



FCC PART 90

TEST AND MEASUREMENT REPORT

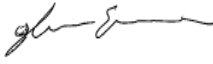
For

SpotterRF, LLC

709 E Technology Way BLDG E Ste. 3100,

Orem, UT 84097, USA

FCC ID: C06-C20-LIC

Report Type: Original Report	Product Type: Ground Surveillance Radar
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Report Number:	R14021812-90
Report Date:	2014-05-19
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* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “*” (Rev 2)

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R14021812-90	Original Report	2014-04-25
Rev A	R14021812-90	Updated FCC ID	2014-05-19

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *SpotterRF, LLC* and their product model: *C20-LIC*, *FCC ID: CO6-C20-LIC* or the “EUT” as referred to in this report. The EUT is a surveillance radar that locates and tracks moving objects in front of it. The device operates in 10-10.5 GHz frequency range.

1.2 Mechanical Description of EUT

The EUT measures approximately 17.5 cm (L) x 4.3 cm (W) x 22.9 cm (H) and weighs 700 g.

The test data gathered are from typical production sample, serial number: SP10098 assigned by Client.

1.3 Objective

This report is prepared on behalf of *SpotterRF, LLC* in accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 90 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 90 rules for Output Power, Antenna Requirements, Occupied Bandwidth, Frequency Stability, Spurious Emissions, Conducted and Radiated Spurious Emissions.

1.4 Related Submittal(s)/Grant(s)

N/A

1.5 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Part 90.

Applicable Standards: TIA/EIA603-C, ANSI C63.4-2009.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR16-4-2:2011, The Treatment of Uncertainty in EMC Measurements, the values ranging from ± 2.0 dB for Conducted Emissions tests and ± 4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

1.7 Test Facility

Bay area compliance Laboratories Corp. (BACL) is:

1- An independent Commercial Test Laboratory accredited to **ISO 17025: 2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminaires and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC (Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

4- A Product Certification Body accredited to **ISO Guide 65:1996** by **A2LA** to certify:

1- Unlicensed, Licensed radio frequency devices and Telephone Terminal Equipment for the FCC. Scope A1, A2, A3, A4, B1, B2, B3, B4 & C.

2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.

3. Radio Communication Equipment for Singapore.

4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.

5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).

6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s), Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2009, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

<http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b>

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to FCC CFR 47 part 2, FCC CFR 47 Part 90, and TIA 603

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

2.2 EUT Exercise Software

The exercise software used was *Spotter RF v3.2.0-00731b_2013-08-08*, provided by SpotterRF, LLC. and was verified by BACL Ken Bai to comply with the standard requirements being tested against.

2.3 Special Equipment

There were no special accessories required, included, or intended for use with EUT during these tests.

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Local Support Equipment

Manufacturer	Description	Model	Serial Number
HP	Laptop	HP ProBook 4525s	2CE041168V
Spotter RF	P.O.E.	POE-IN-J-01	-

2.6 EUT Internal Configuration Details

Manufacturer	Description	Model	Serial Number
SpotterRF	Motherboard	ADAMS-1.3	WD1080-014

2.7 Interface Ports and Cables

Cable Description	Length (m)	To	From
RJ45	<1.0	EUT	POE
RJ45	>1.0	POE	Laptop

2.8 Power Supply List and Details

Manufacturer	Description	Model	Part Number
V-Infinity	AC/DC Adapter	ETSA200200UD	-

3 Summary of Test Results

Results reported relate only to the product tested.

FCC Rules	Description of Test	Results
FCC §1.1310	RF Exposure	Calculate
FCC §15.203	Antenna Requirement	Compliant
FCC §2.1051 , §90.210	Spurious Emissions at Antenna Port	Compliant
FCC §2.1053, §90.210	Radiated Spurious Emissions	Compliant
FCC §2.1049	Occupied Bandwidth	Compliant
FCC §2.1046, §90.205(s), §90.103(c)(13)	Output Power	Compliant
FCC §2.1053, §90.213(b)	Frequency Stability	Compliant

4 FCC §1.1310 – RF Exposure

4.1 Applicable Standard

According to FCC §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* (180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

4.3 MPE Results

Maximum peak output power at antenna input terminal (dBm): 11.91

Maximum peak output power at antenna input terminal (mW): 15.5239

Prediction distance (cm): 20

Prediction frequency (MHz): 10075

Maximum Antenna Gain, typical (dBi): 14

Maximum Antenna Gain (numeric): 25.11886

Power density of prediction frequency at 20.0 cm (mW/cm²): 0.07757

MPE limit for uncontrolled exposure at prediction frequency (mW/cm²): 1.0

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.07757 mW/cm². Limit is 1.0 mW/cm².

5 FCC §2.1051 & §90.210 – Spurious Emissions at Antenna Port

5.1 Applicable Standard

For FCC §2.1051 and FCC §90.210

Attenuation below carrier of $43 + 10 \log (P)$ dB or -13 dBm.

5.2 Measurement Procedure

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 1MHz. The video bandwidth is set to 3MHz.

The spectrum from 30MHz to 50GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 year

Statement of Traceability: *BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

5.4 Test Environmental Conditions

Temperature:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102 kPa

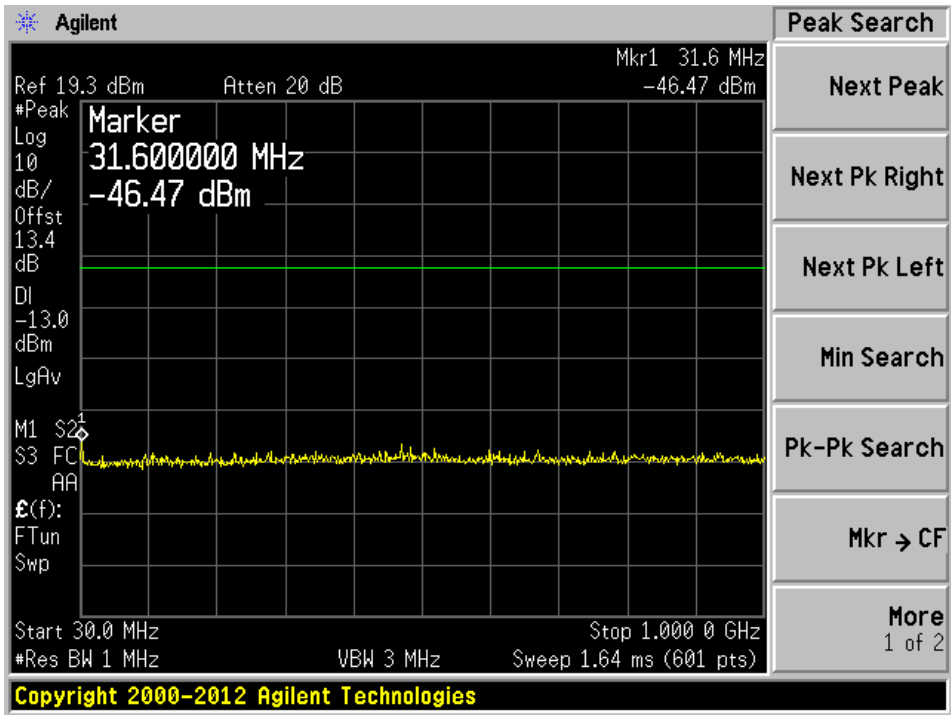
The testing was performed by Glenn Escano on 2014-03-26 at RF site.

