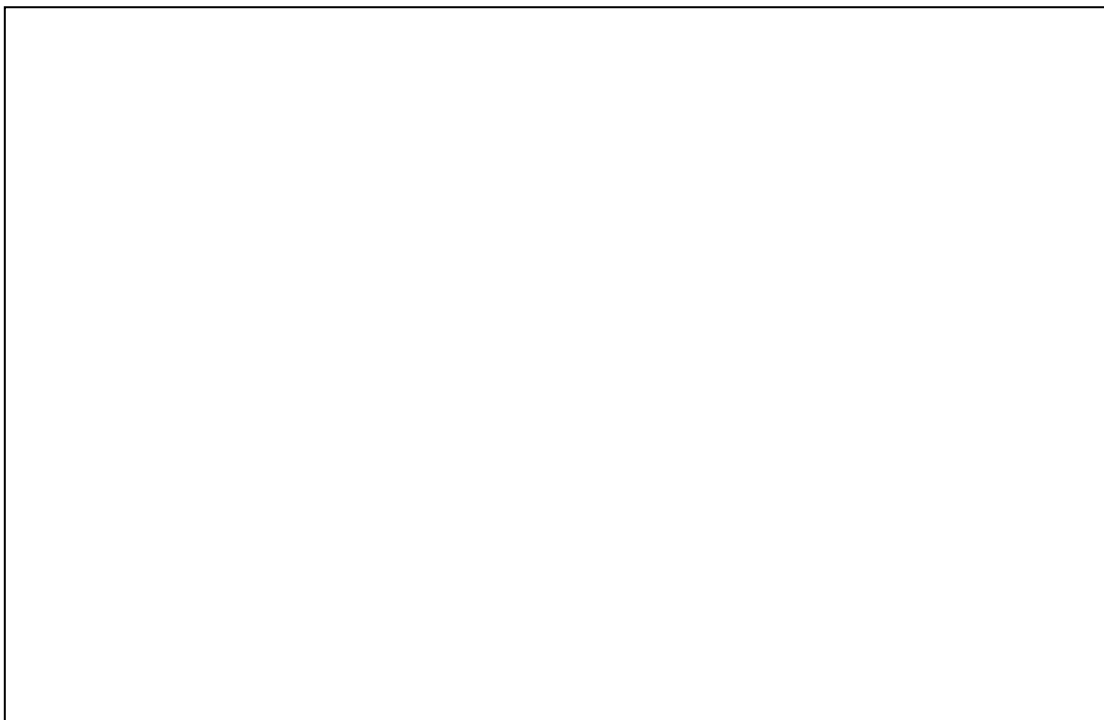


Date: 2016/12/01

Delivery Specifications

Product Description	802.11a/b/g/n/ac Wireless LAN Module
Customer Part Number	098001402081
WNC Part Number	91DAUK13.G32
WNC Model Name	DAUK-W12
Issue Version :	V1.9
Manufacturer	Wistron NeWeb Corporation (WNC) Address: 20 Park Avenue II Road, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C. (ZIP Code: 308) Tel: +886-3-666-7799
Production Factory	Wistron NeWeb (Kunshan) Corporation Address: 789 Yujinxiang Road, Comprehensive Free Trade Zone, Kunshan City, Jiangsu Province, P.R.C (ZIP Code: 215300) Tel: 0086-512-5772-2688
Production Country	People's Republic of China
PO Reception & Invoice Release Company	ANC holding Corporation P.O. Box 3152, Road Town, Tortola, British Virgin Islands



Revision History

Version	Change history	Date
V1.0	Initial version	2016/09/30
V1.1	Updated operation voltage tolerance, output power tolerance, pin define, shielding cover dimension, module dimension and module label information	2016/10/05
V1.2	Updated product photo, output power and PCB layout	2016/10/18
V1.3	Updated product photo, schematic, PCB Layout and module dimension	2016/11/09
V1.4	Updated product photo	2016/11/10
V1.5	Updated module label and BOM	2016/11/10
V1.6	Updated packing information	2016/11/11
V1.7	Updated product photo and module dimension	2016/11/21
V1.8	Updated customer PN, product photo, schematic, PCB layout, shielding cover dimension, module label information, packing information, BOM and reliability environment specification	2016/11/30
V1.9	Updated PCB flame class, shielding cover material certificate, reliability and environment complete date and antenna radiation pattern	2016/12/01

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1. Product Introduction

DAUK-W12 is a 802.11 a/b/g/n/ac WLAN module which compliant with IEEE802.11n/ac standard supports 2x2 ac/a/b/g/n MIMO technology with data rate from MCS 0-15 in 20MHz/40MHz/80MHz Channels.

