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TESTING Cert No.1152.01

DATE: 12 September 2013

I.T.L. (PRODUCT TESTING) LTD.

FCC Radio Test Report

for

GoNet Systems Ltd

Equipment under test:

WiFi BeamForming Access Point

GoBeam 6100F; GoBeam 5100F

Written by: _____
R. Pinchuck, Documentation

Approved by: _____
A. Sharabi, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

*See Customer's Declaration on page 6.

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Measurement/Technical Report for

GoNet Systems Ltd

WiFi BeamForming Access Point

GoBeam 6100F; GoBeam 5100F

FCC ID: A7C-56-100F-000

This report concerns:	Original Grant:	X
	Class I Change:	
	Class II Change:	
Equipment type:	Digital Transmission System	

Limits used:
47CFR15 Section 15.247

Measurement procedures used are KDB 558074 D01 v03r01 April 9, 2013 and ANSI C63.4-2003.

Application for Certification
prepared by:
Ishaishou Raz
ITL (Product Testing) Ltd.
Kfar Bin Nun
D.N. Shimshon 99780
Israel
e-mail Sraz@itl.co.il

Applicant for this device:
(different from "prepared by")
Sharon Ashkenazi
GoNet Systems Ltd.
34 HaBarzel St.
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1. General Information

1.1 Administrative Information

Manufacturer:	GoNet Systems Ltd
Manufacturer's Address:	34 HaBarzel St., Tel-Aviv, 69710, Israel Tel: +972-3-633-8634 Fax: +972-3-649-3866
Manufacturer's Representative:	Nimrod Tenne Sharon Ashkenazi
Equipment Under Test (E.U.T):	WiFi BeamForming Access Point
Equipment Model No.:	GoBeam 6100F; GoBeam 5100F
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	17.06.2012
Start of Test:	17.06.2012
End of Test:	10.09.2013
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 15 Section 15.247

*See Customer's Declaration on next page.

GONET SYSTEMS

Date: 8/7/13

DECLARATION

I hereby declare that the GoBeam-6100 differs from the GoBeam-5100M only by the antennas used.
The GoBeam-6100 uses directional antennas and the GoBeam-5100M uses omni antennas.
Except for the antennas used, the models are identical mechanically, physically, and electronically.
Please relate to them all (from an EMC point of view) as the same product.

Thank you,

Signature: GoNet Systems Ltd.

Sharon Ashkenazi
VP Engineering
GoNet Systems Ltd.

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025B-1.
6. TUV Product Services, England, ASLLAS No. 97201.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 Product Description

Overview

GoBeam 6100 is GoNet Systems new, carrier-grade sector access point, which offers superior range and capacity by combining GoNet Systems MIMO xRF™ beamforming and the latest 802.11n Wi-Fi standard. GoBeam 6100 is the ideal solution for cellular operators deploying large scale 3G data offload and Wi-Fi access applications in dense urban conditions.

GoBeam 6100 is designed for mounting on cellular towers, roof-tops and poles. With multi-block interference mitigation including patented 3G, WiMAX & Wi-Fi channel filters, the GoBeam access point can be co-located with 3G BTS without performance degradation either for the AP or the 3G BST. GoBeam access points deliver a winning business value by enabling cellular operators to leverage their existing network assets and reduce CAPEX and OPEX.

Solution

The GoBeam family of access points is designed to enable mix & match according the specific deployment needs. The GoBeam 6100 provides high-performance from roof-top and pole mounting while the GoBeam 5100 delivers cost-effective omnidirectional, street-level coverage.

- GoBeam 6100 - 120° sector access point
- GoBeam 5100 – 360° omni access point

xRF™ Beamforming

GoNet Systems xRF™ beamforming technology focuses communications to and from each client in a narrow beam. This advanced technology delivers x2-x4 the range and capacity, to any standard-based Wi-Fi client, in comparison to standard Wi-Fi access points. The beamforming technology combined with GoNet Systems specialized channel filters deliver 90% effective noise mitigation in harsh, outdoor environments.

MIMO xRF™ Beamforming

Combining 802.11n and MIMO xRF™ beamforming, GoNet Systems delivers the most powerful Wi-Fi solution for outdoor deployments. By enhancing the xRF™ beamforming to support multiple streams in MIMO configurations, GoNet Systems overcomes the technology limitations and extends the 802.11n range and capacity in noisy, urban environments.

1.4 Test Methodology

Conducted and radiated testing was performed according to the procedures in KDB 558074 D01 v03r01 April 9, 2013 and ANSI C63.4-2003. Radiated testing was performed at with the test antenna at a distance of 3 meters from the EUT.

1.5 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing September 03, 2009; November 21, 2012).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Conducted Emission

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) 0.15 – 30 MHz:
Expanded Uncertainty (95% Confidence, K=2):
± 3.44 dB

Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000 MHz:
Expanded Uncertainty (95% Confidence, K=2):
± 4.96 dB

2. System Test Configuration

2.1 Justification

The unit was configured to transmit at maximum power and 100% of the time. During the tests the unit was tested in three different frequencies, at the bottom of the range, at the upper limit of the range and in the middle of the range. At all the ranges the unit was tested at six different rates 1Mbps, 11Mbps, 6Mbps and 54 Mbps and 6.5Mbps and 130Mbps.

The antenna array of 4 antennas was used for 802.11b/g with the data rates of 1Mbps, 11Mbps, 6Mbps and 54 Mbps.

The MIMO was used for 802.11n with the data rates of 6.5Mbps and 130Mbps.

Radiated tests for the Unit was in a typical installation position and with the internal antenna connected.

2.2 EUT Exercise Software

The original software was used in order to operate the system.

2.3 Special Accessories

No special accessories were needed to achieve compliance.

2.4 Equipment Modifications

No modifications were necessary in order to achieve compliance.

2.5 Configuration of Tested System

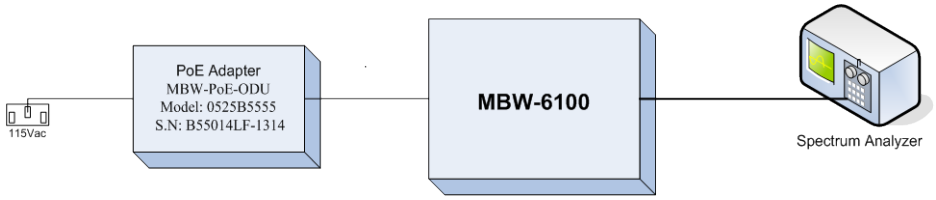


Figure 1. Configuration of Tested System – Conducted

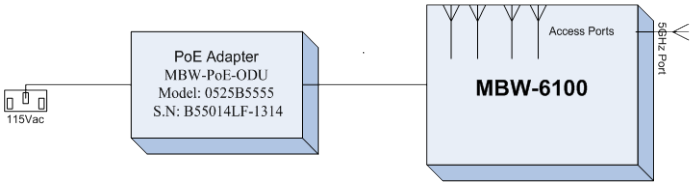


Figure 2. Configuration of Tested System – Radiated

3. Conducted and Radiated Measurement Test Set-up Photos

Figure 3. Conducted Emission From Antenna Port Test

Figure 4. Conducted Emission From AC Power line

Figure 5. Radiated Emission Test 5100F

Figure 6. Radiated Emission Test 5100F

Figure 7. Radiated Emission Test 5100F

Figure 8. Radiated Emission Test 5100F

Figure 9. Radiated Emission Test 6100F

Figure 10. Radiated Emission Test 6100F

Figure 11. Radiated Emission Test 6100F

Figure 12. Radiated Emission Test 6100F

4. Power Lines Conducted Emission

4.1 Test Specification

F.C.C., Part 15, Subpart C

4.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 3.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room, with the E.U.T placed on an 0.8 meter high wooden table, 0.4 meter from the room's vertical wall.

The E.U.T was powered from 115 V AC / 60 Hz via a 50 Ohm / 50 µHn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are pre-loaded to the receiver and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, and using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

4.3 Test Results

JUDGEMENT: Passed by 2.67 dB

The margin between the emission levels and the specification limit was, in the worst case, 7.55 dB for the phase line at 15.6 MHz and 2.67 dB for the neutral line at 15.6 MHz.

The EUT met the F.C.C. Part 15, Subpart C specification requirements.

The details of the highest emissions are given in *Figure 13* to *Figure 16*.

TEST PERSONNEL:

Tester Signature: _____ Date: 12.08.13

Typed/Printed Name: A. Sharabi

Conducted Emission

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Phase
Detectors:	Peak, Quasi-peak, Average

EDIT PEAK LIST (Final Measurement Results)

Trace1: CE22BQP
Trace2: CE22BAP
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	166 kHz	56.75	-8.40
2	Average	166 kHz	46.62	-8.53
2	Average	278 kHz	41.32	-9.54
1	Quasi Peak	290 kHz	39.57	-20.95
1	Quasi Peak	386 kHz	39.87	-18.27
2	Average	390 kHz	37.12	-10.94
1	Quasi Peak	446 kHz	36.32	-20.62
2	Average	446 kHz	34.22	-12.72
1	Quasi Peak	666 kHz	25.07	-30.93
2	Average	666 kHz	21.59	-24.40
2	Average	1.002 MHz	23.20	-22.79
1	Quasi Peak	7.582 MHz	29.61	-30.38
1	Quasi Peak	14.454 MHz	40.48	-19.51
2	Average	14.454 MHz	39.19	-10.80
1	Quasi Peak	15.626 MHz	44.34	-15.65
2	Average	15.626 MHz	42.44	-7.55
2	Average	21.094 MHz	23.57	-26.42
1	Quasi Peak	21.162 MHz	29.14	-30.85

Date: 21.MAR.2013 15:57:54

Figure 13. Detectors: Peak, Quasi-peak, AVERAGE

Note: QP Delta/Av Delta refer to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Phase
Detectors:	Peak, Quasi-peak, Average

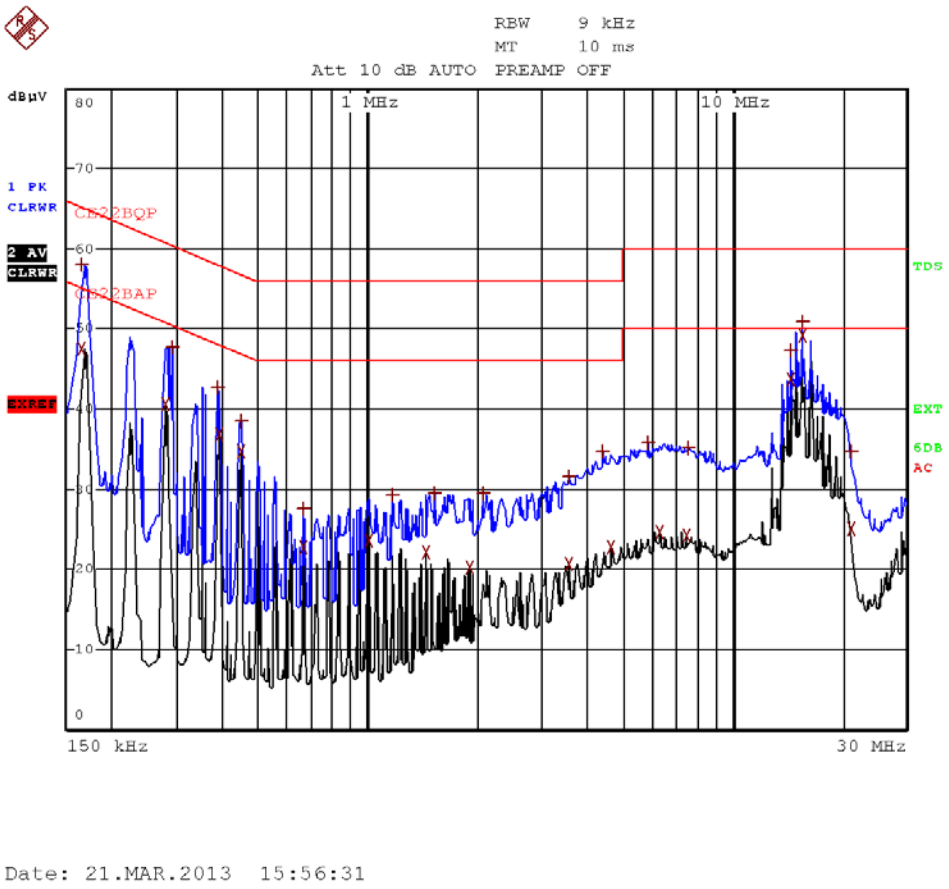
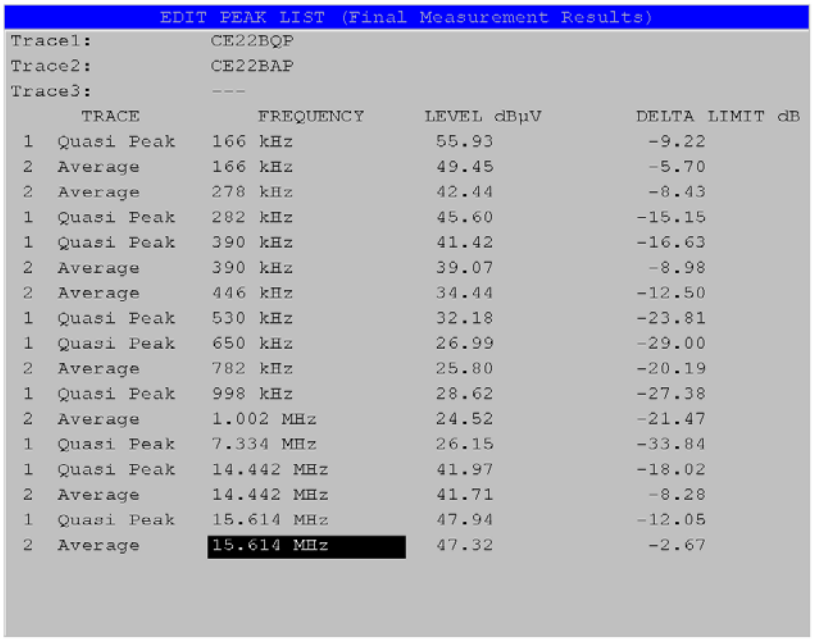


Figure 14. Detectors: Peak, Quasi-peak, Average

Conducted Emission

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average



EDIT PEAK LIST (Final Measurement Results)

Trace1: CE22BQP
Trace2: CE22BAP
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	166 kHz	55.93	-9.22
2	Average	166 kHz	49.45	-5.70
2	Average	278 kHz	42.44	-8.43
1	Quasi Peak	282 kHz	45.60	-15.15
1	Quasi Peak	390 kHz	41.42	-16.63
2	Average	390 kHz	39.07	-8.98
2	Average	446 kHz	34.44	-12.50
1	Quasi Peak	530 kHz	32.18	-23.81
1	Quasi Peak	650 kHz	26.99	-29.00
2	Average	782 kHz	25.80	-20.19
1	Quasi Peak	998 kHz	28.62	-27.38
2	Average	1.002 MHz	24.52	-21.47
1	Quasi Peak	7.334 MHz	26.15	-33.84
1	Quasi Peak	14.442 MHz	41.97	-18.02
2	Average	14.442 MHz	41.71	-8.28
1	Quasi Peak	15.614 MHz	47.94	-12.05
2	Average	15.614 MHz	47.32	-2.67

Date: 21.MAR.2013 16:08:36

Figure 15. Detectors: Peak, Quasi-peak, AVERAGE

Note: QP Delta/Av Delta refer to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average

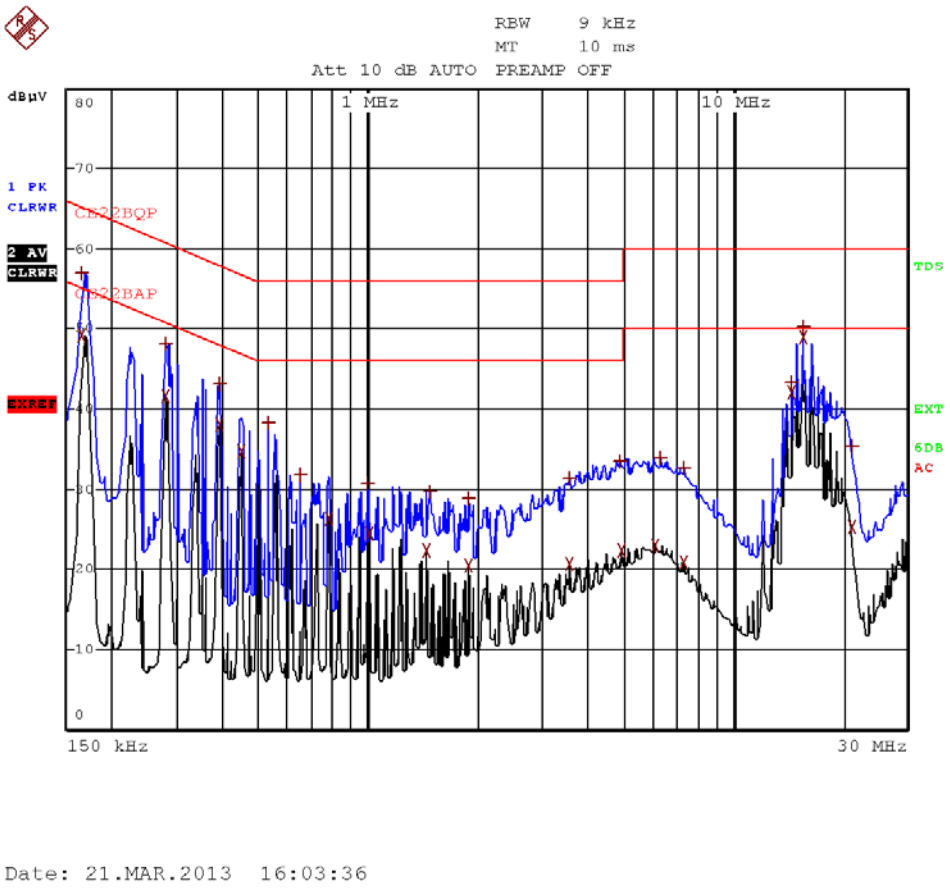


Figure 16 Conducted Emission: NEUTRAL
Detectors: Peak, Quasi-peak, Average

4.4 Test Equipment Used, Power Lines Conducted Emission

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
LISN	Fischer	FCC-LISN-2A	127	December 9, 2012	1 Year
EMI Receiver	R&S	ESCI7	100724	December 27, 2012	1Year

Figure 17 Test Equipment Used, Power Lines Conducted Emission

Note: Testing was performed on 21 March 2013.

5. 6 dB Minimum Bandwidth

5.1 Test Specification

FCC Part 15 Subpart C Section 15.247(a)(2)

5.2 Test Procedure

The E.U.T. was set to the applicable test frequency. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable. The spectrum analyzer was set to 100 kHz resolution BW. The spectrum bandwidth of the E.U.T. at the point of 6 dB below maximum peak power was measured and recorded.

The E.U.T. was tested at 2412, 2437, and 2462 MHz with the following modulations: 1, 11, 6, 6.5, 54 and 130Mbps.

5.3 Test Results

Operation Frequency (MHz)	Modulation (Mbps)	Reading (MHz)	Specification (MHz)
2412	1	8.08	0.5
	11	8.78	0.5
	6	16.47	0.5
	54	16.17	0.5
	6.5	17.17	0.5
	130	17.27	0.5
2437	1	8.85	0.5
	11	11.21	0.5
	6	16.41	0.5
	54	16.24	0.5
	6.5	16.57	0.5
	130	17.54	0.5
2462	1	9.58	0.5
	11	10.31	0.5
	6	16.49	0.5
	54	16.00	0.5
	6.5	16.41	0.5
	130	16.73	0.5

Figure 18 6 dB Minimum Bandwidth Results Table

See additional information in *Figure 19* to *Figure 36*.

