FCC Part 15C Measurement and Test Report

For

Spheris Digital Ltd

Flat Rm A21, Blk A, 4/F, Sheung Shui Plaza, 3 Ka Fu Close, Sheung Shui, Hong Kong

FCC ID: YHO-PXT51013

FCC Rules: FCC Part 15C

Product Description: Wireless Digital Display

Tested Model: PXT510WR04C

Report No.: STR13048235I-1

Tested Date: 2013-05-07 to 2013-05-28

Issued Date: 2013-06-09

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM. Test Compliance Service Co., Ltd

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Spheris Digital Ltd

Address of applicant: Flat Rm A21, Blk A, 4/F, Sheung Shui Plaza, 3 Ka Fu

Close, Sheung Shui, Hong Kong

Manufacturer: Spheris Digital Ltd

Address of manufacturer: Flat Rm A21, Blk A, 4/F, Sheung Shui Plaza, 3 Ka Fu

Close, Sheung Shui, Hong Kong

General Description of EUT	
Product Name:	Wireless Digital Display
Trade Name:	Pix-Star
Model No.:	PXT510WR04C
A states as BA and a L/a No	PXT510VR02C, PXT510GR02C, PXT510WR02C,
Adding Model(s):	PXT510VR04C, PXT510GR04C
Rated Voltage:	DC 5V
Note: The test data is gathered from a pro-	duction sample, provided by the manufacturer.

Technical Characteristics of EUT	
Support Standards:	802.11b/g/n
Frequency Range:	2412-2462MHz
RF Output Power:	15.69dBm (Conducted)
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Modulation:	CCK, BPSK, QPSK, 16QAM, 64QAM
Quantity of Channels:	11
Channel Separation:	5MHz
Antenna Type:	Integral Antenna
Antenna Gain:	1 dBi
Lowest Internal Frequency of EUT:	32.768KHz
Device Category:	Mobile Device

1.2 Test Standards

The following report is prepared on behalf of the Spheris Digital Ltd in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 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. The public notice KDB 558074 D01 V02 for digital transmission systems shall be performed also.

1.4 Test Facility

• FCC – Registration No.: 994117

SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

• Industry Canada (IC) Registration No.: 7673A

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

• CNAS Registration No.: L4062

Shenzhen SEM. Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

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1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List			
Test Mode	Description	Remark	
TM1	802.11b	2412MHz, 2437MHz, 2462MHz	
TM2	802.11g	2412MHz, 2437MHz, 2462MHz	
TM3	802.11n-HT20	2412MHz, 2437MHz, 2462MHz	

Special Cable List and Details						
Cable Description Length (m) Shielded/Unshielded With / Without Ferrite						
/ / / / /						

Auxiliary Equipment List and Details						
Description Manufacturer Model Serial Number						
Power Adapter	I.T.E.	GFP151U-050250B-1	/			

Auxiliary Cable List and Details					
Cable Description Length (m) Shielded/Unshielded With / Without Ferrite					
DC Line 1.8		Unshielded	With Ferrite		

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2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.207(a)	Conducted Emission	Compliant
§ 15.247(e)	Power Spectral Density	Compliant
§ 15.247(a)(2)	6 dB Bandwidth	Compliant
§ 15.247(b)(3)	RF Output Power	Compliant
§ 15.209(a)(d)	Radiated Emission	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant

N/A: not applicable

3. Antenna Requirement

3.1 Standard Applicable

According to FCC Part 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.

3.2 Evaluation Information

This product has a Integral antenna, fulfill the requirement of this section.

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4. Power Spectral Density

4.1 Standard Applicable

According to 15.247(a)(1)(iii), 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.

4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2013-05-07	2014-05-06
Attenuator	ATTEN	ATS100-4-20	/	2013-05-07	2014-05-06

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.3 Test Procedure

According to the KDB 558074 D01 V02, the test method of power spectral density as below:

- 1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 2. Set analyzer center frequency to DTS channel center frequency.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW \geq 3 kHz.
- 5. Set the VBW \geq 3 x RBW.
- 6. Detector = peak.
- 7. Sweep time = auto couple.
- 8. Trace mode = max hold.
- 9. Allow trace to fully stabilize.
- 10. Use the peak marker function to determine the maximum amplitude level.
- 11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.4 Environmental Conditions

Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

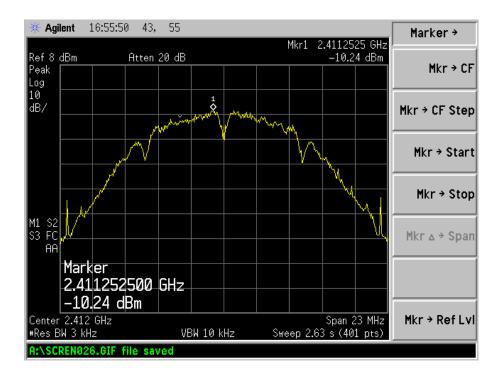
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4.5 Summary of Test Results/Plots

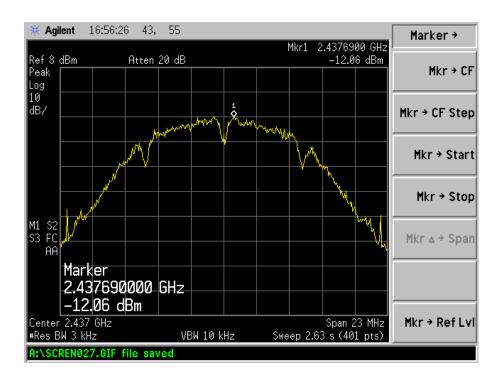
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
	2412	-10.24	8
802.11b	2437	-12.06	8
	2462	-10.41	8
	2412	-15.23	8
802.11g	2437	-15.08	8
	2462	-14.21	8
	2412	-13.62	8
802.11n HT20	2437	-14.50	8
	2462	-12.95	8

Please refer to the following test plots:

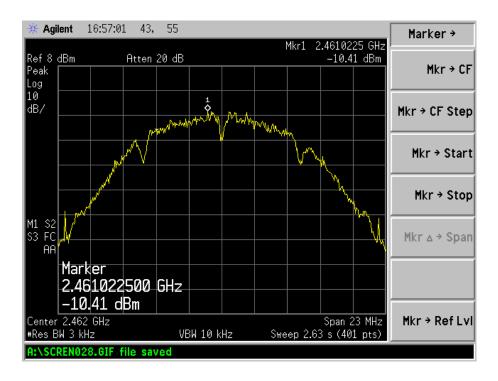
802.11b-Low Channel



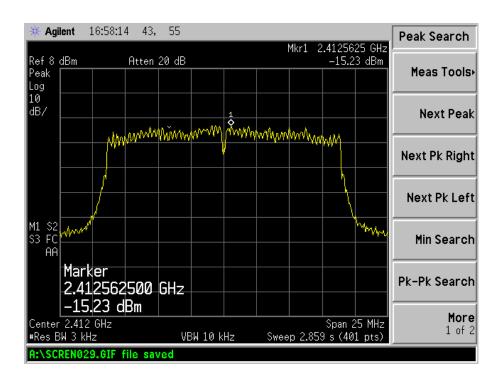
802.11b-Middle Channel



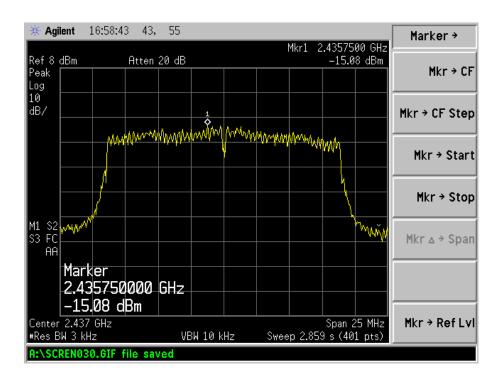
802.11b-High Channel



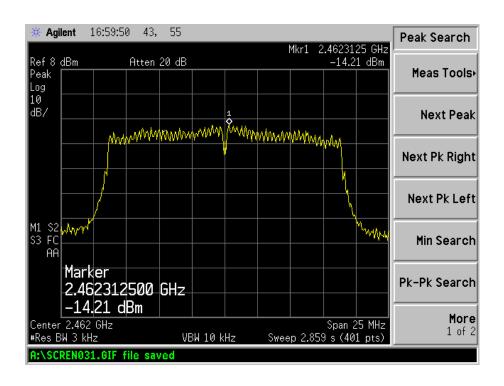
802.11g-Low Channel



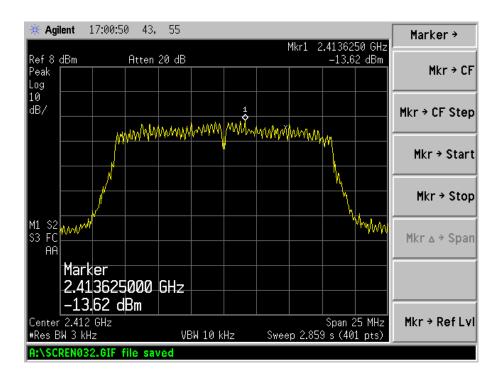
802.11g-Middle Channel



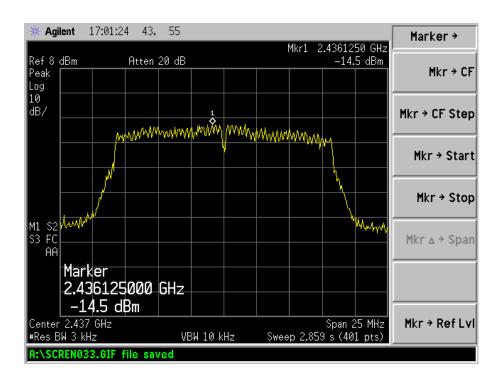
802.11g-High Channel



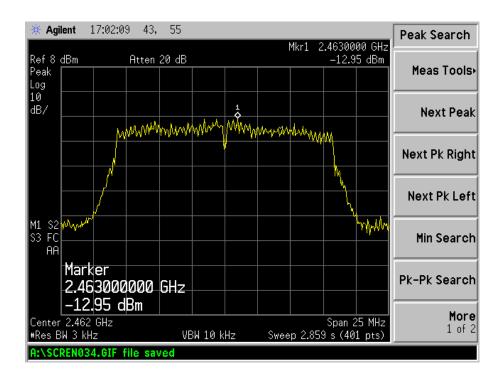
802.11n-HT20-Low Channel



802.11n-HT20-Middle Channel



802.11n-HT20-High Channel



5. 6dB Bandwidth

5.1 Standard Applicable

According to 15.247(a)(2). 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.