Features

- Full IEEE 802.11 a/b/g/n/ac legacy compatibility with enhanced performance
- Dual-stream spatial multiplexing up to 866.7 Mbps data rate, supports 20, 40 and 80 channels with optional SGI (256 QAM modulation)
- Wake on WLAN function
- Double-side SMT process
- Two on-board metal antennas

Interfaces and Power supply

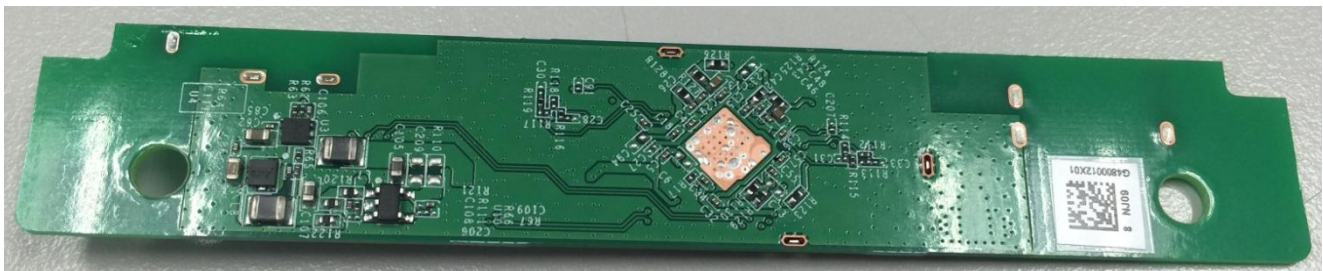
- WLAN RF interface
- USB interface
- 5V supply voltage
- 8 pins I/O connector

