

#### AT4 wireless, S.A.

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### **ASSESSMENT REPORT**

Report No.:	11918BBE 002
Approved by	++)+0KKE.002
(name / position & signature):	
Issue date:	2015-01-21
Identification of item evaluated:	INTEL DUAL BAND WIRELESS – AC 3165
Trademark	Not Supplied
Model and/or type reference	3165NGW
Serial number	n/a
Features	802.11 a/b/g/n/ac Wireless LAN + BT 4.0
Other identifications	FCC: PD93165NG (factory install sku)
	FCC: PD93165NGU (user install allowed)
	IC: 1000M-3165NG
Description:	2x2 PCIe M.2 adapter card
	INTEL MOBILE COMMUNICATIONS
Address:	100 Center Point Circle, Suite 200
	Columbia, South Carolina 29210 USA
CIF/NIF/Passport:	Not Supplied
Contact person	Steve Hackett
Telephone	803-216-2344
e-mail:	
Manufacturer	INTEL MOBILE COMMUNICATIONS
Address:	
CIF/NIF/Passport:	
Telephone / Fax	
Assessment requested	

#### Assessment requested

Evaluation of the possibility of extending the test results of Intel module 7265NGW contained in the test report 41273RRF.002, dated 2014/03/12 to Intel module 3165NGW based on the similarity letter provided by INTEL (See Annex A).

Test Report 41273RRF.002 reference standards are:

USA FCC Part 15.247 10-1-12 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.

USA FCC Part 15.209 10-1-12 Edition: Radiated emission limits; general requirements.

CANADA RSS-210 Issue 8 (December 2010).

CANADA RSS-Gen Issue 3 (December 2010).



Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v03r01 dated 09/04/2013.

Guidance for Emission Testing of Transmitters with Multiple Outputs in the Same Band 662911 D01 Multiple Transmitter Output v02r01 dated 10/31/2013.

NOTE: The specifications in the new standard RSS-Gen Issue 4 (November 2014) applicable to the module are the same as the ones specified in the former version RSS-Gen Issue 3 (December 2010).

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#### **Competences and guarantees**

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#### **Documents used**

Documents undergoing used for the evaluation has been provided by: The applicant.

<u>Title</u>	Description	<b>Reception date</b>
41273RRF.002	Test Report. reference standard USA FCC Part 15.247, 15.209; CANADA RSS-210, RSS-Gen	2014/12/15
	Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. Licence-Exempt Radio Apparatus (All Frequency Bands): Category I Equipment. General Requirements and Information for the Certification of Radio Apparatus.	
Similarity Declaration letter	Similarity declaration between Intel® Dual Band Wireless-AC 7265, model 7265NGW and Intel® Dual Band Wireless-AC 3165, model 3165NGW	2014/12/15

#### Summary

Considering the differences between Intel® Dual Band Wireless-AC 7265, model 7265NGW and Intel® Dual Band Wireless-AC 3165, model 3165NGW declared by the client (see Annex A), we conclude that the following test results from 41273RRF.002 test report are fully applicable to model 3165NGW:

Section 15.247 Subclause (a) (2) / RSS-210 A8.2. (a)6 dB BandwidthSection 15.247 Subclause (b) / RSS-210 A8.4. (4)Maximum output power and antenna gainSection 15.247 Subclause (d) / RSS-210 A8.5..Emission limitations conducted (Transmitter)Section 15.247 Subclause (d) / RSS-210 A8.5..Band-edge emissions compliance (Transmitter)Section 15.247 Subclause (e) / RSS-210 A8.2. (b)Power spectral density

Section 15.247 Subclause (d) / RSS-210 A8.5.. Emission limitations radiated (Transmitter)

For WiFi 2.4 GHz (802.11b/g/n20/n40) and WiFi 5.725 – 5.825 GHz (802.11a/n20/n40/ac80), the results are applicable to only one chain (Chain A or Chain B). The MIMO (Chain A+B) results are not applicable since according to the applicant's declaration MIMO data rates are disabled in model 3165NGW.

See Annex B for test results extracted from 41273RRF.002 test report.

NOTE: The results presented in this Assessment Report apply only to the particular item under evaluation established in page 1 of this document.



# **ANNEX A: Similarity Declaration letter**





#### Similarity Declaration between:

Intel® Dual Band Wireless-AC 7265, model 7265NGW

And

#### Intel® Dual Band Wireless-AC 3165, model 3165NGW.

#### To whom it may concern,

This statement letter is to declare that the two following products are exactly the same board, meaning same HW, same schematic, same layout, same BoM:

- Intel® Dual Band Wireless-AC 7265, model 7265NGW
- Intel® Dual Band Wireless-AC 3165, model 3165NGW

The only difference is disabling by EEprom all MIMO data rate for Intel® Dual Band Wireless-AC 3165, model 3165NGW (Please refer to below table for detailed data rate listing comparison)

Model 7265NGW supports 2 spatial streams and Model 3165NGW supports only 1 spatial stream.

	te	EE 802.	11n/a	Mo	dulatio	on Co	ding S	chem	es
HT	Modulation and	Notulation and Spatial			De	sta Rua	e (MBPS	٥	WHT MCS
Index	Colding Rate	Streams	20 MH	a Chan	40 344	z Chan	NO MH	z Chan	Index
			No ISSI	SGI	No.561	SGL	Nc 551	561	
0	WSK 1/2		6.5	7.1	13.5	15.0	29.3	10.0	0
1	QP561/2		13.0	34.4	27.0	30.0	58.5	85.0	1
2	QPSE 3/4	1	19.5	21.7	405-	150	87.8	5 1A	2
3	IS-CAN L/Z		26.0	28.9	540	80.0	112.0	110 0	3
4	IS-CAM 3/4	1	19.0	43.3	510	50.0	179.5	TO:TO	- 4
. 1	M-QAN 2/1	1 1 1 L	520	57.1	108.0	110 0	234.5	360.0	6
. 6	04-QAN 3/4	1 I.	56.5	65.0	1215	836 0	3633	201-6	. 1
7	61 QAN 5/6	1	650	72.2	135.0	150.0	292.5	15.0	7
	190-42AM 1/4	1	YAC	66.7	162.0	110.0	358.0	390.0	
	256-QAM 5/6	1	m/y	1/4	180.0	200.0	390.9	453.5	9
	BRSH 2/2		13.0	14.4	27.0	30.0	36.5	150	0
9.	QPSK 1/2	1	26.0	28.9	54.0	60.0	ine.e	180.0	1
10	QPSk 3/4	1	390	48.8	810	50.0	175.5	1950	2
11.	IS-GAM 1/2	1	52.0	67.8	ICE O	120 0	234.0	260.0	1
12	15-GAM 3/4	1	76.0	86.7	162.0	160.0	351.C	290.0	
15	64-QAN 2/3	1	104.0	1:56	216-0	240.0	States Including and	5210	5
24	04-QAM 3/4		117.0	1.00.0	1430	200.0	506.0	50014	ó
15	64-QAN 5/6		130.0	144.4	770.0	1000	545 C	6-10 G	1
1000	150 QAM 2/4		186.0	1241	140	IFC O	X02:0	710.0	
-	236-QAM 2/6		n/r	10/1	:e0-0	4(0.0	780.0	606-7	

Authorized signature by: Wilfrid LEFEVRE Regulatory Program Manager

Intel Mobile Communications SAS Le Navigetor B 505 route des Lucioles CS 70293 05905 Sophia Antipolis cedex France Tel. +33 (0)4 93 00 14 00 Fax +33 (0)4 93 00 14 01

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# ANNEX B: Test results that apply to model 3165NGW



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## Test results "WiFi 2.4 GHz (802.11b/g/n20/n40)"



#### **TEST CONDITIONS**

Power supply (V):

V<sub>nominal</sub> = 3.3 Vdc Type of power supply = DC voltage from HMC/NGFC test board. Type of antenna = External attachable PIFA antenna. Declared Gain for antenna = 3.24 dBi

#### **TEST FREQUENCIES:**

For WiFi 802.11b/g/n20:

Lowest channel (1): 2412 MHz

Middle channel (6): 2437 MHz

Highest channel (11): 2462 MHz

Additional channels (12) and (13): 2467 MHz and 2472 MHz, respectively, for information purposes only.

For WiFi 802.11n40:

Lowest channel (3): 2422 MHz

Middle channel (6): 2437 MHz

Highest channel (9): 2452 MHz

Additional channels (10F) and (11F): 2457 MHz and 2462 MHz, respectively, for information purposes only.

The test set-up was made in accordance to the general provisions of FCC DTS Measurement KDB 558074 D01 DTS Meas Guidance v03r01.

For 802.11b/g modes the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually but not simultaneously.

For 802.11n modes 802.11n20 (20 MHz channel bandwidth) and 802.11n40 (40MHz channel bandwidth) the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually and simultaneously.

For radio testing purposes the card was installed in a test fixture. The test fixture is connected to a laptop computer and dc power supplied. The laptop computer was used to configure the EUT to continuously transmit at a specified output power with different modes and modulation schemes.

WiFi 2.4 GHz: 802.11b, 802.11g, 802.11n20 (20 MHz channel bandwidth) and 802.11n40 (40MHz channel bandwidth).

The field strength at the band edges was evaluated for each mode and on each chain individually on the lowest and highest channels at the rated power for the channel under test. Where the power at the edge channels was lower than the power at the center channels additional measurements were made at the adjacent channels. Single transmission at each chain and simultaneous transmission at both chains modes were fully evaluated.

The PC was using the Intel test utility DRTU Version 1.7.3-859.

**Report No.**: 44948RRE.002



During transmitter test the EUT was being controlled by the Intel DRTU tool to operate in a continuous transmit mode on the test channels as required and in each of the different modulation modes.

The data rates of 1Mb/s for 802.11b, 6Mb/s for 802.11g, HT0 (SISO)/HT8 (MIMO) for 802.11n20 and n40 were selected based on preliminary testing that identified those rates corresponding to the worst cases for output power and band edge levels at restricted bands.

The conducted RF output power at each chain was adjusted according to the client's supplied Target values (see following table) using the Intel DRTU tool and measuring the power by using a calibrated average power meter. Measured values for adjustment were within -0.2 dB/+0.3 dB respect to the Target values.

Mode	BW (MHz)	Channel / Freq.	SISO Chain A (dBm)	SISO Chain B (dBm)	MIMO at both ports A and B (dBm)
802.11b	20	1 / 2412	16,5	16,5	n/a
		6 / 2437	17,5	17,5	n/a
		11 / 2462	16,5	16,5	n/a
		12 / 2467	12	13.5	n/a
		13 / 2472	11	12.5	n/a
802.11g	20	1 / 2412	14	14,5	n/a
		2 / 2417	15,5	15,5	n/a
		6 / 2437	17,5	17,5	n/a
		10 / 2457	15,5	15,5	n/a
		11 / 2462	12,5	12,5	n/a
		12 / 2467	10	9	n/a
		13 / 2472	0	0	n/a
802.11n	20	1 / 2412	14	14,5	12,00
		2 / 2417	15,5	15,5	13,50
		6 / 2437	17,5	17,5	17,50
		10 / 2457	15,5	15,5	13,50
		11 / 2462	12,5	12,5	12,00
		12 / 2467	10	9	7,00
		13 / 2472	0	0	0,00
802.11n*	40	3 / 2422	13,5	13,5	9,50
		4 / 2427	14,5	14,5	11,50
		5 / 2432	15,5	15,5	12,00
		6 / 2437	17,5	17,5	13,50
		7 / 2442	14,5	13,5	11,50
		8 / 2447	13,5	12,5	10,50
		9 / 2452	12,5	11,5	9,50
		10F / 2457	10	9	7,00
		11F / 2462	0	0	0,00

#### RF conducted output power target values

#### CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is connected to the spectrum analyser using a calibrated low loss RF cable. The reading in the spectrum analyser is compensated with the cable loss at each measurement frequency.



All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-1000 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 1m for the frequency range 1 GHz-25 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

For radiated emissions in the range 1 GHz-25 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive (wooden) platform one meter above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.



#### **Occupied Bandwidth**

#### **RESULTS**

#### 1. WiFi 2.4GHz 802.11 b mode

Occupied Bandwidth (see next plots).

	Lowest frequency 2412 MHz		Middle frequency		Highest frequency	
			2437 MHz		2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
99% bandwidth (MHz)	12.75	12.54	12.72	12.81	12.66	12.75
Measurement uncertainty (kHz)	±21.7					

#### 2. WiFi 2.4GHz 802.11 g mode

Occupied Bandwidth (see next plots).

	Lowest frequency 2412 MHz		Middle frequency 2437 MHz		Highest frequency	
					2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
99% bandwidth (MHz)	16.53	16.83	16.98	17.22	16.80	16.44
Measurement uncertainty (kHz)	±21.7					

#### <u>3. WiFi 2.4GHz 802.11 n20 mode</u>

Occupied Bandwidth (see next plots).

	Lowest frequency 2412 MHz		Middle frequency 2437 MHz		Highest frequency	
					2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
99% bandwidth (MHz)	17.37	17.91	18.03	18.36	17.91	17.91
Measurement uncertainty (kHz)	±21.7					



#### 4. WiFi 2.4GHz 802.11 n40 mode

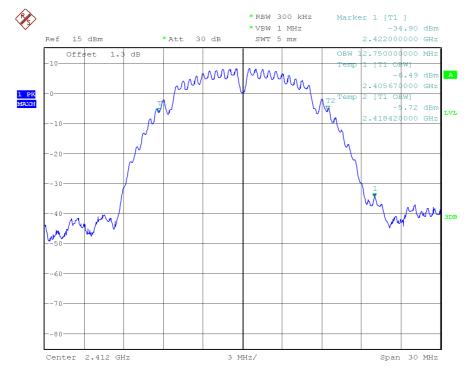
Occupied Bandwidth (see next plots).

	Lowest frequency 2422 MHz		Middle frequency 2437 MHz		Highest frequency	
					2452 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
99% bandwidth (MHz)	36.20	36.22	36.35	36.35	36.20	36.15
Measurement uncertainty (kHz)	±21.7					

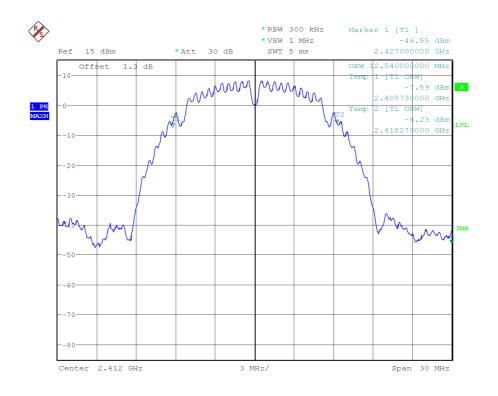


#### 1. WiFi 2.4GHz 802.11 b mode

Lowest Channel: 2412 MHz. Chain A



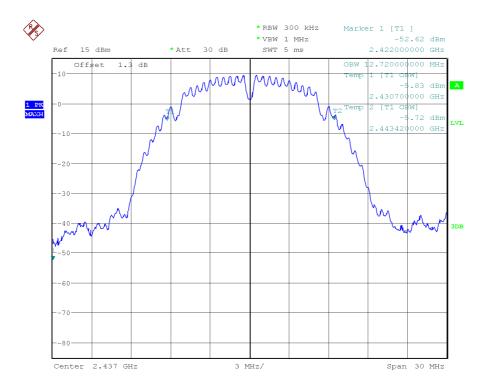
Lowest Channel: 2412 MHz. Chain B.



