



**CFR 47 FCC PART 15 SUBPART C
ISED RSS-247 ISSUE 2**

TEST REPORT

For

YI Dash Cam-Nightscape

MODEL NUMBER: YCS.2A19

**FCC ID: 2AFIB-YCS2A19
IC: 20436-YCS2A19**

REPORT NUMBER: 4788872614-1

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Prepared for

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	06/06/2019	Initial Issue	



Summary of Test Results			
Clause	Test Items	FCC/IC Rules	Test Results
1	6dB Bandwidth and 99% Occupied Bandwidth	FCC Part 15.247 (a) (2) RSS-247 Clause 5.2 (a) ISED RSS-Gen Clause 6.7	Pass
2	Peak Conducted Output Power	FCC Part 15.247 (b) (3) RSS-247 Clause 5.4 (e)	Pass
3	Power Spectral Density	FCC Part 15.247 (e) RSS-247 Clause 5.2 (b)	Pass
4	Conducted Bandedge and Spurious Emission	FCC Part 15.247 (d) RSS-247 Clause 5.5	Pass
5	Radiated Bandedge and Spurious Emission	FCC Part 15.247 (d) FCC Part 15.209 FCC Part 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9	Pass
6	Conducted Emission Test For AC Power Port	FCC Part 15.207 RSS-GEN Clause 8.8	Pass
7	Antenna Requirement	FCC Part 15.203 RSS-GEN Clause 8.3	Pass



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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Shanghai Xiaoyi Technology Co., Ltd.
Address: 6F, Building E, No. 2889, Jinke Road Shanghai, China

Manufacturer Information

Company Name: Shanghai Xiaoyi Technology Co., Ltd.
Address: 6F, Building E, No. 2889, Jinke Road Shanghai, China

EUT Description

EUT Name: YI Dash Cam-Nightscape
Model: YCS.2A19
Sample Status: Normal
Sample Received Date: February 27, 2019
Date of Tested: February 27~ May 30, 2019

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C	PASS
ISED RSS-247 Issue 2	PASS
ISED RSS-GEN Issue 5	PASS

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 2 and ISED RSS-GEN Issue 5.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	A2LA (Certificate No.: 4829.01) UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA. FCC (FCC Designation No.: CN1247) UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules
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Note 1: All tests measurement facilities use to collect the measurement data are located at No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, People's Republic of China

Note 2: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. These measurements below 30MHz had been correlated to measurements performed on an OFS.

Note 3: The test anechoic chamber in UL-CCIC COMPANY LIMITED had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.



4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognize national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.62dB
Radiation Emission test(include Fundamental emission) (9kHz-30MHz)	2.2dB
Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.00dB
Radiation Emission test (1GHz to 26GHz)(include Fundamental emission)	5.78dB (1GHz-18Gz)
	5.23dB (18GHz-26Gz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	



5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name	YI Dash Cam-Nightscape
Model	YCS.2A19
Radio Technology	IEEE802.11b/g/n HT20&HT40
Operation frequency	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz IEEE 802.11n HT40: 2422MHz—2452MHz
Modulation	IEEE 802.11b: DSSS(CCK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
Power Supply	DC 5V

5.2. MAXIMUM OUTPUT POWER

Number of Transmit Chains (NTX)	IEE Std. 802.11	Frequency (MHz)	Channel Number	Max PK Conducted Power (dBm)
1	IEEE 802.11b	2412-2462	1-11[11]	16.77
1	IEEE 802.11g	2412-2462	1-11[11]	16.16
1	IEEE 802.11nHT20	2412-2462	1-11[11]	16.16
1	IEEE 802.11nHT40	2422-2452	3-9[7]	15.51



5.3. CHANNEL LIST

Channel List for 802.11b/g/n (20 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	4	2427	7	2442	10	2457
2	2417	5	2432	8	2447	11	2462
3	2422	6	2437	9	2452	/	/

Channel List for 802.11n (40 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	5	2432	7	2442	9	2452
4	2427	6	2437	8	2447	/	/

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
WiFi TX(802.11b)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz
WiFi TX(802.11g)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz
WiFi TX(802.11n HT20)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz
WiFi TX(802.11n HT40)	CH 3, CH 6, CH 9	2422MHz, 2437MHz, 2452MHz

5.5. THE WORSE CASE CONFIGURATIONS

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band							
Test Software		SmartTools					
Modulation Mode	Transmit Antenna Number	Test Channel					
		NCB: 20MHz			NCB: 40MHz		
		CH 1	CH 6	CH 11	CH 3	CH 6	CH 9
802.11b	1	40	40	40	/		
802.11g	1	50	50	50			
802.11n HT20	1	50	50	50			
802.11n HT40	1	/			50	50	50



5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2412-2462	Dipole Antenna	2.68

Test Mode	Transmit and Receive Mode	Description
IEEE 802.11b	☒ 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11g	☒ 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11n HT20	☒ 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.
IEEE 802.11n HT40	☒ 1TX, 1RX	ANT 1 can be used as transmitting/receiving antenna.

5.7. THE WORSE CASE CONFIGURATIONS

For the product, there is only one transmission antenna, so only the worst data for the antenna1 is recorded in the report.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps
802.11b mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0



5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	Laptop	ThinkPad	E550c	N/A
2	Adapter	YI Adapter Power	A8-501000	N/A

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB to TTL	USB to TTL	USB	1	N/A
2	USB	N/A	N/A	1	N/A

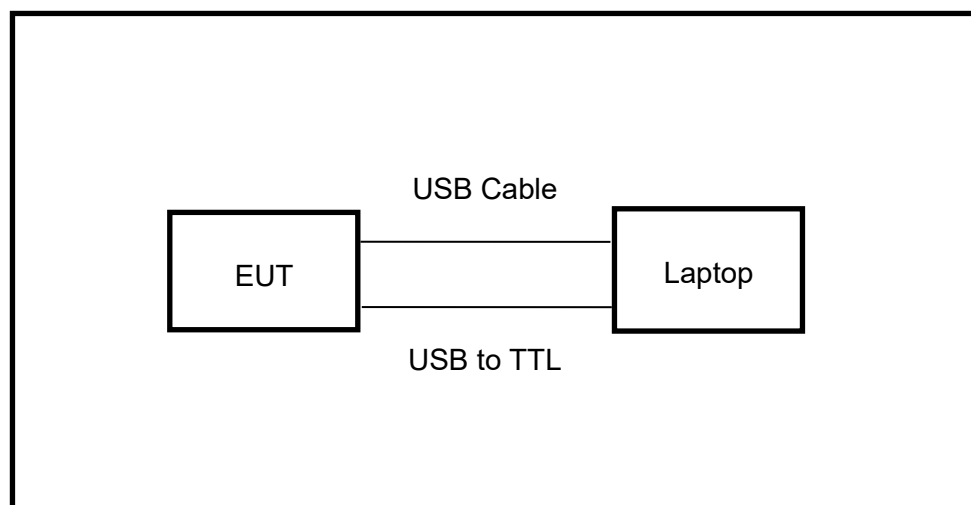
ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
1	N/A	N/A	N/A	N/A

TEST SETUP

The EUT can work in engineering mode with a software through a Laptop.

SETUP DIAGRAM FOR TESTS





6. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions (Instrument)							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☒	EMI Test Receiver	R&S	ESR3	126700	2017-12-14	2018-12-13	2019-12-12
☒	Two-Line V-Network	R&S	ENV216	126701	2017-12-14	2018-12-13	2019-12-12
☒	Artificial Mains Networks	R&S	ENY81	126711	2017-12-14	2018-12-13	2019-12-12
Software							
Used	Description		Manufacturer		Name	Version	
☒	Test Software for Conducted disturbance		R&S		EMC32	Ver. 9.25	
Radiated Emissions (Instrument)							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☒	Spectrum Analyzer	Keysight	N9010B	MY57110128	2018-05-30	2019-05-29	2020-05-28
☒	EMI test receiver	R&S	ESR26	1267603	2017-12-14	2018-12-13	2019-12-22
☒	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB 1513	513-265	2017-06-18	2018-06-17	2019-06-16
☒	Receiver Antenna (30MHz-1GHz)	SunAR RF Motion	JB1	126704	N/A	2019-01-28	2022-01-27
☒	Receiver Antenna (1GHz-18GHz)	R&S	HF907	126705	2018-01-27	2019-01-26	2020-01-26
☒	Receiver Antenna (18GHz-26.5GHz)	Schwarzbeck	BBHA9170	126706	2018-02-07	2019-02-06	2020-02-05
☒	Receiver Antenna (26.5GHz-40GHz)	TOYO	HAP 26-40W	00000012	2017-07-26	2018-07-25	2019-07-24
☒	Pre-amplification (To 1GHz)	R&S	SCU-03D	134666	2018-02-07	2019-02-06	2020-02-05
☒	Pre-amplification (To 18GHz)	TDK	PA-02-0118	TRS-305-00066	2017-12-12	2018-12-11	2019-12-10
☒	Pre-amplification (To 26.5GHz)	R&S	SCU-26D	134668	2018-02-07	2019-02-06	2020-02-05
☒	Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	1	2018-05-30	2019-05-29	2020-05-28
☒	Highpass Filter	Wainwright	WHKX10-2700-3000-18000-40SS	2	2018-05-30	2019-05-29	2020-05-28
Software							
Used	Description		Manufacturer		Name	Version	
☒	Test Software for Radiated disturbance		Tonscend		JS32	V1.0	
Other instruments							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Next Cal.	
☒	Spectrum Analyzer	Keysight	N9010B	MY57110128	2018-05-30	2019-05-29	2020-05-28
☒	Power Meter	Keysight	U2021XA	MY57110002	2018-06-13	2019-06-12	2020-06-11



