

version 7.0.



FCC PART 15.247 TEST REPORT

For

Techfaith Wireless Technology Group Limited

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FCC ID: UJQT700

Report Type: Product Type: GSM/WCDMA Mobile Pad Original Report Ans lin **Test Engineer:** Ares Liu **Report Number:** R2DG131217003-00B **Report Date:** 2014-01-22 fram (av Ivan Cao **Reviewed By:** RF Leader **Test Laboratory:** Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Techfaith Wireless Technology Group Limited*'s product, model number: *T700 (FCC ID: UJQT700)* (the "EUT") in this report was a *GSM /WCDMA mobile pad*, which was measured approximately: 21.3 cm (L) x 13.5 cm (W) x 2.0 cm (H), rated input voltage: DC 3.7 V from lithium battery or DC 5V from adapter.

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Adapter information: ToughShield Model: STC-A22O50I1500C40 Input: AC 100-240V, 50/60Hz, 0.3A

Output: DC 5.0V, 1.5A

Objective

This report is prepared on behalf of *Techfaith Wireless Technology Group Limited* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15B JBP submissions with FCC ID: UJQT700

FCC Part15C DSS submissions with FCC ID: UJOT700 for Bluetooth BDR, EDR mode.

FCC Part15C DTS submissions with FCC ID: UJQT700 for Bluetooth LE mode.

FCC Part15C DXX submissions with FCC ID: *UJQT700*.

FCC Part 22H & 24E PCB submissions with FCC ID: UJQT700.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

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^{*} All measurement and test data in this report was gathered from production sample serial number: 131217003 (Assigned by BACL.Dongguan). The EUT was received on 2013-11-19.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

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Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Dongguan) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 500069-0).



The current scope of accreditations can be found at http://ts.nist.gov/standards/scopes/5 000690.htm

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SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer. For 2.4G band, 11 channels are provided to testing:

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Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

For 802.11b and 802.11g modes were tested with Channel 1, 6 and 11.

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

EUT Exercise Software

The software was a build in software entered with engineering code, which was provided by manufacturer, and the test configured as following table:

Test Mode	Test Software Version	engineering mode			
	Test Frequency	2412MHz	2437MHz	2462MHz	
802.11b	Data Rate	1Mbps	1Mbps	1Mbps	
002.110	Power Level Setting	6	6	6	
	Test Frequency	2412MHz	2437MHz	2462MHz	
802.11g	Data Rate	6Mbps	6Mbps	6Mbps	
002.11g	Power Level Setting	6	5	5	
	Test Frequency	2412MHz	2437MHz	2462MHz	
802.11n20	Data Rate	MCS0	MCS0	MCS0	
002.111120	Power Level Setting	6	5	5	

Equipment Modifications

No modification was made to the EUT.

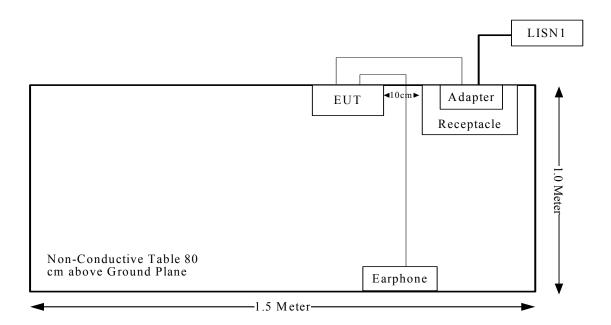
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External I/O Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	То
DC Power Cable	yes	yes	0.6	Adapter	EUT
Earphone Cable	no	no	1.2	EUT	Earphone

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Block Diagram of Test Setup



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SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1093	RF EXPOSURE	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
\$15.205, \$15.209, \$15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

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FCC §15.247 (i) & §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

According to §15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

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Test Result

The stand along SAR is not required for Wi-Fi antenna due to the output power is less than the SAR test exclusion threshold specified in KDB 447498. For simultaneous transmission SAR, please refer to SAR report: R1DG131217003-20.

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FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

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- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connector Construction

The EUT has an internal antenna, which was Conformance with this requirement, and the maximum gain is -1dBi, please refer to the internal photos.

Result: Compliance.

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FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner:

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If $U_{\rm lab}$ is less than or equal to $U_{\rm cispr}$ of Table 1, then:

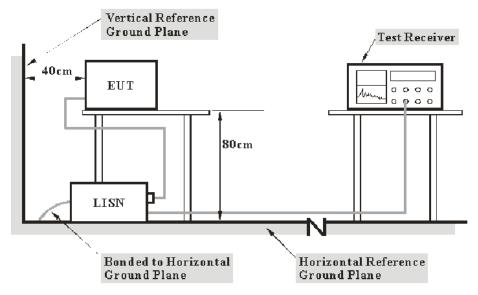
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit. If U_{lab} is greater than U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} U_{cispr})$, exceeds the disturbance limit;
- non compliance is deemed to occur if any measured disturbance level, increased by $(U_{\text{lab}} U_{\text{cispr}})$, exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of
$$U_{\text{cispr}}$$

Measurement	$U_{ m cispr}$
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

EUT Setup



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

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The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$
$$C_f = A_C + VDF$$

Herein.

V_C (cord. Reading): corrected voltage amplitude

V_R: reading voltage amplitude A_c: attenuation caused by cable loss VDF: voltage division factor of AMN

C_f: Correction Factor

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

Margin = Limit – Corrected Amplitude

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Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECEIVER	ESCS 30	830245/006	2013-11-20	2014-11-19
R&S	Two-line V-network	ENV216	3560.6550.12	2013-02-18	2014-02-17
R&S	L.I.S.N	ESH3-Z5	100113	N/A	N/A
BACL	Test Software	BACL-EMC	V1.0-2010	N/A	N/A

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Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

14.15 dB at 0.830 MHz in the Neutral conducted mode

Test Data

Environmental Conditions

Temperature:	18.3 °C	
Relative Humidity:	39 %	
ATM Pressure:	101.8 kPa	

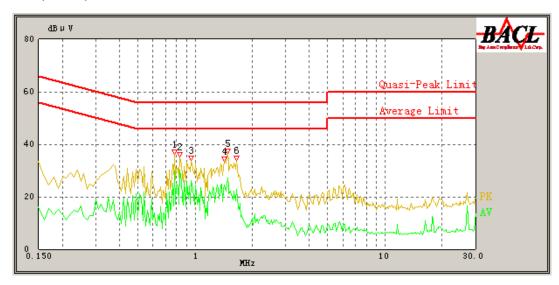
The testing was performed by Ares Liu on 2013-12-23.