5.5 Test Results

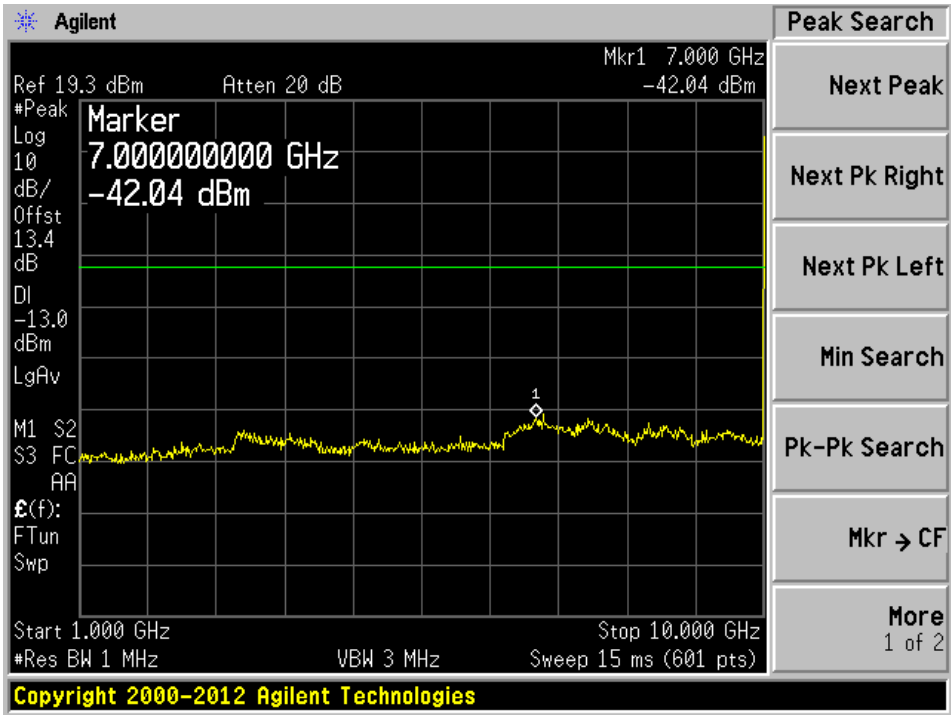
Please refer to following plots of spurious emissions.