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 12 .08.13

Typed/Printed Name: A. Sharabi

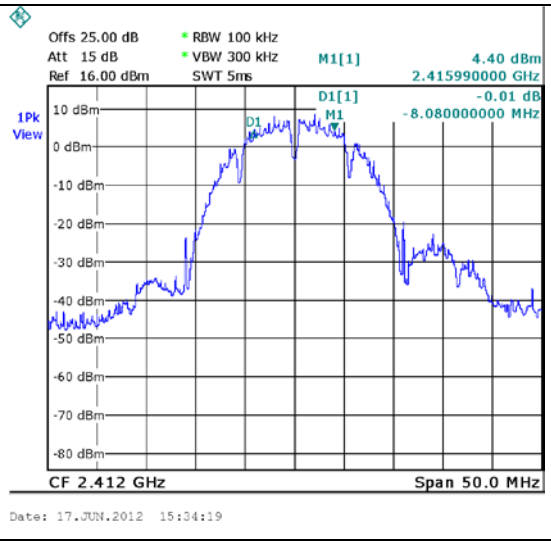


Figure 19 —Low Channel, 1Mbps

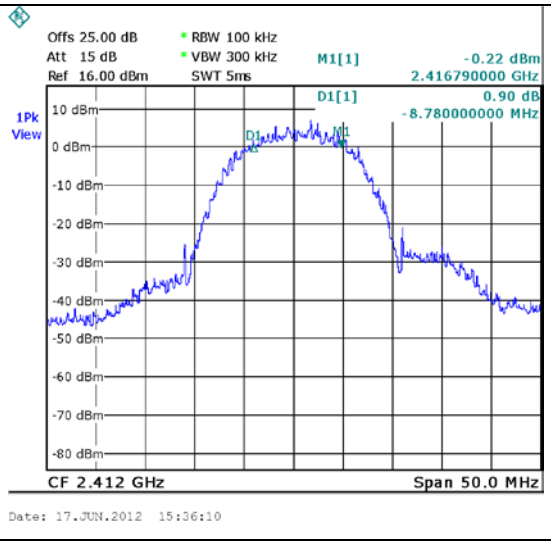


Figure 20 —Low Channel, 11Mbps

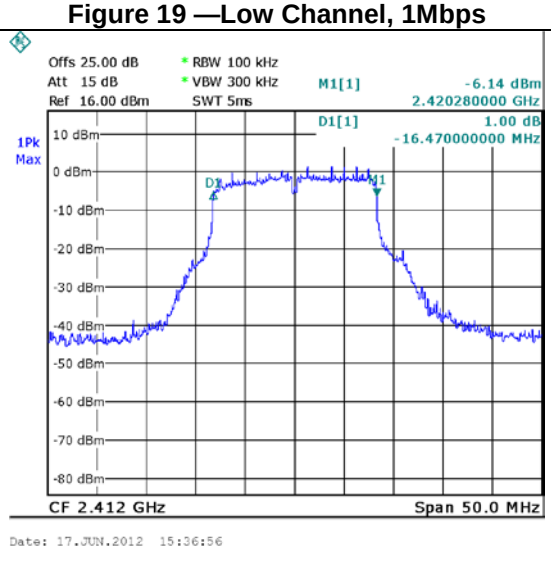


Figure 21 —Low Channel, 6Mbps

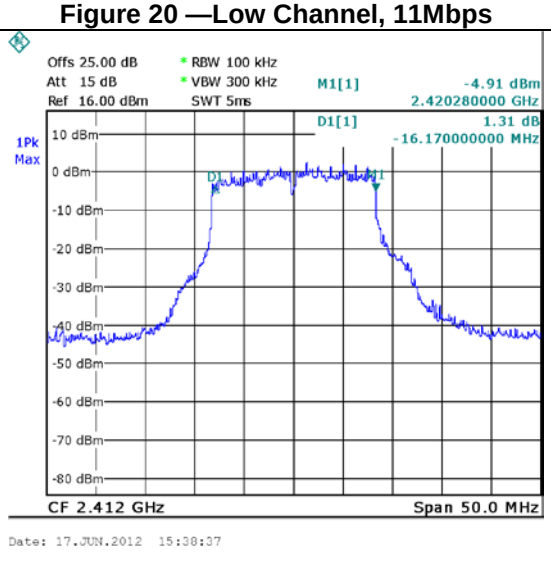


Figure 22 —Low Channel, 54Mbps

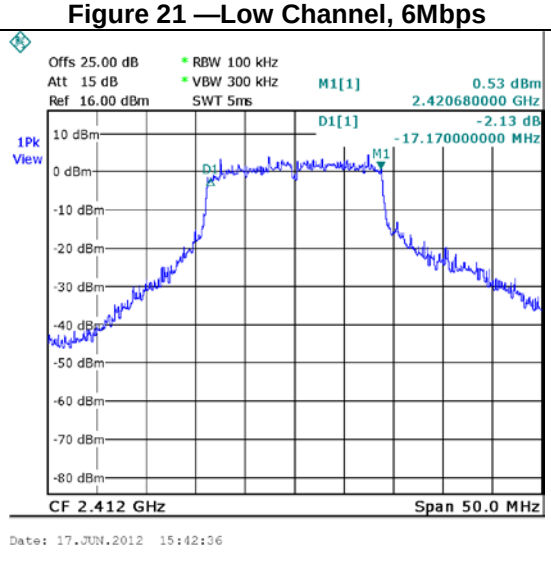


Figure 23 —Low Channel, 6.5Mbps

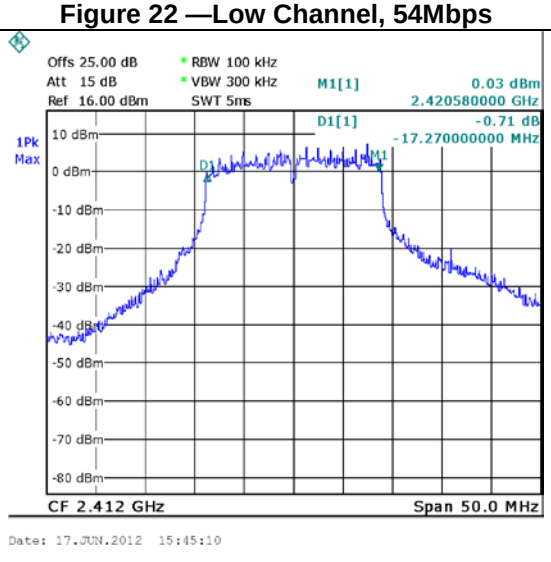


Figure 24 —Low Channel, 130Mbps

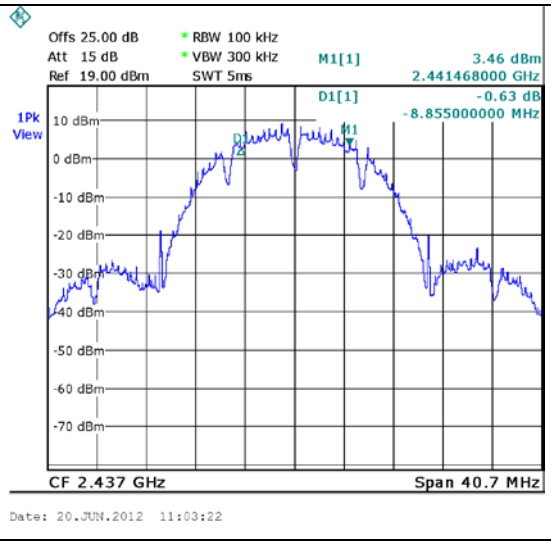


Figure 25 —Mid Channel, 1Mbps

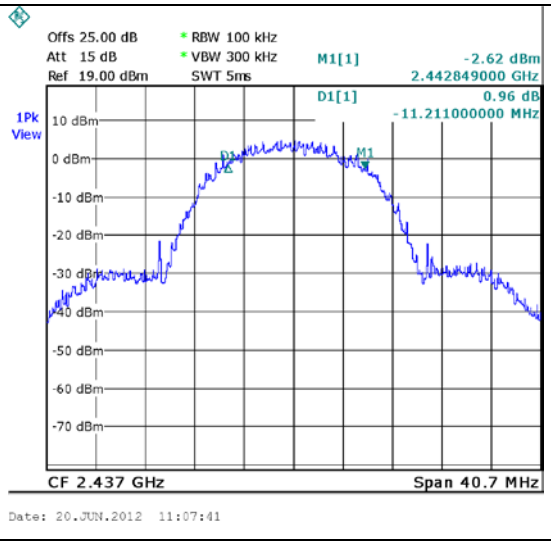


Figure 26 — Mid Channel, 11Mbps

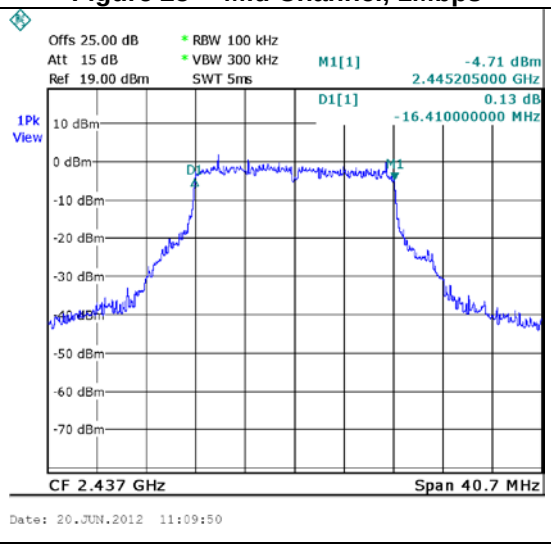


Figure 27 — Mid Channel, 6Mbps

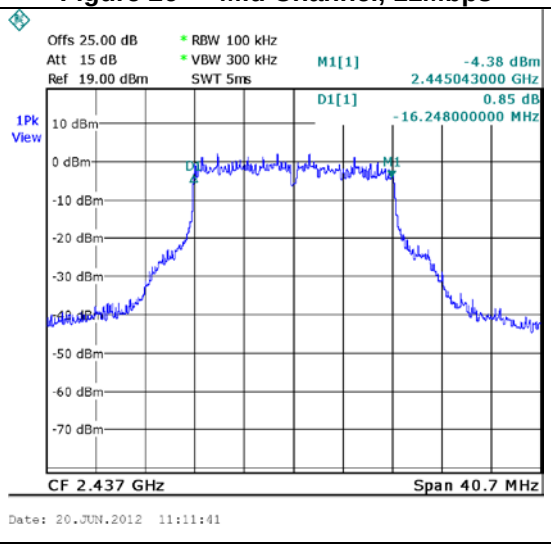


Figure 28 — Mid Channel, 54Mbps

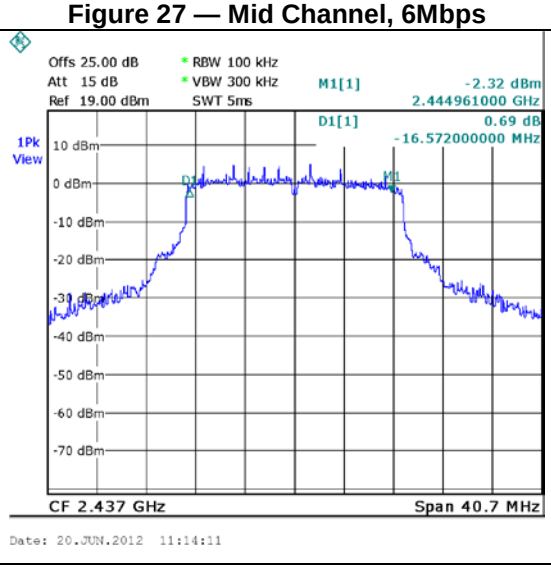


Figure 29 — Mid Channel, 6.5Mbps

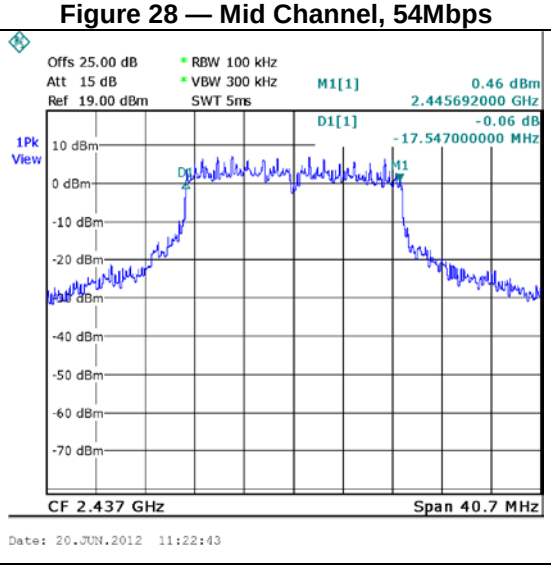


Figure 30 — Mid Channel, 130Mbps

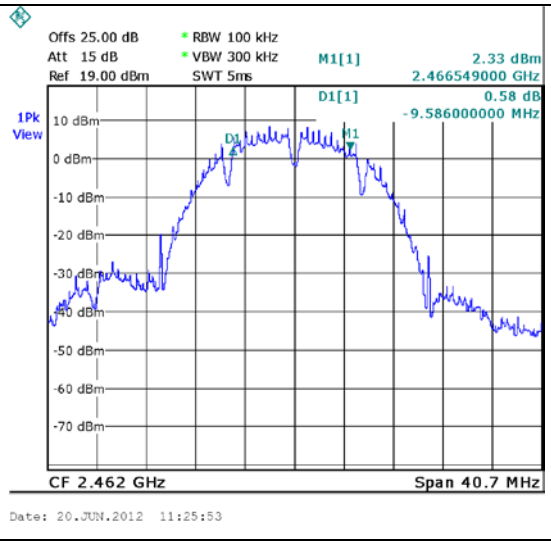


Figure 31 —High Channel, 1Mbps

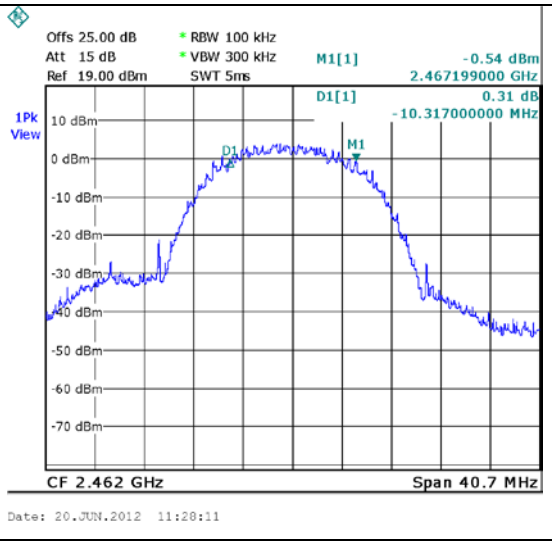


Figure 32 — High Channel, 11Mbps

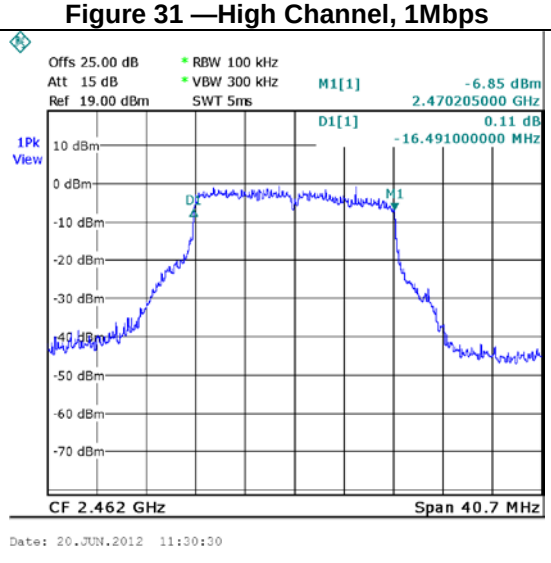


Figure 33 — High Channel, 6Mbps

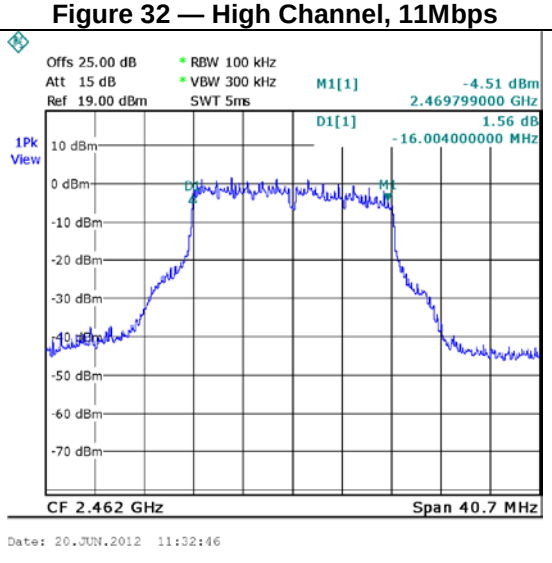


Figure 34 — High Channel, 54Mbps

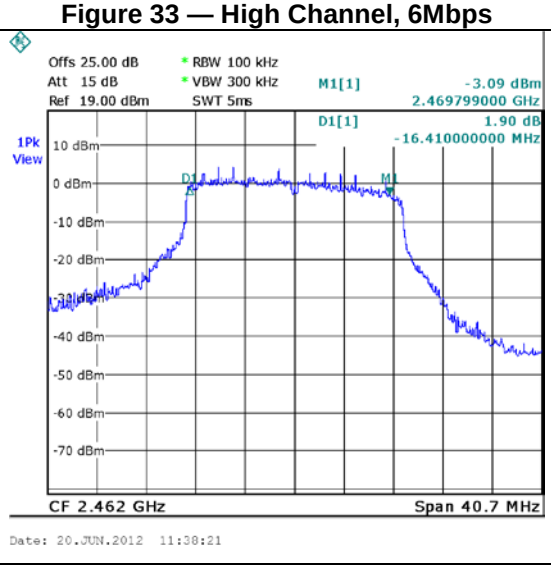


Figure 35 — High Channel, 6.5Mbps

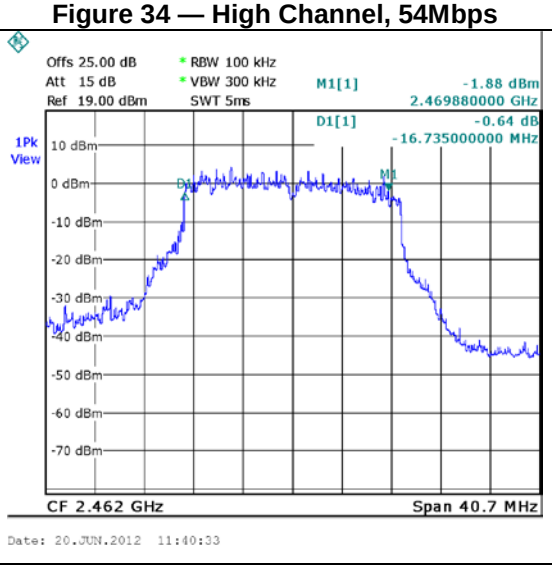


Figure 36 — High Channel, 130Mbps

5.4 Test Equipment Used, 6dB Minimum Bandwidth

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibration Date	Period
Spectrum Analyzer	R&S	FSL6	100194	October 30, 2011	1 year
Attenuator	-	20dB	-	June 17, 2012	1 year
Cable	TestLINE	18	11556	June 17, 2012	1 year

Figure 37 Test Equipment Used, 6dB Minimum Bandwidth

Note: Testing was performed 17 – 20 June 2012.

