Underwriters Laboratories Inc.

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Order No.: 10597416
Report No.: 14-10597416-FCC-1
Date: December 23, 2014
Model No.: RS9110-N-11-22
FCC ID.: XF6-RS9110N1122

RF Test Report

in accordance with
FCC Part 15 Subpart C §15.247

For

WiFi Module

Redpine Signals Inc.
2107 N.First Street, Suite 680, San Jose, CA 95131-2019 United States

Summary of Test Results:

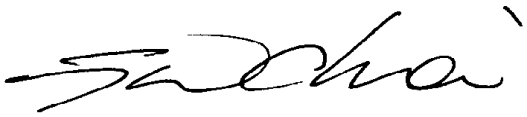
The following tests were performed on a sample submitted for evaluation of compliance with FCC Part 15 C Section 15.247				
No	Reference Clause No. FCC Rule	FCC Part15 Subpart C Conformance Requirements	Result Verdict	Remark
1	15.247(a) (2)	6dB Bandwidth Measurement	N/A	*Note [2]
2	15.247 (e)	Power Spectral Density Measurement	N/A	*Note [2]
3	15.247(b)	Peak Power Measurement	Complied	-
4	15.247(d)	Conducted Spurious Emission Measurement	N/A	*Note [2]
5	15.247(d)	Band Edges Measurement	Complied	-
6	15.247(d)	Radiated Emission Measurement	Complied	-
7	15.207(a)	AC Conducted Emission Measurement	N/A	*Note [3]
*Note [1]: N/T=Not Tested, N/A=Not Applicable *Note [2]: Test was performed by modular transmitter (FCC ID: XF6-RS9110N1124, Test Report no. 19660011 001 issued on July.01,2013 by TUV Rheinland. Ltd.) *Note [3]: The EUT is DC operating only.				

Radiated spurious emissions were tested for the host system so the different antenna type is covered by the system level tests.

Conclusion:

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by UL Korea Ltd. in accordance with the procedures stated in each test requirement and specification. The test list was determined by the Applicant as being applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

Witness tested by
Changmin, Kim WiSE Engineer
UL Verification Services- 3014ASEO
UL Korea Ltd.
Dec. 23, 2014



Reviewed by
Jeawoon, Choi, WiSE Operations Manager
UL Verification Services – 3014ASEO
UL Korea Ltd.
Dec. 23, 2014

Test Report Details

Test Report No:	14-10597416-FCC
Witness Tests Performed By:	UL Korea Ltd. 26th FL. GFC Center, 737 Yeoksam-dong, Gangnam-gu, Seoul, 135-984, Korea
Test Site:	EMC compliance Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-390, Korea
Applicant:	Redpine Signals Inc. 2107 N.First Street, Suite 680, San Jose, CA 95131-2019 United States
Applicant Contact:	Soon-oh Lee
Title:	Manager
Phone:	+82-2-577-9131
Fax:	+82-2-577-9130
FCC ID:	XF6-RS9110N1122
E-mail:	aklee@incmicro.com
Product Type:	802.11 bgn Connection Module
Model Number:	RS9110-N-11-22
Trademark	REDPINE SIGNALS
Sample Serial Number:	N/A
Test standards:	FCC Part 15 C Section 15.247
Sample Serial Number:	N/A
Sample Receive Date:	Dec. 16, 2014
Testing Date:	Dec. 16, 2014 ~ Dec. 22, 2014
Test Report Date:	Dec. 23, 2014
Overall Results:	**Pass**

UL Korea Ltd. reports apply only to the specific test samples and test results submitted for UL's review. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. UL Korea Ltd. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from UL Korea Ltd. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or any agency of the National Authorities. This report may contain test results that are not covered by the NVLAP or KOLAS accreditation.

