



MEASUREMENT REPORT

FCC PART 15.247 WLAN 802.11b/g/n

FCC ID: A2HCN6Q14D

Applicant: ALCO Electronics Limited.

Application Type: Certification

Product: Notebook

Model No.: NS14A6 D

Serial Model No.: CN6Q14 D

Brand Name: AVITA, VENTURER

FCC Classification: Digital Transmission System (DTS)

FCC Rule Part(s): Part 15 Subpart C (Section 15.247)

Test Procedure(s): ANSI C63.10-2013

Test Date: July 23 ~ August 08, 2020

Reviewed By:

(Sunny Sun)

Approved By:

(Robin Wu)



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2007RSU054-U1	Rev. 01	Initial Report	10-12-2020	Valid

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General Information

Applicant:	ALCO Electronics Limited.
Applicant Address:	11/F Metropole Square, 2 On Yiu Street, Sha Tin, New Territories, Hong Kong
Manufacturer:	ALCO Electronics Limited.
Manufacturer Address:	11/F Metropole Square, 2 On Yiu Street, Sha Tin, New Territories, Hong Kong
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is an FCC accredited testing laboratory (MRT Designation No. CN1166) on the FCC website.
- MRT facility is an ISED recognized testing laboratory (MRT Reg. No. CN0001) on the ISED website.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the A2LA under the A2LA Program (Cert. No. 3628.01) and CNAS under the CNAS Program (Cert. No. L10551) in EMC, Safety, Radio, Telecommunications and SAR testing.

1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada and Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



2. PRODUCT INFORMATION

2.1. Feature of Equipment under Test

Product Name:	Notebook
Model No.:	NS14A6 D
Serial Model No.:	CN6Q14 D
Brand Name:	AVITA, VENTURER
Wi-Fi Specification:	802.11a/b/g/n/ac
Bluetooth Version:	v4.2 dual mode
Accessory	
Adapter:	MODEL: ADS-25SGP-12 12024E 2520 INPUT: 100-240V ~ 50/60Hz, Max. 0.7A OUTPUT: 24W, 12Vdc, 2A

Note: The different models are only for marketing different clients, all parts of the circuit are identical.

2.2. Product Specification Subjective to this Report

Frequency Range	802.11b/g/n-HT20: 2412 ~ 2462 MHz 802.11n-HT40: 2422 ~ 2452 MHz
Modulation	802.11b: DSSS 802.11g/n: OFDM
Data Rate	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 150Mbps

Note: For other features of this EUT, test report will be issued separately.

2.3. Working Frequencies for this report

802.11b/g/n-HT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	--	--

802.11n-HT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz
06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	--	--	--	--

2.4. Test Mode

Test Mode	Mode 1: Transmit by 802.11b (1Mbps)
	Mode 2: Transmit by 802.11g (6Mbps)
	Mode 3: Transmit by 802.11n-HT20 (MCS0)
	Mode 3: Transmit by 802.11n-HT40 (MCS0)

2.5. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	Max Peak Antenna Gain (dBi)
Main Antenna (WLAN / BT Antenna)		
PIFA Antenna	2400 ~ 2483.5	2.65
	5150 ~ 5250	-0.30
	5725 ~ 5850	0.90
Aux Antenna (WLAN Antenna)		
PIFA Antenna	2400 ~ 2483.5	4.14
	5150 ~ 5250	4.58
	5725 ~ 5850	5.26

Note 1: This device only supports SISO mode.

Note 2: The antenna gains are declared by the manufacturer.