5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2013-05-07	2014-05-06
Attenuator	ATTEN	ATS100-4-20	/	2013-05-07	2014-05-06

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3 Test Procedure

- 1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 2. Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
- 3. Set the video bandwidth (VBW) \geq 3 x RBW.
- 4. Detector = Peak.
- 5. Trace mode = max hold.
- 6. Sweep = auto couple.
- 7. Allow the trace to stabilize.
- 8. 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..

5.4 Environmental Conditions

Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

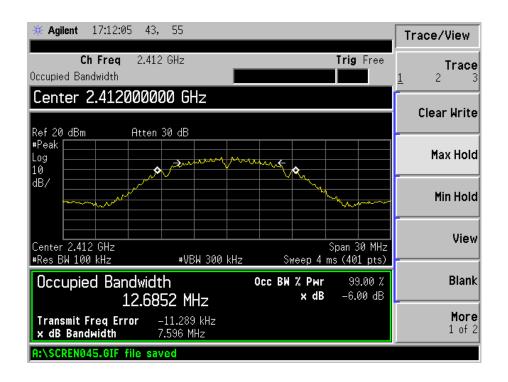
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5.5 Summary of Test Results/Plots

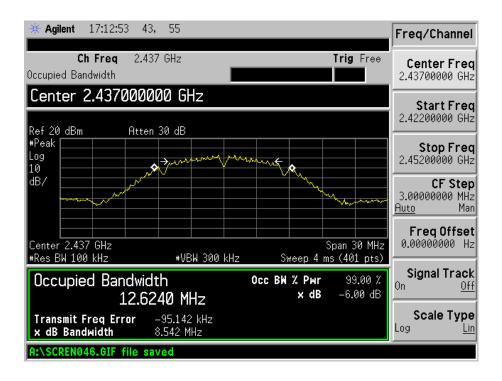
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	Limit kHz
	2412	7596.0	500
802.11b	2437	8542.0	500
002.110	2462	7620.0	500
	2412	15313.0	500
802.11g	2437	14129.0	500
C	2462	15450.0	500
	2412	17566.0	500
802.11n-HT20	2437	17217.0	500
	2462	17196.0	500

Please refer to the following test plots:

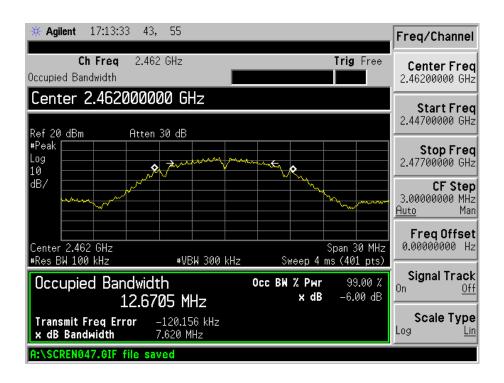
802.11b-Low Channel



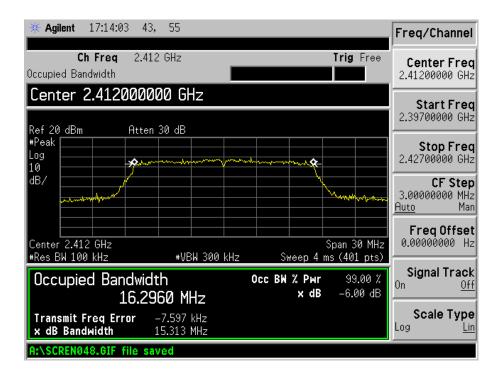
802.11b-Middle Channel



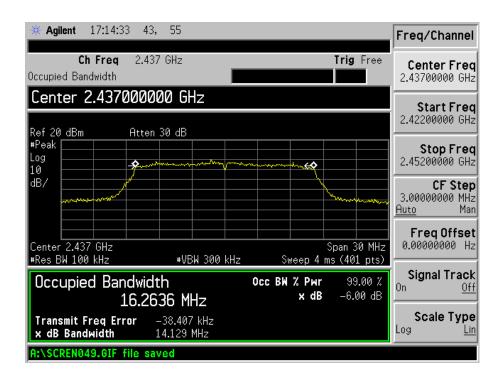
802.11b-High Channel



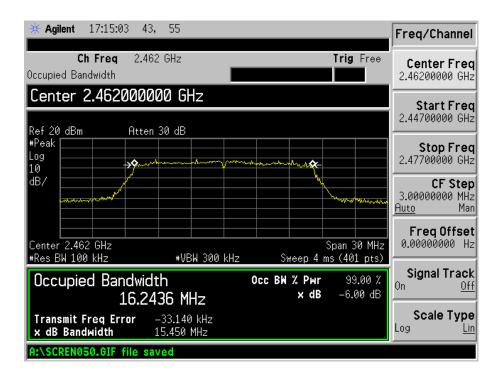
802.11g-Low Channel



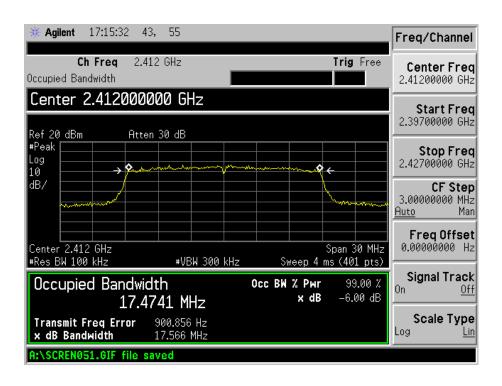
802.11g-Middle Channel



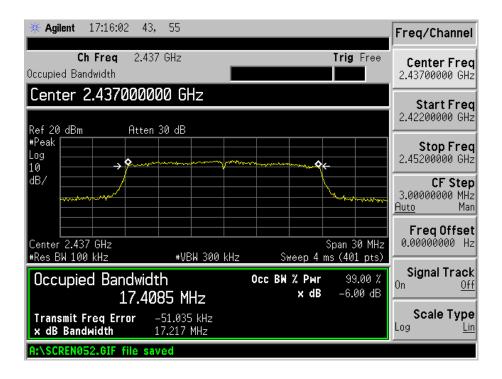
802.11g-High Channel



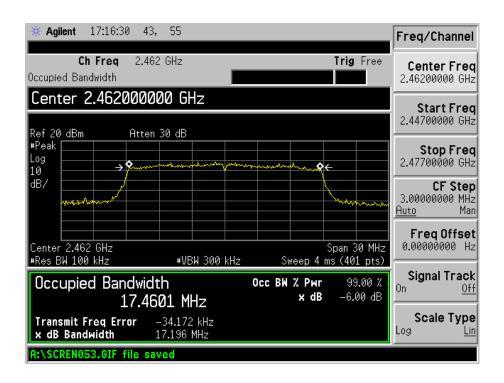
802.11n-HT20-Low Channel



802.11n-HT20-Middle Channel



802.11n-HT20-High Channel



6. RF Output Power

6.1 Standard Applicable

According to 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.

6.2 Test Equipment List and Details

Description	Manufacturer	Model Serial Number		Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2013-05-07	2014-05-06
Attenuator	ATTEN	ATS100-4-20	/	2013-05-07	2014-05-06

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3 Test Procedure

According to section 15.247(b)-power output of the KDB-558074 D01 V02 (2012), 8.1.2 Option 2 (channel integration method) this procedure should only be used when the maximum available RBW of the spectrum/signal analyzer is less than the DTS bandwidth.

- 1. Set the RBW = maximum available (at least 1 MHz).
- 2. Set the VBW = $3 \times RBW$ or maximum available setting (must be $\geq RBW$).
- 3. Set the span to fully encompass the DTS bandwidth.
- 4. Detector = peak.
- 5. Sweep time = auto couple.
- 6. Trace mode = max hold.
- 7. Allow trace to fully stabilize.
- 8. Use the spectrum analyzer's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some analyzers, this may require a manual override to ensure use of peak detector).

6.4 Environmental Conditions

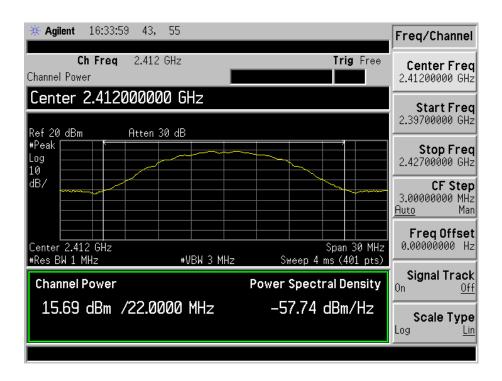
Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

6.5 Summary of Test Results/Plots

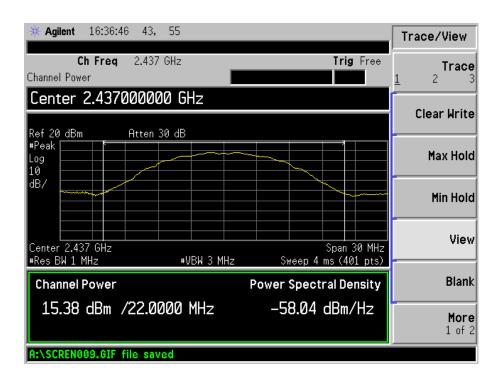
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
	2412	15.69	37.0681	1000
802.11b_1Mbps	2437	15.38	34.5144	1000
	2462	15.21	33.1894	1000
	2412	15.08	32.2107	1000
802.11b _11Mbps	2437	15.29	33.8065	1000
	2462	15.24	33.4195	1000
	2412	13.84	24.2103	1000
802.11g_6Mbps	2437	14.10	25.7040	1000
	2462	14.93	31.1172	1000
	2412	13.11	20.4644	1000
802.11g_54Mbps	2437	13.27	21.2324	1000
	2462	13.51	22.4388	1000
	2412	13.15	20.6538	1000
802.11n HT20_MCS0	2437	13.64	23.1206	1000
	2462	13.47	22.2331	1000
	2412	12.76	18.8799	1000
802.11n HT20_MCS7	2437	13.26	21.1836	1000
	2462	13.86	24.3220	1000

Please refer to the following test plots:

