restricted Bands

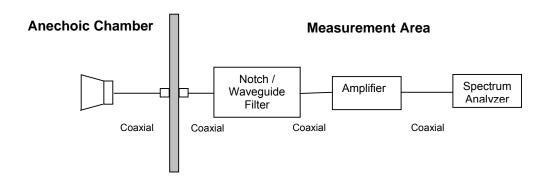
FCC, Part 15 Subpart C §15.247(d) 15.205; 15.209 Industry Canada RSS-210 §A8.5, §2.2, §2.6 Industry Canada RSS-Gen §4.7

#### **Test Procedure**

Radiated emissions above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned.

All measurements on any frequency or frequencies over 1 MHz are based on the use of measurement instrumentation employing an average detector function. All measurements above 1 GHz were performed using a minimum resolution bandwidth of 1 MHz.

### **Test Measurement Set up**



Measurement set up for Radiated Emission Test

## **Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

FS = R + AF + CORR - FO

where: FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL - AG + NFL

CL = Cable Loss AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss

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## For example:

Given receiver input reading of 51.5 dB $_{\mu}$ V; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 dB\mu V/m$$

Conversion between  $dB\mu V/m$  (or  $dB\mu V$ ) and  $\mu V/m$  (or  $\mu V$ ) are done as:

Level (dB $\mu$ V/m) = 20 \* Log (level ( $\mu$ V/m))

40 dB $\mu$ V/m = 100  $\mu$ V/m 48 dB $\mu$ V/m = 250  $\mu$ V/m

Ambient conditions.

Temperature: 17 to 23°C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

### **Emission Characterization**

During testing it was verified that there were several emissions emanating from the body of the EUT which was unrelated to antenna type and gain. The emissions which were observed over the range 1 - 3.5 GHz were individually characterized. The peak amplitude of emissions were found to be above  $54dB\mu V/m$  however they averaged down below the average limit in all cases.

Emissions 1-3.5 GHz and corresponding measurement values are identified on the following page.



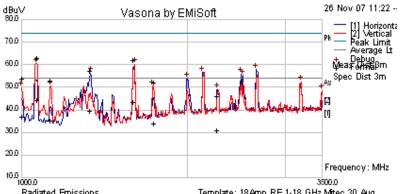
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## **Emission Characterization**

Emissions emanating from body of EUT, 50 Ohm termination on all antenna ports NRB = None Restrictive Band

#### Spurious Emission Scan



Radiated Emissions Template: 18Amp RE 1-18 GHz Miteo 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\EUT Noise no antennas.emi

Frequency	Raw	Cable	AF	Level	Measurement	Pol	Hgt	Azt	Limit	Margin	Pass	Comments
MHz	dBuV	Loss	dB	dBuV	Туре		cm	Deg	dBuV	dB	/Fail	
1070.391	74.79	2.02	-16.09	60.72	Peak Max	V	98	45	74	-13.28	Pass	
1594.398	71.79	2.45	-14.37	59.88	Peak Max	V	104	187	74	-14.12	Pass	
2490.768	65.69	3	-11.24	57.45	Peak Max	V	128	30	74	-16.55	Pass	
1331.012	68.73	2.25	-15.58	55.4	Peak Max	V	119	66	74	-18.60	Pass	
1129.389	64.41	2.08	-15.96	50.52	Peak Max	V	98	27	74	-23.48	Pass	
1739.83	60.74	2.57	-13.26	50.04	Peak Max	V	98	218	74	-23.96	Pass	
1002.856	66.21	1.95	-16.15	52.01	Peak Max	V	99	12	74	-21.99	Pass	
2257.515	52.19	2.89	-11.02	44.05	Peak Max	V	142	185	74	-29.95	Pass	
1070.391	56.14	2.02	-16.09	42.07	Average Max	V	98	45	54	-11.93	Pass	
1594.398	53.15	2.45	-14.37	41.24	Average Max	V	104	187	54	-12.76	Pass	
2490.768	52.71	3	-11.24	44.47	Average Max	V	128	30	54	-9.53	Pass	
1331.012	51.05	2.25	-15.58	37.72	Average Max	Н	106	18	54	-16.28	Pass	
1129.389	47.2	2.08	-15.96	33.31	Average Max	V	98	27	54	-20.69	Pass	
1739.83	42.47	2.57	-13.26	31.78	Average Max	V	98	218	54	-22.22	Pass	
1002.856	49.16	1.95	-16.15	34.96	Average Max	V	99	12	54	-19.04	Pass	
2257.515	37.03	2.89	-11.02	28.89	Average Max	Н	125	134	54	-25.11	Pass	
2658.317	66.27	3.13	-11.37	58.02	Peak [Scan]	Н	100	0				NRB
2127.255	64.97	2.82	-11.04	56.75	Peak [Scan]	Н	100	0				NRB
2513.026	63.53	3.01	-11.31	55.23	Peak [Scan]	Н	100	0				NRB
1996.994	62.23	2.75	-11.18	53.79	Peak [Scan]	Н	100	0				NRB
3209.419	60.7	3.48	-11.65	52.53	Peak [Scan]	V	100	0				NRB
3494.99	56.73	3.6	-11.68	48.65	Peak [Scan]	V	100	0				NRB



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# ARUB20 AP-125 (ANT-INTEGRAL) ART Settings V Aggregate Measured Power

The following matrix identifies the ART power setting V's each output chain. The aggregate power was also measured for all three chains.

As a result of either spurious emissions (harmonic) or band-edge issues the power was reduced to bring the unit into compliance.

Configuration	ART Power Setting	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Tx 3 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
<b>Legacy b</b> (2390   2412 MHz)BE	17.5	15.30	14.72	15.87	20.0
<b>Legacy g</b> (2390   2412 MHz)BE	13.5	15.39	14.70	16.21	17.0
<b>Legacy b</b> (2390   2462 MHz)BE	17.5	11.18	10.74	11.17	20.9
<b>Legacy g</b> (2483.5   2462 MHz)BE	12.5	10.04	10.92	10.47	15.51
HT-20 (2390   2412 MHz)BE	12	10.00	9.27	10.20	15.22
HT-20 (2483.5   2462 MHz)BE	11.5	8.63	8.35	9.30	14.23
HT-40 (2390   2422 MHz)BE	9.5	7.66	7.28	7.68	12.84
HT-40 (2483.5   2452 MHz)BE	9.5	7.35	6.82	7.67	12.68
Legacy b (2412 MHz)SE	19	17.01	16.65	17.39	22.68
Legacy b (2437 MHz)SE	19	16.70	16.20	17.03	21.59
Legacy b (2462 MHz)SE	19	16.64	16.78	17.24	22.39
Legacy g (2412 MHz)SE	17	15.08	14.43	15.35	20.37
Legacy g (2437 MHz)SE	17	14.71	14.32	15.01	20.40
Legacy g (2462 MHz)SE	17	14.78	14.58	15.47	21.27
HT-20 (2412 MHz)SE	19	17.03	16.70	17.34	22.40
HT-20 (2437 MHz)SE	19	16.79	16.30	17.02	22.36
<b>HT-20</b> (2462 MHz)SE	19	16.96	16.67	17.20	22.35
,					
<b>HT-40</b> (2422 MHz)SE	17	14.86	14.43	15.25	20.07
<b>HT-40</b> (2437 MHz)SE	17	14.67	14.62	15.11	19.02
<b>HT-40</b> (2452 MHz)SE	17	14.75	14.80	15.31	20.29

Note BE = Band-edge, SE - Spurious emissions



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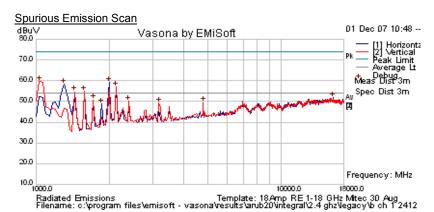
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## AP125: 2400 - 2483.5 MHz INTEGRAL Legacy Data Rates

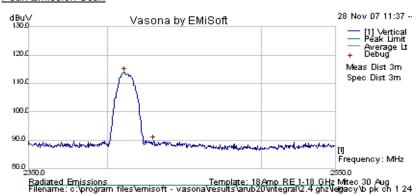
AP125 - IN1	EGRAL Test C	onfiguration			
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
1	2412	ART 19	99%	b 1 MBit/s Legacy	Yes

Three antennas operating simultaneously

NRB = None Restrictive Band



#### Peak Emission Scan

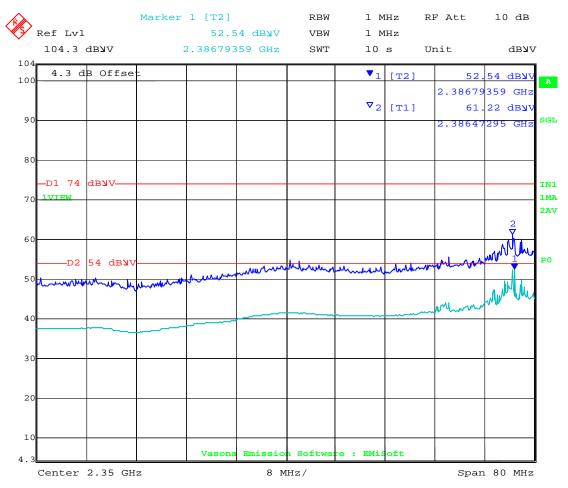


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2410.922	72.66	8.96	32.35	113.97	Peak [Scan]	>	100	0	N/A	N/A	N/A	Pk Emission
2390.0 Pk	ADT Do	ART Power Setting = 17.5			Formal Peak	٧			74	-12.78	Pass	Band-edge
2390.0 Ave	AITTO	wei Settin	g = 17.5	52.54	Formal Average	V			54	-1.46	Pass	Band-edge



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802.11b Legacy Band-edge 2390 MHz

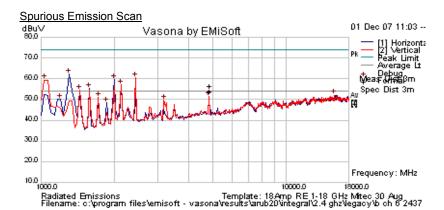


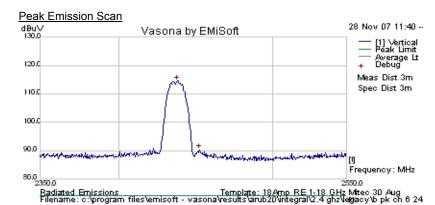
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	AP125 - INT	AP125 - INTEGRAL Test Configuration												
,	Channel	Freq (MHz)	Freq (MHz)   Software Pwr Setting   Duty Cycle   Data Rate (MBit/s)   Compliant											
	6	2437	ART 19	99%	b 1 MBit/s Legacy	Yes								

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2437.776	73.31	8.97	32.37	114.65	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
4873.897	59.26	4.51	-9.16	54.61	Peak Max	V	131	360	74	-19.39	Pass	
4873 807	56 34	4 51	-0.16	51 60	Average May	V	131	360	54	-2 31	Page	

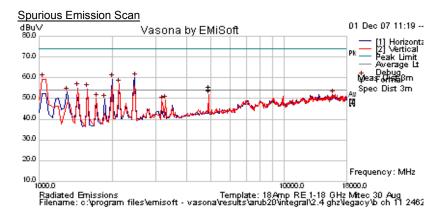


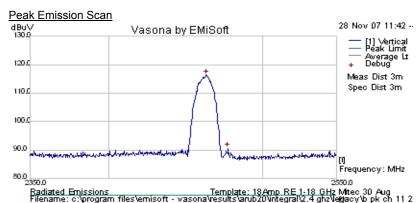
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I	AP125 - INT	EGRAL Test C	onfiguration			
ĺ	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
	11	2462	ART 19	99%	b 1 MBit/s Legacy	Yes

Three antennas operating simultaneously



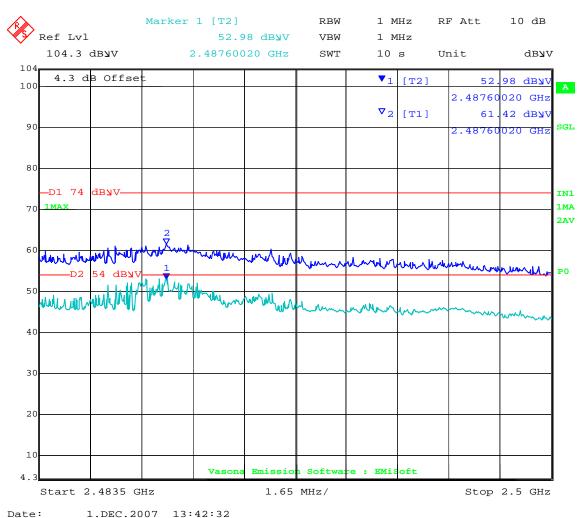


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2463.026	75.06	8.98	32.38	116.42	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ADT Do	wer Settin	a = 17 5	61.42	Formal Peak	>			74	-12.58	Pass	Band-edge
2483.5	ARTFO	wei Selliii	g = 17.5	52.98	Formal Average	٧			54	-1.02	Pass	Band-edge
4924.033	58.2	4.55	-9.25	53.51	Peak Max	V	151	1	74	-20.49	Pass	
4924.033	56.53	4.55	-9.25	51.83	Average Max	Н	116	42	54	-2.17	Pass	



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802.11b Legacy Band-edge 2483.5 MHz



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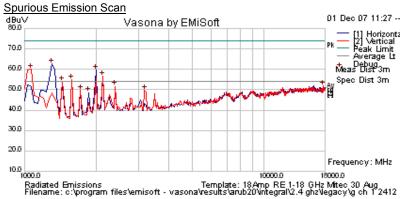
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## AP125: 2400 - 2483.5 MHz INTEGRAL Legacy Data Rates

AP125 - IN1	TEGRAL Test C	onfiguration											
Channel	Freq (MHz)	Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant											
1	2412	ART 17	99%	g 6 MBit/s Legacy	Yes								

Three antennas operating simultaneously

NRB = None Restrictive Band





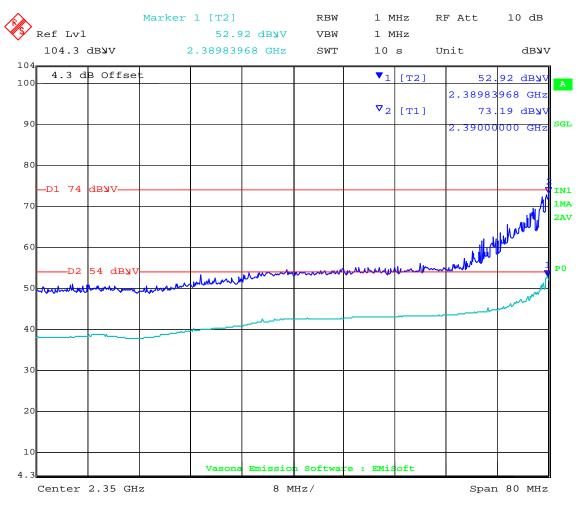
Radiated Emissions Template: 18 App RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\vesults\arub20\vintegral\(\times\)2.4 ghz\vegacy\g pk ch 1 24

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2417.335	73.74	8.96	32.35	115.06	Peak [Scan]	٧	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ADT Do	ART Power Setting = 13.5			Formal Peak	>			74	-0.81	Pass	Band-edge
2390.0	AKTTO	AITT Fower Setting = 13.3		52.92	Formal Average	٧			54	-1.08	Pass	Band-edge



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802.11g Legacy Band-edge 2390 MHz

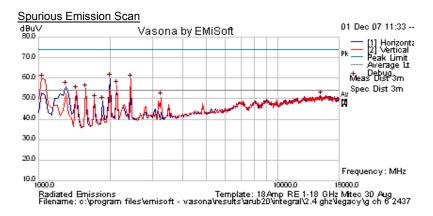


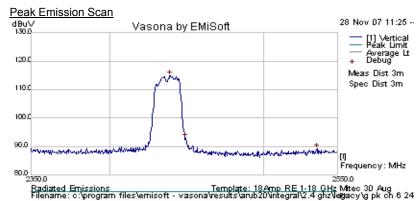
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AP125 - INT	EGRAL Test C	onfiguration											
Channel	Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant												
6	2437	ART 17	99%	g 6 MBit/s Legacy	Yes								

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2438.978	73.44	8.97	32.37	114.78	Peak [Scan]	٧	100	0	N/A	N/A	N/A	Pk Emission

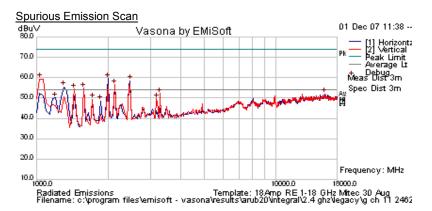


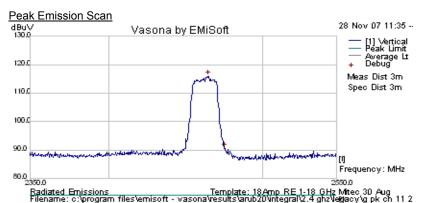
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I	AP125 - INT	EGRAL Test C	onfiguration			
ĺ	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
	11	2462	ART 17	99%	g 6 MBit/s Legacy	Yes

Three antennas operating simultaneously



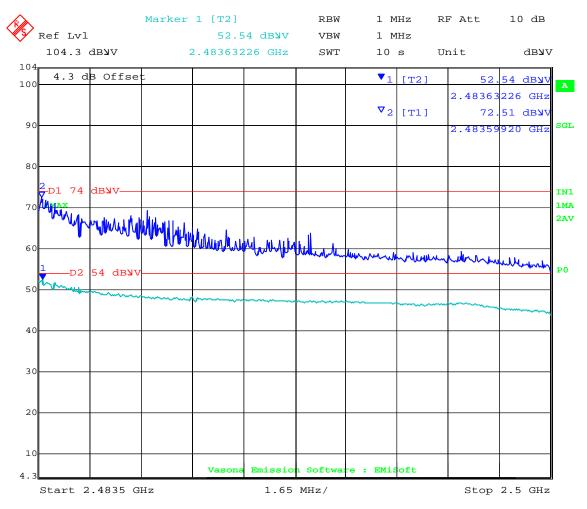


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2464.629	74.58	8.98	32.38	115.95	Peak [Scan]	٧	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ART Power Setting = 12.5			72.51	Formal Peak	V			74	-1.49	Pass	Band-edge
2483.5	AKTTO	ART Fower Setting - 12.5			Formal Average	٧			54	-1.46	Pass	Band-edge



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802.11g Legacy Band-edge 2483.5 MHz



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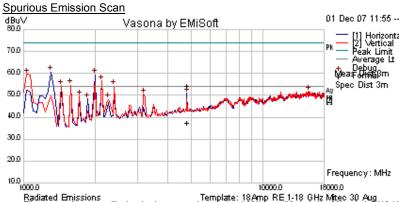
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#### AP125: 2400 - 2483.5 MHz INTEGRAL HT-20 Data Rates

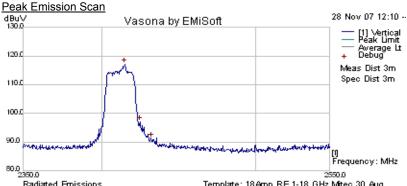
AP125 - IN1	EGRAL Test C	AP125 - INTEGRAL Test Configuration												
Channel	Channel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant													
1	2412	ART 17	99%	g 6.5 MCS HT-20	Yes									

Three antennas operating simultaneously

NRB = None Restrictive Band



Radiated Emissions Template: 18 Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\vesults\arub20\vintegral\2.4 ghz\vit-20\g ch 1 2412 H



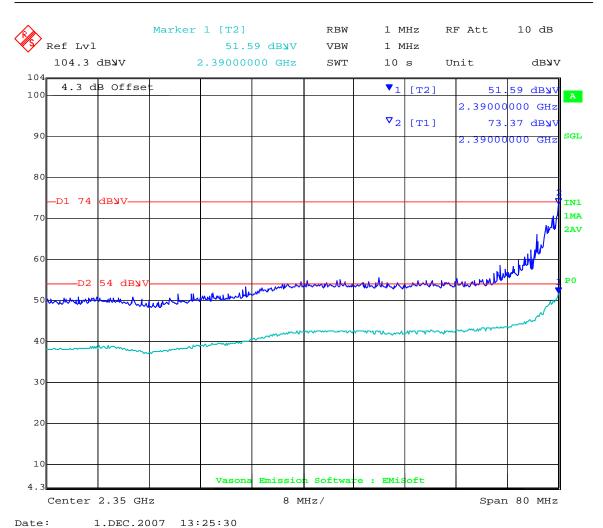
Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\vesults\arub20\vintegral\2.4 ghz\ne\vec{P}\text{in}\vec{P}\text{20\v}\text{j} pk ch 1 2412

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2414.93	75.87	8.96	32.35	117.18	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ART Po	wer Settin	a = 12 0	73.37	Formal Peak	V			74	-0.63	Pass	Band-edge
2390.0	AKTTO	wer setting	g = 12.0	5159	Formal Average	٧			54	-2.41	Pass	Band-edge
4827.906	57.03	4.47	-9.19	52.31	Peak Max	٧	98	225	74	-21.69	Pass	
4827.906	40.25	40.25 4.47 -9.19			Average Max	٧	98	225	54	-18.47	Pass	
3180.361	58.69	3.46	-11.63	50.52	Peak [Scan]	V	100	0	54	-3.48	Pass	



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802.11n HT--20 Band-edge 2390 MHz

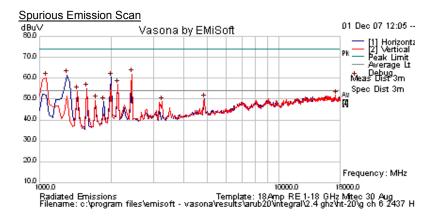


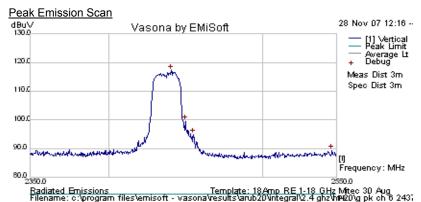
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AP125 - IN1	EGRAL Test C	onfiguration										
Channel	Channel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant											
6	2437	ART 17	99%	g 6.5 MCS HT-20	Yes							