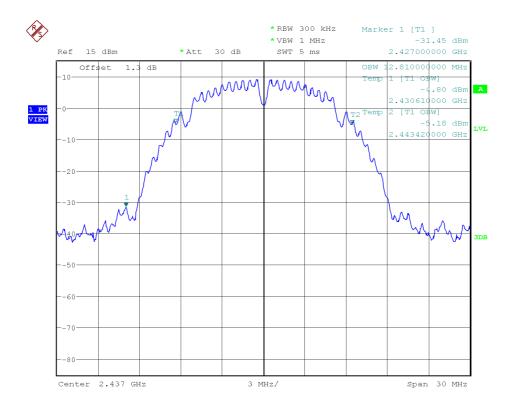
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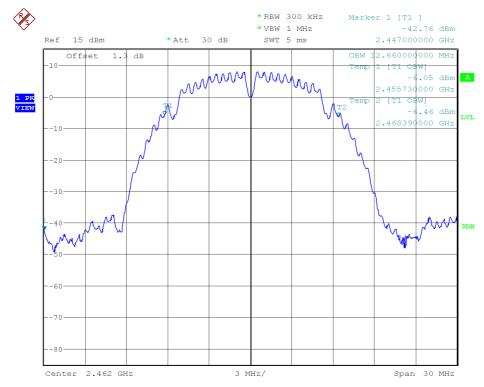
#### Middle Channel: 2437 MHz. Chain A



Middle Channel: 2437 MHz. Chain B

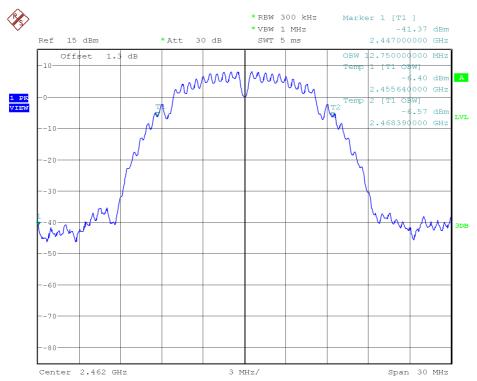






Highest Channel: 2462 MHz. Chain A.

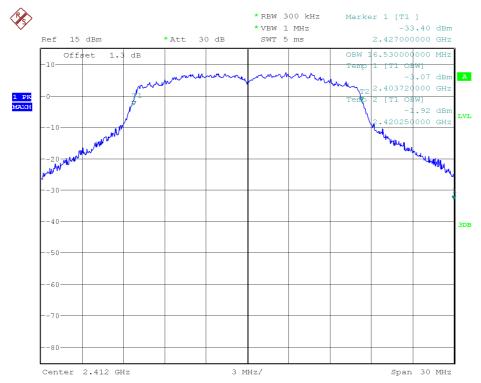




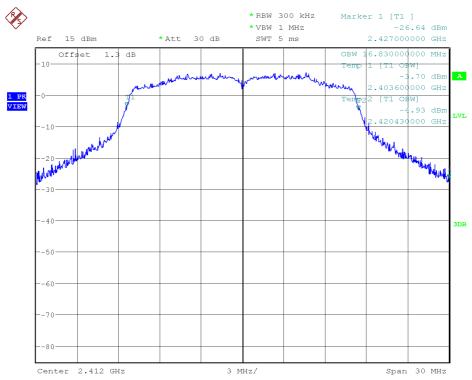


#### 2. WiFi 2.4GHz 802.11 g mode

Lowest Channel: 2412 MHz. Chain A

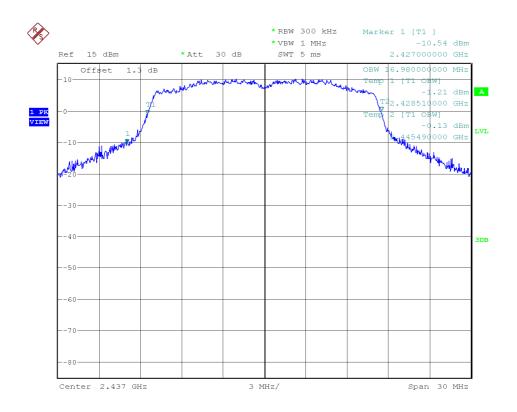




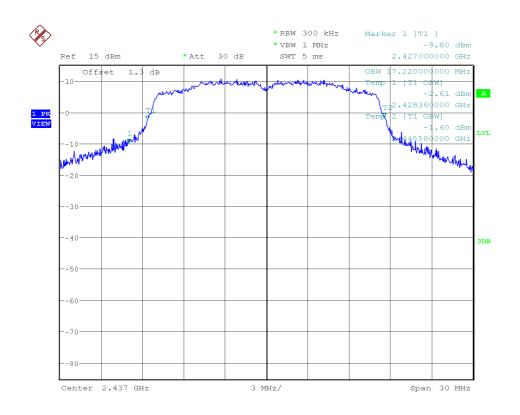




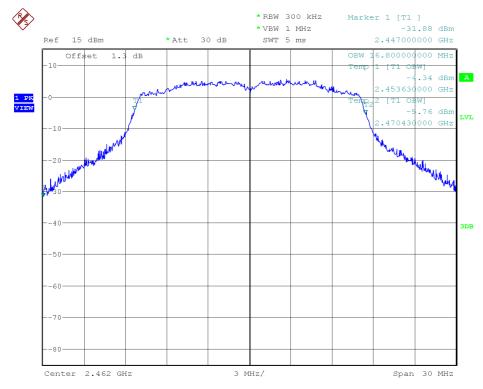
#### Middle Channel: 2437 MHz. Chain A



Middle Channel: 2437 MHz. Chain B

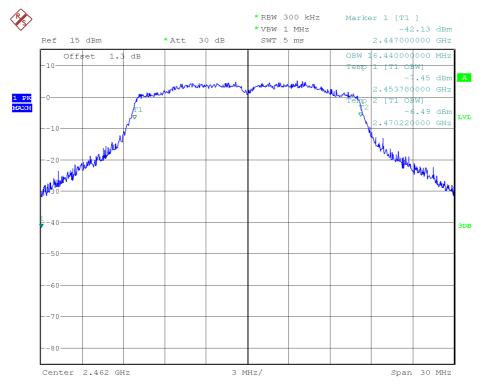






Highest Channel: 2462 MHz. Chain A.

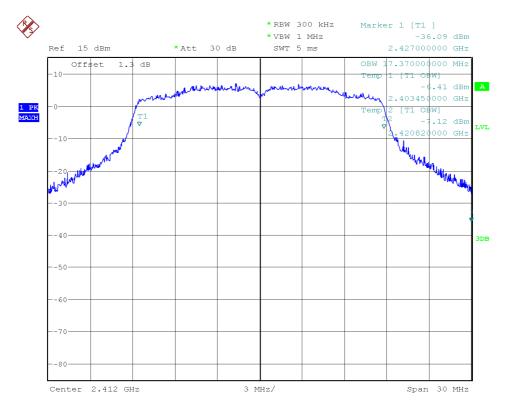
#### Highest Channel: 2462 MHz. Chain B.



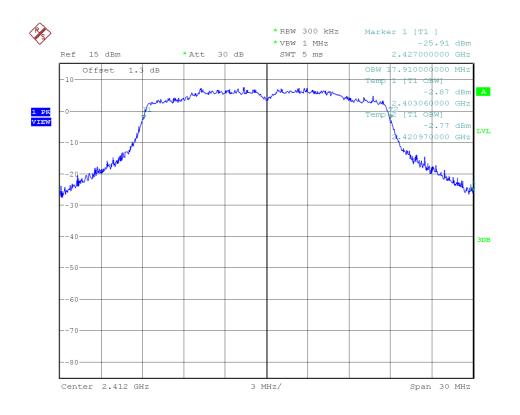


#### <u>3. WiFi 2.4GHz 802.11 n20 mode</u>

Lowest Channel: 2412 MHz. Chain A

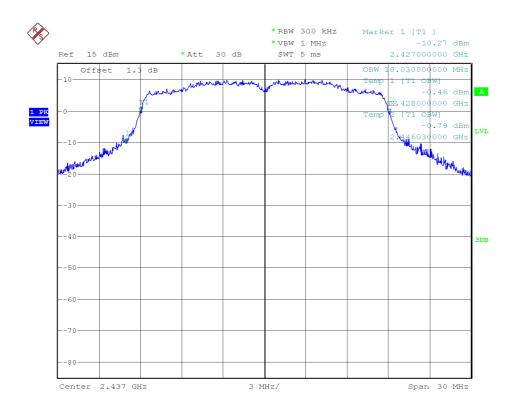


Lowest Channel: 2412 MHz. Chain B

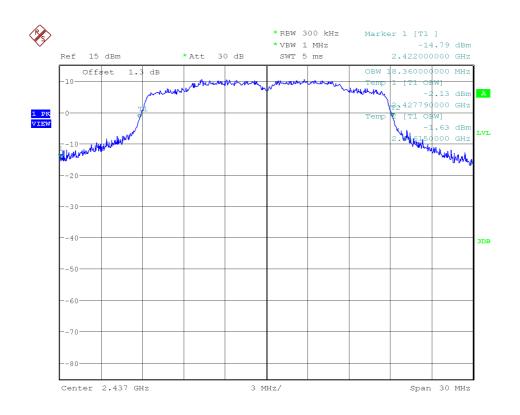




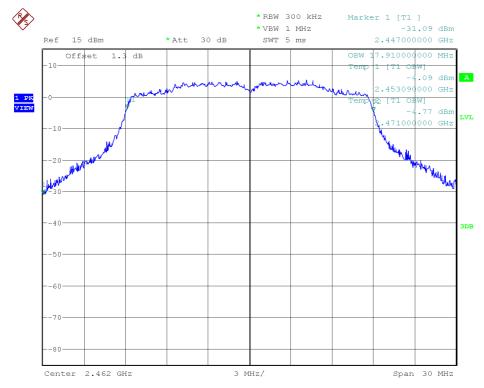
#### Middle Channel: 2437 MHz. Chain A



Middle Channel: 2437 MHz. Chain B

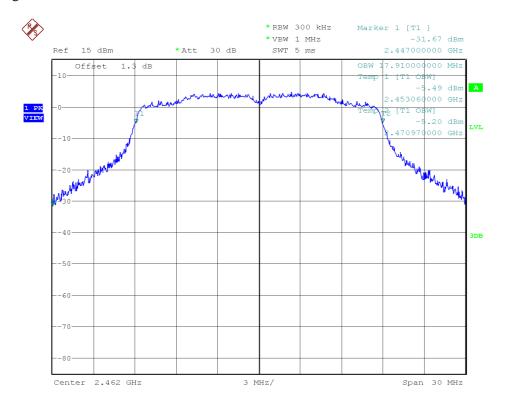






Highest Channel: 2462 MHz. Chain A.

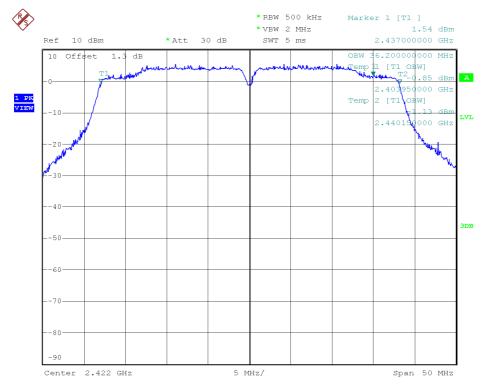
Highest Channel: 2462 MHz. Chain B.



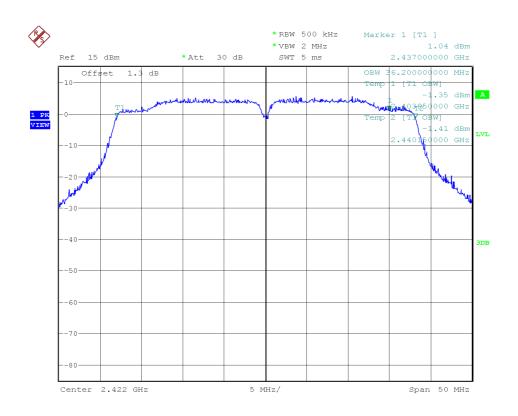


#### 4. WiFi 2.4GHz 802.11 n40 mode

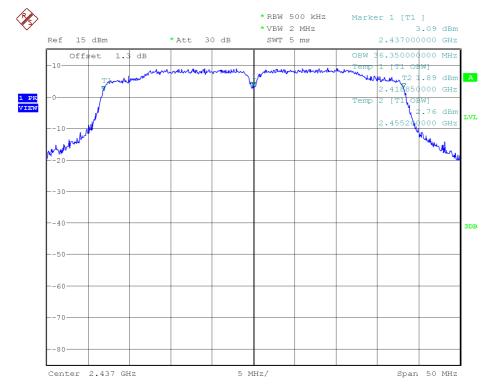
Lowest Channel: 2422 MHz. Chain A



#### Lowest Channel: 2422 MHz. Chain B

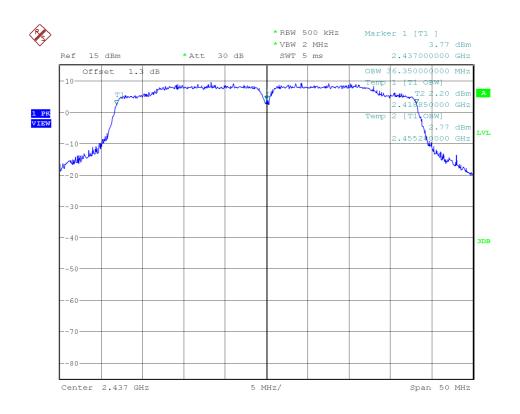






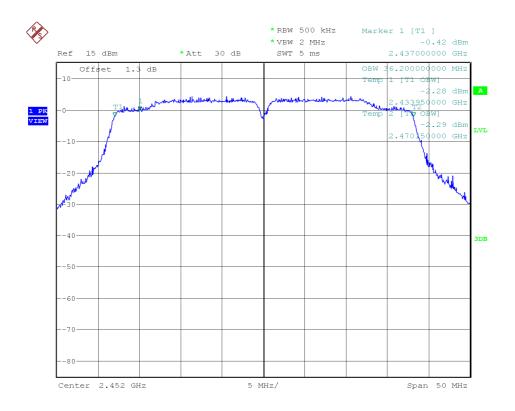
Middle Channel: 2437 MHz. Chain A

Middle Channel: 2437 MHz. Chain B

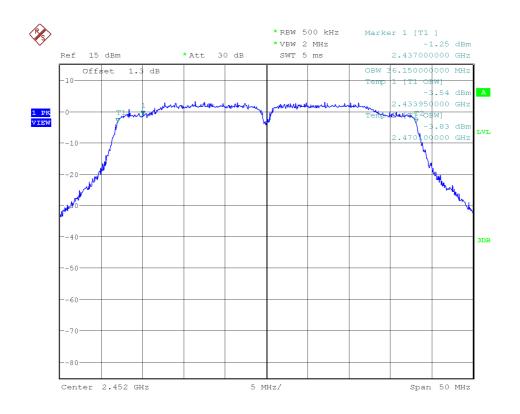




Highest Channel: 2452 MHz. Chain A.



Highest Channel: 2452 MHz. Chain B.





#### Section 15.247 Subclause (a) (2) / RSS-210 A8.2. (a). 6 dB Bandwidth

#### **SPECIFICATION**

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### <u>RESULTS</u>

#### 1. WiFi 2.4GHz 802.11 b mode

6 dB Bandwidth (see next plots).

	Lowest frequency 2412 MHz		Middle frequency 2437 MHz		Highest frequency	
					2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
6 dB Spectrum bandwidth (MHz)	10.06	10.02	10.03	10.05	10.05	10.03
Measurement uncertainty (kHz)	±89					

Verdict: PASS

#### 2. WiFi 2.4GHz 802.11 g mode

6 dB Bandwidth (see next plots).

	Lowest frequency 2412 MHz		Middle frequency 2437 MHz		Highest frequency	
					2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
6 dB Spectrum bandwidth (MHz)	16.06	15.53	15.13	15.13	15.29	15.76
Measurement uncertainty (kHz)	±89					

Verdict: PASS



#### 3. WiFi 2.4GHz 802.11 n20 mode

6 dB Bandwidth (see next plots).