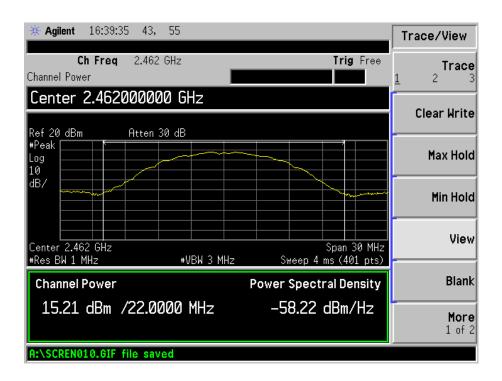
802.11b-1Mbps-Low Channel



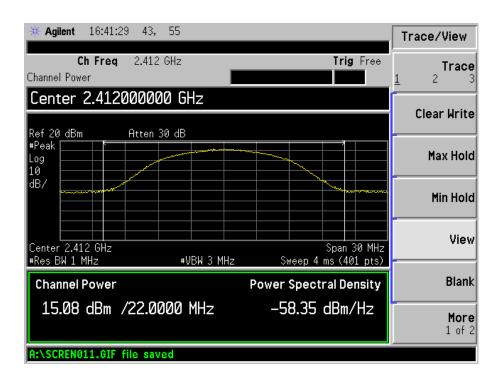
802.11b-1Mbps-Middle Channel



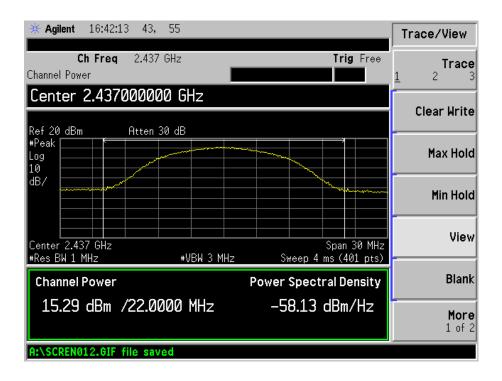
802.11b-1Mpbs-High Channel



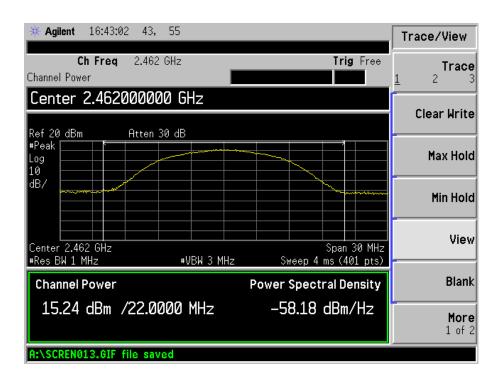
802.11b-11Mbps-Low Channel



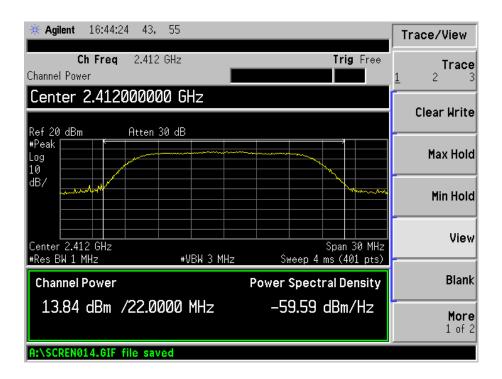
802.11b-11Mbps-Middle Channel



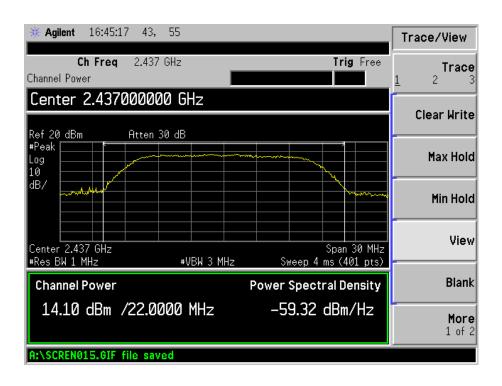
802.11b-11Mpbs-High Channel



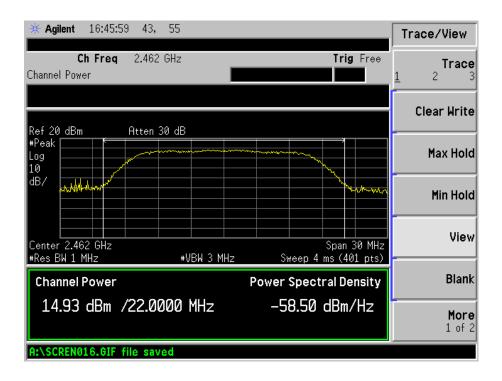
802.11g-6Mbps-Low Channel



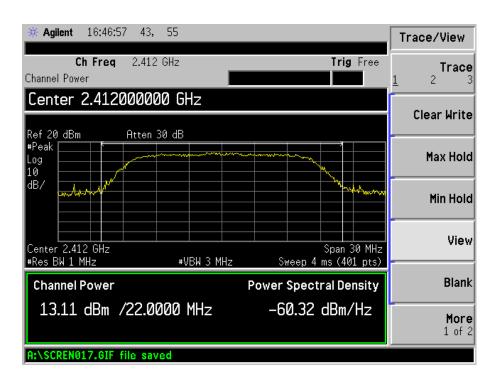
802.11g-6Mbps-Middle Channel



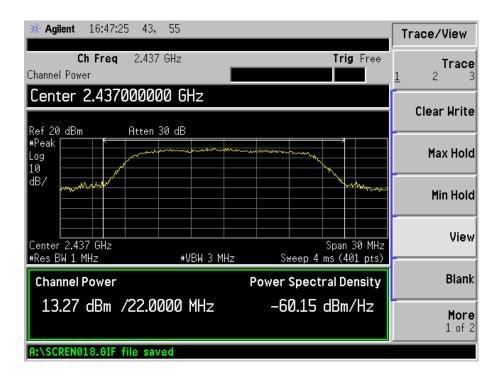
802.11g-6Mpbs-High Channel



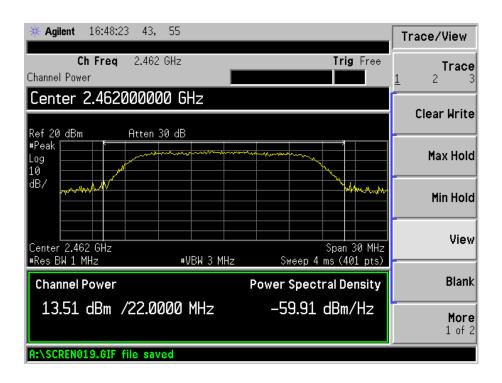
802.11g-54Mbps-Low Channel



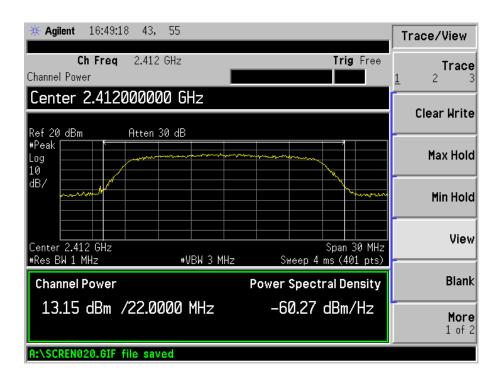
802.11g-54Mbps-Middle Channel



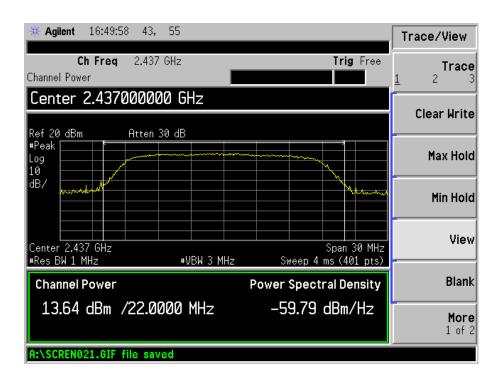
802.11g-54Mpbs-High Channel



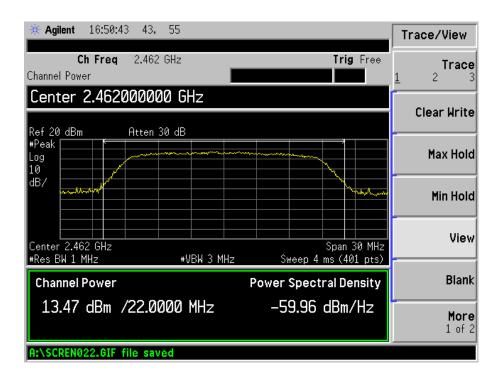
802.11n HT20 MCS0-Low Channel



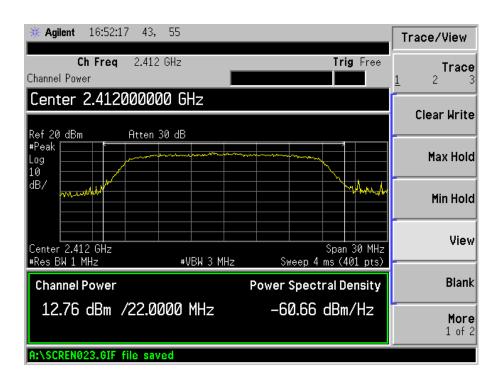
802.11n-HT20_ MCS0-Middle Channel



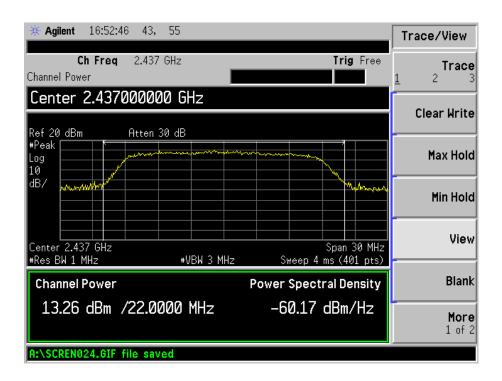
802.11n-HT20 MCS0-High Channel



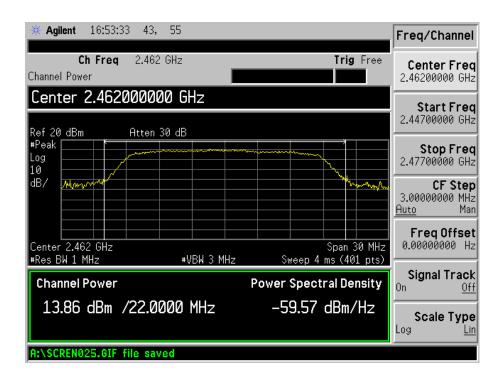
802.11n-HT20_ MCS7-Low Channel



802.11n-HT20 MCS7-Middle Channel



802.11n-HT20_ MCS7-High Channel



7. Field Strength of Spurious Emissions

7.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±5.10 dB.

7.2 Standard Applicable

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 §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).

