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Report No.: T210303N01-RP1

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Rev.: 01

FCC 47 CFR PART 15 SUBPART C AND ANSI C63.10: 2013

TEST REPORT

For

Stand-Alone Media Player

Model: MIXSTREAM

Brand: Numark

Issued for

inMusic Brands, Inc.

200 Scenic View Drive, Suite 201, Cumberland, RI 02864, U.S.A.

Issued by

Compliance Certification Services Inc.

Tainan Lab.

**No.8, Jiucengling, Xinhua Dist.,
Tainan City, Taiwan**

Issued Date: June 11, 2021

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REVISION HISTORY

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	May 14, 2021	Initial Issue	ALL	Gina Lin
01	June 11, 2021	See the following note rev.01	ALL	Gina Lin

Note:

※ Rev.01 Issue Date: June 11, 2021
Update EUT description & update test data of Bluetooth 5.0



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1. TEST REPORT CERTIFICATION

Applicant : **inMusic Brands, Inc.**
200 Scenic View Drive, Suite 201, Cumberland, RI
02864, U.S.A.

Manufacturer : **inMusic Brands, Inc.**
200 Scenic View Drive, Suite 201, Cumberland, RI
02864, U.S.A.

Equipment Under Test : Stand-Alone Media Player

Model : MIXSTREAM

Brand : 

Date of Test : March 18, 2021 ~ April 09, 2021
June 02, 2021 ~ June 04, 2021

APPLICABLE STANDARD	
STANDARD	TEST RESULT
FCC Part 15 Subpart C AND ANSI C63.10: 2013	No non-compliance noted
Statements of Conformity	
Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

Approved by:



Eric Huang
Section Manager

2. EUT DESCRIPTION

Product Name	Stand-Alone Media Player
Model	MIXSTREAM
Brand	
Received Date	March 03, 2021
Frequency Range	IEEE 802.11b/g, 802.11n HT20: 2412MHz~2462MHz Bluetooth 5.0: 2402MHz~2480MHz
Transmit Power	IEEE 802.11b Mode: 15.92dBm (39.08mW) IEEE 802.11g Mode: 17.63dBm (57.94mW) IEEE 802.11n HT20 Mode: 17.01dBm (50.23mW) Bluetooth 5.0 Mode: -4.61dBm (0.35mW)
Channel Spacing	IEEE 802.11b/g, 802.11n HT20: 5MHz Bluetooth 5.0: 2MHz
Channel Number	IEEE 802.11b/g, 802.11n HT20: 11 Channels Bluetooth 5.0 : 40 Channels
Transmit Data Rate	IEEE 802.11b : 11, 5.5, 2, 1 Mbps IEEE 802.11g : 54, 48, 36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT20 : 130, 117, 104, 78, 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 Mbps Bluetooth 5.0: 2 Mbps
Type of Modulation	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK, BPSK) Bluetooth 5.0: GFSK
Antenna Type	Type: WLAN EMBEDDED ANTENNA Model: WLA-EM-1707-0064-B Manufacturer: BRITO Gain: 4.6 dBi
Power Rating	AC 100V-240V, 1.8A, 50/60Hz
Hardware Version	GA-RCA1C REV:1.0
Software Version	N/A
Firmware Version	nh09-2021_02_04_15_07-dj-planck-master-7f9a01a2d-HEAD-39ec8336-INTERNAL-FullImage.tar
Temperature Range	0°C ~ +40°C
Reported Date	April 13, 2021

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	FSP GROUP INC.	FSP036-RHBN3	AC 100-240V, 1.8A, 50-60Hz	DC 12V, 3.0A, 36.0W



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REMARK:

1. The sample (**MIXSTREAM**) selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **Y4O-NH09** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.
3. For more details, please refer to the User's manual of the EUT.

3. DESCRIPTION OF TEST MODES

The EUT is a Stand-Alone Media Player. It has one transmitter chains and one receive chains (1x1 configurations) and BT5.0. The 1x1 configuration is implemented with one outside chains (Chain 0).

The RF chipset is manufactured by Broadcom.

The antenna peak gain 4.6dBi (highest gain) were chosen for full testing.

IEEE 802.11 b ,802.11g ,802.11n HT20 mode (DTS Band)

The EUT had been tested under operating condition.

There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode: 1Mbps long data rate (worst case) were chosen for full testing.

IEEE 802.11g mode: 6Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT20 mode: 6.5Mbps data rate (worst case) were chosen for full testing.

GFSK mode

The EUT had been tested under operating condition.

There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2402
Middle	2442
High	2480

Bluetooth 5.0 (GFSK) mode: 1Mbps data rate (worst case) were chosen for full testing.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10 and FCC CFR 47 15.207, 15.209 and 15.247.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at No.8, Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW1109).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan	TAF
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The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada (TW1109)
Germany	TUV NORD
Taiwan	BSMI
USA	FCC
Japan	VCCI

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

6. CALIBRATION AND UNCERTAINTY

6.1 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 recognized national standards.

6.2 MEASUREMENT UNCERTAINTY

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

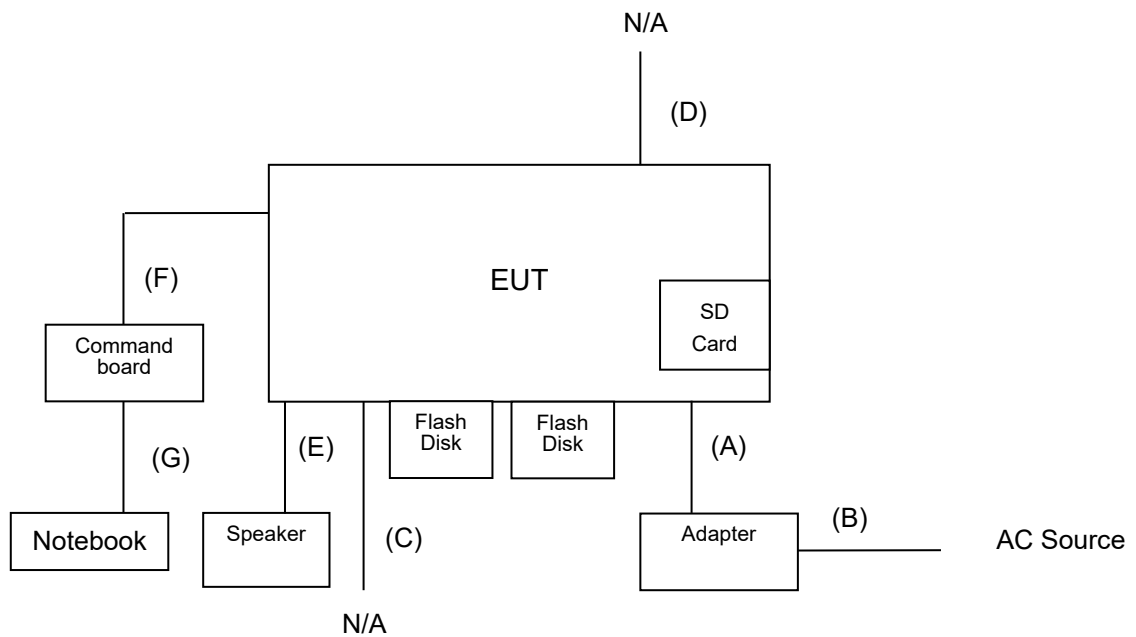
PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz Test Site : OATS-6	$\pm 3.3456\text{dB}$
Radiated Emission, 200 to 1000 MHz Test Site : OATS-6	$\pm 2.6828\text{dB}$
Radiated Emission, 1 to 8 GHz	$\pm 2.6485\text{dB}$
Radiated Emission, 8 to 18 GHz	$\pm 2.6852\text{dB}$
Radiated Emission, 18 to 26.5 GHz	$\pm 2.6485\text{dB}$
Radiated Emission, 26 to 40 GHz	$\pm 3.0295\text{dB}$
Power Line Conducted Emission	$\pm 1.91\text{dB}$
Band Width	136.49kHz
Peak Output Power MU	$\pm 1.904\text{dB}$
Band Edge MU	$\pm 0.302\text{dBuV}$
Channel Separation MU	361.69Hz
Duty Cycle MU	0.064ms
Frequency Stability MU	0.223kHz

Uncertainty figures are valid to a confidence level of 95%, K=2

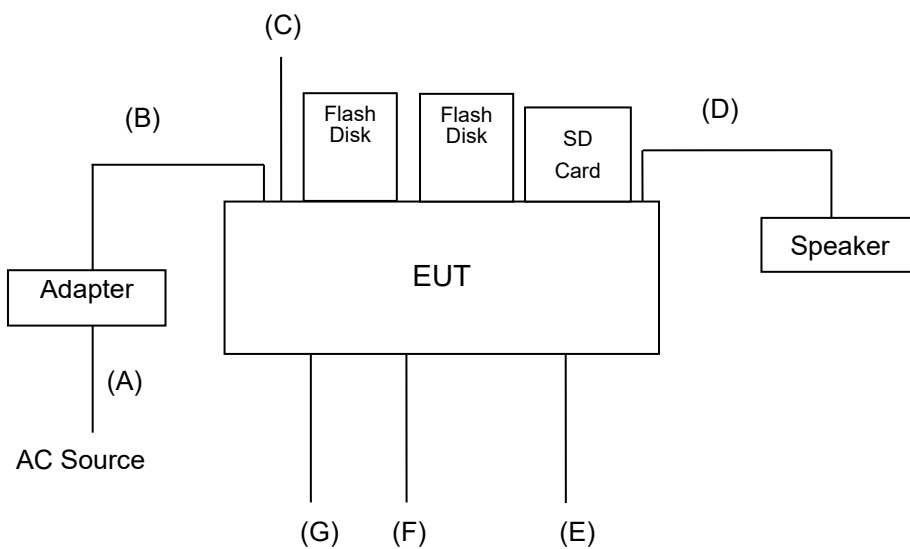
7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

FOR RF TEST



FOR EMI TEST



7.2 SUPPORT EQUIPMENT

RF test

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	Notebook	Acer	AS 3830TG	DOC	DC IN, Unshielded, 1.6m AC IN, Unshielded, 1.6m
2	SD CARD	TOSHIBA	2GB	DOC	N/A
3	Speaker System	T.C.SATR	TCS2285	DOC	N/A
4	Flash Disk	Transcend	Jet Flash700	DOC	N/A

No.	Signal cable description	
A	Power	Unshielded, 1.5m, 1pcs with one core.
B	Power	Unshielded, 1.0m, 1pcs.
C	USB	Shielded, 1.8m, 1pcs with one core.
D	Audio	Unshielded, 0.5m, 3pcs.
E	Audio	Unshielded, 0.6m, 1pcs.
F	Command	Unshielded, 0.2m, 1pcs.
G	USB	Shielded, 1.8m, 1pcs with one core.