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2440 18	75 93	8 97	32 37	117 27	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission

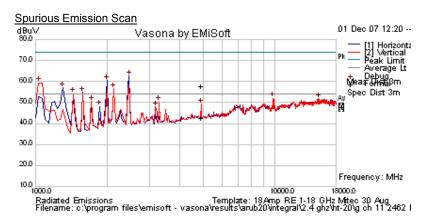


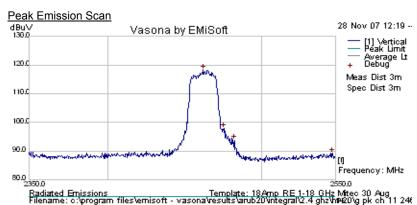
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I	AP125 - INT	EGRAL Test C	onfiguration			
ĺ	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
	11	2462	ART 17	99%	g 6.5 MCS HT-20	Yes

Three antennas operating simultaneously



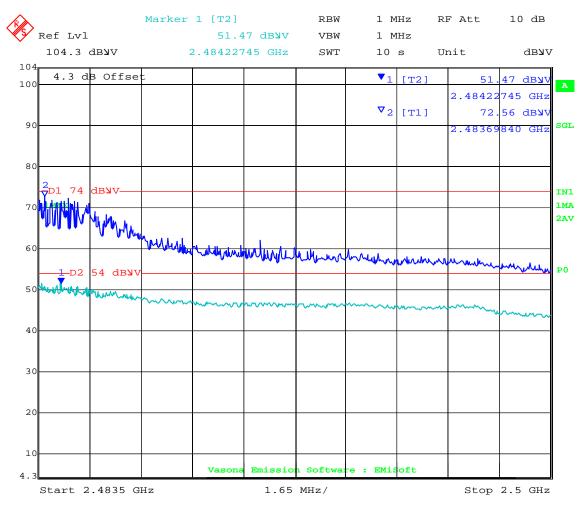


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2461.824	76.98	8.98	32.38	118.34	Peak [Scan]	٧	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ADT Do	wer Settin	a = 11 5	72.56	Formal Peak	٧			74	-1.44	Pass	Band-edge
2483.5	ARTIO	wer octain	g = 11.5	51.47	Formal Average	V			54	-2.53	Pass	Band-edge
4925.602	60.6	4.56	-9.25	55.9	Peak Max	V	114	360	74	-18.1	Pass	
4925.602	45.24	4.56	-9.25	40.54	Average Max	V	114	360	54	-13.46	Pass	
9823.647	47.16	6.39	-1.39	52.16	Peak [Scan]	V	100	0	54	-1.84	Pass	NRB
3282.565	58.39	3.51	-11.56	50.34	Peak [Scan]	٧	100	0	54	-3.66	Pass	NRB



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802.11n HT--20 Band-edge 2483.5 MHz



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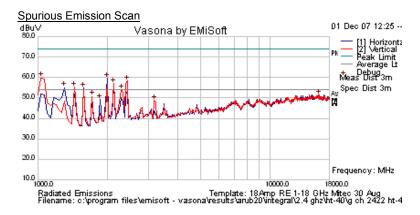
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#### AP125: 2400 - 2483.5 MHz INTEGRAL HT-40 Data Rates

AP125 - IN1	EGRAL Test C	onfiguration			
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
	2422	ART 17	99%	g 13.5 MCS HT-40	Yes

Three antennas operating simultaneously

NRB = None Restrictive Band



Peak Emission Scan

dBuV Vasona by EMiSoft 28 Nov 07 12:36 
[1] Vertical Peak Limit Average Lt Debug

Meas Dist 3m

Spec Dist 3m

Frequency: MHz

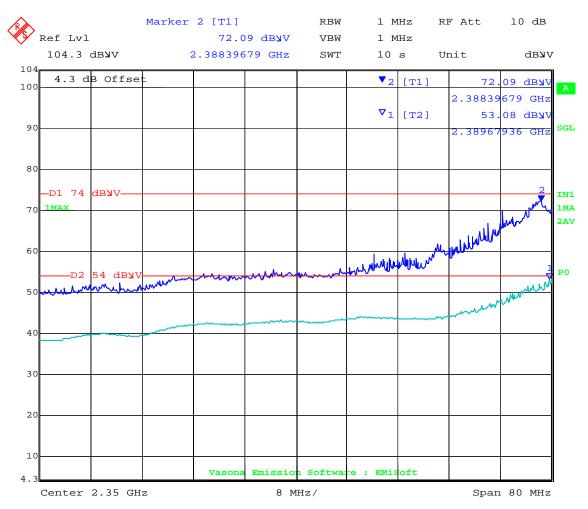
Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\vesults\arub20\vintegral\(2.4 \) gbz\\\P#40\g pk ch 2422 \)

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2435.772	71.03	8.97	32.37	112.37	Peak [Scan]	>	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ADT D	ower Cettin	na = 0 E	72.09	Formal Peak	V			74	-1.91	Pass	Band-edge
2390.0	ART Power Setting = 9.5			53.08	Formal Average	V			54	-0.92	Pass	Band-edge



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Date: 1.DEC.2007 13:32:14

802.11n HT--40 Band-edge 2390 MHz

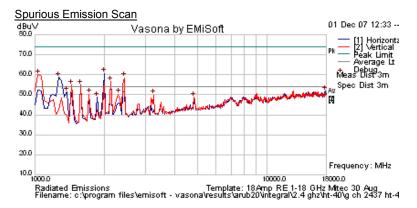


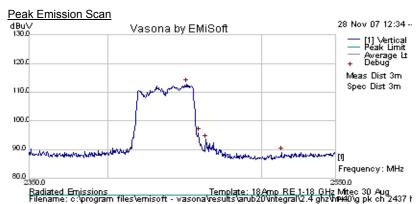
Serial #: ARUB20-A2 Rev A
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A	NP125 - INT	EGRAL Test C	onfiguration												
(	Channel Freq (MHz)   Software Pwr Setting   Duty Cycle   Data Rate (MBit/s)   Compliant														
		2437	ART 17	3 3											

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2450.601	71.51	8.98	32.37	112.86	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission

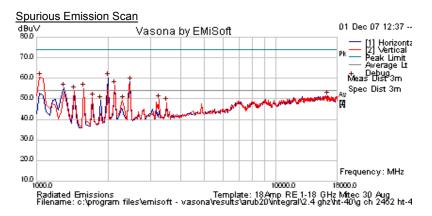


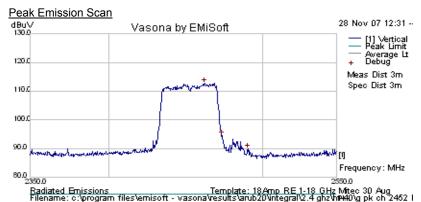
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

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AP125 - INT	AP125 - INTEGRAL Test Configuration											
Channel	Freq (MHz)	Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant										
	2452	ART 17	99%	g 13.5 MCS HT-40	Yes							

Three antennas operating simultaneously



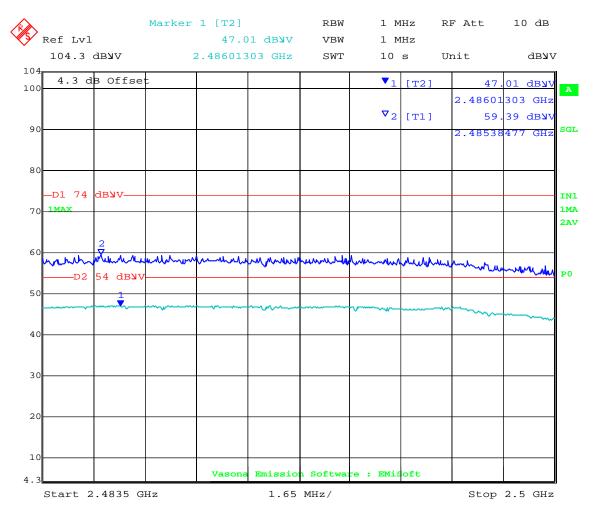


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2462.224	71.4	8.98	32.38	112.77	Peak [Scan]	٧	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ART Power Setting = 9.5			59.39	Formal Peak	V			74	-14.61	Pass	Band-edge
2483.5				47.01	Formal Average	V			54	-6.99	Pass	Band-edge



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Date: 1.DEC.2007 13:40:35

802.11n HT--40 Band-edge 2483.5 MHz



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# ARUB20 AP-125 (ANT-INTEGRAL 5.8 GHz) ART Settings V Aggregate Measured Power

The following matrix identifies the ART power setting V's each output chain. The aggregate power was also measured for all three chains.

As a result of either spurious emissions (harmonic) or band-edge issues the power was reduced to bring the unit into compliance.

Configuration	ART Power Setting	Tx 1 Measur ed Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Tx 3 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
<b>Legacy a</b> (5460   5150   5745 MHz)BE	17	14.05	13.91	15.12	19.97
<b>HT-20</b> (5460   5150   5745 MHz)BE	17	13.95	13.75	15.00	19.98
<b>HT-40</b> (5150   5190   5755 MHz)BE	17	13.94	13.67	14.82	19.84
Legacy a (5745MHz)SE	14	11.27	11.10	12.03	17.02
Legacy a (5785 MHz)SE	14	10.78	10.62	11.56	16.62
Legacy a (5825 MHz)SE	14	10.70	10.54	11.02	16.39
<b>HT-20</b> (5745 MHz)SE	13.5	10.58	10.38	11.30	16.45
<b>HT-20</b> (5785 MHz)SE	13.5	10.37	10.18	10.72	16.14
<b>HT-20</b> (5825 MHz)SE	12.5	9.06	9.10	9.50	14.69
<b>HT-40</b> (5755 MHz)SE	17	13.94	13.79	14.69	19.84
<b>HT-40</b> (5785 MHz)SE	17	13.62	13.90	14.64	19.60
<b>HT-40</b> (5815 MHz)SE	17	13.30	14.00	14.12	19.66

Note BE = Band-edge, SE - Spurious emissions



Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

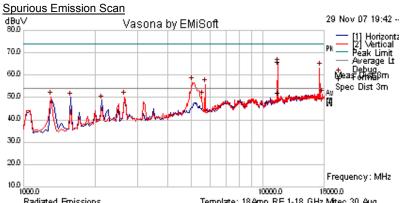
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## AP125: 5725-5850 MHz INTEGRAL Legacy Data Rates

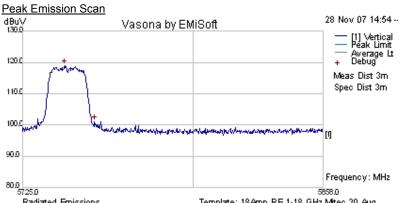
AP125 - INTEGRAL Test Configuration												
Channel	Channel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant											
149	5745	ART 14	99%	a 6 Legacy	Yes							

Three antennas operating simultaneously

NRB = None Restrictive Band



Radiated Emissions Template: 18 Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\right\negac\right\square\text{20\right\negac\righa\right\negac\right\negac\right\negac\right\negac\right\negac\rig



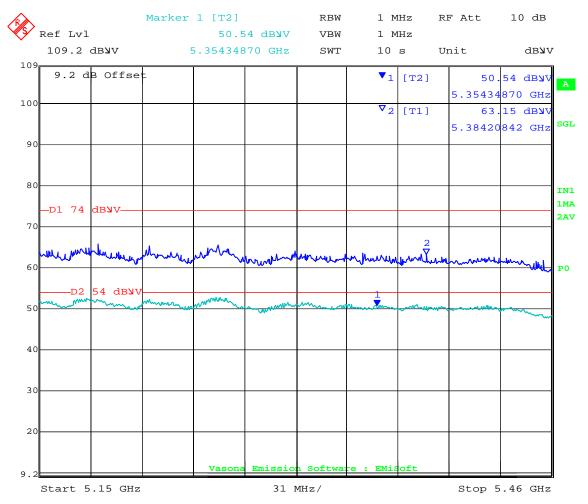
Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\vesults\arub20\vintegra\\0 ghz\ega\end{array} ya pk ch 5745 L

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5743.657	73.19	10.75	35.1	119.05	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
5460				63.15	Formal Peak	V			74	-10.85	Pass	Band-edge
5460	ART P	ower Settii	na = 17	50.54	Formal Average	V			54	-3.46	Pass	Band-edge
5150	/ (() ()	ower octui	19 17	63.4	Formal Peak	V			74	-10.6	Pass	Band-edge
5150				51.60	Formal Average	V			54	-2.4	Pass	Band-edge
11495.79	59	6.79	-1.72	64.08	Peak Max	V	98	79	74	-9.92	Pass	
11495.79	44.95	6.79	-1.72	50.03	Average Max	V	98	79	54	-3.97	Pass	
17625.25	43.06	8.77	-0.38	51.45	Peak [Scan]	V	100	0	99.05	-47.6	Pass	NRB



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Date: 1.DEC.2007 14:02:47

802.11a Legacy Band-edge 5150, 5460 MHz



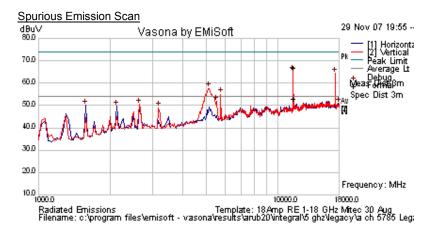
**Serial #:** ARUB20-A2 Rev A **Issue Date:** 11th December 2007

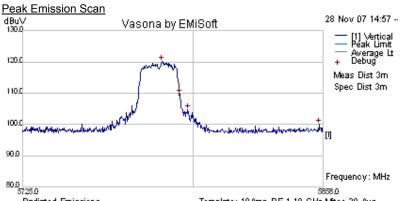
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AP125 - IN1	AP125 - INTEGRAL Test Configuration											
Channel	nannel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant											
157	5785	ART 14	99%	a 6 Legacy	Yes							

Three antennas operating simultaneously

NRB = None Restrictive Band





Radiated Emissions Template: 18 Amp. RE 1-18 GHz Mitec 30 Aug. Filename: c:\program files\emisoft - vasona\results\arub20\rintegral\0 ghz\ega\emisoft - posona\results\arub20\rintegral\0 ghz\ega\emisoft.

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5786.303	74.24	10.78	35.13	120.15	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11574.43	59.52	6.81	-1.57	64.76	Peak Max	V	98	79	74	-9.24	Pass	
11574.43	45.78	6.81	-1.57	51.02	Average Max	V	98	79	54	-2.98	Pass	
17352.71	56.41	8.68	-0.57	64.53	Peak [Scan]	٧	100	0	100.15	-35.62	Pass	NRB

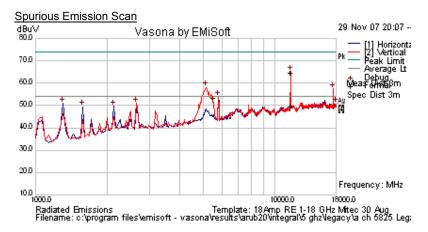


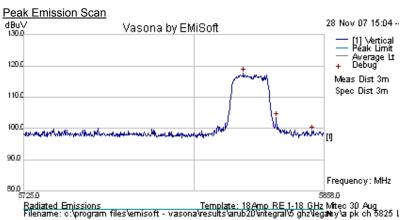
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	AP125 - INTEGRAL Test Configuration											
Ì	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant						
	165	5825	ART 14	99%	a 6 Legacy	Yes						

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5822.018	71.72	10.8	35.16	117.68	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11645.65	57.42	6.83	-1.43	62.81	Peak Max	V	98	248	74	-11.19	Pass	
11645.65	41.99	6.83	-1.43	47.39	Average Max	V	98	248	54	-6.61	Pass	
17488.98	49.27	8.76	-0.62	57.42	Peak [Scan]	V	100	0	97.68	-40.26	Pass	NRB



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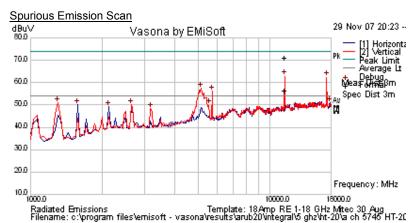
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#### AP125: 5725-5850 MHz INTEGRAL HT-20 Data Rates

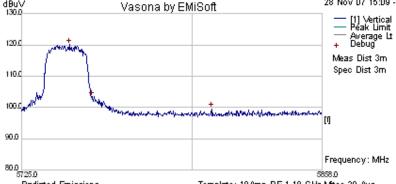
AP125 - INTEGRAL Test Configuration												
Channel	Channel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MCS) Compliant											
149	5745	ART 13.5	99%	a 6.5 HT-20	Yes							

Three antennas operating simultaneously

NRB = None Restrictive Band



 Peak Emission Scan
 Vasona by EMiSoft
 28 Nov 07 15:09 -



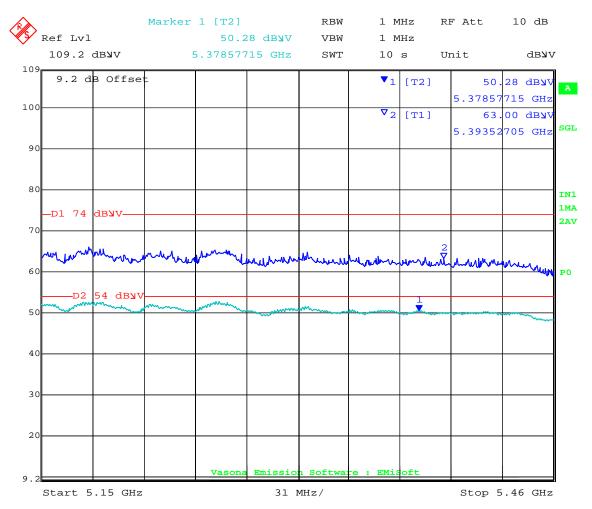
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Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5746.056	74.28	10.76	35.1	120.13	Peak [Scan]	٧	100	0	N/A	N/A	N/A	Pk Emission
5460				63.00	Formal Peak	V			74	-11.00	Pass	Band-edge
5460	ADT D	ower Settir	na – 17	50.28	Formal Average	<b>V</b>			54	-3.72	Pass	Band-edge
5150	AKIT	ower Settii	ig – 17	63.90	Formal Peak	٧			74	-10.1	Pass	Band-edge
5150				52.00	Formal Average	V			54	-2.00	Pass	Band-edge
11493.47	63.9	6.79	-1.72	68.97	Peak Max	V	105	175	74	-5.03	Pass	
11493.42	48.76	6.79	-1.72	53.83	Average Max	<b>V</b>	105	175	54	-0.17	Pass	
17250.5	54.34	8.62	-0.48	62.48	Peak [Scan]	٧	100	0	100.13	-37.65	Pass	NRB



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Date: 1.DEC.2007 14:05:02

802.11a HT-20 Band-edge 5150, 5460 MHz



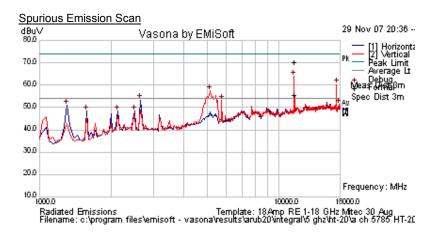
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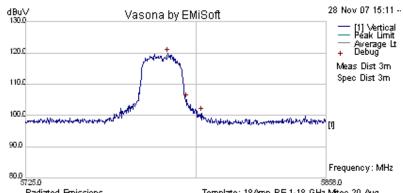
AP125 - IN1	AP125 - INTEGRAL Test Configuration											
Channel	Channel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MCS) Compliant											
157	5785	ART 13.5	99%	a 6.5 HT-20	Yes							

Three antennas operating simultaneously

NRB = None Restrictive Band



## Peak Emission Scan



Radiated Emissions Template: 18 Amp. RE 1-18 GHz Mitec 30 Aug. Filename: c:\program files\emisoft - vasona\vesults\arub20\vintegral\0 ghz\vint-20\arub pk ch 5785 ht-

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5787.635	73.86	10.78	35.13	119.77	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11571.42	62.83	6.81	-1.58	68.06	Peak Max	V	140	68	74	-5.94	Pass	
11571.42	48.24	6.81	-1.58	53.47	Average Max	V	140	68	54	-0.53	Pass	
17386.77	52.27	8.7	-0.64	60.33	Peak [Scan]	V	100	0	99.77	-39.44	pASS	NRB

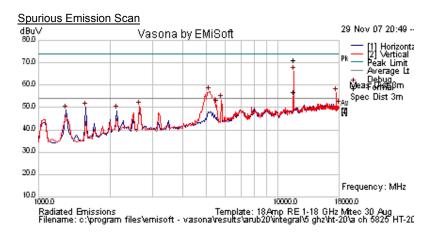


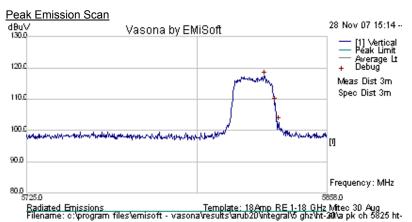
Serial #: ARUB20-A2 Rev A
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I	AP125 - INTEGRAL Test Configuration											
ĺ	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant						
	165	5825	ART 12.5	99%	a 6.5 HT-20	Yes						

Three antennas operating simultaneously





Freque MHz	-	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5830.0	14	71.29	10.8	35.17	117.26	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11653.	34	62.83	6.83	-1.45	68.2	Peak Max	V	120	68	74	-5.8	Pass	
11653.	34	47.99	6.83	-1.45	53.36	Average Max	V	120	68	54	-0.64	Pass	
17488.	98	48.49	8.76	-0.62	56.63	Peak [Scan]	V	100	0	97.26	-40.63	Pass	NRB



