



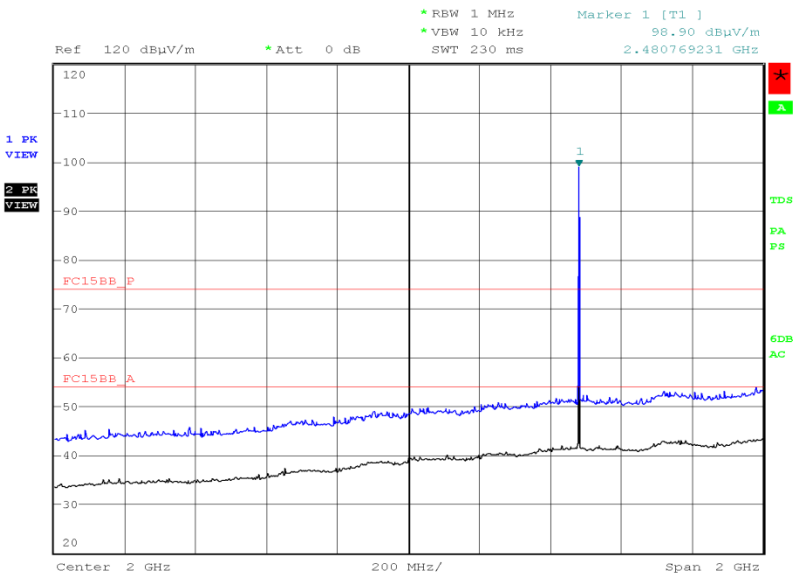
Product Service

Bluetooth Low Energy, 2480 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBμV/m)	Final Average (dBμV/m)	Final Peak (μV/m)	Final Average (μV/m)	Angle (°)	Height (m)	Polarisation
*							

*No emissions were detected within 6 dB of the limit.

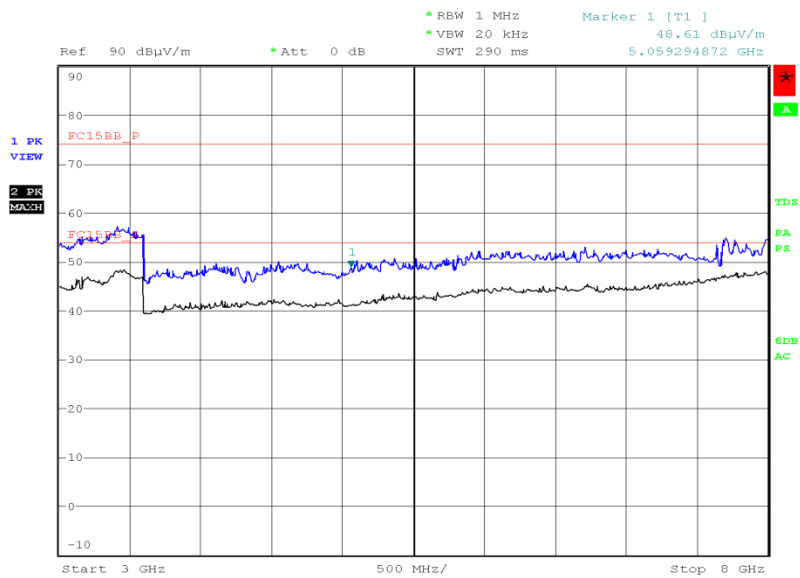
Bluetooth Low Energy, 2480 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



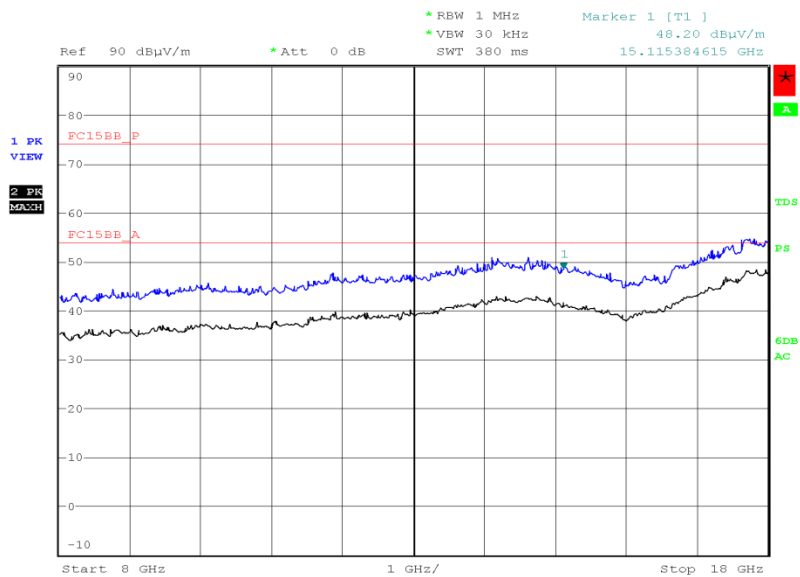
Date: 18.APR.2015 02:21:55



Product Service

Bluetooth Low Energy, 2480 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot

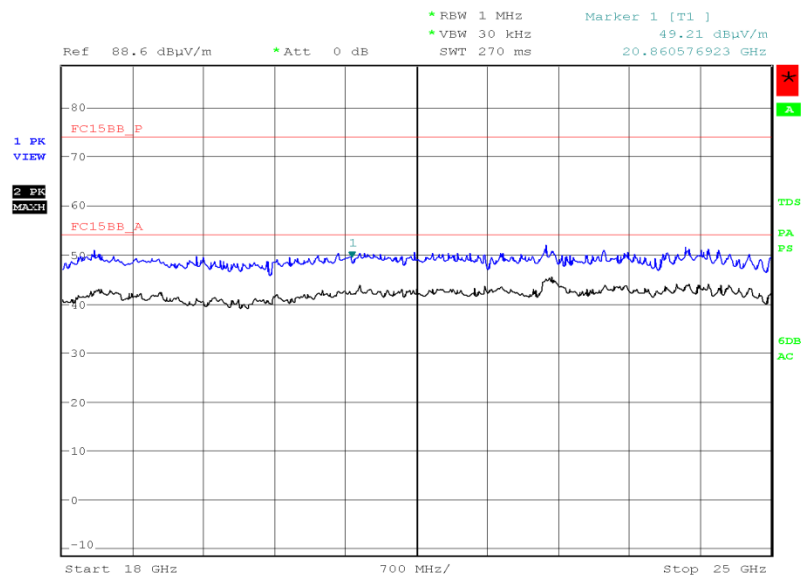
Date: 18.APR.2015 03:38:12

Bluetooth Low Energy, 2480 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot

Date: 19.APR.2015 02:56:24



Bluetooth Low Energy, 2480 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 19.APR.2015 05:01:12

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBμV/m)	Average (dBμV/m)
Restricted Bands of Operation	74	54

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(μV/m)	Average (dBμV/m)	Peak (dBμV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3



Product Service

2.5 RESTRICTED BAND EDGES**2.5.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.205

2.5.2 Equipment Under Test and Modification State

SHV32 S/N: IMEI 004401115406791 - Modification State 0

2.5.3 Date of Test

18 April 2015, 27 April 2015 & 5 May 2015

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Test Procedure

The test was performed in accordance with ANSI C63.10 Clause 6.9.2.

2.5.6 Environmental Conditions

Ambient Temperature	18.7 - 21.5°C
Relative Humidity	26.5 - 34.0%



Product Service

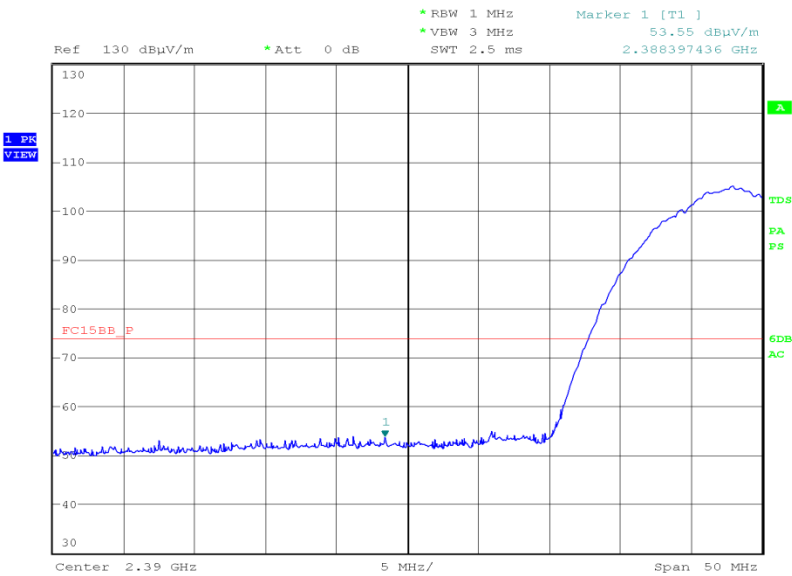
2.5.7 Test Results

4.0 V DC Supply

802.11b, 1 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBμV/m		dBμV/m	
Final Peak	Final Average	Final Peak	Final Average
53.55	40.68	55.32	42.15

802.11b, 2412 MHz, Measured Frequency 2390.00 MHz, 1 Mbps, Final Peak, Restricted Band Edges Plot

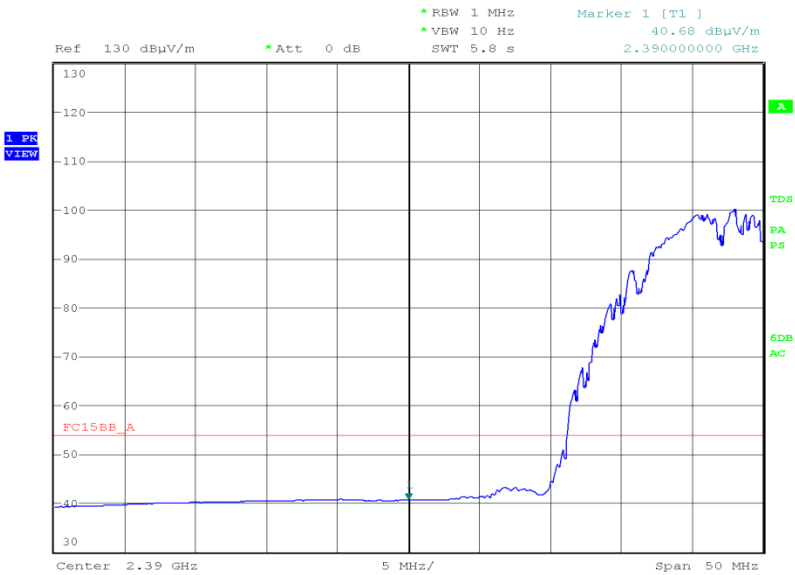


Date: 27.APR.2015 12:17:33



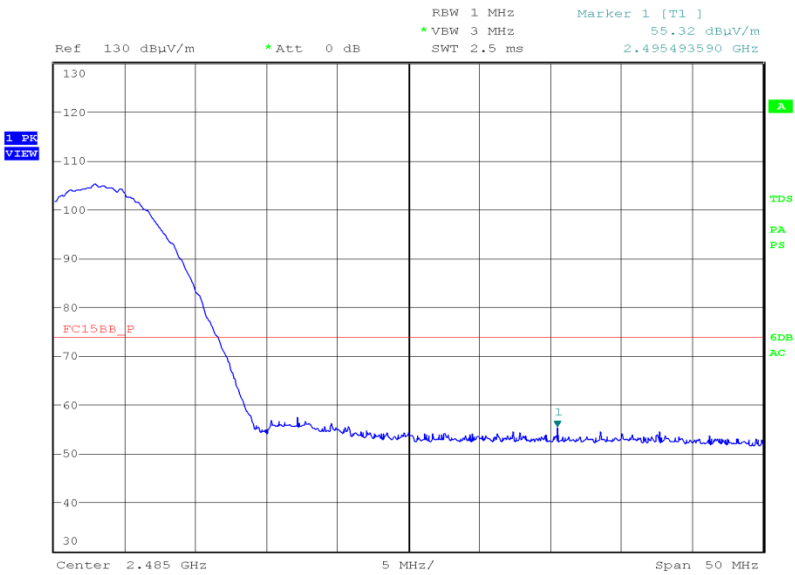
Product Service

802.11b, 2412 MHz, Measured Frequency 2390.00 MHz, 1 Mbps, Final Average, Restricted Band Edges Plot



Date: 27.APR.2015 13:28:28

802.11b, 2462 MHz, Measured Frequency 2483.50 MHz, 1 Mbps, Final Peak, Restricted Band Edges Plot

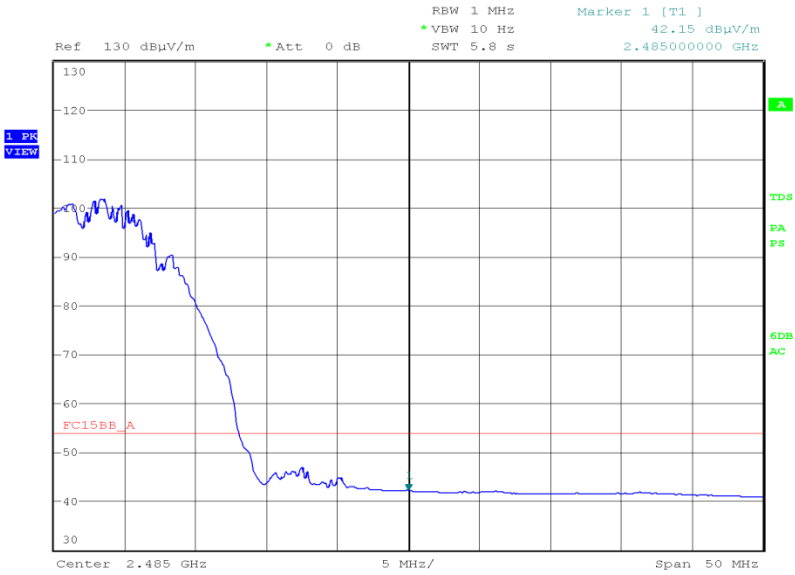


Date: 27.APR.2015 13:38:14



Product Service

802.11b, 2462 MHz, Measured Frequency 2483.50 MHz, 1 Mbps, Final Average, Restricted Band Edges Plot

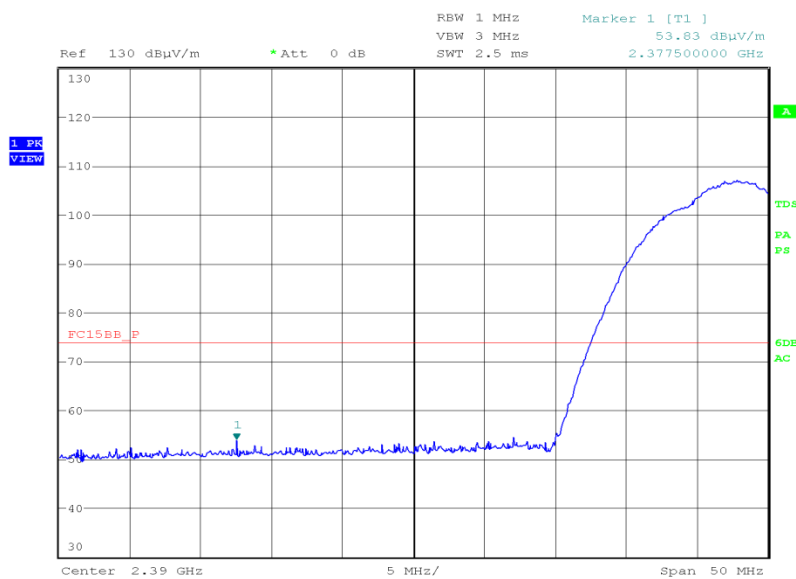


Date: 27.APR.2015 13:38:55

802.11b, 11 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBμV/m		dBμV/m	
Final Peak	Final Average	Final Peak	Final Average
53.83	40.50	53.84	41.33

