FCC Test Report

Product Name ： TwoNav Anima+
Model No. ： ANB1401
FCC ID. ： OR5-ANB1401

Applicant ： CompeGPS Team SL
Address ： Carrer d'en Draper, 13, 08350 Arenys de Mar, Barcelona, Spain

Date of Receipt ： 2014/11/10
Issued Date ： 2014/12/19
Report No. ： 14B0253R-RFUSP15V00
Report Version ： V1.0

Test Report Certification

Issued Date : 2014/12/19
Report No. : 14B0253R-RFUSP15V00

QuieTek

Product Name	:	TwoNav Anima+
Applicant	:	CompeGPS Team SL
Address	:	Carrer d'en Draper, 13, 08350 Arenys de Mar, Barcelona, Spain
Manufacturer	:	Holux Technology, Inc.
Model No.	:	ANB1401
Trade Name	:	TwoNav by CompeGPS
FCC ID.	:	OR5-ANB1401
EUT Voltage	:	Mode 1: DC 3V (Power by Battery) Mode 2: DC 3.7V (Power by Battery) Mode 3: DC 5V (Power by Notebook PC) Mode 4: AC100-240V, 50-60Hz
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.249: 2013
Test Result	:	Complied

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

Documented By : Demi Chang

(Demi Chang / Engineering Adm. Specialist)

Reviewed By : Ken Huang

(Ken Huang / Assistant Engineer)

Approved By : Roy Wang

(Roy Wang / Director)

Laboratory Information

We, **QuieTek Corporation**, are an independent RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025 specified testing scopes:

Taiwan R.O.C.	**:**	**TAF, Accreditation Number: 3024**
USA	**:**	**FCC, Registration Number: 365520**
Canada	**:**	**IC, Submission No: 150981**

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site:http://www.quietek.com/tw/ctg/cts/accreditations.htm
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/
If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

HsinChu Testing Laboratory:
No.75-2, 3rd Lin, Wangye Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan, R.O.C.
TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : service@quietek.com

LinKou Testing Laboratory:
No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : service@quietek.com

TABLE OF CONTENTS

1. General Information

1.1. EUT Description

Product Name	TwoNav Anima+
Trade Name	TwoNav by CompeGPS
Model No.	ANB1401
Frequency Range / Number of Channels	2457MHz / 1 channel
Type of Modulation	GFSK
Antenna Type	Chip Antenna
Antenna Gain	2dBi (Ant+) 0dBi (GPS)

Component	
USB Cable	Shielded, 0.8m, one ferrite core bonded
Power Adapter	Saga Power, KSAS0060500100VUU I/P: 100-240V~50/60Hz, 0.18A O/P: 5.0V ⎓ 1A

Working Frequency of Each Channel	
Channel	Frequency
Channel 01	2457 MHz

Note:

1. This device is an TwoNav Anima+ included a 2.4GHz transmitting and receiving function.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249.
3. Regards to the frequency band operation; the lowest、middle and highest frequency of channel were selected to perform the test, and then shown on this report.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
5. This device is a composite device in accordance with Part 15 regulations. The function receiving was measured and made a test report that the report number is 14B0253R-ITUSP01V00 under Declaration of Conformity.

1.2. Test Mode

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode	
EMI	Mode 1: Transmit_Power by 3V Battery Mode 2: Transmit_Power by 3.7V Battery Mode 3: Transmit_Power by Notebook PC Mode 4: Transmit_Power by Adapter
Final Test Mode	
TX	Mode 1: Transmit_Power by 3V Battery Mode 2: Transmit_Power by 3.7V Battery Mode 3: Transmit_Power by Notebook PC Mode 4: Transmit_Power by Adapter

Emission	
Performed Item	Test
Conducted Emission	Yes
Fundamental Power	Yes
Radiated Emission	Yes
Band Edge	Yes

1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Test Mode		Mode 1: Transmit_Power by 3V Battery Mode 2: Transmit_Power by 3.7V Battery				
Product		Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1	Notebook PC	HP	HSTNN-146C	CNU8253S1X	DoC	Non-Shielded, 1.8m
2	SD Card	Transcend	TS512MSD80	160073-4668	DoC	--

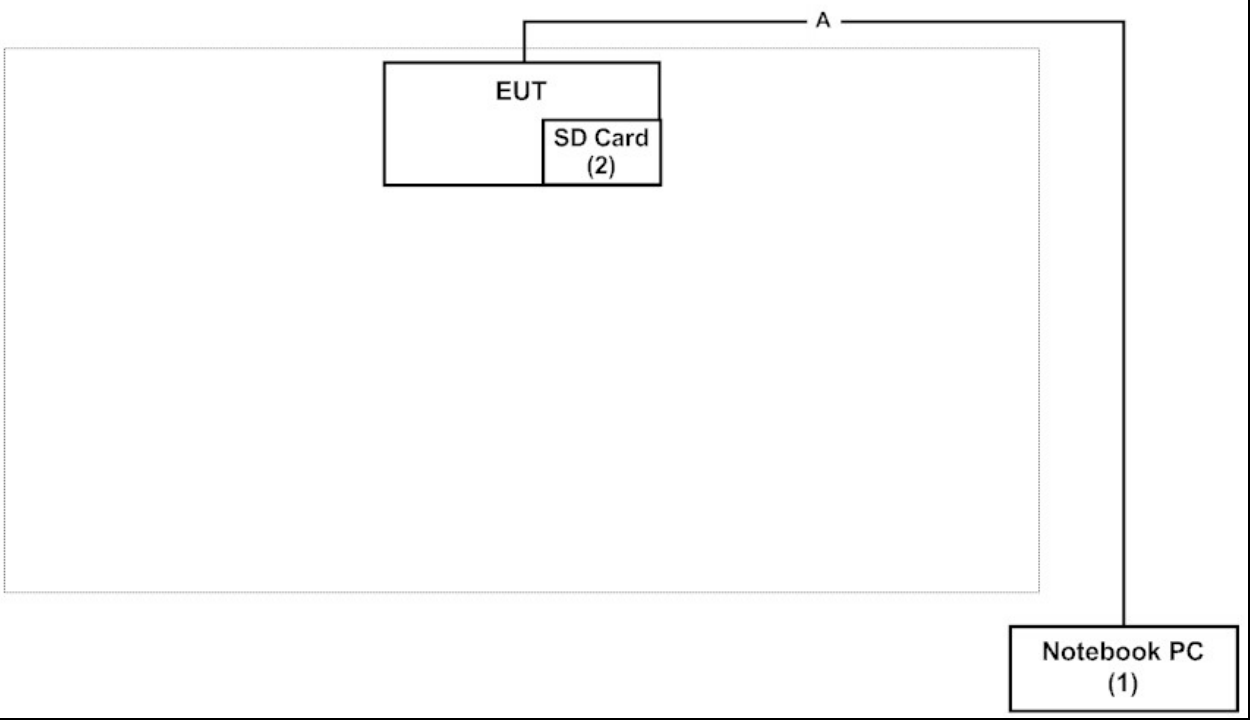
Test Mode		Mode 3: Transmit_Power by Notebook PC				
Product		Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1	Notebook PC	HP	HSTNN-146C	CNU8253S1X	DoC	Non-Shielded, 1.8m
2	Monitor	DELL	U2410f	082WXD-72872-16R-0V7L	DoC	Non-Shielded, 1.8m
3	Microphone & Earphone	Fujiei	SBZ-38	N/A	DoC	--
4	USB Mouse	Logitech	M-UV83	LZE35005917	DoC	--
5	SD Card	Transcend	TS512MSD80	160073-4668	DoC	--

Test Mode		Mode 4: Transmit_Power by Adapter				
Product		Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1	SD Card	Transcend	TS512MSD80	160073-4668	DoC	--

1.4. Configuration of tested System

Test Mode	Mode 1: Transmit_Power by 3V Battery Mode 2: Transmit_Power by 3.7V Battery

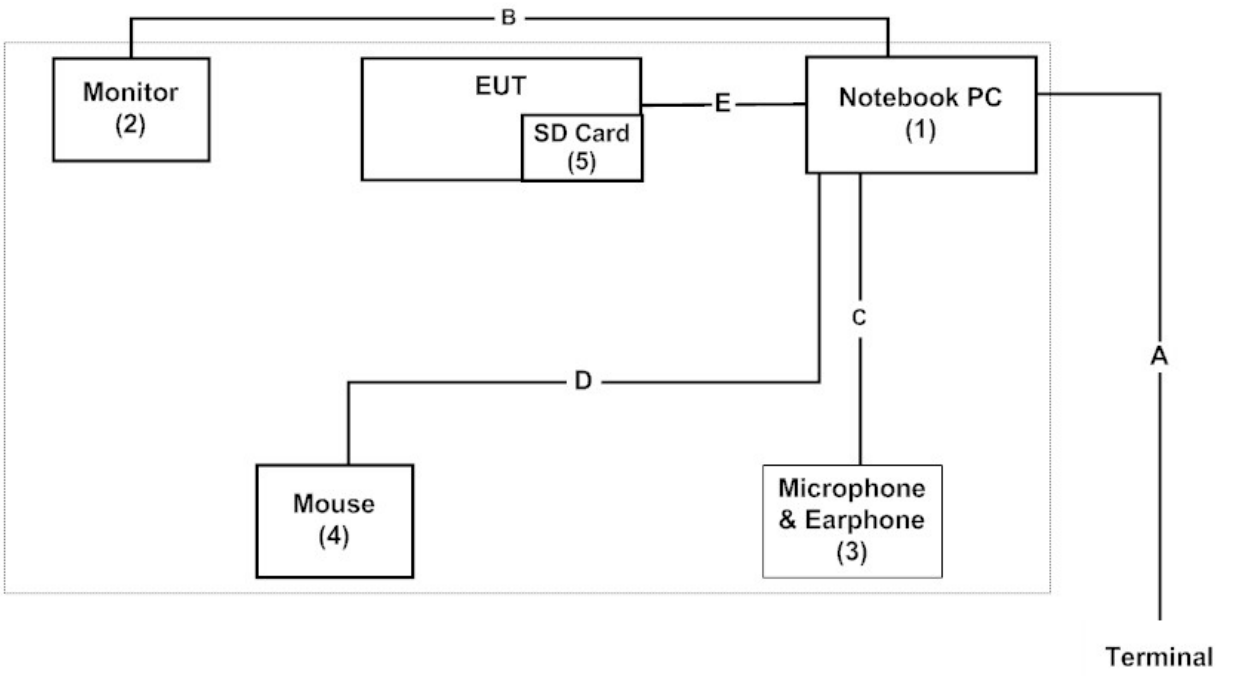
Connection Diagram



Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 2m

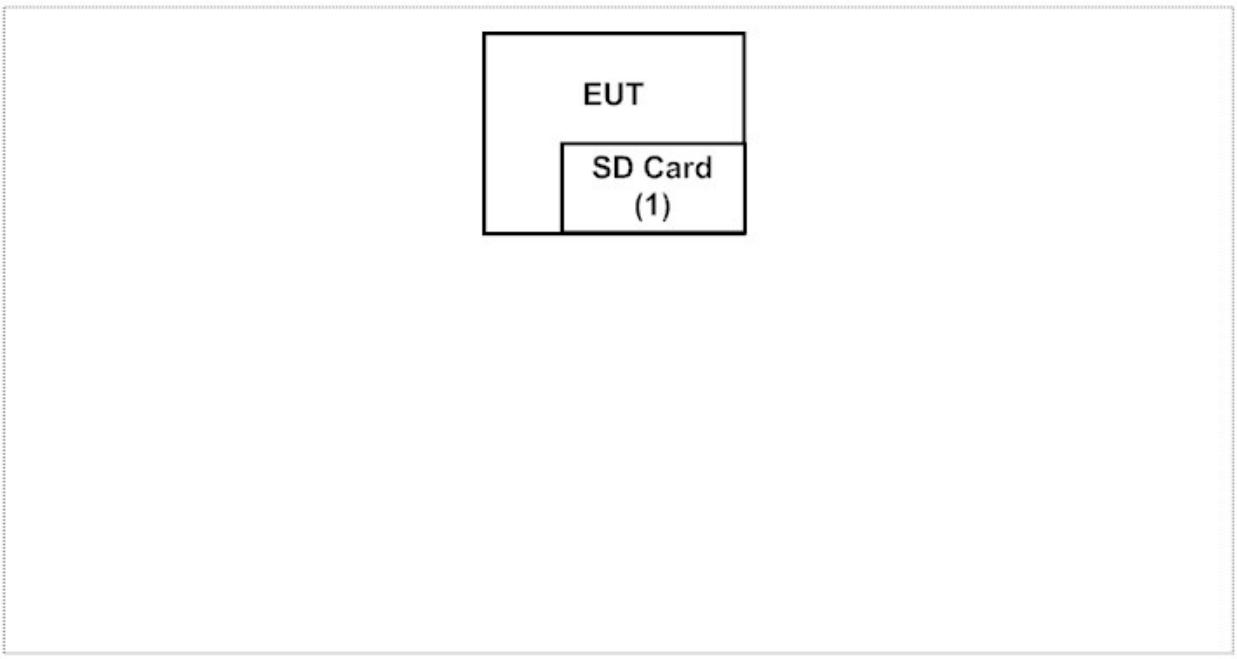
Test Mode	Mode 3: Transmit_Power by Notebook PC

Connection Diagram



Signal Cable Type		Signal cable Description
A	LAN Cable	Non-Shielded, 3m
B	VGA Cable	Shielded, 1.8m
C	Microphone & Earphone Cable	Non-Shielded, 1.2m
D	Mouse Cable	Shielded, 1.8m
E	USB Cable	Shielded, 1m

Test Mode	Mode 4: Transmit_Power by Adapter
Connection Diagram	



1.5. EUT Exercise Software

Test Mode		Mode 1: Transmit_Power by 3V Battery Mode 2: Transmit_Power by 3.7V Battery
1	Setup the EUT as shown in Section 1.4.	
2	Turn on the power of all equipment.	
3	Execute the Ant+ function .	
4	Verify that the EUT works properly.	