2.6. Test Software

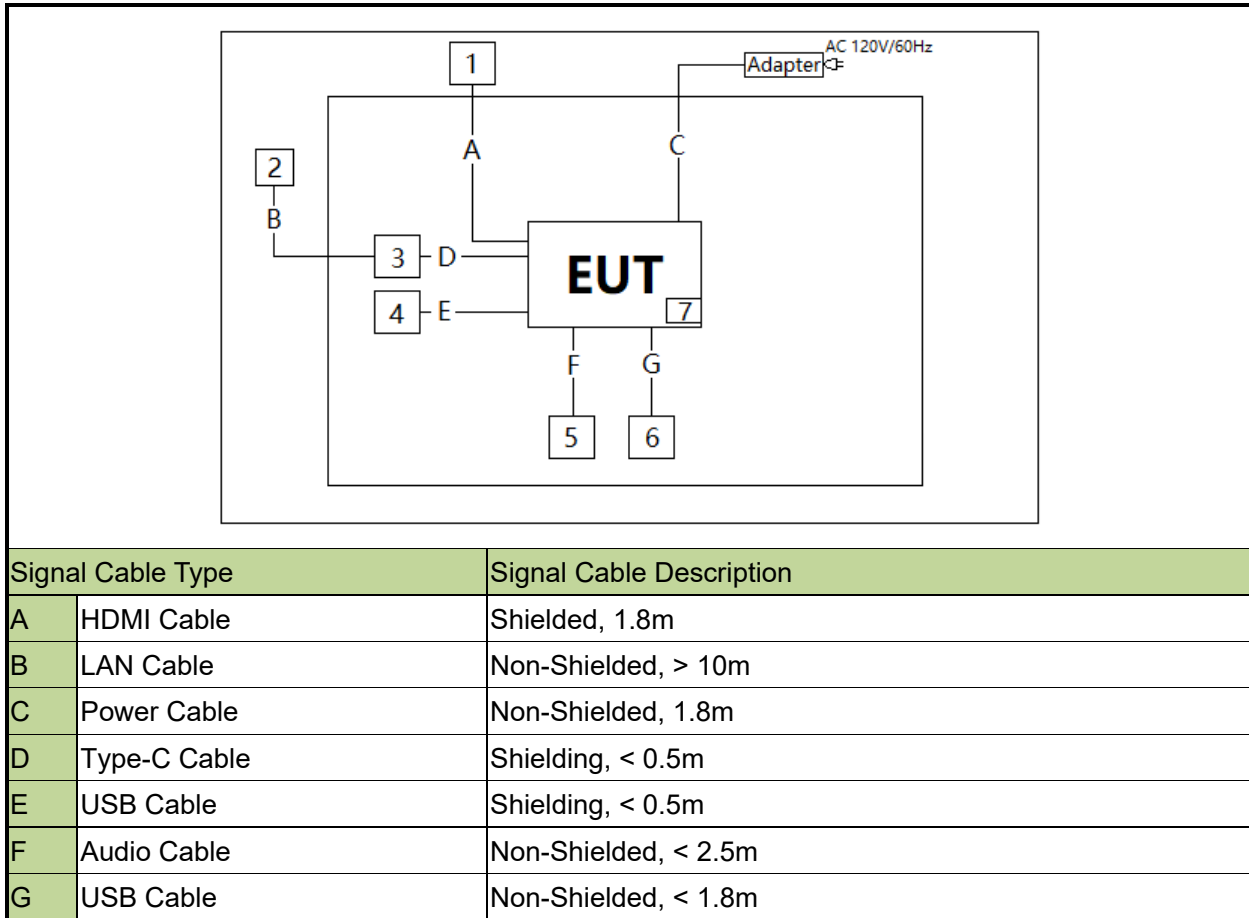
The test utility software used during testing was "REALTEK 11ac 8821C PCIE WLAN", and the version was "0.0000.28.20170731". The power parameter values of this device refer to "Operation Description" file.

2.7. Test Environment Condition

Ambient Temperature	15°C ~ 35°C
Relative Humidity	20%RH ~ 75%RH

2.8. Description of Test Configuration

The ANSI C63.10: 2013 was used to reference the appropriate EUT setup for testing.