Low Channel, 10075 MHz

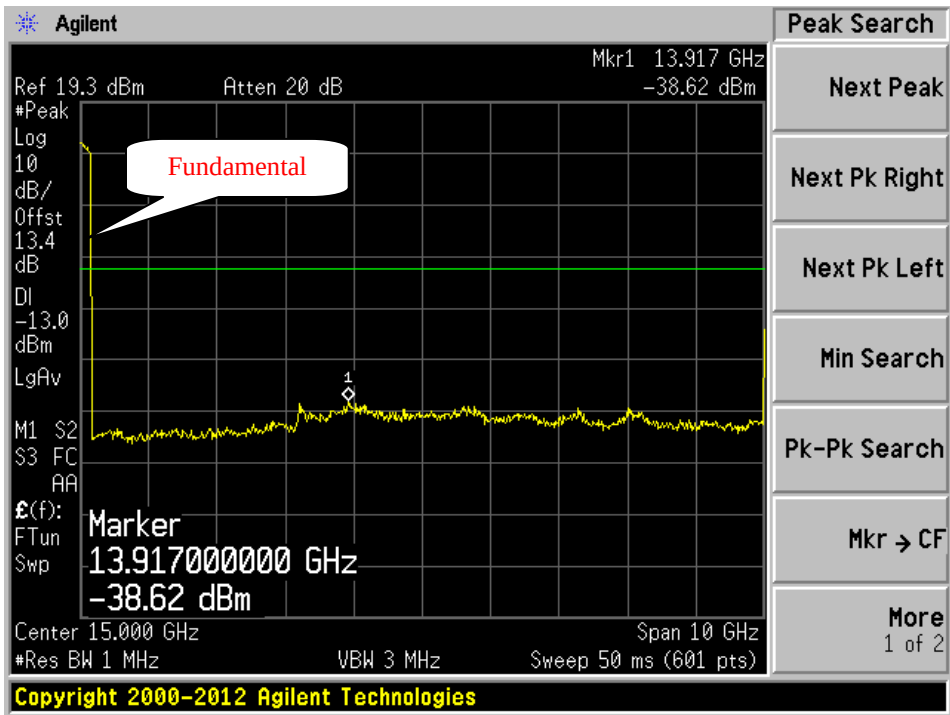
Plot 1: 30 MHz – 1 GHz



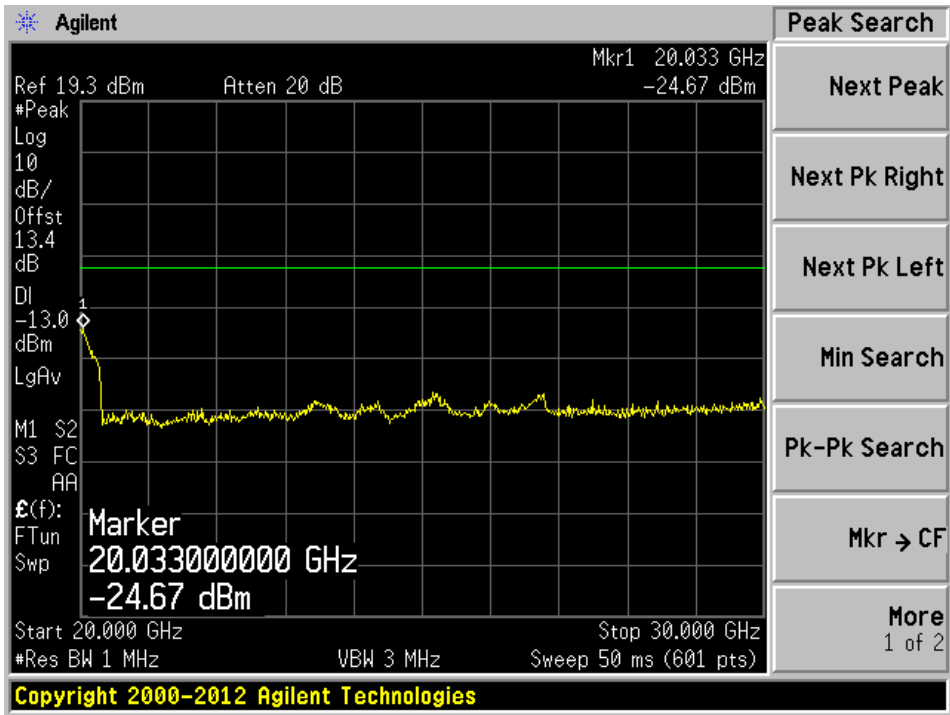
Plot 2: 1 GHz – 10 GHz



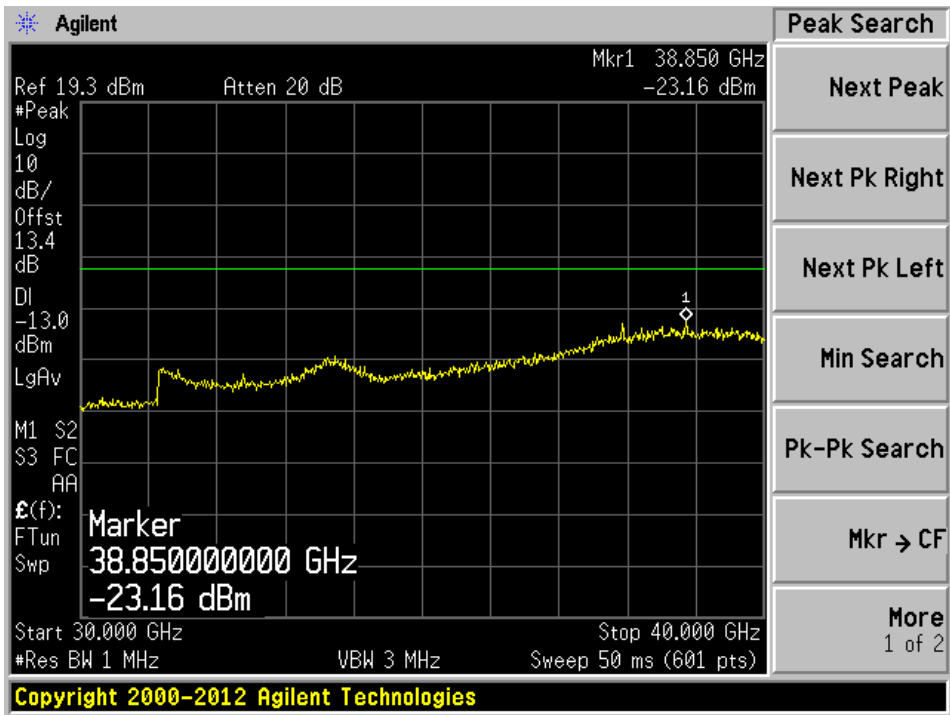
Plot 3: 10 GHz – 20 GHz



Plot 4: 20 GHz – 30 GHz

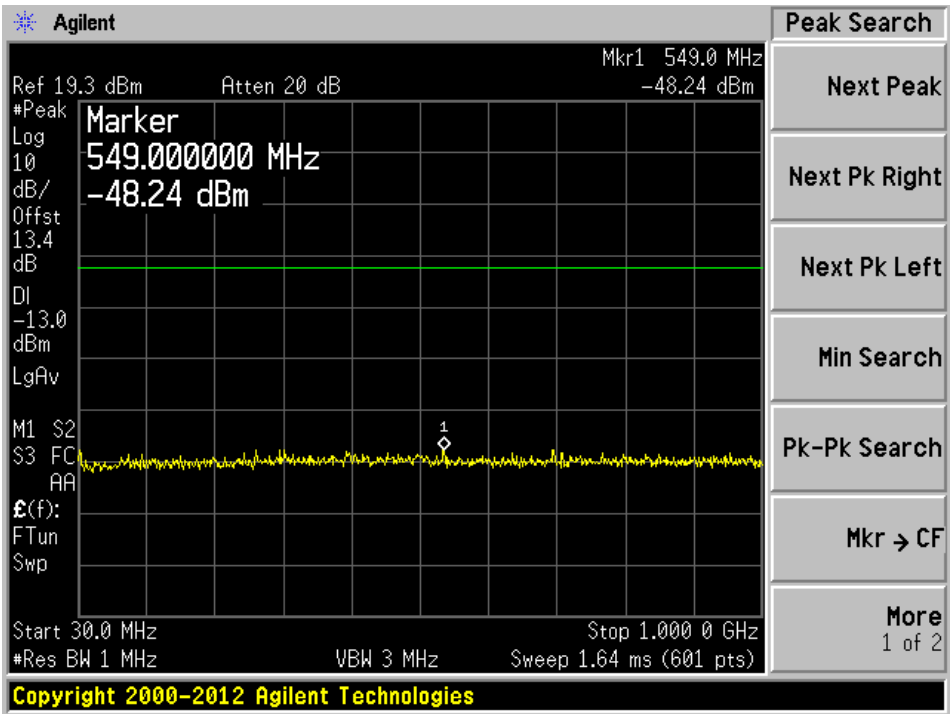


Plot 5: 30 GHz – 40 GHz

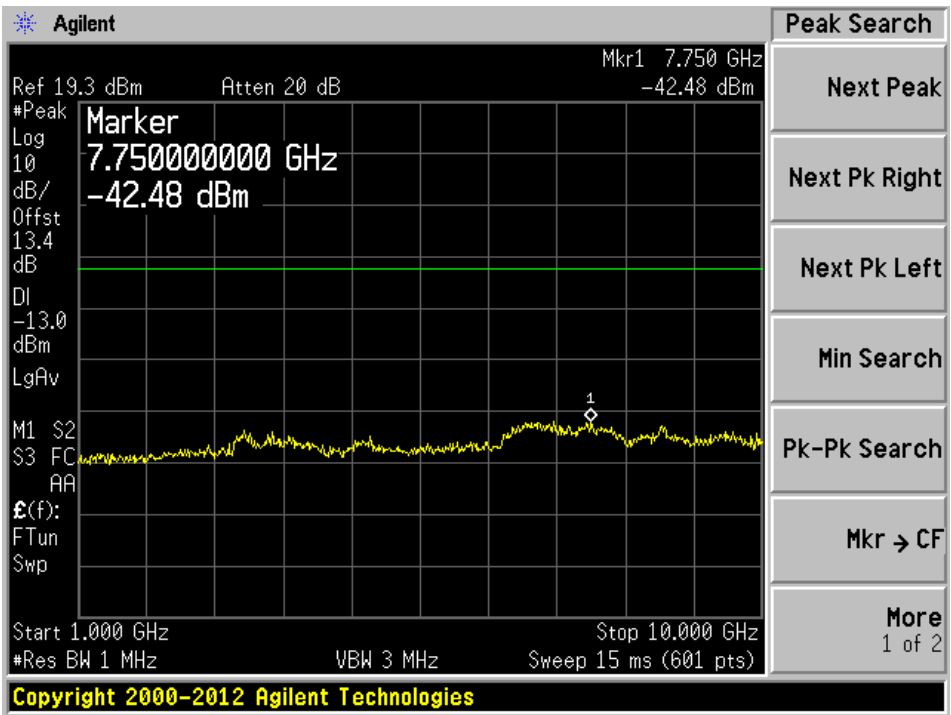


Middle Channel, 10275 MHz

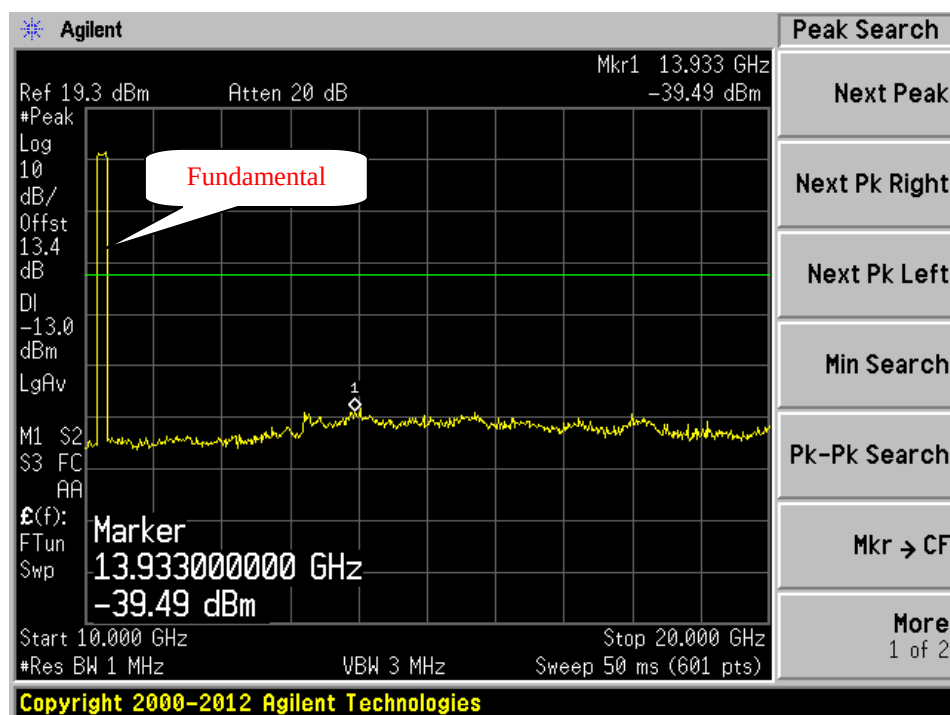