EMI test

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	SD CARD	TOSHIBA	2GB	DOC	N/A
2	Speaker System	T.C.SATR	TCS2285	DOC	N/A
3	Flash Disk	Transcend	Jet Flash700	DOC	N/A

No.	Signal cable description	
A	AC Power	Unshielded, 1.0m, 1pcs.
B	DC Power	Unshielded, 1.5m, 1pcs with one core.
C	USB	Shielded, 1.8m, 1pcs with one core.
D	Audio	Shielded, 1.0m, 1pcs.
E	Audio	Shielded, 1.0m, 2pcs.
F	Earphone	Shielded, 1.0m, 3pcs.
G	Earphone	Shielded, 1.0m, 3pcs.

REMARK:

1. All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

7.3 EUT OPERATING CONDITION

RF Setup

1. Set up a whole system as the setup diagram.
2. The “Tera Term” software was used for testing
3. Key in “root” , ”connmanctl enable wifi”.

TX Mode Key in:

B Mode :

```
wl down  
wl mpc 0  
wl country ALL  
wl band b  
wl up  
wl 2g_rate -r 01 -b 20  
wl channel 01 (01,06,11)  
wl phy_watchdog 0  
wl scansuppress 1  
wl phy_forcecal 1  
wl phy_txpwrctrl 1  
wl txpwr1 -1  
wl pkteng_start 00:90:4c:14:43:19 tx 100 1000 0
```

G Mode :

```
wl down  
wl mpc 0  
wl country ALL  
wl band b  
wl up  
wl 2g_rate -r 06 -b 20  
wl channel 01 (01,06,11)  
wl phy_watchdog 0  
wl scansuppress 1  
wl phy_forcecal 1  
wl phy_txpwrctrl 1  
wl txpwr1 -o -d 11  
wl pkteng_start 00:90:4c:14:43:19 tx 100 1000 0
```

HT20 Mode :

```
wl down  
wl mpc 0  
wl country ALL  
wl band b  
wl up  
wl 2g_rate -h 0 -b 20  
wl channel 01 (01,06,11)  
wl phy_watchdog 0  
wl scansuppress 1  
wl phy_forcecal 1  
wl phy_txpwrctrl 1  
wl txpwr1 -o -d 09  
wl pkteng_start 00:90:4c:14:43:19 tx 100 1000 0
```

RX Mode Key in:

```
wl down  
wl band auto  
wl mpc 0  
wl country ALL  
wl channel 01 (01,06,11)  
wl bi 65535  
wl up  
wl phy_watchdog 0  
wl scansuppress 1  
wl phy_forcecal 1
```

4. All of the function are under run.

5. Start test.

Bluetooth:

1. Set up a whole system as the setup diagram.
2. The "Tera Term" software was used for testing.
3. Key in :
root
cd /sys/class/bluetooth/hci0
ls -al
cd rfkill2/
echo 1 >state
echo 0 > /sys/class/rfkill/rfkill1/soft
bluetoothctl
power on
4. Press "Ctrl + z"

TX Mode Key in:

```
hciconfig hci0 up  
hcidtool cmd 0x03 0x0003  
hcidtool cmd 0x08 0x0034 00(00,14,27) 25 00 02
```

RX Mode Key in:

```
hciconfig hci0 up  
hcidtool cmd 0x03 0x0003  
hcidtool cmd 0x08 0x0033 00(00,14,27) 02 00
```

5. All of the function are under run.
6. Start test.

8. APPLICABLE LIMITS AND TEST RESULTS

8.1 6dB BANDWIDTH

LIMIT

§ 15.247(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/20/2020	07/19/2021
Power Meter	Anritsu	ML2487A	6K00003888	11/20/2019	05/19/2021
Power Sensor	Anritsu	MA2491A	033265	11/20/2019	05/19/2021
SMA Cable + 10dB Attenuator	CCS	SMA+10dB ATT	SMA/10dB	01/29/2021	01/28/2022
Software	Excel(ccs-o6-2020 v1.1)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/20/2020	07/19/2021
Power Meter	Anritsu	ML2487A	6K00003888	05/18/2021	05/17/2023
Power Sensor	Anritsu	MA2491A	033265	05/18/2021	05/17/2023
SMA Cable + 10dB Attenuator	CCS	SMA+10dB ATT	SMA/10dB	01/29/2021	01/28/2022
Software	Excel(ccs-o6-2020 v1.1)				

TEST SETUP



TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 1-5 % of the emission bandwidth (EBW).
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1-5 %.

TEST RESULTS

No non-compliance noted.

Model Name	MIXSTREAM	Test By	Ted Huang
Temp & Humidity	25.6°C, 52%	Test Date	2021/04/01

IEEE 802.11b mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	9.06	500	PASS
Middle	2437	9.04	500	PASS
High	2462	8.59	500	PASS

NOTE :

1. At final test to get the worst-case emission at 1Mbps long.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11g mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	16.38	500	PASS
Middle	2437	16.38	500	PASS
High	2462	16.38	500	PASS

NOTE :

1. At final test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11n HT20 mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	17.62	500	PASS
Middle	2437	17.63	500	PASS
High	2462	17.63	500	PASS

NOTE :

1. At final test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

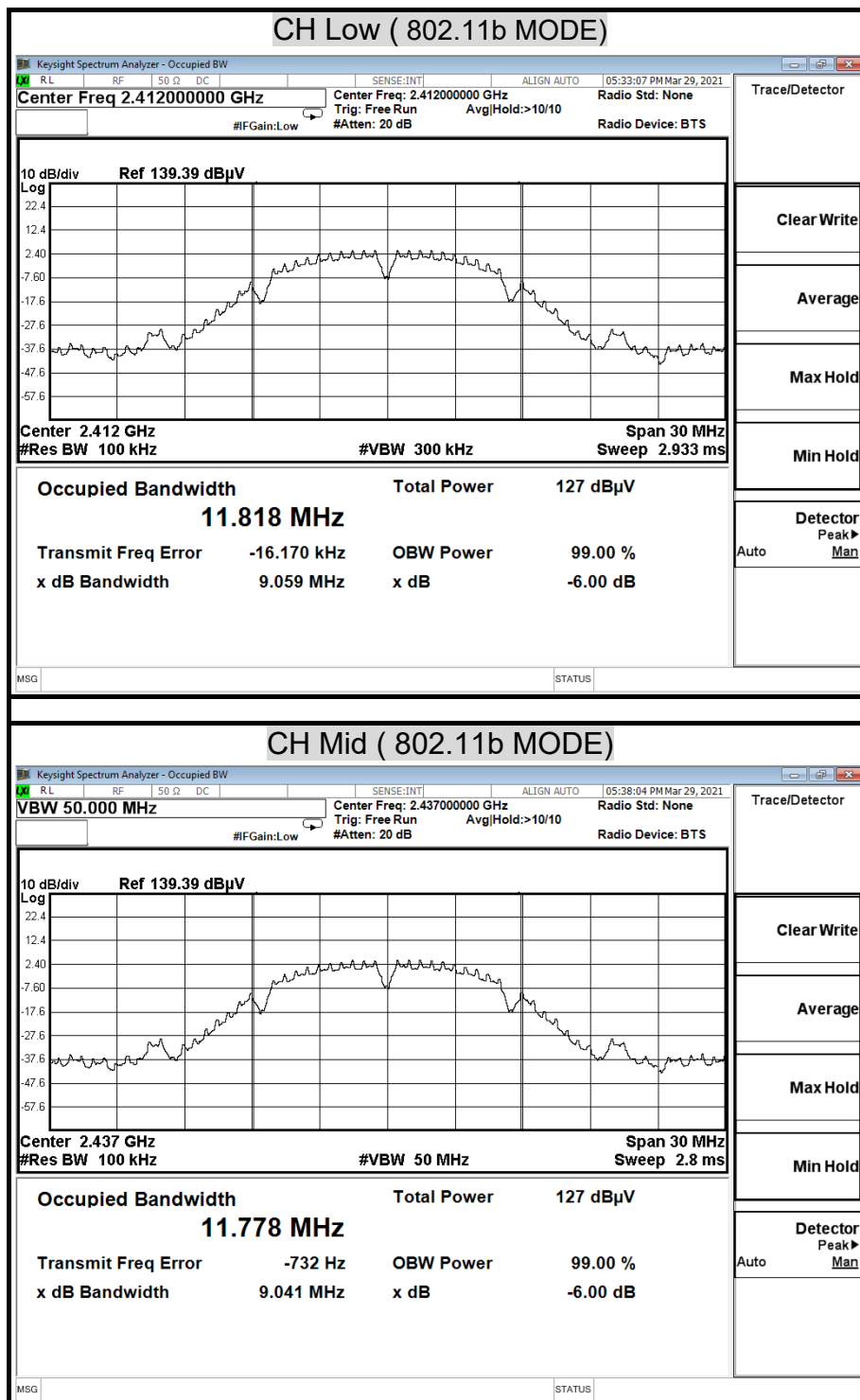
Model Name	MIXSTREAM	Test By	Ted Huang
Temp & Humidity	31.9°C, 51%	Test Date	2021/06/02

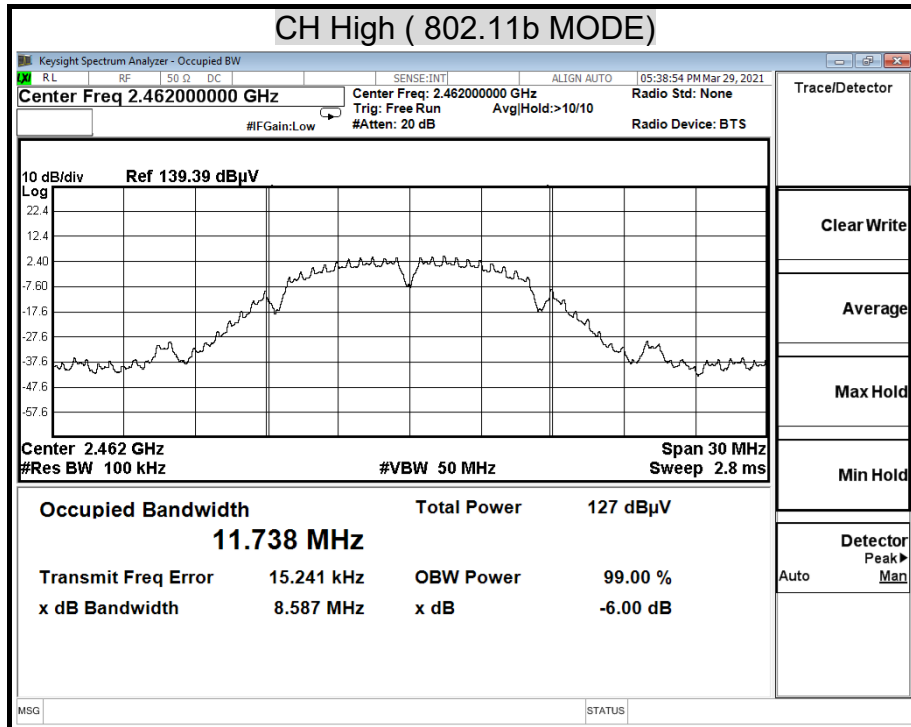
Bluetooth 5.0 (GFSK) mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass / Fail
Low	2402	1102	500	PASS
Middle	2442	1100	500	PASS
High	2480	1104	500	PASS