2.9. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

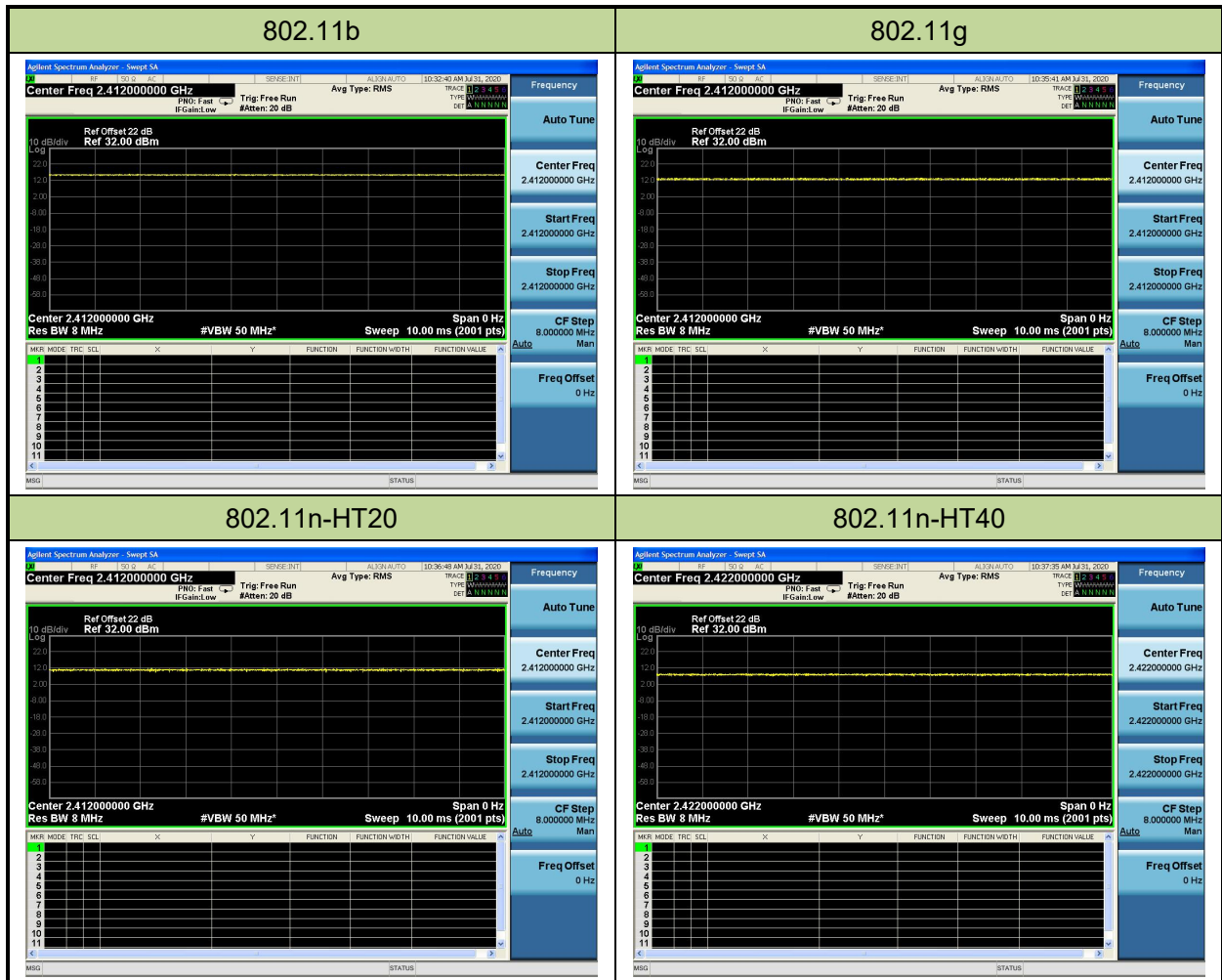
Product		Manufacturer	Model No.
1	Monitor	SAMSUNG	U32H850UMC
2	Notebook	Lenovo	E495
3	GIGABIT	UGREEN	N/A
4	Hard Disk	ORICO	500G
5	Headset	Logitech	N/A
6	Mouse	Dell	MS111-L
7	SD Card	Kingston	Micro SD

2.10. Duty Cycle

2.4GHz WLAN (DTS) operation is possible in 20MHz and 40MHz channel bandwidth. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz.

The duty cycles are as follows:

Test Mode	Duty Cycle
802.11b	100%
802.11g	100%
802.11n-HT20	100%
802.11n-HT40	100%



3. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

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

- The antenna of the unit is **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2021/01/18
Two-Line V-Network	R&S	ENV 216	MRTSUE06002	1 year	2021/06/11
Two-Line V-Network	R&S	ENV 216	MRTSUE06003	1 year	2021/06/11
Thermal Hygrometer	testo	608-H1	MRTSUE06404	1 year	2021/07/26
Shielding Room	MIX-BEP	Chamber-SR2	MRTSUE06215	N/A	N/A

Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2021/01/18
PXA Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2020/09/03
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2020/11/13
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2021/04/03
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2020/10/13
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2020/12/17
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2020/11/15
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Thermal Hygrometer	testo	608-H1	MRTSUE06403	1 year	2021/07/26
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2021/04/30

Radiated Emission - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
MXE EMI Receiver	Keysight	N9038A	MRTSUE06125	1 year	2021/07/02
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2020/11/13
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2020/10/13
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2020/10/27
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2020/12/17
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2020/11/15
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Thermal Hygrometer	Minggao	ETH529	MRTSUE06170	1 year	2020/12/15
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2021/04/30

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2021/04/14
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2021/01/08
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2020/11/18
USB wideband power sensor	Keysight	U2021XA	MRTSUE06446	1 year	2021/06/11
USB wideband power sensor	Keysight	U2021XA	MRTSUE06447	1 year	2021/06/11
Bluetooth Test Set	Anritsu	MT8852B-042	MRTSUE06389	1 year	2021/06/11
Audio Analyzer	Agilent	U8903B	MRTSUE06143	1 year	2021/06/11
Modulation Analyzer	HP	HP8901A	MRTSUE06098	1 year	2020/10/10
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2020/11/07
DC Power Supply	GWINSTEK	DPS-3303C	MRTSUE06064	N/A	N/A
Temperature & Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2020/11/07
Thermal Hygrometer	testo	608-H1	MRTSUE06401	1 year	2021/07/26