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

7.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2013-05-07	2014-05-06
EMI Test Receiver	R&S	ESVB	825471/005	2013-05-07	2014-05-06
Pre-amplifier	Agilent	8447F	3113A06717	2013-05-07	2014-05-06
Pre-amplifier	Compliance Direction	PAP-0118	24002	2013-05-07	2014-05-06
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2013-04-20	2014-04-19
Horn Antenna	ETS	3117	00086197	2013-04-20	2014-04-19
Horn Antenna	ETS	3116B	00088203	2013-04-20	2014-04-19
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2013-04-20	2014-04-19

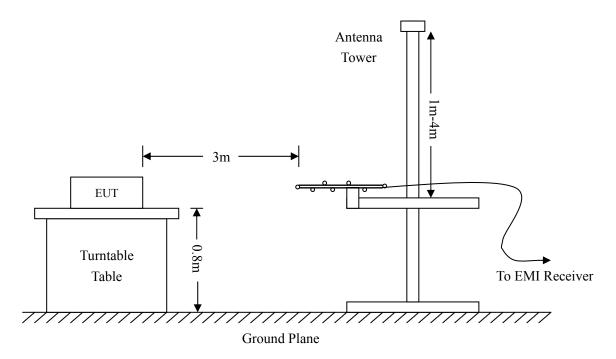
Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

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7.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

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.



Frequency:9kHz-30MHz	Frequency:30MHz-1GHz	Frequency : Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW = 30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Detector function = peak	Detector function = peak	Detector function = peak, AV

7.5 Corrected Amplitude & Margin Calculation

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

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

7.6 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

7.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst margin of:

-2.98 dB at 766.0572 MHz in the Horizontal polarization for 802.11n-HT20 High Channel, 9kHz to 25 GHz, 3 Meters

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

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Plot of Radiated Emissions Test Data (30MHz to 1GHz)

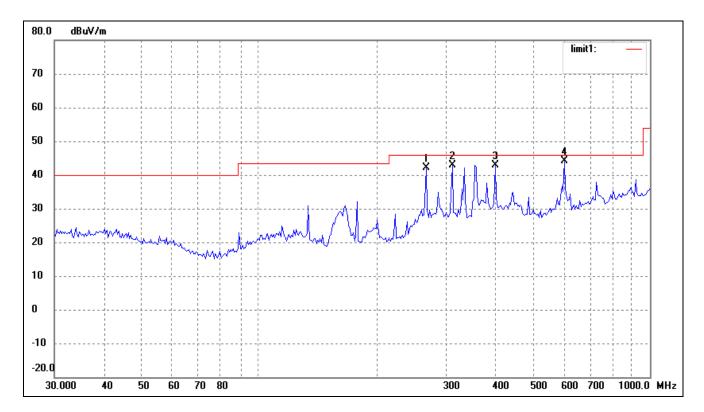
EUT: Wireless Digital Display

Tested Model: PXT510WR04C

Operating Condition: 802.11b Transmitting Low Channel-2412MHz

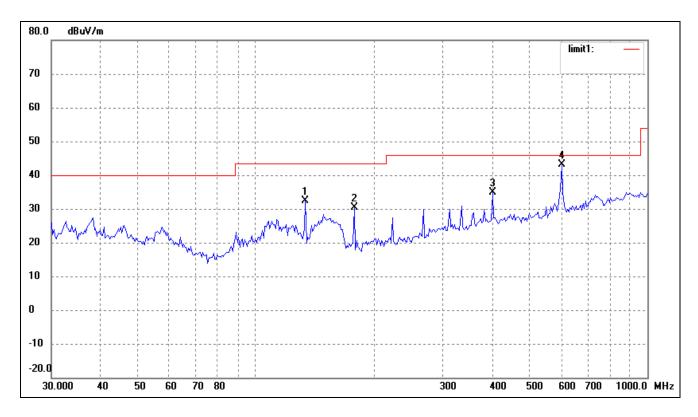
Comment: 3.7V lithium battery

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	267.5455	33.94	8.28	42.22	46.00	-3.78	45	100	peak
2	312.1794	32.49	10.36	42.85	46.00	-3.15	45	100	peak
3	401.8385	31.47	11.47	42.94	46.00	-3.06	45	100	peak
4	603.5392	29.50	14.62	44.12	46.00	-1.88	45	100	peak

Test Specification: Vertical

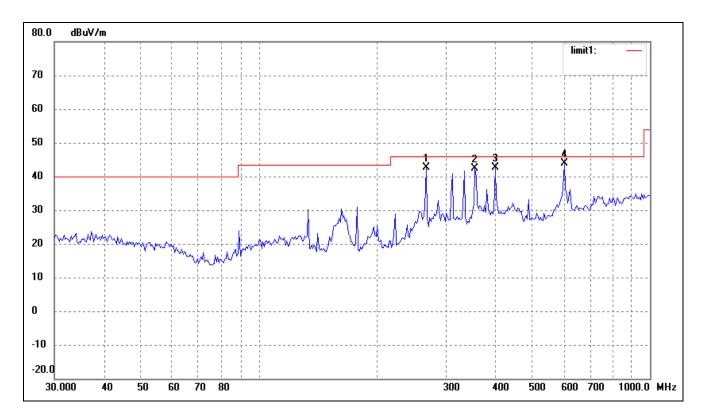


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	133.6188	28.40	3.86	32.26	43.50	-11.24	15	100	peak
2	178.1327	26.62	3.74	30.36	43.50	-13.14	15	100	peak
3	401.8385	23.36	11.47	34.83	46.00	-11.17	15	100	peak
4	603.5392	28.53	14.62	43.15	46.00	-2.85	15	100	peak

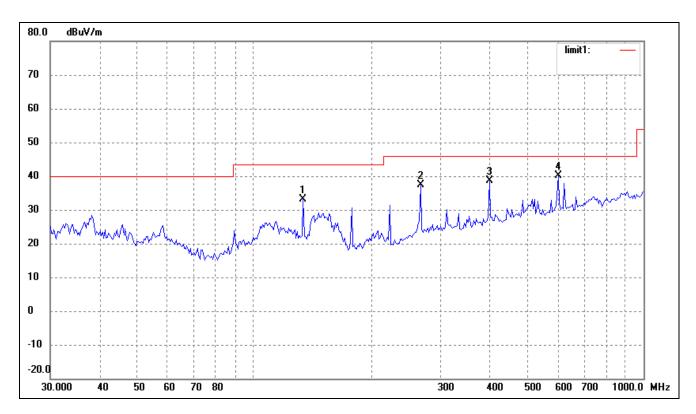
Operating Condition: 802.11b Transmitting Middle Channel-2437MHz

Comment: 3.7V lithium battery

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	267.5455	34.29	8.28	42.57	46.00	-3.43	45	100	peak
2	356.6758	31.66	10.61	42.27	46.00	-3.73	45	100	peak
3	401.8385	31.06	11.47	42.53	46.00	-3.47	45	100	peak
4	603.5392	29.21	14.62	43.83	46.00	-2.17	45	100	peak
1	267.5455	34.29	8.28	42.57	46.00	-3.43	45	100	peak

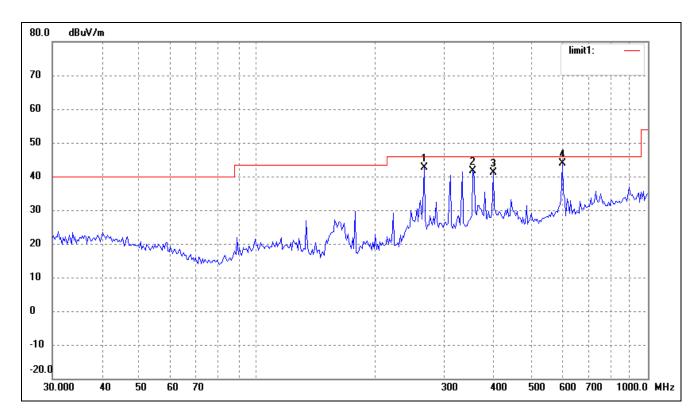


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	133.6188	29.39	3.86	33.25	43.50	-10.25	15	100	peak
2	267.5455	29.18	8.28	37.46	46.00	-8.54	15	100	peak
3	401.8385	27.18	11.47	38.65	46.00	-7.35	15	100	peak
4	603.5392	25.57	14.62	40.19	46.00	-5.81	15	100	peak

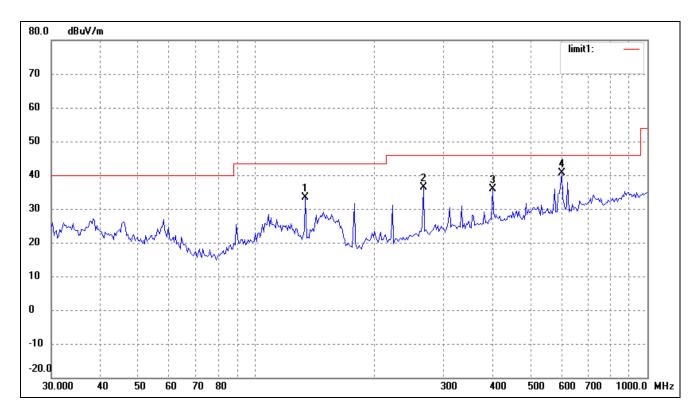
Operating Condition: 802.11b Transmitting High Channel-2462MHz

Comment: 3.7V lithium battery

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	267.5455	34.35	8.28	42.63	46.00	-3.37	45	100	peak
2	356.6758	31.05	10.61	41.66	46.00	-4.34	45	100	peak
3	401.8385	29.54	11.47	41.01	46.00	-4.99	45	100	peak
4	603.5392	29.19	14.62	43.81	46.00	-2.19	45	100	peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	133.6188	29.42	3.86	33.28	43.50	-10.22	15	100	peak
2	267.5455	28.13	8.28	36.41	46.00	-9.59	15	100	peak
3	401.8385	24.36	11.47	35.83	46.00	-10.17	15	100	peak
4	603.5392	25.99	14.62	40.61	46.00	-5.39	15	100	peak

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

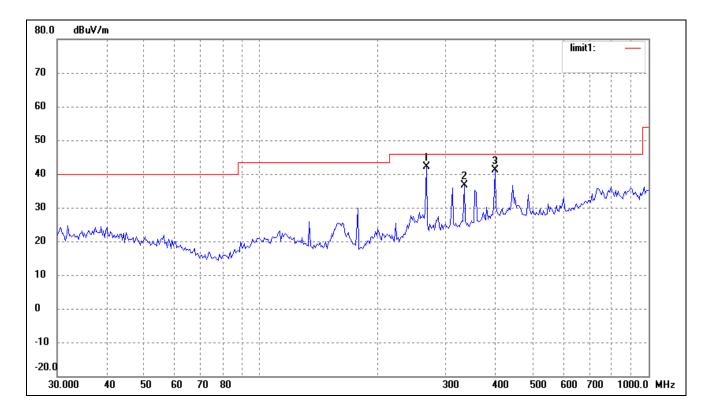
EUT: Wireless Digital Display

Tested Model: PXT510WR04C

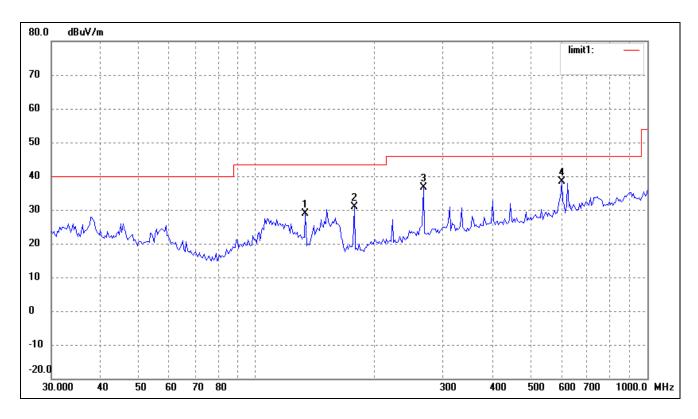
Operating Condition: 802.11g Transmitting Low Channel-2412MHz

