TEST REPORT

FCC Part 15C

Report Reference No.....:	**CTA240315601**
FCC ID. .....:	**2BEUO-H1**
Compiled by (position+printed name+signature).....:	File administrators Zoey Cao
Supervised by (position+printed name+signature).....:	Project Engineer Amy Wen
Approved by (position+printed name+signature).....:	RF Manager Eric Wang
Date of issue .....:	2024-03-16

Testing Laboratory Name.....:	**Shenzhen CTA Testing Technology Co., Ltd.**
Address .....:	Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name.....:	**Guangzhou Hongding Electronic Technology Co. , Ltd.**
Address .....:	503, Building C, Daxin Industrial Park, No. 3 East Development Road,Xisan Village, Luopu Street, Panyu District, Guangzhou City, China

Test specification .....:	
Standard.....:	**FCC Part 15C**

Test item description .....:	Security cameras
Trade Mark.....:	/
Manufacturer.....:	**Guangzhou Hongding Electronic Technology Co. , Ltd.**
Model/Type reference.....:	H1
Listed Models .....:	H2、H3、A10、P2、Q18、Q10、Q8、Q7、X22
Ratings .....:	DC 3.7V from Battery
Result .....:	**PASS**

TEST REPORT

Equipment under Test	:	Security cameras
Model /Type	:	H1
Listed Models	:	H2、H3、A10、P2、Q18、Q10、Q8、Q7、X22
Applicant	:	**Guangzhou Hongding Electronic Technology Co. , Ltd.**
Address	:	503, Building C, Daxin Industrial Park, No. 3 East Development Road,Xisan Village, Luopu Street, Panyu District, Guangzhou City, China
Manufacturer	:	**Guangzhou Hongding Electronic Technology Co. , Ltd.**
Address	:	503, Building C, Daxin Industrial Park, No. 3 East Development Road,Xisan Village, Luopu Street, Panyu District, Guangzhou City, China

Test result	**Pass ***

Contents

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 forTesting 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

compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 1"and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof 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	:	2024.03.01
Testing commenced on	:	2024.03.01
Testing concluded on	:	2024.03.15

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	Security cameras
Model Number	H1
Power Supply	DC 3.7V from battery
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	Integral antenna
Antenna Gain	0dBi
Sample ID:	CTA2403156#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 anantenna 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.

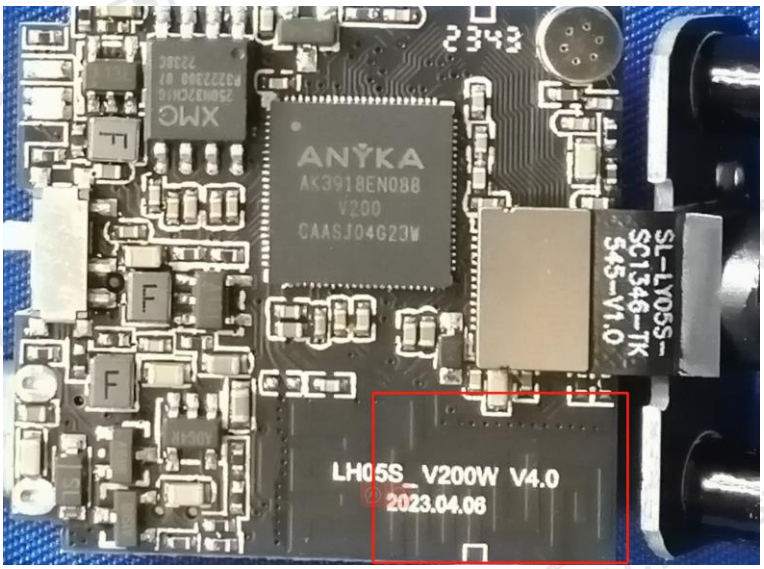
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(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)

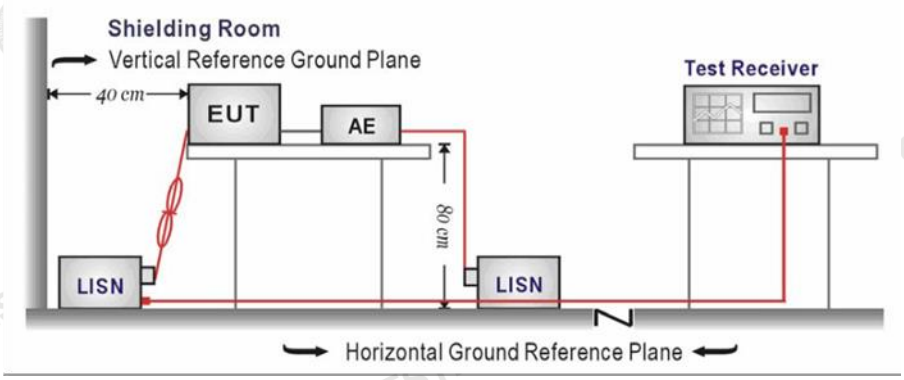
LIMIT

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

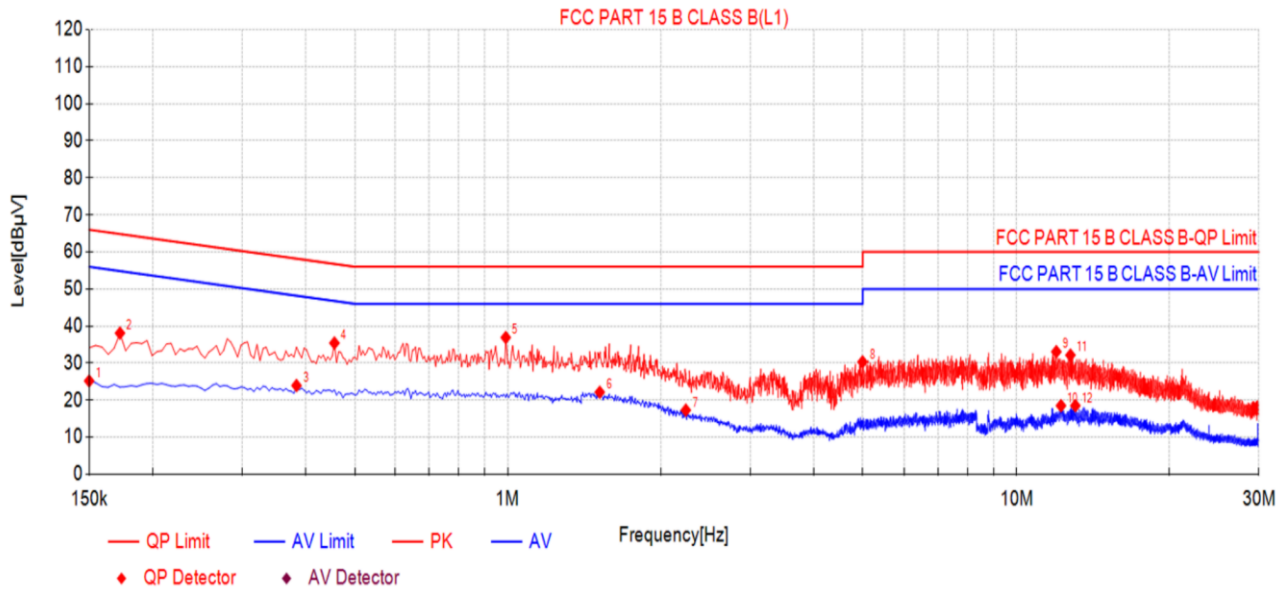
TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note:

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

Test Line:	L

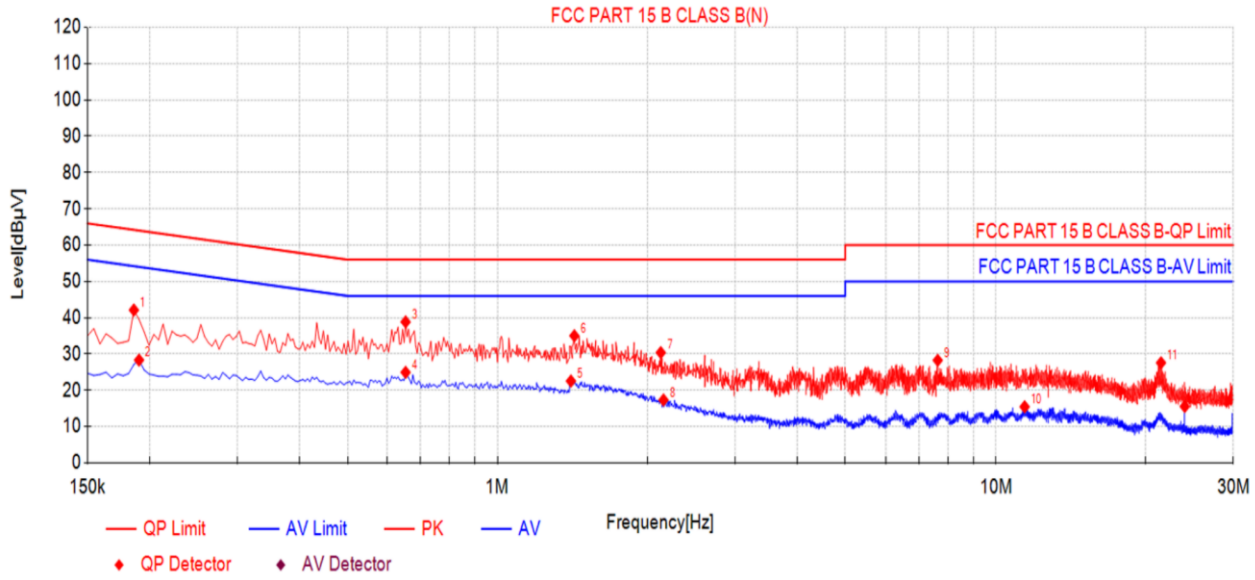


Suspected List

NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector	Type	Verdict
1	0.15	14.69	25.19	10.50	56.00	30.81	AV	L1	PASS
2	0.1725	27.60	38.10	10.50	64.84	26.74	PK	L1	PASS
3	0.384	13.45	23.95	10.50	48.19	24.24	AV	L1	PASS
4	0.456	24.91	35.41	10.50	56.77	21.36	PK	L1	PASS
5	0.9915	26.42	36.92	10.50	56.00	19.08	PK	L1	PASS
6	1.518	11.64	22.14	10.50	46.00	23.86	AV	L1	PASS
7	2.2425	6.80	17.30	10.50	46.00	28.70	AV	L1	PASS
8	4.9965	19.83	30.33	10.50	56.00	25.67	PK	L1	PASS
9	11.9715	22.57	33.07	10.50	60.00	26.93	PK	L1	PASS
10	12.228	8.01	18.51	10.50	50.00	31.49	AV	L1	PASS
11	12.7635	21.66	32.16	10.50	60.00	27.84	PK	L1	PASS
12	13.0515	8.01	18.51	10.50	50.00	31.49	AV	L1	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)

Test Line:	N



Suspected List

NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector	Type	Verdict
1	0.186	31.62	42.12	10.50	64.21	22.09	PK	N	PASS
2	0.1905	17.83	28.33	10.50	54.01	25.68	AV	N	PASS
3	0.654	28.34	38.84	10.50	56.00	17.16	PK	N	PASS
4	0.654	14.45	24.95	10.50	46.00	21.05	AV	N	PASS
5	1.4055	12.05	22.55	10.50	46.00	23.45	AV	N	PASS
6	1.428	24.52	35.02	10.50	56.00	20.98	PK	N	PASS
7	2.13	19.88	30.38	10.50	56.00	25.62	PK	N	PASS
8	2.157	6.83	17.33	10.50	46.00	28.67	AV	N	PASS
9	7.638	17.76	28.26	10.50	60.00	31.74	PK	N	PASS
10	11.418	4.96	15.46	10.50	50.00	34.54	AV	N	PASS
11	21.462	17.07	27.57	10.50	60.00	32.43	PK	N	PASS
12	23.955	5.04	15.54	10.50	50.00	34.46	AV	N	PASS

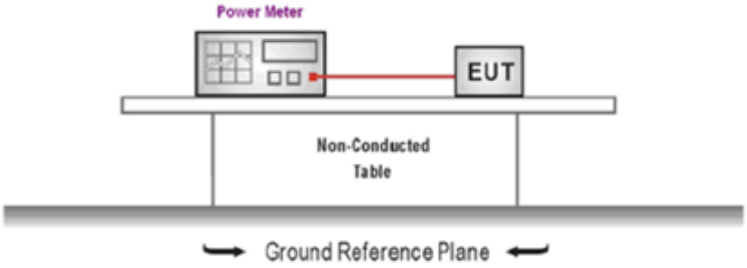
Note:1).QP Value (dBµV)= QP Reading (dBµV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBµV) - QP Value (dBµV)
4). AVMargin(dB) = AV Limit (dBµV) - AV Value (dBµV)

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**

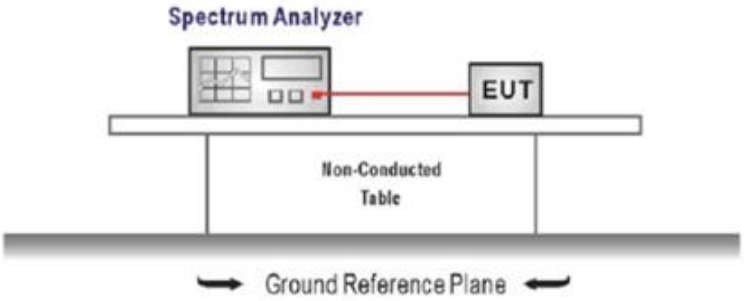
Type	Channel	Peak Output power (dBm)	Limit (dBm)	Result
802.11b	01	17.14	≤30.00	Pass
	06	17.13		
	11	17.03		
802.11g	01	16.06	≤30.00	Pass
	06	16.03		
	11	15.94		
802.11n(HT20)	01	14.96	≤30.00	Pass
	06	15.00		
	11	14.90		
802.11n(HT40)	03	14.27	≤30.00	Pass
	06	14.11		
	09	14.00		

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 kHz ≤ RBW ≤ 100 kHz, VBW ≥ 3 × 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:

