MEASUREMENT REPORT

FCC PART 15C / WLAN 802.11b/g/n

FCC ID:	P27OT221
Applicant:	Sercomm Corporation
Application Type:	Certification
Product:	Subscriber End Equipment HGW
Model No.:	AOT-4221SR
Brand Name:	Airtel
FCC Classification:	Digital Transmission System (DTS)
FCC Rule Part(s):	Part 15 Subpart C (Section 15.247)
Test Procedure(s):	ANSI C63.10-2013, KDB 662911 D01v02r01
Test Date:	August 07 ~ September 05, 2020

Reviewed By: oscar shi
(Oscar Shi)

Approved By: Robin Wu
(Robin Wu)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.
The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2008RSU008-U1	Rev. 01	Initial Report	09-24-2020	Valid

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General Information

Applicant:	Sercomm Corporation
Applicant Address:	8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.
Manufacturer:	Sercomm Corporation
Manufacturer Address:	8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is an FCC accredited testing laboratory (MRT Designation No. CN1166) on the FCC website.**
- **MRT facility is an ISED recognized testing laboratory (MRT Reg. No. CN0001) on the ISED website.**
- **MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the A2LA under the A2LA Program (Cert. No. 3628.01) and CNAS under the CNAS Program (Cert. No. L10551) in EMC, Safety, Radio, Telecommunications and SAR testing.**

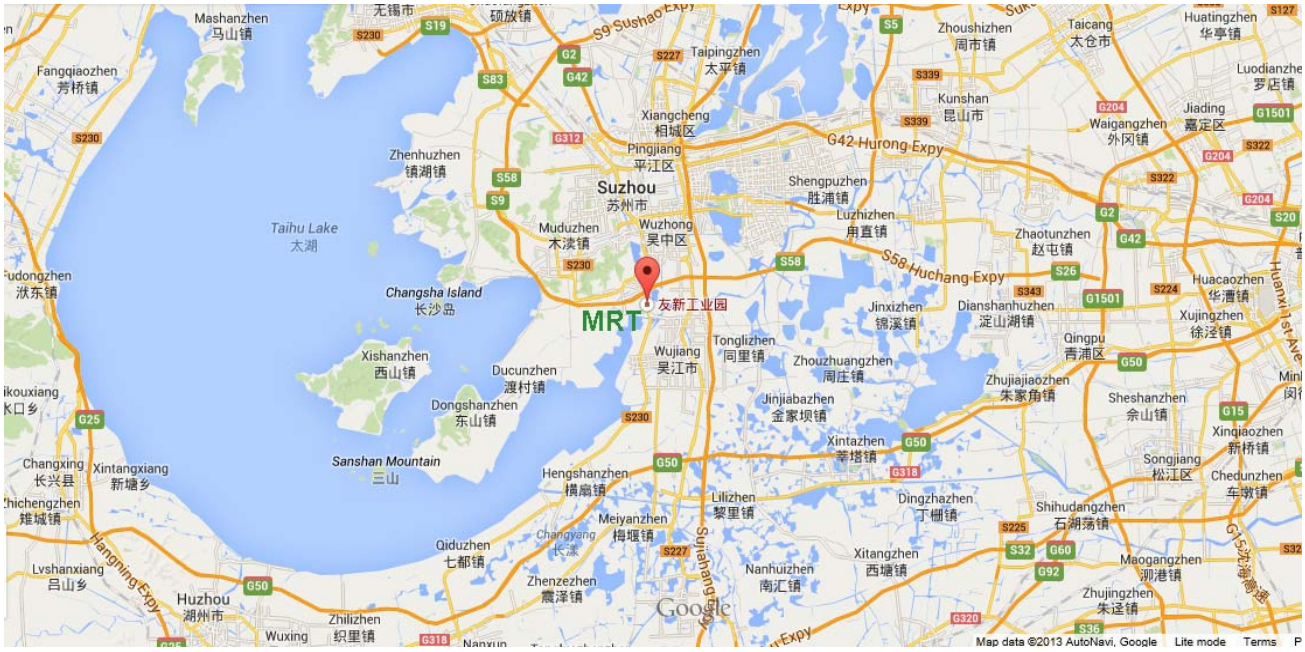
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada and Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Subscriber End Equipment HGW
Model No.	AOT-4221SR
Wi-Fi Specification	802.11a/b/g/n/ac
Serial Number	SROTFA000022
Accessories	
Adapter	Model No.: MSA-C2000IS12.0-24W-IN Input Power: 90 - 270V ~ 50/60Hz, 0.7A max Output Power: 12Vdc 2.0A

2.2. Product Specification Subjective to this Report

Frequency Range	802.11b/g/n-HT20: 2412 ~ 2462 MHz 802.11n-HT40: 2422 ~ 2452 MHz
Channel Number	802.11b/g/n-HT20: 11 802.11b/g/n-HT40: 7
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM
Data Rate	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps
Maximum Output Power	802.11b: 25.87dBm 802.11g: 29.92dBm 802.11n-HT20: 29.96dBm 802.11n-HT40: 27.02dBm

Note: For other features of this EUT, test report will be issued separately.

2.3. Working Frequencies for this report

802.11b/g/n-HT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	--	--

802.11n-HT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz
06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	--	--	--	--

2.4. Description of Available Antennas

Antenna Type	Frequency Band (GHz)	Antenna Gain (dBi)		Directional Gain (dBi)	
		Ant 0	Ant 1	For Power	For PSD
PIFA Antenna	2.4~2.5	3.50	3.40	3.50	6.51
	5.1~5.85	3.20	3.30	3.30	6.31

Note 1: The EUT supports Cyclic Delay Diversity (CDD) technology for 802.11a/b/g/n/ac mode.

Note 2: The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,

  Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;

- For power measurements on IEEE 802.11 devices,

  Array Gain = 0 dB for $N_{ANT} \leq 4$;

If antenna gains are not equal, Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain.

Note 3: The antenna gain is declared by manufacture.

2.5. Test Mode

Test Mode	Mode 1: Transmit by 802.11b (1Mbps)
	Mode 2: Transmit by 802.11g (6Mbps)
	Mode 3: Transmit by 802.11n-HT20 (MCS0)

	Mode 4: Transmit by 802.11n-HT40 (MCS0)

2.6. Description of Test Software

The test utility software used during testing was “QATool_Dbg”, and the version was v5.02. Power parameter value refers to operation description.

2.7. Power setting for 2.4G WLAN

Model	Ch.	Freq. (MHz)	Power Setting (Hex)	Power Setting (Dec)
b	1	2412	25	18.5
	6	2437	2A	21
	11	2462	2A	21
g	1	2412	2E	23
	2	2417	34	26
	6	2437	35	26.5
	10	2457	32	25
	11	2462	29	20.5
n-HT20	1	2412	2C	22
	2	2417	32	25
	6	2437	35	26.5
	10	2457	30	24
	11	2462	27	19.5
n-HT40	3	2422	26	19
	4	2427	29	20.5
	6	2437	2F	23.5
	8	2447	27	19.5
	9	2452	23	17.5

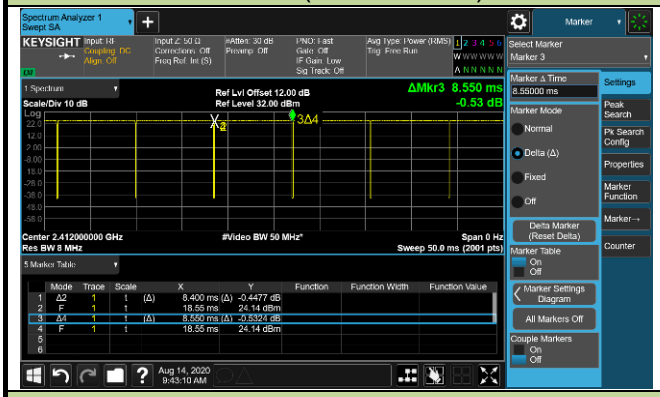
2.8. Duty Cycle

2.4GHz WLAN (DTS) operation is possible in 20MHz and 40MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

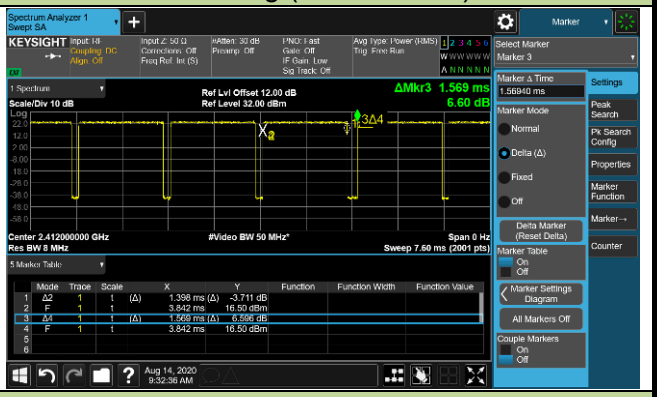
Test Mode	Duty Cycle
802.11b	98.25%
802.11g	89.10%
802.11n-HT20	89.61%
802.11n-HT40	81.01%

Duty Cycle (T = Transmission Duration)

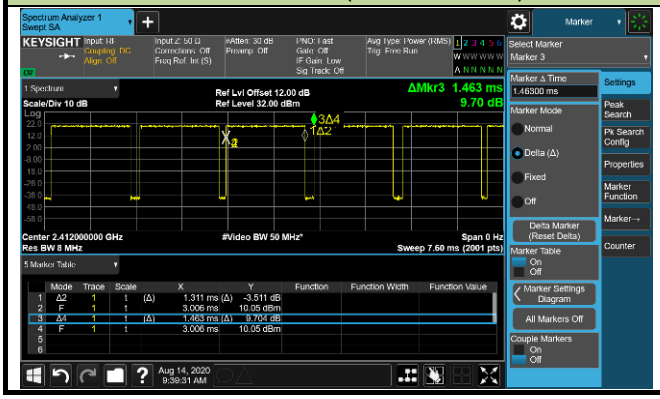
802.11b (T = 8.400ms)



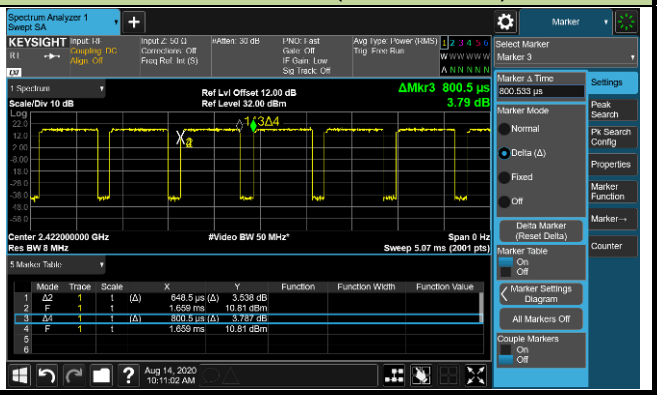
802.11g (T = 1.398ms)



802.11n-HT20 (T = 1.311ms)



802.11n-HT40 (T = 648.5us)



2.9. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.10. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

