

TEST REPORT

- **APPLICANT** : ShenZhen Gospell Smarthome Electronic Co., Ltd.
- PRODUCT NAME : HD Outdoor WiFi Camera
- MODEL NAME : T5922HAA; T5922C
- BRAND NAME : N/A
- FCC ID : TW5T5922HAA
- STANDARD(S) : 47 CFR Part 15 Subpart C
- **TEST DATE** : 2017-11-20 to 2017-12-01
- **ISSUE DATE** : 2017-12-04

Tested by:

Tu Ya'nan

Tu Ya'nan (Test Engineer)

Approved by:

Peng Huarui (Supervisor)

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Change History						
Issue	Date	Reason for change				
1.0	2017-12-04	First edition				



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1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	ShenZhen Gospell Smarthome Electronic Co., Ltd.				
Applicant Address:	5Floor/Block 2, Vision (SZ) Park, Hi-Tech Industrial Park,				
	Shenzhen, China				
Manufacturer: ShenZhen Gospell Smarthome Electronic Co., Ltd.					
Manufacturer Address:	East of 01st-04st Floor, Block A,No.1 Industrial park,				
	Fenghuanggang, South of No.1 Baotian Road, Xixiang street,				
	Bao'an District, Shenzhen City, Guangdong Province				
	518126,P.R.China				

1.2. Equipment Under Test (EUT) Description

Product Name:	HD Outdoor WiFi Camera
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	T5922HAA_M02
Software Version:	E_900.T5922HAA.010.318
Modulation Type:	DSSS, OFDM
Operating Frequency Benger	802.11b/g/n-20MHz: 2.412GHz - 2.462GHz
Operating Frequency Range:	802.11n-40MHz: 2.422GHz - 2.452GHz
Channel Number:	802.11b/g/n-20MHz: 11
	802.11n-40MHz: 7
Modulation Type:	DSSS, OFDM
Antenna Type:	Dipole Antenna
Antenna Gain:	2.0dBi

Note 1: The EUT is operating at 2.4GHz ISM; it supports 802.11b, 802.11g, 802.11n and they are all tested in this report.

For 802.11b/g/n-20MHz (2.4GHz band), the frequencies allocated is F (MHz) = $2412+5^{*}(n-1)$ (1<=n<=11). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 1 (2412MHz), 6 (2437MHz) and 11 (2462MHz).

For 802.11n-40MHz, the frequencies allocated is F (MHz) = $2412+5^{*}(n-1)$ (3<=n<=9). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 3 (2422MHz), 6 (2437MHz) and 9 (2452MHz).





Note 2: According to the designer, they declare that the models(T5922HAA /T5922C) are the same in hardware, software and WiFi IC. Only the model name is different.

Note 3: The EUT connected to the serial port of the computer with a serial communication cable, we use the dedicated software to control the EUT continuous transmission.

Note 4: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 15 (10-1-15 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result
1	15.203	Antenna Requirement	N/A	N/A	PASS
2	15.247(b)	Peak Output Power	Nov 20, 2017	Tu Ya'nan	PASS
3	15.247(a)	Bandwidth	Nov 20, 2017	Tu Ya'nan	PASS
4	15.247(d)	Conducted Spurious Emission and Band Edge	Nov 20, 2017	Tu Ya'nan	PASS
5	15.247(d)	Restricted Frequency Bands	Dec 01, 2017	Wu Zhognwen	PASS
6	15.207	Conducted Emission	Nov 28, 2017	Wu Zhognwen	PASS
7	15.209, 15.247(d)	Radiated Emission	Nov 30, 2017	Wu Zhognwen	PASS
8	15.247(e)	Power spectral density (PSD)	Nov 20, 2017	Tu Ya'nan	PASS

Note: The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2013 and KDB558074 D01 v04 (04/05/2017).

1.4. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106





2. 47 CFR Part 15C Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

2.1.2. Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2. Peak Output Power

2.2.1. Requirement

According to FCC section 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: The maximum peak conducted output power of the intentional radiator shall not exceed1 Watt.

2.2.2. Test Description

The measured output power was calculated by the reading of the USB Wideband Power Sensor and calibration.

A. Test Setup:







The EUT (Equipment under the test) which is coupled to the USB Wideband Power Sensor; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading, all test result in power meter.

B. Equipments List:

Please reference ANNEX A(1.5).

2.2.3. Test Result

The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

2.2.3.1 802.11b Test Mode

Channal		Measured Output Peak Power		Limit		Verdict
Channel	Channel Frequency (MHz)		W	dBm	W	verdict
1	2412	21.79	0.15101			PASS
6	2437	21.29	0.13459	30	1	PASS
11	2462	21.33	0.13583			PASS

Channel	Frequency (MHz)		Output Average Power	Limi	t	Verdict
			W	dBm	W	
1	2412	19.86	0.09683			PASS
6	2437	19.26	0.08433	30	1	PASS
11	2462	19.41	0.08730			PASS

2.2.3.2 802.11g Test mode

Channel		Measured Output Peak Power		Limit		Verdict
Channel	Frequency (MHz)	dBm	W	dBm	W	verdict
1	2412	24.26	0.26669			PASS
6	2437	23.96	0.24889	30	1	PASS
11	2462	23.92	0.24660			PASS

Channel	Frequency (MHz)		Output Average Power	Limi	t	Verdict
		dBm	W	dBm	W	
1	2412	17.92	0.06194			PASS
6	2437	18.11	0.06471	30	1	PASS
11	2462	18.22	0.06637			PASS



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Channel		Measured Output Peak Power		Limit		Verdict
Channel	Frequency (MHz)	dBm	W	dBm	W	verdict
1	2412	24.25	0.26607			PASS
6	2437	23.96	0.24889	30	1	PASS
11	2462	23.67	0.23281			PASS

2.2.3.3 802.11n-20MHz Test mode

Channel Frequency (MHz)		Measured Output Average Power		Limit		Verdict	
		dBm	W	dBm	W		
1	2412	17.87	0.06124			PASS	
6	2437	18.03	0.06353	30	1	PASS	
11	2462	18.17	0.06561			PASS	

2.2.3.4 802.11n-40MHz Test mode

		Measured Output Peak Power		Limit		Verdict
Channel	Frequency (MHz)	dBm	W	dBm	W	verdict
3	2422	23.97	0.24946			PASS
6	2437	23.85	0.24266	30	1	PASS
9	2452	23.63	0.23067			PASS

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict	
		dBm	W	dBm	W		
3	2422	17.43	0.05534			PASS	
6	2437	17.57	0.05715	30	1	PASS	
9	2452	17.72	0.05916			PASS	



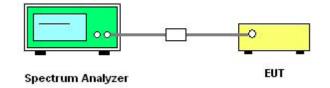


2.3.1. Requirement

According to FCC section 15.247(a) (2), Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

2.3.2. Test Description

A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

KDB 558074 Section 8.1 Option 1 was used in order to prove compliance.

B. Equipments List:

Please reference ANNEX A(1.5).

2.3.3. Test Result

The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module.





2.3.3.1 802.11b Test mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	10.06	≥500	PASS
6	2437	10.06	≥500	PASS
11	2462	10.06	≥500	PASS

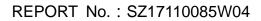
B. Test Plots



(Channel 1: 2412MHz @ 802.11b)



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(Channel 6: 2437 MHz @ 802.11b)



(Channel 11: 2462MHz @ 802.11b)

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E-mail: service@morlab.cn

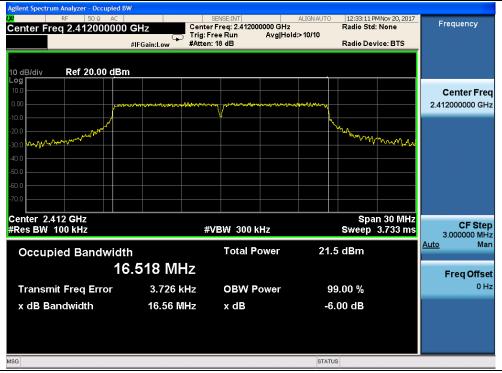


2.3.3.2 802.11g Test mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	16.56	≥500	PASS
6	2437	16.54	≥500	PASS
11	2462	16.54	≥500	PASS

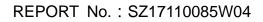
B. Test Plots:



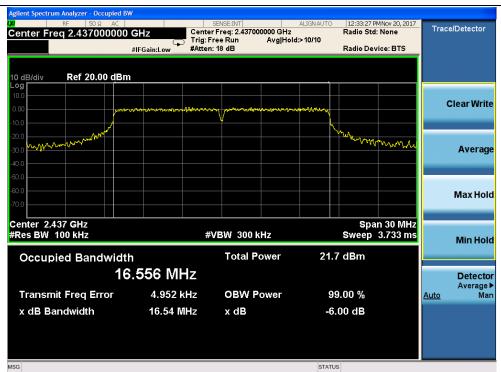
(Channel 1: 2412MHz @ 802.11g)



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(Channel 6: 2437MHz @ 802.11g)



(Channel 11: 2462MHz @ 802.11g)

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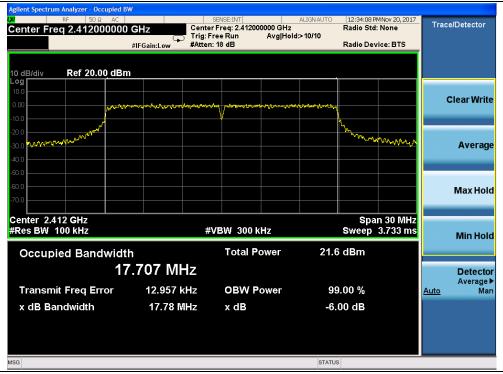