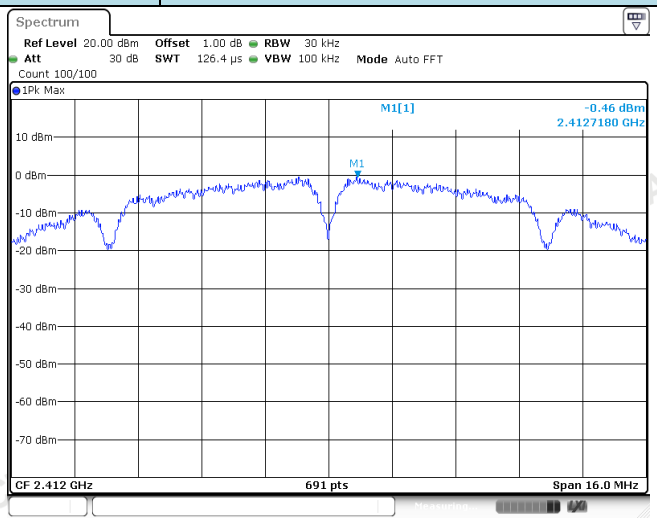
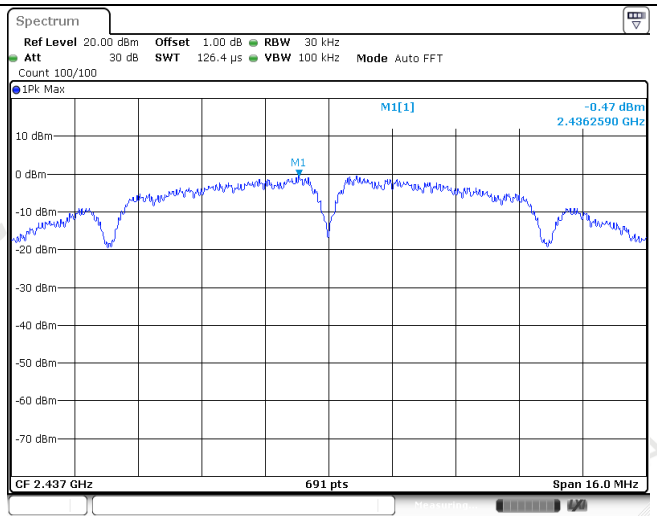
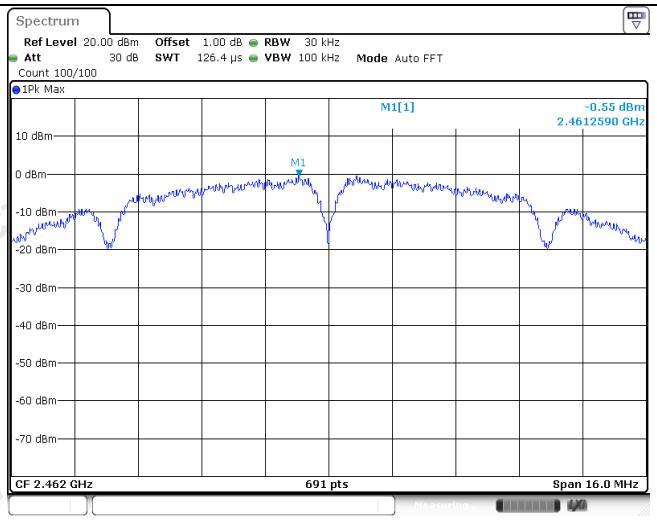
Please refer to the clause 3.3

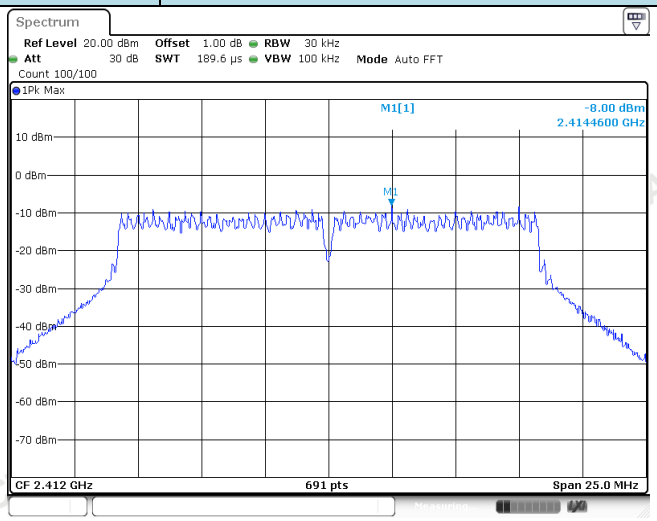
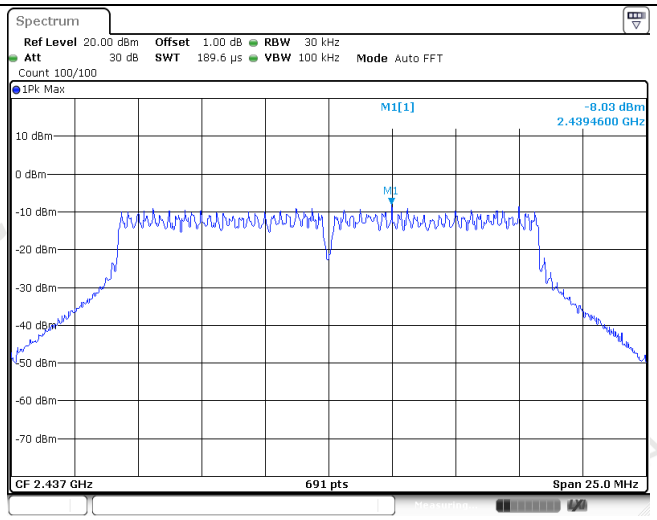
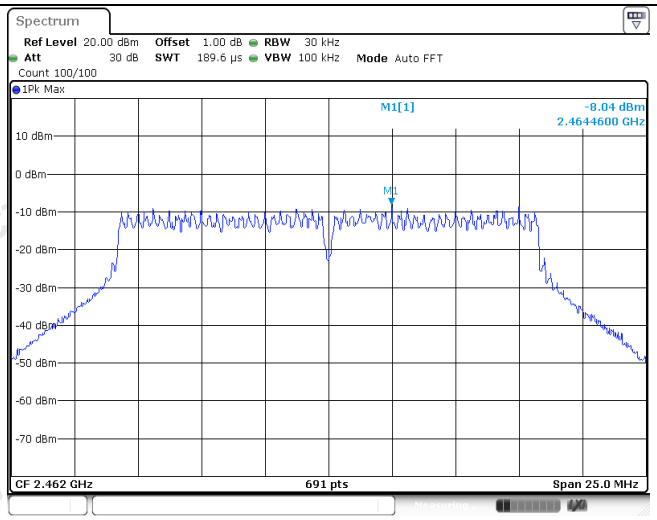
TEST RESULTS

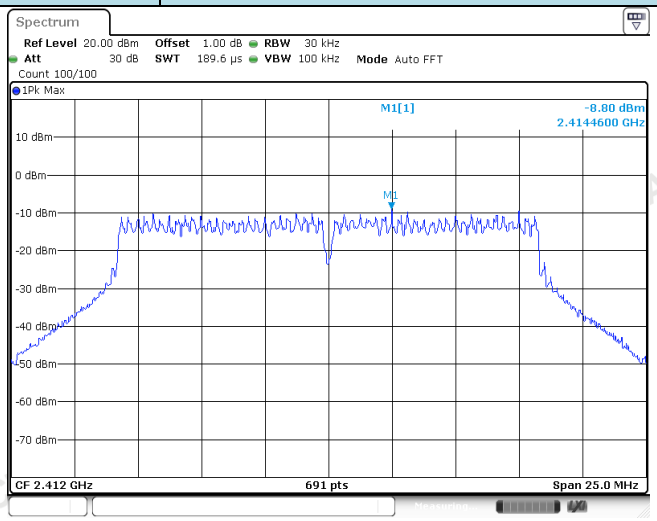
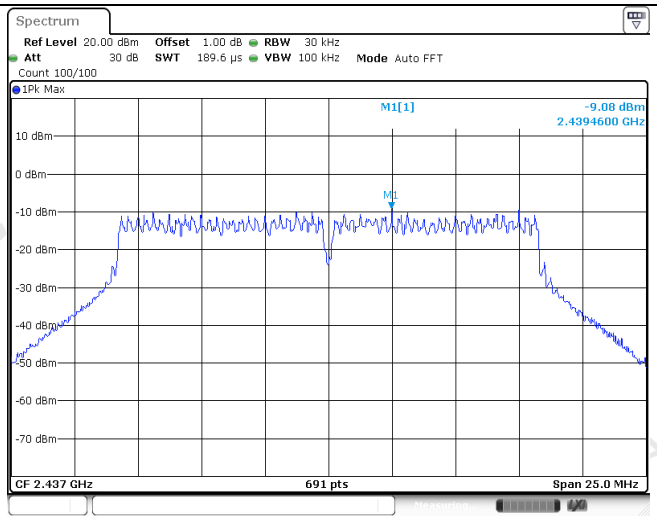
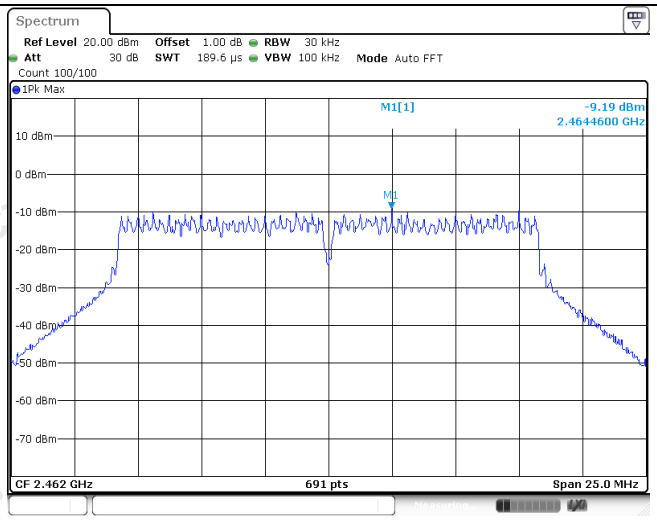
☒ **Passed** ☐ **Not Applicable**

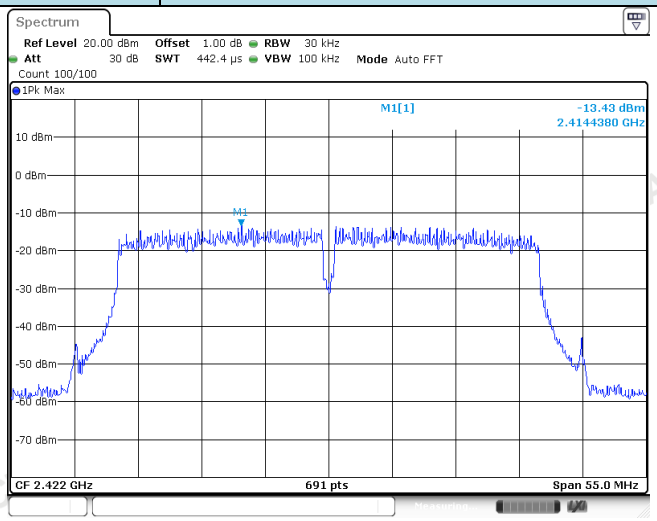
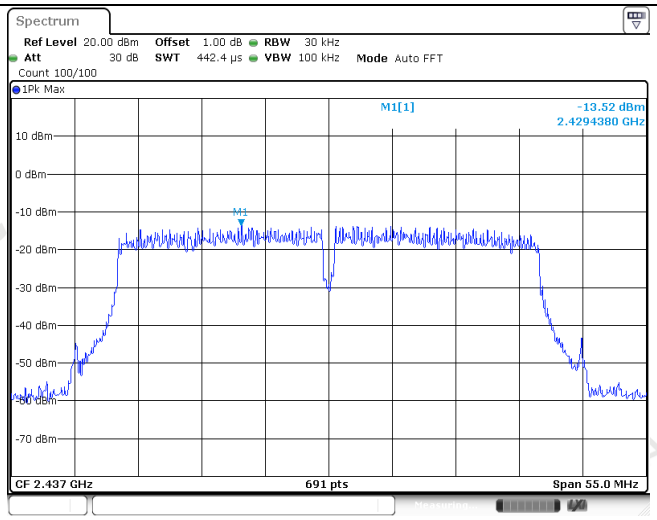
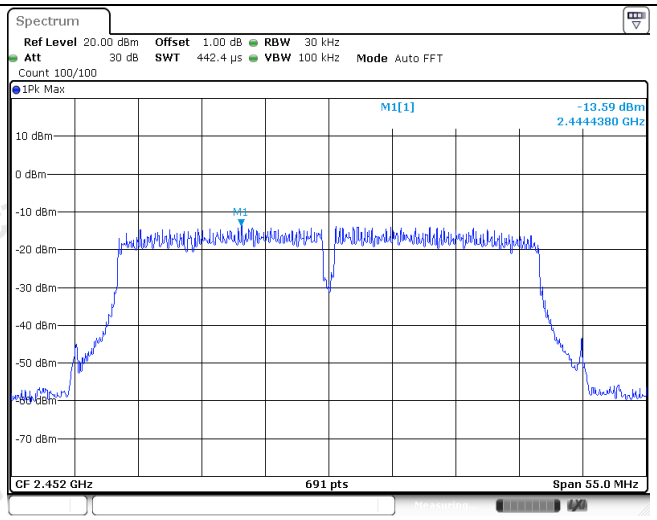
Type	Channel	Power Spectral Density (dBm/30KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-0.46	≤8.00	Pass
	06	-0.47		
	11	-0.55		
802.11g	01	-8.00	≤8.00	Pass
	06	-8.03		
	11	-8.04		
802.11n(HT20)	01	-8.80	≤8.00	Pass
	06	-9.08		
	11	-9.19		
802.11n(HT40)	03	-13.43	≤8.00	Pass
	06	-13.52		
	09	-13.59		

Test plot as follows:

Type:	802.11b
CH01	
CH06	
CH11	

Type:	802.11g
CH01	
CH06	
CH11	

Type:	802.11n(HT20)
CH01	
CH06	
CH11	

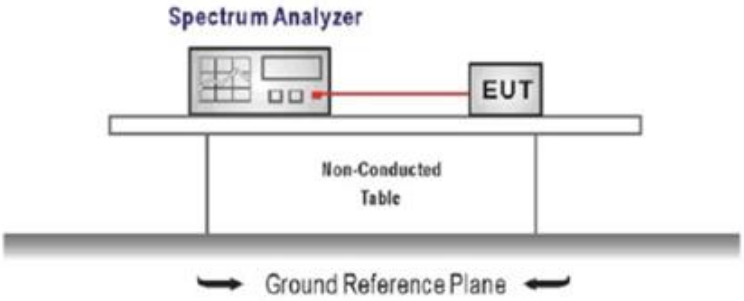
Type:	802.11n(HT40)
CH03	
CH06	
CH09	

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 ≥ 3 × 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:

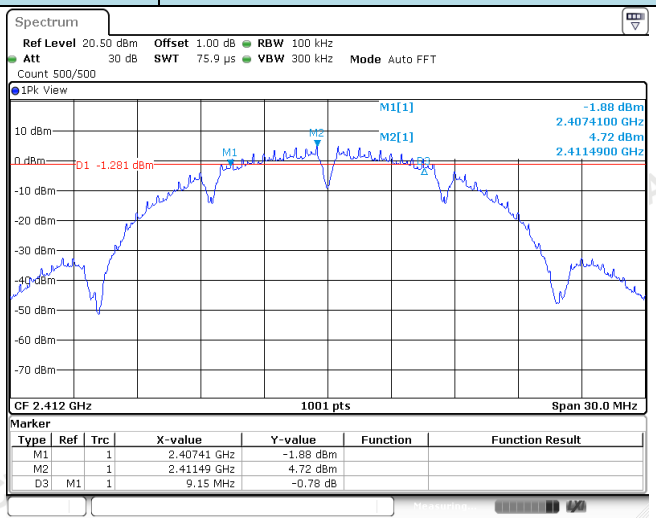
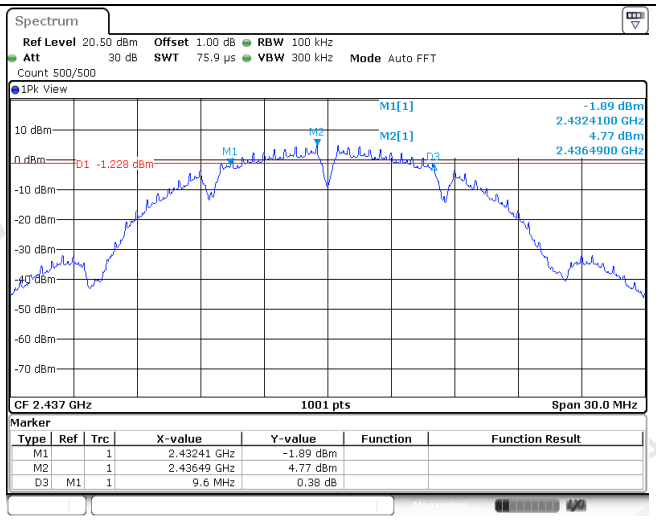
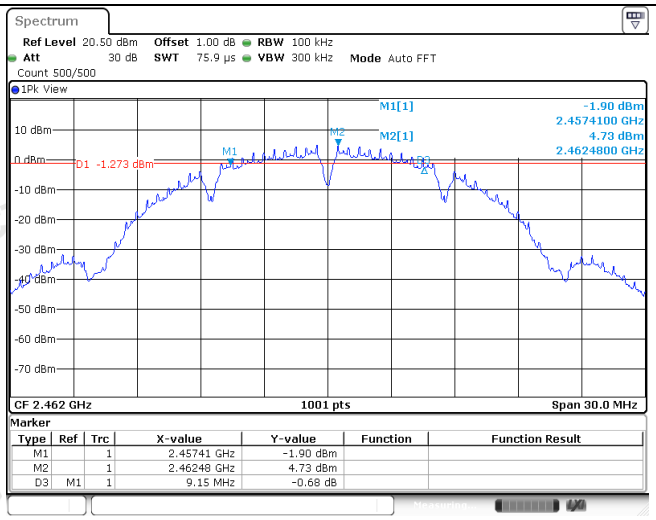
Please refer to the clause 3.3