Comment: 3.7V lithium battery

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	267.5455	33.83	8.28	42.11	46.00	-3.89	45	100	peak
2	334.8589	26.56	10.19	36.75	46.00	-9.25	45	100	peak
3	401.8385	29.60	11.47	41.07	46.00	-4.93	45	100	peak

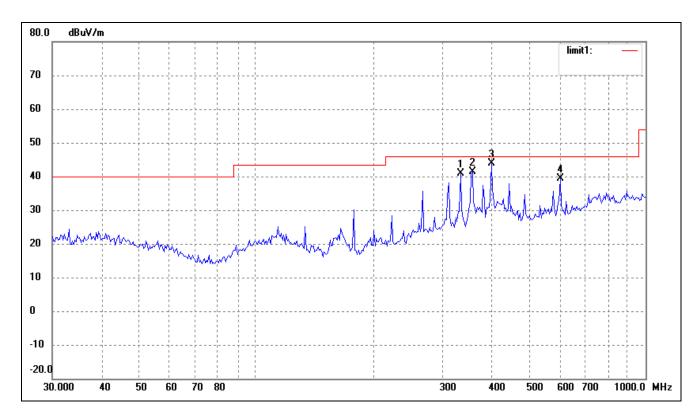


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	133.6188	25.02	3.86	28.88	43.50	-14.62	15	100	peak
2	178.1327	27.21	3.74	30.95	43.50	-12.55	15	100	peak
3	267.5455	28.41	8.28	36.69	46.00	-9.31	15	100	peak
4	603.5392	23.86	14.62	38.48	46.00	-7.52	15	100	peak

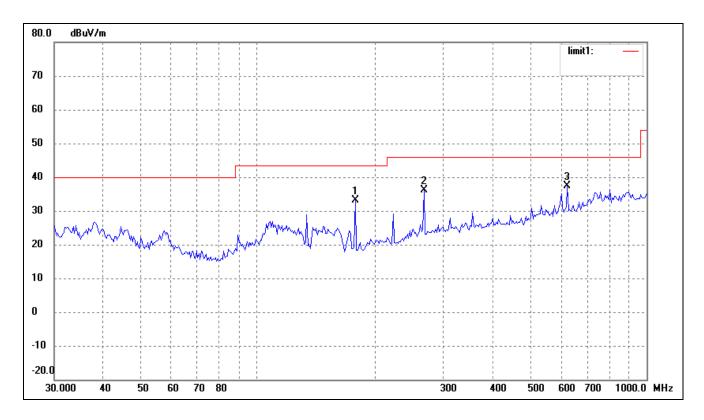
Operating Condition: 802.11g Transmitting Middle Channel-2437MHz

Comment: 3.7V lithium battery

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	334.8589	30.77	10.19	40.96	46.00	-5.04	45	100	peak
2	359.1860	30.69	10.68	41.37	46.00	-4.63	45	100	peak
3	401.8385	32.50	11.47	43.97	46.00	-2.03	45	100	peak
4	603.5392	24.83	14.62	39.45	46.00	-6.55	45	100	peak

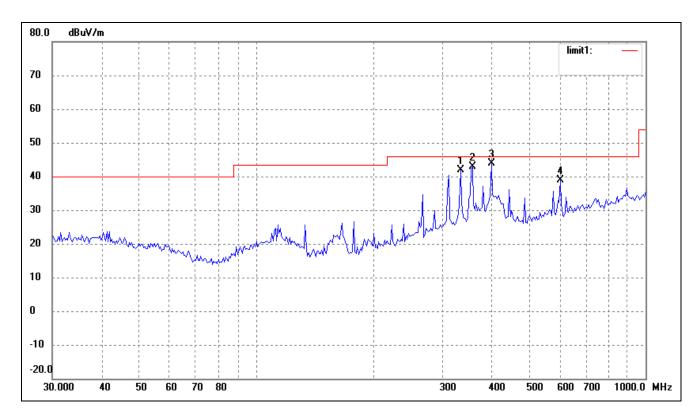


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	178.1327	29.28	3.74	33.02	43.50	-10.48	115	100	peak
2	267.5455	27.79	8.28	36.07	46.00	-9.93	115	100	peak
3	625.0780	23.11	14.23	37.34	46.00	-8.66	115	100	peak

Operating Condition: 802.11g Transmitting High Channel-2462MHz

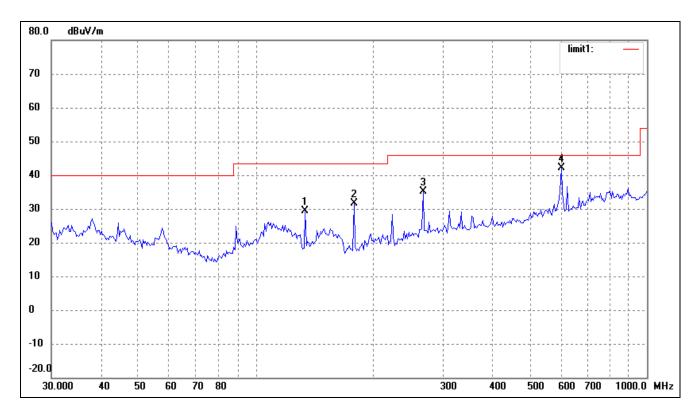
Comment: 3.7V lithium battery

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	334.8589	31.73	10.19	41.92	46.00	-4.08	45	100	peak
2	359.1860	32.10	10.68	42.78	46.00	-3.22	45	100	peak
3	401.8385	32.37	11.47	43.84	46.00	-2.16	45	100	peak
4	603.5392	24.35	14.62	38.97	46.00	-7.03	45	100	peak

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No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	133.6188	25.51	3.86	29.37	43.50	-14.13	15	100	peak
2	178.1327	27.79	3.74	31.53	43.50	-11.97	15	100	peak
3	267.5455	26.77	8.28	35.05	46.00	-10.95	15	100	peak
4	603.5392	27.59	14.62	42.21	46.00	-3.79	15	100	peak

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

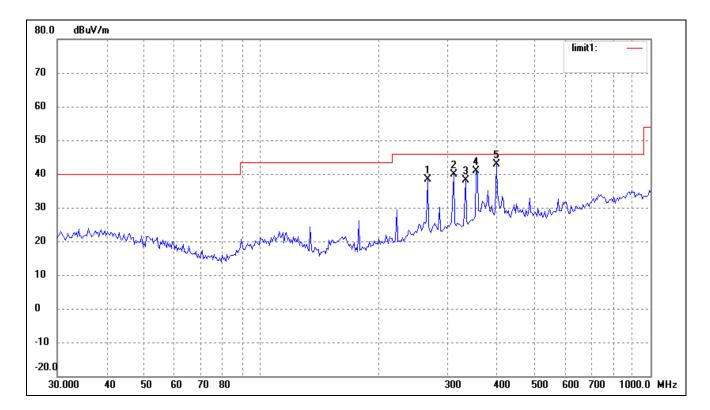
EUT: Wireless Digital Display

Tested Model: PXT510WR04C

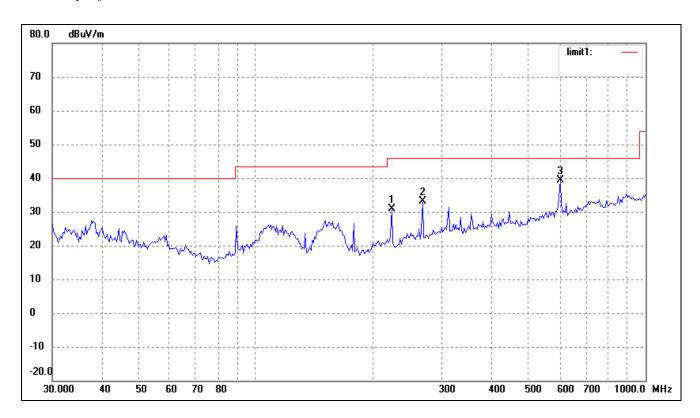
Operating Condition: 802.11n-HT20 Transmitting Low Channel-2412MHz

Comment: 3.7V lithium battery

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	267.5455	30.10	8.28	38.38	46.00	-7.62	45	100	peak
2	312.1794	29.59	10.36	39.95	46.00	-6.05	45	100	peak
3	334.8589	28.06	10.19	38.25	46.00	-7.75	45	100	peak
4	356.6758	30.39	10.61	41.00	46.00	-5.00	45	100	peak
5	401.8385	31.36	11.47	42.83	46.00	-3.17	45	100	peak

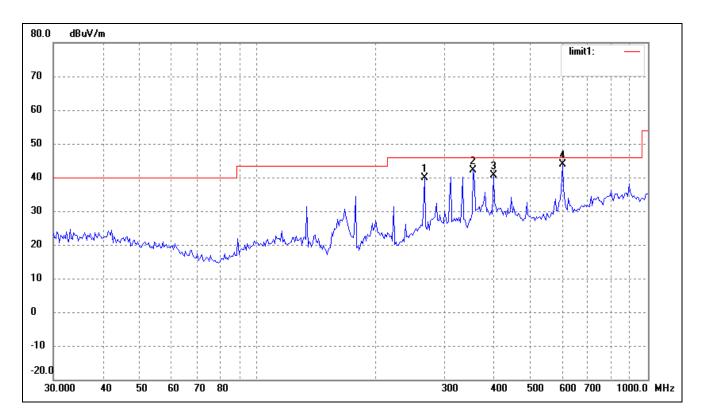


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	222.9502	24.70	6.08	30.78	46.00	-15.22	15	100	peak
2	267.5455	24.79	8.28	33.07	46.00	-12.93	15	100	peak
3	603.5392	24.78	14.62	39.40	46.00	-6.60	15	100	peak