	Lowest frequency 2412 MHz		Middle frequency 2437 MHz		Highest frequency			
					2462 MHz			
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B		
6 dB Spectrum bandwidth (MHz)	15.92	15.16	15.46	15.06	15.96	15.27		
Measurement uncertainty (kHz)	±89							

Verdict: PASS

#### 4. WiFi 2.4GHz 802.11 n40 mode

6 dB Bandwidth (see next plots).

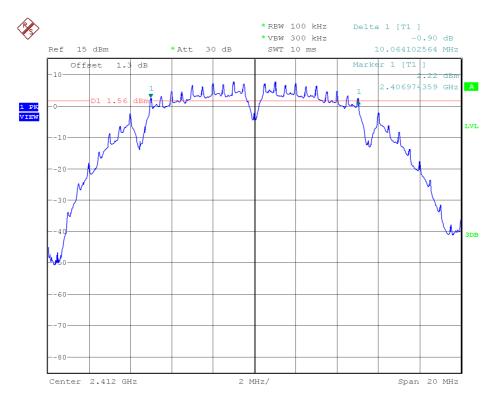
	Lowest frequency 2422 MHz		Middle frequency		Highest frequency		
			2437 MHz		2452 MHz		
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B	
6 dB Spectrum bandwidth (MHz)	35.13	35.13	35.13	35.13	35.13	35.13	
Measurement uncertainty (kHz)	±89						

Verdict: PASS

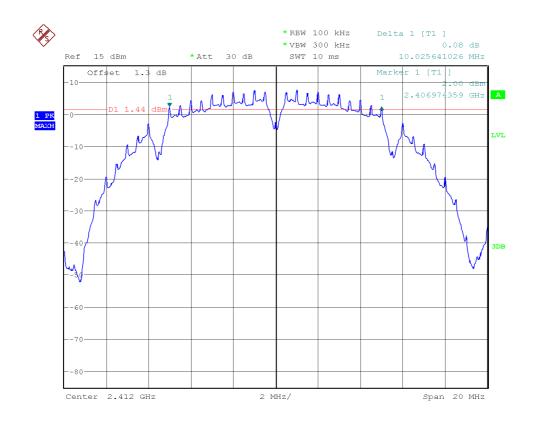


#### 1. WiFi 2.4GHz 802.11 b mode

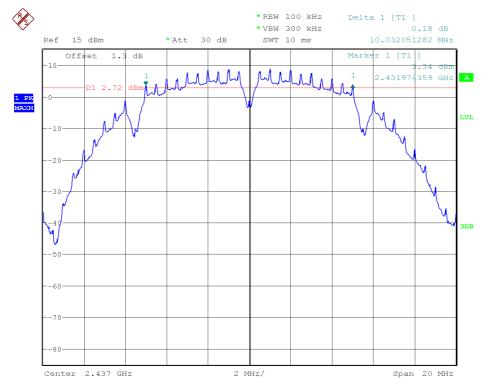
Lowest Channel: 2412 MHz. Chain A.



Lowest Channel: 2412 MHz. Chain B.

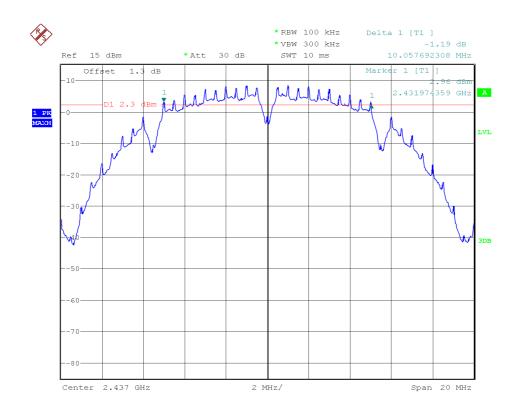




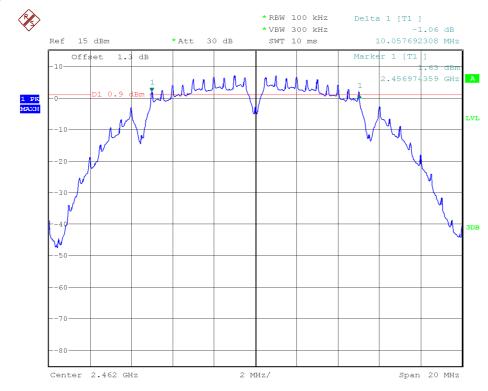


Middle Channel: 2437 MHz. Chain A

Middle Channel: 2437 MHz. Chain B.

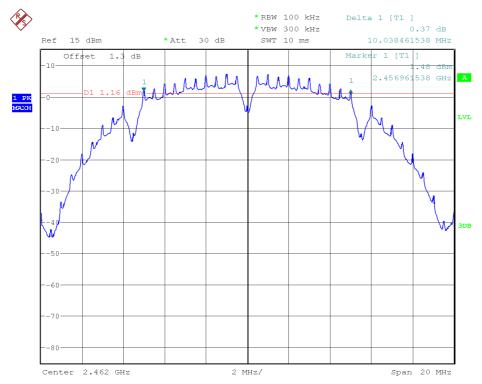






Highest Channel: 2462 MHz. Chain A.

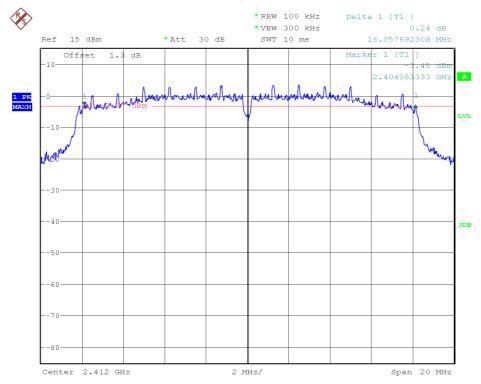
Highest Channel: 2462 MHz. Chain B.



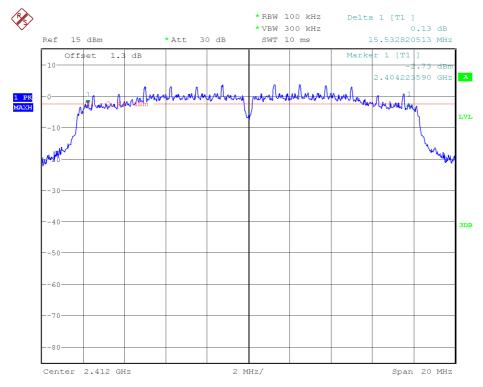


#### 2. WiFi 2.4GHz 802.11 g mode

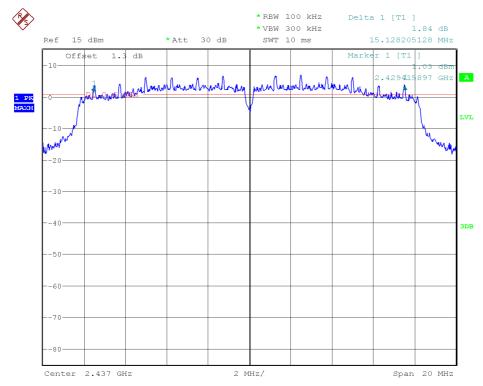
Lowest Channel: 2412 MHz. Chain A



#### Lowest Channel: 2412 MHz. Chain B

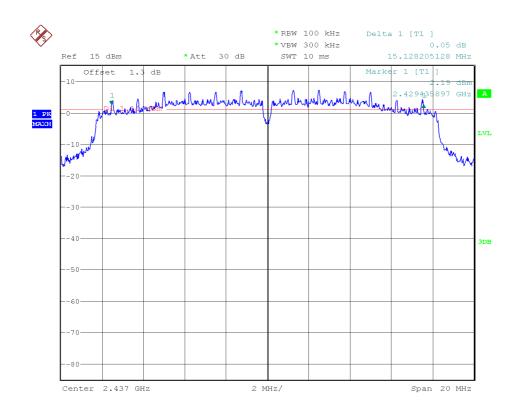




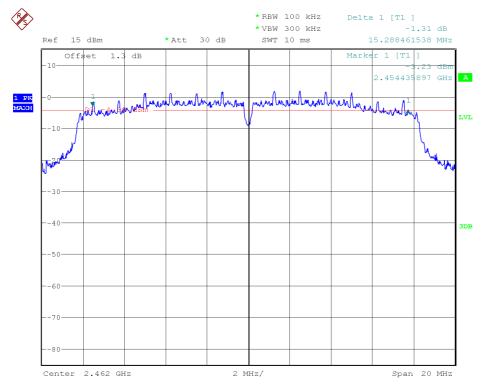


Middle Channel: 2437 MHz. Chain A

Middle Channel: 2437 MHz. Chain B

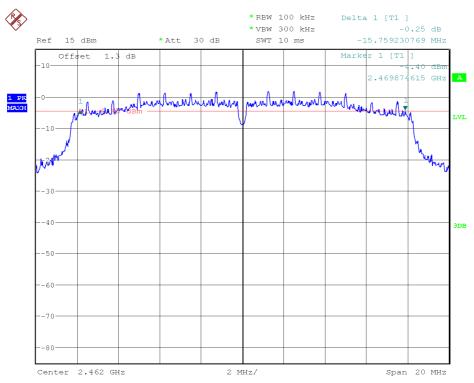






Highest Channel: 2462 MHz. Chain A

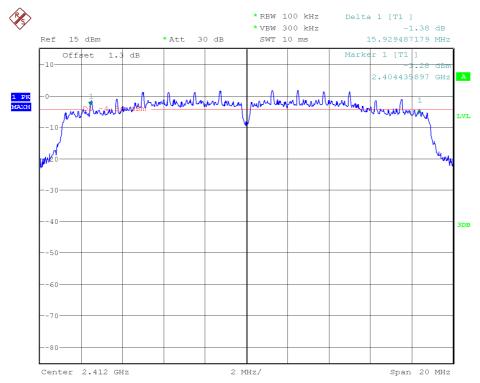




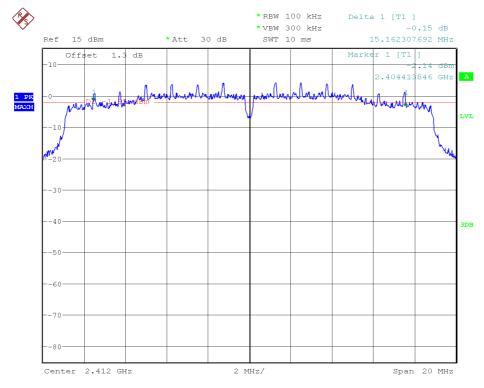


#### <u>3. WiFi 2.4GHz 802.11 n20 mode</u>

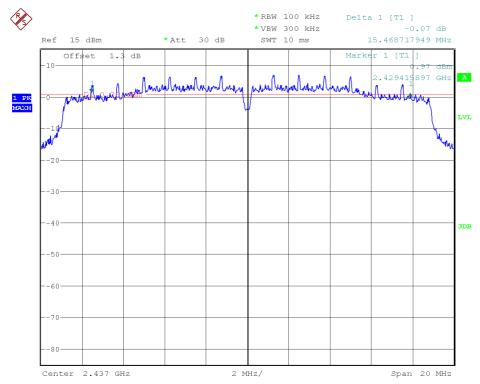
Lowest Channel: 2412 MHz. Chain A



#### Lowest Channel: 2412 MHz. Chain B

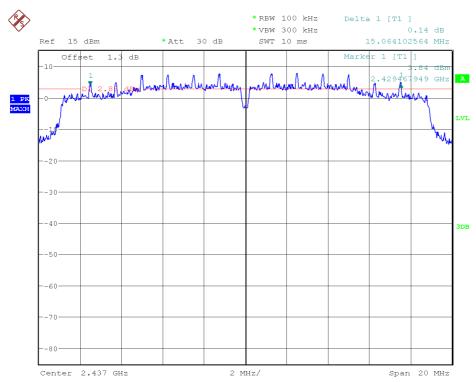




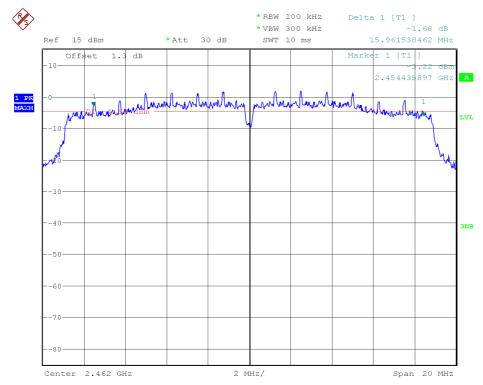


Middle Channel: 2437 MHz. Chain A

Middle Channel: 2437 MHz. Chain B

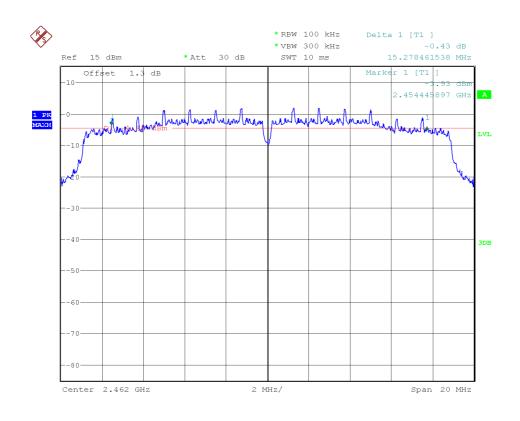






Highest Channel: 2462 MHz. Chain A

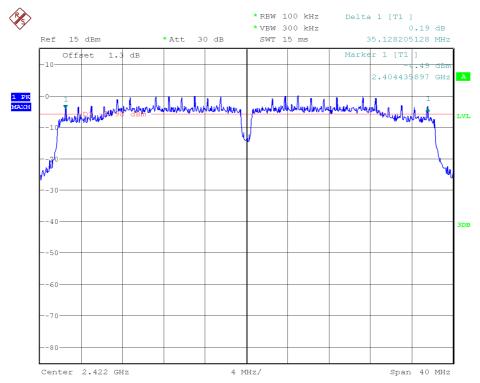
Highest Channel: 2462 MHz. Chain B



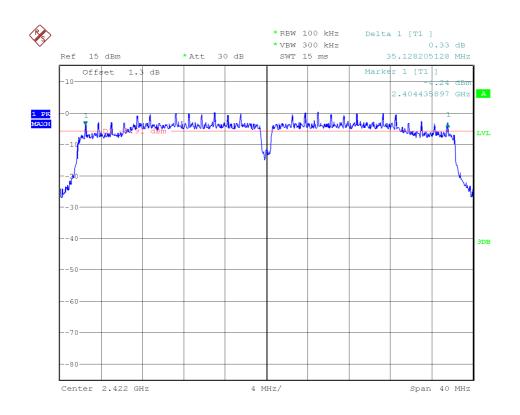


### 4. WiFi 2.4GHz 802.11 n40 mode

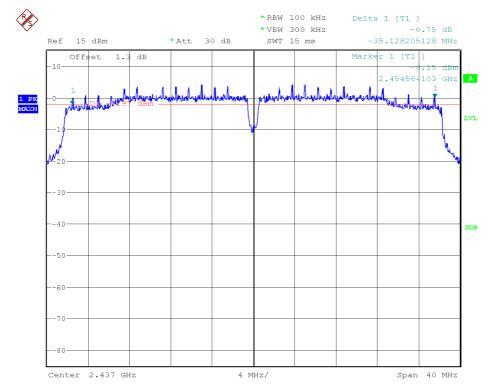
Lowest Channel: 2422 MHz. Chain A



Lowest Channel: 2422 MHz. Chain B

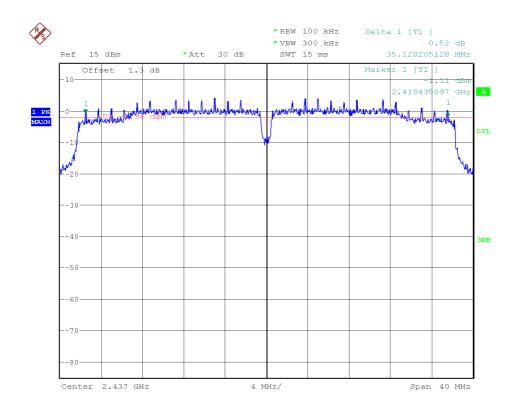




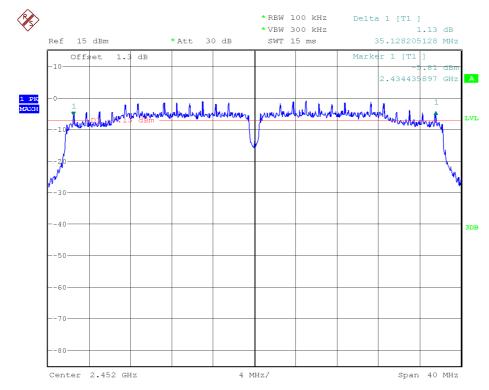


Middle Channel: 2437 MHz. Chain A

Middle Channel: 2437 MHz. Chain B

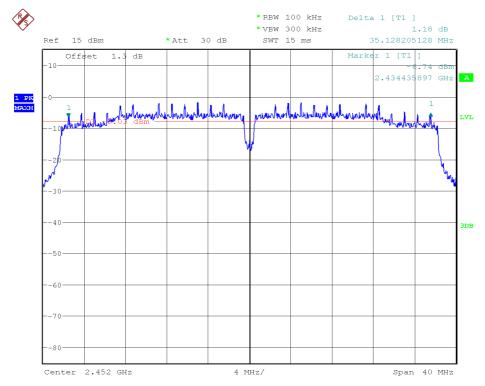






Highest Channel: 2452 MHz. Chain A

Highest Channel: 2452 MHz. Chain B





#### Section 15.247 Subclause (b) / RSS-210 A8.4. (4). Maximum output power and antenna gain

#### **SPECIFICATION**

The maximum peak conducted output power of the intentional radiator shall not exceed 1 watt (30 dBm).