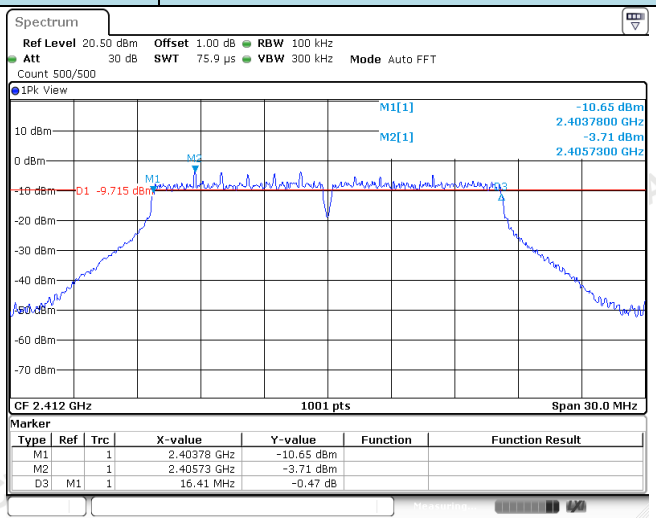
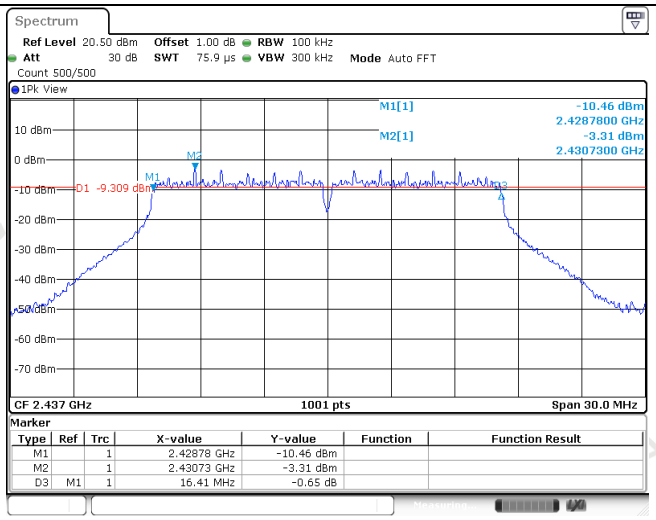
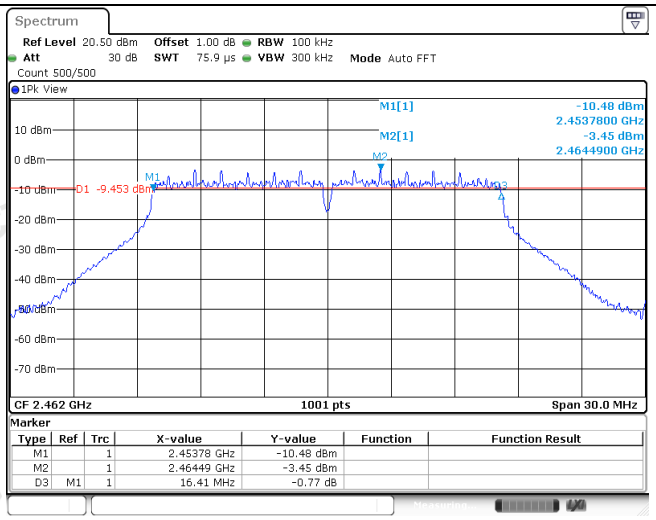
TEST RESULTS

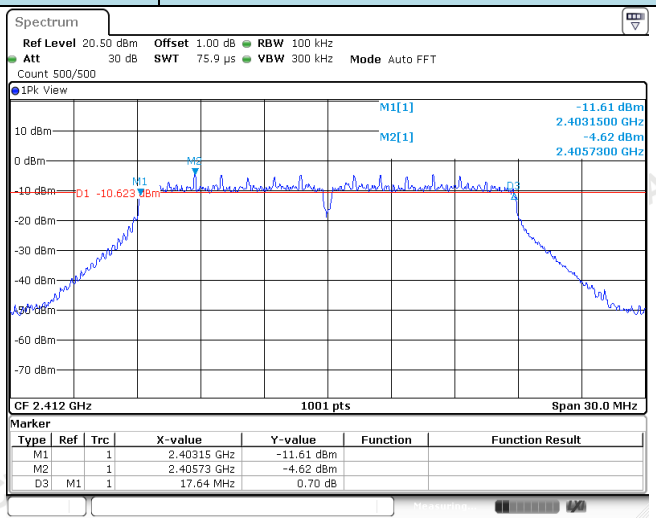
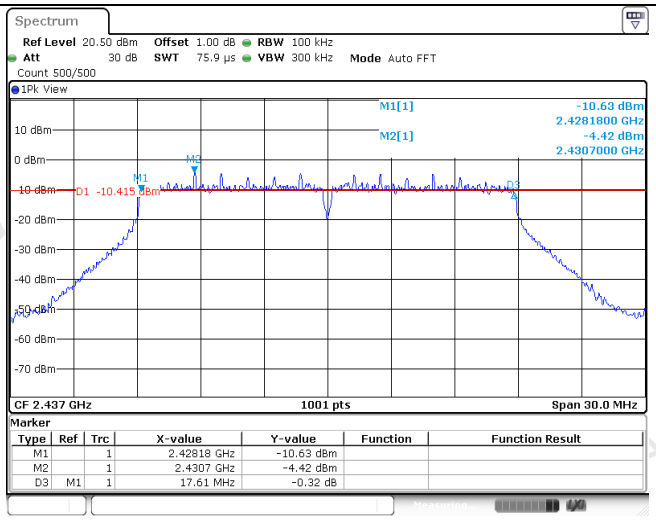
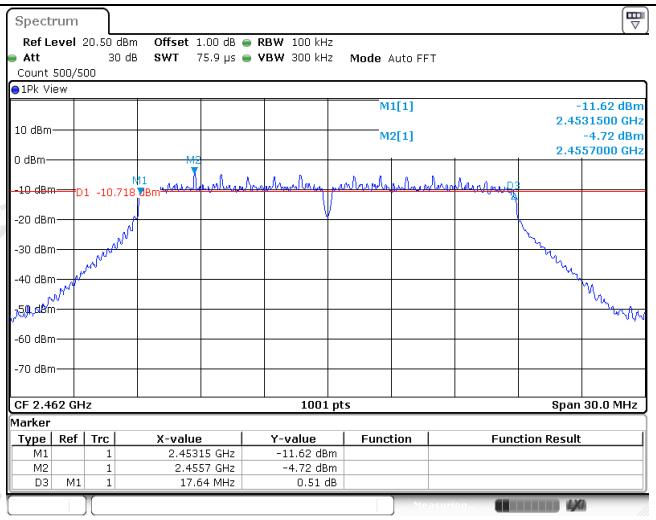
☒ **Passed** ☐ **Not Applicable**

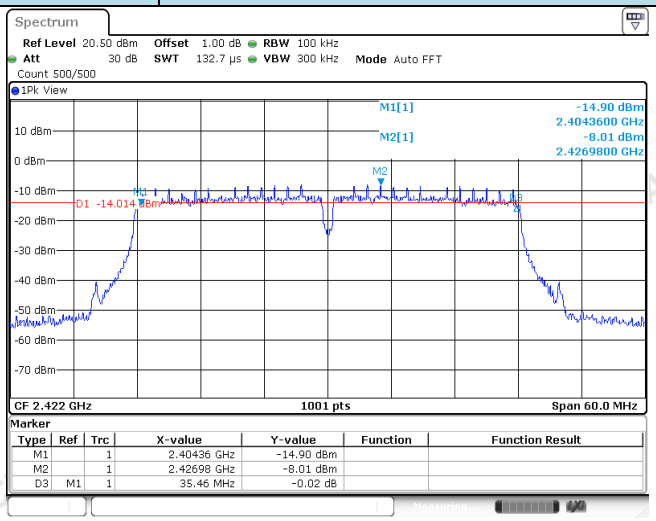
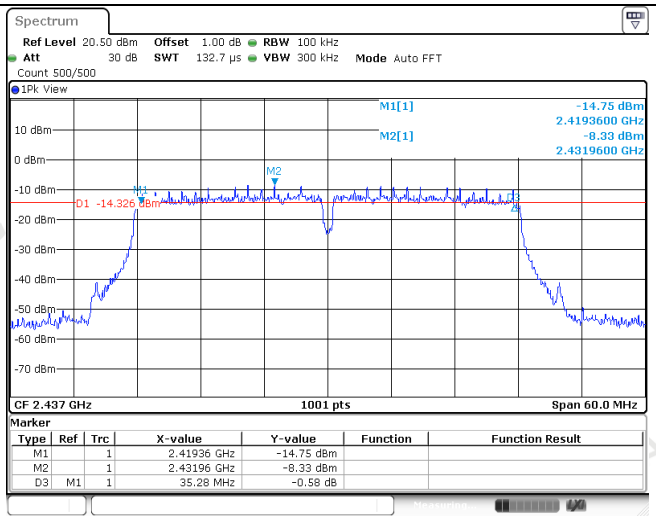
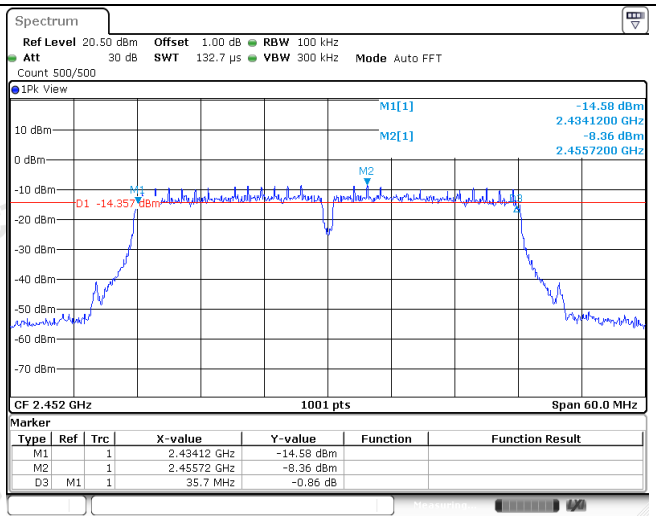
Type	Channel	6dB Bandwidth (MHz)	Limit (kHz)	Result
802.11b	01	9.15	≥500	Pass
	06	9.60		
	11	9.15		
802.11g	01	16.41	≥500	Pass
	06	16.41		
	11	16.41		
802.11n(HT20)	01	17.64	≥500	Pass
	06	17.61		
	11	17.64		
802.11n(HT40)	03	35.46	≥500	Pass
	06	35.28		
	09	35.70		

Test plot as follows:

Type	802.11 b
CH01	
CH06	
CH11	

Type	802.11 g
CH01	
CH06	
CH11	

Type	802.11 n(HT20)
CH01	
CH06	
CH11	

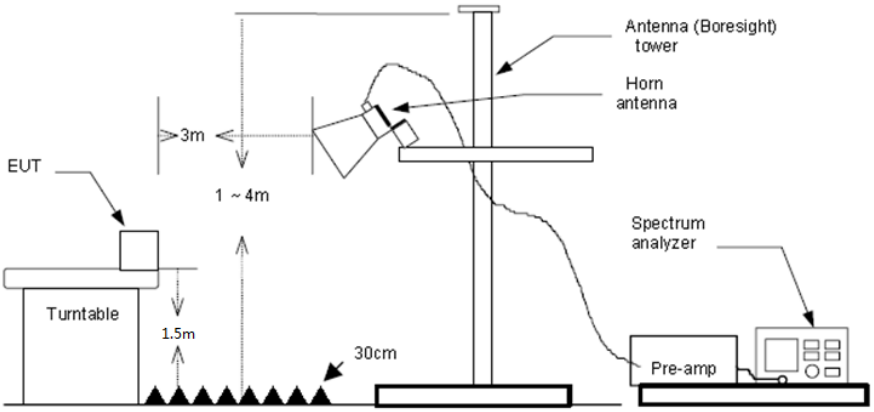
Type	802.11 n(HT40)
CH03	
CH06	
CH09	

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 waspositioned 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. Thisis repeated for both horizontal and vertical polarization of the antenna. In order to find themaximum 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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	14.15	28.05	6.62	0.00	48.82	74.00	-25.18	Vertical	Peak
2390.01	14.70	27.65	6.75	0.00	49.10	74.00	-24.90	Vertical	Peak
2310.00	13.85	28.05	6.62	0.00	48.52	74.00	-25.48	Horizontal	Peak
2390.01	14.05	27.65	6.75	0.00	48.45	74.00	-25.55	Horizontal	Peak
2310.00	10.60	28.05	6.62	0.00	45.27	54.00	-8.73	Vertical	Average
2390.01	10.59	27.65	6.75	0.00	44.99	54.00	-9.01	Vertical	Average
2310.00	10.54	28.05	6.62	0.00	45.21	54.00	-8.79	Horizontal	Average
2390.01	10.58	27.65	6.75	0.00	44.98	54.00	-9.02	Horizontal	Average

802.11b					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.49	13.51	27.26	6.83	0.00	47.60	74.00	-26.40	Vertical	Peak
2500.00	14.58	27.20	6.84	0.00	48.62	74.00	-25.38	Vertical	Peak
2483.49	13.39	27.26	6.83	0.00	47.48	74.00	-26.52	Horizontal	Peak
2500.00	13.54	27.20	6.84	0.00	47.58	74.00	-26.42	Horizontal	Peak
2483.49	10.67	27.26	6.83	0.00	44.76	54.00	-9.24	Vertical	Average
2500.00	11.04	27.20	6.84	0.00	45.08	54.00	-8.92	Vertical	Average
2483.49	10.10	27.26	6.83	0.00	44.19	54.00	-9.81	Horizontal	Average
2500.00	10.14	27.20	6.84	0.00	44.18	54.00	-9.82	Horizontal	Average

802.11g					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	13.36	28.05	6.62	0.00	48.03	74.00	-25.97	Vertical	Peak
2390.01	13.75	27.65	6.75	0.00	48.15	74.00	-25.85	Vertical	Peak
2310.00	13.46	28.05	6.62	0.00	48.13	74.00	-25.87	Horizontal	Peak
2390.01	13.76	27.65	6.75	0.00	48.16	74.00	-25.84	Horizontal	Peak
2310.00	10.60	28.05	6.62	0.00	45.27	54.00	-8.73	Vertical	Average
2390.01	10.51	27.65	6.75	0.00	44.91	54.00	-9.09	Vertical	Average
2310.00	10.54	28.05	6.62	0.00	45.21	54.00	-8.79	Horizontal	Average
2390.01	10.13	27.65	6.75	0.00	44.53	54.00	-9.47	Horizontal	Average

