

RF TEST REPORT

	Test item	:	Mobile Computer
	Model No.	:	PM450
	Order No.	:	DTNC1409-03751
	Date of receipt	:	2014-09-01
	Test duration	:	2014-10-01 ~ 2014-10-14
	Date of issue	:	2014-12-10
	Use of report	:	FCC Original Grant
Applicant	: POINTMOBII	LE C	CO., LTD.
	Gasan-dong South Korea,		F, Kabul Great Valley 32 Digital-ro 9-gil, Geumcheon-gu, Seoul 3-709
Test laboratory	: DT&C Co., L	td.	
(down franklik kiele) – ber (downlawr - 🍋)		154	lbeon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935
	Test specification	:	FCC Part 15 Subpart C 247 RSS-210 Issue 8: 2010
	Test environment)	See appended test report
	Test result	:	: 🛛 Pass 🗌 Fail

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DT&C Co., Ltd.

Tested by:

Reviewed by:

a

Engineer HoonPyo Lee

The

Technical Manager GeunKi Son

TRF-RF-213(04)140314

DT&C Co., Ltd.

Test Report Version

Test Report No.	Date	Description
DRTFCC1412-1601	Dec. 10, 2014	Initial issue

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1. GENERAL INFORMATION

Applicant	:	POINTMOBILE CO., LTD.
Address	:	Gasan-dong B-9F, Kabul Great Valley 32 Digital-ro 9-gil, Geumcheon-gu, Seoul South Korea, 153-709
FCC ID	:	V2X-PM450
EUT	:	Mobile Computer
Model	:	PM450
Additional Model(s)	:	NA
Date of Test	:	2014-10-01 ~ 2014-10-14
Contact person	:	W.S. Park

2. EUT DESCRIPTION

Product	Mobile Computer
Model Name	PM450
Power Supply	DC 3.7 V
Battery type	Standard Battery: Lithium Ion Battery
Frequency Range	2.4GHz Band • 802.11b/g/n(20 MHz): 2412 MHz ~ 2462 MHz
Max. RF Output Power	2.4GHz Band • 802.11b: 16.27 dBm • 802.11g: 22.64 dBm • 802.11n (HT20): 21.96 dBm
Modulation Type	802.11b: DSSS/CCK 802.11g/n: OFDM
Antenna Specification	Internal Antenna (1TX ,1RX) • 2.4GHz Band Max. peak gain : 1.911 dBi

3. SUMMARY OF TESTS

FCC Part Section(s)	RSS Section(s)	Parameter	Limit	Test Condition	Status Note 1
I. Transmitter	Mode (TX)	·	•		
15.247(a)	RSS-210 [A8.2]	6 dB Bandwidth	> 500 kHz		С
15.247(b)	RSS-210 [A8.4]	Transmitter Output Power	< 1 Watt		С
15.247(d)	RSS-210 [A8.5]	Out of Band Emissions / Band Edge	20 dBc in any 100 kHz BW	Conducted	С
15.247(e)	RSS-210 [A8.2]	Transmitter Power Spectral Density	Transmitter Power Spectral		С
-	RSS-Gen [6.6]	Occupied Bandwidth (99%)	RSS-Gen(6.6)		NA
15.205 15.209	RSS-210 [A8.5]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	<fcc 15.209="" limits<="" td=""><td>Radiated</td><td>C Note 2</td></fcc>	Radiated	C Note 2
15.207	RSS-Gen [8.8]	AC Conducted Emissions	< FCC 15.207 limits	AC Line Conducted	С
15.203	RSS-Gen [6.7]	Antenna Requirements	FCC 15.203	-	С
Note 1: C =Con Note 2: This te		Comply NT =Not Tested NA =N ormed in each axis and the worst ca	ot Applicable se data was reported.		

4. TEST METHODOLOGY

Generally the tests were performed according to the KDB558074 v03r2. And ANSI C63.10-2009 was used to reference appropriate EUT setup and maximizing procedures of radiated spurious emission and AC line conducted emission testing

4.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT EXERCISE

The EUT was operated in the test mode to fix the TX frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

4.3 GENERAL TEST PROCEDURES

Conducted Emissions

The power-line conducted emission test procedure is not described on the KDB 558074 v03r2. So this test was fulfilled with the requirements in Section 6.2 of ANSI C63.10.

The EUT is placed on the non-conductive table, which is 0.8 m above ground plane and the conducted emissions from the EUT measured in the frequency range between 0.15MHz and 30MHz using CISPR Quasi-peak and Average detector.

Radiated Emissions

Basically the radiated tests were performed with KDB 558074 v03r2. But some requirements and procedures like test site requirements, EUT setup and maximizing procedure were fulfilled with the requirements in Section 5 and 6 of the ANSI C63.10 as stated on section 12.1 of the KDB 558074 v03r2.

The EUT is placed on a non-conductive table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the highest emission, the relative positions of the EUT were rotated through three orthogonal axes..

4.4 DESCRIPTION OF TEST MODES

The EUT has been tested with all modes of operating conditions to determine the worst case emission characteristics. A test program is used to control the EUT for staying in continuous transmitting mode.

5. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

6. FACILITIES AND ACCREDITATIONS

6.1 FACILITIES

The open area test site (OATS) or semi anechoic chamber and conducted measurement facility used to collect the radiated and conducted test data are located at the 683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-080, Korea. The site is constructed in conformance with the requirements.

- Semi anechoic chamber registration Number: 678747(FCC) & 5740A-2(IC)

6.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and peak, quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

7. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203& RSS-Gen [7.1.2]:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

The internal antenna is attached on the main PCB using the special spring tension. Therefore this E.U.T Complies with the requirement of §15.203

8. TEST RESULT

8.1 6 dB Bandwidth

Test Requirements and limit, §15.247(a)& RSS-210 [A8.2]

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

TEST CONFIGURATION

Refer to the APPENDIX I.

TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer and used following test procedure of KDB558074 v03r2.

- 1. Set resolution bandwidth (RBW) = 100 kHz
- 2. Set the video bandwidth (VBW) \ge 3 x RBW.
- (RBW:100kHz/VBW:300 kHz)
- 3. Detector = **Peak**.
- 4. Trace mode = **max hold**.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.

7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

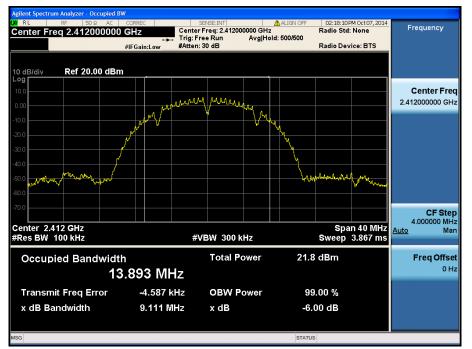
TEST RESULTS: Comply

Test Mode	Data Rate	Frequency [MHz]	Test Results[MHz]
		2412	9.111
802.11b	1 Mbps	2437	9.113
		2462	9.092
		2412	15.110
802.11g	6 Mbps	2437	15.540
		2462	15.710
		2412	15.710
802.11n (20 MHz)	MCS 0	2437	15.320
(, , ,		2462	15.630