2. Product Photograph

Top side



Bottom side



4. Product Specification

5.1 Specifications

Item	Key specifications																																																																																																																																																																																															
Main chipset	➤ Realtek RTL8812AU-VS																																																																																																																																																																																															
TX/RX	➤ 2T2R																																																																																																																																																																																															
Host interface	➤ USB 2.0																																																																																																																																																																																															
Operation voltage	➤ 5V DC +/- 5%																																																																																																																																																																																															
Frequency range	➤ 2.400 ~ 2.483GHz, 5.15 ~ 5.85GHz																																																																																																																																																																																															
PCB dimension	➤ 100mm*17mm*1.0mm, 4L, FR4																																																																																																																																																																																															
Modulation technique	➤ 802.11 Legacy a/b/g DSSS (DBPSK, DQPSK, CCK) OFDM (BPSK, QPSK, 16-QAM, 64-QAM) DSSS (Direct Sequence Spread Spectrum) with DBPSK (Differential Binary Phase Shift Keying 1Mbps), DQPSK (Differential Quaternary Phase Shift Keying 2Mbps), and CCK (Complementary Code Keying 5.5&11Mbps), and OFDM (Orthogonal Frequency Division Multiplexing with BPSK for 6,9Mbps 、 QPSK for 12,18Mbps 、 16QAM for 24,36Mbps 、 64QAM for 48,54Mbps) ➤ 802.11n a/g OFDM (BPSK, QPSK, 16-QAM, 64-QAM) ➤ 802.11ac OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)																																																																																																																																																																																															
Output power (for each chain; with ±1.5dBm tolerance)	➤ 802.11b <table><tr><td>Test Frequencies</td><td>1/2_Target</td><td>5.5_Target</td><td>11_Target</td></tr><tr><td>2412</td><td>17</td><td>17</td><td>17</td></tr><tr><td>2437</td><td>17</td><td>17</td><td>17</td></tr><tr><td>2462</td><td>17</td><td>17</td><td>17</td></tr></table> ➤ 802.11g <table><tr><td>Test Frequencies</td><td>6-24_Target</td><td>36_Target</td><td>48_Target</td><td>54_Target</td></tr><tr><td>2412</td><td>16</td><td>16</td><td>16</td><td>16</td></tr><tr><td>2437</td><td>16</td><td>16</td><td>16</td><td>16</td></tr><tr><td>2462</td><td>16</td><td>16</td><td>16</td><td>16</td></tr></table> ➤ 802.11a <table><tr><td>Test Frequencies</td><td>6-24_Target</td><td>36_Target</td><td>48_Target</td><td>54_Target</td></tr><tr><td>5180</td><td>14</td><td>14</td><td>14</td><td>14</td></tr><tr><td>5500</td><td>14</td><td>14</td><td>14</td><td>14</td></tr><tr><td>5785</td><td>14</td><td>14</td><td>14</td><td>14</td></tr></table> ➤ 802.11n 2G HT20 <table><tr><td>Test Frequencies</td><td>MCS0</td><td>MCS1</td><td>MCS2</td><td>MCS3</td><td>MCS4</td><td>MCS5</td><td>MCS6</td><td>MCS7</td></tr><tr><td>2412</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td></tr><tr><td>2437</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td></tr><tr><td>2462</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td></tr></table> ➤ 802.11n 2G HT40 <table><tr><td>Test Frequencies</td><td>MCS0</td><td>MCS1</td><td>MCS2</td><td>MCS3</td><td>MCS4</td><td>MCS5</td><td>MCS6</td><td>MCS7</td></tr><tr><td>2422</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td></tr><tr><td>2437</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td></tr><tr><td>2452</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td><td>15</td></tr></table> ➤ 802.11n 5G HT20 <table><tr><td>Test Frequencies</td><td>MCS0</td><td>MCS1</td><td>MCS2</td><td>MCS3</td><td>MCS4</td><td>MCS5</td><td>MCS6</td><td>MCS7</td></tr><tr><td>5180</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td></tr><tr><td>5500</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td></tr><tr><td>5785</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td></tr></table> ➤ 802.11n 5G HT40 <table><tr><td>Test Frequencies</td><td>MCS0</td><td>MCS1</td><td>MCS2</td><td>MCS3</td><td>MCS4</td><td>MCS5</td><td>MCS6</td><td>MCS7</td></tr><tr><td>5190</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td><td>13</td></tr></table>										Test Frequencies	1/2_Target	5.5_Target	11_Target	2412	17	17	17	2437	17	17	17	2462	17	17	17	Test Frequencies	6-24_Target	36_Target	48_Target	54_Target	2412	16	16	16	16	2437	16	16	16	16	2462	16	16	16	16	Test Frequencies	6-24_Target	36_Target	48_Target	54_Target	5180	14	14	14	14	5500	14	14	14	14	5785	14	14	14	14	Test Frequencies	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	2412	15	15	15	15	15	15	15	15	2437	15	15	15	15	15	15	15	15	2462	15	15	15	15	15	15	15	15	Test Frequencies	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	2422	15	15	15	15	15	15	15	15	2437	15	15	15	15	15	15	15	15	2452	15	15	15	15	15	15	15	15	Test Frequencies	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	5180	13	13	13	13	13	13	13	13	5500	13	13	13	13	13	13	13	13	5785	13	13	13	13	13	13	13	13	Test Frequencies	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	5190	13	13	13	13	13	13	13	13
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EVM	The transmit modulation accuracy is measured using error vector magnitude (EVM). EVM is the magnitude of the phase difference as a function of time between an ideal reference signal and the measured transmitted signal. ➤ 802.11b <table><tr><td>Modulation</td><td>Code Rate</td><td>Relative constellation error (dB)</td><td>Relative constellation error (dB)</td></tr><tr><td></td><td></td><td>IEEE Spec (1Tx dB)</td><td>Typical (1Tx dB)</td></tr><tr><td>DBPSK</td><td></td><td>-10</td><td>-14</td></tr><tr><td>DQPSK</td><td></td><td>-10</td><td>-14</td></tr><tr><td>CCK</td><td></td><td>-10</td><td>-14</td></tr></table> ➤ 802.11g <table><tr><td>Modulation</td><td>Code Rate</td><td>Relative constellation error (dB)</td><td>Relative constellation error (dB)</td></tr><tr><td></td><td></td><td>IEEE Spec (1Tx dB)</td><td>Typical (1Tx dB)</td></tr><tr><td>BPSK</td><td>1/2</td><td>-5</td><td>-32</td></tr><tr><td>BPSK</td><td>3/4</td><td>-8</td><td>-32</td></tr><tr><td>QPSK</td><td>1/2</td><td>-10</td><td>-32</td></tr><tr><td>QPSK</td><td>3/4</td><td>-13</td><td>-32</td></tr><tr><td>16-QAM</td><td>1/2</td><td>-16</td><td>-32</td></tr><tr><td>16-QAM</td><td>3/4</td><td>-19</td><td>-32</td></tr><tr><td>64-QAM</td><td>2/3</td><td>-22</td><td>-32</td></tr><tr><td>64-QAM</td><td>3/4</td><td>-25</td><td>-32</td></tr></table> ➤ 802.11a <table><tr><td>Modulation</td><td>Code Rate</td><td>Relative constellation error (dB)</td><td>Relative constellation error (dB)</td></tr><tr><td></td><td></td><td>IEEE Spec (1Tx dB)</td><td>Typical (1Tx dB)</td></tr><tr><td>BPSK</td><td>1/2</td><td>-5</td><td>-30</td></tr><tr><td>BPSK</td><td>3/4</td><td>-8</td><td>-30</td></tr><tr><td>QPSK</td><td>1/2</td><td>-10</td><td>-30</td></tr><tr><td>QPSK</td><td>3/4</td><td>-13</td><td>-30</td></tr><tr><td>16-QAM</td><td>1/2</td><td>-16</td><td>-30</td></tr><tr><td>16-QAM</td><td>3/4</td><td>-19</td><td>-30</td></tr><tr><td>64-QAM</td><td>2/3</td><td>-22</td><td>-30</td></tr><tr><td>64-QAM</td><td>3/4</td><td>-25</td><td>-30</td></tr></table> ➤ 802.11ng <table><tr><td>Modulation</td><td>Code Rate</td><td>Relative constellation error (dB)</td><td>Relative constellation error (dB)</td></tr><tr><td></td><td></td><td>IEEE Spec (1Tx dB)</td><td>Typical (1Tx dB)</td></tr><tr><td>✧ HT20</td><td></td><td></td><td></td></tr><tr><td>(MCS0) BPSK</td><td>1/2</td><td>-5</td><td>-31</td></tr><tr><td>(MCS1) QPSK</td><td>1/2</td><td>-10</td><td>-31</td></tr><tr><td>(MCS2) QPSK</td><td>3/4</td><td>-13</td><td>-31</td></tr><tr><td>(MCS3) 16-QAM</td><td>1/2</td><td>-16</td><td>-31</td></tr><tr><td>(MCS4) 16-QAM</td><td>3/4</td><td>-19</td><td>-31</td></tr><tr><td>(MCS5) 64-QAM</td><td>2/3</td><td>-22</td><td>-31</td></tr><tr><td>(MCS6) 64-QAM</td><td>3/4</td><td>-25</td><td>-31</td></tr><tr><td>(MCS7) 64-QAM</td><td>5/6</td><td>-27</td><td>-31</td></tr></table>										Modulation	Code Rate	Relative constellation error (dB)	Relative constellation error (dB)			IEEE Spec (1Tx dB)	Typical (1Tx dB)	DBPSK		-10	-14	DQPSK		-10	-14	CCK		-10	-14	Modulation	Code Rate	Relative constellation error (dB)	Relative constellation error (dB)			IEEE Spec (1Tx dB)	Typical (1Tx dB)	BPSK	1/2	-5	-32	BPSK	3/4	-8	-32	QPSK	1/2	-10	-32	QPSK	3/4	-13	-32	16-QAM	1/2	-16	-32	16-QAM	3/4	-19	-32	64-QAM	2/3	-22	-32	64-QAM	3/4	-25	-32	Modulation	Code Rate	Relative constellation error (dB)	Relative constellation error (dB)			IEEE Spec (1Tx dB)	Typical (1Tx dB)	BPSK	1/2	-5	-30	BPSK	3/4	-8	-30	QPSK	1/2	-10	-30	QPSK	3/4	-13	-30	16-QAM	1/2	-16	-30	16-QAM	3/4	-19	-30	64-QAM	2/3	-22	-30	64-QAM	3/4	-25	-30	Modulation	Code Rate	Relative constellation error (dB)	Relative constellation error (dB)			IEEE Spec (1Tx dB)	Typical (1Tx dB)	✧ HT20				(MCS0) BPSK	1/2	-5	-31	(MCS1) QPSK	1/2	-10	-31	(MCS2) QPSK	3/4	-13	-31	(MCS3) 16-QAM	1/2	-16	-31	(MCS4) 16-QAM	3/4	-19	-31	(MCS5) 64-QAM	2/3	-22	-31	(MCS6) 64-QAM	3/4	-25	-31	(MCS7) 64-QAM	5/6	-27	-31
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QPSK	3/4	-13	-30																																																																																																																																																							
16-QAM	1/2	-16	-30																																																																																																																																																							
16-QAM	3/4	-19	-30																																																																																																																																																							
64-QAM	2/3	-22	-30																																																																																																																																																							
64-QAM	3/4	-25	-30																																																																																																																																																							
Modulation	Code Rate	Relative constellation error (dB)	Relative constellation error (dB)																																																																																																																																																							
		IEEE Spec (1Tx dB)	Typical (1Tx dB)																																																																																																																																																							
✧ HT20																																																																																																																																																										
(MCS0) BPSK	1/2	-5	-31																																																																																																																																																							
(MCS1) QPSK	1/2	-10	-31																																																																																																																																																							
(MCS2) QPSK	3/4	-13	-31																																																																																																																																																							
(MCS3) 16-QAM	1/2	-16	-31																																																																																																																																																							
(MCS4) 16-QAM	3/4	-19	-31																																																																																																																																																							
(MCS5) 64-QAM	2/3	-22	-31																																																																																																																																																							
(MCS6) 64-QAM	3/4	-25	-31																																																																																																																																																							
(MCS7) 64-QAM	5/6	-27	-31																																																																																																																																																							