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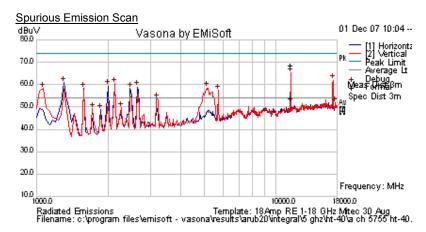
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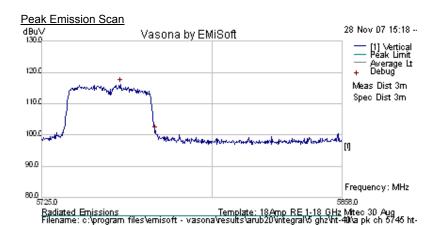
#### AP125: 5725-5850 MHz INTEGRAL HT-40 Data Rates

AP125 - INTEGRAL Test Configuration											
Channel	Freq (MHz)	Software Pwr Setting	Data Rate (MCS)	Compliant							
	5755	ART 17	99%	a 13.5 HT-40	Yes						

Three antennas operating simultaneously

NRB = None Restrictive Band





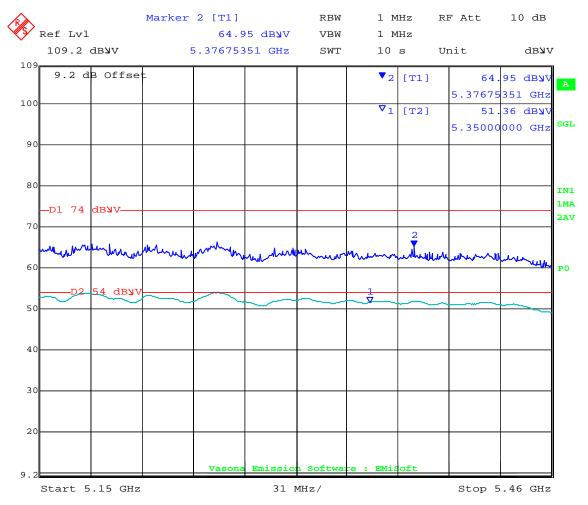
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5759.649	70.37	10.76	35.11	116.24	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
5460.00				64.95	Formal Peak	V			74	-9.05	Pass	Band-edge
5460.00	ART D	ower Settir	na = 17	51.36	Formal Average	V			54	-2.64	Pass	Band-edge
5150.00	AKIT	ower octin	ig – 17	64.80	Formal Peak	V			74	-9.20	Pass	Band-edge
5150.00				53.10	Formal Average	V			54	-0.90	Pass	Band-edge
11515.13	61.29	6.79	-1.71	66.38	Peak Max	V	106	64	74	-7.62	Pass	
11515.13	46.85	6.79	-1.71	51.93	Average Max	V	106	64	54	-2.07	Pass	
17284.57	54.1	8.64	-0.64	62.11	Peak [Scan]	V	100	0	96.24	-34.13	Pass	NRB

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Date: 1.DEC.2007 14:06:56

802.11a HT-40 Band-edge 5150, 5460 MHz



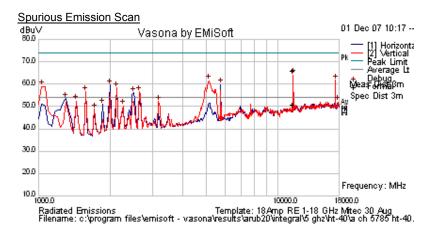
Serial #: ARUB20-A2 Rev A
Issue Date: 11th December 2007

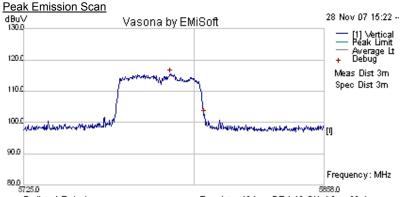
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AP125 - INTEGRAL Test Configuration											
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant						
157	5785	ART 17	99%	13.5 HT-40	Yes						

Three antennas operating simultaneously

NRB = None Restrictive Band





Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\vesults\arub20\vintegra\\0 ghz\vint-40\\a pk ch 5785 ht-

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5789.768	69.49	10.78	35.14	115.4	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11565.63	58.6	6.81	-1.6	63.81	Peak Max	V	102	76	74	-10.19	Pass	
11565.63	43.45	6.81	-1.6	48.66	Average Max	V	102	76	54	-5.34	Pass	
17386.77	53.67	8.7	-0.64	61.73	Peak [Scan]	V	100	0	95.40	-33.67	Pass	NRB

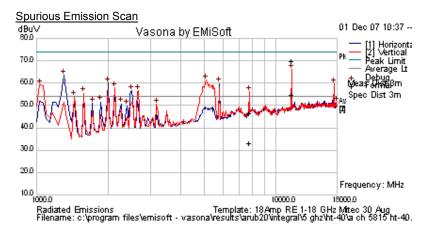


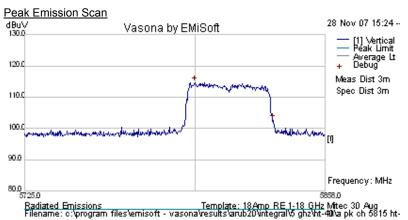
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

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AP125 - INTEGRAL Test Configuration												
Channel	Freq (MHz)	Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MCS) Compliant										
	5815	ART 17	99%	13.5 HT-40	Yes							

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5800.162	68.78	10.78	35.14	114.71	Peak [Scan]	V	100	0	N/A	N/A	N/A	Fundamental
11625.7	62.55	6.82	-1.38	67.99	Peak Max	V	103	111	74	-6.01	Pass	
7753.351	52.47	5.54	-2.25	55.76	Peak	V	141	74	74	-18.24	Pass	
11625.7	47.01	6.82	-1.38	52.45	Average Max	V	103	111	54	-1.55	Pass	
7753.351	47.79	5.54	-2.25	51.08	Average Max	V	141	74	54	-2.92	Pass	
17454.91	51.47	8.74	-0.56	59.65	Peak [Scan]	V	100	0	94.71	-35.06	Pass	NRB



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# ARUB20 AP-124 (ANT-7) ART Settings V Aggregate Measured Power

The following matrix identifies the ART power setting V's each output chain. The aggregate power was also measured for all three chains.

As a result of either spurious emissions (harmonic) or band-edge issues the power was reduced to bring the unit into compliance.

Configuration	ART Power Setting	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Tx 3 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
<b>Legacy b</b> (2390   2412 MHz)BE	16	13.74	13.27	14.33	19.38
<b>Legacy g</b> (2390   2412 MHz)BE	11	8.93	8.71	8.91	14.37
<b>Legacy b</b> (2483.5   2462 MHz)BE	16	13.94	13.25	14.14	19.10
<b>Legacy g</b> (2483.5   2462 MHz)BE	7.5	5.51	5.27	5.75	10.71
<b>HT-20</b> (2390   2412 MHz)BE <b>HT-20</b> (2483.5   2462 MHz)BE	6.5 10	4.30 7.49	3.57 7.02	4.98 7.71	9.76 12.63
<b>HT-40</b> (2483.5   2452 MHz)BE	3	1.67	.78	1.70	6.72
<b>HT-40</b> (2390   2422 MHz)BE	7	5.60	4.74	5.90	10.88
Legacy b (2412 MHz)SE	19	16.92	16.52	17.40	22.68
Legacy b (2437 MHz)SE	19	16.80	16.32	17.02	21.59
Legacy b (2462 MHz)SE	19	17.00	16.46	17.47	22.39
Legacy g (2412 MHz)SE	17	15.19	14.19	15.52	20.37
Legacy g (2437 MHz)SE	17	14.56	14.32	14.97	20.40
Legacy g (2462 MHz)SE	17	14.84	14.68	15.46	21.27
<b>HT-20</b> (2412 MHz)SE	19	16.96	16.51	17.40	22.40
HT-20 (2437 MHz)SE	19	16.73	16.23	17.06	22.36
HT-20 (2462 MHz)SE	19	16.93	16.80	17.26	22.35
HT-40 (2422 MHz)SE	19	17.30	16.75	17.39	22.68
HT-40 (2437 MHz)SE	19	17.11	16.53	17.36	22.30
<b>HT-40</b> (2452 MHz)SE	19	16.91	16.42	17.80	22.25

Note BE = Band-edge, SE – Spurious emissions



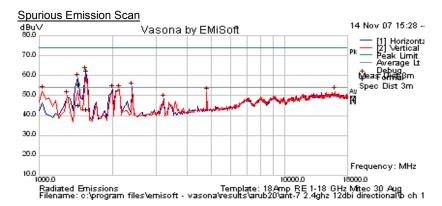
Serial #: ARUB20-A2 Rev A
Issue Date: 11th December 2007

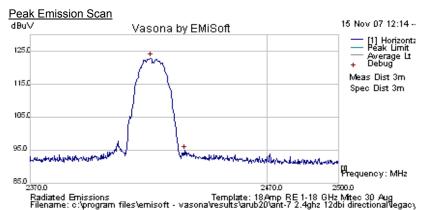
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### AP124: 2400 - 2483.5 MHz ANT-7 (12 dBi) Legacy Data Rates

AP124 - AN	AP124 - ANT-7 (12 dBi) Test Configuration											
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant							
1	2412	ART 19	99%	B 1 MBit/s Legacy	Yes							

Three antennas operating simultaneously



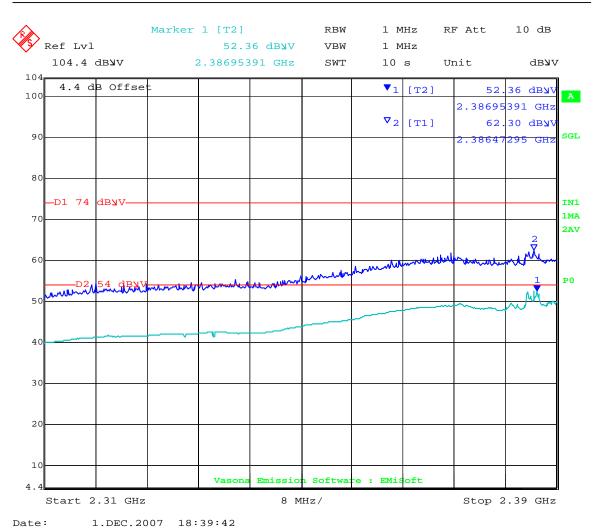


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2421.062	87.56	2.96	32.36	122.88	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ADT D	ART Power Setting = 16		62.3	Formal Peak	V			74	-11.7	Pass	Band-edge
2390.0	AIXIT	ower Setti	ng – 10	52.36	Formal Average	V			54	-1.64	Pass	Band-edge
1555.897	72.8	2.42	-14.72	60.5	Peak Max	V	110	14	74	-13.5	Pass	
1451.031	66.44	2.34	-15.37	53.41	Peak Max	V	132	202	74	-20.59	Pass	
1555.897	53.12	2.42	-14.72	40.82	Average Max	Н	137	22	54	-13.18	Pass	
1451.031	56.29	2.34	-15.37	43.27	Average Max	Н	98	35	54	-10.73	Pass	
2396.794	62.71	2.95	-11.08	54.58	Peak [Scan]	Н	100	0	102.88	-48.30	Pass	NRB
2124.248	61.34	2.82	-11.03	53.12	Peak [Scan]	V	100	0	102.88	-49.76	Pass	NRB
1987.976	61.55	2.74	-11.26	53.03	Peak [Scan]	Н	100	0	102.88	-49.85	Pass	NRB
3214 429	56 46	3 48	-11 65	48 28	Peak [Scan]	П	100	0	102 88	-54 60	Pass	NRB



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802.11b Legacy Band-edge 2390 MHz



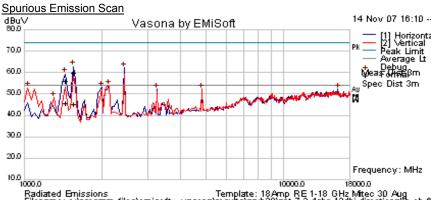
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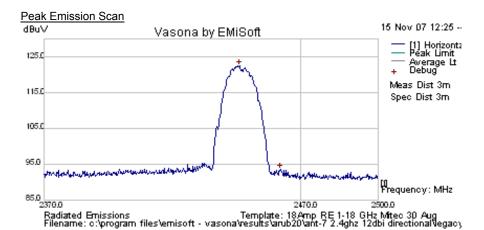
AP124 - ANT-7 (12 dBi) Test Configuration											
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant						
6	2437	ART 19	99%	B 1 MBit/s Legacy	Yes						

Three antennas operating simultaneously

NRB = None Restrictive Band



Radiated Emissions Template: 18 Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-7 2.4ghz 12dbi directional\rb ch 6



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2446.072	87.18	2.98	32.37	122.53	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
1559.398	70.02	2.42	-14.69	57.75	Peak Max	V	106	13	74	-16.25	Pass	
1451.551	66.82	2.34	-15.36	53.79	Peak Max	V	133	204	74	-20.21	Pass	
1559.398	55.46	2.42	-14.69	43.19	Average Max	Н	123	50	54	-10.81	Pass	
1451.551	56.58	2.34	-15.36	43.55	Average Max	Н	98	34	54	-10.45	Pass	
2430.862	70.5	2.97	-11.17	62.3	Peak [Scan]	Н	100	0	102.53	-40.23	Pass	NRB
2124.248	62	2.82	-11.03	53.78	Peak [Scan]	Н	100	0	102.53	-48.75	Pass	NRB
1987.976	61.73	2.74	-11.26	53.21	Peak [Scan]	Н	100	0	102.53	-49.32	Pass	NRB
3248.497	60.32	3.49	-11.64	52.17	Peak [Scan]	Н	100	0	102.53	-50.36	Pass	NRB



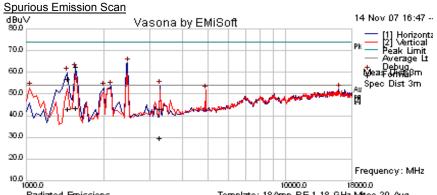
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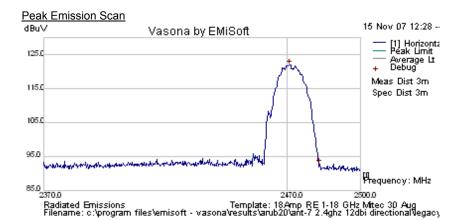
AP124 - ANT-7 (12 dBi) Test Configuration											
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant						
11	2462	ART 19	99%	B 1 MBit/s Legacy	Yes						

Three antennas operating simultaneously

NRB = None Restrictive Band



Radiated Emissions Template: 18 Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\vesults\arub20\ant-7 2.4ghz 12dbi directional\vb ch 1

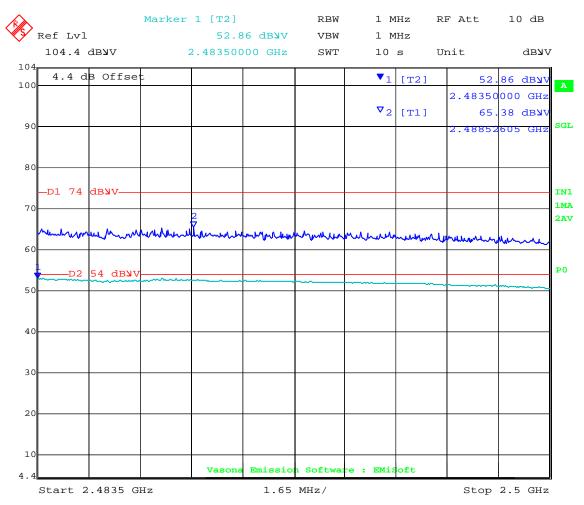


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2471.082	86.62	2.99	32.38	121.99	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ART Power Setting = 16		65.38	Formal Peak	V			74	-8.62	Pass	Band-edge	
2483.5	AIXI	ower Setti	ng – 10	52.86	Formal Average	V			54	-1.14	Pass	Band-edge
1555.912	72.93	2.42	-14.72	60.63	Peak Max	V	106	15	74	-13.37	Pass	
1454.549	67.69	2.34	-15.36	54.67	Peak Max	V	116	21	74	-19.33	Pass	
3276.057	48.89	3.51	-11.57	40.83	Peak Max	V	98	149	74	-33.17	Pass	
1555.912	53.86	2.42	-14.72	41.56	Average Max	Н	98	22	54	-12.44	Pass	
1454.549	54.17	2.34	-15.36	41.15	Average Max	Н	151	35	54	-12.85	Pass	
2464.93	72.68	2.98	-11.17	64.49	Peak [Scan]	Н	100	0	101.99	-37.50	Pass	NRB
2124.248	61.73	2.82	-11.03	53.52	Peak [Scan]	Н	100	0	101.99	-48.47	Pass	NRB
1987.976	61.49	2.74	-11.26	52.98	Peak [Scan]	Н	100	0	101.99	-49.01	Pass	NRB
4917.836	56.69	4.55	-9.24	51.99	Peak [Scan]	V	100	0	101.99	-50.00	Pass	NRB



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802.11b Legacy Band-edge 2483.5 MHz



Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

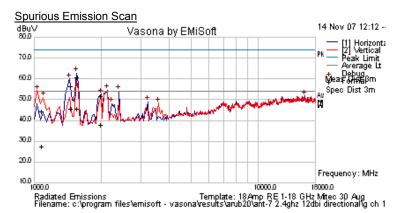
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## AP124: 2400 - 2483.5 MHz ANT-7 (12 dBi) Legacy Data Rates

AP124 - AN	AP124 - ANT-7 (12 dBi) Test Configuration											
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant							
1	2412	ART 17	99%	G 6 MBit/s Legacy	Yes							

Three antennas operating simultaneously

NRB = None Restrictive Band

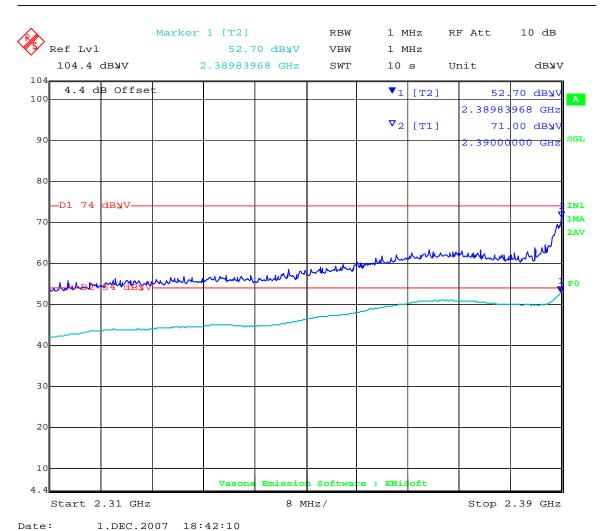


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2415.331	91.96	2.96	32.35	127.27	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ADT D	ower Setti	na – 11	71.00	Formal Peak	V			74	-3.00	Pass	Band-edge
2390.0	AIXI F	ART Power Setting = 11			Formal Average	V			54	-1.30	Pass	Band-edge
1557.459	71.11	2.42	-14.71	58.83	Peak Max	V	103	13	74	-15.17	Pass	
1459.219	67.44	2.34	-15.34	54.44	Peak Max	V	117	18	74	-19.56	Pass	
1085.204	56.53	2.03	-16.09	42.47	Peak Max	V	102	57	74	-31.53	Pass	
1989.579	58.23	2.74	-11.25	49.72	Peak Max	V	98	102	74	-24.28	Pass	
2132.645	61.41	2.82	-11.04	53.19	Peak Max	V	101	156	74	-20.81	Pass	
1557.459	55.93	2.42	-14.71	43.64	Average Max	Н	124	53	54	-10.36	Pass	
1459.219	56.65	2.34	-15.34	43.65	Average Max	Н	102	34	54	-10.35	Pass	
1085.204	39.49	2.03	-16.09	25.43	Average Max	V	102	57	54	-28.57	Pass	
1989.579	44.27	2.74	-11.25	35.77	Average Max	Н	100	83	54	-18.23	Pass	
2132.645	41.48	2.82	-11.04	33.25	Average Max	Н	98	196	54	-20.75	Pass	
3214.429	57.25	3.48	-11.65	49.08	Peak [Scan]	Н	100	0	54	-4.92	Pass	NRB



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802.11g Legacy Band-edge 2390 MHz



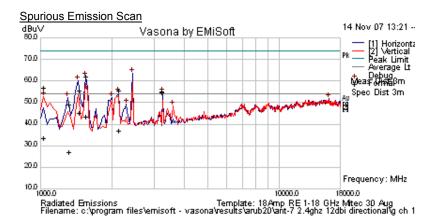
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

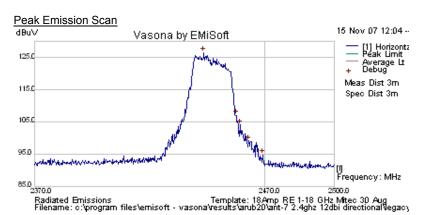
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AP124 - AN	AP124 - ANT-7 (12 dBi) Test Configuration											
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant							
6	2437	ART 17	99%	G 6 MBit/s Legacy	Yes							

Three antennas operating simultaneously

NRB = None Restrictive Band





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2443.467	91.19	2.97	32.37	126.54	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
1555.391	72.55	2.42	-14.72	60.24	Peak Max	V	104	115	74	-13.76	Pass	
1460.281	66.44	2.34	-15.34	53.44	Peak Max	V	104	25	74	-20.56	Pass	
2132.024	61.69	2.82	-11.04	53.46	Peak Max	V	98	156	74	-20.54	Pass	
3249.399	61.14	3.49	-11.64	53	Peak Max	V	104	253	74	-21	Pass	
1037.515	68.82	1.99	-16.05	54.76	Peak Max	V	98	71	74	-19.24	Pass	
1327.615	60.3	2.24	-15.59	46.95	Peak Max	V	99	340	74	-27.05	Pass	
1555.391	53.67	2.42	-14.72	41.37	Average Max	Н	99	23	54	-12.63	Pass	
1460.281	56.29	2.34	-15.34	43.29	Average Max	Н	103	38	54	-10.71	Pass	
2132.024	43.24	2.82	-11.04	35.02	Average Max	Н	114	232	54	-18.98	Pass	
3249.399	60.98	3.49	-11.64	52.83	Average Max	Н	98	34	54	-1.17	Pass	•
1037.515	45.55	1.99	-16.05	31.49	Average Max	V	98	71	54	-22.51	Pass	
1327.615	38.48	2.24	-15.59	25.13	Average Max	Н	98	53	54	-28.87	Pass	