802.11b, 2412 MHz, Measured Frequency 2390.00 MHz, 11 Mbps, Final Peak, Restricted Band Edges Plot

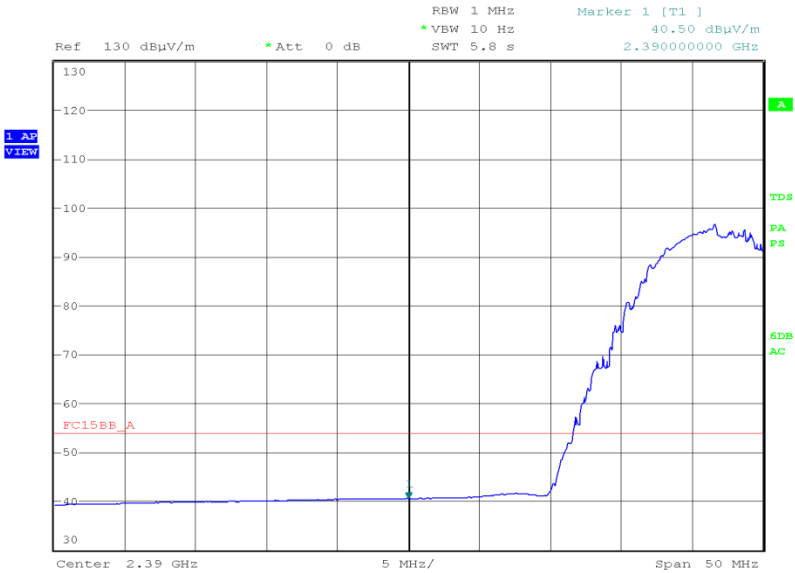


Date: 27.APR.2015 14:23:15



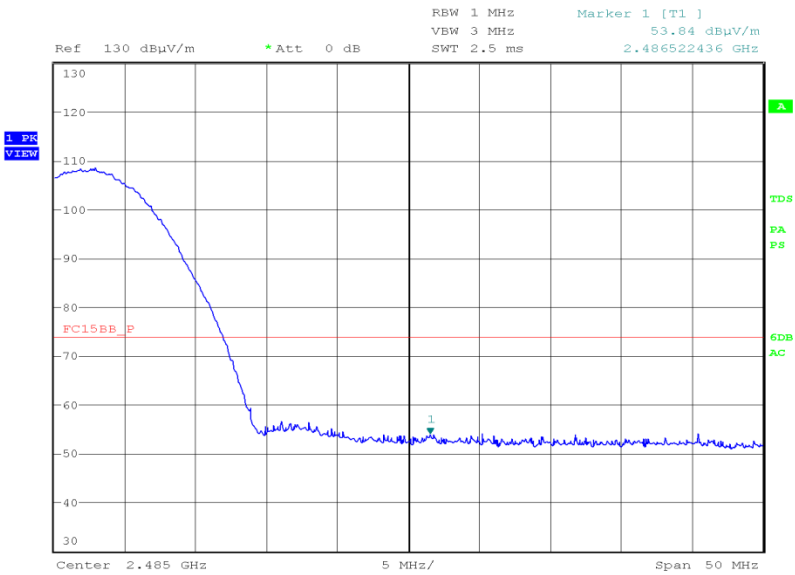
Product Service

802.11b, 2412 MHz, Measured Frequency 2390.00 MHz, 11 Mbps, Final Average, Restricted Band Edges Plot



Date: 27.APR.2015 14:24:01

802.11b, 2462 MHz, Measured Frequency 2483.50 MHz, 11 Mbps, Final Peak, Restricted Band Edges Plot

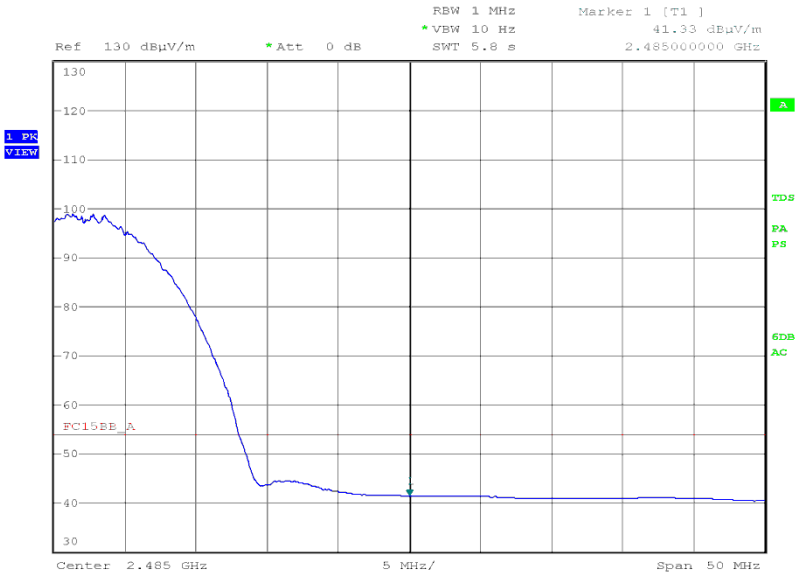


Date: 27.APR.2015 14:41:18



Product Service

802.11b, 2462 MHz, Measured Frequency 2483.50 MHz, 11 Mbps, Final Average, Restricted Band Edges Plot



Date: 27.APR.2015 14:43:34

Remark

The test was performed on 1 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 11 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBμV/m)	Average (dBμV/m)
Restricted Bands of Operation	74	54



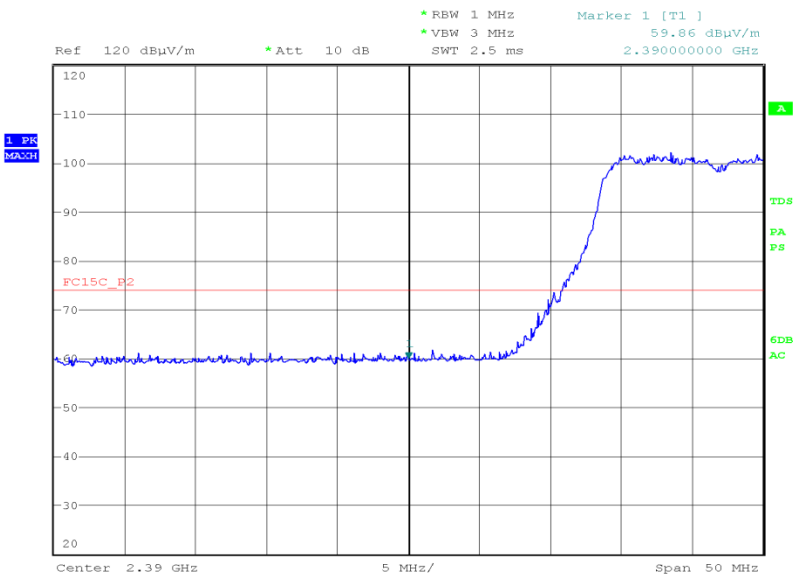
Product Service

4.0 V DC Supply

802.11g, 6 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBμV/m		dBμV/m	
Final Peak	Final Average	Final Peak	Final Average
59.86	48.59	60.58	48.84

802.11g, 2412 MHz, Measured Frequency 2390.00 MHz, 6 Mbps, Final Peak, Restricted Band Edges Plot

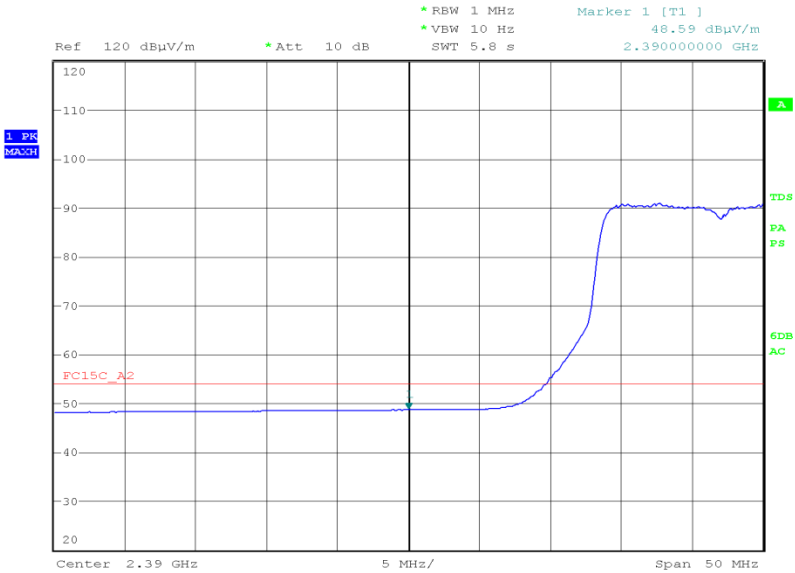


Date: 5.MAY.2015 21:14:32



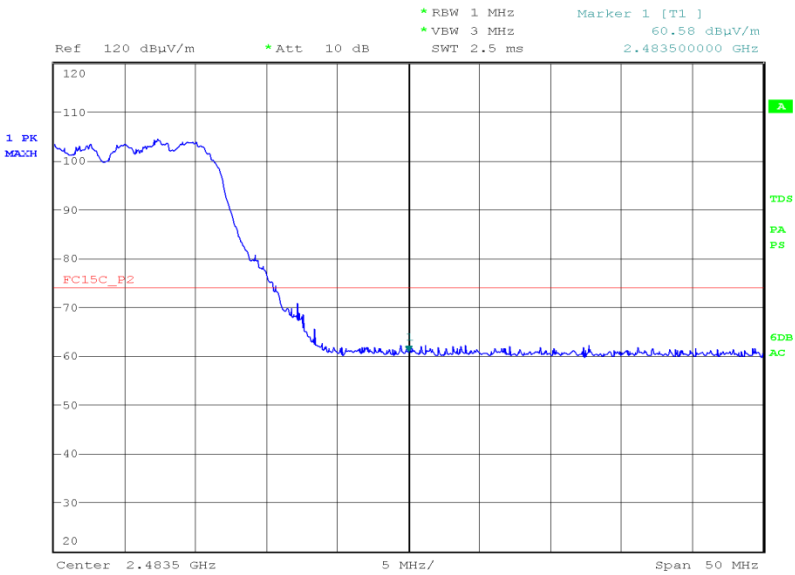
Product Service

802.11g, 2412 MHz, Measured Frequency 2390.00 MHz, 6 Mbps, Final Average, Restricted Band Edges Plot



Date: 5.MAY.2015 21:15:30

802.11g, 2462 MHz, Measured Frequency 2483.50 MHz, 6 Mbps, Final Peak, Restricted Band Edges Plot

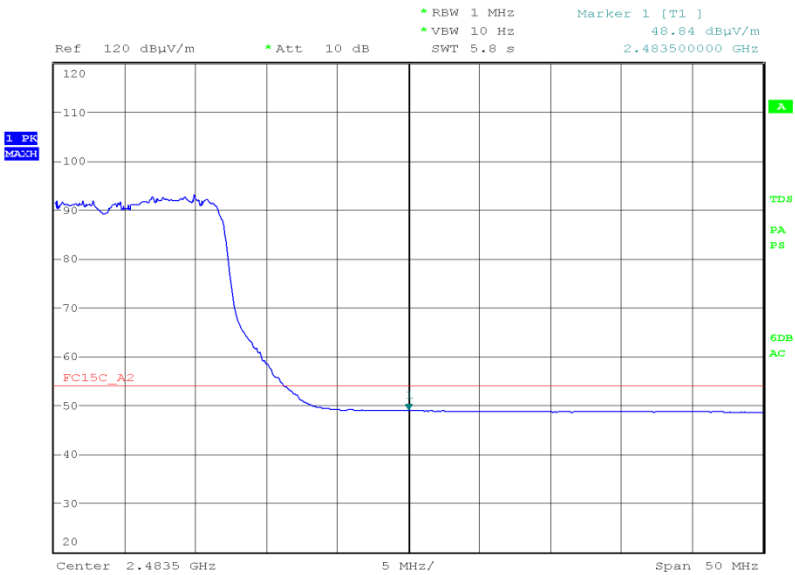


Date: 5.MAY.2015 21:08:13



Product Service

802.11g, 2462 MHz, Measured Frequency 2483.50 MHz, 6 Mbps, Final Average, Restricted Band Edges Plot



Date: 5.MAY.2015 21:08:52

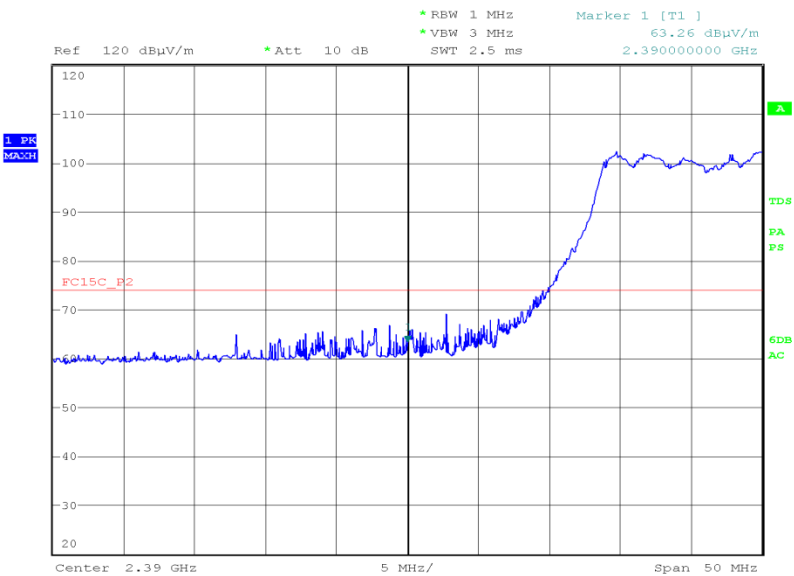


Product Service

802.11g, 54 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
63.26	48.66	60.98	48.56

802.11g, 2412 MHz, Measured Frequency 2390.00 MHz, 54 Mbps, Final Peak, Restricted Band Edges Plot