7. MEASUREMENT METHODS

No.	Test Item	KDB Name	Section
1	6dB Bandwidth	KDB 558074 D01 15.247 Meas Guidance v05r02	8.2
2	Peak Output Power	KDB 558074 D01 15.247 Meas Guidance v05r02	8.3.1.3/8.3.2.3
3	Power Spectral Density	KDB 558074 D01 15.247 Meas Guidance v05r02	8.4
4	Out-of-band emissions in non-restricted bands	KDB 558074 D01 15.247 Meas Guidance v05r02	8.5
5	Out-of-band emissions in restricted bands	KDB 558074 D01 15.247 Meas Guidance v05r02	8.6
6	Band-edge	KDB 558074 D01 15.247 Meas Guidance v05r02	8.7
7	Conducted Emission Test For AC Power Port	ANSI C63.10-2013	6.2
8	99% Bandwidth	ANSI C63.10-2013	6.9.3



8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

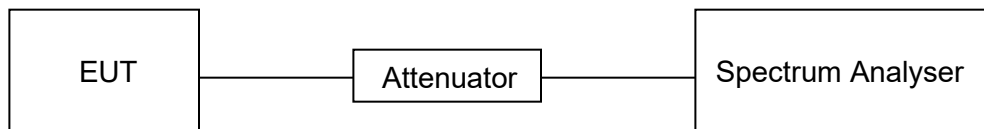
LIMITS

None; for reporting purposes only

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



TEST ENVIRONMENT

Temperature	20°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 5.0V

RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (KHz)	Final setting For VBW (KHz)
11B	12.410	12.485	0.9940	99.40%	0.026	0.08	0.01
11G	2.063	2.1434	0.9625	96.25%	0.166	0.48	1.0
11N20	1.919	1.9997	0.9596	95.96%	0.179	0.52	1.0
11N40	0.9438	1.0417	0.9060	90.60%	0.429	1.06	2.0

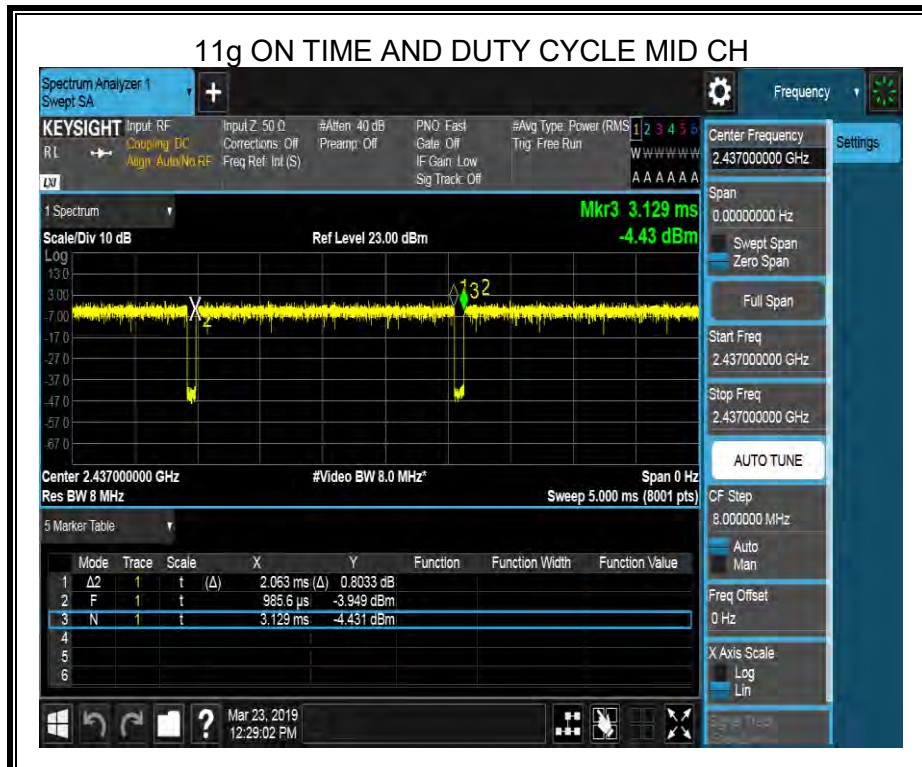
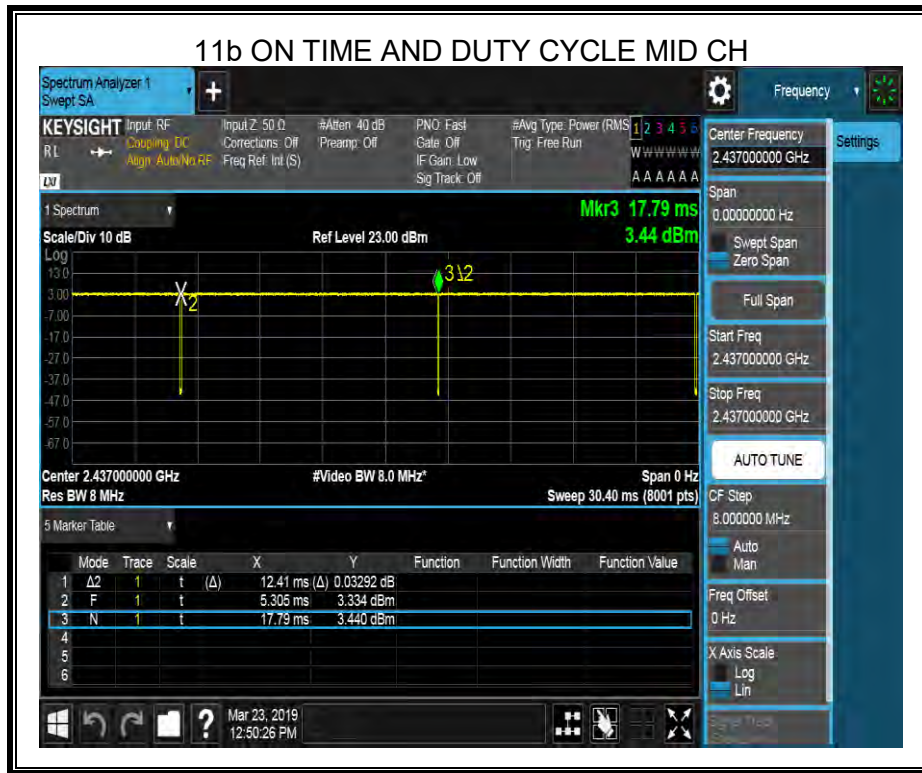
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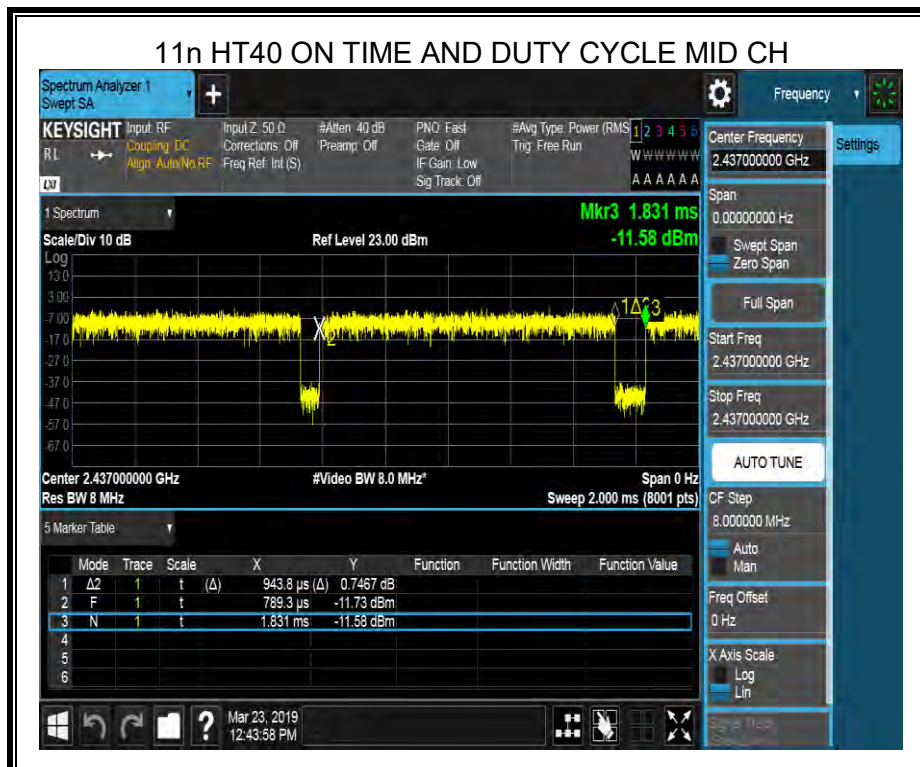
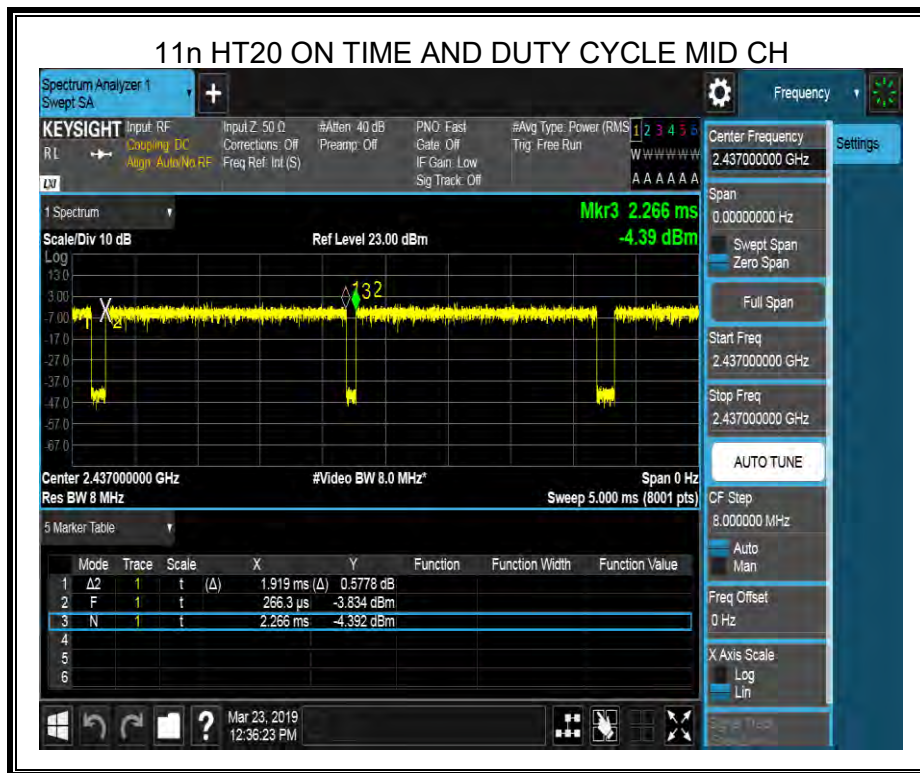
Duty Cycle Correction Factor=10log (1/x).