Test Mode		Mode 3: Transmit_Power by Notebook PC
1	T Setup the EUT as shown in Section 1.4.	
2	Turn on the power of all equipment.	
3	Execute the Ant+ function from EUT.	
4	Repeat the above procedure (4) to (5).	

Test Mode		Mode 4: Transmit_Power by Adapter
1	T Setup the EUT as shown in Section 1.4.	
2	Turn on the power of all equipment.	
3	Execute the Ant+ function from EUT.	
4	Repeat the above procedure (4) to (5).	

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.209 Conducted Emission	15 - 35	25
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.209 Fundamental Power	15 - 35	25
Humidity (%RH)		25 - 75	65
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.209 Radiated Emission	15 - 35	25
Humidity (%RH)		25 - 75	65
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.249 Band Edge	15 - 35	25
Humidity (%RH)		25 - 75	65
Barometric pressure (mbar)		860 - 1060	950-1000

2. Conducted Emission

2.1. Test Equipment

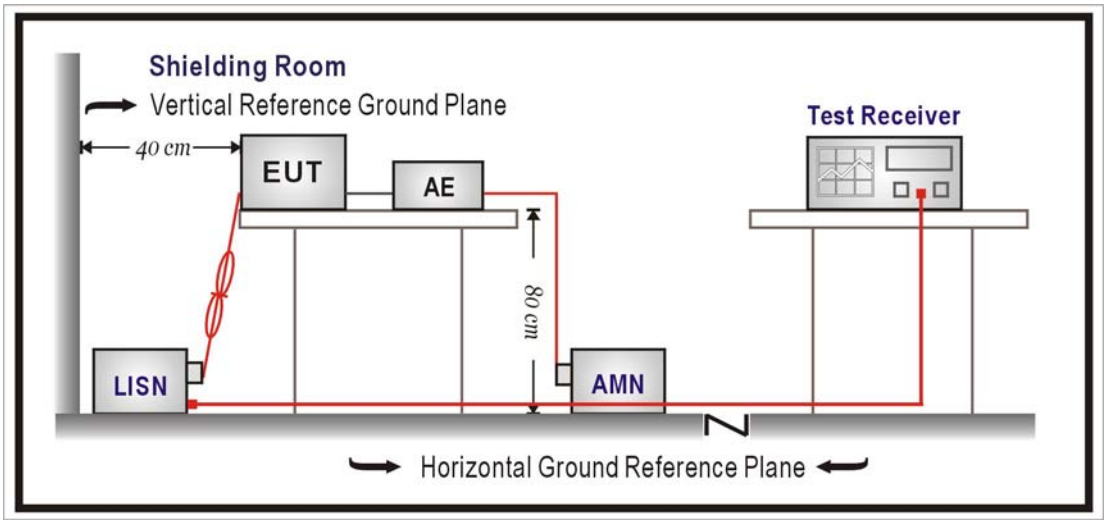
The following test equipments are used during the test:

Conducted Emission/ SR2

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
LISN	R&S	ENV216	100092	2015/08/24
Artificial Mains Network	R&S	ENV4200	848411/010	2015/02/09
Test Receiver	R&S	ESCS 30	825442/014	2015/07/13

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66-56	56-46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.) Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Specification

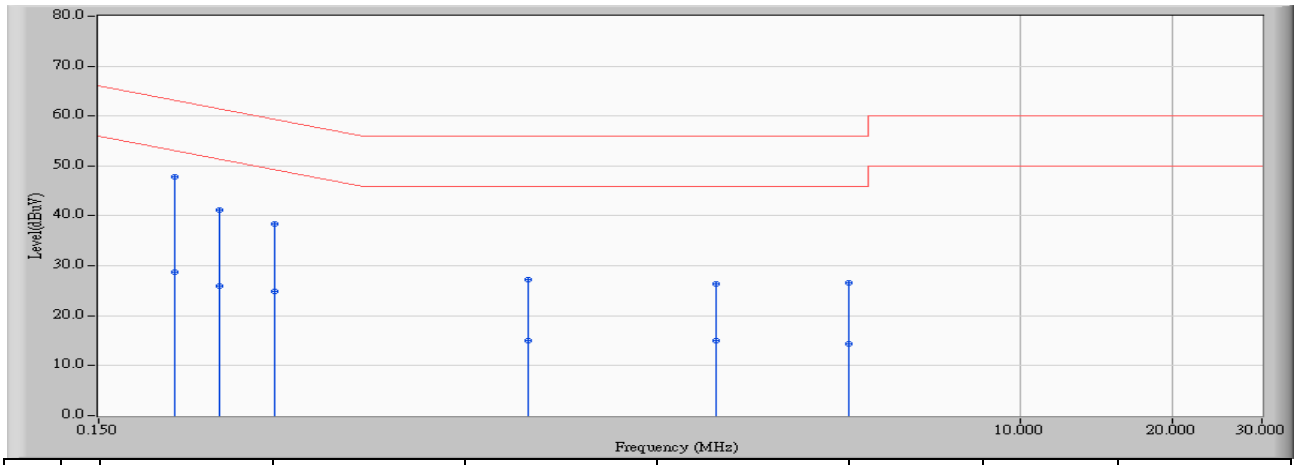
According to FCC Part 15 Subpart C Paragraph 15.207: 2012

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Site : SR2	**Time : 2014/12/16 - 14:12**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-4_0825 - Line1	**Power : AC 120V / 60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook PC_2457MHz**

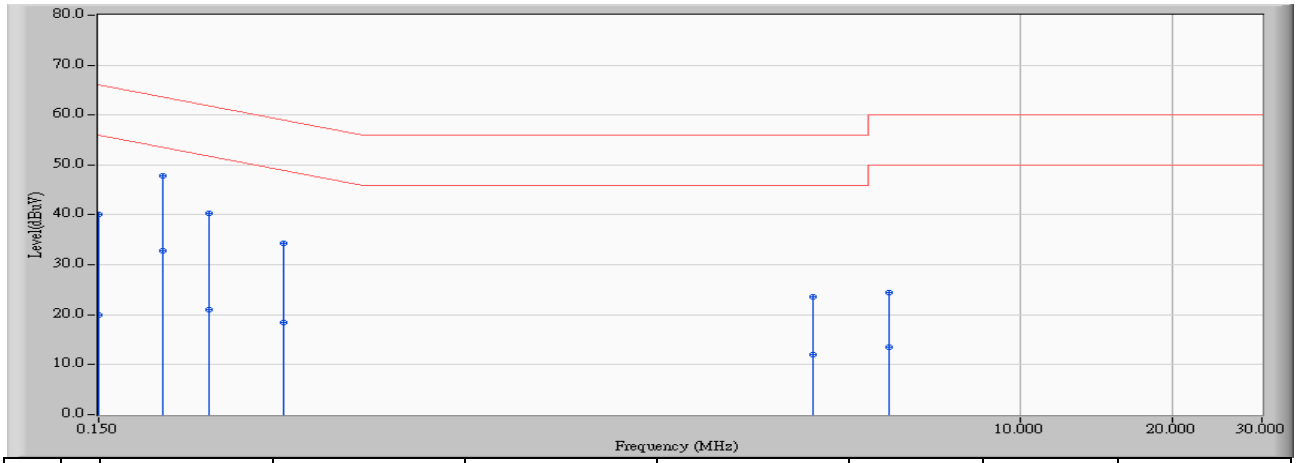


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.212	9.759	38.090	47.849	-15.258	63.107	QUASIPEAK
2		0.212	9.759	18.970	28.729	-24.378	53.107	AVERAGE
3		0.259	9.757	31.340	41.097	-20.354	61.451	QUASIPEAK
4		0.259	9.757	16.280	26.037	-25.414	51.451	AVERAGE
5		0.334	9.753	28.660	38.413	-20.948	59.361	QUASIPEAK
6		0.334	9.753	15.180	24.933	-24.428	49.361	AVERAGE
7		1.064	9.811	17.470	27.281	-28.719	56.000	QUASIPEAK
8		1.064	9.811	5.250	15.061	-30.939	46.000	AVERAGE
9		2.502	9.845	16.540	26.384	-29.616	56.000	QUASIPEAK
10		2.502	9.845	5.260	15.104	-30.896	46.000	AVERAGE
11		4.568	9.946	16.620	26.566	-29.434	56.000	QUASIPEAK
12		4.568	9.946	4.400	14.346	-31.654	46.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR2	**Time : 2014/12/16 - 14:15**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-4_0825 - Line2	**Power : AC 120V / 60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook PC_2457MHz**

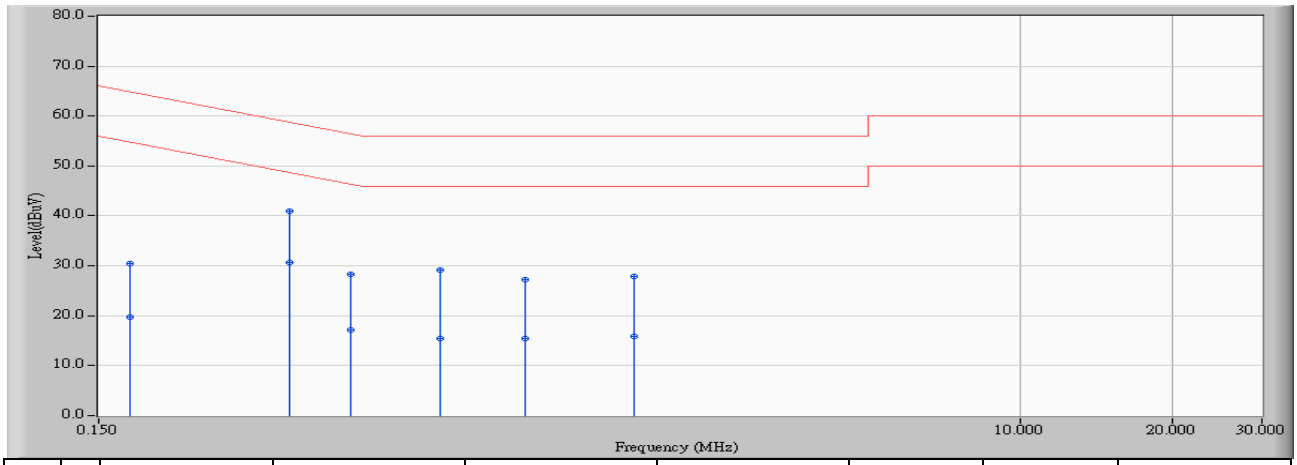


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.150	9.811	30.350	40.161	-25.839	66.000	QUASIPEAK
2		0.150	9.811	10.150	19.961	-36.039	56.000	AVERAGE
3	*	0.201	9.810	38.110	47.920	-15.658	63.578	QUASIPEAK
4		0.201	9.810	23.010	32.820	-20.758	53.578	AVERAGE
5		0.248	9.812	30.470	40.282	-21.553	61.835	QUASIPEAK
6		0.248	9.812	11.230	21.042	-30.793	51.835	AVERAGE
7		0.349	9.817	24.520	34.337	-24.644	58.981	QUASIPEAK
8		0.349	9.817	8.660	18.477	-30.504	48.981	AVERAGE
9		3.892	9.981	13.510	23.491	-32.509	56.000	QUASIPEAK
10		3.892	9.981	2.080	12.061	-33.939	46.000	AVERAGE
11		5.505	10.057	14.410	24.467	-35.533	60.000	QUASIPEAK
12		5.505	10.057	3.510	13.567	-36.433	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR2	**Time : 2014/12/16 - 13:42**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-4_0825 - Line1	**Power : AC 120V / 60Hz**
EUT : TwoNav Anima+	**Note : Mode 4: Transmit_Power by Adapter_2457MHz**