2.3.3.3 802.11n-20 Test mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	17.78	≥500	PASS
6	2437	17.80	≥500	PASS
11	2462	17.80	≥500	PASS

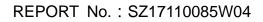
B. Test Plots:



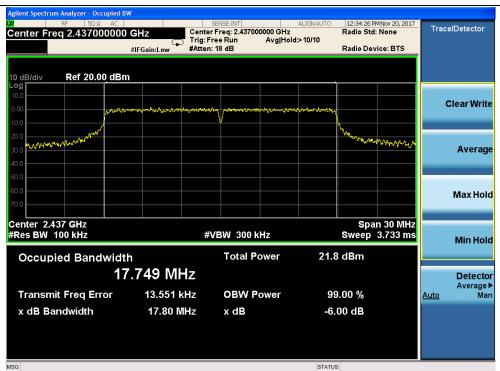
(Channel 1: 2412MHz @ 802.11n-20)



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(Channel 6 [.]	2437MHz	@	802.11n-20)	
	Unamer 0.		۳	002.111 20)	



(Channel 11: 2462MHz @ 802.11n-20)



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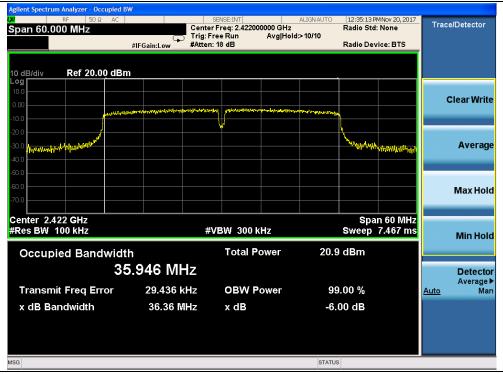


2.3.3.4 802.11n-40 Test mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
3	2422	36.36	≥500	PASS
6	2437	36.34	≥500	PASS
9	2452	36.36	≥500	PASS

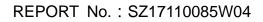
B. Test Plots:



(Channel 3: 2422Mz @ 802.11n-40)



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(Channel 6: 2437MHz @ 802.11n-40)

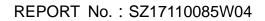


(Channel 9: 2452MHz @ 802.11n-40)

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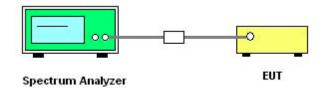
2.4. Conducted Spurious Emissions and Band Edge

2.4.1. Requirement

According to FCC section 15.247(c), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

2.4.2. Test Description

A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

KDB 558074 Section 11.0 was used in order to prove compliance.

B. Equipments List:

Please reference ANNEX A(1.5).

2.4.3. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.





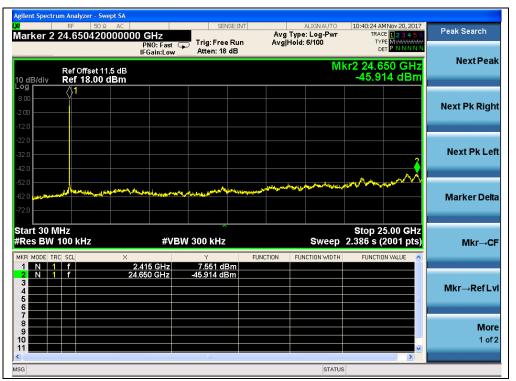
2.4.3.1 802.11b Test mode

A. Test Verdict:

Frequency		Measured Max.	Limit		
Channel	Frequency (MHz)	Out of Band	Carrier	Calculated	Verdict
		Emission (dBm)	Level	-20dBc Limit	
1	2412	-45.91	7.55	-12.45	PASS
6	2437	-48.47	6.90	-13.10	PASS
11	2462	-49.52	5.74	-14.26	PASS

B. Test Plots:

Note: the power of the Module transmitting frequency should be ignored.

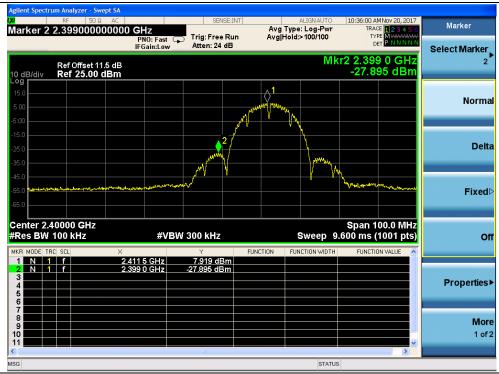


(Channel = 1, 30MHz to 25GHz)



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(Band Edge @ Channel = 1)



(Channel = 6, 30MHz to 25GHz)

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Agilent Spectrum Analyzer - Swept SA				
Marker 2 24.637935000000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	10:38:23 AMNov 20, 2017 TRACE 1 2 3 4 5 6	Peak Search
PNO: I IFGain:	Fast 😱 Trig: Free Run Low Atten: 14 dB	Avg Hold: 5/100		Next Peak
Ref Offset 11.5 dB 10 dB/div Ref 15.00 dBm		IVI	kr2 24.638 GHz -49.521 dBm	
500 1 5.00				Next Pk Right
-25.0			3	Next Pk Left
-550 -650	مىيەللىرىنىي كەرىمىيى يەرىپىلىرىنى بىرى كەرىپىلىرىنى	۵. ۲۰۰۰ میلادی ۱۹۹۰ میلاد ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلاد ۱۹۹۰ میلاد ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلاد ۱۹۹۰ میلاد ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلاد ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلاد ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلاد ۱۹۹۰ میلادی ۱۹۹۰ میلاد ۱۹۹۰ میلاد ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلادی ۱۹۹۰ میلاد ۱۹۹۰ میلاد میلاد ۱۹۹۰ میلاد میلاد ۱۹۹۰ میلاد ۱۹۹۰ میلاد ۱۹۹۰ میلاد ۱۹۹۰ میلاد ۱۹۹۰ میلاد ۱۹۹۰ میلاد میلاد ۱۹۹۰ میلاد میلاد مالار		Marker Delta
MKR MODE TRC SCL X		Sweep	Stop 25.00 GHz 2.386 s (2001 pts)	Mkr→CF
1 N 1 f 2.465 G 2 N 1 f 2.4638 G 3 - - - - 4 - - - - - 5 -				Mkr→RefLvl
7 8 9 9 10 11 11			v	More 1 of 2
MSG		STATUS		

(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)

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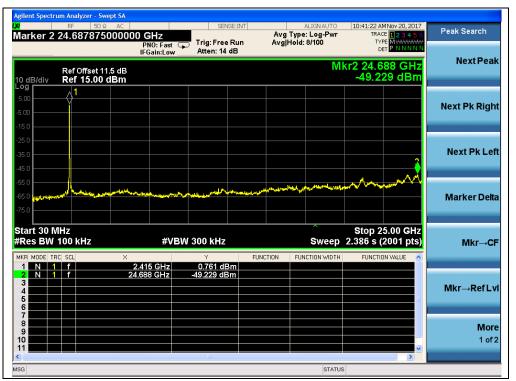
2.4.3.2 802.11g Test mode

A. Test Verdict:

Fraguanay		Measured Max.	Limi	t (dBm)	
Channel	Frequency (MHz)	Out of Band	Carrier	Calculated	Verdict
	(IVITZ)	Emission (dBm)	Level	-20dBc Limit	
1	2412	-49.23	0.76	-19.24	PASS
6	2437	-48.11	0.96	-19.04	PASS
11	2462	-48.73	0.64	-19.36	PASS

B. Test Plots:

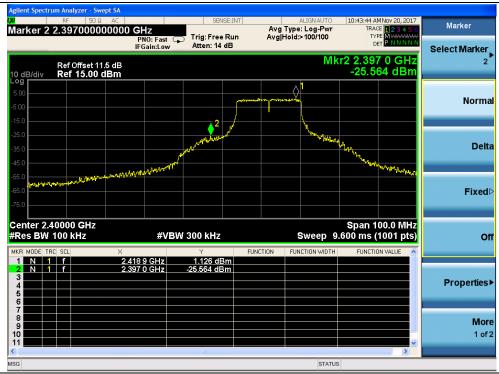
Note: the power of the Module transmitting frequency should be ignored.