REPORT DIRECTORY

1. General Product Information

1.1 Equipment Description

The RS9110-N-11-22 module is a IEEE 802.11bgn based WLAN device that directly provides a wireless interface to any equipment with a UART or SPI interface for data transfer

1.2 Details of Test Equipment (EUT)

- Equipment Type : WiFi Module
- Model No. : RS9110-N-11-22
- Operating characteristic : Short range wireless device operating in the 2400 – 2483.5 ISM frequency band
- Manufacturer : Redpine Signals Inc.
  2107 N.First Street, Suite 680, San Jose, CA 95131-2019 United States

1.3 Equipment Configuration

The EUT is consisted of the following component provided by the manufacturer.

Use*	Product Type	Manufacturer	Model	Comments
EUT	WiFi Module	Redpine Signals Inc.	RS9110-N-11-22	-
***Note:** Use = EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment. SIM - Simulator (Not Subjected to Test)				

1.4 Technical Data

Item	WiFi Module
Frequency Ranges	2 412 ~ 2 472 MHz
Kind of modulation (s)	DSSS (CCK), OFDM(BPSK, QPSK, 16QAM, 64QAM)
Channel	13 channels (802.11b/g/n_HT20)
Antenna information	External type (PCB antenna)
Working temperature	-40 ~ 85 ℃
Supply Voltage	DC 3.1V ~ 3.6V from Host device
***Note:** All the technical data described above were provided by the manufacturer.	

1.5 Antenna Information

Item	Antenna
Antenna Model Name	PCA-4606-2G4C1-B8-FM
Antenna Type	PCB antenna
Manufacturer	MAG.LAYERS
GAIN(dBi) - 2.4GHz	3.3 dBi
Polarization	Linear Vertical
***Note:** All the technical data described above were provided by the manufacturer.	

1.6 Equipment Type :

☒ Radio and ancillary equipment for fixed or semi-fixed use
☐ Radio and ancillary equipment for vehicular mounted use
☐ Radio and ancillary equipment for portable or handheld use

☐ Stand alone ☒ Host connected

☐ Self contained single unit ☒ Module with associated connection or interface

1.7 Maximum Output Power (Baseline Measurement)

802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Peak Output Power (dBm)	GC Value
b	11Mbps	2 412	17.23	53
		2 442	16.65	53
		2 472	10.52	40
g	24Mbps	2 412	12.62	44
		2 442	12.51	46
		2 472	7.44	35
n20	MCS0	2 412	11.30	41
		2 442	11.68	44
		2 472	6.11	31

1.8 Technical descriptions and documents

No.	Document Title and Description
1	User Manual
***Note:** The following document was provided by the manufacturer.	

2. Test Specification

The following test specifications and standards have been applied and used for testing.

1) FCC Part 15 C Section 15.247
Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz

2) ANSI C63.4:2009
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

3) KDB 558074 D01 v03r02
Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

3. Test Conditions

3.1 Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	WiFi Module	Redpine Signals Inc.	RS9110-N-11-22	-
AE	Note PC	HP	Compad 6730b	**S**/N :CNU8390HKZ
***Note:** Use = EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment. SIM - Simulator (Not Subjected to Test)				

3.2 Input/Output Ports

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
1	DC input port	DC	N	Y	USB
2	Serial port	I/O	N	Y	RS-232

***Note:**
AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
I/O = Signal Input or Output Port (Not Involved in Process Control)
TP = Telecommunication Ports

3.3 Power Interface

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Comments
1	3.3	-	-	DC	Normal operating voltage

3.4 Operating Frequencies

Mode #	Frequency tested
1	Operating frequency range: 2 412 ㎒ ~ 2 472 ㎒ (802.11b/g/n_HT20) 3 channels in the Transmitter modes of 802.11b/g/n_HT20 are tested. - Low : 2 412 MHz / CH = 1 - Mid : 2 442 MHz / CH = 7 - Top : 2 472 MHz / CH= 13