6. 26 dB Minimum Bandwidth

6.1 Test Specification

FCC Part 2 Section 2.1049

6.2 Test Procedure

The E.U.T. was set to the applicable test frequency. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable. The spectrum analyzer was set to 100 kHz resolution BW. The spectrum bandwidth of the E.U.T. at the point of 26 dB below maximum peak power was measured and recorded.

The E.U.T. was tested at 2412, 2437, and 2462 MHz with the following modulations: 1, 11, 6, 6.5, 54 and 130Mbps.

6.3 Test Results

Operation Frequency (MHz)	Modulation (Mbps)	Reading (MHz)	Specification (MHz)
2412	1	18.46	N/A
	11	18.56	N/A
	6	19.66	N/A
	54	19.46	N/A
	6.5	23.95	N/A
	130	20.76	N/A
2437	1	19.33	N/A
	11	19.17	N/A
	6	20.30	N/A
	54	19.82	N/A
	6.5	22.90	N/A
	130	21.04	N/A
2462	1	18.68	N/A
	11	19.41	N/A
	6	20.71	N/A
	54	19.41	N/A
	6.5	21.60	N/A
	130	21.69	N/A

Figure 38 26 dB Minimum Bandwidth Test results table

See additional information in *Figure 39* to *Figure 56*.

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 12.08.13

Typed/Printed Name: A. Sharabi

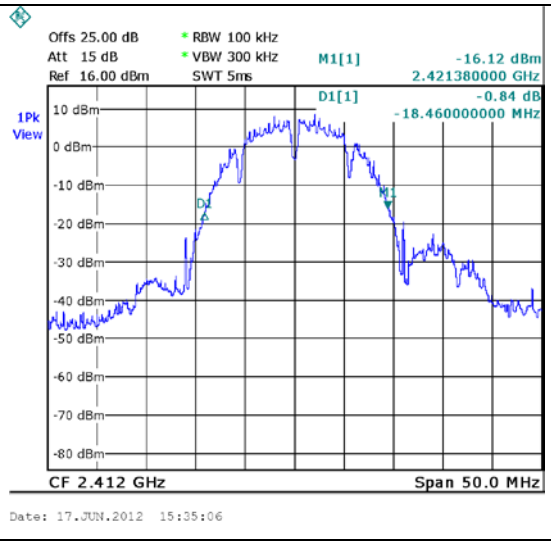


Figure 39 —Low Channel, 1Mbps

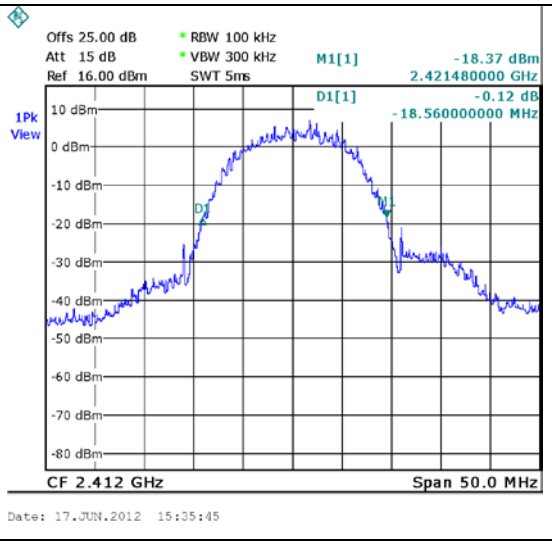


Figure 40 —Low Channel, 11Mbps

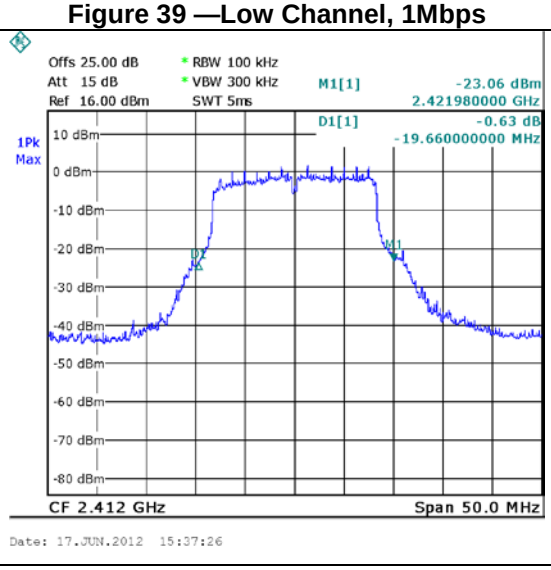


Figure 41 —Low Channel, 6Mbps

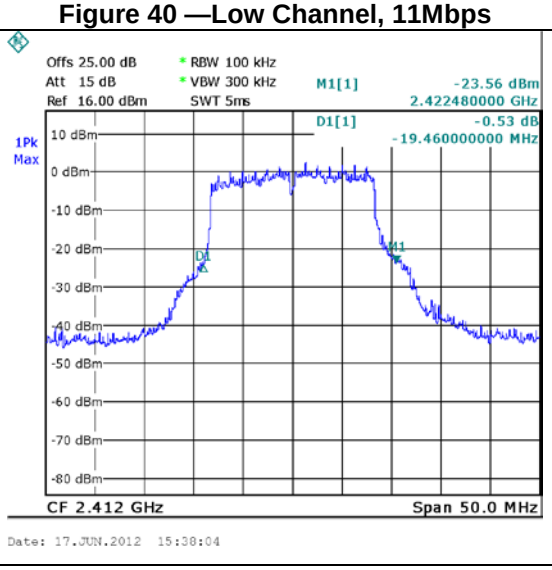


Figure 42 —Low Channel, 54Mbps

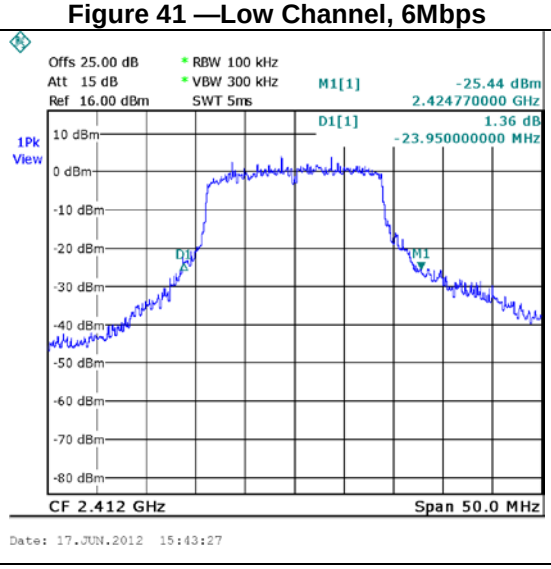


Figure 43 —Low Channel, 6.5Mbps

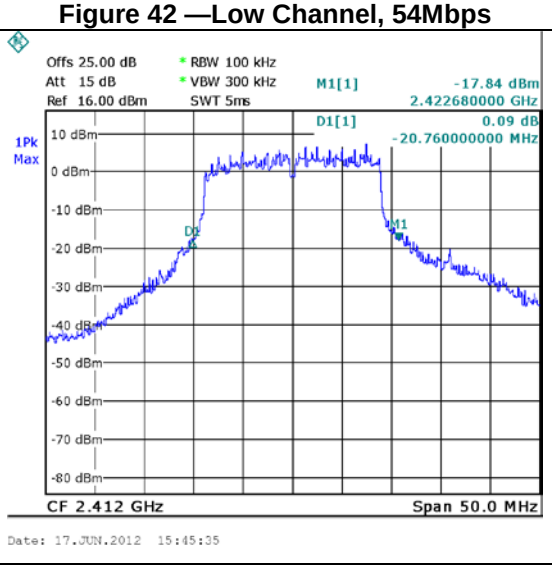


Figure 44 —Low Channel, 130Mbps

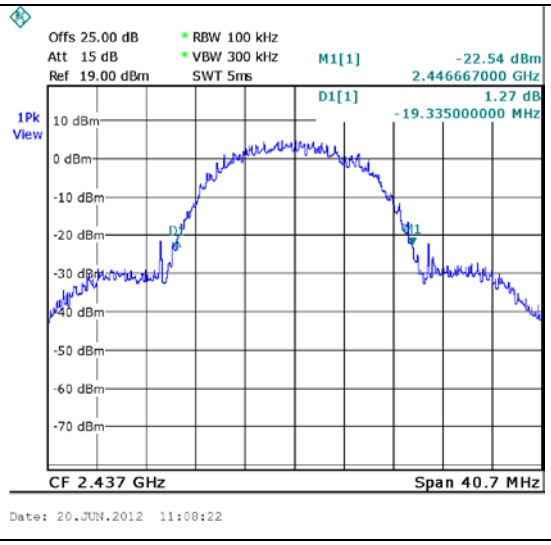


Figure 45 —Mid Channel, 1Mbps

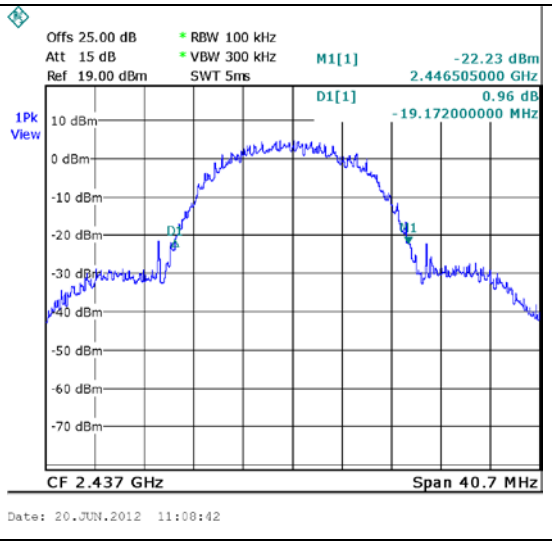


Figure 46 — Mid Channel, 11Mbps

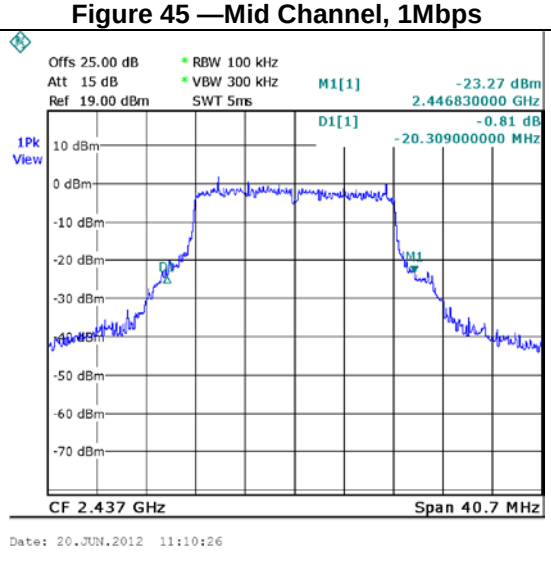


Figure 47 — Mid Channel, 6Mbps

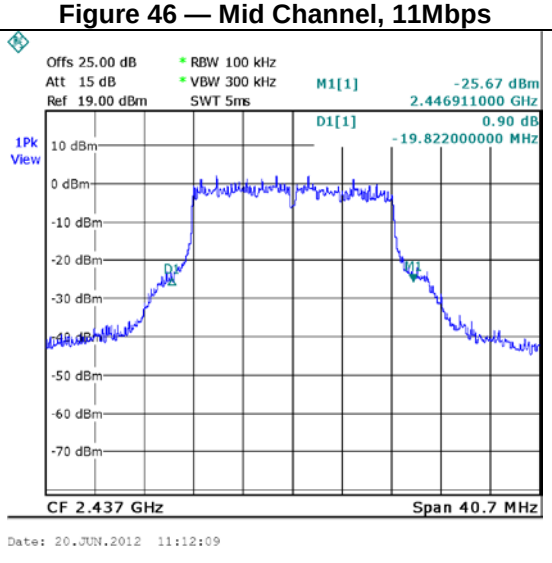


Figure 48 — Mid Channel, 54Mbps

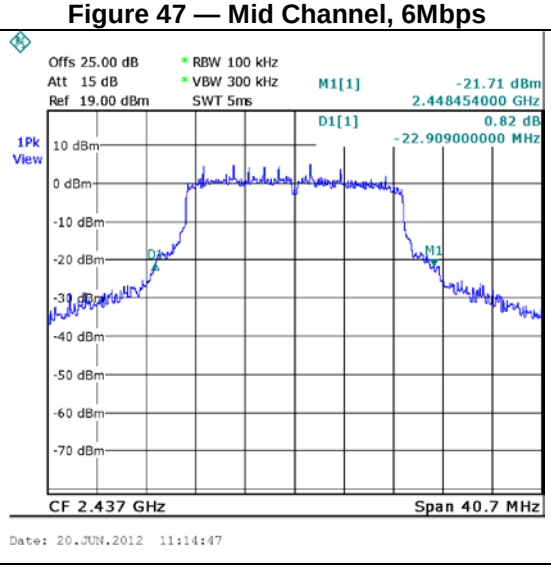


Figure 49 — Mid Channel, 6.5Mbps

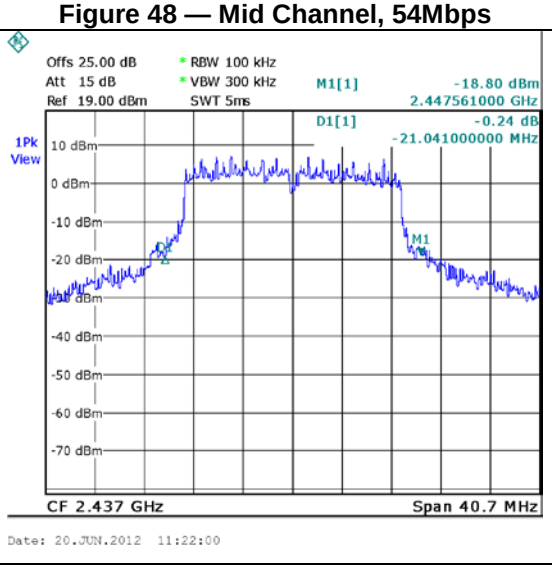


Figure 50 — Mid Channel, 130Mbps

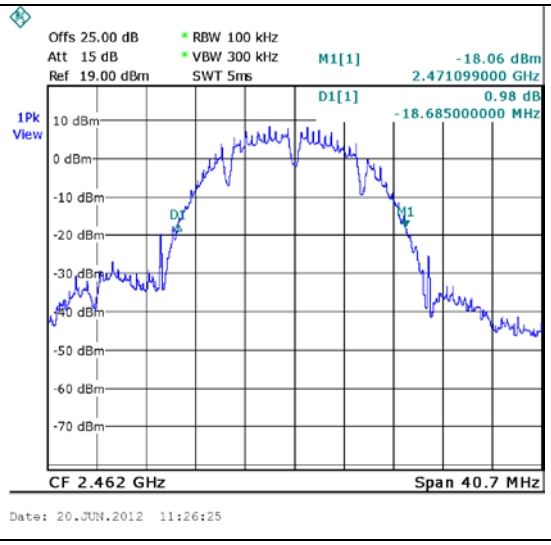


Figure 51 —High Channel, 1Mbps

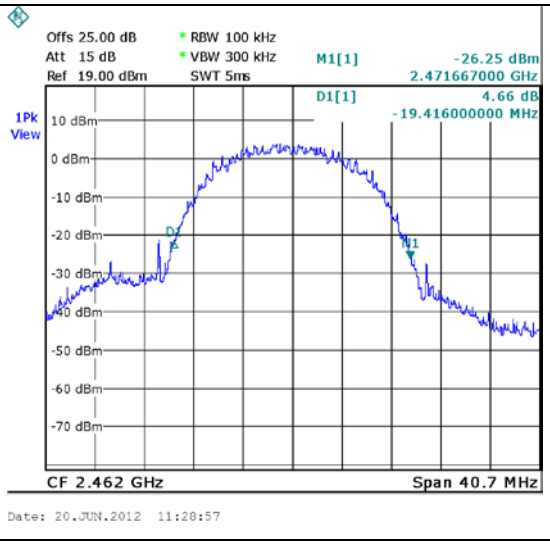


Figure 52 — High Channel, 11Mbps

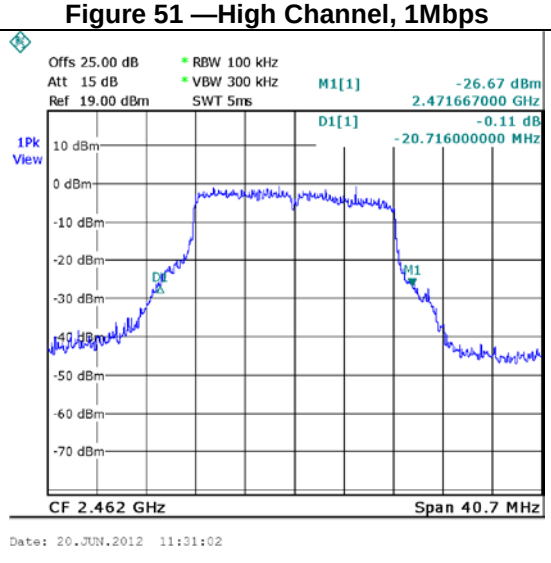


Figure 53 — High Channel, 6Mbps

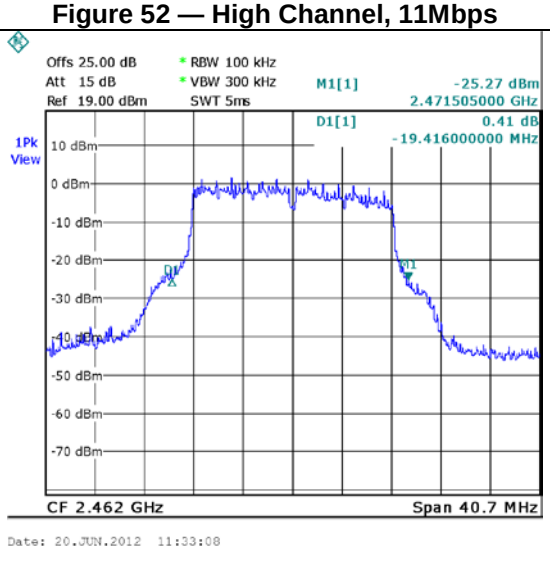


Figure 54 — High Channel, 54Mbps

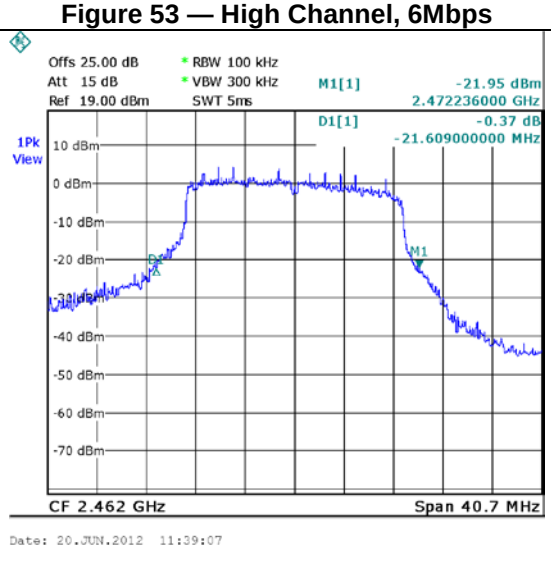


Figure 55 — High Channel, 6.5Mbps

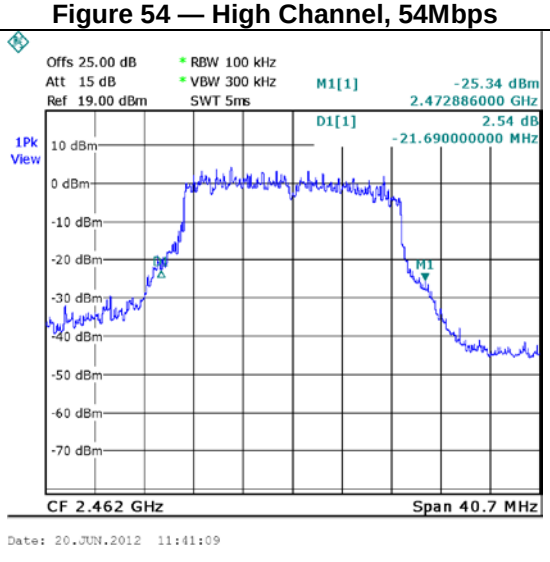


Figure 56 — High Channel, 130Mbps

6.4 Test Equipment Used, 26 dB Minimum Bandwidth

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibration Date	Period
Spectrum Analyzer	R&S	FSL6	100194	October 30, 2011	1 year
Attenuator	-	20dB	-	June 17, 2012	1 year
Cable	TestLINE	18	11556	June 17, 2012	1 year

Figure 57 Test Equipment Used, 26 dB Minimum Bandwidth

Note: Testing was performed between 17-20 June 2012.

