

Produkte
Products

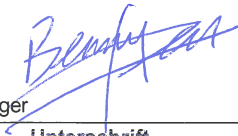
Prüfbericht - Nr.: 14048469 001			Seite 1 von 21 Page 1 of 21				
<i>Test Report No.:</i>							
Auftraggeber: <i>Client:</i>		Ambi Labs Limited 1903, Loon Kee Building, 267-275 Des Voeux Road Central Sheung Wan, Hong Kong					
Gegenstand der Prüfung: <i>Test Item:</i>		Air condition controller - Ambi Climiate 2					
Bezeichnung: <i>Identification:</i>	AC02	Serien-Nr.: <i>Serial No.:</i>	Engineering sample				
Wareneingangs-Nr.: <i>Receipt No.:</i>	A000566953-001 A000579334-001	Eingangsdatum: <i>Date of Receipt:</i>	16.06.2017 06.07.2017				
Prüfört: <i>Testing Location:</i>	TÜV Rheinland Hong Kong Ltd. 3-4, 11/F., Fou Wah Industrial Building, 10-16 Pun Shan Street, Tsuen Wan, N.T., Hong Kong Hong Kong Productivity Council HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong						
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of test item at delivery:</i>		Test samples are not damaged and suitable for testing.					
Prüfgrundlage: <i>Test Specification:</i>	FCC Part 15 Subpart B FCC Part 15 Subpart C RSS-247 Issue 2 ANSI C63.4-2014 ANSI C63.10-2013						
Prüfergebnis: <i>Test Results:</i>	Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage. The above mentioned product was tested and passed .						
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland Hong Kong Ltd. 3-4, 11/F., Fou Wah Industrial Building, 10-16 Pun Shan Street, Tsuen Wan, N.T., Hong Kong						
geprüft/ tested by:		kontrolliert/ reviewed by:					
11.07.2017 Datum Date		David Cheng Test Engineer  Unterschrift Signature		11.07.2017 Datum Date		Benny Lau Senior Project Manager  Unterschrift Signature	
Sonstiges: Other Aspects		FCC ID: 2AL4KAMBIV2 IC: 20530-AMBIV2					
Abkürzungen:		Abbreviations:					
P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet		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. 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.							

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Product information

Manufacturers declarations

	Transceiver
Operating frequency range	2412 - 2462 MHz
Type of modulation	802.11b: DSSS (DBPSK/DQPSK/CCK) 802.11g: OFDM (BPSK/QPSK/16-QAM) 802.11n: OFDM (BPSK/QPSK/16QAM/64QAM)
Number of channels	11 for 20MHz Bandwidth 9 for 40MHz Bandwidth
Channel separation	5 MHz
Type of antenna	Integral PCB Antenna
Antenna gain (dBi)	2.3 dBi
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	No
Nominal voltage	V _{nom} : 100-240VAC and 6 VDC
Independent Operation Modes	Transmitting

Product function and intended use

The equipment under test (EUT) is a Smart Air Conditioning Controller operating in 2412 - 2462MHz. The device is an universal infrared remote that is controlled by WIFI.

FCC ID: 2AL4KAMBIV2/ IC: 20530-AMBIV2

Models	Product description
AC02	Air condition controller - Ambi Climate 2

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 is a single application for certification of the transmitter.

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.

- During test, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power was selected according to the instruction given by the manufacturer. For 802.11b/g/n-HT20 mode, the RF power setting of channel 1 to 11 is "10". For 802.11n-HT40, the RF power setting of channel 3 to 8 is "10" and channel 9 is "4". The setting of the RF output power expected by the manufacturer shall be fixed on the firmware of the final end product.

