



Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

TEST REPORT

FCC Part 15C

Report Reference No.....: CTA240709105

FCC ID.: 2BHLL-V22

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Date of issue: 2024-07-15



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Testing Laboratory Name.....: Shenzhen CTA Testing Technology Co., Ltd.

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Applicant's name.....: Shenzhen Chuanghongyu Technology Co., Ltd

Address: 301 Jinjin Building, No. 242 Jihua Road, Jihua Street, Longgang District, Shenzhen, Guangdong, China

Test specification

Standard.....: FCC Part 15C

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Test item description: Dash camera, Car Dvr

Trade Mark: /

Manufacturer.....: Shenzhen Chuanghongyu Technology Co., Ltd

Model/Type reference.....: V22

Listed Models: V21, V26A, V26B, K04, S5

Ratings: DC5V, 2A from Car charging

Result: PASS

TEST REPORT

Equipment under Test : Dash camera,Car Dvr

Model /Type : V22

Listed Models : V21, V26A, V26B, K04, S5

Applicant : Shenzhen Chuanghongyu Technology Co., Ltd

Address : 301 Jinjin Building, No. 242 Jihua Road, Jihua Street,
Longgang District, Shenzhen,Guangdong,China

Manufacturer : Shenzhen Chuanghongyu Technology Co., Ltd

Address : 301 Jinjin Building, No. 242 Jihua Road, Jihua Street,
Longgang District, Shenzhen,Guangdong,China

Test result	Pass *
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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

[ANSI C63.10:2013](#): American National Standard for Testing Unlicensed Wireless Devices

[KDB 558074 D01 DTS Meas Guidance v05](#): Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of The FCC Rules

1.2. Test Description

Test Item	FCC Rule	Result
Antenna requirement	15.203/15.247(c)	PASS
Line Conducted Emissions (AC Main)	15.207	PASS
Conducted Peak Output Power	15.247(b)(3)	PASS
Power Spectral Density	15.247(e)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Restricted band	15.247(d)/15.205	PASS
Spurious Emissions	15.247(d)/15.209	PASS

1.3. Address of the test laboratory

Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.4. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 517856 Designation Number: CN1318

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6534.01

Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

ISED#: 27890 CAB identifier: CN0127

Shenzhen CTA Testing Technology Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

1.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic

compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Global Test Service Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Global Test Service Co., Ltd. is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)
Conducted Power	9KHz~18GHz	0.61 dB	(1)
Spurious RF Conducted Emission	9KHz~40GHz	1.22 dB	(1)
Band Edge Compliance of RF Emission	9KHz~40GHz	1.22 dB	(1)
Occupied Bandwidth	9KHz~40GHz	-	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

2. GENERAL INFORMATION

2.1. General Remarks

Date of receipt of test sample	:	2024.07.09
Testing commenced on	:	2024.07.10
Testing concluded on	:	2024.07.15

2.2. Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.3. General Description of EUT

Name of EUT	Dash camera, Car Dvr
Model Number	V22, V21, V26A, V26B, K04, S5
Power Supply	DC5V, 2A from Car charging
Frequency Range	2412MHz~2462MHz for 802.11b/802.11g/802.11n(HT20) 2422MHz~2452MHz for 802.11n(HT40)
Channel number:	11 for 802.11b/802.11g/802.11n(HT20) 7 for 802.11n(HT40)
Modulation Type	DSSS for 802.11b OFDM for 802.11g/802.11n(HT20)/802.11n(HT40)
Channel separation:	5MHz
Antenna Type	Pcb antenna
Antenna Gain	-1.0dBi
Sample ID:	CTA240709105-1

Note: For more details, refer to the user's manual of the EUT.

2.4. Operation state

➤ Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

802.11b/g/n(HT20)		802.11n(HT40)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	01	-
02	2417	02	-
03	2422	03	2422
04	2427	04	2427
05	2432	05	2432
06	2437	06	2437
07	2442	07	2442
08	2447	08	2447
09	2452	09	2452

10	2457	10	-
11	2462	11	-

➤ **Test mode**

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).
For AC power line conducted emissions:
The EUT was set to connect with the WLAN AP under large package sizes transmission.
For Radiated suprious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit(duty cycle>98%). The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data Recorded in the report.

2.5. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2023/09/19	2024/09/18
LISN	R&S	ESH2-Z5	893606/008	2023/09/19	2024/09/18
EMI Test Receiver	R&S	ESPI3	101841-cd	2023/09/19	2024/09/18
EMI Test Receiver	R&S	ESCI7	101102	2023/09/19	2024/09/18
Spectrum Analyzer	Agilent	N9020A	MY48010425	2023/09/19	2024/09/18
Spectrum Analyzer	R&S	FSV40	100019	2023/09/19	2024/09/18
Vector Signal generator	Agilent	N5181A	MY49060502	2023/09/19	2024/09/18
Signal generator	Agilent	E4421B	3610AO1069	2023/09/19	2024/09/18
Climate Chamber	ESPEC	EL-10KA	A20120523	2023/09/19	2024/09/18
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2023/09/19	2024/09/18
Active Loop Antenna	Beijing Da Ze Technology Co.,Ltd.	ZN30900C	15006	2023/09/19	2024/09/18
Bilog Antenna	Schwarzbeck	VULB9163	000976	2023/09/19	2024/09/18
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2023/09/19	2024/09/18
Amplifier	Schwarzbeck	BBV 9743	#202	2023/09/19	2024/09/18
Amplifier	Schwarzbeck	BBV9179	9719-025	2023/09/19	2024/09/18
Amplifier	EMCI	EMC051845B	980355	2023/09/19	2024/09/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2023/09/19	2024/09/18
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2023/09/19	2024/09/18
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2023/09/19	2024/09/18
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2023/09/19	2024/09/18
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2023/09/19	2024/09/18
Data acquisition card	Agilent	U2531A	TW53323507	2023/09/19	2024/09/18
Power Sensor	Agilent	U2021XA	MY5365004	2023/09/19	2024/09/18
Test Control Unit	Tonscend	JS0806-1	178060067	2023/09/19	2024/09/18
Automated filter bank	Tonscend	JS0806-F	19F8060177	2023/09/19	2024/09/18
Radio Communication	HP	8920A	116250	2023/09/19	2024/09/18

Tester					
EMI Test Software	Tonscend	JS1120-1	Ver 2.6.8.0518	/	/
EMI Test Software	Tonscend	JS1120-3	Ver 2.5.77.0418	/	/
EMI Test Software	Tonscend	JS32-CE	Ver 2.5	/	/
EMI Test Software	Tonscend	JS32-RE	Ver 2.5.1.8	/	/

Note: The Cal.Interval was one year.

2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for filing to comply with Section 15.247 of the FCC Part 15, Subpart C rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

2.8. Environmental conditions

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

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

3. TEST CONDITIONS AND RESULTS

3.1. Antenna requirement

REQUIREMENT:

FCC CFR Title 47 Part 15 Subpart C Section 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

The directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



3.2. Conducted Emissions (AC Main)

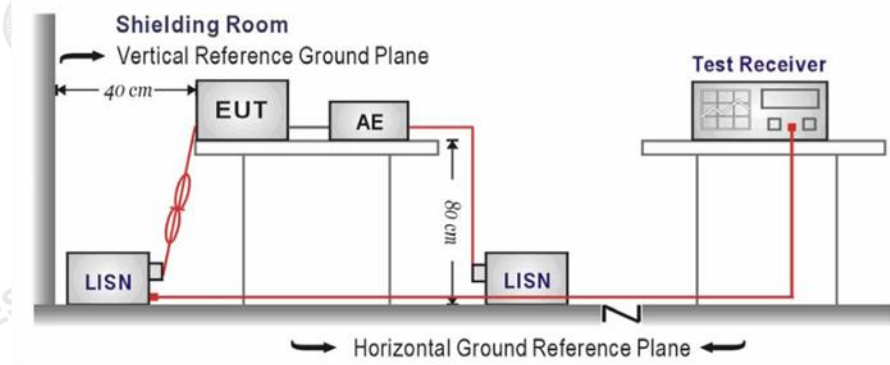
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST MODE:

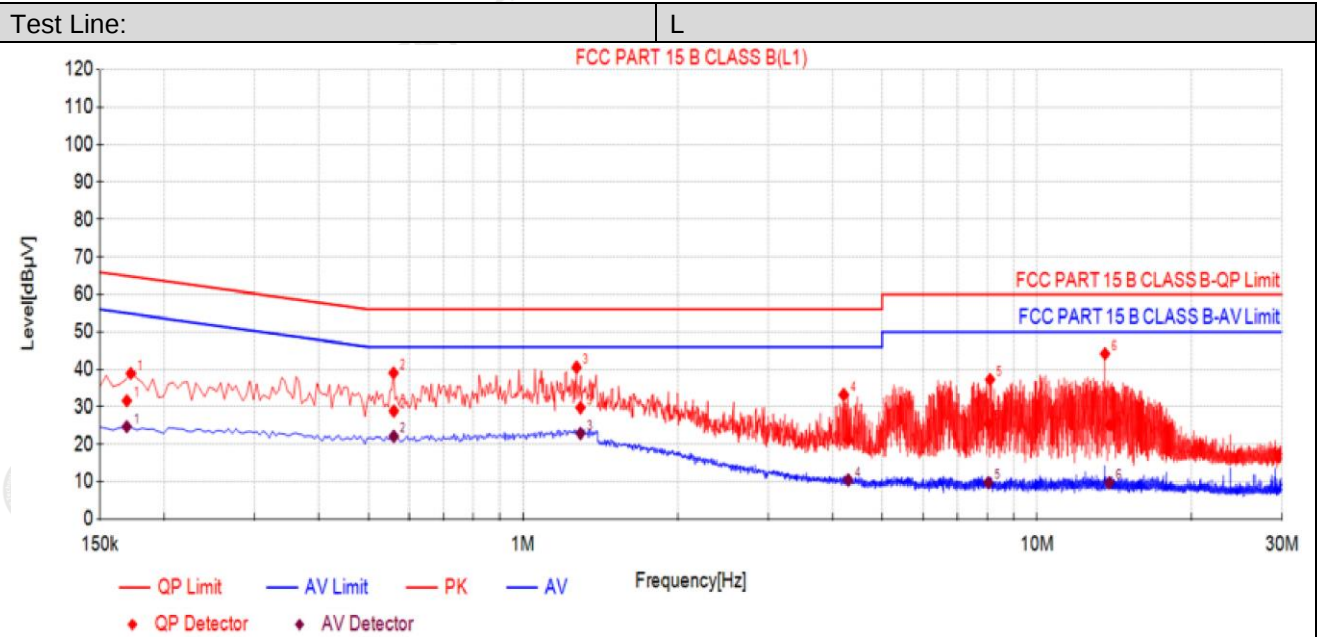
Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

Note:

- 1) Transd=Cable lose+ Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin= Limit -Level



Final Data List

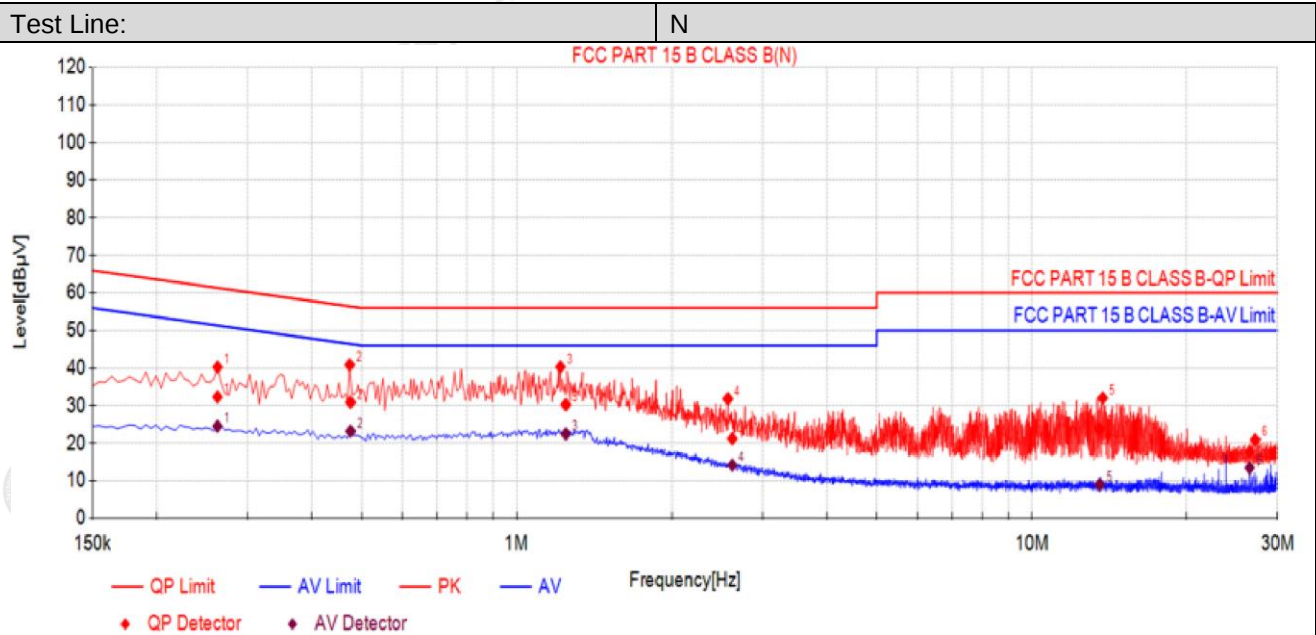
NO.	Freq. [MHz]	Factor [dB]	QP Reading[dB μV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.1694	10.50	21.13	31.63	64.99	33.36	14.20	24.70	54.99	30.29	PASS
2	0.5601	10.50	18.38	28.88	56.00	27.12	11.63	22.13	46.00	23.87	PASS
3	1.2935	10.50	19.25	29.75	56.00	26.25	12.40	22.90	46.00	23.10	PASS
4	4.2944	10.50	10.74	21.24	56.00	34.76	-0.03	10.47	46.00	35.53	PASS
5	8.0456	10.50	14.98	25.48	60.00	34.52	-0.75	9.75	50.00	40.25	PASS
6	13.8477	10.50	14.64	25.14	60.00	34.86	-0.76	9.74	50.00	40.26	PASS