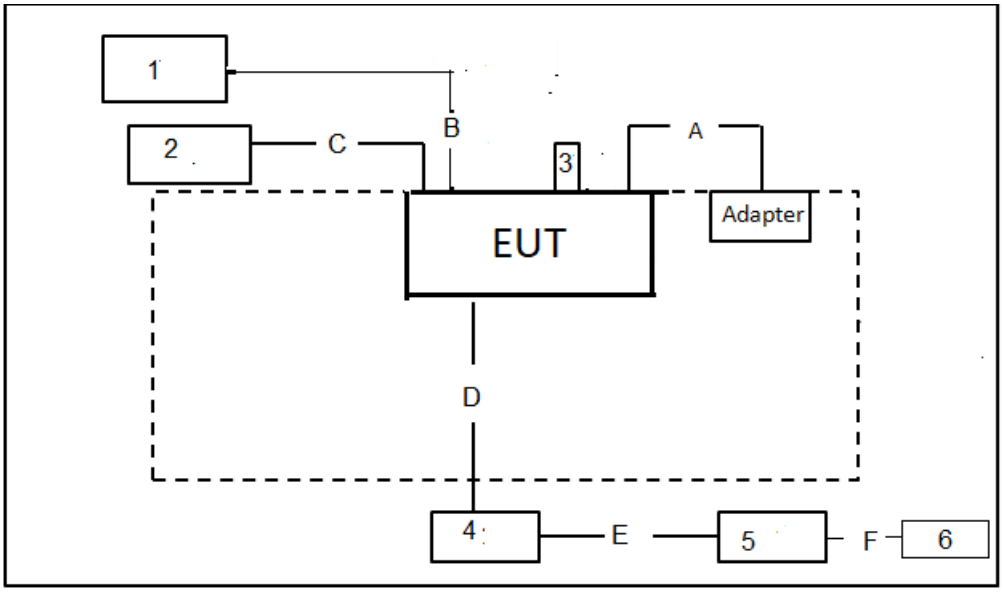
2.11. Test Environment Condition

Ambient Temperature	15°C~35°C
Relative Humidity	20%RH ~75%RH

2.12. Description of Test Configuration

The device was tested per the guidance ANSI C63.10: 2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.

Connection Diagram



Signal Cable Type		Signal cable Description
A	Power Cable	Non-Shielded, 1.5m
B	LAN Cable (RJ45)	Non-Shielded, >1.5m

C	LAN Cable (RJ11)	Non-Shielded, >1.5m
D	Optical fiber cable	Non-Shielded, >1.5m
E	LAN Cable (RJ45)	Non-Shielded, >1.5m
F	LAN Cable (RJ45)	Non-Shielded, 1.5m

2.13. Test System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Lenovo	E495	N/A	Non-Shielded, 1.8m
2	Telephone	Tonnet	TA-8012A	N/A	N/A
3	USB flash disk	SanDisk	CZ48	N/A	N/A
4	OLT	Fiberhome	AN5516-04	N/A	Non-Shielded, 1.5m
5	TRAFFIC Generator/ Performance analyzer	IXIA	IXIA 400T	N/A	Non-Shielded, 1.5m
6	Notebook	Lenovo	E495	N/A	Non-Shielded, 1.8m

3. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

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

- The antenna of the device is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2021/01/18
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2021/06/11
Four-Line V-Network	R&S	ENV432	MRTSUE06615	1 year	2020/11/11
Impedance Stabilization Network	TESEQ	ISN T200A	MRTSUE06004	1 year	2021/01/04
Impedance Stabilization Network	TESEQ	ISN T800	MRTSUE06005	1 year	2021/01/04
Impedance Stabilization Network	TESEQ	ISN T8-CAT6	MRTSUE06006	1 year	2021/01/04
V-Network	R&S	ESH3-Z6	MRTSUE06187	1 year	2021/04/14
V-Network	R&S	ESH3-Z6	MRTSUE06188	1 year	2021/04/14
RF Current Probe	R&S	EZ-17	MRTSUE06190	1 year	2021/04/14
Thermal Hygrometer	testo	608-H1	MRTSUE06404	1 year	2021/07/26

Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2021/01/18
PXA Signal Analyzer	Keysight	9030B	MRTSUE06395	1 year	2021/08/30
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2020/11/13
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2021/04/03
Broad Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2020/10/13
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2020/12/29
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2020/11/15
Preamplifier	EMC Instruments corporation	EMC051845SE	MRTSUE06602	1 year	2020/10/07
Thermohygrometer	Testo	608-H1	MRTSUE06403	1 year	2021/07/26
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06213	1 year	2021/04/30

Radiated Emission - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Keysight	N9038A	MRTSUE06125	1 year	2021/07/02
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2020/11/13
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2020/10/13
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06171	1 year	2020/10/27
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2020/12/29
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2020/12/29
Preamplifier	EMC Instruments corporation	EMC051845SE	MRTSUE06602	1 year	2020/10/07
Temperature/Humidity Meter	Minggao	ETH529	MRTSUE06170	1 year	2020/12/15
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2021/04/30

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2021/04/14
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2021/01/08
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2020/11/18
USB wideband power sensor	Keysight	U2021XA	MRTSUE06446	1 year	2021/06/11
USB wideband power sensor	Keysight	U2021XA	MRTSUE06447	1 year	2021/06/11
Bluetooth Test Set	Anritsu	MT8852B-042	MRTSUE06389	1 year	2021/06/11
Audio Analyzer	Agilent	U8903B	MRTSUE06143	1 year	2021/06/11
Modulation Analyzer	HP	HP8901A	MRTSUE06098	1 year	2020/10/10
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2020/11/07
DC Power Supply	GWINSTEK	DPS-3303C	MRTSUE06064	N/A	N/A
Attenuator	MVE	6dB	MRTSUE06534	1 year	2020/12/12
Attenuator	MVE	10dB	MRTSUE06543	1 year	2020/12/12
Temperature & Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2020/11/07
Thermal Hygrometer	testo	608-H1	MRTSUE06401	1 year	2021/07/26

Software	Version	Function
EMI Software	V3	EMI Test Software

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 30MHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 30MHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

6. TEST RESULT

6.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	6dB Bandwidth	≥ 500kHz	Conducted	Pass	Section 6.2
15.247(b)(3)	Output Power	≤ 1Watt		Pass	Section 6.3
15.247(e)	Power Spectral Density	≤ 8dBm / 3kHz		Pass	Section 6.4
15.247(d)	Band Edge / Out-of-Band Emissions	≥ 30dBc (Average)		Pass	Section 6.5
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 6.6 & 6.7
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 6.8

Notes:

1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2) The test results shown in the following sections represent the worst case emissions.

6.2. 6dB Bandwidth Measurement

6.2.1.Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

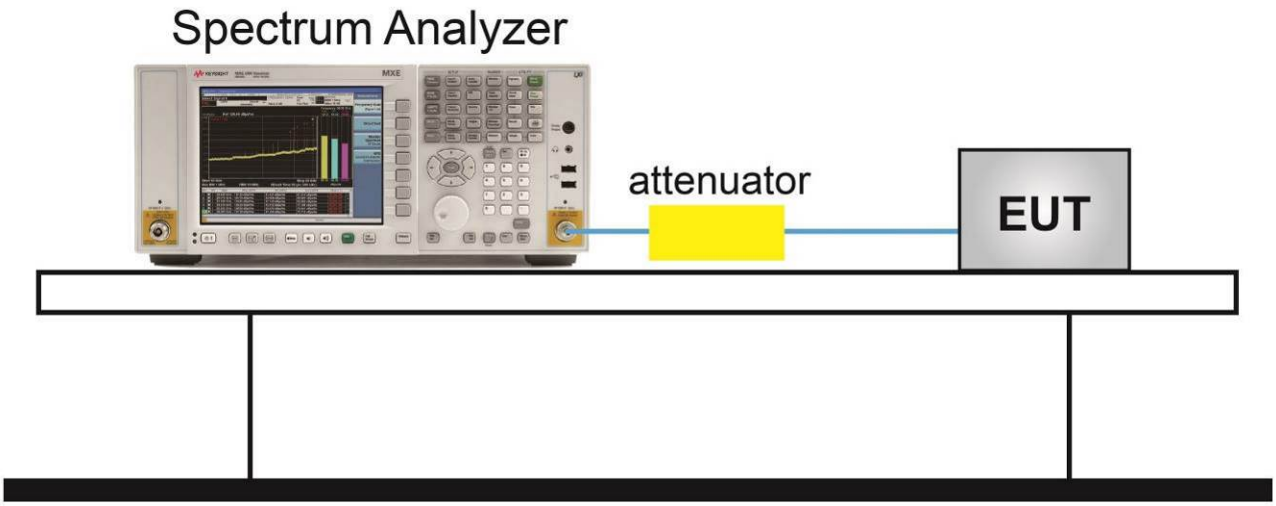
6.2.2.Test Procedure used

ANSI C63.10-2013 - Section 11.8

6.2.3.Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. VBW ≥ 3 × RBW
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep = Auto couple
7. Allow the trace was allowed to stabilize

6.2.4.Test Setup



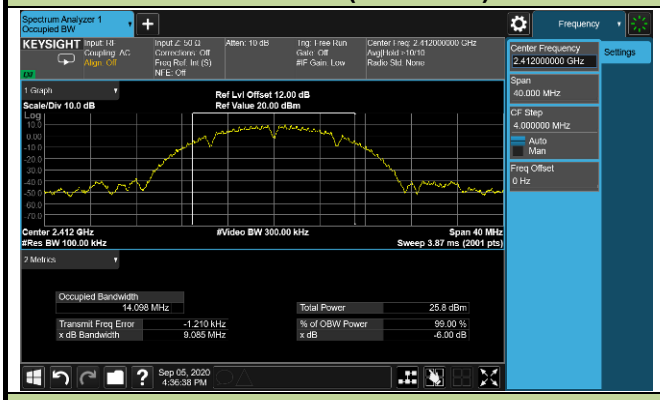
6.2.5.Test Result

Product	Subscriber End Equipment HGW	Test Engineer	Amy Zhang
Test Site	TR3	Test Date	2020/09/05

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11b	1Mbps	01	2412	9.09	≥ 0.5	Pass
802.11b	1Mbps	06	2437	10.01	≥ 0.5	Pass
802.11b	1Mbps	11	2462	10.02	≥ 0.5	Pass
802.11g	6Mbps	01	2412	15.11	≥ 0.5	Pass
802.11g	6Mbps	06	2437	15.12	≥ 0.5	Pass
802.11g	6Mbps	11	2462	15.11	≥ 0.5	Pass
802.11n-HT20	MCS0	01	2412	15.11	≥ 0.5	Pass
802.11n-HT20	MCS0	06	2437	15.70	≥ 0.5	Pass
802.11n-HT20	MCS0	11	2462	15.11	≥ 0.5	Pass
802.11n-HT40	MCS0	03	2422	35.10	≥ 0.5	Pass
802.11n-HT40	MCS0	06	2437	35.10	≥ 0.5	Pass
802.11n-HT40	MCS0	09	2452	35.11	≥ 0.5	Pass