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^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Mode: Transmitting

120 V, 60 Hz, Line:

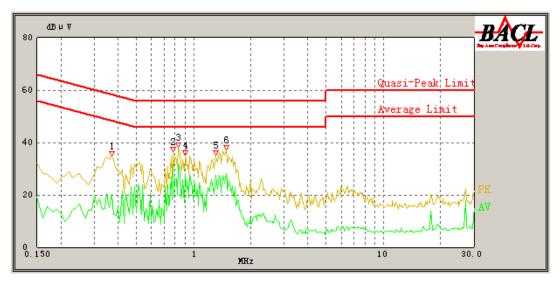


Frequency (MHz)	Cord. Reading (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/AV/QP)
0.780	33.60	9.67	56.00	22.40	QP
0.780	29.86	9.67	46.00	16.14	AV
0.830	34.04	9.67	56.00	21.96	QP
0.830	30.24	9.67	46.00	15.76	AV
0.950	31.21	9.68	56.00	24.79	QP
0.950	26.16	9.68	46.00	19.84	AV
1.430	31.71	9.68	56.00	24.29	QP
1.430	24.39	9.68	46.00	21.61	AV
1.480	33.05	9.68	56.00	22.95	QP
1.480	27.06	9.68	46.00	18.94	AV
1.650	28.61	9.68	56.00	27.39	QP
1.650	22.79	9.68	46.00	23.21	AV

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120 V, 60 Hz, Neutral:



Frequency (MHz)	Cord. Reading (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/AV/QP)
0.370	31.09	9.67	58.50	27.41	QP
0.370	20.08	9.67	48.50	28.42	AV
0.780	35.21	9.68	56.00	20.79	QP
0.780	31.62	9.68	46.00	14.38	AV
0.830	35.62	9.68	56.00	20.38	QP
0.830	31.85	9.68	46.00	14.15	AV
0.900	32.76	9.68	56.00	23.24	QP
0.900	27.62	9.68	46.00	18.38	AV
1.310	33.45	9.69	56.00	22.55	QP
1.310	27.64	9.69	46.00	18.36	AV
1.480	36.32	9.69	56.00	19.68	QP
1.480	28.09	9.69	46.00	17.91	AV

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FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner:

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If U_{lab} is less than or equal to U_{cispr} of Table 2, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit. If U_{lab} is greater than U_{cispr} of Table 2, then:
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} U_{cispr})$, exceeds the disturbance limit:
- non compliance is deemed to occur if any measured disturbance level, increased by $(U_{\text{lab}} U_{\text{cispr}})$, exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:

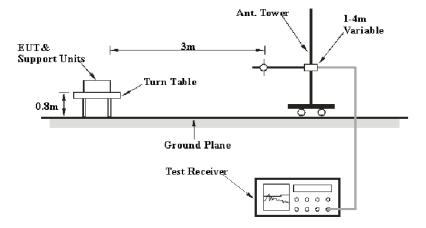
30M~200MHz: 5.0 dB 200M~1GHz: 6.2 dB 1G~6GHz: 4.45 dB 6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

Measurement	$U_{ m cispr}$
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

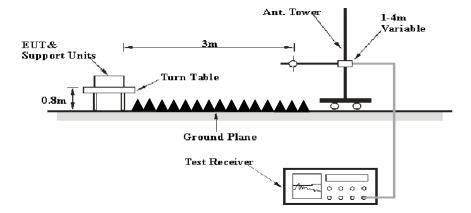
EUT Setup

Below 1GHz:



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Above 1GHz:



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The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 CHa	1MHz	3 MHz	/	PK
Above 1 GHz	1MHz	10 Hz	/	Ave.

Test Procedure

During the radiated emission test, the adapter was connected to the AC floor outlet.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

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Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

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Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2013-05-06	2014-05-05
Sunol Sciences	Antenna	JB3	A060611-1	2011-09-06	2014-09-05
HP	Amplifier	8447E	2434A02181	2013-09-06	2014-09-05
R&S	Spectrum Analyzer	FSEM	DE31388	2013-05-07	2014-05-06
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-05
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2013-2-19	2014-2-18
R&S	Spectrum Analyzer	FSP 38	100478	2013-06-16	2014-06-15
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2013-06-16	2014-06-15
Quinstar	Amplifier	QLW- 18405536-JO	15964001001	2013-09-06	2014-09-05

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the recorded data in following table, the EUT complied with the <u>FCC Title 47, Part 15,</u> Section 15.205, 15.209 and 15.247, with the worst margin reading of:

9.48 dB at 2483.5 MHz in the Horizontal polarization for 802.11b Mode

Test Data

Environmental Conditions

Temperature:	18.4 °C
Relative Humidity:	48 %
ATM Pressure:	101.8 kPa

The testing was performed by Ares Liu on 2013-12-21.

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Mode: Transmitting 802.11b Mode