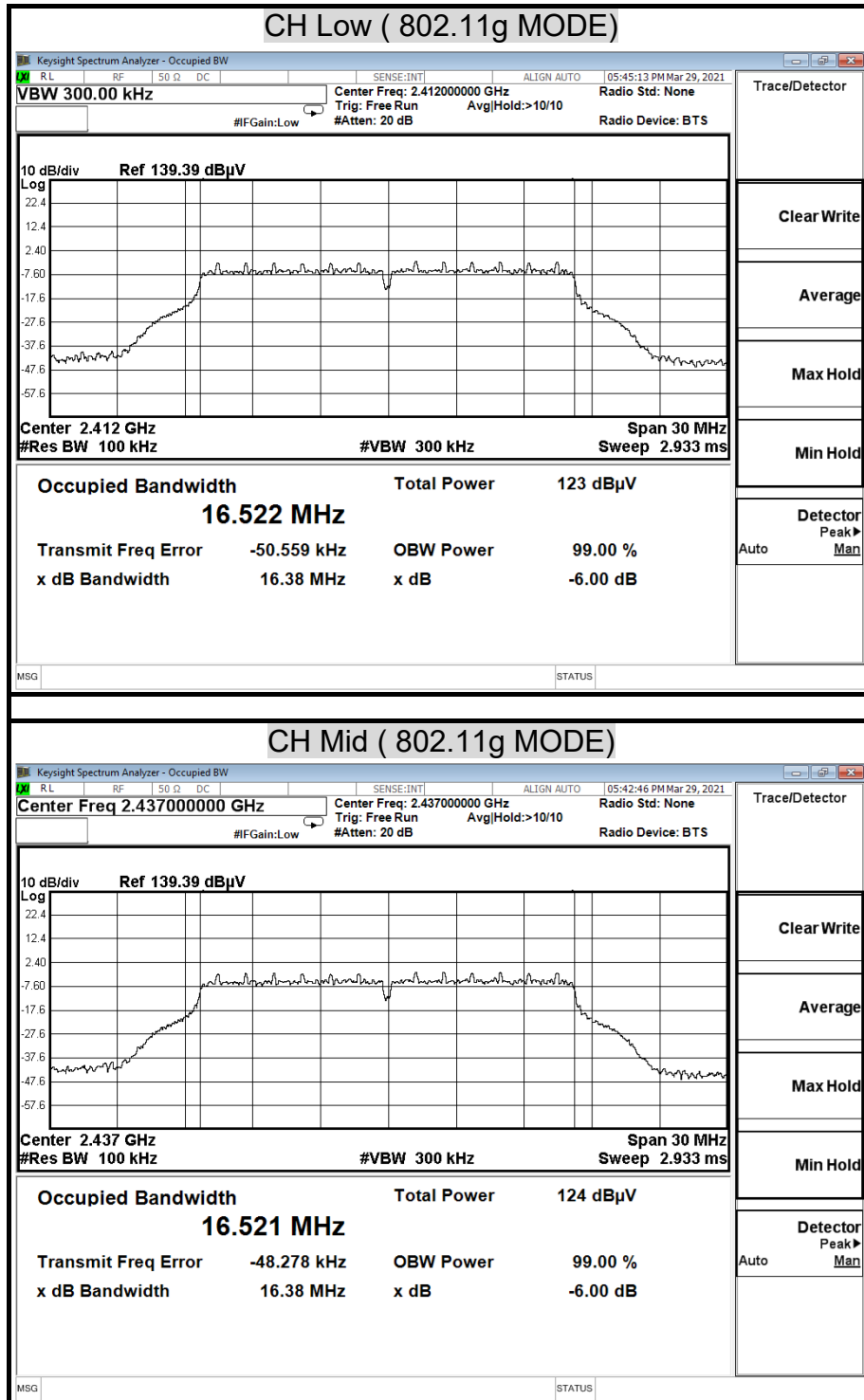
NOTE :

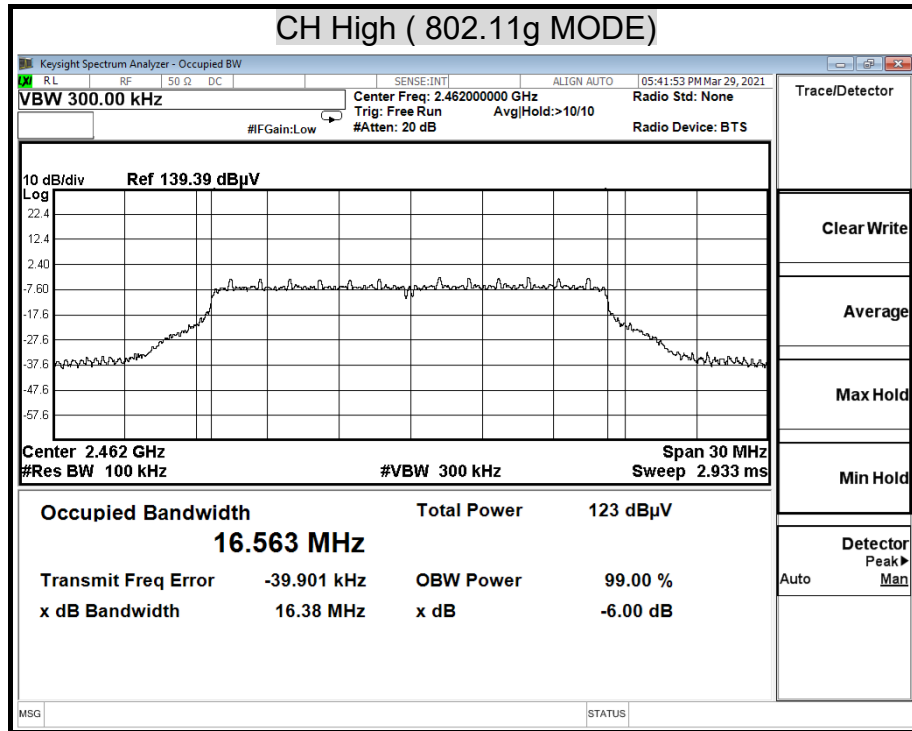
1. At final test to get the worst-case emission at 1Mbps.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

6dB BANDWIDTH (802.11b MODE)