7. Maximum Transmitted Peak Power Output

7.1 Test Specification

FCC Part 15 Subpart C Section 15.247(b)

7.2 Test Procedure

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable. The Spectrum Analyzer was set to 1.0 MHz resolution BW. Peak power level was measured at selected operation frequencies.

The E.U.T. was tested at 2412, 2437, and 2462 MHz with the following modulations: 1, 11, 6, 6.5, 54 and 130 Mbps.

7.3 Test Results

Operation Frequency (MHz)	Modulation (Mbps)	Reading (dBm)	Specification (dBm)	Margin (dB)
2412	1	20.99	21.3	-0.31
	11	20.30	21.3	-1.00
	6	21.05	21.3	-0.25
	54	21.10	21.3	-0.20
	6.5	22.99	23.3	-0.31
	130	23.10	23.3	-0.20
2437	1	21.25	21.3	-0.05
	11	20.92	21.3	-0.62
	6	21.02	21.3	-0.28
	54	20.12	21.3	-1.18
	6.5	23.07	23.3	-0.23
	130	19.99	23.3	-3.31
2462	1	21.28	21.3	-0.02
	11	21.03	21.3	-0.27
	6	20.81	21.3	-0.49
	54	20.97	21.3	-0.33
	6.5	23.22	23.3	-0.08
	130	23.29	23.3	-0.01

Figure 58 Maximum Peak Power Output Test Results Table

See additional information in *Figure 59* to *Figure 76*.

Calculated Power Limit per Each Antenna Connector:

Gain of each antenna is 8.0 dBi (at the worst case).

For 802.11b/g using Beamforming:

Gain of antenna array (4 antennas) G_m = 8.0 +10 log 4 = 14.0 dBi

Total output power $P_t = 30 - \frac{14.0 - 6}{3} = 27.3 dBm$

Peak power limit per each antenna connector:

$P = P_t - 10 \log 4 = 27.3 - 6 = 21.3$ dBm

Note: The antenna array (4 antennas) is used for 802.11b/g only (rates: 1Mbps, 11Mbps, 6Mbps and 54 Mbps).

For 802.11n:

Total output power $P_t = 30 - \frac{8.0 - 6}{3} = 29.3 dBm$

Peak power limit per each antenna connector:

$P = P_t - 10 \log 4 = 29.3 - 6 = 23.3$ dBm

Note: 802.11n is MIMO only (rates 6.5Mbps and 130Mbps)

JUDGEMENT: Passed by 0.01 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 12.08.13