802.11	802.11b Mode								
_	R	eceiver	Rx A	ntenna	Cable	Amplifier	Corrected	FCC 15	5.247
Frequency	Reading	Detector	Polar	Factor	loss	Gain	Amplitude	Limit	Margin
(MHz)	(dBµV)	(PK/QP/AV)	(H/V)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
	(2.		` /	w Channe	1· 2412 N	(Hz	•		
2412	64.21	PK	Н	25.67	4.42	0.00	94.30	N/A	N/A
2412	58.66	AV	Н	25.67	4.42	0.00	88.75	N/A	N/A
2412	59.14	PK	V	25.67	4.42	0.00	89.23	N/A	N/A
2412	53.65	AV	V	25.67	4.42	0.00	83.74	N/A	N/A
2390	28.02	PK	Н	25.61	4.39	0.00	58.02	74.00	15.98
2390	14.09	AV	Н	25.61	4.39	0.00	44.09	54.00	9.91
4824	33.76	PK	Н	30.64	6.03	27.26	43.17	74.00	30.83
4824	22.83	AV	Н	30.64	6.03	27.26	32.24	54.00	21.76
7236	32.2	PK	Н	34.17	7.47	26.36	47.48	74.00	26.52
7236	18.36	AV	H	34.17	7.47	26.36	33.64	54.00	20.36
9648	32.26	PK	Н	36.06	8.81	26.06	51.07	74.00	22.93
9648	18.33	AV	H	36.06	8.81	26.06	37.14	54.00	16.86
1721	35.81	PK	Н	24.04	3.52	26.97	36.40	74.00	37.60
1721	21.71	AV	Н	24.04	3.52	26.97	22.30	54.00	31.70
372.5	34.3	QP	Н	15.70	2.34	21.70	30.64	46.00	15.36
372.3	34.3	Ųr		dle Chann			30.04	40.00	13.30
2437	64.06	PK	H	25.74	4.41	0.00	94.21	N/A	N/A
2437	58.68	AV	Н	25.74	4.41	0.00	88.83	N/A	N/A
2437	58.95	PK	V	25.74	4.41		89.10	N/A N/A	N/A N/A
2437			V			0.00	83.59		
	53.44	AV		25.74	4.41	0.00		N/A	N/A
4874	33.63	PK	Н	30.77	6.09	27.26	43.23	74.00	30.77
4874	22.79	AV	Н	30.77	6.09	27.26	32.39	54.00	21.61
7311 7311	32.22	PK	Н	34.35	7.51	26.51	47.57	74.00 54.00	26.43
	18.39	AV	Н	34.35	7.51	26.51	33.74		20.26
9748	32.25	PK	Н	36.30	8.83	25.68	51.70	74.00	22.30
9748	18.25	AV PK	H H	36.30	8.83	25.68	37.70	54.00	16.30
1721	35.67			24.04	3.52	26.97	36.26	74.00	37.74
1721	21.44	AV	Н	24.04	3.52	26.97	22.03	54.00	31.97
2224	34.19	PK	Н	25.18	4.18	27.24	36.31	74.00	37.69
2224	20.13	AV	Н	25.18	4.18	27.24	22.25	54.00	31.75
372.5	34.1	QP	Н	15.70	2.34	21.70	30.44	46.00	15.56
2462	(4.10	DIZ		sh Channe			04.42	NT/A	NT/A
2462	64.19	PK	Н		4.43	0.00	94.42	N/A	N/A
2462 2462	58.49	AV	H V	25.80	4.43	0.00	88.72	N/A	N/A
	58.97	PK		25.80	4.43	0.00	89.20	N/A	N/A
2462	53.5	AV	V	25.80	4.43	0.00	83.73	N/A	N/A
2483.5	28.07	PK	Н	25.86	4.49	0.00	58.42	74.00	15.58
2483.5	14.17	AV	H	25.86	4.49	0.00	44.52	54.00	9.48
4924	33.86	PK	Н	30.90	5.97	27.27	43.46	74.00	30.54 21.71
4924	22.69	AV PK	Н	30.90	5.97	27.27	32.29	54.00 74.00	
7386	31.9		Н	34.53	7.55	26.66	47.32		26.68
7386 9848	18.11 32	AV PK	H H	34.53 36.54	7.55	26.66 25.49	33.53 51.90	54.00 74.00	20.47 22.10
9848	18.2		Н		8.85				
1721		AV PK	Н	36.54 24.04	8.85	25.49 26.97	38.10 36.25	54.00 74.00	15.90 37.75
1721	35.66 21.61	AV	Н	24.04	3.52 3.52	26.97	22.20	54.00	31.80
372.5	34		Н	15.70	2.34	21.70	30.34	46.00	15.66
312.3	34	QP	П	13.70	2.34	41.70	30.34	40.00	13.00

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Report No.: R2DG131217003-00B

802.11g Mode

$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	FCC 1 Limit (dBμV/m) N/A N/A N/A N/A 74.00 54.00	Margin (dB) N/A N/A N/A
Columb Columb	N/A N/A N/A N/A N/A N/A 74.00	N/A N/A N/A
2412 65.1 PK H 25.67 4.42 0.00 95.19 2412 51.85 AV H 25.67 4.42 0.00 81.94 2412 60.01 PK V 25.67 4.42 0.00 90.10 2412 44.6 AV V 25.67 4.42 0.00 74.69 2390 27.88 PK H 25.61 4.39 0.00 57.88	N/A N/A N/A 74.00	N/A N/A
2412 65.1 PK H 25.67 4.42 0.00 95.19 2412 51.85 AV H 25.67 4.42 0.00 81.94 2412 60.01 PK V 25.67 4.42 0.00 90.10 2412 44.6 AV V 25.67 4.42 0.00 74.69 2390 27.88 PK H 25.61 4.39 0.00 57.88	N/A N/A N/A 74.00	N/A N/A
2412 51.85 AV H 25.67 4.42 0.00 81.94 2412 60.01 PK V 25.67 4.42 0.00 90.10 2412 44.6 AV V 25.67 4.42 0.00 74.69 2390 27.88 PK H 25.61 4.39 0.00 57.88	N/A N/A N/A 74.00	N/A N/A
2412 60.01 PK V 25.67 4.42 0.00 90.10 2412 44.6 AV V 25.67 4.42 0.00 74.69 2390 27.88 PK H 25.61 4.39 0.00 57.88	N/A 74.00	N/A
2412 44.6 AV V 25.67 4.42 0.00 74.69 2390 27.88 PK H 25.61 4.39 0.00 57.88	N/A 74.00	
2390 27.88 PK H 25.61 4.39 0.00 57.88	74.00	N/A
		16.12
		10.39
4824 32.05 PK H 30.64 6.03 27.26 41.46	74.00	32.54
4824 18.97 AV H 30.64 6.03 27.26 28.38	54.00	25.62
7236 32.68 PK H 34.17 7.47 26.36 47.96	74.00	26.04
7236 18.14 AV H 34.17 7.47 26.36 33.42	54.00	20.58
9648 32.63 PK H 36.06 8.81 26.06 51.44	74.00	22.56
9648 18.48 AV H 36.06 8.81 26.06 37.29	54.00	16.71
1721 34.8 PK H 24.04 3.52 26.97 35.39	74.00	38.61
1721 21.32 AV H 24.04 3.52 26.97 21.91	54.00	32.09
372.5 34.6 QP H 15.70 2.34 21.70 30.94	46.00	15.06
Middle Channel: 2437 MHz	40.00	13.00
2437 65.13 PK H 25.74 4.41 0.00 95.28	N/A	N/A
2437 51.91 AV H 25.74 4.41 0.00 82.06	N/A	N/A
2437 59.8 PK V 25.74 4.41 0.00 89.95	N/A	N/A
2437	N/A	N/A
4874 32.02 PK H 30.77 6.09 27.26 41.62	74.00	32.38
4874 19.05 AV H 30.77 6.09 27.26 28.65	54.00	25.35
7311 32.68 PK H 34.35 7.51 26.51 48.03	74.00	25.97
7311 18.08 AV H 34.35 7.51 26.51 33.43	54.00	20.57
9748 32.61 PK H 36.30 8.83 25.68 52.06	74.00	21.94
9748 18.53 AV H 36.30 8.83 25.68 37.98	54.00	16.02
1721 35.69 PK H 24.04 3.52 26.97 36.28	74.00	37.72
1721 21.4 AV H 24.04 3.52 26.97 21.99	54.00	32.01
2224 34.27 PK H 25.18 4.18 27.24 36.39	74.00	37.61
2224 20.16 AV H 25.18 4.18 27.24 22.28	54.00	31.72
372.5 33.9 QP H 15.70 2.34 21.70 30.24	46.00	15.76
High Channel: 2462 MHz	.0.00	10.70
2462 65.19 PK H 25.80 4.43 0.00 95.42	N/A	N/A
2462 51.76 AV H 25.80 4.43 0.00 81.99	N/A	N/A
2462 60.04 PK V 25.80 4.43 0.00 90.27	N/A	N/A
2462 44.89 AV V 25.80 4.43 0.00 75.12	N/A	N/A
2483.5 28.16 PK H 25.86 4.49 0.00 58.51	74.00	15.49
2483.5 13.67 AV H 25.86 4.49 0.00 44.02	54.00	9.98
4924 32.31 PK H 30.90 5.97 27.27 41.91	74.00	32.09
4924 19.25 AV H 30.90 5.97 27.27 28.85	54.00	25.15
7386 32.78 PK H 34.53 7.55 26.66 48.20	74.00	25.80
7386 18.42 AV H 34.53 7.55 26.66 33.84	54.00	20.16
9848 32.61 PK H 36.54 8.85 25.49 52.51	74.00	21.49
9848 18.53 AV H 36.54 8.85 25.49 38.43	54.00	15.57
1721 34.89 PK H 24.04 3.52 26.97 35.48	74.00	38.52
1721 21.26 AV H 24.04 3.52 26.97 21.85	54.00	32.15
372.5 34.7 QP H 15.70 2.34 21.70 31.04	46.00	14.96