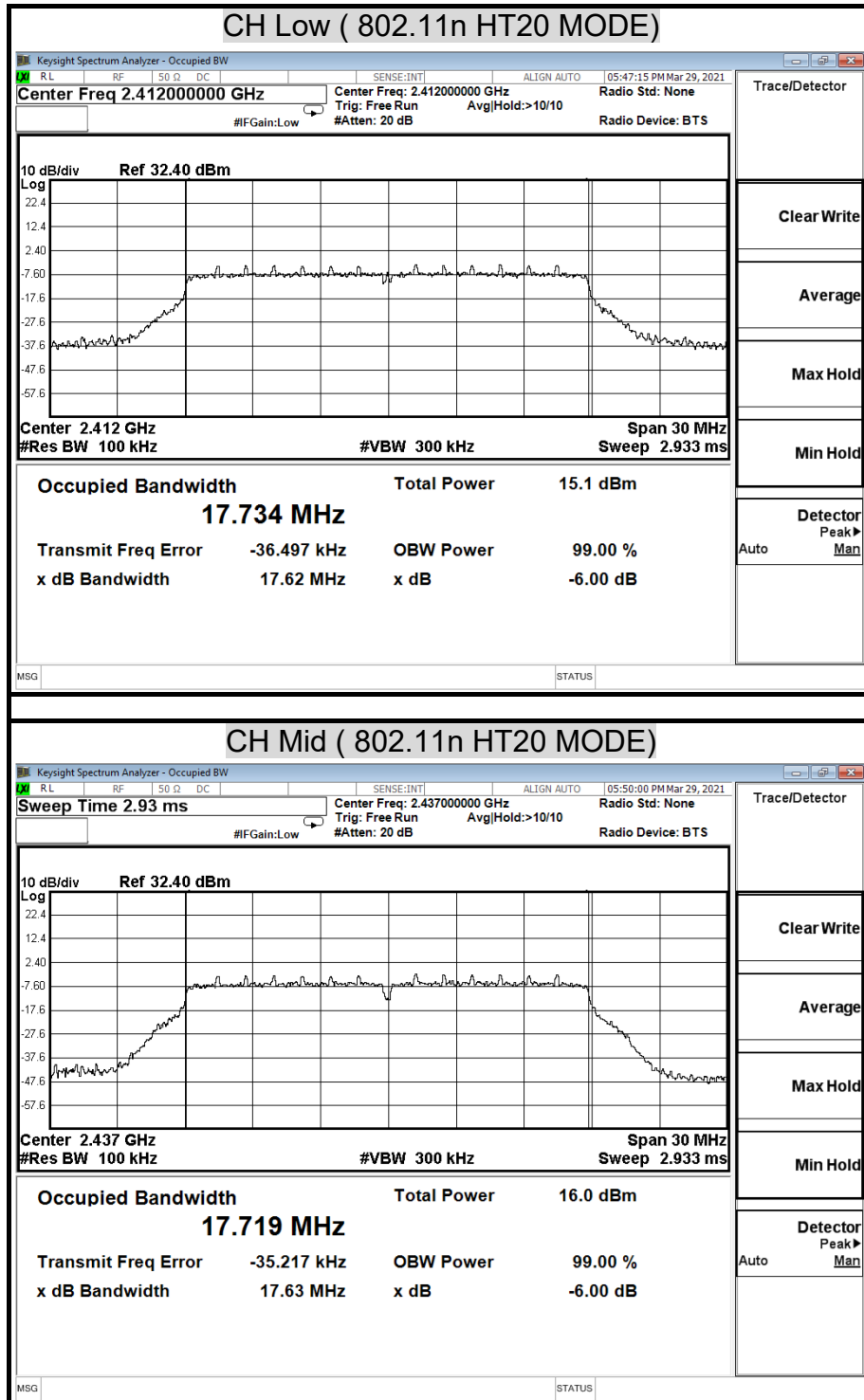


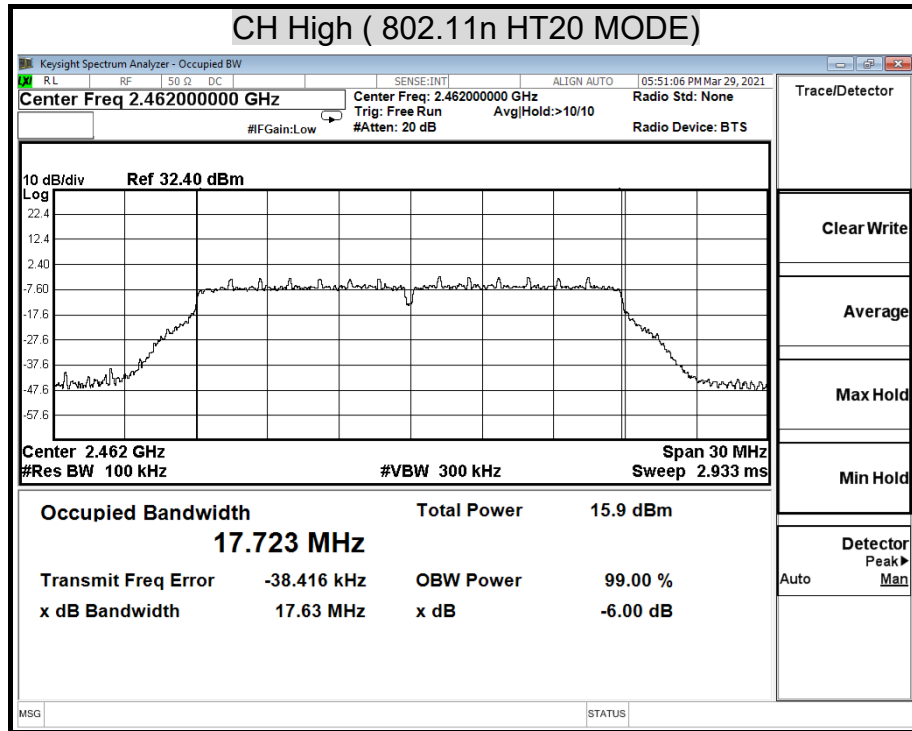
6dB BANDWIDTH (802.11g MODE)



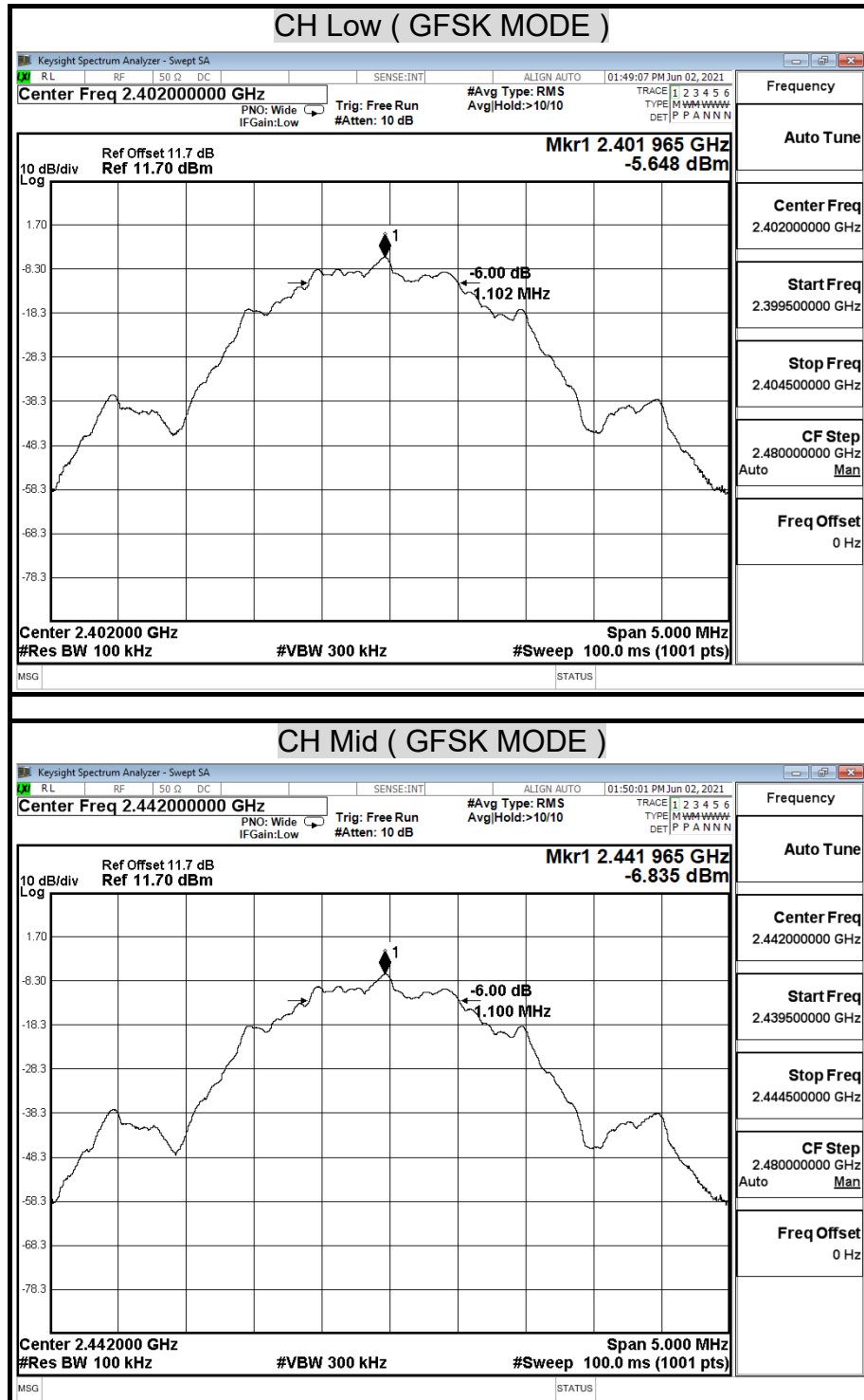


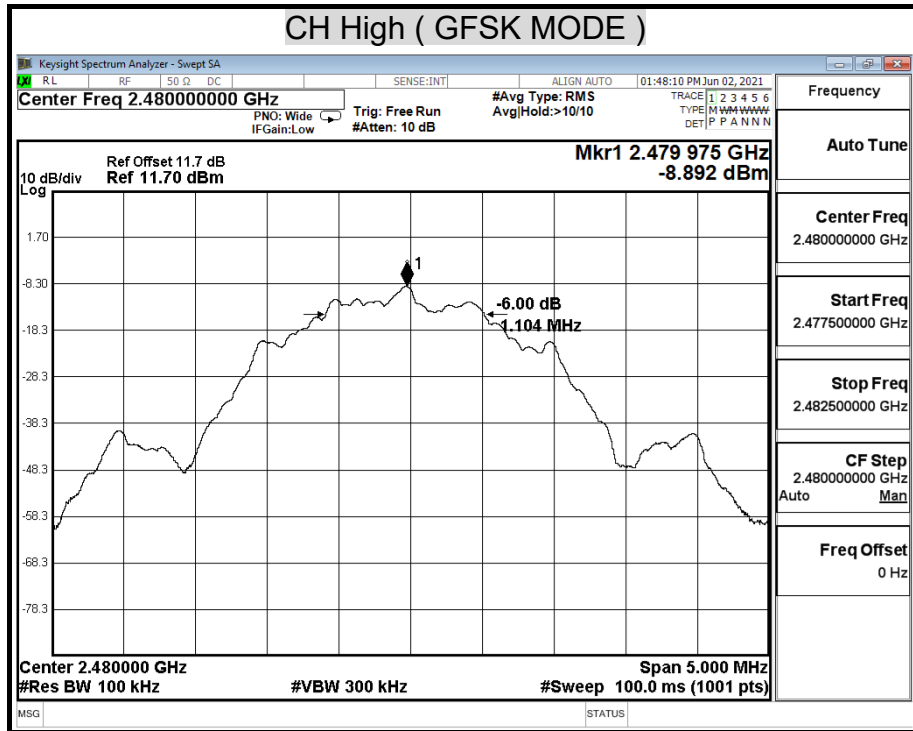
6dB BANDWIDTH (802.11n HT20 MODE)





6dB BANDWIDTH (GFSK MODE)





8.2 MAXIMUM PEAK OUTPUT POWER

LIMIT

§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :

§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

§ 15.247(b) (4) Except as shown in paragraphs (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section , as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/20/2020	07/19/2021
Power Meter	Anritsu	ML2487A	6K00003888	11/20/2019	05/19/2021
Power Sensor	Anritsu	MA2491A	033265	11/20/2019	05/19/2021
SMA Cable + 10dB Attenuator	CCS	SMA+10dB ATT	SMA/10dB	01/29/2021	01/28/2022
Software	Excel(ccs-o6-2020 v1.1)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/20/2020	07/19/2021
Power Meter	Anritsu	ML2487A	6K00003888	05/18/2021	05/17/2023
Power Sensor	Anritsu	MA2491A	033265	05/18/2021	05/17/2023
SMA Cable + 10dB Attenuator	CCS	SMA+10dB ATT	SMA/10dB	01/29/2021	01/28/2022
Software	Excel(ccs-o6-2020 v1.1)				

TEST SETUP



TEST PROCEDURE

The tests were performed in accordance with KDB 558074 5.2.1.2 and 5.2.2.1.

5.2.1.2 Measurement Procedure PK2:

1. Set the RBW = 1 MHz.
2. Set the VBW ≥ 3 RBW
3. Set the span $\geq 1.5 \times$ DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function,
9. Sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

TEST RESULTS

No non-compliance noted

Model Name	MIXSTREAM	Test By	Ted Huang
Temp & Humidity	25.6°C, 52%	Test Date	2021/04/01

IEEE 802.11b mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2412	15.22	30.00	PASS
Middle	2437	15.54	30.00	PASS
High	2462	15.92	30.00	PASS

- NOTE :**
1. At final test to get the worst-case emission at 1Mbps long.
 2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11g mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2412	17.24	30.00	PASS
Middle	2437	17.54	30.00	PASS
High	2462	17.63	30.00	PASS

- NOTE :**
1. At final test to get the worst-case emission at 6Mbps.
 2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11n HT20 mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2412	17.01	30.00	PASS
Middle	2437	16.65	30.00	PASS
High	2462	16.59	30.00	PASS

NOTE : 1. At final test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

Model Name	MIXSTREAM	Test By	Ted Huang
Temp & Humidity	31.9°C, 51%	Test Date	2021/06/02

Bluetooth 5.0 (GFSK) mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2402	-4.61	30.00	PASS
Middle	2442	-5.85	30.00	PASS
High	2480	-7.86	30.00	PASS

NOTE : 1. At final test to get the worst-case emission at 1Mbps.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

Average Power Data

IEEE 802.11b mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	12.30
Middle	2437	12.66
High	2462	13.00

IEEE 802.11g mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	8.86
Middle	2437	9.22
High	2462	9.31