RESULT PLOTS

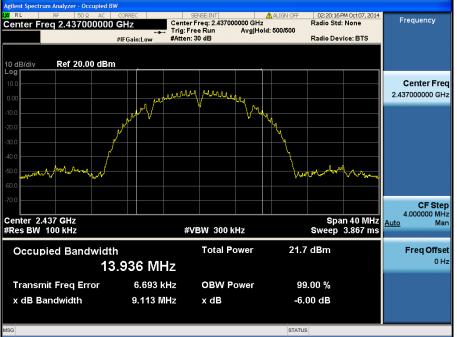
6 dB Bandwidth

Test Mode: 802.11b & 1 Mbps & 2412 MHz

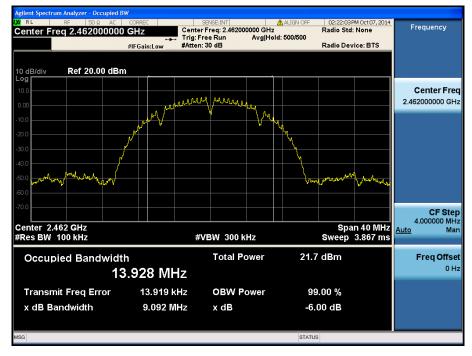


6 dB Bandwidth

Test Mode: 802.11b & 1 Mbps & 2437 MHz



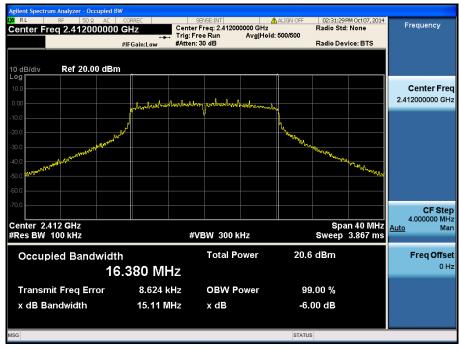
Test Mode: 802.11b & 1 Mbps & 2462 MHz



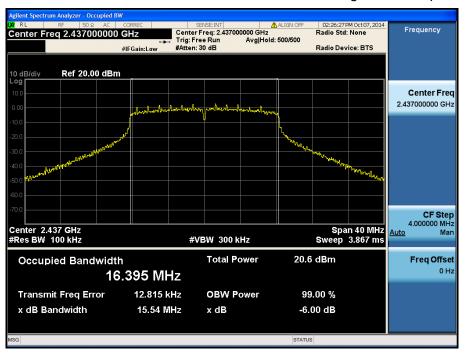
& 2437 MHz

6 dB Bandwidth

Test Mode: 802.11g & 6 Mbps & 2412 MHz



6 dB Bandwidth

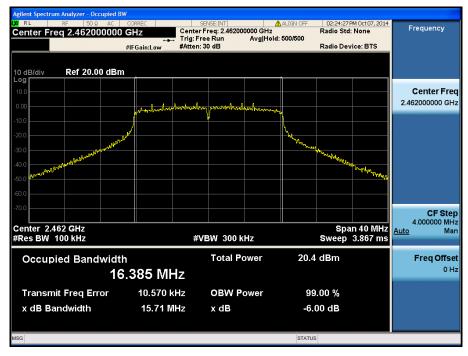


Test Mode: 802.11g

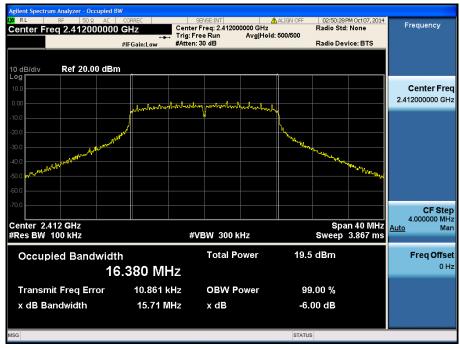
&

6 Mbps

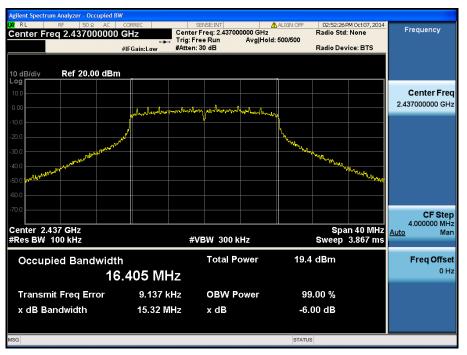
Test Mode: 802.11g & 6 Mbps & 2462 MHz



Test Mode: 802.11n & MCS 0 & 2412 MHz



6 dB Bandwidth



Test Mode: 802.11n

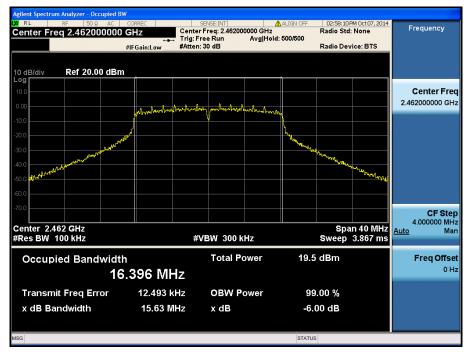
&

MCS 0

&

2437 MHz

Test Mode: 802.11n & MCS 0 & 2462 MHz

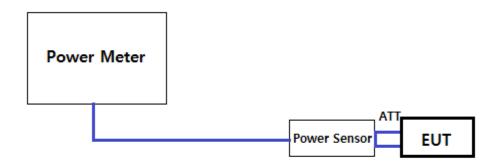


8.2 Maximum Peak Conducted Output Power

Test Requirements and limit, §15.247(b) & RSS-210 [A8.4]

The maximum permissible conducted output power is 1 Watt.

TEST CONFIGURATION



TEST PROCEDURE:

1. PKPM1 Peak power meter method of KDB558074 v03r2

The maximum conducted output powers were measured using a broadband peak RF power meter which has greater video bandwidth than DUT's DTS bandwidth and utilize a fast-responding diode detector.

2. Method AVGPM-G (Measurement using a gated RF average power meter) of KDB558074 v03r2

The average conducted output powers were measured using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

- Measurement Data: Comply

- Test Results

				Test Result [dBm]							
Mode Channel	Frequency [MHz]	Detector	DATA RATE [Mbps]								
				1	2	5.5	11	NA	NA	NA	NA
	4	2442	РК	16.27	16.19	15.96	16.03	-	-	-	-
	1	2412	AV	14.09	14.03	13.98	14.01	-	-	-	-
000 445	C	2437	РК	16.24	16.10	15.89	15.87	-	-	-	-
802.11b	6		AV	14.03	13.98	13.97	13.93	-	-	-	-
			РК	16.08	16.03	15.80	15.71	-	-	-	-
11	2462	AV	13.95	13.91	13.88	13.84	-	-	-	-	

				Test Result [dBm]								
Mode Channel	Frequency [MHz]	Detector	DATA RATE [Mbps]									
			6	9	12	18	24	36	48	54		
	1	2412	PK	22.58	22.51	22.46	22.41	22.44	22.38	22.29	22.30	
	1	2412	AV	13.43	13.32	13.35	13.34	13.34	13.37	13.35	13.31	
902.11 a	G	2437	PK	22.62	22.59	22.57	22.33	22.43	22.29	22.20	22.20	
802.11g	6		AV	13.36	13.31	13.34	13.23	13.27	13.25	13.28	13.30	
		2462	PK	22.64	22.54	22.48	22.25	22.34	22.30	22.11	22.14	
11	2462	AV	13.31	13.24	13.16	13.17	13.17	13.26	13.22	13.23		

Mode Channel				Test Result [dBm]							
	Frequency [MHz]	Detector	or DATA RATE [MCS]								
	[]		0	1	2	3	4	5	6	7	
	4	2412	PK	21.96	21.80	21.91	21.76	21.67	21.56	21.42	21.49
	1 241	2412	AV	12.40	12.18	12.22	12.28	12.29	12.26	12.25	12.24
802.11n	6	0407	PK	21.94	21.80	21.75	21.77	21.60	21.33	21.26	21.43
(HT20)	6	2437	AV	12.36	12.11	12.14	12.27	12.26	12.13	12.13	12.17
			PK	21.74	21.55	21.66	21.52	21.42	21.23	21.06	21.30
11	2462	AV	12.22	12.02	12.08	12.09	12.12	12.08	12.06	12.07	

8.3 Maximum Power Spectral Density

Test requirements and limit, §15.247(e) & RSS-210[A8.2]

The peak power density is measured with a spectrum analyzer connected to the antenna terminal

while the EUT is operating in transmission mode at the appropriate frequencies.

Minimum Standard – specifies a conducted power spectral density (PSD) limit of 8 dBm in any 3 kHz Band segment within the fundamental EBW during any time interval of continuous transmission.

TEST CONFIGURATION

Refer to the APPENDIX I.

TEST PROCEDURE:

Method PKPSD of KDB558074 v03r2 is used.

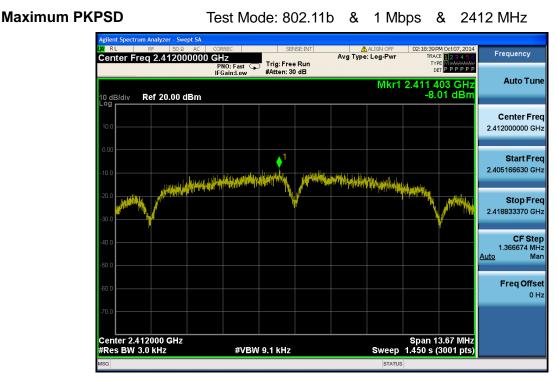
1. Set analyzer center frequency to DTS channel center frequency.

- 2. Set the span to **1.5 times** the DTS bandwidth.
- 3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- 4. Set the VBW \geq 3 x RBW.
- 5. Detector = peak.
- 6. Sweep time = **auto couple**.
- 7. Trace mode = **max hold.**
- 8. Allow trace to fully stabilize.
- 9. Use the **peak marker function** to determine the maximum amplitude level within the RBW.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST RESULTS: Comply

Test Mode	Data Rate	Frequency [MHz]	RBW	PKPSD [dBm]
		2412	3 kHz	-8.01
802.11b	1 Mbps	2437	3 kHz	-8.36
		2462	3 kHz	-8.62
	6 Mbps	2412	3 kHz	-11.14
802.11g		2437	3 kHz	-11.19
		2462	3 kHz	-11.51
	MCS 0	2412	3 kHz	-12.56
802.11n HT20		2437	3 kHz	-13.05
		2462	3 kHz	-12.47

RESULT PLOTS



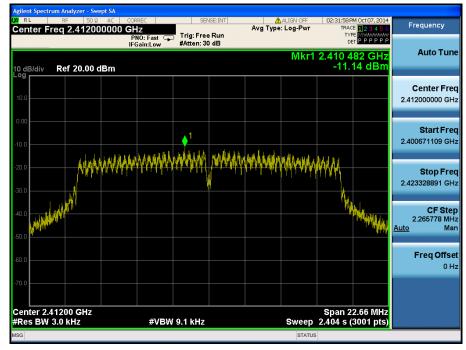
Maximum PKPSD

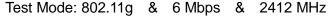
Test Mode: 802.11b & 1 Mbps & 2437 MHz



Test Mode: 802.11b & 1 Mbps & 2462 MHz





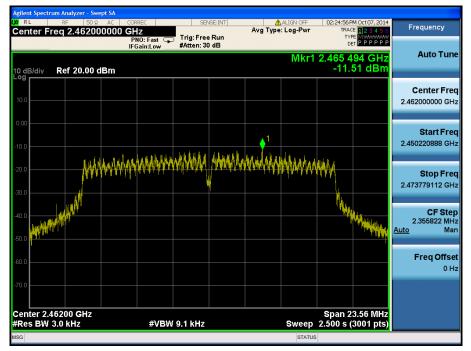


Maximum PKPSD

Test Mode: 802.11g & 6 Mbps & 2437 MHz



Test Mode: 802.11g & 6 Mbps & 2462 MHz



Test Mode: 802.11n(HT20) & MCS 0 & 2412 MHz



Maximum PKPSD

Test Mode: 802.11n(HT20) & MCS 0 & 2437 MHz



Test Mode: 802.11n(HT20) & MCS 0 & 2462 MHz



8.4 Out of Band Emissions at the Band Edge / Conducted Spurious Emissions

Test requirements and limit, §15.247(d) & RSS-210 [A8.5]

§15.247(d) specifies that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to 15.247(b)(3) requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to **15.247(b)(3)** requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in band average PSD level.