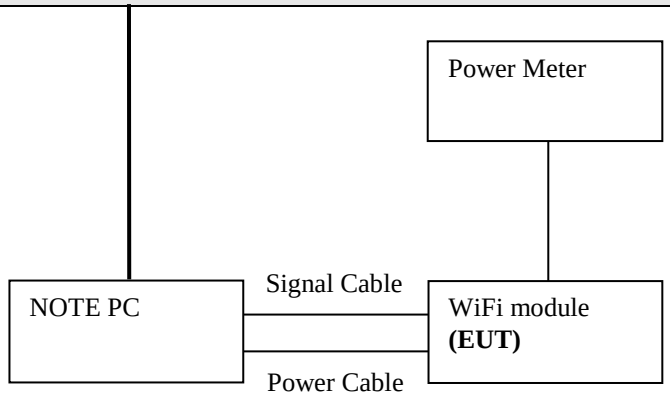
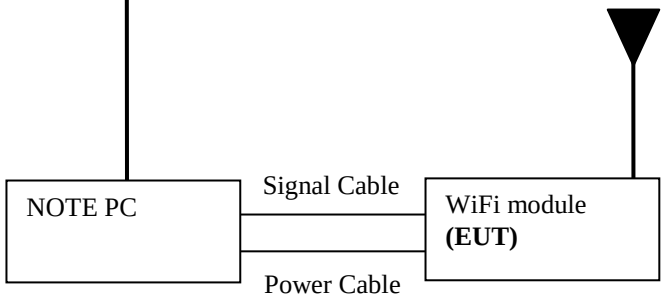
3.5 Operation Modes

Mode #	Description
1	Carrier on mode: Signal from the RF module was generated continuously for the representative channels (Low, Mid, High) by the test program incorporated
2	Carrier off (Idle) mode: RF carrier was not activated by the RF module.

Note:

1. Hyper terminal in the computer was used to enable the transmission with 100% duty cycle, changing channels (Low, Mid, High) and data rate on the EUT for the tests.
2. The worst-case condition is determined by the baseline measurement of RF output power of the modular transmitter test report. The worst-case channel was determined as the channel with highest output power.
3. Output power from the device during the radiated spurious measurements are within expected tolerance of the module test results to justify using the original conducted antenna port measurements for the module

3.6 Test Configurations

No.	Test Set-up
1	
2	

3.7 List of Test Equipment

No	Description	Manufacturer	Model	Identifier	Cal. Due
1	Spectrum Analyzer	R&S	FSV40	100988	2014.12.23
2	Signal Generator	R&S	SMR40	100007	2015.06.10
3	Highpass Filter	Wainwright Instruments GmbH	WHK0.5 /13G-10SS	4	2015.04.08
4	Horn Antenna	ETS-LINDGREN	3117	155787	2015.02.26
5	Preamplifier	R&S	SCU18	0117	2015.01.12
6	Antenna Mast	Innco Systems	MA4000-EP	N/A	-
7	Amplifier	Sonoma Instrument	310N	293004	2015.09.25
8	Loop Antenna	R&S	HFH2-Z2	100355	2015.06.19
9	Bi-Log Antenna	Schwarzbeck	VULB9163	552	2016.05.14
10	EMI Test Receiver	Schwarzbeck	ESR7	101078	2015.02.24
11	Broadband Preamplifier	Schwarzbeck	BBV9718	216	2015.04.22
12	Attenuator	HP	8491A	16861	2015.07.01
13	Wide Band Power Sensor	R&S	NRP-Z81	100677	2015.05.28

4. Overview of Technical requirements

The following tests were performed on a sample submitted for evaluation of compliance with FCC Part 15 C Section 15.247				
No	Reference Clause No.	FCC Part15 Subpart C Conformance Requirements	Test method	Reported
1	15.247(b)	Peak Power Measurement	Note 1	[X]
2	15.205(a)	Restricted bands of operation	Note 1	[X]
3	15.209(a)	Radiated emission limits, general requirements	Note 1	[X]
4	15.247(d)	Transmitter radiated spurious emissions	Note 1	[X]
5	15.203	Antenna Requirement	-	[X]

Note 1: The measurement procedures described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 MHz (ANSI C63.4-2009), the guidance provided in KDB 558074 D01 v03r02 were used in the measurement of the DUT.

