

Produkte
Products

Prüfbericht - Nr.: 14047149 001			Seite 1 von 22 Page 1 of 22		
Test Report No.:					
Auftraggeber: Client:		Megabyte Limited Unit 507, Building 12W, No. 12 Science Park West Avenue Hong Kong Science Park, Shatin, N.T., Hong Kong			
Gegenstand der Prüfung: Test Item:		UHF Mobile RFID Reader			
Bezeichnung: Identification:	T8-01-MB T8-01-39, T8-01-PH	Serien-Nr.: Serial No.:	Engineering sample		
Wareneingangs-Nr.: Receipt No.:	A000386196-002	Eingangsdatum: Date of Receipt:	30.06.2016		
Prüfort: Testing Location:	EMTEK (Shenzhen) Co., Ltd. Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of test item at delivery:		Test samples are not damaged and suitable for testing.			
Prüfgrundlage: Test Specification:	FCC Part 15 Subpart E ANSI C63.10-2013				
Prüfergebnis: Test Results:	Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage. The above mentioned product was tested and passed .				
Prüflaboratorium: Testing Laboratory:	TÜV Rheinland Hong Kong Ltd. 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong				
geprüft/ tested by:		kontrolliert/ reviewed by:			
23.12.2016 Datum Date		Benny Lau Senior Project Manager Unterschrift Signature		23.12.2016 Datum Date	
		Sharon Li Department Manager Unterschrift Signature			
Sonstiges: Other Aspects		FCC ID: XEK-MTRAYT8 This device is a composite device. This report contains the test result of the 5GHz WIFI transceiver portion.			
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet		Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested			
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>					

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Product information

Manufacturers declarations

	Transceiver
Operating frequency range	5180 - 5320 MHz 5500 - 5700 MHz 5745 - 5825 MHz
Operating mode	☐ Master Device ☒ Client Device with No Radar Detection ☐ Client Device with Radar Detection
Type of modulation	802.11a: OFDM (BPSK/QPSK/16QAM/64QAM) 802.11n: OFDM (BPSK/QPSK/16QAM/64QAM)
Number of channels	23
Channel separation	20 MHz
Type of antenna	Integral PCB Antenna
Antenna gain (dBi)	2 dBi
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	Yes
Nominal voltage	100-240VAC/ 3.7VDC
Independent Operation Modes	Transmitting

Product function and intended use

The equipment under test (EUT) is a mobile RFID reader. It is a compact NFC and UHF RFID reader with Bluetooth and WIFI connectivity.

The manufacturer declared that the model: T8-01-39 and T8-01-PH are identical to the model T8-01-MB except the logo plate.

FCC ID: XEK-MTRAYT8

Models	Product description
T8-01-MB T8-01-39, T8-01-PH	UHF Mobile RFID Reader

Submitted documents

Circuit Diagram
Block Diagram
Technical Description
User manual
Label

Independent Operation Modes

The basic operation modes are:

- Transmitting mode.

For further information refer to User Manual

Related Submittal(s) Grants

This device is a composite device. This is a single application for certification of the 5GHz WIFI transceiver. Refer test report 14047148 001 for DFS test results.

The RFID transmitter portion is authorized under the certification procedure (refer to test report 14045645 001 issued by TÜV Rheinland HK Ltd on 23.12.2016).

The NFC portion is authorized under the certification procedure (refer to test report 14045648 001 issued by TÜV Rheinland HK Ltd on 23.12.2016).

The Bluetooth portion is authorized under the certification procedure (refer to test report 14045646 001 and 14045647 001 and 14047147 001 issued by TÜV Rheinland HK Ltd on 23.12.2016).

The 2.4GHz WIFI portion is authorized under the certification procedure (refer to test report 14045649 001 issued by TÜV Rheinland HK Ltd on 23.12.2016).

Remark

The test results in this test report are only relevant to the tested sample and does not involve any assessment in the production.

Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Test Operation and Test Software

Test operation should refer to test methodology.

Test operation should refer to test methodology.

- During test, Channel & Power Controlling Software provided by the applicant was used to control the operating channel as well as the maximum output power level. The maximum RF output power and the operating frequencies was selected according to the instruction given by the manufacturer. The setting of the maximum RF output power and the operating frequency range expected by the customer shall be fixed on the firmware of the final end product.