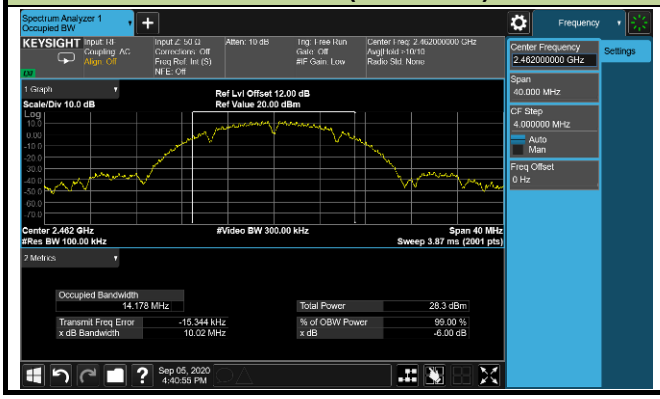
802.11b 6dB Bandwidth

Channel 01 (2412MHz)



Channel 06 (2437MHz)

Channel 11 (2462MHz)



802.11g 6dB Bandwidth

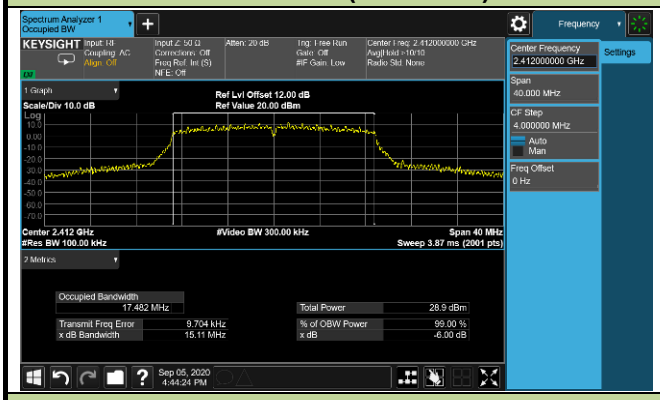
Channel 01 (2412MHz)

Channel 06 (2437MHz)

Channel 11 (2462MHz)

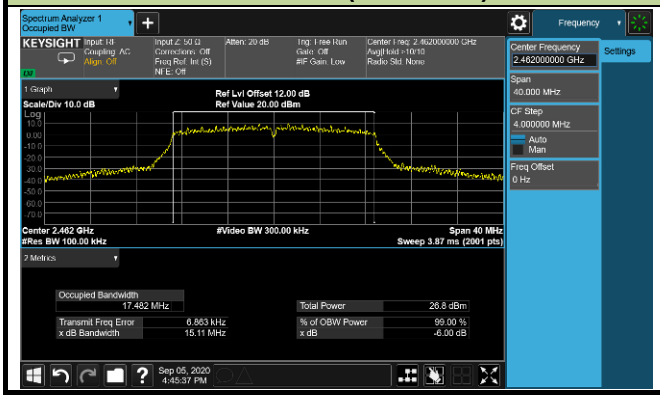
802.11n-HT20 6dB Bandwidth

Channel 01 (2412MHz)



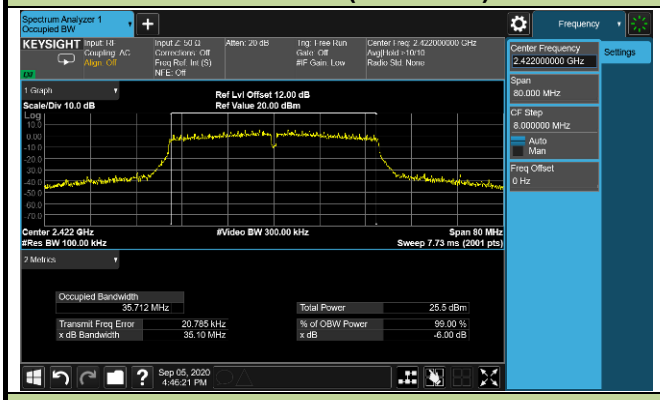
Channel 06 (2437MHz)

Channel 11 (2462MHz)



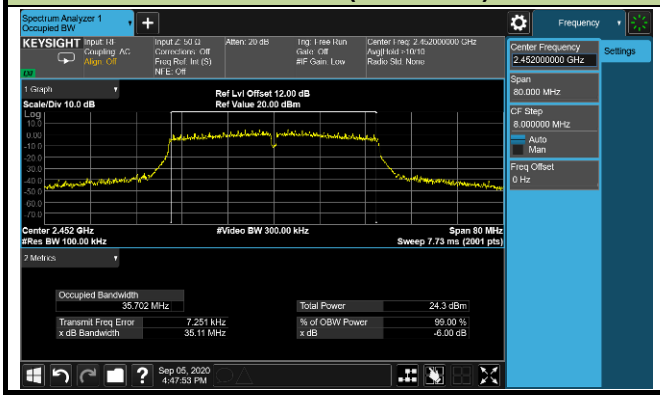
802.11n-HT40 6dB Bandwidth

Channel 03 (2422MHz)



Channel 06 (2437MHz)

Channel 09 (2452MHz)



6.3. Output Power Measurement

6.3.1.Test Limit

The maximum conducted output power shall not exceed 1 Watt (30dBm).

6.3.2.Test Procedure Used

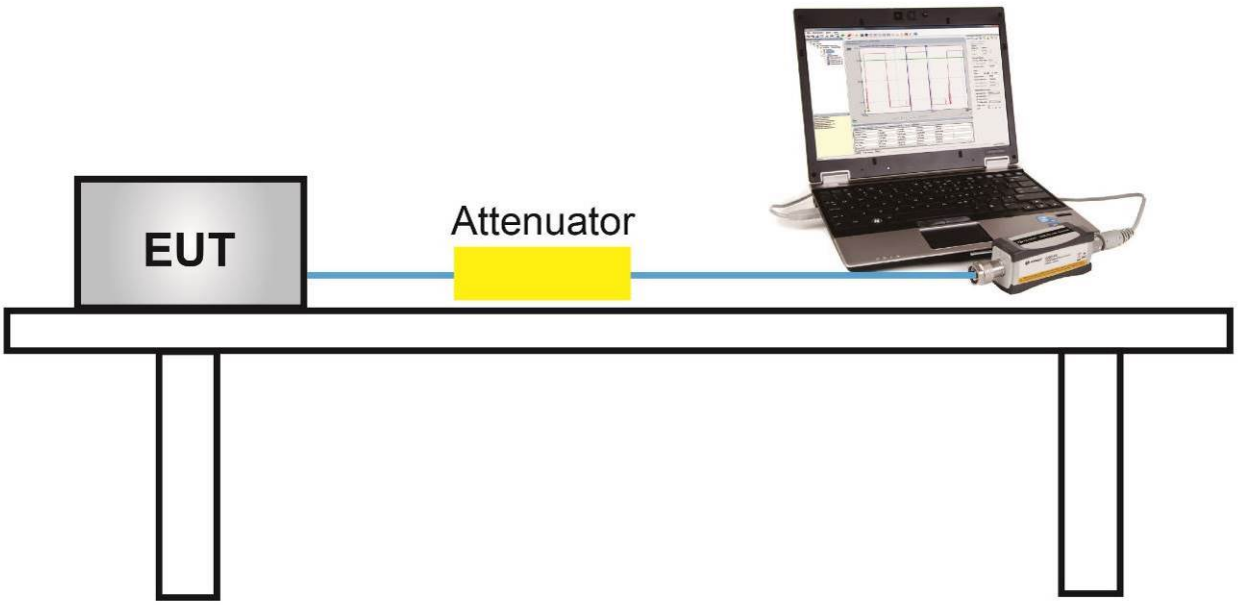
ANSI C63.10-2013 - Section 11.9.2.3.2

6.3.3.Test Setting

Method AVGPM-G (Measurement using a gated RF average-reading power meter)

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

6.3.4.Test Setup



6.3.5.Test Result

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (gray marker) for final test of each channel.

Output power at various data rates for Ant 0/ Ant 0+1 port:

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate / MCS	Average Power (dBm)
802.11b	20	6	2437	1Mbps	22.05
				5.5Mbps	21.78
				11Mbps	21.46
802.11g	20	6	2437	6Mbps	26.59
				24Mbps	26.32
				54Mbps	26.01
802.11n	20	6	2437	MCS0	26.53
				MCS3	26.24
				MCS7	25.98
802.11n	40	6	2437	MCS0	23.48
				MCS3	23.15
				MCS7	22.88

Product	Subscriber End Equipment HGW	Test Engineer	Amy Zhang
Test Site	TR3	Test Date	2020/08/21

Test Result of Average Output Power

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Average Power (dBm)		Total Average Power (dBm)	Limit (dBm)	Result
				Ant 0	Ant 1			
11b	1Mbps	01	2412	20.04	20.55	23.31	≤ 30.00	Pass
11b	1Mbps	06	2437	22.05	23.43	25.80	≤ 30.00	Pass
11b	1Mbps	11	2462	21.93	23.63	25.87	≤ 30.00	Pass
11g	6Mbps	01	2412	23.61	24.30	26.98	≤ 30.00	Pass
11g	6Mbps	02	2417	26.30	26.83	29.58	≤ 30.00	Pass
11g	6Mbps	06	2437	26.59	27.20	29.92	≤ 30.00	Pass
11g	6Mbps	10	2457	25.37	26.17	28.80	≤ 30.00	Pass
11g	6Mbps	11	2462	21.67	22.91	25.34	≤ 30.00	Pass
11n-HT20	MCS0	01	2412	22.81	23.28	26.06	≤ 30.00	Pass
11n-HT20	MCS0	02	2417	25.48	25.74	28.62	≤ 30.00	Pass
11n-HT20	MCS0	06	2437	26.53	27.34	29.96	≤ 30.00	Pass
11n-HT20	MCS0	10	2457	23.87	24.77	27.35	≤ 30.00	Pass
11n-HT20	MCS0	11	2462	20.74	21.65	24.23	≤ 30.00	Pass
11n-HT40	MCS0	03	2422	19.36	20.28	22.85	≤ 30.00	Pass
11n-HT40	MCS0	04	2427	20.57	21.59	24.12	≤ 30.00	Pass
11n-HT40	MCS0	06	2437	23.48	24.48	27.02	≤ 30.00	Pass
11n-HT40	MCS0	08	2447	19.74	20.65	23.23	≤ 30.00	Pass
11n-HT40	MCS0	09	2452	17.61	18.37	21.02	≤ 30.00	Pass

Note: Total Average Power (dBm) = $10*\log \{10^{(\text{ANT 0 Average Power /10})} + 10^{(\text{ANT 1 Average Power /10})}\}$ (dBm).