Software	Version	Function
EMI Software	V3	EMI Test Software

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): Horizontal: 30MHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 30MHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB
Spurious Emissions, Conducted
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 0.78dB
Output Power
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 1.13dB
Power Spectrum Density
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 1.15dB
Occupied Bandwidth
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 0.28%

6. TEST RESULT

6.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	6dB Bandwidth	$\geq 500\text{kHz}$	Conducted	Pass	Section 6.2
15.247(b)(3)	Output Power	$\leq 30.00\text{dBm}$		Pass	Section 6.3
15.247(e)	Power Spectral Density	Refer to Section 7.4		Pass	Section 6.4
15.247(d)	Band Edge / Out-of-Band Emissions	$\leq 20\text{dBc}$ (Peak)		Pass	Section 6.5
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 6.6 & 6.7
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 6.8

Notes:

- 1) All modes of operation and data rates were investigated. For radiated emission test, the test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) Test Items "6dB Bandwidth" & "Band Edge / Out-of-Band Emissions" have been assessed Main and Aux antenna transmission, and showed the worst test data in this report.

6.2. 6dB Bandwidth Measurement

6.2.1. Test Limit

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

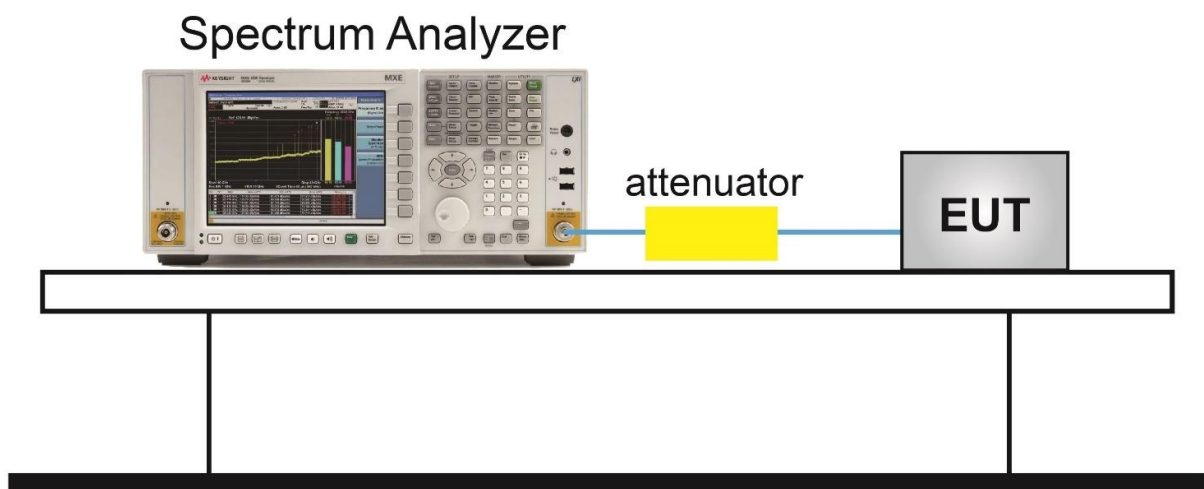
6.2.2. Test Procedure used

ANSI C63.10-2013 Section 11.8

6.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 6$. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. $VBW \geq 3 \times RBW$
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace was allowed to stabilize