The e.i.r.p. shall not exceed 4 W (36 dBm) (Canada).

#### RESULTS

The maximum Peak Conducted Output Power was measured using the channel integration method according to point 9.1.2. of Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v03r01 dated 09/04/2013. This method was used for 802.11g and 802.11n20 modes.

The maximum conducted (average) output power was measured using the method according to point 9.2.1.2. of Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v03r01 dated 09/04/2013. This method was used for 802.11b and 802.11n40 modes.

In the measure-and-sum approach for MIMO mode, the conducted emission level (*e.g.*, transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units (mW—not dBm).

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

For MIMO mode, the Guidance on directional Gain calculations according to the Guidance for Emission Testing of Transmitters with Multiple Outputs in the Same Band 662911 D01 Multiple Transmitter Output v02r01 dated 10/31/2013 was used.

The number of transmit antennas (NANT) are 2 and the number of spatial streams (Nss) are 2 and therefore the Array Gain is 0 dB.



### 1. WiFi 2.4GHz 802.11 b mode

MAXIMUM OUTPUT POWER. Conducted (average) output power (See next plot of worst case: Highest power levels).

Maximum declared antenna gain: 3.24 dBi.

	Lowest frequency 2412 MHz		Middle frequency		Highest frequency	
			2437 MHz		2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Maximum conducted power (dBm)	16.12	16.33	17.21	17.31	16.55	16.20
Maximum EIRP power (dBm)	19.36	19.57	20.45	20.55	19.79	19.44
Measurement uncertainty (dB)	±1.5					

Verdict: PASS

### 2. WiFi 2.4GHz 802.11 g mode

MAXIMUM OUTPUT POWER. Peak Conducted Output Power (See next plot of worst case: Highest power level).

Maximum declared antenna gain: 3.24 dBi.

	Lowest frequency		Middle frequency		Highest frequency	
	2412 MHz		2437 MHz		2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Maximum conducted power (dBm)	16.86	17.04	20.18	20.49	15.29	14.89
Maximum EIRP power (dBm)	20.10	20.28	23.42	23.73	18.53	18.13
Measurement uncertainty (dB)			±	1.5		

#### Verdict: PASS

Conducted (average) output power. These results are for information purposes only.

Maximum declared antenna gain: 3.24 dBi.

	Lowest frequency 2412 MHz		Middle frequency		Highest frequency	
			2437 MHz		2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Maximum conducted power (dBm)	13.91	14.37	17.19	17.60	12.13	12.64
Maximum EIRP power (dBm)	17.15	17.61	20.43	20.84	15.37	15.88
Measurement uncertainty (dB)	±1.5					



### 3. WiFi 2.4GHz 802.11 n20 mode

MAXIMUM OUTPUT POWER. Peak Conducted Output Power (See next plot of worst case: Highest power level).

Maximum declared antenna gain: 3.24 dBi.

	Lowest frequency		Middle frequency		Highest frequency	
	2412 MHz		2437 MHz		2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Maximum conducted power (dBm)	16.57	17.02	20.00	20.72	15.24	14.87
Maximum EIRP power (dBm)	19.81	20.26	23.24	23.96	18.48	18.11
Measurement uncertainty (dB)	±1.5					

МІМО	Lowest frequency 2412 MHz		Middle frequency 2437 MHz		Highest frequency		
	2412	MHZ	2437	MHZ	2462	MHz	
	Chain A+B		Chain A+B		Chair	Chain A+B	
	Port A	Port B	Port A	Port B	Port A	Port B	
Maximum conducted power (dBm)	14.85	14.26	25.57	26.54	14.16	14.57	
	Port A+B		Port A+B		Port A+B		
Maximum conducted power (dBm)	17.57		29.09		17.38		
Maximum EIRP power (dBm)	20.81		32.33		20.62		
Measurement uncertainty (dB)	±1	.5	±	1.2	±1.5		

Verdict: PASS

Conducted (average) output power. These results are for information purposes only.

Maximum declared antenna gain: 3.24 dBi.

	Lowest frequency 2412 MHz		Middle frequency		Highest frequency	
			2437 MHz		2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Maximum conducted power (dBm)	13.76	14.65	17.18	17.84	12.15	12.18
Maximum EIRP power (dBm)	17.00	17.89	20.42	21.08	15.39	15.42
Measurement uncertainty (dB)			±1	1.5		



	Lowest frequency 2412 MHz		Middle frequency		Highest frequency	
MIMO			2437	MHz	2462	2462 MHz
	Chain A+B		Chain A+B		Chain A+B	
	Port A	Port B	Port A	Port B	Port A	Port B
Maximum conducted power (dBm)	11.68	11.98	17.13	17.20	12.07	11.90
	Port A+B		Port A+B		Port A+B	
Maximum conducted power (dBm)	14.84		20.18		14.99	
Maximum EIRP power (dBm)	18.08		23.42		18.23	
Measurement uncertainty (dB)	±1	1.5	±1.2		±1.5	

### 4. WiFi 2.4GHz 802.11 n40 mode

MAXIMUM OUTPUT POWER. Conducted (average) output power (See next plot of worst case: Highest power level).

Maximum declared antenna gain: 3.24 dBi.

	Lowest frequency		Middle frequency		Highest frequency	
	2422 MHz		2437 MHz		2452 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Maximum conducted power (dBm)	a) 13.27 13.54		17.25	17.34	12.29	11.28
Maximum EIRP power (dBm)	IRP power (dBm) 16.51 16		20.49	20.58	15.53	14.52
Measurement uncertainty (dB)	±1.5					



MIMO	Lowest frequency 2422 MHz Chain A+B		Middle frequency 2437 MHz		Highest frequency 2452 MHz	
			Chain A+B		Chain A+B	
	Chan		Chan		Chan	IATD
	Port A	Port B	Port A	Port B	Port A	Port B
Maximum conducted power (dBm)	9.54	9.53	13.54	13.45	9.37	9.37
	Port A+B		Port A+B		Port A+B	
Maximum conducted power (dBm)	12.54		16.50		12.38	
Maximum EIRP power (dBm)	15.78		19.74		15.62	
Measurement uncertainty (dB)			±1.5			

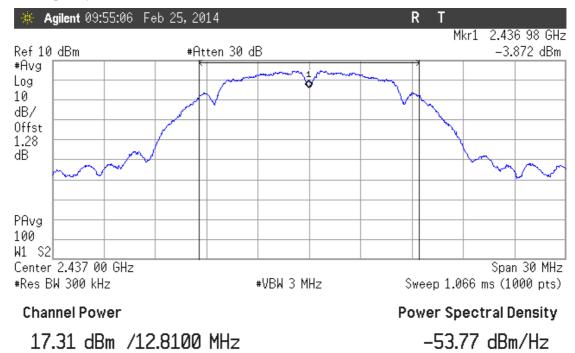
# Verdict: PASS

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.



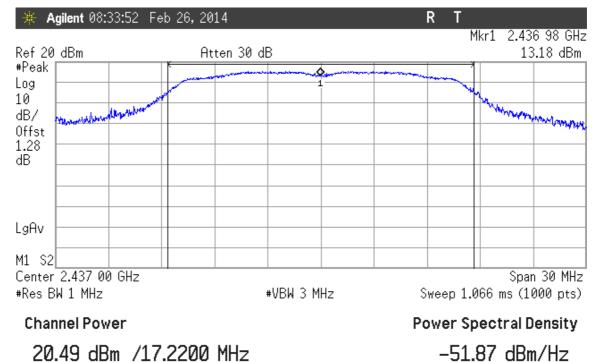
### 1. WiFi 2.4GHz 802.11 b mode

Middle frequency 2437 MHz. Chain B.



# 2. WiFi 2.4GHz 802.11 g mode

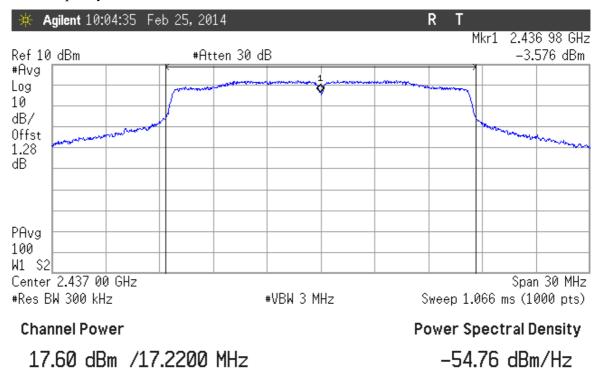
Peak conducted output power. Middle frequency 2437 MHz. Chain B.





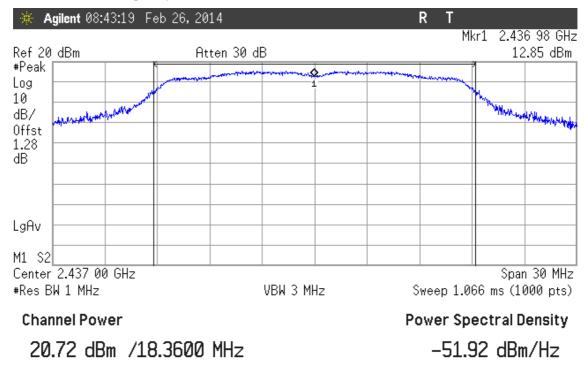
Conducted (average) output power (for information purposes only).

Middle frequency 2437 MHz. Chain B.



### 3. WiFi 2.4GHz 802.11 n20 mode

Peak conducted output power. SISO mode. Middle frequency 2437 MHz. Chain B.





MIMO mode. Middle frequency 2437 MHz. Chain A.

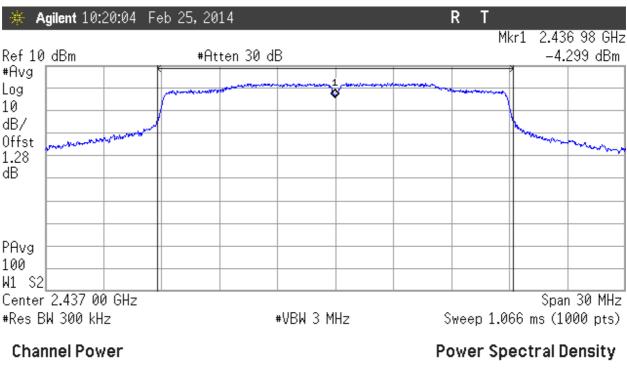
Ref Level 20.00 dbm         Offset 0.73 db         RBW 1 MHz           35 db         SWT         1 ms         VBW 3 MHz         Mode Auto Sweep           1ACLR         1 ms         VBW 3 MHz         Mode Auto Sweep         1 Pk View           10 dbm         10 dbm         1 ms         1 Pk View         1 Pk View           10 dbm         1 ms         1 Pk View         1 Pk View         1 Pk View           10 dbm         1 ms         1 Pk View         1 Pk View         1 Pk View           10 dbm         1 Pk View         1 Pk View         1 Pk View         1 Pk View           10 dbm         1 Pk View         1 Pk View         1 Pk View         1 Pk View           10 dbm         1 Pk View         1 Pk View         1 Pk View         1 Pk View           10 dbm         1 Pk View         1 Pk View         1 Pk View         1 Pk View           -20 dbm	MultiView 😑 Spectr	um				
1 ACLR          • 1 Pk View          10 dBm          • 1 Pk View          0 dBm          • 1 Pk View          10 dBm          • 1 Pk View						
10 dBm       10 dBm         0 dBm       10 dBm         10 dBm       10 dBm         10 dBm       10 dBm         20 dBm       10 dBm         -20 dBm       10 dBm         -30 dBm       10 dBm         -50 dBm       10 dBm         -70 dBm       100 pts       3.0 MHz/       Span 30.0 MHz         2 Result Summary       None		SWT 1 ms 🖷 VBW 3 MI	Hz Mode Auto Sweep			
0 dBm       721         100 dBm       100 pts         3.0 MHz/       Span 30.0 MHz	1 ACLR					●1Pk View
0 dBm       721         100 dBm       100 pts         3.0 MHz/       Span 30.0 MHz						
0 dBm       721         100 dBm       100 pts         3.0 MHz/       Span 30.0 MHz		and the second sec		and the second		
-20 dBm	10 dBm	- Junior and a second s			mon and a second s	
-20 dBm		- market				
-20 dBm	0 d0m	www.			Mar allan	
-20 dBm	U UBIII		T×1		mundle.	
-20 dBm	MUNUMUN				0007	within my man
-20 dBm	10 dBm	_				100 5114
-30 dBm						
-30 dBm						
-40 dBm	-20 dBm					
-40 dBm						
-40 dBm	-30 dBm	_				
-50 dBm						
-50 dBm						
-60 dBm	-40 dBm	-				
-60 dBm						
-60 dBm	-50 dBm					
-70 dBm	-So ubiii					
-70 dBm						
CF 2.437 GHz         1000 pts         3.0 MHz/         Span 30.0 MHz           2 Result Summary         None	-60 dBm	-				
CF 2.437 GHz         1000 pts         3.0 MHz/         Span 30.0 MHz           2 Result Summary         None						
CF 2.437 GHz         1000 pts         3.0 MHz/         Span 30.0 MHz           2 Result Summary         None	70 dBm					
2 Result Summary None	-70 dBin					
2 Result Summary None						
2 Result Summary None	CE 2 427 CHz		1000 pts	2 0 MHz /	c	Pap 20.0 MHz
				5.0 MILZ/		pan 50.0 Minz
Channel Bandwidth Offset Power		Pandwidth		Dowor		
Channel         Bandwidth         Offset         Power           Tx1 (Ref)         18.030 MHz         25.57 dBm			Unset	25.57 dBm		
Tx Total 25.57 dBm		10.000 1112		25.57 dBm		

MIMO mode. Middle frequency 2437 MHz. Chain B.