6.4. Power Spectral Density Measurement

6.4.1.Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

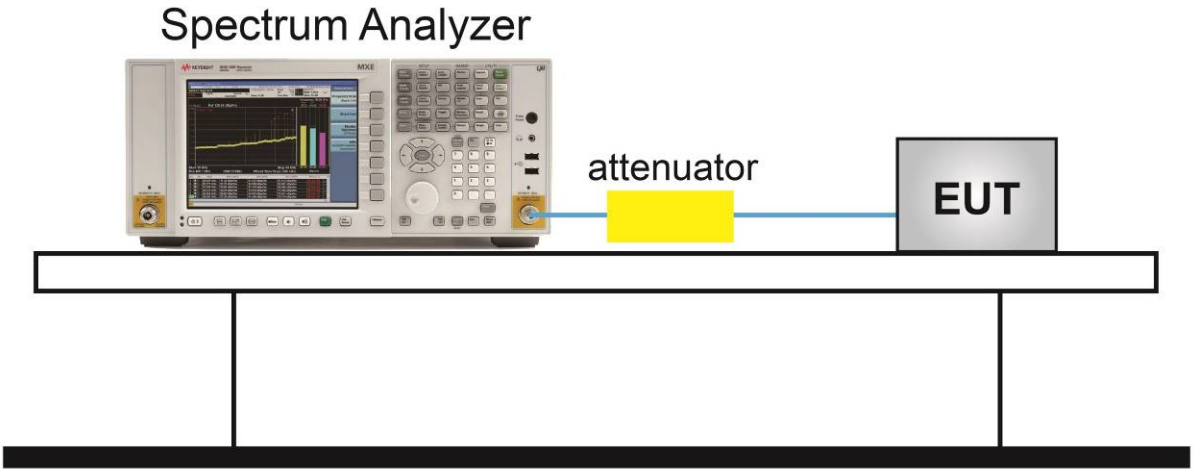
6.4.2.Test Procedure Used

ANSI C63.10-2013 - Section 11.10.3 & 11.10.5

6.4.3.Test Setting

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the OBW
3. RBW = 3kHz
4. VBW = 10kHz
5. Detector = RMS
6. Employ trace averaging (rms) mode over a minimum of 100 traces.
7. Sweep time = auto couple
8. Use the peak marker function to determine the maximum amplitude level.
9. Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.
10. Trace was allowed to stabilize

6.4.4.Test Setup



6.4.5.Test Result

Product	SUBSCRIBER END EQUIPMENT HGW	Test Engineer	Amy Zhang
Test Site	TR3	Test Date	2020/08/21

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	AVGPSD(dBm/10kHz)		Duty Cycle(%)	Final PSD (dBm/10kHz)	Limit (dBm/3kHz)	Result
				Ant 0	Ant 1				
11b	1Mbps	01	2412	-7.79	-8.04	98.24	-4.90	≤ 8.00	Pass
11b	1Mbps	06	2437	-4.94	-5.14	98.24	-2.03	≤ 8.00	Pass
11b	1Mbps	11	2462	-4.68	-4.93	98.24	-1.80	≤ 8.00	Pass
11g	6Mbps	01	2412	-5.77	-6.02	89.10	-2.38	≤ 8.00	Pass
11g	6Mbps	06	2437	-2.53	-2.89	89.10	0.80	≤ 8.00	Pass
11g	6Mbps	11	2462	-7.69	-8.12	89.10	-4.39	≤ 8.00	Pass
11n-HT20	MCS0	01	2412	-6.21	-6.98	89.61	-3.09	≤ 8.00	Pass
11n-HT20	MCS0	06	2437	-2.13	-2.36	89.61	1.24	≤ 8.00	Pass
11n-HT20	MCS0	11	2462	-8.46	-8.86	89.61	-5.17	≤ 8.00	Pass
11n-HT40	MCS0	03	2422	-13.74	-14.15	81.01	-10.02	≤ 8.00	Pass
11n-HT40	MCS0	06	2437	-8.84	-9.26	81.01	-5.12	≤ 8.00	Pass
11n-HT40	MCS0	09	2452	-13.96	-14.13	81.01	-10.12	≤ 8.00	Pass

Note 1: When EUT duty cycle > 98%, Final AVGPSD (dBm / 3kHz) = 10*log $\{^{10(\text{Ant 0 AVGPSD}/10)} + ^{10(\text{Ant 1 AVGPSD}/10)}\}$.

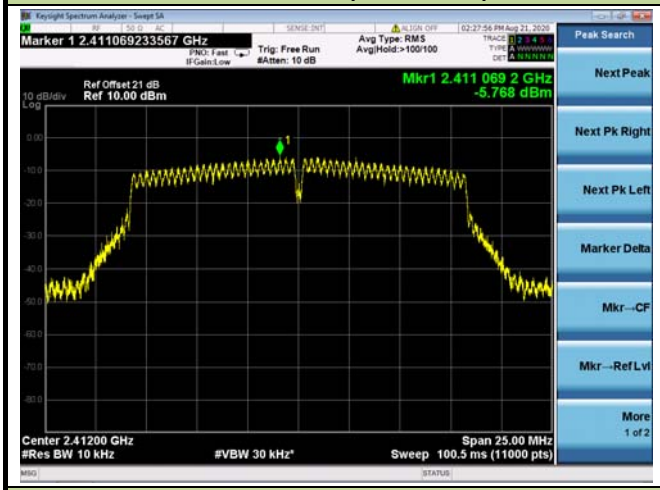
When EUT duty cycle < 98%, Final AVGPSD (dBm / 3kHz) = 10*log $\{^{10(\text{Ant 0 AVGPSD}/10)} + ^{10(\text{Ant 1 AVGPSD}/10)}\}$ + 10*log (1/Duty cycle).

Note 2: Total AVGPSD (dBm / 10kHz) << Limit (dBm / 3kHz), so there is no necessary to conversion unit.

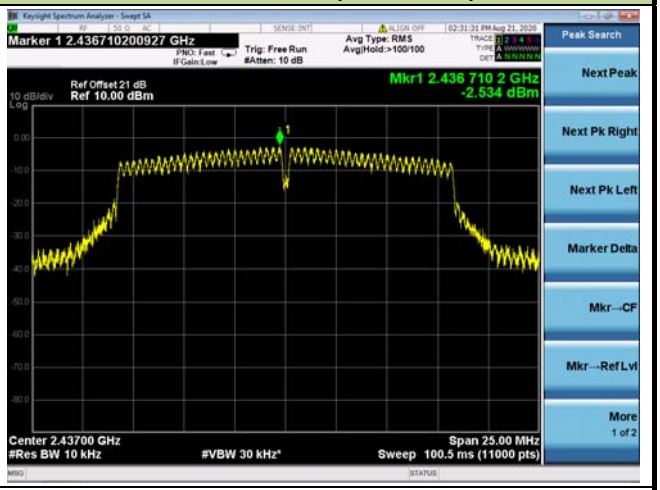
802.11b AVGPSD – Ant 0	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
Channel 11 (2462MHz)	

802.11g - AVGPSD – Ant 0

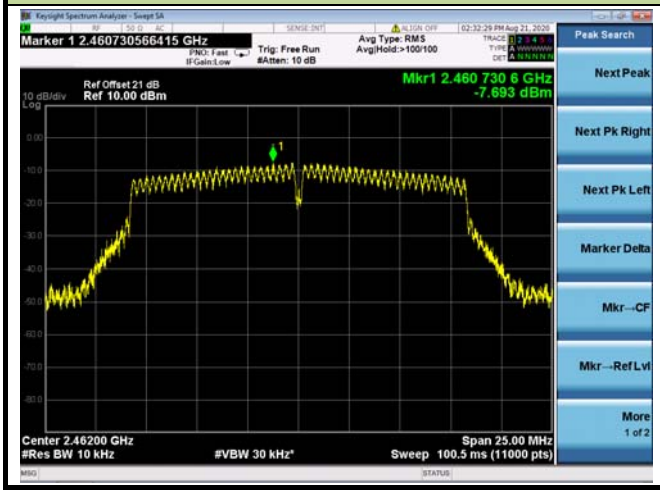
Channel 01 (2412MHz)

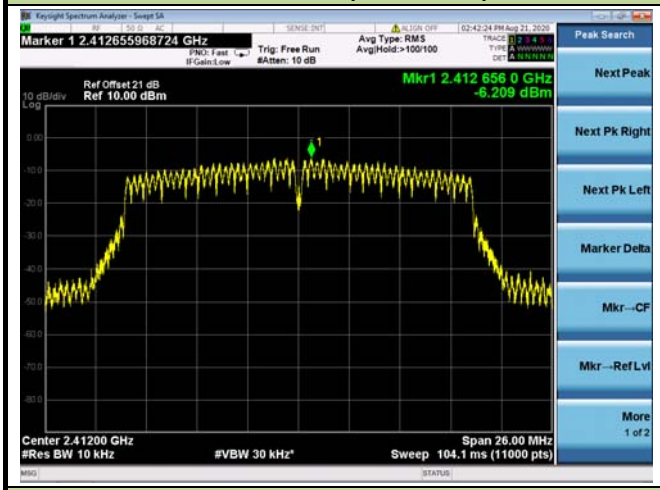
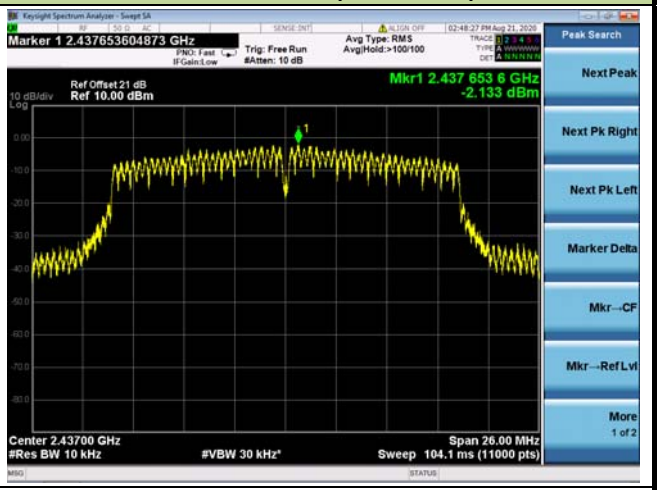
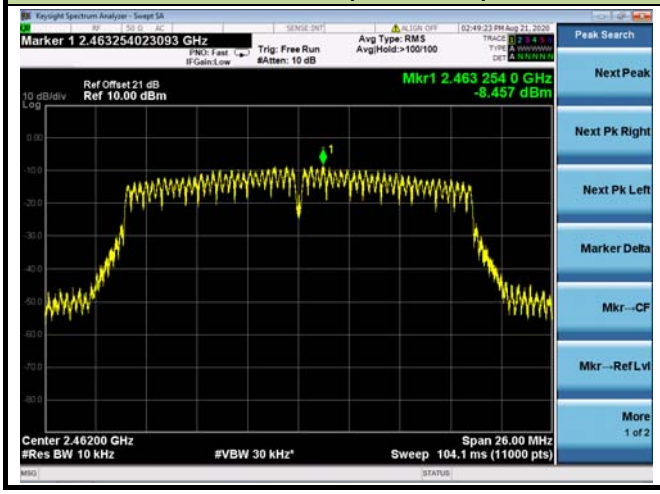