In either case, attenuation to levels below the general emission limits specified in §15.209(a) is not required.

TEST CONFIGURATION

Refer to the APPENDIX I.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer.

- Measurement Procedure 1 – Reference Level

- 1. Set instrument center frequency to DTS channel center frequency.
- 2. Set the span to \geq 1.5 times the DTS bandwidth.
- 3. Set the RBW = 100 kHz.
- 4. Set the VBW \geq 3 x RBW.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum PSD level

- Measurement Procedure 2 - Unwanted Emissions

- 1. Set the center frequency and span to encompass frequency range to be measured.
- 2. Set the RBW = 100 kHz.(Actual 1 MHz , See below note)
- 3. Set the VBW \geq 3 x RBW.(Actual 3 MHz, See below note)
- 4. Detector = **peak**.
- 5. Ensure that the number of measurement points \geq span/RBW
- 6. Sweep time = auto couple.
- 7. Trace mode = **max hold.**
- 8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
- 9. Use the peak marker function to determine the maximum amplitude level.

Note : The conducted spurious emission was tested with below settings.

Frequency range: 9 kHz ~ 30 MHz RBW= 100 kHz, VBW= 300kHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, SWEEP POINT: 40001

Frequency range: 30 MHz ~ 10 GHz, 10 GHz~25 GHz RBW= 1MHz, VBW= 3MHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, SWEEP POINT: 40001

LIMIT LINE = 20 dB below of the reference level of above measurement procedure Step 2. (RBW = 100 kHz, VBW = 300 kHz)

If the emission level with above setting was close to the limit (ie, less than 3 dB margin) then zoom scan is required using RBW = 100 kHz, VBW = 300 kHz, SAPN = 100 MHz and BINS = 2001 to get accurate emission level within 100 kHz BW.

Also the path loss for conducted measurement setup was used as described on the Appendix I of this test report.

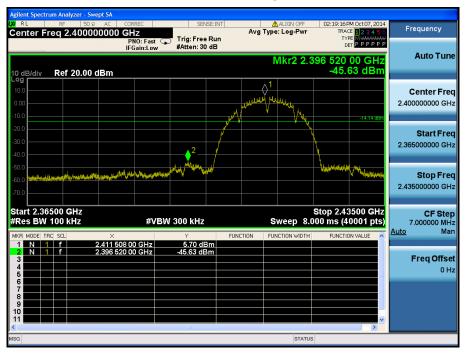
RESULT PLOTS

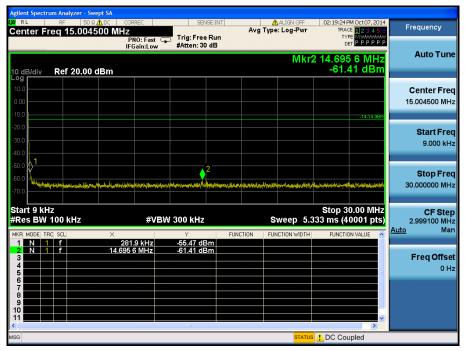
802.11b & 1 Mbps & 2412 MHz

Reference



Low Band-edge





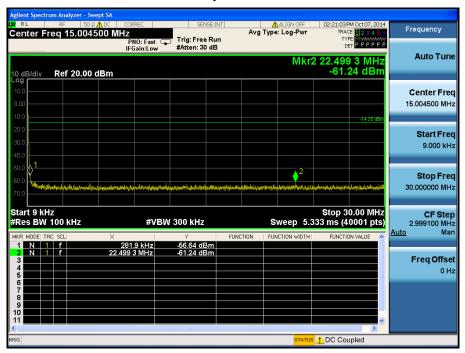
PNO: Fast	SENSE:INT	Avg Type: Log-Pwr	02:19:36 PM Oct 07, 2014 TRACE 1 2 3 4 5 6 TYPE MWWWW	Frequency
	#Atten: 30 dB	Mkr1		Auto Tune
			-14.14.0Hm	Center Fre 5.015000000 GH
		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Start Fre 30.000000 M⊦
				Stop Fre 10.000000000 GF
X	Y FU		(I)	CF Ste 997.000000 Mi <u>Auto</u> Ma
6.957 16 GHz 6.426 75 GHz 7.118 42 GHz 6.949 68 GHz	-41.66 dBm -43.08 dBm -43.50 dBm -43.74 dBm			Freq Offs 0 F
6.078 80 GHz 6.693 20 GHz 6.857 21 GHz 5.559 11 GHz	-43.96 dBm -43.98 dBm -43.99 dBm -43.01 dBm			
	000000 GHz PNO: Fast IFGain:Low 0 dBm 1 1 4 4 4 4 4 4 4 4 4 4 4 4 4	D00000 GHz Trig: Free Run #Atten: 30 dB 0 dBm	Bit State Y Function Avg Type: Log-Pwr PN0: Fast Trig: Free Run #Atten: 30 dB Mkr11 0 dBm 1 1 1 0 dBm 10 7 3 4 10 0 7 3 4 10 7 3 4 4 4 4 4 4 4 10 7 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 </td <td>OD00000 GHz Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Trace: Dig 22 dist is Type: Dig 22 dist is T</td>	OD00000 GHz Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Trace: Dig 22 dist is Type: Dig 22 dist is T



802.11b & 1 Mbps & 2437 MHz



Reference



RL BE 50.9	Ω AC CORREC	SENSE:INT	ALIGN OFF	02:21:15PM Oct 07, 2014	
enter Freq 5.0150			Avg Type: Log-Pwr	TRACE 23456 TYPE MWWWWW DET PPPPP	Frequency
0 dB/div Ref 20.00			Mkr10	7.150 08 GHz -43.44 dBm	Auto Tun
•g 0.0 0.00 0.00				-14.25 dBm	Center Fre 5.015000000 G⊦
0.0	8		$\sqrt{4}$ $\sqrt{2}$ $\sqrt{2}$ 10	nur, indus, initial states	Start Fre 30.000000 MF
					Stop Fre 10.000000000 GF
tart 30 MHz Res BW 1.0 MHz	#VB	W 3.0 MHz	Sweep 18.	Stop 10.000 GHz 67 ms (40001 pts)	CF Ste 997.000000 MH
KR MODE TRC SCL	× 2.438 50 GHz	Y 8.91 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
2 N 1 F 3 N 1 F 4 N 1 F 5 N 1 F	6.322 07 GHz 7.094 99 GHz 5.829 30 GHz 6.932 48 GHz	-42.42 dBm -42.48 dBm -42.81 dBm -43.29 dBm		=	Freq Offs 0 H
6 N 1 f 7 N 1 f	6.809 35 GHz 6.899 83 GHz 2.533 47 GHz 6.737 82 GHz	-43.32 dBm -43.39 dBm -43.41 dBm -43.41 dBm			
8 N 1 F 9 N 1 F 0 N 1 F	7.150 08 GHz	-43.44 dBm		_	

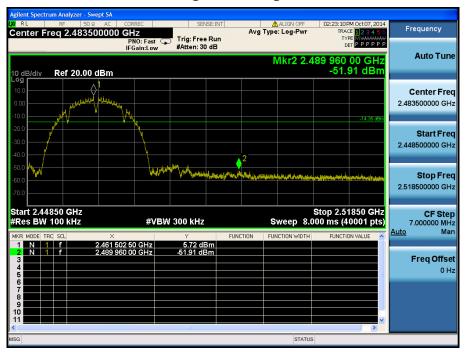
enter Fred 17 50(Ω AC CORREC	SENSE:INT		ALIGN OFF	02:21:24 PM Oct 07, 2014 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast IFGain:Low	Trig: Free Run #Atten: 30 dB	-			
dB/div Ref 20.00	dBm			Mkr5 2	1.875 500 GHz -35.51 dBm	Auto Tun
						Center Fre 17.500000000 GH
		ting the second interaction of payments are a			-14.25 dBm 53	Start Fre 10.000000000 GH
						Stop Fre 25.000000000 GH
art 10.000 GHz es BW 1.0 MHz	#V	BW 3.0 MHz		Sweep 40.	Stop 25.000 GHz 00 ms (40001 pts)	CF Ste 1.500000000 G⊦
R MODE TRC SCL	× 24.955 750 GHz	-31.92 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
N 1 F N 1 F N 1 F N 1 F N 1 F	24.955750 GHz 24.185875 GHz 23.548375 GHz 21.282250 GHz 21.875500 GHz	-31.92 dBm -33.15 dBm -34.63 dBm -35.28 dBm -35.51 dBm			=	Freq Offse 0 H
6						