Note 2: This device use already certified module so that the below specified test items are not tested in the end product evaluation. (FCC ID: XF6-RS9110N1124, Test Report no. 19660011 001 issued on July.01,2013 by TUV Rheinland. Ltd.)
-. 6dB bandwidth
-. Conducted Spurious Emission
-. Tx Spectral Power Density

4.1 Antenna Requirement

4.1.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section §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. And according to FCC 47 CFR Section § 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dBi.

4.1.2 Antenna Connected Construction

The antenna used of this product is PCB dipole Antenna Assembly and peak max gain of antenna as below. Antenna is permanently installed in the end product enclosure and no user exchange is allowed.

Band	2 412 – 2 472 MHz
Antenna Gain (dBi)	3.3 Max.

5. Test Results

5.1 Maximum peak output power

TEST: Maximum Peak Output Power			
Method	Maximum Peak Output Power measurements were performed in accordance with Measurement of Digital Transmission Systems Operating under KDB558074 D01 v03r02. **9.1.2 PKPM1 Peak power meter method** The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.		
Reference Clause		Part15 C Section 15.247 (b)(3)	
Parameters recorded during the test		Laboratory Ambient Temperature	23 °C
		Relative Humidity	43 %
		Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range		2 412 MHz - 2 472 MHz	Antenna port

Configuration Settings

Power Interface Mode # (See Section 3.3)	Test Configurations Mode # (See Section 3.6)	EUT Operation Mode # (See 3.5)
1	1	1
Supplementary information: None		

Limits

The maximum peak output power of the intentional radiator shall not exceed the following :

1. §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.

According to §15.247(b)(4), the conducted output power limit specified in paragraph(b) of this section is based on the use of antenna with directional gains that do not exceed 6 dBi. Except as shown in paragraph(c) of this section, if transmitting antenna of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraph (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Measurement Results

Table 1. Data Table of Maximum Peak Output Power

802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Peak Output Power* (dBm)	Limit (dBm)	Margin (dB)
b	1	2 412	10.26	30	19.74
		2 442	9.80	30	20.20
		2 472	9.38	30	20.62
	11	2 412	17.23	30	12.77
		2 442	16.65	30	13.35
		2 472	10.52	30	19.48
g	6	2 412	12.10	30	17.90
		2 442	12.24	30	17.76
		2 472	7.26	30	22.74
	24	2 412	12.62	30	17.38
		2 442	12.51	30	17.49
		2 472	7.44	30	22.56
	54	2 412	12.01	30	17.99
		2 442	12.29	30	17.71
		2 472	7.28	30	22.72
HT 20	MCS0	2 412	11.30	30	18.70
		2 442	11.68	30	18.32
		2 472	6.11	30	23.89
	MCS4	2 412	11.07	30	18.93
		2 442	11.61	30	18.39
		2 472	5.99	30	24.01
	MCS7	2 412	11.05	30	18.95
		2 442	11.61	30	18.39
		2 472	5.93	30	24.07

* Peak Output Power= Power Meter Reading + Cable Loss(0.5dB)

5.2 Transmitter radiated spurious emissions

TEST: Transmitter radiated spurious emissions		
Method	Radiated emissions from the EUT were measured according to ANSI C63.4 -2009 procedure. 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation. The antenna is is varied from 1 to 4 meters above the ground to find the maximum field strength. Measurement are made with both horizontal and vertical polarizations For fundamental investigation, the EUT was positioned for 3 orthogonal orientations. 2. For measurement below 1GHz, the resolution bandwidth is set to 100 kHz for peak detection or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak. 3. For measurement above 1GHz, the resolution bandwidth is set to 1 MHz and video bandwidth is set to 1 MHz for peak measurement and 10 Hz for average measurement. 4. For 2.4GHz transmitter measurement, the spectrum from 30 MHz to 26GHz is investigated for Low, Mid and High channels. For 5 GHz transmitter measurement, the spectrum from 30 MHz to 40GHz is investigated for Low, Mid and High channels.	
Supplementary information: Radiated emission which fall in the restricted bands must also comply with FCC section 15.209.		
Reference Clause	Part15 C Section 15.247 (d)	
Parameters recorded during the test	Laboratory Ambient Temperature	23 °C
	Relative Humidity	43 %
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz to 10th harmonics	Enclosure Port