(Channel = 1, 30MHz to 25GHz)







(Band Edge @ Channel = 1)



(Channel = 6, 30MHz to 25GHz)

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Agilent Spectrum Analyzer - Swept SA				
Marker 2 24.063625000000 GHz	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	10:42:34 AMNov 20, 2017 TRACE 1 2 3 4 5 6	Peak Search
PNO: Fast IFGain:Lov	, Trig: Free Run Atten: 14 dB	Avg Hold: 6/100	TYPE MWWWWW DET PNNNNN	
Ref Offset 11.5 dB 10 dB/div Ref 15.00 dBm		М	kr2 24.064 GHz -48.730 dBm	Next Peak
5.00 -5.00 -15.0				Next Pk Right
-25.0 -35.0 -45.0			2	Next Pk Left
-55.0 -65.0 -75.0	lan and a lively and the state of the section and	al many period and a grant and a firm	and the second of the	Marker Delta
Start 30 MHz #Res BW 100 kHz #V	BW 300 kHz	Sweep	Stop 25.00 GHz 2.386 s (2001 pts)	Mkr→CF
I I f 2.465 GHz 2 N 1 f 24.064 GHz 3 4 5 6 6	0.643 dBm -48.730 dBm			Mkr→RefLvl
7 8 9 10 11			~	More 1 of 2
MSG		STATU		

(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)

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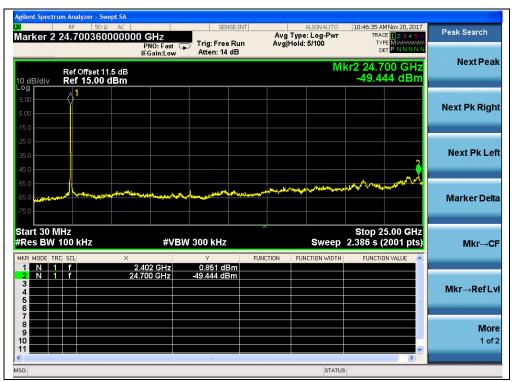
2.4.3.3 802.11n -20MHz Test mode

A. Test Verdict:

	Fraguanay	Measured Max.	Limit (dBm)		
Channel	Frequency	Out of Band	Carrier	Calculated	Verdict
	(MHz)	Emission (dBm)	Level	-20dBc Limit	
1	2412	-49.44	0.85	-19.15	PASS
6	2437	-49.30	0.61	-19.39	PASS
11	2462	-48.51	0.71	-19.29	PASS

B. Test Plots:

Note: the power of the Module transmitting frequency should be ignored.



(Channel = 1, 30MHz to 25GHz)







(Band Edge @ Channel = 1)



(Channel = 6, 30MHz to 25GHz)

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Agilent Spectrum Analyzer - Swept SA				
Marker 2 24.038655000000 GHz	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 5/100	10:45:34 AMNov 20, 2017 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N	Peak Search
IFGain:L				Next Peak
Ref Offset 11.5 dB 10 dB/div Ref 15.00 dBm		IVI	kr2 24.039 GHz -48.513 dBm	
5.00 1 5.00				Next Pk Right
-15 0 -25 0 -35 0 -45 0			2	Next Pk Left
-45.0 -65.0 -75.0	ىرىمەن ئىدىنى ^{يىر} ىمەن بىرىمەن	مان المراجع ال المراجع المراجع	mann	Marker Delta
Start 30 MHz #Res BW 100 kHz #	VBW 300 kHz	Sweep	Stop 25.00 GHz 2.386 s (2001 pts)	Mkr→CF
1 N 1 f 2.465 GH 2 N 1 f 24.039 GH 3 4 5 6				Mkr→RefLvl
7 8 9 10 11			~	More 1 of 2
MSG		STATU		

(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)

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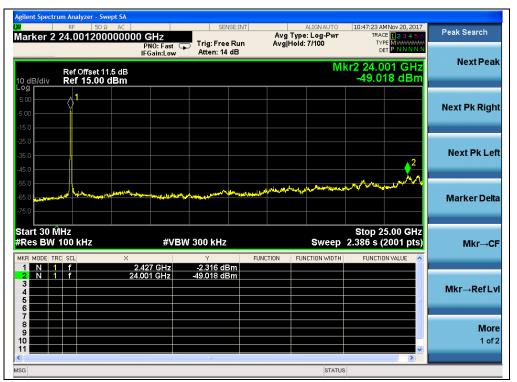
2.4.3.4 802.11n -40MHz Test mode

A. Test Verdict:

	Frequency	Measured Max.	Limit (dBm)		
Channel	Frequency (MHz)	Out of Band	Carrier	Calculated	Verdict
	(IVITZ)	Emission (dBm)	Level	-20dBc Limit	
3	2422	-49.02	-2.32	-22.32	PASS
6	2437	-49.56	-2.98	-22.98	PASS
9	2452	-49.29	-2.88	-22.88	PASS

B. Test Plots:

Note: the power of the Module transmitting frequency should be ignored.



(Channel = 3, 30MHz to 25GHz)







(Band Edge @ Channel = 3)



(Channel = 6, 30MHz to 25GHz)

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Agilent Spectrum Analyzer - Swept SA				
Marker 2 24.026170000000 GHz	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	10:48:39 AMNov 20, 2017 TRACE 1 2 3 4 5 6	Peak Search
PNO: Fast IFGain:Lov	Trig: Free Run Atten: 14 dB	Avg Hold: 6/100	TYPE MWWWW DET PNNNNN	
Ref Offset 11.5 dB 10 dB/div Ref 15.00 dBm		М	kr2 24.026 GHz -49.286 dBm	Next Peak
Log1				Next Pk Right
-25.0			¢²	Next Pk Left
-55 0 -65 0 -75 0 -75 0	لىرىرىنى ئارىرىكى ^{يۇرى} لىكىنى بىرىن ئالىرىكى بىرى	يانىلغەم بىغا ^{مى} رىل ^{ىي} رۇھەمتەنىياسەنىزىن		Marker Delta
Start 30 MHz #Res BW 100 kHz #V	'BW 300 kHz	Sweep	Stop 25.00 GHz 2.386 s (2001 pts)	Mkr→CF
I N I F 2.465 GHz 2 N 1 f 24.026 GHz 3 4 5 6 6	-2.883 dBm -49.286 dBm			Mkr→RefLvl
7 8 9 10 11			×	More 1 of 2
MSG		STATU		

(Channel = 9, 30MHz to 25GHz)



(Band Edge @ Channel = 9)

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2.5. Power spectral density (PSD)

2.5.1. Requirement

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

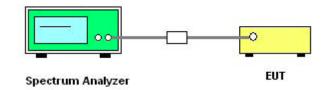
2.5.2. Test Description

A. Test procedure

The measured power spectral density was calculated by the reading of the spectrum analyzer and calibration. Following is the test procedure for PSD test:

- a) Set analyzer center frequency to channel center frequency.
- b) Set the span to 30MHz
- c) Set the RBW to 3 kHz
- d) Set the VBW to 10KHz
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.

B. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading.

KDB 558074 Section 10.2 was used in order to prove compliance.

C. Equipments List:

Please reference ANNEX A(1.5).





2.5.3. Test Result

2.5.3.1 802.11b Test mode

A. Test Verdict:

Spectral power density (dBm/3kHz)					
Channel	Frequency	requency Measured PSD Limit		Verdict	
Channel	(MHz)	(dBm/3kHz)	(dBm/3kHz)	verdict	
1	2412	-12.75	8	PASS	
6	2437	-12.99	8	PASS	
11	2462	-13.59	8	PASS	
Measurement uncertainty: ±1.3dB					

B. Test Plots:



(Channel = 1 @ 802.11b)



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(Channel = 6 @ 802.11b)



(Channel = 11 @ 802.11b)

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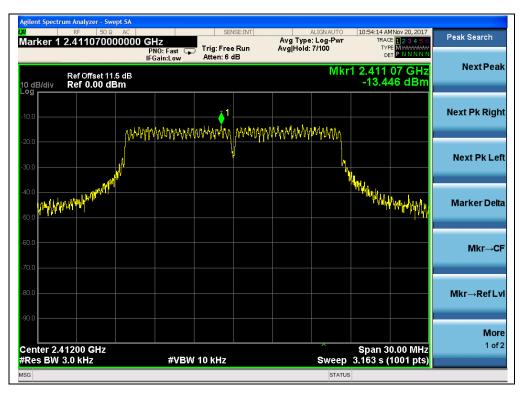


2.5.3.2 802.11g Test mode

A. Test Verdict:

Spectral power density (dBm/3kHz)						
Channel	Frequency Measured PSD		Limit	Verdict		
Chainio	(MHz)	(dBm/3kHz)	(dBm/3kHz)	Voralot		
1	2412	-13.45	8	PASS		
6	2437	-13.27	8	PASS		
11 2462 -13.00 8 PASS						
Measurement uncertainty: ±1.3dB						

B. Test Plots:

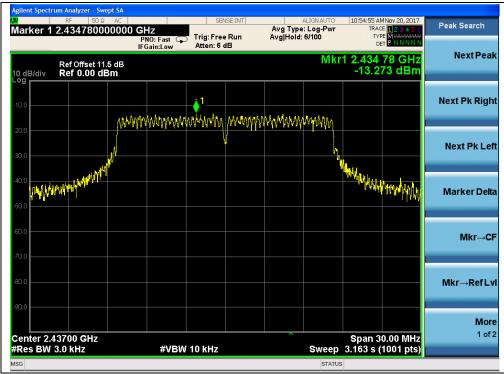


(Channel = 1 @ 802.11g)

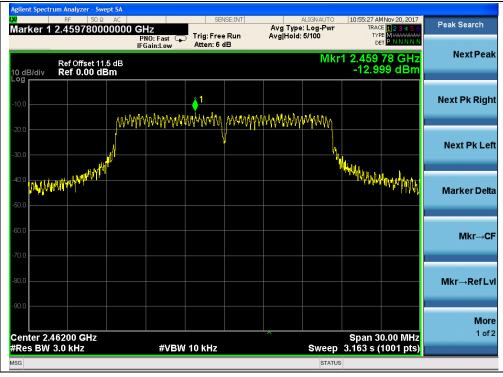


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(Channel = 6 @ 802.11g)



(Channel = 11 @ 802.11g)