Typed/Printed Name: A. Sharabi

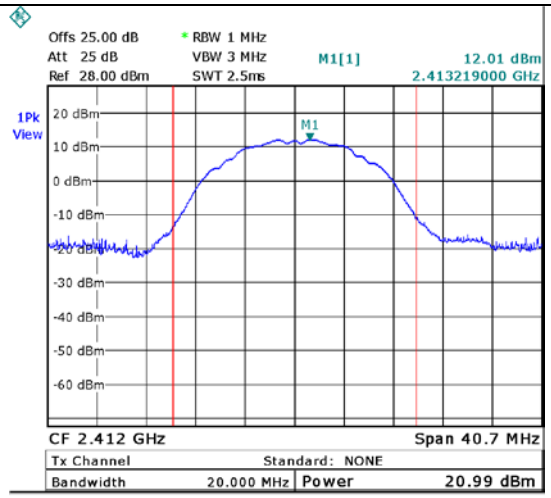


Figure 59 —Low Channel, 1Mbps

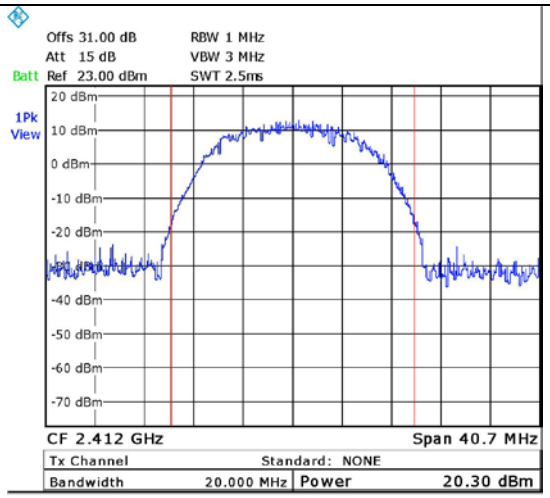


Figure 60 —Low Channel, 11Mbps

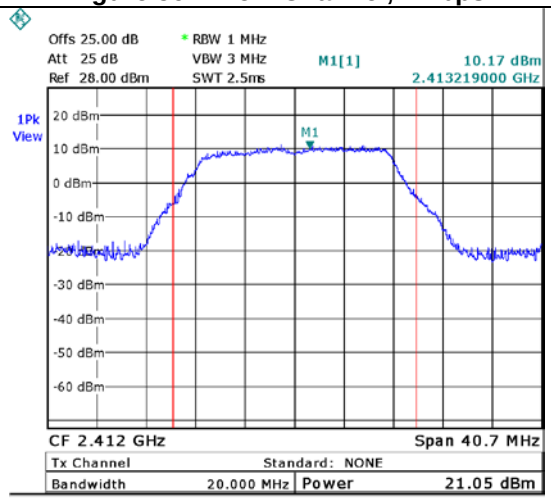


Figure 61 —Low Channel, 6Mbps

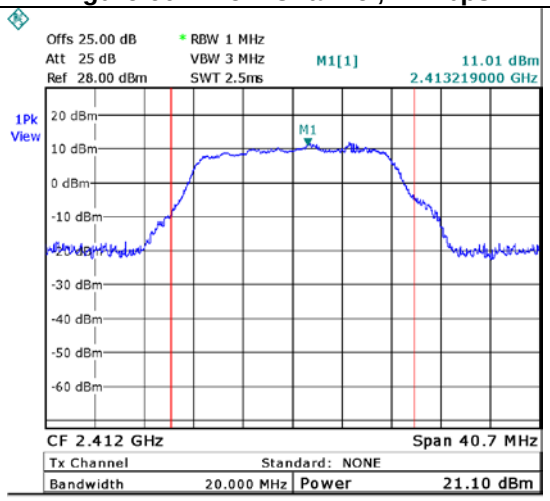


Figure 62 —Low Channel, 54Mbps

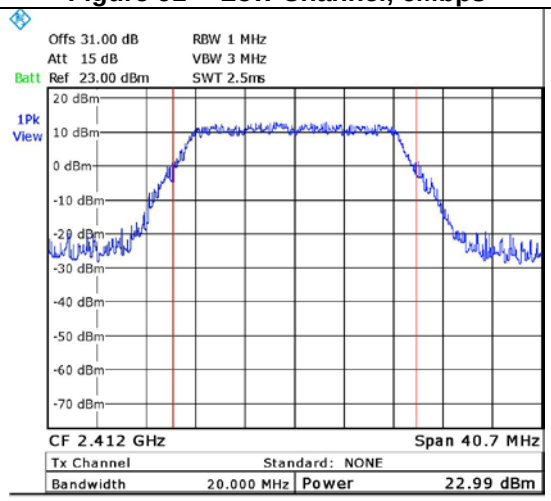


Figure 63 —Low Channel, 6.5Mbps

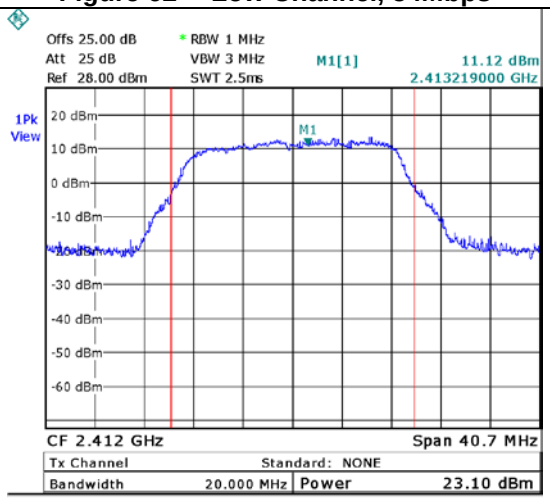


Figure 64 —Low Channel, 130Mbps

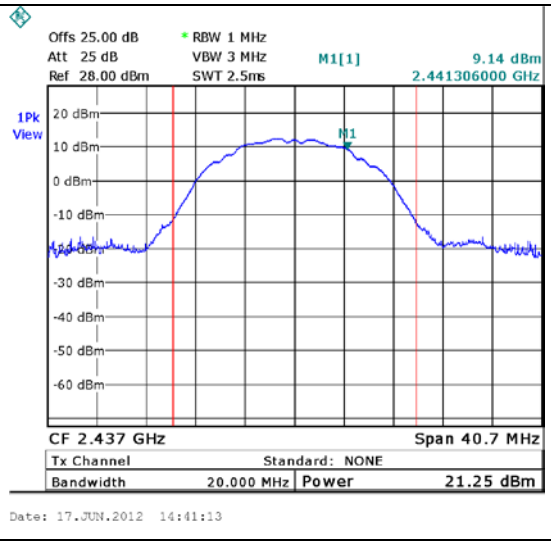


Figure 65 —Mid Channel, 1Mbps

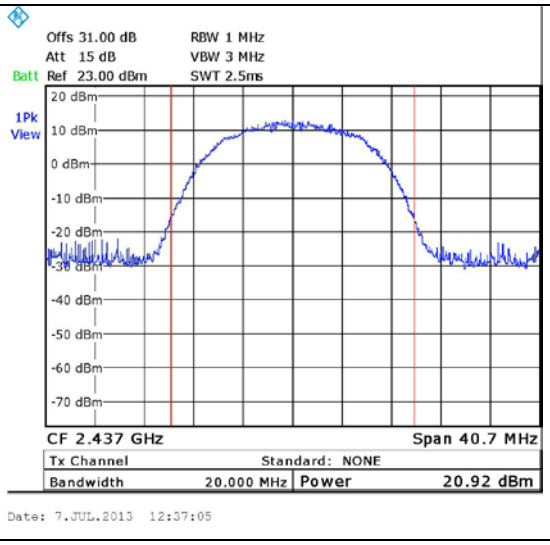


Figure 66 — Mid Channel, 11Mbps

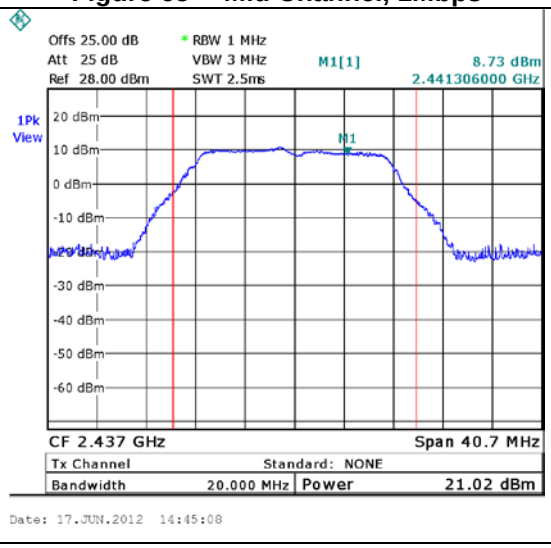


Figure 67 — Mid Channel, 6Mbps

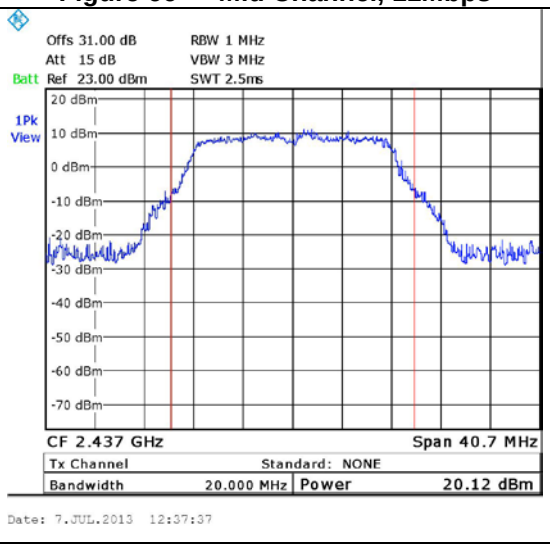


Figure 68 — Mid Channel, 54Mbps

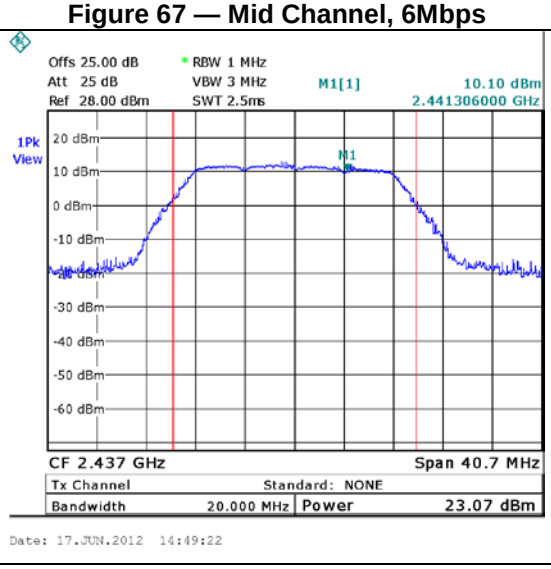


Figure 69 — Mid Channel, 6.5Mbps

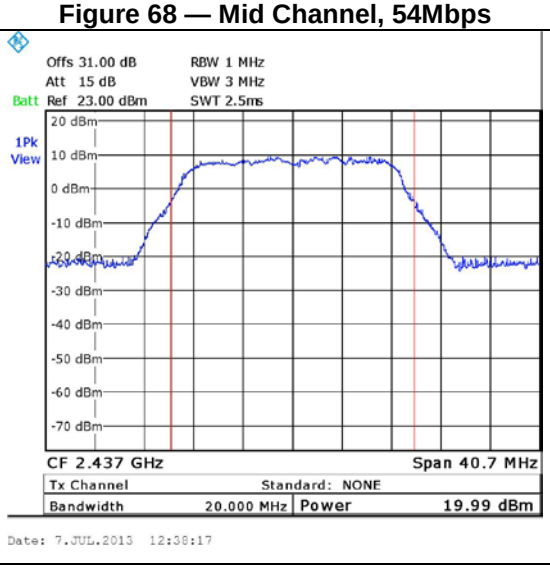


Figure 70 — Mid Channel, 130Mbps

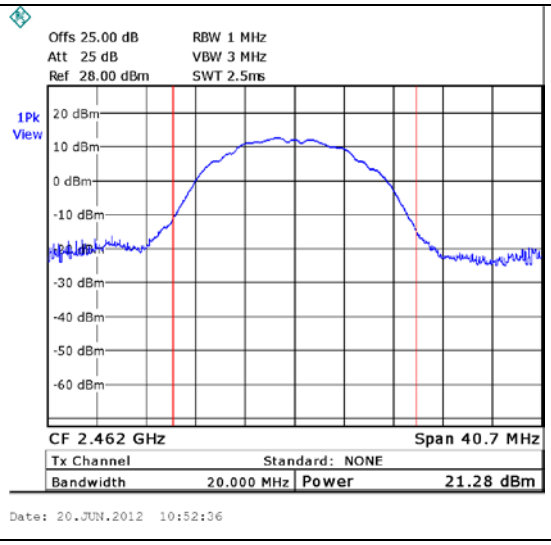


Figure 71 —High Channel, 1Mbps

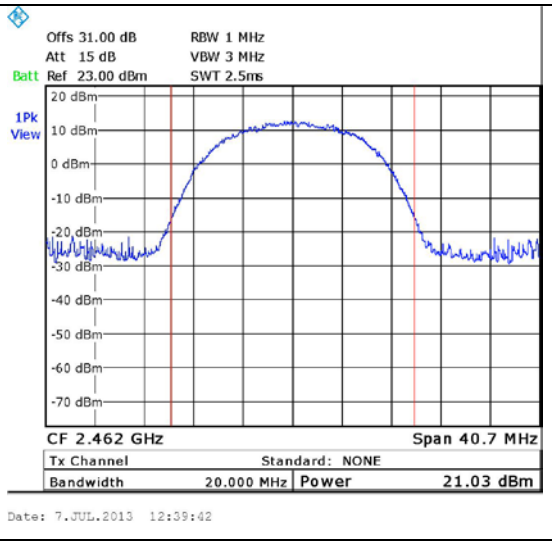


Figure 72 — High Channel, 11Mbps

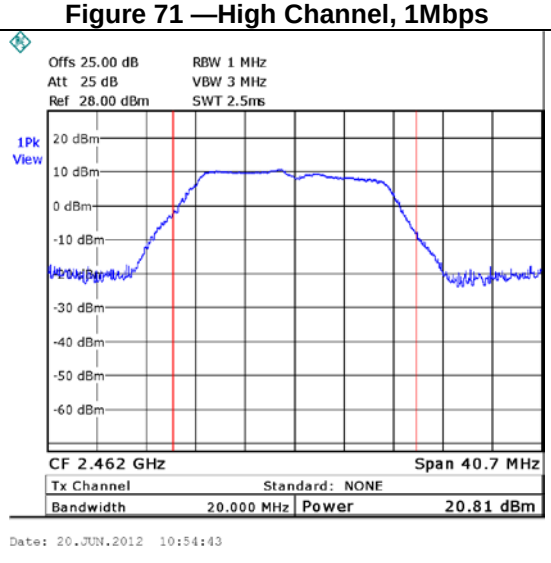


Figure 73 — High Channel, 6Mbps

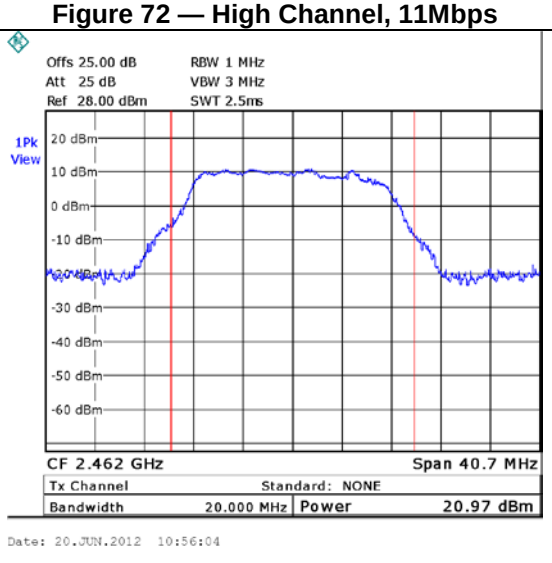


Figure 74 — High Channel, 54Mbps

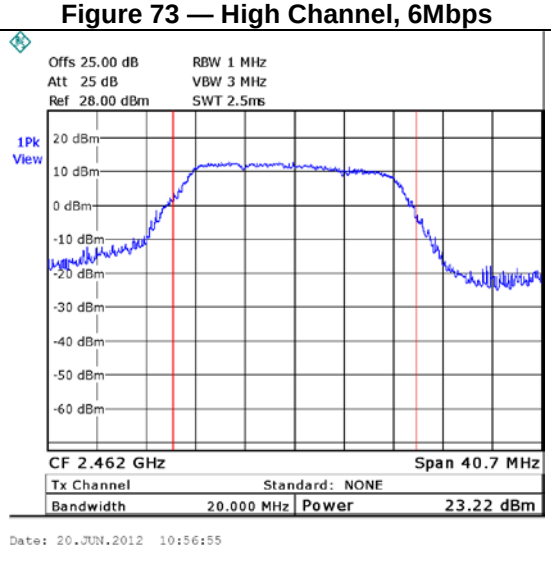


Figure 75 — High Channel, 6.5Mbps

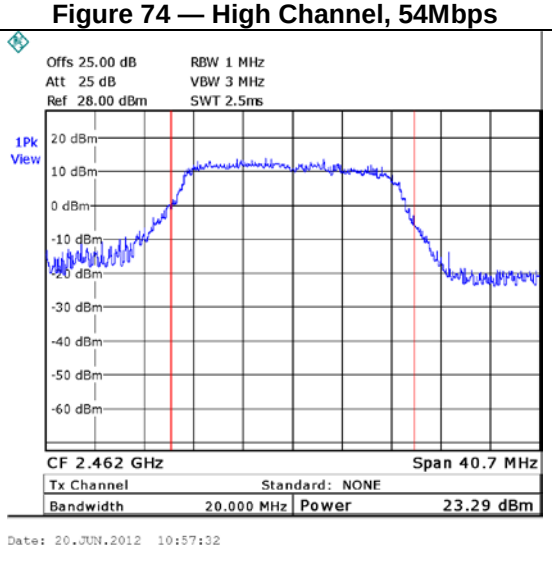


Figure 76 — High Channel, 130Mbps

7.4 Test Equipment Used, Maximum Peak Power Output

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibration Date	Period
Spectrum Analyzer	R&S	FSL6	100194	November 30, 2011 November 1, 2012	1 year
Attenuator	-	30dB	-	November 10, 2011 July 7, 2013	1 year
Cable	TestLINE	18	11556	November, 10, 2011 July 7, 2013	1 year

Figure 77 Test Equipment Used, Maximum Peak Power Output

Note: Testing was performed 07-20 June 2012 and 07 July 2013.

8. Peak Power Output Out of 2400-2483.5 MHz Band

8.1 Test Specification

FCC Part 15 Section 15.247

8.2 Test Procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable. The spectrum analyzer was set to 1 kHz resolution BW for the frequency range 9 kHz - 150 kHz, 10 kHz resolution BW for the frequency range
150 kHz - 1 MHz, 30 kHz resolution BW for the frequency range 1 - 30 MHz, 100 kHz resolution BW for the frequency range 30 MHz - 1 GHz and
2.4 – 2.4835 GHz, and 1 MHz resolution BW for the frequency range
1 - 25 GHz. The frequency range from 9 kHz to 25 GHz was scanned. Level of spectrum components out of the 2400-2483.5 MHz was measured at the selected operation frequencies.

The E.U.T. was tested at 2412, 2437, and 2462 MHz with the following modulations: 1, 11, 6,54, 6.5 and 130 Mbps.