Plot 1: 30 MHz – 1 GHz



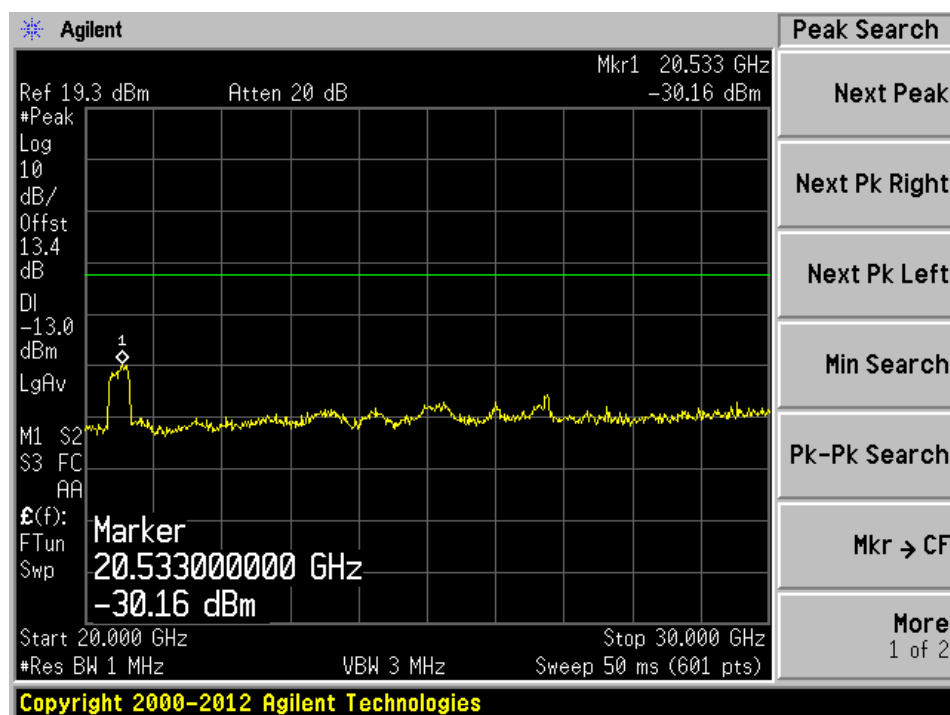
Plot 2: 1 GHz – 10 GHz



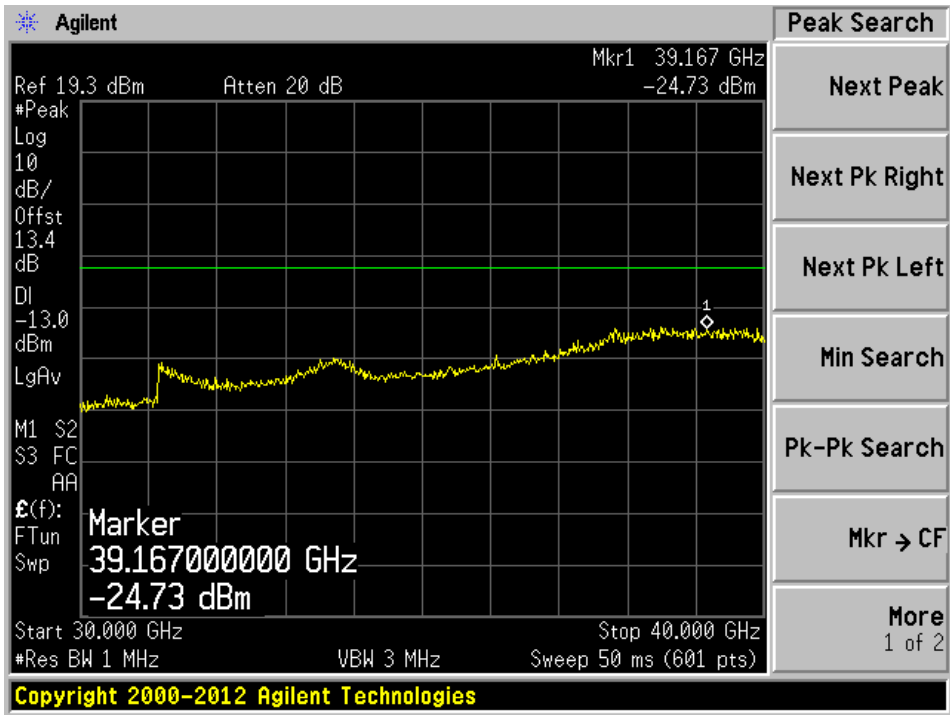
Plot 3: 10 GHz – 20 GHz



Plot 4: 20 GHz – 30 GHz

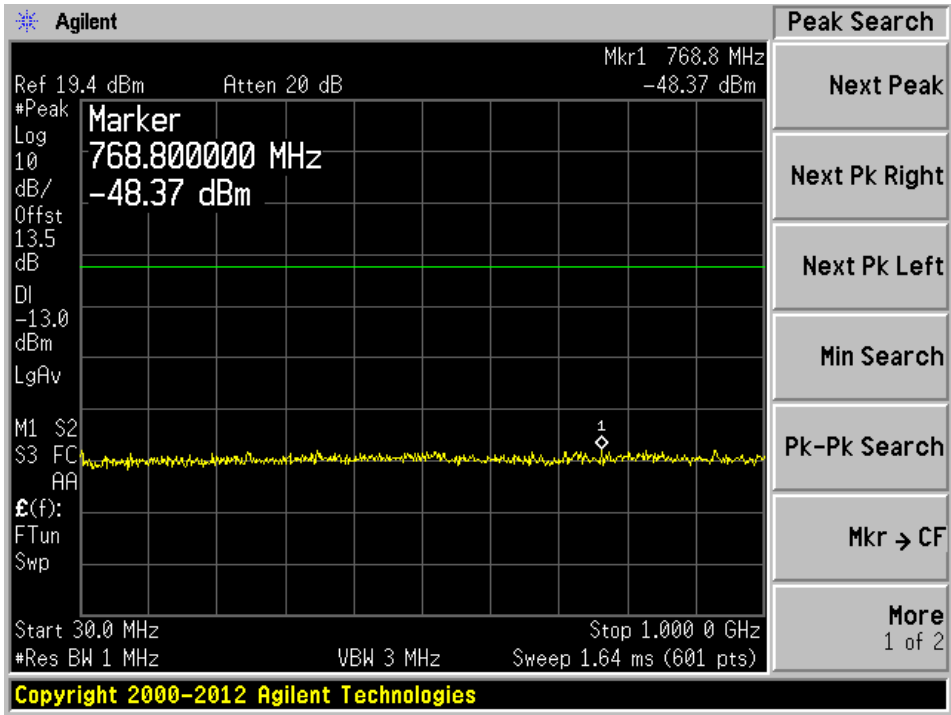


Plot 5: 30 GHz – 40 GHz

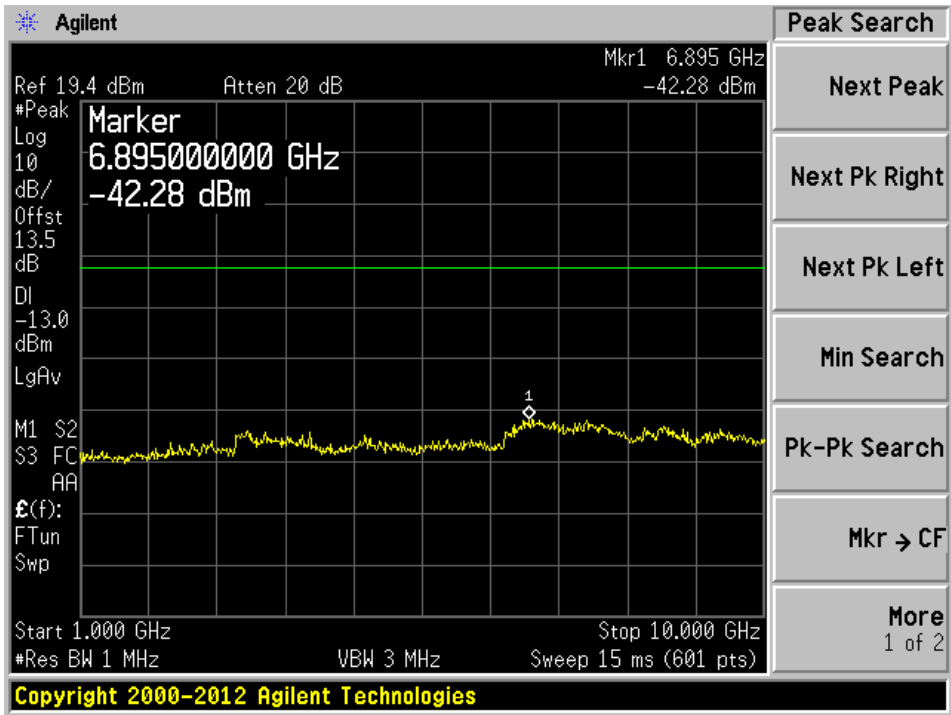


High Channel, 10425 MHz

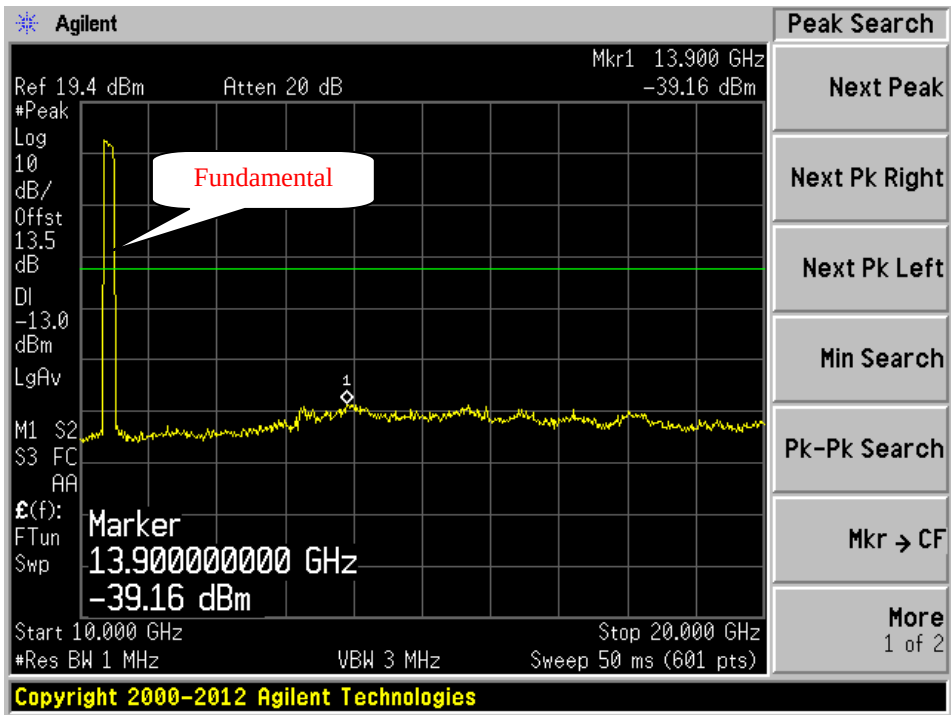
Plot 1: 30 MHz – 1 GHz



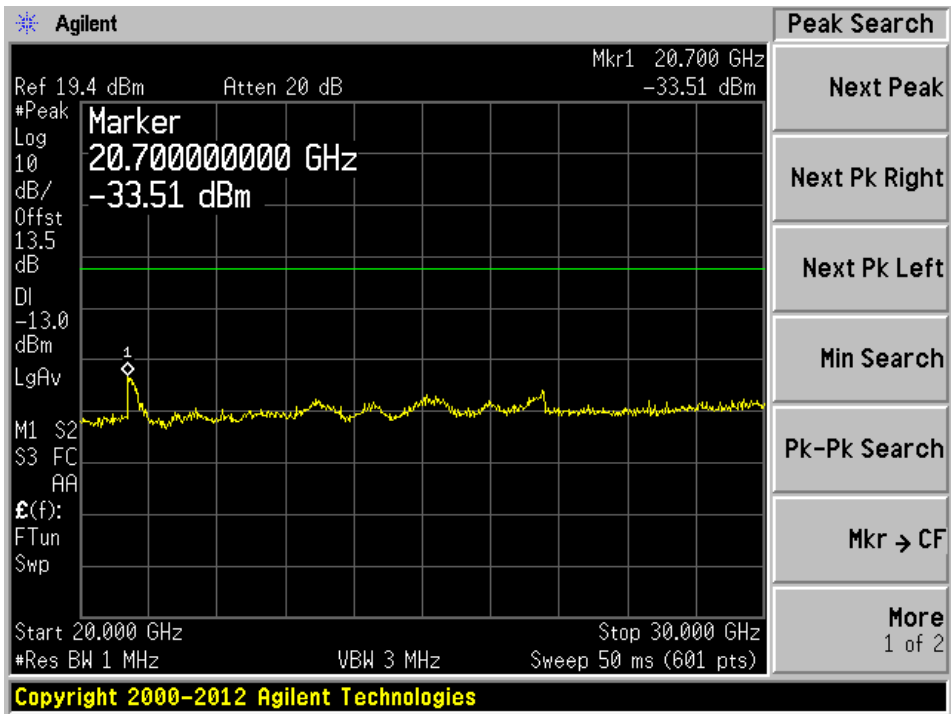