Special Accessories and Auxiliary Equipment

- AC-DC adaptor model: NBS05B050100VUU (Provided by Appliant)

Countermeasures to achieve EMC Compliance

- none

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:

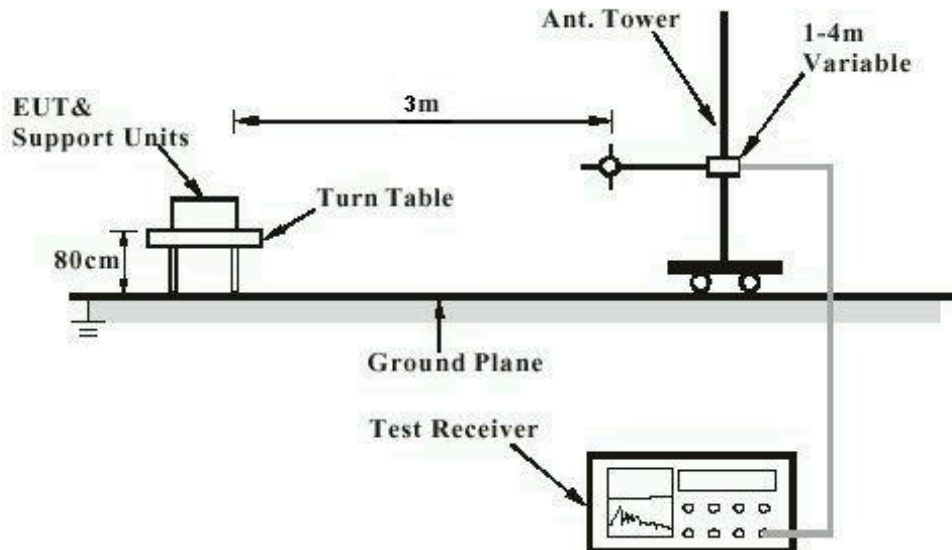
$$FS = R + AF + CF + FA - PA$$

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)

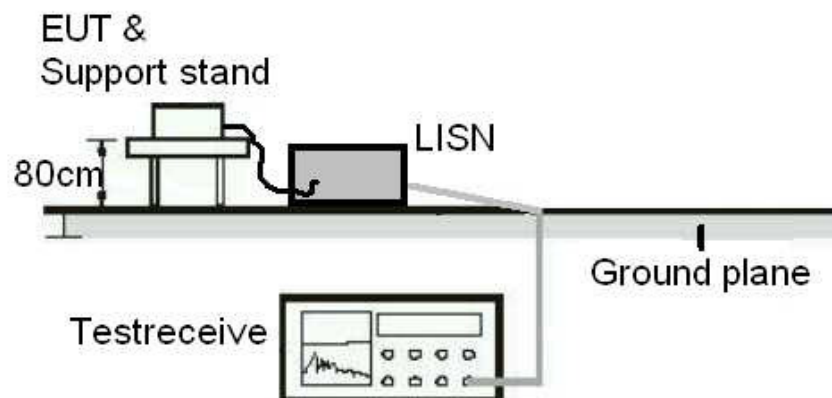
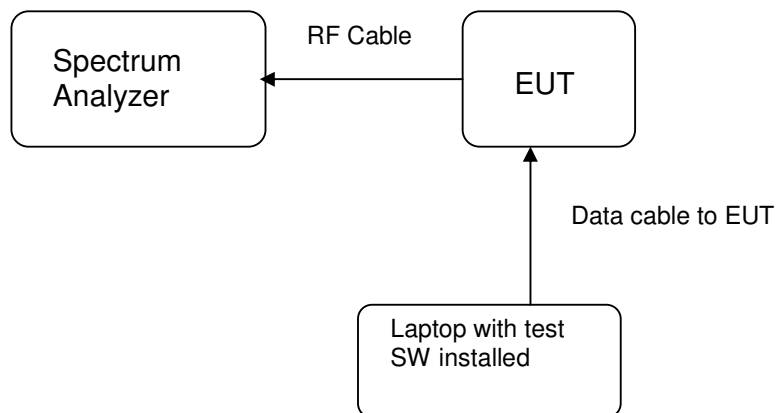


Diagram of Equipment Configuration for Antenna-port Conducted Measurement (if applicable)



List of Test and Measurement Instruments

Hong Kong Productivity Council (FCC/ IC Registration number: 90656/ 4780A-1)

Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Semi-anechoic Chamber	Frankonia	Nil	25-Apr-17	25-Apr-18
Test Receiver	R & S	ESU40	11-Jul-17	11-Jul-18
Active Loop Antenna	EMCO	6502	27-Oct-16	27-Oct-17
Bi-conical Antenna	R & S	HK116	7-Jun-16	07-Jun-18
Log Periodic Antenna	R & S	HL223	31-May-16	31-May-18
Standard Gain Horn	ETS-Lindgren	3160-07	3-Mar-16	03-Mar-18
Standard Gain Horn	ETS-Lindgren	3160-08	3-Mar-16	03-Mar-18
Standard Gain Horn	ETS-Lindgren	3160-10	3-Mar-16	03-Mar-18
Double-Ridged Waveguide Horn	EMCO	3116	17-Jun-16	17-Jun-18
Double-Ridged Waveguide Horn	EMCO	3117	22-Jun-16	22-Jun-18
Coaxial cable	Harbour	LL335	10-Jun-14	10-Jun-16
High Frequency Cable	Pasternack	PE3VNA4001-3M	27-Jan-17	27-Jan-18
Microwave amplifier 0.5-26.5GHz, 25dB gain	HP	83017A	18-Jul-16	18-Jul-18
Preamplifier 18GHz to 40GHz with cable (EMC656)	A.H. Systems, Inc.	PAM-1840VH	27-Jan-17	27-Jan-18
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	28-Oct-15	28-Oct-17

AC Mains Conducted Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Test Receiver	R & S	ESU40	11-Jul-17	11-Jul-18
LISN	R&S	ESH3-Z5	19-Jul-17	19-Jul-18
Double Shield Cable	Radiall	RG142	18-May-17	18-May-19
Pulse Limiter	R&S	ESH3-Z2	3-Jun-16	03-Jun-18

TÜV Rheinland Hong Kong Ltd

Antenna port conducted test

Equipment	Manufacturer	Type	Cal. Date	Due Date
Spectrum Analyzer	R & S	FSP30	15-Oct-16	15-Oct-17
Wideband power meter	Boonton	55006	15-Nov-16	16-Nov-17

Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is $\pm 2.42\text{dB}$.

The estimated combined standard uncertainty for radiated emissions measurements is $\pm 4.81\text{dB}$ (9kHz to 30MHz) and $\pm 4.62\text{dB}$ (30MHz to 200MHz) and $\pm 5.67\text{dB}$ (200MHz to 1000MHz) and is $\pm 5.07\text{dB}$ (1GHz to 8.2GHz) and $\pm 4.58\text{dB}$ (8.2GHz to 12.4GHz) and $\pm 4.78\text{dB}$ (12.4GHz to 18GHz)

The estimated combined standard uncertainty for antenna conducted emission is $\pm 2.1\text{dB}$

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 C / RSS-247 Issue 2

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: N/A c) Peak Gain: 2.3 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	

RSS-Gen 6.3 – External Control		Pass
IC Requirement: The device shall not have any external controls accessible to the user that enable it to be adjusted, selected or programmed to operate in violation of the limits prescribed in the applicable RSS.		
Results:	The device does not have any transmitter external controls accessible to the user that can be adjusted and operated in violation of the limits of this standard.	
Verdict:	Pass	

RSS-Gen 8.3 – Antenna Requirement		Pass
IC Requirement: When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer.		
Results:	a) Antenna type: Integral PCB Antenna b) Manufacturer: N/A c) model no: N/A d) Gain with reference to an isotropic radiator: 2.3 dBi	
Verdict:	Pass	

FCC 15.207/15.107/RSS-Gen 8.8 – Conducted Emission on AC Mains						Pass
Test Specification : ANSI C63.10 – 2013/ ANSI C63.4 – 2014 Mode of operation : TX mode – 802.11b Normal Operating mode – WIFI ON, IR ON, transferring Temp. and Hum. Info. to the Cell Phone App. 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	0.172	55.2	39.3	66 - 56	56 - 46	Pass
	0.229	48.7	33.6			Pass
	0.286	44.0	32.4			Pass
	0.402	44.7	37.0			Pass
> 0,5 - 5	1.037	46.1	37.2	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	0.171	50.0	34.5	66 - 56	56 - 46	Pass
> 0,5 - 5	1.030	38.0	29.8	56	46	Pass
	1.938	36.7	27.9			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. Only the worst data is shown in the report. 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.						