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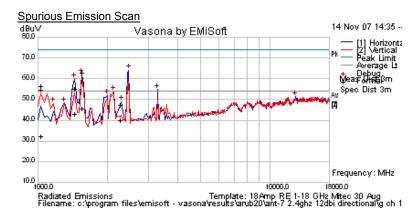


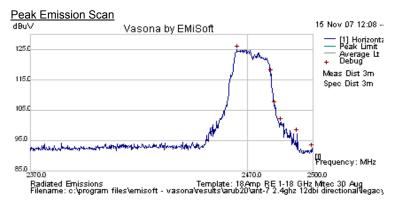
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	AP124 - AN	AP124 - ANT-7 (12 dBi) Test Configuration												
Ī	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant								
Ī	11	2462	ART 17	99%	G 6 MBit/s Legacy	Yes								

Three antennas operating simultaneously



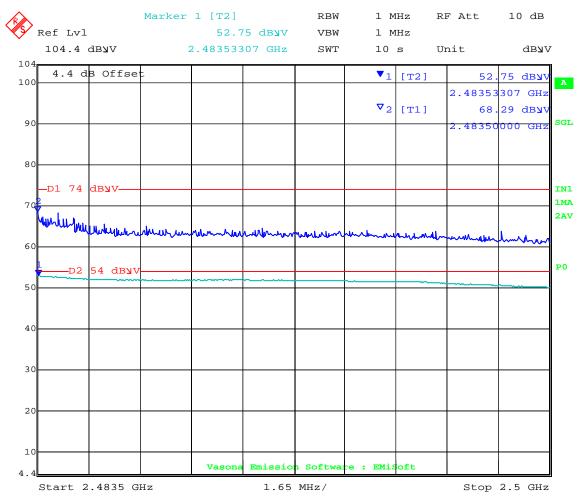


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2465.09	89.55	2.98	32.38	124.91	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ADT D	ower Settir	na = 7.5	68.29	Formal Peak	V			74	-5.71	Pass	Band-edge
2483.5	AIXIT	ower Settii	ig = 7.5	52.75	Formal Average	V			54	-1.25	Pass	Band-edge
1555.631	73.06	2.42	-14.72	60.76	Peak Max	V	107	15	74	-13.24	Pass	
1452.766	66.31	2.34	-15.36	53.29	Peak Max	V	134	202	74	-20.71	Pass	
1036.733	68.44	1.99	-16.05	54.38	Peak Max	V	98	67	74	-19.62	Pass	
2287.214	53.34	2.9	-10.99	45.25	Peak Max	V	139	304	74	-28.75	Pass	
1555.631	55.67	2.42	-14.72	43.37	Average Max	Н	124	57	54	-10.63	Pass	
1452.766	53.97	2.34	-15.36	40.94	Average Max	Н	98	79	54	-13.06	Pass	
1036.733	44.37	1.99	-16.05	30.3	Average Max	V	98	67	54	-23.7	Pass	
2287.214	46.25	2.9	-10.99	38.16	Average Max	Н	108	325	54	-15.84	Pass	
3282.565	63.06	3.51	-11.56	55.01	Peak [Scan]	Н	100	0	104.91	-49.90	Pass	NRB
2124.248	62.03	2.82	-11.03	53.81	Peak [Scan]	Н	100	0	104.91	-51.10	Pass	NRB



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Date: 1.DEC.2007 18:53:37

802.11g Legacy Band-edge 2483.5 MHz



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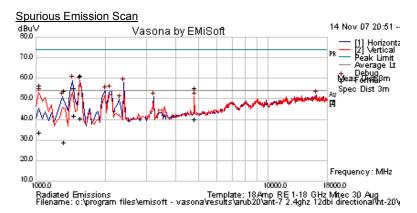
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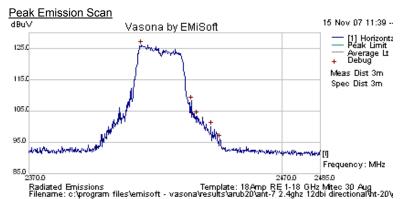
#### AP124: 2400 - 2483.5 MHz ANT 7 HT-20 Data Rates

-	AP124 - AN	T 7 Test Config	juration			
	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
	1	2412	ART 19	99%	G 6.5 MCS HT-20	Yes

Three antennas operating simultaneously

NRB = None Restrictive Band





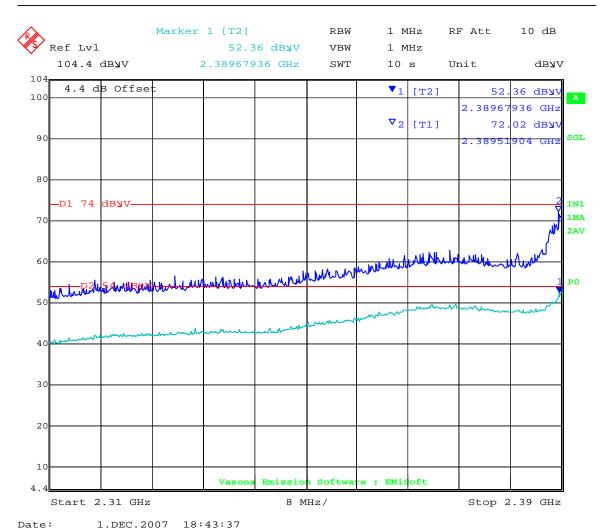
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2414.479	90.77	2.96	32.35	126.08	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ADT Do	wer Settin	a = 10 0	72.02	Formal Peak	V			74	-1.98	Pass	Band-edge
2390.0	ARTFO	wei Selliii	g = 10.0	52.36	Formal Average	V			54	-1.64	Pass	Band-edge
1555.1	71.51	2.42	-14.73	59.2	Peak Max	V	110	15	74	-14.8	Pass	
1464.589	66.19	2.35	-15.33	53.2	Peak Max	V	118	21	74	-20.8	Pass	
1037.254	68.32	1.99	-16.05	54.25	Peak Max	V	110	12	74	-19.75	Pass	
4826.513	57.96	4.47	-9.19	53.23	Peak Max	V	98	150	74	-20.77	Pass	
1320.2	65.15	2.24	-15.62	51.77	Peak Max	V	98	181	74	-22.23	Pass	
1555.1	50.7	2.42	-14.73	38.39	Average Max	Н	140	21	54	-15.61	Pass	
1464.589	52.69	2.35	-15.33	39.71	Average Max	Н	142	30	54	-14.29	Pass	
1037.254	45.66	1.99	-16.05	31.6	Average Max	V	110	12	54	-22.4	Pass	
4826.513	42.83	4.47	-9.19	38.1	Average Max	V	98	150	54	-15.9	Pass	
1320.2	40.19	2.24	-15.62	26.81	Average Max	Н	109	48	54	-27.19	Pass	

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802.11n HT--20 Band-edge 2390 MHz



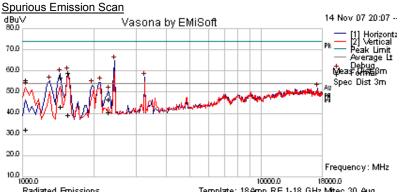
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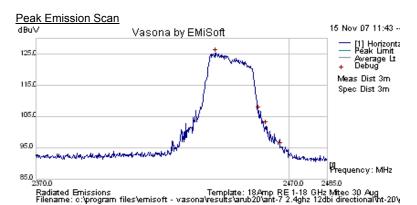
I	AP124 - AN	AP124 - ANT 7 Test Configuration												
Ì	Channel	Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant												
	6	2437	ART 19	99%	G 6.5 MCS HT-20	Yes								

Three antennas operating simultaneously

NRB = None Restrictive Band



Radiated Emissions Template: 18Anp RE 1-18 GHz Miteo 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\art-7 2.4ghz 12dbi directional\rt-20\r



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2440.982	90.01	2.97	32.37	125.36	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
1554.86	69.35	2.42	-14.73	57.04	Peak Max	V	100	115	74	-16.96	Pass	
1451.754	67.69	2.34	-15.36	54.66	Peak Max	V	133	204	74	-19.34	Pass	
1036.924	67.44	1.99	-16.05	53.37	Peak Max	V	101	32	74	-20.63	Pass	
2307.996	52.38	2.91	-11.02	44.27	Peak Max	V	103	304	74	-29.73	Pass	
1554.86	49.49	2.42	-14.73	37.18	Average Max	Н	108	222	54	-16.82	Pass	
1451.754	54.12	2.34	-15.36	41.1	Average Max	Н	98	30	54	-12.9	Pass	
1036.924	44.4	1.99	-16.05	30.33	Average Max	٧	101	32	54	-23.67	Pass	
2307.996	46.34	2.91	-11.02	38.23	Average Max	Н	99	242	54	-15.77	Pass	
3248.497	65.33	3.49	-11.64	57.18	Peak [Scan]	Н	100	0	105.36	-48.18	Pass	NRB
2124.248	62.96	2.82	-11.03	54.74	Peak [Scan]	Н	100	0	105.36	-50.62	Pass	NRB
1953.908	62.24	2.72	-11.52	53.43	Peak [Scan]	Н	100	0	105.36	-51.93	Pass	NRB

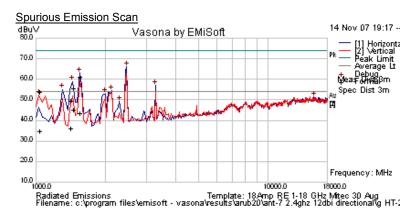


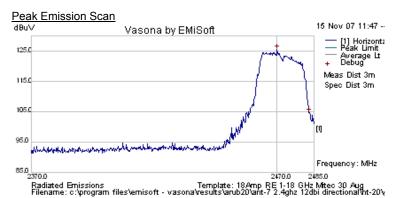
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

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AP124 - AN	AP124 - ANT 7 Test Configuration												
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant								
11	2462	ART 19	99%	G 6.5 MCS HT-20	Yes								

Three antennas operating simultaneously



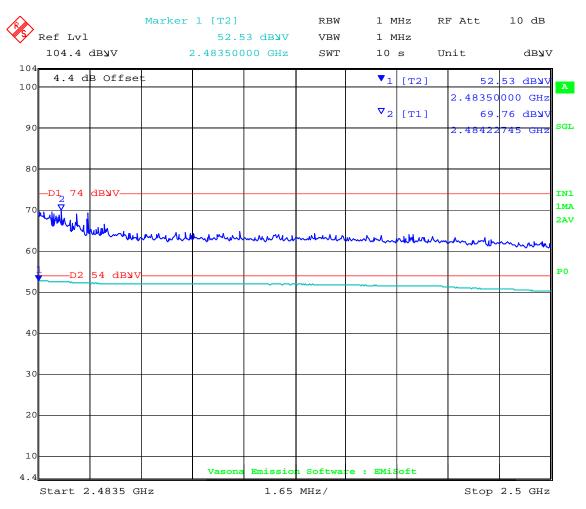


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2470.02	90.18	2.99	32.38	125.55	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ADT D	ower Settir	na = 6.5	69.76	Formal Peak				74	-4.24	Pass	Band-edge
2483.5	AIXI F	Jwei Settii	ig = 0.5	52.53	Formal Average				54	-1.47	Pass	Band-edge
1555.791	71.51	2.42	-14.72	59.21	Peak Max	V	100	114	74	-14.79	Pass	
1458.638	66.44	2.34	-15.34	53.43	Peak Max	V	138	203	74	-20.57	Pass	
1426.132	60.72	2.32	-15.4	47.64	Peak Max	V	98	327	74	-26.36	Pass	
1050	65.93	2	-16.07	51.87	Peak Max	٧	104	7	74	-22.13	Pass	
1555.791	53.84	2.42	-14.72	41.54	Average Max	Н	98	20	54	-12.46	Pass	
1458.638	56.2	2.34	-15.34	43.2	Average Max	Н	98	37	54	-10.8	Pass	
1426.132	47.35	2.32	-15.4	34.27	Average Max	Н	98	38	54	-19.73	Pass	
1050	46.82	2	-16.07	32.75	Average Max	٧	104	7	54	-21.25	Pass	
3282.565	65.09	3.51	-11.56	57.05	Peak [Scan]	Н	100	0	105.55	-48.50	Pass	NRB
2124.248	62.69	2.82	-11.03	54.47	Peak [Scan]	Н	100	0	105.55	-51.08	Pass	NRB
1987.976	61.54	2.74	-11.26	53.02	Peak [Scan]	Н	100	0	105.55	-52.53	Pass	NRB



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Date: 1.DEC.2007 18:50:40

802.11n HT--20 Band-edge 2483.5 MHz



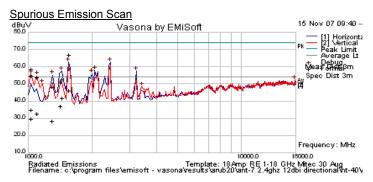
**Serial #:** ARUB20-A2 Rev A **Issue Date:** 11th December 2007

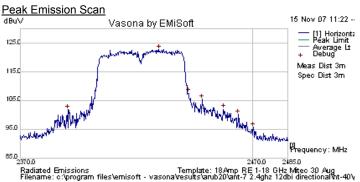
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#### AP124: 2400 - 2483.5 MHz ANT 7 HT-40 Data Rates

AP124 - AN	AP124 - ANT 7 Test Configuration												
Channel	Freq (MHz)	Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant											
	2422	ART 19	99%	G 13.5 MCS HT-40	Yes								

Three antennas operating simultaneously



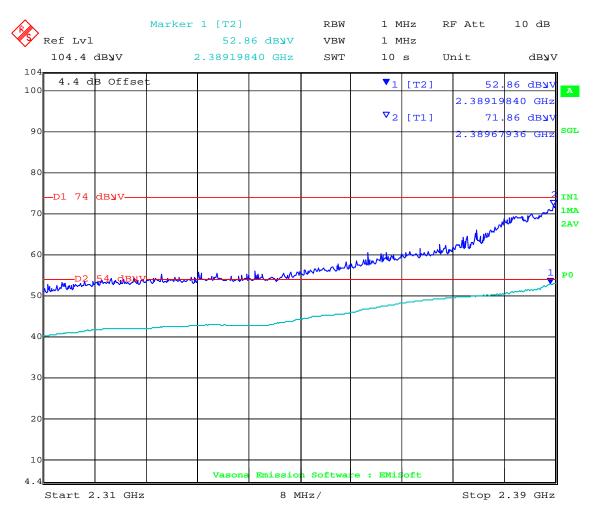


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2429.689	87.47	2.97	32.36	122.8	Peak [Scan]	Η	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ΔRT Pa	ower Settir	ng = 6.5	71.86	Formal Peak	V			74	-2.14	Pass	Band-edge
2390.0	AICH	ower octui	ig = 0.5	52.86	Formal Average	V			54	-1.14	Pass	Band-edge
1555.711	77.17	2.42	-14.72	64.87	Peak Max	Н	121	60	74	-9.13	Pass	
1427.966	62.24	2.32	-15.4	49.17	Peak Max	V	98	335	74	-24.83	Pass	
1449.539	63.61	2.33	-15.37	50.58	Peak Max	V	98	347	74	-23.42	Pass	
1036.024	66.69	1.99	-16.06	52.62	Peak Max	V	101	37	74	-21.38	Pass	
1037.154	69.75	1.99	-16.05	55.69	Peak Max	V	110	12	74	-18.31	Pass	
1304.962	59.64	2.23	-15.68	46.19	Peak Max	V	114	241	74	-27.81	Pass	
1104.18	65.67	2.05	-16.03	51.69	Peak Max	V	98	2	74	-22.31	Pass	
1555.711	56.32	2.42	-14.72	44.02	Average Max	Н	121	60	54	-9.98	Pass	
1427.966	48.13	2.32	-15.4	35.05	Average Max	Н	99	41	54	-18.95	Pass	
1449.539	52.8	2.33	-15.37	39.76	Average Max	Н	137	28	54	-14.24	Pass	
1036.024	41.67	1.99	-16.06	27.6	Average Max	V	101	37	54	-26.4	Pass	
1037.154	46.69	1.99	-16.05	32.62	Average Max	V	110	12	54	-21.38	Pass	
1304.962	39.91	2.23	-15.68	26.46	Average Max	Н	103	48	54	-27.54	Pass	



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Date: 1.DEC.2007 18:47:24

802.11n HT--40 Band-edge 2390 MHz



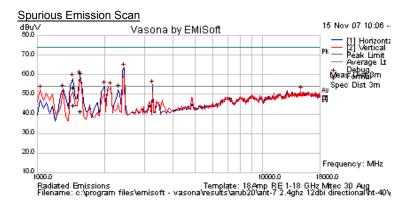
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

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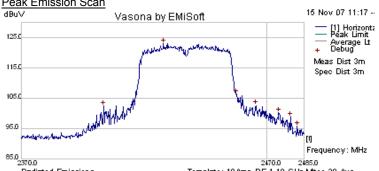
I	AP124 - AN	- ANT 7 Test Configuration												
Ī	Channel	Freq (MHz)	Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant											
ĺ		2437	ART 18.5	99%	G 13.5 MCS HT-40	Yes								

Three antennas operating simultaneously

NRB = None Restrictive Band



Peak Emission Scan



Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-7 2.4ghz 12dbi directional\rt-40\cdots

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2427.846	87.7	2.97	32.36	123.03	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
1555.831	71.11	2.42	-14.72	58.81	Peak Max	V	110	360	74	-15.19	Pass	
1451.524	64.39	2.34	-15.36	51.36	Peak Max	V	98	342	74	-22.64	Pass	
1555.831	51.74	2.42	-14.72	39.43	Average Max	Н	101	224	54	-14.57	Pass	
1451.524	55.51	2.34	-15.36	42.48	Average Max	Н	98	29	54	-11.52	Pass	
2430.862	71.84	2.97	-11.17	63.64	Peak [Scan]	Н	100	0	103.03	-39.39	Pass	NRB
3248.497	63.19	3.49	-11.64	55.05	Peak [Scan]	Н	100	0	103.03	-47.98	Pass	NRB
1987.976	62.72	2.74	-11.26	54.2	Peak [Scan]	Н	100	0	103.03	-48.83	Pass	NRB
2124.248	62.34	2.82	-11.03	54.12	Peak [Scan]	Н	100	0	103.03	-48.91	Pass	NRB
2294.589	60.62	2.9	-10.98	52.54	Peak [Scan]	Н	100	0	103.03	-50.49	Pass	NRB

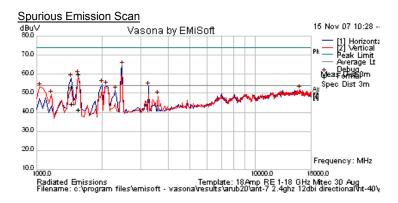


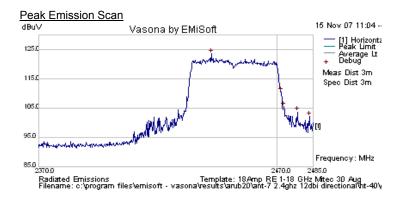
**Serial #:** ARUB20-A2 Rev A **Issue Date:** 11th December 2007

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AP124 - AN	T 7 Test Config	guration			
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
	2452	ART 18.5	99%	G 13.5 MCS HT-40	Yes

Three antennas operating simultaneously



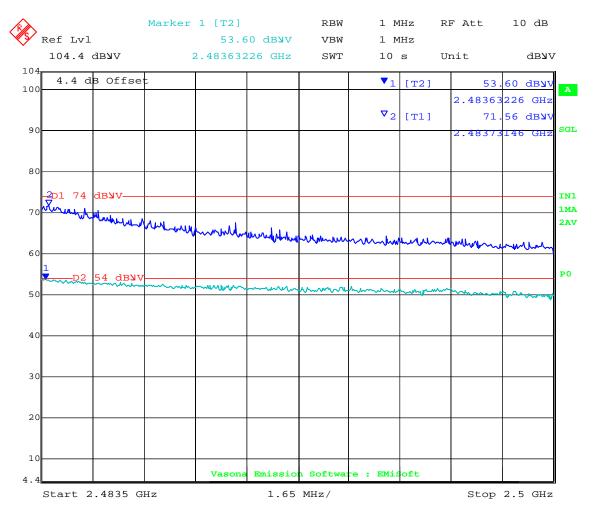


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2442.365	88.22	2.97	32.37	123.56	Peak [Scan]	Н	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ΔRT Pa	ower Settir	na = 3.0	71.56	Formal Peak	V			74	-2.44	Pass	Band-edge
2483.5	AITT	ower ocui	ig = 0.0	53.60	Formal Average	V			54	-0.4	Pass	Band-edge
1555.391	70.02	2.42	-14.72	57.71	Peak Max	V	99	17	74	-16.29	Pass	
1450.04	64.01	2.33	-15.37	50.97	Peak Max	V	98	345	74	-23.03	Pass	
1555.391	51.38	2.42	-14.72	39.07	Average Max	Н	101	224	54	-14.93	Pass	
1450.04	55.12	2.33	-15.37	42.09	Average Max	Н	135	30	54	-11.91	Pass	
2464.93	72.57	2.98	-11.17	64.39	Peak [Scan]	Н	100	0	103.56	-39.17	Pass	NRB
1987.976	63.22	2.74	-11.26	54.7	Peak [Scan]	Н	100	0	103.56	-48.86	Pass	NRB
2090.18	62.06	2.8	-11.1	53.75	Peak [Scan]	Н	100	0	103.56	-49.81	Pass	NRB
3248.497	61.73	3.49	-11.64	53.58	Peak [Scan]	Н	100	0	103.56	-49.98	Pass	NRB



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802.11n HT--40 Band-edge 2483.5 MHz



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# ARUB20 AP-124 (ANT-8) ART Settings V Aggregate Measured Power

The following matrix identifies the ART power setting V's each output chain. The aggregate power was also measured for all three chains.