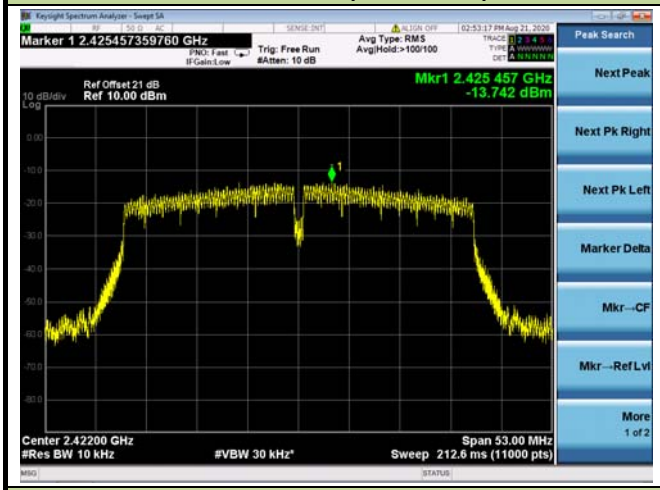
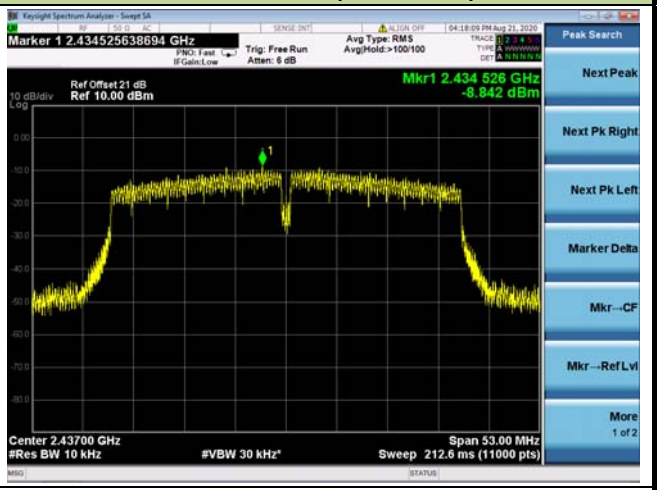
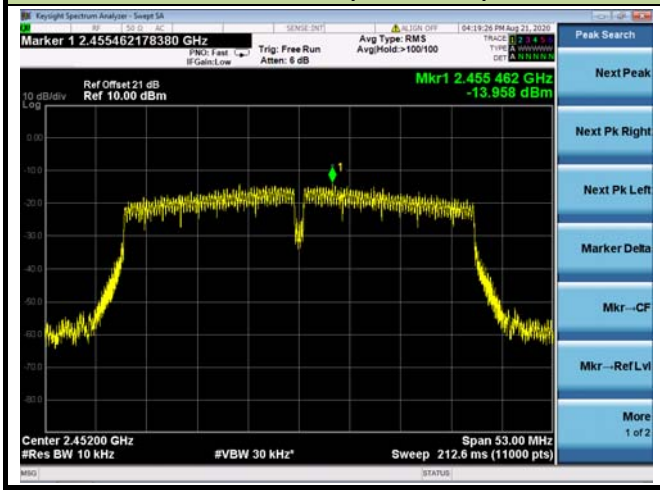
Channel 06 (2437MHz)



Channel 11 (2462MHz)



802.11n-HT20 - AVGPSD – Ant 0	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

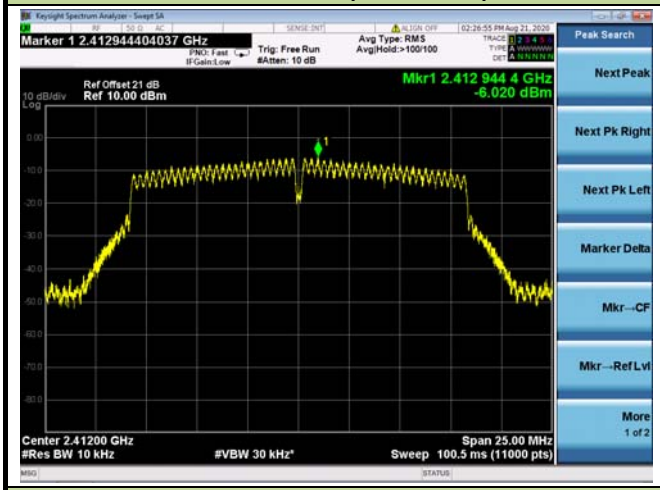
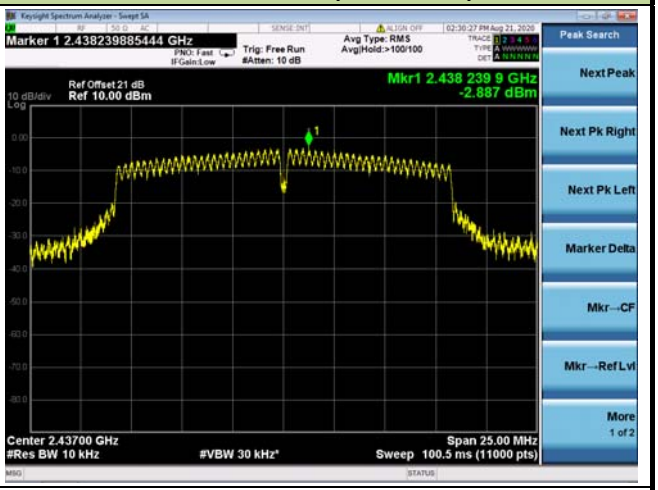
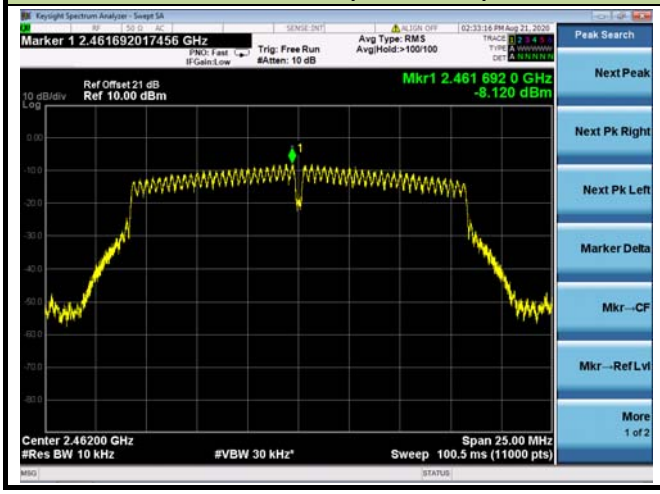
802.11n-HT40 - AVGPSD – Ant 0	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2452MHz)	
	

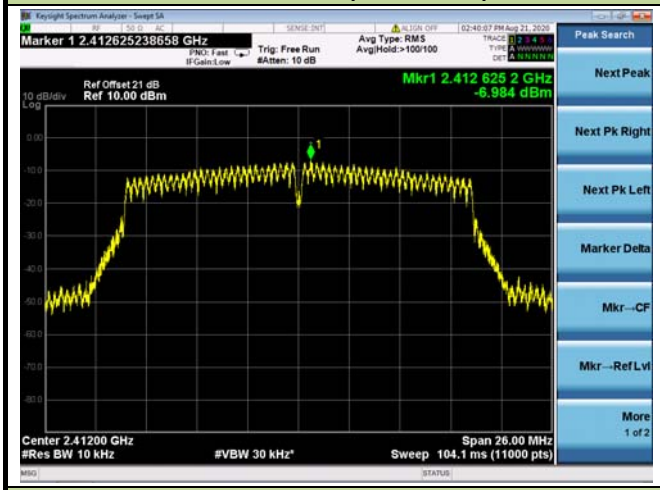
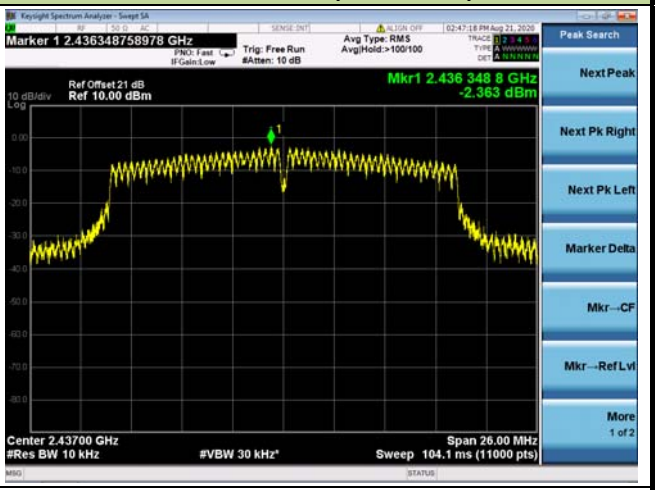
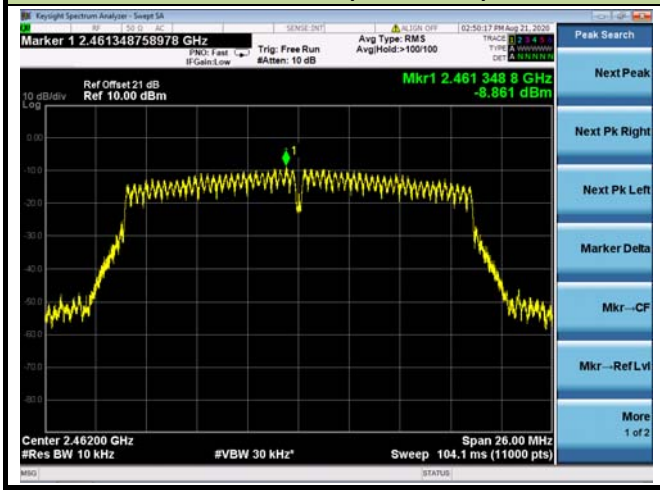
802.11b - AVGPSD – Ant 1

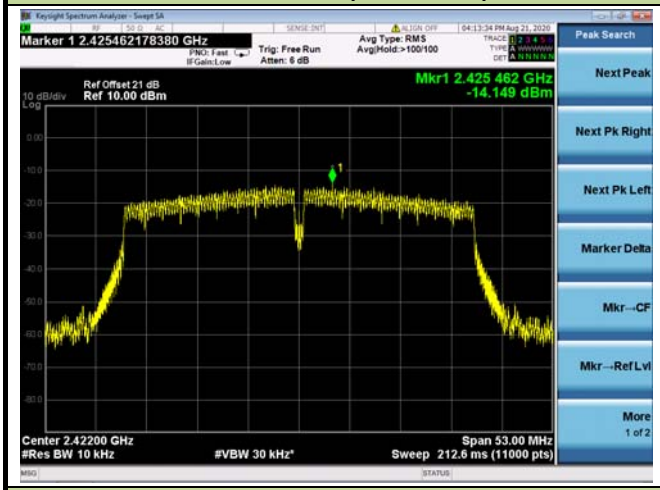
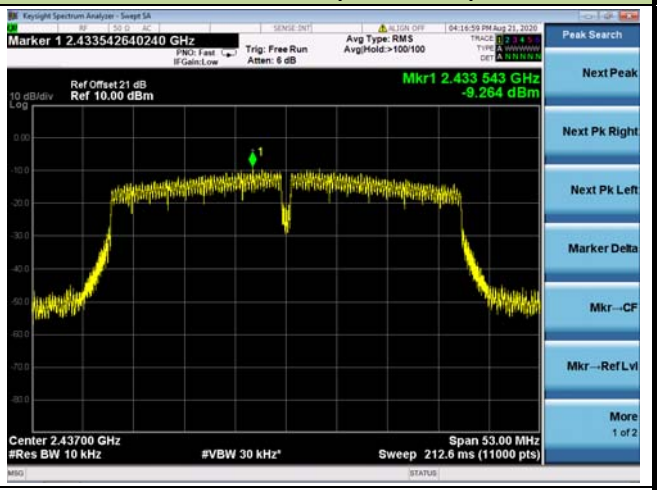
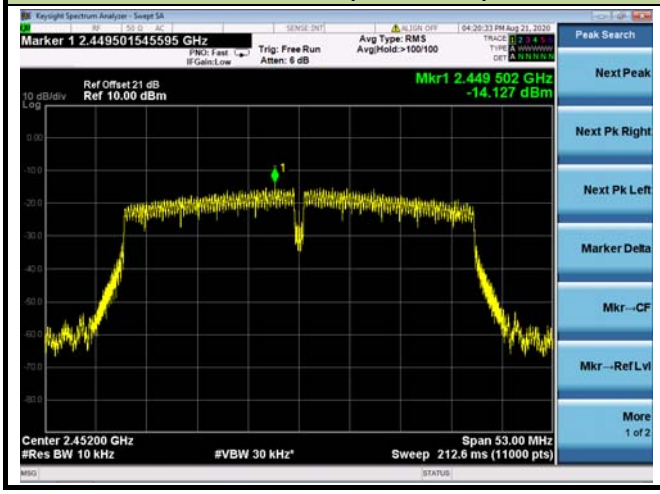
Channel 01 (2412MHz)