FCC 15.247 (a)(2) / RSS-247 5.2 – 6dB Bandwidth Measurement			Pass
Requirement: Systems using digital modulation techniques may operate in the 902 – 928 MHz, 2400 – 2483.5 MHz, and 5725 – 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500kHz.			
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Temporary antenna port Detector : Peak Supply voltage : 5 Vdc Temperature : 23°C Humidity : 50%			
Results: For test protocols please refer to Appendix 1			
802.11b			
Channel frequency (MHz)	6 dB left (MHz)	6 dB right (MHz)	6dB bandwidth (MHz)
2412	2405.850	2418.100	12.25
2437	2430.850	2443.100	12.25
2462	2455.850	2468.100	12.25
802.11g			
Channel frequency (MHz)	6 dB left (MHz)	6 dB right (MHz)	6dB bandwidth (MHz)
2412	2403.680	2420.280	16.60
2437	2428.640	2445.280	16.64
2462	2453.640	2470.280	16.64
802.11n20			
Channel frequency (MHz)	6 dB left (MHz)	6 dB right (MHz)	6dB bandwidth (kHz)
2412	2403.100	2420.900	17.80
2437	2428.100	2445.900	17.80
2462	2453.100	2470.850	17.75
802.11n40			
Channel frequency (MHz)	6 dB left (MHz)	6 dB right (MHz)	6dB bandwidth (kHz)
2422	2403.700	2440.300	36.60
2437	2418.700	2455.300	36.60
2452	2433.700	2470.300	36.60

FCC 15.247(b)(3) / RSS-247 5.4 – Maximum Peak Couducted Output Power			Pass
Requirement: For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850MHz bands: 1 Watt (30dBm)			
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Temporary antenna port Detector : Peak (Power Meter) Supply voltage : 5.0 Vdc Temperature : 23°C Humidity : 50%			
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 1Mbps, 6Mbps, 6.5Mbps and 13.5Mbps respectively.			
802.11b			
Frequency (MHz)	Measured Output Power (dBm)	Limit (dBm)	Verdict
2412	12.593	30.0	Pass
2437	12.375	30.0	Pass
2462	12.105	30.0	Pass
802.11g			
Frequency (MHz)	Measured Output Power (dBm)	Limit (dBm)	Verdict
2412	19.079	30.0	Pass
2437	19.425	30.0	Pass
2462	19.437	30.0	Pass
802.11n-HT20			
Frequency (MHz)	Measured Output Power (dBm)	Limit (dBm)	Verdict
2412	19.049	30.0	Pass
2437	19.287	30.0	Pass
2462	19.316	30.0	Pass
802.11n-HT40			
Frequency (MHz)	Measured Output Power (dBm)	Limit (dBm)	Verdict
2422	19.627	30.0	Pass
2437	19.752	30.0	Pass
2452	17.687	30.0	Pass

FCC 15.247(e) / RSS-247 5.2 – Power Spectral Density			Pass
Requirement: 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.			
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Temporary antenna port Detector : Peak Supply voltage : 5.0 Vdc Temperature : 23°C Humidity : 50%			
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 1Mbps, 6Mbps, 6.5Mbps and 13.5Mbps respectively. For test protocols please refer to Appendix 1			
802.11b			
Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict
2412	-1.77	8.0	Pass
2437	-1.61	8.0	Pass
2462	-1.83	8.0	Pass
802.11g			
Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict
2412	-2.94	8.0	Pass
2437	-2.76	8.0	Pass
2462	-3.85	8.0	Pass
802.11n-HT20			
Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict
2412	-4.02	8.0	Pass
2437	-3.61	8.0	Pass
2462	-3.59	8.0	Pass
802.11n-HT40			
Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict
2422	-6.97	8.0	Pass
2437	-7.21	8.0	Pass
2452	-9.55	8.0	Pass