Plot 2: 1 GHz – 10 GHz



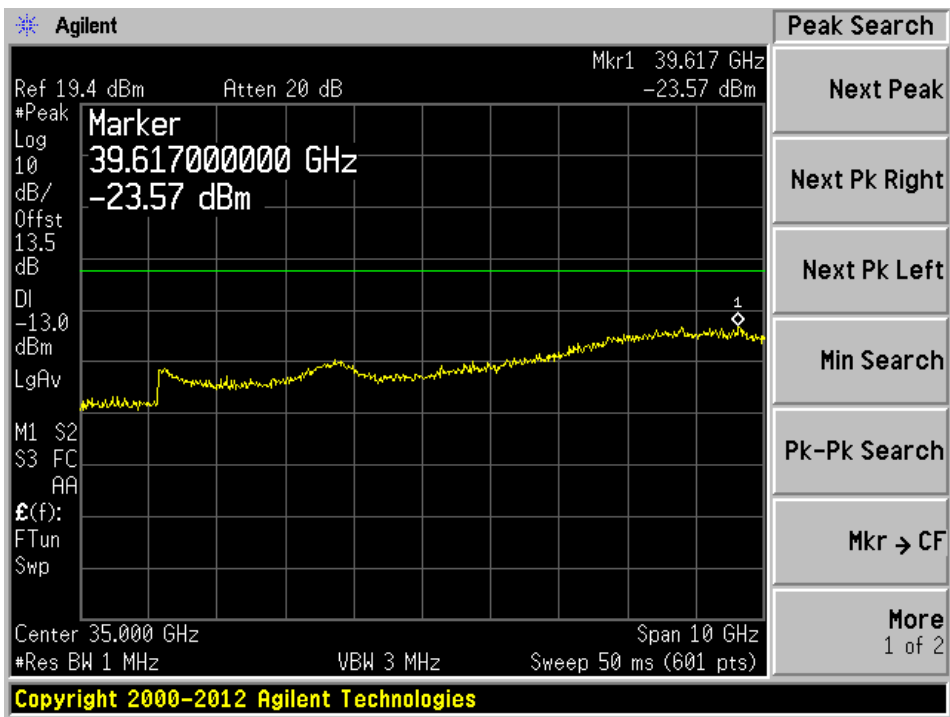
Plot 3: 10 GHz – 20 GHz



Plot 4: 20 GHz – 30 GHz



Plot 5: 30 GHz – 40 GHz



6 FCC §2.1053 & §90.210 – Spurious Radiated Emissions

6.1 Applicable Standard

FCC §2.1053 and FCC §90.210

-13 dBm (82 dBuV/m @ 3m)

6.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.4-2009. The specification used was the FCC §2.1053 and FCC §90.210 limits.