Where: x is Duty Cycle (Linear)

Where: T is On Time

If that calculated VBW is not available on the analyzer then the next higher value should be used.







8.2. 6 dB DTS BANDWIDTH AND 99% OCCUPIED BANDWIDTH

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2) ISED RSS-247 5.2 (a)	6 dB Bandwidth	$\geq 500\text{KHz}$	2400-2483.5
ISED RSS-Gen Clause 6.7	99% Occupied Bandwidth	For reporting purposes only.	2400-2483.5

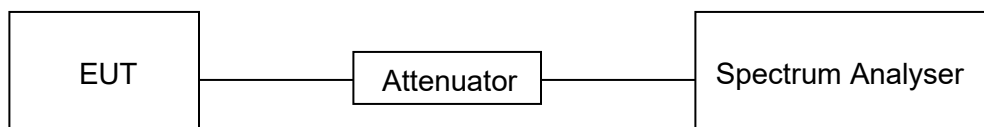
TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6dB Bandwidth :100K For 99% Occupied Bandwidth :1% to 5% of the occupied bandwidth
VBW	For 6dB Bandwidth : $\geq 3 \times \text{RBW}$ For 99% Occupied Bandwidth : approximately $3 \times \text{RBW}$
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and 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 and 99% relative to the maximum level measured in the fundamental emission.

TEST SETUP





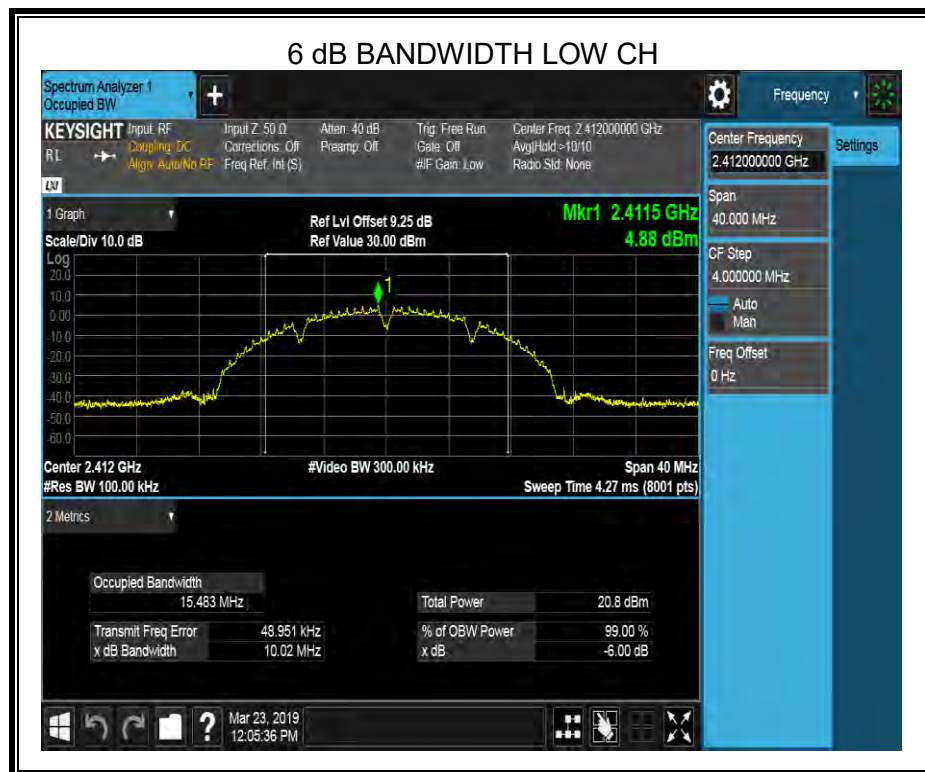
TEST ENVIRONMENT

Temperature	20°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 5.0V

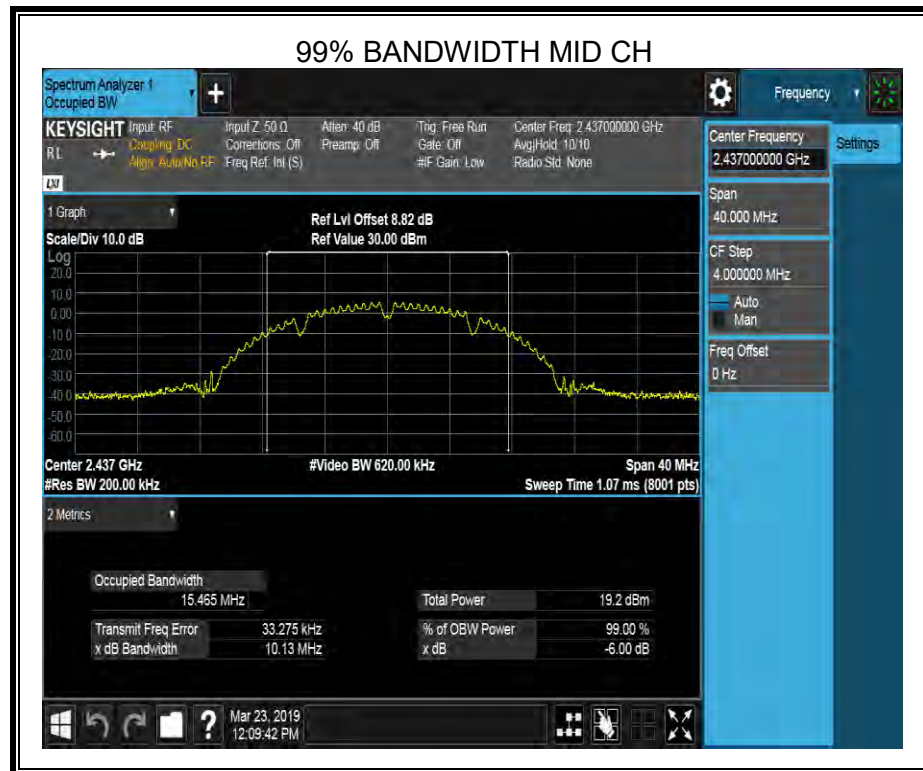
RESULTS

8.2.1. 802.11b MODE

Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	10.02	15.510	≥500	Pass
Middle	10.01	15.465	≥500	Pass
High	10.03	15.554	≥500	Pass