	✦ HT40 <table><tr><td>(MCS0) BPSK</td><td>1/2</td><td>-5</td><td>-31</td></tr><tr><td>(MCS1) QPSK</td><td>1/2</td><td>-10</td><td>-31</td></tr><tr><td>(MCS2) QPSK</td><td>3/4</td><td>-13</td><td>-31</td></tr><tr><td>(MCS3) 16-QAM</td><td>1/2</td><td>-16</td><td>-31</td></tr><tr><td>(MCS4) 16-QAM</td><td>3/4</td><td>-19</td><td>-31</td></tr><tr><td>(MCS5) 64-QAM</td><td>2/3</td><td>-22</td><td>-31</td></tr><tr><td>(MCS6) 64-QAM</td><td>3/4</td><td>-25</td><td>-31</td></tr><tr><td>(MCS7) 64-QAM</td><td>5/6</td><td>-27</td><td>-31</td></tr></table> ➤ 802.11na <table><tr><th>Modulation</th><th>Code Rate</th><th>Relative constellation error (dB) IEEE Spec (1Tx dB)</th><th>Relative constellation error (dB) Typical (1Tx dB)</th></tr></table> ✦ HT20 <table><tr><td>(MCS0) BPSK</td><td>1/2</td><td>-5</td><td>-30</td></tr><tr><td>(MCS1) QPSK</td><td>1/2</td><td>-10</td><td>-30</td></tr><tr><td>(MCS2) QPSK</td><td>3/4</td><td>-13</td><td>-30</td></tr><tr><td>(MCS3) 16-QAM</td><td>1/2</td><td>-16</td><td>-30</td></tr><tr><td>(MCS4) 16-QAM</td><td>3/4</td><td>-19</td><td>-30</td></tr><tr><td>(MCS5) 64-QAM</td><td>2/3</td><td>-22</td><td>-30</td></tr><tr><td>(MCS6) 64-QAM</td><td>3/4</td><td>-25</td><td>-30</td></tr><tr><td>(MCS7) 64-QAM</td><td>5/6</td><td>-27</td><td>-30</td></tr></table> ✦ HT40 <table><tr><td>(MCS0) BPSK</td><td>1/2</td><td>-5</td><td>-31</td></tr><tr><td>(MCS1) QPSK</td><td>1/2</td><td>-10</td><td>-31</td></tr><tr><td>(MCS2) QPSK</td><td>3/4</td><td>-13</td><td>-31</td></tr><tr><td>(MCS3) 16-QAM</td><td>1/2</td><td>-16</td><td>-31</td></tr><tr><td>(MCS4) 16-QAM</td><td>3/4</td><td>-19</td><td>-31</td></tr><tr><td>(MCS5) 64-QAM</td><td>2/3</td><td>-22</td><td>-31</td></tr><tr><td>(MCS6) 64-QAM</td><td>3/4</td><td>-25</td><td>-31</td></tr><tr><td>(MCS7) 64-QAM</td><td>5/6</td><td>-27</td><td>-31</td></tr></table> ➤ 802.11ac <table><tr><th>Modulation</th><th>Code Rate</th><th>Relative constellation error (dB) IEEE Spec (1Tx dB)</th><th>Relative constellation error (dB) Typical (1Tx dB)</th></tr></table> ✦ HT80 <table><tr><td>(MCS0) BPSK</td><td>1/2</td><td>-5</td><td>-30</td></tr><tr><td>(MCS1) QPSK</td><td>1/2</td><td>-10</td><td>-30</td></tr><tr><td>(MCS2) QPSK</td><td>3/4</td><td>-13</td><td>-30</td></tr><tr><td>(MCS3) 16-QAM</td><td>1/2</td><td>-16</td><td>-30</td></tr><tr><td>(MCS4) 16-QAM</td><td>3/4</td><td>-19</td><td>-30</td></tr><tr><td>(MCS5) 64-QAM</td><td>2/3</td><td>-22</td><td>-30</td></tr><tr><td>(MCS6) 64-QAM</td><td>3/4</td><td>-25</td><td>-30</td></tr><tr><td>(MCS7) 64-QAM</td><td>5/6</td><td>-27</td><td>-30</td></tr><tr><td>(MCS8) 256-QAM</td><td>3/4</td><td>-30</td><td>-32</td></tr><tr><td>(MCS9) 256-QAM</td><td>5/6</td><td>-32</td><td>-33.5</td></tr></table>				(MCS0) BPSK	1/2	-5	-31	(MCS1) QPSK	1/2	-10	-31	(MCS2) QPSK	3/4	-13	-31	(MCS3) 16-QAM	1/2	-16	-31	(MCS4) 16-QAM	3/4	-19	-31	(MCS5) 64-QAM	2/3	-22	-31	(MCS6) 64-QAM	3/4	-25	-31	(MCS7) 64-QAM	5/6	-27	-31	Modulation	Code Rate	Relative constellation error (dB) IEEE Spec (1Tx dB)	Relative constellation error (dB) Typical (1Tx dB)	(MCS0) BPSK	1/2	-5	-30	(MCS1) QPSK	1/2	-10	-30	(MCS2) QPSK	3/4	-13	-30	(MCS3) 16-QAM	1/2	-16	-30	(MCS4) 16-QAM	3/4	-19	-30	(MCS5) 64-QAM	2/3	-22	-30	(MCS6) 64-QAM	3/4	-25	-30	(MCS7) 64-QAM	5/6	-27	-30	(MCS0) BPSK	1/2	-5	-31	(MCS1) QPSK	1/2	-10	-31	(MCS2) QPSK	3/4	-13	-31	(MCS3) 16-QAM	1/2	-16	-31	(MCS4) 16-QAM	3/4	-19	-31	(MCS5) 64-QAM	2/3	-22	-31	(MCS6) 64-QAM	3/4	-25	-31	(MCS7) 64-QAM	5/6	-27	-31	Modulation	Code Rate	Relative constellation error (dB) IEEE Spec (1Tx dB)	Relative constellation error (dB) Typical (1Tx dB)	(MCS0) BPSK	1/2	-5	-30	(MCS1) QPSK	1/2	-10	-30	(MCS2) QPSK	3/4	-13	-30	(MCS3) 16-QAM	1/2	-16	-30	(MCS4) 16-QAM	3/4	-19	-30	(MCS5) 64-QAM	2/3	-22	-30	(MCS6) 64-QAM	3/4	-25	-30	(MCS7) 64-QAM	5/6	-27	-30	(MCS8) 256-QAM	3/4	-30	-32	(MCS9) 256-QAM	5/6	-32	-33.5
(MCS0) BPSK	1/2	-5	-31																																																																																																																																																	
(MCS1) QPSK	1/2	-10	-31																																																																																																																																																	
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(MCS3) 16-QAM	1/2	-16	-31																																																																																																																																																	
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(MCS3) 16-QAM	1/2	-16	-30																																																																																																																																																	
(MCS4) 16-QAM	3/4	-19	-30																																																																																																																																																	
(MCS5) 64-QAM	2/3	-22	-30																																																																																																																																																	
(MCS6) 64-QAM	3/4	-25	-30																																																																																																																																																	
(MCS7) 64-QAM	5/6	-27	-30																																																																																																																																																	
(MCS0) BPSK	1/2	-5	-31																																																																																																																																																	
(MCS1) QPSK	1/2	-10	-31																																																																																																																																																	
(MCS2) QPSK	3/4	-13	-31																																																																																																																																																	
(MCS3) 16-QAM	1/2	-16	-31																																																																																																																																																	
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(MCS8) 256-QAM	3/4	-30	-32																																																																																																																																																	
(MCS9) 256-QAM	5/6	-32	-33.5																																																																																																																																																	
Sensitivity (with +2/-2dB tolerance, dBm)	➤ 802.11b																																																																																																																																																			
	Modulation	Code Rate	IEEE Spec (1Rx dBm)	Typical (1Rx dBm)																																																																																																																																																
	DBPSK		not specified	-93																																																																																																																																																
	DQPSK		not specified	-90																																																																																																																																																
	CCK		not specified	-85																																																																																																																																																
	➤ 802.11g																																																																																																																																																			
	Modulation	Code Rate	IEEE Spec (1Rx dBm)	Typical (1Rx dBm)																																																																																																																																																
	BPSK	1/2	-82	-88																																																																																																																																																
	BPSK	3/4	-81	-85																																																																																																																																																
	QPSK	1/2	-79	-85																																																																																																																																																
QPSK	3/4	-77	-83																																																																																																																																																	
16-QAM	1/2	-74	-80																																																																																																																																																	
16-QAM	3/4	-70	-77																																																																																																																																																	