802.11b & 1 Mbps & 2462 MHz



Reference

High Band-edge



	um Analyzer - S									
X RL Center Fr	RF 50 req 15.004			SENSE			ALIGN OFF : Log-Pwr	TRA	PM Oct 07, 2014 CE 123456 PE M WWWWWW	
		PNO: IFGain	Fast 🖵 :Low	#Atten: 30 d				D	T PPPPP	Auto Tur
10 dB/div	Ref 20.00) dBm					Mkr	2 20.640 -60.3) 6 MHz 89 dBm	Auto Tun
.og 10.0										Center Fre
0.00										15.004500 MH
10.0									-14.35 dBm	
20.0										Start Fre
30.0 40.0										9.000 kH
50.0							2			
60.0	to a discussion of such	untherstation of the states	يرو و المراجع ال	onesk-bada ktar et om då	والمعاصرة برور الإرطاقية و	المحاجات فاقده	e. Ali se di seri se	la le materia de la consta da co		Stop Fre 30.000000 MH
70.0	and a stand of a stand of the last of t	anel La Gandais Analysis (1999-1944) and	a Brita Brita ann an Airlinean an Airlinean Airlinean Airlinean Airlinean Airlinean Airlinean Airlinean Airline Airlinean Airlinean Ai			aan aha ta daa				30.000000 WIF
start 9 kH Res BW			#VBW	300 kHz		Si	weep 5.		0.00 MHz 0001 pts)	
IKR MODE TR		×		Y	FUNCTIO	ON FUN	CTION WIDTH	FUNCTIO	ON VALUE	Auto Ma
1 N 1 2 N 1	f f	294.7 k 20.640 6 M		-55.89 dBm -60.89 dBm						
3 4										Freq Offs
6									==	
8										
9										
11 <u></u>				ш					~	
SG							STATUS	🗜 DC Cou	upled	

gilent Spectrum Analyzer - Sv RL RF 50 Center Freg 5.0150	AC CORREC	SENSE:INT	Avg	ALIGN OFF	02:23:30 PM Oct 07, 2014 TRACE 1 2 3 4 5 6	Frequency
0 dB/div Ref 20.00	PNO: Fast G IFGain:Low	Trig: Free Run #Atten: 30 dB		Mkr1	0 7.738 80 GHz -43.94 dBm	Auto Tune
					-14.35 dBm	Center Fre 5.015000000 GH
20.0	9			7 38 1		Start Free 30.000000 MH
60.0 2010 100 100 100 100 100 100 100 100 100						Stop Fre 10.000000000 GH
tart 30 MHz Res BW 1.0 MHz	#VB\	V 3.0 MHz		Sweep 18	Stop 10.000 GHz .67 ms (40001 pts)	CF Ste 997.000000 MH Auto Ma
MKR MODE TRC SCL	× 2.462 18 GHz	ү 9.00 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f	7.118 92 GHz 7.051 62 GHz 6.222 12 GHz 6.381 14 GHz	-43.05 dBm -43.36 dBm -43.60 dBm -43.62 dBm				Freq Offse 0 H
6 N 1 f 7 N 1 f 8 N 1 f 9 N 1 f	5.812 85 GHz 6.459 90 GHz 7.149 08 GHz 2.667 56 GHz 7.738 80 GHz	43.70 dBm 43.76 dBm 43.78 dBm 43.93 dBm 43.94 dBm				
	7.750'80 GHZ	40.94 GBIII			×	
SG				STATUS	i i	



802.11g & 6 Mbps & 2412 MHz



Reference

Low Band-edge



	ım Analyzer - S									
XI RL Center Fr	RF 50 eq 15.004			SENSE			ALIGN OFF	TRAC	M Oct 07, 2014	Frequency
		PNO: IFGai	:Fast 🖵 n:Low	#Atten: 30 d				DI	1.9 kHz	Auto Tune
10 dB/div Log	Ref 20.00	dBm							75 dBm	
10.0 0.00										Center Fred 15.004500 MH;
-10.0									-16.65 dBm	
-20.0										Start Free 9.000 kH:
-50.0 2	harrad harrow ways a second	and and the state of the state	tudesserve these	ماريد والمداريد والم	elenter son sin sin sin sin sin sin sin sin sin si	the two and the second s	n Alantin and the	en aj stal prodjel kjeletor	historic fondesistanting si	Stop Free 30.000000 MH
Start 9 kH #Res BW			#VBW	300 kHz		s	weep 5.3		0.00 MHz 0001 pts)	CF Ste 2.999100 MH Auto Ma
MKR MODE TR	C SCL	× 281.9 I	kHz	∀ -55.75 dBr	FUNCT	ION FU	NCTION WIDTH	FUNCTIO	IN VALUE	Auto Ma
2 N 1 3 4 5	f	281.91		-55.75 dBn	n					Freq Offse 0 H
6 7 8 9										
10 11									~	
ISG							STATUS	LDC Cou	upled	

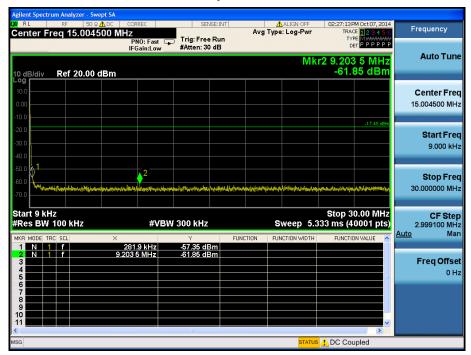
enter Freq 5.0150	Ω AC CORREC 000000 GHz PN0: Fast G	SENSE:INT	ALIGN OFF	02:32:54 PM Oct 07, 2014 TRACE 2 3 4 5 6 TYPE MWWWWW DET P P P P P P	Frequency
) dB/div Ref 20.00	IFGain:Low	#Atten: 30 dB	Mkr1	0 6.427 75 GHz -43.67 dBm	Auto Tun
.00 0.0					Center Fre 5.015000000 GH
0.0 0.0 0.0				-16.65 dBm	Start Fre 30.000000 MH
0.0					Stop Fre 10.00000000 GH
tart 30 MHz Res BW 1.0 MHz	#VB\	V 3.0 MHz	· · · · ·	Stop 10.000 GHz 3.67 ms (40001 pts)	CF Ste 997.000000 MI <u>Auto</u> Mi
KR MODE TRC SCL	× 2.409 84 GHz	Y FU 10.61 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	
2 N 1 F 3 N 1 F 4 N 1 F 5 N 1 F	2.400 62 GHz 2.423 30 GHz 2.575 84 GHz 2.573 35 GHz	-10.65 dBm -14.13 dBm -38.85 dBm -40.24 dBm			Freq Offs 0 I
6 N 1 f 7 N 1 f 8 N 1 f	2.814 37 GHz 2.334 07 GHz 2.552 16 GHz 7.741 30 GHz	-42.80 dBm -42.94 dBm -43.41 dBm -43.54 dBm			
9 N 1 f 0 N 1 f	6.427 75 GHz	-43.67 dBm			

RL RF 5	i0 Ω AC CORREC	SENSE:INT	🛕 ALIGN OFF	02:33:02 PM Oct 07, 2014	-
enter Freq 17.50	00000000 GHz PNO: Fast IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	TRACE 123456 TYPE MWWWWWW DET PPPPP	Frequency
dB/div Ref 20.0	0 dBm		Mkr5 2	21.285 625 GHz -35.52 dBm	Auto Tun
•9				-16.65 dBm	Center Fre 17.500000000 GH
	the stift a segment of any extra a set of a second		5_	$\begin{array}{c} 3 \\ 3 \\ 4 \\ 4 \\ 4 \\ 4 \\ 4 \\ 4 \\ 4 \\ 4 \\$	Start Fre 10.000000000 GH
0.0 0.0 0.0 0.0 0.0 0.0					Stop Fre 25.000000000 GH
tart 10.000 GHz Res BW 1.0 MHz	#VE	W 3.0 MHz	-	Stop 25.000 GHz 0.00 ms (40001 pts)	CF Ste 1.50000000 GF Auto Ma
KR MODE TRC SCL	X		UNCTION FUNCTION WIDTH	FUNCTION VALUE	Auto
1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f	24.994 750 GHz 24.166 750 GHz 22.276 000 GHz 23.523 250 GHz 21.285 625 GHz	-32.23 dBm -33.20 dBm -35.05 dBm -35.43 dBm -35.52 dBm			Freq Offso 0 ⊦
6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7					
1				~	
				>	