Channel 06 (2437MHz)

Channel 11 (2462MHz)

802.11g - AVGPSD – Ant 1	
Channel 03 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2462MHz)	
	

802.11n-HT20 - AVGPSD – Ant 1	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT40 - AVGPSD – Ant 1	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2452MHz)	
	

6.5. Conducted Band Edge and Out-of-Band Emissions

6.5.1.Test Limit

The limit for out-of-band spurious emissions at the band edge is 30dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

6.5.2.Test Procedure Used

ANSI C63.10-2013 - Section 11.11

6.5.3.Test Settitng

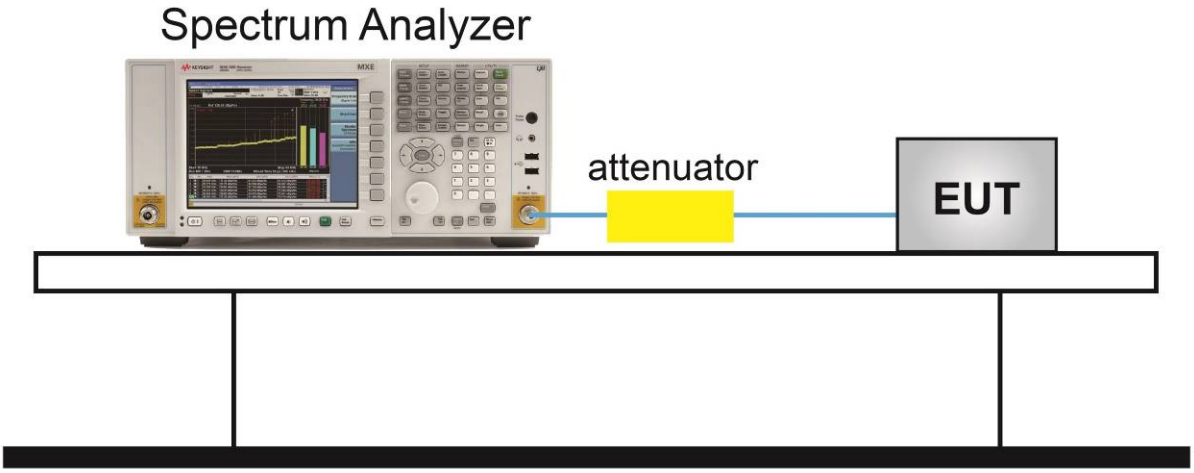
Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW ≥ 3 x RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

6.5.4.Test Setup



6.5.5.Test Result

Product	SUBSCRIBER END EQUIPMENT HGW	Test Engineer	Amy Zhang
Test Site	TR3	Test Date	2020/08/25~08/26

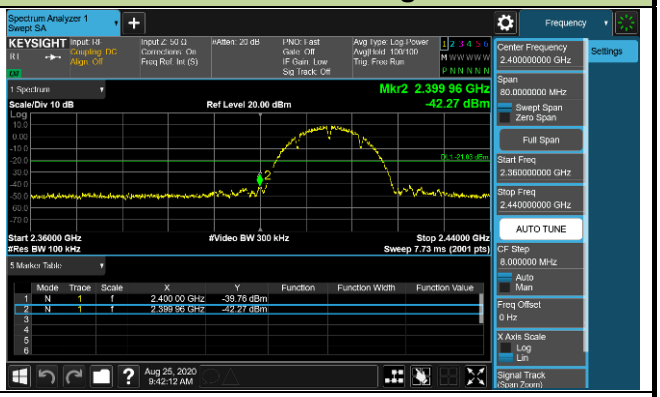
Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	Limit	Result
Ant 0/Ant 0+1					
802.11b	1Mbps	01	2412	30dBc	Pass
802.11b	1Mbps	06	2437	30dBc	Pass
802.11b	1Mbps	11	2462	30dBc	Pass
802.11g	6Mbps	01	2412	30dBc	Pass
802.11g	6Mbps	06	2437	30dBc	Pass
802.11g	6Mbps	11	2462	30dBc	Pass
802.11n-HT20	MCS0	01	2412	30dBc	Pass
802.11n-HT20	MCS0	06	2437	30dBc	Pass
802.11n-HT20	MCS0	11	2462	30dBc	Pass
802.11n-HT40	MCS0	03	2422	30dBc	Pass
802.11n-HT40	MCS0	06	2437	30dBc	Pass
802.11n-HT40	MCS0	09	2452	30dBc	Pass
Ant 1/Ant 0+1					
802.11b	1Mbps	01	2412	30dBc	Pass
802.11b	1Mbps	06	2437	30dBc	Pass
802.11b	1Mbps	11	2462	30dBc	Pass
802.11g	6Mbps	01	2412	30dBc	Pass
802.11g	6Mbps	06	2437	30dBc	Pass
802.11g	6Mbps	11	2462	30dBc	Pass
802.11n-HT20	MCS0	01	2412	30dBc	Pass
802.11n-HT20	MCS0	06	2437	30dBc	Pass
802.11n-HT20	MCS0	11	2462	30dBc	Pass
802.11n-HT40	MCS0	03	2422	30dBc	Pass
802.11n-HT40	MCS0	06	2437	30dBc	Pass
802.11n-HT40	MCS0	09	2452	30dBc	Pass

802.11b Out-of-Band Emissions –Ant 0/Ant 0+ 1

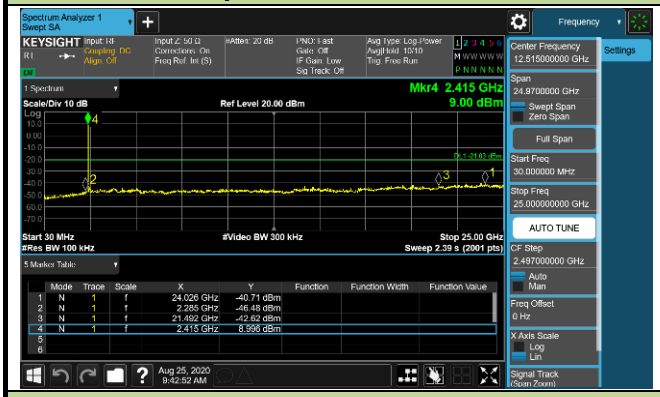
Channel 01 (2412MHz)

100kHz PSD Reference Level

Low Band Edge

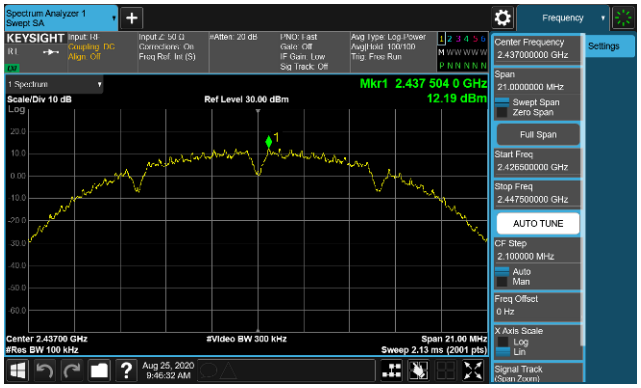


Spurious Emission

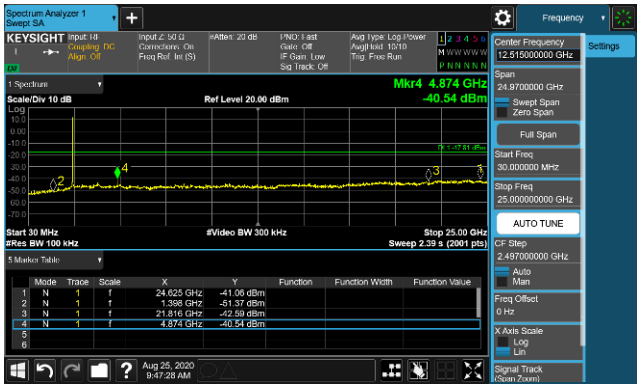


Channel 06 (2437MHz)

100kHz PSD Reference Level



Spurious Emission

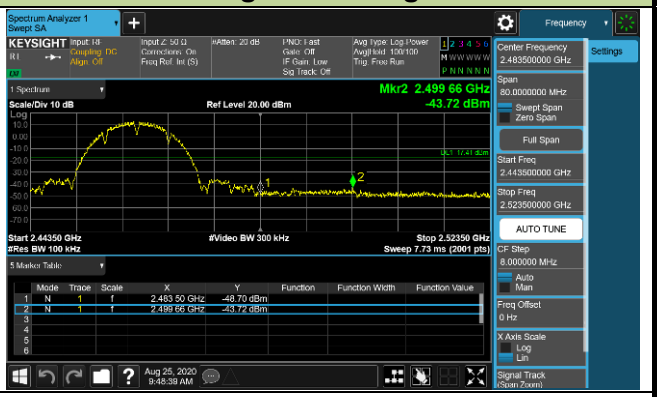


802.11b Out-of-Band Emissions –Ant 0/Ant 0+ 1

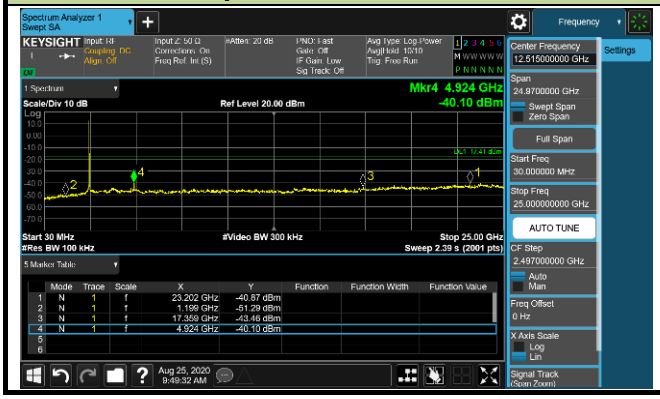
Channel 11 (2462MHz)