	64-QAM	2/3	-66	-72
	64-QAM	3/4	-65	-71
➤ 802.11a				
	Modulation	Code Rate	IEEE Spec (1Rx dBm)	Typical (1Rx dBm)
	BPSK	1/2	-82	-90
	BPSK	3/4	-81	-88
	QPSK	1/2	-79	-86
	QPSK	3/4	-77	-84
	16-QAM	1/2	-74	-80
	16-QAM	3/4	-70	-77
	64-QAM	2/3	-66	-71
	64-QAM	3/4	-65	-70
➤ 802.11ng				
	Modulation	Code Rate	Relative constellation error (dB) IEEE Spec (1Tx dB)	Relative constellation error (dB) Typical (1Tx dB)
✧ HT20				
	(MCS0) BPSK	1/2	-82	-88
	(MCS1) QPSK	1/2	-79	-85
	(MCS2) QPSK	3/4	-77	-82
	(MCS3) 16-QAM	1/2	-74	-78
	(MCS4) 16-QAM	3/4	-70	-74
	(MCS5) 64-QAM	2/3	-66	-72
	(MCS6) 64-QAM	3/4	-65	-71
	(MCS7) 64-QAM	5/6	-64	-70
✧ HT40				
	(MCS0) BPSK	1/2	-79	-85
	(MCS1) QPSK	1/2	-76	-82
	(MCS2) QPSK	3/4	-74	-79
	(MCS3) 16-QAM	1/2	-71	-75
	(MCS4) 16-QAM	3/4	-67	-71
	(MCS5) 64-QAM	2/3	-63	-69
	(MCS6) 64-QAM	3/4	-62	-68
	(MCS7) 64-QAM	5/6	-61	-67
➤ 802.11na				
	Modulation	Code Rate	Relative constellation error (dB) IEEE Spec (1Tx dB)	Relative constellation error (dB) Typical (1Tx dB)
✧ HT20				
	(MCS0) BPSK	1/2	-82	-87
	(MCS1) QPSK	1/2	-79	-85
	(MCS2) QPSK	3/4	-77	-83
	(MCS3) 16-QAM	1/2	-74	-79
	(MCS4) 16-QAM	3/4	-70	-76
	(MCS5) 64-QAM	2/3	-66	-71
	(MCS6) 64-QAM	3/4	-65	-69
	(MCS7) 64-QAM	5/6	-64	-68
✧ HT40				
	(MCS0) BPSK	1/2	-79	-84
	(MCS1) QPSK	1/2	-76	-81
	(MCS2) QPSK	3/4	-74	-78
	(MCS3) 16-QAM	1/2	-71	-75
	(MCS4) 16-QAM	3/4	-67	-72
	(MCS5) 64-QAM	2/3	-63	-68
	(MCS6) 64-QAM	3/4	-62	-66
	(MCS7) 64-QAM	5/6	-61	-65
➤ 802.11ac				
	Modulation	Code Rate	Relative constellation error (dB) IEEE Spec (1Tx dB)	Relative constellation error (dB) Typical (1Tx dB)