The spacing between the peripherals was 3 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

6.3 Test Procedure

The measurements are based on FCC §2.1053 and FCC §90.210.

For the radiated emissions test, the EUT host, and all support equipment power cords were connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed to test both the horizontal and vertical polarization of the EUT antenna.

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

RBW = 100 kHz/VBW = 300 kHz/Sweep = Auto

For frequency range above 1 GHz, TIA 603-D section 2.2.12

6.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + AF + CL + Atten - Ga$$

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corrected Amplitude} - \text{Limit}$$

6.5 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 Year
Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950K03	100338	2013-09-19	1 Year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2013-07-11	1 Year
Hewlett Packard	Pre-amplifier	8447D	2944A10187	2013-03-08	1 Year
EMCO	Horn antenna	3115	9511-4627	2014-01-07	1 Year
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2013-05-09	1 Year
Hewlett Packard	Pre Amplifier	8449B OPT H02	3008A01103	2014-03-10	1 Year
WiseWave	Horn Antenna	ARH-4223-02	10555-01	2012-08-09	3 Years
WiseWave	Amplifier	ALN-33144130-01	11424-01	2013-04-28	3 Years

Statement of Traceability: BACL attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.

6.6 Test Environmental Conditions

Temperature:	22 °C
Relative Humidity:	52 %
ATM Pressure:	101.89 kPa

The testing was performed by Glenn Escano on 2014-03-28 in 5 m chamber 3.

6.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part FCC §2.1053 and FCC §90.210 radiated emissions limits, and had the worst margin of:

30-1000 MHz:

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Mode, Channel
-27.39	275.0018	Vertical	High Channel

1-40 GHz:

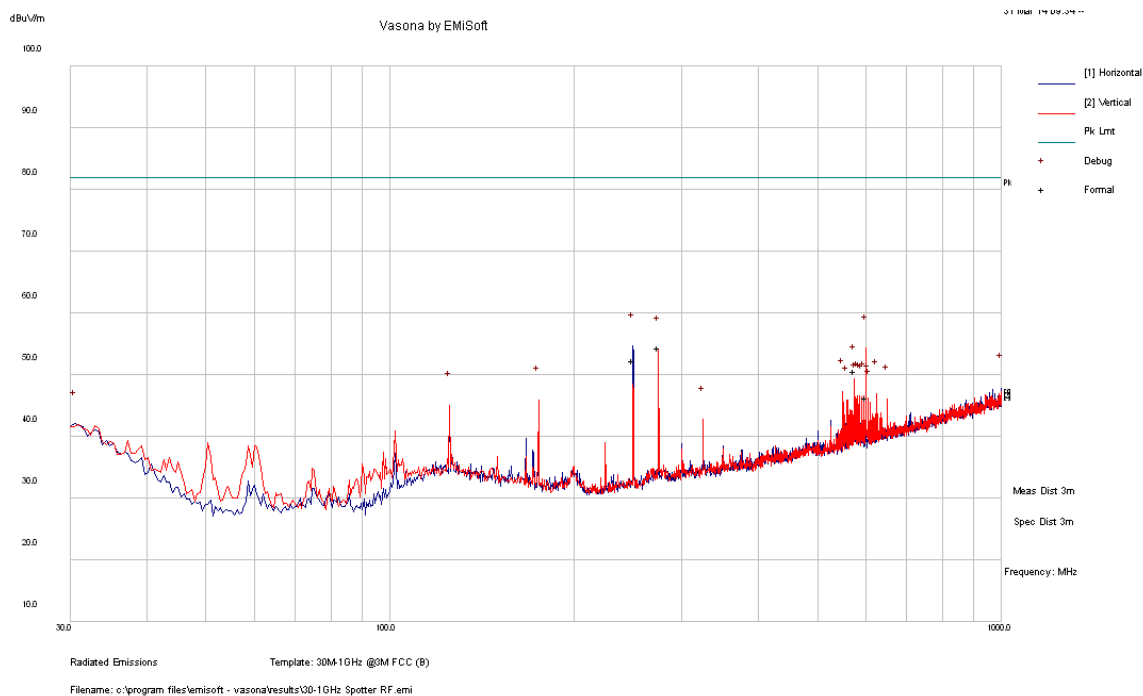
Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Mode, Channel
-14.411	25160	Vertical	Low Channel

Please refer to the following table and plots for specific test result details

6.8 Radiated Emissions Test Data and Plots

Low Channel (10.075 GHz)

30 MHz-1 GHz, Measured at 3 meters, EUT antenna port was terminated



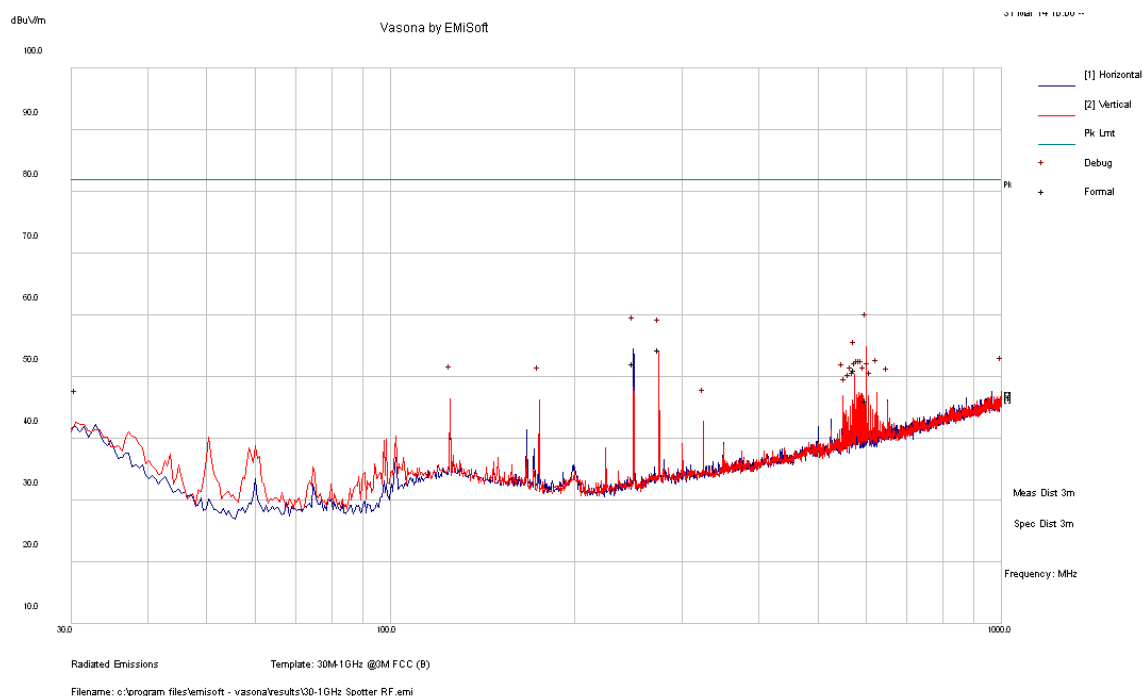
Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
249.9545	52.31	107	H	129	82	-29.69
600.1308	46.27	98	V	352	82	-35.73
274.999	54.35	232	V	159	82	-27.65
575.0018	50.65	98	V	0	82	-31.35