802.11g & 6 Mbps & 2437 MHz



Reference



KIRL RF 50 G	vept SA	SENSE:INT	ALIO	SN OFF	7:27 PM Oct 07, 2014	
Center Freg 5.0150		JENJEVIN	Avg Type: Lo		TRACE 123456	Frequency
senter freq 5.0150	PNO: Fast	Trig: Free Run			TYPE M WAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	
	IFGain:Low	#Atten: 30 dB			DETPPPPP	
				Mkr10.5.7	14 40 GHz	Auto Tun
					13.67 dBm	
10 dB/div Ref 20.00					15.07 UBIII	
	()1					
10.0						Center Fre
0.00	2					5.015000000 GH
10.0						
	3				-17.45 dBm	
20.0						Start Fre
30.0						30.000000 MH
				4		30.000000 MH
40.0			W Y Y Y	an Martin an		
50.0	a love a second second second second	The second s				
60.0						Stop Fre
00.0						10.000000000 GH
70.0						
Start 30 MHz					10.000 GHz	CF Ste
Res BW 1.0 MHz	#VB	W 3.0 MHz	Swe	ep 18.67 m	s (40001 pts)	997.000000 MH
					NCTION VALUE	<u>Auto</u> Ma
MKB MODE TBC SCI	X	Y	FUNCTION FUNCTIO	N WIDTH FU		
MKR MODE TRC SCL	× 2.435 76 GHz	Y 10.33 dBm	FUNCTION FUNCTIO	N WIDTH FU	NCTION VALUE	
MKR MODE TRC SCL 1 N 1 F 2 N 1 F	× 2.435 76 GHz 2.448 22 GHz	10.33 dBm -8.94 dBm	FUNCTION FUNCTIO	N WIDTH FU	NCTION VALUE	
MKR MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f	2.435 76 GHz 2.448 22 GHz 2.451 71 GHz	10.33 dBm -8.94 dBm -19.54 dBm	FUNCTION FUNCTIO	N WIDTH FU	NCTION VALUE	Freq Offs
MKR MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f	2.435 76 GHz 2.448 22 GHz 2.451 71 GHz 7.212 14 GHz	10.33 dBm -8.94 dBm -19.54 dBm -43.25 dBm	FUNCTION FUNCTIO	N WIDTH FU	NCTION VALUE	FreqOffso 0⊦
MKR MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f 6 N 1 f	2.435 76 GHz 2.448 22 GHz 2.451 71 GHz 7.212 14 GHz 6.311 10 GHz	10.33 dBm -8.94 dBm -19.54 dBm -43.25 dBm -43.35 dBm	FUNCTION FUNCTIO	N WIDTH FU		
MCR MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f 6 N 1 f 7 N 1 f	2.435 76 GHz 2.448 22 GHz 2.451 71 GHz 7.212 14 GHz	10.33 dBm -8.94 dBm -19.54 dBm -43.25 dBm	FUNCTION FUNCTIO	N WIDTH FU		
MKR MODE TRC SCL 1 N 1 F 2 N 1 F 3 N 1 F 4 N 1 F 5 N 1 F 6 N 1 F 7 N 1 F	2.435 76 GHz 2.448 22 GHz 2.451 71 GHz 7.212 14 GHz 6.311 10 GHz 5.805 62 GHz 6.692 20 GHz 6.588 02 GHz	10.33 dBm -8.94 dBm -19.54 dBm -43.25 dBm -43.36 dBm -43.36 dBm -43.37 dBm -43.46 dBm	FUNCTION FUNCTIO	N WIDTH FU		
1 N 1 f 2 N 1 f 4 N 1 f 5 N 1 f 6 N 1 f 7 N 1 f 7 N 1 f 8 N 1 f 8 N 1 f	2.435 76 GHz 2.448 22 GHz 2.451 71 GHz 7.212 14 GHz 6.311 10 GHz 5.805 62 GHz 6.692 20 GHz 6.588 02 GHz 5.921 77 GHz	10.33 dBm -8.94 dBm -19.54 dBm -43.25 dBm -43.35 dBm -43.35 dBm -43.37 dBm -43.46 dBm -43.46 dBm	FUNCTION FUNCTIO	N WIDTH FU		
1 N 1 f 2 N 1 f 23 N 1 f 34 5 N 1 f 7 N 1 f f 66 N 1 f f 78 N 1 f g 90 N 1 f g	2.435 76 GHz 2.448 22 GHz 2.451 71 GHz 7.212 14 GHz 6.311 10 GHz 5.805 62 GHz 6.692 20 GHz 6.588 02 GHz	10.33 dBm -8.94 dBm -19.54 dBm -43.25 dBm -43.36 dBm -43.36 dBm -43.37 dBm -43.46 dBm	FUNCTION FUNCTIO	N WIDTH FU		
1 N 1 f 2 N 1 f 23 N 1 f 34 5 N 1 f 7 N 1 f f 66 N 1 f f 78 N 1 f g 90 N 1 f g	2.435 76 GHz 2.448 22 GHz 2.451 71 GHz 7.212 14 GHz 6.311 10 GHz 5.805 62 GHz 6.692 20 GHz 6.588 02 GHz 5.921 77 GHz	10.33 dBm -8.94 dBm -19.54 dBm -43.25 dBm -43.35 dBm -43.35 dBm -43.37 dBm -43.46 dBm -43.46 dBm	FUNCTION FUNCTIO	N WIDTH FU		
MKR MODE TRC SCL 1 N 1 F 2 N 1 F 3 N 1 F 4 N 1 F 5 N 1 F 6 N 1 F 7 N 1 F 9 N 1 F 10 N 1 F 11 F 11 F 11 F 12	2.435 76 GHz 2.448 22 GHz 2.451 71 GHz 7.212 14 GHz 6.311 10 GHz 5.805 62 GHz 6.692 20 GHz 6.588 02 GHz 5.921 77 GHz	10.33 dBm -8.94 dBm -19.54 dBm -43.25 dBm -43.35 dBm -43.35 dBm -43.37 dBm -43.46 dBm -43.46 dBm	FUNCTION FUNCTIO	STATUS		

enter Freq 17.50	0 Ω AC CORREC 00000000 GHz PN0: Fast	SENSE:INT		ALIGN OFF Type: Log-Pwr	02:27:35 PM Oct 07, 2014 TRACE 12 3 4 5 6 TYPE MWWWWW	Frequency
dB/div Ref 20.0	IFGain:Low	#Atten: 30 dB		Mkr5 2	оет РРРРРР 1.275 125 GHz -35.13 dBm	Auto Tun
						Center Fre 17.50000000 GF
	Crity - Uphyretroine yw Atrent Piler			5	-17.45 dBm	Start Fre 10.000000000 GH
I.O Ald the day of the state of						Stop Fre 25.00000000 GH
art 10.000 GHz Res BW 1.0 MHz	#VI	3W 3.0 MHz		Sweep 40	Stop 25.000 GHz .00 ms (40001 pts)	CF Ste 1.50000000 GF Auto Mi
R MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f	× 24.823 375 GHz 24.296 875 GHz 23.527 375 GHz 22.243 750 GHz 21.275 125 GHz	Y -31.98 dBm -32.99 dBm -34.53 dBm -35.04 dBm -35.13 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma Freq Offs 0 F
6 7 8 9 9 0 1						
		m				

802.11g & 6 Mbps & 2462 MHz



Reference

High Band-edge

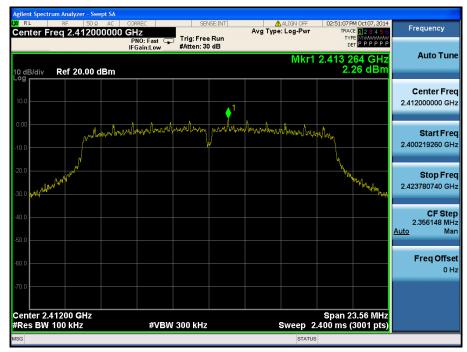


Agilent Spectrum Ar								
RE RE	= 50 ຄ <u>≜</u> DC ເ 15.004500 MH	CORREC 7	SENSE:1	Avg	ALIGN OFF Type: Log-Pwr	TRA	PM Oct 07, 2014	Frequency
		PNO: Fast G	Trig: Free Ru #Atten: 30 dB	n		TY D	PE MWWWWW ET P P P P P	
10 dB/div Re	f 20.00 dBm				Mkr		4 6 MHz 21 dBm	Auto Tune
- og 10.0 0.00								Center Fre 15.004500 MH
-10.0 -20.0 -30.0							-16.73 dBm	Start Fre 9.000 kH
40.0 50.0 60.0	สารประโคริโรสารประสารประสารประสารประสารประสารประสารประสารประสารประสารประสารประสารประสารประสารประสารประสารประสา	antherine and the second	inght same sport of the last sectors	chicherine perticipates	(versitered) for a feature of the second	2	get processes al vitte	Stop Fre 30.000000 MH
Start 9 kHz Res BW 100		#VBV	V 300 kHz	FUNCTION	Sweep 5.3	33 ms (4		CF Ste 2.999100 M⊦ <u>Auto</u> Ma
1 N 1 f 2 N 1 f 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	2	81.9 kHz '4 6 MHz	-57.79 dBm -61.21 dBm	FORCHON		FONCH		Freq Offse 0 H
6 7 8 9 10 11								
(1) (1)							>	

enter Freq 5.0150	PNO: Fast C	SENSE:INT		ALIGN OFF Type: Log-Pwr	02:25:52 PM Oct 07, 2014 TRACE 1 2 3 4 5 6 TYPE M WWWWWW DET P P P P P P	Frequency
0 dB/div Ref 20.00	IFGain:Low	#Atten: 30 dB		Mkr1	7.101 22 GHz -43.51 dBm	Auto Tun
•g 10.0 0.00 10.0						Center Fre 5.015000000 G⊦
20.0 30.0 40.0	2 39			10 0 ⁶	-16.73 dBm	Start Fre 30.000000 MF
50.0 70.0						Stop Fre 10.00000000 GF
tart 30 MHz Res BW 1.0 MHz	#VBI	W 3.0 MHz		Sweep 18	Stop 10.000 GHz 67 ms (40001 pts)	CF Ste 997.000000 MH <u>Auto</u> Ma
IKR MODE TRC SCL	× 2.465 42 GHz 2.446 48 GHz	Y 10.19 dBm -24.94 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	
3 N 1 F 4 N 1 F 5 N 1 F	2.504 30 GHz 5.912 30 GHz 5.872 67 GHz	-41.00 dBm -43.07 dBm -43.12 dBm			111	Freq Offs 0 H
6 N 1 f	7.808 34 GHz 5.813 35 GHz 7.273 95 GHz	-43.36 dBm -43.39 dBm -43.40 dBm				
7 N 1 f 8 N 1 f 9 N 1 f	2.602 26 GHz 7.101 22 GHz	-43.47 dBm -43.51 dBm				