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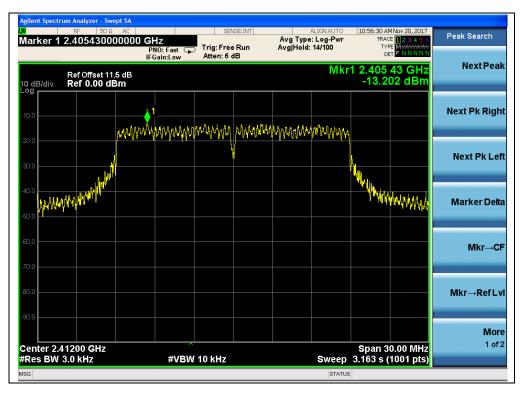


2.5.3.3 802.11n-20MHz Test mode

A. Test Verdict:

Spectral power density (dBm/3kHz)						
Channel	Frequency Measured PSD		Limit	Verdict		
	(MHz)	(dBm/3kHz)	(dBm/3kHz)	verdict		
1	2412	-13.20	8	PASS		
6	2437	-12.51	8	PASS		
11 2462 -12.60 8 PASS						
Measurement uncertainty: ±1.3dB						

B. Test Plots:



(Channel = 1 @ 802.11n-20MHz)



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REPORT No. : SZ17110085W04



(Channel = 6 @ 802.11n-20MHz)



(Channel = 11 @ 802.11n-20MHz)

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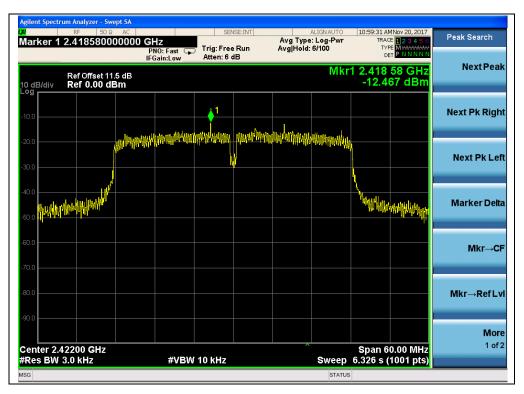


2.5.3.4 802.11n-40MHz Test mode

A. Test Verdict:

Spectral power density (dBm/3kHz)								
Channel Frequency (MHz)		Measured PSD	Limit	Vardiat				
		(dBm/3kHz)	(dBm/3kHz)	Verdict				
3	2422	-12.47	8	PASS				
6 2437 -15.20 8 P								
9 2452 -12.59 8 PASS								
Measurem	ent uncertainty:	±1.3dB						

B. Test Plots:



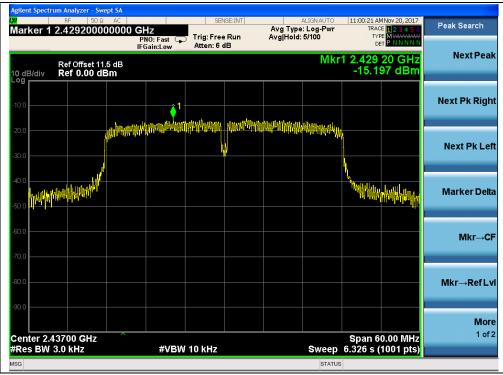
(Channel = 3 @ 802.11n-40MHz)



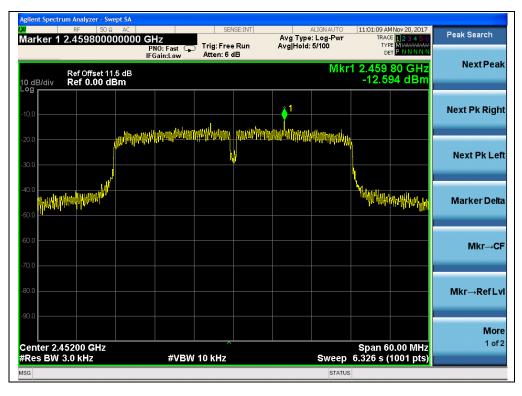
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REPORT No. : SZ17110085W04



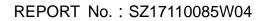
(Channel = 6 @ 802.11n-40MHz)



(Channel = 9 @ 802.11n-40MHz)

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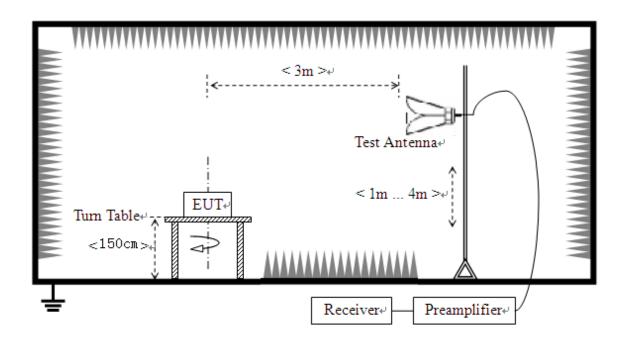
2.6. Restricted Frequency Bands

2.6.1. Requirement

According to FCC section 15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

2.6.2. Test Description

A. Test Setup



The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

KDB 558074 Section 12.1 was used in order to prove compliance.



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REPORT No. : SZ17110085W04

B. Equipments List:

Please reference ANNEX A(1.5).

2.6.3. Test Result

The lowest and highest channels are tested to verify Restricted Frequency Bands.

The measurement results are obtained as below: E $[dB\mu V/m] = U_R + A_T + A_{Factor} [dB]; A_T = L_{Cable loss} [dB] - G_{preamp} [dB]$ A_T: Total correction Factor except Antenna U_R: Receiver Reading G_{preamp}: Preamplifier Gain A_{Factor}: Antenna Factor at 3m

Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

2.6.3.1 802.11b Test mode

The lowest and highest channels are tested to verify the band edge emissions.

A. Test Verdict:

Channel	Frequency	Detector	Receiver Reading	A _T	A _{Factor}	Max. Emission	Limit	Verdict
Chamiler	(MHz)	PK/ AV	U _R (dBuV)	(dB)	(dB@3m)	E (dBµV/m)	(dBµV/m)	voraiot
1	2388.14	PK	52.66	-33.63	32.56	51.59	74	Pass
1	2387.02	AV	36.52	-33.63	32.56	35.45	54	Pass
11	2485.75	PK	53.57	-33.18	32.5	52.89	74	Pass
11	2484.08	AV	37.96	-33.18	32.5	37.28	54	Pass

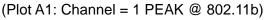


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B. Test Plots:

Aug Type: Voltage Avg|Hold:>100/100 07:18:03 AM Dec 01, 2017 TRACE 123456 TYPE M Marker Marker 1 2.388144000000 GHz Trig: Free Run Atten: 14 dB PNO: Fast 😱 IFGain:Low Select Marker Mkr1 2.388 14 GHz 52.659 dBµV Ref 110.00 dBµV 10 dB/div _og Normal Delta <mark>,2</mark> **Fixed** Start 2.30000 GHz Res BW (CISPR) 1 MHz Stop 2.41200 GHz Sweep 1.000 ms (1001 pts) #VBW 3.0 MHz Off 2.388 14 GHz 2.390 00 GHz 52.659 dBµV 50.952 dBµV f f **Properties**► More 1 of 2

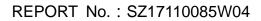




(Plot A2: Channel = 1 AVG @ 802.11b)



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📁 Keysight Spectrum Analyzer - Swept SA				
Marker 2 2.485750000000	PNO: Fast 😱 Trig: Free Run	ALIGN OFF Avg Type: Voltage Avg Hold:>100/100	07:48:16 AM Dec 01, 2017 TRACE 123456 TYPE MWWWWW DET P. P. N.N.N.	Trace/Detector
10 dB/div Ref 110.00 dBµV	IFGain:Low Atten: 14 dB	Mkr2	2 2.485 750 GHz 53.569 dBµV	Select Trace
Log 100 90.0 80.0				Detector Peak⊅ <u>Auto</u> Mar
70.0		1 2-	or work the two and we wanted as the two and two an	Preset Detectors
40.0 30.0 20.0				Clear Trace
Start 2.46200 GHz Res BW (CISPR) 1 MHz	#VBW 3.0 MHz		Stop 2.50000 GHz 1.000 ms (1001 pts)	Clear All Traces
2 N 1 f 2.485 3 - <td>500 GHz 52.578 dBµV 750 GHz 53.569 dBµV</td> <td>FUNCTION FUNCTION WIDTH</td> <td>FUNCTION VALUE</td> <td>Prese All Traces</td>	500 GHz 52.578 dBµV 750 GHz 53.569 dBµV	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Prese All Traces
7 8 9 10 11				More 2 of 3

(Plot B1: Channel = 11 PEAK @ 802.11b)



(Plot B2: Channel = 11 AVG @ 802.11b)



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2.6.3.2 802.11g Test mode

The lowest and highest channels are tested to verify the band edge emissions.