8.3 Test Results

See plots in *Figure 78* to *Figure 95*

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 12.08.13

Typed/Printed Name: A. Sharabi

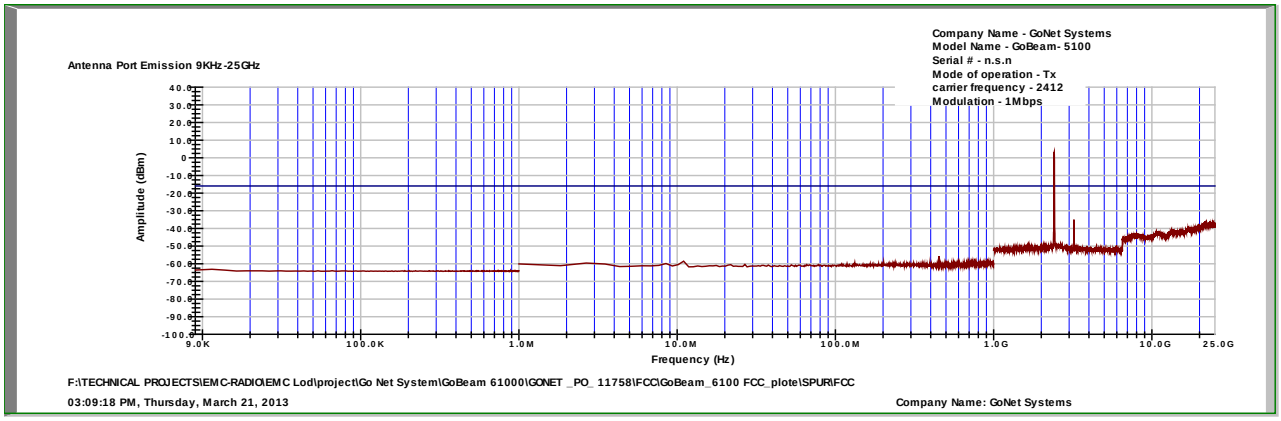


Figure 78 – Channel 1 , 1Mbps

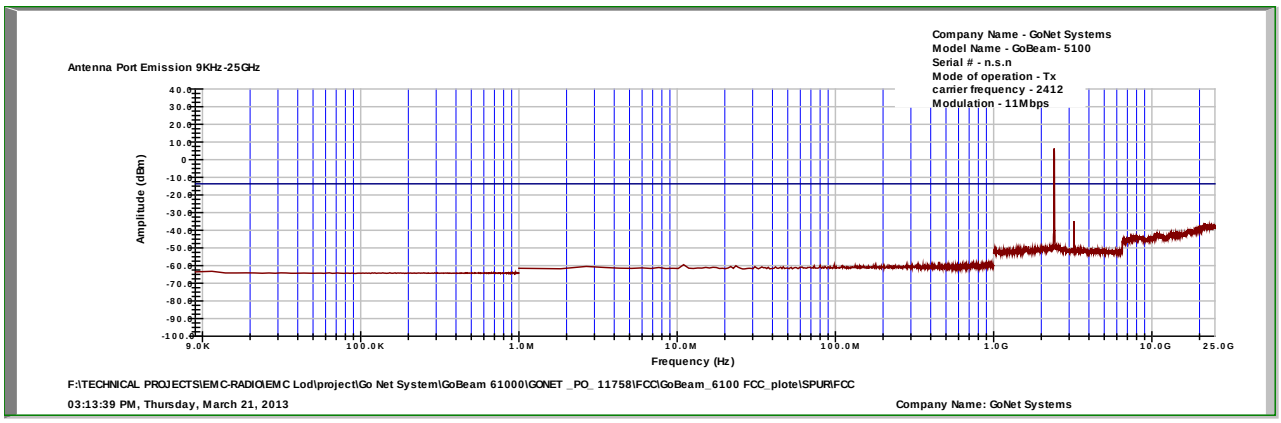


Figure 79 – Channel 1 , 11Mbps

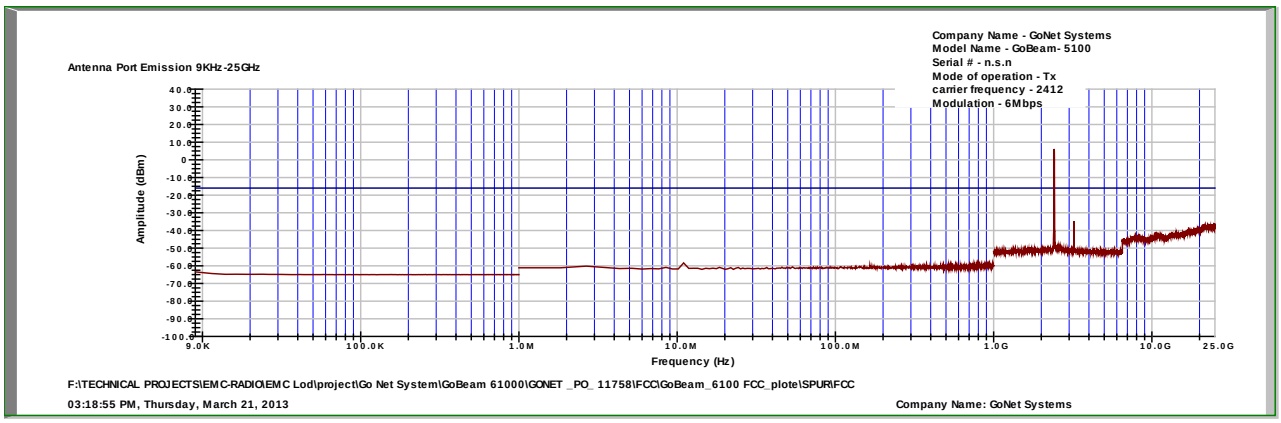


Figure 80 – Channel 1 , 6Mbps

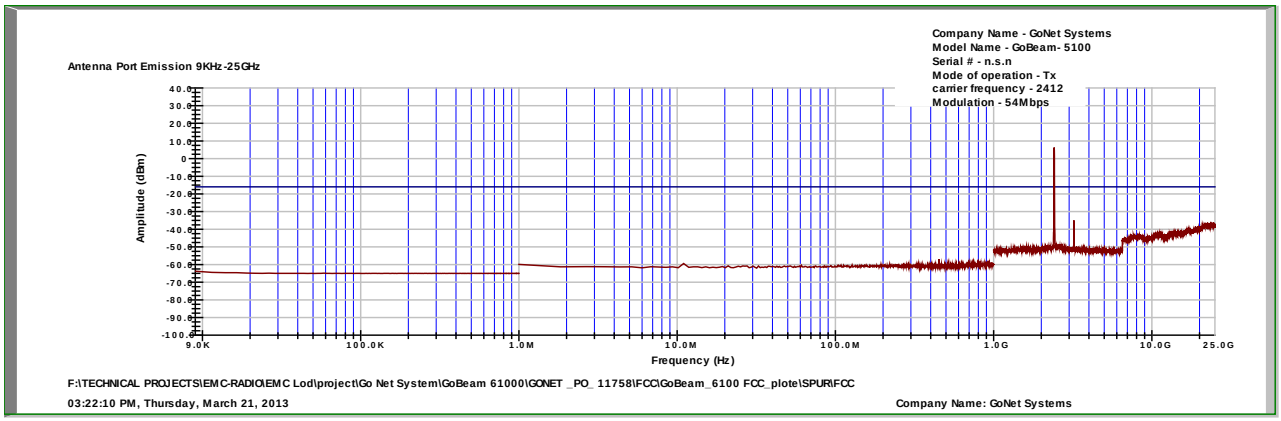


Figure 81 – Channel 1 , 54Mbps

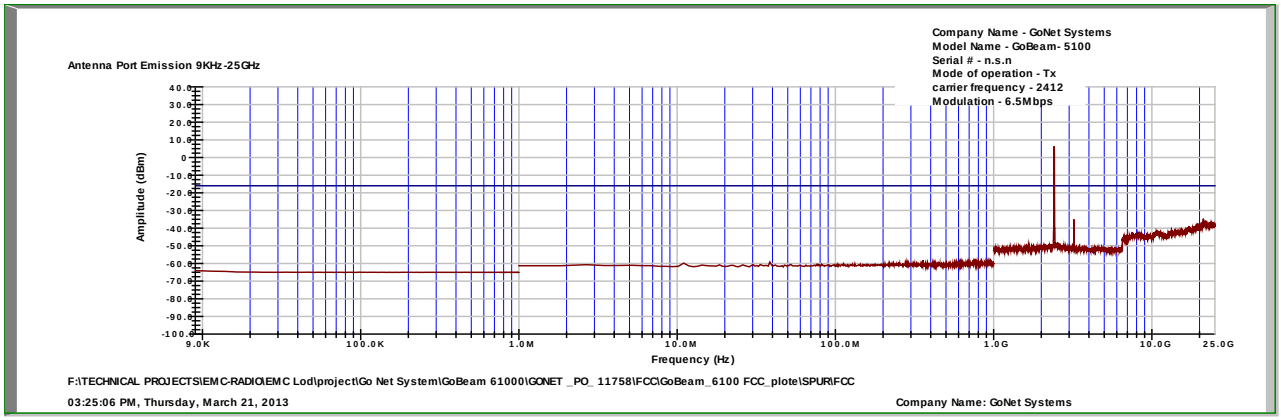


Figure 82 – Channel 1 , 6.5Mbps

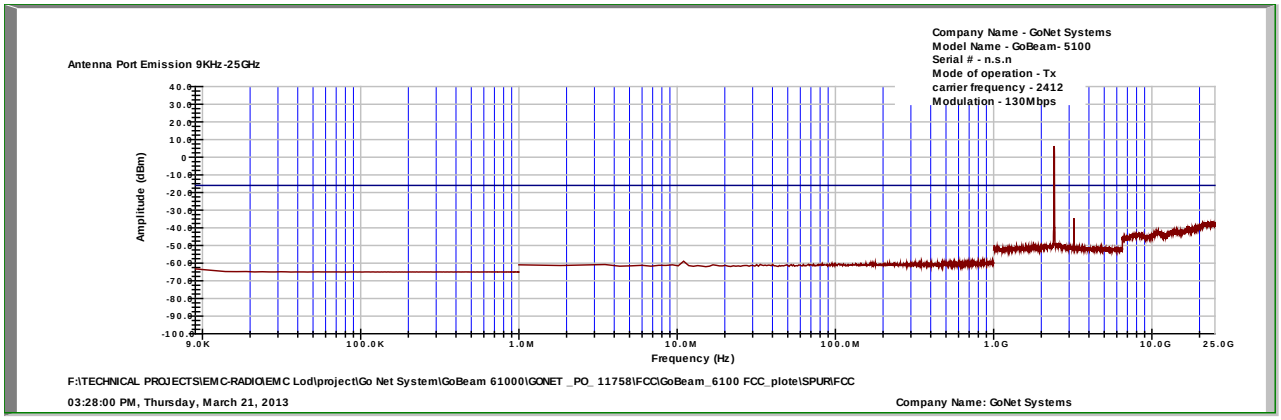


Figure 83 – Channel 1 , 130Mbps

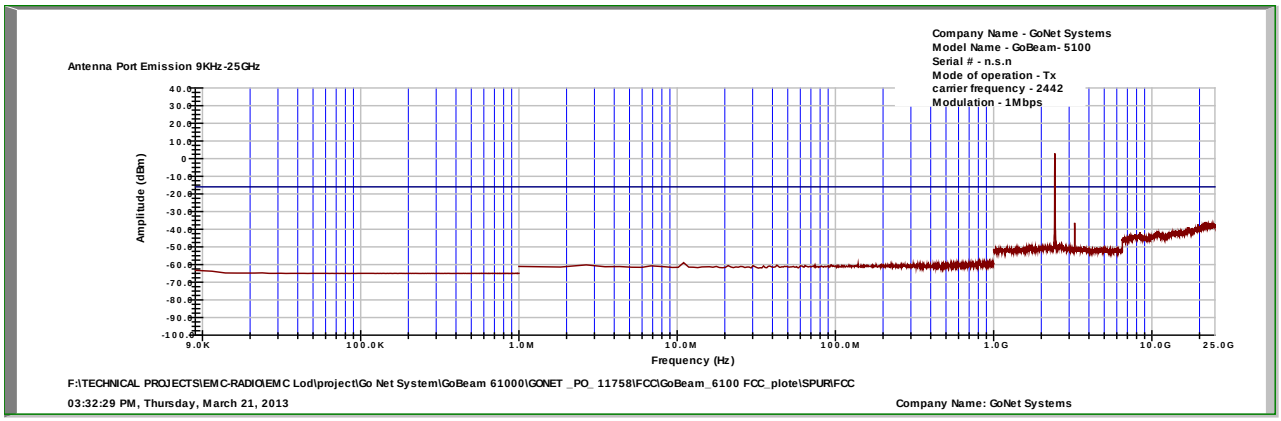


Figure 84 – Channel 6 , 1Mbps

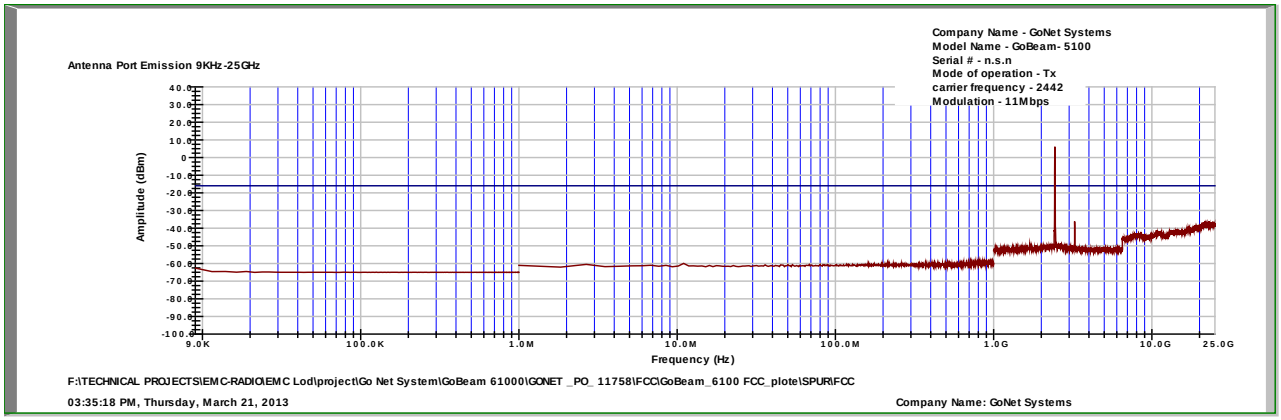


Figure 85 – Channel 6 , 11Mbps

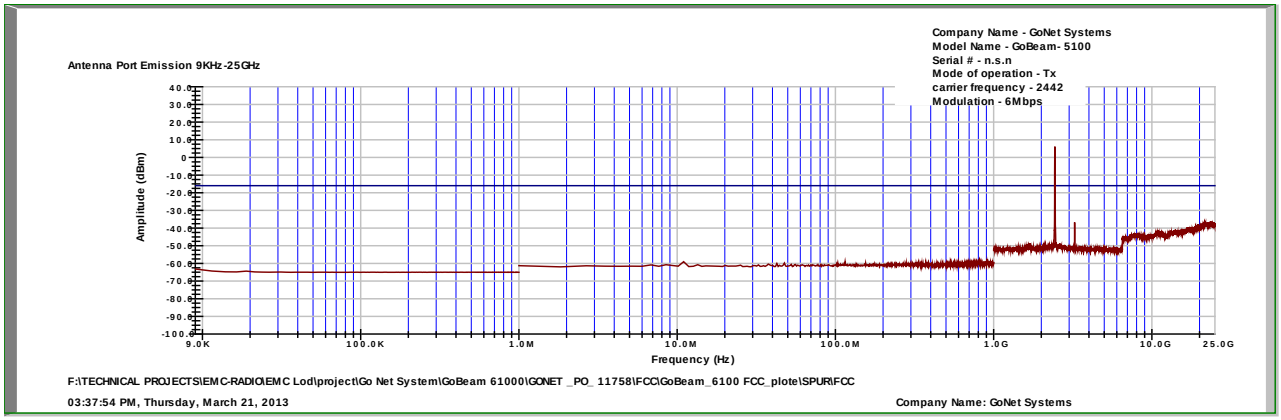


Figure 86 – Channel 6 , 6Mbps

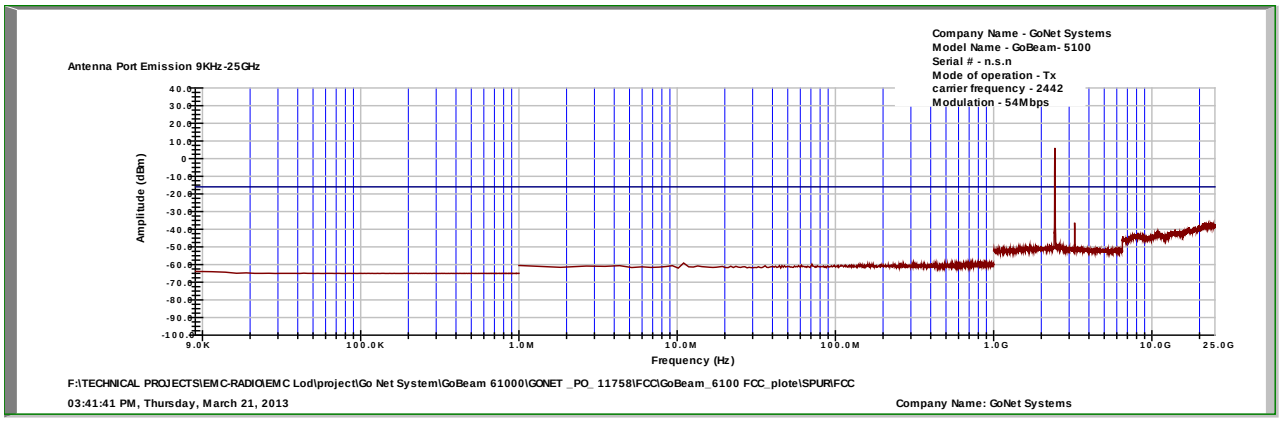


Figure 87 – Channel 6 , 54Mbps

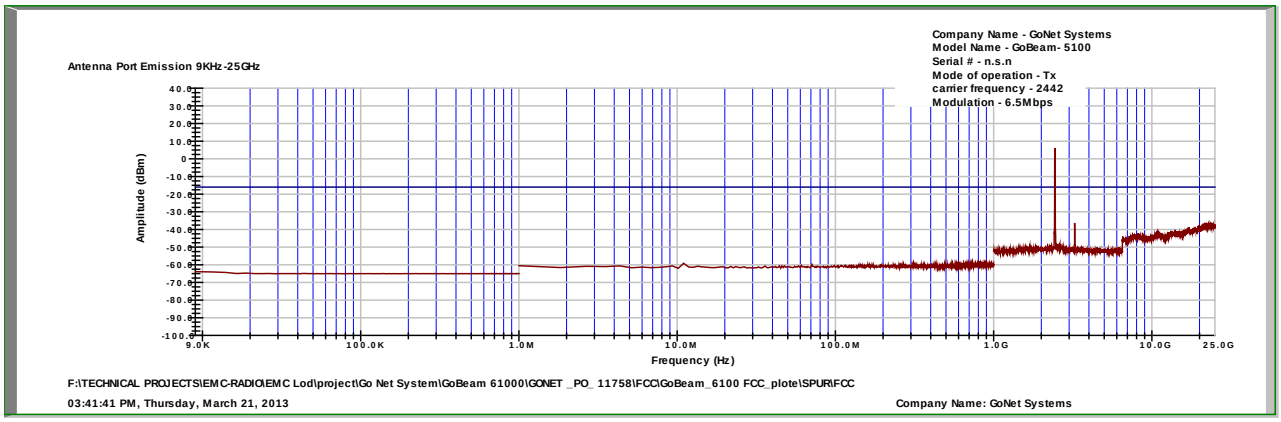


Figure 88 – Channel 6 , 6.5Mbps

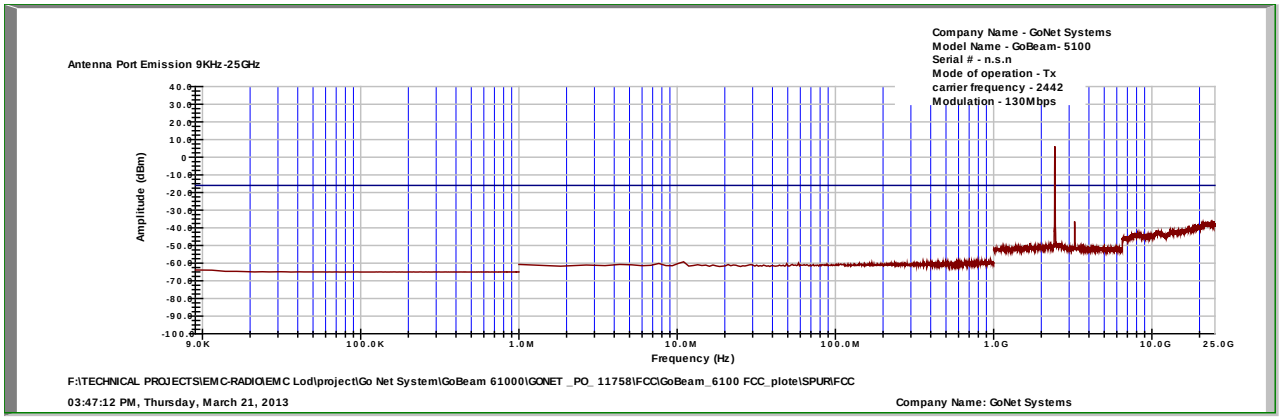


Figure 89 – Channel 6 , 130Mbps

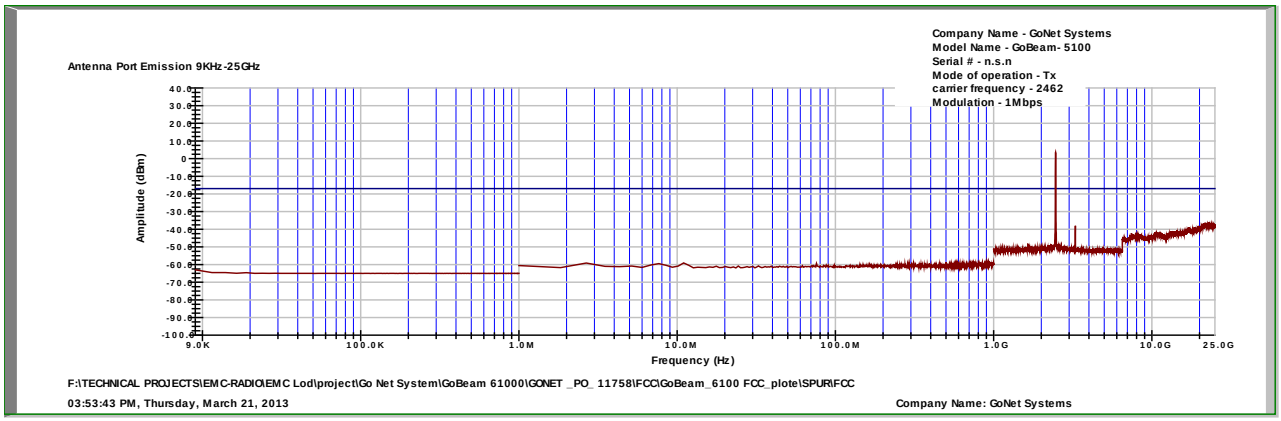


Figure 90 – Channel 11 , 1Mbps

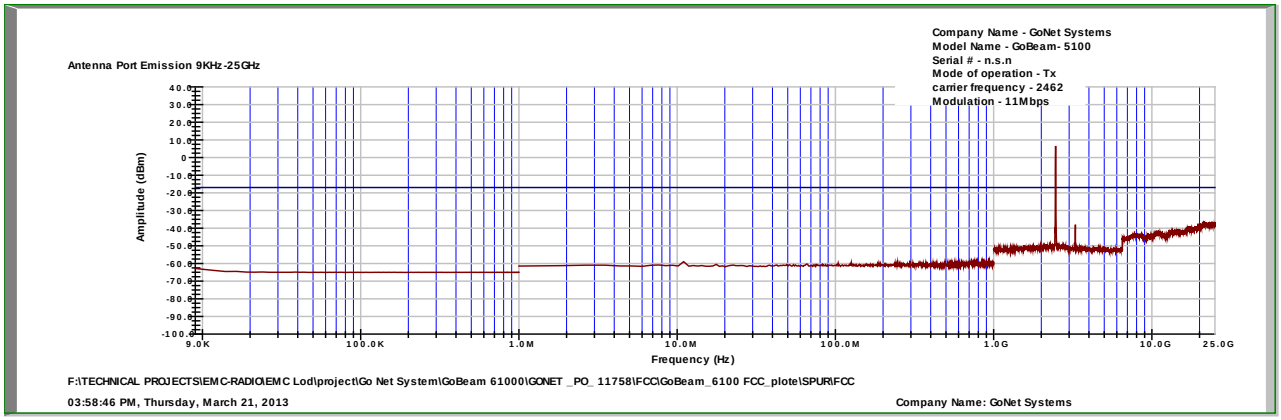


Figure 91 – Channel 11 , 11Mbps

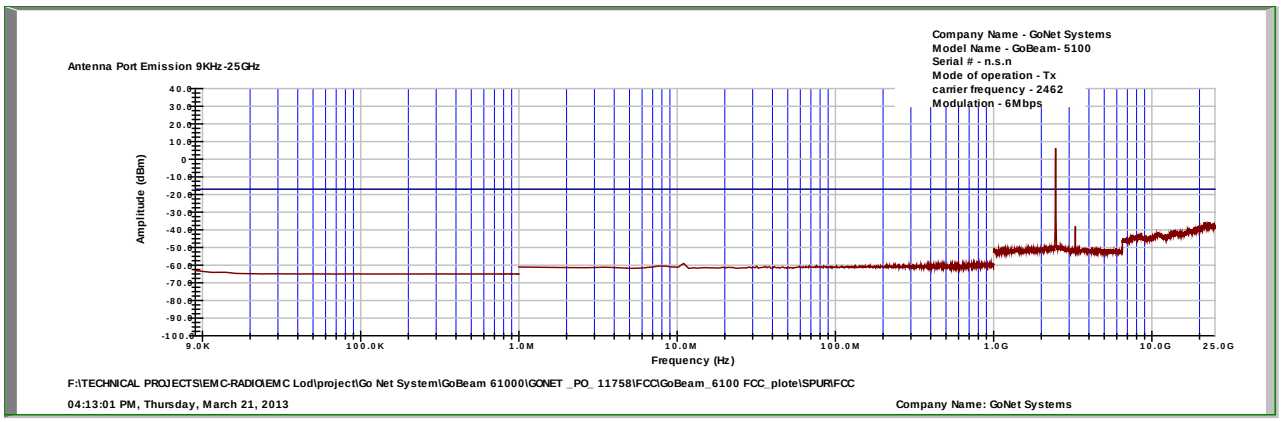


Figure 92 – Channel 11 , 6Mbps

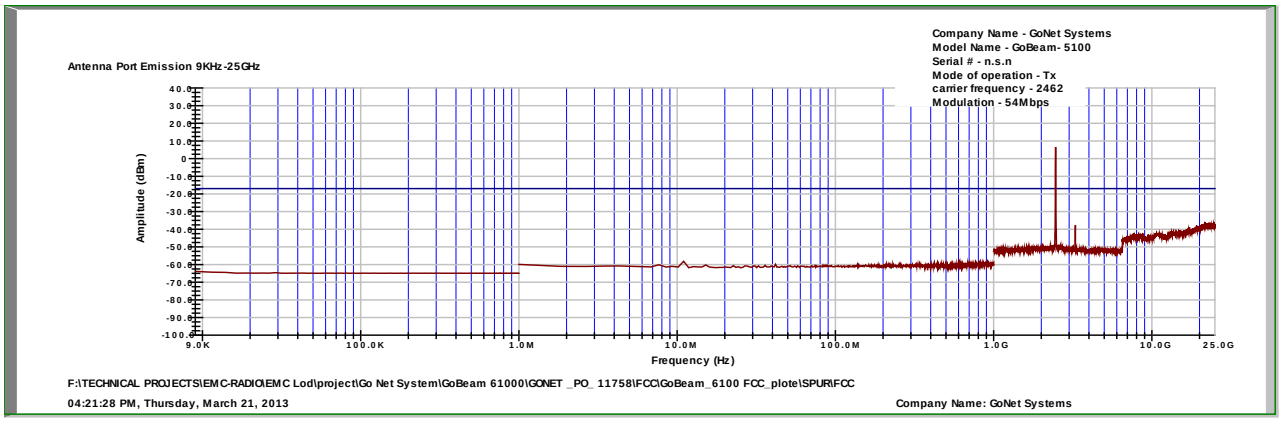


Figure 93 – Channel 11 , 54Mbps

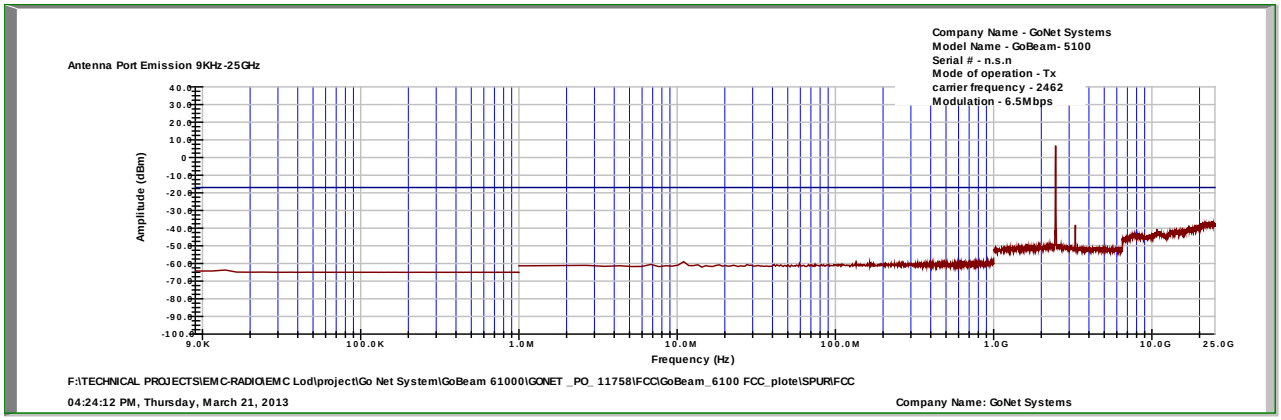


Figure 94 – Channel 11 , 6.5Mbps

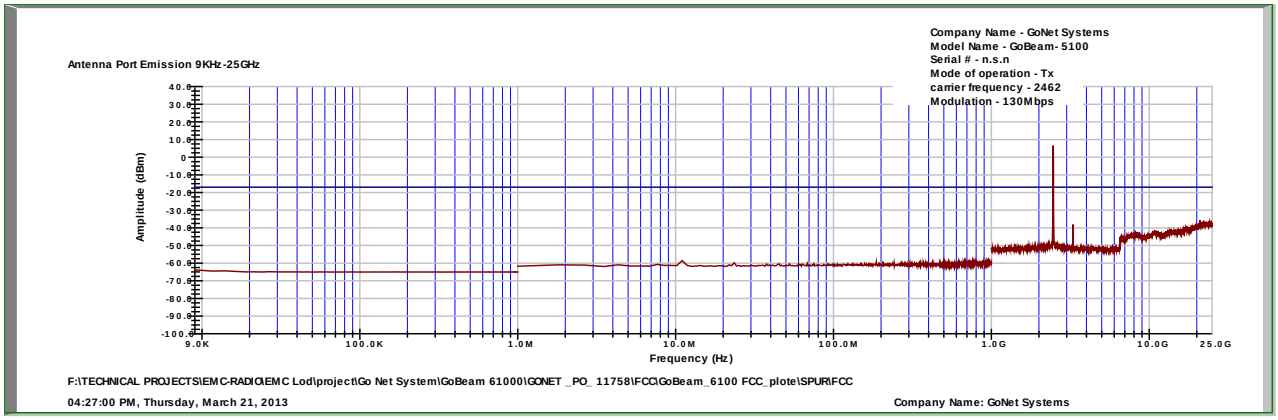


Figure 95 – Channel 11 , 130Mbps

8.4 Test Equipment Used, Peak Power Output Out of 2400-2483.5 MHz Band

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibration Date	Period
Spectrum Analyzer	R&S	FSL6	100194	November 1, 2012	1 year
Attenuator	-	30dB	-	June 17, 2012	1 year
Cable	TestLINE	18	11556	June 17, 2012	1 year

Figure 96 Test Equipment Used, Peak Power Output Out of 2400-2483.5 MHz Band

Note: testing was performed on 21 March 2013.

9. Band Edge

9.1 Test Specification

FCC Part 15 Subpart C Section 15.247

9.2 Test Procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable. The spectrum analyzer was set to 120 kHz IF BW.

Maximum power level below 2400 MHz and above 2483.5 MHz was measured relative to power level at 2412 MHz, and 2462.0 MHz correspondingly.

The E.U.T. was tested at 2412 and 2462 MHz with the following modulations: 1, 11, 6,54,6.5 and 130 Mbps.

9.3 Test Results

Operation Frequency (MHz)	Modulation (Mbps)	Band Edge Frequency (MHz)	Band Edge Limit (dBuV/m)	Frequency reading (MHz)	Pass/ Fail
2412	1	2400.00	88.22	2403.0	Pass
	11	2400.00	90.51	2403.1	Pass
	6	2400.00	84.33	2402.8	Pass
	54	2400.00	84.81	2403.2	Pass
	6.5	2400.00	85.90	2402.7	Pass
	130	2400.00	80.71	2402.8	Pass
2462	1	2483.50	90.21	2407.0	Pass
	11	2483.50	90.39	2407.0	Pass
	6	2483.50	81.97	2471.2	Pass
	54	2483.50	83.09	2471.2	Pass
	6.5	2483.50	80.77	2472.2	Pass
	130	2483.50	75.35	2471.1	Pass

Figure 97 Test Results Table, Band Edge

See additional information in *Figure 98* to *Figure 109*.