802.11n(HT20) & MCS 0 & 2412 MHz



Reference

Low Band-edge



Agilent Spectro	um Analyzer - S	wept SA Ω Δ DC CORREC		SE:INT	ALIGN OFF	02:51:41PM Oct 07, 201	
	req 15.004	500 MHz	ast 😱 Trig: Free	Avg Run	Type: Log-Pwr	TRACE 1 2 3 4 5 TYPE MWWWWW DET P P P P P	Frequency
10 dB/div	Ref 20.00	IFGain: IdBm	Low #Atten: 30	dB		Mkr2 297.7 kHz -56.97 dBm	Auto Tune
Log 10.0 0.00							Center Free 15.004500 MH
-10.0 -20.0 -30.0 -40.0						-17.74 dBn	Start Fred 9.000 kH:
-50.0 2 -60.0 -70.0		rajyjasillindigadaastiringtaad adhian	ál fyilgið skyli skurnar ffankspildira	ſŧĸĹĸŧĸſġĸĹĬţŎĸĬĊĬŊĬĬţŧĸġĬŧĸĬŶŔĬĬţ	idanet#ectboondareappi	ginyahinenalipuntanenalipuntanenalisasi kalendi	Stop Fre 30.000000 MH
Start 9 kH #Res BW	100 kHz	X	#VBW 300 kHz	FUNCTION	Sweep 5.3	Stop 30.00 MHz 333 ms (40001 pts FUNCTION VALUE	2.999100 MH
1 N 1 2 N 1 3 4 5 6 7		297.7 kł 297.7 kł					Freq Offse 0 H
8 9 10 11						~ ~	
SG					STATUS	DC Coupled	

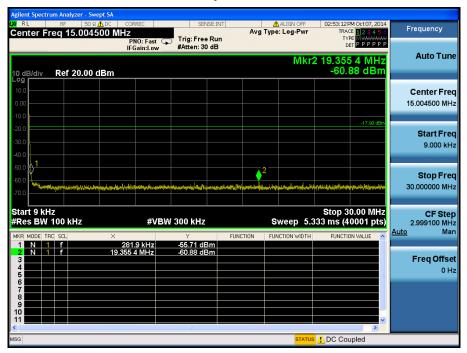
Agilent Spectrum Analyzer - Sw XIRL RF 50 ຊ Center Freq 5.01500	AC CORREC	SENSE:INT	Avg T _i	ALIGN OFF	02:51:54 PM Oct 07, 2014 TRACE 2 3 4 5 6 TYPE MWWWWW	Frequency
10 dB/div Ref 20.00	IFGain:Low	#Atten: 30 dB		Mkr10	оет Р Р Р Р Р Р Р 7.712 88 GHz -43.63 dBm	Auto Tune
10.0 .000 -10.0						Center Freq 5.015000000 GHz
-20.0				8 ↓10	-17.74 dBm	Start Freq 30.000000 MHz
-50.0 -70.0						Stop Fred 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz	#VB\	V 3.0 MHz		Sweep 18.	Stop 10.000 GHz 67 ms (40001 pts)	CF Step 997.000000 MH Auto Mar
MKR MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f 6 N 1 f 7 N 1 f 8 N 1 f 9 N 1 f 10 N 1 f	X 2.408 34 GHz 2.427 29 GHz 2.397 63 GHz 2.396 38 GHz 2.395 38 GHz 6.352 48 GHz 6.821 63 GHz 6.881 63 GHz 6.164 54 GHz 7.712 88 GHz	Y 8.69 dBm -21.84 dBm -21.86 dBm -22.33 dBm -29.69 dBm -43.21 dBm -43.27 dBm -43.61 dBm -43.62 dBm -43.63 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
11				STATUS	>	

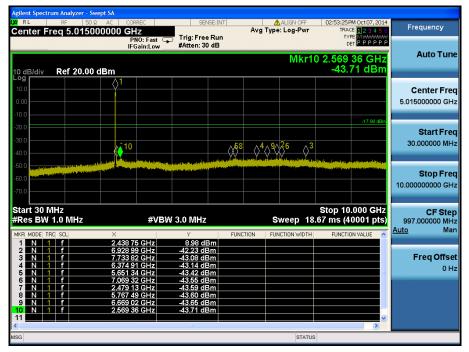


802.11n(HT20) & MCS 0 & 2437 MHz



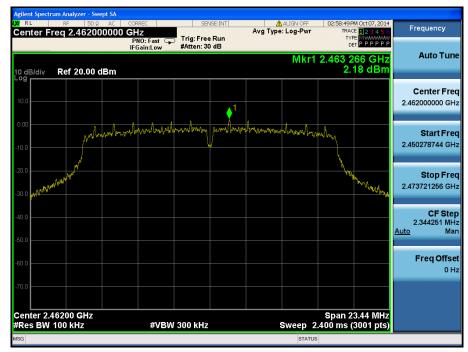
Reference





47 500	Ω AC CORREC	SENSE:INT	ALIGN OFF	02:53:34 PM Oct 07, 2014 TRACE 1 2 3 4 5 6	Frequency
enter Freq 17.500	PNO: Fast (IFGain:Low	➡ Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr		
0 dB/div Ref 20.00	dBm		Mkr5 2	3.618 500 GHz -34.85 dBm	Auto Tun
og 10.0 0.00					Center Fre 17.500000000 G⊦
		in a constant of the line (in Fig. 2). Standard state particular		-17.90 dBm	Start Fre 10.000000000 G⊦
50.0 70.0					Stop Fre 25.00000000 GF
tart 10.000 GHz Res BW 1.0 MHz	#VB	W 3.0 MHz	Sweep 40	Stop 25.000 GHz .00 ms (40001 pts)	CF Ste 1.50000000 Gł
KR MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f	× 24.925 750 GHz 24.221 875 GHz 24.244 375 GHz	-31.87 dBm -32.55 dBm -33.48 dBm	JNCTION FUNCTION WIDTH	FUNCTION VALUE	Auto Ma Freq Offs
4 N 1 f	23.902 750 GHz 23.618 500 GHz	-34.64 dBm -34.85 dBm		=	0 H
5 N 1 f 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7					

802.11n(HT20) & MCS 0 & 2462 MHz



Reference

High Band-edge



NIKE? 23.138 8 NIHz 10 dB/div Ref 20.00 dBm -61.31 dBm 10 dB/div Ref 20.00 dBm -61.31 dBm 10 dB/div Ref 20.00 dBm -61.31 dBm 10 dB/div -61.31 dBm -61.31 dBm	gilent Spectrum Analyze						
PD0: Fast WAtten: 30 dB Def PPPPP Mkr2 3,158 8 MHz Auto Tur 10 dB/div Ref 20.00 dBm -61.31 dBm 000 -61.31 dBm -61.31 dBm 000 -61.32 dBm -61.31 dBm 000 -61.31 dBm -61.31 dBm 100 -72 -61.31 dBm 000 -1 -22 000 -1 -22 000 -1 -22 010 -1 -22 011 -2 -2 11 -2 -2 11 -2 -2 11 -2 -2 11 -2 -2 11 -2 -2 11 -2 -2 12 -4 -2 13 -4 -4 14 -1 -2 <td< td=""><td></td><td>004500 MHz</td><td></td><td>Avg</td><td></td><td>TRACE 12345</td><td>Frequency</td></td<>		004500 MHz		Avg		TRACE 12345	Frequency
Log of the core core core core core core core cor		IFGain:Lov			Mk	DET PPPPP r2 3.158 8 MHz	Auto Tune
100	Log	0.00 dBm				-61.31 dBm	Center Free
2000 200 2000 2						17.93 dBm	15.004500 MH
Construction Construction<	-30.0					*1732 dBm	Start Free 9.000 kH
#Res BW 100 kHz #VBW 300 kHz Sweep 5.333 ms (40001 pts) 2.999100 MI MKR MODE TC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE Auto Mit 1 N 1 f 281.9 kHz -54.90 dBm Final dBm Auto Mit 2 N 1 f 3.158 8 MHz -61.31 dBm Final dBm Freq Offs 0 I 4		aðiffysingifkjur setnigangifkjur sen and ekstenig	patru III pushantakifi jurintifu Atlanu	ity, manufata, type hadee	de tradicio de la consegu	รั _ย กประที่สุขไปที่รูฟประกังได้เรื่อง _{หล} ูการที่ประไปท _ั ดไ	Stop Fre 30.000000 MH
MARK MODE THC SLC X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE 2 N 1 f 281.9 KHz -54.80 dBm -	Res BW 100 kH					333 ms (40001 pts)	2.999100 MH
	1 N 1 f 2 N 1 f	281.9 kHz	-54.80 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	
	4 5					=	он
	9						
ISG STATUS DC Coupled							