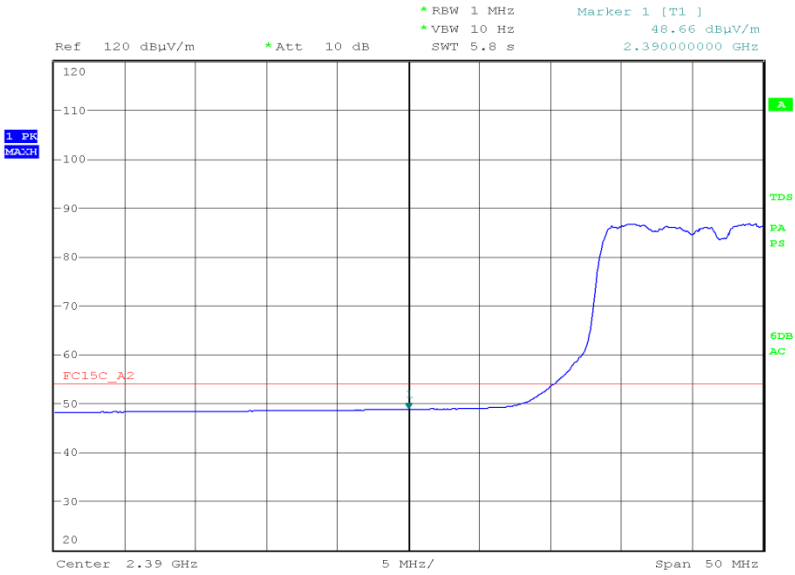


Date: 5.MAY.2015 21:36:11



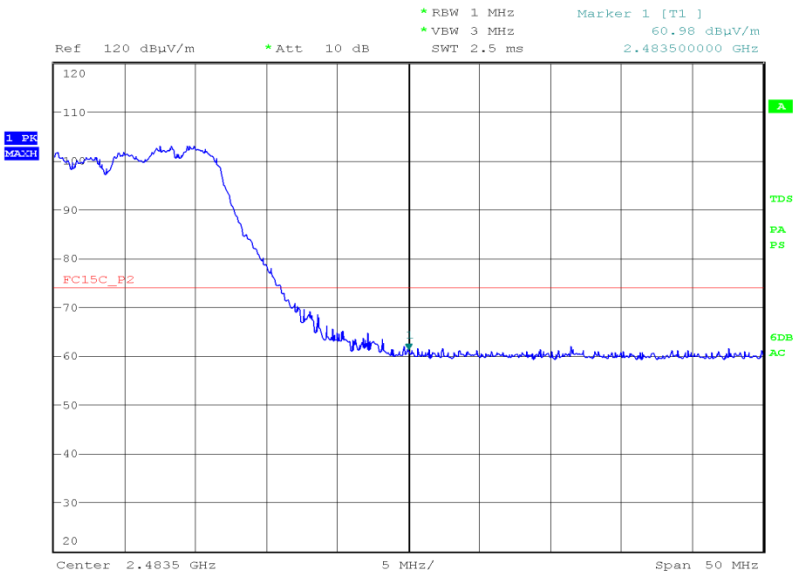
Product Service

802.11g, 2412 MHz, Measured Frequency 2390.00 MHz, 54 Mbps, Final Average, Restricted Band Edges Plot



Date: 5.MAY.2015 21:36:58

802.11g, 2462 MHz, Measured Frequency 2483.50 MHz, 54 Mbps, Final Peak, Restricted Band Edges Plot

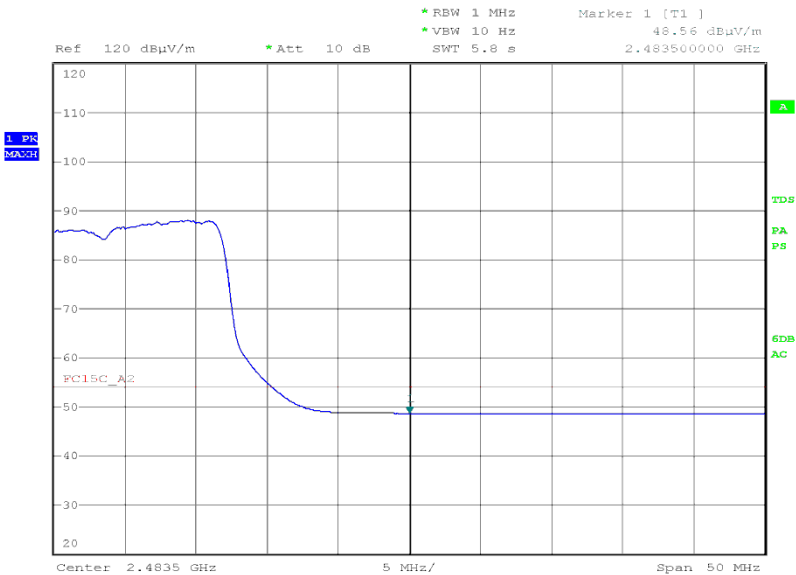


Date: 5.MAY.2015 21:51:08



Product Service

802.11g, 2462 MHz, Measured Frequency 2483.50 MHz, 54 Mbps, Final Average, Restricted Band Edges Plot



Date: 5.MAY.2015 21:51:57

Remark

The test was performed on 6 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 54 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBμV/m)	Average (dBμV/m)
Restricted Bands of Operation	74	54



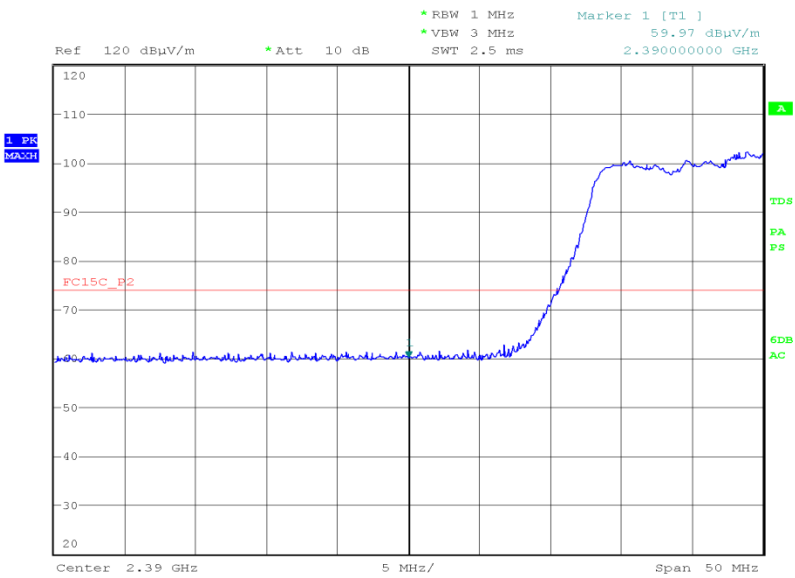
Product Service

4.0 V DC Supply

802.11n, 6.5 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBμV/m		dBμV/m	
Final Peak	Final Average	Final Peak	Final Average
59.97	48.60	60.37	48.72

802.11n, 2412 MHz, Measured Frequency 2390.00 MHz, 6.5 Mbps, Final Peak, Restricted Band Edges Plot

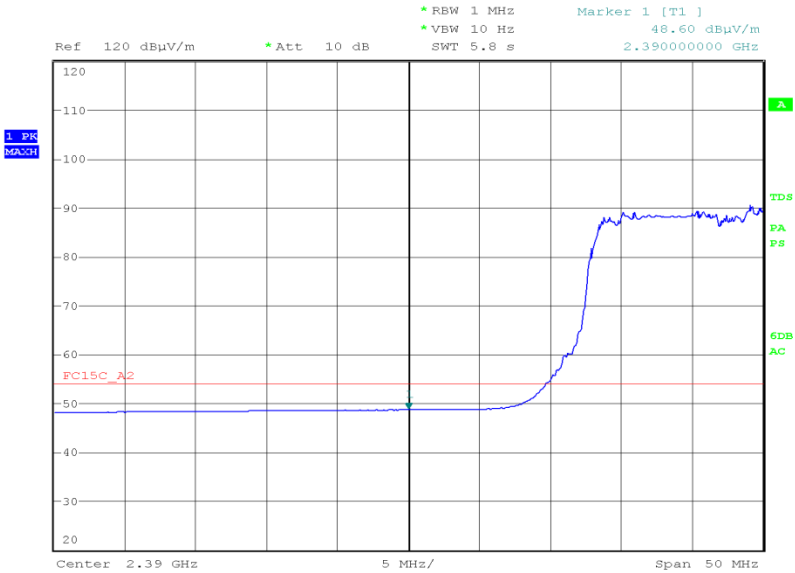


Date: 5.MAY.2015 22:40:51



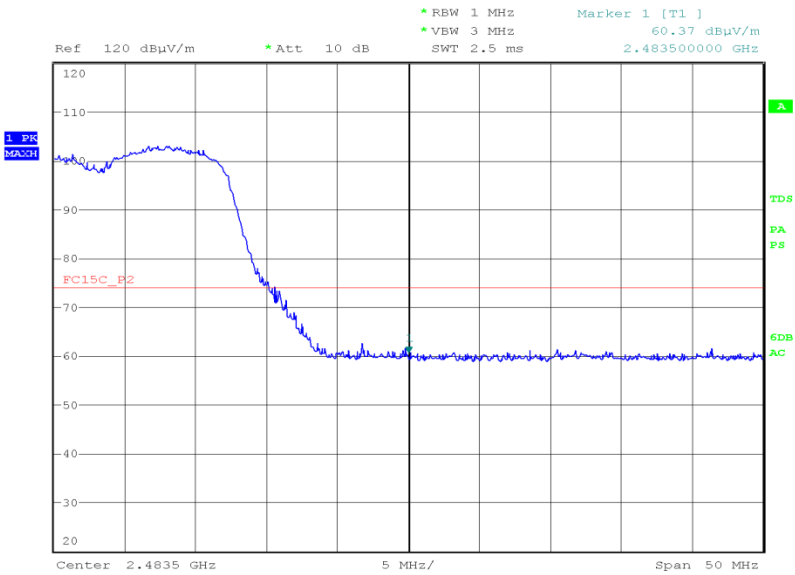
Product Service

802.11n, 2412 MHz, Measured Frequency 2390.00 MHz, 6.5 Mbps, Final Average, Restricted Band Edges Plot



Date: 5.MAY.2015 22:41:29

802.11n, 2462 MHz, Measured Frequency 2483.50 MHz, 6.5 Mbps, Final Peak, Restricted Band Edges Plot

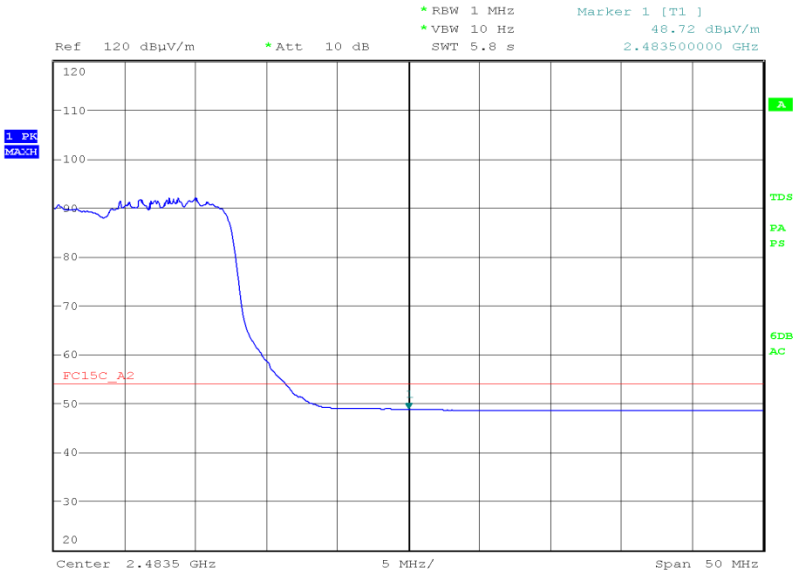


Date: 5.MAY.2015 22:50:44



Product Service

802.11n, 2462 MHz, Measured Frequency 2483.50 MHz, 6.5 Mbps, Final Average, Restricted Band Edges Plot



Date: 5.MAY.2015 22:50:02

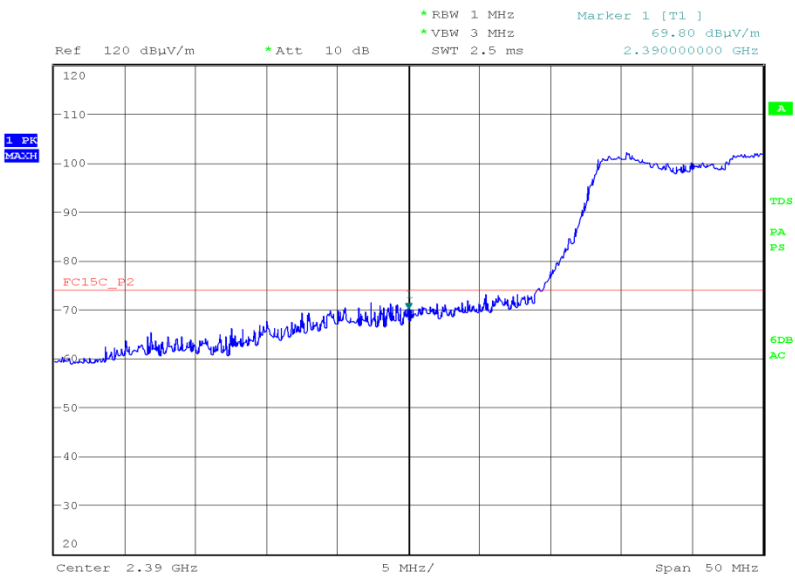


Product Service

802.11n, 65 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBμV/m		dBμV/m	
Final Peak	Final Average	Final Peak	Final Average
69.80	48.99	62.36	48.73

802.11n, 2412 MHz, Measured Frequency 2390.00 MHz, 65 Mbps, Final Peak, Restricted Band Edges Plot

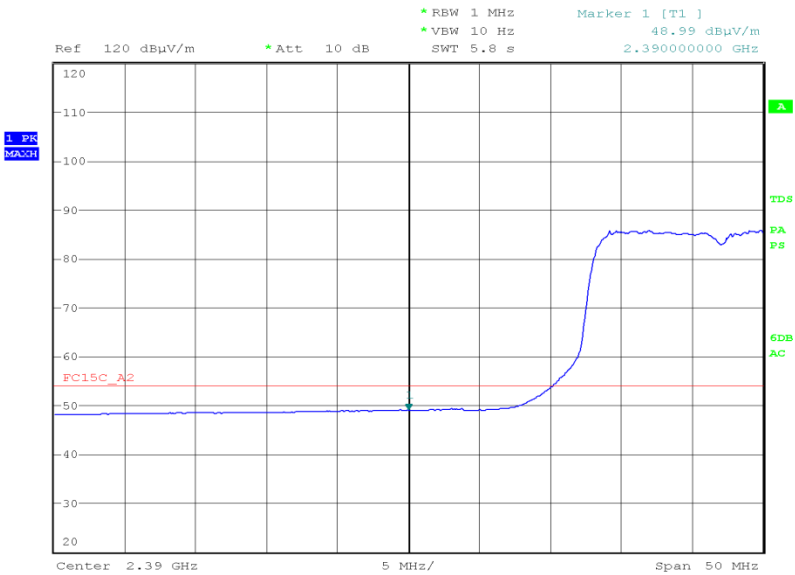


Date: 5.MAY.2015 23:01:24



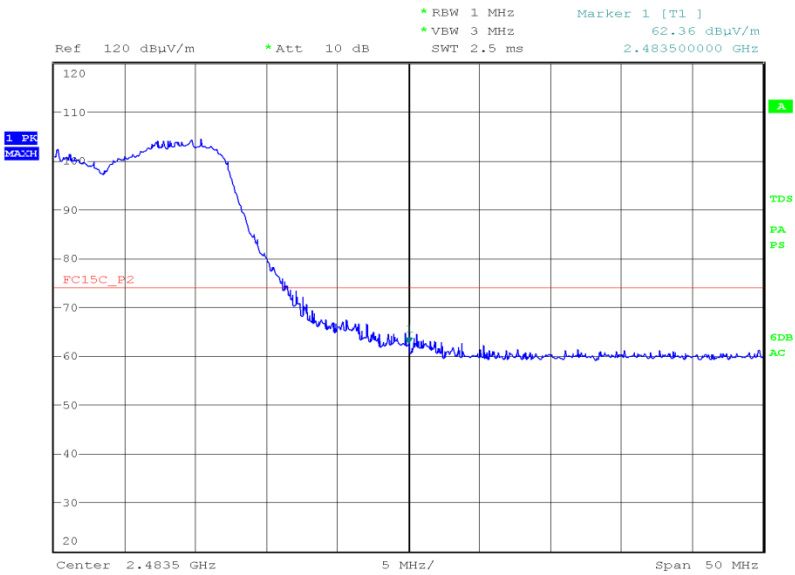
Product Service

802.11n, 2412 MHz, Measured Frequency 2390.00 MHz, 65 Mbps, Final Average, Restricted Band Edges Plot