1– 40 GHz, Measured at 3 meters, EUT antenna port was terminated

Freq. (MHz)	S.A. Amp. (dBμV/m)	Table Azimuth (Degrees)	Test Antenna		Substitution				Absolute Level (dBm)	Result	
			Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Antenna Gain (dB)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
1793	50.81	97	100	V	1793	-53.67	5.979	0.911	-46.78	-13	-33.78
1793	46.98	117	100	H	1793	-54.64	5.979	0.911	-47.75	-13	-34.75
2643	47.04	20	100	V	2643	-52.96	10.753	1.446	-40.761	-13	-27.761
2643	42.96	95	100	H	2643	-55.04	10.753	1.446	-42.841	-13	-29.841
25160	37.45	0	100	V	25160	-42.79	12.125	3.254	-27.411	-13	-14.411
25160	35.94	0	100	H	25160	-45.31	12.125	3.254	-29.931	-13	-16.931

Middle Channel (10.25 GHz)

30 MHz-1 GHz, Measured at 3 meters, EUT antenna port was terminated



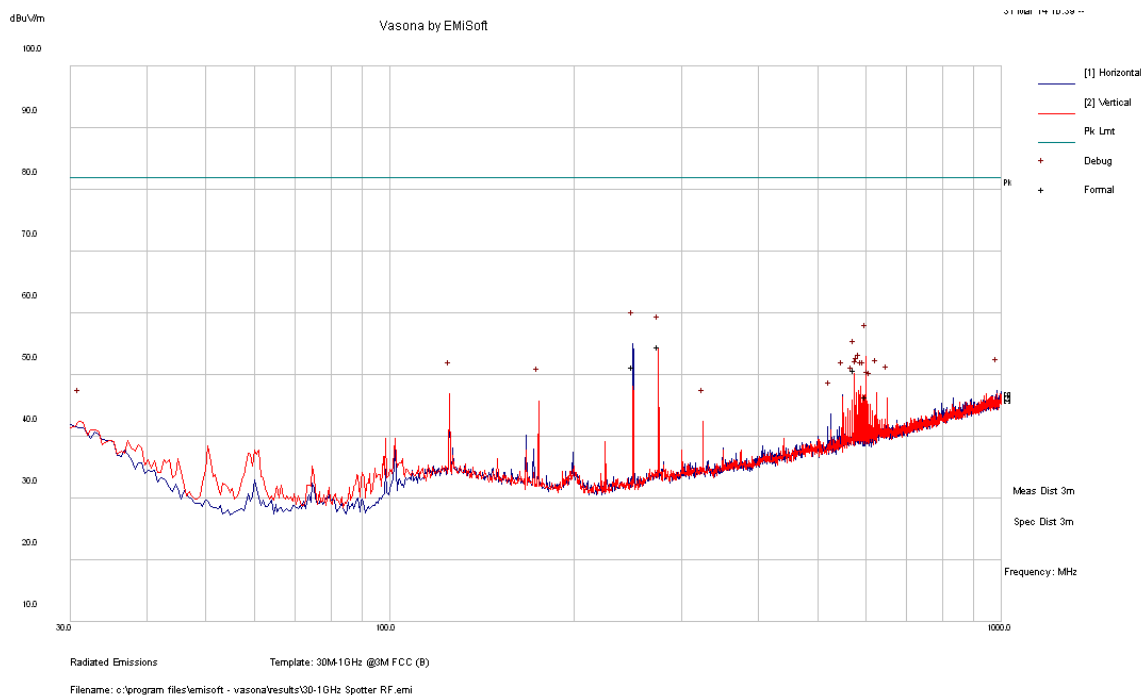
Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
275.0028	54.36	232	V	329	82	-27.64
249.9548	52.15	98	H	130	82	-29.85
574.978	51.15	98	V	4	82	-30.85
600.603	46.04	120	V	7	82	-35.96

1– 40 GHz, Measured at 3 meters, EUT antenna port was terminated

Freq. (MHz)	S.A. Amp. (dBμV/m)	Table Azimuth (Degrees)	Test Antenna		Substitution				Absolute Level (dBm)	Result	
			Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Antenna Gain (dB)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
1793	50.59	93	100	V	1793	-53.89	5.979	0.911	-47	-13	-34
1793	47.04	21	100	H	1793	-54.58	5.979	0.911	-47.69	-13	-34.69
2643	46.77	119	100	V	2643	-53.23	10.753	1.446	-41.031	-13	-28.031
2643	43.06	0	100	H	2643	-54.94	10.753	1.446	-42.741	-13	-29.741
25160	36.79	0	100	V	25160	-43.45	12.125	3.254	-28.071	-13	-15.071
25160	36.21	0	100	H	25160	-45.04	12.125	3.254	-29.661	-13	-16.661

High Channel (10.425 GHz)

30 MHz-1 GHz, Measured at 3 meters, EUT antenna port was terminated



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
275.0018	54.61	224	V	341	82	-27.39
249.9528	51.36	141	H	118	82	-30.64
574.999	50.71	103	V	1	82	-31.29
600.4705	46.48	98	V	30	82	-35.52

1– 40 GHz, Measured at 3 meters, EUT antenna port was terminated

Freq. (MHz)	S.A. Amp. (dBμV/m)	Table Azimuth (Degrees)	Test Antenna		Substitution				Absolute Level (dBm)	Result	
			Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Antenna Gain (dB)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
1595	52.33	15	100	V	1595	-52.15	5.979	0.911	-45.26	-13	-32.26
1595	50.41	317	100	H	1595	-51.21	5.979	0.911	-44.32	-13	-31.32
2643	45.96	339	100	V	2643	-54.04	10.753	1.446	-41.841	-13	-28.841
2643	43.48	0	100	H	2643	-54.52	10.753	1.446	-42.321	-13	-29.321
25160	36.86	0	100	V	25160	-43.38	12.125	3.254	-28.001	-13	-15.001
25160	36.44	0	100	H	25160	-44.81	12.125	3.254	-29.431	-13	-16.431

Note: all emissions above 26.5 GHz are on the noise floor level.

7 FCC§2.1049 – Occupied Bandwidth

7.1 Applicable Standard

FCC §2.1049

No limit

7.2 Measurement Procedure

The transmitter output is connected to the spectrum analyzer. The sweep time is coupled. The spectrum analyzer internal 26dB bandwidth function is utilized.

KDB 971168 Occupied bandwidth measurement method is used.

7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 year

Statement of Traceability: *BACL Corp.* attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

7.4 Test Environmental Conditions

Temperature:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102 kPa

The testing was performed by Glenn Escano on 2014-03-26.

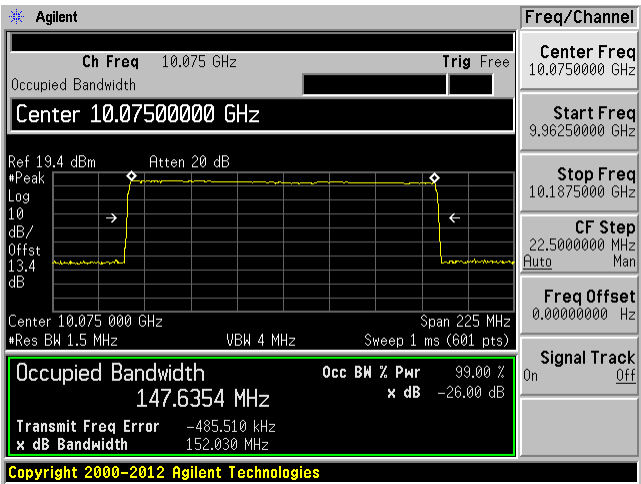
7.5 Test Results

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
Low	10075	152.030	147.6354
Middle	10250	151.655	147.3012
High	10425	151.814	147.2949