RL RF 50 senter Freq 5.0150	PNO: Fast	SENSE:INT	ALIGN OFF	02:59:34 PM Oct 07, 2014 TRACE 1 2 3 4 5 6 TYPE MVWWWW DET P P P P P P	Frequency
0 dB/div Ref 20.00	IFGain:Low	#Atten: 30 dB	Mkr1	0 7.228 59 GHz -43.72 dBm	Auto Tun
og 10.0 0.00 10.0					Center Fre 5.015000000 GH
20.0 30.0 40.0				-17.82 dBm	Start Fre 30.000000 M⊦
50.0 70.0					Stop Fre 10.000000000 GF
tart 30 MHz Res BW 1.0 MHz		V 3.0 MHz	· · · ·	Stop 10.000 GHz .67 ms (40001 pts)	CF Ste 997.000000 Mi <u>Auto</u> Mi
KR MODE TRC SCL	× 2.459 19 GHz 2.472 40 GHz	8.89 dBm -8.69 dBm	JNCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offs
3 N 1 f 4 N 1 f 5 N 1 f 6 N 1 f	2.449 72 GHz 2.474 64 GHz 2.443 74 GHz 6.614 44 GHz	-16.28 dBm -16.37 dBm -32.94 dBm -43.11 dBm			01
0 N 1 F 8 N 1 F 9 N 1 F 0 N 1 F	6.814 44 GHz 7.133 13 GHz 6.353 47 GHz 7.579 53 GHz 7.228 59 GHz	-43.11 dBm -43.15 dBm -43.53 dBm -43.60 dBm -43.72 dBm			
1				~	



8.5 Radiated Spurious Emissions

Test Requirements and limit,

§15.247(d), §15.205, §15.209 & RSS-210 [A8.5], RSS-Gen [7.2.2], RSS-Gen [7.2.5]

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) and (b), then the 15.209(a) limit in the table below has to be followed

- FCC Part 15.209(a) and (b)

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 - 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

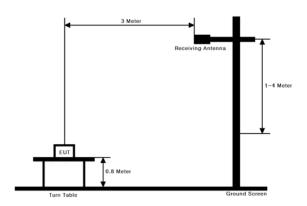
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.52025	156.52475 ~	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	12.57675 ~	156.52525	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	12.57725	156.7 ~ 156.9	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	13.36 ~ 13.41	162.0125 ~ 167.17	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.42 ~ 16.423	167.72 ~ 173.2	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	16.69475 ~	240 ~ 285	2655 ~ 2900		
8.291 ~ 8.294	16.69525	322 ~ 335.4	3260 ~ 3267		
8.362 ~ 8.366	16.80425 ~	399.90 ~ 410	3332 ~ 3339		
8.37625 ~ 8.38675	16.80475	608 ~ 614	3345.8 ~ 3358		
	25.5 ~ 25.67	960 ~ 1240	3600 ~ 4400		
	37.5 ~ 38.25				
	73 ~ 74.6				
	74.8 ~ 75.2				

• FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

• FCC Part 15.205(b): The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a non-conductive table, which is 0.8 m above ground plane.

- 2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 6. Repeat above procedures until the measurements for all frequencies are complete.

Measurement Instrument Setting for Radiated Emission Measurements.

The radiated emission was tested according to the section 6.3 6.4, 6.5 and 6.6 of the ANSI C63.10-2009 with following settings.

Peak Measurement :

RBW = As specified in below table , VBW \geq 3 x RBW, Sweep = Auto, Detector = Peak, Trace mode = Max Hold until the trace stabilizes.

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

Average Measurement :

1.RBW = 1 MHz (unless otherwise specified).

- 2. VBW \geq 3 x RBW.
- 3. Detector = RMS (Number of points ≥ 2 x Span / RBW)
- 4. Averaging type = power (i.e., RMS).
- 5. Sweep time = auto.
- 6. Perform a trace average of at least 100 traces.
- 7. A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
- 1) If power averaging (RMS) mode was used in step 4, then the applicable correction factor is 10 log(1/x), where x is the duty cycle.
- 2) If linear voltage averaging mode was used in step 4, then the applicable correction factor is 20 log(1/x), where x is the duty cycle.
- 3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

Duty Cycle Corrections (Refer to appendix II for duty cycle measurement procedure and plots)

Band	Duty Cycle(%)	T _{on} (ms)	T _{on} + T _{off} (ms)	DCF = 10log(1/Duty) (dB)
802.11b	89.38	8.420	9.420	0.49
802.11g	58.09	1.400	2.410	2.36
802.11n(HT20)	56.47	1.310	2.320	2.48
-	-	-	-	-

9 kHz ~ 25 GHz Data(<u>802.11b & 1 Mbps</u>)

Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2387.05	Н	Y	PK	55.91	2.51	N/A	N/A	58.42	74.00	15.58
2386.87	Н	Y	AV	48.03	2.51	0.49	N/A	51.03	54.00	2.97
4823.96	Н	Y	PK	48.99	8.70	N/A	N/A	57.69	74.00	16.31
4824.02	Н	Y	AV	42.35	8.70	0.49	N/A	51.54	54.00	2.46
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4873.97	Н	Y	PK	48.75	8.71	N/A	N/A	57.46	74.00	16.54
4874.08	Н	Y	AV	42.25	8.71	0.49	N/A	51.45	54.00	2.55
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2488.30	Н	Y	PK	55.79	3.10	N/A	N/A	58.89	74.00	15.11
2488.38	Н	Y	AV	47.37	3.10	0.49	N/A	50.96	54.00	3.04
4923.94	Н	Y	PK	49.30	8.72	N/A	N/A	58.02	74.00	15.98
4924.03	Н	Z	AV	42.31	8.72	0.49	N/A	51.52	54.00	2.48
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

1. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz. So Distance Correction Factor :- 9.54dB = 20*log(1m/3m)

2. No other spurious and harmonic emissions were found greater than listed emissions on above table.

3. Above listed point data is the worst case data.

4. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor / T.F = AF + CL – AG Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, DCF = Duty Cycle Correction Factor.

9 kHz ~ 25 GHz Data(802.11g & 6 Mbps)

Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2389.10	Н	Y	PK	65.25	2.51	N/A	N/A	67.76	74.00	6.24
2389.94	Н	Y	AV	47.16	2.51	2.36	N/A	52.03	54.00	1.97
4824.98	Н	Y	PK	47.23	8.70	N/A	N/A	55.93	74.00	18.07
4824.14	Н	Y	AV	36.75	8.70	2.36	N/A	47.81	54.00	6.19
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4873.85	Н	Y	PK	46.90	8.71	N/A	N/A	55.61	74.00	18.39
4870.55	Н	Y	AV	36.23	8.71	2.36	N/A	47.30	54.00	6.70
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2485.75	Н	Y	PK	62.95	3.10	N/A	N/A	66.05	74.00	7.95
2484.01	Н	Y	AV	46.35	3.10	2.36	N/A	51.81	54.00	2.19
4926.89	Н	Y	PK	48.54	8.72	N/A	N/A	57.26	74.00	16.74
4923.20	Н	Y	AV	36.56	8.72	2.36	N/A	47.64	54.00	6.36
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

- 1. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz. So Distance Correction Factor :- 9.54dB = 20*log(1m/3m)
- 2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
- 3. Above listed point data is the worst case data.
- 4. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor / T.F = AF + CL – AG Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, DCF = Duty Cycle Correction Factor.

9 kHz ~ 25 GHz Data(802.11n HT20 & MCS 0)

Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2389.89	Н	Y	PK	66.11	2.51	N/A	N/A	68.62	74.00	5.38
2389.99	Н	Y	AV	47.29	2.51	2.48	N/A	52.28	54.00	1.72
4823.54	Н	Y	PK	45.75	8.70	N/A	N/A	54.45	74.00	19.55
4824.11	Н	Y	AV	36.02	8.70	2.48	N/A	47.20	54.00	6.80
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4873.70	Н	Y	PK	45.53	8.71	N/A	N/A	54.24	74.00	19.76
4874.01	Н	Y	AV	35.04	8.71	2.48	N/A	46.23	54.00	7.77
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCF (dB)	Distance Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.69	Н	Y	PK	63.55	3.10	N/A	N/A	66.65	74.00	7.35
2389.99	Н	Y	AV	46.77	3.10	2.48	N/A	52.35	54.00	1.65
4926.01	Н	Y	PK	45.32	8.72	N/A	N/A	54.04	74.00	19.96
4924.05	Н	Y	AV	35.98	8.72	2.48	N/A	47.18	54.00	6.82
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

Note.

- 1. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz. So Distance Correction Factor :- 9.54dB = 20*log(1m/3m)
- 2. No other spurious and harmonic emissions were found greater than listed emissions on above table.
- 3. Above listed point data is the worst case data.
- 4. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCF + Distance Factor / T.F = AF + CL – AG Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, DCF = Duty Cycle Correction Factor.

8.6 Power-line Conducted Emissions

Test Requirements and limit, §15.207& RSS-Gen [7.2.4]

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range	Conducted I	₋imit (dBuV)
(MHz)	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs for the actual connections between EUT and support equipment.

Test Mode

The all modes of EUT operation were investigated and the worst case mode was reported.