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- AC-DC adaptor Model: EA1024AR-050 Input: 100-240 VAC 50/60 Hz; Output: 5.0VDC 2A)
(Provided by the applicant)

Countermeasures to achieve EMC Compliance

- Nil

Test Methodology

Radiated Emission

The radiated emission measurements of the transmitter part were performed according to the procedures in ANSI C63.10-2013.

For measurement below 1GHz, the equipment under test (EUT) was placed at the middle of the 80 cm height turntable. For measurement above 1GHz, the EUT was placed at the middle of the 1.5 m height turntable and RF absorbing material was placed on ground plane between turntable and measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in particular parts of this test report.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

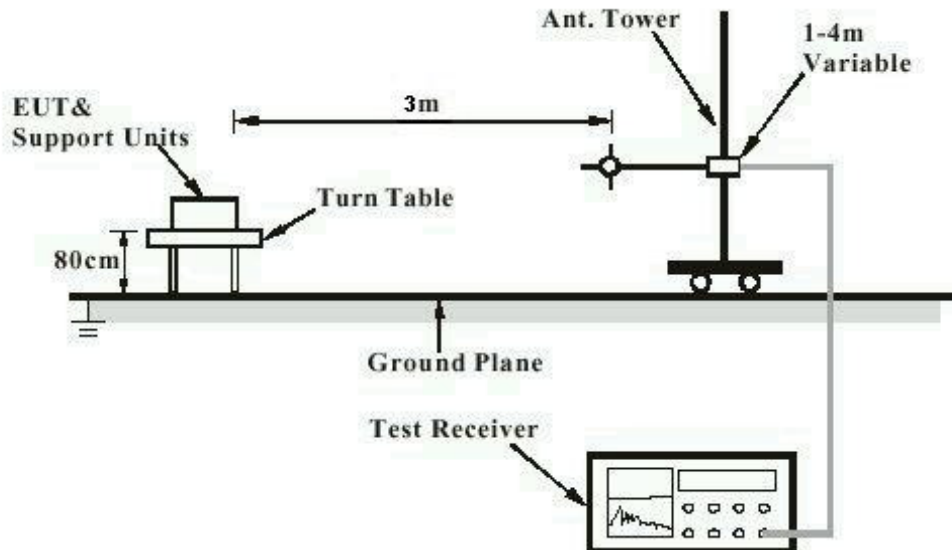
$$FS = R + AF + CF + FA - PA$$

Where FS = Field Strength in dBuV/m at 3 meters.
R = Reading of Spectrum Analyzer in dBuV.
AF = Antenna Factor in dB.
CF = Cable Attenuation Factor in dB.
FA = Filter Attenuation Factor in dB.
PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

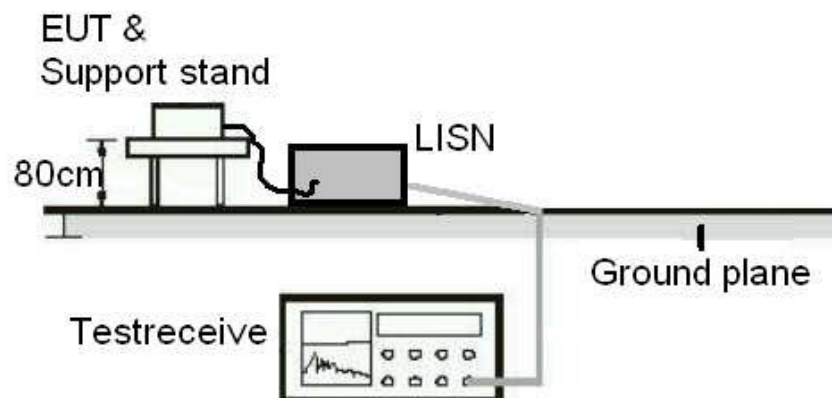
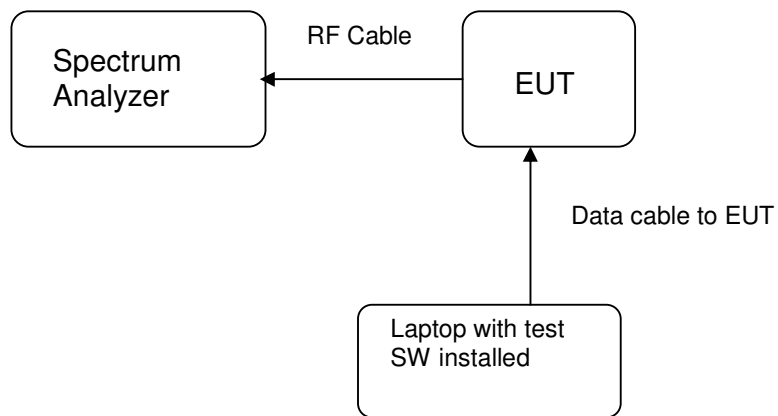