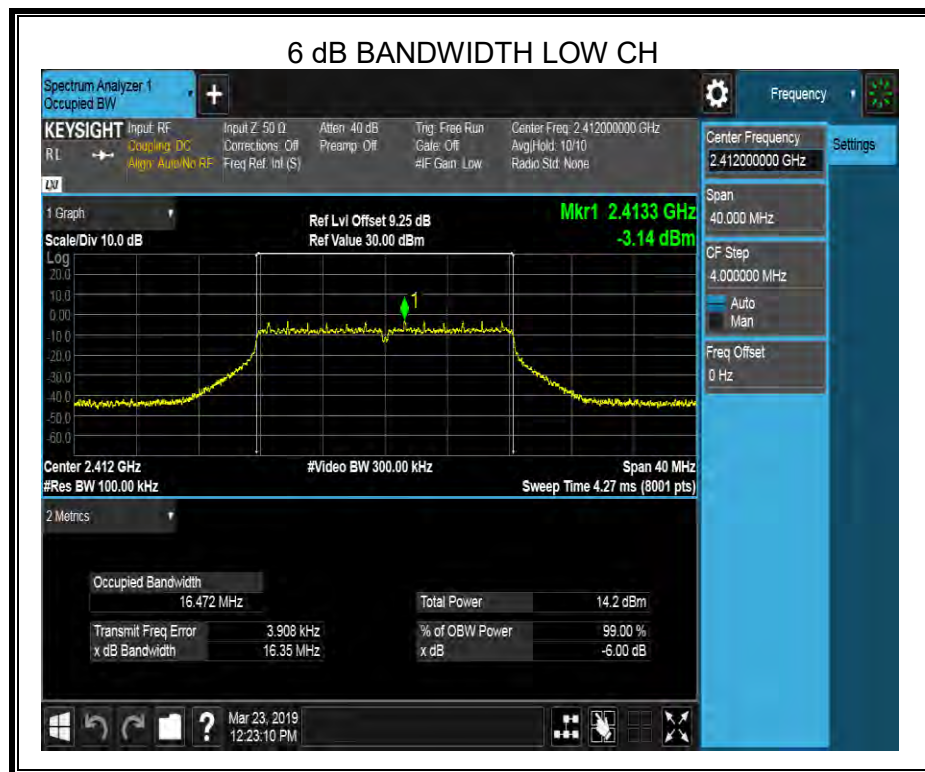




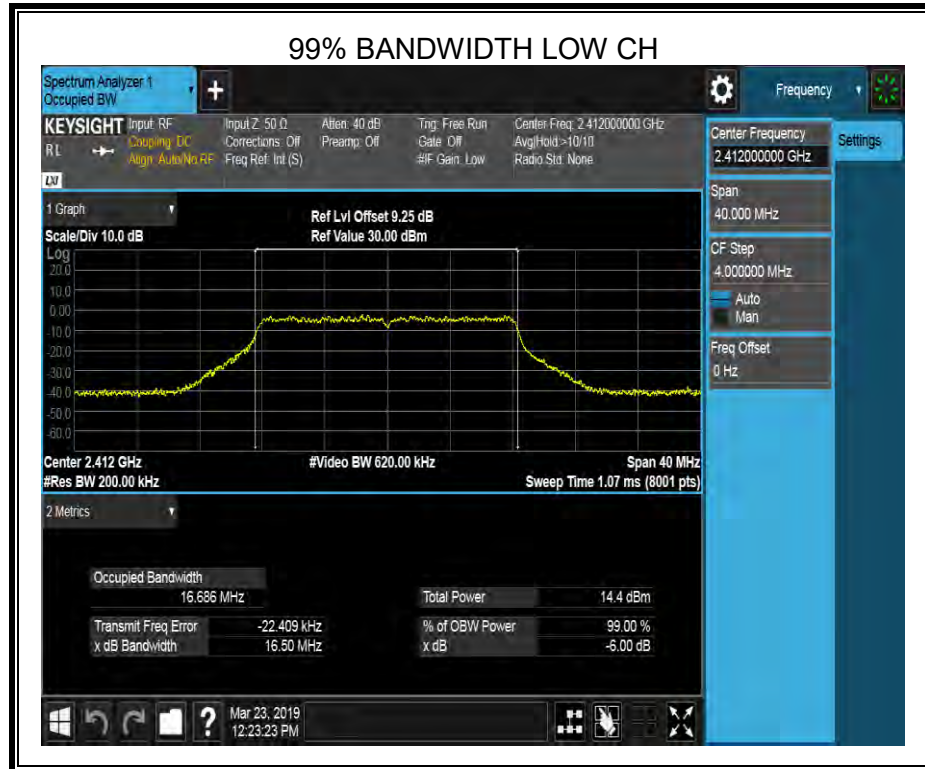


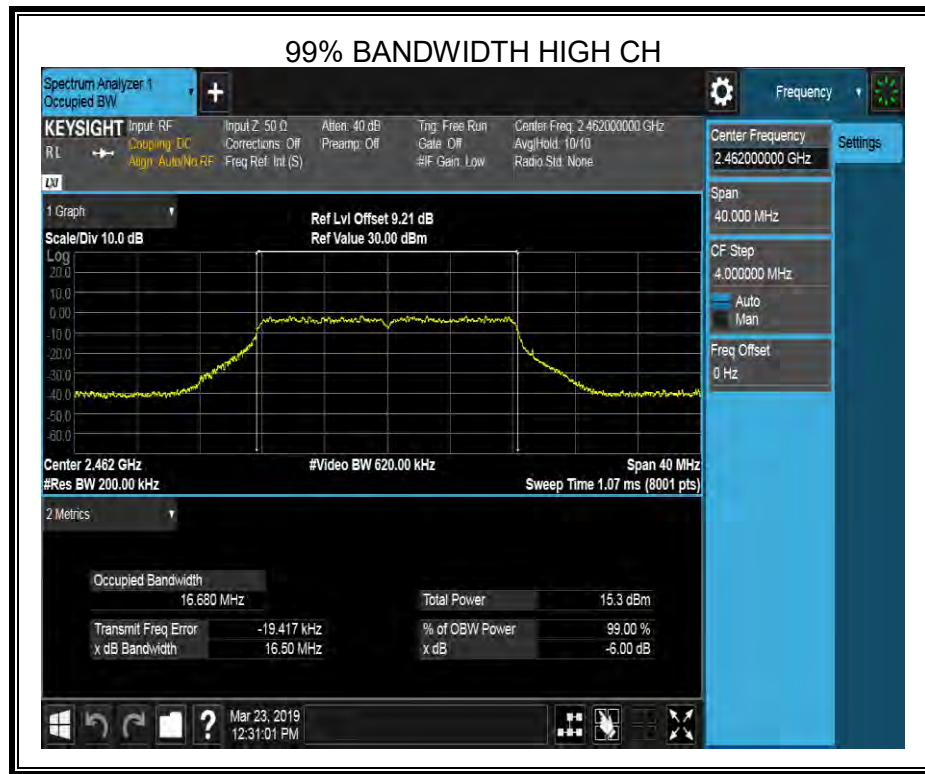
8.2.2. 802.11g MODE

Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	16.35	16.686	≥500	Pass
Middle	16.34	16.662	≥500	Pass
High	16.36	16.680	≥500	Pass







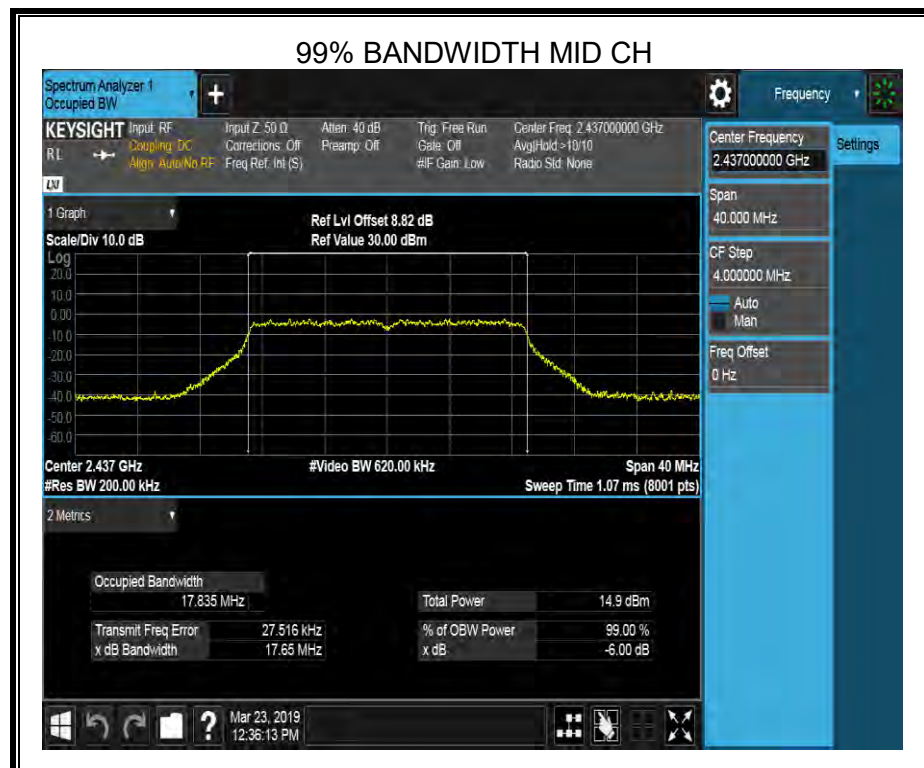


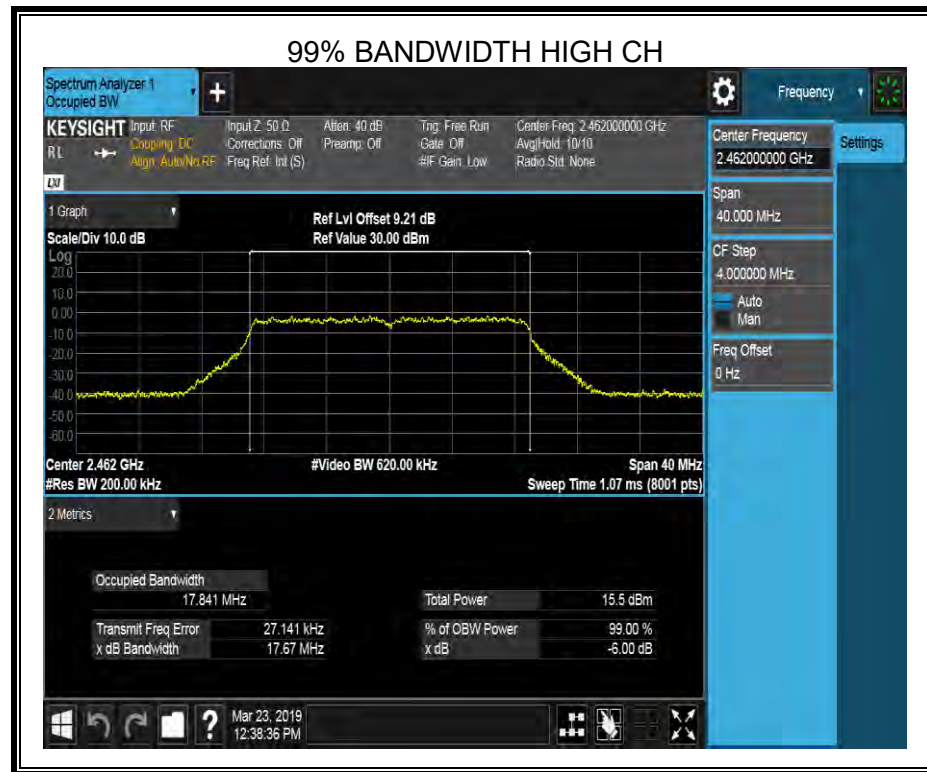
8.2.3. 802.11n HT20 MODE

Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	17.58	17.859	≥500	Pass
Middle	17.57	17.835	≥500	Pass
High	17.58	17.841	≥500	Pass