A. Test Verdict:

Channel	Frequency	Detector	Receiver Reading	A _T	A _{Factor}	Max. Emission	Limit	Verdict
Channel	(MHz)	PK/ AV	U _R (dBuV)	(dB)	(dB@3m)	E (dBµV/m)	(dBµV/m)	verdict
1	2388.48	PK	55.64	-33.63	32.56	54.57	74	Pass
1	2388.82	AV	34.62	-33.63	32.56	33.55	54	Pass
11	2484.08	PK	60.18	-33.18	32.5	59.50	74	Pass
11	2484.08	AV	38.65	-33.18	32.5	37.97	54	Pass

B. Test Plots:



(Plot C1: Channel = 1 PEAK @ 802.11g)

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Keysight Spectrum Analyzer - Swept SA					
X RL RF PRESEL 50 Ω DC Marker 1 2.388816000000	GHz PNO: Fast Trig: Free	Avg Typ Run Avg Hold	ALIGN OFF e: Voltage I: 6/100	07:29:26 AM Dec 01, 2017 TRACE 12345 6 TYPE M	Marker
	IFGain:Low Atten: 14	dB		DET P P N N N N	Select Marker
10 dB/div Ref 110.00 dBµV	,		Mkr1	2.388 82 GHz 34.617 dBµV	1
100					
90.0					Normal
80.0					
70.0					Delta
60.0				/	Dena
40.0			 1	2	
30.0			¥		Fixed⊳
20.0					
Start 2.30000 GHz				top 2.41200 GHz	
Res BW (CISPR) 1 MHz	#VBW 10 Hz		Sweep 1	12.84 s (1001 pts)	Off
MKR MODE TRC SCL X	Y		NCTION WIDTH	FUNCTION VALUE	
2 N 1 f 2.39	88 82 GHz 34.617 dB 90 00 GHz 35.679 dB				
3					Properties►
5				E	
8					More
9					1 of 2
11	III				

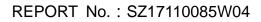
(Plot C2: Channel = 1 AVG @ 802.11g)



(Plot D1: Channel = 11 PEAK @ 802.11g)

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eysight Spectrum Analyzer - Swept S L RF PRESEL 50 Ω D Ker 2 2.484078000	IC			ALIGN (Avg Type: Volta Avg Hold: 8/100	де тя	AM Dec 01, 2017 ACE 123456	Marker
B/div Ref 110.00 dl	IFGain:Low				kr2 2.484	DET PPNNNN	Select Marker 2
							Norm
							De
			12	*			Fixe
rt 2.46200 GHz BW (CISPR) 1 MHz		BW 10 Hz			ep 4.357 s		,
N 1 f	× 2.483 500 GHz 2.484 078 GHz	Y <u>39.298 dB</u> J 38.652 dBJ		DN FUNCTION W		TION VALUE	Propertie
							Мс 1 с

(Plot D2: Channel = 11 AVG @ 802.11g)

2.6.3.3 802.11n-20MHz Test mode

The lowest and highest channels are tested to verify the band edge emissions.

A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading	A _T (dB)	A _{Factor} (dB@3m)	Max. Emission E	Limit	Verdict
		PK/ AV	U _R (dBuV)	(UD)	(ub@siii)	∟ (dBµV/m)	(dBµV/m)	
1	2389.04	PK	59.73	-33.63	32.56	58.66	74	Pass
1	2388.93	AV	35.17	-33.63	32.56	34.10	54	Pass
11	2484.38	PK	57.45	-33.18	32.5	56.77	74	Pass
11	2484.00	AV	38.34	-33.18	32.5	37.66	54	Pass



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B. Test Plots:

🕻 Keysight Sp m Analyzer - Swept SA Avg Type: Voltage Avg|Hold:>100/100 07:32:37 AM Dec 01, 2017 TRACE 12345 6 TYPE M WWWWW Marker Marker 1 2.389040000000 GHz PNO: Fast IFGain:Low Trig: Free Run Atten: 14 dB DET Select Marker Mkr1 2.389 04 GHz 59.726 dBµV Ref 110.00 dBµV 10 dB/div Log Normal Delta an de la cale **Fixed** Start 2.30000 GHz Res BW (CISPR) 1 MHz Stop 2.41200 GHz 1.000 ms (1001 pts) #VBW 3.0 MHz Sweep Off 2.389 04 GHz 2.390 00 GHz 59.726 dBµV 57.831 dBµV Ň Properties► More 1 of 2

(Plot E1: Channel = 1 PEAK @ 802.11n-20)



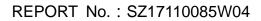
(Plot E2: Channel = 1 AVG @ 802.11n-20)

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Fax: 86-755-36698525 E-mail: service@morlab.cn





Keysight Spectrum Analyzer - Swept SA				- 6 론
RL RF PRESEL 50 Ω DC Narker 2 2.484382000000	PNO: Fast 😱 Trig: Free Ru	Avg Type: Voltage	08:13:25 AM Dec 01, 2017 TRACE 12 3 4 5 6 TYPE MWWWWW DET P P N N N N	Marker
0 dB/div Ref 110.00 dBµV	IFGain:Low Atten: 14 dB	Mkrź	2 2.484 382 GHz 57.447 dBµV	Select Marker 2
				Norm
200	And the second s	2		De
				Fixe
tart 2.46200 GHz es BW (CISPR) 1 MHz	#VBW 3.0 MHz	-	Stop 2.50000 GHz 1.000 ms (1001 pts)	
2 N 1 f 2.484 3 4 5	500 GHz 54.303 dBµV 382 GHz 57.447 dBµV	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Propertie
6 7 8 9 9 0				Ма 1 а
1				

(Plot F1: Channel = 11 PEAK @ 802.11n-20)



(Plot F2: Channel = 11 AVG @ 802.11n-20)

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2.6.3.4 802.11n-40MHz Test mode

The lowest and highest channels are tested to verify the band edge emissions.

A. Test Verdict:

Channel	Frequency	Detector	Receiver Reading	A _T	A _{Factor}	Max. Emission E	Limit	Verdict
	(MHz)	PK/ AV	U _R (dBuV)	(dB)	(dB@3m)	∟ (dBµV/m)	(dBµV/m)	
3	2388.70	PK	58.14	-33.63	32.56	57.07	74	Pass
3	2388.48	AV	36.43	-33.63	32.56	35.36	54	Pass
9	2485.10	PK	57.95	-33.18	32.5	57.27	74	Pass
9	2484.46	AV	39.04	-33.18	32.5	38.36	54	Pass

B. Test Plots:



(Plot E1: Channel = 3 PEAK @ 802.11n-40)

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			Swept SA	ectrum Analyzer - Sw	📜 Keysight Sr
ALIGN OFF 07:38:42 AM Dec 01, 2017 vg Type: Voltage TRACE 23:43:6 vg Hold: 3/100 Type DET PNNINT Select Marker	Avg Tyj in Avg Hol			RF PRESEL 50 Ω	LXI RL
Mkr1 2.388 48 GHz 36.432 dBµV)0 dBµV	Ref 110.00	10 dB/div
Normal					Log 100 90.0
Delta					70.0 60.0
Fixed⊳					50.0 40.0 30.0 20.0
Stop 2.41200 GHz Sweep 12.84 s (1001 pts) Off		≠VBW 10 Hz		0000 GHz CISPR) 1 MI	
	FUNCTION FU	z 36.432 dBµ\	× 2.388 48 GHz 2.390 00 GHz	f	1 N 2 N 3 4 5 6
More 1 of 2					6 7 8 9 10
		m			•

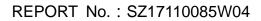
(Plot E2: Channel = 3 AVG @ 802.11n-40)



(Plot F1: Channel = 9 PEAK @ 802.11n-40)

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Keysight Spectrum Analyzer - Swept S						
RL RF PRESEL 50 Ω C Arker 2 2.484458000		SENSE	Av	ALIGN OFF	08:06:46 AM Dec 01, TRACE 123	456 Marker
	PNO: Fast IFGain:Low	Trig: Free R Atten: 14 d		Hold: 3/100	TYPE MWWW DET P P N	Select Marker
0 dB/div Ref 110.00 d	3μV			Mkr2	2.484 458 G 39.043 dB	HZ 2
og 100						Norm
80.0						
0.0	\					Del
0.0			2			
0.0						Fixed
0.0 tart 2.46200 GHz					Stop 2.50000 G	
es BW (CISPR) 1 MHz	#VE	3W 10 Hz		Sweep	4.357 s (1001 p	pts) C
KR MODE TRC SCL	Х	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	·
1 N 1 f 2 N 1 f 3	2.483 500 GHz 2.484 458 GHz	38.685 dBµ\ 39.043 dBµ\	/			Properties
4 5 6						E
7 8 9						Ma
0						1 0
		m				▶ •

(Plot F2: Channel = 9 AVG @ 802.11n-40)



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2.7. Conducted Emission

2.7.1. Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μ H/ 50Ω line impedance stabilization network (LISN).

Frequency range	Conducted Limit (dBµV)					
(MHz)	Quai-peak	Average				
0.15 - 0.50	66 to 56	56 to 46				
0.50 - 5	56	46				
5 - 30	60	50				

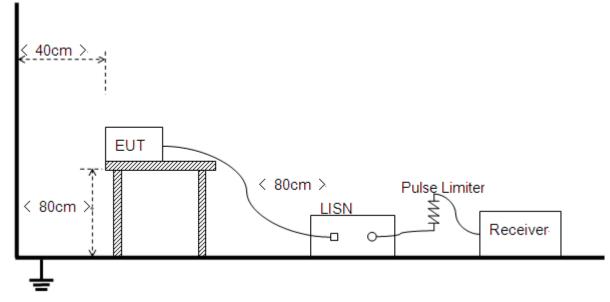
NOTE:

(a) The lower limit shall apply at the band edges.

(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

2.7.2. Test Description

A. Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10 2013.

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B. Equipments List:

Please reference ANNEX A(1.5).