Diagram of Equipment Configuration for Antenna-port Conducted Measurement (if applicable)



List of Test and Measurement Instruments

EMTEK (Shenzhen) Co., Ltd. (Registration number: 406365)

For 3m Radiated Emission Measurement 9K-30M (3m chamber)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde & Schwarz	ESCI	101414	May 28, 2016	1 Year
Loop Antenna	Schwarzbeck	FMZB 1519	1519-012	May 28, 2016	1 Year
Cable	H+B	NmSm-2-C15201		May 29, 2016	1 Year
Cable	H+B	NmNm-7-C15702		May 29, 2016	1 Year

For 3m Radiated Emission Measurement 30M-1G (3m chamber)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde & Schwarz	ESCI	101414	May 28, 2016	1 Year
Pre-Amplifier	LUNAR-EM	LNA30M3G-25	J10100000071	May 28, 2016	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	660	May 29, 2016	1 Year
Cable	H+B	NmSm-05-C15052		May 29, 2016	1 Year
Cable	H+B	NmSm-2-C15201		May 29, 2016	1 Year
Cable	H+B	NmNm-7-C15702		May 29, 2016	1 Year

For 3m Radiated Emission Measurement 1G-18G(3m chamber)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde & Schwarz	FSV40	132.1-3008K39-100967-AP	May 28, 2016	1 Year
Pre-Amplifier	Lunar EM	LNA1G18-48	J1011131010001	May 28, 2016	1 Year
Horn Antenna	Schwarzbeck	BBHA 9120	1178	May 29, 2016	1 Year
Cable	H+B	SAC-40G-1	414	May 29, 2016	1 Year
Cable	H+B	SUCOFLEX104	MY14871/4	May 29, 2016	1 Year
Cable	H+B	BLU18A-NmSm-6500	D8501	May 29, 2016	1 Year

For 3m Radiated Emission Measurement 18G-26.5G (3m chamber)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde & Schwarz	FSV40	132.1-3008K39-100967-AP	May 28, 2016	1 Year
Pre-Amplifier	Lunar EM	LNA18G26-40	J1012131010001	May 28, 2016	1 Year
Horn Antenna	Schwarzbeck	BBHA 9170	RS1307229170547	May 29, 2016	1 Year
Cable	A.H	SAC-40G-1	414	May 29, 2016	1 Year
Cable	A.H	SAC-40G-1	413	May 29, 2016	1 Year

For 3m Radiated Emission Measurement 26.5G-40G (3m chamber)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde & Schwarz	FSV40	132.1-3008K39-100967-AP	May 28, 2016	1 Year
Pre-Amplifier	Lunar EM	LNA26G40-40	J1013131028001	May 28, 2016	1 Year
Horn Antenna	AHS/USA	SAS-573	184	May 29, 2016	1 Year
Cable	A.H	SAC-40G-1	414	May 29, 2016	1 Year
Cable	A.H	SAC-40G-1	413	May 29, 2016	1 Year

For Power Line Conducted Emission (site 1)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Test Receiver	Rohde & Schwarz	ESCI	26115-010-0027	May 28, 2016	1 Year
L.I.S.N.	Rohde & Schwarz	ENV216	101161	May 28, 2016	1 Year
50Ω Coaxial Switch	Anritsu	MP59B	6100175589	May 29, 2016	1 Year
Voltage Probe	Rohde & Schwarz	ESH2-Z3	100122	May 29, 2016	1 Year

For Power Measurement

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Power Analyzer	Agilent	PS-X10-200	N/A	05/28/2016	1 Year

Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is $\pm 2.74\text{dB}$.