802.11g					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.49	13.68	27.26	6.83	0.00	47.77	74.00	-26.23	Vertical	Peak
2500.00	14.94	27.20	6.84	0.00	48.98	74.00	-25.02	Vertical	Peak
2483.49	15.18	27.26	6.83	0.00	49.27	74.00	-24.73	Horizontal	Peak
2500.00	14.39	27.20	6.84	0.00	48.43	74.00	-25.57	Horizontal	Peak
2483.49	10.73	27.26	6.83	0.00	44.82	54.00	-9.18	Vertical	Average
2500.00	11.15	27.20	6.84	0.00	45.19	54.00	-8.81	Vertical	Average
2483.49	10.11	27.26	6.83	0.00	44.20	54.00	-9.80	Horizontal	Average
2500.00	10.14	27.20	6.84	0.00	44.18	54.00	-9.82	Horizontal	Average

802.11n(HT20)					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	17.66	28.05	6.62	0.00	52.33	74.00	-21.67	Vertical	Peak
2390.01	18.62	27.65	6.75	0.00	53.02	74.00	-20.98	Vertical	Peak
2310.00	18.33	28.05	6.62	0.00	53.00	74.00	-21.00	Horizontal	Peak
2390.01	17.55	27.65	6.75	0.00	51.95	74.00	-22.05	Horizontal	Peak
2310.00	10.92	28.05	6.62	0.00	45.59	54.00	-8.41	Vertical	Average
2390.01	10.86	27.65	6.75	0.00	45.26	54.00	-8.74	Vertical	Average
2310.00	10.88	28.05	6.62	0.00	45.55	54.00	-8.45	Horizontal	Average
2390.01	10.49	27.65	6.75	0.00	44.89	54.00	-9.11	Horizontal	Average

802.11n(HT20)					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.49	17.26	27.26	6.83	0.00	51.35	74.00	-22.65	Vertical	Peak
2500.00	18.09	27.20	6.84	0.00	52.13	74.00	-21.87	Vertical	Peak
2483.49	17.32	27.26	6.83	0.00	51.41	74.00	-22.59	Horizontal	Peak
2500.00	17.83	27.20	6.84	0.00	51.87	74.00	-22.13	Horizontal	Peak
2483.49	10.94	27.26	6.83	0.00	45.03	54.00	-8.97	Vertical	Average
2500.00	10.99	27.20	6.84	0.00	45.03	54.00	-8.97	Vertical	Average
2483.49	10.45	27.26	6.83	0.00	44.54	54.00	-9.46	Horizontal	Average
2500.00	10.45	27.20	6.84	0.00	44.49	54.00	-9.51	Horizontal	Average

802.11n(HT40)					CH03				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	18.23	28.05	6.62	0.00	52.90	74.00	-21.10	Vertical	Peak
2389.99	17.02	27.65	6.75	0.00	51.42	74.00	-22.58	Vertical	Peak
2310.00	19.07	28.05	6.62	0.00	53.74	74.00	-20.26	Horizontal	Peak
2389.99	17.87	27.65	6.75	0.00	52.27	74.00	-21.73	Horizontal	Peak
2310.00	10.92	28.05	6.62	0.00	45.59	54.00	-8.41	Vertical	Average
2389.99	10.96	27.65	6.75	0.00	45.36	54.00	-8.64	Vertical	Average
2310.00	10.88	28.05	6.62	0.00	45.55	54.00	-8.45	Horizontal	Average
2389.99	10.49	27.65	6.75	0.00	44.89	54.00	-9.11	Horizontal	Average

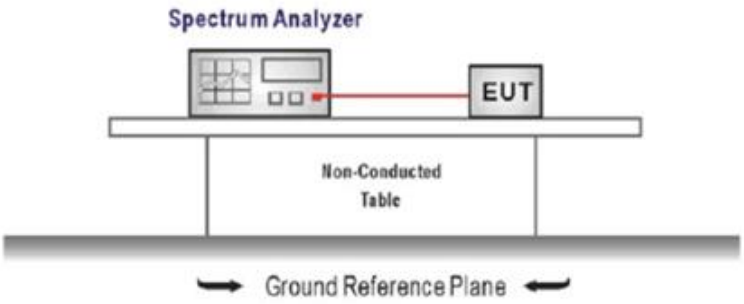
802.11n(HT40)					CH09				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.50	17.18	27.26	6.83	0.00	51.27	74.00	-22.73	Vertical	Peak
2500.00	17.65	27.20	6.84	0.00	51.69	74.00	-22.31	Vertical	Peak
2483.50	17.32	27.26	6.83	0.00	51.41	74.00	-22.59	Horizontal	Peak
2500.00	18.89	27.20	6.84	0.00	52.93	74.00	-21.07	Horizontal	Peak
2483.50	11.16	27.26	6.83	0.00	45.25	54.00	-8.75	Vertical	Average
2500.00	11.16	27.20	6.84	0.00	45.20	54.00	-8.80	Vertical	Average
2483.50	10.56	27.26	6.83	0.00	44.65	54.00	-9.35	Horizontal	Average
2500.00	10.57	27.20	6.84	0.00	44.61	54.00	-9.39	Horizontal	Average

3.7. Band edge and Spurious Emissions (conducted)

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section15.247 (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 ≥ 3 x 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

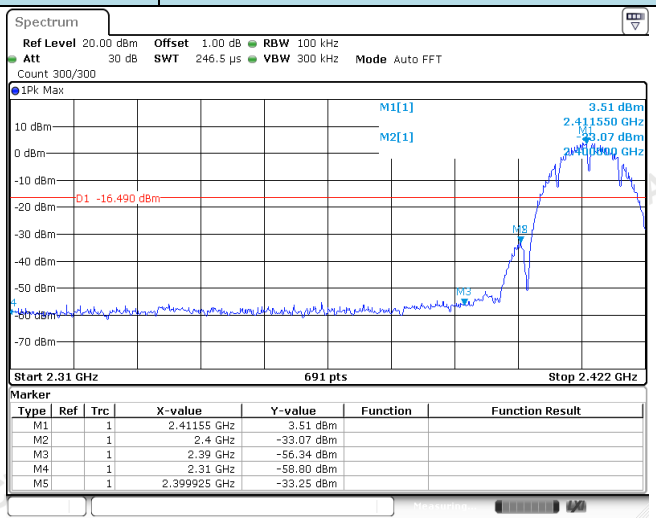
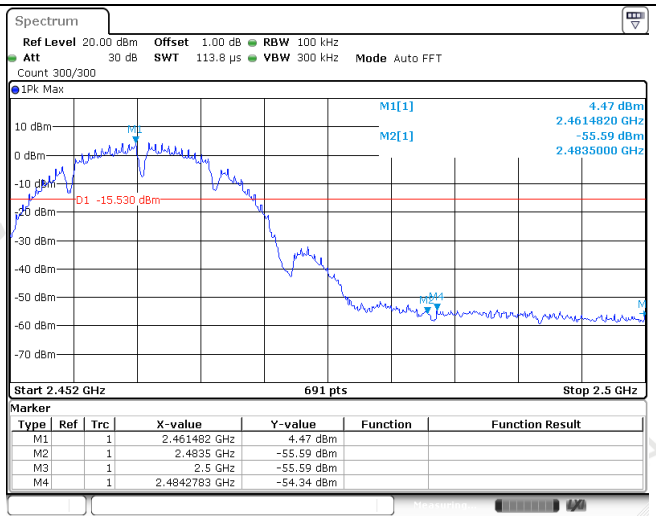
   Note: the channel found to contain the maximum PSD level can be used to establish the reference level.
3. Emission level measurement
   Set the center frequency and span to encompass frequency range to be measured
   RBW = 100 kHz, VBW ≥ 3 x RBW
   Detector = peak, Sweep time = auto couple, Trace mode = 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.

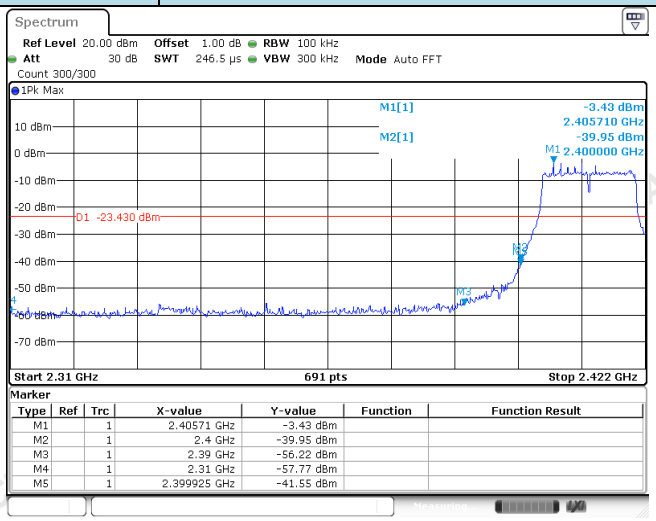
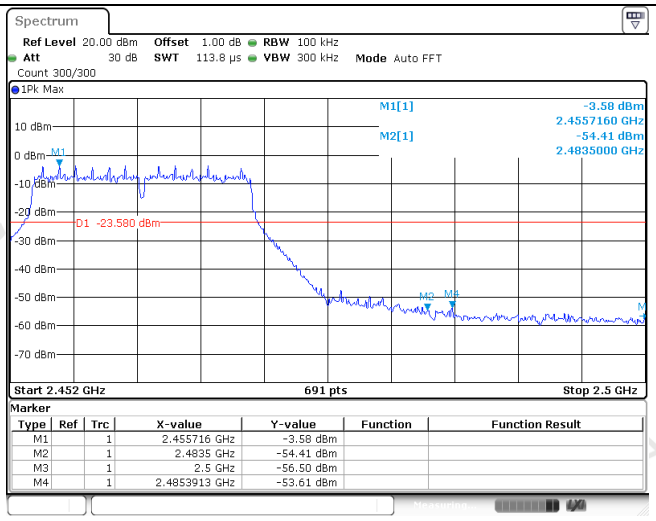
TEST MODE:

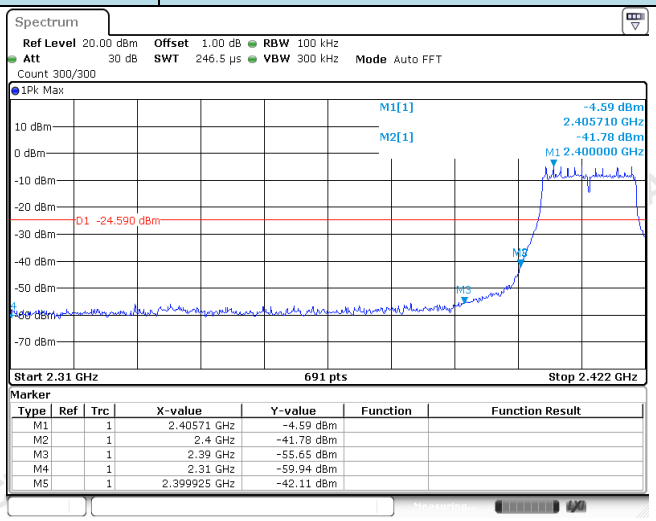
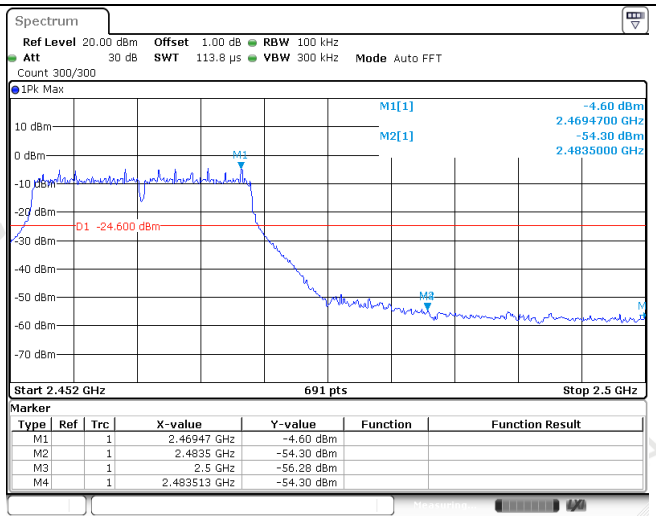
Please refer to the clause 3.3

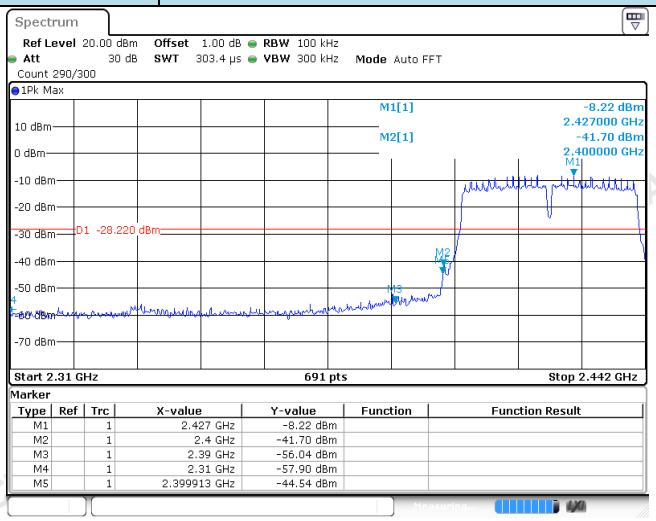
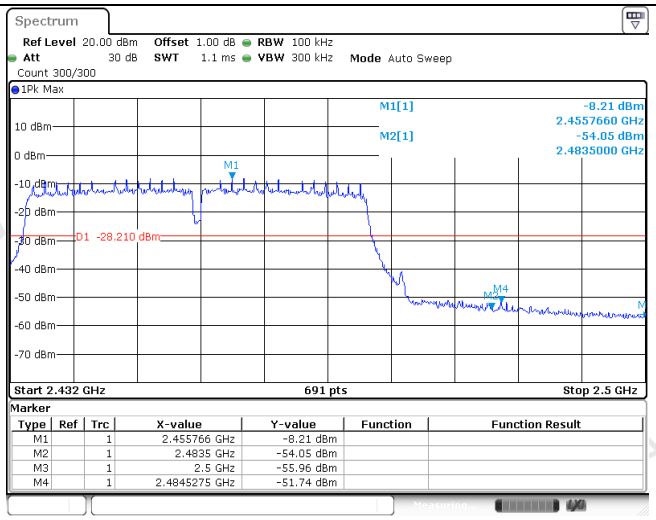
TEST RESULTS