Date: 5.MAY.2015 23:00:33

802.11n, 2462 MHz, Measured Frequency 2483.50 MHz, 65 Mbps, Final Peak, Restricted Band Edges Plot

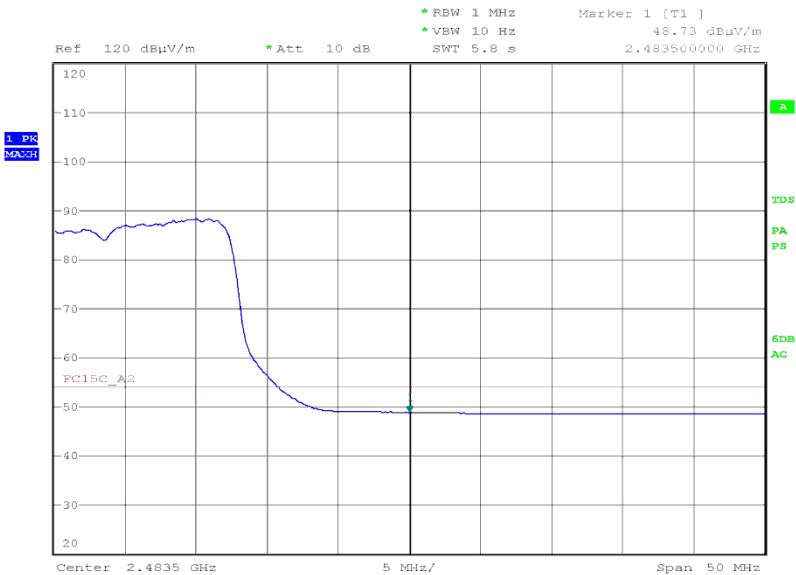


Date: 5.MAY.2015 23:19:05



Product Service

802.11n, 2462 MHz, Measured Frequency 2483.50 MHz, 65 Mbps, Final Average, Restricted Band Edges Plot



Date: 5.MAY.2015 23:20:24

Remark

The test was performed on 6.5 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 65 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.205

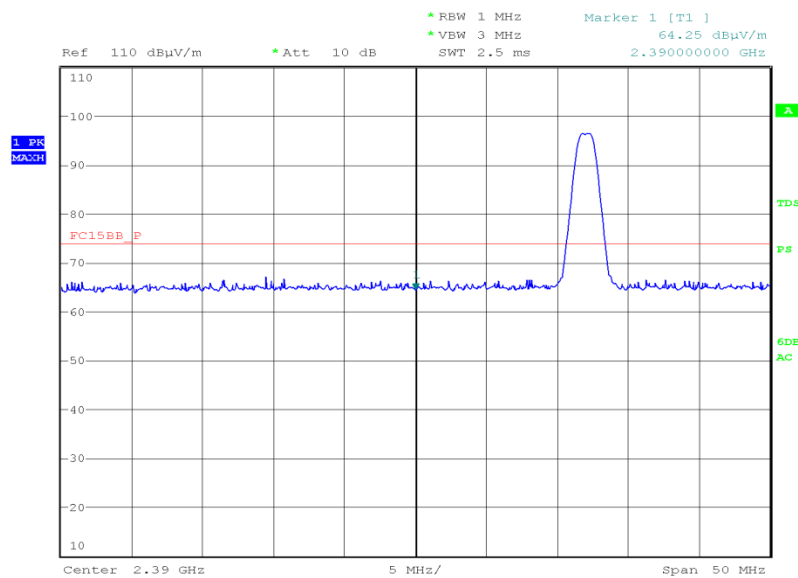
	Peak (dBμV/m)	Average (dBμV/m)
Restricted Bands of Operation	74	54



4.0 V DC Supply

Bluetooth Low Energy, GFSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBμV/m		dBμV/m	
Final Peak	Final Average	Final Peak	Final Average
64.25	48.04	64.62	47.99

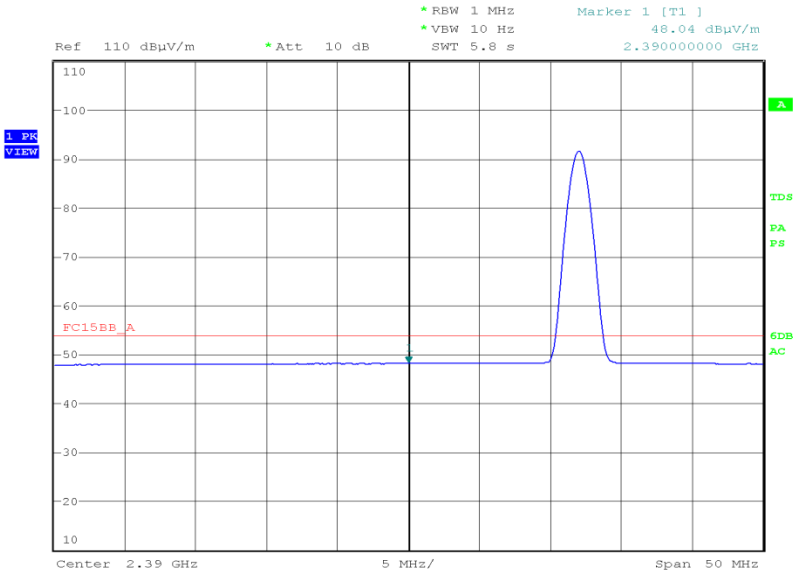
Bluetooth Low Energy, 2402 MHz, Measured Frequency 2390.00 MHz, GFSK, Final Peak, Restricted Band Edges Plot

Date: 18.APR.2015 01:55:38



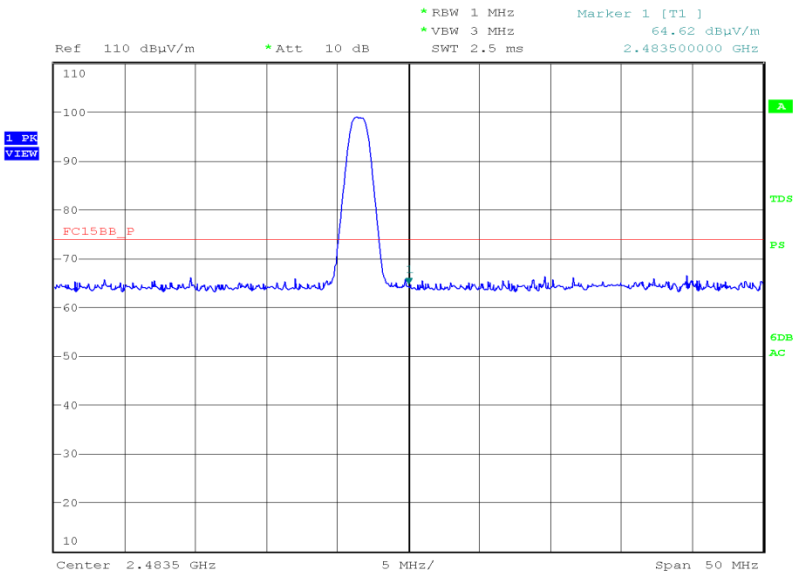
Product Service

Bluetooth Low Energy, 2402 MHz, Measured Frequency 2390.00 MHz, GFSK, Final Average, Restricted Band Edges Plot



Date: 18.APR.2015 01:57:07

Bluetooth Low Energy, 2480 MHz, Measured Frequency 2483.50 MHz, GFSK, Final Peak, Restricted Band Edges Plot

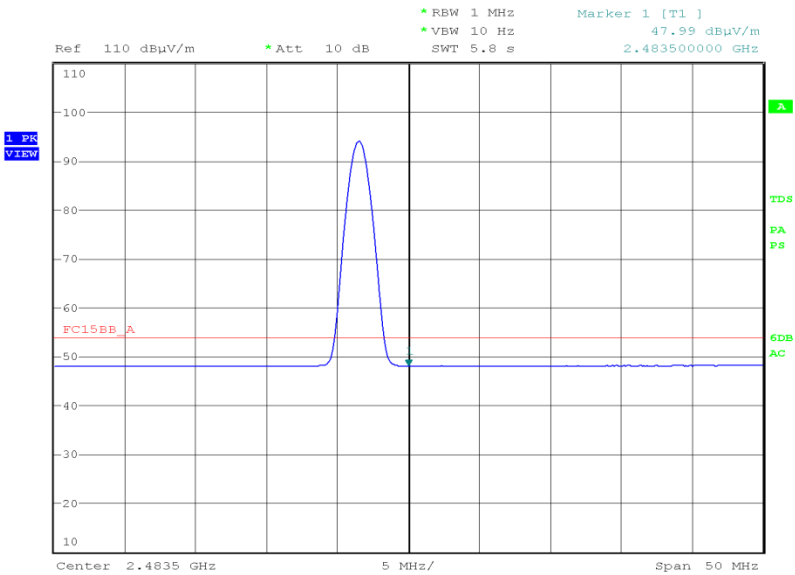


Date: 18.APR.2015 02:00:56



Product Service

Bluetooth Low Energy, 2480 MHz, Measured Frequency 2483.50 MHz, GFSK, Final Average, Restricted Band Edges Plot



Date: 18.APR.2015 01:59:54

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBμV/m)	Average (dBμV/m)
Restricted Bands of Operation	74	54



Product Service

2.6 AUTHORISED BAND EDGES

2.6.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d)

2.6.2 Equipment Under Test and Modification State

SHV32 S/N: IMEI 004401115406791 - Modification State 0

2.6.3 Date of Test

22 April 2015, 27 April 2015 & 5 May 2015

2.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.5 Test Procedure

The test was performed in accordance with KDB 558074 D01 V03r02, clause 11.0.

2.6.6 Environmental Conditions

Ambient Temperature	19.8 - 21.5°C
Relative Humidity	27.0 - 34.0%



Product Service

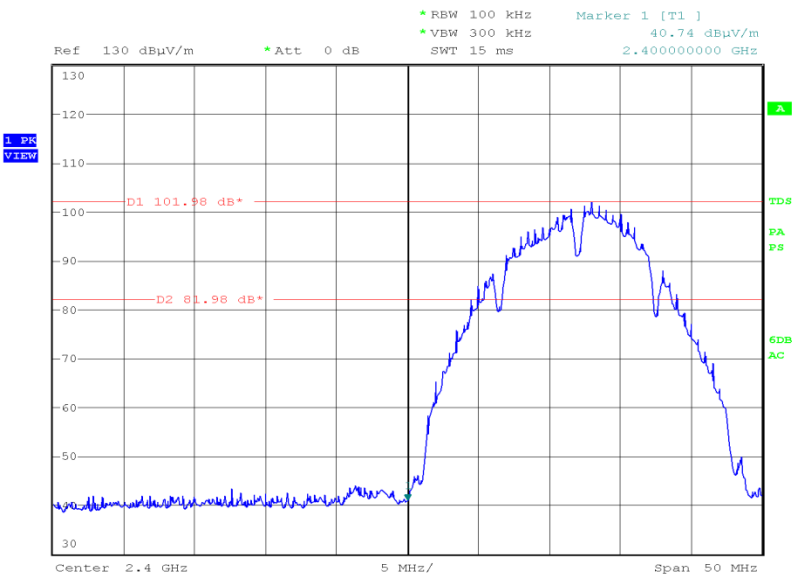
2.6.7 Test Results

4.0 V DC Supply

802.11b, 1 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured 2400.00 MHz	Measured 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
40.74	44.08

802.11b, 2412 MHz, Measured Frequency 2400.00 MHz, 1 Mbps, Final Peak, Authorised Band Edges Plot

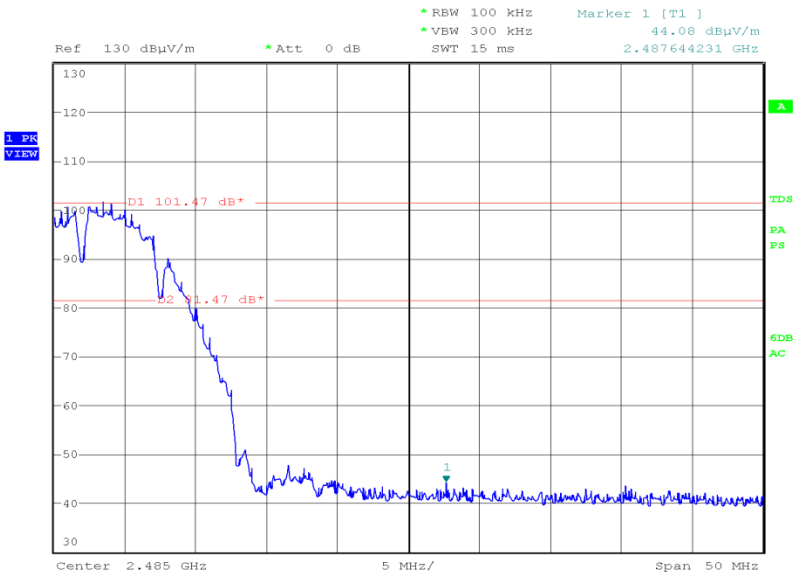


Date: 27.APR.2015 12:13:35



Product Service

802.11b, 2462 MHz, Measured Frequency 2483.50 MHz, 1 Mbps, Final Peak, Authorised Band Edges Plot



Date: 27.APR.2015 13:40:08

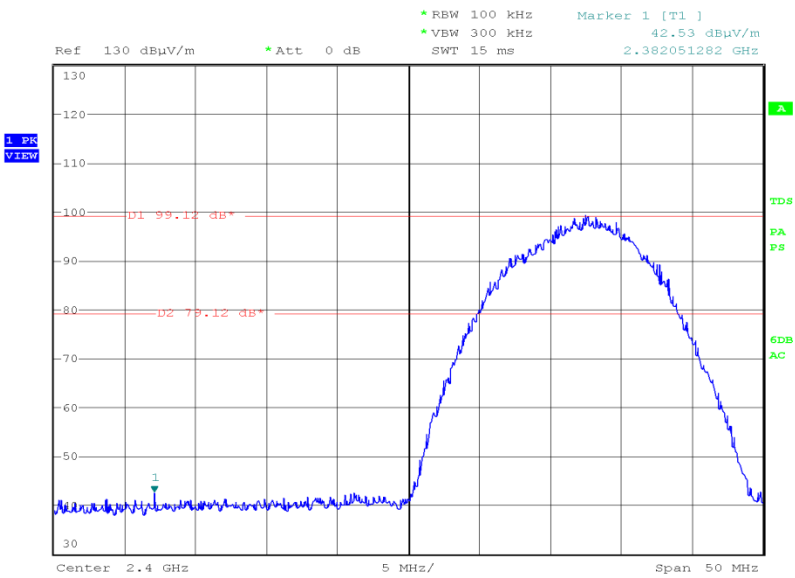


Product Service

802.11b, 11 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
42.53	42.89

802.11b, 2412 MHz, Measured Frequency 2400.00 MHz, 11 Mbps, Final Peak, Authorised Band Edges Plot

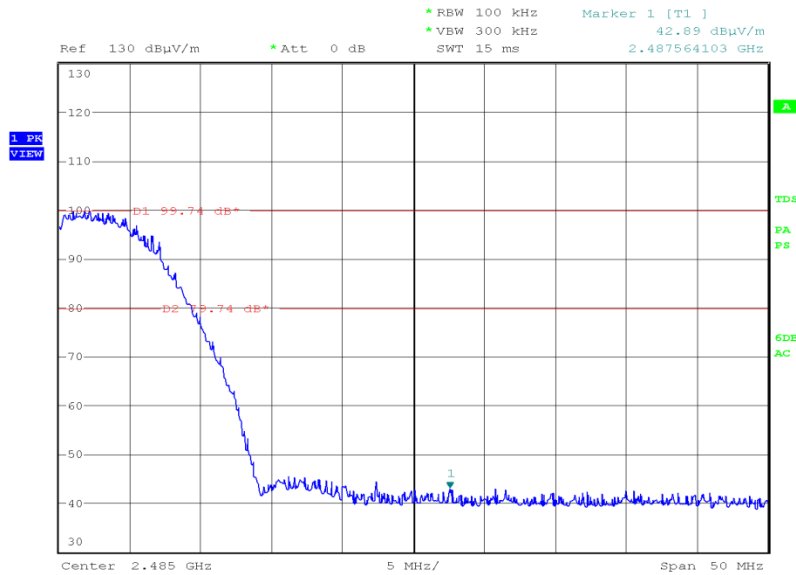


Date: 27.APR.2015 14:25:25



Product Service

802.11b, 2462 MHz, Measured Frequency 2483.50 MHz, 11 Mbps, Final Peak, Authorised Band Edges Plot



Date: 27.APR.2015 14:44:55

Remark

The test was performed on 1 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 11 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.