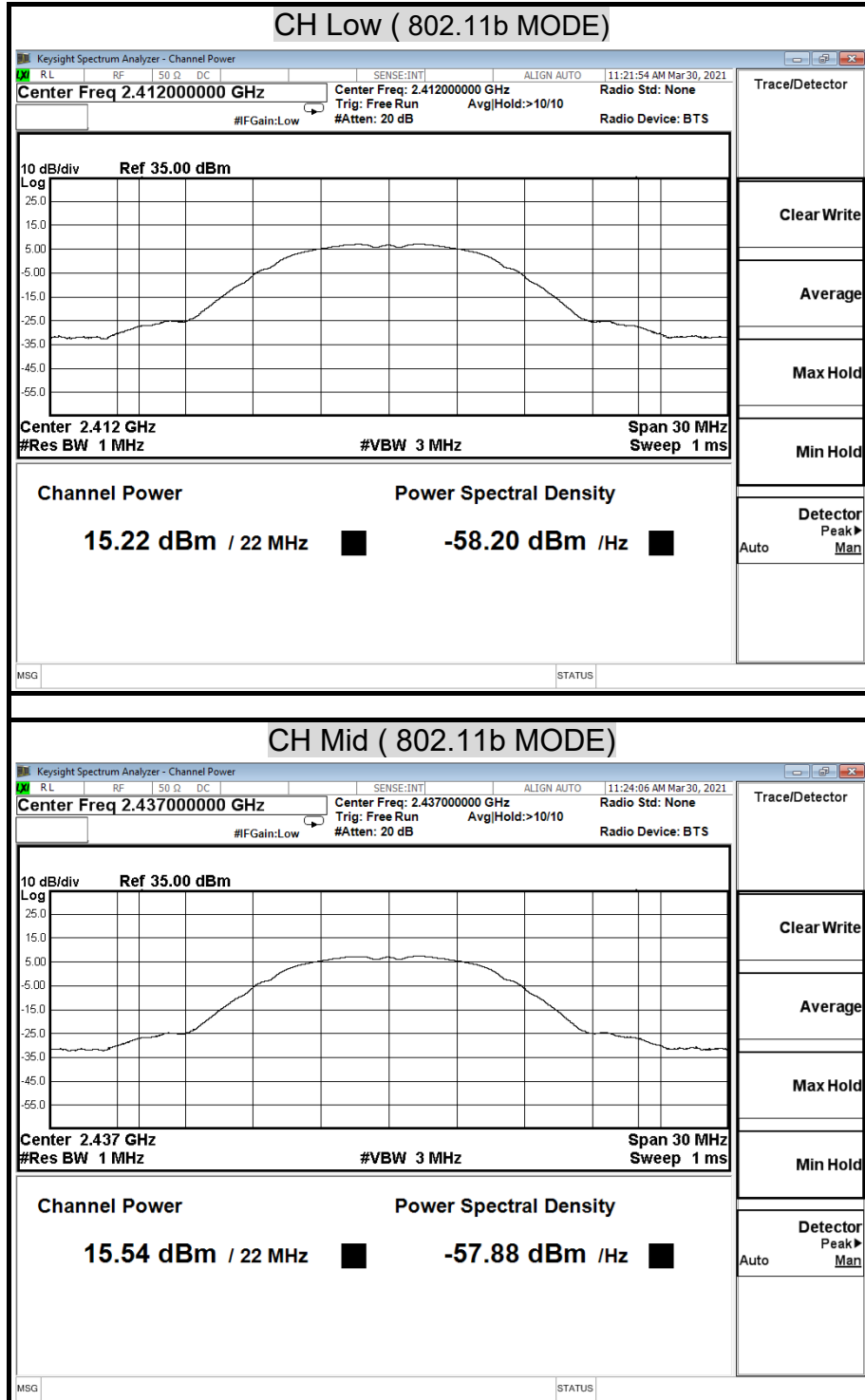
IEEE 802.11n HT20 mode

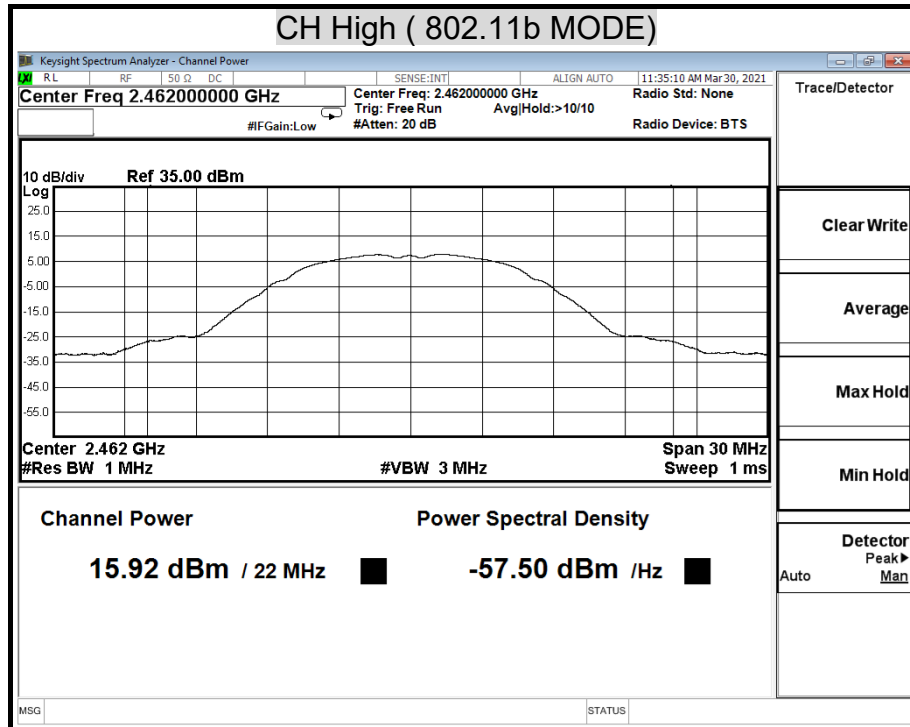
Channel	Channel Frequency (MHz)	Average Power (dBm)
		Chain 0
Low	2412	8.23
Middle	2437	8.33
High	2462	8.24

Bluetooth 5.0 (GFSK) mode

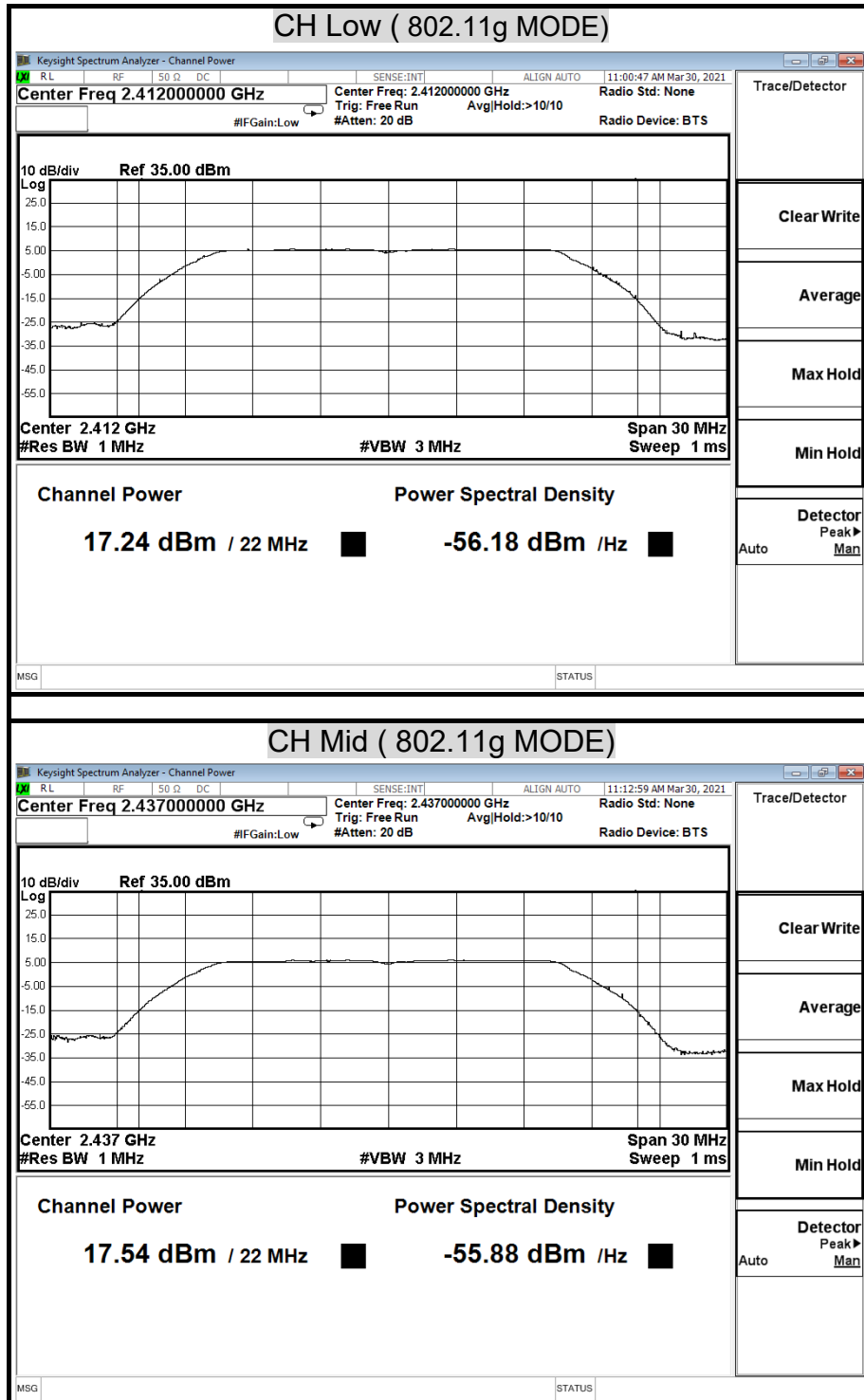
Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2402	-5.11
Middle	2442	-6.38
High	2480	-8.33