Note:1). QP Value (dBμV) = QP Reading (dBμV) + Factor (dB)

2). Factor (dB) = insertion loss of LISN (dB) + Cable loss (dB)

3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)

4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dB μV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.2624	10.50	21.84	32.34	61.35	29.01	14.04	24.54	51.35	26.81	PASS
2	0.4758	10.50	20.43	30.93	56.41	25.48	12.70	23.20	46.41	23.21	PASS
3	1.2455	10.50	19.79	30.29	56.00	25.71	11.98	22.48	46.00	23.52	PASS
4	2.6209	10.50	10.73	21.23	56.00	34.77	3.68	14.18	46.00	31.82	PASS
5	13.5525	10.50	13.27	23.77	60.00	36.23	-1.49	9.01	50.00	40.99	PASS
6	26.4882	10.50	7.22	17.72	60.00	42.28	2.97	13.47	50.00	36.53	PASS

Note:1). QP Value (dBμV) = QP Reading (dBμV) + Factor (dB)

2). Factor (dB) = insertion loss of LISN (dB) + Cable loss (dB)

3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)

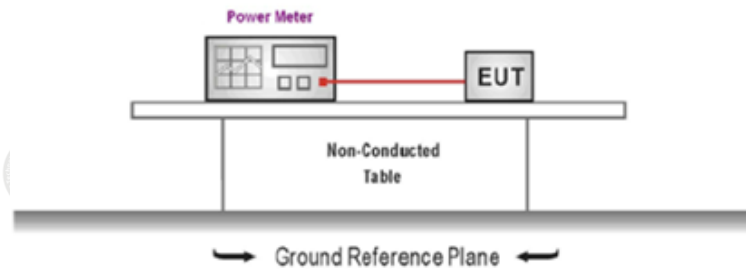
4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

3.3. Conducted Peak Output Power

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3): 30dBm

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10: 2013 and KDB 558074 D01 for compliance to FCC 47 CFR 15.247 requirements.
2. The maximum peak conducted output power may be measured using a broadband peak RF power meter.
3. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector
4. Record the measurement data.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

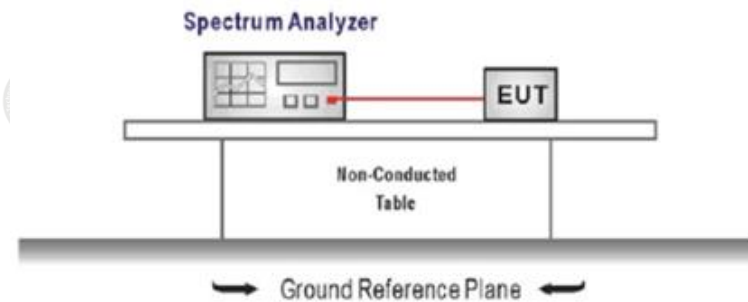
Type	Channel	Peak Output power (dBm)	Limit (dBm)	Result
802.11b	01	17.65	≤30.00	Pass
	06	17.74		
	11	18.48		
802.11g	01	17.19	≤30.00	Pass
	06	17.24		
	11	17.47		
802.11n(HT20)	01	16.28	≤30.00	Pass
	06	16.60		
	11	16.91		
802.11n(HT40)	03	15.71	≤30.00	Pass
	06	15.55		
	09	15.79		

3.4. Power Spectral Density

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e):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 CONFIGURATION



TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input,
2. Configure the spectrum analyzer as shown below:
Center frequency=DTS channel center frequency
Span =1.5 times the DTS bandwidth
 $RBW = 3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$, $VBW \geq 3 \times RBW$
Sweep time = auto couple
Detector = peak
Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
4. Use the peak marker function to determine the maximum amplitude level within the RBW.
5. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

Type	Channel	Power Spectral Density (dBm/30KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-1.45	≤8.00	Pass
	06	-1.12		
	11	-0.53		
802.11g	01	-7.93	≤8.00	Pass
	06	-7.80		
	11	-7.74		
802.11n(HT20)	01	-8.68	≤8.00	Pass
	06	-8.21		
	11	-7.91		
802.11n(HT40)	03	-12.08	≤8.00	Pass
	06	-12.85		
	09	-12.11		

Test plot as follows:

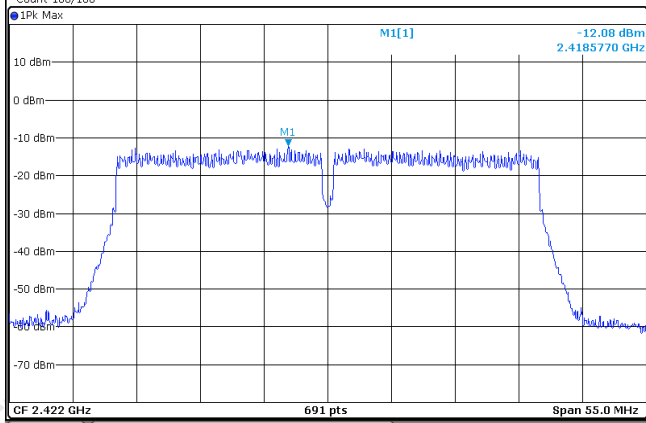
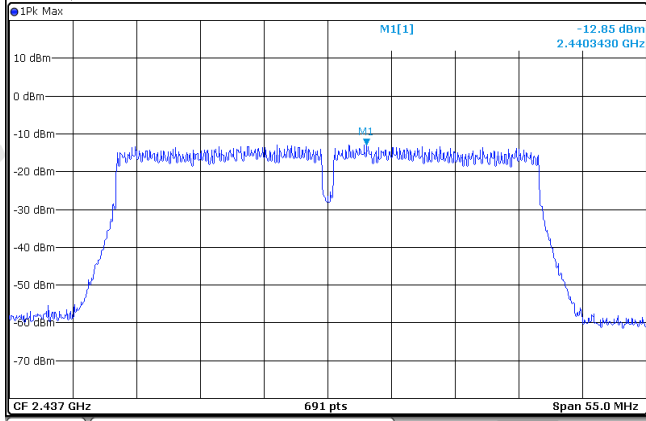
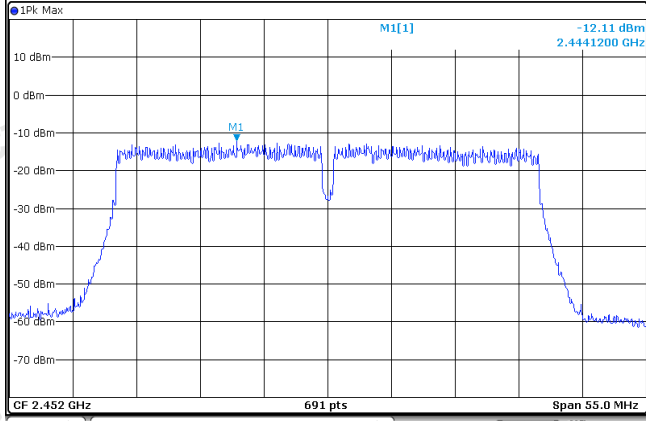
Report No.: CTA240709105

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Type:	802.11b
CH01	Spectrum plot for CH01. The plot shows a signal at 2.4129030 GHz with a peak level of -1.45 dBm. The plot includes a grid, a blue line representing the signal, and various measurement parameters like Ref Level, Att, Offset, RBW, and Span.
CH06	Spectrum plot for CH06. The plot shows a signal at 2.4360740 GHz with a peak level of -1.12 dBm. The plot includes a grid, a blue line representing the signal, and various measurement parameters like Ref Level, Att, Offset, RBW, and Span.
CH11	Spectrum plot for CH11. The plot shows a signal at 2.4610740 GHz with a peak level of -0.53 dBm. The plot includes a grid, a blue line representing the signal, and various measurement parameters like Ref Level, Att, Offset, RBW, and Span.

Type:		802.11g
CH01	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 189.6 μs VBW 100 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -7.93 dBm 2.4088520 GHz M1 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.412 GHz 691 pts Span 25.0 MHz	
CH06	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 189.6 μs VBW 100 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -7.80 dBm 2.4338520 GHz M1 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.437 GHz 691 pts Span 25.0 MHz	
CH11	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 189.6 μs VBW 100 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -7.74 dBm 2.4588520 GHz M1 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.462 GHz 691 pts Span 25.0 MHz	

Type:		802.11n(HT20)
CH01	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 189.6 μs VBW 100 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -8.68 dBm 2.4126150 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.412 GHz 691 pts Span 25.0 MHz	
CH06	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 189.6 μs VBW 100 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -8.21 dBm 2.4376150 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.437 GHz 691 pts Span 25.0 MHz	
CH11	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 189.6 μs VBW 100 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -7.91 dBm 2.4626150 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.462 GHz 691 pts Span 25.0 MHz	

Type:		802.11n(HT40)
CH03	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 442.4 μs VBW 100 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -12.08 dBm 2.4185770 GHz  CF 2.422 GHz 691 pts Span 55.0 MHz	
CH06	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 442.4 μs VBW 100 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -12.85 dBm 2.4403430 GHz  CF 2.437 GHz 691 pts Span 55.0 MHz	
CH09	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 442.4 μs VBW 100 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -12.11 dBm 2.4441200 GHz  CF 2.452 GHz 691 pts Span 55.0 MHz	

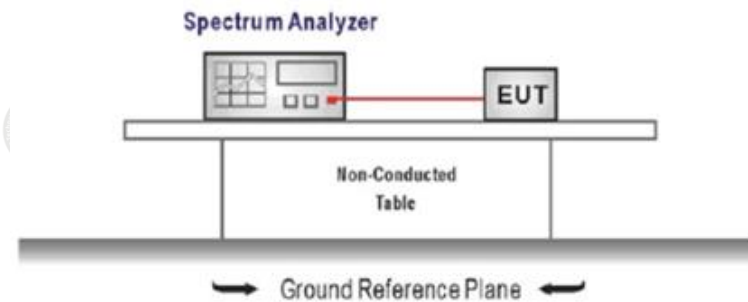
3.5. 6dB bandwidth

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2):

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).
Center Frequency = DTS channel center frequency
Span = 2 x DTS bandwidth
RBW = 100 kHz, VBW $\geq 3 \times$ RBW
Sweep time = auto couple
Detector = Peak
Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission, and record the pertinent measurements.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

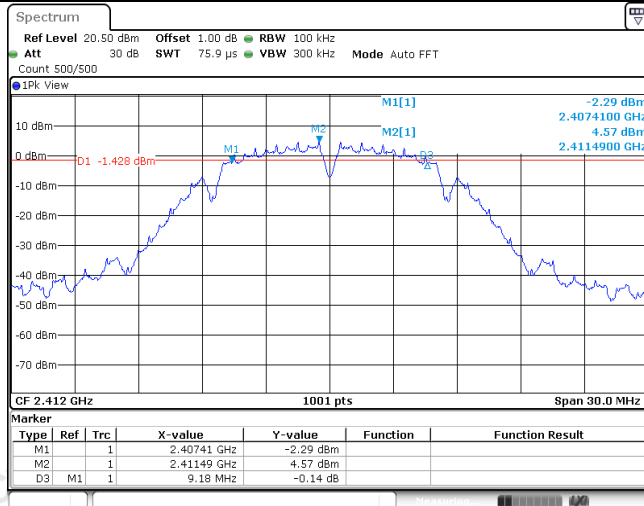
Type	Channel	6dB Bandwidth (MHz)	Limit (kHz)	Result
802.11b	01	9.18	≥500	Pass
	06	9.15		
	11	9.15		
802.11g	01	16.41	≥500	Pass
	06	16.65		
	11	16.65		
802.11n(HT20)	01	17.67	≥500	Pass
	06	17.88		
	11	17.85		
802.11n(HT40)	03	36.48	≥500	Pass
	06	36.54		
	09	36.54		

Test plot as follows:

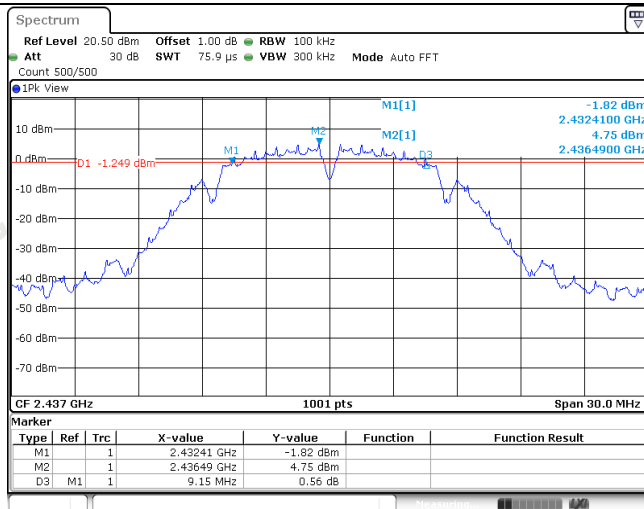
Type:

802.11b

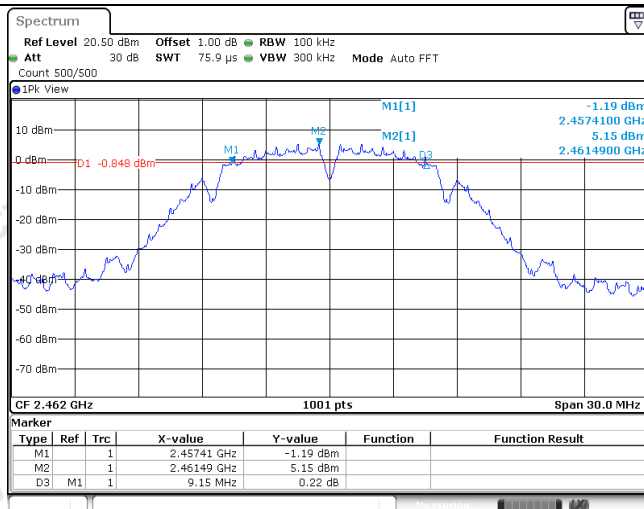
CH01



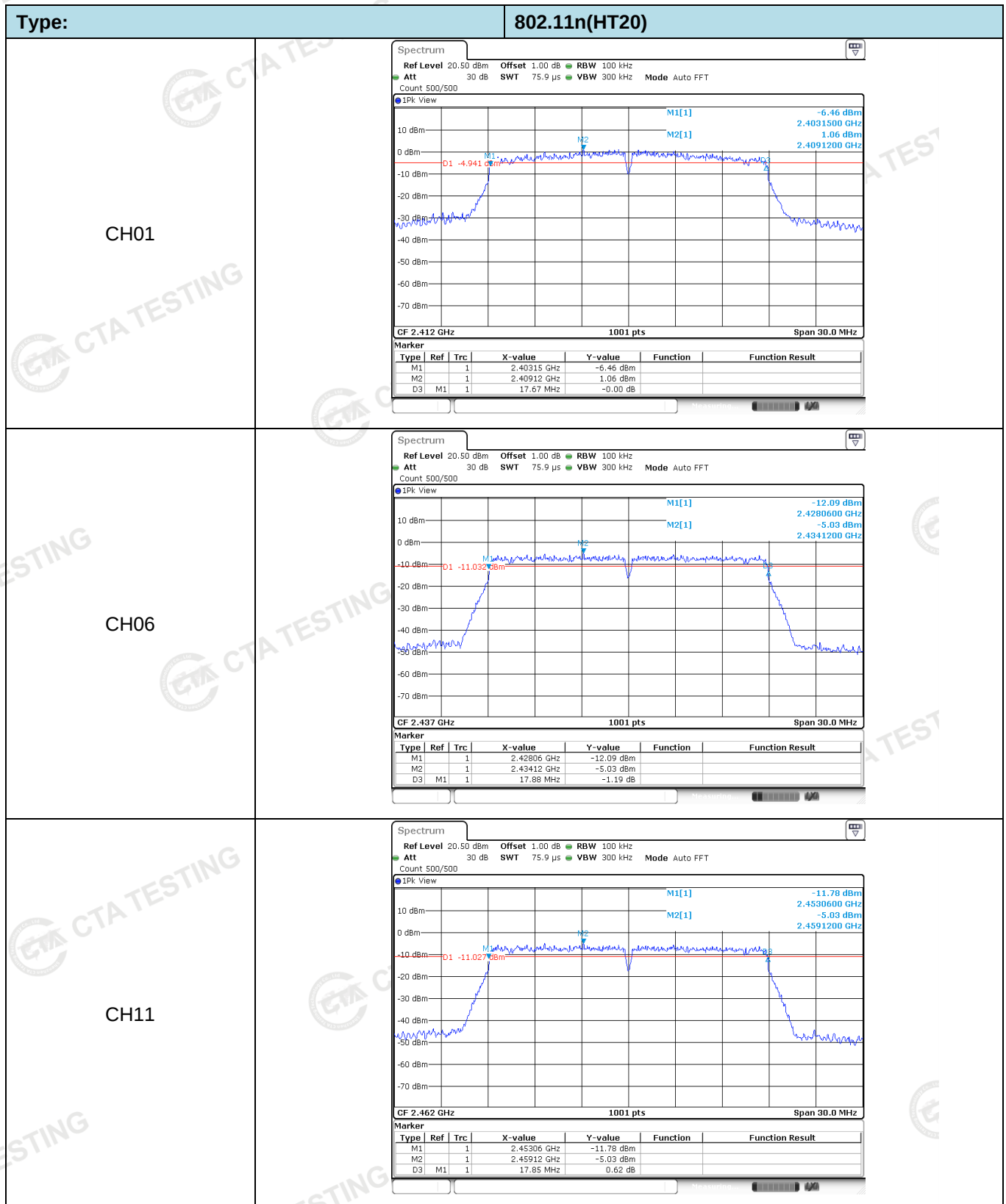
CH06

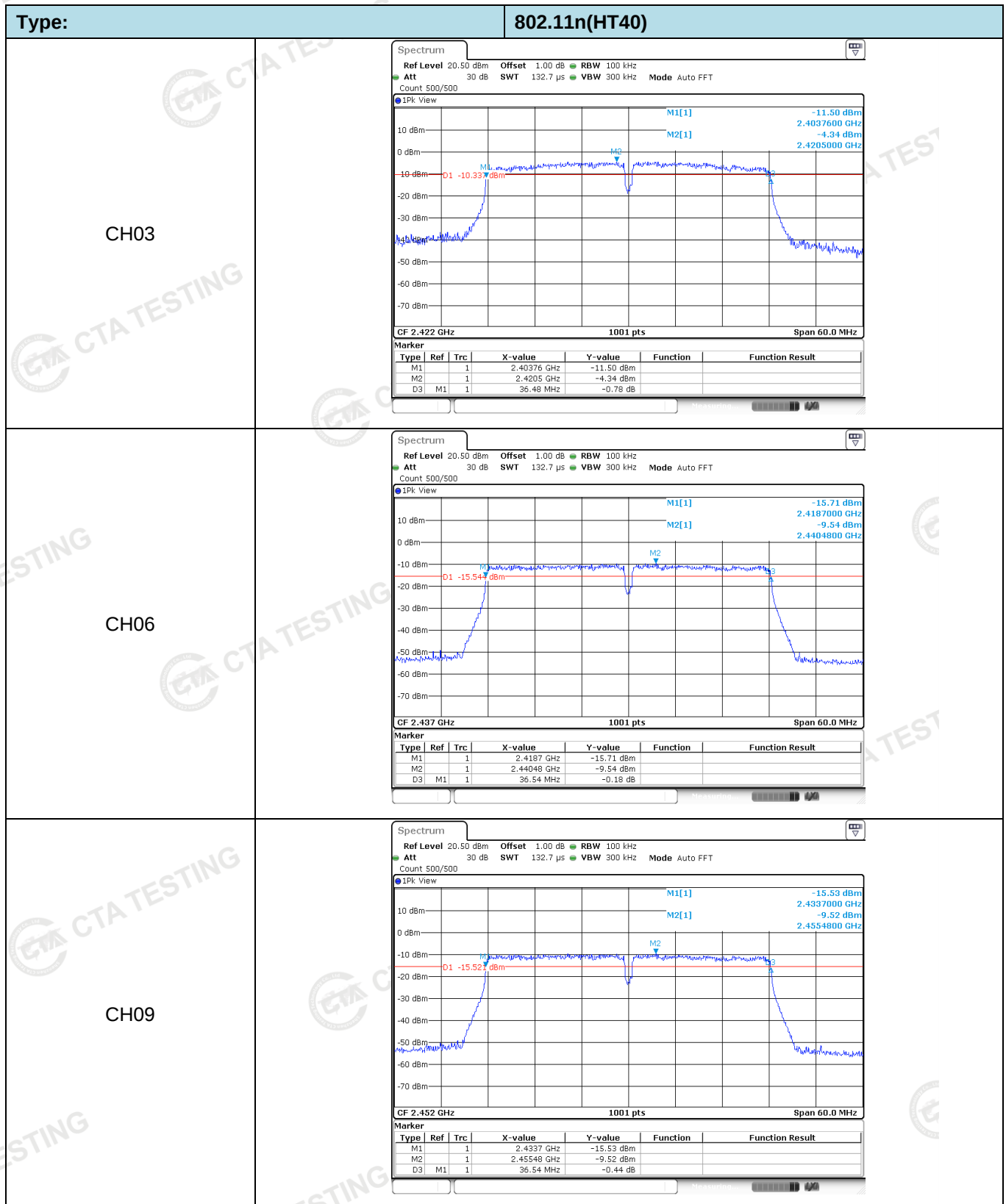


CH11



Type:		802.11g																												
CH01	Spectrum Ref Level 20.50 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 75.9 μs VBW 300 kHz Mode Auto FFT Count 500/500 1Pk View 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm 01 -4.725 dBm M1 M2 M1[1] M2[1] -5.33 dBm 2.4037800 GHz 1.28 dBm 2.4126300 GHz CF 2.412 GHz 1001 pts Span 30.0 MHz Marker <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td></td><td>1</td><td>2.40378 GHz</td><td>-5.33 dBm</td><td></td><td></td></tr><tr><td>M2</td><td></td><td>1</td><td>2.41263 GHz</td><td>1.28 dBm</td><td></td><td></td></tr><tr><td>D3</td><td>M1</td><td>1</td><td>16.41 MHz</td><td>-0.05 dB</td><td></td><td></td></tr></table>		Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1		1	2.40378 GHz	-5.33 dBm			M2		1	2.41263 GHz	1.28 dBm			D3	M1	1	16.41 MHz	-0.05 dB		
Type	Ref	Trc	X-value	Y-value	Function	Function Result																								
M1		1	2.40378 GHz	-5.33 dBm																										
M2		1	2.41263 GHz	1.28 dBm																										
D3	M1	1	16.41 MHz	-0.05 dB																										
CH06	Spectrum Ref Level 20.50 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 75.9 μs VBW 300 kHz Mode Auto FFT Count 500/500 1Pk View 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm 01 -10.732 dBm M1 M2 M1[1] M2[1] -11.76 dBm 2.4286600 GHz -4.73 dBm 2.4342400 GHz CF 2.437 GHz 1001 pts Span 30.0 MHz Marker <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td></td><td>1</td><td>2.42866 GHz</td><td>-11.76 dBm</td><td></td><td></td></tr><tr><td>M2</td><td></td><td>1</td><td>2.43424 GHz</td><td>-4.73 dBm</td><td></td><td></td></tr><tr><td>D3</td><td>M1</td><td>1</td><td>16.65 MHz</td><td>-0.40 dB</td><td></td><td></td></tr></table>		Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1		1	2.42866 GHz	-11.76 dBm			M2		1	2.43424 GHz	-4.73 dBm			D3	M1	1	16.65 MHz	-0.40 dB		
Type	Ref	Trc	X-value	Y-value	Function	Function Result																								
M1		1	2.42866 GHz	-11.76 dBm																										
M2		1	2.43424 GHz	-4.73 dBm																										
D3	M1	1	16.65 MHz	-0.40 dB																										
CH11	Spectrum Ref Level 20.50 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 75.9 μs VBW 300 kHz Mode Auto FFT Count 500/500 1Pk View 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm 01 -10.797 dBm M1 M2 M1[1] M2[1] -11.46 dBm 2.4536600 GHz -4.80 dBm 2.4592400 GHz CF 2.462 GHz 1001 pts Span 30.0 MHz Marker <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td></td><td>1</td><td>2.45366 GHz</td><td>-11.46 dBm</td><td></td><td></td></tr><tr><td>M2</td><td></td><td>1</td><td>2.45924 GHz</td><td>-4.80 dBm</td><td></td><td></td></tr><tr><td>D3</td><td>M1</td><td>1</td><td>16.65 MHz</td><td>-0.90 dB</td><td></td><td></td></tr></table>		Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1		1	2.45366 GHz	-11.46 dBm			M2		1	2.45924 GHz	-4.80 dBm			D3	M1	1	16.65 MHz	-0.90 dB		
Type	Ref	Trc	X-value	Y-value	Function	Function Result																								
M1		1	2.45366 GHz	-11.46 dBm																										
M2		1	2.45924 GHz	-4.80 dBm																										
D3	M1	1	16.65 MHz	-0.90 dB																										





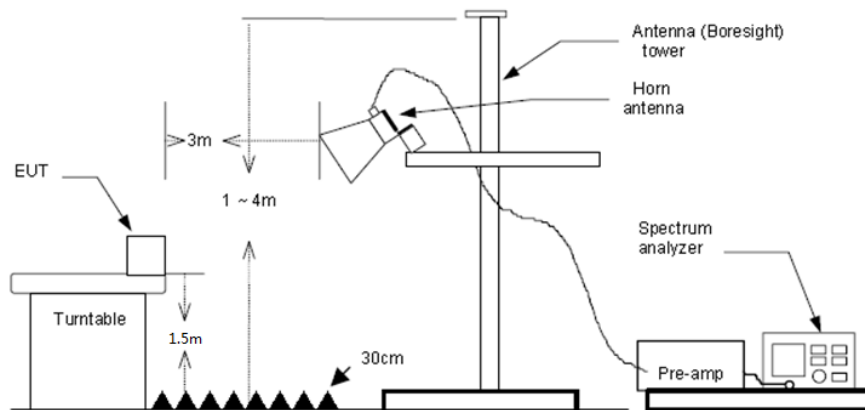
3.6. Restricted band

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

- 1) The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
- 2) The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3) The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
- 4) The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
- 5) The receiver set as follow:
 RBW=1MHz, VBW=3MHz PEAK detector for Peak value.
 RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