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802 11 n20 Mode

802.11 n2	802.11 n20 Mode								
E	Re	eceiver	Rx A	ntenna	Cable	Amplifier	Corrected	FCC 1	5.247
Frequency (MHz)	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB/m)	loss (dB)	Gain (dB)	Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	,		L	ow Chann	el· 2412.]	MHz		/	` /
2412	65.13	PK	Н	25.67	4.42	0.00	95.22	N/A	N/A
2412	51.88	AV	Н	25.67	4.42	0.00	81.97	N/A	N/A
2412	60.09	PK	V	25.67	4.42	0.00	90.18	N/A	N/A
2412	44.67	AV	V	25.67	4.42	0.00	74.76	N/A	N/A
2390	27.63	PK	Н	25.61	4.39	0.00	57.63	74.00	16.37
2390	13.46	AV	Н	25.61	4.39	0.00	43.46	54.00	10.54
4824	31.85	PK	Н	30.64	6.03	27.26	41.26	74.00	32.74
4824	18.78	AV	Н	30.64	6.03	27.26	28.19	54.00	25.81
7236	32.44	PK	Н	34.17	7.47	26.36	47.72	74.00	26.28
7236	17.93	AV	Н	34.17	7.47	26.36	33.21	54.00	20.79
9648	32.45	PK	Н	36.06	8.81	26.06	51.26	74.00	22.74
9648	18.41	AV	Н	36.06	8.81	26.06	37.22	54.00	16.78
1721	34.72	PK	Н	24.04	3.52	26.97	35.31	74.00	38.69
1721	21.08	AV	Н	24.04	3.52	26.97	21.67	54.00	32.33
372.5	34.6	QP	Н	15.70	2.34	21.70	30.94	46.00	15.06
	•		Mi	ddle Chan	nel: 2437	MHz			
2437	65.23	PK	Н	25.74	4.41	0.00	95.38	N/A	N/A
2437	51.66	AV	Н	25.74	4.41	0.00	81.81	N/A	N/A
2437	59.75	PK	V	25.74	4.41	0.00	89.90	N/A	N/A
2437	44.35	AV	V	25.74	4.41	0.00	74.50	N/A	N/A
4874	31.95	PK	Н	30.77	6.09	27.26	41.55	74.00	32.45
4874	18.93	AV	Н	30.77	6.09	27.26	28.53	54.00	25.47
7311	32.55	PK	Н	34.35	7.51	26.51	47.90	74.00	26.10
7311	17.9	AV	Н	34.35	7.51	26.51	33.25	54.00	20.75
9748	32.51	PK	Н	36.30	8.83	25.68	51.96	74.00	22.04
9748	18.37	AV	Н	36.30	8.83	25.68	37.82	54.00	16.18
1721	35.54	PK	Н	24.04	3.52	26.97	36.13	74.00	37.87
1721	21.39	AV	Н	24.04	3.52	26.97	21.98	54.00	32.02
2224	34.12	PK	Н	25.18	4.18	27.24	36.24	74.00	37.76
2224	20.03	AV	Н	25.18	4.18	27.24	22.15	54.00	31.85
372.5	33.6	QP	Н	15.70	2.34	21.70	29.94	46.00	16.06
	6.0-			igh Chann			0.7.5.	7 7 1	3 ~ / .
2462	64.98	PK	H	25.80	4.43	0.00	95.21	N/A	N/A
2462	51.48	AV	H	25.80	4.43	0.00	81.71	N/A	N/A
2462	59.77	PK	V	25.80	4.43	0.00	90.00	N/A	N/A
2462	44.73	AV	V	25.80	4.43	0.00	74.96	N/A	N/A
2483.5	27.92	PK	Н	25.86	4.49	0.00	58.27	74.00	15.73
2483.5	13.72	AV	Н	25.86	4.49	0.00	44.07	54.00	9.93
4924	32.28	PK	Н	30.90	5.97	27.27	41.88	74.00	32.12
4924 7386	19.19 32.76	AV PK	H H	30.90 34.53	5.97 7.55	27.27 26.66	28.79 48.18	54.00 74.00	25.21 25.82
7386	18.34	AV	Н	34.53	7.55	26.66	33.76	54.00	20.24
9848	32.56	PK	Н	36.54	8.85	25.49	52.46	74.00	21.54
9848	18.51	AV	Н	36.54	8.85	25.49	38.41	54.00	15.59
1721	34.64	PK	H	24.04	3.52	26.97	35.23	74.00	38.77
1721	21.06	AV	H	24.04	3.52	26.97	21.65	54.00	32.35
372.5	34.6	QP	Н	15.70	2.34	21.70	30.94	46.00	15.06
314.3	57.0		11	15.70	۲.5⊤	21./0	50.77	70.00	15.00

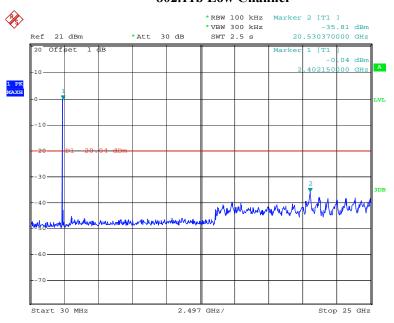
Report No.: R2DG131217003-00B

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Conducted Spurious Emissions at Antenna Port