JUDGEMENT: Passed by 18.83 dB

TEST PERSONNEL:
Tester Signature: _____ Date: 12.08.13
Typed/Printed Name: A. Sharabi

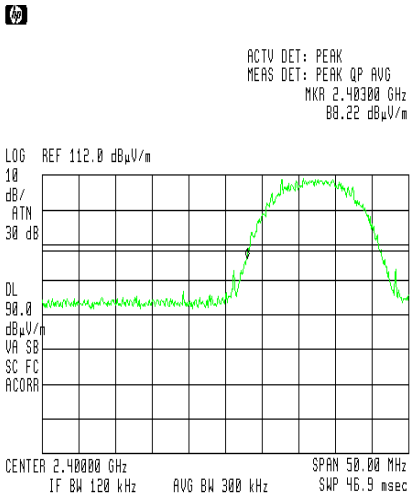


Figure 98 — Channel 1, 1Mbps

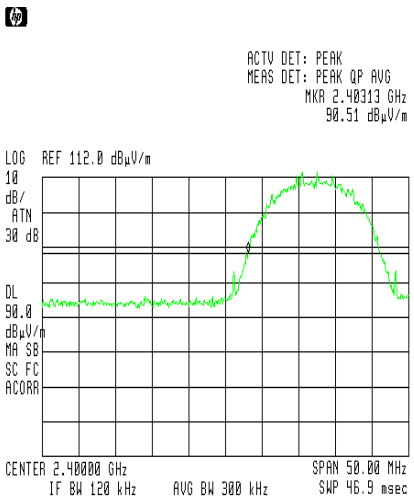


Figure 99 — Channel 1, 11Mbps

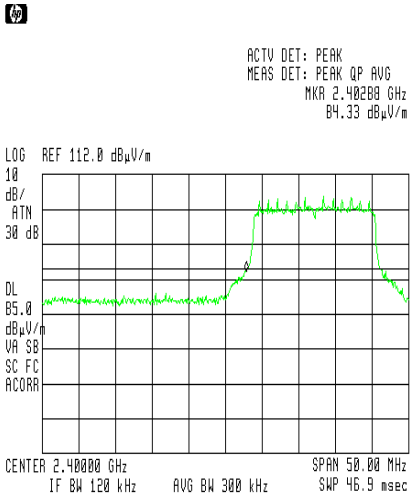


Figure 100 — Channel 1, 6Mbps

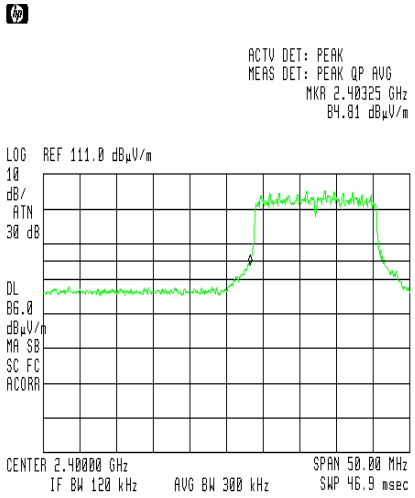


Figure 101 — Channel 1, 54Mbps

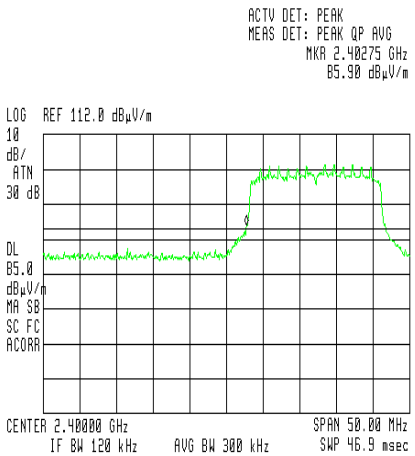


Figure 102 — Channel 1, 6.5Mbps

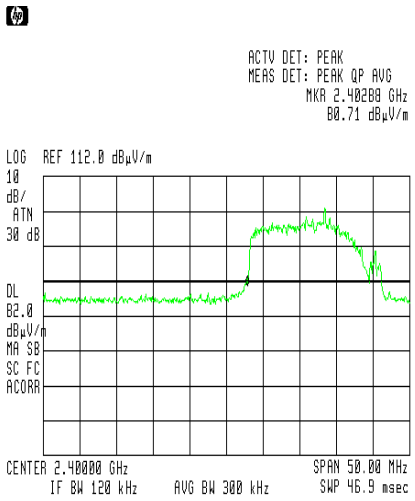


Figure 103 — Channel 1, 130Mbps

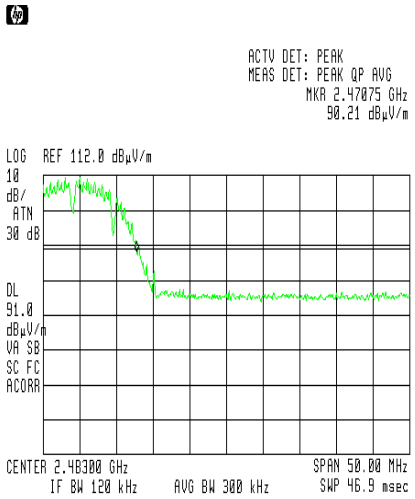


Figure 104 — Channel 11, 1Mbps

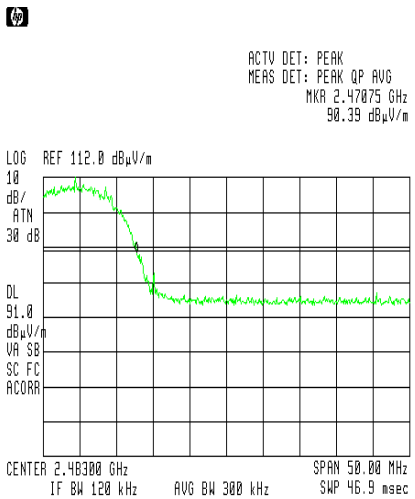


Figure 105 — Channel 11, 11Mbps

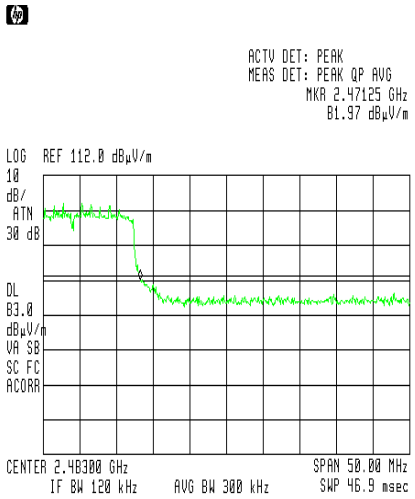


Figure 106 — Channel 11, 6Mbps

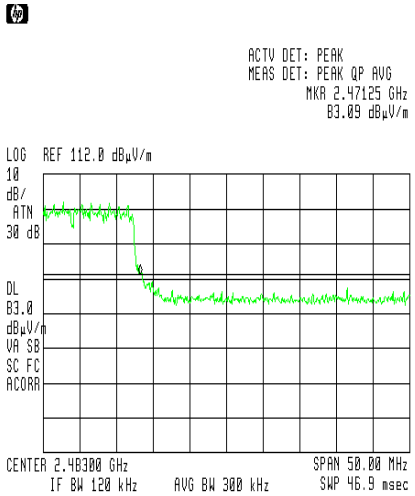


Figure 107 — Channel 11, 54Mbps

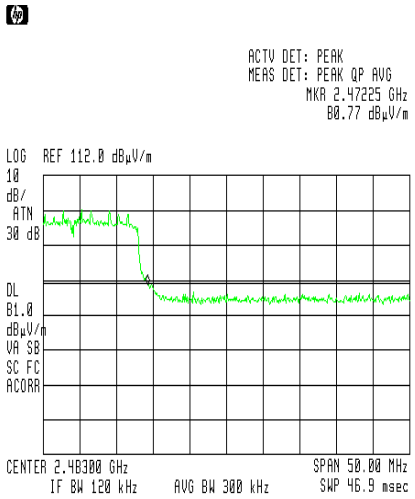


Figure 108 — Channel 11, 6.5Mbps

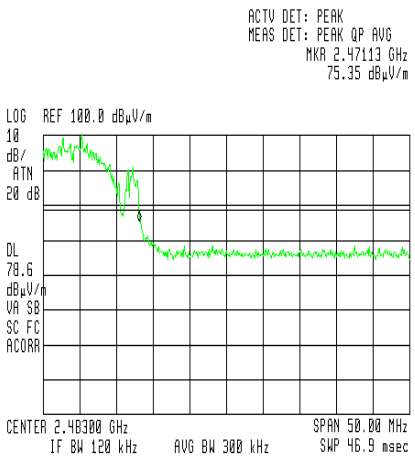


Figure 109 — Channel 11, 130Mbps

9.4 Test Equipment Used, Band Edge

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibration Date	Period
Spectrum Analyzer	HP	8564E	3442A00275	February 28, 2013	1 year
Attenuator	-	30dB	-	June 17, 2012	1 year
Cable	TestLINE	18	11556	June 17, 2012	1 year

Figure 110 Test Equipment Used, Band Edge

Note: Testing was performed on 24 March 2013.

10. Radiated Emission, 9 kHz – 30 MHz

10.1 Test Specification

9 kHz-30 MHz, FCC, Part 15, Subpart C, Section 209

10.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.1.

The frequency range 9 kHz-30 MHz was scanned.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 9 kHz-30MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter at a distance of 3 meters.

The E.U.T. was tested at 2412, 2437, and 2462 MHz with the following modulations: 1, 11, 6 and 54 Mbps.
Measurement was performed using a peak detector.

10.3 Test Results

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 209 specification.

The results for all 3 operation frequencies and modulations were the same.

No signals were detected in the frequency range of 9 kHz – 30 MHz.

TEST PERSONNEL:

Tester Signature: _____ Date: 12.08.13

Typed/Printed Name: A. Sharabi

10.4 Test Instrumentation Used, Radiated Emission 9kHz – 30 MHz

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	February 26, 2013	1 year
RF Section	HP	85420E	3705A00248	February 26, 2013	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 21, 2012	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 111 Test Equipment Used, Radiated Emission 9 kHz – 30 MHz

Note: testing was performed on 21 March 2013.

10.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

FS = RA + AF + CF

FS: Field Strength [dBμv/m]
RA: Receiver Amplitude [dBμv]
AF: Receiving Antenna Correction Factor [dB/m]
CF: Cable Attenuation Factor [dB]

Example: FS = 30.7 dBμV (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dBμV

No external pre-amplifiers are used.

11. Radiated Emission 30 – 25000 MHz

11.1 Test Specification

30 MHz-25000 MHz, F.C.C., Part 15, Subpart C

11.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 1.

The frequency range 30 MHz-25000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

In the frequency range of 30 MHz – 2.9 GHz, the emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 2.9-25.0 GHz, a spectrum analyzer including a low noise amplifier was used. During average measurements, the IF bandwidth was 1 MHz and the video bandwidth was 100Hz. During peak measurements, the IF bandwidth was 1 MHz and the video bandwidth was 3 MHz.
The test distance was 3 meters.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The E.U.T. was tested at 2412, 2437, and 2462 MHz with the following modulations: 1, 11, 6 and 54 Mbps.

11.3 Test Results

JUDGEMENT: Passed by 6.3 dB

For the operation frequency of 2412 MHz, the margin between the emission level and the specification limit is 6.5 dB in the worst case at the frequency of 2390.00 MHz, vertical polarization.

For the operation frequency of 2437 MHz, the margin between the emission level and the specification limit is 12.3 dB in the worst case at the frequency of 4783.00 MHz, vertical polarization.

For the operation frequency of 2462 MHz, the margin between the emission level and the specification limit is 6.3 dB in the worst case at the frequency of 2483.5 MHz, vertical polarization.

The results for all modulations were the same.

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

The details of the highest emissions are given in *Figure 112* to *Figure 123.*

TEST PERSONNEL:

Tester Signature: _____ Date: 12.08.13

Typed/Printed Name: A. Sharabi

Radiated Emission terminated antenna port 30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 2412 MHz, Dipole antenna

Frequency (MHz)	Polarity (H/V)	Peak Reading (dBµV/m)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
2390.00	H	49.9	74.0	-24.1
2390.00	V	49.5	74.0	-24.5
4824.00	H	42.6	74.0	-31.4
4824.00	V	44.1	74.0	-29.9

Figure 112. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission terminated antenna port 30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: 2412 MHz , Dipole antenna

Frequency (MHz)	Polarity (H/V)	Average Reading (dBµV/m)	Average Specification (dB µV/m)	Peak. Margin (dB)
2390.00	H	38.8	54.0	-15.2
2390.00	V	38.8	54.0	-15.2
4824.00	H	36.8	54.0	-17.2
4824.00	V	37.0	54.0	-17.0

Figure 113. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission terminated antenna port 30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 2437 MHz, Dipole antenna

Freqency (MHz)	Polarity (H/V)	Peak Reading (dBµV/m)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
4783.00	H	43.5	74.0	-30.5
4783.00	V	44.6	74.0	-29.4

Figure 114. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission terminated antenna port 30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: 2437 MHz, Dipole antenna

Frequency (MHz)	Polarity (H/V)	Average Reading (dBµV/m)	Average Specification (dB µV/m)	Peak. Margin (dB)
4783.00	H	38.7	54.0	-15.3
4783.00	V	38.9	54.0	-15.1

Figure 115. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission terminated antenna port 30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 2462 MHz, Dipole antenna

Frequency (MHz)	Polarity (H/V)	Peak Reading (dBµV/m)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
2483.50	H	50.6	74.0	-23.4
2483.50	V	50.7	74.0	-23.3
4924.00	H	49.5	74.0	-24.5
4924.00	V	48.8	74.0	-25.2

Figure 116. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission terminated antenna port 30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz

Test Distance: 3 meters Detector: Average

Operation Frequency: 2462 MHz, Dipole antenna

Frequency (MHz)	Polarity (H/V)	Average Reading (dBµV/m)	Average Specification (dB µV/m)	Peak. Margin (dB)
2483.50	H	39.3	54.0	-14.7
2483.50	V	39.3	54.0	-14.7
4924.00	H	36.8	54.0	-17.2
4924.00	V	37.7	54.0	-16.3

Figure 117. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Integral antenna
30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters
Detector: Peak
Operation Frequency: 2412 MHz, Patch antenna

Frequency (MHz)	Polarity (H/V)	Peak Reading (dBµV/m)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
2390.00	H	56.4	74.0	-17.6
2390.00	V	60.1	74.0	-13.9
4824.00	H	48.3	74.0	-25.7
4824.00	V	49.0	74.0	-25.0

Figure 118. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Integral antenna
30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 2412 MHz, Patch antenna

Frequency (MHz)	Polarity (H/V)	Average Reading (dBµV/m)	Average Specification (dB µV/m)	Peak. Margin (dB)
2390.00	H	45.6	54.0	-8.4
2390.00	V	47.5	54.0	-6.5
4824.00	H	38.7	54.0	-15.3
4824.00	V	38.0	54.0	-16.0

Figure 119. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Integral antenna
30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 2437 MHz, Patch antenna

Freqency (MHz)	Polarity (H/V)	Peak Reading (dBµV/m)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
4783.00	H	50.5	74.0	-23.5
4783.00	V	51.6	74.0	-22.4

Figure 120. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Integral antenna
30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical
Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters
Detector: Average
Operation Frequency: 2437 MHz, Patch antenna

Frequency (MHz)	Polarity (H/V)	Average Reading (dBµV/m)	Average Specification (dB µV/m)	Peak. Margin (dB)
4783.00	H	40.4	54.0	-13.6
4783.00	V	41.7	54.0	-12.3

Figure 121. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Integral antenna 30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 2462 MHz, Patch antenna

Frequency (MHz)	Polarity (H/V)	Peak Reading (dBµV/m)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
2483.50	H	55.0	74.0	-19.0
2483.50	V	60.7	74.0	-13.3
4924.00	H	50.3	74.0	-23.7
4924.00	V	51.5	74.0	-22.5

Figure 122. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

Radiated Emission Integral antenna
30 MHz – 25 GHz

E.U.T Description	WiFi BeamForming Access Point
Type	GoBeam 6100F; GoBeam 5100F
Serial Number:	Not designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: 2462 MHz, Patch antenna

Frequency (MHz)	Polarity (H/V)	Average Reading (dBµV/m)	Average Specification (dB µV/m)	Peak. Margin (dB)
2483.50	H	44.8	54.0	-9.2
2483.50	V	47.7	54.0	-6.3
4924.00	H	38.0	54.0	-16.0
4924.00	V	39.6	54.0	-14.4

Figure 123. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Average

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Average Reading" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

11.4 Field Strength Calculation below 1 GHz

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$[dB\mu v/m]\ FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

Example: FS = 30.7 dBμV (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dBμV

No external pre-amplifiers are used.

11.5 Test equipment Used, Radiated Emission 30 MHz -25 GHz

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
EMI Receiver	HP	85422E	3906A00276	February 26, 2013	1Year
RF Filter Section	HP	85420E	3705A00248	February 26, 2013	1Year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	1Year
Antenna Log Periodic	ARA	LPD-2010/A	1038	April 2, 2012	1 Year
Horn Antenna	ETS	3115	29845	March 14, 2012	2 Years
Horn Antenna	ARA	SWH-28	1007	January 26, 2011	3 Years
Low Noise Amplifier	Narda	LNA-DBS-0411N313	013	August 21, 2012	1 Year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 28, 2012	1 Year
Spectrum Analyzer	HP	8592L	3826A01204	February 28, 2013	1 Year
Spectrum Analyzer	HP	8564E	3442A00275	February 28, 2013	1 Year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 124 Test Equipment Used, Radiated Emission 30 MHz – 25 GHz

Note: Testing was performed on 21 March 2013.

12. Transmitted Power Density

12.1 Test Specification

FCC Part 15 Section 15.247(e)

12.2 Test Procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable. The spectrum analyzer was set to 3 kHz resolution BW. The spectrum peaks were located at each of the 3 operating frequencies.

12.3 Test Results

Operation Frequency (MHz)	Modulation (Mbps)	Reading (dBm)	Specification (dBm)	Margin (dB)
2412	1	-6.6	2.0	-4.6
	11	-5.6	2.0	-3.6
	6	-2.7	2.0	-0.7
	54	-6.1	2.0	-4.1
	6.5	-2.8	2.0	-0.8
	130	-1.0	2.0	1
2437	1	-5.3	2.0	-3.3
	11	-5.3	2.0	-3.3
	6	-6.1	2.0	-4.1
	54	-2.2	2.0	-0.2
	6.5	-2.8	2.0	-0.8
	130	-6.7	2.0	-4.7
2462	1	-3.4	2.0	-1.4
	11	-6.4	2.0	-4.4
	6	-6.9	2.0	-4.9
	54	-6.3	2.0	-4.3
	6.5	-6.1	2.0	-4.1
	130	-6.8	2.0	-4.8

Figure 125 Transmitted Power Density Test Results Table

See additional information in *Figure 126* to *Figure 143*.