2.7.3. Test Result

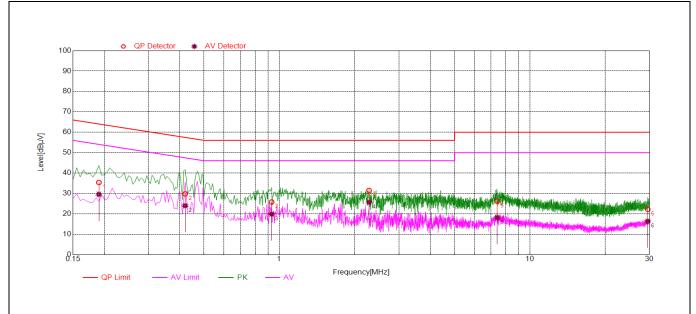
The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

A. Test setup:

The EUT configuration of the emission tests is EUT + Link.

Note: The test voltage is AC 120V/60Hz.

B. Test Plots:



(Plot A: L Phase)

NO. Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)	Power-line	Verdict	
	(MHz)	Quai-peak	Average	Quai-peak	Average		
1	0.19	35.36	29.56	64.03	54.03	Line	PASS
2	0.42	29.76	23.96	57.45	47.45		PASS
3	0.93	25.78	19.86	56.00	46.00		PASS
4	2.28	31.49	25.70	56.00	46.00		PASS
5	7.40	26.17	18.12	60.00	50.00		PASS
6	29.53	22.21	16.33	60.00	50.00		PASS



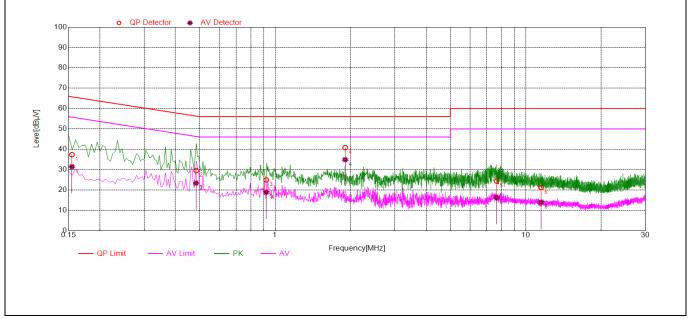
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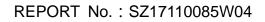
REPORT No. : SZ17110085W04



(Plot B: N Phase)

NO.	Fre.	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
	(MHz)	Quai-peak	Average	Quai-peak	Average		renalet
1	0.15	37.35	31.41	65.75	55.75		PASS
2	0.48	29.50	23.37	56.27	46.27	Line	PASS
3	0.92	24.96	18.86	56.00	46.00		PASS
4	1.90	40.83	34.89	56.00	46.00		PASS
5	7.64	24.33	16.27	60.00	50.00		PASS
6	11.50	21.18	13.89	60.00	50.00		PASS







2.8. Radiated Emission

2.8.1. Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

- For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
- For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)



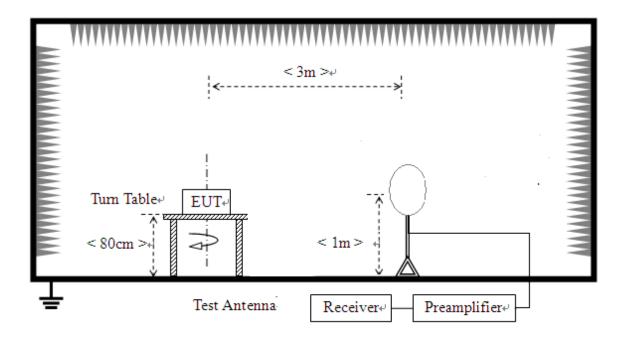


REPORT No. : SZ17110085W04

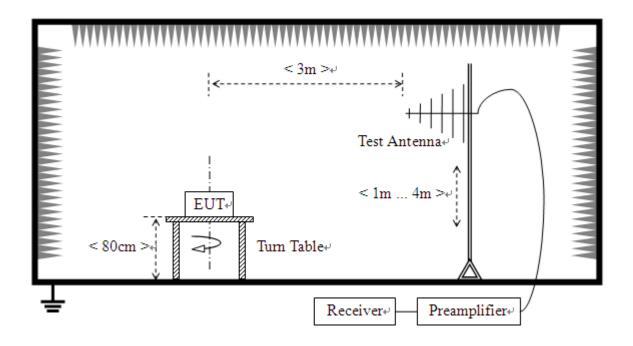
2.8.2. Test Description

A. Test Setup:

1) For radiated emissions from 9kHz to 30MHz



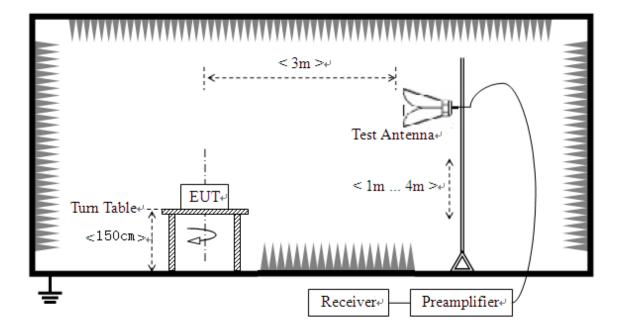
2) For radiated emissions from 30MHz to1GHz





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3) For radiated emissions above 1GHz



The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz. Test site have a minimum area of the ground plane covered with RF absorbing material as specified in Figure 6 of ANSI C63.4: 2014.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10 (2013). For radiated emissions below or equal to 1GHz, The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of



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the site as factors are calculated to correct the reading

For the Test Antenna:

(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.

(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Place the test antenna at 3m away from area of the EUT, while keeping the test antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The test antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final test antenna elevation shall be that which maximizes the emissions. The test antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. The emission levels at both horizontal and vertical polarizations should be tested.

A. Equipments List:

Please reference ANNEX A(1.5).

2.8.3. Test Result

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

 $E [dB\mu V/m] = U_R + A_T + A_{Factor} [dB]; A_T = L_{Cable loss} [dB] - G_{preamp} [dB]$

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

A_{Factor}: Antenna Factor at 3m

During the test, the total correction Factor A_T and A_{Factor} were built in test software.

The low frequency, which started from 9KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

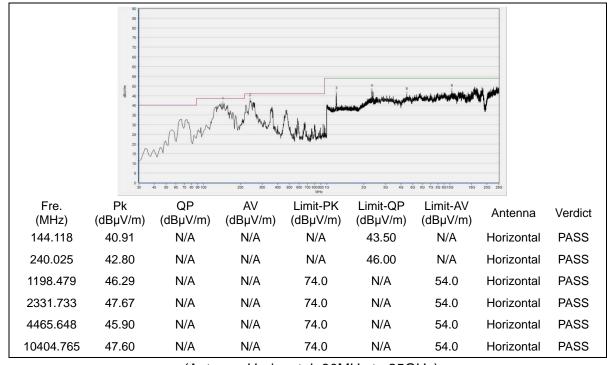




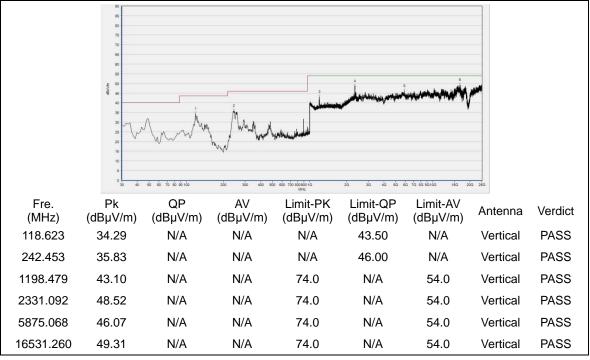
2.8.3.1 802.11b Test mode

A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



(Antenna Horizontal, 30MHz to 25GHz)

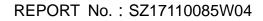


(Antenna Vertical, 30MHz to 25GHz)



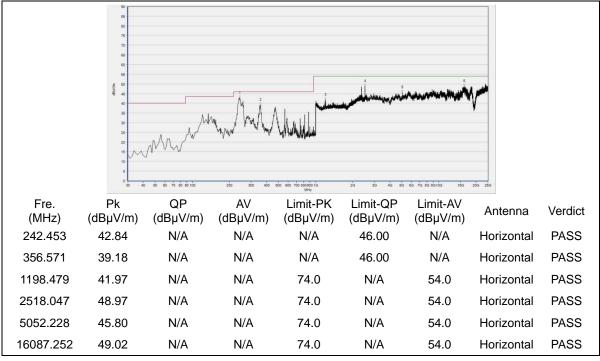
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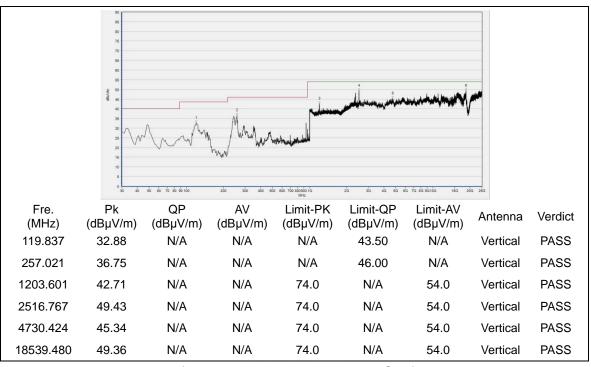




Plot for Channel = 6

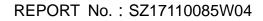


(Antenna Horizontal, 30MHz to 25GHz)