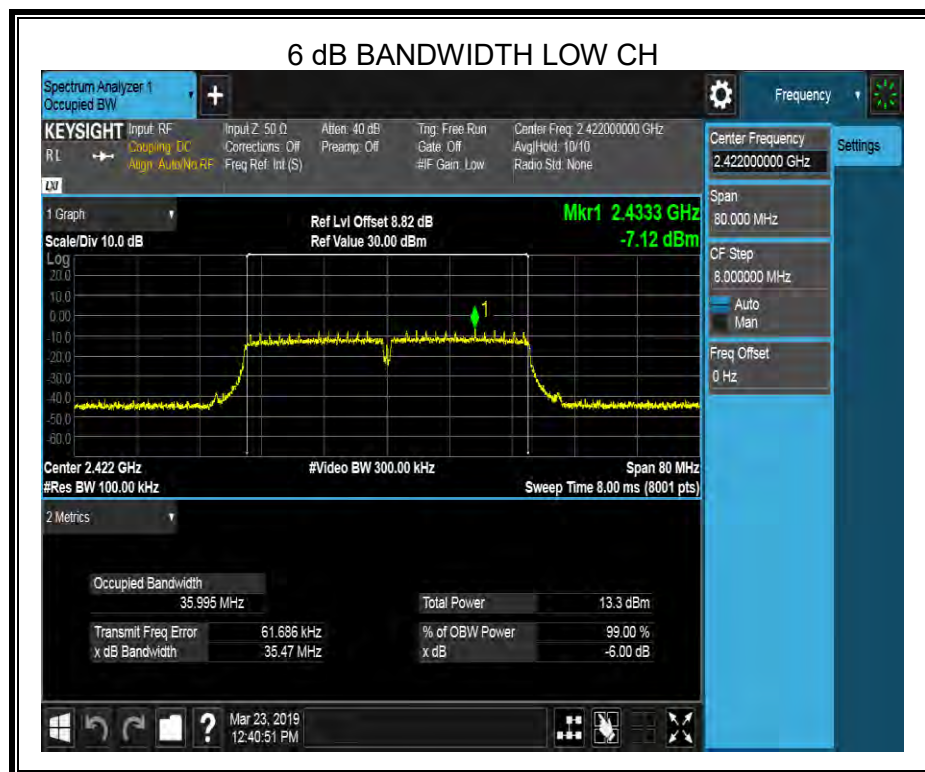


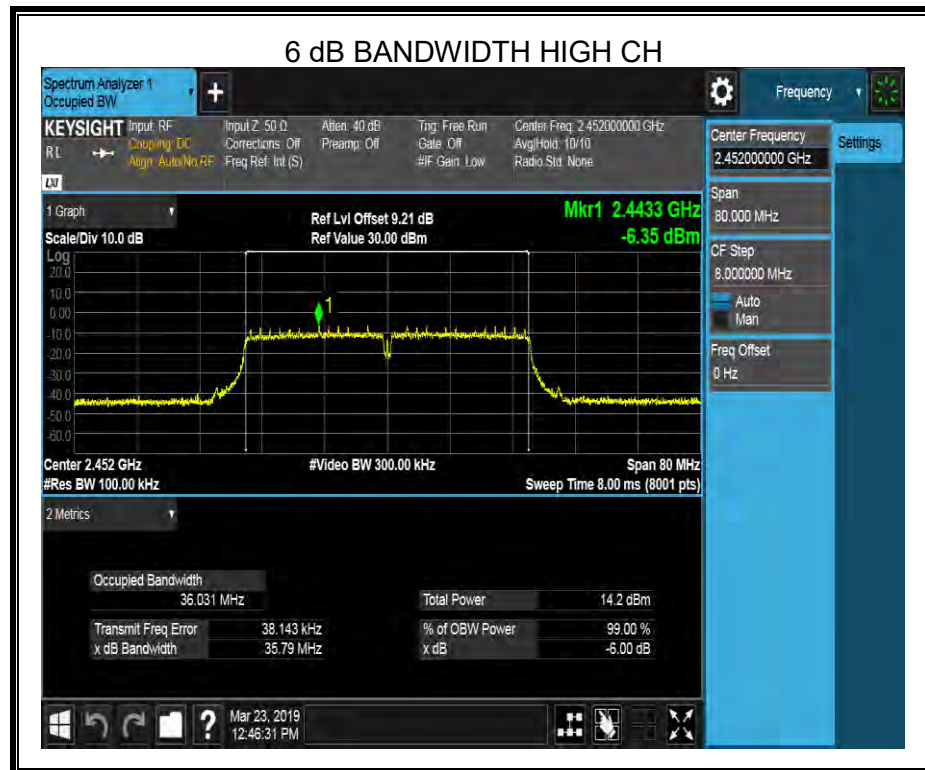


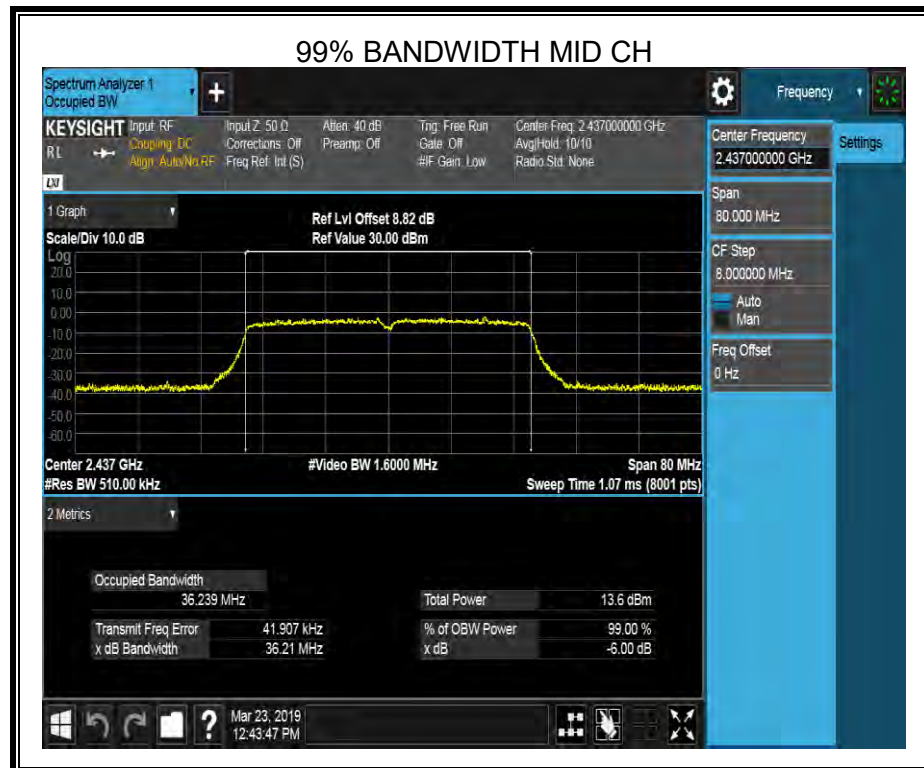


8.2.4. 802.11n HT40 MODE

Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	35.47	36.265	≥500	Pass
Middle	35.58	36.239	≥500	Pass
High	35.79	36.258	≥500	Pass











8.3. PEAK CONDUCTED OUTPUT POWER

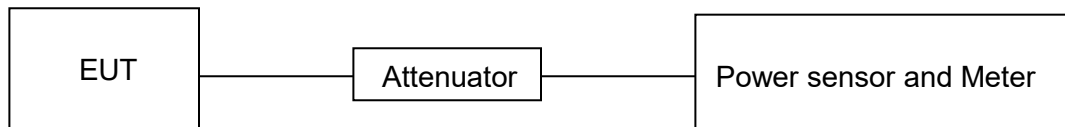
LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3) ISED RSS-247 5.4 (e)	Peak Output Power	1 watt or 30dBm (See note1)	2400-2483.5
Note: 1. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.			

TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.
Measure the power of each channel.
Peak Detector use for Peak result.
AVG Detector use for AVG result.

TEST SETUP



TEST ENVIRONMENT

Temperature	20°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 5.0V



RESULTS

8.3.1. 802.11b MODE

Test Channel	ANT.	Maximum Conducted Output Power(PK) (dBm)	Maximum Conducted Output Power(AV) (dBm)	LIMIT
				dBm
Low	1	16.51	16.01	30
Middle	1	16.70	15.98	30
High	1	16.94	16.77	30

8.3.2. 802.11g MODE

Test Channel	ANT.	Maximum Conducted Output Power(PK) (dBm)	Maximum Conducted Output Power(AV) (dBm)	LIMIT
				dBm
Low	1	15.69	15.33	30
Middle	1	16.12	15.16	30
High	1	16.57	16.16	30

8.3.3. 802.11n HT20 MODE

Test Channel	ANT.	Maximum Conducted Output Power(PK) (dBm)	Maximum Conducted Output Power(AV) (dBm)	LIMIT
				dBm
Low	1	15.77	15.19	30
Middle	1	16.29	15.01	30
High	1	16.71	16.16	30

8.3.4. 802.11n HT40 MODE

Test Channel	ANT.	Maximum Conducted Output Power(PK) (dBm)	Maximum Conducted Output Power(AV) (dBm)	LIMIT
				dBm
Low	1	14.79	14.59	30
Middle	1	15.18	14.51	30
High	1	15.72	15.51	30



8.4. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e) ISED RSS-247 5.2 (b)	Power Spectral Density	8 dBm/3 kHz (See note1)	2400-2483.5
Note: 1. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.			