	✧ HT80 <table><tr><td>(MCS0) BPSK</td><td>1/2</td><td>-76</td><td>-80</td></tr><tr><td>(MCS1) QPSK</td><td>1/2</td><td>-73</td><td>-77</td></tr><tr><td>(MCS2) QPSK</td><td>3/4</td><td>-71</td><td>-75</td></tr><tr><td>(MCS3) 16-QAM</td><td>1/2</td><td>-68</td><td>-72</td></tr><tr><td>(MCS4) 16-QAM</td><td>3/4</td><td>-64</td><td>-68</td></tr><tr><td>(MCS5) 64-QAM</td><td>2/3</td><td>-60</td><td>-64</td></tr><tr><td>(MCS6) 64-QAM</td><td>3/4</td><td>-59</td><td>-63</td></tr><tr><td>(MCS7) 64-QAM</td><td>5/6</td><td>-58</td><td>-62</td></tr><tr><td>(MCS8) 256-QAM</td><td>3/4</td><td>-53</td><td>-57</td></tr><tr><td>(MCS9) 256-QAM</td><td>5/6</td><td>-51</td><td>-55</td></tr></table>	(MCS0) BPSK	1/2	-76	-80	(MCS1) QPSK	1/2	-73	-77	(MCS2) QPSK	3/4	-71	-75	(MCS3) 16-QAM	1/2	-68	-72	(MCS4) 16-QAM	3/4	-64	-68	(MCS5) 64-QAM	2/3	-60	-64	(MCS6) 64-QAM	3/4	-59	-63	(MCS7) 64-QAM	5/6	-58	-62	(MCS8) 256-QAM	3/4	-53	-57	(MCS9) 256-QAM	5/6	-51	-55
(MCS0) BPSK	1/2	-76	-80																																						
(MCS1) QPSK	1/2	-73	-77																																						
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(MCS3) 16-QAM	1/2	-68	-72																																						
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(MCS5) 64-QAM	2/3	-60	-64																																						
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(MCS7) 64-QAM	5/6	-58	-62																																						
(MCS8) 256-QAM	3/4	-53	-57																																						
(MCS9) 256-QAM	5/6	-51	-55																																						
Transmit spectrum mask	➤ For transmitted spectral mask for 11a shall be less than −40dBr for $f_c-30\text{MHz}<f<f_c+30\text{MHz}$. ➤ For transmitted spectral mask for 11b shall be less than −50dBr for $f_c-22\text{MHz}<f<f_c+22\text{MHz}$. ➤ For transmitted spectral mask for 11g shall be less than −40dBr for $f_c-30\text{MHz}<f<f_c+30\text{MHz}$. ➤ For transmitted spectral mask for 11n 20MHz shall be less than −45dBr for $f_c-30\text{MHz}<f<f_c+30\text{MHz}$. ➤ For transmitted spectral mask for 11n 40MHz shall be less than −45dBr for $f_c-60\text{MHz}<f<f_c+60\text{MHz}$.																																								
Transmit spectrum flatness	➤ For 802.11a/g the average energy of the constellations in each of spectral lines −16..-1 and +1..+16 will deviate no more than +/- 2dB from their average energy. For 802.11n 40MHz mode, the average energy of the constellations in each of spectral lines −42..-2 and +2..+42 will deviate no more than +/- 2dB from their average energy. ➤ The transmitted spectral flatness should be with in +2/- 4dB.																																								
Transmit center frequency tolerance	➤ The transmitted center frequency tolerance shall be ±20 ppm maximum.																																								
Carrier suppression	802.11a: The leakage of the center frequency component shall not exceed -15 dB relative to overall transmitted power or, equivalently, +2 dB relative to the average energy of the rest of the sub-carriers. 802.11b: The RF carrier suppression, measured at the channel center frequency, shall be at least 15 dB below the peak SIN(x)/x power spectrum. 802.11g: The leakage of the center frequency component shall not exceed -15 dB relative to overall transmitted power or, equivalently, +2 dB relative to the average energy of the rest of the sub-carriers. 802.11n: For all 20 MHz modes of transmission The leakage of the center frequency component shall not exceed -15 dB relative to overall transmitted power or, equivalently, +2 dB relative to the average energy of the rest of the sub-carriers. For all 40 MHz modes of transmission The center frequency leakage shall not exceed -18 dB relative to overall transmitted power, or, equivalently, +2 dB relative to the average energy of the rest of the sub-carriers. ➤ Delta > 15dB for a, b, g & 11n 20MHz ➤ Delta > 18dB for 11n 40MHz																																								
Transmit power on ramp and power down ramp	➤ The transmitting power-on ramp for 10% to 90% of maximum power m shall be no greater than 2 μs. ➤ The transmitting power-down ramp for 90% to 10% of maximum power shall be no																																								