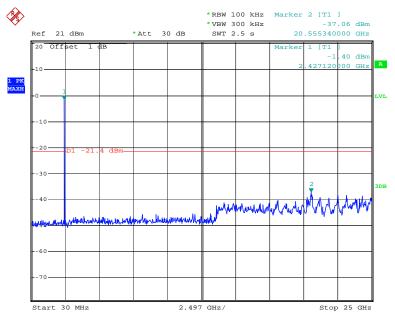
Report No.: R2DG131217003-00B

802.11b Low Channel



Date: 21.DEC.2013 17:41:08

802.11b Middle Channel

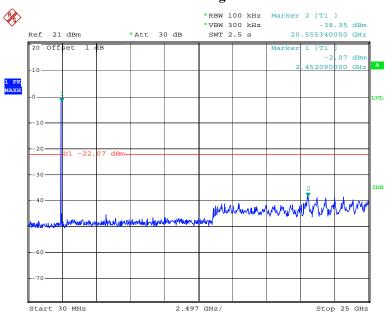


Date: 21.DEC.2013 17:41:57

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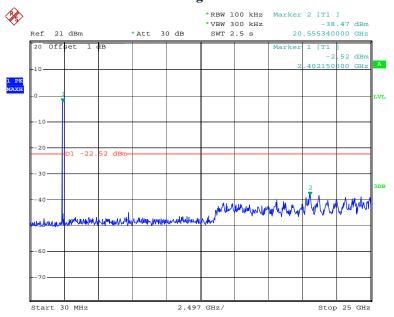
802.11b High Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 17:42:41

802.11g Low Channel

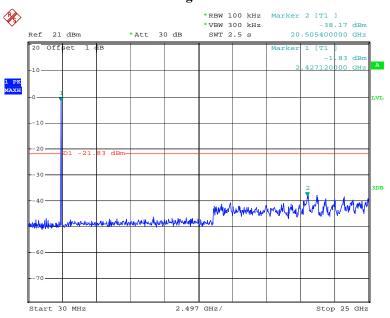


Date: 21.DEC.2013 17:43:35

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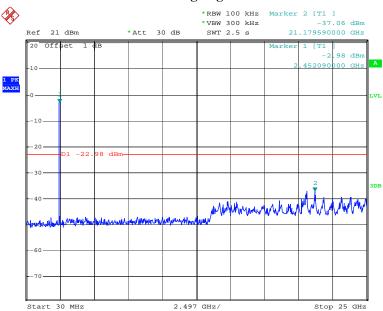
802.11g Middle Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 17:44:13

802.11g High Channel

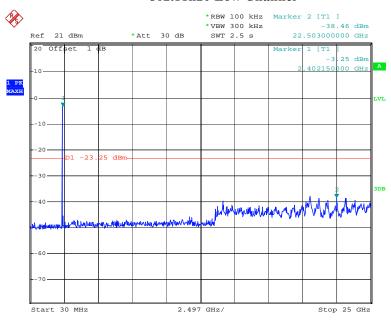


Date: 21.DEC.2013 17:44:39

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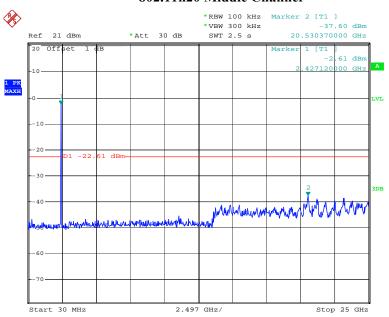
802.11n20 Low Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 17:45:17

802.11n20 Middle Channel

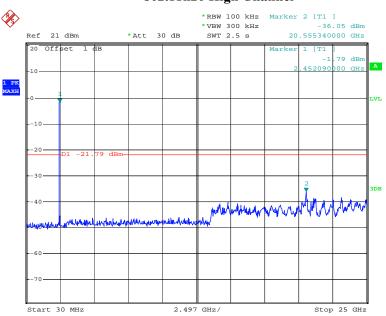


Date: 21.DEC.2013 17:45:48

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802.11n20 High Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 17:46:46

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FCC $\S15.247(a)$ (2) – 6 dB EMISSION BANDWIDTH

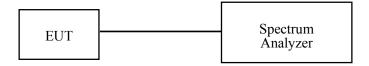
Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Report No.: R2DG131217003-00B

Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- 3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
- 4. Repeat above procedures until all frequencies measured were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2013-06-16	2014-06-15

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	20.7 °C
Relative Humidity:	37 %
ATM Pressure:	101.8 kPa

The testing was performed by Ares Liu on 2013-12-21.

Test Result: Pass.

Please refer to the following tables and plots.

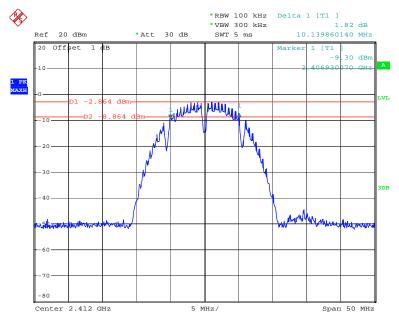
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Test Mode: Transmitting

Test Mode	Channel	Frequency	6 dB Bandwidth	Limit
1 est Mode	Chamici	(MHz)	(MHz)	(kHz)
	Low	2412	10.14	>500
802.11b	Middle	2437	9.19	>500
	High	2462	10.19	>500
	Low	2412	16.43	>500
802.11g	Middle	2437	16.48	>500
	High	2462	16.43	>500
	Low	2412	17.68	>500
802.11n20	Middle	2437	17.68	>500
	High	2462	17.68	>500

Report No.: R2DG131217003-00B

802.11b Low Channel

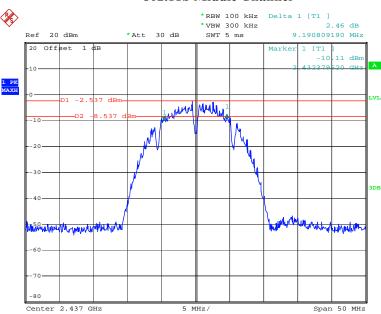


Date: 21.DEC.2013 16:09:02

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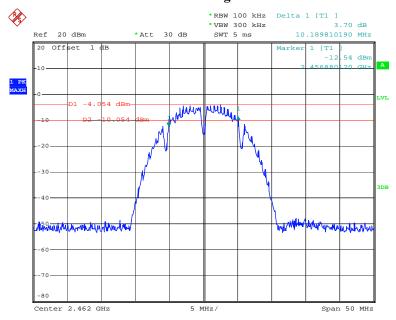
802.11b Middle Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:10:38