As a result of either spurious emissions (harmonic) or band-edge issues the power was reduced to bring the unit into compliance.

Configuration	ART	Tx 1	Tx 2	Tx 3	Aggregate
	Power	Measured	Measured	Measured	Measured
	Setting	Pwr (dBm)	Pwr (dBm)	Pwr (dBm)	Pwr (dBm)
<b>Legacy b</b> (2390   2412 MHz)BE	19	16.86	16.72	17.52	22.68
<b>Legacy g</b> (2390   2412 MHz)BE	17	15.06	14.36	15.07	20.37
<b>Legacy b</b> (2483.5   2462 MHz)BE	19	16.58	16.74	17.11	22.39
<b>Legacy g</b> (2483.5   2462 MHz)BE	17	14.72	14.78	15.38	21.27
<b>HT-20</b> (2390   2412 MHz)BE	17	15.02	14.31	15.48	20.54
<b>HT-20</b> (2483.5   2462 MHz)BE	18	15.68	15.62	16.26	21.36
HT-40 (2390   2422 MHz)BE	15	12.97	12.58	13.47	18.19
<b>HT-40</b> (2483.5   2452 MHz)BE	16	13.88	13.90	14.50	19.26
Legacy b (2412 MHz)SE	19	16.86	16.72	17.36	22.68
Legacy b (2437 MHz)SE	19	16.61	16.31	16.87	21.59
Legacy b (2462 MHz)SE	19	16.58	16.74	17.12	22.39
Legacy g (2412 MHz)SE	17	15.06	14.36	15.07	20.37
Legacy g (2437 MHz)SE	17	14.63	14.37	15.55	20.40
Legacy g (2462 MHz)SE	17	14.72	14.78	15.38	21.27
<b>HT-20</b> (2412 MHz)SE	19	16.84	16.57	17.60	22.40
HT-20 (2437 MHz)SE	19	16.64	16.40	17.06	22.36
<b>HT-20</b> (2462 MHz)SE	19	16.71	16.75	17.16	22.35
HT-40 (2422 MHz)SE	19	17.30	16.81	17.38	22.68
<b>HT-40</b> (2437 MHz)SE	19	17.30	16.64	17.46	22.30
<b>HT-40</b> (2452 MHz)SE	19	16.97	16.40	17.58	22.25

Note BE = Band-edge, SE – Spurious emissions



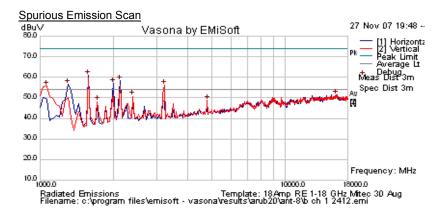
Serial #: ARUB20-A2 Rev A
Issue Date: 11th December 2007

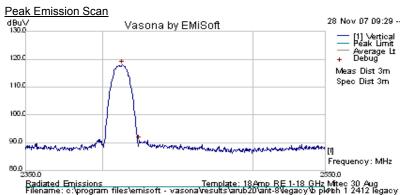
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#### AP124: 2400 - 2483.5 MHz ANT-8 (5 dBi) Legacy Data Rates

AP124 - AN	T-8 (5 dBi) Tes	t Configuration			
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
1	2412	ART 19	99%	B 1 MBit/s Legacy	Yes

Three antennas operating simultaneously



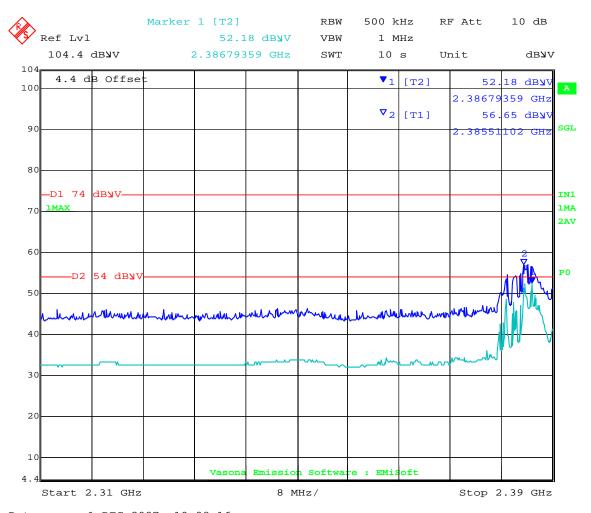


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2412.926	76.69	8.96	32.35	118	Peak [Scan]	Ι	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ADT D	ower Settir	na – 10	56.65	Formal Peak	>			74	-17.35	Pass	Band-edge
2390.0	2390.0 ART Power Setting = 19			52.18	Formal Average	٧			54	-1.82	Pass	Band-edge



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802.11b Legacy Band-edge 2390 MHz



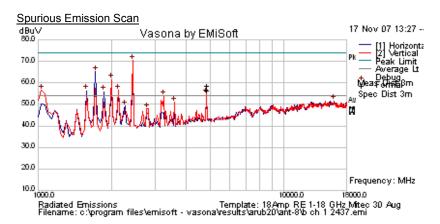
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AP124 - AN	IT-8 (5 dBi) Tes	t Configuration			
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
6	2437	ART 19	99%	B 1 MBit/s Legacy	Yes

Three antennas operating simultaneously

NRB = None Restrictive Band



2500 2500 Filename: c:typrogram files\emisoft - vasona\text{vesults\emisoft} = 18.6mp RE 1-18 GHz Mitec 30 Aug Filename: c:typrogram files\emisoft - vasona\text{vesults\emisoft} = 18.6mp RE 1-18 GHz Mitec 30 Aug

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2438.577	76.06	8.97	32.37	117.4	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
4873.982	62.39	4.51	-9.16	57.74	Peak Max	V	98	130	74	-16.26	Pass	
1033.079	62.53	1.98	-16.06	48.45	Peak Max	V	102	16	74	-25.55	Pass	
1604.609	65.54	2.46	-14.27	53.73	Peak Max	V	98	74	74	-20.27	Pass	
2260.521	60.86	2.89	-11.02	52.73	Peak Max	V	122	218	74	-21.27	Pass	
1624.807	56.53	2.48	-14.09	44.92	Peak Max	V	98	190	74	-29.08	Pass	
4873.982	57.68	4.51	-9.16	53.03	Average Max	V	98	130	54	-0.97	Pass	
1033.079	46.39	1.98	-16.06	32.31	Average Max	V	102	16	54	-21.69	Pass	
1604.609	50.98	2.46	-14.27	39.17	Average Max	Н	100	309	54	-14.83	Pass	
2260.521	43.26	2.89	-11.02	35.13	Average Max	V	122	218	54	-18.87	Pass	
1624.807	50.98	2.48	-14.09	39.37	Average Max	V	98	190	54	-14.63	Pass	

Frequency: MHz



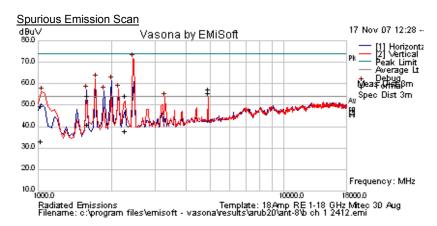
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

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I	AP124 - AN	T-8 (5 dBi) Tes	t Configuration			
ĺ	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
	11	2462	ART 19	99%	B 1 MBit/s Legacy	Yes

Three antennas operating simultaneously

NRB = None Restrictive Band



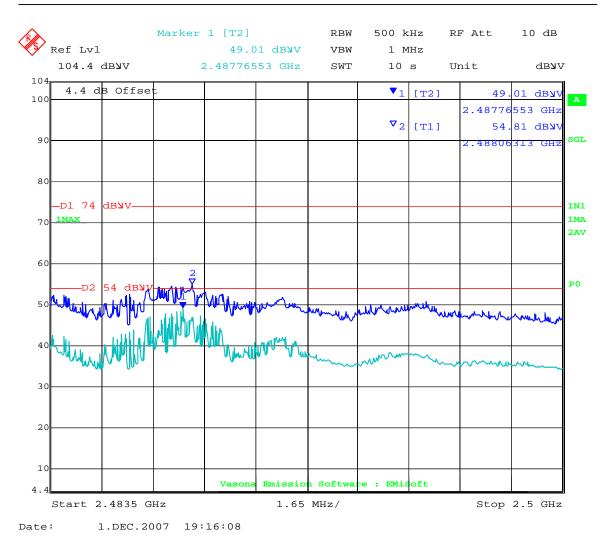
| Peak Emission Scan | dBuV | Vasona by EMiSoft | 28 Nov 07 09:34 -- | 1] Vertical | Peak Limit | Average Lt | Debug | Meas Dist 3m | Spec Dist 3m | Spec Dist 3m | Spec Dist 3m | Peak Limit | Peak Lim

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2463.026	76.67	8.98	32.38	118.04	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ΔRT P	ower Setti	na = 10	54.81	Formal Peak	V			74	-19.19	Pass	Band-edge
2483.5	AKTT	OWCI OCUI		49.01	Formal Average	V			54	-4.99	Pass	Band-edge
1594.699	64.26	2.45	-14.36	52.35	Peak Max	V	98	329	74	-21.65	Pass	
1031.383	61.55	1.98	-16.07	47.46	Peak Max	V	107	16	74	-26.54	Pass	
4923.973	60.02	4.55	-9.25	55.32	Peak Max	V	98	128	74	-18.68	Pass	
2265.852	60.16	2.89	-11.01	52.03	Peak Max	V	98	255	74	-21.97	Pass	
1594.699	50.66	2.45	-14.36	38.75	Average Max	Н	136	305	54	-15.25	Pass	
1031.383	45.03	1.98	-16.07	30.94	Average Max	V	107	16	54	-23.06	Pass	
4923.973	58.1	4.55	-9.25	53.41	Average Max	Н	98	130	54	-0.59	Pass	
2265.852	43.84	2.89	-11.01	35.72	Average Max	Н	98	250	54	-18.28	Pass	



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802.11b Legacy Band-edge 2483.5 MHz



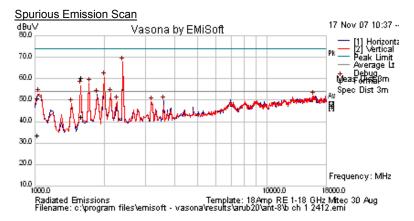
Serial #: ARUB20-A2 Rev A
Issue Date: 11th December 2007

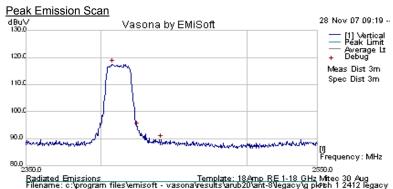
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### AP124: 2400 - 2483.5 MHz ANT-8 (5 dBi) Legacy Data Rates

I	AP124 - AN	T-8 (5 dBi) Tes	t Configuration			
ĺ	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant
	1	2412	ART 17	99%	G 6 MBit/s Legacy	Yes

Three antennas operating simultaneously



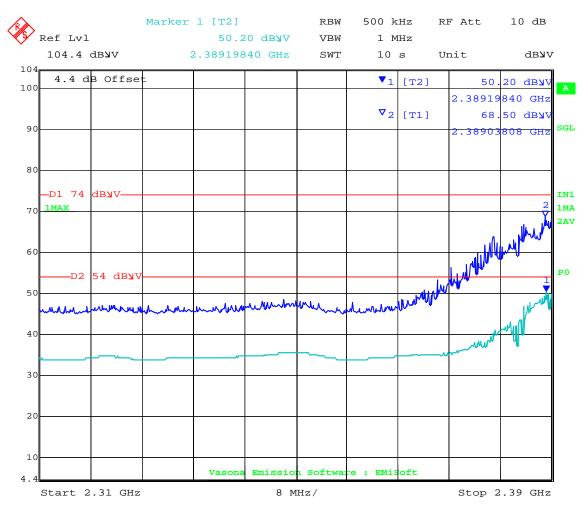


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2408.116	76.18	8.96	32.35	117.49	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ADT D	ower Settii	na – 17	68.50	Formal Peak	V			74	-5.5	Pass	Band-edge
2390.0	AIXIT	ower Setti	ng – 17	50.20	Formal Average	V			54	-3.8	Pass	Band-edge
1594.469	70.29	2.45	-14.37	58.38	Peak Max	Н	136	299	74	-15.62	Pass	
1030.1	62.95	1.98	-16.07	48.86	Peak Max	V	106	185	74	-25.14	Pass	
1594.469	51.89	2.45	-14.37	39.98	Average Max	Н	136	299	54	-14.02	Pass	
1030.1	45.38	1.98	-16.07	31.29	Average Max	V	106	185	54	-22.71	Pass	
1987.976	69.28	2.74	-11.26	60.76	Peak [Scan]	V	100	0	97.49	-36.73	Pass	NRB
1715.431	68.7	2.55	-13.44	57.81	Peak [Scan]	V	100	0	97.49	-39.68	Pass	NRB
2124.248	61.34	2.82	-11.03	53.13	Peak [Scan]	V	100	0	97.49	-44.36	Pass	NRB
1851.703	62.6	2.65	-12.42	52.83	Peak [Scan]	Н	100	0	97.49	-44.66	Pass	NRB
3589.178	57.61	3.66	-11.49	49.78	Peak [Scan]	Н	100	0	97.49	-47.71	Pass	NRB



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Date: 1.DEC.2007 19:06:14

802.11g Legacy Band-edge 2390 MHz



Margin

Pass

Pass

-43.18

-43.99

Pass

Comments

NRB

NRB

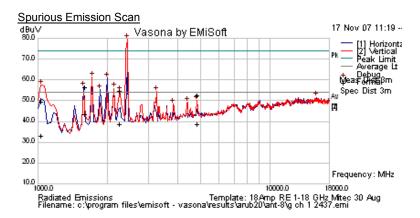
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

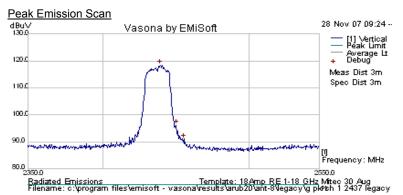
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	AP124 - AN	T-8 (5 dBi) Tes	t Configuration							
Channel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant										
	6	2437	ART 17	99%	G 6 MBit/s Legacy	Yes				

Three antennas operating simultaneously

NRB = None Restrictive Band





Level

55.23

54.42

AF

-12.42

-11.64

Raw

65

62.57

Frequency

1851.703

3248.497

Cable

2.65

3.49

MHz	dBuV	Loss	dB	dBuV	Туре		cm	Deg	dBuV	dB	/Fail	
2438.978	77.07	8.97	32.37	118.41	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
1034.349	61.69	1.98	-16.06	47.61	Peak Max	V	100	41	74	-26.39	Pass	
1595.711	66.44	2.45	-14.35	54.54	Peak Max	V	98	205	74	-19.46	Pass	
2263.607	61	2.89	-11.02	52.87	Peak Max	V	98	211	74	-21.13	Pass	
4875.31	55.15	4.51	-9.16	50.5	Peak Max	V	120	157	74	-23.5	Pass	
1034.349	44.96	1.98	-16.06	30.89	Average Max	V	100	41	54	-23.11	Pass	
1595.711	53.32	2.45	-14.35	41.42	Average Max	Н	134	299	54	-12.58	Pass	
2263.607	44.76	2.89	-11.02	36.64	Average Max	V	98	211	54	-17.36	Pass	
4875.31	41.37	4.51	-9.16	36.72	Average Max	V	120	157	54	-17.28	Pass	
1728.777	72.3	2.6	-13.3	61.48	Peak [Scan]	V	100	0	98.41	-36.93	Pass	NRB
1987.976	69.42	2.74	-11.26	60.9	Peak [Scan]	Н	100	0	98.41	-37.51	Pass	NRB
2139.719	64.2	2.8	-11.1	55.93	Peak [Scan]	V	100	0	98.41	-42.48	Pass	NRB

Pol

Hgt

Azt

Limit

98.41

98.41

Measurement

Peak [Scan]

Peak [Scan]

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Н

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100

100

0

0

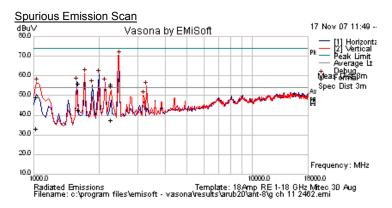


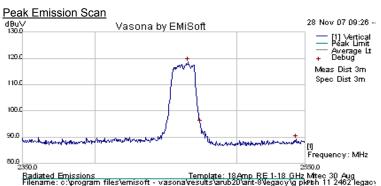
**Serial #:** ARUB20-A2 Rev A **Issue Date:** 11th December 2007

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	AP124 - AN	T-8 (5 dBi) Tes	t Configuration								
Ì	Channel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant										
Ī	11	2462	ART 17	99%	G 6 MBit/s Legacy	Yes					

Three antennas operating simultaneously



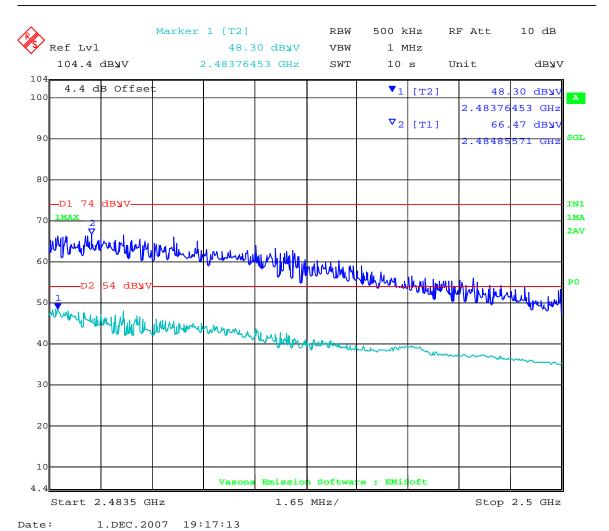


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2465.431	77.15	8.98	32.38	118.52	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ADT D	ower Settii	ng - 17	66.47	Formal Peak	V			74	-7.53	Pass	Band-edge
2483.5	AIXIT	ower Settii	ig – 17	48.30	Formal Average	V			54	-5.70	Pass	Band-edge
1595.741	65.8	2.45	-14.35	53.9	Peak Max	V	98	210	74	-20.1	Pass	
1032.224	61.28	1.98	-16.07	47.19	Peak Max	V	108	10	74	-26.81	Pass	
2258.607	61.82	2.89	-11.02	53.69	Peak Max	V	98	217	74	-20.31	Pass	
1595.741	52.46	2.45	-14.35	40.56	Average Max	Н	134	296	54	-13.44	Pass	
1032.224	45.04	1.98	-16.07	30.95	Average Max	V	108	10	54	-23.05	Pass	
2258.607	43.68	2.89	-11.02	35.55	Average Max	V	98	217	54	-18.45	Pass	
1715.431	72.41	2.55	-13.44	61.52	Peak [Scan]	V	100	0	98.52	-37.00	Pass	NRB
1987.976	69.4	2.74	-11.26	60.88	Peak [Scan]	Н	100	0	98.52	-37.64	Pass	NRB
2124.248	64.93	2.82	-11.03	56.72	Peak [Scan]	V	100	0	98.52	-41.80	Pass	NRB
1851.703	65.36	2.65	-12.42	55.59	Peak [Scan]	Н	100	0	98.52	-42.93	Pass	NRB
3282.565	63.06	3.51	-11.56	55.01	Peak [Scan]	V	100	0	98.52	-43.51	Pass	NRB
3180.361	58.43	3.46	-11.63	50.27	Peak [Scan]	V	100	0	98.52	-48.25	Pass	NRB



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802.11g Legacy Band-edge 2483.5 MHz



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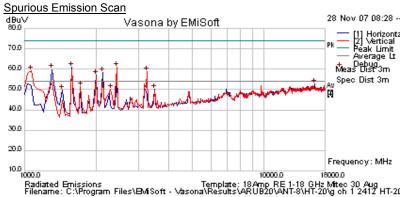
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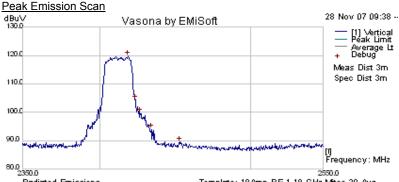
#### AP124: 2400 - 2483.5 MHz ANT 8 HT-20 Data Rates

AP124 - AN	AP124 - ANT 8 Test Configuration											
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant							
1	2412	ART 19	99%	G 6.5 MCS HT-20	Yes							

Three antennas operating simultaneously

NRB = None Restrictive Band





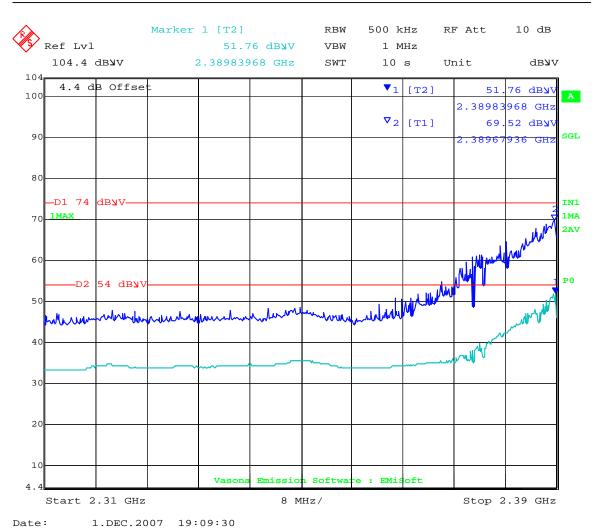
Radiated Emissions Template: 18 Amp. RE 1-18 GHz Mitec 30 Aug. Filename: c:\program files\emisoft - vasona\results\arub20\ant-8\rt-20\g pk d\t 1 2412 HT-20.er

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2418.537	78.44	8.96	32.36	119.76	Peak [Scan]	٧	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ADT D	ower Settii	ng = 17	69.52	Formal Peak	٧			74	-4.48	Pass	Band-edge
2390.0	ANTE	ower Settii	ig – 17	51.76	Formal Average	٧			54	-2.24	Pass	Band-edge