Note:

- 1) Final level= Read level + Antenna Factor+ Cable Loss- Preamp Factor

802.11b					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	27.15	28.05	6.62	0.00	61.82	74.00	-12.18	Vertical	Peak
2390.01	27.92	27.65	6.75	0.00	62.32	74.00	-11.68	Vertical	Peak
2310.00	28.13	28.05	6.62	0.00	62.80	74.00	-11.20	Horizontal	Peak
2390.01	26.63	27.65	6.75	0.00	61.03	74.00	-12.97	Horizontal	Peak
2310.00	12.53	28.05	6.62	0.00	47.20	54.00	-6.80	Vertical	Average
2390.01	12.25	27.65	6.75	0.00	46.65	54.00	-7.35	Vertical	Average
2310.00	12.52	28.05	6.62	0.00	47.19	54.00	-6.81	Horizontal	Average
2390.01	12.23	27.65	6.75	0.00	46.63	54.00	-7.37	Horizontal	Average

802.11b					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.49	27.29	27.26	6.83	0.00	61.38	74.00	-12.62	Vertical	Peak
2500.00	26.73	27.20	6.84	0.00	60.77	74.00	-13.23	Vertical	Peak
2483.49	27.50	27.26	6.83	0.00	61.59	74.00	-12.41	Horizontal	Peak
2500.00	27.11	27.20	6.84	0.00	61.15	74.00	-12.85	Horizontal	Peak
2483.49	12.19	27.26	6.83	0.00	46.28	54.00	-7.72	Vertical	Average
2500.00	12.19	27.20	6.84	0.00	46.23	54.00	-7.77	Vertical	Average
2483.49	12.18	27.26	6.83	0.00	46.27	54.00	-7.73	Horizontal	Average
2500.00	12.19	27.20	6.84	0.00	46.23	54.00	-7.77	Horizontal	Average

802.11g					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	26.73	28.05	6.62	0.00	61.40	74.00	-12.60	Vertical	Peak
2390.01	27.30	27.65	6.75	0.00	61.70	74.00	-12.30	Vertical	Peak
2310.00	26.71	28.05	6.62	0.00	61.38	74.00	-12.62	Horizontal	Peak
2390.01	26.15	27.65	6.75	0.00	60.55	74.00	-13.45	Horizontal	Peak
2310.00	12.51	28.05	6.62	0.00	47.18	54.00	-6.82	Vertical	Average
2390.01	13.17	27.65	6.75	0.00	47.57	54.00	-6.43	Vertical	Average
2310.00	12.52	28.05	6.62	0.00	47.19	54.00	-6.81	Horizontal	Average
2390.01	12.57	27.65	6.75	0.00	46.97	54.00	-7.03	Horizontal	Average

802.11g					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.49	25.79	27.26	6.83	0.00	59.88	74.00	-14.12	Vertical	Peak
2500.00	26.33	27.20	6.84	0.00	60.37	74.00	-13.63	Vertical	Peak
2483.49	26.72	27.26	6.83	0.00	60.81	74.00	-13.19	Horizontal	Peak
2500.00	26.21	27.20	6.84	0.00	60.25	74.00	-13.75	Horizontal	Peak
2483.49	12.36	27.26	6.83	0.00	46.45	54.00	-7.55	Vertical	Average
2500.00	12.20	27.20	6.84	0.00	46.24	54.00	-7.76	Vertical	Average
2483.49	12.31	27.26	6.83	0.00	46.40	54.00	-7.60	Horizontal	Average
2500.00	12.19	27.20	6.84	0.00	46.23	54.00	-7.77	Horizontal	Average

802.11n(HT20)					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	25.29	28.05	6.62	0.00	59.96	74.00	-14.04	Vertical	Peak
2390.01	26.25	27.65	6.75	0.00	60.65	74.00	-13.35	Vertical	Peak
2310.00	27.28	28.05	6.62	0.00	61.95	74.00	-12.05	Horizontal	Peak
2390.01	26.29	27.65	6.75	0.00	60.69	74.00	-13.31	Horizontal	Peak
2310.00	12.51	28.05	6.62	0.00	47.18	54.00	-6.82	Vertical	Average
2390.01	13.91	27.65	6.75	0.00	48.31	54.00	-5.69	Vertical	Average
2310.00	12.53	28.05	6.62	0.00	47.20	54.00	-6.80	Horizontal	Average
2390.01	12.75	27.65	6.75	0.00	47.15	54.00	-6.85	Horizontal	Average

802.11n(HT20)					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.49	25.71	27.26	6.83	0.00	59.80	74.00	-14.20	Vertical	Peak
2500.00	26.48	27.20	6.84	0.00	60.52	74.00	-13.48	Vertical	Peak
2483.49	25.96	27.26	6.83	0.00	60.05	74.00	-13.95	Horizontal	Peak
2500.00	24.98	27.20	6.84	0.00	59.02	74.00	-14.98	Horizontal	Peak
2483.49	12.40	27.26	6.83	0.00	46.49	54.00	-7.51	Vertical	Average
2500.00	12.22	27.20	6.84	0.00	46.26	54.00	-7.74	Vertical	Average
2483.49	12.56	27.26	6.83	0.00	46.65	54.00	-7.35	Horizontal	Average
2500.00	12.18	27.20	6.84	0.00	46.22	54.00	-7.78	Horizontal	Average

802.11n(HT40)					CH03				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	27.34	28.05	6.62	0.00	62.01	74.00	-11.99	Vertical	Peak
2389.99	26.76	27.65	6.75	0.00	61.16	74.00	-12.84	Vertical	Peak
2310.00	25.53	28.05	6.62	0.00	60.20	74.00	-13.80	Horizontal	Peak
2389.99	27.11	27.65	6.75	0.00	61.51	74.00	-12.49	Horizontal	Peak
2310.00	12.52	28.05	6.62	0.00	47.19	54.00	-6.81	Vertical	Average
2389.99	16.00	27.65	6.75	0.00	50.40	54.00	-3.60	Vertical	Average
2310.00	12.52	28.05	6.62	0.00	47.19	54.00	-6.81	Horizontal	Average
2389.99	14.01	27.65	6.75	0.00	48.41	54.00	-5.59	Horizontal	Average

802.11n(HT40)					CH09				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.50	26.50	27.26	6.83	0.00	60.59	74.00	-13.41	Vertical	Peak
2500.00	27.31	27.20	6.84	0.00	61.35	74.00	-12.65	Vertical	Peak
2483.50	26.29	27.26	6.83	0.00	60.38	74.00	-13.62	Horizontal	Peak
2500.00	26.86	27.20	6.84	0.00	60.90	74.00	-13.10	Horizontal	Peak
2483.50	13.66	27.26	6.83	0.00	47.75	54.00	-6.25	Vertical	Average
2500.00	12.35	27.20	6.84	0.00	46.39	54.00	-7.61	Vertical	Average
2483.50	13.47	27.26	6.83	0.00	47.56	54.00	-6.44	Horizontal	Average
2500.00	12.41	27.20	6.84	0.00	46.45	54.00	-7.55	Horizontal	Average

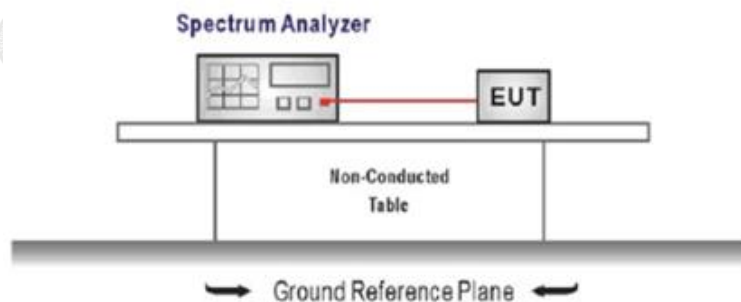
3.7. Band edge and Spurious Emissions (conducted)

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

TEST CONFIGURATION



TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Establish a reference level by using the following procedure
Center frequency=DTS channel center frequency
The span = 1.5 times the DTS bandwidth.
RBW = 100 kHz, VBW $\geq 3 \times$ RBW
Detector = peak, Sweep time = auto couple, Trace mode = max hold
Allow trace to fully stabilize
Use the peak marker function to determine the maximum PSD level

Note: the channel found to contain the maximum PSD level can be used to establish the reference level.
3. Emission level measurement
Set the center frequency and span to encompass frequency range to be measured
RBW = 100 kHz, VBW $\geq 3 \times$ RBW
Detector = peak, Sweep time = auto couple, Trace mode = max hold
Allow trace to fully stabilize
Use the peak marker function to determine the maximum amplitude level.
4. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
5. Ensure that the amplitude of all unwanted emission outside of the authorized frequency band excluding restricted frequency bands) are attenuated by at least the minimum requirements specified (at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz). Report the three highest emission relative to the limit.

TEST MODE:

Please refer to the clause 3.3

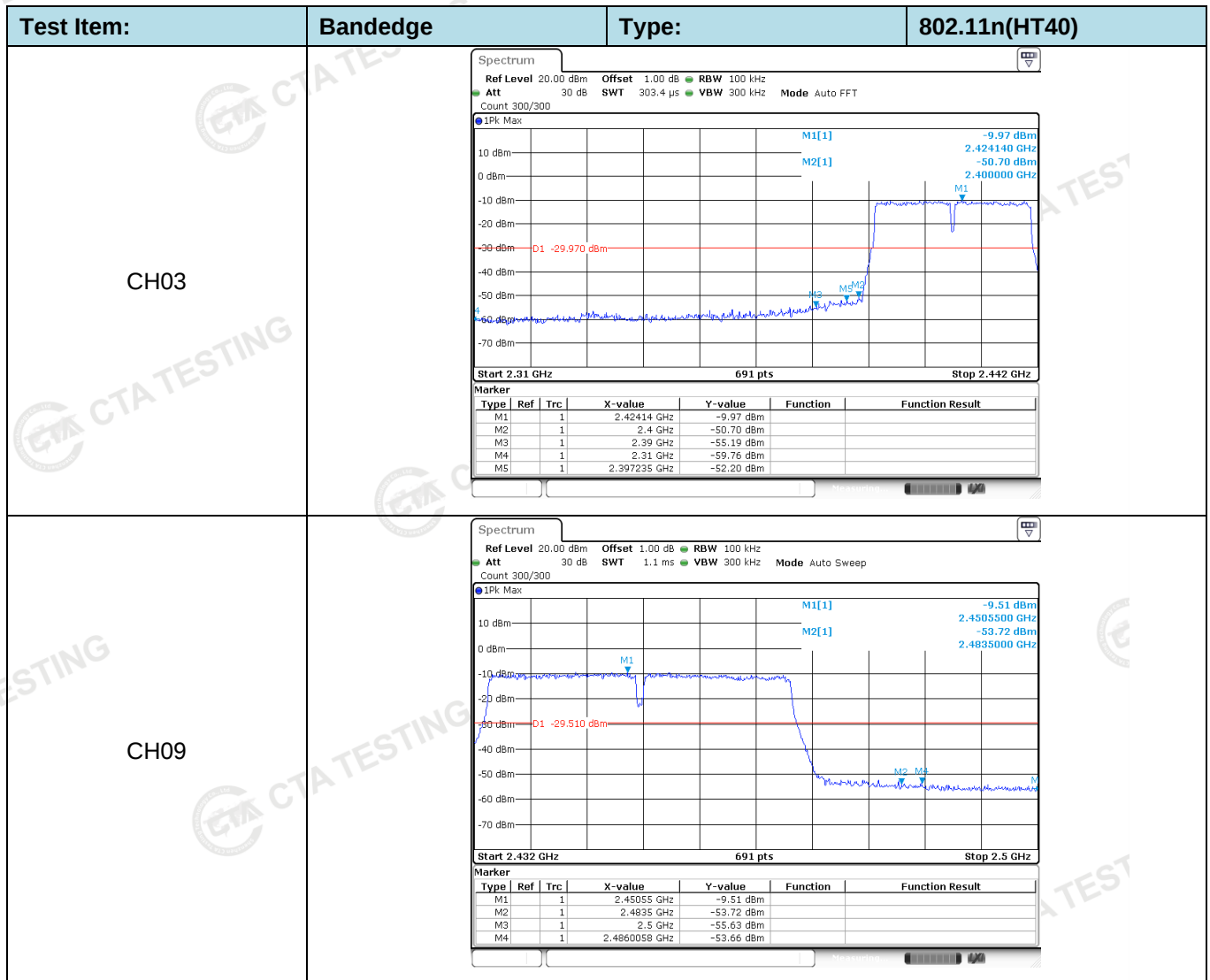
TEST RESULTS

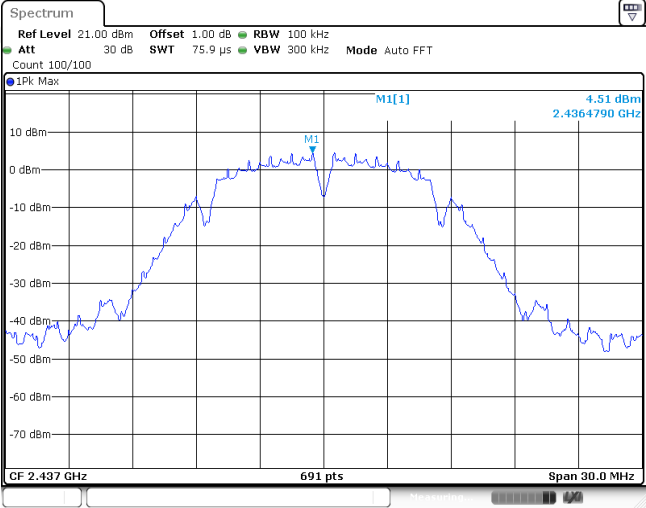
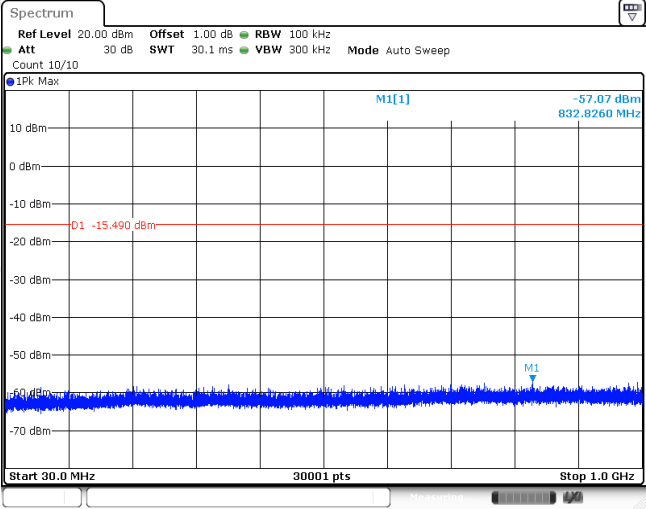
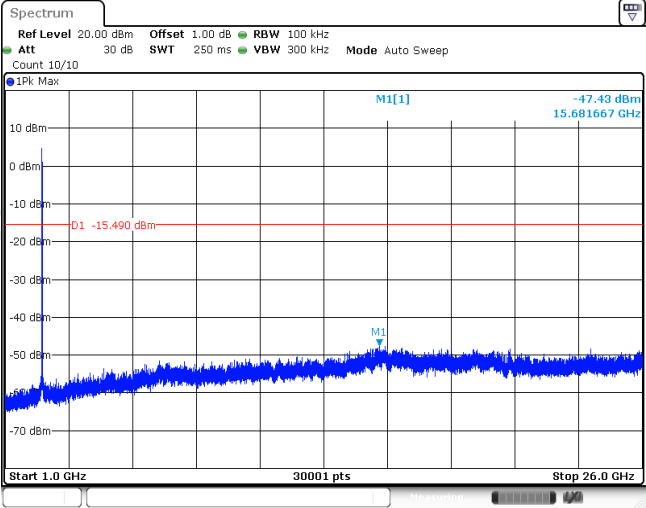
☒ Passed ☐ Not Applicable

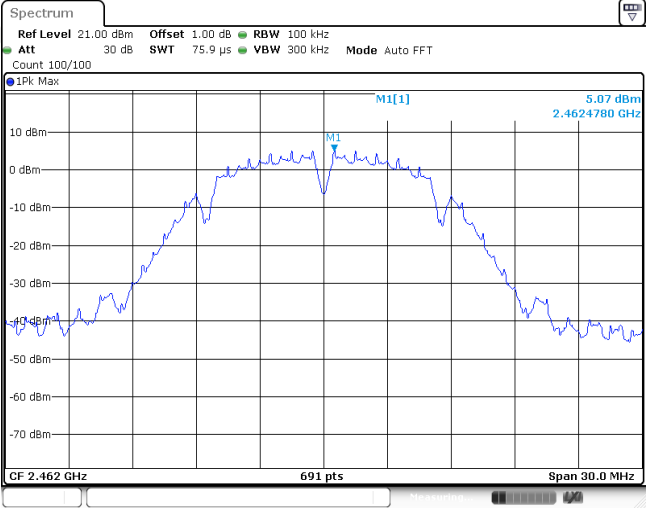
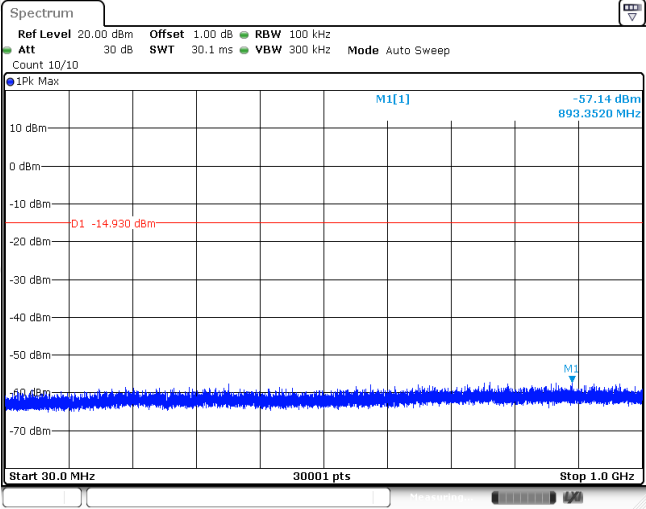
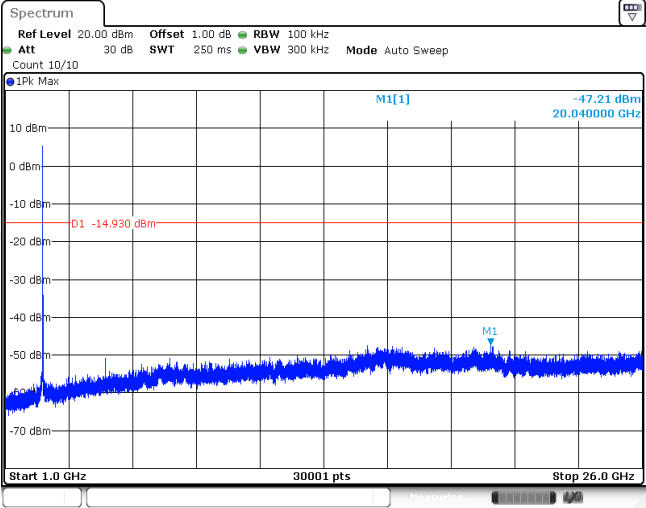
Test Item:	Bandedge	Type:	802.11b																																										
CH01	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 246.5 μs VBW 300 kHz Mode Auto FFT Count 300/300 1Pk Max 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm M1[1] M2[1] D1 -15.850 dBm M3 M4 M5 4.15 dBm 2.411550 GHz -44.06 dBm 2.39 GHz -56.45 dBm 2.31 GHz -60.79 dBm 2.3996 GHz -41.77 dBm Start 2.31 GHz 691 pts Stop 2.422 GHz Marker <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.41155 GHz</td><td>4.15 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-44.06 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-56.45 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-60.79 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.3996 GHz</td><td>-41.77 dBm</td><td></td><td></td></tr></table>			Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.41155 GHz	4.15 dBm			M2	1		2.4 GHz	-44.06 dBm			M3	1		2.39 GHz	-56.45 dBm			M4	1		2.31 GHz	-60.79 dBm			M5	1		2.3996 GHz	-41.77 dBm		
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CH11	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 113.8 μs VBW 300 kHz Mode Auto FFT Count 300/300 1Pk Max 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm M1[1] M2[1] D1 -14.990 dBm M2 M4 5.01 dBm 2.4614820 GHz -56.64 dBm 2.5 GHz -58.10 dBm 2.4940174 GHz -53.72 dBm Start 2.452 GHz 691 pts Stop 2.5 GHz Marker <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-value</th><th>Y-value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.461482 GHz</td><td>5.01 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-56.64 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-58.10 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.4940174 GHz</td><td>-53.72 dBm</td><td></td><td></td></tr></table>			Type	Ref	Trc	X-value	Y-value	Function	Function Result	M1	1		2.461482 GHz	5.01 dBm			M2	1		2.4835 GHz	-56.64 dBm			M3	1		2.5 GHz	-58.10 dBm			M4	1		2.4940174 GHz	-53.72 dBm									
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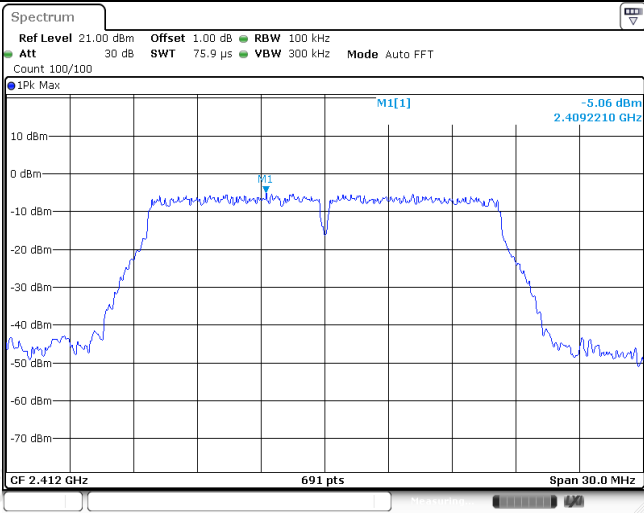
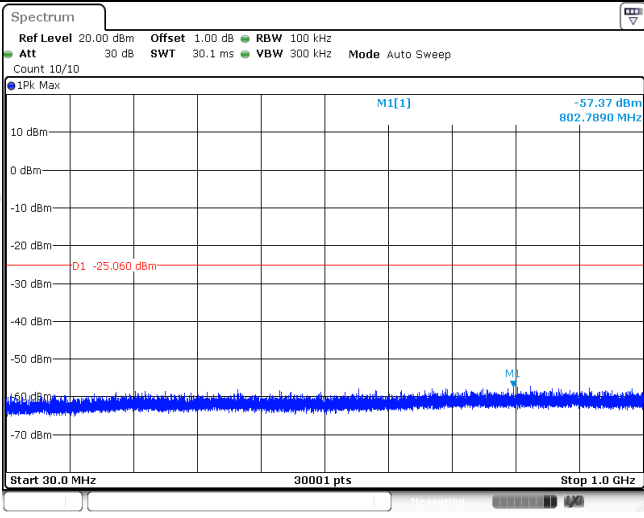
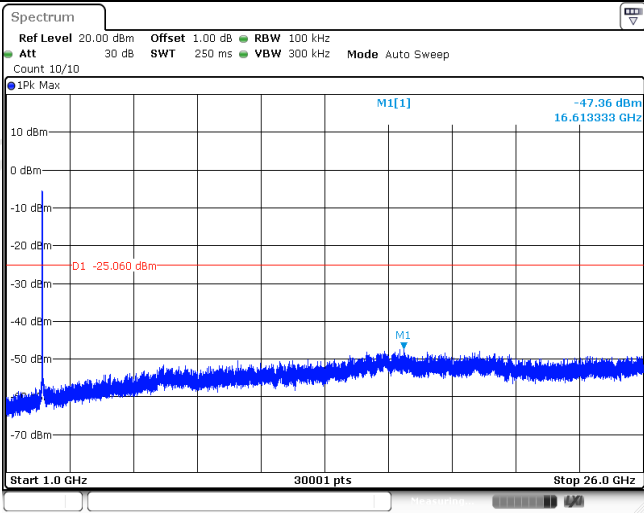
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Type	Ref	Trc	X-value	Y-value	Function	Function Result																																						
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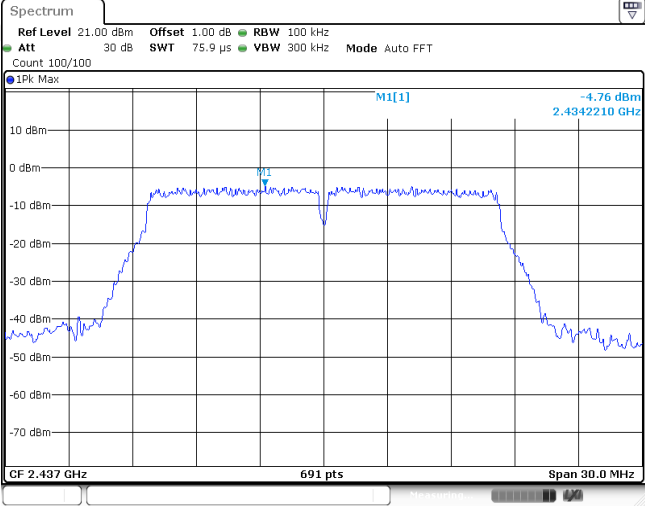
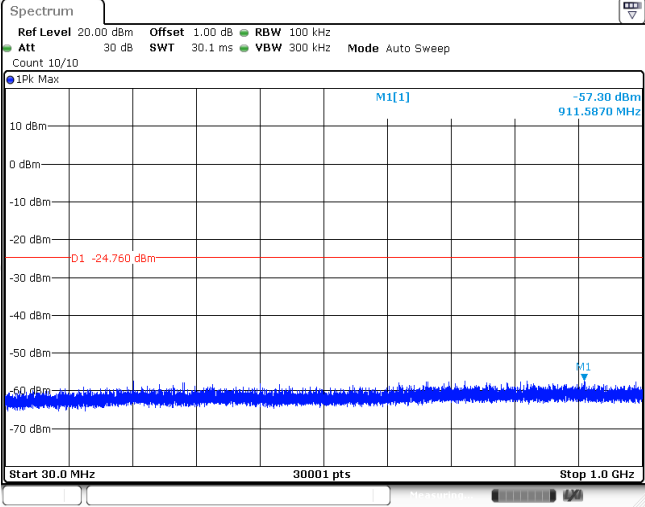
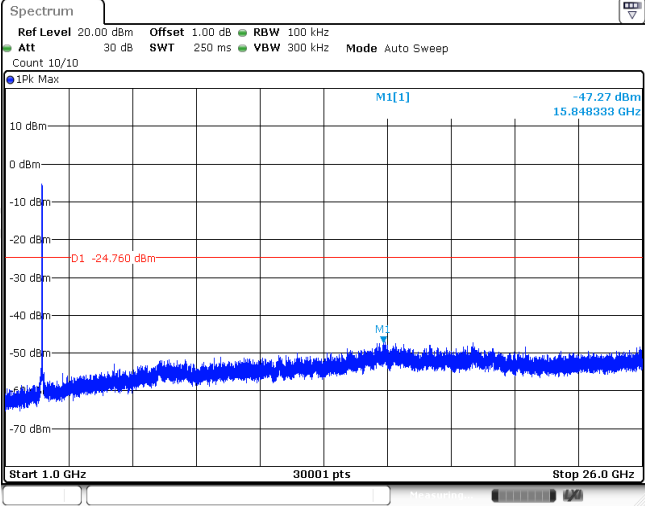
Test Item:	Bandedge	Type:	802.11n(HT20)																																										
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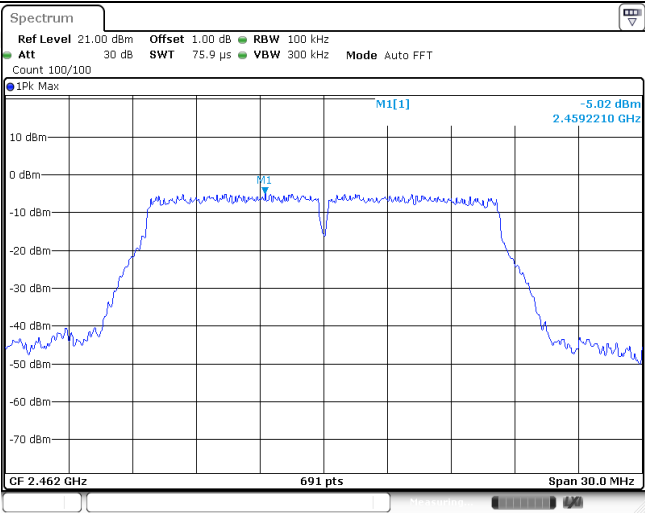
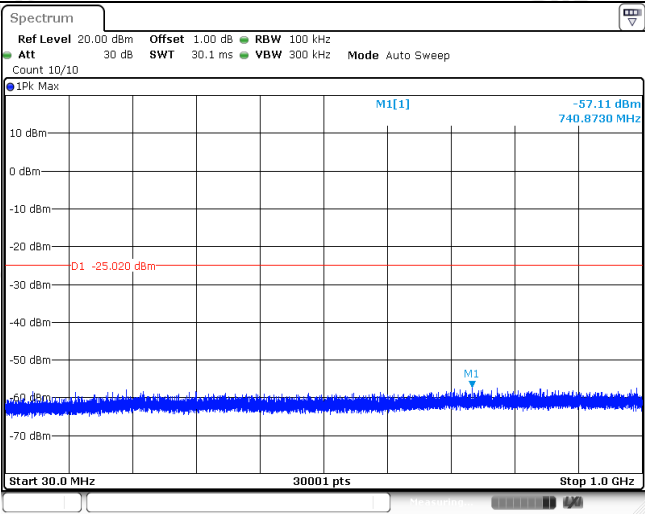
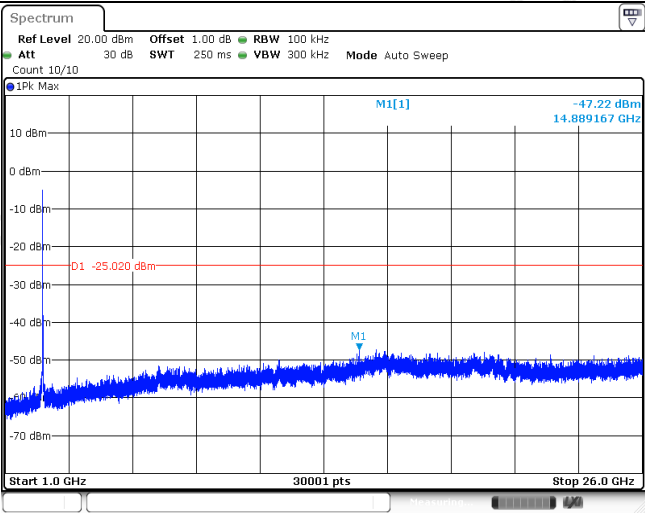