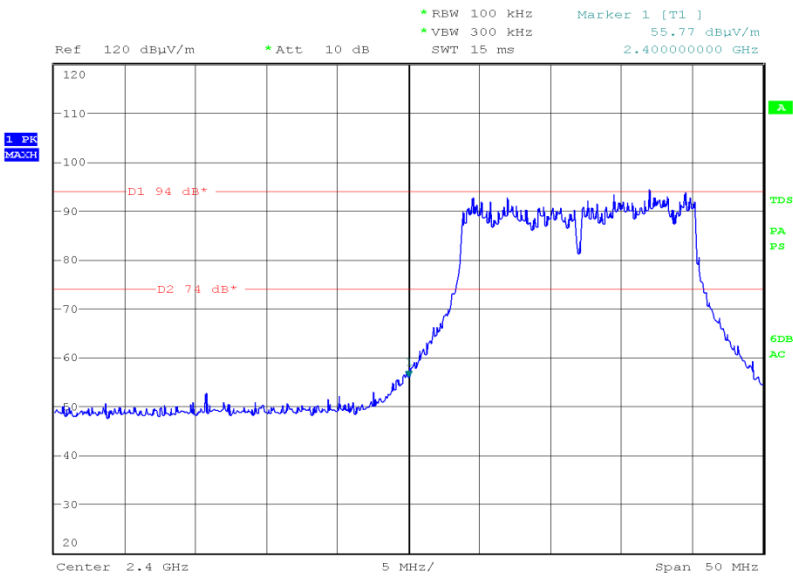
Product Service

4.0 V DC Supply

802.11g, 6 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
55.77	50.91

802.11g, 2412 MHz, Measured Frequency 2400.00 MHz, 6 Mbps, Final Peak, Authorised Band Edges Plot

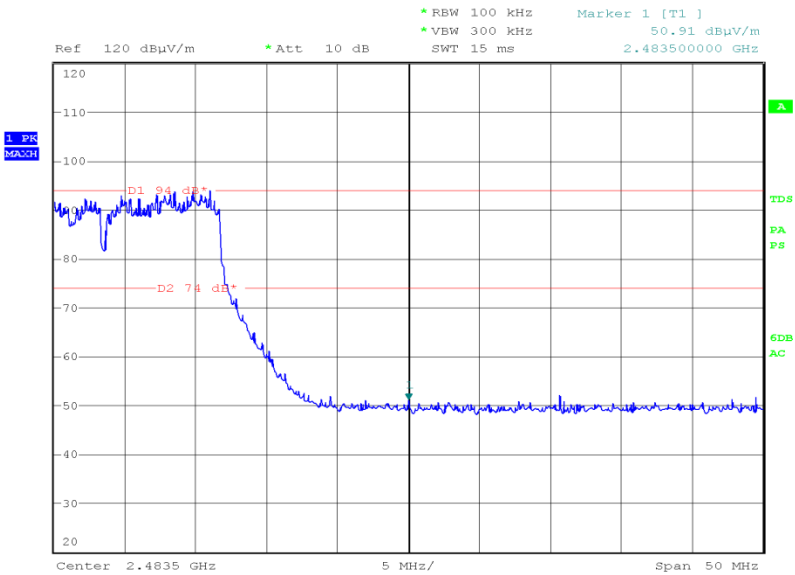


Date: 5.MAY.2015 21:39:29



Product Service

802.11g, 2462 MHz, Measured Frequency 2483.50 MHz, 6 Mbps, Final Peak, Authorised Band Edges Plot



Date: 5.MAY.2015 21:49:51

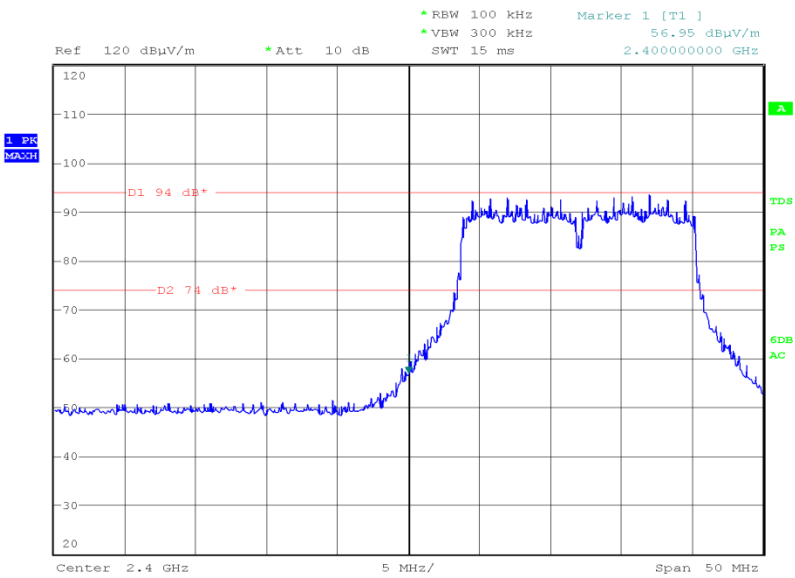


Product Service

802.11g, 54 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
56.95	50.22

802.11g, 2412 MHz, Measured Frequency 2400.00 MHz, 54 Mbps, Final Peak, Authorised Band Edges Plot

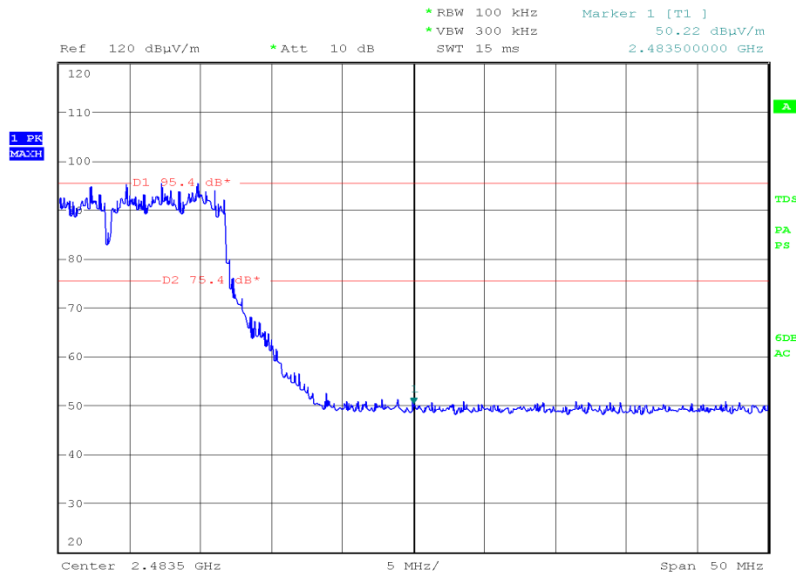


Date: 5.MAY.2015 21:13:18



Product Service

802.11g, 2462 MHz, Measured Frequency 2483.50 MHz, 54 Mbps, Final Peak, Authorised Band Edges Plot



Date: 5.MAY.2015 21:10:20

Remark

The test was performed on 6 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 54 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

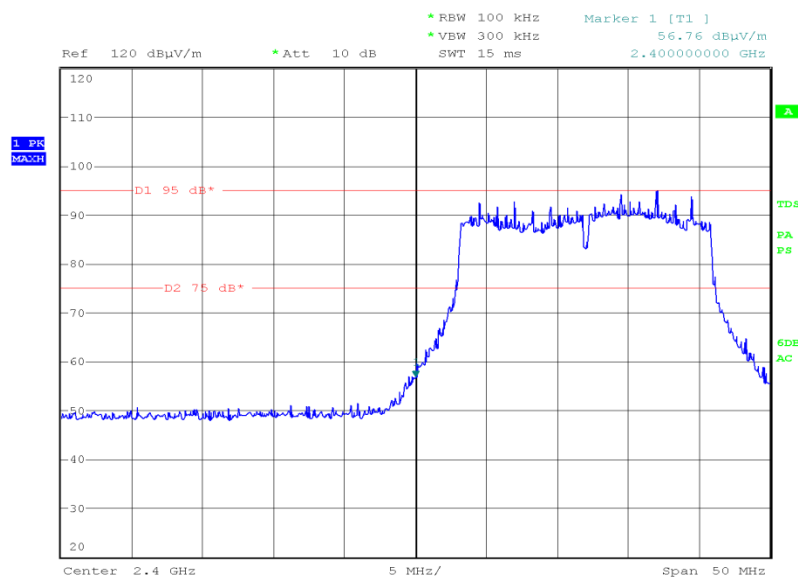


Product Service

4.0 V DC Supply

802.11n, 6.5 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dB μ V/m	dB μ V/m
Final Peak	Final Peak
56.76	49.68

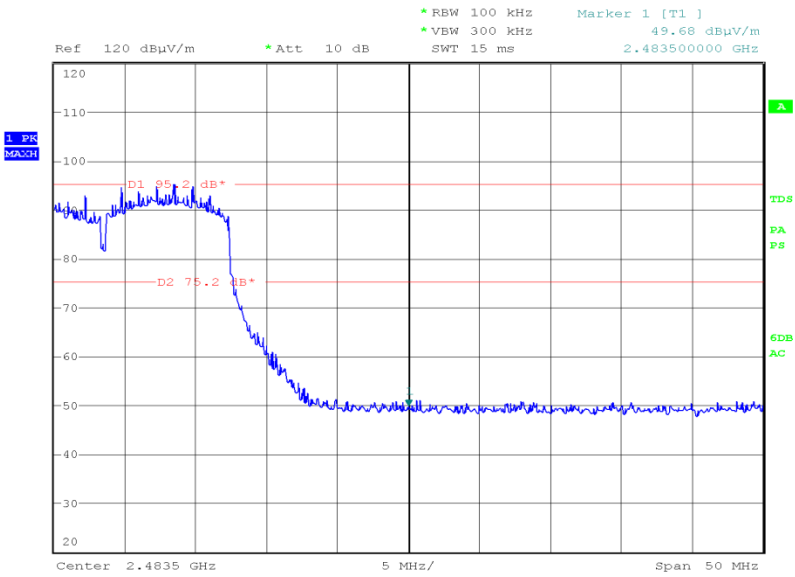
802.11n, 2412 MHz, Measured Frequency 2400.00 MHz, 6.5 Mbps, Final Peak, Authorised Band Edges Plot

Date: 5.MAY.2015 22:43:11



Product Service

802.11n, 2462 MHz, Measured Frequency 2483.50 MHz, 6.5 Mbps, Final Peak, Authorised Band Edges Plot



Date: 5.MAY.2015 22:48:07

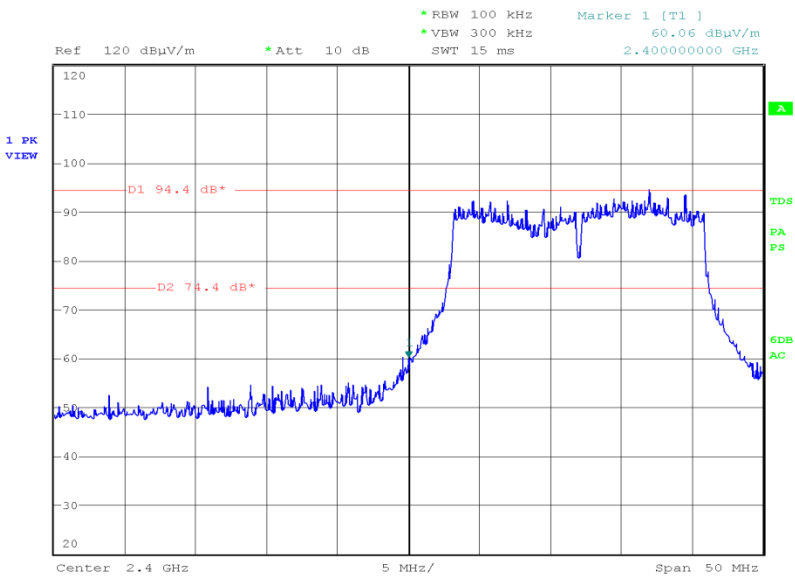


Product Service

802.11n, 65 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
60.06	51.20

802.11n, 2412 MHz, Measured Frequency 2400.00 MHz, 65 Mbps, Final Peak, Authorised Band Edges Plot

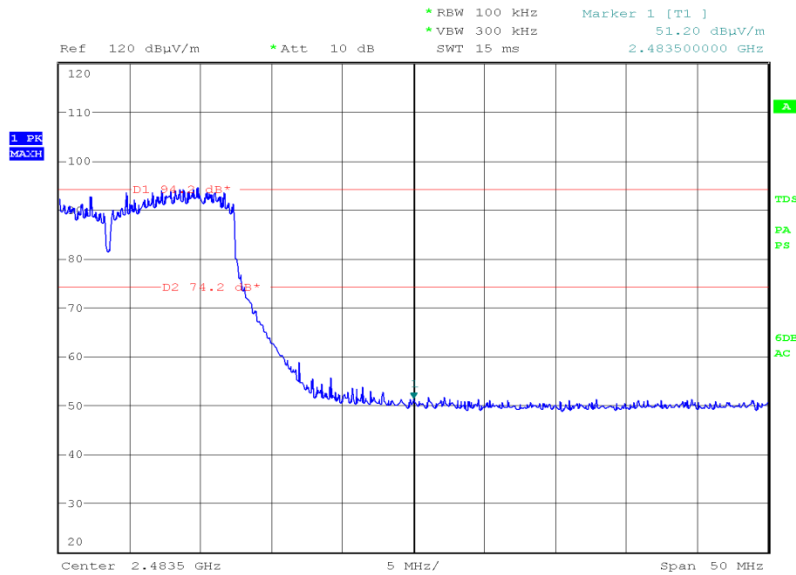


Date: 5.MAY.2015 23:04:15



Product Service

802.11n, 2462 MHz, Measured Frequency 2483.50 MHz, 65 Mbps, Final Peak, Authorised Band Edges Plot