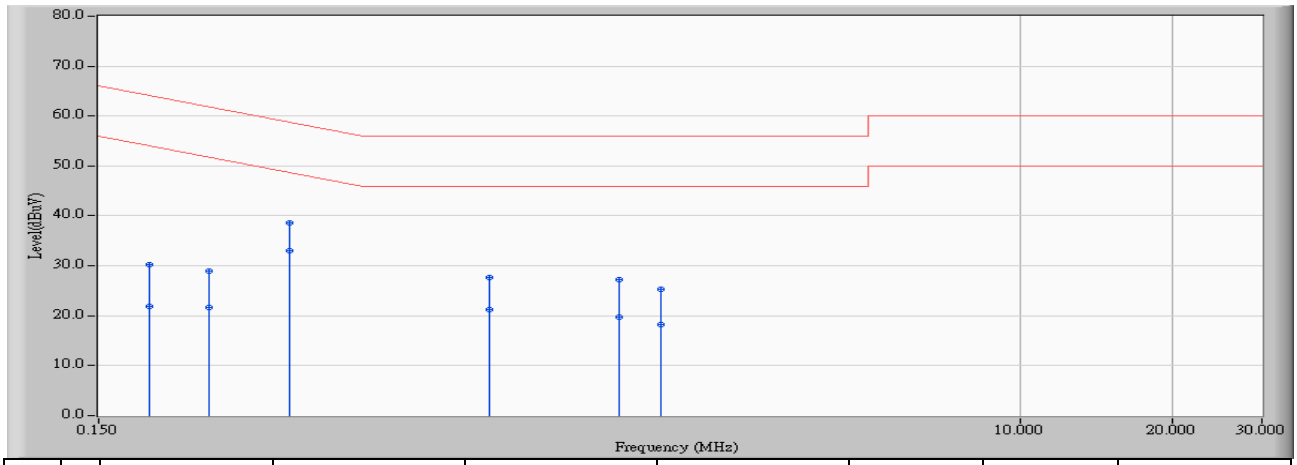


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.173	9.760	20.720	30.480	-34.314	64.794	QUASIPEAK
2		0.173	9.760	9.910	19.670	-35.124	54.794	AVERAGE
3	*	0.357	9.752	31.130	40.882	-17.915	58.797	QUASIPEAK
4		0.357	9.752	20.840	30.592	-18.205	48.797	AVERAGE
5		0.474	9.751	18.490	28.241	-28.198	56.440	QUASIPEAK
6		0.474	9.751	7.510	17.261	-29.178	46.440	AVERAGE
7		0.713	9.776	19.430	29.206	-26.794	56.000	QUASIPEAK
8		0.713	9.776	5.700	15.476	-30.524	46.000	AVERAGE
9		1.045	9.810	17.440	27.250	-28.750	56.000	QUASIPEAK
10		1.045	9.810	5.680	15.490	-30.510	46.000	AVERAGE
11		1.720	9.817	18.090	27.907	-28.093	56.000	QUASIPEAK
12		1.720	9.817	6.000	15.817	-30.183	46.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR2	**Time : 2014/12/16 - 13:46**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-4_0825 - Line2	**Power : AC 120V / 60Hz**
EUT : TwoNav Anima+	**Note : Mode 4: Transmit_Power by Adapter_2457MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.189	9.810	20.350	30.160	-33.918	64.078	QUASIPEAK
2		0.189	9.810	12.120	21.930	-32.148	54.078	AVERAGE
3		0.248	9.812	19.040	28.852	-32.983	61.835	QUASIPEAK
4		0.248	9.812	11.890	21.702	-30.133	51.835	AVERAGE
5		0.357	9.818	28.730	38.548	-20.250	58.797	QUASIPEAK
6	*	0.357	9.818	23.140	32.958	-15.840	48.797	AVERAGE
7		0.888	9.859	17.830	27.689	-28.311	56.000	QUASIPEAK
8		0.888	9.859	11.300	21.159	-24.841	46.000	AVERAGE
9		1.611	9.876	17.260	27.136	-28.864	56.000	QUASIPEAK
10		1.611	9.876	9.770	19.646	-26.354	46.000	AVERAGE
11		1.947	9.879	15.440	25.319	-30.681	56.000	QUASIPEAK
12		1.947	9.879	8.260	18.139	-27.861	46.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. Fundamental Power

3.1. Test Equipment

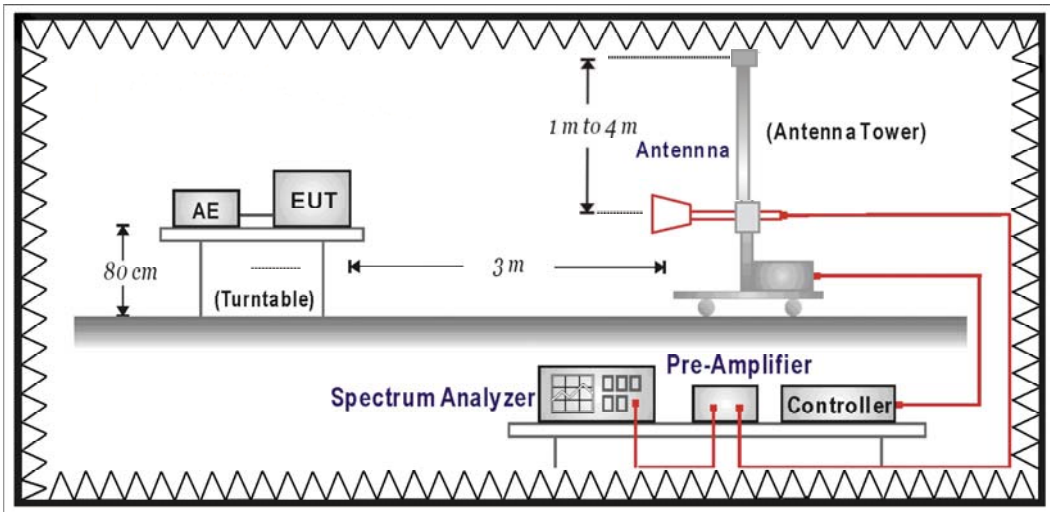
The following test equipments are used during the test:

Fundamental Power / CB1

Instrument	Manufacturer	Type No.	Serial No	Next Cal. Date
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120	D743	2015/02/12
Spectrum Analyzer	Agilent	E4440A	MY46187335	2015/01/12
k Type Cable	Huber Suhner	Sucoflex 102	25623/2	2015/02/10

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

3.2. Test Setup



3.3. Limits

➢ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Fundamental Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2009 on radiated measurement.

On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit. The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

3.5. Test Specification

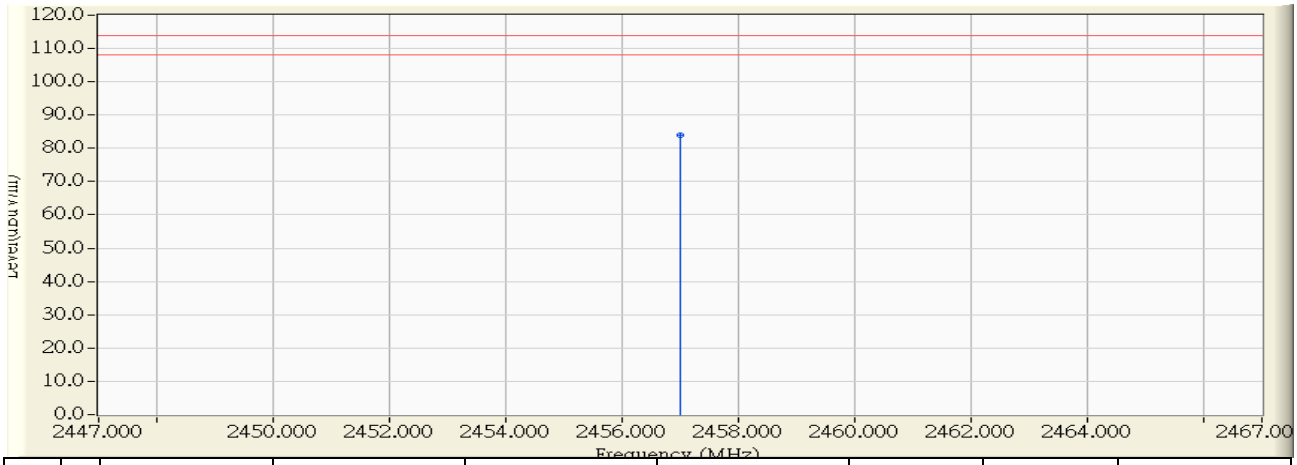
According to FCC Part 15 Subpart C Paragraph 15.249: 2013

3.6. Uncertainty

The measurement uncertainty: 1GHz～26.5GHz as ±3.65dB

3.7. Test Result

Site : CB1	**Time : 2014/12/14 - 09:00**
Limit : FCC_SpartC_15.249_F_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-X-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	52.134	84.070	-29.930	114.000	PEAK

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

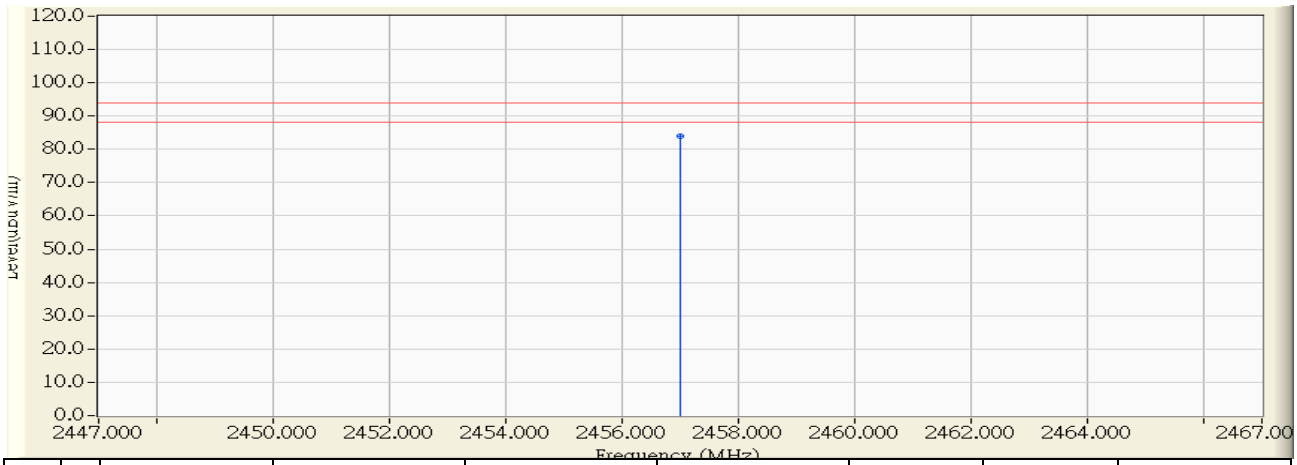
=101.391+20log(0.0025)=49.3498dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:01**
Limit : FCC_SpartC_15.249_F_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-X-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	51.937	83.873	-10.127	94.000	AVERAGE

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

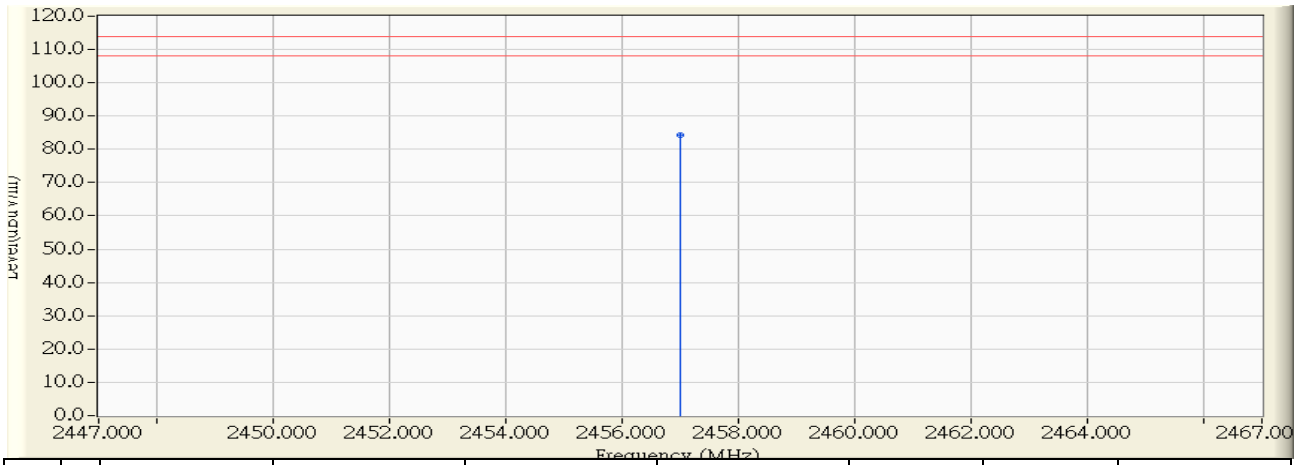
=86.577+20log(0.0025)=34.5358dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:06**
Limit : FCC_SpartC_15.249_F_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-X-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	52.369	84.305	-29.695	114.000	PEAK