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1.556.2007 13.03.30

802.11n HT--20 Band-edge 2390 MHz

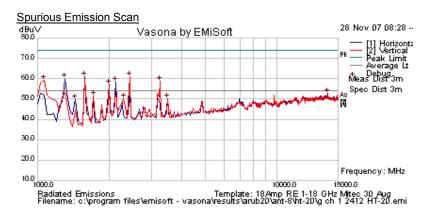


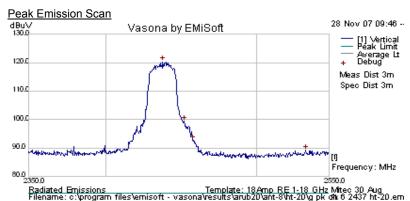
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AP124 - AN	T 8 Test Config	guration									
Channel	Channel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant										
6	2437	ART 19	99%	G 6.5 MCS HT-20	Yes						

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2437.375	78.95	8.97	32.37	120.29	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission

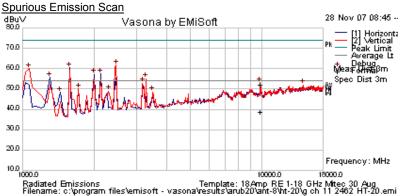


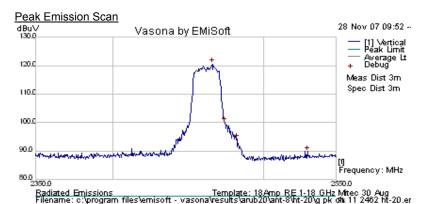
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AP124 - ANT 8 Test Configuration										
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant					
11	2462	ART 19	99%	G 6.5 MCS HT-20	Yes					

Three antennas operating simultaneously



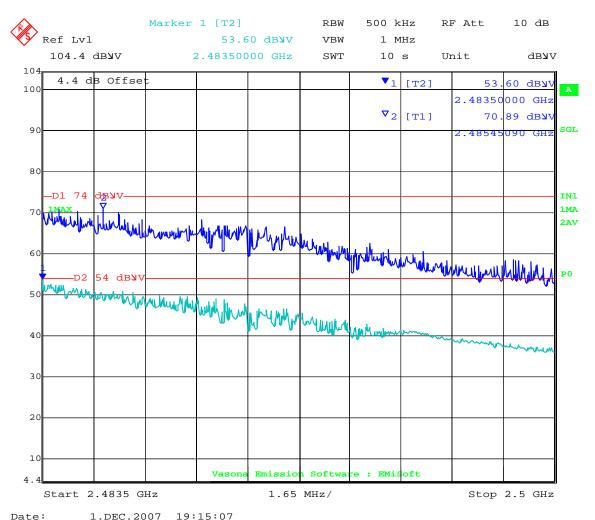


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2465.832	79.23	8.98	32.38	120.6	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ADT D	ART Power Setting = 18			Formal Peak	V			74	-3.11	Pass	Band-edge
2483.5	AIXIT				Formal Average	V			54	-0.4	Pass	Band-edge
9849.643	45.25	6.4	-1.44	50.21	Peak Max	V	104	335	74	-23.79	Pass	
9849.643	31.87	6.4	-1.44	36.83	Average Max	V	104	335	54	-17.17	Pass	



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802.11n HT--20 Band-edge 2483.5 MHz



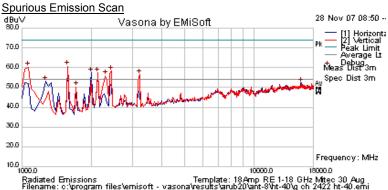
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

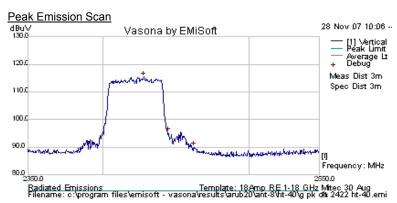
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#### AP124: 2400 - 2483.5 MHz ANT 8 HT-40 Data Rates

AP124 - ANT 8 Test Configuration										
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant					
3	2422	ART 19	99%	G 13.5 MCS HT-40	Yes					

Three antennas operating simultaneously



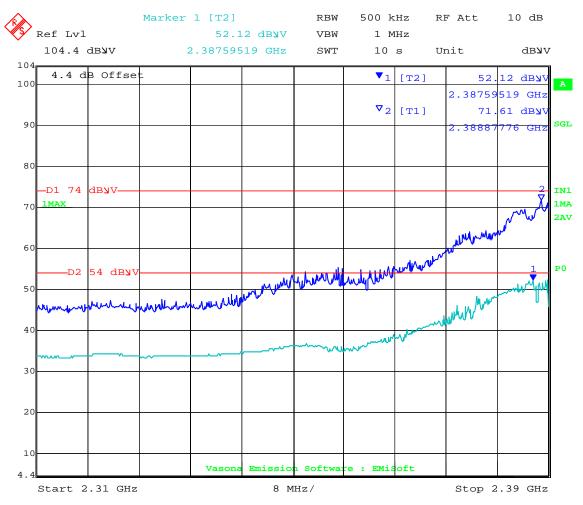


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2427.756	74.13	8.97	32.36	115.45	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
2390.0	ADT D	ower Settin	ng = 15	71.61	Formal Peak	V			74	-2.39	Pass	Band-edge
2390.0	ANTE	ART Power Setting = 15			Formal Average	V			54	-1.88	Pass	Band-edge



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Date: 1.DEC.2007 19:11:00

802.11n HT--40 Band-edge 2390 MHz

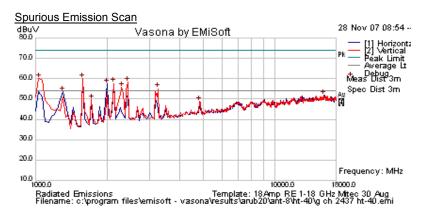


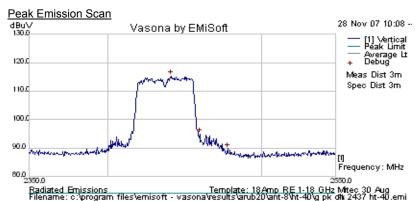
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AP124 - ANT 8 Test Configuration											
Channel	Channel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant										
6	2437	ART 19	99%	G 13.5 MCS HT-40	Yes						

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2440.581	74	8.97	32.37	115.34	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission



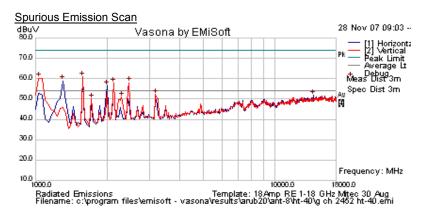
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AP124 - AN	AP124 - ANT 8 Test Configuration										
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant						
9	2452	ART 19	99%	G 13.5 MCS HT-40	Yes						

Three antennas operating simultaneously

NRB = None Restrictive Band

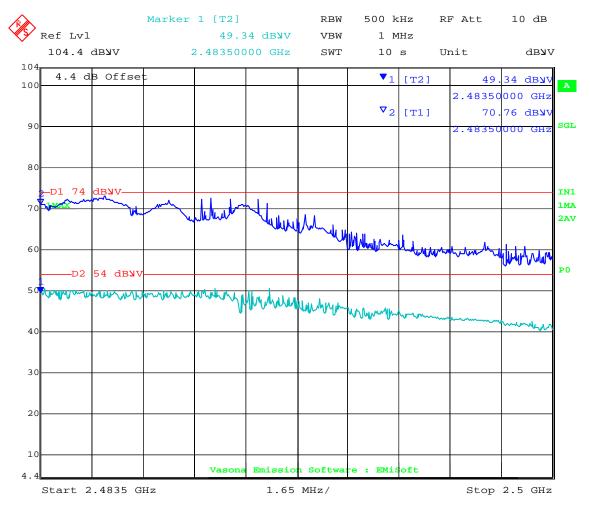


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2462.625	74.18	8.98	32.38	115.54	Peak [Scan]	٧	100	0	N/A	N/A	N/A	Pk Emission
2483.5	ADT D	ADT Dower Setting - 16		70.76	Formal Peak	<b>V</b>			74	-3.24	Pass	Band-edge
2483.5	AIXI F	ART Power Setting = 16			Formal Average	٧			54	-4.66	Pass	Band-edge



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802.11n HT--40 Band-edge 2483.5 MHz



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# ARUB20 AP-124 (ANT-10) ART Settings V Aggregate Measured Power

The following matrix identifies the ART power setting V's each output chain. The aggregate power was also measured for all three chains.

As a result of either spurious emissions (harmonic) or band-edge issues the power was reduced to bring the unit into compliance.

Configuration	ART Power Setting	Tx 1 Measur ed Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Tx 3 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
<b>Legacy a</b> (5460   5150   5745 MHz)BE	16	13.10	12.95	14.10	19.02
<b>HT-20</b> (5460   5150   5745 MHz)BE	16	13.00	13.00	13.84	18.87
<b>HT-40</b> (5150   5190   5755 MHz)BE	14	10.67	10.65	11.48	16.76
Legacy a (5745MHz)SE	12	9.46	9.83	9.80	14.95
Legacy a (5785 MHz)SE	12	8.90	8.52	9.21	14.50
Legacy a (5825 MHz)SE	12	8.43	8.79	9.07	14.35
<b>HT-20</b> (5745 MHz)SE	12	9.42	8.72	9.80	14.86
<b>HT-20</b> (5785 MHz)SE	12	8.82	8.51	9.11	14.49
<b>HT-20</b> (5825 MHz)SE	12	8.48	8.73	8.90	14.12
<b>HT-40</b> (5755 MHz)SE	12	8.67	8.55	9.57	14.58
HT-40 (5785 MHz)SE	12	8.44	8.29	9.12	14.32
<b>HT-40</b> (5815 MHz)SE	11.5	7.63	7.80	8.12	13.53

Note BE = Band-edge, SE - Spurious emissions



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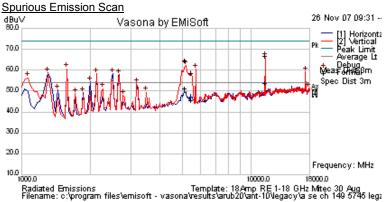
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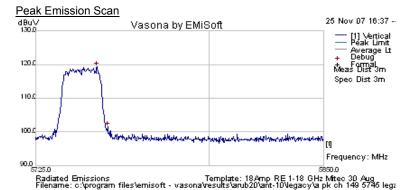
## AP124: 5725-5850 MHz ANT-10 (6 dBi) Legacy Data Rates

AP124 - ANT-10 ( <u>6 dBi</u> ) Test Configuration										
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant					
149	5745	ART 12	99%	6 Legacy	Yes					

Three antennas operating simultaneously

NRB = None Restrictive Band





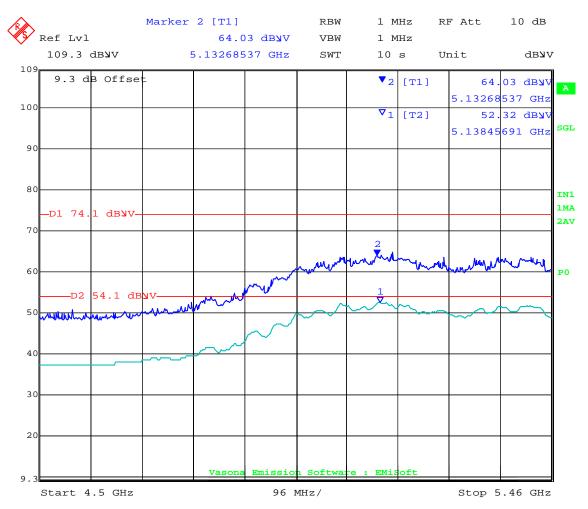
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5751.553	73.54	10.76	35.11	119.41	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
5460				60.50	Formal Peak	V			74	-13.5	Pass	Band-edge
5460	ADT Do	wer Settin	a = 16 0	49.00	Formal Average	V			54	-5.00	Pass	Band-edge
5150	ARTFO	wei Selliii	g = 10.0	64.03	Formal Peak	V			74	-9.97	Pass	Band-edge
5150				52.32	Formal Average	V			54	-1.68	Pass	Band-edge
11493.32	59.65	6.79	-1.72	64.72	Peak Max	V	138	72	74	-9.28	Pass	
1605.851	72.04	2.46	-14.26	60.24	Peak Max	>	99	182	74	-13.76	Pass	
1329.399	69.62	2.24	-15.58	56.28	Peak Max	V	105	239	74	-17.72	Pass	
1064.829	72.93	2.02	-16.08	58.86	Peak Max	V	98	124	74	-15.14	Pass	
11493.32	46.53	6.79	-1.72	51.61	Average Max	V	138	72	54	-2.39	Pass	
1605.851	53.48	2.46	-14.26	41.68	Average Max	V	99	182	54	-12.32	Pass	
1329.399	46.76	2.24	-15.58	33.42	Average Max	Н	151	103	54	-20.58	Pass	
1064.829	55.32	2.02	-16.08	41.25	Average Max	V	98	124	54	-12.75	Pass	

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802.11a Legacy Band-edge 5150, 5460MHz



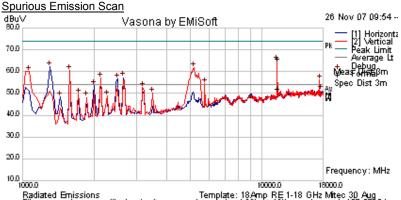
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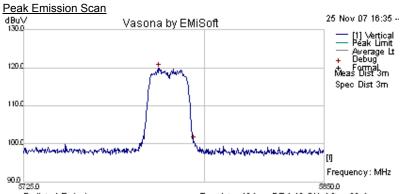
AP124 - AN	AP124 - ANT-10 ( <u>6 dBi OMNI</u> ) Test Configuration											
Channel	Channel Freq (MHz) Software Pwr Setting Duty Cycle Data Rate (MBit/s) Compliant											
157	5785	ART 12	99%	6 Legacy	Yes							

Three antennas operating simultaneously

NRB = None Restrictive Band



Radiated Emissions Template: 18 Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-10\legacy\a se ch 157 5785 lega



Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-10\legacy\a pk ch 157 5785 Leg

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5781.112	74.03	10.77	35.13	119.94	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11573.99	58.6	6.81	-1.57	63.84	Peak Max	V	98	305	74	-10.16	Pass	
11573.99	44.7	6.81	-1.57	49.94	Average Max	V	98	305	54	-4.06	Pass	
17.357.21	48.03	8.7	-0.64	56.09	Peak [Scan]	V	100	0	99.94	-43.85	Pass	



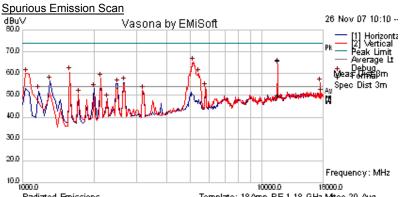
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I	AP124 - AN	AP124 - ANT-10 (6 dBi OMNI) Test Configuration												
ĺ	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant								
	165	5825	ART 12	99%	6 Legacy	Yes								

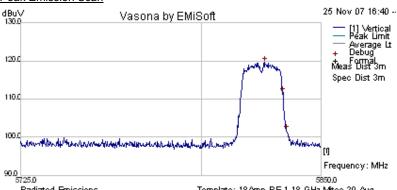
Three antennas operating simultaneously

NRB = None Restrictive Band



Radiated Emissions Template: 18 Amp. RE 1-18 GHz Mitec 30 Aug. Filename: C:\Program Files\BviSoft - \/asona\Results\ARU820\ANT-10\Legacy\a se ch 165 58;

#### Peak Emission Scan



Radiated Emissions Template: 18 Amp RE 1-18 GHz Miteo 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-10\legacy\a pk ch 165 5825 lega

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5826.453	73.64	10.8	35.17	119.6	Peak [Scan]	<b>V</b>	100	0	N/A	N/A	N/A	Pk Emission
11645.89	58.74	6.83	-1.43	64.13	Peak Max	V	115	54	74	-9.87	Pass	
11645.89	42.64	6.83	-1.43	48.03	Average Max	V	115	54	54	-5.97	Pass	



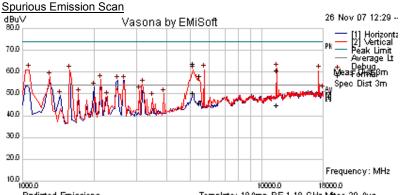
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

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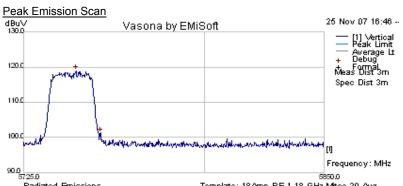
AP124 - AN	AP124 - ANT-10 (6 dBi OMNI) Test Configuration												
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant								
149	5745	ART 12	99%	6.5 HT-20	Yes								

Three antennas operating simultaneously

NRB = None Restrictive Band



Radiated Emissions Template: 18 Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-10\ht-20\a ch 149 5745 ht-20.err



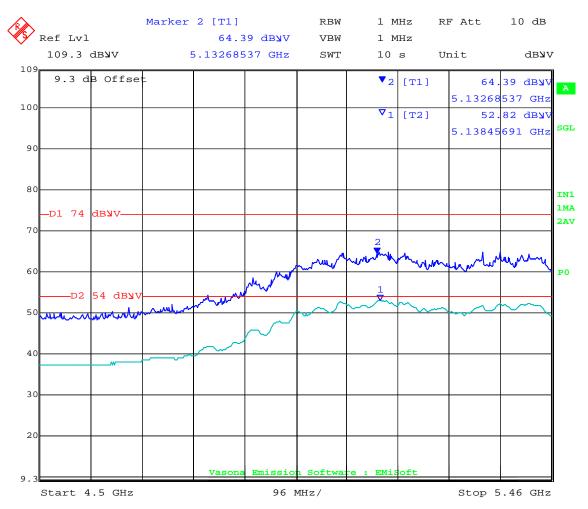
Radiated Emissions Template: 18 Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-10\ht-20\a pk ch 149 5746 HT-2i

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5746.794	73.12	10.76	35.1	118.98	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
5460				60.00	Formal Peak	٧			74	-14.00	Pass	Band-edge
5460	ADT D	ower Settii	og = 16	49.50	Formal Average	V			54	-4.50	Pass	Band-edge
5150	ARIF	ower Selli	ig – 10	64.39	Formal Peak	V			74	-9.61	Pass	Band-edge
5150				52.82	Formal Average	V			54	-1.18	Pass	Band-edge
11500.68	53.7	6.79	-1.72	58.77	Peak Max	V	135	34	74	-15.23	Pass	
11500.68	37.81	37.81 6.79 -1.72			Average Max	V	135	34	54	-11.12	Pass	
17250.5	52.65	52.65 8.62 -0.48			Peak [Scan]	٧	100	0	98.98	-38.19	Pass	NRB



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Date: 1.DEC.2007 16:50:42

802.11a HT-20 Band-edge 5150, 5460MHz

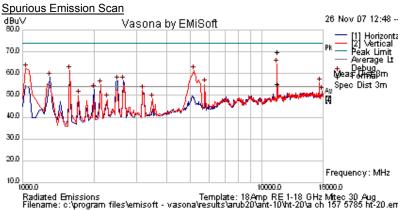


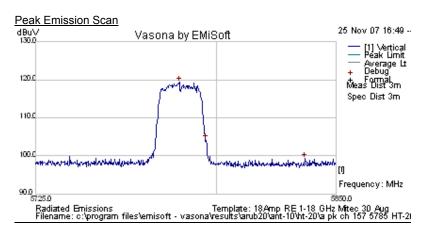
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

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AP124 - ANT-10 (6 dBi OMNI) Test Configuration												
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant							
157	5785	ART 12	99%	6.5 HT-20	Yes							

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5784.619	73.4	10.78	35.13	119.31	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11571.4	62.69	6.81	-1.58	67.92	Peak Max	V	100	57	74	-6.08	Pass	
11571.4	48.08	6.81	-1.58	53.31	Average Max	V	100	57	54	-0.69	Pass	
17795.59	43.18	8.78	-0.09	51.86	Peak [Scan]	V	100	0	99.31	-47.45	Pass	NRB

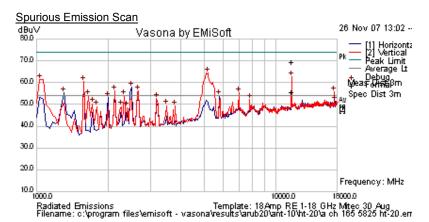


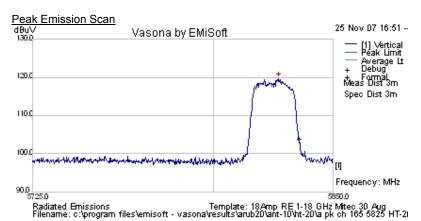
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I	AP124 - ANT-10 ( <u>6 dBi OMNI</u> ) Test Configuration												
ĺ	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant							
	165	5825	ART 12	99%	6.5 HT-20	Yes							

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5827.204	73.76	10.8	35.17	119.72	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11651.3	62.13	6.83	-1.45	67.51	Peak Max	V	124	59	74	-6.49	Pass	
11651.3	48.22	6.83	-1.45	53.6	Average Max	V	124	59	54	-0.4	Pass	
17488.98	47.54	8.76	-0.62	55.69	Peak [Scan]	V	100	0	99.72	-44.03	Pass	NRB
6995.992	52.08	5.38	-2.24	55.22	Peak [Scan]	V	100	0	99.72	-44.50	Pass	NRB
7779 559	48 78	5 54	-2 1	52 22	Peak (Scan)	V	100	n	99.72	-47 50	Pass	NRR