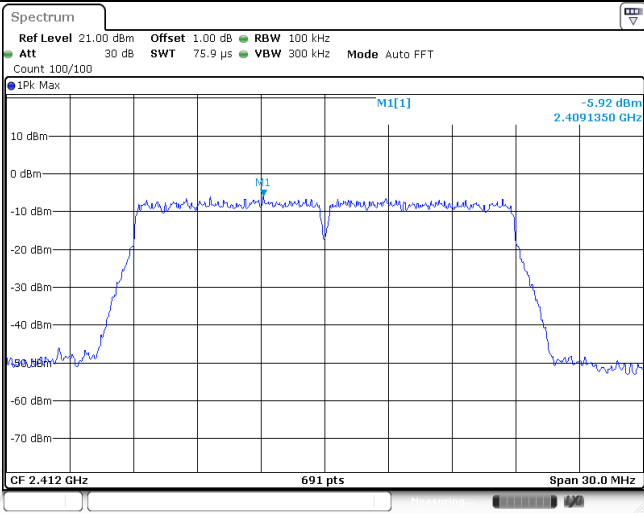
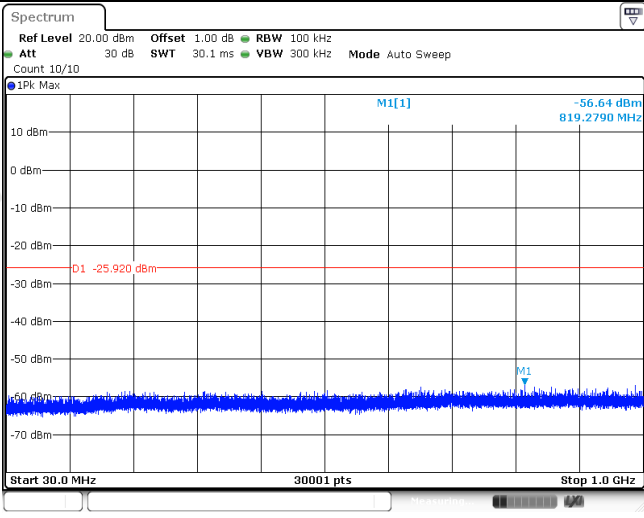
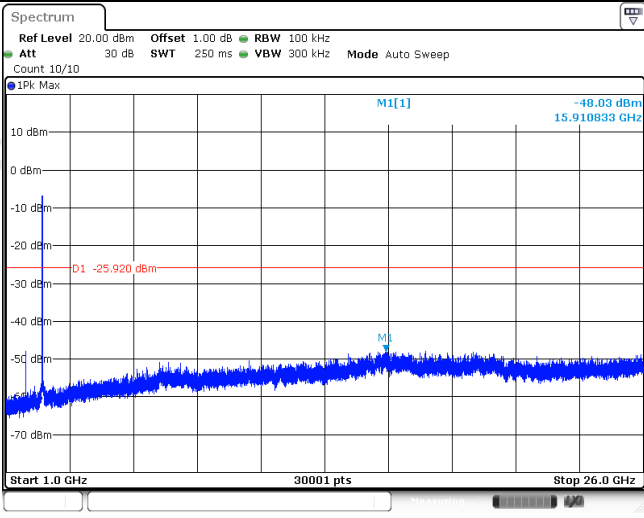
CH06 Reference level	
CH06 30MHz~1000MHz	
CH06 1GHz~26GHz	

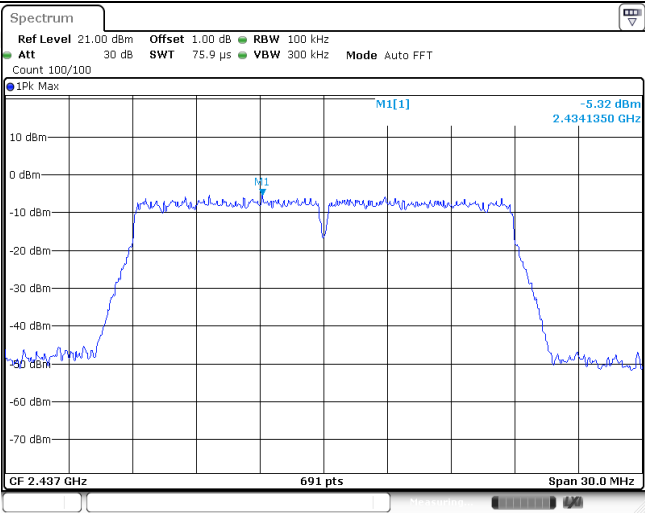
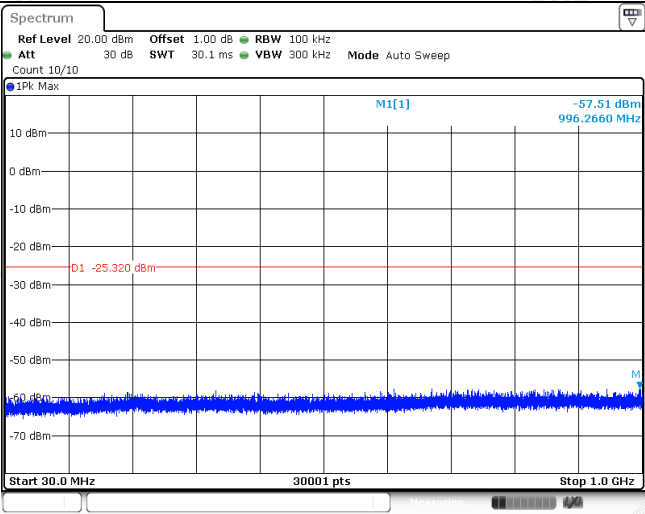
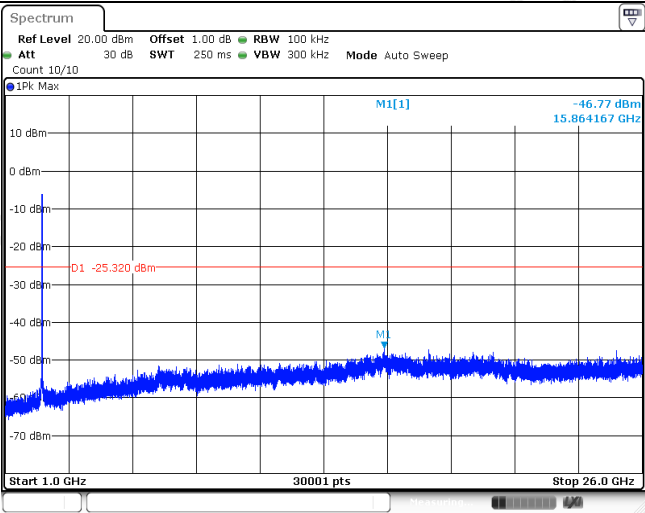
CH11 Reference level	
CH11 30MHz~1000MHz	
CH11 1GHz~26GHz	

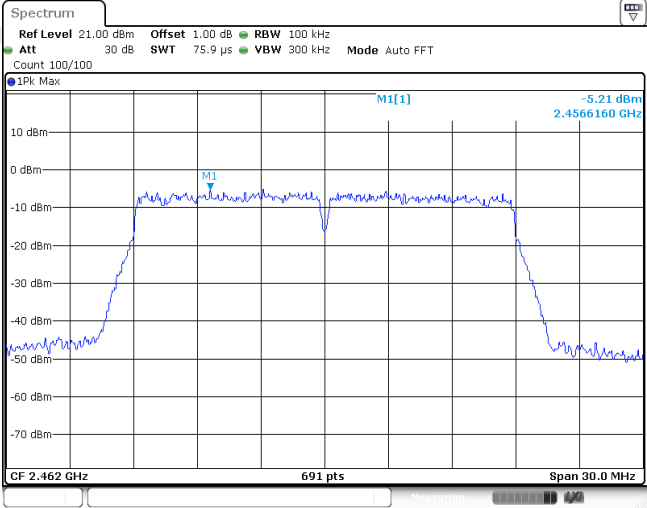
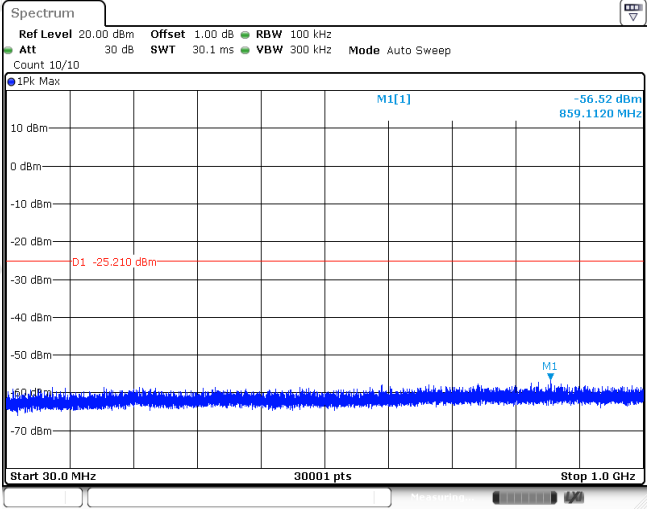
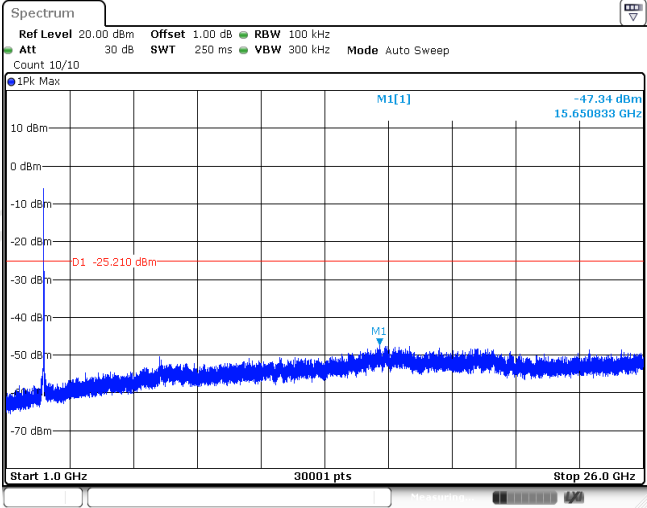
Test Item:	SE	Type:	802.11g
CH01 Reference level	 Spectrum Ref Level 21.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 75.9 μs VBW 300 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -5.06 dBm 2.4092210 GHz CF 2.412 GHz 691 pts Span 30.0 MHz		
CH01 30MHz~1000MHz	 Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1Pk Max M1[1] -57.37 dBm 802.7890 MHz D1 -25.060 dBm Start 30.0 MHz 30001 pts Stop 1.0 GHz		
CH01 1GHz~26GHz	 Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1Pk Max M1[1] -47.36 dBm 16.613333 GHz D1 -25.060 dBm Start 1.0 GHz 30001 pts Stop 26.0 GHz		