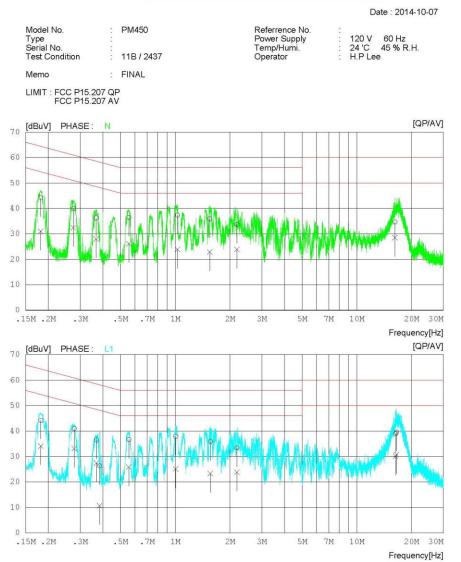
TEST PROCEDURE

- 1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
- 2. The EUT is connected via LISN to the test power supply.
- 3. The measurement results are obtained as described below:
- 4. Detectors Quasi Peak and Average Detector.

RESULT PLOTS

AC Line Conducted Emissions (Graph)

Test Mode: 802.11b & 1Mbps & 2437 MHz



Results of Conducted Emission

AC Line Conducted Emissions (List)

Test Mode: 802.11b & 1Mbps & 2437 MHz

Results of Conducted Emission

									Date : 2014-10-07			
Model Type Serial Test C			PM450	437		P	eferrence ower Sup emp/Hun perator	oply	: 24		60 Hz 5 % R.H.	
Memo		1	FINAL									
LIMIT	CISPR22 CISPR22											
NO	FREQ	REAI		C.FACTOR	RES		LIM			GIN	PHASE	
	[MHz]	QP [dBuV]	AV [dBuV]	[dB]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.18163	34.3		9.9	44.2	31.0	64.4	54.4	20.2		N	
2	0.27467	30.0		9.9	39.9	32.5	61.0	51.0	21.1	18.5	N	
3	0.36696	26.3		9.9	36.2	28.0	58.6	48.6	22.4	20.6	N	
4	0.55551	26.6		9.9	36.5	26.1	56.0	46.0	19.5	19.9	Ν	
5	1.02940	27.5		9.9	37.4	23.9	56.0	46.0	18.6	22.1	N	
6	1.55000	25.9		10.0	35.9	22.9	56.0	46.0	20.1	23.1	Ν	
7	2.18760	23.7		10.0	33.7	23.9	56.0	46.0	22.3	22.1	Ν	
	16.25800	24.4	18.2	10.3	34.7	28.5	60.0	50.0	25.3	21.5	Ν	
9	0.18203	34.3		9.9	44.2	34.1	64.4	54.4	20.2	20.3	L1	
10	0.27781	31.1		9.9	41.0	33.1	60.9	50.9	19.9	17.8	L1	
11 12	0.36893	26.6	17.6	9.9 9.9	36.5	27.5	58.5 58.2	48.5 48.2	22.0 31.8	21.0	L1 L1	
12	0.55534	26.8		9.9	26.4	25.9	58.2	48.2	31.8 19.3	20.1	L1	
13	1.00620	28.0		9.9	36.7	25.9	56.0	46.0	19.3	20.1	L1	
14	1.56120	25.9		10.0	35.9	23.3	56.0	46.0	20.1	20.9	L1	
16	2.18760	23.4	13.8	10.0	33.4	23.8	56.0	46.0	22.6	22.2	L1	
	16.37880	28.6		10.0	38.9	30.1	60.0	50.0	22.0	19.9	L1	

8.7 Occupied Bandwidth

Test Requirements, RSS-Gen [4.6.1]

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99 % emission bandwidth, as calculated or measured.

TEST CONFIGURATION

Refer to the APPENDIX I.

TEST PROCEDURE

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1 %. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual.

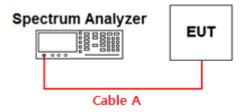
TEST RESULTS: NA

9. LIST OF TEST EQUIPMENT

Туре	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
MXA Signal Analyzer	Agilent	N9020A	14/03/28	15/03/28	MY50510026
Digital Multimeter	H.P	34401A	14/02/27	15/02/27	3146A13475
Dynamic Measurement DC Source	Agilent	66332A	14/09/11	15/09/11	US37473627
Thermohygrometer	BODYCOM	BJ5478	14/03/03	15/03/03	1209
Vector Signal Generator	Rohde Schwarz	SMJ100A	14/01/07	15/01/07	100148
Signal Generator	Rohde Schwarz	SMF100A	14/07/01	15/07/01	102341
Attenuator(3dB)	SMAJK	SMAJK-2-3	13/10/22	14/10/22	3
High-pass filter	Wainwright	WHKX3.0	14/09/11	15/09/11	9
LOOP Antenna	Schwarzbeck	FMZB1513	14/04/29	16/04/29	1513-128
BILOG ANTENNA	SCHAFFNER	CBL6112B	12/11/06	14/11/06	2737
Horn Antenna	ETS-LINDGREN	3117	14/05/12	16/05/12	00140394
HORN ANT	A.H.Systems	SAS-574	13/03/20	15/03/20	154
Amplifier (22dB)	H.P	8447E	14/01/07	15/01/07	2945A02865
Amplifier (30dB)	Agilent	8449B	14/02/27	15/02/27	3008A00370
EMI TEST RECEIVER	R&S	ESU	14/01/07	15/01/07	100014
EMI TEST RECEIVER	R&S	ESCI	14/02/27	15/02/27	100910
CVCF	NF	4420	14/05/26	15/05/26	3049354420023
LISN	R&S	ESH2-Z5	14/09/11	15/09/11	828739/006
PULSE LIMITER	R&S	ESH3-Z2	14/01/08	15/01/08	101334

APPENDIX I Conducted Test set up Diagram &Path loss Information

Conducted Measurement



Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	0.32	15	5.17
1	1.45	20	5.79
2412 & 2441 & 2462	2.1	25	7.94
5	2.88	-	-
10	3.95	-	-

Note. 1: The path loss from EUT to Spectrum analyzer was measured and used for test.

Path loss (=S/A's offset value) = Cable A (Attenuator, Applied only when it was used externally)

APPENDIX II Duty cycle plots

TEST PROCEDURE

Duty Cycle measured using section 6.0 b) of KDB558074 v03r2 :

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission. Set RBW \geq OBW if possible; otherwise, set RBW to the largest available value. Set VBW \geq RBW. Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T \leq 16.7 microseconds.)

Test Plots :

ALIGN OFF Avg Type: Log-Pwr Frequency Trig: Free Run Atten: 40 dB PNO: Fast + IFGain:Low TYPI DE Auto Tune ΔMkr3 9.420 -0.07 dE Ref 30.00 dBm </> </> ∆1∆: 3∆ **Center Freq** 2 437000000 GHz Start Freq 2.437000000 GHz Stop Freq 2.437000000 GH: Center 2.437000000 GHz Res BW 8 MHz Span 0 Hz Sweep 20.00 ms (1001 pts) CF Step VBW 8.0 MHz 8.000000 MH; 21. Freq Offset (Δ) (Δ) 21.29 dB 0 Hz 🔇 Align Now, All required

Duty Cycle

Test Mode: 802.11b & 1 Mbps & 2437 MHz

Duty Cycle

Test Mode: 802.11g & 6 Mbps & 2437 MHz

Agilent Spectru <mark>XI</mark> RL	<mark>ım Analyzer - Swep</mark> RF 50 Ω		SENSE	Avg Typ	ALIGNAUTO De: Log-Pwr	TYPE M	23456	Frequency
10 dB/div	Ref 30.00 df	IFGain:Low	Atten: 40 dE		Δ	Mkr1 1.40	00 ms 08 dB	Auto Tune
20.0 10.0 0.00	Xaglotterladamak	olimitation della recompositiones	1Δ2	A3∆4 Manthuoromet	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	ntrathetisen		Center Free 2.437000000 GH:
-10.0 -20.0 -30.0 <mark>vla^{nukris}:</mark>	haffish		ay his group of the second second second			Min Palat	alatter function	Start Fre 2.437000000 GH
-40.0 -50.0 -60.0								Stop Fre 2.437000000 GH
Res BW 8	C SCL	× VBI	N 8.0 MHz		Sweep 5.	Spa .000 ms (100 FUNCTION V/		CF Ste 8.000000 MH Auto Ma
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	t (Δ) t t (Δ) t t	1.400 ms(535.0 μs 2.410 ms(535.0 μs	17.86 dBm					Freq Offse 0 H
8 9 10 11 11							~	
SG					STATUS			

Duty Cycle

Test Mode: 802.11n & MCS 0 & 2437 MHz

Agilent Spectrum Analyzer - Swept SA	A			
(X) RL RF 50Ω AC		Avg Type: Log-Pwr	04:29:45 PM Oct 01, 2014 TRACE 123456 TYPE WANNAAAAA	Frequency
10 dB/div Ref 30.00 dBn	IFGain:Low Atten: 40 di	3	Mkr3 2.320 ms 0.26 dB	Auto Tune
Log		3∆4 rebbraineraner/bbb	lyhyfnod	Center Freq 2.437000000 GHz
-10.0	Prover forth the		leury Nyhraviwaan	Start Freq 2.437000000 GHz
-40.0 -50.0 -60.0				Stop Freq 2.437000000 GHz
	VBW 8.0 MHz	FUNCTION FUNCTION WIDTH	Span 0 Hz .000 ms (1001 pts) FUNCTION VALUE	CF Step 8.000000 MHz <u>Auto</u> Man
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.310 ms (Δ) 0.96 dt 705.0 μs 15.70 dBn 2.320 ms (Δ) 0.26 dt 705.0 μs 15.70 dBn	1		Freq Offset 0 Hz
9 10 11		STATUS		