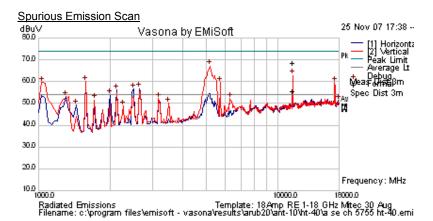
Serial #: ARUB20-A2 Rev A
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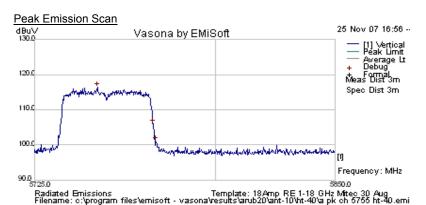
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### AP124: 5725-5850 MHz ANT-10 (6 dBi OMNI) HT-40 Data Rates

AP124 - AN	T-10 ( <u>6 dBi OM</u>	NI Cushcraft P/N: S5153V	VBPX) Test Cor	nfiguration	
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant
	5755	ART 12	99%	13.5 HT-40	Yes

Three antennas operating simultaneously



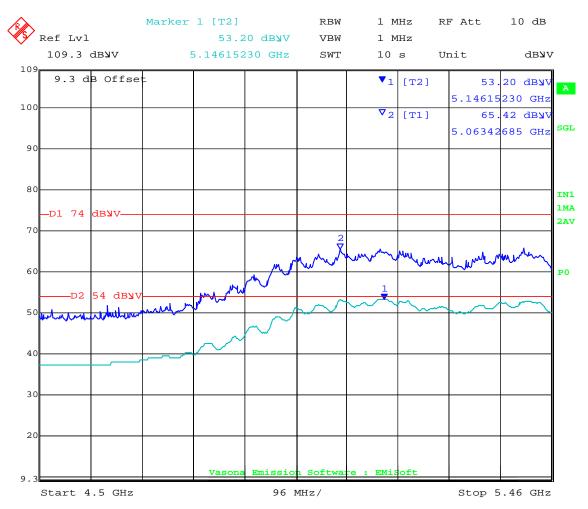


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5751.052	70.59	10.76	35.11	116.45	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
5460.00				65.00	Formal Peak	V			74	-9.00	Pass	Band-edge
5460.00	ART Po	war Sattin	a = 14 0	53.40	Formal Average	V			54	-0.6	Pass	Band-edge
5150.00	AKTTO	ART Power Setting = 14.0			Formal Peak	V			74	-8.58	Pass	Band-edge
5150.00					Formal Average	V			54	-0.80	Pass	Band-edge
11513.95	59.43	6.79	-1.71	64.52	Peak Max	V	134	44	74	-9.48	Pass	
11513.95	46.24	6.79	-1.71	51.33	Average Max	V	134	44	54	-2.67	Pass	
5190.381	71.78	4.62	-9.21	67.19	Peak [Scan]	V	100	0	96.45	-29.26	Pass	NRB
17250.5	51.55	8.62	-0.48	59.69	Peak [Scan]	V	100	0	96.45	-36.76	Pass	NRB
2635.271	65.13	3.11	-11.37	56.86	Peak [Scan]	Н	100	0	96.45	-39.45	Pass	NRB
2124.248	64.5	2.82	-11.03	56.29	Peak [Scan]	Н	100	0	96.45	-40.16	Pass	NRB



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802.11a HT-40 Band-edge 5150, 5460MHz

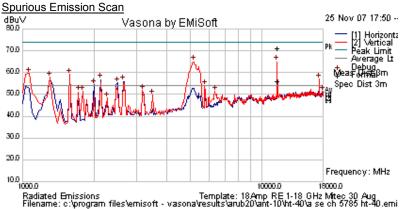


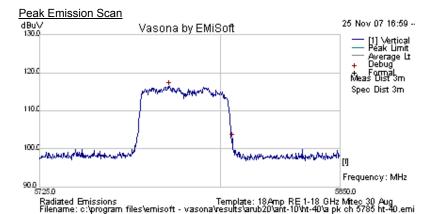
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

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AP124 - AN	AP124 - ANT-10 (6 dBi OMNI) Test Configuration												
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant								
157	5785	ART 12	99%	13.5 HT-40	Yes								

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5778.858	70.54	10.77	35.13	116.44	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11570.02	63.76	6.81	-1.58	68.99	Peak Max	V	105	57	74	-5.01	Pass	
11570.02	48.76	6.81	-1.58	53.99	Average Max	V	105	57	54	-0.01	Pass	
5190.381	69.65	4.62	-9.21	65.06	Peak [Scan]	V	100	0	96.44	-31.38	Pass	NRB
17352.71	49.05	8.68	-0.57	57.17	Peak [Scan]	V	100	0	96.44	-39.27	Pass	NRB
2124.248	65.12	2.82	-11.03	56.91	Peak [Scan]	Н	100	0	96.44	-39.53	Pass	NRB
2635.271	64.24	3.11	-11.37	55.97	Peak [Scan]	Н	100	0	96.44	-40.47	Pass	NRB



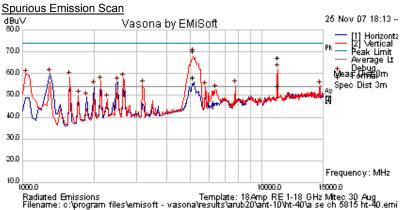
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

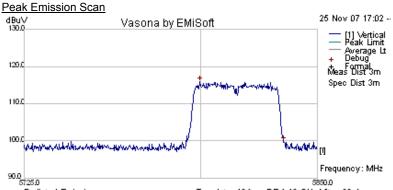
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AP124 - AN	T-10 ( <u>6 dBi OM</u>	NI) Test Configuration	AP124 - ANT-10 ( <u>6 dBi OMNI</u> ) Test Configuration												
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant										
	5815	ART 12	99%	13.5 HT-40	Yes										

Three antennas operating simultaneously

NRB = None Restrictive Band





Radiated Emissions Template: 18 Amp RE 1-18 GHz Mttec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-10\ht-40\a pk ch 5815 ht-40.emi

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5799.649	69.97	10.78	35.14	115.9	Peak [Scan]	V	100	0	N/A	N/A	N/A	Fundamental
11634.43	59.78	6.82	-1.39	65.21	Peak Max	V	99	48	74	-8.79	Pass	
1605.851	73.57	2.46	-14.26	61.77	Peak Max	V	99	182	74	-12.23	Pass	
1329.399	72.11	2.24	-15.58	58.77	Peak Max	V	105	239	74	-15.23	Pass	
1064.829	71.81	2.02	-16.08	57.75	Peak Max	V	98	124	74	-16.25	Pass	
11634.43	46.66	6.82	-1.39	52.09	Average Max	V	99	48	54	-1.91	Pass	
11401.30	48.75	6.82	-1.73	53.84	Average Max	V	103	166	54	-0.16	Pass	
1605.851	54.38	2.46	-14.26	42.58	Average Max	V	99	182	54	-11.42	Pass	
1329.399	48.18	2.24	-15.58	34.84	Average Max	Н	151	103	54	-19.16	Pass	
1064.829	56.78	2.02	-16.08	42.72	Average Max	V	98	124	54	-11.28	Pass	



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# ARUB20 AP-124 (ANT-12) ART Settings V Aggregate Measured Power

The following matrix identifies the ART power setting V's each output chain. The aggregate power was also measured for all three chains.

As a result of either spurious emissions (harmonic) or band-edge issues the power was reduced to bring the unit into compliance.

Configuration	ART Power Setting	Tx 1 Measur ed Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Tx 3 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
<b>Legacy a</b> (5460   5150   5745 MHz)BE	13	10.21	9.96	10.89	15.91
<b>HT-20</b> (5460   5150   5745 MHz)BE	12.5	9.83	9.13	10.37	15.38
<b>HT-40</b> (5150   5190   5755 MHz)BE	10	7.06	6.53	7.73	12.70
Legacy a (5745MHz)SE	11.5	8.88	8.40	9.36	14.42
Legacy a (5785 MHz)SE	12	8.90	8.53	9.21	14.50
Legacy a (5825 MHz)SE	12	8.45	8.76	9.05	14.35
<b>HT-20</b> (5745 MHz)SE	14	11.18	11.03	12.01	16.99
<b>HT-20</b> (5785 MHz)SE	14	10.87	10.57	11.49	16.66
<b>HT-20</b> (5825 MHz)SE	11.5	7.97	8.27	8.35	13.64
<b>HT-40</b> (5755 MHz)SE	12	8.75	8.36	9.51	14.58
<b>HT-40</b> (5785 MHz)SE	12	8.49	8.30	9.25	14.32
<b>HT-40</b> (5815 MHz)SE	12	8.10	8.29	8.70	14.10

Note BE = Band-edge, SE – Spurious emissions



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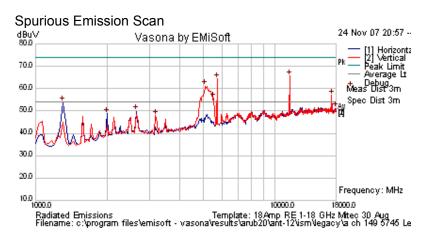
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# AP124: 5725-5850 MHz ANT-12 (14 dBi OMNI) Legacy Data Rates

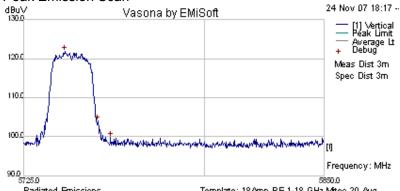
AP124 - AN	AP124 - ANT-12 (14 dBi OMNI) Test Configuration												
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant								
149	5745	ART 11.5	99%	6 Legacy	Yes								

Three antennas operating simultaneously

NRB = None Restrictive Band



#### Peak Emission Scan



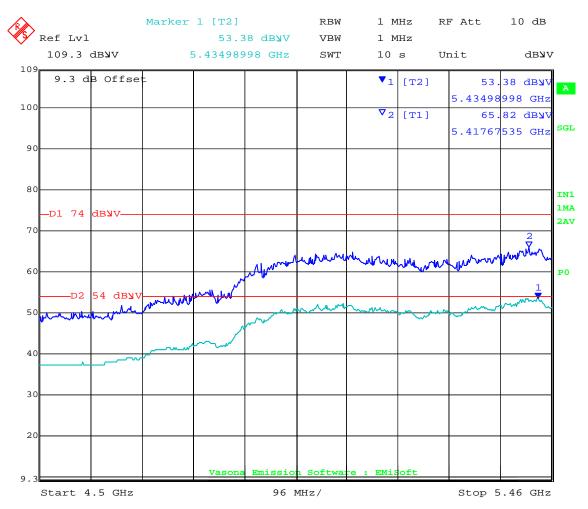
Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-12\ism\egacy\a ch 6745 legacy

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5742.034	76.06	10.75	35.1	121.91	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
5460				65.82	Formal Peak	V			74	-8.18	Pass	Band-edge
5460	ADT Do	wer Settin	a = 12 0	53.38	Formal Average	V			54	-0.62	Pass	Band-edge
5150	AKTFO	wei Selliii	g = 13.0	64.10	Formal Peak	V			74	-9.90	Pass	Band-edge
5150				52.50	Formal Average	V			54	-1.50	Pass	Band-edge
11497.32	63.09	6.79	-1.72	68.16	Peak Max	V	106	63	74	-5.84	Pass	
11497.32	48.88	6.79	-1.72	53.95	Average Max	V	106	63	54	-0.05	Pass	
17250.5	53.75	8.62	-0.48	61.89	Peak [Scan]	٧	100	0	101.91	-40.02	Pass	NRB



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Date: 1.DEC.2007 17:14:15

802.11a Legacy Band-edge 5150, 5460MHz



Serial #: ARUB20-A2 Rev A
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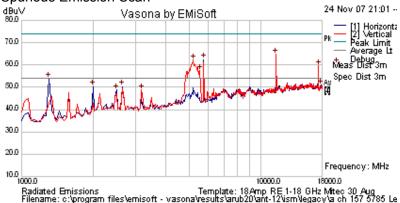
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AP124 - AN	T-12 ( <u>14 dBi Ol</u>	MNI )Test Configuration	AP124 - ANT-12 (14 dBi OMNI )Test Configuration												
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant										
157	5785	ART 12	99%	6 Legacy	Yes										

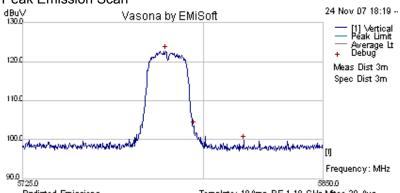
Three antennas operating simultaneously

NRB = None Restrictive Band

#### Spurious Emission Scan



#### Peak Emission Scan



Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-12\ism\egacy\a ch 5785 legacy

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5784.118	76.83	10.78	35.13	122.74	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11561.12	58.23	6.8	-1.61	63.42	Peak Max	V	102	330	74	-10.58	Pass	
11561.12	39.19	6.8	-1.61	44.39	Average Max	Н	120	86	54	-9.61	Pass	
17352.71	55.32	8.68	-0.57	63.44	Peak [Scan]	٧	100	0	102.74	-39.30	Pass	NRB



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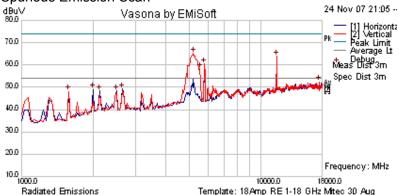
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I	AP124 - ANT-12 (14 dBi OMNI) Test Configuration												
Ì	Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MBit/s)	Compliant							
	165	5825	ART 12	99%	6 Legacy	Yes							

Three antennas operating simultaneously

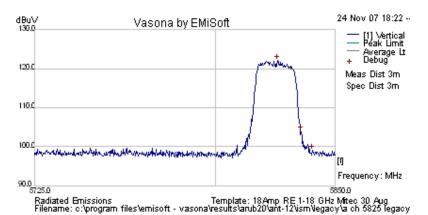
NRB = None Restrictive Band

#### Spurious Emission Scan



Radiated Emissions Template: 18 Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\vesults\arub20\ant-12\ism\egacy\a ch 165 5825 Le

#### Peak Emission Scan



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5825.701	76.18	10.8	35.16	122.15	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11650.81	62.95	6.83	-1.45	68.33	Peak Max	V	130	329	74	-5.67	Pass	
11650.81	47.97	6.83	-1.45	53.35	Average Max	V	130	329	54	-0.65	Pass	



Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

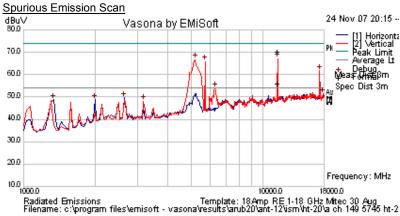
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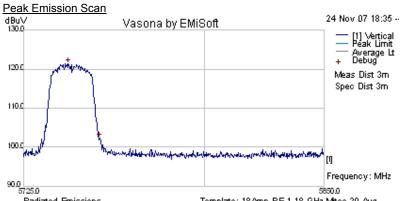
#### AP124: 5725-5850 MHz ANT-12 (14 dBi OMNI) Legacy Data Rates

AP124 - AN	AP124 - ANT-12 (14 dBi OMNI) Test Configuration												
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant								
149	5745	ART 14	99%	6.5 HT-20	Yes								

Three antennas operating simultaneously

NRB = None Restrictive Band





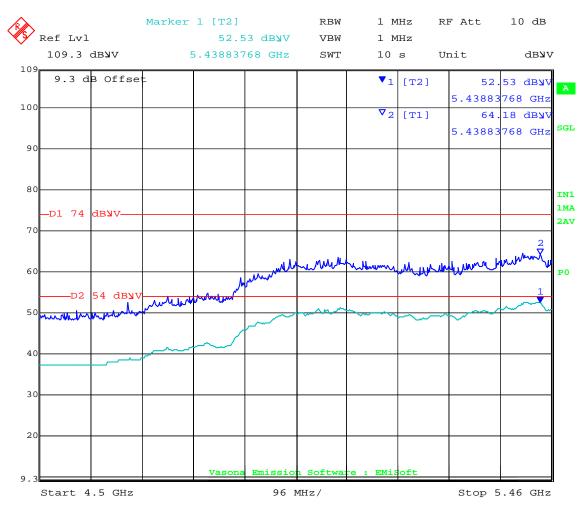
Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\vesults\arub20\ant-12\ism\nt-20\a ch 5745 HT-20.ei

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5743.537	75.52	10.75	35.1	121.37	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
5460				64.18	Formal Peak	V			74	-9.82	Pass	Band-edge
5460	ART Po	wer Settin	a = 12 5	52.53	Formal Average	V			54	-1.47	Pass	Band-edge
5150	AKTTO	wer octain	g = 12.5	63.10	Formal Peak	V			74	-10.9	Pass	Band-edge
5150				51.00	Formal Average	V			54	-3.00	Pass	Band-edge
11497.32	63.09	6.79	-1.72	68.16	Peak Max	V	106	63	74	-5.84	Pass	
11497.32	48.88	6.79	-1.72	53.95	Average Max	V	106	63	54	-0.05	Pass	
5224.449	71.24	4.62	-9.09	66.77	Peak [Scan]	V	100	0	101.37	-34.60	Pass	NRB
17250.5	53.75	8.62	-0.48	61.89	Peak [Scan]	٧	100	0	101.37	-39.48	Pass	NRB
6314.629	56.29	5.04	-7.18	54.16	Peak [Scan]	٧	100	0	101.37	-47.21	Pass	NRB



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Date: 1.DEC.2007 17:12:21

802.11a HT-20 Band-edge 5150, 5460MHz



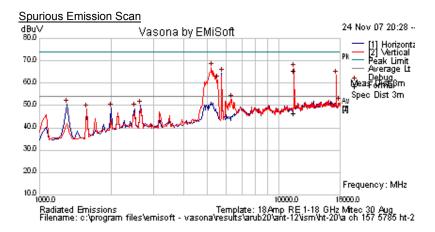
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

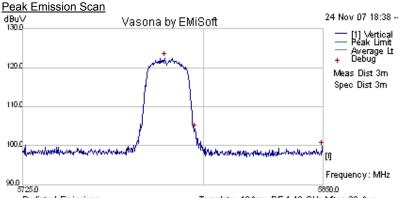
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AP124 - AN	AP124 - ANT-12 (14 dBi OMNI) Test Configuration						
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant		
157	5785	ART 14	99%	6.5 HT-20	Yes		

Three antennas operating simultaneously

NRB = None Restrictive Band





Radiated Emissions Template: 18 Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-12\ism\nt-20\a ch 5785 HT-20.ei

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5783.868	76.53	10.78	35.13	122.44	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11561.12	58.23	6.8	-1.61	63.42	Peak Max	V	102	330	74	-10.58	Pass	
11561.12	39.19	6.8	-1.61	44.39	Average Max	Н	120	86	54	-9.61	Pass	
17352.71	55.32	8.68	-0.57	63.44	Peak [Scan]	V	100	0	102.44	-39.00	Pass	NRB
5531.062	65.05	4.64	-8.32	61.37	Peak [Scan]	V	100	0	102.44	-41.07	Pass	NRB
6348.697	54.79	5.06	-7.05	52.81	Peak [Scan]	V	100	0	102.44	-49.63	Pass	NRB

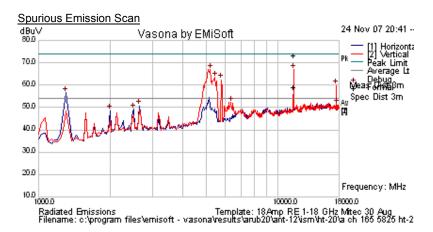


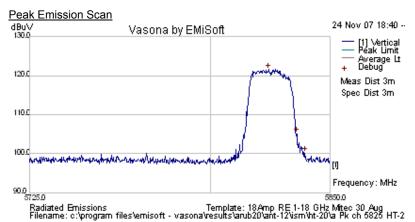
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AP124 - AN	AP124 - ANT-12 (14 dBi OMNI) Test Configuration							
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant			
165	5825	ART 11.5	99%	6.5 HT-20	Yes			

Three antennas operating simultaneously





Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5824.198	75.65	10.8	35.16	121.62	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11650.81	62.95	6.83	-1.45	68.33	Peak Max	V	130	329	74	-5.67	Pass	
11650.81	47.97	6.83	-1.45	53.35	Average Max	V	130	329	54	-0.65	Pass	
17488.98	51.68	8.76	-0.62	59.83	Peak [Scan]	V	100	0	101.62	-41.79	Pass	NRB
6382.766	54.13	5.08	-6.9	52.3	Peak [Scan]	V	100	0	101.62	-49.32	Pass	NRB



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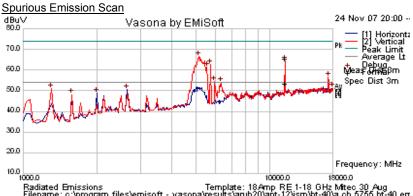
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#### AP124: 5725-5850 MHz ANT-12 (14 dBi OMNI) HT-40 Data Rates

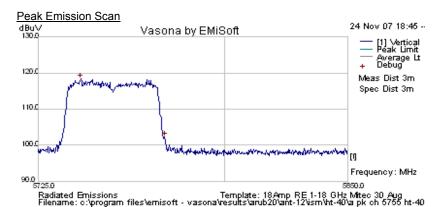
AP124 - AN	AP124 - ANT-12 (14 dBi OMNI) Test Configuration						
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant		
	5755	ART 12	99%	13.5 HT-40	Yes		

Three antennas operating simultaneously

NRB = None Restrictive Band



Radiated Emissions Template: 18 Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-12\ism\nt-40\a ch 5755 ht-40.em