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

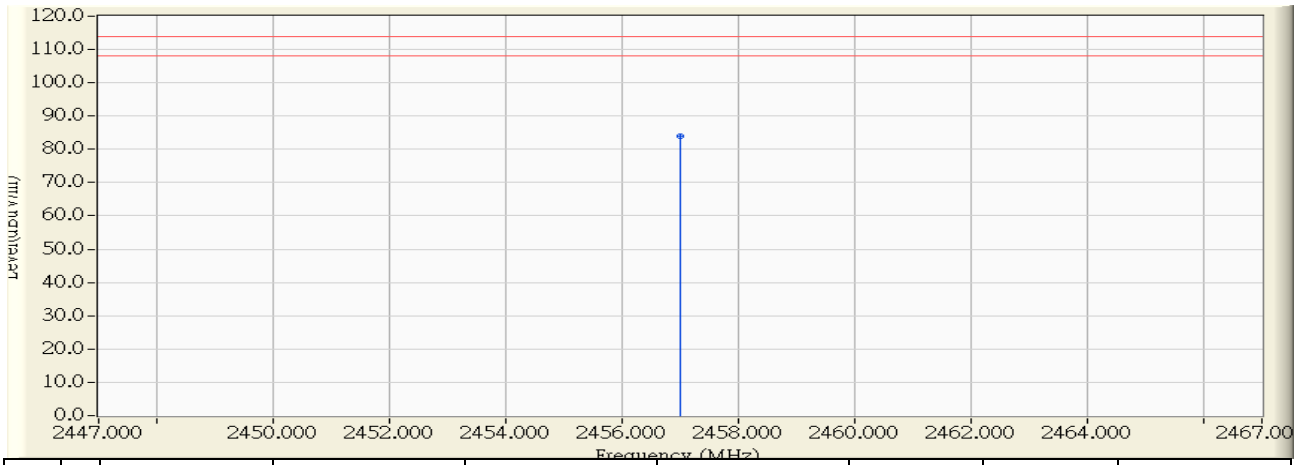
=97.457+20log(0.0025)=45.4158dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:07**
Limit : FCC_SpartC_15.249_F_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-X-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	52.170	84.106	-29.894	114.000	AVERAGE

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

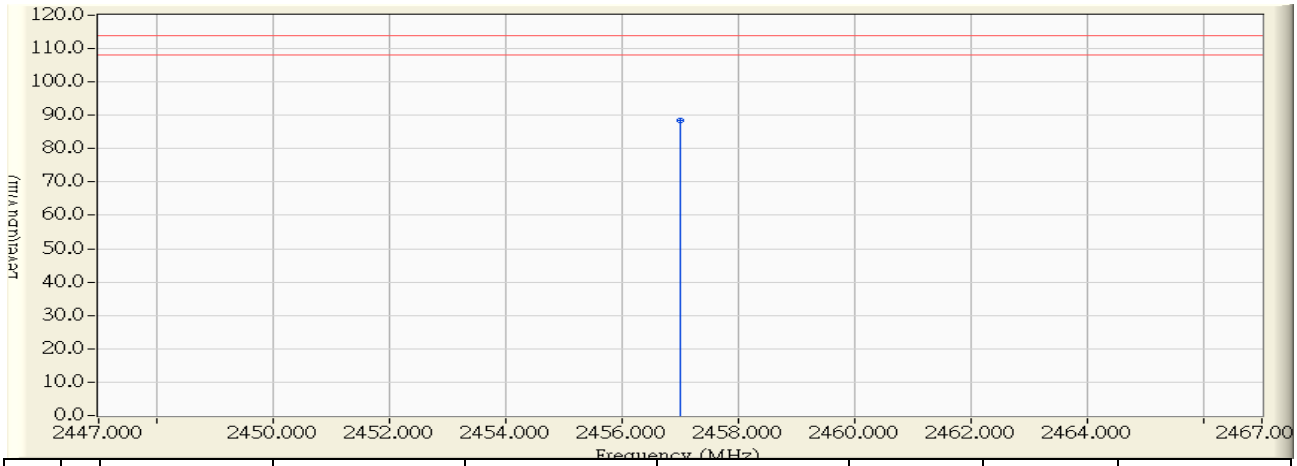
=91.621+20log(0.0025)=39.5798dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:13**
Limit : FCC_SpartC_15.249_F_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-Y-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	56.438	88.374	-25.626	114.000	PEAK

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

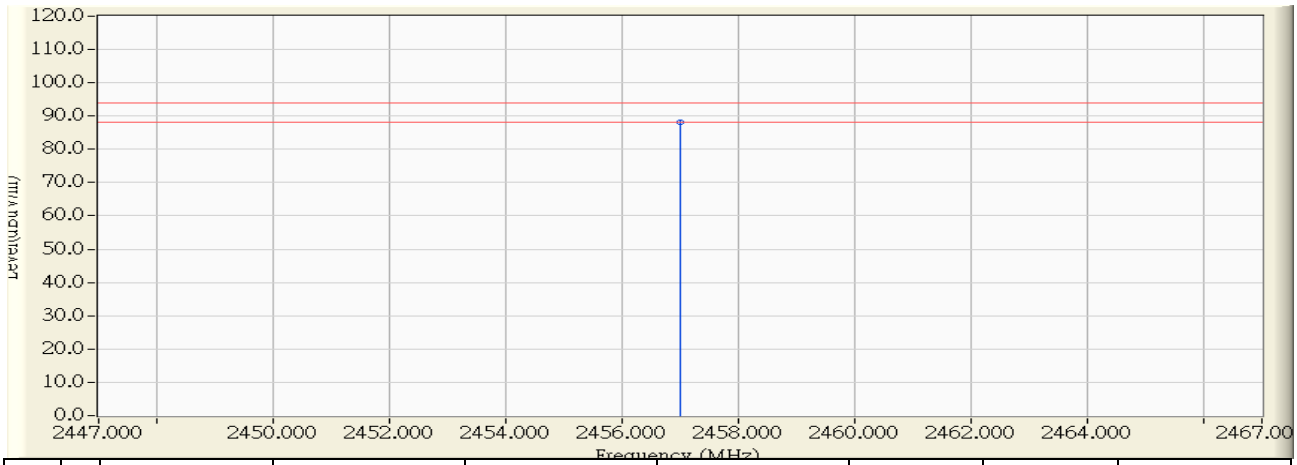
=93.800+20log(0.0025)=41.7588dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:14**
Limit : FCC_SpartC_15.249_F_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-Y-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	56.329	88.265	-5.735	94.000	AVERAGE

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

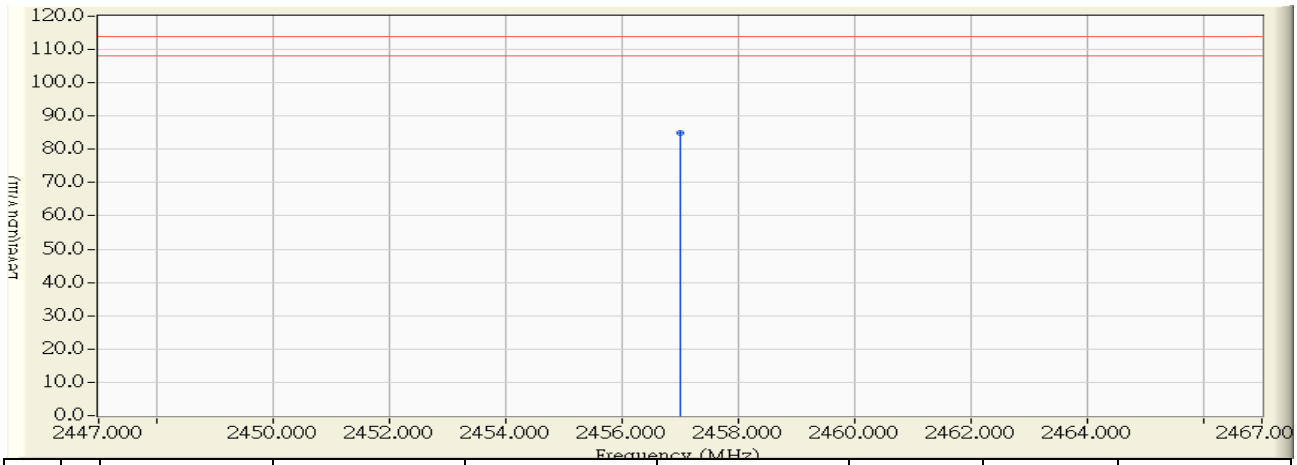
=96.422+20log(0.0025)=44.3808dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:19**
Limit : FCC_SpartC_15.249_F_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-Y-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	53.104	85.040	-28.960	114.000	PEAK

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

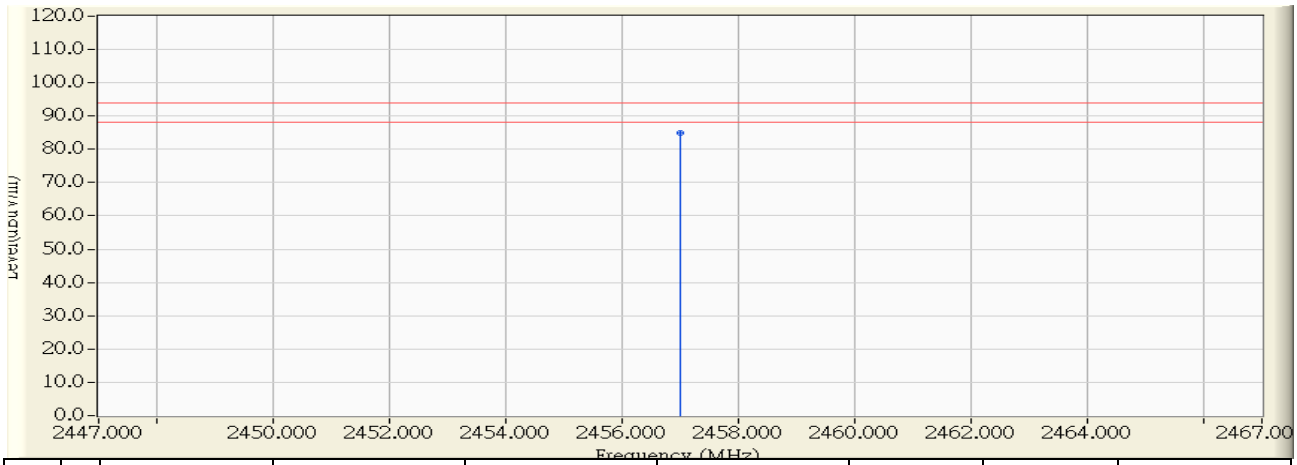
=96.422+20log(0.0025)=44.3808dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:20**
Limit : FCC_SpartC_15.249_F_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-Y-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	52.988	84.924	-9.076	94.000	AVERAGE

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

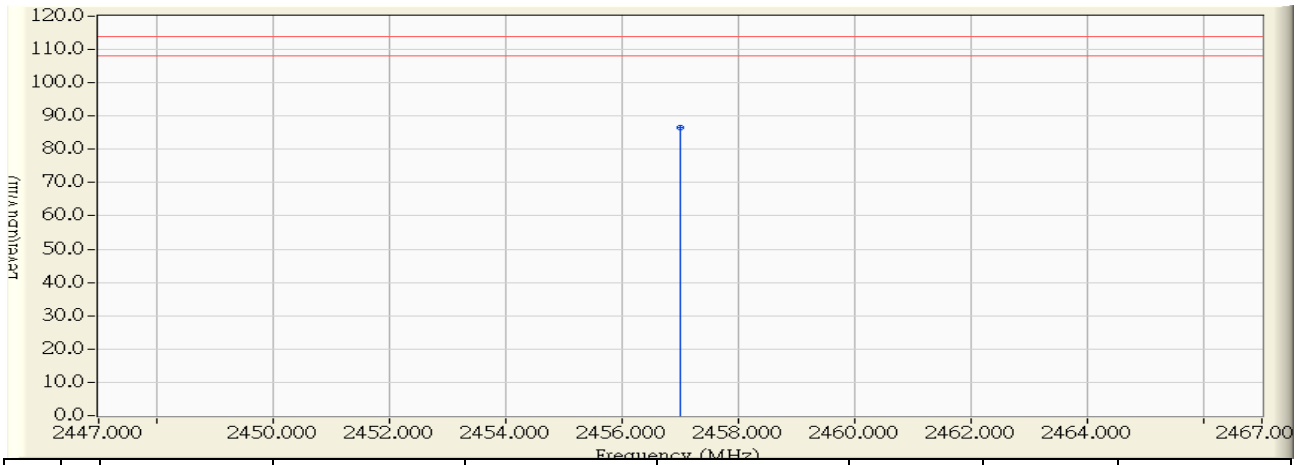
=96.422+20log(0.0025)=44.3808dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:25**
Limit : FCC_SpartC_15.249_F_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-Z-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	54.536	86.472	-27.528	114.000	PEAK

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

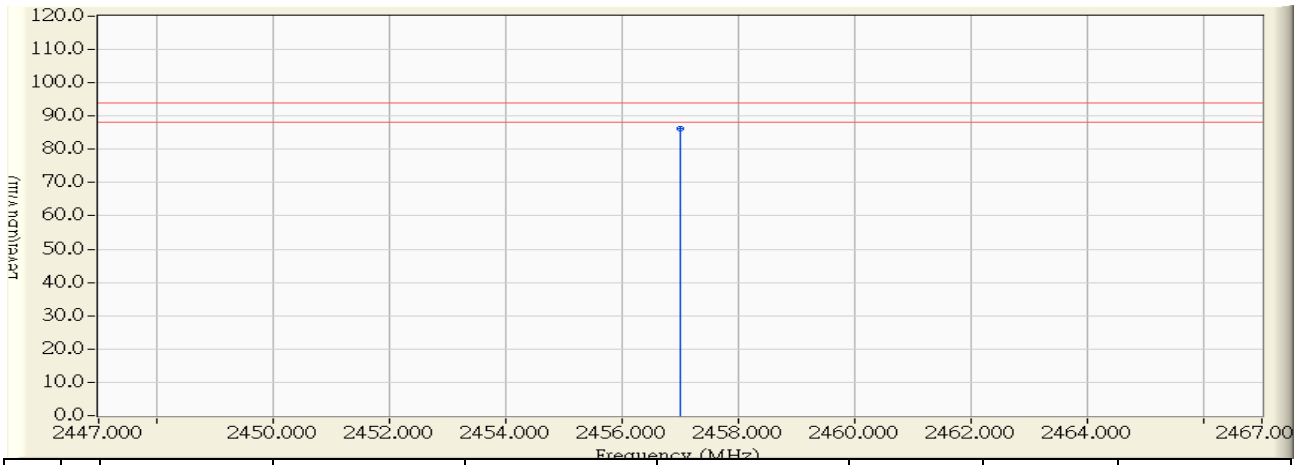
=96.422+20log(0.0025)=44.3808dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:26**
Limit : FCC_SpartC_15.249_F_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-Z-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	54.335	86.271	-7.729	94.000	AVERAGE