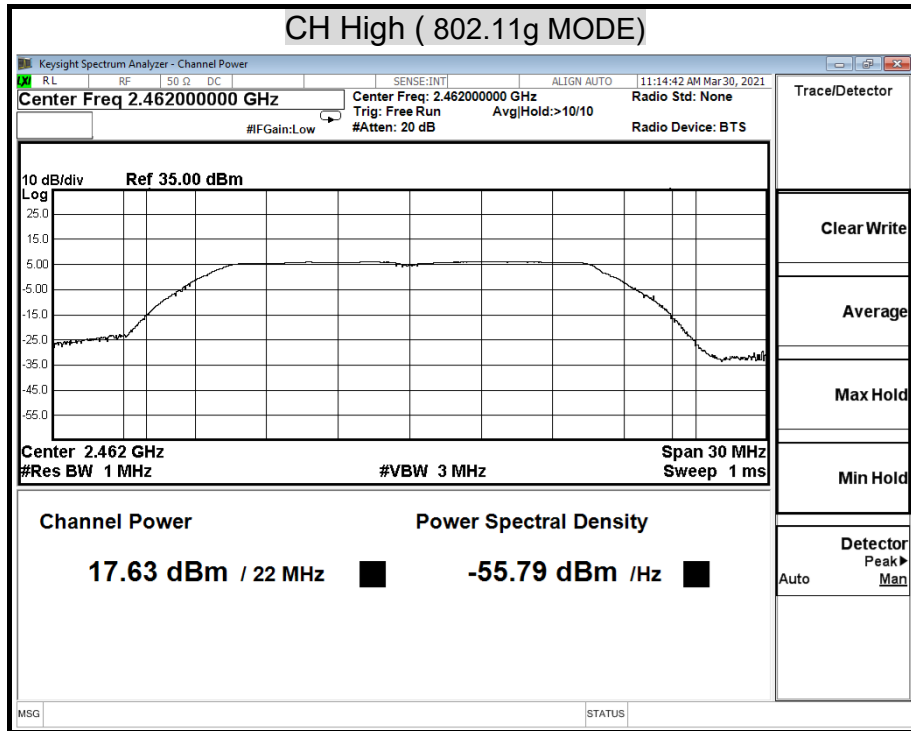
MAXIMUM PEAK OUTPUT POWER (802.11b MODE)



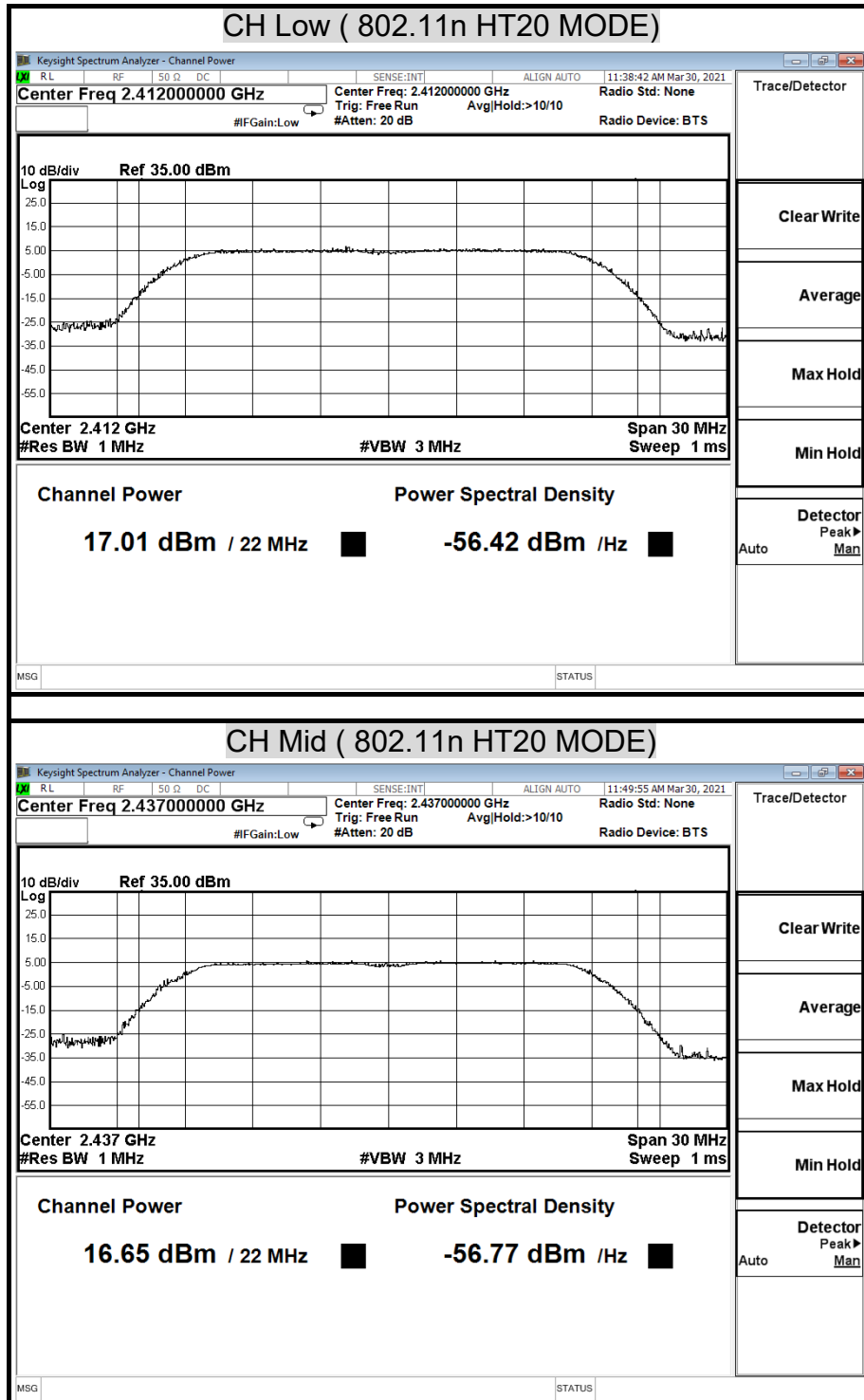


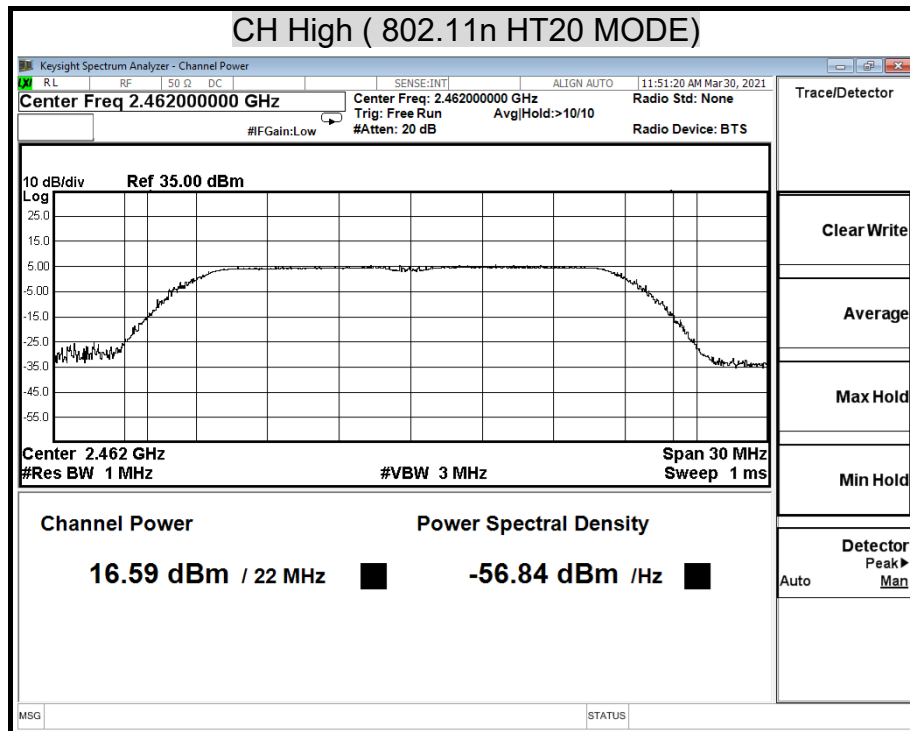
MAXIMUM PEAK OUTPUT POWER (802.11g MODE)