TEST PROCEDURE

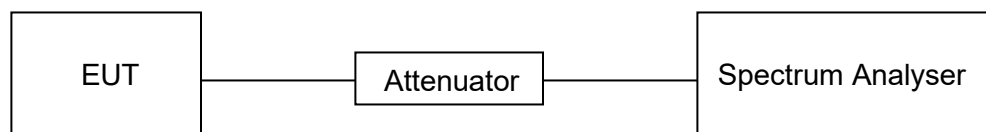
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST SETUP



TEST ENVIRONMENT

Temperature	20°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 5.0V

RESULTS

8.4.1. 802.11b MODE

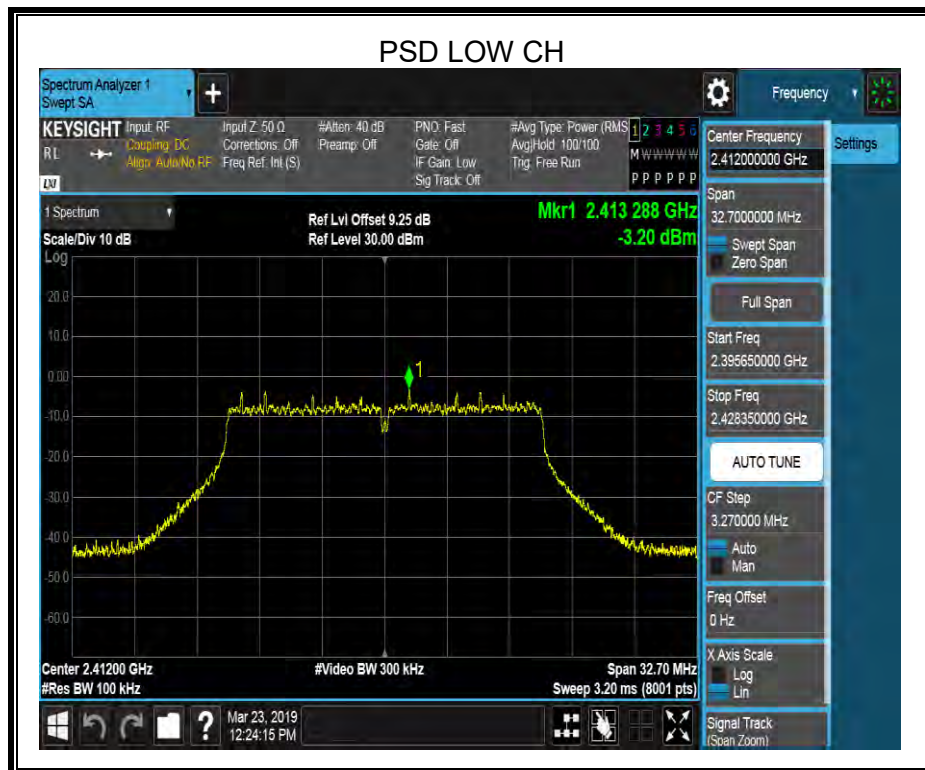
Test Channel	Power Spectral Density (dBm/100kHz)	Limit (dBm/3kHz)	Result
Low	4.44	8	PASS
Middle	4.86	8	PASS
High	5.13	8	PASS

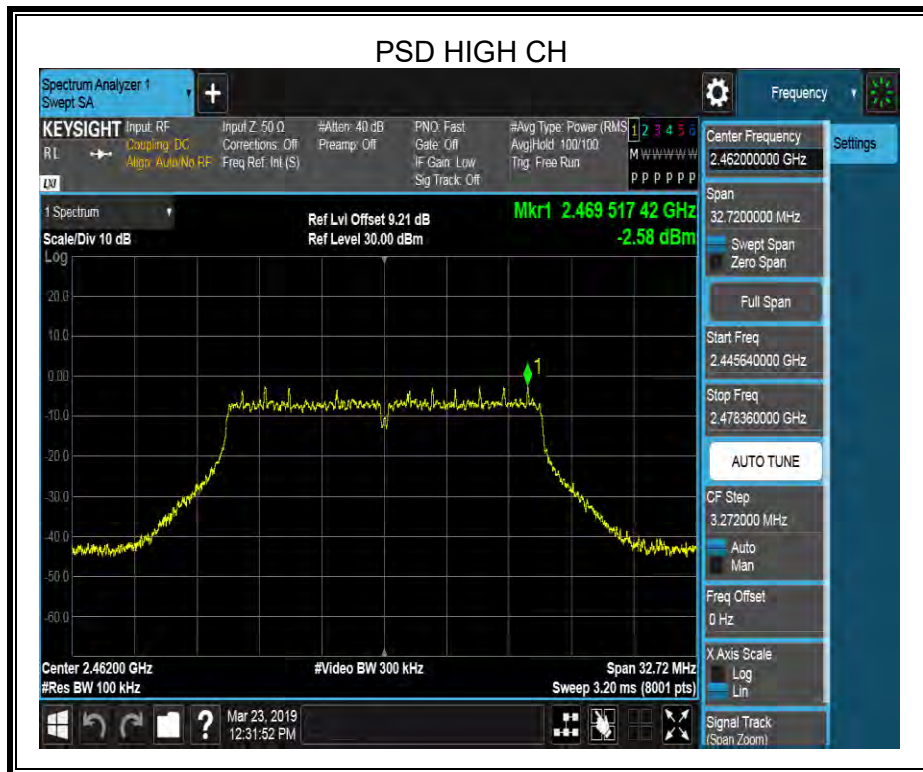
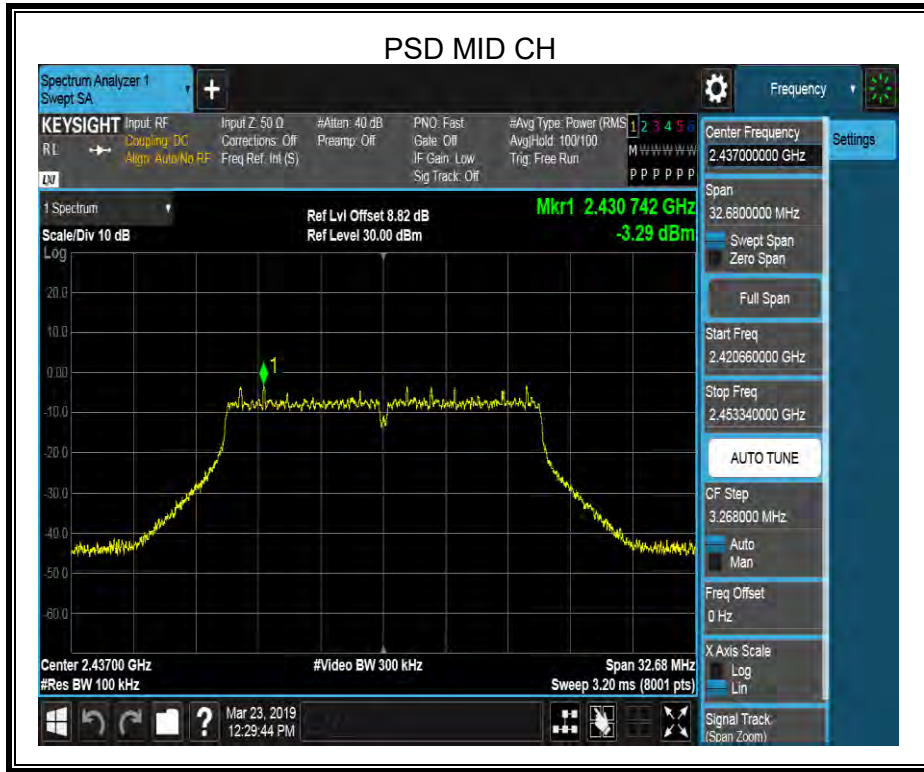




8.4.2. 802.11g MODE

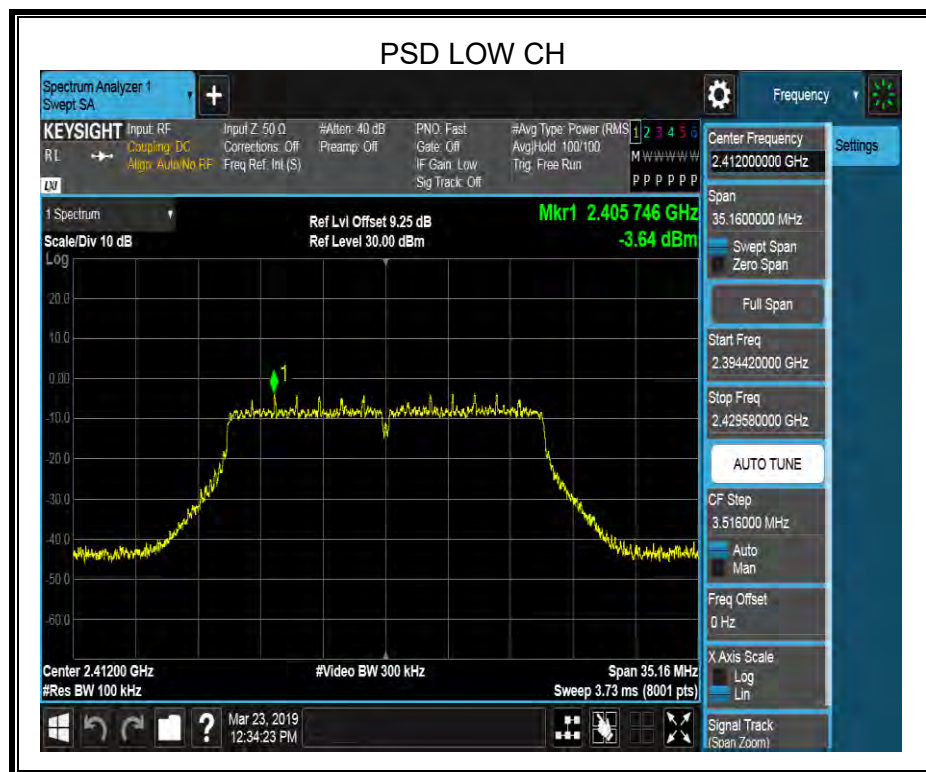
Test Channel	Power Spectral Density (dBm/100kHz)	Limit (dBm/3kHz)	Result
Low	-3.20	8	PASS
Middle	-3.29	8	PASS
High	-2.58	8	PASS