Operating Condition: 802.11n-HT20 Transmitting Middle Channel-2437MHz

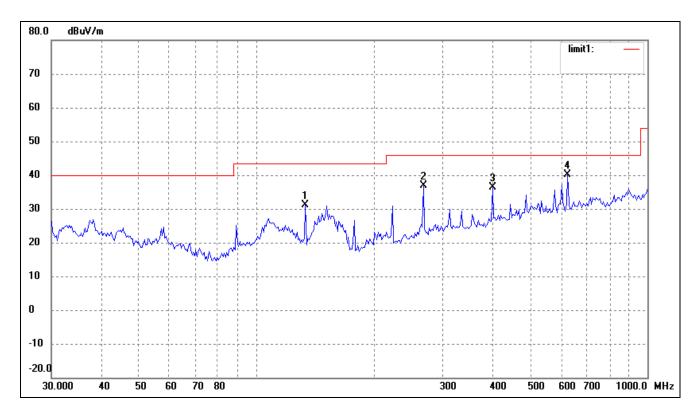
Comment: 3.7V lithium battery

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	267.5455	31.57	8.28	39.85	46.00	-6.15	45	100	peak
2	356.6758	31.64	10.61	42.25	46.00	-3.75	45	100	peak
3	401.8385	29.09	11.47	40.56	46.00	-5.44	45	100	peak
4	603.5392	29.35	14.62	43.97	46.00	-2.03	45	100	peak

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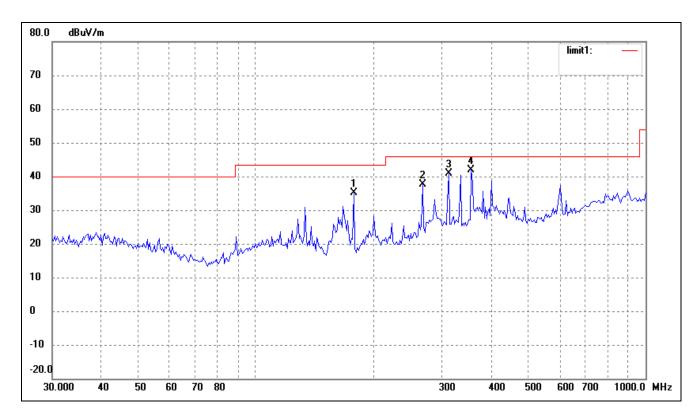


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	133.6188	27.25	3.86	31.11	43.50	-12.39	15	100	peak
2	267.5455	28.57	8.28	36.85	46.00	-9.15	15	100	peak
3	401.8385	24.94	11.47	36.41	46.00	-9.59	15	100	peak
4	625.0780	25.99	14.23	40.22	46.00	-5.78	15	100	peak

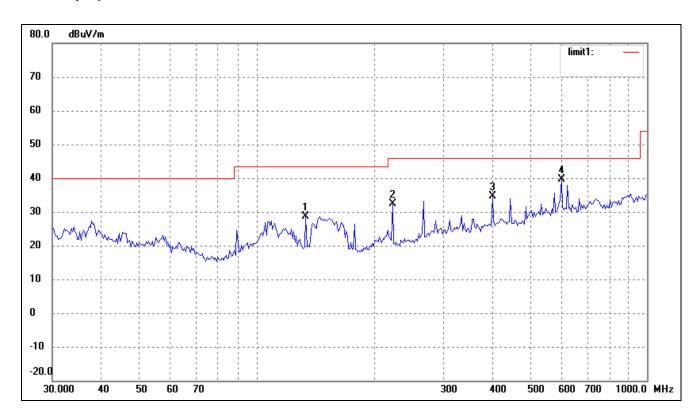
Operating Condition: 802.11n-HT20 Transmitting High Channel-2462MHz

Comment: 3.7V lithium battery

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	178.1327	31.31	3.74	35.05	43.50	-8.45	45	100	peak
2	267.5455	29.23	8.28	37.51	46.00	-8.49	45	100	peak
3	312.1794	30.62	10.36	40.98	46.00	-5.02	45	100	peak
4	356.6758	31.16	10.61	41.77	46.00	-4.23	45	100	peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	133.6188	24.71	3.86	28.57	43.50	-14.93	15	100	peak
2	222.9502	26.30	6.08	32.38	46.00	-13.62	15	100	peak
3	401.8385	23.06	11.47	34.53	46.00	-11.47	15	100	peak
4	603.5392	24.91	14.62	39.53	46.00	-6.47	15	100	peak

Spurious Emissions Above 1GHz

Test Mode: 802.11b

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
			Low Channe	el-2412MHz			•
4824	54.01	-3.85	50.16	74.00	-23.84	Н	PK
4824	44.14	-3.85	40.29	54.00	-13.71	Н	AV
7236	46.84	1.14	47.98	74.00	-26.02	Н	PK
7236	38.45	1.14	39.59	54.00	-14.41	Н	AV
4824	63.11	-3.85	59.26	74.00	-14.74	V	PK
4824	44.14	-3.85	40.29	54.00	-13.71	V	AV
7236	48.5	1.14	49.64	74.00	-24.36	V	PK
7236	37.19	1.14	38.33	54.00	-15.67	V	AV
			Middle Chan	nel-2437MHz			
4874	55.81	-3.71	52.10	74.00	-21.9	Н	PK
4874	43.71	-3.71	40.00	54.00	-14.00	Н	AV
7311	47.95	1.59	49.54	74.00	-24.46	Н	PK
7311	36.41	1.59	38.00	54.00	-16.00	Н	AV
4874	61.86	-3.71	58.15	74.00	-15.85	V	PK
4874	45.17	-3.71	41.46	54.00	-12.54	V	AV
7311	48.51	1.59	50.10	74.00	-23.9	V	PK
7311	37.4	1.59	38.99	54.00	-15.01	V	AV
			High Chann	el-2462MHz			
4924	57.88	-3.57	54.30	74.00	-19.70	Н	PK
4924	42.22	-3.57	38.65	54.00	-15.35	Н	AV
7386	47.74	1.91	49.65	74.00	-24.35	Н	PK
7386	35.71	1.91	37.62	54.00	-16.38	Н	AV
4924	66.25	-3.57	62.61	74.00	-11.39	V	PK
4924	49.02	-3.57	45.45	54.00	-8.55	V	AV
7386	49.58	1.91	51.49	74.00	-22.51	V	PK
7386	36.97	1.91	38.56	54.00	-15.44	V	AV

Test Mode: 802.11g

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
			Low Chann	el-2412MHz			
4824	54.98	-3.85	51.13	74.00	-22.87	Н	PK
4824	49.11	-3.85	45.26	54.00	-8.74	Н	AV
7236	51.85	1.14	52.99	74.00	-21.01	Н	PK
7236	38.08	1.14	39.22	54.00	-14.78	Н	AV
4824	56.08	-3.85	52.23	74.00	-21.77	V	PK
4824	46.01	-3.85	42.16	54.00	-11.84	V	AV
7236	51.08	1.14	52.22	74.00	-21.78	V	PK
7236	37.86	1.14	39.00	54.00	-15.00	V	AV
			Middle Chan	nel-2437MHz			
4874	59.07	-3.71	55.36	74.00	-18.64	Н	PK
4874	49.33	-3.71	45.62	54.00	-8.38	Н	AV
7311	50.42	1.59	52.01	74.00	-21.99	Н	PK
7311	36.66	1.59	38.25	54.00	-15.75	Н	AV
4874	56.07	-3.71	52.36	74.00	-21.64	V	PK
4874	51.42	-3.71	47.71	54.00	-6.29	V	AV
7311	53.12	1.59	54.71	74.00	-19.29	V	PK
7311	38.75	1.59	40.34	54.00	-13.66	V	AV
			High Chann	el-2462MHz			
4924	56.83	-3.57	53.26	74.00	-20.74	Н	PK
4924	48.69	-3.57	45.12	54.00	-8.88	Н	AV
7386	48.11	1.91	50.02	74.00	-23.98	Н	PK
7386	37.07	1.91	38.98	54.00	-15.02	Н	AV
4924	61.36	-3.57	57.79	74.00	-16.21	V	PK
4924	45.68	-3.57	42.11	54.00	-11.89	V	AV
7386	48.19	1.91	50.1	74.00	-23.90	V	PK
7386	36.98	1.91	38.89	54.00	-15.11	V	AV

Test Mode: 802.11n-HT20

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
			Low Chann	el-2412MHz			
4824	60.31	-3.85	56.46	74.00	-17.54	Н	PK
4824	45.06	-3.85	41.21	54.00	-12.79	Н	AV
7236	36.52	1.14	37.66	54.00	-16.34	Н	PK
7236	48.01	1.14	49.15	74.00	-24.85	Н	AV
4824	62.21	-3.85	58.36	74.00	-15.64	V	PK
4824	44.00	-3.85	40.15	54.00	-13.85	V	AV
7236	54.17	1.14	55.31	74.00	-18.69	V	PK
7236	37.36	1.14	38.50	54.00	-15.50	V	AV
			Middle Chan	nel-2437MHz			
4874	62.56	-3.71	58.85	74.00	-15.15	Н	PK
4874	45.49	-3.71	41.78	54.00	-12.22	Н	AV
7311	48.62	1.59	50.21	74.00	-23.79	Н	PK
7311	38.35	1.59	39.94	54.00	-14.06	Н	AV
4874	56.07	-3.71	52.36	74.00	-21.64	V	PK
4874	49.32	-3.71	45.61	54.00	-8.39	V	AV
7311	53.52	1.59	55.11	74.00	-18.89	V	PK
7311	38.46	1.59	40.05	54.00	-13.95	V	AV
			High Chann	el-2462MHz			
4924	55.93	-3.57	52.36	74.00	-21.64	Н	PK
4924	44.73	-3.57	41.16	54.00	-12.84	Н	AV
7386	50.45	1.91	52.36	74.00	-21.64	Н	PK
7386	38.35	1.91	40.26	54.00	-13.74	Н	AV
4924	57.30	-3.57	53.73	74.00	-20.27	V	PK
4924	45.93	-3.57	42.36	54.00	-11.64	V	AV
7386	54.24	1.91	56.15	74.00	-17.85	V	PK
7386	39.20	1.91	41.11	54.00	-12.89	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. The measurements greater than 20dB below the limit from 9kHz to 30MHz..

8. Out of Band Emissions

8.1 Standard Applicable

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 §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).