6.2.4. Test Setup

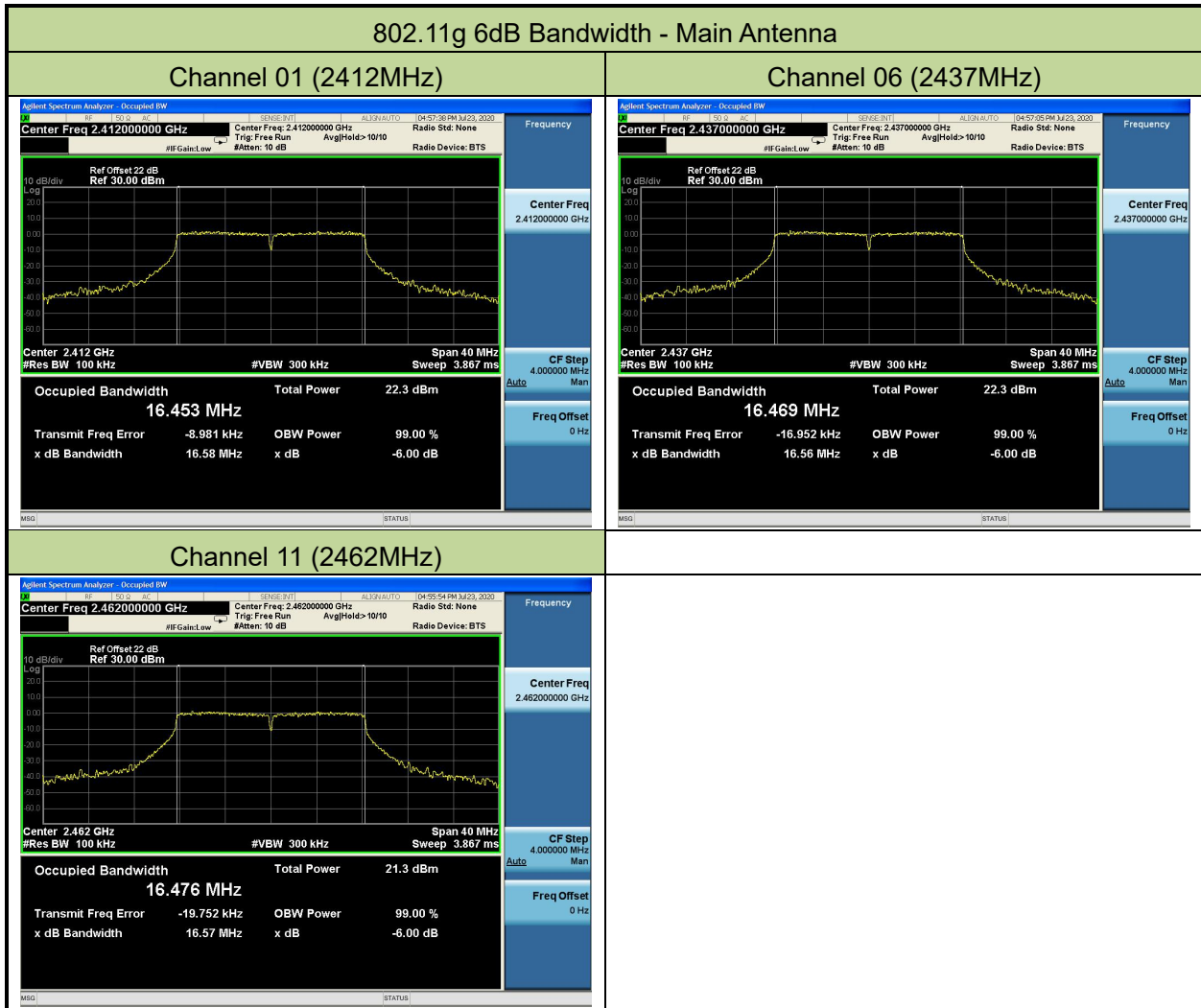


6.2.5. Test Result

Product	Notebook	Test Engineer	Dandy Li
Test Site	TR3	Test Date	2020/07/23

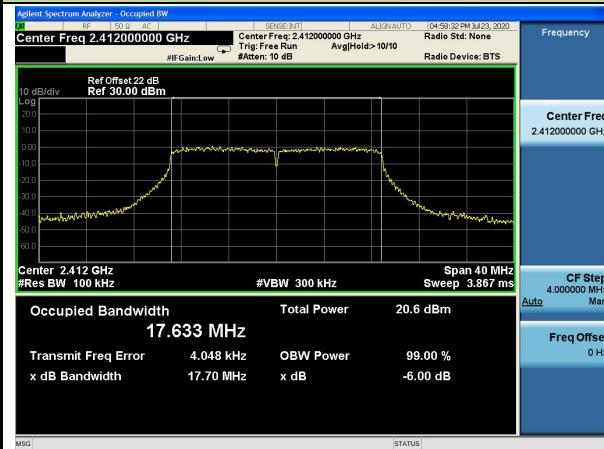
Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Main Antenna						
11b	1Mbps	01	2412	10.15	≥ 0.5	Pass
11b	1Mbps	06	2437	10.15	≥ 0.5	Pass
11b	1Mbps	11	2462	10.15	≥ 0.5	Pass
11g	6Mbps	01	2412	16.58	≥ 0.5	Pass
11g	6Mbps	06	2437	16.56	≥ 0.5	Pass
11g	6Mbps	11	2462	16.57	≥ 0.5	Pass
11n-HT20	MCS0	01	2412	17.70	≥ 0.5	Pass
11n-HT20	MCS0	06	2437	17.72	≥ 0.5	Pass
11n-HT20	MCS0	11	2462	17.70	≥ 0.5	Pass
11n-HT40	MCS0	03	2422	36.51	≥ 0.5	Pass
11n-HT40	MCS0	06	2437	36.50	≥ 0.5	Pass
11n-HT40	MCS0	09	2452	36.50	≥ 0.5	Pass