time	greater than 2 μs.
Receiver maximum input level	➤ 802.11a Modulation Code Rate IEEE Spec (1Rx dBm) >-30 ➤ 802.11b Modulation DBPSK IEEE Spec (1Rx dBm) >-10 DQPSK >-10 CCK >-10 ➤ 802.11g Modulation Code Rate IEEE Spec (1Rx dBm) >-20 ➤ 802.11na Modulation Code Rate IEEE Spec (1Rx dBm) >-30 ➤ 802.11ng Modulation Code Rate IEEE Spec (1Rx dBm) >-20 ➤ 802.11ac Modulation Code Rate IEEE Spec (1Rx dBm) >-30
Transfer data rate	➤ 802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps ➤ 802.11b: 1, 2, 5.5, 11Mbps ➤ 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps ➤ 802.11n: @800GI(400GI) ● 20MHz BW ▪ 1 Nss: 65(72.2) Mbps maximal ▪ 2 Nss: 130(144.444) Mbps maximal ● 40MHz BW ▪ 1 Nss: 135(150) Mbps maximal ▪ 2 Nss: 270(300) Mbps maximal
Operation temperature	➤ -10° ~ 60° C
Storage temperature	➤ -35° ~ 70° C, R.H.: 90%
Antenna	➤ Two on-board antennas