CH06 Reference level	 Spectrum Ref Level 21.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 75.9 μs VBW 300 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] -4.76 dBm 2.4342210 GHz CF 2.437 GHz 691 pts Span 30.0 MHz
CH06 30MHz~1000MHz	 Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1Pk Max M1[1] -57.30 dBm 911.5870 MHz D1 -24.760 dBm Start 30.0 MHz 30001 pts Stop 1.0 GHz
CH06 1GHz~26GHz	 Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1Pk Max M1[1] -47.27 dBm 15.848333 GHz D1 -24.760 dBm Start 1.0 GHz 30001 pts Stop 26.0 GHz

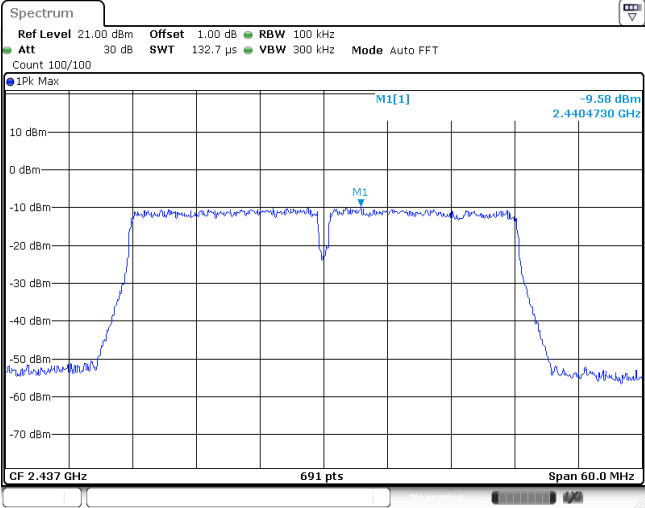
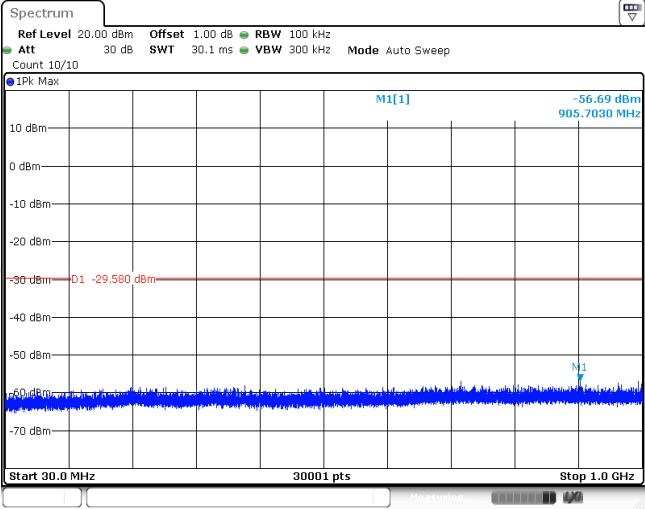
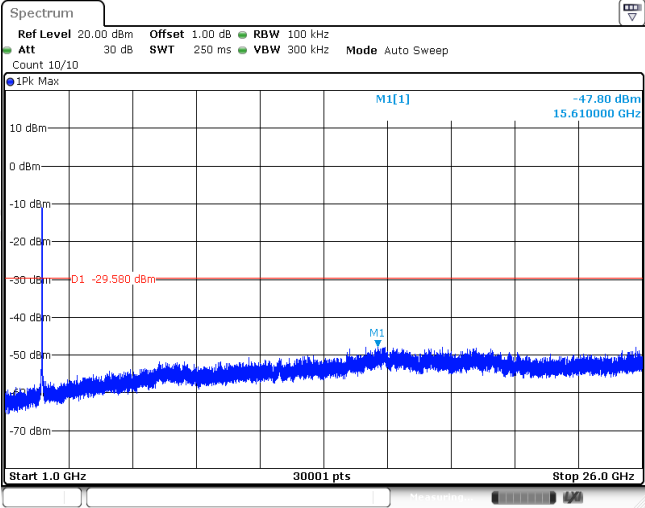
CH11 Reference level	
CH11 30MHz~1000MHz	
CH11 1GHz~26GHz	

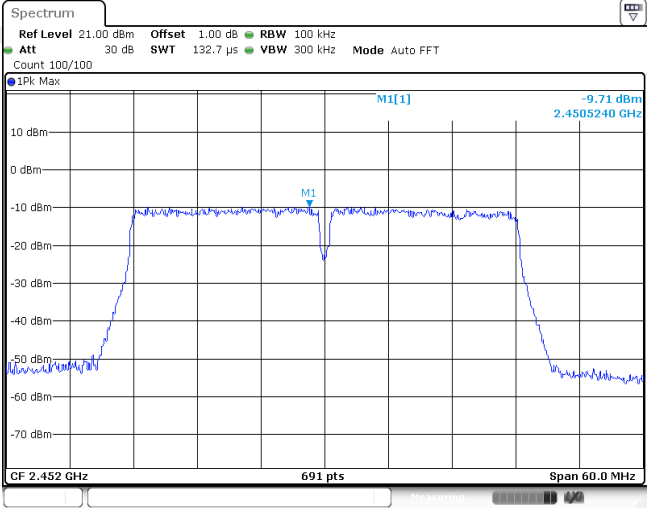
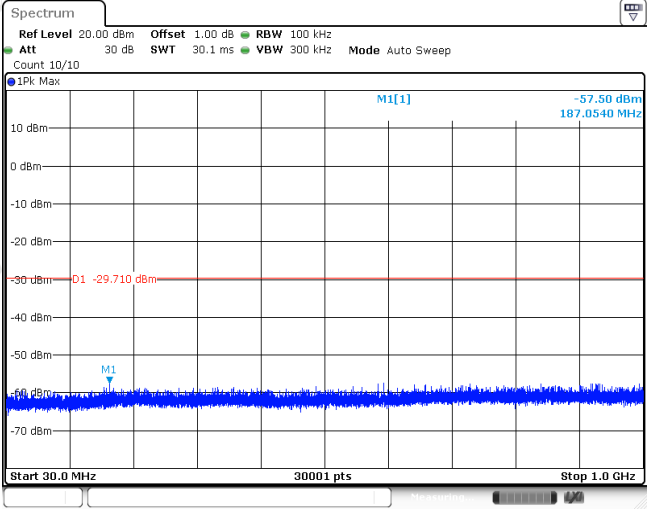
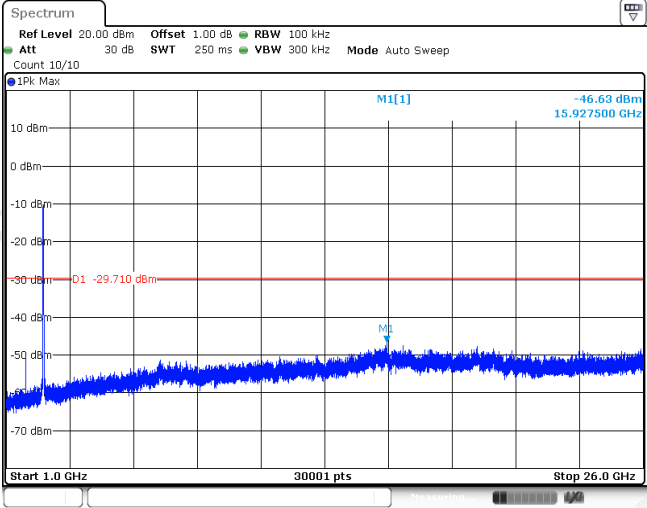
Test Item:	SE	Type:	802.11n(HT20)
CH01 Reference level			
CH01 30MHz~1000MHz			
CH01 1GHz~26GHz			

CH06 Reference level	
CH06 30MHz~1000MHz	
CH06 1GHz~26GHz	

CH11 Reference level	 The spectrum plot displays a reference level. The y-axis represents power in dBm, ranging from -70 to 10. The x-axis represents frequency in GHz, with a center frequency (CF) of 2.462 GHz and a span of 30.0 MHz. A single peak is visible at 2.4566160 GHz with a power of -5.21 dBm. The plot includes parameters: Ref Level 21.00 dBm, Offset 1.00 dB, RBW 100 kHz, Att 30 dB, SWT 75.9 μs, VBW 300 kHz, Mode Auto FFT, and Count 100/100.
CH11 30MHz~1000MHz	 The spectrum plot shows a noise floor across the 30 MHz to 1000 MHz range. The y-axis ranges from -70 to 10 dBm. The x-axis shows a start frequency of 30.0 MHz and a stop frequency of 1.0 GHz, with 30001 points. A red horizontal line is drawn at -25.210 dBm. A peak is marked at 859.1120 MHz with a power of -56.52 dBm. Parameters: Ref Level 20.00 dBm, Offset 1.00 dB, RBW 100 kHz, Att 30 dB, SWT 30.1 ms, VBW 300 kHz, Mode Auto Sweep, and Count 10/10.
CH11 1GHz~26GHz	 The spectrum plot displays a noise floor from 1 GHz to 26 GHz. The y-axis ranges from -70 to 10 dBm. The x-axis shows a start frequency of 1.0 GHz and a stop frequency of 26.0 GHz, with 30001 points. A red horizontal line is drawn at -25.210 dBm. A peak is marked at 15.650833 GHz with a power of -47.34 dBm. Parameters: Ref Level 20.00 dBm, Offset 1.00 dB, RBW 100 kHz, Att 30 dB, SWT 250 ms, VBW 300 kHz, Mode Auto Sweep, and Count 10/10.

Test Item:	SE	Type:	802.11n(HT40)
CH03 Reference level	Spectrum Ref Level 21.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 132.7 μs VBW 300 kHz Mode Auto FFT Count 100/100 IPk Max M1[1] -9.88 dBm 2.4254730 GHz M1 CF 2.422 GHz 691 pts Span 60.0 MHz		
CH03 30MHz~1000MHz	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 IPk Max M1[1] -57.27 dBm 844.8860 MHz D1 -29.880 dBm M1 Start 30.0 MHz 30001 pts Stop 1.0 GHz		
CH03 1GHz~26GHz	Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 IPk Max M1[1] -47.54 dBm 15.580833 GHz D1 -29.880 dBm M1 Start 1.0 GHz 30001 pts Stop 26.0 GHz		

CH06 Reference level	
CH06 30MHz~1000MHz	
CH06 1GHz~26GHz	

CH09 Reference level	
CH09 30MHz~1000MHz	
CH09 1GHz~26GHz	

3.8. Spurious Emissions (radiated)

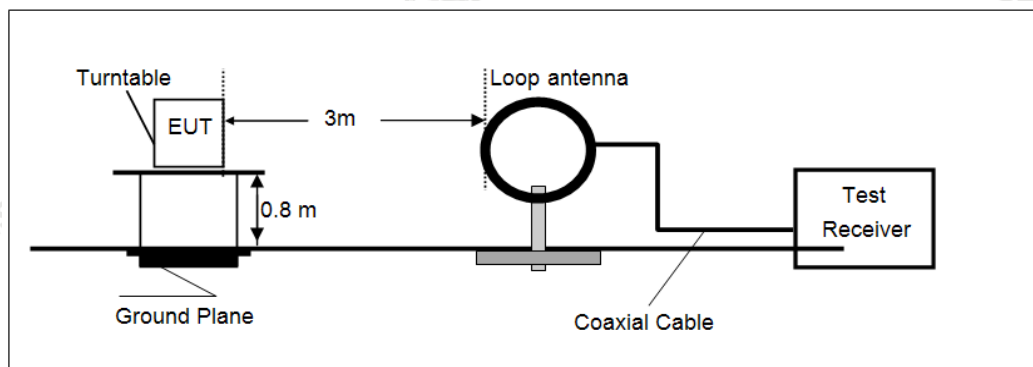
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