MultiView 🔠 Spectrum				$\bigtriangledown$
Ref Level 20.00 dBm Offset Att 35 dB • SWT	0.73 dB • RBW 1 MHz 1 ms • VBW 3 MHz Mode Auto Sweep			
1 ACLR	1 ms  VBW 3 MHz Mode Auto Sweep			●1Pk View
	- manual manufacture and a second	in manager and the stand the second		
10 dBm	Walker		h.	
0 dBm-	N <sup>M</sup>	Tx1	Murry 1	
In a man with the way of			with we prost in	No. of the second s
O dBm	<u> </u>		margamerar	and muchalander and
-20 dBm				
-30 dBm	_			
-40 dBm				
-50 dBm	_			
-60 dBm	_			
-70 dBm	_			
CF 2.437 GHz	1000 pts	3.73 MHz/		Span 37.3 MHz
2 Result Summary Channel	Bandwidth Offset	one Power	1	1
	18.360 MHz	26.54 dBm 26.54 dBm		



Conducted (average) output power (for information purposes only).



SISO mode. Middle frequency 2437 MHz. Chain B.

17.84 dBm /18.3600 MHz

-54.80 dBm/Hz

MultiView 😕 Spectrum  $\nabla$ SGL Mode Auto Sweep Count 100/100 ●1Rm Avg 0 dBm -10 dBm -20 dBr monte in m -30 dBm 40 dBm -50 dBr -60 dBm 70 dB -80 dBm Span 30.0 MHz CF 2.437 GHz 1000 pts 3.0 MHz/ 2 Result Summary None Offset Power 17.13 dBm 17.13 dBm Channel Bandwidth Tx1 (Ref) Tx Total 18.030 MHz

MIMO mode. Middle frequency 2437 MHz. Chain A.

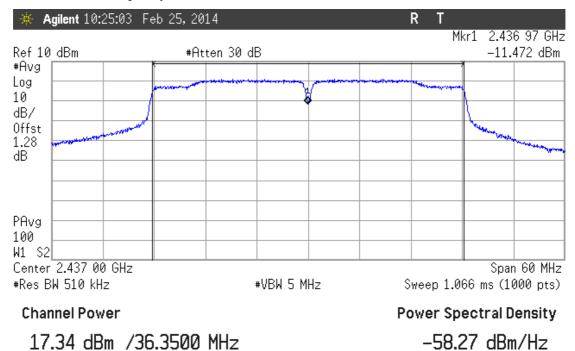


MIMO mode. Middle frequency 2437 MHz. Chain B.

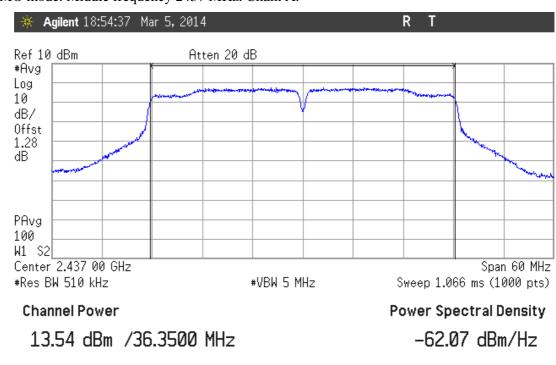
MultiView 🗄 Spectrur	n			
Ref Level 10.00 dBm Off	set 0.73 dB • RBW 300	kHz		SGL
	/T 1.07 ms 🗢 VBW 3	MHz Mode Auto Sweep		Count 100/100
1 ACLR				●1Rm Avg
0 dBm		and a stand and a stand and a stand a s		
	( man war		and the second second	$\gamma$
-10 dBm		Tx1		<b>N</b>
-20 dBm	-			Manage and and a second
-20 dBm				monorward
-30 dBm	_			
-40 dBm	-			
-50 dBm	_			
-60 dBm	_			
-70 dBm	-			
-80 dBm				
-50 dBm				
CF 2.437 GHz		1000 pts	3.0 MHz/	Span 30.0 MHz
2 Result Summary Channel	Bandwidth	None Offset	Dowor	
Tx1 (Ref) Tx Total	18.360 MHz	Unset	Power 17.20 dBm 17.20 dBm	

#### 4. WiFi 2.4GHz 802.11 n40 mode

SISO mode. Middle frequency 2437 MHz. Chain B.

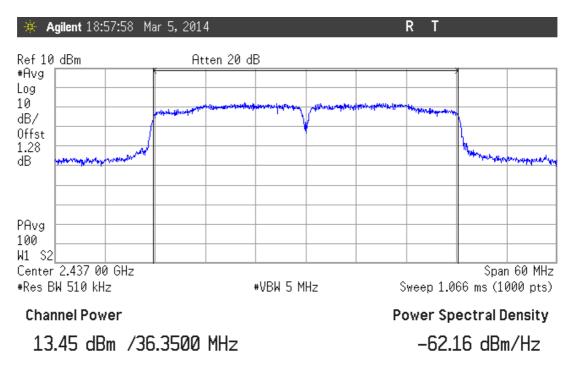






### MIMO mode. Middle frequency 2437 MHz. Chain A.

### MIMO mode. Middle frequency 2437 MHz. Chain B.





#### Section 15.247 Subclause (d) / RSS-210 A8.5. Emission limitations conducted (Transmitter)

#### **SPECIFICATION**

In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. 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 instead of 20 dB.

#### <u>RESULTS:</u> (See next plots)

#### 1. WiFi 2.4GHz 802.11 b mode

#### Reference Level Measurement

	Lowest f	requency	Middle f	requency	Highest frequency 2462 MHz	
	2412	MHz	2437	MHz		
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Reference Level Measurement (dBm)	7.22	6.78	8.18	8.53	6.75	6.78
Measurement uncertainty (dB)			±	:1.5		

#### Chain A / B:

Lowest frequency 2412 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-22.78 / -23.22

Middle frequency 2437 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-21.82 / -21.47

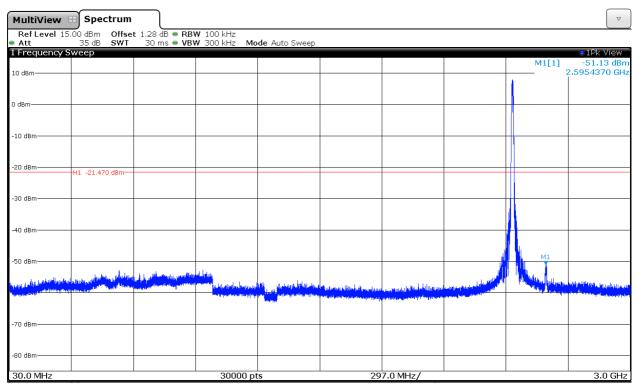
Highest frequency 2462 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-23.25 / -23.22



See next plots of worst case: Mode b. Middle Channel: 2437 MHz. Chain B.

Number of sweep points: 30,000.

### Plot 30 MHz to 3 GHz:



Note: The peak above the limit is the carrier frequency.

#### Plot 3 GHz to 6 GHz:

MultiView	B) Spectrum								
RefLevel 15 Att	35 dB <b>SWT</b>	t 1.28 dB • RB\ 30 ms • VB\		de Auto Sweep					
1 Frequency S	Sweep							M1[1]	<ul> <li>1Pk View</li> <li>-54.34 dBm</li> </ul>
10 dBm									4.8709500 GHz
0 dBm									
-10 dBm									
-20 dBm	H1 -21.470 dBm								
-30 dBm									
-40 dBm									
-50 dBm						M1			
a di manala na saladi di kasa ma	The all of the deal of the sector of	والمعادية ومعالية والمعالية	ومعمرا يستع المروار واسأ السايين و	and the second of the second of	k produkta dia projega kana dia dia situ ni disarka nga kana nga kana nga kana nga kana nga kana nga kana nga k	and algerates	. Harden and Andrew and	and the second states of the	hand all the land property of the
and all of the second secon	filiter-fotoriscentedprischetsproper	sa birangakan, pri bagin insindratangan	and the second secon				an a	and the second department of the second	والكامي المرار إن المسرية ومن المرار والمرامع المالية ا
-70 dBm									
-80 dBm									
3.0 GHz	I		30000 pt	IS	30	0.0 MHz/	1	1	6.0 GHz



# Plot 6 GHz to 9 GHz:

MultiView	B Spectrum								
Att	.00 dBm Offse 35 dB SWT		♥ 100 kHz ♥ 300 kHz Mo	de Auto Sweep					
1 Frequency S	weep								●1Pk View
10 dBm									
0 dBm									
-10 dBm									
-20 dBm	H1 -21.470 dBm								
-30 dBm									
-40 dBm									
-50 dBm									و يومنا و منابع أمانيا من المعرف الم
الأرباع والاستارافين فسريط وفي زر	مرجلية والمالي والمراجع	alamata de altard, de acese	atthe day of the second states	وعاسيما الاحصالة وأطارت	فالمسولين بالمأفقة وتقتحفنا ال	والمعطائي ويومط فالفريقان	al-and an alternation and a second	and the second sector of the later	and the second s
the second balance philosophilo	and the second s	Sunday or a subscription of	and general the party of the pa		and a state of the second s	Different and a subsection of the	and the second	nan an	has a second
-70 dBm									
-80 dBm			20000			0.0 ML = /			0.0.011-
6.0 GHz			30000 pt	S	30	0.0 MHz/			9.0 GHz

# Plot 9 GHz to 12 GHz:

Frequency Sweep         IPk View           0 den	MultiView	Spectrum												
0 dBm       Image: state s	Att	Att 35 dB SWT 30 ms 🖷 VBW 300 kHz Mode Auto Sweep												
1 dBm       Image: state s		weep								IPk View				
10 dBm       Image: state	10 dBm													
20 dBm       H1 -21.470 dBm       Image: state of the state	0 dBm													
20 dBm       H1 -21.470 dBm       Image: state of the state	-10 dBm													
H1 -21.470 dBm 30 dBm 40 dBm 50 dBm 70 dBm 70 dBm 80 dBm 80 dBm 10 dBm	-10 000													
A0 dBm       Image: set of the set of	-20 dBm	-H1 -21.470 dBm												
S0 dBm       Image: S0 dBm	-30 dBm													
S0 dBm       Image: S0 dBm														
en la grand and an	-40 dBm													
S0 dBm         S0 dBm<	-50 dBm													
ABM-     Image: Constraint of the second secon	and the provident	Antonikowany Juliotan poten	antinatan mujulu dilaan	and the second			an ha bana sa marang ban bia n	and the same at a state.	and patiened all malant					
80 dBm [ ] ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]	-60 dBm	and a second		, Balanda ( <sub>1996</sub> - principality) yang pang pang balanda kanang balanda kanang pang pang pang pang pang pang pang										
	-70 dBm													
9.0 GHz 30000 pts 300.0 MHz/ 12.0 GHz	-80 dBm									12.0 GHz				



### Plot 12 GHz to 15 GHz:

MultiView	s 😁 Spectrum								
🕨 Att	15.00 dBm Offse 35 dB SWT		№ 100 kHz № 300 kHz Mo	de Auto Sweep					
1 Frequency	/ Sweep								●1Pk View
10 dBm									
) dBm									
-10 dBm									
-20 dBm									
-30 dBm									
-40 dBm									
50 dBm					Italian datamata at				
Indexed and a second			a daga kana na bhadanan ka sa	ales by the black part as sub	and the second field and a second				an second and the fit
-60 dBm		- catter burden	nanga ang ang ang ang ang ang ang ang an	an a			The second s	and the second	na na hara ƙasarta ƙasarta
70 dBm									
80 dBm									
12.0 GHz		I	30000 pt	S	30	0.0 MHz/	1	1	15.0 GH

# Plot 15 GHz to 18 GHz:

MultiView	) 🗄 Spectrum								
Ref Level Att	35 dB <b>SWT</b>	t 1.28 dB • RB 30 ms • VB	₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep					
1 Frequency	y Sweep								●1Pk View
10 dBm									
) dBm									
-10 dBm									
-20 dBm	H1 -21.470 dBm								
30 dBm									
40 dBm									
50 dBm						a talata			
	Handligtenetische bester Antikater Manalischer von der sterlinderte Berner		e ferstiller andersteller beseter fers Angeseter opgesteller beseterter geseter	and to by Andrew Colors (States) and the second provided and second pro-	languag galan kangangangan Ang panganganganganganganganganganganganganga		l y felen a se ha fel la galer (felen) Y felen se	la Banafad Indi Akan, baharada Produkti Sayi Kadapartan ang pad	yaytaliyahilik kalendari <sub>Mana</sub> nasana kalendari
ьо dBm									
70 dBm									
80 dBm									
15.0 GHz			30000 pt	l IS	30	0.0 MHz/			18.0 GH



### Plot 18 GHz to 21 GHz:

MultiView	Spectrum								
Att	.00 dBm Offse 35 dB SWT	t 1.28 dB • RB 30 ms • VB	₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep					
1 Frequency S	weep								●1Pk View
10 dBm									
0 dBm									
-10 dBm									
-20 dBm	H1 -21.470 dBm								
-30 dBm									
-40 dBm									
-50 dBm	all ball of all visition dates (c. e.e., ees	and succession design assesses	endi, i od stalana v bitada	al likerikusine daraan erituuri	nder van die van an die van die die bekel	an an far a frank an	وروار والمراجع والمراجع والمراجع والمراجع	and her also her as the lite of the	and the state of the second states of the second st
-60 dBm	n method and a state of the sta	er par se a nage i se an	And and a strugger design a second and grant A	an disinentri sini manga parta	tille, som gjelen dom den solder en ster en sold fille	antaal jagdaan meterika kaaran yad	energia anti-entry of entry for the family of problem (	ուցեւ <sub>ստ</sub> ուցերի թուլկունքների 	y <sup>alab</sup> ad terthethik ka bili kat patal yang bi
-70 dBm									
-80 dBm									
18.0 GHz	I	1	30000 pt	ts	30	0.0 MHz/	1	1	21.0 GHz

# Plot 21 GHz to 24 GHz:

MultiView	88 Spectrum								
RefLevel 1. Att	35 dB SWT	t 1.28 dB • RB 30 ms • VB	₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep					
1 Frequency	Sweep								●1Pk View
10 dBm									
0 dBm									
-10 dBm									
-20 dBm	H1 -21.470 dBm-								
-30 dBm									
-40 dBm									
50 dBm		himmen to deale a	r				1		
entranne fijtterestergen	highing shill black on the all styles and it is not all the processing processing and the strength of the strength of the strength of the strength of the st	<mark>i lagung ganganan salagan sa kutan</mark> Kalanyan sa Lagung salagan salah ku	an fan de filmen yn filmen yn de filmen yn de filmen. An fan de filmen yn filmen yn de filmen yn de filmen yn de filmen.	and the state of the second	n fallen segen an der seinen seinen der sein An der seinen s	late daala bayaa ya Mila baha ba panganan ya waxayaa waxaa ya maa		l h <sub>en</sub> ning på blander skinne (del af del prove fra skinder skinne konstanter skinne skin	الم الذي الم الم المسير ( معال الذي الذي الله ). المتحد المحمو المسيرة في محتو المحتو المحتو
-60 dBm									
-70 dBm									
80 dBm									
21.0 GHz			30000 pt	ls	30	0.0 MHz/			24.0 GH



# Plot 24GHz to 25 GHz:

MultiView	B) Spectrum							$\bigtriangledown$
Ref Level 15 Att	.00 dBm Offse 35 dB SWT		₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep				
1 Frequency S								●1Pk View
10 dBm								
0 dBm								
-10 dBm								
-20 dBm	H1 -21.470 dBm							
-30 dBm								
-40 dBm								
-50 dBm	ldyl gennendt gebreken.	and an and a second produced as a second	Nales Sateller Martines	n a stall agente a des la sella des justes de la sella des sella de la sella de la sella de la sella de la sel	pilipers fil gog brælli her træli jer tver	a Allen an March Inger Allen an Inger	an a	<mark>y da <sub>en s</sub>an di padatan padatan padatan yang san di sebuah sebuah sebuah sebuah sebuah sebuah sebuah sebuah sebuah s</mark>
-60 dBm	n te parte la facta del AtA ( ), de segunda del	and provide the first product of the first product						
-70 dBm								
-80 dBm								
24.0 GHz			30000 pt	ts	10	0.0 MHz/		25.0 GHz



# 2. WiFi 2.4GHz 802.11 g mode

#### Reference Level Measurement

	Lowest frequency 2412 MHz		Middle f	requency	Highest frequency	
			2437 MHz		2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Reference Level Measurement (dBm)	3.40	3.09	6.47	6.72	1.43	1.32
Measurement uncertainty (dB)	±1.5					

### Chain A / B:

Lowest frequency 2412 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-16.60 / -16.91

Middle frequency 2437 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-13.53 / -13.28

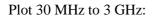
Highest frequency 2462 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-18.57 / -18.68

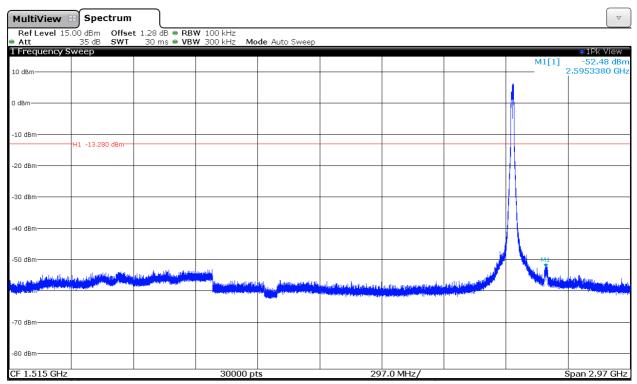
Verdict: PASS (NOTE: The limit is set to -20 dBc since the maximum peak conducted output power was measured for this mode.)