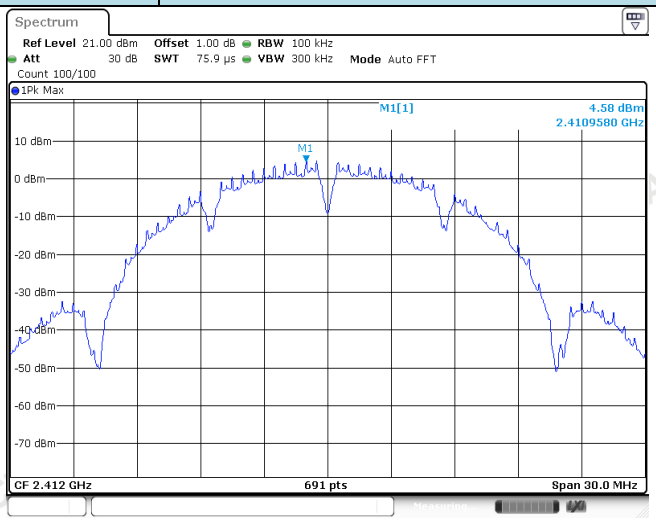
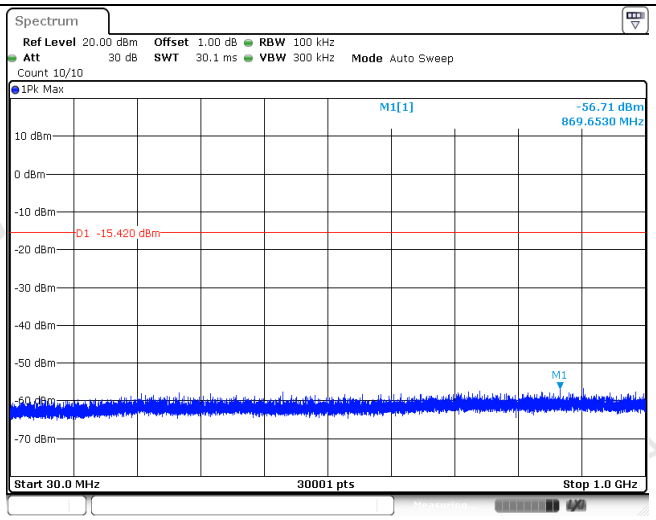
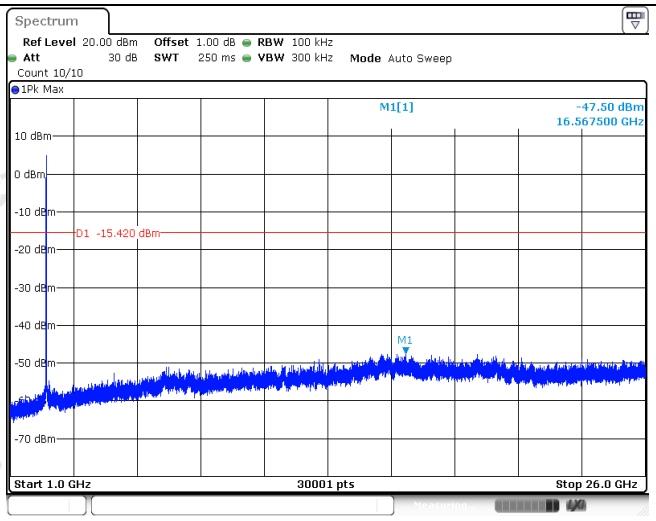
☒ **Passed** ☐ **Not Applicable**

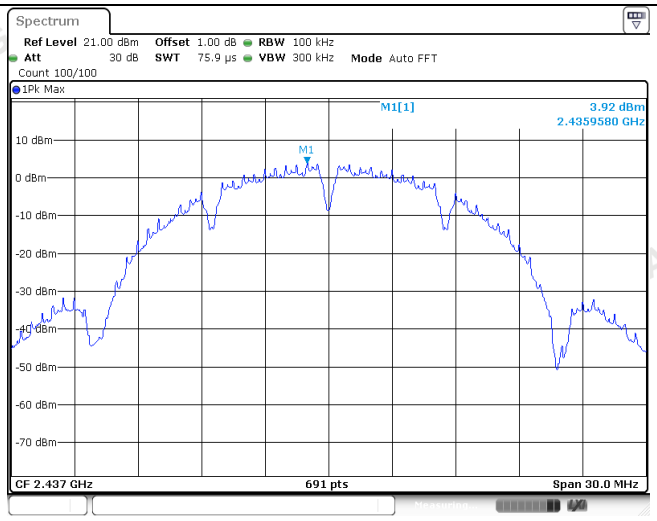
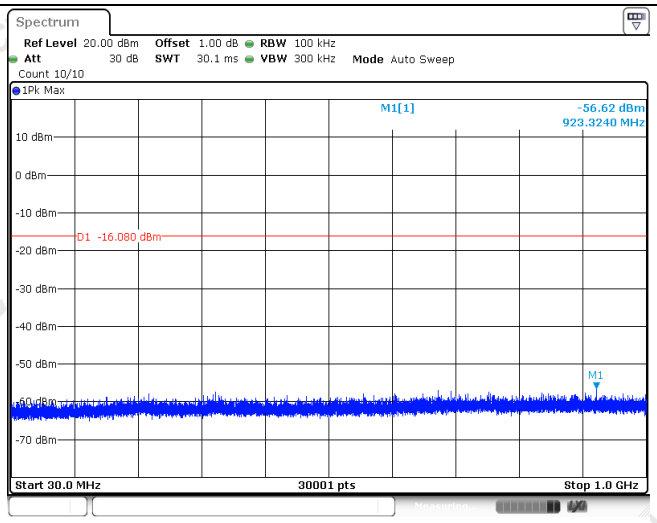
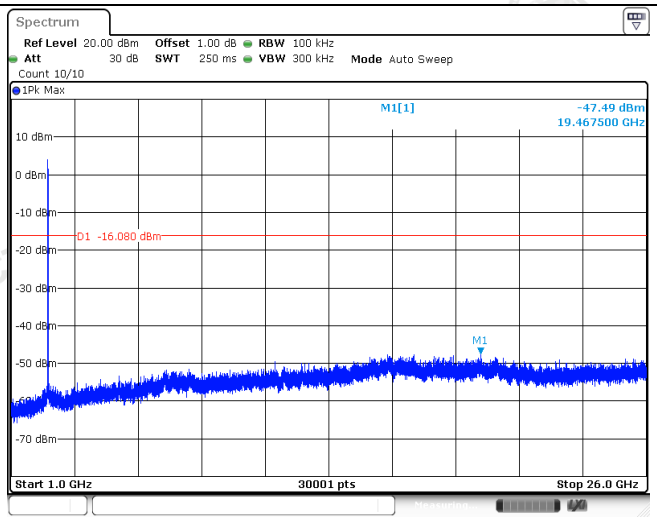
Test Item:	Bandedge	802.11 b
CH01	
CH11	

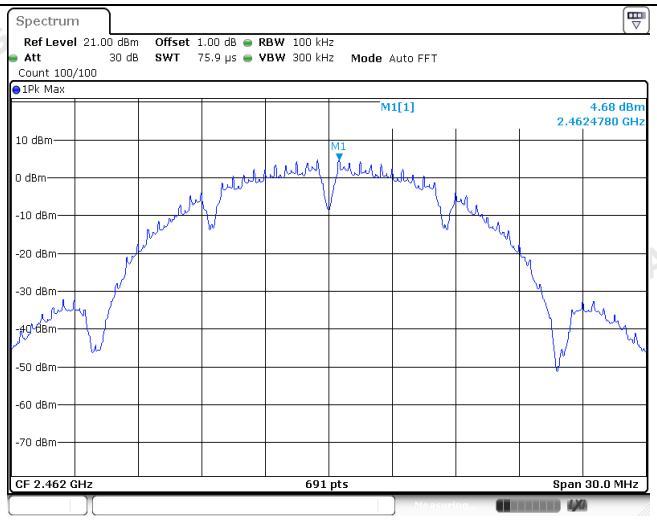
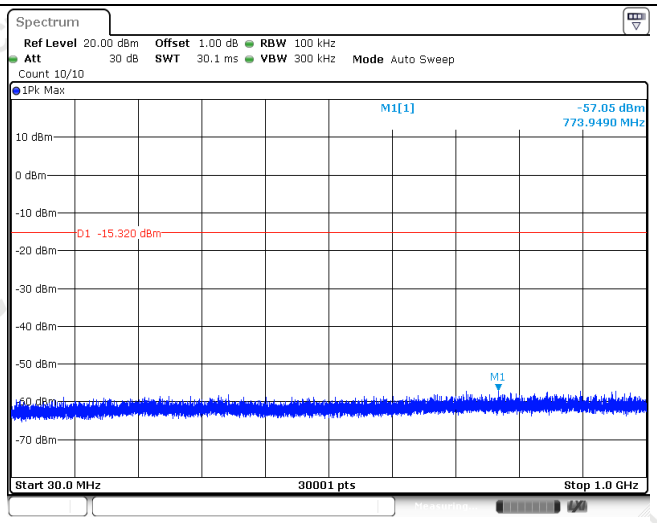
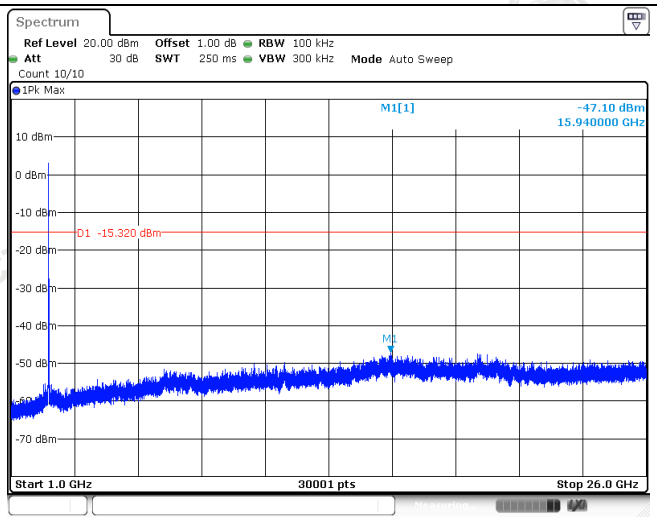
Test Item:	Bandedge	802.11 g
CH01		
CH11		

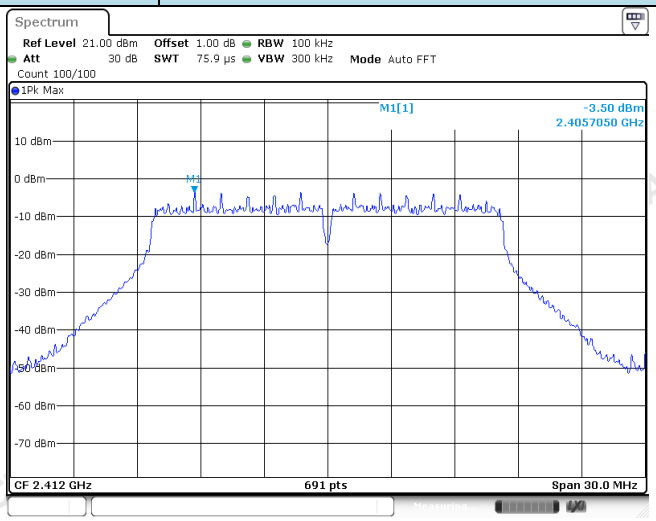
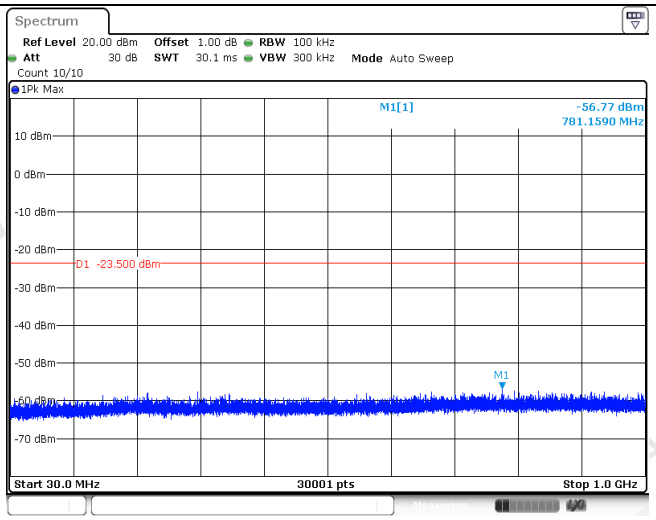
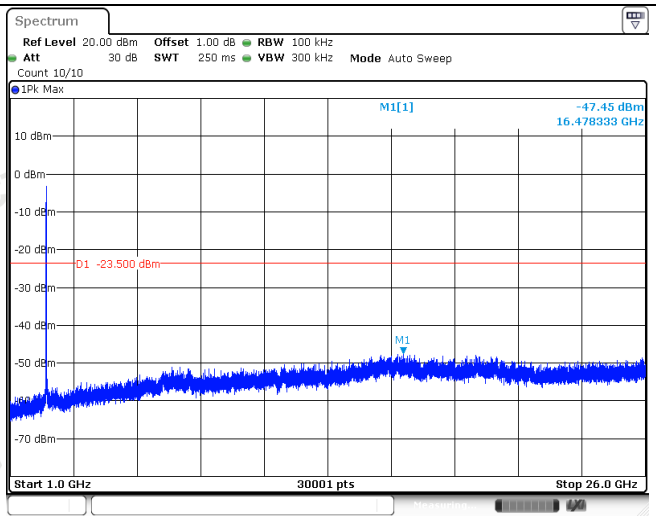
Test Item:	Bandedge	802.11 n(HT20)
CH01		
CH11		

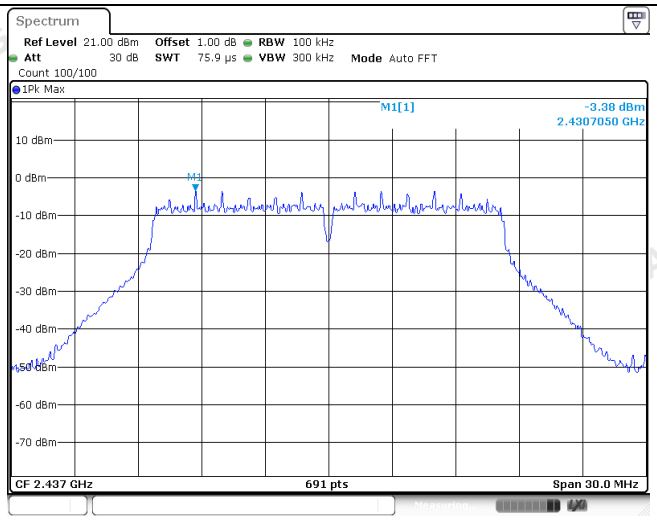
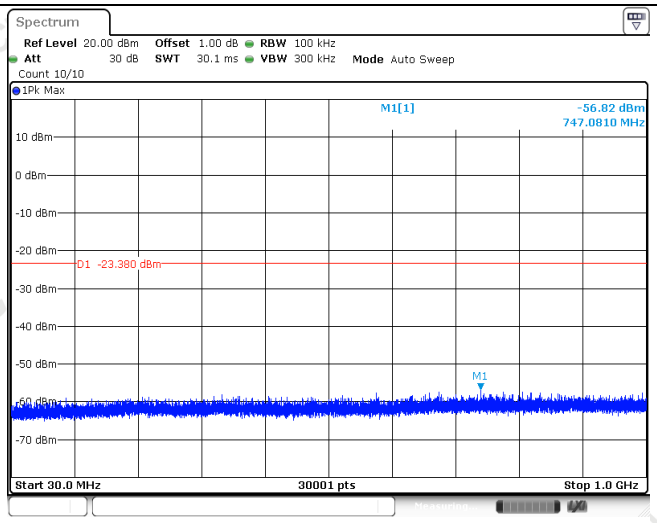
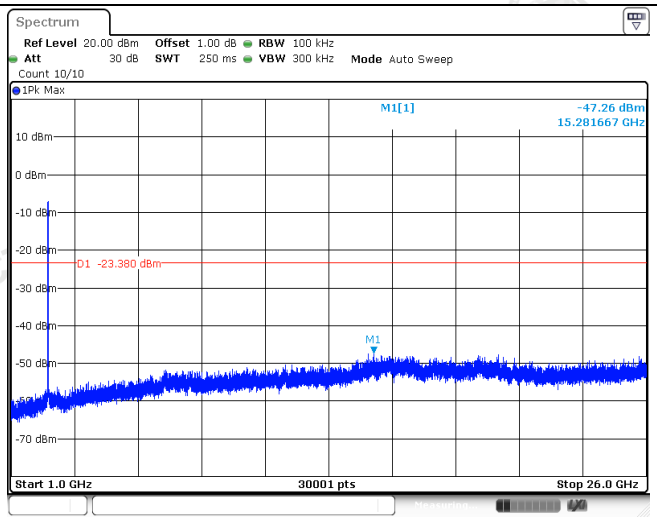
Test Item:	Bandedge	802.11 n(HT40)
CH03		
CH09		