FCC 15.247(d) / RSS-247 5.5 – Spurious Conducted Emissions					Pass
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Temporary antenna port Detector : Peak Supply voltage : 3.7 Vdc Temperature : 23 °C Humidity : 50 %					
Requirement: 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.					
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 1Mbps, 6Mbps, 6.5Mbps and 13.5Mbps respectively. Only the worst cases is shown below. For test protocols refer to Appendix 1					
802.11b					
Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2412	2396.96	-43.30	-1.77	41.53	Pass
2437	24232.00	-31.74	-1.61	30.13	Pass
2462	24352.00	-31.22	-1.83	29.39	Pass
802.11g					
Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2412	2400.00	-29.74	-2.94	26.80	Pass
2437	22792.00	-31.18	-2.76	28.42	Pass
2462	2483.50	-40.47	-3.85	36.62	Pass
802.11n-HT20					
Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2412	2398.88	-30.77	-4.02	26.75	Pass
2437	24352.00	-32.32	-3.61	28.71	Pass
2462	2483.50	-38.89	-3.59	35.30	Pass
802.11n-HT40					
Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2422	2397.88	-29.32	-6.97	22.35	Pass
2437	24616.000	-41.23	-7.21	34.02	Pass
2452	2486.14	-38.59	-9.55	29.04	Pass

FCC 15.205/ RSS-Gen 8.9 – Radiated Emissions in Restricted Frequency Bands			Pass
Test Specification : ANSI C63.10 – 2013 Mode of operation : TX mode Port of testing : Enclosure Detector : Peak Supply voltage : 5.0 Vdc Temperature : 23°C Humidity : 50%			
Requirement: In any 100kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.205(c).			
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. All three transmit frequency modes comply with the field strength within the restricted bands. There is no spurious found below 30MHz.			
Mode: 802.11b 2412MHz TX		Vertical Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
4823.718	62.03	74.0 / PK	
4822.115	48.60	54.0 / AV	
2390.000	49.39	74.0 / PK	
2390.000	36.08	54.0 / AV	
Mode: 802.11b 2412MHz TX		Horizontal Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
4823.678	53.28	74.0 / PK	
4822.397	39.68	54.0 / AV	
2390.000	46.09	74.0 / PK	
2390.000	34.49	54.0 / AV	
Mode: 802.11b 2437 MHz TX		Vertical Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
144.003	25.10	43.5 / QP	
299.995	24.50	43.5 / QP	
599.991	42.20	46.0 / QP	
4873.878	60.65	74.0 / PK	
4871.955	47.22	54.0 / AV	
Mode: 802.11b 2437 MHz TX		Horizontal Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
144.003	19.50	43.5 / QP	
298.991	21.60	46.0 / QP	
599.991	43.80	46.0 / QP	

4874.038	52.79	74.0 / PK
4872.756	38.96	54.0 / AV
Mode: 802.11b 2462MHz TX Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4924.000	61.02	74.0 / PK
4924.000	47.78	54.0 / AV
2483.500	48.01	74.0 / PK
2483.500	46.22	54.0 / AV
Mode: 802.11b 2462 MHz TX Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4924.000	52.18	74.0 / PK
4924.000	38.91	54.0 / AV
No peak found	46.50	74.0 / PK
No peak found	34.43	54.0 / AV
Mode: 802.11g 2412MHz TX Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	65.07	74.0 / PK
2390.000	43.09	54.0 / AV
4824.000	64.09	74.0 / PK
4824.000	51.17	54.0 / AV
Mode: 802.11g 2412MHz TX Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	59.94	74.0 / PK
2390.000	40.71	54.0 / AV
4824.000	53.83	74.0 / PK
4824.000	40.43	54.0 / AV
Mode: 802.11g 2437 MHz TX Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
144.003	26.0	43.5 / QP
599.990	41.1	46.0 / QP
4873.878	61.27	74.0 / PK
4873.878	48.44	54.0 / AV
7311.378	62.38	74.0 / PK
7311.378	46.51	54.0 / AV
Mode: 802.11g 2437 MHz TX Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
144.003	22.0	43.5 / QP
599.991	42.9	46.0 / QP
4871.955	53.83	74.0 / PK
4871.955	39.49	54.0 / AV
Mode: 802.11g 2462MHz TX Vertical Polarization		
Freq	Level	Limit/ Detector