The estimated combined standard uncertainty for radiated emissions measurements is $\pm 3.78\text{dB}$ (30MHz to 200MHz) and $\pm 4.27\text{dB}$ (200MHz to 1000MHz) and is $\pm 4.46\text{dB}$ (1GHz to 6GHz) and $\pm 4.96\text{dB}$ (6GHz to 18GHz).

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for the level of confidence is approximately 95%.

Results FCC Part 15 – Subpart E

FCC 15.203 – Antenna Requirement 1		Pass
FCC Requirement: No antenna other than that furnished by the responsible party shall be used with the device		
Results:	a) Antenna type: Integral PCB antenna b) Manufacturer and model no: QCOM c) Peak Gain: 2 dBi	
Verdict:	Pass	

FCC 15.204 – Antenna Requirement 2		N/A
FCC Requirement: An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.		
Results:	Only one integral antenna can be used.	
Verdict:	N/A	

FCC 15.207 – Conducted Emission on AC Mains						Pass
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : AC Mains input port of power supply Supply voltage : 120Vac 60Hz Temperature : 23°C Humidity : 50%						
Requirement:		15.207(a)				
Results:		Pass				
Live measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0,15 – 0,5	0.155	58.36	45.95	66 - 56	56 - 46	Pass
> 0,5 - 5	No peak found	---	---	56	46	Pass
> 5 - 30	No peak found	---	---	60	50	Pass
Neutral measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0,15 – 0,5	0.155	59.62	44.81	66 - 56	56 - 46	Pass
> 0,5 - 5	No peak found	---	---	56	46	Pass
> 5 - 30	No peak found	---	---	60	50	Pass

Results:	Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz does not exceed the limits. For test Results plots refer to Appendix 1-A.
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FCC 15.407(e) - Emission Bandwidth Measurement			Pass
FCC Requirement: Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.			
Test Specification : ANSI C63.10 – 2013 Port of testing : Temporary antenna port Mode of operation : TX mode Supply voltage : 120VAC and/ or 3.7VDC Temperature : 23°C Humidity : 50%			
Results: For test protocols please refer to Appendix 1-A			
802.11a Band U-NII-1 (5150 – 5250 MHz)			
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)	
5180	15.14	18.86	
5200	15.10	18.74	
5240	15.14	18.77	
802.11a Band U-NII-2A (5250 – 5350 MHz)			
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)	
5260	15.15	18.60	
5280	15.10	18.88	
5320	15.13	18.65	
802.11a Band U-NII-2C (5470 – 5725 MHz)			
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)	
5500	14.73	18.87	
5600	15.16	19.86	
5700	15.11	19.17	
802.11a Band U-NII-3 (5725 – 5850 MHz)			
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)	
5745	15.15	18.68	
5785	15.02	18.77	
5825	15.11	18.74	
802.11n20 Band U-NII-1 (5150 – 5250 MHz)			
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)	
5180	15.10	19.17	

5200	15.07	19.10
5240	15.11	19.06
802.11n20 Band U-NII-2A (5250 – 5350 MHz)		
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)
5260	15.09	19.16
5280	15.07	19.14
5320	15.15	19.19
802.11n20 Band U-NII-2C (5470 – 5725 MHz)		
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)
5500	15.17	19.23
5600	15.12	20.20
5700	15.05	21.51
802.11n20 Band U-NII-3 (5725 – 5850 MHz)		
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)
5745	14.25	19.57
5785	15.14	19.01
5825	15.15	19.21
802.11n40 Band U-NII-1 (5150 – 5250 MHz)		
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)
5190	35.15	39.70
5230	35.19	39.22
802.11n40 Band U-NII-2A (5250 – 5350 MHz)		
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)
5270	35.17	39.54
5310	35.19	39.50
802.11n40 Band U-NII-2C (5470 – 5725 MHz)		
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)
5510	35.18	39.61
5590	35.18	41.49
5670	35.20	51.29
802.11n40 Band U-NII-3 (5725 – 5850 MHz)		
Channel frequency (MHz)	6dB bandwidth (MHz)	26dB bandwidth (MHz)
5755	33.88	39.75
5795	35.20	49.22