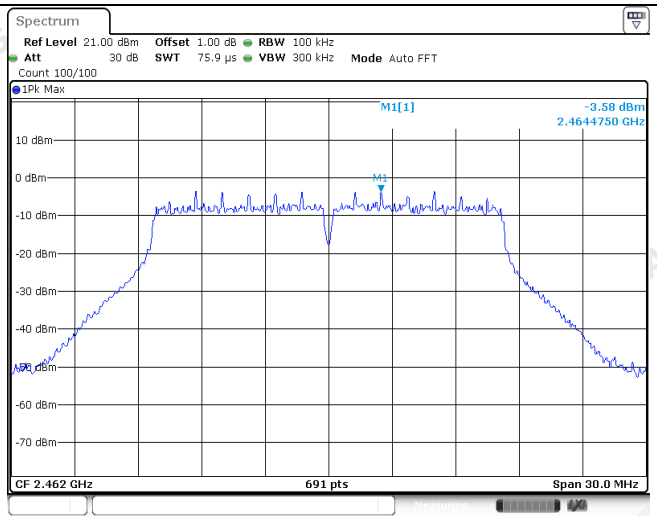
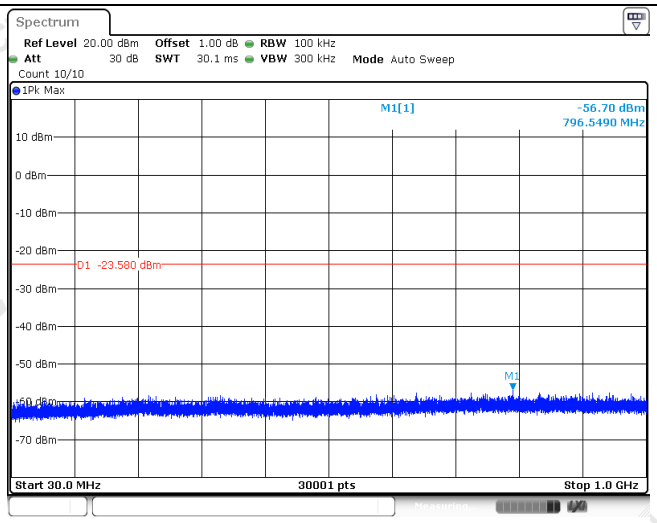
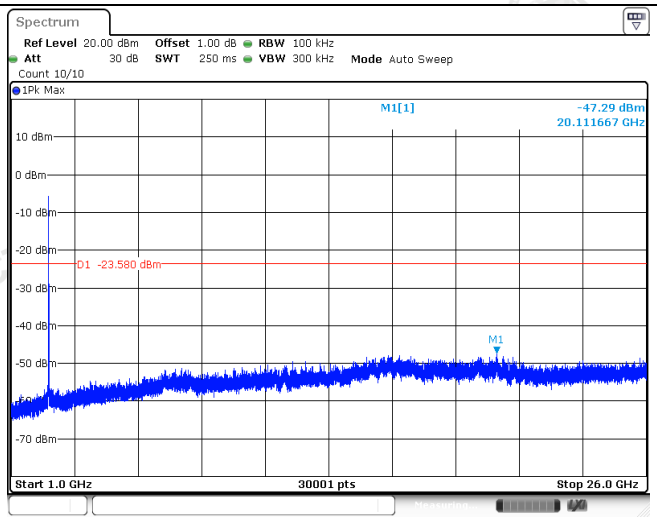
Test Item:	SE	802.11 b
Reference level CH01		
CH01		
		

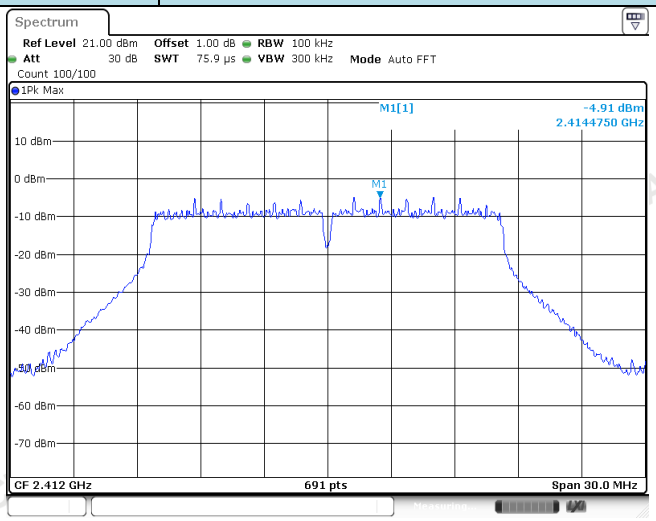
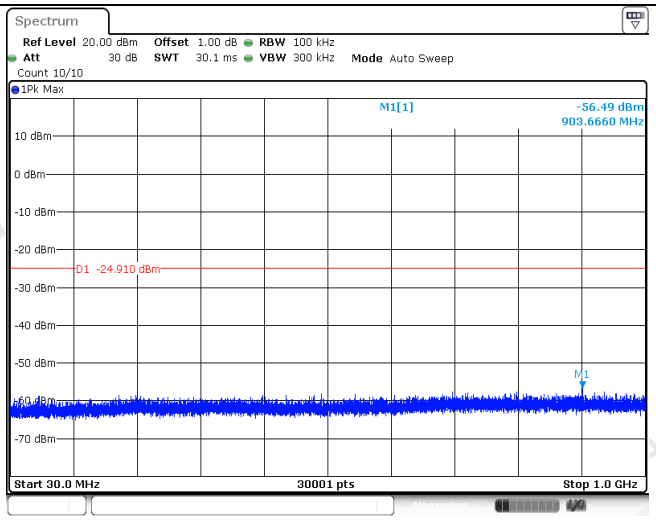
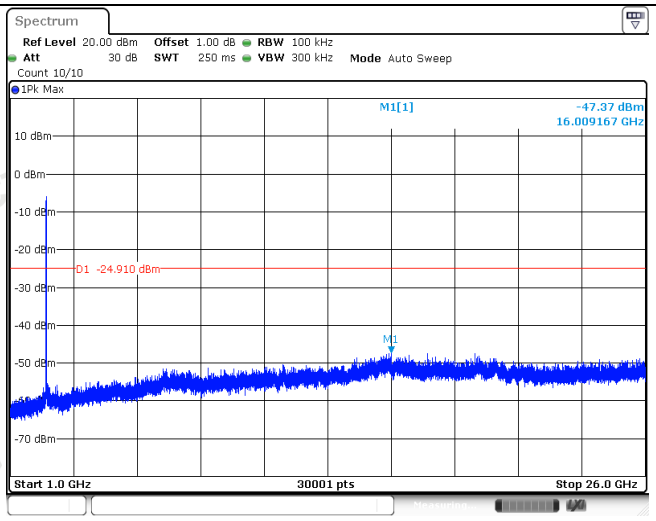
Reference level CH06	
CH06	
	

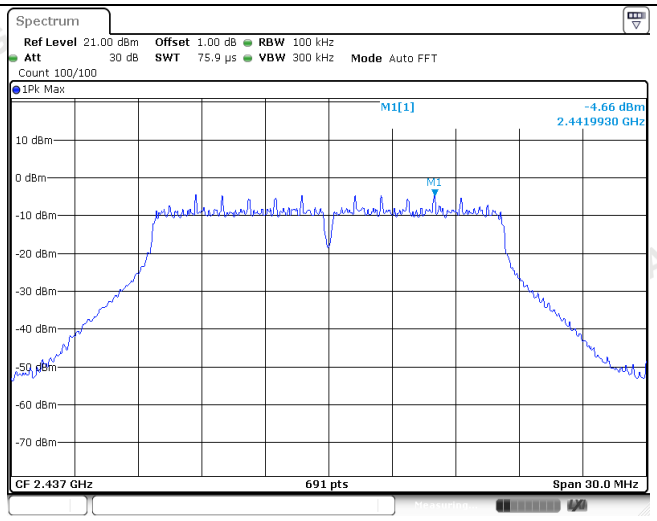
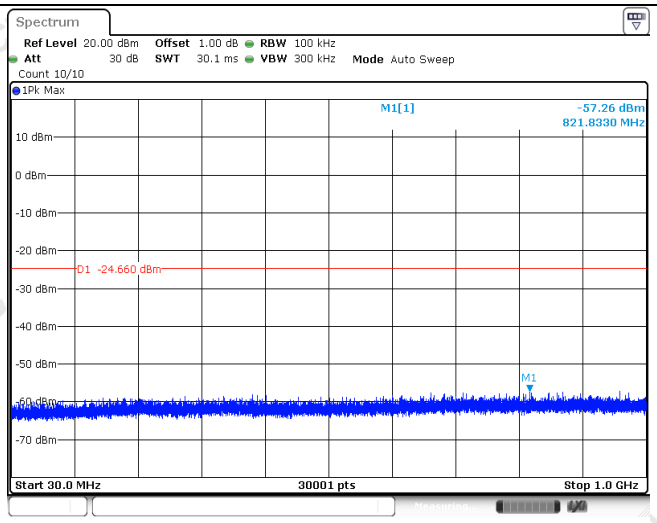
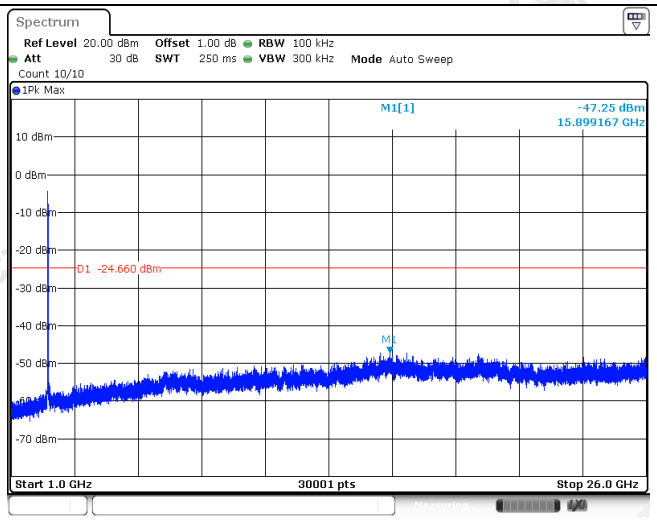
Reference level CH11	
CH11	 

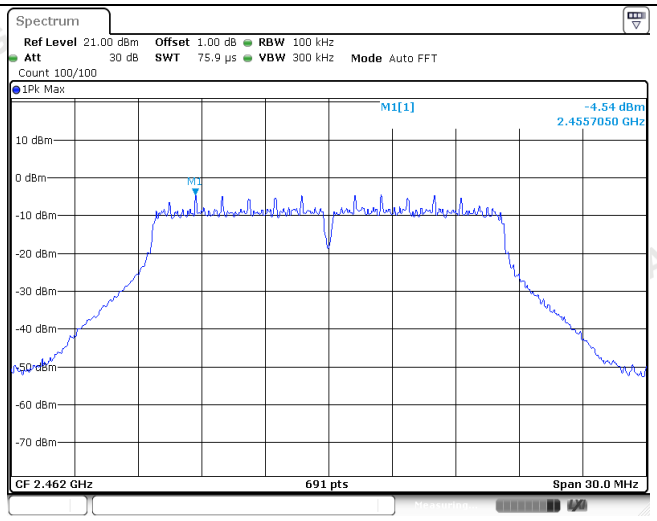
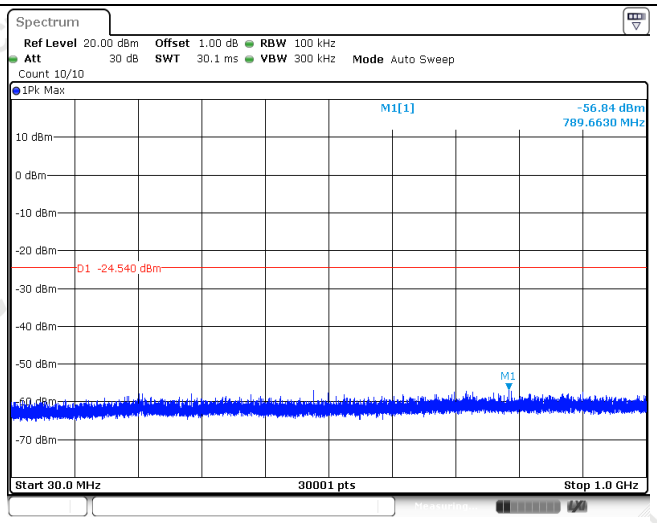
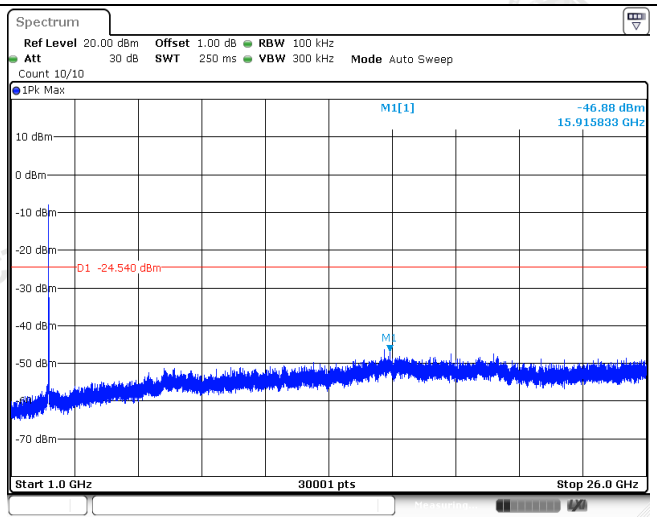
Test Item:	SE	802.11 g
Reference level CH01		
CH01		
		