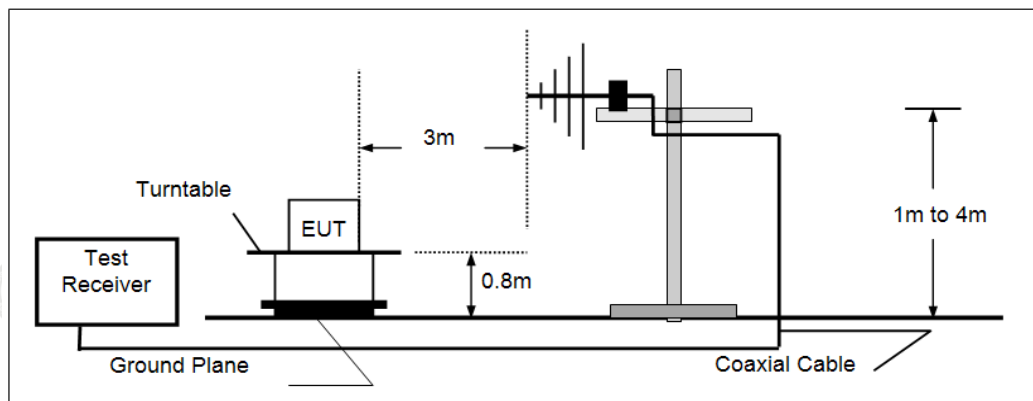
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30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

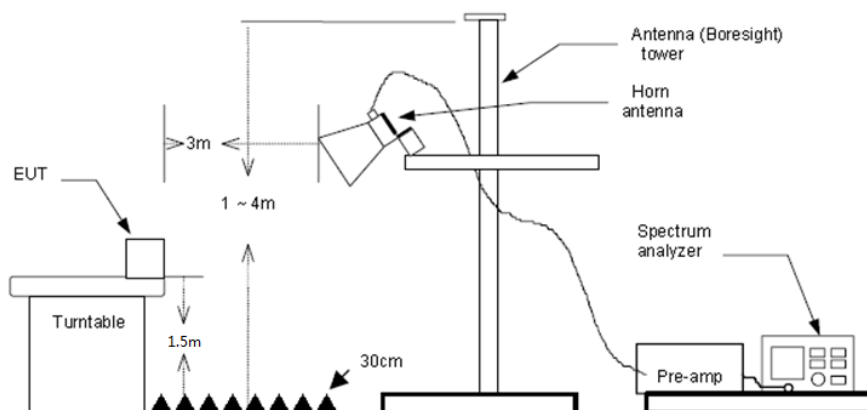
➤ 9kHz ~30MHz



➤ 30MHz ~ 1GHz



➤ Above 1GHz



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz:
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - (3) From 1 GHz to 10th harmonic:
RBW=1MHz, VBW=3MHz Peak detector for Peak value.
RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

Note:

- 1) Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.

➤ **9kHz ~ 30MHz**

The EUT was pre-scanned the frequency band (9kHz~30MHz), found the radiated level lower than the limit, so don't show on the report.

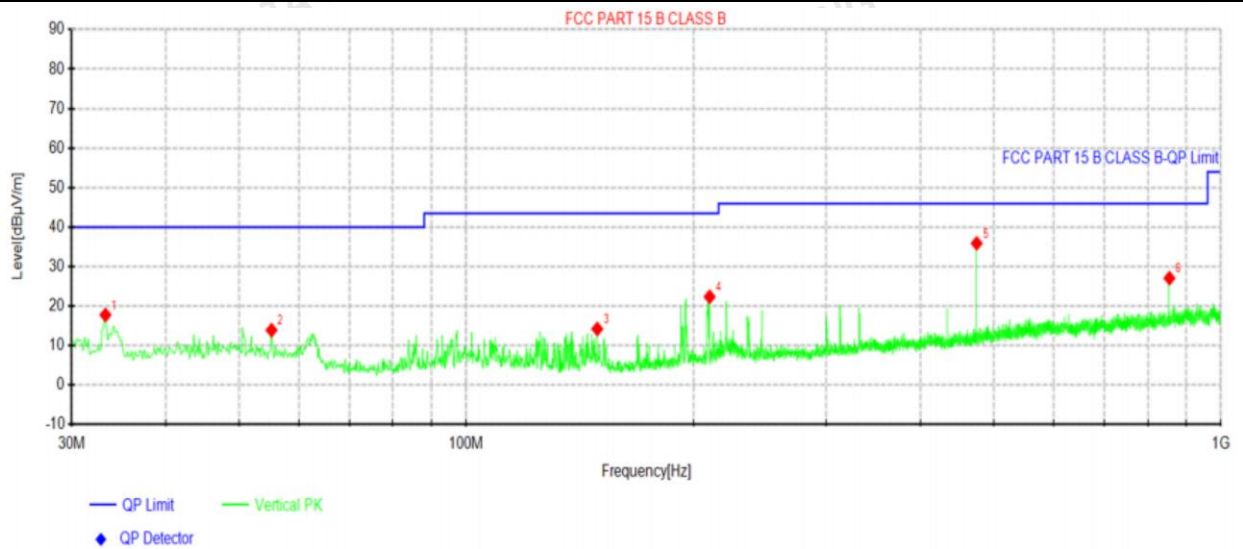
➤ **30MHz ~1000MHz**

Have pre-scan all modulation mode, found the 802.11b mode CH01 which it was worst case, so only the worst case's data on the test report.

➤ 30MHz ~ 1GHz

Polarization:

Vertical



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.2738	35.94	17.78	-18.16	40.00	22.22	100	220	Vertical
2	55.22	31.10	13.92	-17.18	40.00	26.08	100	164	Vertical
3	149.188	36.00	14.24	-21.76	43.50	29.26	100	334	Vertical
4	210.177	41.46	22.37	-19.09	43.50	21.13	100	347	Vertical
5	474.745	50.59	35.91	-14.68	46.00	10.09	100	115	Vertical
6	854.742	36.85	27.09	-9.76	46.00	18.91	100	172	Vertical

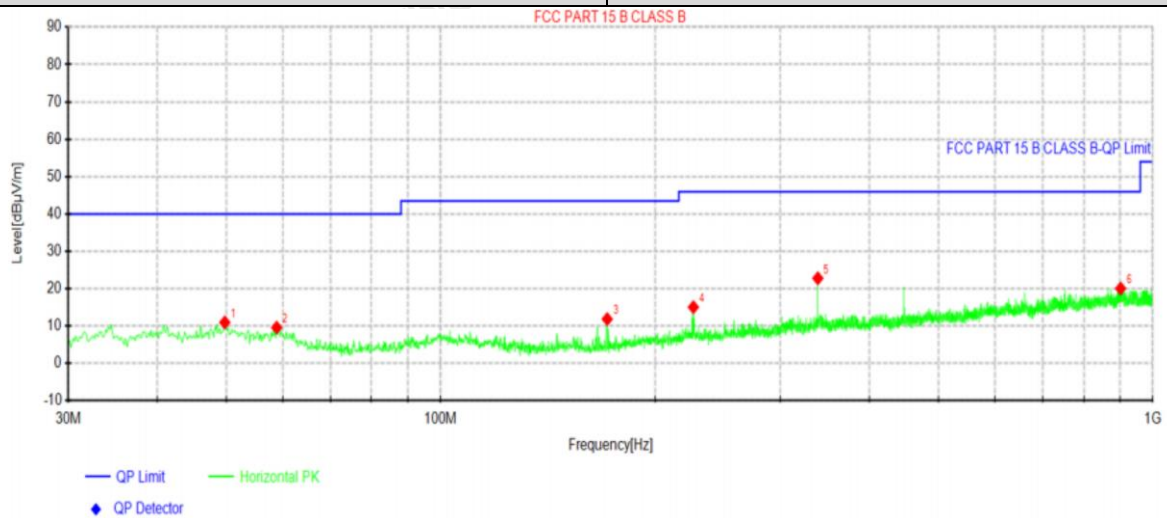
Note:1). Level (dBμV/m) = Reading (dBμV) + Factor (dB/m)

2). Factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin (dB) = Limit (dBμV/m) - Level (dBμV/m)

Polarization:

Horizontal



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	49.7638	27.07	10.99	-16.08	40.00	29.01	100	107	Horizontal
2	58.8575	27.57	9.61	-17.96	40.00	30.39	100	33	Horizontal
3	171.377	32.85	11.88	-20.97	43.50	31.62	100	293	Horizontal
4	226.425	33.67	15.08	-18.59	46.00	30.92	100	285	Horizontal
5	338.581	39.15	22.80	-16.35	46.00	23.20	100	163	Horizontal
6	901.181	29.25	20.07	-9.18	46.00	25.93	100	350	Horizontal

Note:1). Level (dBμV/m) = Reading (dBμV) + Factor (dB/m)

2). Factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin (dB) = Limit (dBμV/m) - Level (dBμV/m)

➤ 1 GHz ~ 25 GHz

802.11b					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1213.44	34.54	26.29	4.68	37.22	28.29	74.00	-45.71	Vertical	Peak
3088.45	34.41	28.78	7.59	37.50	33.28	74.00	-40.72	Vertical	Peak
5689.36	32.08	31.62	10.41	34.31	39.80	74.00	-34.20	Vertical	Peak
7880.77	31.18	36.59	12.87	33.06	47.58	74.00	-26.42	Vertical	Peak
1468.70	32.81	25.83	5.20	37.08	26.76	74.00	-47.24	Horizontal	Peak
3143.98	34.00	28.80	7.65	37.45	33.00	74.00	-41.00	Horizontal	Peak
5476.22	30.96	31.81	10.18	34.46	38.49	74.00	-35.51	Horizontal	Peak
7566.25	30.35	36.17	12.61	33.03	46.10	74.00	-27.90	Horizontal	Peak

802.11b					CH06				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1207.28	34.79	26.29	4.67	37.22	28.53	74.00	-45.47	Vertical	Peak
4045.06	33.62	29.79	8.82	36.72	35.51	74.00	-38.49	Vertical	Peak
6594.52	31.38	34.19	11.35	33.67	43.25	74.00	-30.75	Vertical	Peak
8770.01	31.12	37.76	13.07	32.98	48.97	74.00	-25.03	Vertical	Peak
1303.09	33.69	26.19	4.84	37.17	27.55	74.00	-46.45	Horizontal	Peak
3160.03	34.16	28.80	7.67	37.43	33.20	74.00	-40.80	Horizontal	Peak
6219.51	30.83	32.94	11.01	33.91	40.87	74.00	-33.13	Horizontal	Peak
9251.58	31.05	38.91	13.55	33.44	50.07	74.00	-23.93	Horizontal	Peak

802.11b					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1182.94	34.56	26.17	4.62	37.23	28.12	74.00	-45.88	Vertical	Peak
3184.25	33.08	28.80	7.70	37.41	32.17	74.00	-41.83	Vertical	Peak
5125.52	32.40	31.80	9.77	35.13	38.84	74.00	-35.16	Vertical	Peak
7508.69	30.90	36.11	12.42	33.02	46.41	74.00	-27.59	Vertical	Peak
1273.57	34.63	26.23	4.79	37.18	28.47	74.00	-45.53	Horizontal	Peak
3096.33	35.00	28.79	7.60	37.49	33.90	74.00	-40.10	Horizontal	Peak
5086.52	32.57	31.85	9.74	35.21	38.95	74.00	-35.05	Horizontal	Peak
7376.08	31.86	36.30	12.04	33.23	46.97	74.00	-27.03	Horizontal	Peak

Remark:

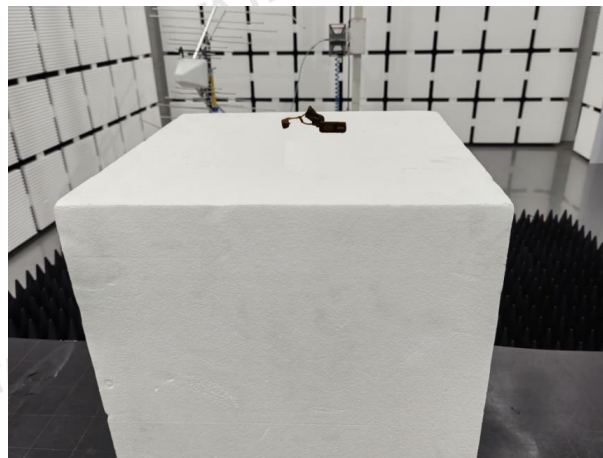
1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The peak level is lower than average limit (54 dBuV/m), this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies (test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.
4. Pre-scan all modes, found the 802.11b was the worst case and recorded it.

4. TEST SETUP PHOTOS

Conducted Emissions



Radiated Emissions



5. EXTERNAL AND INTERNAL PHOTOS

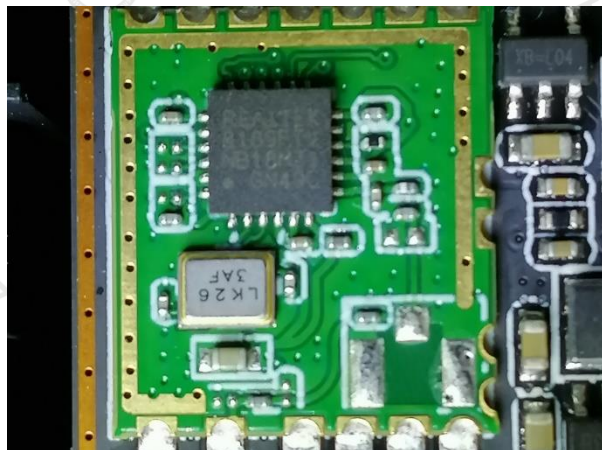
External Photos





Internal Photos





-----End of Report-----