Measurement Cable AF Pol Hgt Limit Comments Frequency Raw Level Azt Margin **Pass** dBuV MHz Loss dB dBuV Type Deg dBuV dB /Fail ٧ 5742.285 72.55 10.75 35.1 118.4 Peak [Scan] 100 0 N/A N/A N/A Pk Emission 5460 65.56 Formal Peak ٧ 74 -8.44 **Pass** Band-edge 5460 53.01 Formal Average ٧ 54 -0.99 Pass Band-edge ART Power Setting = 10.0 ٧ 5150 64.90 Formal Peak 74 -9.10 Pass Band-edge V 54 Pass 5150 52.10 Formal Average -1.90Band-edge 11519.118 58.49 6.79 -1.7 63.59 Peak Max ٧ 108 168 74 -10.41 Pass ٧ 6.79 -1.7 51.18 -2.82 11519.118 46.09 Average Max 108 168 54 **Pass** 4.62 ٧ **NRB** 71.39 -9.28 66.73 100 0 98.4 -31.67 5156.313 Peak [Scan] Pass 5565.13 64.97 4.66 -8.35 61.28 V 100 0 98.4 -37.12 **NRB** Peak [Scan] Pass 17250.501 48.54 8.62 -0.48 56.69 ٧ 100 0 98.4 -41.71 NRB Peak [Scan] Pass -7.8 ٧ 100 0 **NRB** 5973.948 57.36 4.88 54.44 Peak [Scan] 98.4 -43.96 Pass -7.05 ٧ 100 0 Pass **NRB** 6348.697 55.81 5.06 53.82 Peak [Scan] 98.4 -44.58

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Date: 1.DEC.2007 17:09:09

802.11a HT-40 Band-edge 5150, 5460MHz



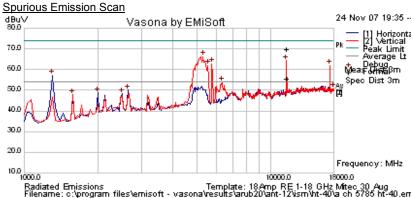
Serial #: ARUB20-A2 Rev A Issue Date: 11th December 2007

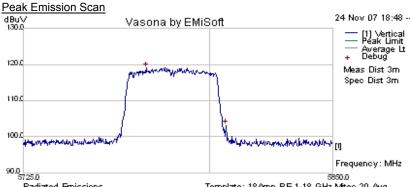
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AP124 - AN	AP124 - ANT-12 (14 dBi OMNI) Test Configuration						
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant		
157	5785	ART 12	99%	13.5 HT-40	Yes		

Three antennas operating simultaneously

NRB = None Restrictive Band





Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug Filename: c:\program files\emisoft - vasona\results\arub20\ant-12\ism\nt-40\a pk ch 5785 ht-40

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5774.349	73.31	10.77	35.12	119.2	Peak [Scan]	V	100	0	N/A	N/A	N/A	Pk Emission
11571.09	62.39	6.81	-1.58	67.62	Peak Max	V	129	330	74	-6.38	Pass	
11571.09	48.09	6.81	-1.58	53.32	Average Max	V	129	330	54	-0.68	Pass	
17352.705	53.91	8.68	-0.57	62.02	Peak [Scan]	V	100	0	99.2	-37.18	Pass	NRB
5565.13	65.69	4.66	-8.35	62	Peak [Scan]	V	100	0	99.2	-37.20	Pass	NRB
6348.697	55.77	5.06	-7.05	53.78	Peak [Scan]	V	100	0	99.2	-45.42	Pass	NRB
18000	42.59	8.78	-0.43	50.94	Peak [Scan]	V	100	0	54	-3.06	Pass	
2635.271	58.33	3.11	-11.37	50.07	Peak [Scan]	Н	100	0	99.2	-49.13	Pass	NRB
1987.976	57.32	2.74	-11.26	48.8	Peak [Scan]	Н	100	0	54	-5.2	Pass	
2498.998	56.77	3	-11.26	48.51	Peak [Scan]	Н	100	0	54	-5.49	Pass	
1579.158	60.09	2.44	-14.51	48.01	Peak [Scan]	V	100	0	54	-5.99	Pass	

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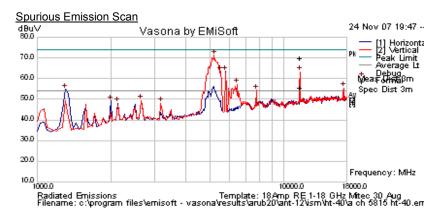
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AP124 - AN	AP124 - ANT-12 (14 dBi OMNI) Test Configuration						
Channel	Freq (MHz)	Software Pwr Setting	Duty Cycle	Data Rate (MCS)	Compliant		
	5815	ART 12	99%	13.5 HT-40	Yes		

Three antennas operating simultaneously

NRB = None Restrictive Band



Peak Emission Scan

dBuV Vasona by EMiSoft 24 Nov 07 18:50 -1300 Peak Limit Average It
1200 Meas Dist 3m

1100 Prequency: MHz
1200 Si 25.0

Radiated Emissions
Filename: c:\program files\emisoft - vasona\vesults\arub20\vesults\aru

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5819.94	73.36	10.8	35.16	119.32	Peak [Scan]	V	100	0	N/A	N/A	N/A	Fundamental
5150.00												Band-edge
5460.00												Band-edge
11631.934	62.39	6.82	-1.39	67.82	Peak Max	V	142	329	74	-6.18	Pass	
11631.934	48	6.82	-1.39	53.44	Average Max	V	142	329	54	-0.56	Pass	
5224.449	75.78	4.62	-9.09	71.31	Peak [Scan]	V	100	0	99.32	-28.01	Pass	NRB
5531.062	67.27	4.64	-8.32	63.59	Peak [Scan]	V	100	0	99.32	-35.73	Pass	NRB
6450.902	58.7	5.11	-6.57	57.24	Peak [Scan]	V	100	0	99.32	-42.08	Pass	NRB
17454.91	47.36	8.74	-0.56	55.55	Peak [Scan]	V	100	0	99.32	-43.77	Pass	NRB



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# **Specification Limits**

FCC §15.247(d) and RSS-210 §A8.5 In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

#### FCC §15.247(d)

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section §15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(a)).

IC RSS-210 §A8.5 If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

#### IC RSS-Gen §4.7

The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate of carrier frequency), or from 30 MHz, whichever is the lowest frequency, to the  $5^{th}$  harmonic of the highest frequency generated without exceeding 40 GHz.

FCC §15.205 (a) Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

**FCC §15.205 (a)** Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

FCC §15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.



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### §15.209 (a) Limit Matrix

Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (meters)		
30-88	100	40.0	3		
88-216	150	43.5	3		
216-960	200	46.0	3		
Above 960	500	54.0	3		

# **Laboratory Measurement Uncertainty for Radiated Emissions**

Measurement uncertainty	+5.6/ -4.5 dB
-------------------------	---------------

# **Traceability**

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312



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## 5.1.6.2. Receiver Radiated Spurious Emissions (above 1 GHz)

## Industry Canada RSS-Gen §4.8, §6

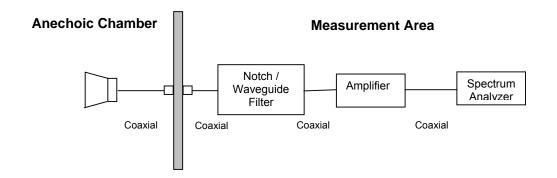
#### **Test Procedure**

Radiated emissions above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned.

All measurements on any frequency or frequencies over 1 MHz are based on the use of measurement instrumentation employing an average detector function. All measurements above 1 GHz were performed using a minimum resolution bandwidth of 1 MHz.

All Sectors of the EUT were tested simulatneously

# **Test Measurement Set up**



Measurement set up for Radiated Emission Test

# **Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

FS = R + AF + CORR - FO

where: FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL - AG + NFL

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss



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#### For example:

Given receiver input reading of 51.5 dB $_{\mu}$ V; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 dB\mu V/m$$

Conversion between dB $\mu$ V/m (or dB $\mu$ V) and  $\mu$ V/m (or  $\mu$ V) are done as:

Level (dB $\mu$ V/m) = 20 \* Log (level ( $\mu$ V/m))

40 dB $\mu$ V/m = 100  $\mu$ V/m 48 dB $\mu$ V/m = 250  $\mu$ V/m

Section 5.1.6.1 Transmitter Spurious above 1 GHz identifies that emissions peaking above 54 dB $\mu$ V/m emanate from the EUT and not transmitted through the antenna port. These (1 – 3.5 GHz) emissions were formally measured and characterized and are not considered when examining Receiver Radiated Spurious above 1 GHz.



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### Receiver Radiated Spurious Emissions above 1 GHz

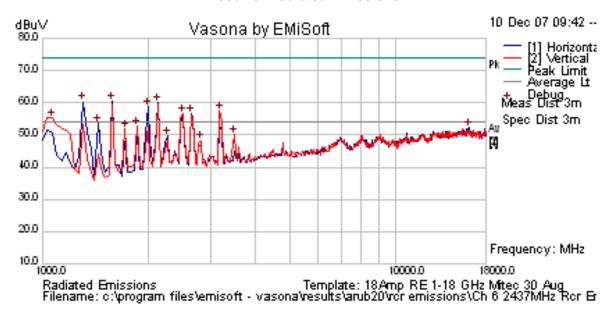
The 2.4 GHz and 5 GHz receiver radiated spurious emissions were tested simultaneously on mid-channel.

### Test Setup – 2.4 GHz channel 2437 GHz, 5 GHz channel 5785 MHz

TABLE OF RESULTS -

Freq. (MHz)	Pol. (H/V)	Raw Reading (dB <sub>µ</sub> V/m)	Correction Factor (dB)	Corrected Field Strength (dBµV/m)	Limit (dBμV/m)	Margin (dB)

### 802.11b Channel 2437 MHz Receiver Radiated Emissions



See Section 5.1.6.1 for characterization of emissions (1 – 3.5 GHz) breaking the 54 dB $\mu$ V/m limit line.

No receiver emissions were observed.



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### **Specification**

### **Receiver Radiated Spurious Emissions**

### Industry Canada RSS-Gen §4.8,

The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tunable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz.

### RSS-Gen §6

The following receiver spurious emission limits shall be complied with;

(a) If a radiated measurement is made, all spurious emissions hall comply with the limits of Table 1.

Frequency (MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

#### **Laboratory Measurement Uncertainty for Radiated Emissions**

Measurement uncertainty	+5.6/ -4.5 dB

**Traceability** 

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312



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### 5.1.6.3. Radiated Spurious Emissions (30M-1 GHz)

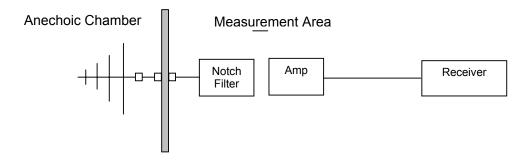
FCC, Part 15 Subpart C §15.205/ §15.209 Industry Canada RSS-210 §2.2

#### **Test Procedure**

Testing 30M-1 GHz was performed in a 3-meter anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed. The anechoic chamber test set-up is identified in Section 6 Test Set-Up Photographs.

The EUT had two methods of powering on ac/dc converter and Power over Ethernet (POE). Both modes were tested for emissions below 1GHz.

### **Test Measurement Set up**



#### **Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

FS = R + AF + CORR

where:

FS = Field Strength
R = Measured Receiver Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss

AG = Amplifier Gain



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### For example:

Given a Receiver input reading of  $51.5dB\mu V$ ; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

 $FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 dB\mu V/m$ 

Conversion between  $dB\mu V/m$  (or  $dB\mu V$ ) and  $\mu V/m$  (or  $\mu V$ ) are done as:

Level (dB $\mu$ V/m) = 20 \* Log (level ( $\mu$ V/m))

 $40 \text{ dB}\mu\text{V/m} = 100\mu\text{V/m}$  $48 \text{ dB}\mu\text{V/m} = 250\mu\text{V/m}$ 

### Measurement Results for Spurious Emissions (30 MHz – 1 GHz)

Ambient conditions.

Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar



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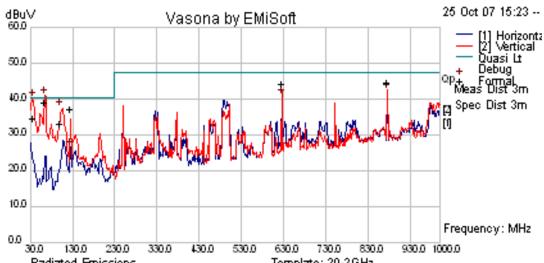
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#### **TABLE OF RESULTS**

EUT powered via AC/DC Convertor

Freq.	Peak	QP	QP Lmt	QP	Angle	Height	Delevity
(MHz)	(dBuV/m)	(dBuV/m)	(dBuV/m)	Margin (dB)	(deg)	(cm)	Polarity
37.435	40.29	32.89	40.5	-7.61	303	98	V
65.034	41.09	37.15	40.5	-3.35	286	98	V
100.489	37.58	31.55	40.5	-8.95	105	103	V
125.008	26.69	35.38	40.5	-5.12	174	98	V
625.011	41.2	42.51	47.5	-4.99	130	110	Н
875.054	42.57	42.84	47.5	-4.66	0	102	V

### Radiated Spurious Emissions 30 MHz to 1 GHz - AC/DC Convertor





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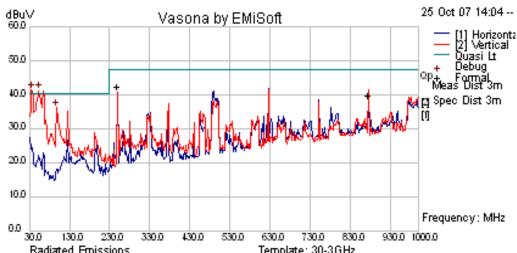
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#### **TABLE OF RESULTS**

**EUT** powered via POE

Freq. (MHz)	Peak (dBuV/m)	QP (dBuV/m)	QP Lmt (dBuV/m)	QP Margin (dB)	Angle (deg)	Height (cm)	Polarity
38.846	41.38	34.54	40.5	-5.96	243	98	V
55.443	41.3	38.15	40.5	-2.35	44	101	V
98.097	36.18	34.47	40.5	-6.03	80	118	V

### Radiated Spurious Emissions 30 MHz to 1 GHz - POE





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### **Specification**

#### Limits

**§15.205 (a)** Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

§15.205 (a) Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

### §15.209 (a) and RSS-Gen §2.2 Limit Matrix

Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

### **Laboratory Measurement Uncertainty for Radiated Emissions**

Measurement uncertainty	+5.6/ -4.5 dB

### **Traceability**

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312



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### 5.1.7. AC Wireline Conducted Emissions (150 kHz – 30 MHz)

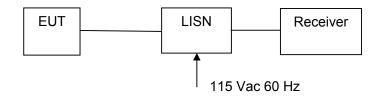
### FCC, Part 15 Subpart C §15.207

Industry Canada RSS-Gen §7.2.2

#### **Test Procedure**

The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

### **Test Measurement Set up**



Measurement set up for AC Wireline Conducted Emissions Test

### Measurement Results for AC Wireline Conducted Emissions (150 kHz – 30 MHz)

Ambient conditions.

Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar



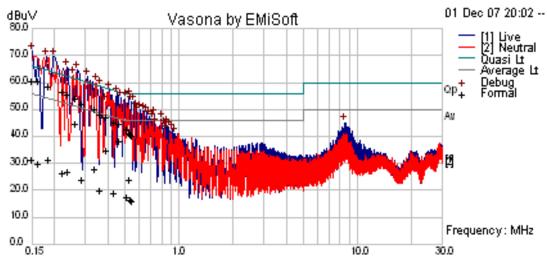
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### TABLE OF RESULTS - ac/dc Converter

Freq (MHz)	Line	Peak (dBμV)	QP (dBμV)	QP Limit (dBμV)	QP Margin (dB)	Ave. (dBμV)	Ave. Limit (dBμV)	Ave. Margin (dB)
0.150	Live	71.57	58.36	65.99	-7.64	29.19	55.99	-26.80
0.187	Live	69.74	55.98	64.18	-8.21	29.05	54.18	-25.13
0.265	Live	64.52	51.52	61.27	-9.75	42.39	51.27	-8.89
0.392	Live	52.92	45.03	58.02	-12.99	32.22	48.02	-15.8
0.463	Live	55.83	42.49	56.65	-14.16	35.68	46.65	-10.97
0.534	Live	54.53	38.97	56.00	-17.03	21.39	46.00	-24.61

### AC Wireline Conducted Emissions -150 kHz - 30 MHz) ac/dc Converter



Power Line Conducted Emissions Filename: c:\program files\emisoft - vasona\results\arub20\ac wireline emissions\ARUB20 ac do



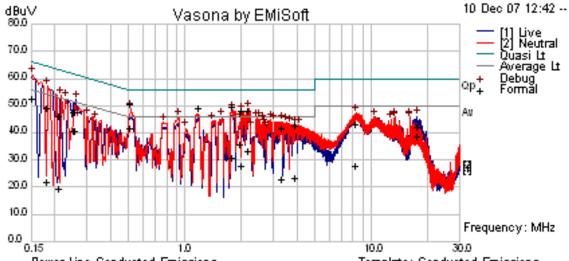
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#### **TABLE OF RESULTS - POE**

Freq (MHz)	Line	Peak (dBμV)	QP (dBμV)	QP Limit (dBμV)	QP Margin (dB)	Ave. (dBμV)	Ave. Limit (dBμV)	Ave. Margin (dB)
0.154	Neutral		50.3	65.78	-15.48	50.3	55.78	-5.48
0.515	Neutral		48.08	56.00	-7.92	39.28	46.00	-6.72
2.204	Neutral		45.93	56.00	-10.07	30.93	46.00	-15.17
1.803	Neutral		47.31	56.00	-8.69	28.60	46.00	-17.40
2.039	Neutral		45.94	56.00	-10.06	25.65	46.00	-20.35
1.195	Neutral		44.77	56.00	-11.23	23.71	46.00	-22.29

### AC Wireline Conducted Emissions –150 kHz – 30 MHz) POE



Power Line Conducted Emissions
Filename: c:\program files\emissif - vasona\results\arub20\ac wireline emissions\poe 48vdc.em



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### **Specification**

#### Limit

**§15.207 (a)** Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu\Omega$  line impedance stabilization network (LISN), see §15.207 (a) matrix below. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

### **RSS-Gen §7.2.2**

The radio frequency voltage that is conducted back into the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table below. The tighter limit applies at the frequency range boundaries.

### §15.207 (a) and RSS-Gen §7.2.2 Limit Matrix

The lower limit applies at the boundary between frequency ranges

Frequency of Emission (MHz)	Conduc	ted Limit (dBμV)
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

<sup>\*</sup> Decreases with the logarithm of the frequency

#### **Laboratory Measurement Uncertainty for Conducted Emissions**

Measurement uncertainty	±2.64 dB
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# **Traceability**

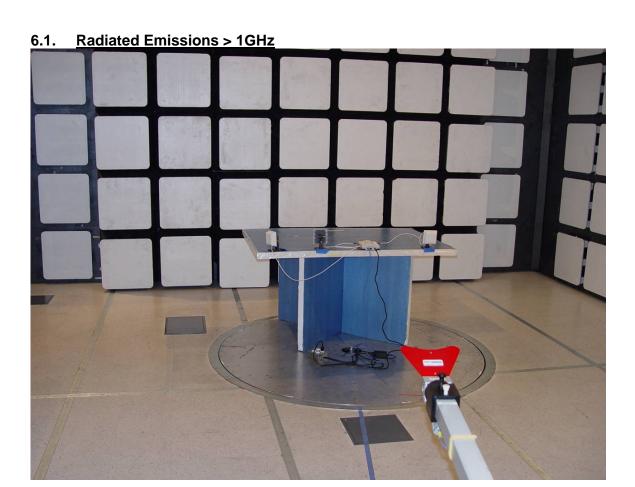
Method	Test Equipment Used
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'	0158, 0184, 0193, 0190, 0293, 0307



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# 6. PHOTOGRAPHS





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# 6.2. Radiated Emissions < 1GHz with ac Power Converter





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# 6.3. Radiated Emissions < 1GHz with POE (Power Over EtherNet)





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# 6.4. AC Wireline Conducted Emissions ac/dc Converter

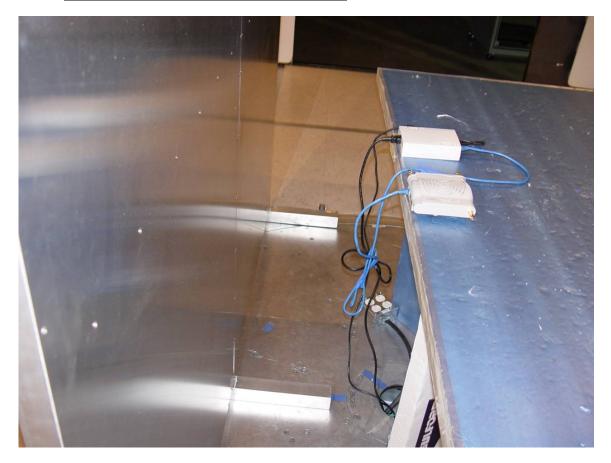




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# 6.5. AC Wireline Conducted Emissions POE





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# 6.6. General Measurement Test Set-Up





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# 7. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #
0088	Spectrum Analyzer	Hewlett Packard	8564E	3410A00141
0134	Amplifier	Com Power	PA 122	181910
0158	Barometer /Thermometer	Control Co.	4196	E2846
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007
0252	SMA Cable	Megaphase	Sucoflex 104	None
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787- 3G03G0	209089-001
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181- 3G0300	209092-001
0313	Coupler	Hewlett Packard	86205A	3140A01285
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623
0070	Power Meter	Hewlett Packard	437B	3125U11552
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0184	Pulse Limiter	Rhode & Schwartz	ESH3Z2	357.8810.52
0190	LISN	Rhode & Schwartz	ESH3Z5	836679/006
0293	BNC Cable	Megaphase	1689 1GVT4	15F50B001
0301	5.6 GHz Notch Filter	Micro-Tronics	RBC50704	001
0302	5.25 GHz Notch Filter	Micro-Tronics	BRC50703	002
0303	5.8 GHz Notch Filter	Micro-Tronics	BRC50705	003
0304	2.4GHzHz Notch Filter	Micro-Tronics		001
0307	BNC Cable	Megaphase	1689 1GVT4	15F50B002
0335	1-18GHz Horn Antenna	ETS- Lindgren	3117	00066580
0337	Amplifier	MiCOM Labs		
0338	Antenna	Sunol Sciences	JB-3	A052907



440 Boulder Court, Suite 200 Pleasanton, CA 94566, USA Tel: 1.925.462.0304 Fax: 1.925.462.0306 www.micomlabs.com