The peak power spectral density limit for each antenna connector is
$PD_1 = PD_{total} - 10 \log 4 = 8-6= 2dBm/3kHz$

JUDGEMENT: Passed by 2.07 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 12.08.13

Typed/Printed Name: A. Sharabi

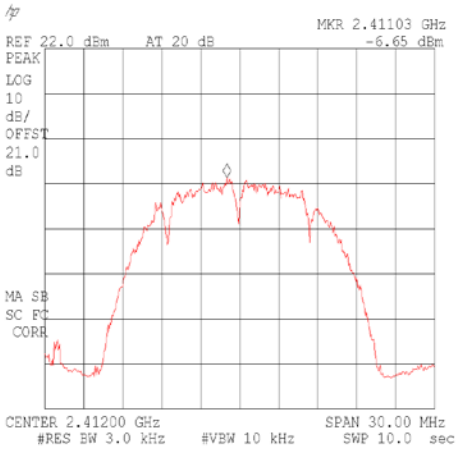


Figure 126 – Channel 1 , 1Mbps

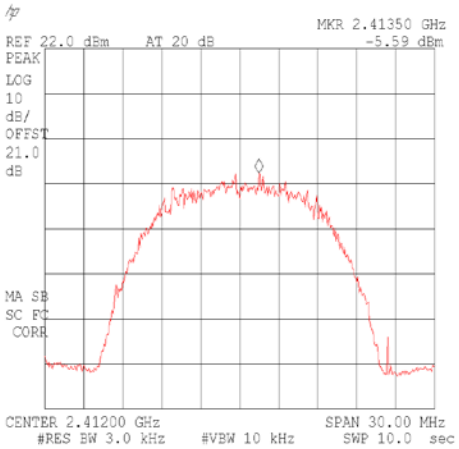


Figure 127- Channel 1 , 11Mbps

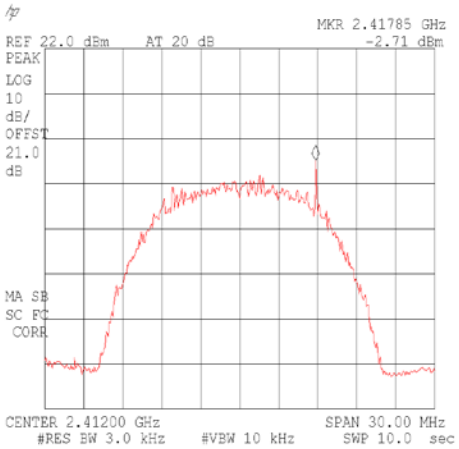


Figure 128 - Channel 1 , 6Mbps

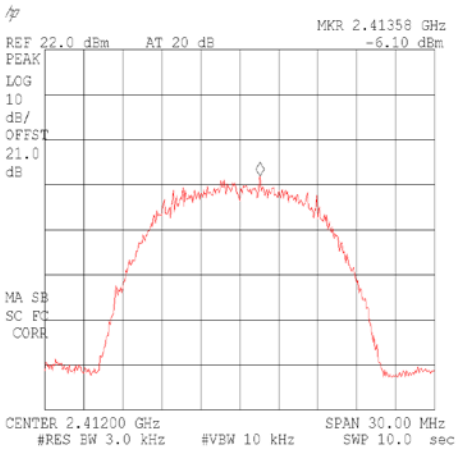


Figure 129 - Channel 1 , 54Mbps

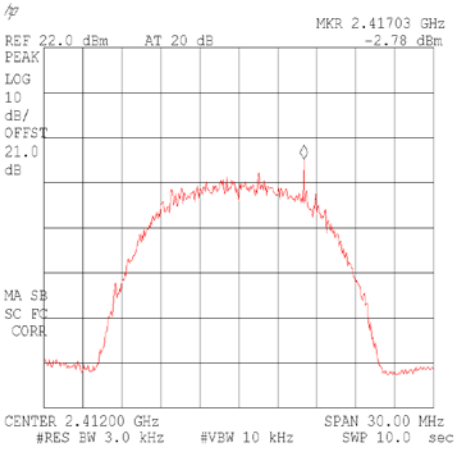


Figure 130 - Channel 1 , 6.5Mbps

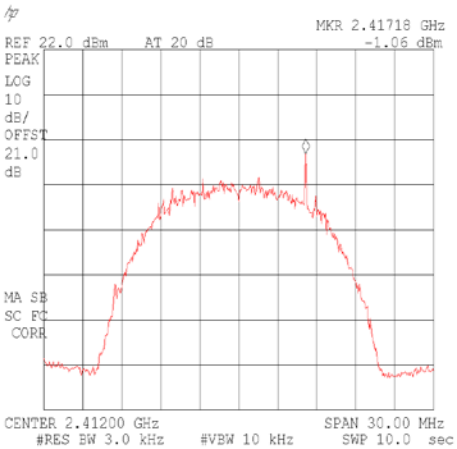


Figure 131 - Channel 1 , 130Mbps

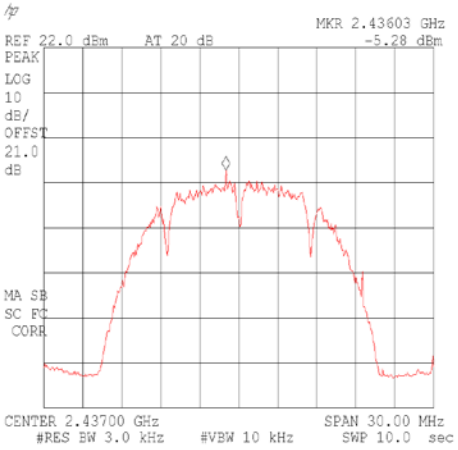


Figure 132 - Channel 6 , 1Mbps

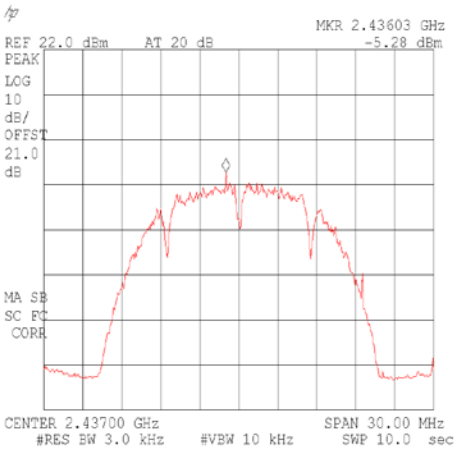


Figure 133 - Channel 6 , 11Mbps

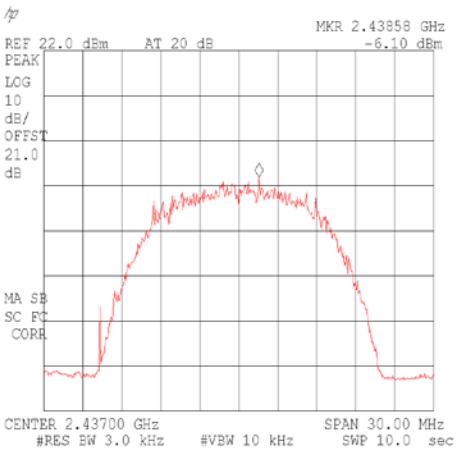


Figure 134 - Channel 6 , 6Mbps

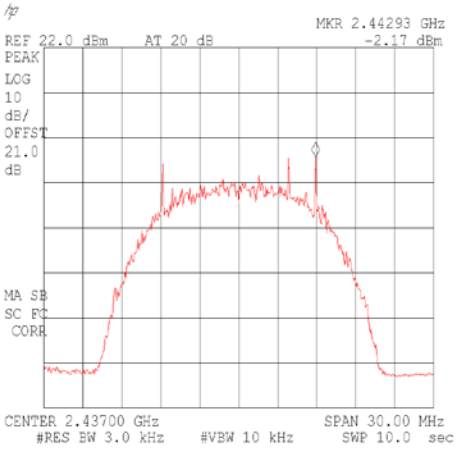


Figure 135 - Channel 6 , 54Mbps

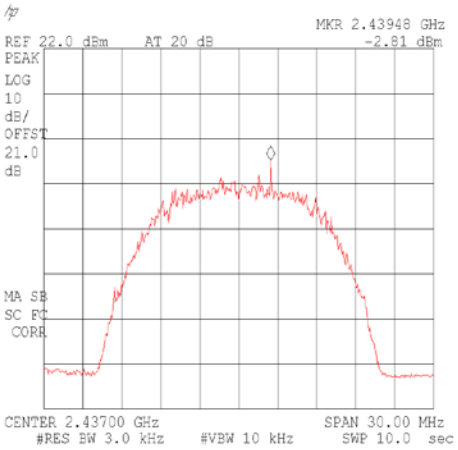


Figure 136 - Channel 6 , 6.5Mbps

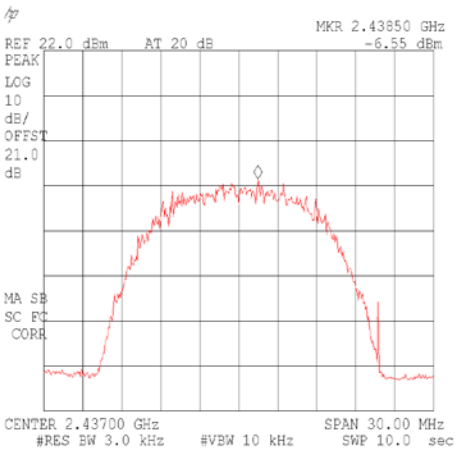


Figure 137 - Channel 6 , 130Mbps

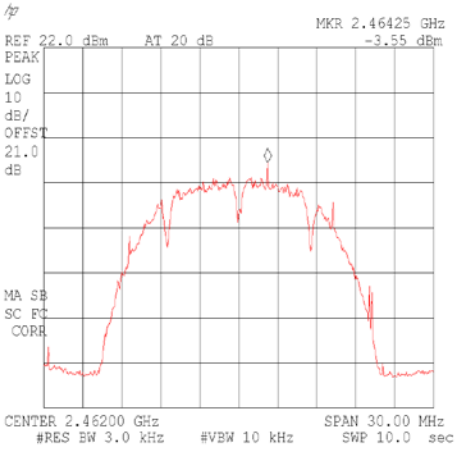


Figure 138 - Channel 11 , 1Mbps

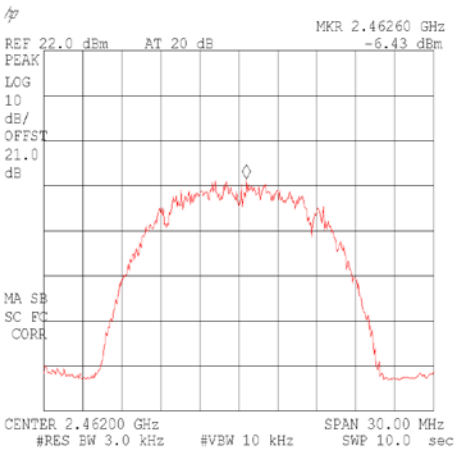


Figure 139 - Channel 11 , 11Mbps

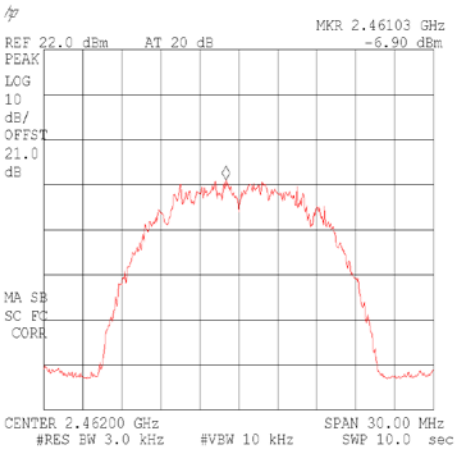


Figure 140 - Channel 11 , 6Mbps

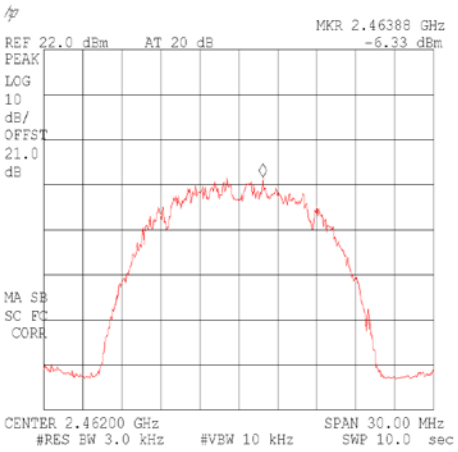


Figure 141 - Channel 11 , 54Mbps

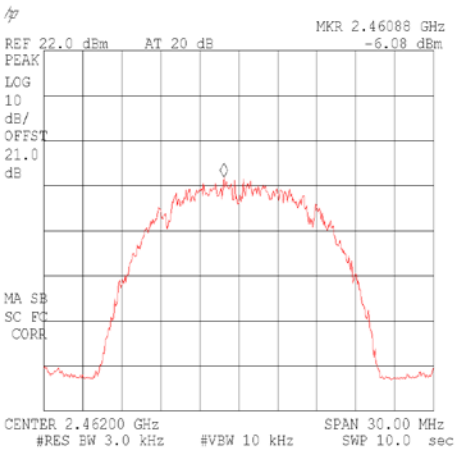


Figure 142 - Channel 11 , 6.5Mbps

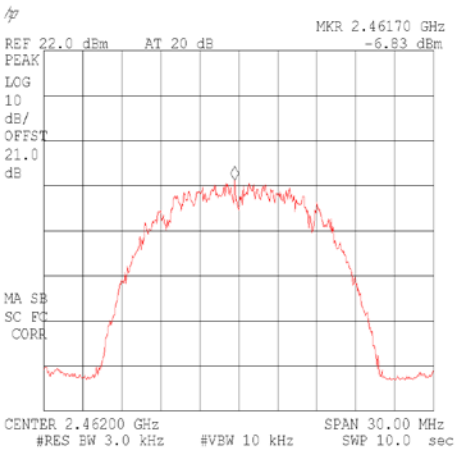


Figure 143 - Channel 11 , 130Mbps

12.4 Test Equipment Used, Transmitted Power Density

Instrument	Manufacturer	Model	Serial/Part Number	Calibration	
				Last Calibration Date	Period
Spectrum Analyzer	HP	8592L	3826A01204	February 13, 2013	1 year
Attenuator	-	20dB	-	September 10, 2013	1 year
Cable	TestLINE	18	11556	September 10, 2013	1 year

Figure 144 Test Equipment Used, Transmitted Power Density

Note: Testing was performed 10 September 2013.

13. Antenna Gain/Information

The antenna gain is 8.0 dBi (Patch) and 8.0 (dipole).

14. R.F Exposure/Safety

The typical placement of the E.U.T. is on a pole. The typical distance between the E.U.T. and the user in the worst case application, is >100 cm

Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1307(b)(1) Requirements

(a) FCC limits at 2462 MHz is: $1\frac{mW}{cm^2}$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(b) The power density produced by the E.U.T. is

$P_{t\,(b/g)}$ (Antenna array of 4 antennas) - Transmitted Peak Power 21.28 dBm = 134 mw

$P_{t(n)}$ (MIMO) - Transmitted Peak Power 23.29 dBm = 213.3 mw

$$S = \frac{P_t G_t}{4\pi R^2}$$

$G_{T(b/g)}$ (Antenna array of 4 antennas) -Antenna Gain, 14 dBi = 25.1

$G_{T(n)}$ (MIMO) -Antenna Gain, 8 dBi = 6.3

R- Distance from Transmitter using 100 cm worst case

(c) The peak power density is :

Antenna array of 4 antennas:

$$S_{p(b/g)} = \frac{134 \times 25}{4\pi(20)^2} = 0.026\frac{mW}{cm^2}$$

MIMO:

$$S_{p(n)} = \frac{213.3 \times 6.3}{4\pi(20)^2} = 0.01\frac{mW}{cm^2}$$

(f) This is below the FCC limit.

15. APPENDIX A - CORRECTION FACTORS

15.1 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3
20.0	0.6
30.0	0.8
40.0	0.9
50.0	1.1
60.0	1.2
70.0	1.3
80.0	1.4
90.0	1.6
100.0	1.7
150.0	2.0
200.0	2.3
250.0	2.7
300.0	3.1
350.0	3.4
400.0	3.7
450.0	4.0
500.0	4.3
600.0	4.7
700.0	5.3
800.0	5.9
900.0	6.3
1000.0	6.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.3
1400.0	7.8
1600.0	8.4
1800.0	9.1
2000.0	9.9
2300.0	11.2
2600.0	12.2
2900.0	13.0

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 27 meters.

3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

15.2 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

1. The cable type is RG-8.

2. The overall length of the cable is 10 meters.

15.3 Correction factors for CABLE

from spectrum analyzer to test antenna above 2.9 GHz

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

NOTES:

1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.

2. The cable is used for measurements above 2.9 GHz.

3. The overall length of the cable is 10 meters.

12.6 Correction factors for LOG PERIODIC ANTENNA

Type LPD 2010/A
at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	12.5
400.0	15.4
500.0	16.1
600.0	19.2
700.0	19.4
800.0	19.9
900.0	21.2
1000.0	23.5

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.8
400.0	15.3
500.0	15.6
600.0	18.7
700.0	19.1
800.0	20.2
900.0	21.1
1000.0	23.2

NOTES:

1. *Antenna serial number is 1038.*
2. *The above lists are located in file number 38M3O.ANT for a 3 meter range, and file number 38M100.ANT for a 10 meter range.*
3. *The files mentioned above are located on the disk marked "Radiated Emission Test EMI Receiver".*

15.4 Correction factors for LOG PERIODIC ANTENNA

Type SAS-200/511
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

NOTES:

1. Antenna serial number is 253.

2. The above lists are located in file number SAS3M0.ANT for a 3 meter range.

3. The files mentioned above are located on the disk marked "Antenna Factors".

15.5 Correction factors for BICONICAL ANTENNA

Type BCD-235/B, at 3 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.

2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

15.6 Correction factors for Double-Ridged Waveguide Horn

Model: 3115, S/N 29845
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)	FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)
1.0	24.8	5.4	10.0	38.8	11.4
1.5	26.1	7.6	10.5	38.9	11.8
2.0	28.6	7.7	11.0	39.0	12.1
2.5	29.8	8.4	11.5	39.6	11.8
3.0	31.4	8.4	12.0	39.8	12.0
3.5	32.4	8.7	12.5	39.6	12.5
4.0	33.7	8.6	13.0	40.0	12.5
4.5	33.4	9.9	13.5	39.8	13.0
5.0	34.5	9.7	14.0	40.2	13.0
5.5	35.1	9.9	14.5	40.6	12.9
6.0	35.4	10.4	15.0	41.3	12.4
6.5	35.6	10.8	15.5	39.5	14.6
7.0	36.2	10.9	16.0	38.8	15.5
7.5	37.3	10.4	16.5	40.0	14.6
8.0	37.7	10.6	17.0	41.4	13.4
8.5	38.3	10.5	17.5	44.8	10.3
9.0	38.5	10.8	18.0	47.2	8.1
9.5	38.7	11.1			

15.7 Correction factors for Horn Antenna

Model: SWH-28
at 1 meter range.

FREQUENCY (GHz)	AFE (dB /m)	Gain (dB1)
18.0	40.3	16.1
19.0	40.3	16.3
20.0	40.3	16.1
21.0	40.3	16.3
22.0	40.4	16.8
23.0	40.5	16.4
24.0	40.5	16.6
25.0	40.5	16.7
26.0	40.6	16.4

15.8 Correction factors for ACTIVE LOOP ANTENNA

Model 6502
S/N 9506-2950

FREQUENCY (MHz)	Magnetic Antenna Factor (dB)	Electric Antenna Factor (dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2