8.2 Test Equipment List and Details

Description Manufacturer		Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2013-05-07	2014-05-06
EMI Test Receiver	R&S	ESVB	825471/005	2013-05-07	2014-05-06
Pre-amplifier	Agilent	8447F	3113A06717	2013-05-07	2014-05-06
Pre-amplifier	Compliance Direction	PAP-0118	24002	2013-05-07	2014-05-06
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2013-04-20	2014-04-19
Horn Antenna	ETS	3117	00086197	2013-04-20	2014-04-19

8.3 Test Procedure

According to the KDB 558074 D01 V02, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)

RBW = 1MHz, VBW = 1MHz for peak value measured

RBW = 1MHz, VBW = 10Hz for average value measured

Sweep = auto; Detector function = peak/average; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation porduct outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

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According to the KDB 558074 D01 V02, the conducted spurious emissions test method as follows:

- 1. Set start frequency to DTS channel edge frequency.
- 2. Set stop frequency so as to encompass the spectrum to be examined.
- 3. Set RBW = 100 kHz.
- 4. Set VBW \geq 300 kHz.
- 5. Detector = peak.
- 6. Trace Mode = \max hold.
- 7. Sweep = auto couple.
- 8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
- 9. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

8.4 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

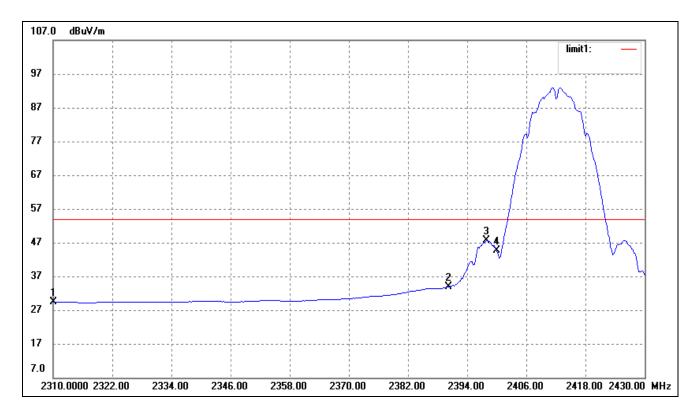
8.5 Summary of Test Results/Plots

Test Mode	Test Frequency MHz	Limit dBuV / dBc	Result
	2390.00	<54 dBuV	Pass
802.11b	2400.00	<54 dBuV	Pass
	2483.50	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
802.11g	2400.00	<54 dBuV	Pass
	2483.50	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
802.11n-HT20	2400.00	<54 dBuV	Pass
	2483.50	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
802.11n-HT40	2400.00	<54 dBuV	Pass
	2483.50	<54 dBuV	Pass

The edge emissions are below the FCC 15.209 Limits or complies with the 15.247(d) requirements. Please refer to the test plots as below.

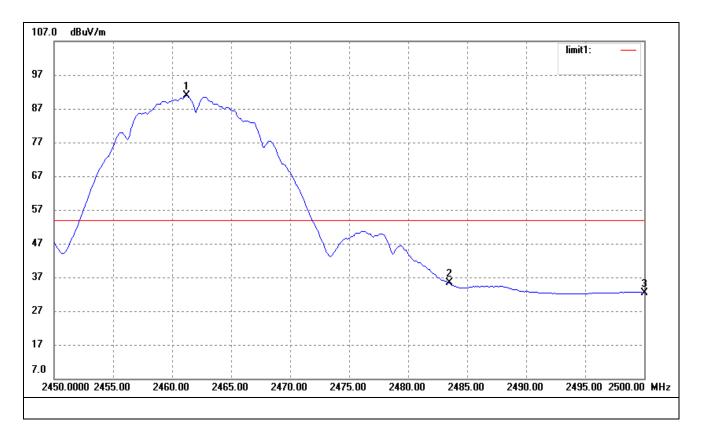
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802.11b-Lowest Bandedge



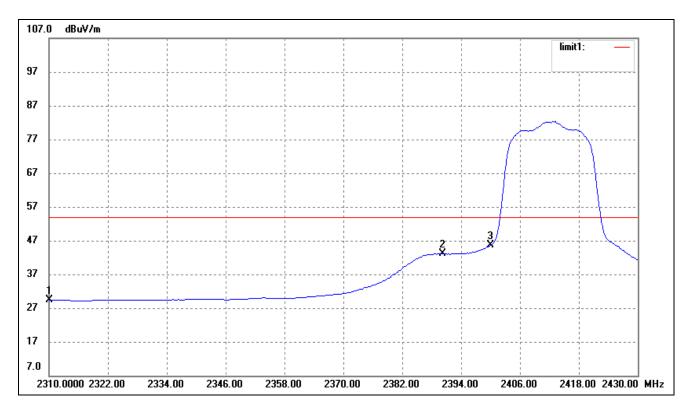
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.08	-3.71	29.37	54.00	-24.63	Average Detector
	2310.000	45.79	-3.71	42.08	74.00	-31.92	Peak Detector
2	2390.000	37.38	-3.54	33.84	54.00	-20.16	Average Detector
	2390.000	53.27	-3.54	49.73	74.00	-24.27	Peak Detector
3	2397.840	51.24	-3.51	47.73	54.00	-6.27	Average Detector
	2397.840	68.80	-3.51	65.29	74.00	-8.71	Peak Detector
4	2400.000	48.25	-3.51	44.74	54.00	-9.26	Average Detector
	2400.000	62.88	-3.51	59.37	74.00	-14.63	Peak Detector

802.11b-Highest Bandedge



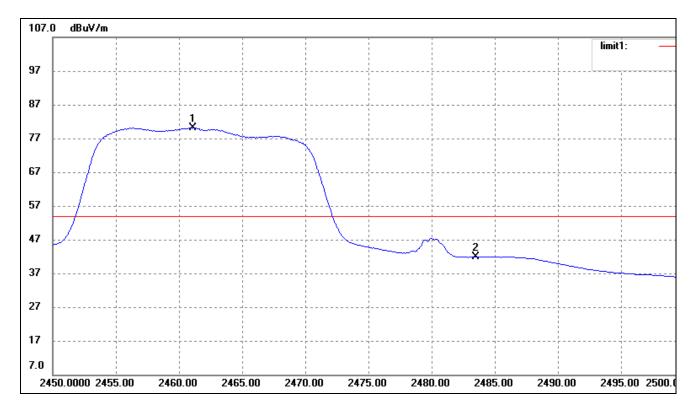
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2461.200	94.34	-3.37	90.97	/	/	Average Detector
	2461.200	106.36	-3.37	102.99	/	/	Peak Detector
2	2483.500	Dolto - 54	Delta = 55.77 dBc		54.00	-18.80	Average Detector
	2483.500	Dena – 3.).// ubc	47.22	74.00	-26.78	Peak Detector
3	2500.000	35.74	-3.28	32.46	54.00	-21.54	Average Detector
	2500.000	48.62	-3.28	45.34	74.00	-28.66	Peak Detector

802.11g-Lowest Bandedge



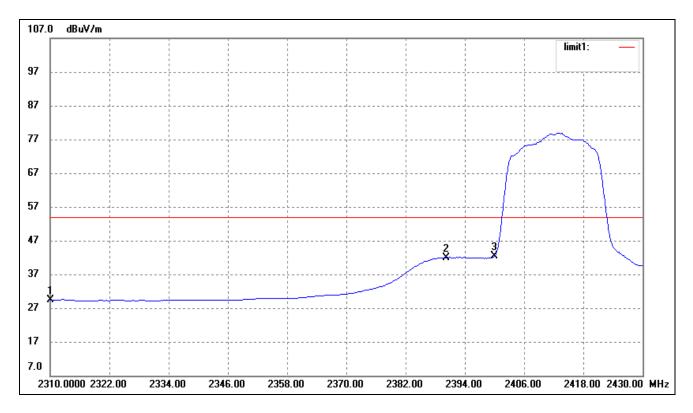
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark	
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)		
1	2310.000	33.06	-3.71	29.35	54.00	-24.65	Average Detector	
	2310.000	46.17	-3.71	42.46	74.00	-31.54	Peak Detector	
2	2390.000	46.62	-3.54	43.08	54.00	-10.92	Average Detector	
	2390.000	60.68	-3.54	57.14	74.00	-16.86	Peak Detector	
3	2400.000	49.02	-3.51	45.51	54.00	-8.49	Average Detector	
	2400.000	69.56	-3.51	66.05	74.00	-7.95	Peak Detector	

802.11g-Highest Bandedge



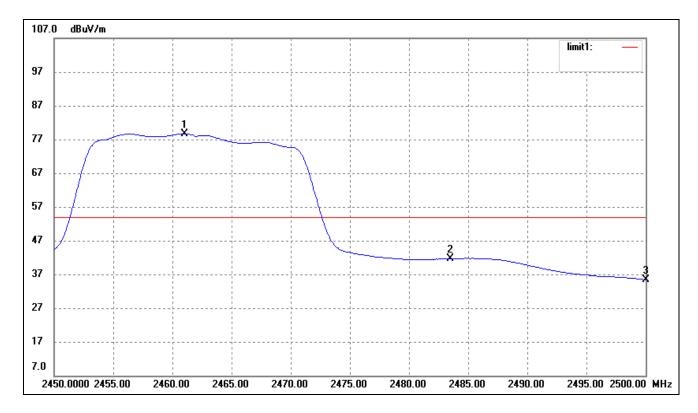
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark	
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)		
1	2461.100	83.44	-3.37	80.07	/	/	Average Detector	
	2461.100	101.62	-3.37	98.25	/	/	Peak Detector	
2	2483.500	Delta = 40.88 dBc		39.19	54.00	-14.81	Average Detector	
	2483.500			57.37	74.00	-16.63	Peak Detector	
3	2500.000	39.00	-3.28	35.72	54.00	-18.28	Average Detector	
	2500.000	54.45	-3.28	51.17	74.00	-22.83	Peak Detector	

802.11n-HT20-Lowest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.12	-3.71	29.41	54.00	-24.59	Average Detector
	2310.000	45.63	-3.71	41.92	74.00	-32.08	Peak Detector
2	2390.000	45.54	-3.54	42.00	54.00	-12.00	Average Detector
	2390.000	61.09	-3.54	57.55	74.00	-16.45	Peak Detector
3	2400.000	45.88	-3.51	42.37	54.00	-11.63	Average Detector
	2400.000	65.93	-3.51	62.42	74.00	-11.58	Peak Detector