Configuration Settings

Test Item	Power Interface Mode # (See Section 3.3)	Test Configurations Mode # (See Section 3.6)	EUT Operation Mode # (See 3.5)
Radiated Spurious emission	1	2	1
Conducted Spurious emission	N/A	N/A	N/A
Supplementary information: None			

Limits

According to §15.247(d), 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 section §15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))

According to § 15.209(a), Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Distance (meters)	Field Strength (dBuV/m)	Field Strength (uV/m)
0.009-0.490	300*	48.50-13.80	2400/F(kHz)
0.490-1.705	30*	33.80-23.00	24000/F(kHz)
1.705	30*	29.54	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

Remark: * The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 88.50 – 53.80, 53.80 – 43.00 and 49.5dBμV/m at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

5.2.1. Radiated Spurious Emissions for Below 1 GHz

Measurement method : ☒ Radiated ☐ Conducted
Mode of operation : Continuous Wave

Table 2. Test data for Radiated emission for 9 kHz ~ 30 MHz

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
0.590	H	QP	59.6	-12.8	46.8	52.9	6.1
0.703	H	QP	60.3	-12.8	47.5	52.0	4.5
0.886	H	QP	59.7	-12.9	46.8	50.4	3.6
1.055	H	QP	56.4	-12.8	43.6	48.9	5.3
1.182	H	QP	52.9	-12.8	40.1	47.9	7.8
1.404	H	QP	53.2	-12.7	40.5	45.9	5.4
1.475	H	QP	52.9	-12.7	40.2	45.3	5.1

Table 3. Test data for Radiated emission for 30 MHz ~ 1 GHz

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
69.04	V	QP	39.3	-17.4	21.9	40.0	18.1
120.00	H	QP	48.2	-17.2	31.0	43.5	12.5
332.88	H	QP	39.3	-12.2	27.1	46.0	18.9
360.04	H	QP	37.8	-11.3	26.5	46.0	19.5
474.02	H	QP	38.0	-9.0	29.0	46.0	17.0
497.66	V	QP	35.0	-8.6	26.4	46.0	19.6
663.53	V	QP	31.2	-5.5	25.7	46.0	20.3
848.44	V	QP	31.4	-2.7	28.7	46.0	17.3
998.67	V	QP	33.9	-0.4	33.5	54.0	20.5

Supplementary information:
-. The frequency spectrum from 30 MHz to 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB. All reading values are peak values.

Remark
a. To get a maximum emission level from the EUT, the EUT was moved throughout the x-axis, Y-axis and Z-axis. The worst case is X-axis.
b. Factor = AF + CL + AG (AF : Antenna factor, CL : Cable loss, AG: Pre-Amp gain)
c. Level = Reading + Factor (Factor = AF + CL + AG)
d. Margin = Limit (dBuV/m) - Level (dBuV/m)

5.2.2. Radiated Spurious Emissions for Above 1 GHz

Measurement method : ☒ Radiated ☐ Conducted
Mode of operation : Continuous Wave

802.11b Mode (11Mbps)

Table 4. Low Channel (2412 MHz)

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
1655.50	V	PK	58.6	-3.2	55.4	74.0	18.6
1655.50	V	AV	47.2	-3.2	44.0	54.0	10.0
2390.00	H	PK	57.4	1.9	59.3	74.0	14.7
2390.00	H	AV	47.3	1.9	49.2	54.0	4.8
4822.50	H	PK	50.3	7.5	57.8	74.0	16.2
4822.50	H	AV	38.1	7.5	45.6	54.0	8.4

Table 5. Middle Channel (2442 MHz)