See next plots of worst case: Mode g. Middle Channel: 2437 MHz. Chain B.

Number of sweep points: 30,000.





Note: The peak above the limit is the carrier frequency.

Plot 3 GHz to 6 GHz	<b>::</b>
---------------------	-----------

MultiView	B) Spectrum								
RefLevel 15 Att	35 dB SWT	t 1.28 dB • RB 30 ms • VB		de Auto Sweep					
1 Frequency S	weep							M1[1]	1Pk View -55.16 dBn
10 dBm									4.9824500 GH:
) dBm									
-10 dBm									
-20 dBm	H1 -13.280 dBm								
-30 dBm									
40 dBm									
-50 dBm			I to and	and and an and a second state	laran an lu a san de main	M1			
5 h H washed and the second second	an a		مانية بالاية أن راغاني رأم ميرينان و. منه فرانستين ومني الشواسيني	and a second	and other schlings, discontinues of	and a second	and the second sec	and a second	nan dikadinya kalenang kawa Penganan di Kaman dan se
70 dBm						n and g Day or	797 · · ·		
80 dBm									
3.0 GHz			30000 pt	ls	30	0.0 MHz/			6.0 GH:



# Plot 6 GHz to 9 GHz:

MultiView	Spectrum								
Att	35 dB <b>SWT</b>	t 1.28 dB • RB 30 ms • VB	₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep					
1 Frequency S	Sweep								●1Pk View
10 dBm									
0 dBm									
-10 dBm	H1 -13.280 dBm								
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm									1
Instructure of the state of t	Lood of the state	n h Mart patro at a data t	pagased <sub>bet</sub> neild liture (c	and the state of the	وم ما الدرارية (محمد الالعام ال	وموتعفقه وماليا ليرام ولوا	ومعالفه والمعالمين لتقول ور	naloval doda politica a ser	A DESCRIPTION OF THE PARTY OF T
Part Indonesia (separate)	e delayers ages as being a bened.	ing kalanga fanta kalangin pananant	langgang <sup>kan</sup> na <mark>kanggang kanggang kanggang kanggang kanggang kanggang kanggang kanggang kanggang kanggang kang Kanggang kanggang kang</mark>	ley an Andrea di <sup>Des</sup> feranti kersa terdeng serent	<mark>den kongen stallen det in genegen den stallen s</mark> tallen stallen stallen stallen stallen stallen stallen stallen st Stallen stallen	n a gun a ghall dheann da rhainn an Stàitean a	population production in the second	and the second secon	
-70 dBm									
-80 dBm									
6.0 GHz			30000 pt	s	. 30	0.0 MHz/			9.0 GHz

### Plot 9 GHz to 12 GHz:

MultiView	🗄 Spectrum								
Ref Level 15 Att Frequency 3	5.00 dBm Offse 35 dB SWT Sweep		₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep					●1Pk View
10 dBm									
0 dBm									
-10 dBm									
-20 dBm	-H1 -13.280 dBm								
-30 dBm									
-40 dBm									
-50 dBm									
-60'dBm-	di da la bata contra da presa da construiteza Pre fontes hi contra construingenes trastras	lig na <sub>b</sub> a da anan di <mark>d</mark> a Ca Capana di Al Manga da manda da mana da mana da ma	addin an ar an	harpent Meretilised stale all programmer and suppliced and a	terren dira da la este andida de digi Neren de la contra de Neren de la contra d	an é a halan sa sa bang daga di bada ménaphan kanan di manénén ng men	i pojestalo na sti ki levilo je doj na postelo na potenci na kao	i g Ling ( ) <sub>(</sub> an g ) a ( )	Allanders gestere independent of Managementer interactions Managementer interactions
-70 dBm									
-80 dBm									
9.0 GHz				IS	30	0.0 MHz/			12.0 GHz



## Plot 12 GHz to 15 GHz:

MultiView	B Spectrum								
RefLevel 15 Att	.00 dBm Offse 35 dB SWT	t 1.28 dB • RBV 30 ms • VBV	№ 100 kHz № 300 kHz Mo	de Auto Sweep					
1 Frequency S	weep								●1Pk View
10 dBm									
0 dBm									
-10 dBm	H1 -13.280 dBm								
-20 dBm	HI -13.280 dBm								
-30 dBm									
-30 aBm									
-40 dBm									
-50 dBm	h fifteritate and constructed and a state of the	I			The state of a strategiest state of a				
n (ha je politana pila pa pila da) (hi bi pa pila na na n	n (fyl andred as sine on the book and with the four set on any stay and was single break to	in the first of the second state of the second	وحرائي أشعر أحفاظ للأطفان أعجارها	الله ومعرا بالمريد بدر معروفاته	and the second s	n sense for her her her her her her her her her he	A Ministration of the Annual Street of the Annual S	Uganja sela faralasen fa some angenessa senset selatas	A children of the second states
-60 dBm			<mark>under her her her her her her her her her h</mark>	n a fil a falla a fil a fi			an an an an ann ann Anna	anadologia (n. 1997). A see and the advanta	n in a fan de sen ann an tha an th
-70 dBm									
-80 dBm									
12.0 GHz	1	1	30000 pt	ts	30	0.0 MHz/	I	1	15.0 GHz

## Plot 15 GHz to 18 GHz:

MultiView	spectrum								
Ref Level Att 1 Frequency	15.00 dBm Offse 35 dB SWT		₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep					●1Pk View
10 dBm	/ Sweep								UIPK VIEW
) dBm									
-10 dBm	H1 -13.280 dBm-								
20 dBm									
30 dBm									
40 dBm									
50 dBm	tal a star loca a contract in state with a later to	1	at discussion and t	nd val no o vancin no odklati koji	d délaterty, manadatatiké ar	متعمل الملاقع المراقع ا		n hadeb laka saran sa .	
ikal debbereden Sörößin <del>terenden</del>	tal a place hay be performed in the soft of the later and the program of performance in the program in the state and the program of the performance in the performance	daga ( <sub>p</sub> anary) ay karakteri (birani Guyan Buyanara (birata) in anarah kara	<mark>, or all produces and a second system (second second second second second second second second second second se National second second</mark>	ing and the logical distribution of the line of the li	universited for the state of th	na fan San Jawara an Yana synaun	witegoli ana ang ki pitanomi <sup>ng ka</sup> nd	n finning generation operations for each of	neede, ingesonen tillter for ken ja
70 dBm									
80 dBm									
15.0 GHz			30000 pt	IS	30	0.0 MHz/			18.0 GH:



# Plot 18 GHz to 21 GHz:

MultiView	B) Spectrum								
Att	.00 dBm Offse 35 dB SWT		№ 100 kHz № 300 kHz Mo	de Auto Sweep					
1 Frequency S	weep								●1Pk View
10 dBm									
0 dBm									
-10 dBm	H1 -13.280 dBm								
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm	and felder attrict on a state of a second	and the state of the line of the	terred have at an available of a second	n ha nahili talah mining ang ang ang ang ang ang ang ang ang a	an all an an a shirth an third	unite and the film that to not the state	Li juhun lind anterna di kunturna	and to a set of the set of a state of a stat	al an Alderton John Marco al Angelo de
والمحفور ويستعر وحفير الغاب	the state of the second pro-	and a local second s	The second s	and we are a state of the sector of the s			laganga jarana ada asaraba	and a literate to search a second	Bin markilling a second a device of
-60 dBm									
-70 dBm									
-80 dBm			20000						21.0.6
18.0 GHz			30000 pt	IS	30	0.0 MHz/			21.0 GHz

### Plot 21 GHz to 24 GHz:

MultiView	B Spectrum								
Att	.5.00 dBm Offse 35 dB SWT		₩ 100 kHz № 300 kHz Mo	de Auto Sweep					
1 Frequency	Sweep								●1Pk View
10 dBm									
0 dBm									
-10 dBm									
-20 dBm	-13.280 UBM								
-30 dBm									
-40 dBm									
-50 dBm			l klasti	1					
pala de la constitución de la const	university and the starts	Contract design of the state of the	իստի շկալու է եկ արեկ	duinital duine publication	والأوبانسا والألاف أسأط فاعترته مرط	heles/Helesters contact have.	dedulisen du millum in	والاستعمامية والمتعامل والمتعاد	and a straight of the state
-60 dBm	(MA desidation or general solaria by Alma)		demonstration of the second second	and a static	a finder over gester of provide the first state of the second second second second second second second second	a na kana kana kana kana kana kana kana	hiteliteliteleteriten (hereitere) 	ny fals ang	and provided and the style of the
-70 dBm									
-80 dBm									
21.0 GHz			30000 pt	ts	30	0.0 MHz/			24.0 GHz



# Plot 24GHz to 25 GHz:

MultiView	B) Spectrum								
Ref Level 15 Att	.00 dBm Offse 35 dB SWT		№ 100 kHz № 300 kHz Mo	de Auto Sweep					
1 Frequency S	weep								●1Pk View
10 dBm									
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm	And the stand of the state of the		n an handar (da anta a damini dadi	1, 19 m. Hall Provide Landson and	<mark>n baya kuri kalinda ku</mark> i pakalang baya	nduari littainin, ahta italahadi	etal an en mante la contra la contra da contra da	ny na sanà tanàna dia kaominina dia kaominina dia kaominina dia kaominina dia kaominina dia kaominina dia kaomi Ny faora dia kaominina dia k	digitation desiderated
provident of the second states			or Alithe and a boot on a build be botted	(and a constitution of the last of	y ang tilih paliti, ina masa ta ng min	ang	a Manada pengahan penintahan katala	na kalena di batta talipera kiti bara	an datab tetrakenda da a la
-60 dBm									
-70 dBm									
-80 dBm									
24.0 GHz		1	30000 pt		10	0.0 MHz/			25.0 GHz



### <u>3. WiFi 2.4GHz 802.11 n20 mode</u>

# Reference Level Measurement

	Lowest frequency		Middle f	requency	Highest	frequency
	2412	MHz	2437	MHz	2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Reference Level Measurement (dBm)	3.27	3.59	6.40	7.14	1.40	1.08
Measurement uncertainty (dB)			±	:1.5		

### Chain A / B:

Lowest frequency 2412 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-16.73 / -16.41

Middle frequency 2437 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-13.60 / -12.86

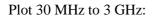
Highest frequency 2462 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-18.60 / -18.92

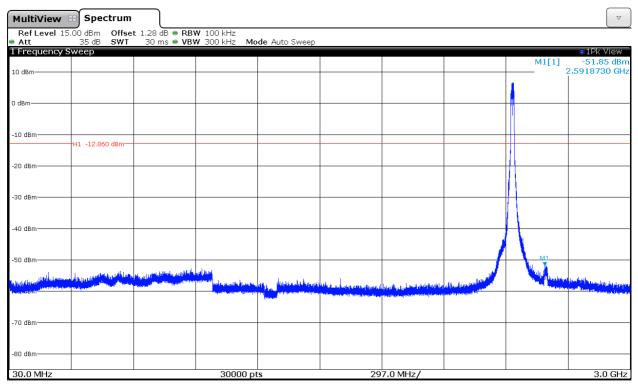
Verdict: PASS (NOTE: The limit is set to -20 dBc since the maximum peak conducted output power was measured for this mode.)



See next plots of worst case: Mode n20. Middle Channel: 2437 MHz. Chain B.

Number of sweep points: 30,000.





Note: The peak above the limit is the carrier frequency.

#### Plot 3 GHz to 6 GHz:

MultiView	Spectrum	·							$\bigtriangledown$
RefLevel 15 Att	35 dB SWT	et 1.28 dB ● R 30 ms ● V	BW 100 kHz BW 300 kHz Mo	ode Auto Sweep					
1 Frequency S	weep							M1[1]	● 1Pk View -54.18 dBm 4.8635500 GHz
0 dBm									
-10 dBm									
-10 dBm	H1 -12.860 dBm-								
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm						M1			
and and the balance between the	The formation of the sector of	The Parameter of the	الله مع الله أن يتلق في من الالتحاد (ل معلى الم محمد إن مع مع من معمد المحمد المعام مع مع من من	a de la companya de La companya de la comp		a di si ingga sa	din Banda Islandari Mili	the distance of the property lade on the	line flit of the link block out for d
-70 dBm									
-80 dBm									
3.0 GHz			30000 pt	ts	30	0.0 MHz/			6.0 GHz



# Plot 6 GHz to 9 GHz:

MultiView	😁 Spectrum							
Ref Level 1 Att	35 dB <b>SWT</b>	t 1.28 dB • RB 30 ms • VB	№ 100 kHz № 300 kHz Mo	de Auto Sweep				
1 Frequency	Sweep							●1Pk View
10 dBm								
0 dBm								
-10 dBm	H1 -12.860 dBm							
-20 dBm								
-30 dBm								
-40 dBm								
-50 dBm			1				 	
dismailed, while day and	Las and the state of	والمعادية والمحالية والتبدية ويستنا	na sa kating san Jina kana kating di kating sang sang sang sang sang sang sang sa	ارا (میروان ۱۹۹۹ ایل اندان رسومی را ا	the second of the first Little of the second se	population of the state of the state of the	n in de la constant de la constant La constant de la cons	
a a sa i fada ang palakan i	William Contraction of the second second	and the second	1.049012		n an an an an an an Anna Anna Anna Anna			
-70 dBm								
-80 dBm								
6.0 GHz			30000 pt	S	30	0.0 MHz/		9.0 GHz

## Plot 9 GHz to 12 GHz:

MultiView	😁 Spectrum							
Att	5.00 dBm Offse 35 dB SWT		№ 100 kHz № 300 kHz Mo	de Auto Sweep				o t DL View
1 Frequency (	Sweep							●1Pk View
0 dBm								
-10 dBm								
-20 dBm	H1 -12.860 dBm							
-30 dBm								
-40 dBm								
-50 dBm								
<sup>la f</sup> han anglal ang biologi Thinting <u>ang ang biologi</u>	an a star a s	La parte de la falle de la diversión nomes en anterna de la contra de la contra de la contra de la contra de la	united participation in the	an a ballanda ana falahara kao tao Manana sa kao palana sa manana	lailan (a) dha ang dipilang ata Maladari Mangan na ang ang ata dipilang katalaka kata	and a state of the second second	and for the street for the following	andrind of a terroristic day where the processing of the procession
-70 dBm								
-80 dBm			30000 pt	S	30	0.0 MHz/		12.0 GHz