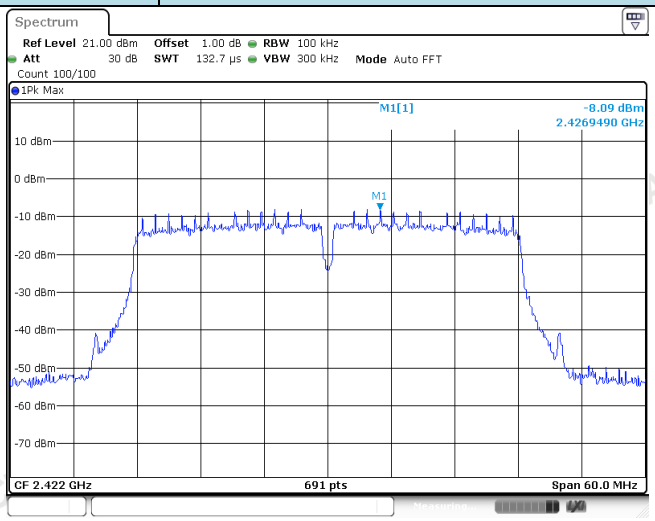
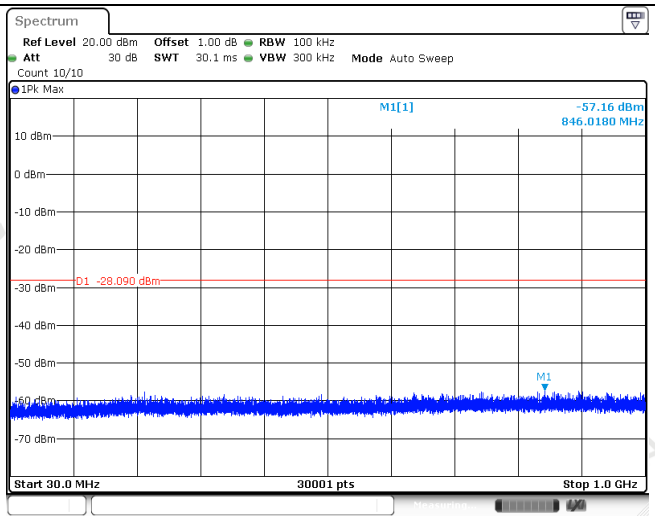
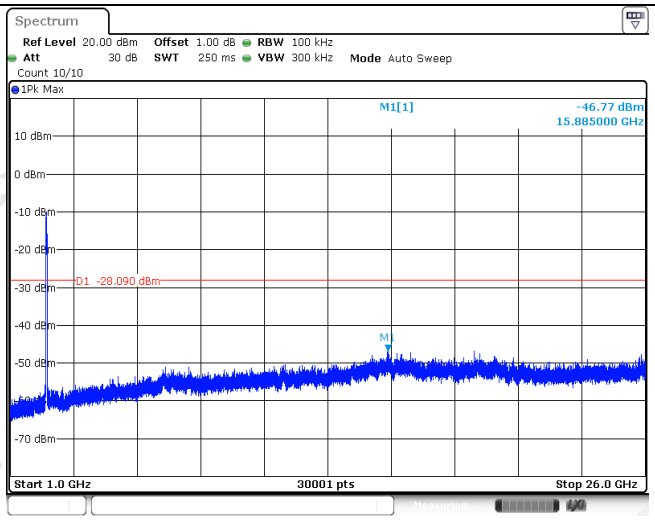
Reference level CH06	
CH06	
	

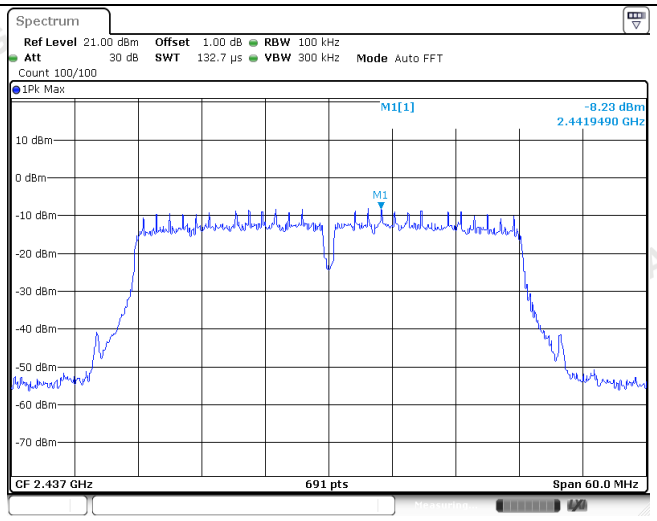
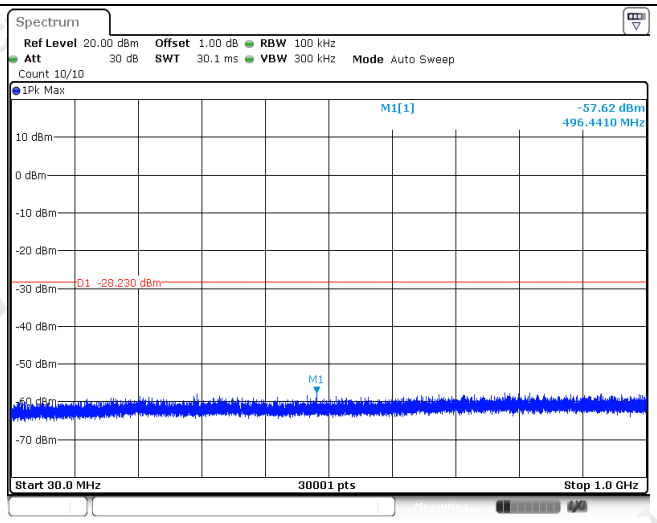
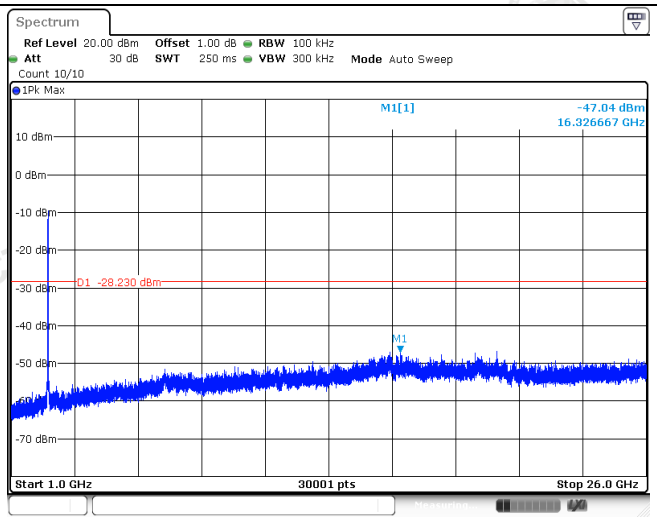
Reference level CH11	
CH11	
	

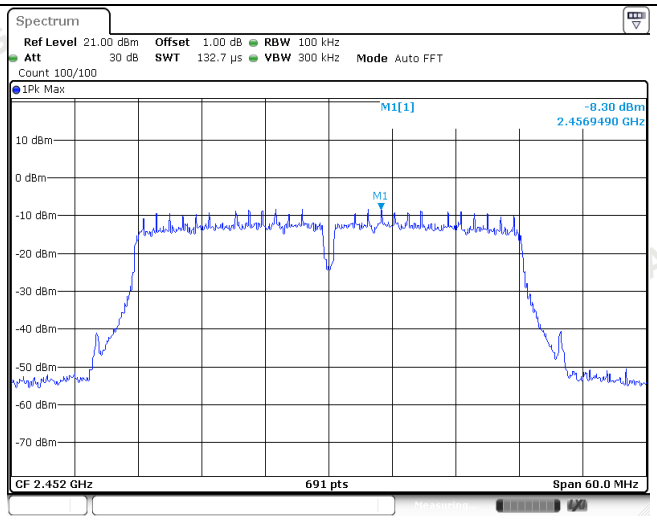
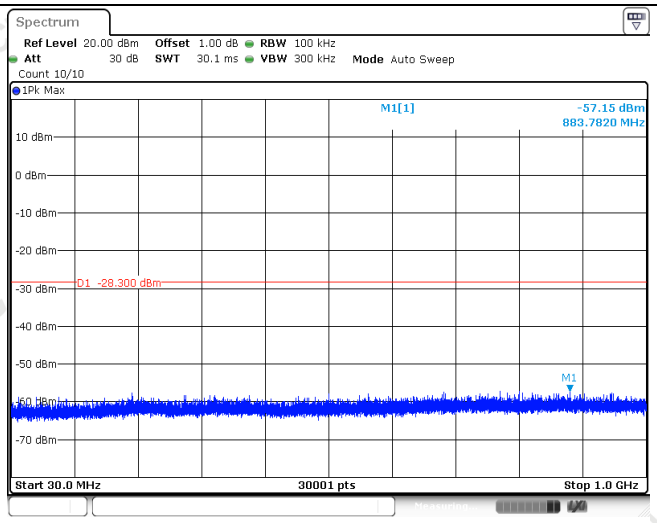
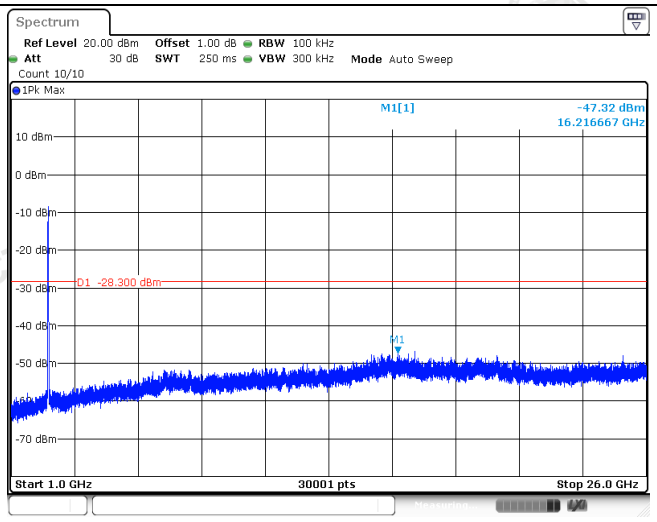
Test Item:	SE	802.11 n(HT20)
Reference level CH01		
CH01		
		

Reference level CH06	
CH06	
	

Reference level CH11	
CH11	
	

Test Item:	SE	802.11 n(HT40)
Reference level CH03		
CH03		
		

Reference level CH06	
CH06	
	

Reference level CH09	
CH09	
	

3.8. Spurious Emissions (radiated)

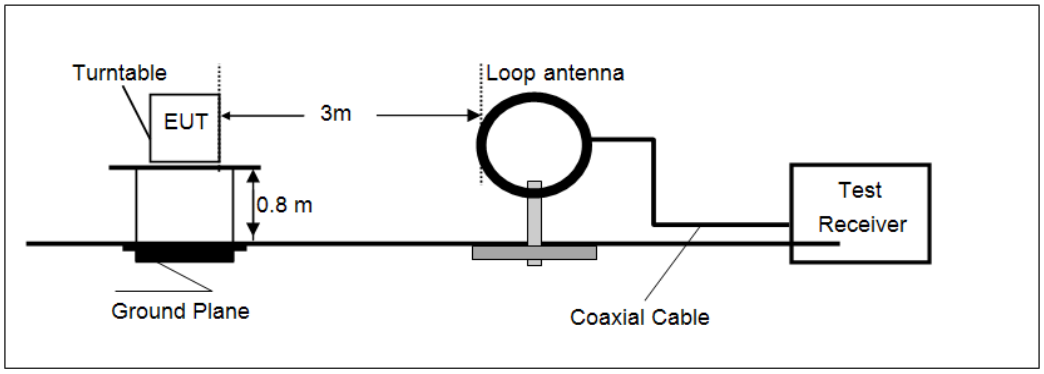
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

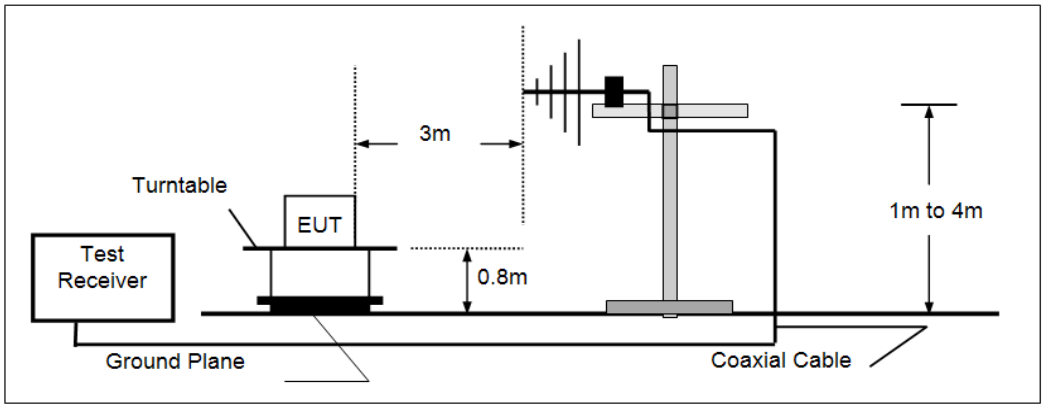
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

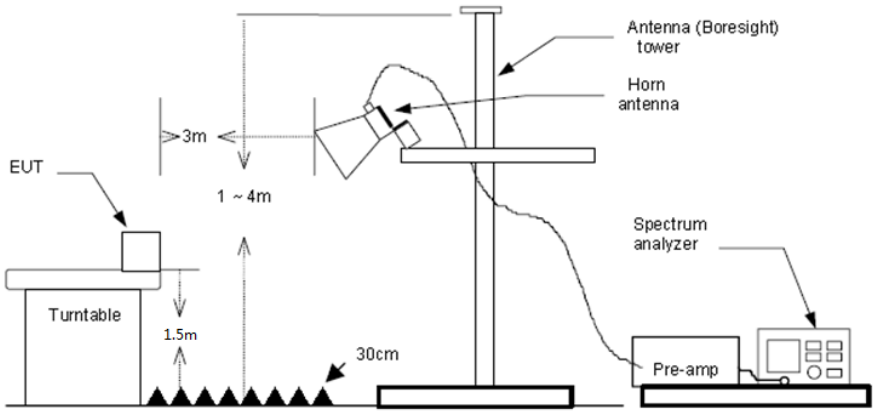
➢ 9kHz ~30MHz



➢ 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**

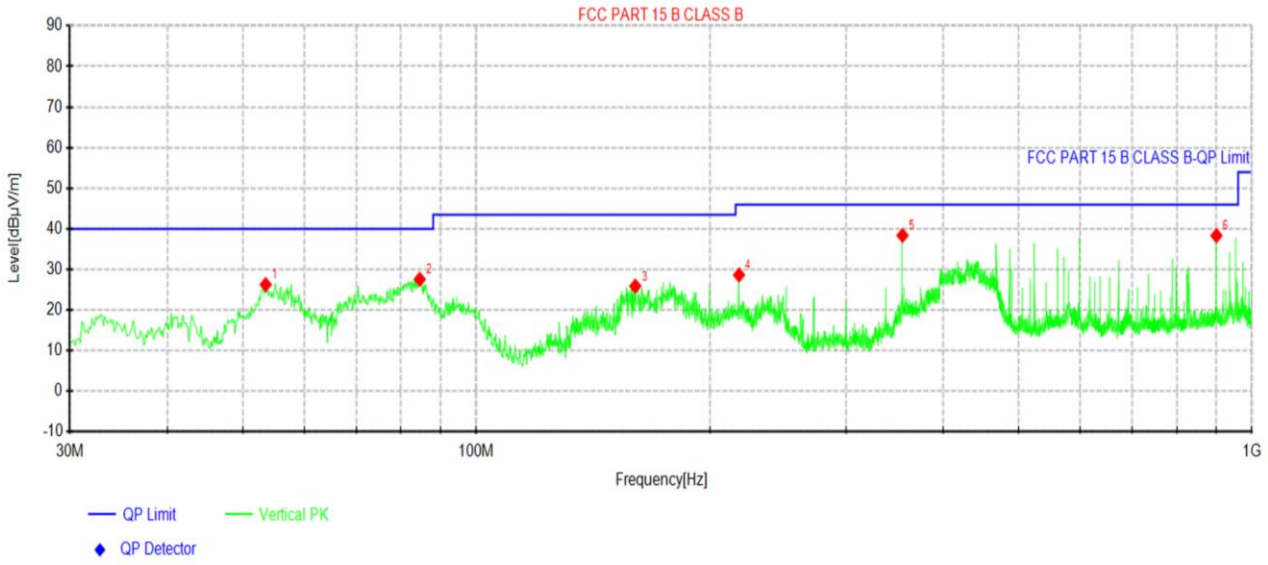
Note:
1) Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2) The emission levels of other frequencies are very lower than the limit and not show in test report.