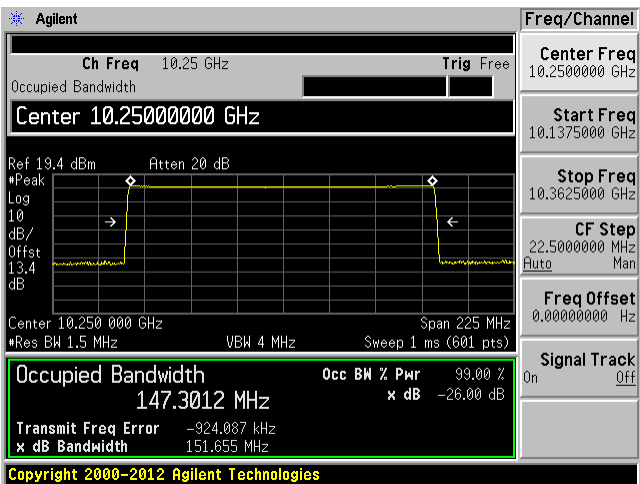
Please refer to the following plots for detailed test results

Emission Bandwidth

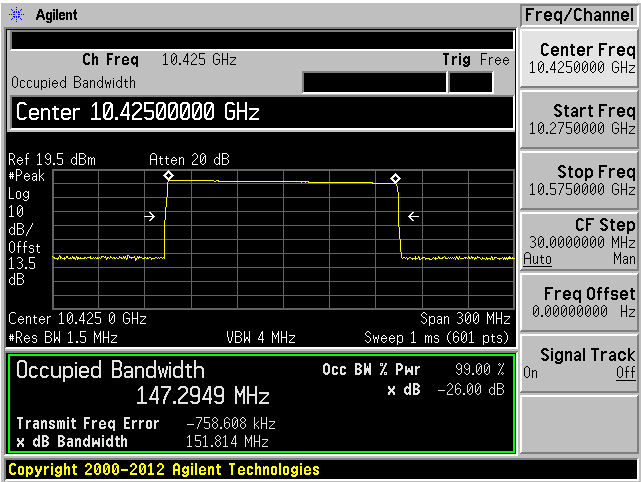
Low channel: 10075 MHz



Middle channel: 10250 MHz



High channel: 10425 MHz



8 FCC §2.1046, §90.205 & §90.103 (c) – Output Power

8.1 Applicable Standard

FCC §2.1046

FCC §90.205 (s) The output power shall not exceed by more than 20 percent either the output power shown in the Radio Equipment List [available in accordance with §90.203(a)(1)] for transmitters included in this list or when not so listed, the manufacturer's rated output power for the particular transmitter specifically listed on the authorization.

FCC §90.103 (c) (13) Operations in this band are limited to survey operations using transmitters with a peak power not to exceed 5 watts into the antenna.

8.2 Measurement Procedure

The transmitter output was connected to the input terminal via calibrated coaxial cable. The output power was measured with the wideband power meter at the low, middle and high channel in each band.

KDB 9771168 wideband power measurement method is used.

8.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 year

Statement of Traceability: *BACL Corp.* attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

8.4 Test Environmental Conditions

Temperature:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102 kPa

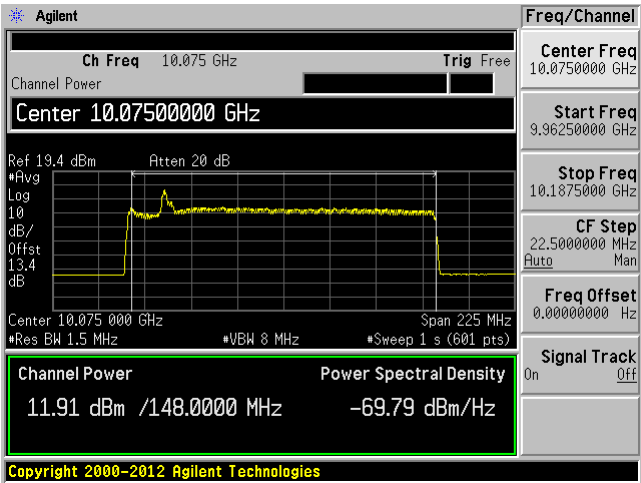
The testing was performed by Glenn Escano on 2014-03-27.

8.5 Test Results

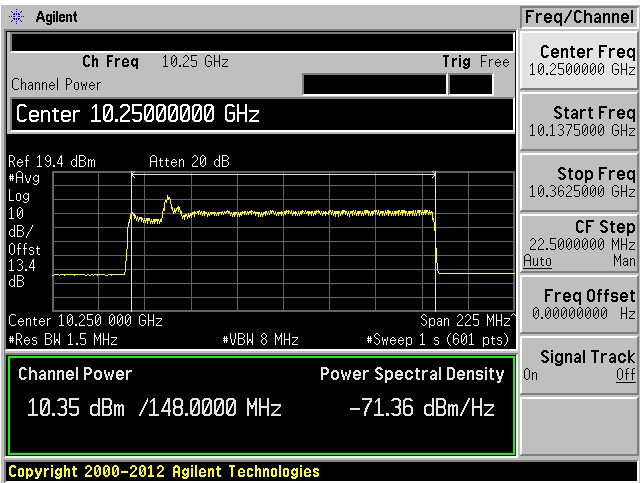
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	10075	11.91	37	-25.09
Middle	10250	10.35	37	-26.65
High	10425	11.64	37	-25.36

Please refer to the following plots for detailed test results

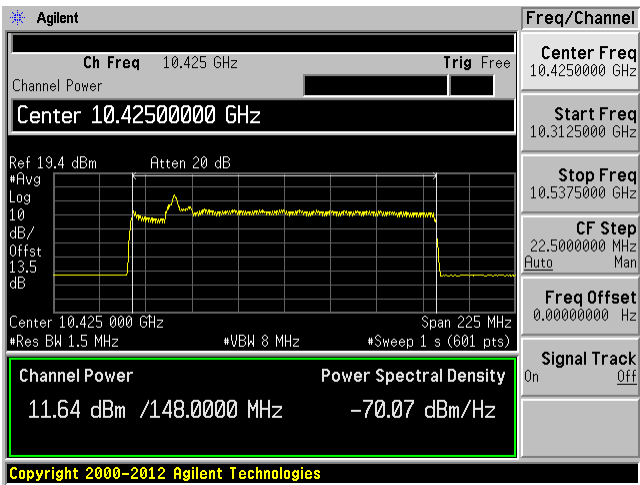
Low channel: 10075 MHz



Middle channel: 10250 MHz



High channel: 10425 MHz



9 FCC §2.1053 & §90.213(a) – Frequency Stability

9.1 Applicable Standard

FCC §2.1053

FCC §90.213 (b) For the purpose of determining the frequency stability limits, the power of a transmitter is considered to be the maximum rated output power as specified by the manufacturer

9.2 Measurement Procedure

ANSI/TIA/EIA 603 clause 2.3.1 and 2.3.2

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 year

Statement of Traceability: *BACL Corp.* attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

9.4 Test Environmental Conditions

Temperature:	22-24 °C
Relative Humidity:	42-45 %
ATM Pressure:	101-102 kPa

The testing was performed by Ken Bai on 2014-03-04 at RF site.

9.5 Test Results

Reference Frequency: EUT Mid Channel @ 20 °C Limit: ± 100 ppm = 10275 kHz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
120	60	10274.9249537	0.023	± 100
120	50	10274.9249462	0.022	± 100
120	40	10274.9248654	0.014	± 100
120	30	10274.9248441	0.012	± 100
120	20	10274.9247150	0.000	± 100
120	10	10274.9246872	-0.002	± 100
120	0	10274.9245632	-0.015	± 100
120	-10	10274.9238842	-0.081	± 100
120	-20	10274.9236560	-0.103	± 100