100kHz PSD Reference Level

High Band Edge



Spurious Emission

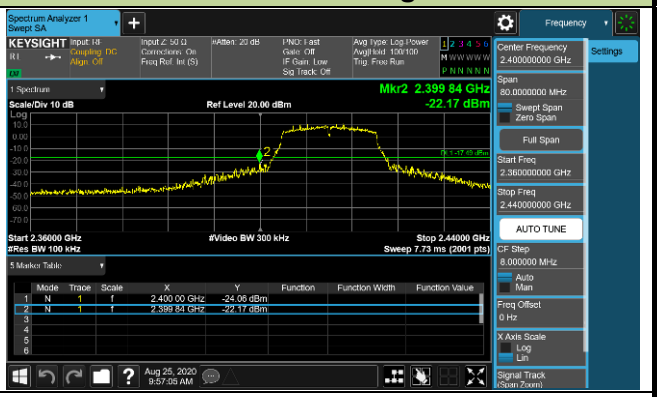


802.11g Out-of-Band Emissions –Ant 0/Ant 0+ 1

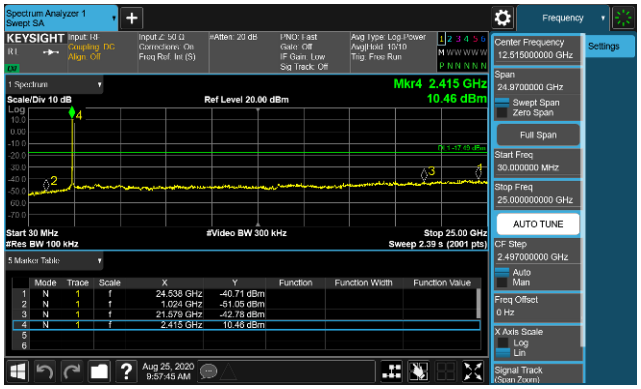
Channel 01 (2412MHz)

100kHz PSD Reference Level

Low Band Edge

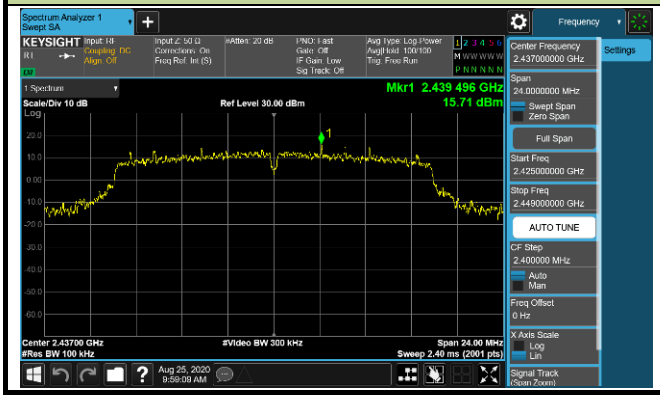


Spurious Emission

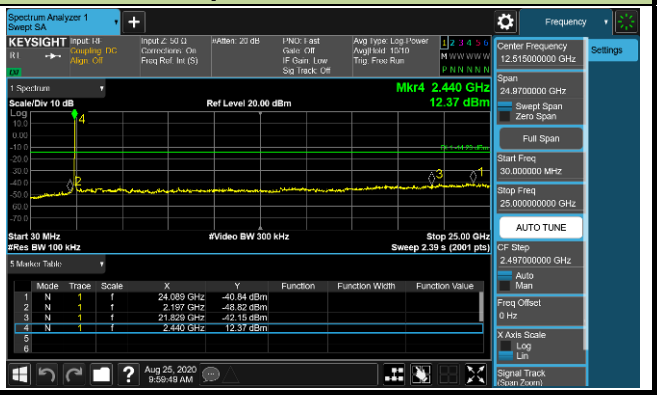


Channel 06 (2437MHz)

100kHz PSD Reference Level

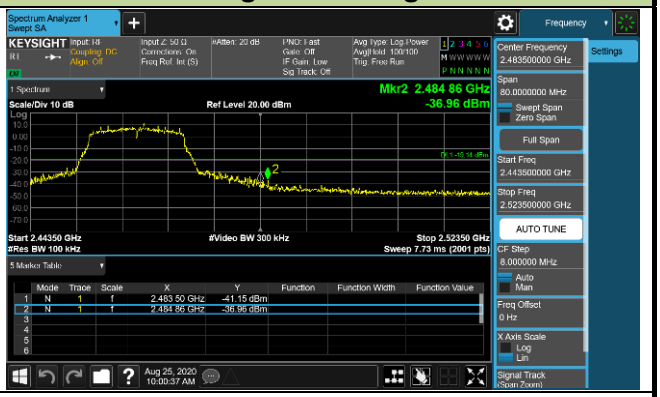
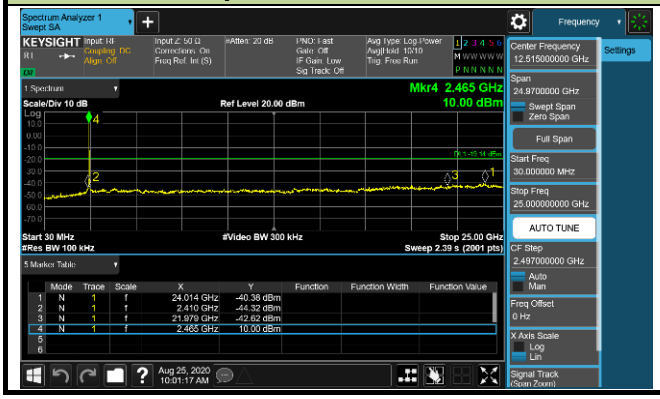


Spurious Emission



802.11g Out-of-Band Emissions –Ant 0/Ant 0+ 1

Channel 11 (2462MHz)

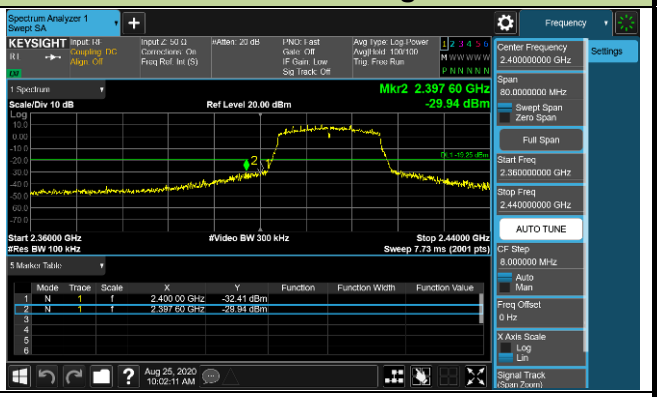
100kHz PSD Reference Level	High Band Edge
	
Spurious Emission	
	

802.11n-HT20 Out-of-Band Emissions –Ant 0/Ant 0+ 1

Channel 01 (2412MHz)

100kHz PSD Reference Level

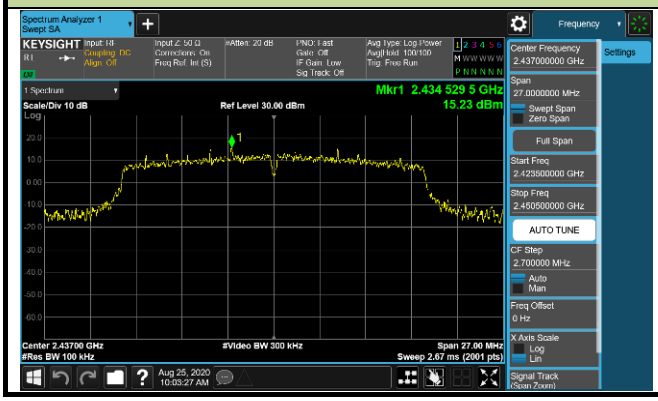
Low Band Edge



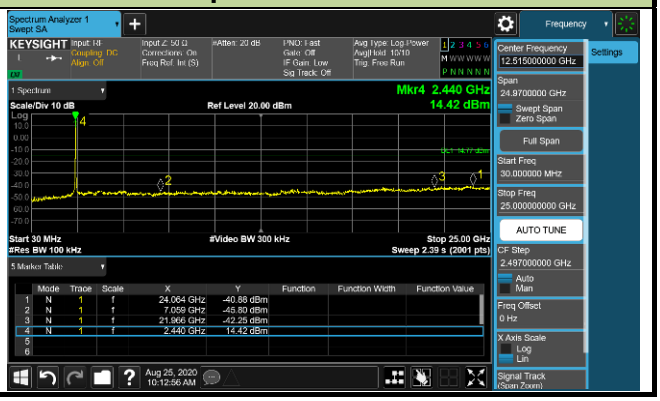
Spurious Emission

Channel 06 (2437MHz)

100kHz PSD Reference Level



Spurious Emission

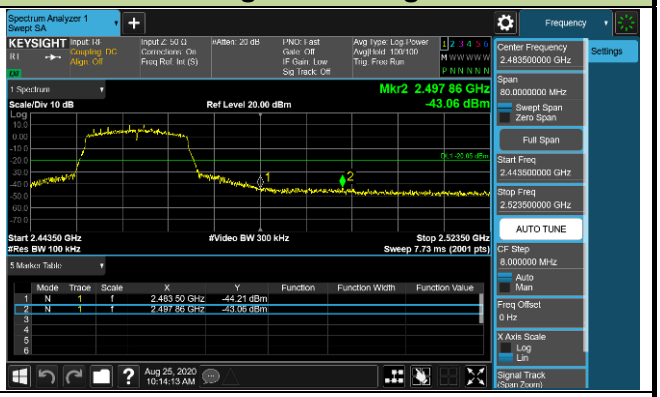


802.11n-HT20 Out-of-Band Emissions –Ant 0/Ant 0+ 1

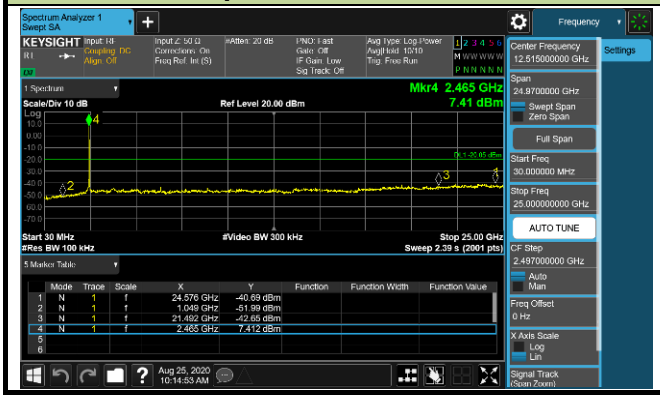
Channel 11 (2462MHz)