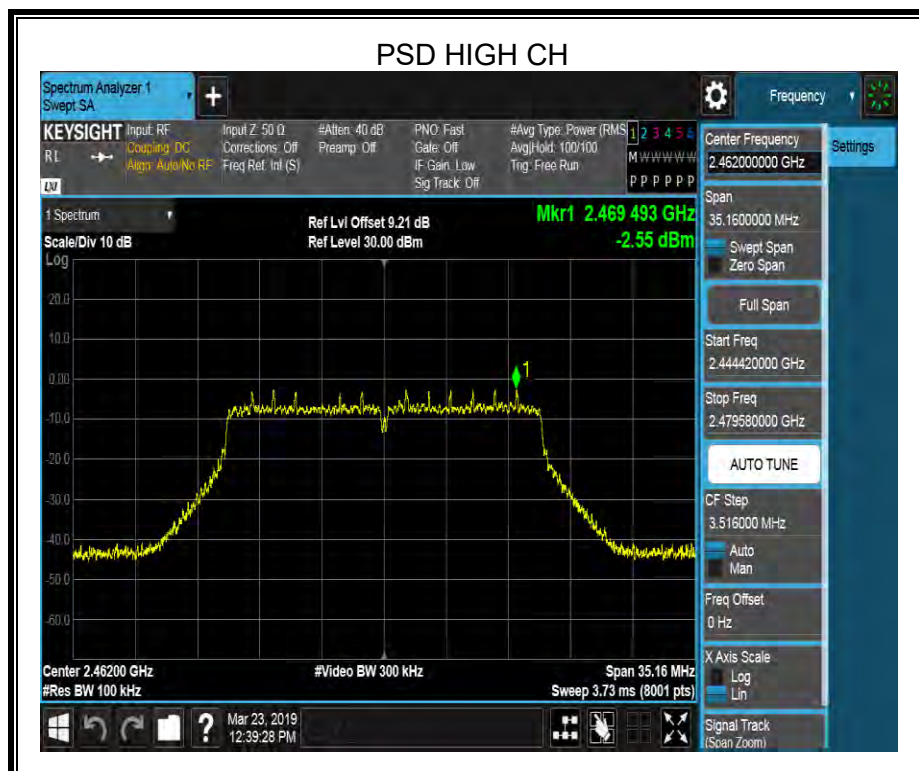
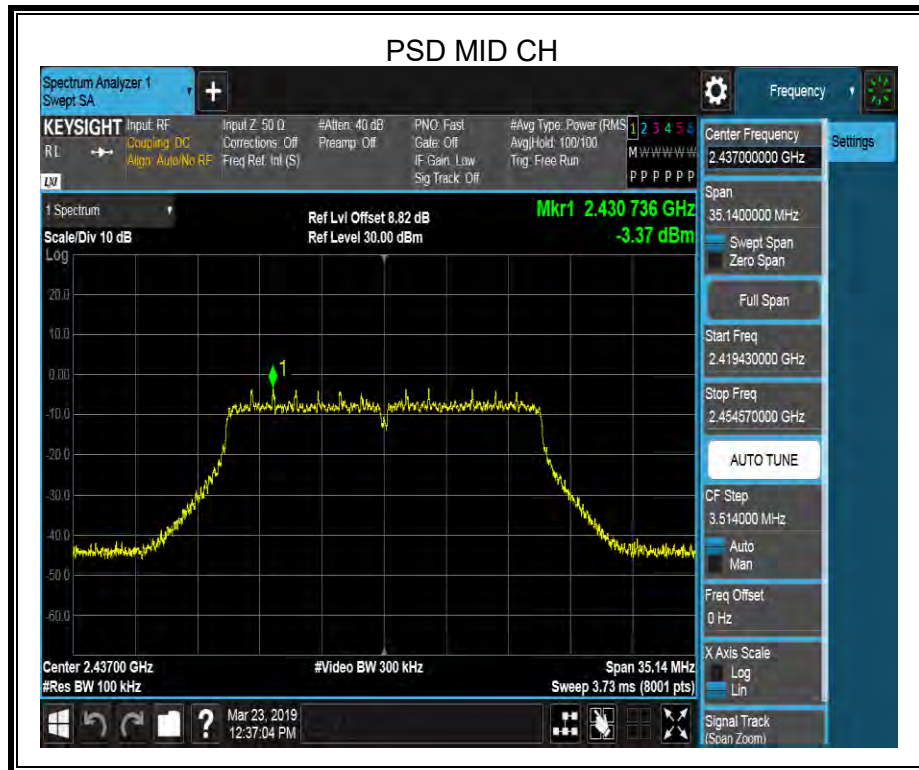




8.4.3. 802.11n HT20 MODE

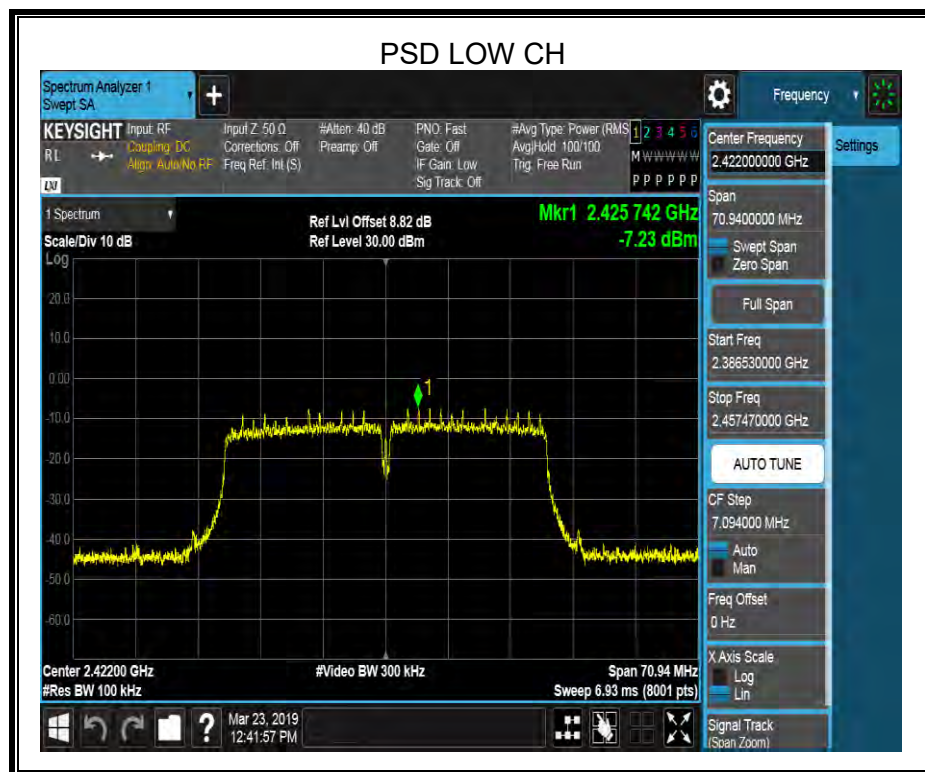
Test Channel	Power Spectral Density (dBm/100kHz)	Limit (dBm/3kHz)	Result
Low	-3.64	8	PASS
Middle	-3.37	8	PASS
High	-2.55	8	PASS

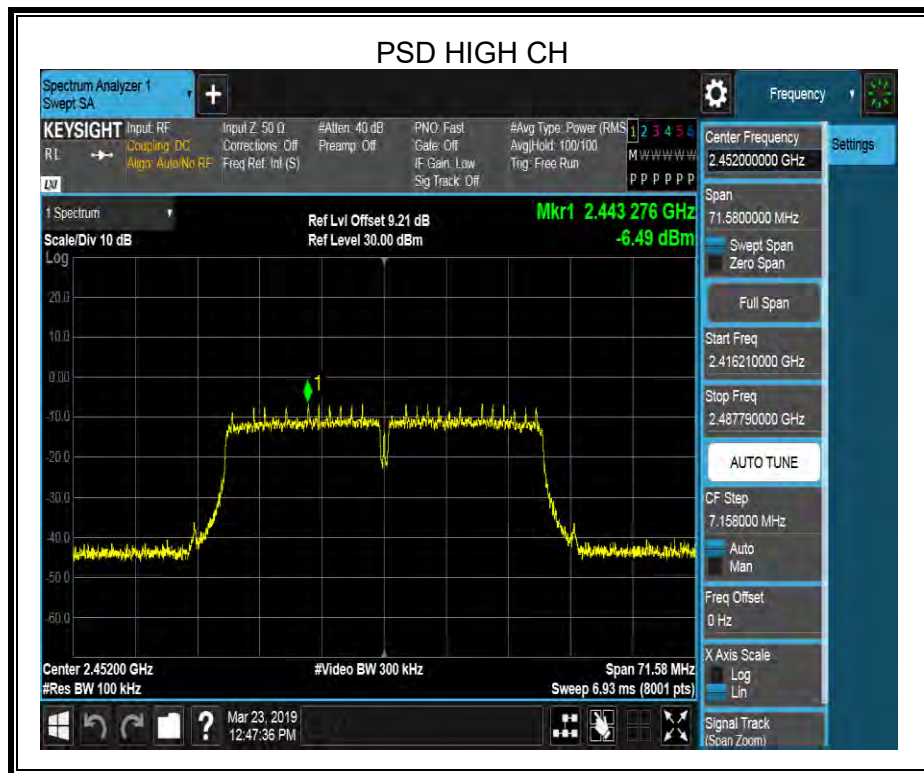
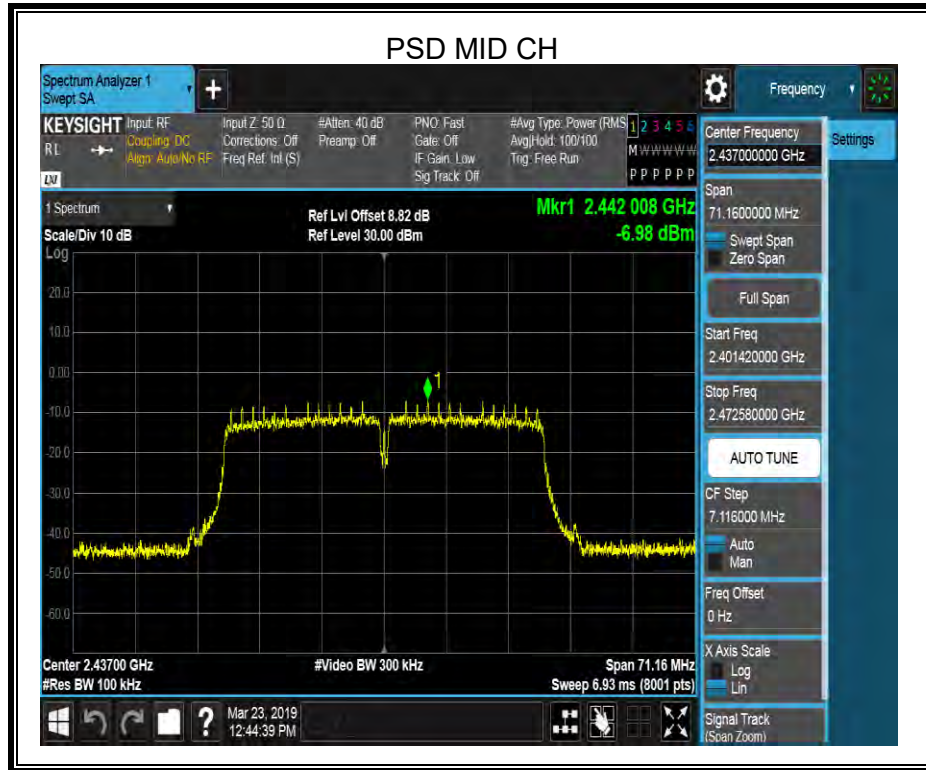