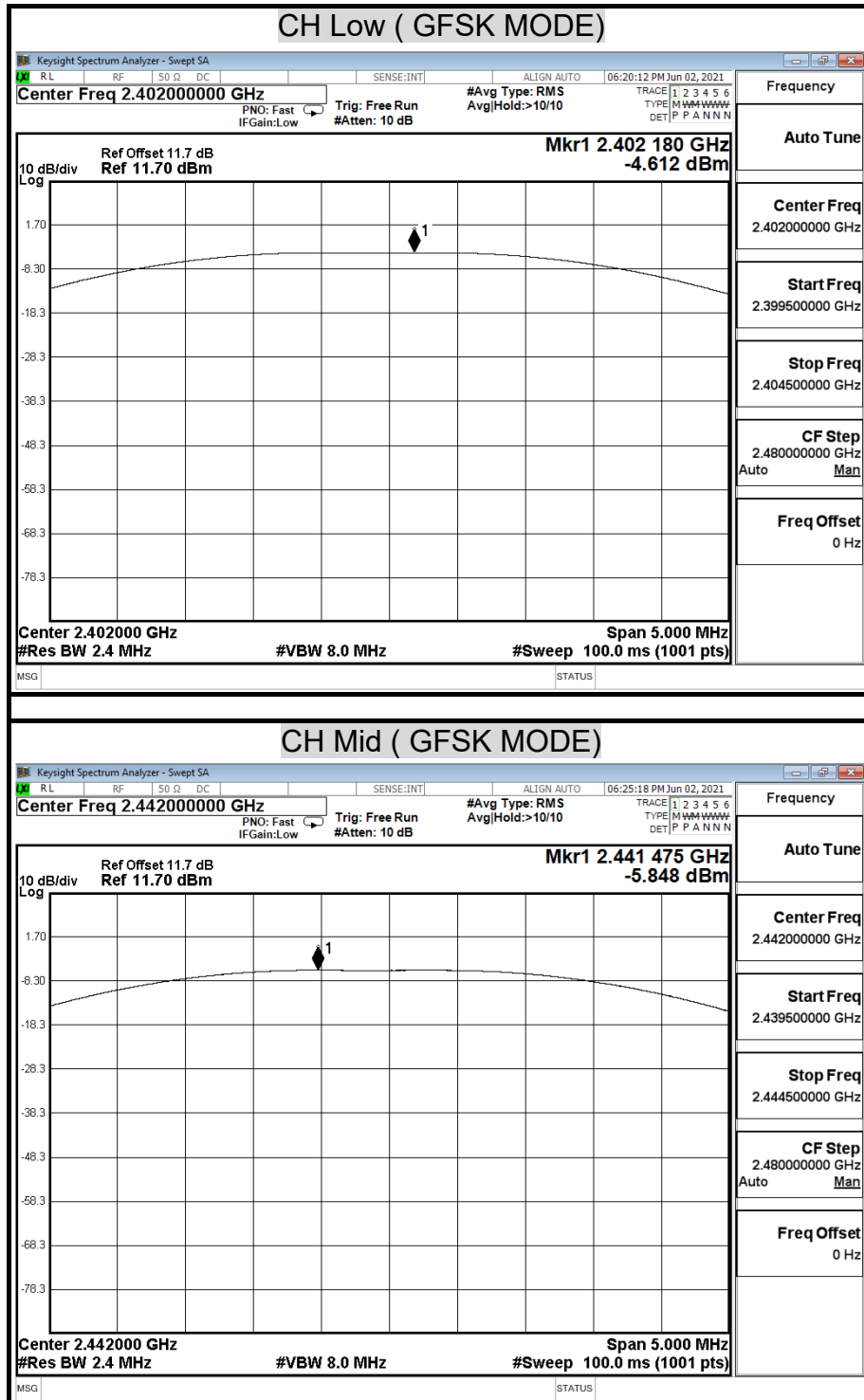


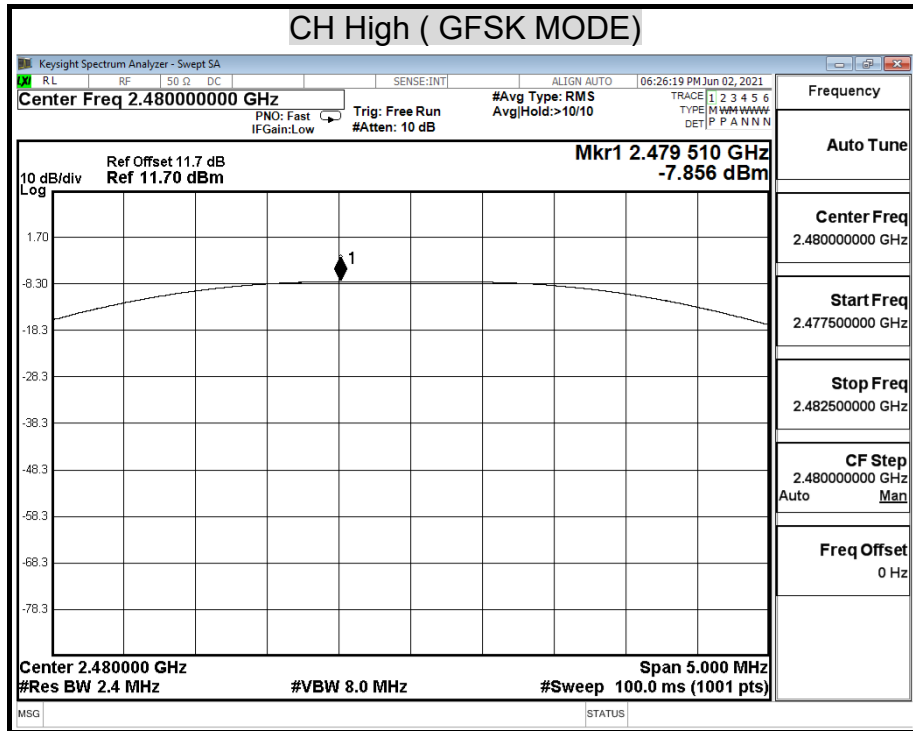
MAXIMUM PEAK OUTPUT POWER (802.11n HT20 MODE)





MAXIMUM PEAK OUTPUT POWER (GFSK MODE)





8.3 DUTY CYCLE

LIMIT

Nil (No dedicated limit specified in the Rules)

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/20/2020	07/19/2021
Power Meter	Anritsu	ML2487A	6K00003888	11/20/2019	05/19/2021
Power Sensor	Anritsu	MA2491A	033265	11/20/2019	05/19/2021
SMA Cable + 10dB Attenuator	CCS	SMA+10dB ATT	SMA/10dB	01/29/2021	01/28/2022
Software	Excel(ccs-o6-2020 v1.1)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/20/2020	07/19/2021
Power Meter	Anritsu	ML2487A	6K00003888	05/18/2021	05/17/2023
Power Sensor	Anritsu	MA2491A	033265	05/18/2021	05/17/2023
SMA Cable + 10dB Attenuator	CCS	SMA+10dB ATT	SMA/10dB	01/29/2021	01/28/2022
Software	Excel(ccs-o6-2020 v1.1)				

TEST SETUP



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

TEST RESULTS

No non-compliance noted.

TEST DATA

WIFI

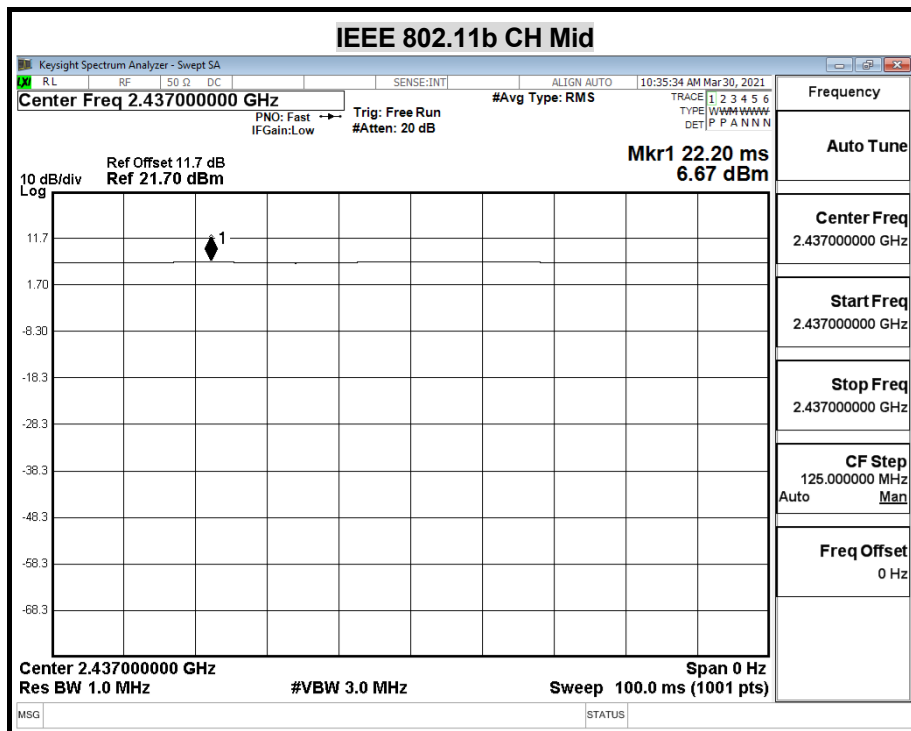
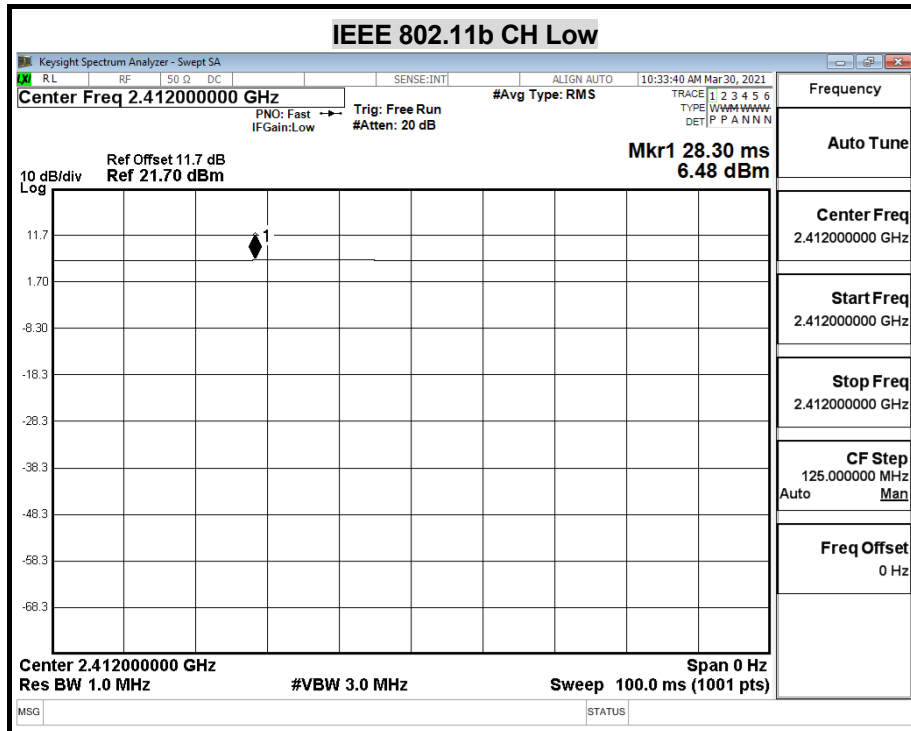
Model Name	MIXSTREAM	Test By	Ted Huang
Temp & Humidity	25.6°C , 52%	Test Date	2021/04/01

	us	Times	Ton	Total Ton time(ms)
Ton1	100000.000	1	100000	
Ton2		0	0	
Ton3			0	100
Tp				100