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
1665.25	V	PK	58.6	-3.1	55.5	74.0	18.5
1665.25	V	AV	47.4	-3.1	44.3	54.0	9.7
4884.38	H	PK	49.6	7.6	57.2	74.0	16.8
4884.38	H	AV	38.7	7.6	46.3	54.0	7.7

Table 6. High Channel (2472 MHz)

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
1660.25	V	PK	58.4	-3.2	55.2	74.0	18.8
1660.25	V	AV	47.4	-3.2	44.2	54.0	9.8
2483.50	H	PK	57.1	2.2	59.3	74.0	14.7
2483.50	H	AV	48.1	2.2	50.3	54.0	3.7
4944.38	H	PK	47.1	7.7	54.8	74.0	19.2
4944.38	H	AV	35.1	7.7	42.8	54.0	11.2

Supplementary information:
-. The frequency spectrum from 30 MHz to 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB. All reading values are peak values.

Remark
a. To get a maximum emission level from the EUT, the EUT was moved throughout the x-axis, Y-axis and Z-axis. The worst case is X-axis.
b. Factor = AF + CL + AG (AF : Antenna factor, CL : Cable loss, AG: Pre-Amp gain)
c. Level = Reading + Factor (Factor = AF + CL + AG)
d. Margin = Limit (dBuV/m) - Level (dBuV/m)

802.11g Mode (24Mbps)

Table 7. Low Channel (2412 MHz)

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
1661.75	V	PK	67.3	-3.2	64.1	74.0	9.9
1661.75	V	AV	48.5	-3.2	45.3	54.0	8.7
2390.00	H	PK	62.6	1.9	64.5	74.0	9.5
2390.00	H	AV	47.1	1.9	49.0	54.0	5.0

Table 8. Middle Channel (2442 MHz)

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Emission levels are not reported much lower than the limits by over 30 dB.							

Table 9. High Channel (2472 MHz)

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
1667.50	V	PK	61.5	-3.1	58.4	74.0	15.6
1667.50	V	AV	47.6	-3.1	44.5	54.0	9.5
2483.50	H	PK	63.4	2.2	65.6	74.0	8.4
2483.50	H	AV	48.0	2.2	50.2	54.0	3.8

Supplementary information:

-. The frequency spectrum from 30 MHz to 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB. All reading values are peak values.

Remark

a. To get a maximum emission level from the EUT, the EUT was moved throughout the x-axis, Y-axis and Z-axis. The worst case is X-axis.
b. Factor = AF + CL + AG (AF : Antenna factor, CL : Cable loss, AG: Pre-Amp gain)
c. Level = Reading + Factor (Factor = AF + CL + AG)
d. Margin = Limit (dBuV/m) - Level (dBuV/m)

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Table 10. Low Channel (2412 MHz)

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
2390.00	H	PK	67.0	1.9	68.9	74.0	5.1
2390.00	H	AV	48.5	1.9	50.4	54.0	3.6

Table 11. Middle Channel (2442 MHz)

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
4884.15	H	PK	39.2	7.6	46.8	74.0	27.2
4884.15	H	AV	30.4	7.6	38.0	54.0	16.0

Table 12. High Channel (2472 MHz)

Frequency [MHz]	Pol.	Detect Mode	Reading [dB(μV)]	Factor [dB]	Level [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
1665.25	V	PK	60.0	-3.1	56.9	74.0	17.1
1665.25	V	AV	47.3	-3.1	44.2	54.0	9.8
2483.50	H	PK	65.0	2.2	67.2	74.0	6.8
2483.50	H	AV	48.5	2.2	50.7	54.0	3.3

Supplementary information:

-. The frequency spectrum from 30 MHz to 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB. All reading values are peak values.

Remark

a. To get a maximum emission level from the EUT, the EUT was moved throughout the x-axis, Y-axis and Z-axis. The worst case is X-axis.
b. Factor = AF + CL + AG (AF : Antenna factor, CL : Cable loss, AG: Pre-Amp gain)
c. Level = Reading + Factor (Factor = AF + CL + AG)
d. Margin = Limit (dBuV/m) - Level (dBuV/m)