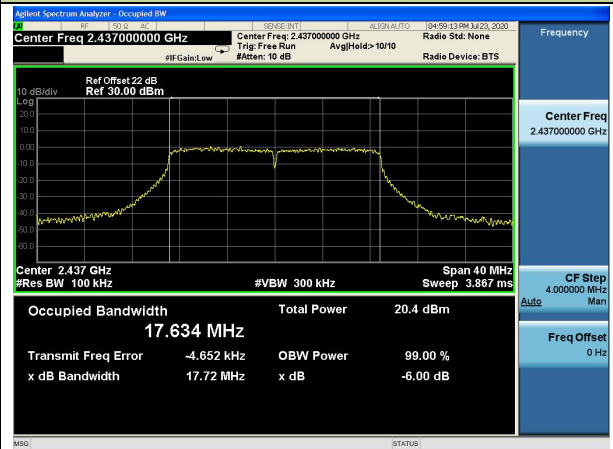


802.11n-HT20 6dB Bandwidth - Main Antenna

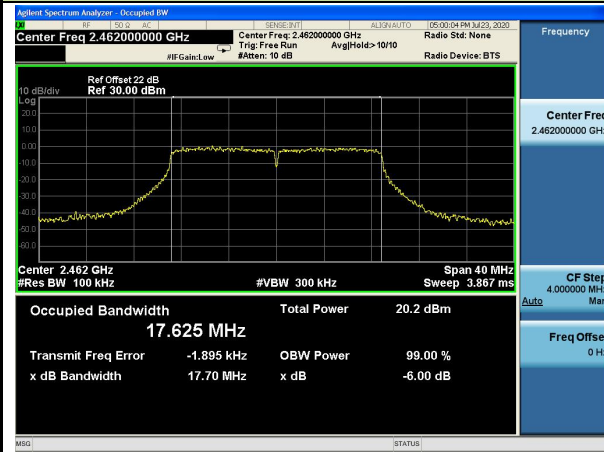
Channel 01 (2412MHz)



Channel 06 (2437MHz)

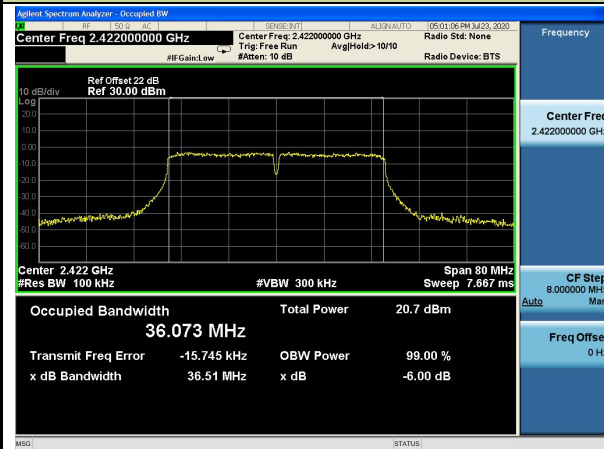


Channel 11 (2462MHz)

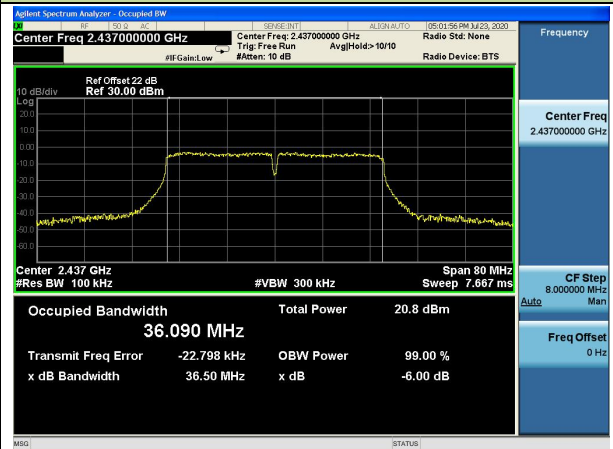


802.11n-HT40 6dB Bandwidth - Main Antenna

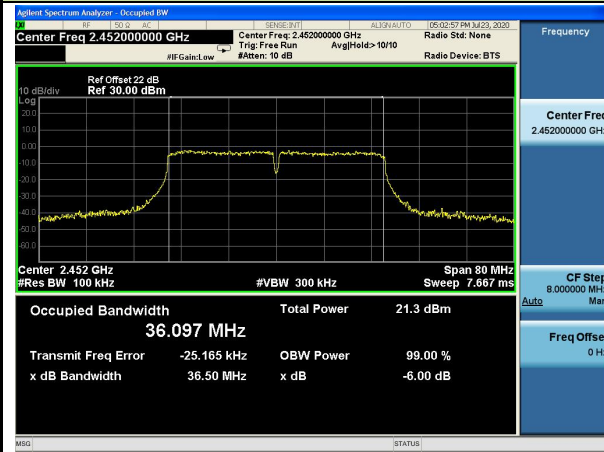
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



6.3. Output Power Measurement

6.3.1. Test Limit

The maximum output power shall be less 1 Watt (30dBm).