- **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

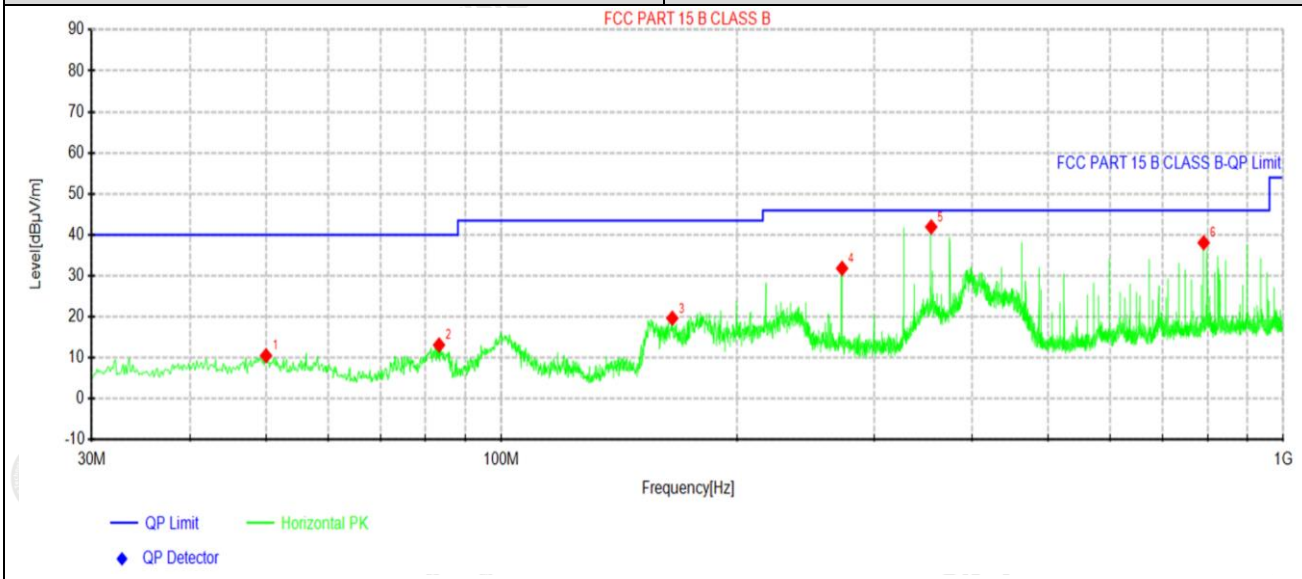


Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	53.5225	43.11	26.29	-16.82	40.00	13.71	100	237	Vertical
2	84.5625	48.27	27.58	-20.69	40.00	12.42	100	51	Vertical
3	160.343	47.50	25.90	-21.60	43.50	17.60	100	358	Vertical
4	218.18	47.53	28.67	-18.86	46.00	17.33	100	115	Vertical
5	354.465	54.39	38.39	-16.00	46.00	7.61	100	347	Vertical
6	900.09	47.53	38.35	-9.18	46.00	7.65	100	83	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	50.0062	26.59	10.53	-16.06	40.00	29.47	100	221	Horizontal
2	83.2288	34.02	13.14	-20.88	40.00	26.86	100	27	Horizontal
3	165.436	40.97	19.67	-21.30	43.50	23.83	100	27	Horizontal
4	272.742	49.54	31.85	-17.69	46.00	14.15	100	262	Horizontal
5	354.586	57.95	41.95	-16.00	46.00	4.05	100	343	Horizontal
6	790.965	48.88	38.08	-10.80	46.00	7.92	100	67	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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2412.72	47.24	27.55	6.78	37.59	43.98	74.00	-30.02	Vertical	Peak
2995.54	51.15	28.60	7.48	37.58	49.65	74.00	-24.35	Vertical	Peak
4983.99	41.38	31.48	9.66	35.41	47.11	74.00	-26.89	Vertical	Peak
8659.10	30.48	37.66	12.95	32.95	48.14	74.00	-25.86	Vertical	Peak
2412.72	44.57	27.55	6.78	37.59	41.31	74.00	-32.69	Horizontal	Peak
2987.92	44.21	28.59	7.47	37.58	42.69	74.00	-31.31	Horizontal	Peak
4821.76	39.95	31.56	9.55	35.69	45.37	74.00	-28.63	Horizontal	Peak
8002.06	31.28	37.10	12.30	33.07	47.61	74.00	-26.39	Horizontal	Peak

802.11b					CH06				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2437.41	48.25	27.45	6.80	37.59	44.91	74.00	-29.09	Vertical	Peak
3003.17	50.32	28.61	7.48	37.58	48.83	74.00	-25.17	Vertical	Peak
4996.69	38.71	31.50	9.67	35.39	44.49	74.00	-29.51	Vertical	Peak
5325.01	35.62	31.35	10.02	34.75	42.24	74.00	-31.76	Vertical	Peak
2437.41	43.55	27.45	6.80	37.59	40.21	74.00	-33.79	Horizontal	Peak
2987.92	43.14	28.59	7.47	37.58	41.62	74.00	-32.38	Horizontal	Peak
4871.10	36.42	31.46	9.59	35.61	41.86	74.00	-32.14	Horizontal	Peak
8571.38	31.64	37.19	12.88	32.93	48.78	74.00	-25.22	Horizontal	Peak

802.11b					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2462.36	46.65	27.35	6.81	37.59	43.22	74.00	-30.78	Vertical	Peak
2995.54	49.26	28.60	7.48	37.58	47.76	74.00	-26.24	Vertical	Peak
4996.69	43.44	31.50	9.67	35.39	49.22	74.00	-24.78	Vertical	Peak
8250.27	31.08	36.55	12.79	32.99	47.43	74.00	-26.57	Vertical	Peak
2462.36	42.55	27.35	6.81	37.59	39.12	74.00	-34.88	Horizontal	Peak
2995.54	44.31	28.60	7.48	37.58	42.81	74.00	-31.19	Horizontal	Peak
4996.69	35.98	31.50	9.67	35.39	41.76	74.00	-32.24	Horizontal	Peak
7961.43	30.45	36.95	12.49	33.07	46.82	74.00	-27.18	Horizontal	Peak

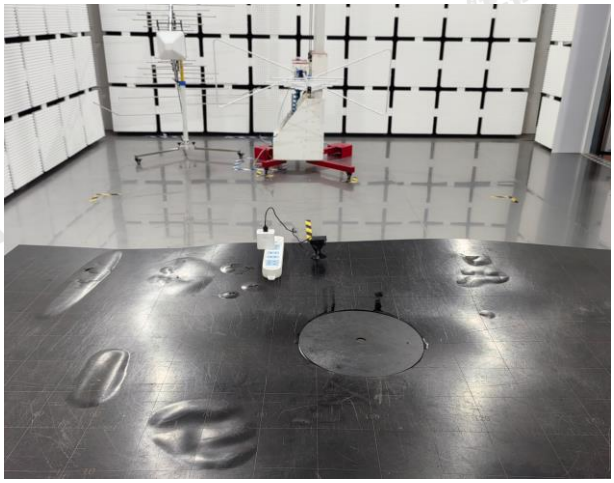
Remark:

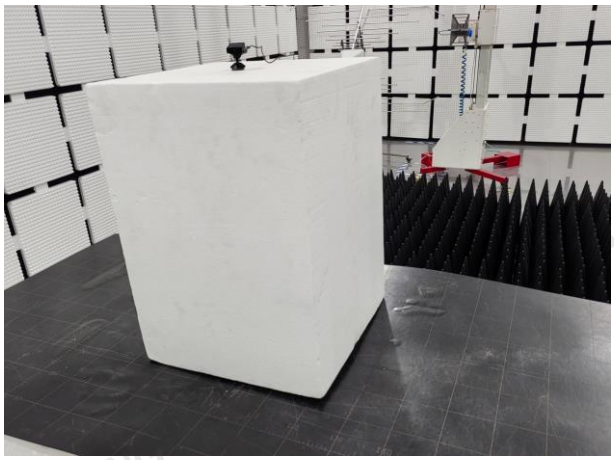
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies(test frequency band is 1GHz to 25GHz) are very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

4. TEST SETUP PHOTOS

Conducted Emissions

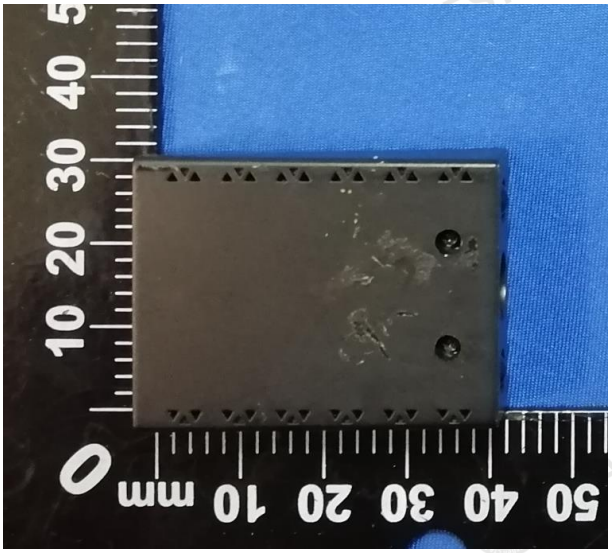
Radiated Emissions

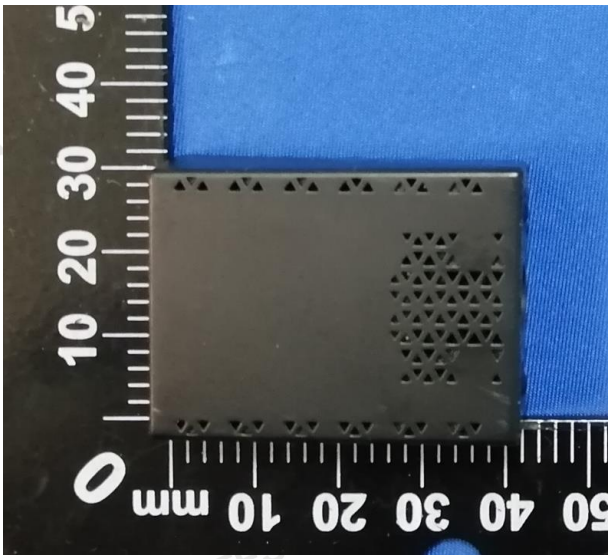


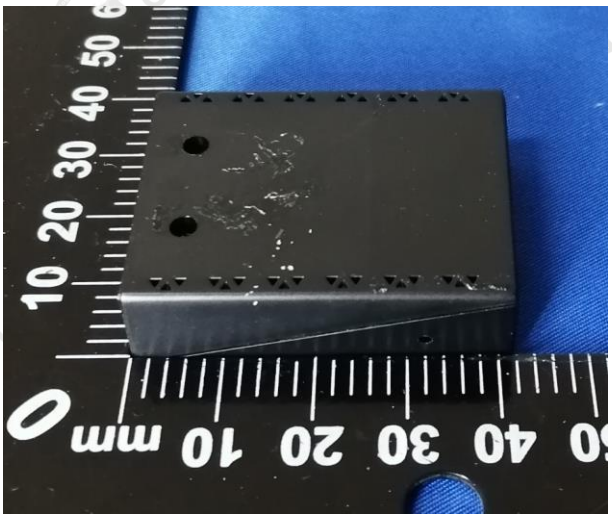


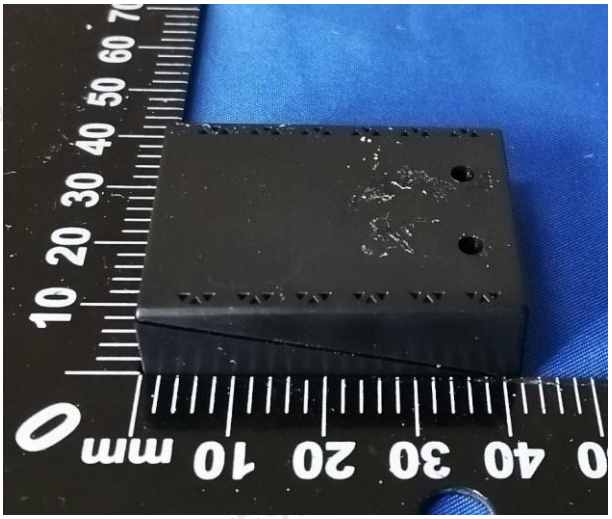
5. EXTERANAL AND INTERNAL PHOTOS

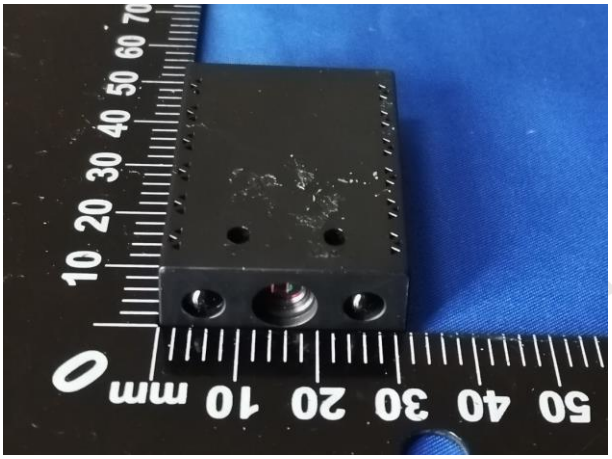
External Photos



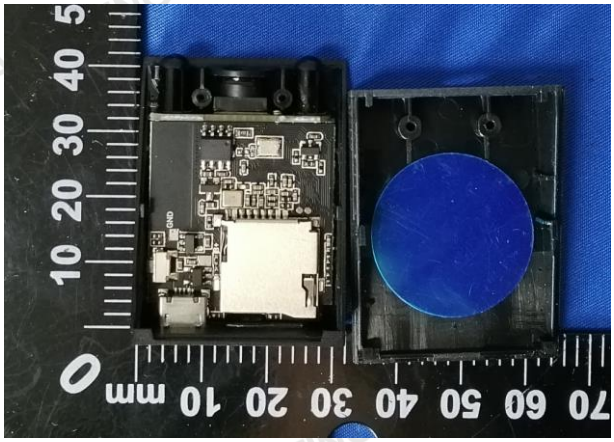


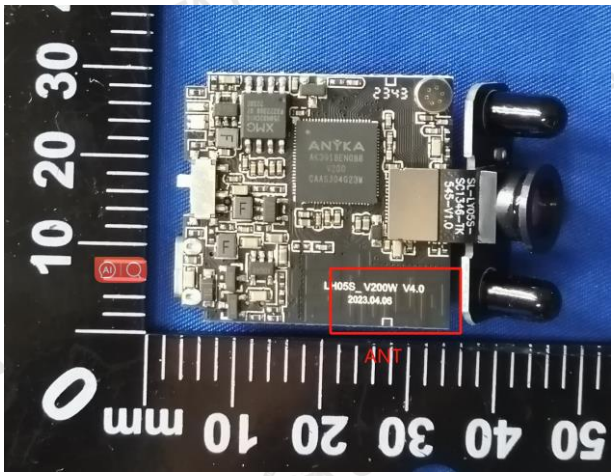


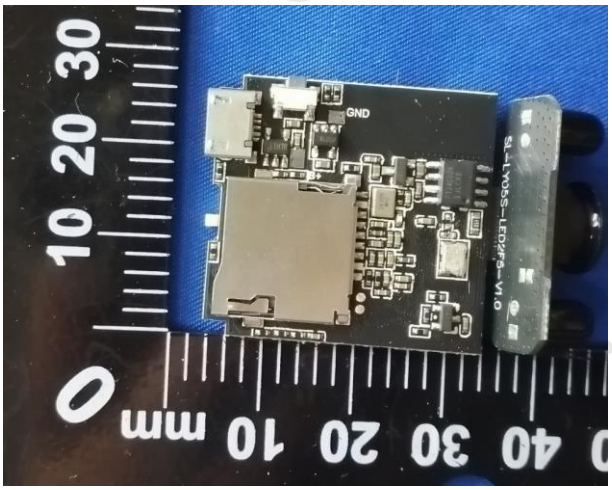




Internal Photos







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