802.11b High Channel

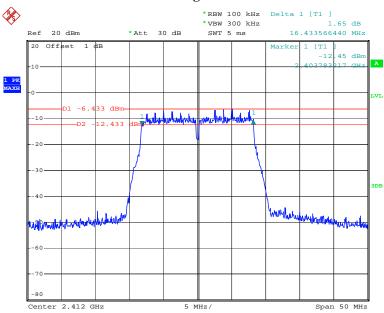


Date: 21.DEC.2013 16:11:44

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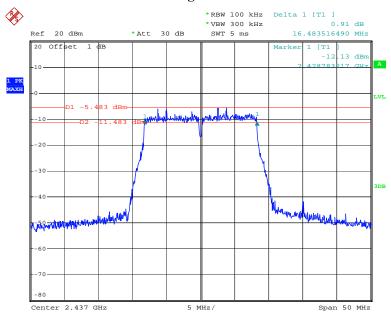
802.11g Low Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:13:15

802.11g Middle Channel

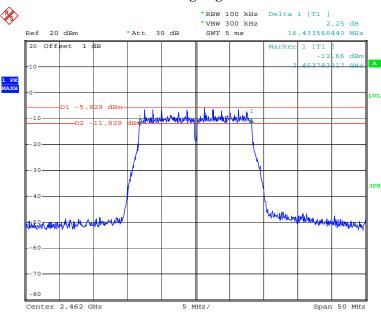


Date: 21.DEC.2013 16:14:46

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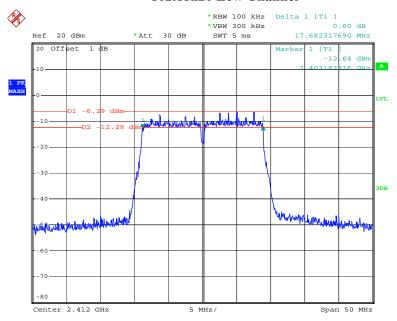
802.11g High Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:16:33

802.11n20 Low Channel

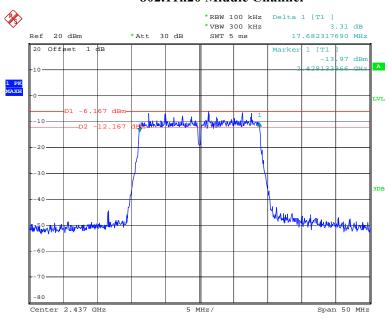


Date: 21.DEC.2013 16:18:09

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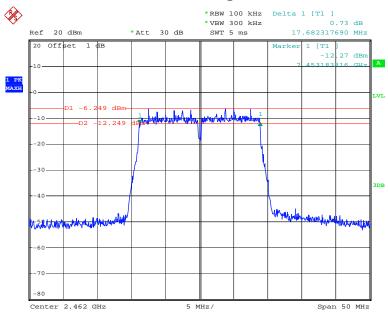
802.11n20 Middle Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:19:54

802.11n20 High Channel



Date: 21.DEC.2013 16:21:00

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FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

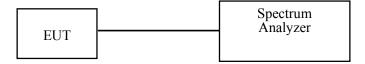
Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Report No.: R2DG131217003-00B

Test Procedure

- 1. According to KDB 558074 D01 DTS Meas Guidance v03r01, place the EUT on a bench and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a spectrum Analyzer.
- 3. Add a correction factor to the display.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	FSP 38	100478	2013-06-16	2014-06-15

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

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. Test Data

Environmental Conditions

Temperature:	20.7 °C
Relative Humidity:	37 %
ATM Pressure:	101.8 kPa

The testing was performed by Ares Liu on 2013-12-21.

Test Mode: Transmitting

Test Mode	Channel	Frequency	Conducted Output Power	Limit	Result
		(MHz)	(dBm)	(dBm)	
802.11b	Low	2412	9.22	30	PASS
	Middle	2437	9.63	30	PASS
	High	2462	9.18	30	PASS
802.11g	Low	2412	9.34	30	PASS
	Middle	2437	9.30	30	PASS
	High	2462	9.64	30	PASS
802.11n20	Low	2412	9.38	30	PASS
	Middle	2437	9.40	30	PASS
	High	2462	9.64	30	PASS

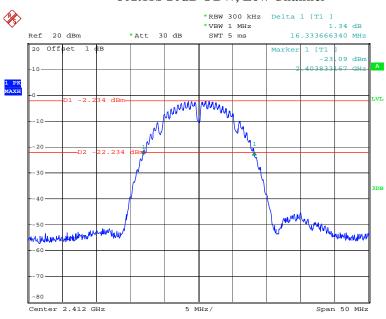
Report No.: R2DG131217003-00B

Please refer to the following plots

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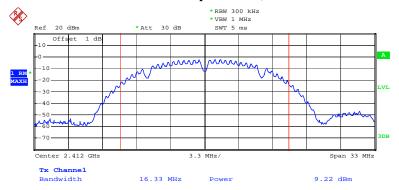
802.11b 20dB OBW, Low Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:09:16

802.11b RF Output Power, Low Channel

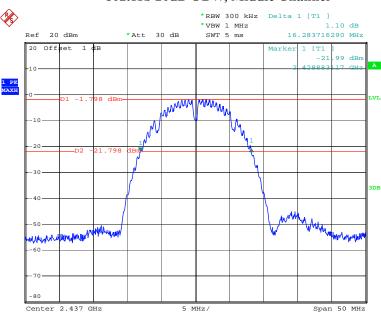


Date: 21.DEC.2013 16:09:26

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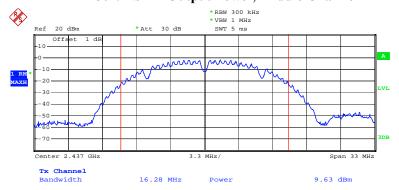
802.11b 20dB OBW, Middle Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:10:52

802.11b RF Output Power, Middle Channel

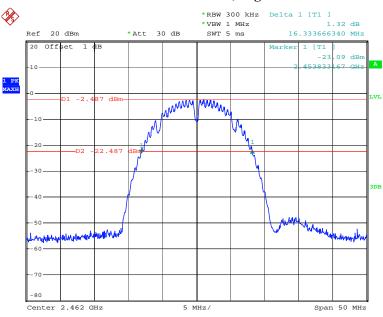


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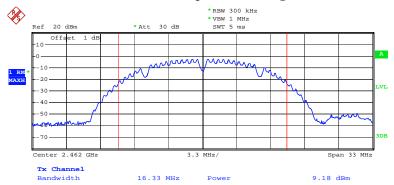
802.11b 20dB OBW, High Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:11:57