MHz	dBuV/m	dBuV/m
4924.000	62.74	74.0 / PK
4924.000	50.08	54.0 / AV
2483.500	66.72	74.0 / PK
2483.500	48.09	54.0 / AV
Mode: 802.11g 2462 MHz TX Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4924.000	54.34	74.0 / PK
4924.000	40.13	54.0 / AV
2483.500	57.68	74.0 / PK
2483.500	40.22	54.0 / AV
Mode: 802.11n20 2412MHz TX Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	70.00	74.0 / PK
2390.000	46.62	54.0 / AV
4824.000	66.07	74.0 / PK
4824.000	50.99	54.0 / AV
Mode: 802.11n20 2412MHz TX Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	68.38	74.0 / PK
2390.000	44.94	54.0 / AV
4824.000	54.45	74.0 / PK
4824.000	41.20	54.0 / AV
Mode: 802.11n20 2437 MHz TX Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
120.000	21.8	43.5 / QP
839.993	31.9	46.0 / QP
4872.718	63.36	74.0 / PK
4872.718	49.34	54.0 / AV
7311.000	65.99	74.0 / PK
7311.000	49.40	54.0 / AV
Mode: 802.11n20 2437 MHz TX Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
599.994	44.5	46.0 / QP
4874.000	53.50	74.0 / PK
4874.000	39.80	54.0 / AV
Mode: 802.11n20 2462MHz TX Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4924.000	67.64	74.0 / PK
4924.000	53.31	54.0 / AV
2483.500	72.09	74.0 / PK
2483.500	50.20	54.0 / AV

Mode: 802.11n20 2462 MHz TX			Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4924.000	55.18	74.0 / PK	4924.000	40.66	54.0 / AV
2483.500	63.54	74.0 / PK	2483.500	41.23	54.0 / AV
Mode: 802.11n40 2422MHz TX			Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	70.53	74.0 / PK	2390.000	53.40	54.0 / AV
4844.000	65.24	74.0 / PK	4844.000	53.21	54.0 / AV
Mode: 802.11n40 2422MHz TX			Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	68.18	74.0 / PK	2390.000	51.72	54.0 / AV
4844.000	56.58	74.0 / PK	4844.000	43.61	54.0 / AV
Mode: 802.11n40 2437 MHz TX			Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
120.000	21.0	43.5 / QP	599.994	35.5	46.0 / QP
599.994	35.5	46.0 / QP	4873.680	59.76	74.0 / PK
4873.680	59.76	74.0 / PK	4873.680	47.01	54.0 / AV
4873.680	47.01	54.0 / AV	7311.000	61.58	74.0 / PK
7311.000	61.58	74.0 / PK	7311.000	47.65	54.0 / AV
7311.000	47.65	54.0 / AV	Mode: 802.11n40 2437 MHz TX		
Mode: 802.11n40 2437 MHz TX			Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
599.994	44.4	46.0 / QP	4874.000	51.16	74.0 / PK
4874.000	51.16	74.0 / PK	4874.000	39.16	54.0 / AV
4874.000	39.16	54.0 / AV	Mode: 802.11n40 2452MHz TX		
Mode: 802.11n40 2452MHz TX			Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2483.500	70.76	74.0 / PK	2483.500	51.20	54.0 / AV
2483.500	51.20	54.0 / AV	4904.000	63.00	74.0 / PK
4904.000	63.00	74.0 / PK	4904.000	51.14	54.0 / AV
4904.000	51.14	54.0 / AV	Mode: 802.11n40 2452 MHz TX		
Mode: 802.11n40 2452 MHz TX			Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2483.500	61.27	74.0 / PK	2483.500	41.76	54.0 / AV
2483.500	41.76	54.0 / AV			

4904.000	54.25	74.0 / PK
4904.000	40.91	54.0 / AV

FCC 15.109 – Radiated Emissions		Pass
Test Specification : ANSI C63.4-2014 Mode of operation : Normal Operating mode – WIFI ON, IR ON and transferring Temp. and Hum. Info. to the Cell Phone App. Port of testing : Enclosure Supply voltage : 5.0 Vdc Temperature : 23°C Humidity : 50%		
Requirement: The field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the radiated limits shown in §15.109(a).		
Results: Pass		
Vertical Polarization		
Freq MHz	Level dBuV/m	Limit dBuV/m
144.003	21.8	43.5 / QP
299.990	28.2	43.5 / QP
599.990	39.2	46.0 / QP
Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
599.994	39.8	46.0 / QP