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

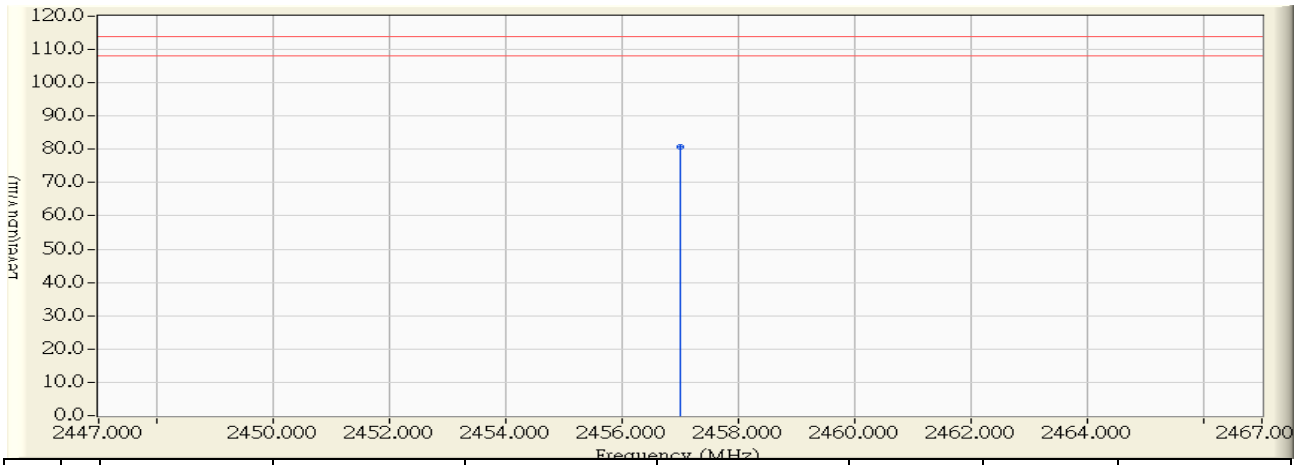
=96.422+20log(0.0025)=44.3808dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:31**
Limit : FCC_SpartC_15.249_F_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-Z-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	48.790	80.726	-33.274	114.000	PEAK

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

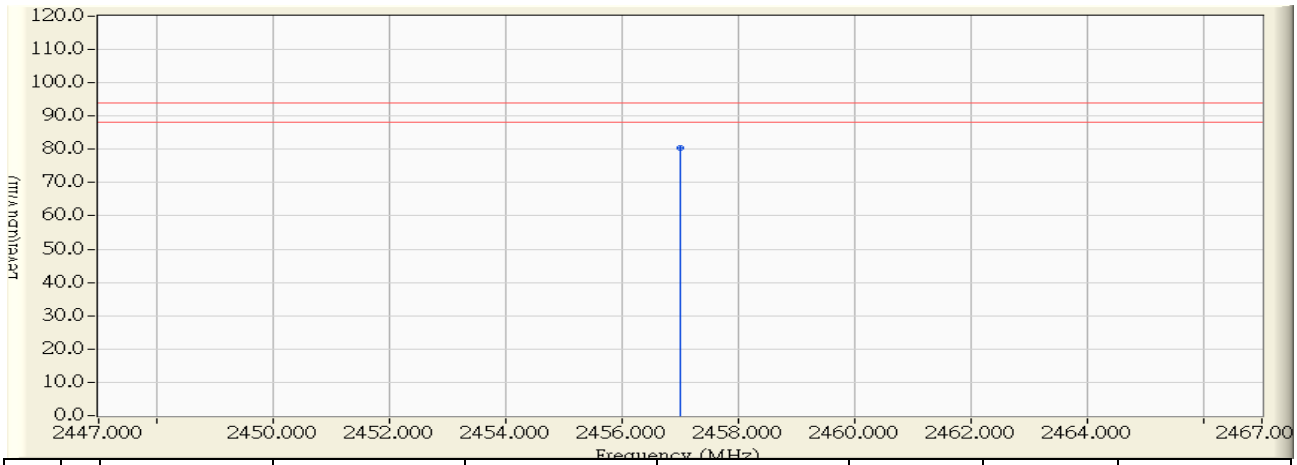
=96.422+20log(0.0025)=44.3808dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/14 - 09:32**
Limit : FCC_SpartC_15.249_F_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : 2457MHz-Z-zxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2457.000	31.936	48.423	80.359	-13.641	94.000	AVERAGE

Peak Measure Level=Reading Level+Correct Factor

Average Measure Level=Peak Measure Level+20log(Duty Cycle)

=96.422+20log(0.0025)=44.3808dBuV/m

Duty Cycle=(Ton/(Ton+Toff))=T_{ON}/100ms=0.25/100=0.25%

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

4. Radiated Emission

4.1. Test Equipment

The following test equipment are used during the test:

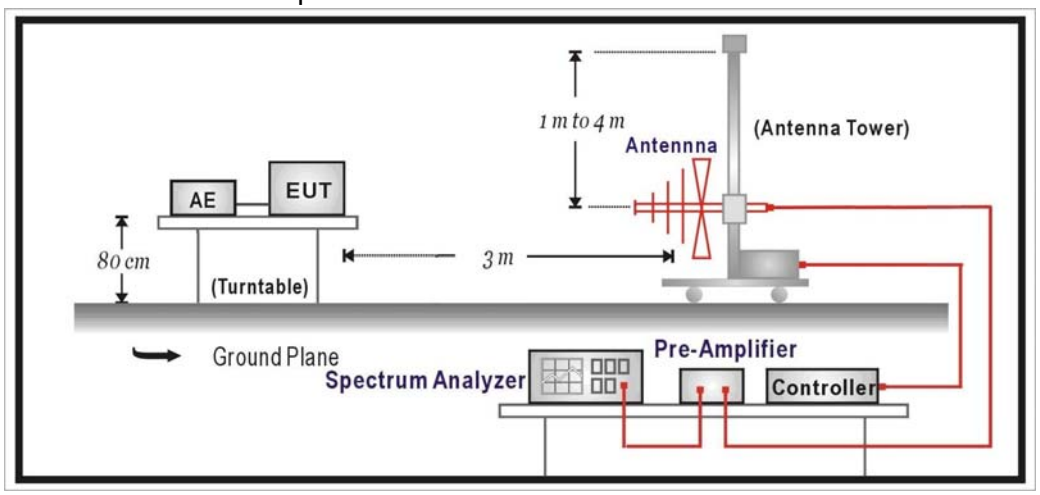
Radiated Emission / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	SCHAFFNER	CBL6112B	2895(CB1)	2015/08/14
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120	D743	2015/02/12
Pre-Amplifier	Quietek	AMF-4D.	888003	2015/06/02
Pre-Amplifier	QuieTek	AP-025C	CHM-0706049	2015/02/06
Spectrum Analyzer	Agilent	E4440A	MY46187335	2015/01/12
k Type Cable	Huber Suhner	Sucoflex 102	25623/2	2015/02/10

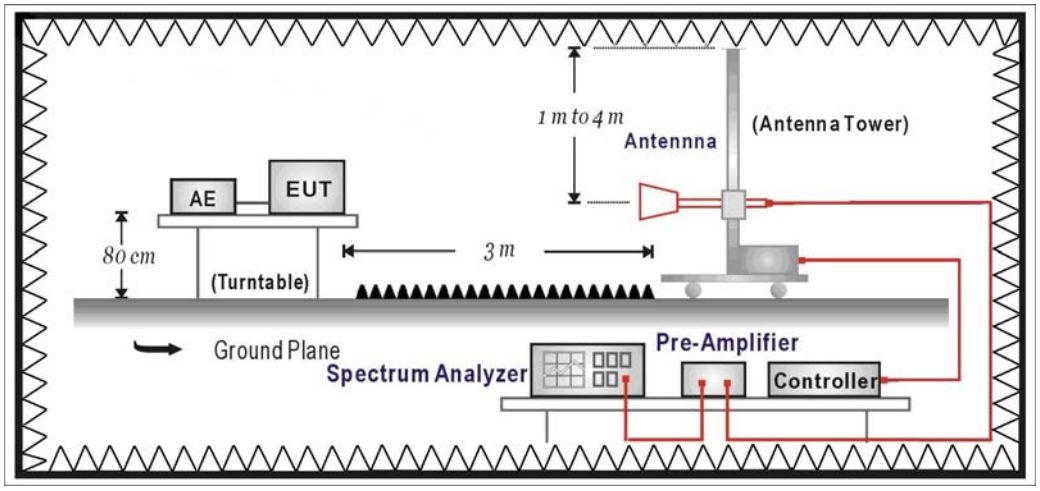
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

4.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limits

➢ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Fundamental Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➢ Spurious electric field strength limits

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2009 on radiated measurement.

On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit. The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.209 and Paragraph 15.249: 2013

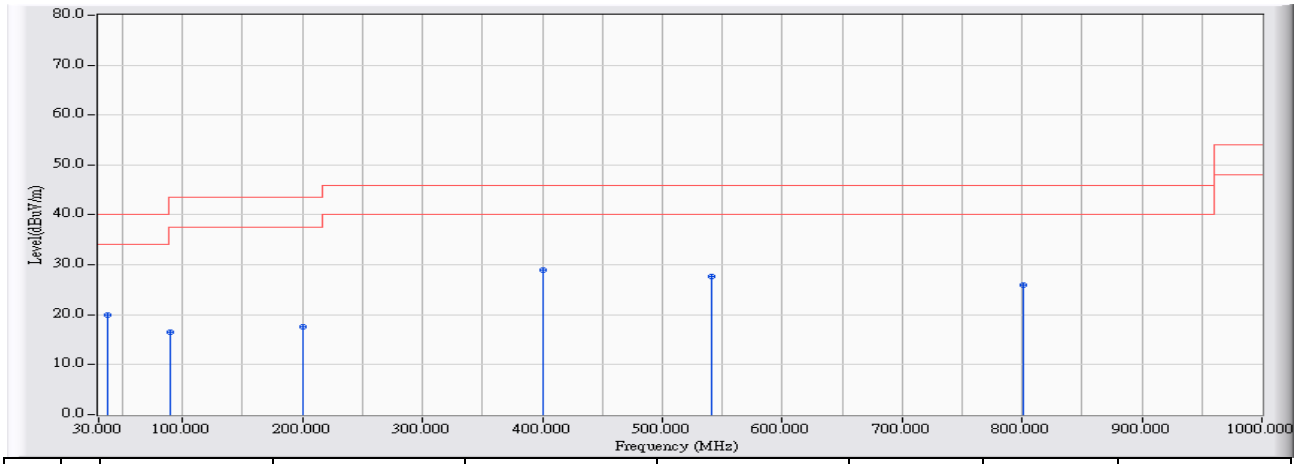
4.6. Uncertainty

The measurement uncertainty
30MHz～1GHz as ±3.43dB
1GHz～26.5GHz as ±3.65dB

4.7. Test Result

30 MHz-1 GHz Spurious:

Site : CB1	**Time : 2014/11/19 - 20:30**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	**Power :DC 3V**
EUT : TwoNav Anima+	**Note : Mode 1: Transmit_Power by 3V Battery**

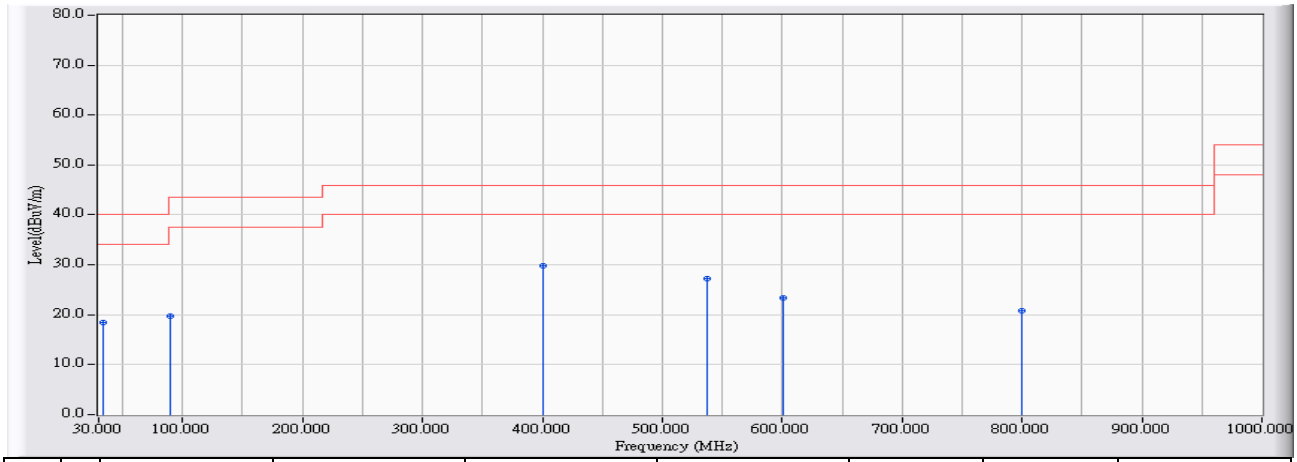


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		37.760	-29.794	49.803	20.009	-19.991	40.000	QUASIPEAK
2		89.170	-33.965	50.560	16.595	-26.905	43.500	QUASIPEAK
3		199.750	-32.796	50.412	17.615	-25.885	43.500	QUASIPEAK
4	*	400.055	-25.365	54.329	28.964	-17.036	46.000	QUASIPEAK
5		541.675	-23.402	51.133	27.731	-18.269	46.000	QUASIPEAK
6		800.665	-21.721	47.658	25.937	-20.063	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2014/11/19 - 20:36**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	**Power :DC 3V**
EUT : TwoNav Anima+	**Note : Mode 1: Transmit_Power by 3V Battery**