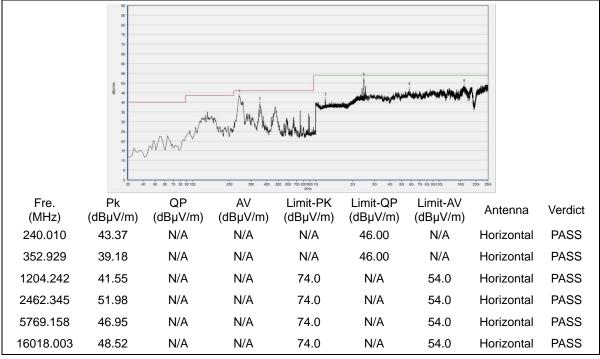
(Antenna Vertical, 30MHz to 25GHz)

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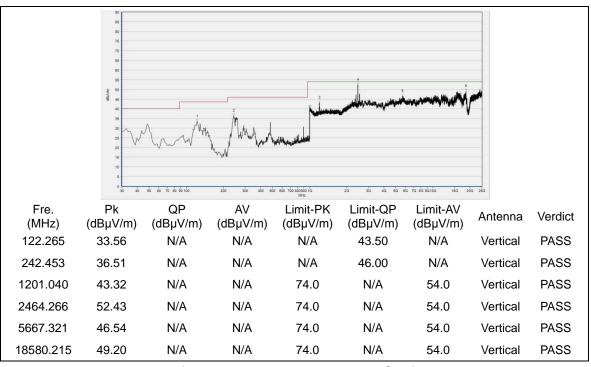




Plot for Channel = 11



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

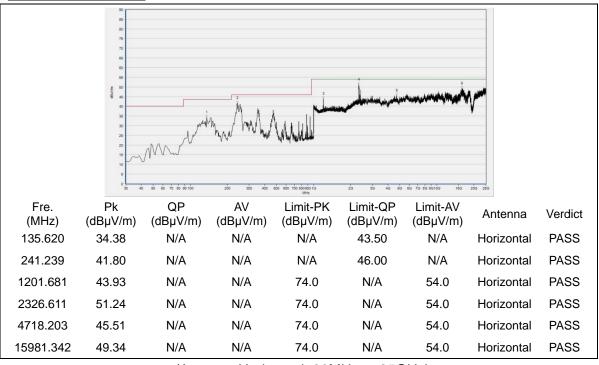




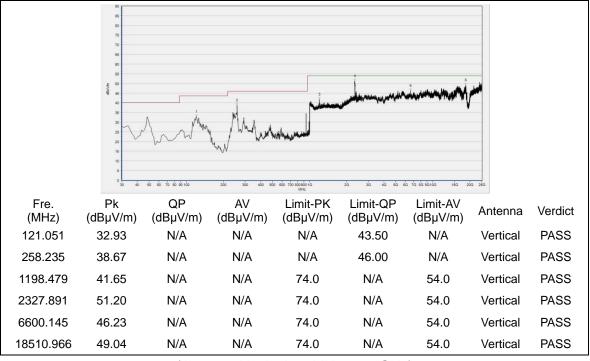
2.8.3.2 802.11g Test mode

B. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



(Antenna Horizontal, 30MHz to 25GHz)

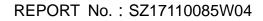


(Antenna Vertical, 30MHz to 25GHz)



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Fax: 86-755-36698525 E-mail: service@morlab.cn

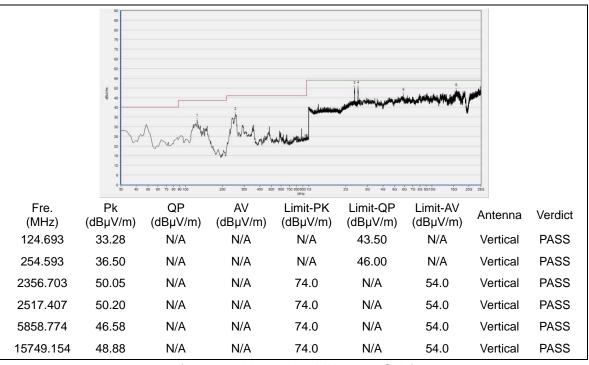




Plot for Channel = 6

	100 110 110 110 110 110 110 110	M. M.	May My My			e ro no norto to	200 210	
Fre. (MHz)	Pk (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
241.239	42.35	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
687.997	40.56	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2356.703	50.14	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
2516.767	50.67	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
5048.154	45.98	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
16445.717	49.01	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

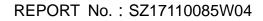
(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

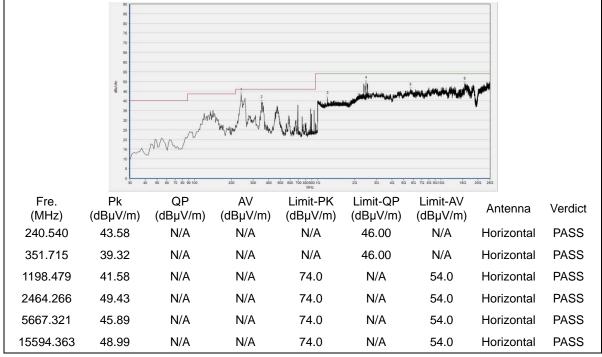


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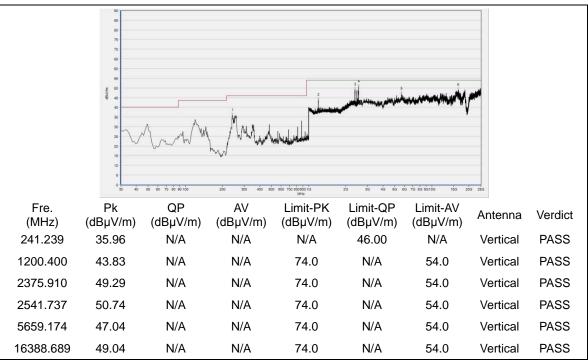




Plot for Channel = 11



(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)

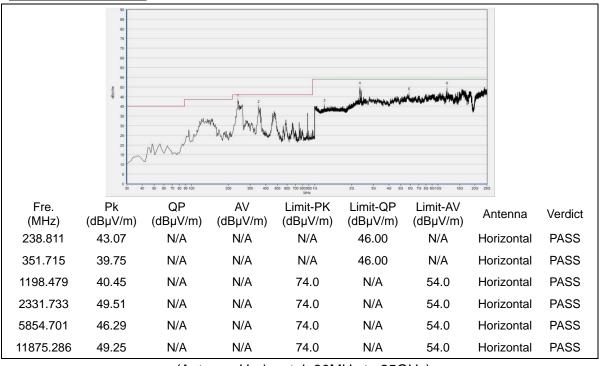




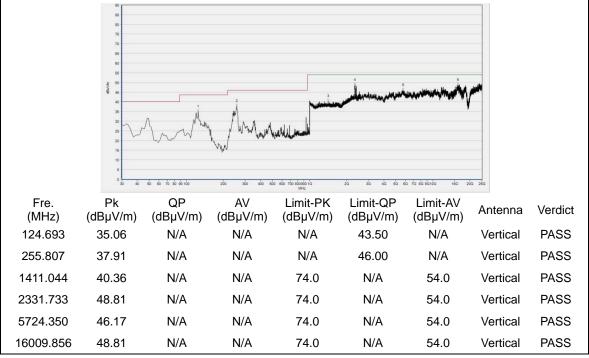
2.8.3.3 802.11n-20MHz Test mode

C. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



(Antenna Horizontal, 30MHz to 25GHz)

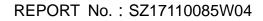


(Antenna Vertical, 30MHz to 25GHz)



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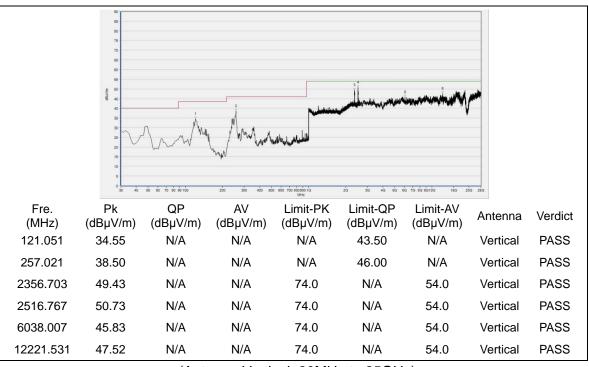




Plot for Channel = 6

	00 80 90 90 90 90 90 90 90 90 90 90 90 90 90	M M w w to so so so	Ma hay and hay		3 4 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	eo rio da bistio sia	20 20 20	
Fre. (MHz)	Pk (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
241.239	42.95	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
357.785	38.99	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2356.062	50.38	N/A	N/A	74.0	N/A	74.0	Horizontal	PASS
2516.126	50.49	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
4473.795	45.96	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
11736.789	47.73	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

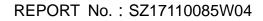
(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)



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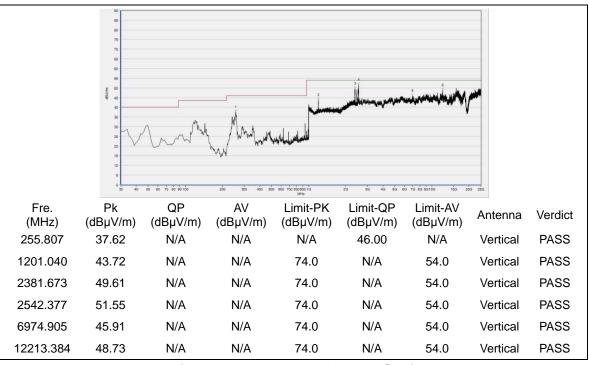