The conducted output power limit specified in paragraph FCC Part 15.247(b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas 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 paragraphs FCC Part 15.247(b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.3.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.9.1.3

ANSI C63.10-2013 - Section 11.9.2.3.2

6.3.3. Test Setting

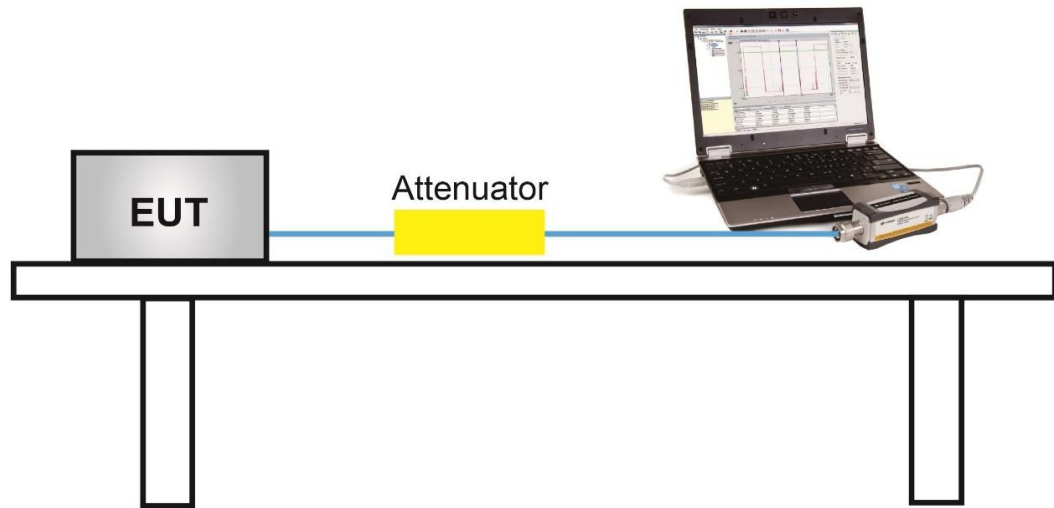
PKPM1 Peak Power Meter Method

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 use a fast-responding diode detector.

Average Power Measurement

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

6.3.4. Test Setup



6.3.5. Test Result

Power output test was verified over all data rates of each mode shown as below table, and then chose the maximum power output (gray marker) for final test of each channel.

Pre-Test RF Output Power at various data rates for Main Antenna RF port.

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate/ MCS	Average Power (dBm)
802.11b	20	6	2437	1Mbps	16.54
				5.5Mbps	16.34
				11Mbps	16.14
802.11g	20	6	2437	6Mbps	15.52
				24Mbps	15.34
				54Mbps	15.21
802.11n	20	6	2437	MCS0	13.65
				MCS3	13.53
				MCS7	13.41
802.11n	40	6	2437	MCS0	13.85
				MCS3	13.76
				MCS7	13.62

Note: All modes of operation and data rates were investigated, so all RF test requirements shall be executed at low data rates.

Product	Notebook	Test Engineer	Dandy Li
Test Site	TR3	Test Date	2020/08/03

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Main Antenna Peak Power (dBm)	Aux Antenna Peak Power (dBm)	Limit (dBm)	Result
Peak Output Power							
11b	1Mbps	01	2412	19.02	19.65	≤ 30.00	Pass
11b	1Mbps	06	2437	19.24	19.40	≤ 30.00	Pass
11b	1Mbps	11	2462	18.86	19.38	≤ 30.00	Pass
11g	6Mbps	01	2412	23.75	23.98	≤ 30.00	Pass
11g	6Mbps	06	2437	23.06	23.92	≤ 30.00	Pass
11g	6Mbps	11	2462	24.01	23.90	≤ 30.00	Pass
11n-HT20	MCS0	01	2412	22.03	22.59	≤ 30.00	Pass
11n-HT20	MCS0	06	2437	21.11	22.50	≤ 30.00	Pass
11n-HT20	MCS0	11	2462	22.19	23.02	≤ 30.00	Pass
11n-HT40	MCS0	03	2422	21.75	22.90	≤ 30.00	Pass
11n-HT40	MCS0	06	2437	22.58	22.51	≤ 30.00	Pass
11n-HT40	MCS0	09	2452	22.05	22.68	≤ 30.00	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Main Antenna Average Power (dBm)	Aux Antenna Average Power (dBm)	Limit (dBm)	Result
Average Output Power (Reporting Only)							
11b	1Mbps	01	2412	16.35	17.05	≤ 30.00	Pass
11b	1Mbps	06	2437	16.54	16.82	≤ 30.00	Pass
11b	1Mbps	11	2462	16.13	16.70	≤ 30.00	Pass
11g	6Mbps	01	2412	15.50	14.91	≤ 30.00	Pass
11g	6Mbps	06	2437	15.52	14.80	≤ 30.00	Pass
11g	6Mbps	11	2462	15.91	14.82	≤ 30.00	Pass
11n-HT20	MCS0	01	2412	13.64	13.96	≤ 30.00	Pass
11n-HT20	MCS0	06	2437	13.65	13.74	≤ 30.00	Pass
11n-HT20	MCS0	11	2462	13.66	13.88	≤ 30.00	Pass
11n-HT40	MCS0	03	2422	13.73	14.00	≤ 30.00	Pass
11n-HT40	MCS0	06	2437	13.85	14.03	≤ 30.00	Pass
11n-HT40	MCS0	09	2452	13.56	14.01	≤ 30.00	Pass