FCC 15.407(a)(1)(2)(3) – Maximum Conducted Output Power			Pass
FCC Requirement: For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.			
Test Specification : ANSI C63.10 – 2013 Port of testing : Temporary antenna port Mode of operation : TX mode Supply voltage : 120VAC and/ or 3.7VDC Temperature : 23°C Humidity : 50%			
Results: The worst cases is found in 6Mbps, 6.5Mbps and 13.5Mbps respectively.			
802.11a Band U-NII-1 (5150 – 5250 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5180	10.34	23.98	Pass
5200	12.82	23.98	Pass
5240	11.79	23.98	Pass
802.11a Band U-NII-2A (5250 – 5350 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5260	12.00	23.70	Pass
5280	12.50	23.76	Pass
5320	9.83	23.71	Pass
802.11a Band U-NII-2C (5470 – 5725 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5500	9.77	23.76	Pass
5600	10.76	23.98	Pass
5700	10.17	23.83	Pass
802.11a Band U-NII-3 (5725 – 5850 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5745	10.42	30.00	Pass
5785	10.41	30.00	Pass
5825	10.04	30.00	Pass
802.11n20 Band U-NII-1 (5150 – 5250 MHz)			

Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5180	10.28	23.98	Pass
5200	12.48	23.98	Pass
5240	12.21	23.98	Pass
802.11n20 Band U-NII-2A (5250 – 5350 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5260	12.42	23.82	Pass
5280	12.47	23.82	Pass
5320	9.75	23.83	Pass
802.11n20 Band U-NII-2C (5470 – 5725 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5500	9.60	23.84	Pass
5600	10.67	23.98	Pass
5700	10.10	23.98	Pass
802.11n20 Band U-NII-3 (5725 – 5850 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5745	10.32	30.00	Pass
5785	10.24	30.00	Pass
5825	9.93	30.00	Pass
802.11n40 Band U-NII-1 (5150 – 5250 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5190	6.75	23.98	Pass
5230	11.67	23.98	Pass
802.11n40 Band U-NII-2A (5250 – 5350 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5270	11.85	23.98	Pass
5310	6.19	23.98	Pass
802.11n40 Band U-NII-2C (5470 – 5725 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5510	3.26	23.98	Pass
5590	11.30	23.98	Pass
5670	8.73	23.98	Pass
802.11n40 Band U-NII-3 (5725 – 5850 MHz)			
Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Verdict
5755	9.99	30.00	Pass
5795	10.04	30.00	Pass

FCC 15.407(a)(1)(2)(3) – Maximum Power Spectral Density			Pass
FCC Requirement: For client devices in the 5.15-5.25 GHz band the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.			
Test Specification : ANSI C63.10 – 2013 Port of testing : Temporary antenna port Mode of operation : TX mode Supply voltage : 120VAC and/ or 3.7VDC Temperature : 23°C Humidity : 50%			
Results: The worst cases is found in 6Mbps, 6.5Mbps and 13.5Mbps respectively. For test protocols please refer to Appendix 1-A.			
802.11a Band U-NII-1 (5150 – 5250 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
5180	0.658	11	Pass
5200	3.239	11	Pass
5240	3.588	11	Pass
802.11a Band U-NII-2A (5250 – 5350 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
5260	3.348	11	Pass
5280	3.662	11	Pass
5320	1.333	11	Pass
802.11a Band U-NII-2C (5470 – 5725 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
5500	0.627	11	Pass
5600	1.868	11	Pass
5700	0.855	11	Pass
802.11a Band U-NII-3 (5725 – 5850 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/500kHz)	Verdict
5745	-2.115	30	Pass
5785	-2.079	30	Pass
5825	-1.708	30	Pass
802.11n20 Band U-NII-1 (5150 – 5250 MHz)			

Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
5180	0.636	11	Pass
5200	2.913	11	Pass
5240	2.825	11	Pass
802.11n20 Band U-NII-2A (5250 – 5350 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
5260	2.956	11	Pass
5280	3.369	11	Pass
5320	1.173	11	Pass
802.11n20 Band U-NII-2C (5470 – 5725 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
5500	0.121	11	Pass
5600	1.378	11	Pass
5700	0.583	11	Pass
802.11n20 Band U-NII-3 (5725 – 5850 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/500kHz)	Verdict
5745	-2.584	30	Pass
5785	-2.615	30	Pass
5825	-1.965	30	Pass
802.11n40 Band U-NII-1 (5150 – 5250 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
5190	-5.319	11	Pass
5230	-5.154	11	Pass
802.11n40 Band U-NII-2A (5250 – 5350 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
5270	0.867	11	Pass
5310	-4.977	11	Pass
802.11n40 Band U-NII-2C (5470 – 5725 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
5510	-8.116	11	Pass
5590	-0.945	11	Pass
5670	-4.077	11	Pass
802.11n40 Band U-NII-3 (5725 – 5850 MHz)			
Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/500kHz)	Verdict
5755	-6.840	30	Pass
5795	-6.843	30	Pass

FCC 15.407(h)(1) – Transmit Power Control		N/A
FCC Requirement: U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm.		
Results:	A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW	

FCC 15.407(b) – Undesirable Emissions		Pass
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Enclosure Supply voltage : 120VAC and/ or 3.7VDC Temperature : 23 °C Humidity : 50 %		
FCC Requirement: For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of –27 dBm/MHz. For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of –27 dBm/MHz. For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of –27 dBm/MHz. For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of –27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. The provisions of §15.205 apply to intentional radiators operating under this section.		
Results:	Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. The worst cases is found in 6Mbps, 6.5Mbps and 13.5Mbps respectively. Simultaneous transmission was investigated and no new emissions were found. Only the worst cases is shown. There is no spurious found below 30MHz. For radiated emission test results please refer to Appendix 1-B.	

FCC 15.407(g) – Frequency Stability			Pass
FCC Requirement: An emission is maintained within the band of operation under all conditions of normal operation as specified in the user manual.			
Test Specification : ANSI C63.10 – 2013 Port of testing : Temporary antenna port Mode of operation : TX mode Supply voltage : 120VAC Temperature : 23°C Humidity : 50%			
Results: The operating temperature range specified in user manual is 0°C to +40°C. Test result shown that by varying the operating temperature and supply voltage the carrier frequency will drift to the negative side. So the worst case is at the lower band-edge and only the worst cases is reported. The largest 26dB bandwidth of the lowest channel in each frequency band are found 19.57MHz (802.11n20 mode) and 39.75MHz (802.11n40 mode). Therefore, deviation less than 125kHz is required for the emission bandwidth to be maintained within the band of operation.			
Operating Frequency: 5180 MHz			
Temp. (°C)	Supply Voltage (VAC)	Frequency (MHz)	Deviation (kHz)
0	120	5179.987645	-12.355
10	120	5179.979520	-20.480
20	120	5179.984635	-15.365
30	120	5179.981975	-18.025
40	120	5179.970745	-29.255
20	102	5179.986720	-13.280
20	138	5179.983715	-16.285
Operating Frequency: 5260 MHz			
Temp. (°C)	Supply Voltage (VAC)	Frequency (MHz)	Deviation (kHz)
0	120	5259.976415	-23.585
10	120	5259.978965	-21.035
20	120	5259.985635	-14.365
30	120	5259.983750	-16.250
40	120	5259.981575	-18.425
20	102	5259.969550	-30.450
20	138	5259.991405	-8.595
Operating Frequency: 5500 MHz			
Temp. (°C)	Supply Voltage (VAC)	Frequency (MHz)	Deviation (kHz)
0	120	5499.967850	-32.150
10	120	5499.974835	-25.165
20	120	5499.989705	-10.295
30	120	5499.984525	-15.475
40	120	5499.976345	-23.655
20	102	5499.981455	-18.545
20	138	5499.990365	-9.635

Operating Frequency: 5745 MHz			
Temp. (°C)	Supply Voltage (VAC)	Frequency (MHz)	Deviation (kHz)
0	120	5744.964375	-35.625
10	120	5744.969735	-30.265
20	120	5744.991655	-8.345
30	120	5744.984125	-15.875
40	120	5744.972375	-27.625
20	102	5744.988415	-11.585
20	138	5744.991865	-8.135