Plot for Channel = 11

		M to to to to to	Mu MM M		20 20 40 60	ο το rio rio rio	200 X62	
Fre. (MHz)	Pk (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
240.025	42.72	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
687.997	38.41	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1201.040	42.78	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
2534.694	49.63	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
5773.231	46.49	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
15683.979	49.26	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



(Antenna Vertical, 30MHz to 25GHz)



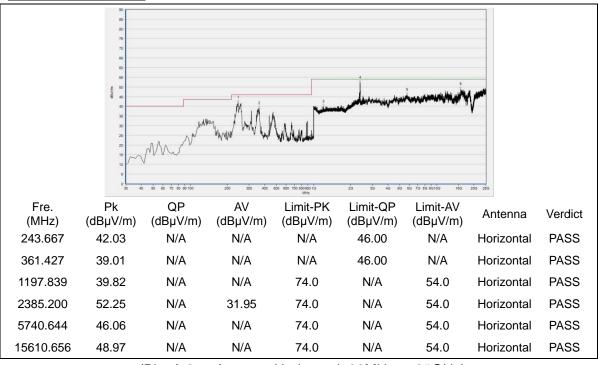
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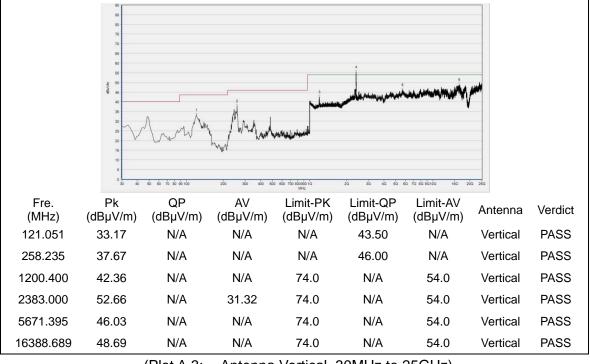
2.8.3.4 802.11n-40MHz Test mode

D. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 3



(Plot A.2: Antenna Horizontal, 30MHz to 25GHz)



(Plot A.3: Antenna Vertical, 30MHz to 25GHz)

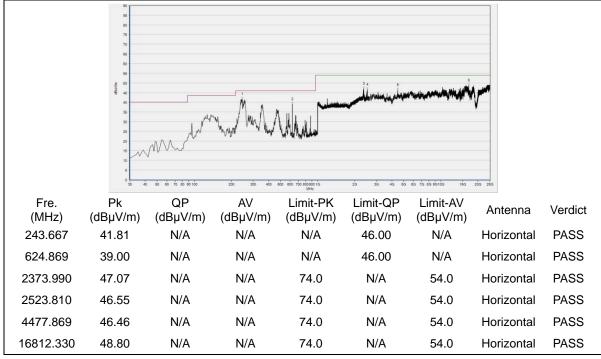


SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China Tel: 86-755-36698555 Http://www.morlab.cn Fax: 86-755-36698525 E-mail: service@morlab.cn

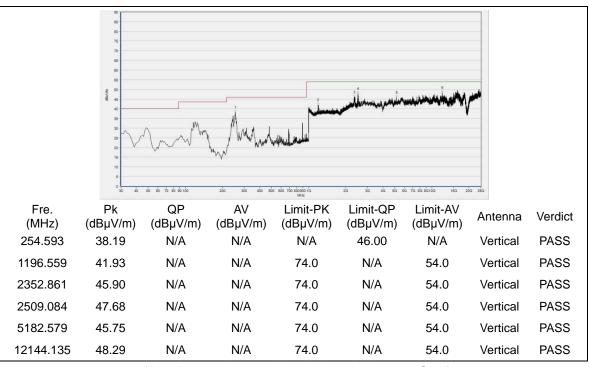


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Plots for Channel = 6

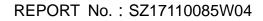


(Plot B.2: Antenna Horizontal, 30MHz to 25GHz)



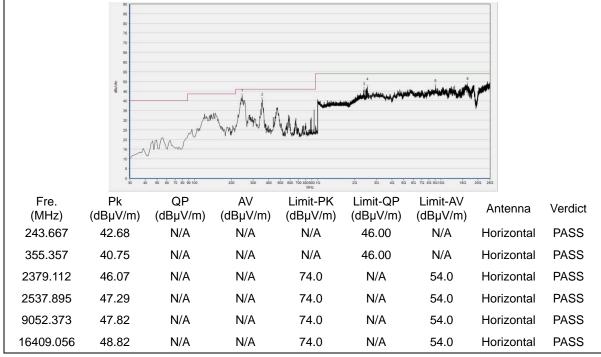
(Plot B.3: Antenna Vertical, 30MHz to 25GHz)



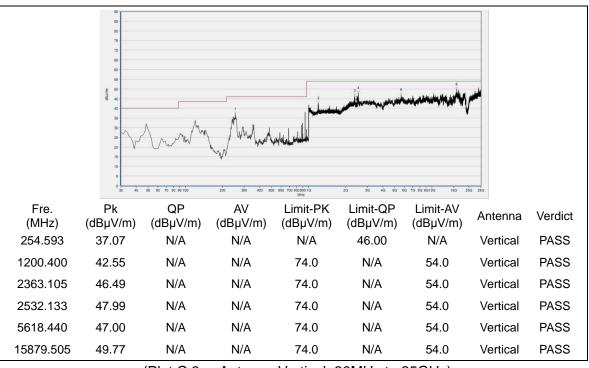




Plots for Channel = 9



(Plot C.2: Antenna Horizontal, 30MHz to 25GHz)



(Plot C.3: Antenna Vertical, 30MHz to 25GHz)



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Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test items	Uncertainty
Peak Output Power	±2.22dB
Power spectral density (PSD)	±2.22dB
Bandwidth	±5%
Conducted Spurious Emission	±2.77 dB
Restricted Frequency Bands	±5%
Radiated Emission	±2.95dB
Conducted Emission	±2.44dB

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2





Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.					
Department:	Morlab Laboratory					
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang					
	Road, Block 67, BaoAn District, ShenZhen, GuangDong					
	Province, P. R. China					
Responsible Test Lab	Mr. Su Fond					
Manager:	Mr. Su Feng					
Telephone:	+86 755 36698555					
Facsimile:	+86 755 36698525					

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.				
Name.	Morlab Laboratory				
	FL.3, Building A, FeiYang Science Park, No.8 LongChang				
Address:	Road, Block 67, BaoAn District, ShenZhen, GuangDong				
	Province, P. R. China				

3. Facilities and Accreditations

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192.





4. Test Equipments Utilized

4.1 Conducted Test Equipments

Equipment Name	Serial No.	Туре	Manufacturer	Cal. Date	Cal. Due
Spectrum Analyzer	MY45101810	E4407B	Agilent	2017.05.24	2018.05.23
Power Splitter	NW521	1506A	Weinschel	2017.05.24	2018.05.23
Attenuator 1	(N/A.)	10dB	Resnet	2017.05.24	2018.05.23
Attenuator 2	(N/A.)	3dB	Resnet	2017.05.24	2018.05.23
EXA Signal Analzyer	MY53470836	N9010A	Agilent	2016.12.07	2017.12.06
USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2017.05.24	2018.05.23
RF cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
Coaxial cable	CB02	RF02	Morlab	N/A	N/A
SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

4.2 Conducted Emission Test Equipments

Equipment Name	Serial No.	Туре	Manufacturer	Cal. Date	Cal. Due
Receiver	US44210471	E7405A	Agilent	2017.05.17	2018.05.16
LISN	812744	NSLK 8127	Schwarzbeck	2017.05.17	2018.05.16
Service Supplier	100448	CMU200	R&S	2017.05.17	2018.05.16
Pulse Limiter	9391	VTSD	Schwarzbeck	2017.05.17	2018.05.16
(20dB)		9561-D	Schwarzbeck	2017.05.17	2018.05.10
Coaxial cable(BNC)	CB01	EMC01	Morlab	N/A	N/A
(30MHz-26GHz)			USITION		

4.3Auxiliary Test Equipment

Equipment Name	Model No.	Brand Name	Manufacturer	Cal.Date	Cal.Due Date
Computer	T430i	Think Pad	Lenovo	N/A	N/A





4.4 Radiated Test Equipments

Equipment Name	Serial No.	Туре	Manufacturer	Cal. Date	Cal.Due Date
System Simulator	GB45360846	8960-E5515C	Agilent	2017.05.17	2018.05.16
Receiver	MY54130016	N9038A	Agilent	2017.05.17	2018.05.16
Test Antenna - Bi-Log	N/A	VULB9163	Schwarzbeck	2016.12.09	2017.12.08
Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2017.03.30	2018.03.29
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2017.03.30	2018.03.29
Test Antenna - Horn	1774	BBHA 9120D	Schwarzbeck	2017.09.13	2018.09.12
Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
Coaxial cable(N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
1-18GHz pre-Amplifier	MA02	TS-PR18	Rohde& Schwarz	2017.05.17	2018.05.16
18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde& Schwarz	2017.05.17	2018.05.16
Climate Chamber	2004012	HL4003T	Yinhe	2017.01.11	2018.01.10
Vibration Table	N/A	ACT2000-S01 5L	CMI-COM	2017.01.11	2018.01.10
Anechoic Chamber	N/A	9m*6m*6m	Changning	2017.01.11	2018.01.10

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