802.11b RF Output Power, High Channel

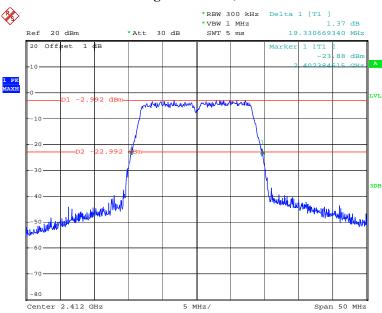


Date: 21.DEC.2013 16:12:05

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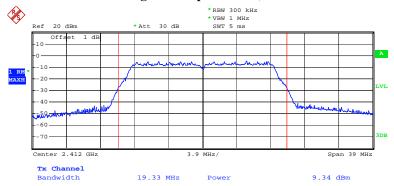
802.11g 20dB OBW, Low Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:13:29

802.11g RF Output Power, Low Channel

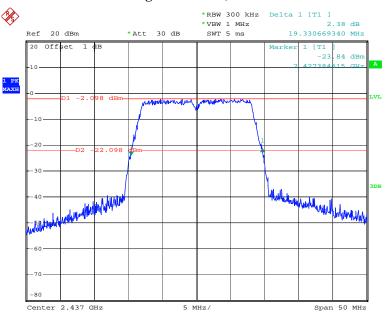


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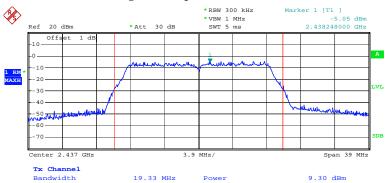
802.11g 20dB OBW, Middle Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:15:00

802.11g RF Output Power, Middle Channel

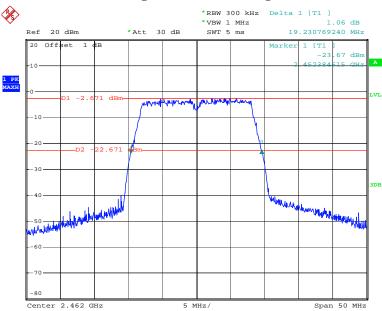


Date: 21.DEC.2013 16:15:42

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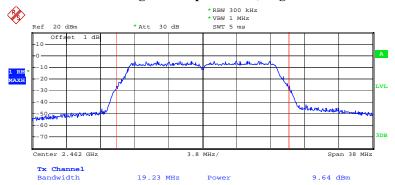
802.11g RF 20dB OBW, High Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:16:47

802.11g RF Output Power, High Channel

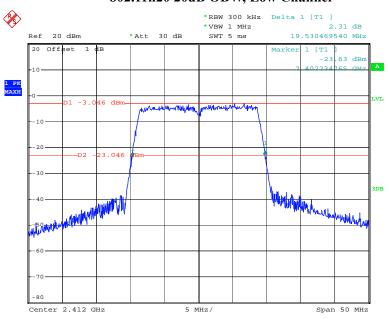


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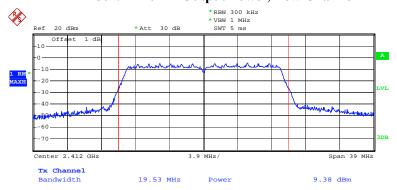
802.11n20 20dB OBW, Low Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:18:23

802.11n20 RF Output Power, Low Channel

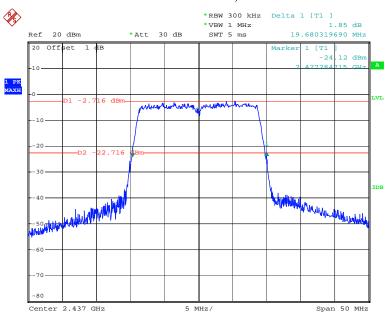


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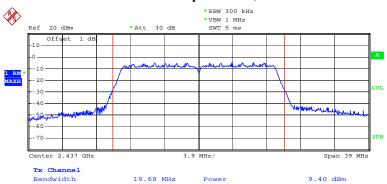
802.11n20 20dB OBW, Middle Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:20:08

802.11n20 RF Output Power, Middle Channel

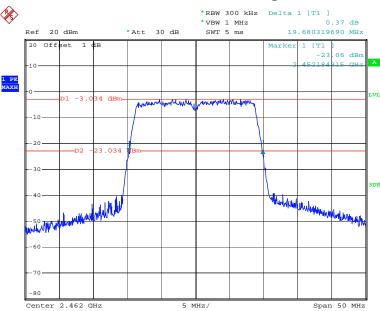


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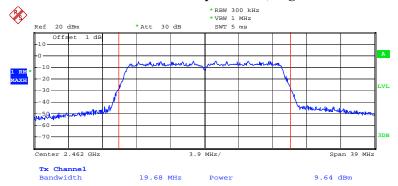
802.11n20 RF 20dB OBW, High Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:21:14

802.11n20 RF Output Power, High Channel



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FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Report No.: R2DG131217003-00B

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	FSP 38	100478	2013-06-16	2014-06-15

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	20.7 °C	
Relative Humidity:	37 %	
ATM Pressure:	101.8 kPa	

The testing was performed by Ares Liu on 2013-12-21.

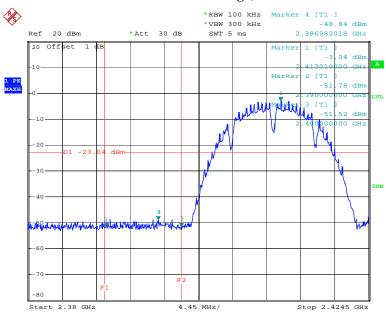
Test Result: Compliance

Please refer to following table and plots.

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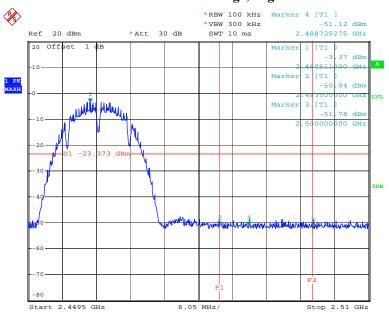
802.11b: Band Edge, Left Side

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:09:47

802.11b: Band Edge, Right Side

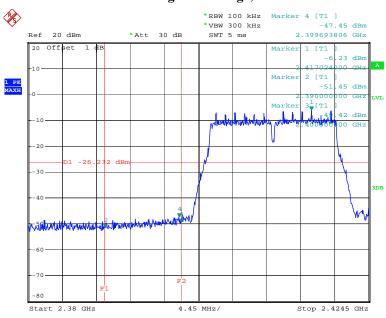


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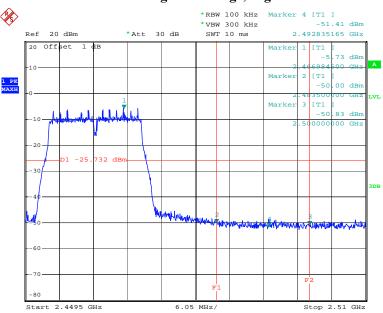
802.11g: Band Edge, Left Side