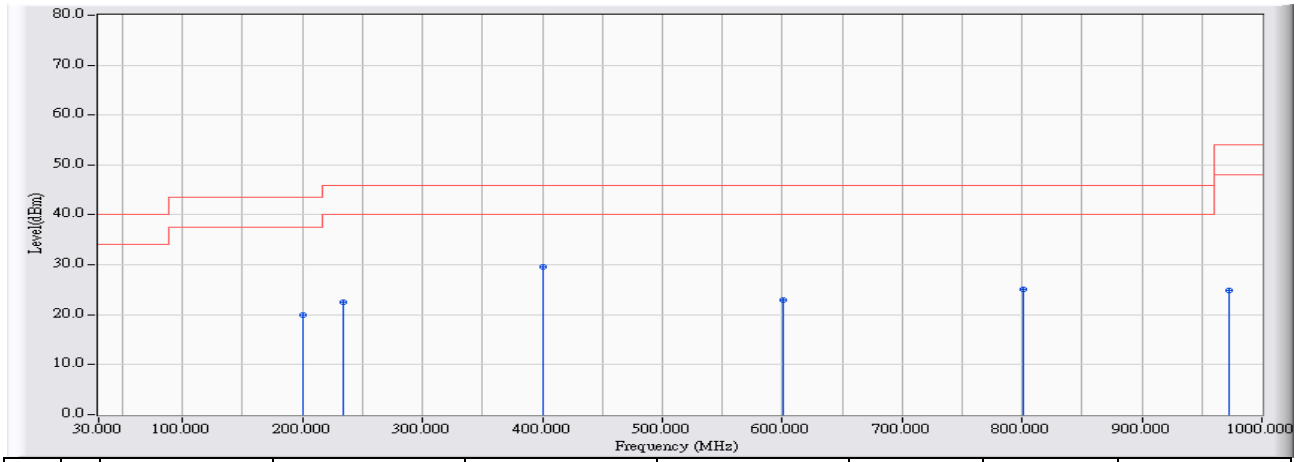


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		33.395	-28.396	46.816	18.420	-21.580	40.000	QUASIPEAK
2		89.170	-33.965	53.761	19.796	-23.704	43.500	QUASIPEAK
3	*	400.055	-25.365	55.139	29.774	-16.226	46.000	QUASIPEAK
4		537.795	-23.413	50.741	27.327	-18.673	46.000	QUASIPEAK
5		600.360	-23.521	46.841	23.320	-22.680	46.000	QUASIPEAK
6		800.180	-21.725	42.608	20.883	-25.117	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2014/11/19 - 21:56**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	**Power : DC3.7V**
EUT : TwoNav Anima+	**Note : Mode 2: Transmit_Power by 3.7V Battery**

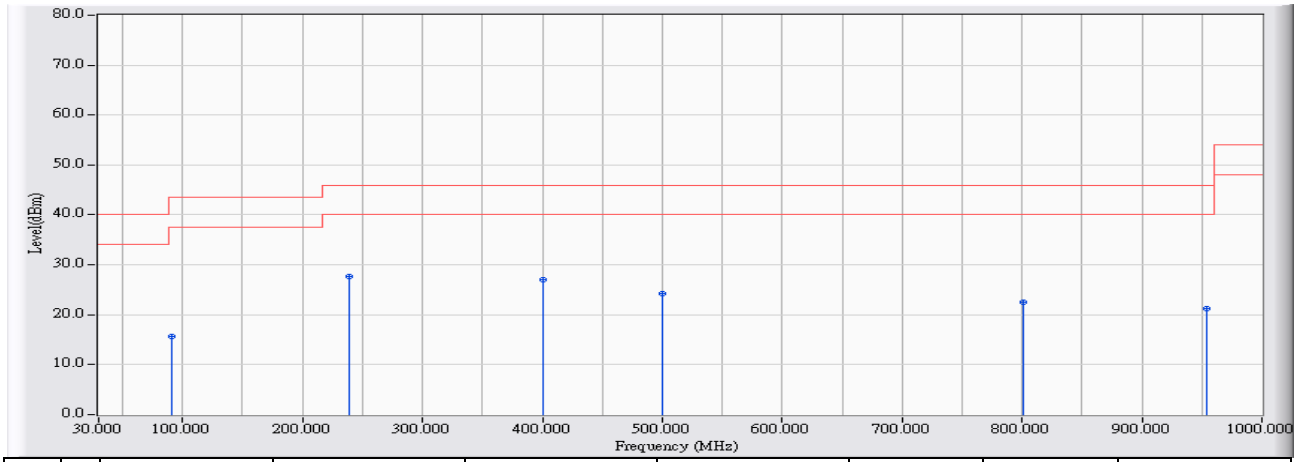


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm)	Margin (dB)	Limit (dBm)	Detector Type
1		199.750	-15.843	35.703	19.860	-23.640	43.500	QUASIPEAK
2		233.700	-13.413	35.940	22.527	-23.473	46.000	QUASIPEAK
3	*	400.055	-9.489	39.120	29.631	-16.369	46.000	QUASIPEAK
4		600.360	-7.559	30.475	22.915	-23.085	46.000	QUASIPEAK
5		800.665	-6.406	31.444	25.038	-20.962	46.000	QUASIPEAK
6		972.355	-5.680	30.545	24.865	-29.135	54.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2014/11/19 - 22:00**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	**Power : DC3.7V**
EUT : TwoNav Anima+	**Note : Mode 2: Transmit_Power by 3.7V Battery**

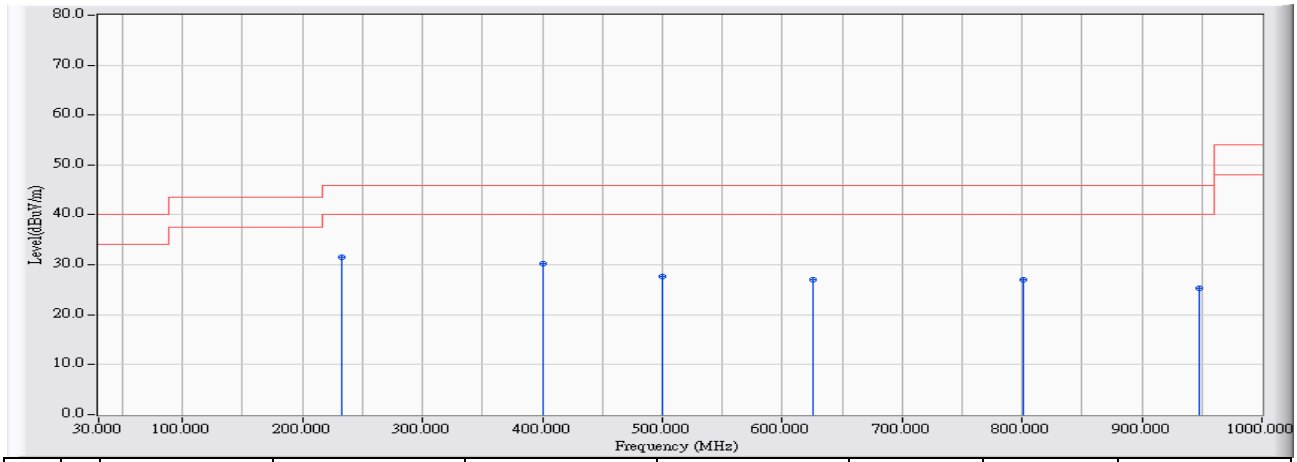


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm)	Margin (dB)	Limit (dBm)	Detector Type
1		90.625	-18.130	33.772	15.643	-27.857	43.500	QUASIPEAK
2	*	239.035	-15.248	43.004	27.755	-18.245	46.000	QUASIPEAK
3		400.055	-11.938	38.930	26.992	-19.008	46.000	QUASIPEAK
4		500.450	-10.406	34.609	24.203	-21.797	46.000	QUASIPEAK
5		800.665	-9.245	31.713	22.468	-23.532	46.000	QUASIPEAK
6		953.925	-8.771	30.067	21.295	-24.705	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2014/11/19 - 20:55**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	**Power :120V/60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook** PC

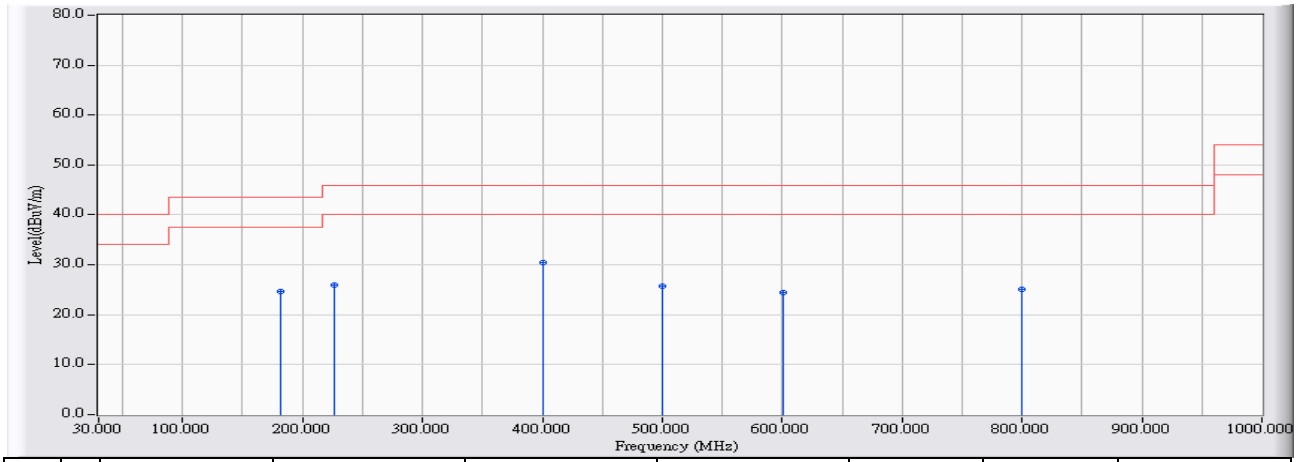


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	232.730	-30.302	61.794	31.492	-14.508	46.000	QUASIPEAK
2		400.055	-25.365	55.680	30.315	-15.685	46.000	QUASIPEAK
3		499.965	-23.530	51.135	27.604	-18.396	46.000	QUASIPEAK
4		625.095	-23.158	50.188	27.030	-18.970	46.000	QUASIPEAK
5		800.665	-21.721	48.660	26.939	-19.061	46.000	QUASIPEAK
6		948.105	-20.846	46.072	25.226	-20.774	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2014/11/19 - 21:02**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	**Power :120V/60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook** PC

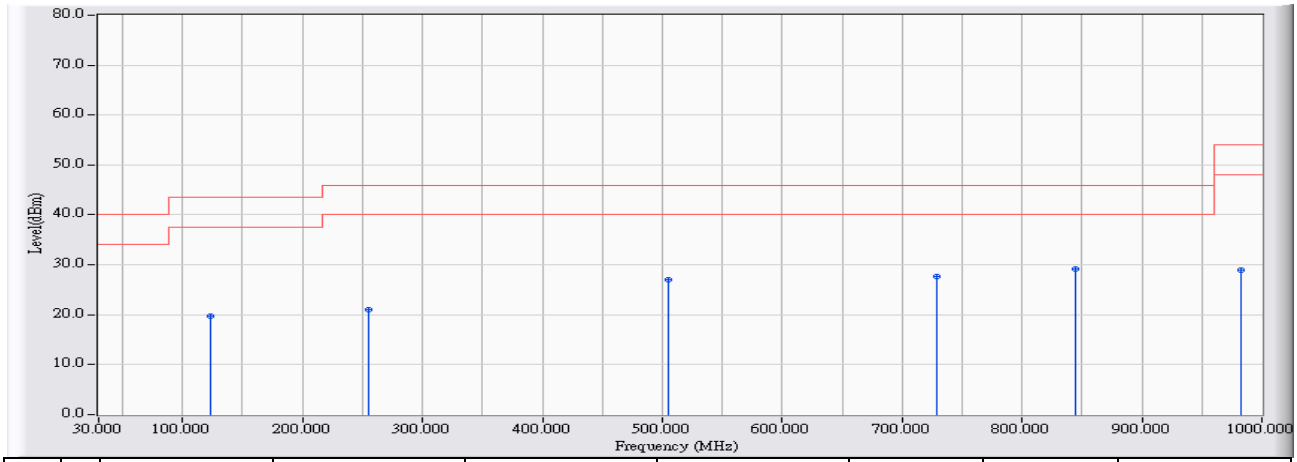


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		181.320	-32.926	57.595	24.669	-18.831	43.500	QUASIPEAK
2		226.910	-30.746	56.634	25.889	-20.111	46.000	QUASIPEAK
3	*	400.055	-25.365	55.879	30.514	-15.486	46.000	QUASIPEAK
4		499.965	-23.530	49.183	25.652	-20.348	46.000	QUASIPEAK
5		600.360	-23.521	47.938	24.417	-21.583	46.000	QUASIPEAK
6		800.180	-21.725	46.916	25.191	-20.809	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2014/11/19 - 21:08**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	**Power : AC 120V / 60Hz**
EUT : TwoNav Anima+	**Note : Mode 4: Transmit_Power by Adapter**