# Plot 12 GHz to 15 GHz:

MultiView	B Spectrum								
RefLevel 15 Att	.00 dBm Offset 35 dB SWT		₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep					
1 Frequency S	weep								●1Pk View
10 dBm									
0 dBm									
-10 dBm	H1 -12.860 dBm								
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm									
hour data to the state	and productions, such as	train made and other	ata al an an addinated an top	and an a late of the table of a sec	net Donald Justilia analiste pro	a design that a state of a second	deckroadel a base of fact	mana katon ka wadin f	aligned a design and bottle
1450 (ABH)	ayanıy İlandəyi və hətəri yərə bələri yərəbirdi.	whether the state of the second	and the second	and the first of the second states	alifyers of same constraints	<sup>1906</sup> - North Start, Start Andrew (North Start), and	a <mark>haduwa da kasaluat tera jerangana</mark> na	and the state of the	<mark>na in an /mark>
-70 dBm									
-80 dBm									
12.0 GHz			30000 pt	ts	30	0.0 MHz/			15.0 GHz

# Plot 15 GHz to 18 GHz:

MultiView	🕄 Spectrum								
RefLevel 15 Att	35 dB <b>SWT</b>	t 1.28 dB • RB 30 ms • VB	№ 100 kHz № 300 kHz Mo	de Auto Sweep					e t Die Viewe
1 Frequency S	Sweep								●1Pk View
) dBm									
10 dBm									
	-H1 -12.860 dBm								
-20 dBm									
30 dBm									
40 dBm									
50 dBm	color, key des jock op at sjoch standt den			na tana kata da manana kata kata kata kata kata kata kata	distable de secola da da	and the static burgers of the barry structure of the	6. 1940 J. (1970 M. 1980 M. 19	enterinet Hilling led a locate an an	Normal a stand of the later of the stand
60 dBm	an a final state of part and the part of a second state of a secon	<mark>lagr<sup>a t</sup>alandi gi sa papalan sa gu</mark>	en en fil stelen dere lette odges på ges på en	na kalender, itt Kaning som der Hörlich	dar Mittel Loopbiggheetilerithe	an period and a feature to a part of the	na kodina, manta gina mata ana kata	adaatiidaa goolayisaaaabaa yoo ayaaba	the feature that the second proceeds a
70 dBm									
80 dBm									
15.0 GHz			30000 pt	ls	30	0.0 MHz/			18.0 GH



# Plot 18 GHz to 21 GHz:

MultiView	B) Spectrum								
Ref Level 15 Att	.00 dBm Offse 35 dB SWT		₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep					
1 Frequency S									●1Pk View
10 dBm									
0 dBm									
-10 dBm	H1 -12.860 dBm								
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm	and the second			lantara kaominina dia mpika kataka d	der Laureh, mennette der bereiten		Ungen land line line and line of		a been a second as been a
-60 dBm-		one of the factor of the facto	an a						
-70 dBm									
-80 dBm									
18.0 GHz	1		30000 pt	l ts	30	0.0 MHz/		1	21.0 GHz

### Plot 21 GHz to 24 GHz:

MultiView	spectrum								
Att	15.00 dBm Offse 35 dB SWT		₩ 100 kHz № 300 kHz Mo	de Auto Sweep					
1 Frequency	/ Sweep								●1Pk View
0 dBm									
-10 dBm	H1 -12.860 dBm								
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm	net the state of a lay and a fail of a lay only	adutara na m	La La Albert	da at a s					
-60 dBm	ra na prava da da da da da persona da person Altera da ferencia de persona da p	and a second production of the state of the second s	na na serie presenta de la serie de Regelle principal de constituir de la serie de la s	httiskosi polek perekiite perekiite. Mitter on territer en de en algebraac	l efficient parley for the constant of young the efficiency for the classific entropy to the constant of the second s				han ya ka di Ala ka ya Ka wa ka Mana Ala Ala Ala Ala Aya ka wa wa ka wa ka wa ka wa ka
-70 dBm									
-80 dBm									
21.0 GHz		I	30000 pt	ts	30	0.0 MHz/	I	I	24.0 GHz



# Plot 24GHz to 25 GHz:

MultiView 🕀 Spectrum									
Ref Level         15.00         dBm         Offset         1.28         dB         RBW         100         kHz           ● Att         35         dB         SWT         30         ms         ● VBW         300         kHz         Mode         Auto         Sweep         Sweep         Sweep         Sweep         Sweep         Sweep         Sweep         Sweep									
1 Frequency S									●1Pk View
10 dBm									
0 dBm									
-10 dBm	H1 -12.860 dBm-								
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm	en por taller of south talls, etc. sola, la fac	anas, cearcal thadke ceality a	te blavat i versitere timetekning fredetik	y ku ya jina pilikina di dala	นารุปอร์มีโซอร์เตราได้ไม่ <sub>เรา</sub> อน	the histolety out to a first the	te the first and the state of the test of the state	and a second processing the second	
and the standard stan	n de positio d'Altra de positio de la construcción de la construcción de la construcción de la construcción de Anticipation de la construcción de l	the ball of the proceeding the stand of the st	alle ophigette printen heltikette	fernellen politiker ander som det som att som et som att som a Till som att so	neres d'Arrester des profes	in terretal dan keminikan kanya pe	<mark>વાગણવીને તેવુક વાદે છે. તે </mark>	an a su an	barear nd a second of a
-60 dBm									
-70 dBm									
-80 dBm									
24.0 GHz			30000 pt	S	10	0.0 MHz/			25.0 GHz



### 4. WiFi 2.4GHz 802.11 n40 mode

### Reference Level Measurement

	Lowest frequency 2422 MHz			requency MHz	Highest frequency 2452 MHz		
	Chain A	Chain B	Chain A		Chain A	Chain B	
Reference Level Measurement (dBm)	-0.34	-0.54	3.70	3.57	-1.41	-1.86	
Measurement uncertainty (dB)	±1.5						

## Chain A / B:

Lowest frequency 2422 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-30.34 / -30.54

Middle frequency 2437 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-26.30 / -26.43

Highest frequency 2452 MHz	Limit (dBm)
All peaks are more than 20 dB below the limit.	-31.41 / -31.86

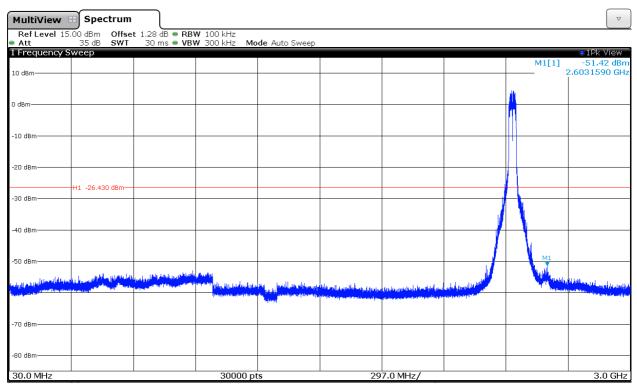
Verdict: PASS



See next plots of worst case: Mode n40. Middle Channel: 2437 MHz. Chain B.

Number of sweep points: 30,000.

### Plot 30 MHz to 3 GHz:



Note: The peak above the limit is the carrier frequency.

#### Plot 3 GHz to 6 GHz:

MultiView	B Spectrum							
RefLevel 15 Att	35 dB <b>SWT</b>	t 1.28 dB • RB 30 ms • VB	№ 100 kHz № 300 kHz Mo	de Auto Sweep				
1 Frequency S	Sweep							●1Pk View
10 dBm								
0 dBm								
-10 dBm								
-20 dBm								
-30 dBm	H1 -26.430 dBm							
-40 dBm								
-50 dBm								
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-70 dBm								
-80 dBm								
3.0 GHz	L		30000 pt	S	30	0.0 MHz/		6.0 GH



# Plot 6 GHz to 9 GHz:

MultiView	Spectrum							
RefLevel 15. Att	.00 dBm Offse 35 dB SWT		₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep				
1 Frequency S	weep							●1Pk View
10 dBm								
0 dBm								
-10 dBm								
-20 dBm								
-30 dBm	H1 -26.430 dBm							
-40 dBm								
-50 dBm								
والتعريدين الإيطاري والتقرير	historia (heli andre i heli andre	Alan and a landon	Notes and an all and	البريون بالرسالية أعمانيه معاقبون	ord. All the constraints		i daga gala yaka kata data data data data data data d	n in a standard black til data da a in a San standard (Strandard Strandard Strandard Strandard Strandard Strandard Strandard Strandard Strandard Strandard
hoozefik terdiyeyeyeyeye	linda) <mark>wittel</mark> mused with the	and Representation of the second science of the left	anna Indalan - an anna	a na fallen och at standare fat standare	an ingen der Können der Können der Anter	and a state of the second s	and the real of the	
-70 dBm								
-80 dBm								
6.0 GHz			30000 pt	IS	30	0.0 MHz/		 9.0 GHz

# Plot 9 GHz to 12 GHz:

MultiView	B) Spectrum								
RefLevel 15 Att	35 dB SWT	t 1.28 dB • RBV 30 ms • VBV	№ 100 kHz № 300 kHz Mo	de Auto Sweep					
1 Frequency S	weep								●1Pk View
0 dBm									
-10 dBm									
-20 dBm									
	H1 -26.430 dBm								
-30 dBm									
-40 dBm									
-50 dBm									
-60 diamana adalah		a <sub>n pe</sub> ktoli provinse and disk inget. Name angende datast dispite provinse	huist fearing of a second of the	ling and the output from the output stronger production of the strong party of	anderselliget filmstersellstere Sterepassense	a adalah matana di salam (da di silaya dali 1997 ng pangana di sina ang mangana dal	lines de la constant br>La constant de la cons	n Stagt and a state of the History	
-70 dBm									
-80 dBm									
9.0 GHz	I		30000 pt	S	30	0.0 MHz/	1	1	12.0 GHz



## Plot 12 GHz to 15 GHz:

MultiView	Spectrum							
Att	.00 dBm Offse 35 dB SWT		№ 100 kHz № 300 kHz Mo	de Auto Sweep				
1 Frequency S	weep							●1Pk View
10 dBm								
0 dBm								
-10 dBm								
-20 dBm								
-30 dBm	-H1 -26.430 dBm							
-40 dBm								
-50 dBm			ورج فالانتقاف فالمتلجين	Alastated and a Managed Acad	a particular and an addition of the following sector of the sector of th		and the second	the state of the state of the state
-60 dBm		a construction and the	and block and a second second	digen silamen diri fan de f			and a design of the party of th	ي <u>معر المتحكم المالية من المليم من المليمة الم</u> ليمة الم
-70 dBm								
-80 dBm								
12.0 GHz			30000 pt	S	30	0.0 MHz/		15.0 GHz

## Plot 15 GHz to 18 GHz:

MultiView	B Spectrum								
Att	5.00 dBm Offse 35 dB SWT		₩ 100 kHz № 300 kHz Mo	de Auto Sweep					●1Pk View
1 Frequency S	sweep								• IPK VIEW
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm	H1 -26.430 dBm-								
-40 dBm									
-50 dBm	hanna sa gung ti pike ti Madhase kada piki	at containing an east		n, samalasa as ss. <mark>kandabat</mark>	a finanta <b>bail</b> a yang dekita silayan anis kitak	on habilitarije stitanji benata te	an salat at ta san ta da san da ta ma	Millelland constant of the second	وروار والمروم والمروم والمروم والمروم والمروم
-60 dem	n han general de general general de la politika de la serie de la politika de la serie de la politika de la se Angelera de la politika de la politik Angelera de la politika de la politik	energen for jarreprejjerij Jeronege notesterne av de service Allerenerge	aligned to be provided in the second second	n berken anderen an die Berken die	dirlatif" a provinsion and	dentelis i i spaniska pinateli pisla propi	anger and the second	angelegan general general fall megeneral fall me	-paperpressive options
-70 dBm									
-80 dBm									
15.0 GHz			30000 pt	ts	30	0.0 MHz/			18.0 GHz



# Plot 18 GHz to 21 GHz:

MultiView	B) Spectrum								
Ref Level 15 Att	.00 dBm Offse 35 dB SWT		№ 100 kHz № 300 kHz Mo	de Auto Sweep					
1 Frequency S	weep								●1Pk View
10 dBm									
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm	H1 -26.430 dBm								
-40 dBm									
-50 dBm	alara ta la sharahara a maati	1			a constantine and		the faith of the landstate	na tan mana kati sa nana ikal	nation das fointes for a commu
-60 dBm	a na manta na batina lina na filianya. Ana manta na batina lina na filianya	Parallel and a second	a ya a ya angangka shika na na fiya na ya a ya angangka shika na na fiya	ka sa ka Ng ka panganganganganganganganganganganganganga	te en frankriger fra ser frankriger De frankriger frankriger frankriger	a participation and a second second	estimustations <mark>agentempte</mark> Medicali		and supervised provided a state
-60 dBm									
-70 dBm									
-80 dBm									
18.0 GHz	1		30000 pt	S	30	0.0 MHz/	1	1	21.0 GHz

# Plot 21 GHz to 24 GHz:

MultiView	B Spectrum								$\bigtriangledown$
RefLevel 15 Att	35 dB <b>SWT</b>	t 1.28 dB • RB 30 ms • VB	₩ 100 kHz ₩ 300 kHz Mo	de Auto Sweep					●1Pk View
1 Frequency S	sweep								IPK View
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm	H1 -26.430 dBm								
-40 dBm									
-50 dBm		and the state of the second second	la man fan tallak kan mana kan d	an an ann an	n and have been and a second	adalaniki tupine andali	فعرجها والالعاد الأدام والالعادية	n in physical and a statement of the	alasta alasta di badi
-60 dBm	a <mark>l <sup>para</sup>ta an <sup>bi</sup>la sa san sa kaji an sa babis</mark>	ىلىكەر <sup>ي</sup> اسىرىغىر <mark>ئۇس</mark> ۇنىلەرمىر يىرامىيىكىيە مە <mark>م</mark>	a balan analah kun na baha shire na baha bas	a nel graveri di Del lefondazione di ende di <sup>dal</sup> p	a ta papata panja ta	ine and the provided set of the second second set of the second second second second second second second second	a desta de la d La desta de la d	n television protocial factoria distributional	and an and second s
-70 dBm									
-80 dBm									
21.0 GHz				ts	30	0.0 MHz/	<u> </u>	<u> </u>	24.0 GHz



# Plot 24GHz to 25 GHz:

MultiView	B Spectrum								
RefLevel 15 Att	.00 dBm Offse 35 dB SWT	t 1.28 dB • RBV 30 ms • VBV	V 100 kHz V 300 kHz Mo	de Auto Sweep					
1 Frequency S	weep								●1Pk View
10 dBm									
0 dBm									
-10 dBm									
-20 dBm									
-30 dBm	H1 -26.430 dBm								
-40 dBm									
-50 dBm	an an <mark>halaile dha an an balan</mark> d	والمراجع والمراجع والمراجع والمراجع	Hellefter och and	ale (ab point to the	P <sup>1</sup> Fallinga Hardaa Maja	. (Million de la fallense a	nd autombookultuseeerthäukit	ally and schargeliter (1997) or 1	leadel ( estimation of the second
-60 dBm	anna fa <mark>hain 18 - 19 na seanna bhaileanna</mark> na ceanna ann ann ann ann ann ann ann ann an	and pick by the provide and the second second	ing to a low the state of the s	n je kolenstati na fina ini te protestano	Angel da particular de la factoria per parte	en fan de kenne fan jinder fan de kenne fan	analydyferegyddiaethygygy	- Andrew Jerland Andrew Andrewski	no de la segunda de servición e
-70 dBm									
-80 dBm									
24.0 GHz	1		30000 pt		10	0.0 MHz/			25.0 GHz



#### Section 15.247 Subclause (d) / RSS-210 A8.5. Band-edge emissions compliance (Transmitter)

#### **SPECIFICATION**

Emissions outside the frequency band in which the intentional radiator is operating shall be at least 20dB below the highest level of the desired power. 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 instead of 20 dB.