8.4.1. 802.11n HT40 MODE

Test Channel	Power Spectral Density (dBm/100kHz)	Limit (dBm/3kHz)	Result
Low	-7.23	8	PASS
Middle	-6.98	8	PASS
High	-6.49	8	PASS







8.5. CONDUCTED BANDEGE AND SPURIOUS EMISSIONS

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d) ISED RSS-247 5.5	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100K
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

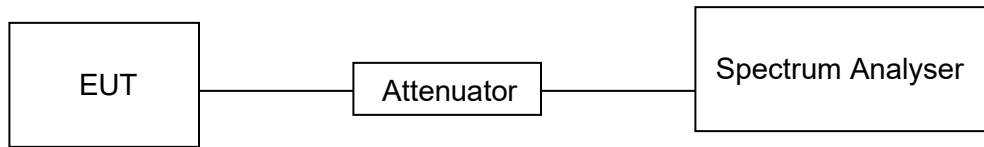
Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100K
VBW	$\geq 3 \times \text{RBW}$
measurement points	$\geq \text{span}/\text{RBW}$
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level.



TEST SETUP



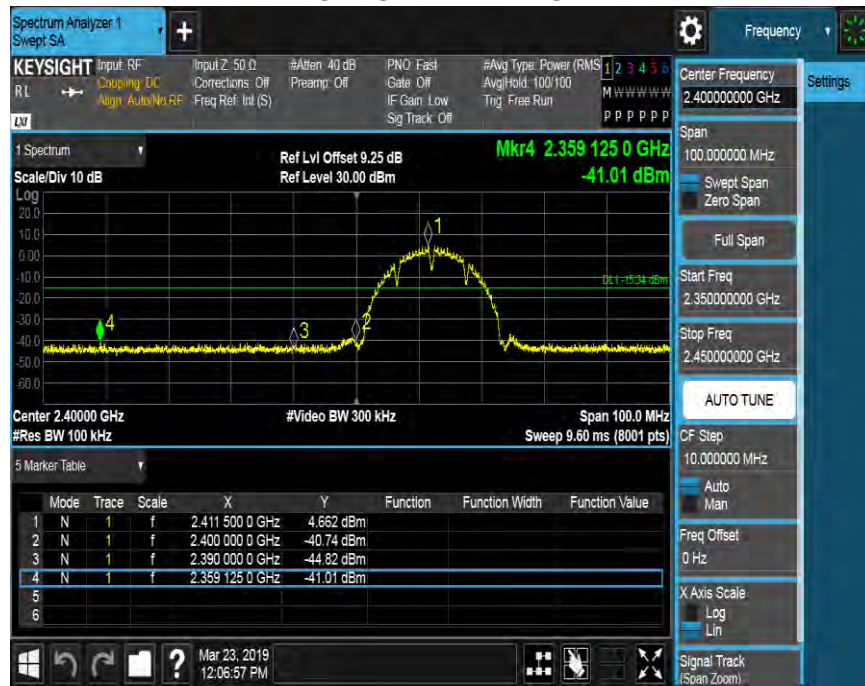
TEST ENVIRONMENT

Temperature	20°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 5.0V

RESULTS

8.5.1. 802.11b MODE

LOW CH BANDEDGE



LOW CH SPURIOUS EMISSIONS

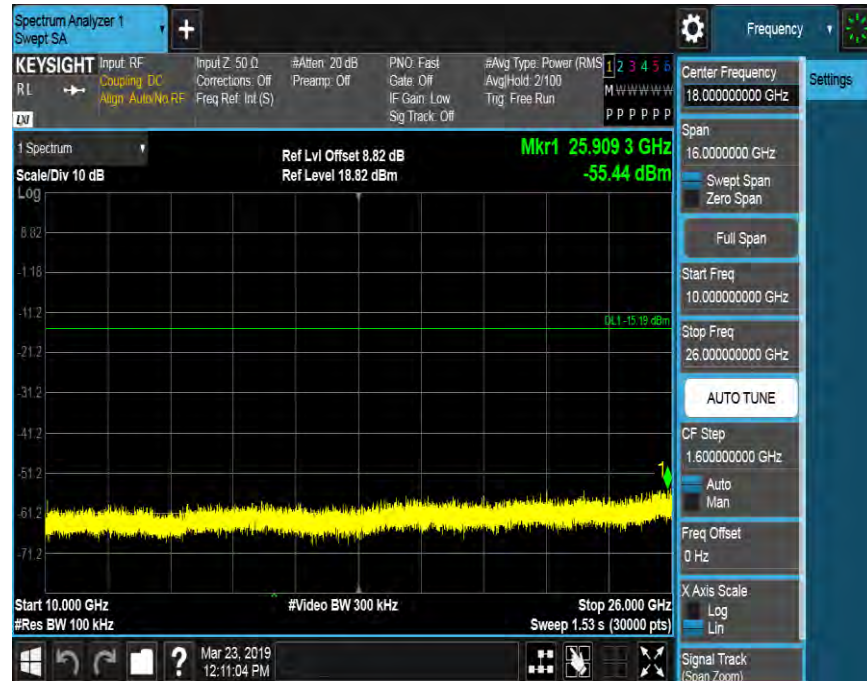






MID CH SPURIOUS EMISSIONS





HIGH CH BANDEDGE





HIGH CH SPURIOUS EMISSIONS





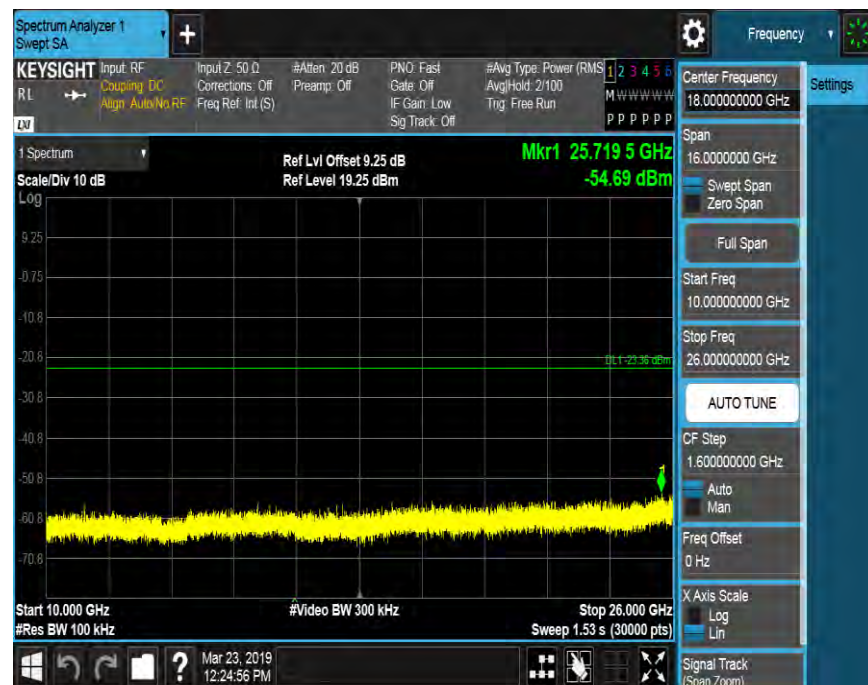
8.5.2. 802.11g MODE

LOW CH BANDEDGE



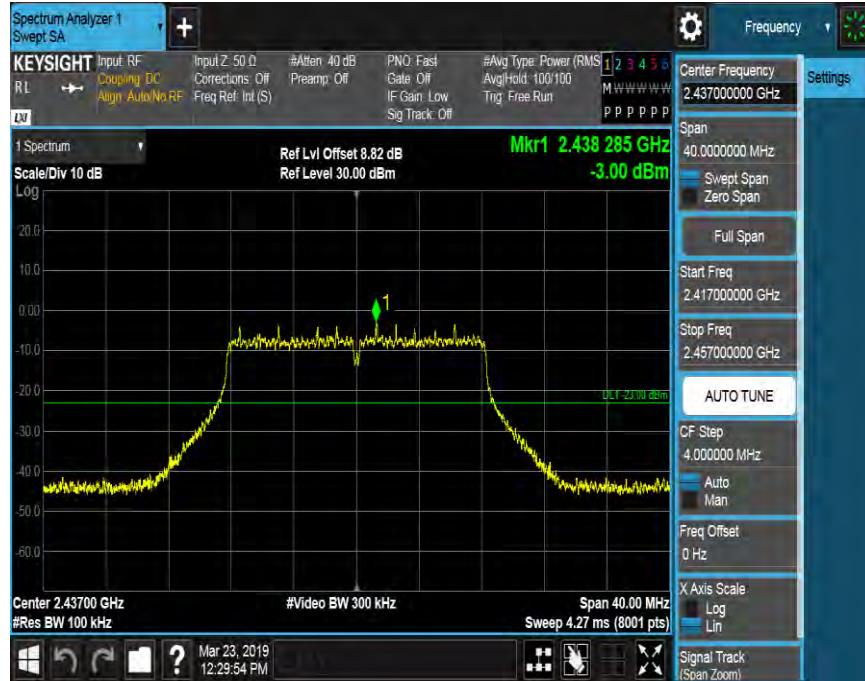
LOW CH SPURIOUS EMISSIONS







MID CH SPURIOUS EMISSIONS





HIGH CH BANDEDGE