Date: 5.MAY.2015 23:17:59

Remark

The test was performed on 6.5 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 65 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

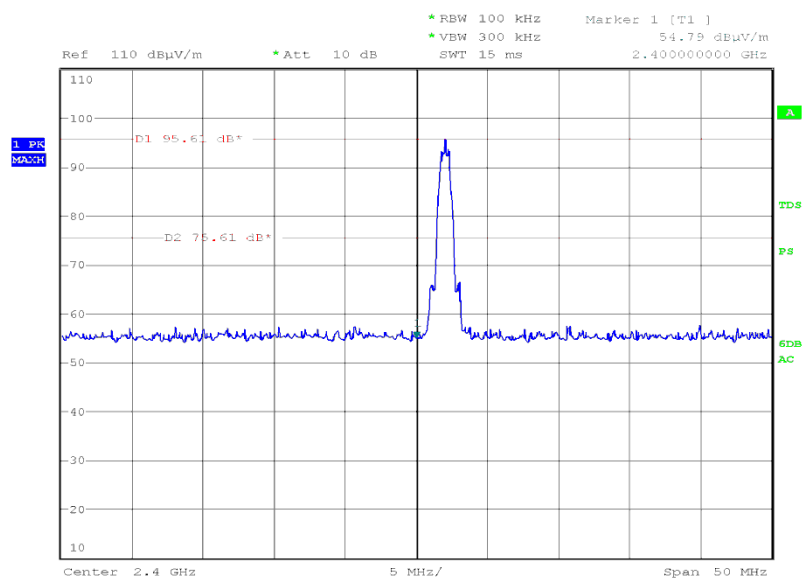


Product Service

4.0 V DC Supply

Bluetooth Low Energy, GFSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.5 MHz
dBμV/m	dBμV/m
Final Peak	Final Peak
54.79	55.48

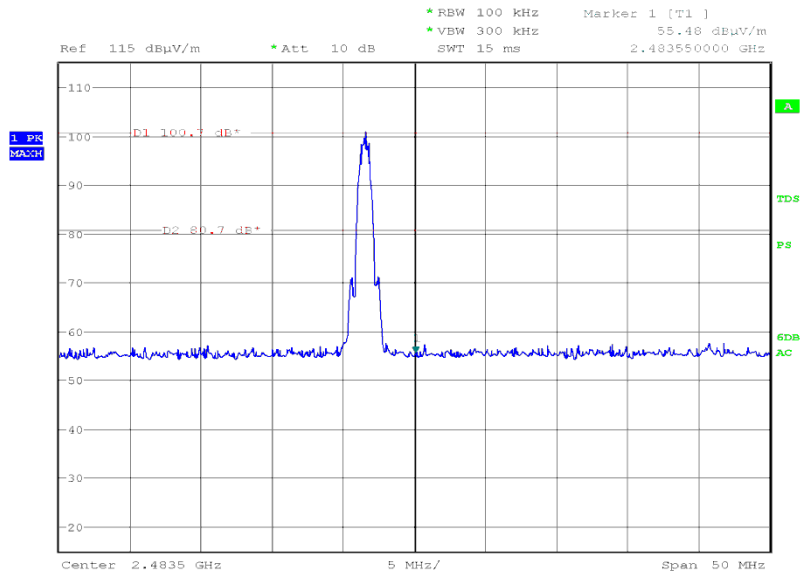
Bluetooth Low Energy, 2402 MHz, Measured Frequency 2400.00 MHz, GFSK, Final Peak, Authorised Band Edges Plot

Date: 18.APR.2015 01:49:45



Product Service

Bluetooth Low Energy, 2480 MHz, Measured Frequency 2483.50 MHz, GFSK, Final Peak, Authorised Band Edges Plot



Date: 18.APR.2015 02:07:20

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.



Product Service

2.7 POWER SPECTRAL DENSITY**2.7.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (e)

2.7.2 Equipment Under Test and Modification State

SHV32 S/N: IMEI 004401115406510 - Modification State 0

SHV32 S/N: IMEI 004401115406536 - Modification State 0

2.7.3 Date of Test

27 April 2015 & 30 April 2015

2.7.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.5 Test Procedure

The test was performed in accordance with KDB 558074 D01 V03r02, clause 10.3 for 802.11b as the duty cycle is greater than 98%. The test was performed in accordance with KDB 558074 D01 V03r02, clause 10.5 for 802.11g and 802.11n and Bluetooth Low Energy.

Remarks

Where KDB 558074 D01 V03r02, clause 10.5 has been used, the duty cycle correction factor has been included as a reference level offset on the spectrum analyser plots.

The EUT supports antenna diversity for 802.11b & 802.11g therefore both antenna ports have been measured individually. 802.11n can also operate simultaneously (MIMO) therefore the procedure described in KDB 662911 V02r01, clause E.2(b) to determine the sum of the spectral maxima across both antenna terminals.

2.7.6 Environmental Conditions

Ambient Temperature 23.5°C

Relative Humidity 22.0 - 27.8%



2.7.7 Test Results

4.0 V DC Supply

802.11b, DSSS, 1 Mbps, Power Spectral Density Results

2412 MHz		
dBm		
Port A	Port B	Total Power
-9.96	-9.09	N/A

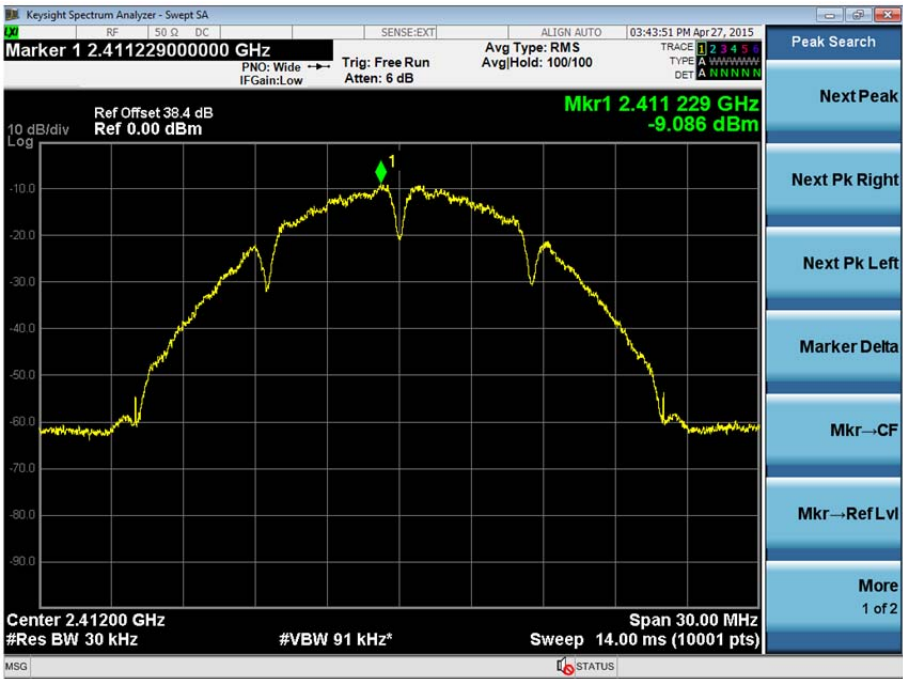
802.11b, 2412 MHz, DSSS, 1 Mbps, Port A, Power Spectral Density Plot





Product Service

802.11b, 2412 MHz, DSSS, 1 Mbps, Port B, Power Spectral Density Plot





Product Service

802.11b, DSSS, 1 Mbps, Power Spectral Density Results

2437 MHz		
dBm		
Port A	Port B	Total Power
-10.46	-9.84	N/A

802.11b, 2437 MHz, DSSS, 1 Mbps, Port A, Power Spectral Density Plot





Product Service

802.11b, 2437 MHz, DSSS, 1 Mbps, Port B, Power Spectral Density Plot





Product Service

802.11b, DSSS, 1 Mbps, Power Spectral Density Results

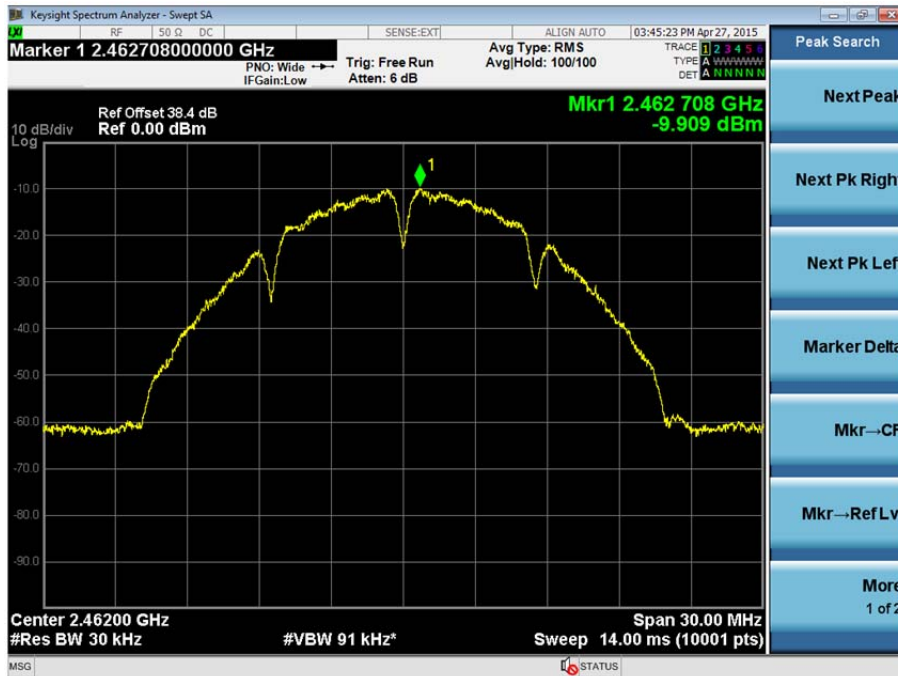
2462 MHz		
dBm		
Port A	Port B	Total Power
-9.79	-9.91	N/A

802.11b, 2462 MHz, DSSS, 1 Mbps, Port A Power Spectral Density Plot





Product Service

802.11b, 2462 MHz, DSSS, 1 Mbps, Port A Power Spectral Density PlotRemarks

Port A = ANT-0 and Port B = ANT-1

FCC 47 CFR Part 15, Limit Clause 15.247 (e)

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.



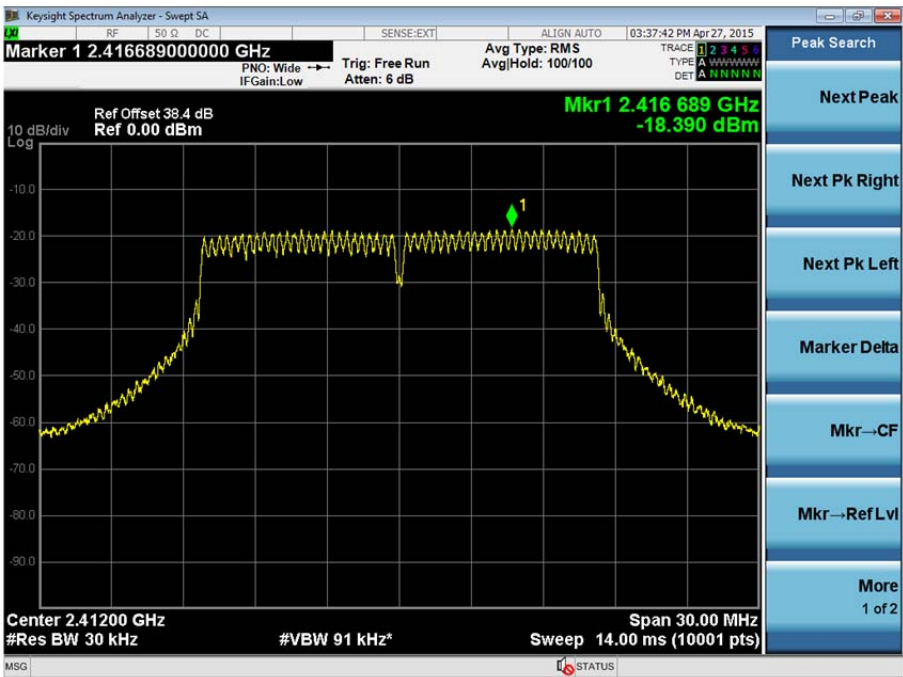
Product Service

4.0 V DC Supply

802.11g, OFDM, 6 Mbps, Power Spectral Density Results

2412 MHz		
dBm		
Port A	Port B	Total Power
-18.39	-16.23	N/A

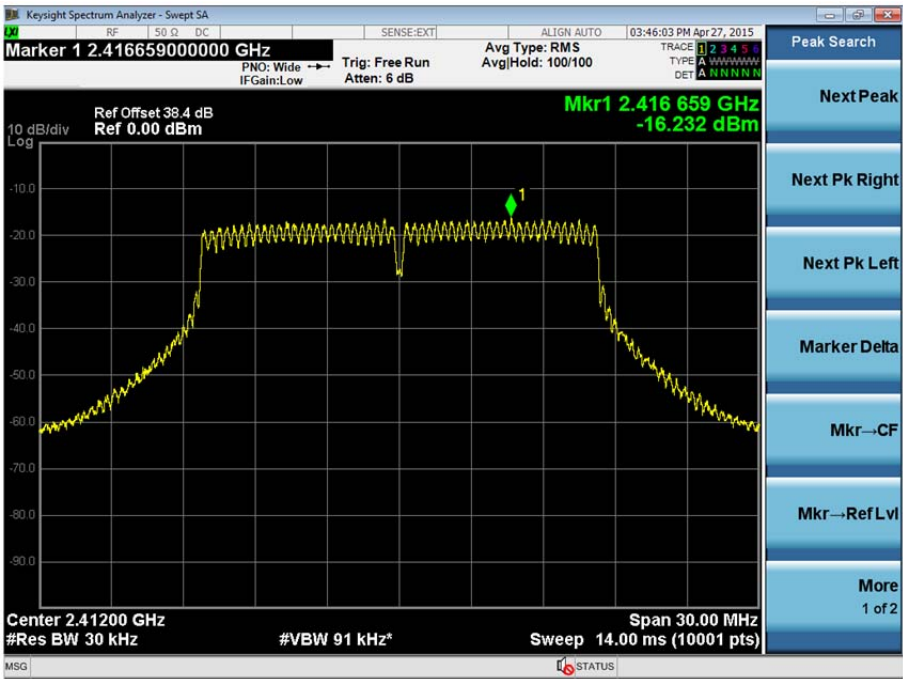
802.11g, 2412 MHz, OFDM, 6 Mbps, Port A, Power Spectral Density Plot