#### **RESULTS:**

Note: Radiated measurements were used to show compliance with the limits in the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

## LOW FREQUENCY SECTION 2412 MHz. CONDUCTED.

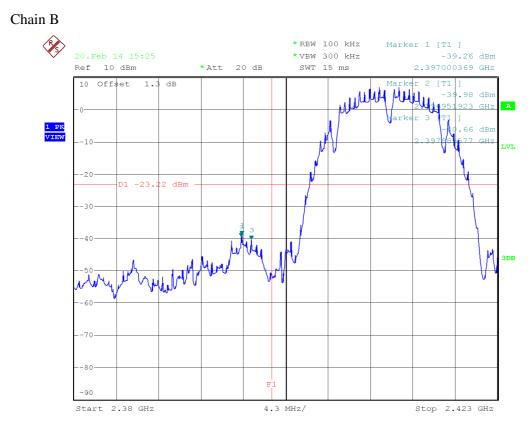
#### <u>1. WiFi 2.4GHz 802.11 b mode</u>

See next plots.

Chain A



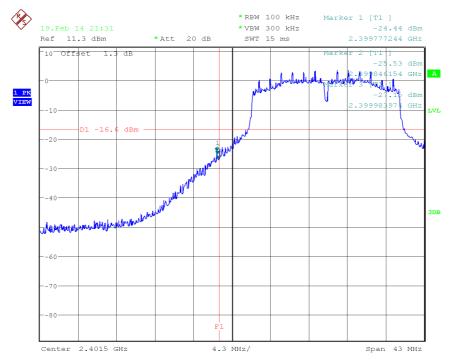




Verdict: PASS

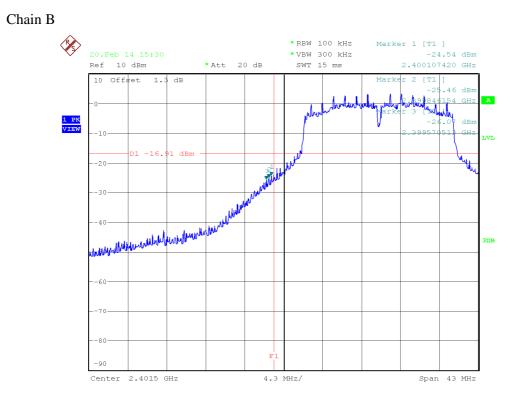
## 2. WiFi 2.4GHz 802.11 g mode

Chain A



Date: 19.FEB.2014 21:31:34



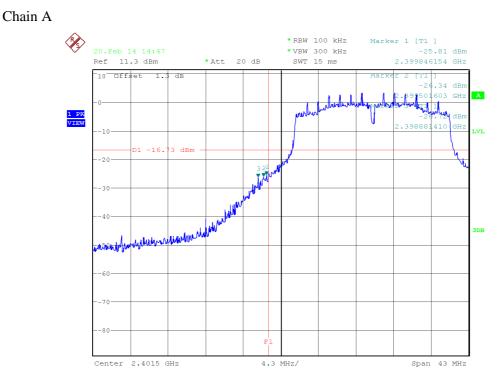


Date: 20.FEB.2014 15:30:52

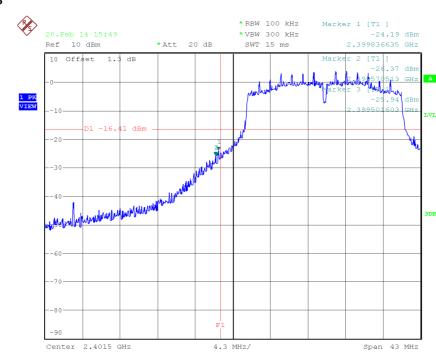
Verdict: PASS (NOTE: The limit is set to -20 dBc since the maximum peak conducted output power was measured for this mode.)



## <u>3. WiFi 2.4GHz 802.11 n20 mode</u>



Date: 20.FEB.2014 14:47:14



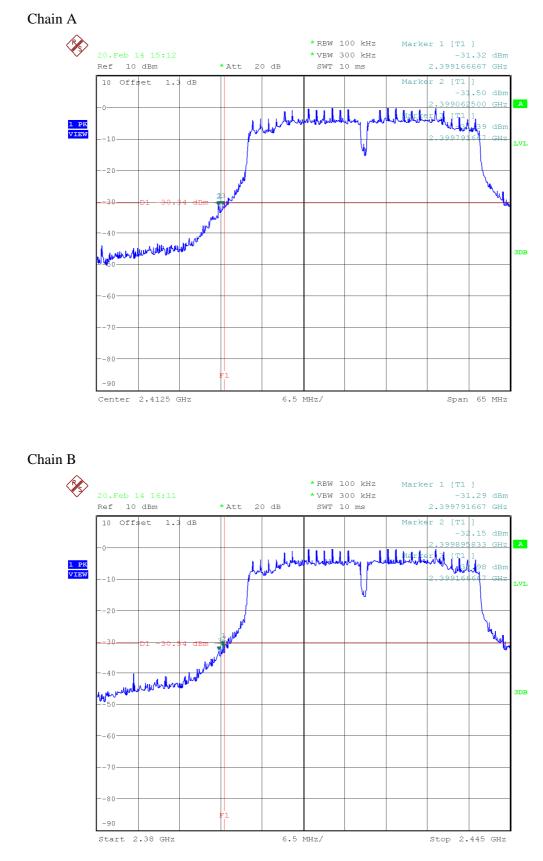
Chain B

Verdict: PASS (NOTE: The limit is set to -20 dBc since the maximum peak conducted output power was measured for this mode.)

Date: 20.FEB.2014 15:49:54



## 4. WiFi 2.4GHz 802.11 n40 mode



Verdict: PASS



## Section 15.247 Subclause (e) / RSS-210 A8.5. Power spectral density

#### **SPECIFICATION**

For digitally modulated systems, 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.

#### **RESULTS**

The maximum power spectral density level in the fundamental emission was measured using the method of trace averaging with EUT transmitting at full power throughout each sweep according to point 10.3. of Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas Guidance v03r01 dated 09/04/2013. This method was used for 802.11b and 802.11n40 modes.

For 802.11g and 802.11n20 modes the PKPSD (peak PSD) method was used since the maximum peak conducted output power was measured for this mode.

For MIMO mode, the *Measure and add 10 log(NANT) dB*, (where *NANT* is the number of outputs) technique was used according to the Guidance for Emission Testing of Transmitters with Multiple Outputs in the Same Band 662911 D01 Multiple Transmitter Output v02r01 dated 10/31/2013.

With this technique, spectrum measurements are performed at each output of the device, and the quantity  $10 \log(NANT)$  dB is added to each spectrum value before comparing to the emission limit. Number of outputs = 2.

#### 1. WiFi 2.4GHz 802.11 b mode

Power spectral density (See next plot of worst case = highest level).

	Lowest f	requency	Middle f	requency	Highest frequency	
	2412 MHz		2437 MHz		2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Power spectral density (dBm)	-0.869	-0.583	0.170	0.266	-0.802	-1.194
Measurement uncertainty (dB)			±1	1.5		

Verdict: PASS



## 2. WiFi 2.4GHz 802.11 g mode

Power spectral density (See next plot of worst case = highest level).

	Lowest f	requency	Middle f	requency	Highest frequency	
	2412 MHz		2437 MHz		2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Power spectral density (dBm)	3.73	4.33	6.99	7.76	1.99	2.20
Measurement uncertainty (dB)			±.	1.5		

Verdict: PASS (NOTE: the PKPSD (peak PSD) method was used since the maximum peak conducted output power was measured for this mode).

## 3. WiFi 2.4GHz 802.11 n20 mode

Power spectral density (See next plot of worst case = highest level).

	Lowest f	Lowest frequency		requency	Highest	frequency
	2412 MHz		2437 MHz		2462 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Power spectral density (dBm)	3.77	3.87	6.90	7.54	1.36	1.36
Measurement uncertainty (dB)			±	1.5		

МІМО	Lowest f	requency MHz		requency MHz	Highest frequency 2462 MHz	
	Chain A+B		Chain A+B		Chain A+B	
	Port A	Port B	Port A	Port B	Port A	Port B
Power spectral density (dBm)	2.62	1.70	-6.92	-6.59	2.25	1.65
Power spectral density (dBm) + 10*Log(2)	5.63	5.26	-3.91	-3.58	5.26	4.66
Measurement uncertainty (dB)	<u>±</u> ]	1.5	±1.2		±1.5	

Verdict: PASS (NOTE: the PKPSD (peak PSD) method was used since the maximum peak conducted output power was measured for this mode. The Middle channel (MIMO A+B) was measured with RBW=3KHz and VBW=30KHz.)



## 4. WiFi 2.4GHz 802.11 n40 mode

Power spectral density (See next plot of worst case= highest level).

	Lowest f	requency	Middle f	requency	Highest frequency	
	2422 MHz		2437 MHz		2452 MHz	
	Chain A	Chain B	Chain A	Chain B	Chain A	Chain B
Power spectral density (dBm)	-9.504	-9.990	-5.311	-5.960	-10.121	-11.653
Measurement uncertainty (dB)			±.	1.5		

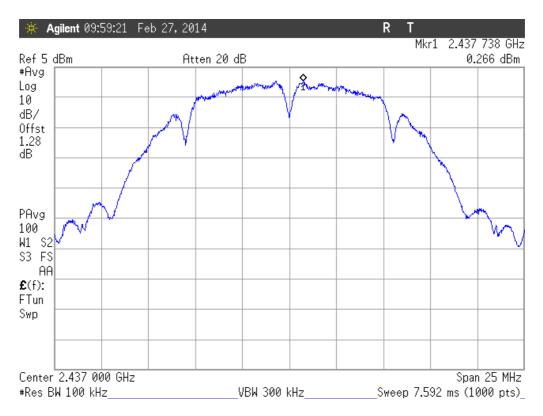
		requency		requency	Highest frequency 2452 MHz		
MIMO	2422 MHz		2437	2437 MHz		MHz	
	Chair	Chain A+B		Chain A+B		Chain A+B	
	Port A	Port B	Port A	Port B	Port A	Port B	
Power spectral density (dBm)	-13.957	-13.139	-9.599	-9.440	-13.933	-13.726	
Power spectral density (dBm) + 10*Log(2)	-10.95	-10.13	-6.59	-6.43	-10.92	-10.72	
Measurement uncertainty (dB)			±	1.5			

Verdict: PASS



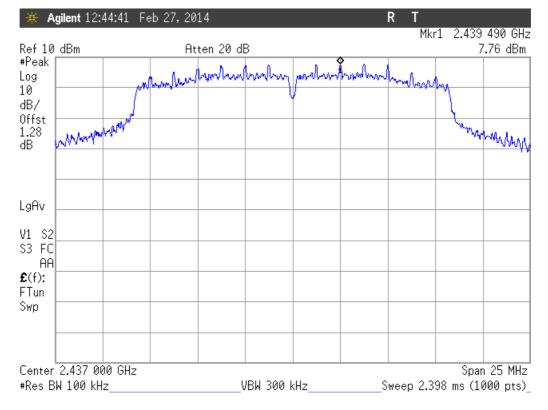
## 1. WiFi 2.4GHz 802.11 b mode

Middle Channel: 2437 MHz. Chain B.



# 2. WiFi 2.4GHz 802.11 g mode

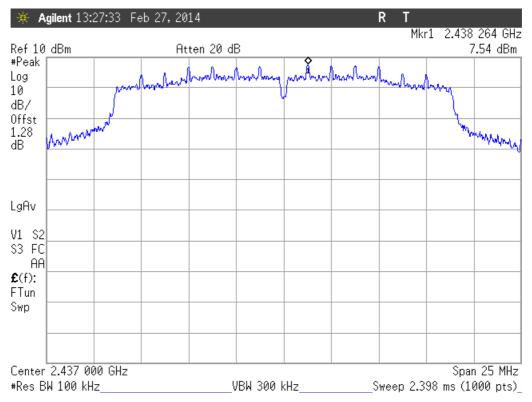
Middle Channel: 2437 MHz. Chain B.



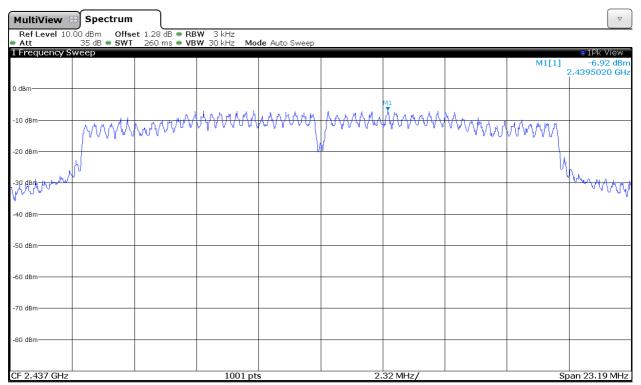


## 3. WiFi 2.4GHz 802.11 n20 mode

SISO. Middle Channel: 2437 MHz. Chain B.



MIMO. Middle Channel: 2437 MHz. Chain A+B. Port A.



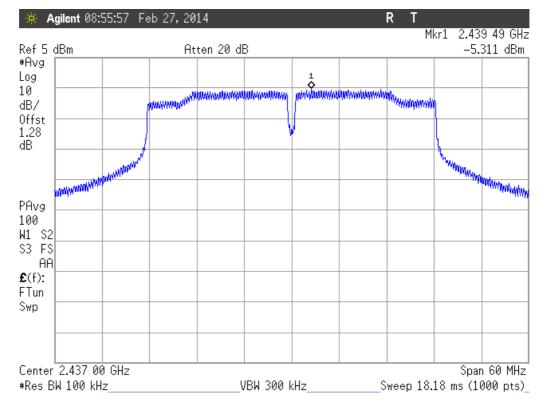


MultiView	B) Spectrum								
RefLevel 10 Att		et 1.28 dB • RB 260 ms • VB		de Auto Sweep					
1 Frequency S								M1[1]	● 1Pk View -6.59 dBm 2.4363680 GHz
0 dBm									
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-20 dBm	1	n là v an					· · · / //•	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
238 Ballynyn W	1								Mulunghynor
-40 dBm									• • • • • •
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
CF 2.437 GHz			1001 pt	s	2.	26 MHz/		Sp	an 22.59 MHz

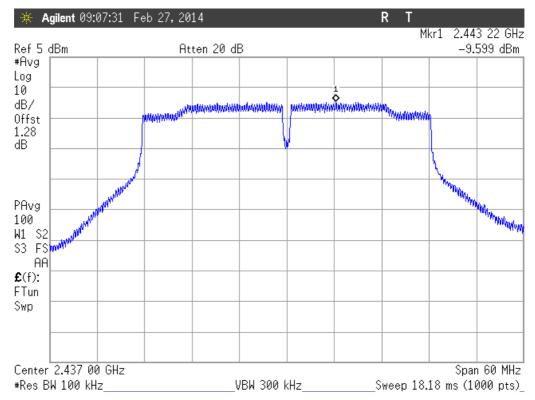
# MIMO. Middle Channel: 2437 MHz. Chain A+B. Port B.

# 4. WiFi 2.4GHz 802.11 n40 mode

SISO. Middle Channel: 2437 MHz. Chain A.







MIMO. Middle Channel: 2437 MHz. Chain A+B. Port A.

MIMO. Middle Channel: 2437 MHz. Chain A+B. Port B.