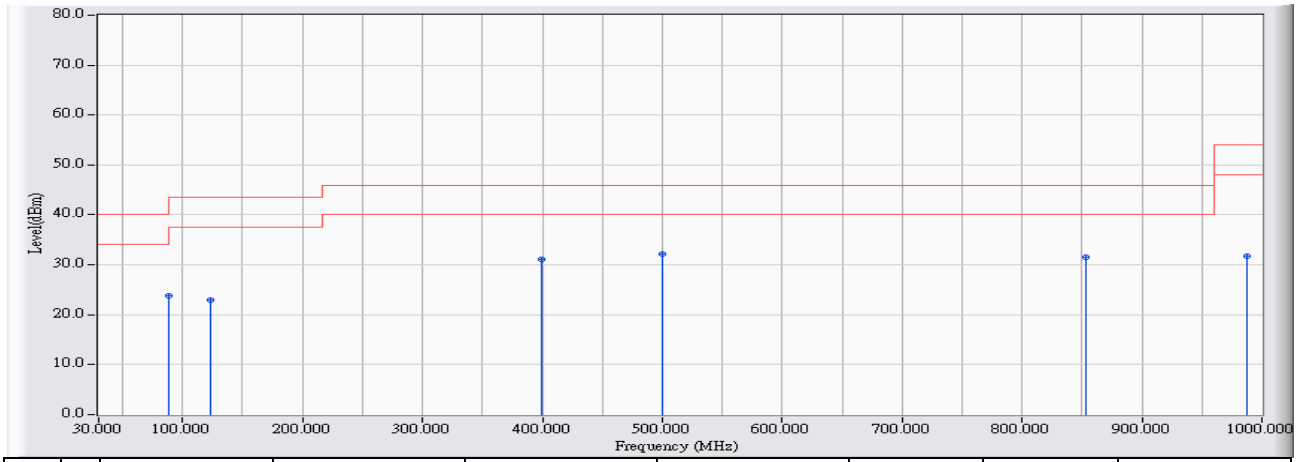


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm)	Margin (dB)	Limit (dBm)	Detector Type
1		122.952	10.717	9.108	19.824	-23.676	43.500	QUASIPEAK
2		255.384	11.977	9.096	21.073	-24.927	46.000	QUASIPEAK
3		504.755	17.198	9.777	26.974	-19.026	46.000	QUASIPEAK
4		728.640	18.342	9.245	27.587	-18.413	46.000	QUASIPEAK
5	*	845.080	19.331	9.884	29.214	-16.786	46.000	QUASIPEAK
6		983.009	20.150	8.908	29.058	-24.942	54.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2014/11/19 - 21:13**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	**Power : AC 120V / 60Hz**
EUT : TwoNav Anima+	**Note : Mode 4: Transmit_Power by Adapter**



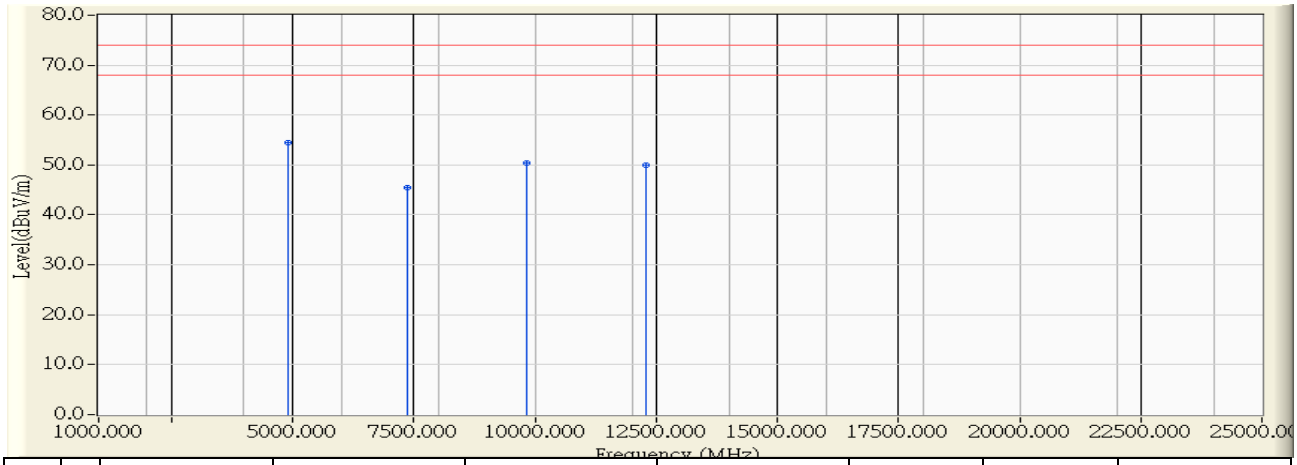
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm)	Margin (dB)	Limit (dBm)	Detector Type
1		88.970	7.370	16.362	23.733	-19.767	43.500	QUASIPEAK
2		123.452	10.699	12.251	22.950	-20.550	43.500	QUASIPEAK
3		399.809	15.149	15.987	31.136	-14.864	46.000	QUASIPEAK
4	*	499.758	17.175	14.912	32.088	-13.912	46.000	QUASIPEAK
5		853.076	19.351	12.134	31.485	-14.515	46.000	QUASIPEAK
6		988.006	20.191	11.459	31.650	-22.350	54.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Above 1GHz Spurious：

Site : CB1	**Time : 2014/12/01 - 13:52**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook PC_2457MHz**

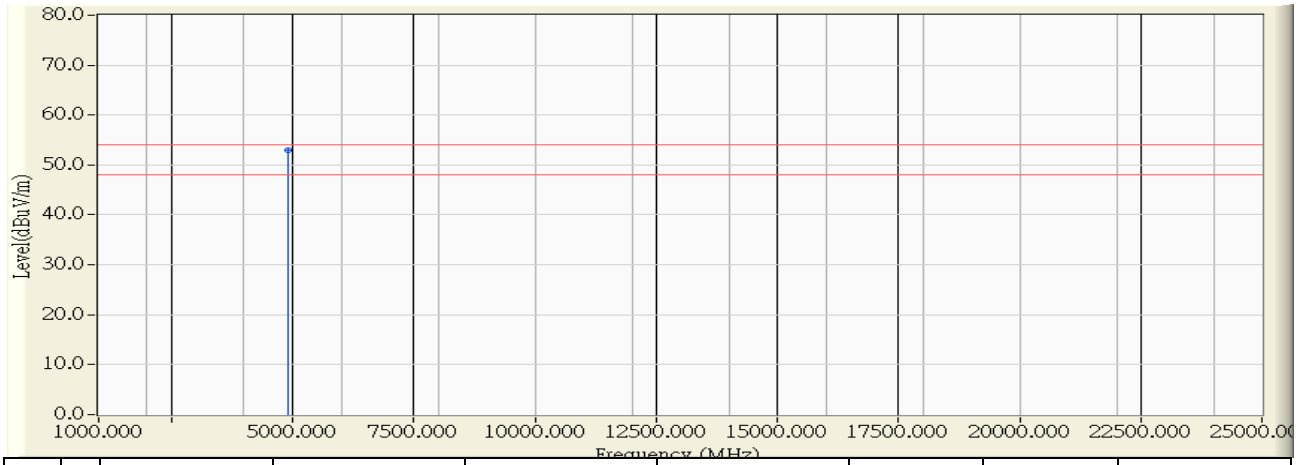


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4914.100	-0.313	54.770	54.456	-19.544	74.000	PEAK
2		7370.760	5.811	39.760	45.570	-28.430	74.000	PEAK
3		9830.960	10.631	39.830	50.461	-23.539	74.000	PEAK
4		12293.040	10.994	39.020	50.014	-23.986	74.000	PEAK

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/01 - 13:52**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook PC_2457MHz**

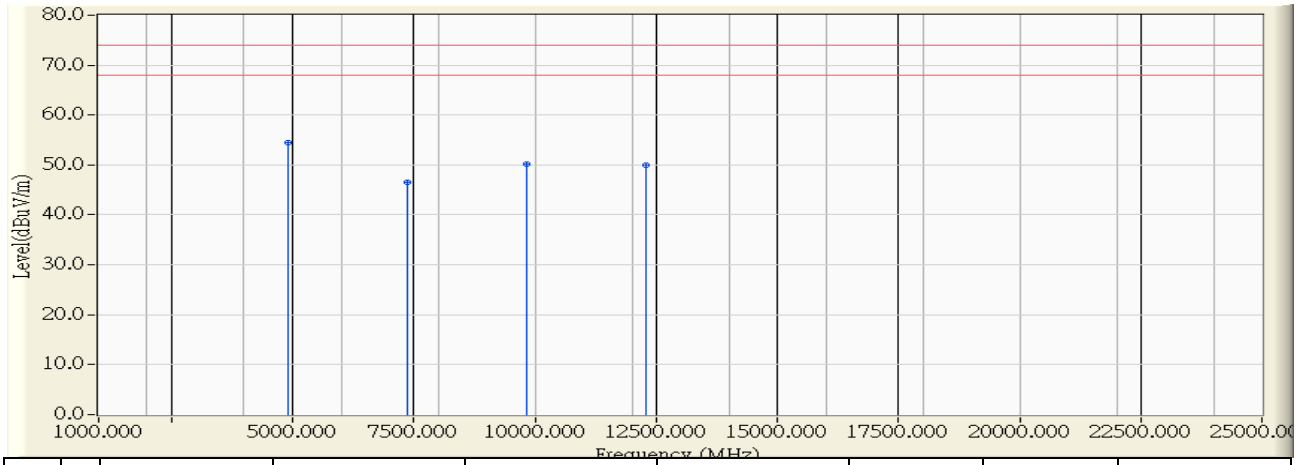


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4914.140	-0.313	53.341	53.027	-0.973	54.000	AVERAGE

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/01 - 14:03**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook PC_2457MHz**

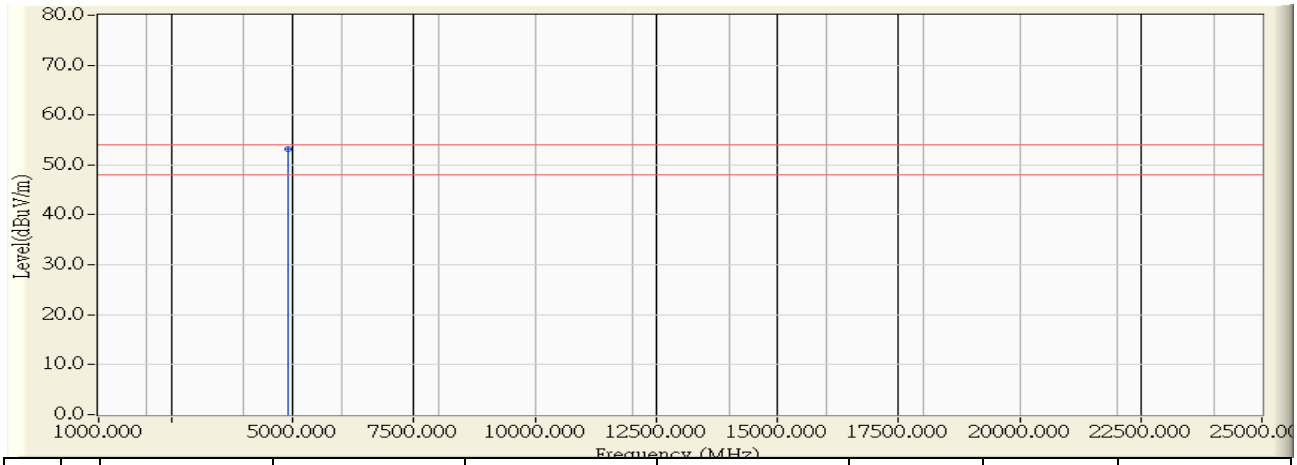


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4914.000	-0.314	54.760	54.446	-19.554	74.000	PEAK
2		7371.290	5.812	40.700	46.511	-27.489	74.000	PEAK
3		9826.060	10.598	39.630	50.229	-23.771	74.000	PEAK
4		12288.400	10.996	38.980	49.976	-24.024	74.000	PEAK