Product Service

802.11g, 2412 MHz, OFDM, 6 Mbps, Port B, Power Spectral Density Plot



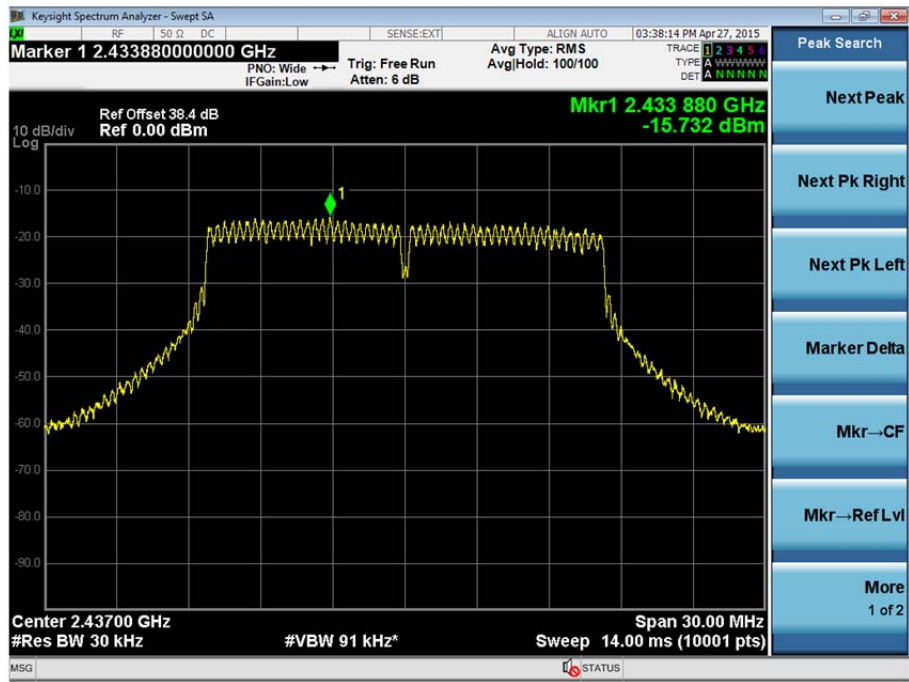


Product Service

802.11g, OFDM, 6 Mbps, Power Spectral Density Results

2437 MHz		
dBm		
Port A	Port B	Total Power
-15.73	-15.37	N/A

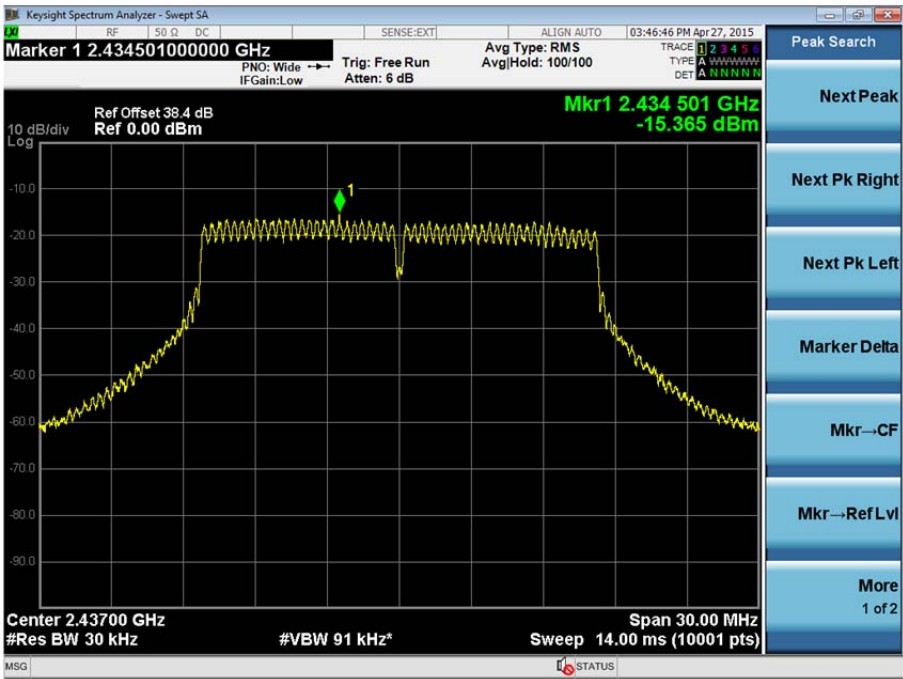
802.11g, 2437 MHz, OFDM, 6 Mbps, Port A, Power Spectral Density Plot





Product Service

802.11g, 2437 MHz, OFDM, 6 Mbps, Port B, Power Spectral Density Plot



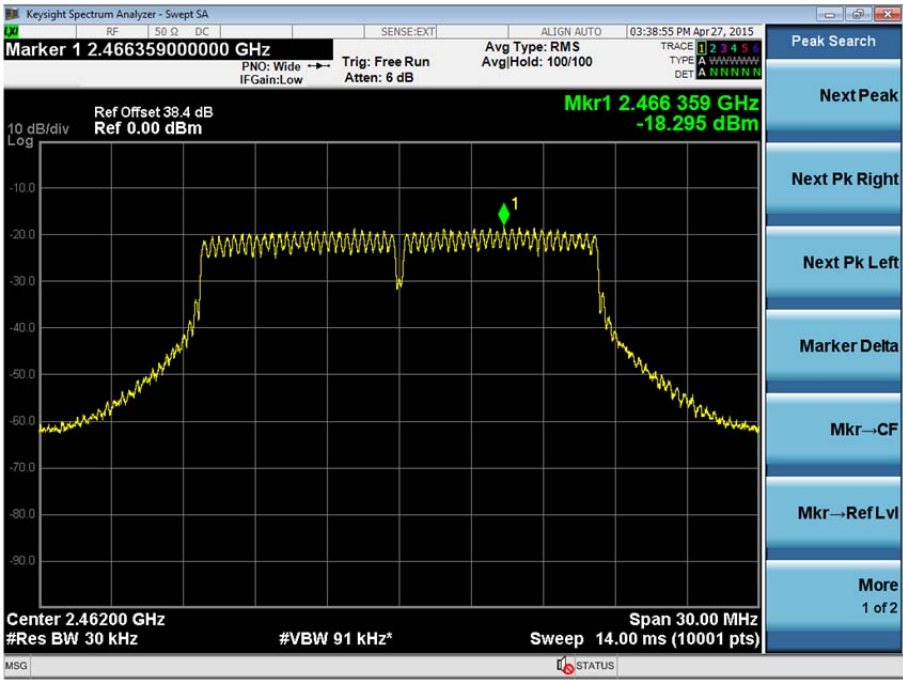


Product Service

802.11g, OFDM, 6 Mbps, Power Spectral Density Results

2462 MHz		
dBm		
Port A	Port B	Total Power
-18.30	-17.57	N/A

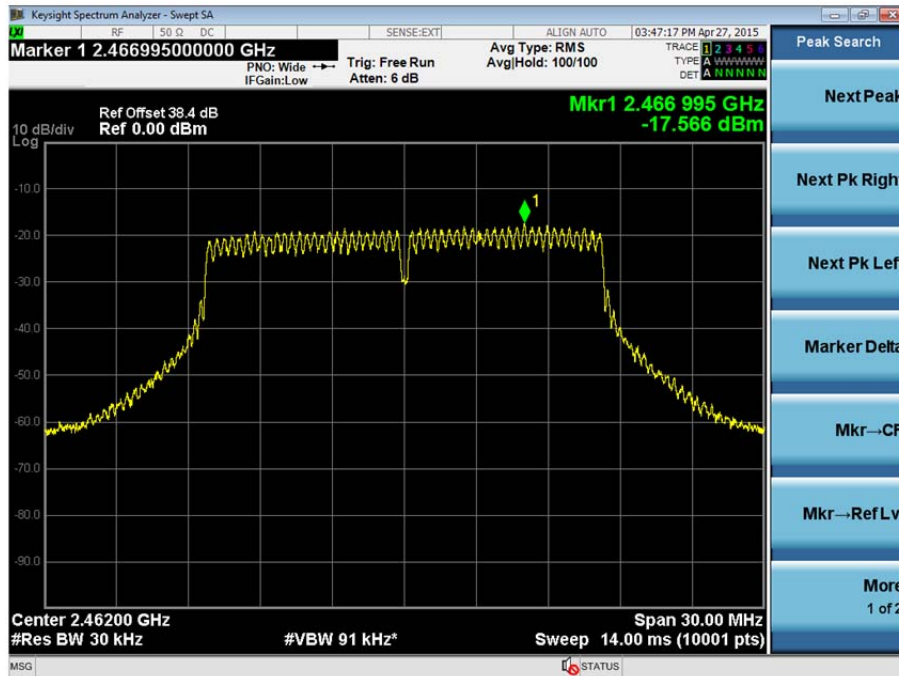
802.11g, 2462 MHz, OFDM, 6 Mbps, Port A Power Spectral Density Plot





Product Service

802.11g, 2462 MHz, OFDM, 6 Mbps, Port A Power Spectral Density Plot



Remarks

Port A = ANT-0 and Port B = ANT-1

FCC 47 CFR Part 15, Limit Clause 15.247 (e)

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.



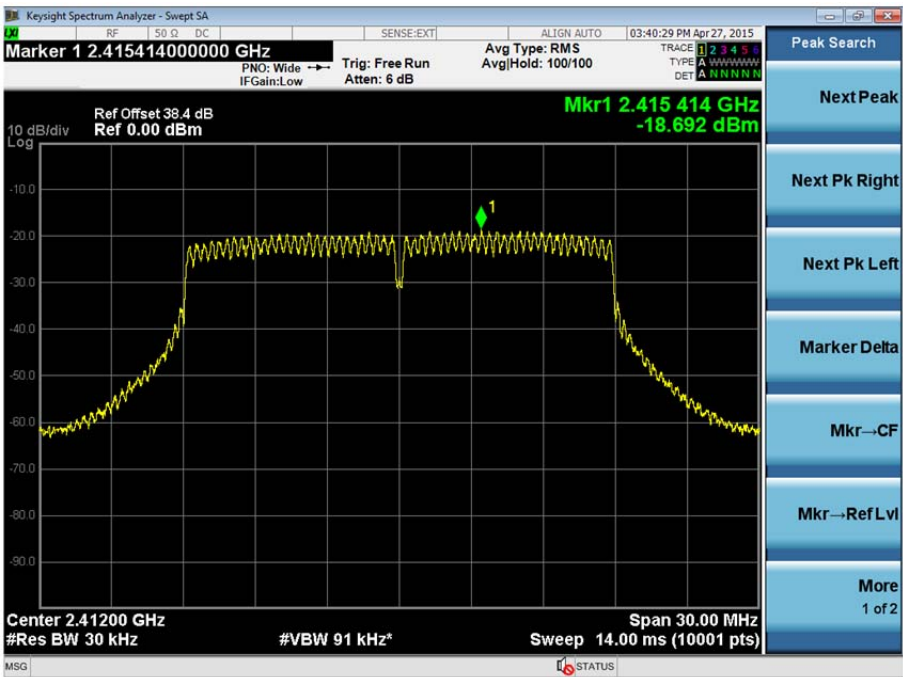
Product Service

4.0 V DC Supply

802.11n, OFDM, 6.5 Mbps, Power Spectral Density Results

2412 MHz		
dBm		
Port A	Port B	Total Power
-18.69	-15.87	-14.04

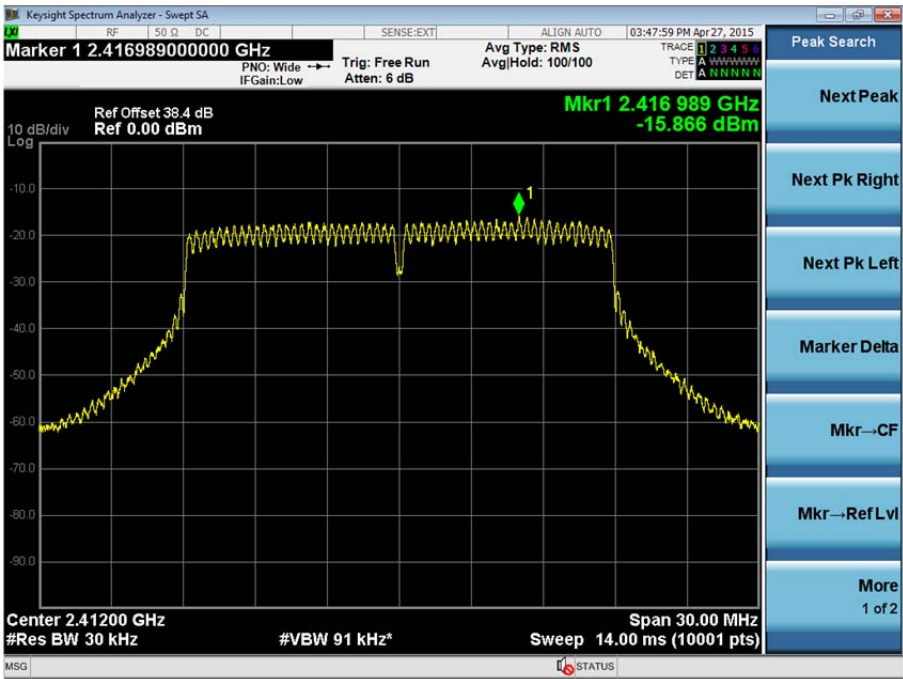
802.11n, 2412 MHz, OFDM, 6.5 Mbps, Port A, Power Spectral Density Plot





Product Service

802.11n, 2412 MHz, OFDM, 6.5 Mbps, Port B, Power Spectral Density Plot



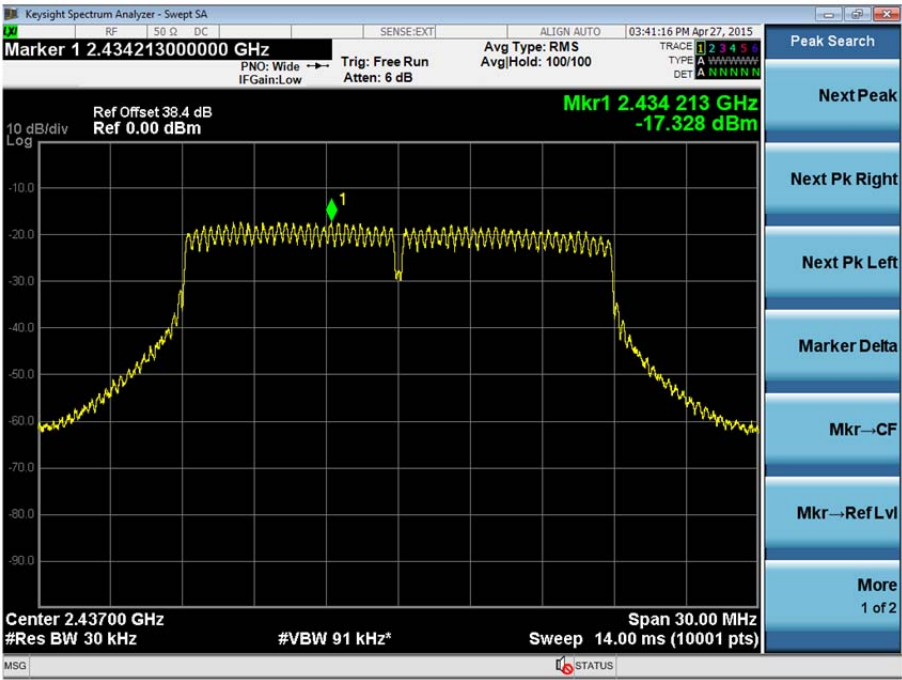


Product Service

802.11n, OFDM, 6.5 Mbps, Power Spectral Density Results

2437 MHz		
dBm		
Port A	Port B	Total Power
-17.33	-16.34	-13.80

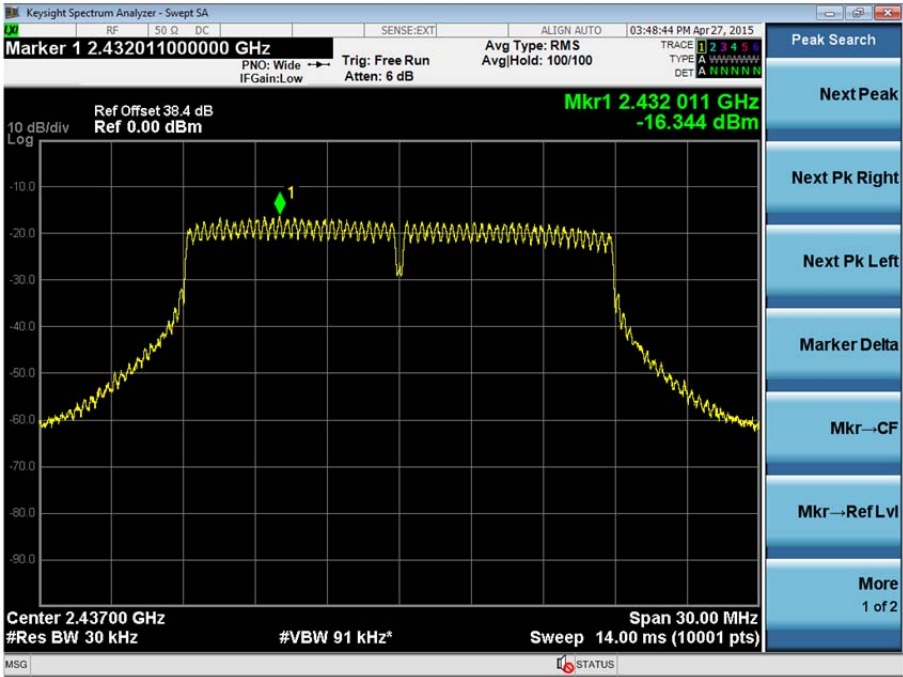
802.11n, 2437 MHz, OFDM, 6.5 Mbps, Port A, Power Spectral Density Plot