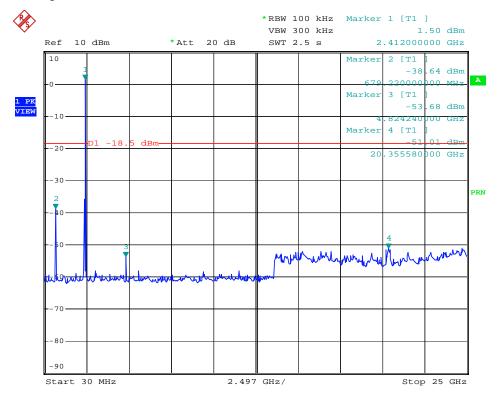
802.11n-HT20-Highest Bandedge



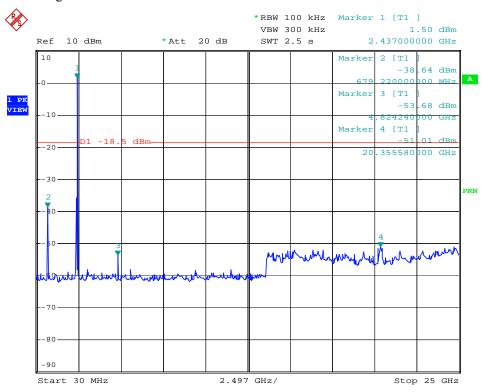
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark	
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)		
1	2461.000	82.07	-3.37	78.70	/	/	Average Detector	
	2461.000	101.42	-3.37	98.05	/	/	Peak Detector	
2	2483.500	Delta = 40.00 dBc		38.70	54.00	-15.30	Average Detector	
	2483.500	Dena – 40	J.00 abc	58.05	74.00	-15.95	Peak Detector	
3	2500.000	38.74	-3.28	35.46	54.00	-18.54	Average Detector	
	2500.000	53.55	-3.28	50.27	74.00	-23.73	Peak Detector	

Conducted Spurious Emissions

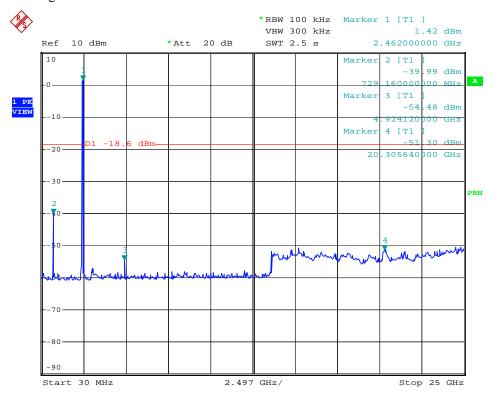
802.11b Low Bandedge



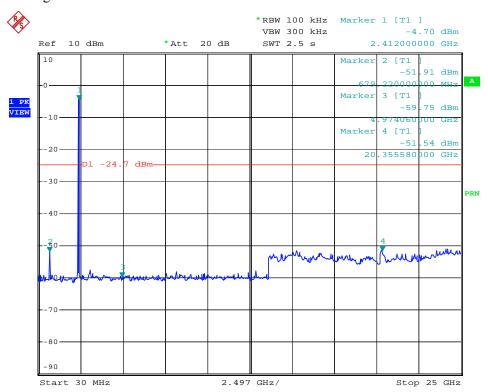
802.11b Middle Bandedge



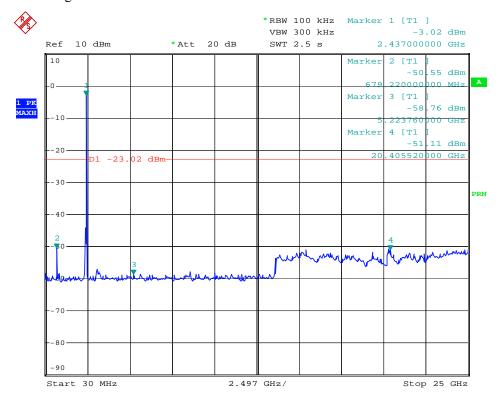
802.11b High Bandedge



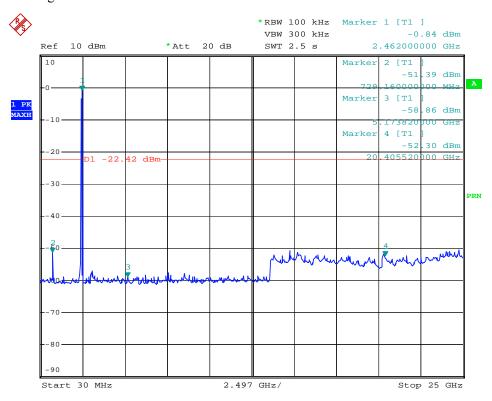
802.11g Low Bandedge



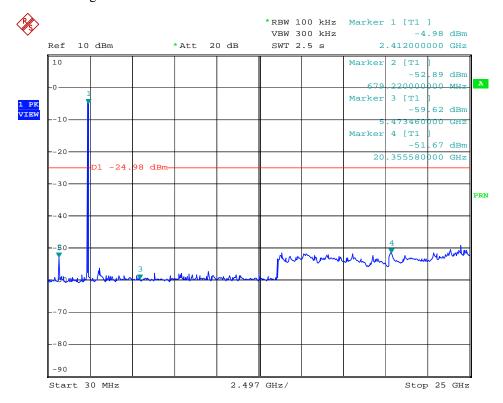
802.11g Middle Bandedge



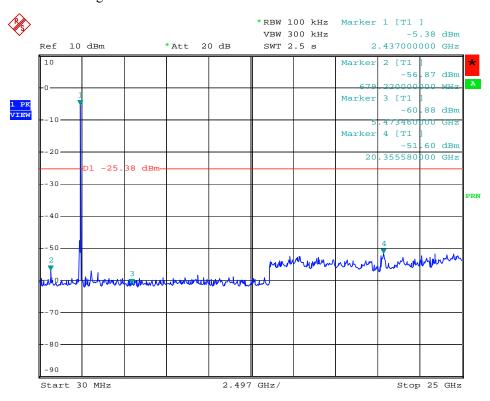
802.11g High Bandedge



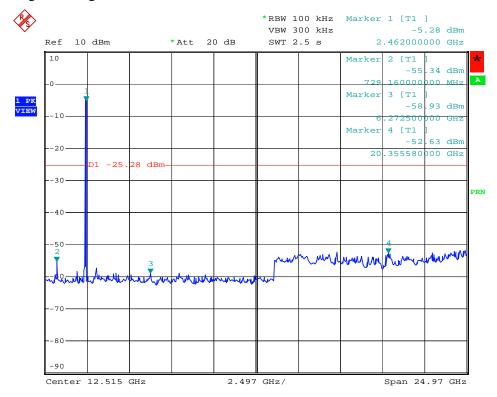
802.11n-HT20 Low Bandedge



802.11n-HT20 Middle Bandedge



802.11n-HT20 High Bandedge



9. Conducted Emissions

9.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

9.2 Test Equipment List and Details

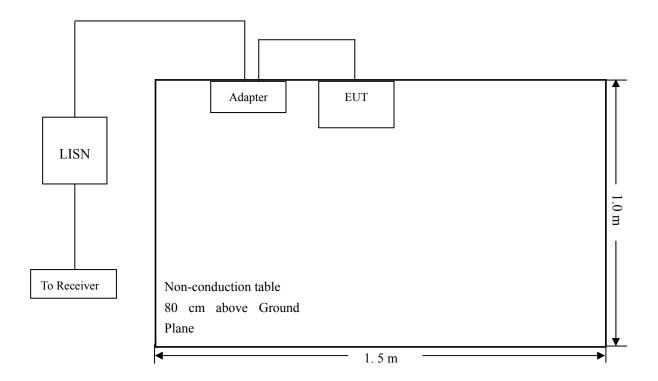
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2013-05-07	2014-05-06
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2013-05-07	2014-05-06
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2013-05-07	2014-05-06

9.3 Test Procedure

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

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.

9.4 Basic Test Setup Block Diagram



9.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

9.6 Test Receiver Setup

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

Start Frequency	150 kHz
Stop Frequency	30 MHz
Sweep Speed	
IF Bandwidth	10 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

9.7 Summary of Test Results/Plots

According to the data in section 9.8, the EUT <u>complied with the FCC Part 15.207</u> Conducted margin for a Class B device, with the *worst* margin reading of:

-4.81 dB at 0.434 MHz in the Line mode, Peak detector, 0.15-30MHz

9.8 Conducted Emissions Test Data

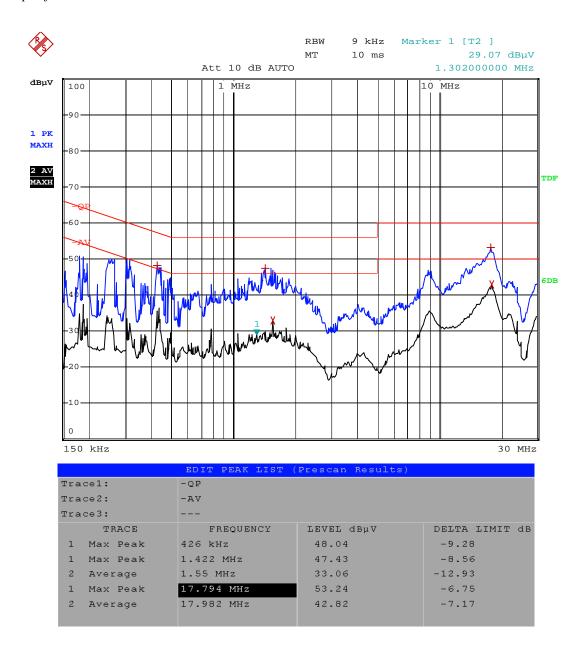
Plot of Conducted Emissions Test Data

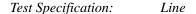
EUT: Wireless Digital Display

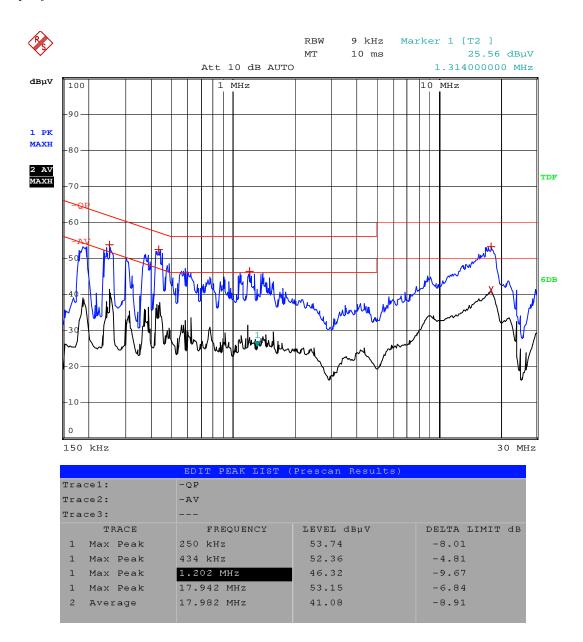
Tested Model: PXT510WR04C
Operating Conditation: Transmiting

Comment: Input AC 120V/60Hz adapter, Output DC 5V

Test Specification: Neutral







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