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/01 - 14:04**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook PC_2457MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4914.130	-0.313	53.440	53.126	-0.874	54.000	AVERAGE

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

5. Band Edge

5.1. Test Equipment

The following test equipment are used during the test:

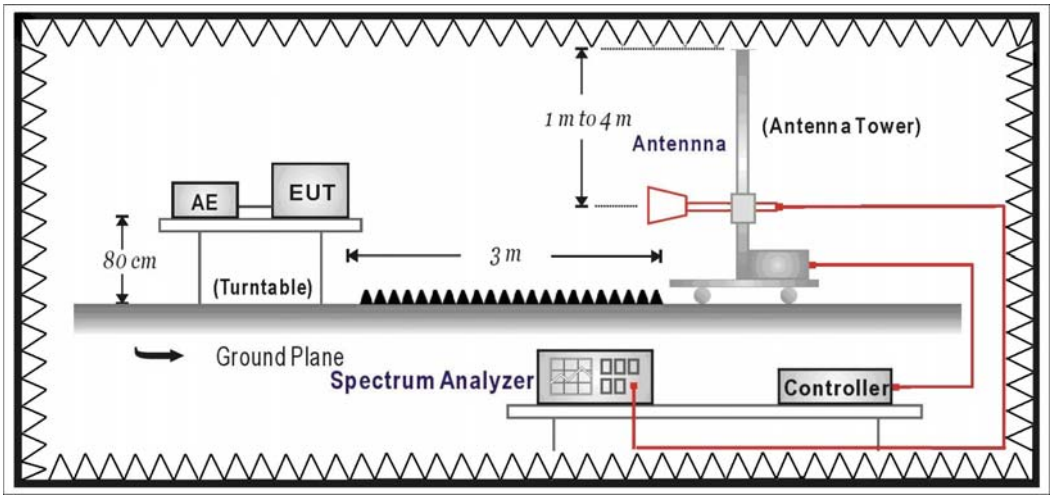
Band Edge / CB1

Instrument	Manufacturer	Type No.	Serial No	Next Cal. Date
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120	D743	2015/02/12
Spectrum Analyzer	Agilent	E4440A	MY46187335	2015/01/12
k Type Cable	Huber Suhner	Sucoflex 102	25623/2	2015/02/10

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

5.2. Test Setup

RF Radiated Measurement:



5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50 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 a radiated measurement. Attenuation below the general limits specified in Section 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(c)).

5.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2009 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz.

5.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.249: 2013

5.6. Uncertainty

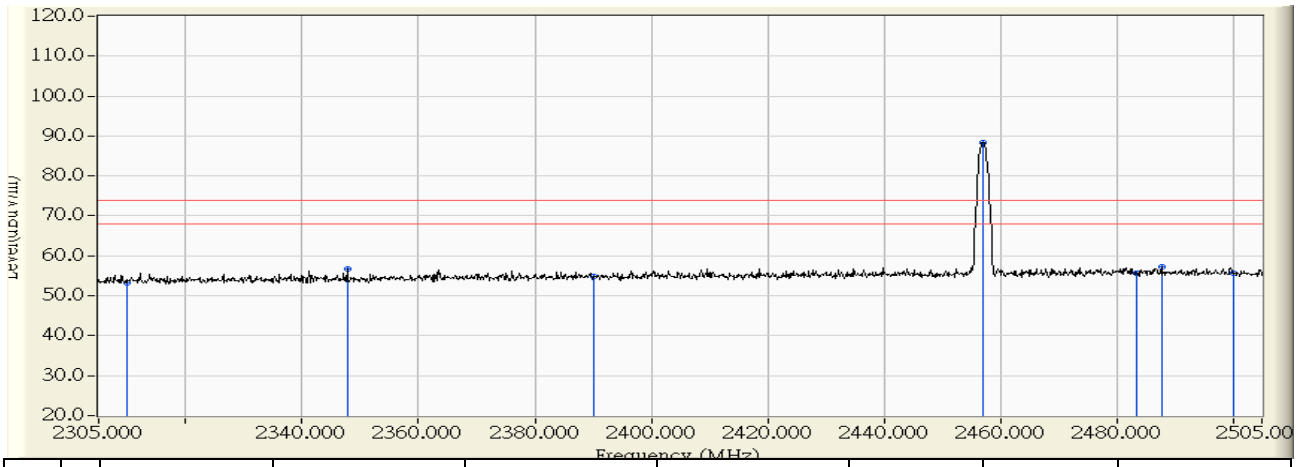
The measurement uncertainty

Conducted is defined as ± 1.27dB

Radiated is defined as ± 3.9dB

5.7. Test Result

Site : CB1	**Time : 2014/12/18 - 15:25**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook PC_2457MHz-Y-yxis**

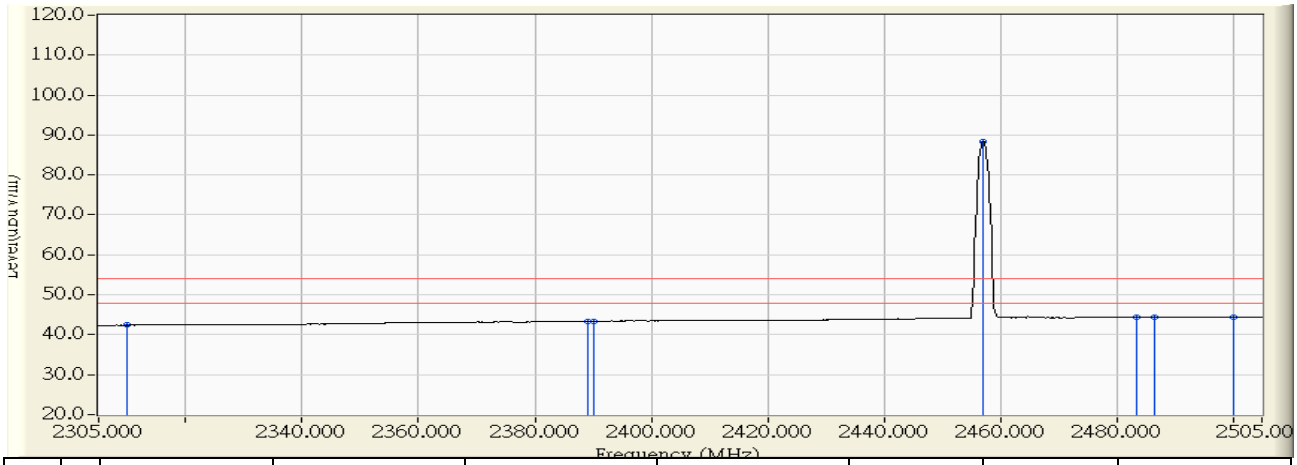


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	30.411	22.951	53.362	-20.638	74.000	PEAK
2		2347.760	30.803	25.971	56.774	-17.226	74.000	PEAK
3		2390.000	31.241	23.594	54.835	-19.165	74.000	PEAK
4	*	2457.040	31.937	56.438	88.374	14.374	74.000	PEAK
5		2483.500	31.980	23.658	55.637	-18.363	74.000	PEAK
6		2487.760	31.968	25.310	57.278	-16.722	74.000	PEAK
7		2500.000	31.934	23.737	55.672	-18.328	74.000	PEAK

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/18 - 15:27**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook PC_2457MHz-Y-yxis**

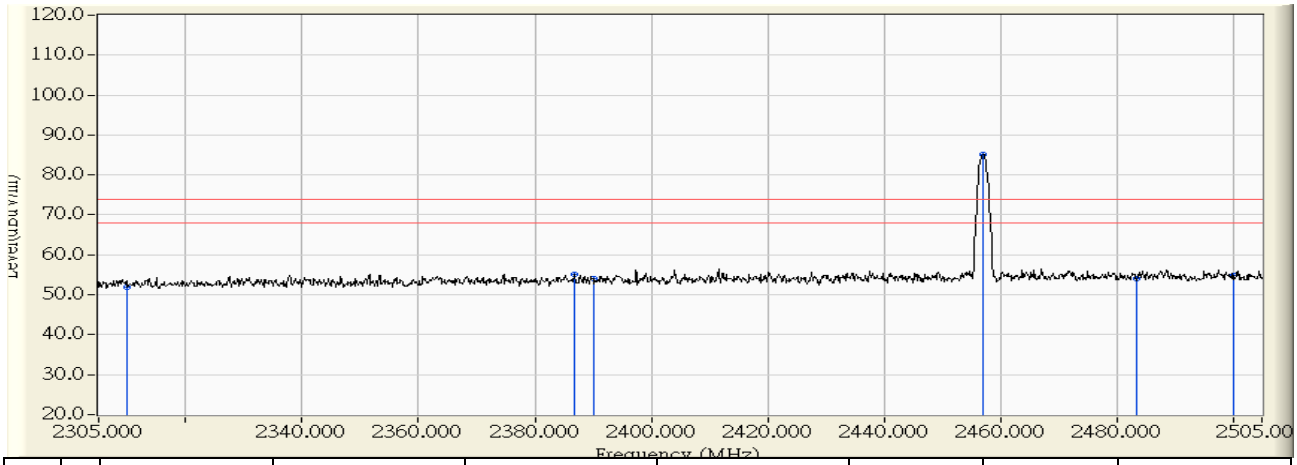


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	30.411	11.976	42.387	-11.613	54.000	AVERAGE
2		2389.200	31.232	12.171	43.404	-10.596	54.000	AVERAGE
3		2390.000	31.241	12.171	43.412	-10.588	54.000	AVERAGE
4	*	2457.040	31.937	56.329	88.265	34.265	54.000	AVERAGE
5		2483.500	31.980	12.330	44.309	-9.691	54.000	AVERAGE
6		2486.640	31.971	12.420	44.391	-9.609	54.000	AVERAGE
7		2500.000	31.934	12.372	44.307	-9.693	54.000	AVERAGE

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/18 - 15:28**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook PC_2457MHz-Y-yxis**

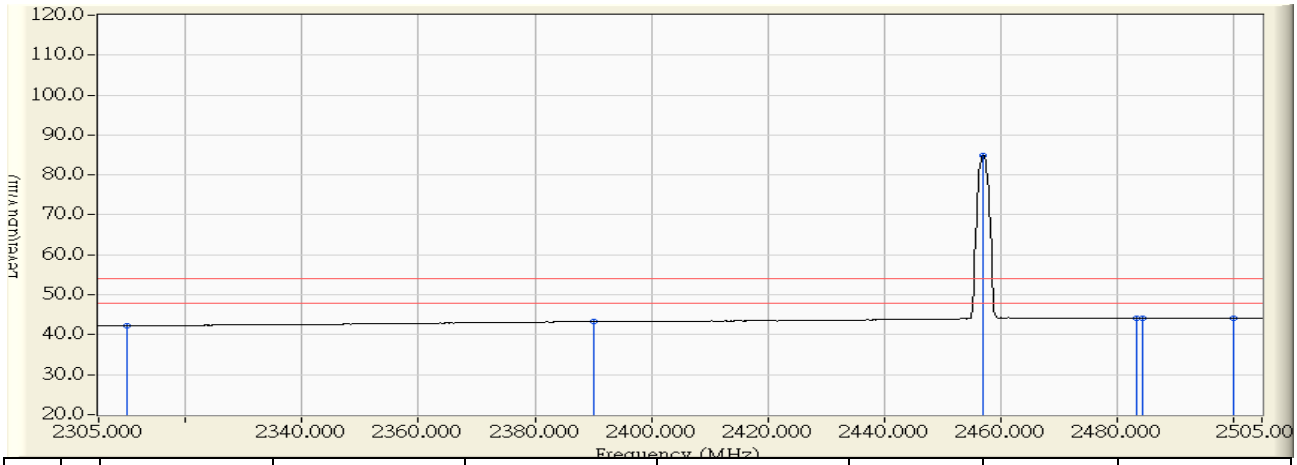


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	30.411	21.517	51.928	-22.072	74.000	PEAK
2		2386.800	31.207	23.925	55.133	-18.867	74.000	PEAK
3		2390.000	31.241	22.892	54.133	-19.867	74.000	PEAK
4	*	2457.040	31.937	53.104	85.040	11.040	74.000	PEAK
5		2483.500	31.980	21.978	53.957	-20.043	74.000	PEAK
6		2500.000	31.934	23.048	54.983	-19.017	74.000	PEAK
7		2563.120	31.763	24.567	56.330	-17.670	74.000	PEAK

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2014/12/18 - 15:30**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : AC120V/60Hz**
EUT : TwoNav Anima+	**Note : Mode 3: Transmit_Power by Notebook PC_2457MHz-Y-yxis**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2300.000	30.308	11.854	42.162	-11.838	54.000	AVERAGE
2		2310.000	30.411	11.812	42.223	-11.777	54.000	AVERAGE
3		2390.000	31.241	12.065	43.306	-10.694	54.000	AVERAGE
4	*	2457.040	31.937	52.988	84.924	30.924	54.000	AVERAGE
5		2483.500	31.980	12.232	44.211	-9.789	54.000	AVERAGE
6		2484.400	31.977	12.250	44.227	-9.773	54.000	AVERAGE
7		2500.000	31.934	12.190	44.125	-9.875	54.000	AVERAGE

Note:

1. All Readings below 1GHz are Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.