6.4. Power Spectral Density Measurement

6.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

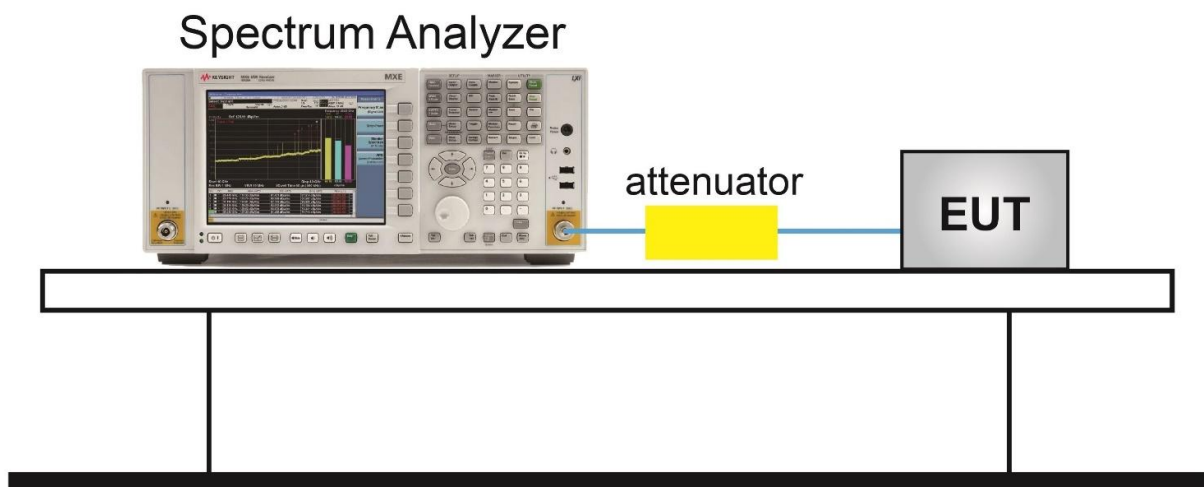
6.4.2. Test Procedure Used

ANSI C63.10-2013 Section 11.10.2

6.4.3. Test Setting

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 3kHz
4. VBW = 10kHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

6.4.4. Test Setup



6.4.5. Test Result

Product	Notebook	Test Engineer	Dandy Li
Test Site	TR3	Test Date	2020/07/23 ~ 2020/08/04

Test Mode	Data Rate / MCS	Channel No.	Freq. (MHz)	Main Antenna PK PSD (dBm/3kHz)	Aux Antenna PK PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
11b	1Mbps	1	2412	-13.64	-13.13	≤ 8.00	Pass
11b	1Mbps	6	2437	-13.30	-13.25	≤ 8.00	Pass
11b	1Mbps	11	2462	-14.05	-13.55	≤ 8.00	Pass
11g	6Mbps	1	2412	-12.52	-12.74	≤ 8.00	Pass
11g	6Mbps	6	2437	-12.64	-13.88	≤ 8.00	Pass
11g	6Mbps	11	2462	-11.78	-13.81	≤ 8.00	Pass
11n-HT20	MCS0	1	2412	-13.35	-13.37	≤ 8.00	Pass
11n-HT20	MCS0	6	2437	-13.36	-13.03	≤ 8.00	Pass
11n-HT20	MCS0	11	2462	-13.09	-13.91	≤ 8.00	Pass
11n-HT40	MCS0	3	2422	-14.80	-14.87	≤ 8.00	Pass
11n-HT40	MCS0	6	2437	-15.20	-16.02	≤ 8.00	Pass
11n-HT40	MCS0	9	2452	-15.60	-14.65	≤ 8.00	Pass