100kHz PSD Reference Level

High Band Edge



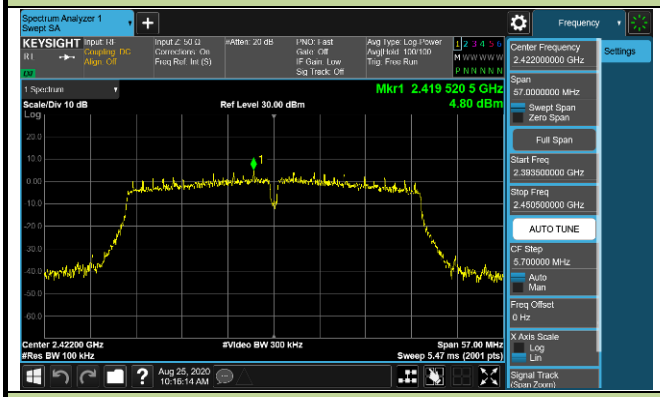
Spurious Emission



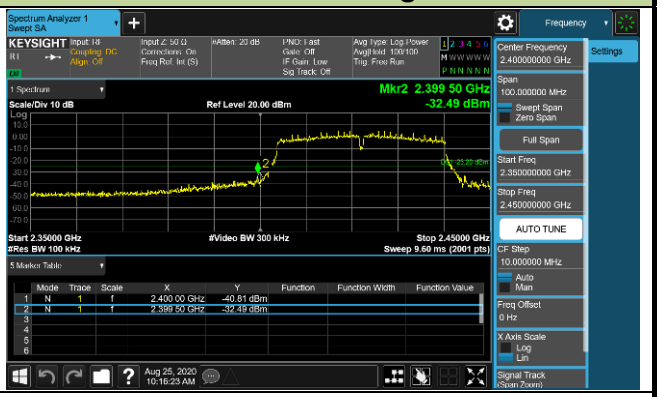
802.11n-HT40 Out-of-Band Emissions –Ant 0/Ant 0+ 1

Channel 03 (2422MHz)

100kHz PSD Reference Level



Low Band Edge



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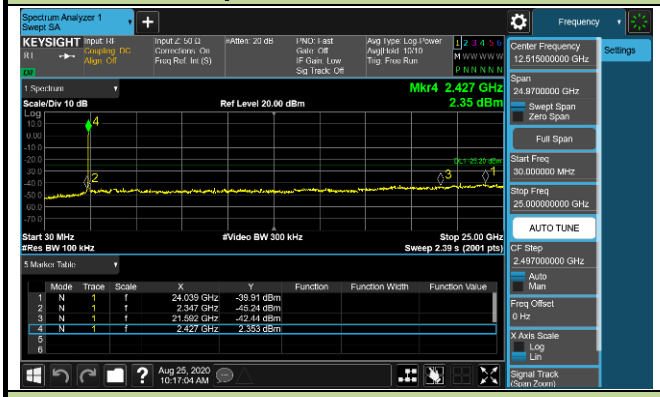
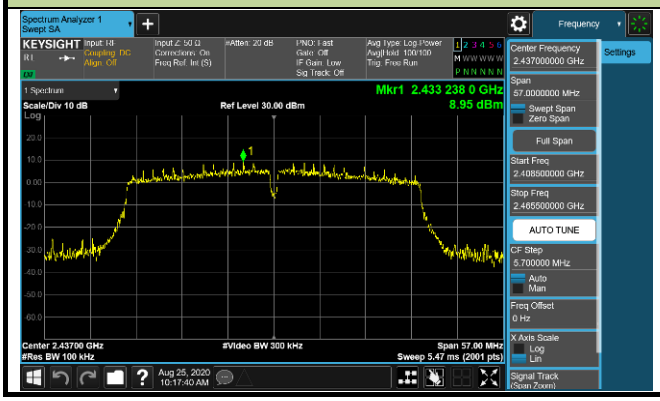
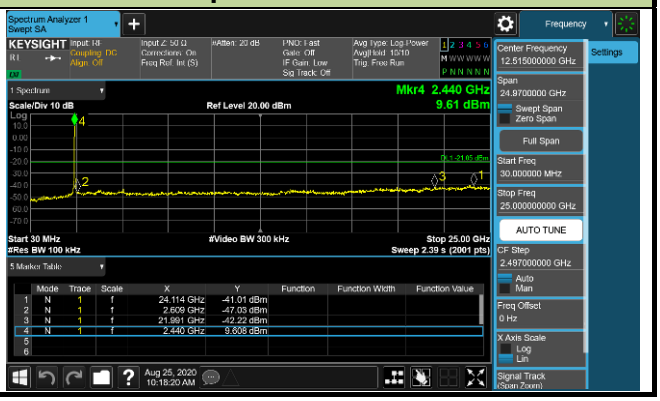


Channel 06 (2437MHz)

100kHz PSD Reference Level



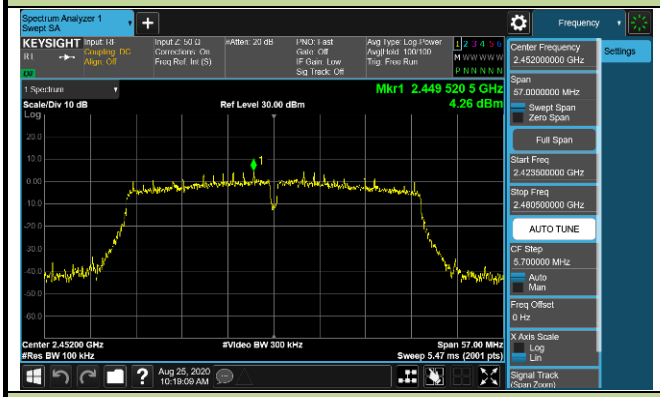
Spurious Emission



802.11n-HT40 Out-of-Band Emissions –Ant 0/Ant 0+ 1

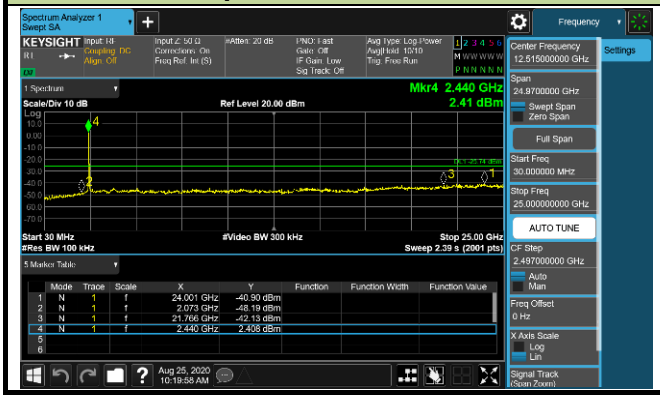
Channel 09 (2452MHz)

100kHz PSD Reference Level



High Band Edge

Spurious Emission



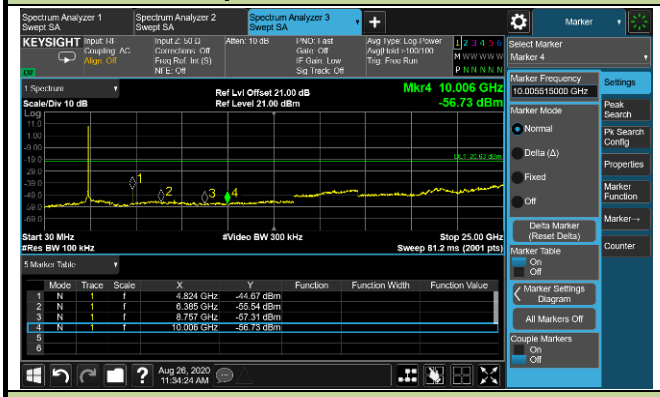
802.11b Out-of-Band Emissions –Ant 1/Ant 0+ 1

Channel 01 (2412MHz)

100kHz PSD Reference Level

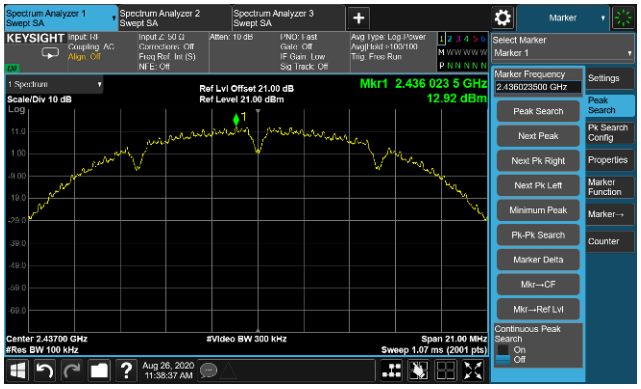
Low Band Edge

Spurious Emission

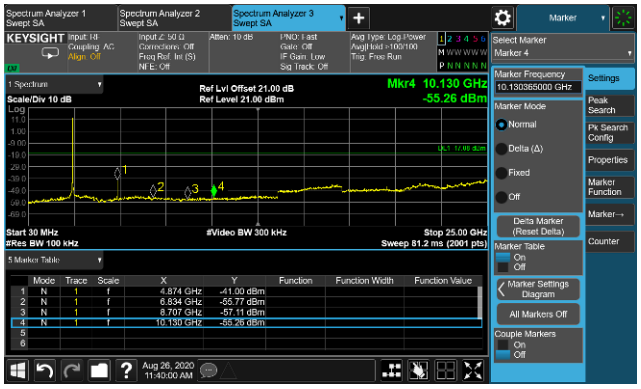


Channel 06 (2437MHz)

100kHz PSD Reference Level



Spurious Emission

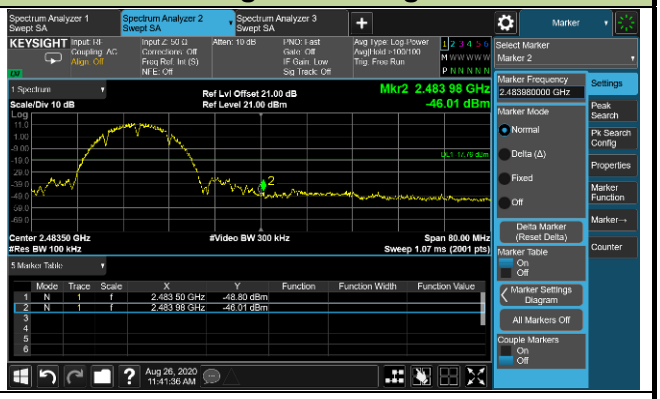
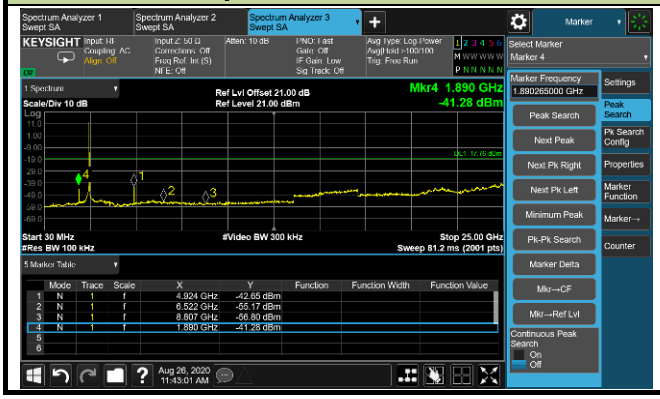


802.11b Out-of-Band Emissions –Ant 1/Ant 0+ 1

Channel 11 (2462MHz)

100kHz PSD Reference Level

High Band Edge



Spurious Emission