Product Service

802.11n, 2437 MHz, OFDM, 6.5 Mbps, Port B, Power Spectral Density Plot



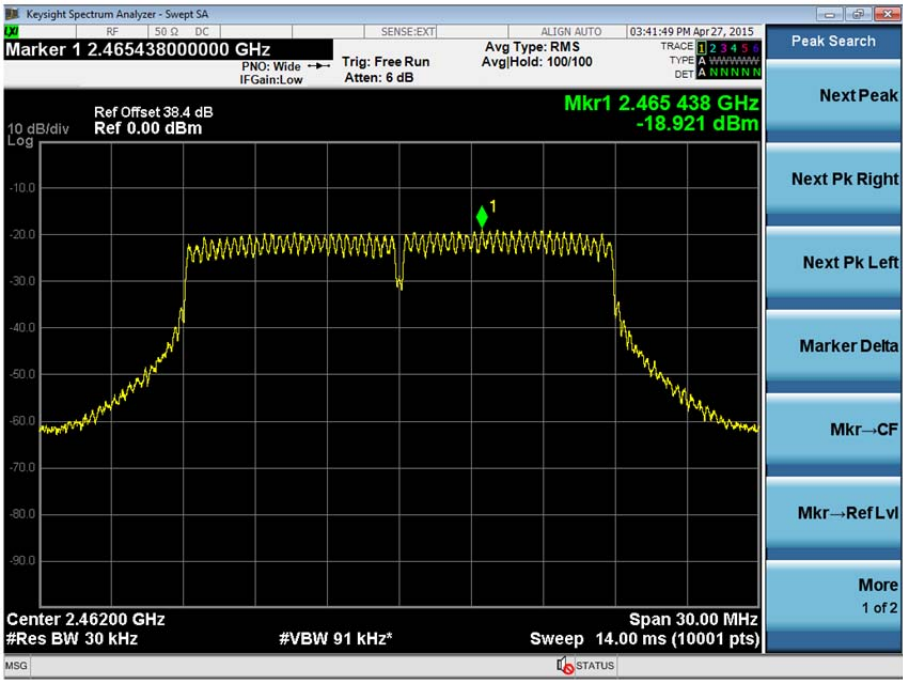


Product Service

802.11n, OFDM, 6.5 Mbps, Power Spectral Density Results

2462 MHz		
dBm		
Port A	Port B	Total Power
-18.92	-18.14	-15.50

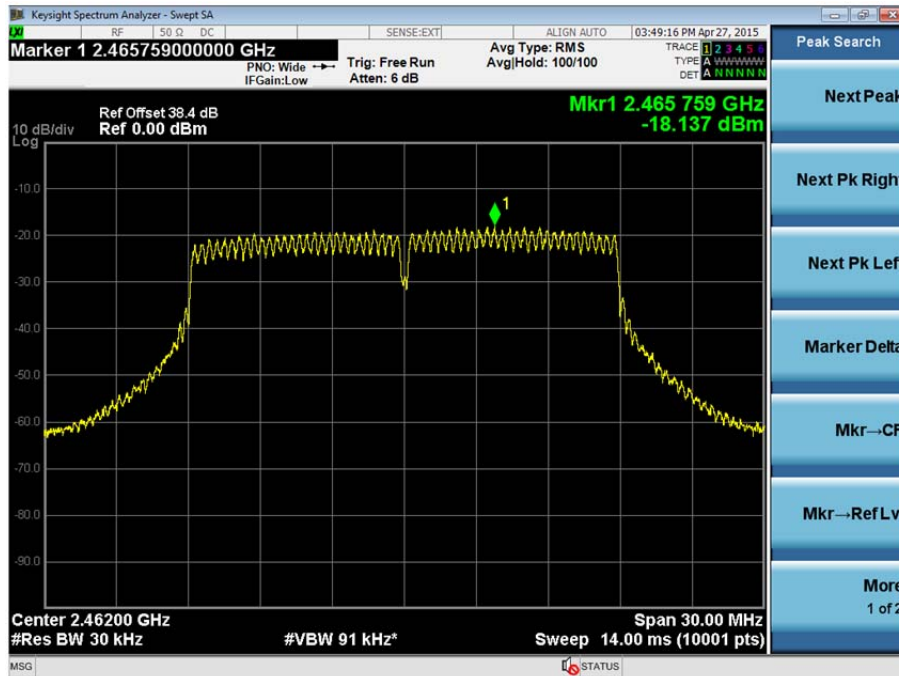
802.11n, 2462 MHz, OFDM, 6.5 Mbps, Port A Power Spectral Density Plot





Product Service

802.11n, 2462 MHz, OFDM, 6.5 Mbps, Port A Power Spectral Density Plot



Remarks

Port A = ANT-0 and Port B = ANT-1

FCC 47 CFR Part 15, Limit Clause 15.247 (e)

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

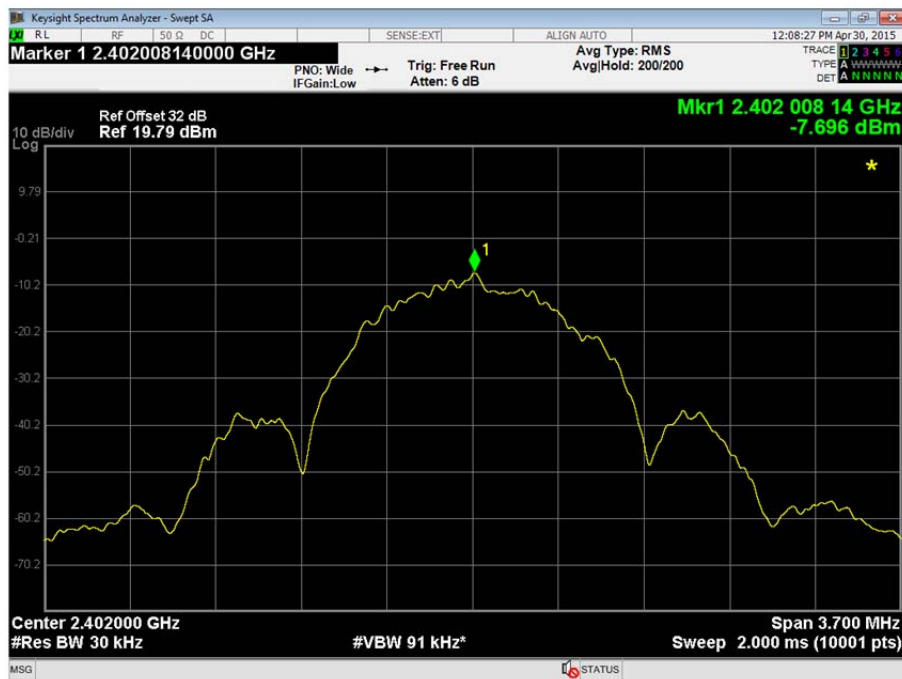


Product Service

4.0 V DC Supply

Bluetooth Low Energy, GFSK, Power Spectral Density Results

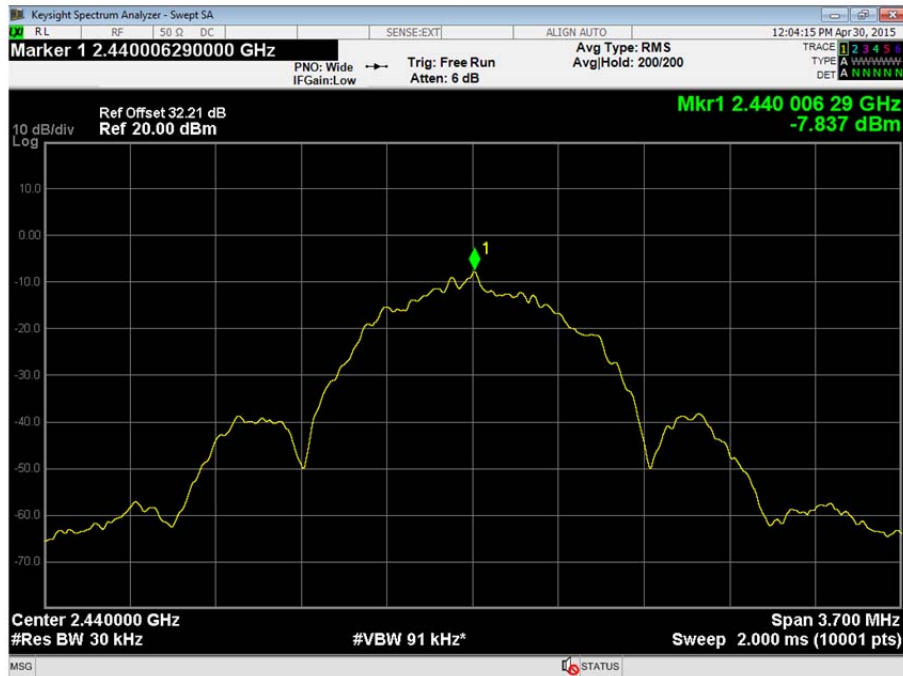
2402 MHz	2441 MHz	2480 MHz
dBm	dBm	dBm
-7.696	-7.837	-7.562

Bluetooth Low Energy, 2402 MHz, GFSK, Power Spectral Density Plot



Product Service

Bluetooth Low Energy, 2441 MHz, GFSK, Power Spectral Density Plot



Bluetooth Low Energy, 2480 MHz, GFSK, Power Spectral Density Plot



Remarks

Port A = ANT-0 and Port B = ANT-1



Product Service

FCC 47 CFR Part 15, Limit Clause 15.247 (e)

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1- AC Line Conducted Emissions					
Transient Limiter	Hewlett Packard	11947A	15	12	16-Dec-2015
LISN (1 Phase)	Chase	MN 2050	336	12	1-Apr-2016
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
Section 2.2- 6dB Bandwidth					
Power Supply Unit	Hewlett Packard	6267B	21	-	TU
Broadband Resistive Power Divider	Weinschel	1506A	601	12	24-Mar-2016
Multimeter	Fluke	79 Series III	611	12	1-Sep-2015
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	30-Jun-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
2 metre SMA Cable	IW Microwave	3PS-1806LC-788-3PS	4525	12	29-Jan-2016
Section 2.3 - Maximum Conducted Output Power					
Power Supply Unit	Hewlett Packard	6253A	441	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	12-Dec-2015
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	6-Aug-2015
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	3-Sep-2015
Combiner/Splitter	Weinschel	1506A	3877	12	24-Mar-2016
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	22-Oct-2015
P-Series Power Meter	Agilent Technologies	N1911A	3980	12	22-Sep-2015
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3982	12	22-Sep-2015
True RMS Multimeter	Fluke	179	4007	12	31-Jul-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	24-Sep-2015
1 metre N-Type Cable	IW Microwave	NPS-1806LC-394-NPS	4504	12	26-Feb-2016
1 metre SMA Cable	IW Microwave	3PS-1806LC-394-3PS	4522	12	29-Jan-2016
Wideband Radio Test Set	Rohde & Schwarz	CMW500	4546	12	23-Jan-2016



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4- Spurious Radiated Emissions					
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	26-Nov-2015
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	1002	12	19-Sep-2015
Pre-Amplifier	Phase One	PS04-0086	1533	12	23-Dec-2015
Pre-Amplifier	Phase One	PS04-0087	1534	12	23-Dec-2015
Screened Room (5)	Rainford	Rainford	1545	24	26-Jun-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	A1	2138	12	3-Dec-2015
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
Comb Generator	Schaffner	RSG1000	3034	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4105	12	7-Nov-2015
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	12	3-Jun-2015
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2015
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4411	12	24-Mar-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	6	29-Jul-2015
0.5m SMA Cable (Rx)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	29-Jul-2015
Section 2.5 - Restricted Band Edges					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-May-2015
Screened Room (5)	Rainford	Rainford	1545	24	26-Jun-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	A1	2138	12	3-Dec-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
Section 2.6- Authorised Band Edges					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Screened Room (5)	Rainford	Rainford	1545	24	26-Jun-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	A1	2138	12	3-Dec-2015
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	6	29-Jul-2015



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.7- Power Spectral Density					
Power Supply Unit	Hewlett Packard	6267B	21	-	TU
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	12	15-Aug-2015
20dB/2W Attenuator	Narda	4772-20	461	-	TU
Broadband Resistive Power Divider	Weinschel	1506A	601	12	24-Mar-2016
Power Supply Unit	Farnell	D302T	609	-	O/P Mon
Multimeter	Fluke	79 Series III	611	12	1-Sep-2015
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	28-Jul-2015
Multimeter	Iso-tech	IDM101	2418	12	26-Sep-2015
Power Supply Unit	Kingshill	36V-5C	2753	-	O/P Mon
Multimeter	Fluke	79 Series II	3057	12	6-Oct-2015
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	6-Aug-2015
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	3-Sep-2015
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	30-Jun-2015
DC - 12.4 GHz 10 dB Attenuator 1 W	Suhner	6810.17.A	3964	12	22-Oct-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	24-Sep-2015
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	28-Jul-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
1 metre N-Type Cable	IW Microwave	NPS-1806LC-394-NPS	4505	12	26-Feb-2016
1 metre SMA Cable	IW Microwave	3PS-1806LC-394-3PS	4521	12	27-Jan-2016
2 metre SMA Cable	IW Microwave	3PS-1806LC-788-3PS	4525	12	29-Jan-2016

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	MU
6 dB Bandwidth	± 212.114 kHz
AC Line Conducted Emissions	± 3.2 dB
Maximum Conducted Output Power	± 0.70 dB
Power Spectral Density	± 3.0 dB
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB
Authorised Band Edges	Conducted: ± 3.08 dB Radiated: 30 MHz to 1 GHz: ± 5.1 dB Radiated: 1 GHz to 40 GHz: ± 6.3 dB
Restricted Band Edges	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB



Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA
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TÜV SÜD Product Service

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