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:14:14

802.11g: Band Edge, Right Side

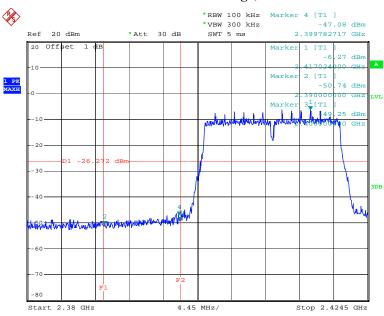


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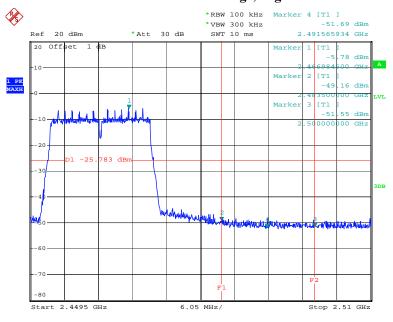
802.11n20 Band Edge, Left Side

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:19:12

802.11n20 Band Edge, Right Side



Date: 21.DEC.2013 16:21:55

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FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Report No.: R2DG131217003-00B

Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 3. Set the RBW = 3 kHz, VBW = 10 kHz, Set the span to 1.5 times the DTS bandwidth.
- 4. Use the peak marker function to determine the maximum amplitude level.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	FSP 38	100478	2013-06-16	2014-06-15

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	20.7 °C	
Relative Humidity:	37 %	
ATM Pressure:	101.8 kPa	

The testing was performed by Ares Liu on 2013-12-21.

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Test Mode: Transmitting

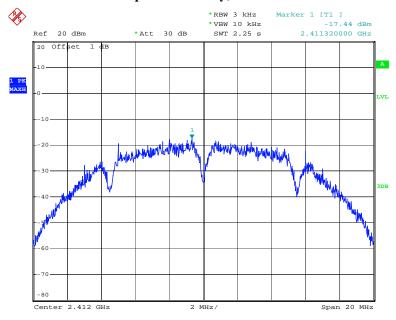
Test Result: Pass

Test Mode	Channel	PSD	Limit	D14
		(dBm/3kHz)	(dBm/3kHz)	Result
802.11b	Low	-17.44	8	PASS
	Middle	-16.21	8	PASS
	High	-18.86	8	PASS
802.11g	Low	-20.59	8	PASS
	Middle	-19.93	8	PASS
	High	-20.13	8	PASS
802.11n20	Low	-21.11	8	PASS
	Middle	-20.50	8	PASS
	High	-20.37	8	PASS

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Please refer to the following plots

Power Spectral Density, 802.11b Low Channel

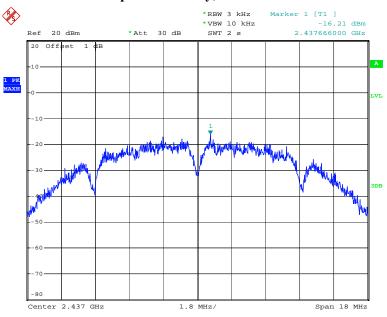


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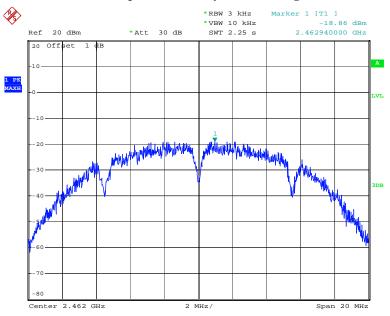
Power Spectral Density, 802.11b Middle Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:11:07

Power Spectral Density, 802.11b High Channel

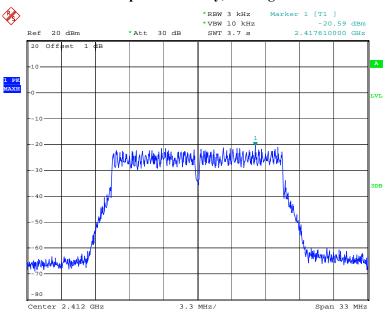


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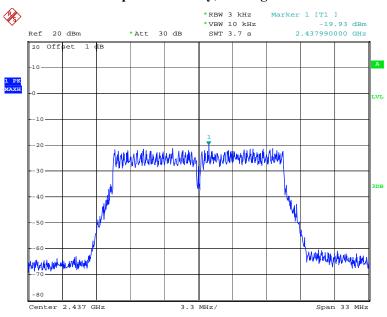
Power Spectral Density, 802.11g Low Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:14:02

Power Spectral Density, 802.11g Middle Channel

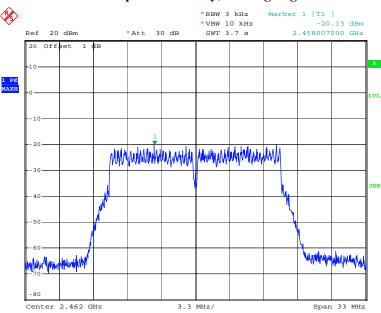


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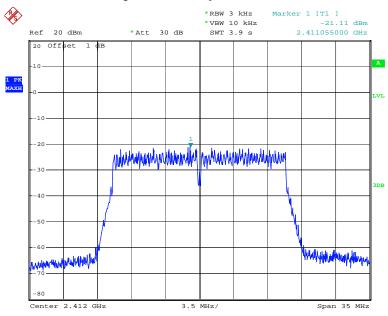
Power Spectral Density, 802.11g High Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:17:15

Power Spectral Density, 802.11n20 Low Channel

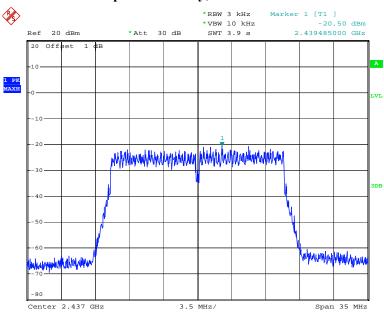


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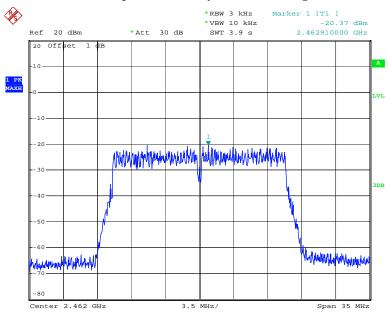
Power Spectral Density, 802.11n20 Middle Channel

Report No.: R2DG131217003-00B



Date: 21.DEC.2013 16:20:35

Power Spectral Density, 802.11n20 High Channel



Date: 21.DEC.2013 16:21:42

***** END OF REPORT *****

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