5.2 EEPROM Information

- WiFi MAC Address
- PA parameter
- Vendor ID
- Product ID

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/CANADA

Operation of this device is restricted to indoor use only

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna,
- 3) For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 3 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: NKR-DAUKW12".

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Antenna info.	Antenna		Peak gain (dBi)					
Model	Type	Connector	2400~ 2483.5MHz	5150~ 5250MHz	5250~ 5350MHz	5470~ 5725MHz	5725~ 5850MHz	sample 組態
ANT 0	PIFA	No	2.21	3.04	2.82	2.7	2.7	On-board ANT0 + On-board ANT0
ANT 1	PIFA	No	3.32	4.95	4.48	5.43	5.63	
RFMTA340740IMLB701	PIFA	IPEX	2.3	4.36	4.36	4.36	4.36	External-Amtran (白色) + On-board ANT1
ANT 1	PIFA	No	3.32	4.95	4.48	5.43	5.63	
NA	PIFA	IPEX	-4.72	-5.22	-4.92	-4.69	-4.69	External-WNC Antenna (330mm) + External-WNC Antenna (330mm)
NA	PIFA	IPEX	-4.72	-5.22	-4.92	-4.69	-4.69	

Industry Canada statement:

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- 1) l'appareil ne doit pas produire de brouillage;
- 2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This radio transmitter (IC: 4441A-DAUKW12) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (IC: 4441A-DAUKW12) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Antenna info.	Antenna		Peak gain (dBi)					
Model	Type	Connector	2400~ 2483.5MHz	5150~ 5250MHz	5250~ 5350MHz	5470~ 5725MHz	5725~ 5850MHz	sample 組態
ANT 0	PIFA	No	2.21	3.04	2.82	2.7	2.7	On-board ANT0 + On-board ANT0
ANT 1	PIFA	No	3.32	4.95	4.48	5.43	5.63	
RFMTA340740IMLB701	PIFA	IPEX	2.3	4.36	4.36	4.36	4.36	External-Amtran (白色) + On-board ANT1
ANT 1	PIFA	No	3.32	4.95	4.48	5.43	5.63	
NA	PIFA	IPEX	-4.72	-5.22	-4.92	-4.69	-4.69	External-WNC Antenna (330mm) + External-WNC Antenna (330mm)
NA	PIFA	IPEX	-4.72	-5.22	-4.92	-4.69	-4.69	

Caution:

(i) the device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

(ii) for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;

(iii) for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate; and

Operations in the 5.25-5.35GHz band are restricted to indoor usage only.

Avertissement:

(i) les dispositifs fonctionnant dans la bande de 5150 à 5250MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

(ii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5250 à 5350MHz et de 5470 à 5725 MHz doit être conforme à la limite de la p.i.r.e;

(iii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5725 à 5850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée pour l'exploitation point à point et l'exploitation non point à point, selon le cas;

Les opérations dans la bande de 5.25-5.35GHz sont limités à un usage intérieur seulement.

Radiation Exposure Statement:

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

This device is intended only for OEM integrators under the following conditions:

- 1) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 1 condition above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:

- 1) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 1 condition ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling

The final end product must be labeled in a visible area with the following: "Contains IC: 4441A-DAUKW12".

Plaque signalétique du produit final

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 4441A-DAUKW12".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.