Ton	100
Tp(Ton+Toff)	100
Duty Cycle	1
10 * log (1/x) =	0

TEST PLOT

Plot

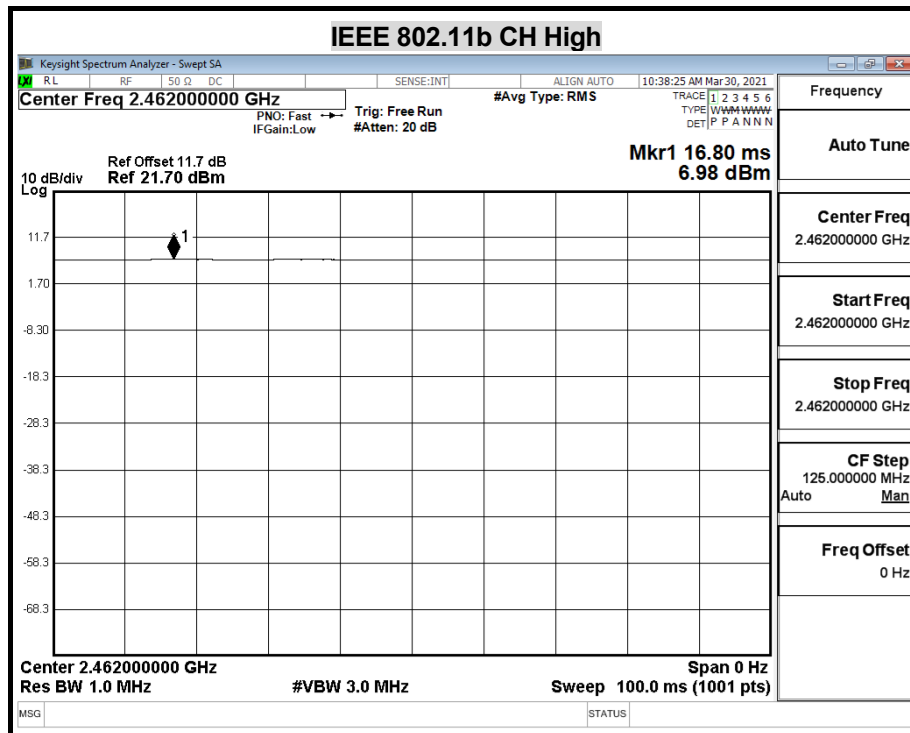


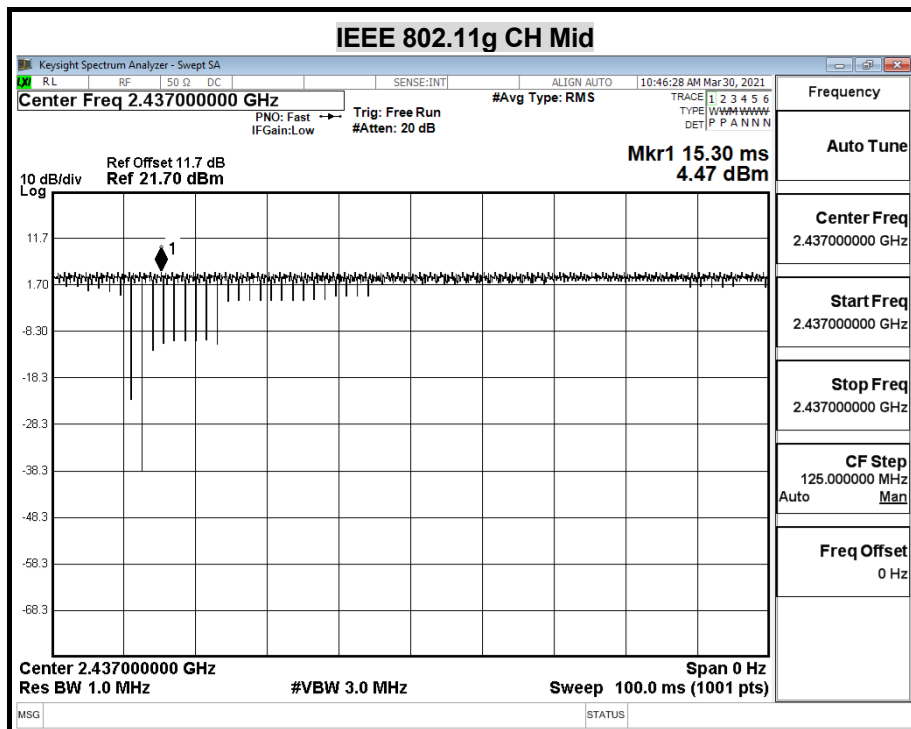
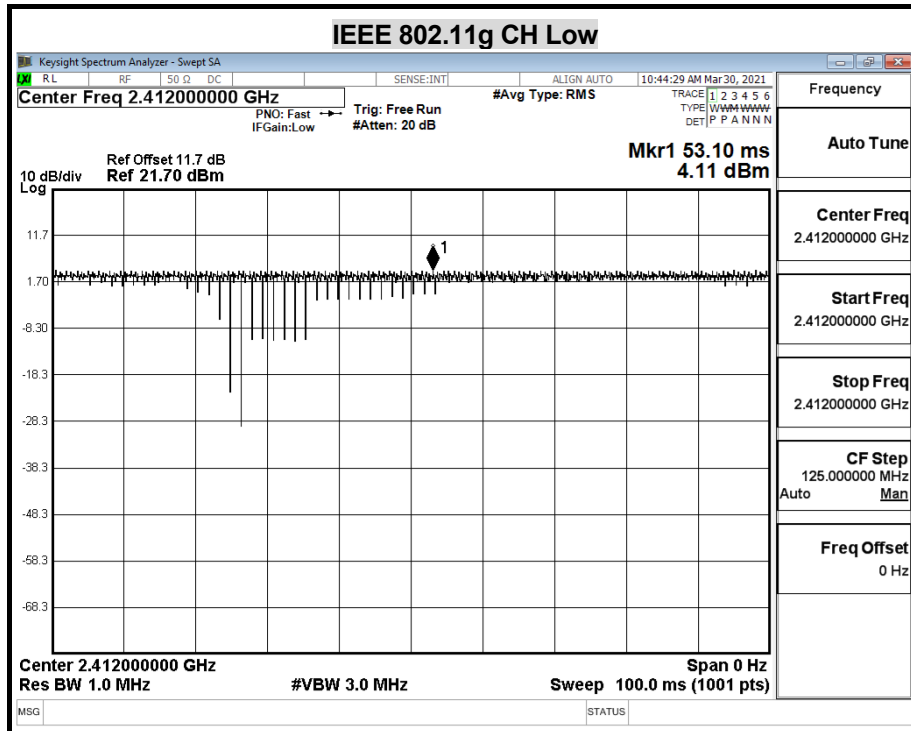


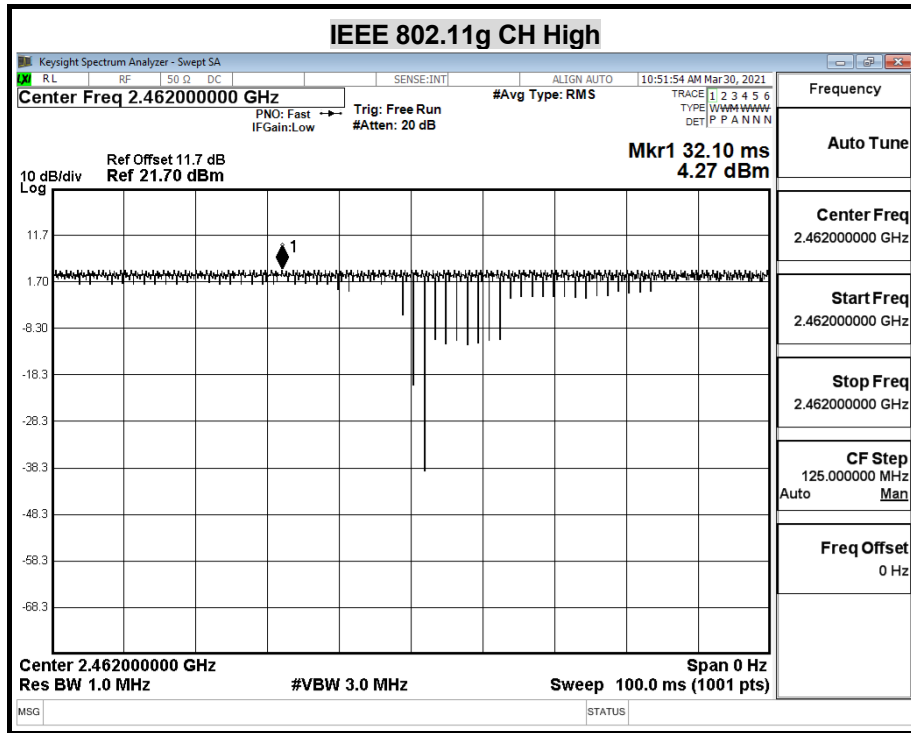
Report No.: T210303N01-RP1

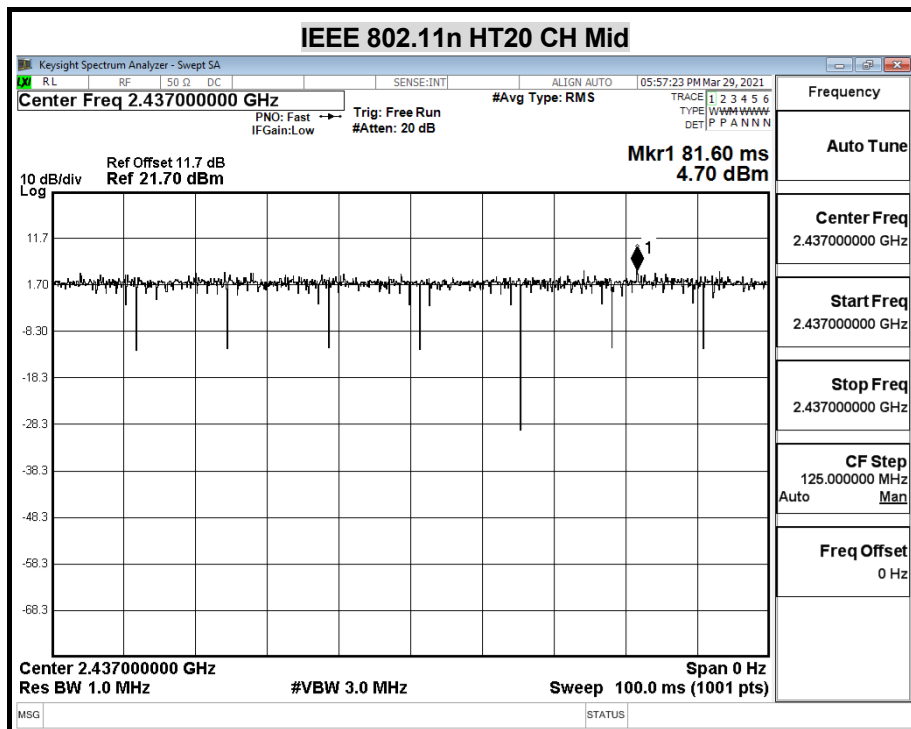
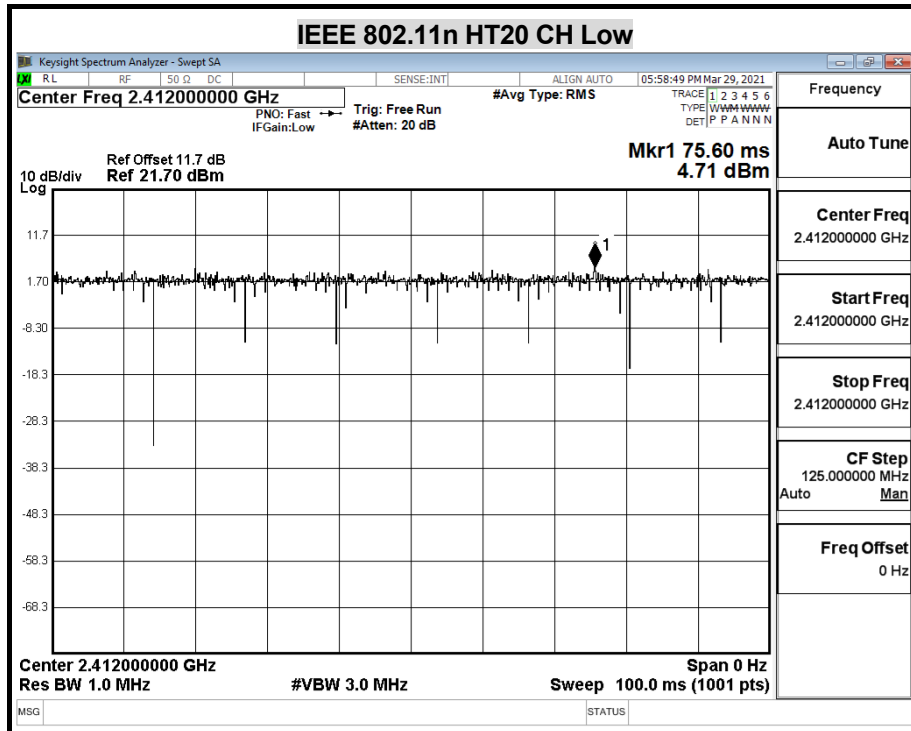
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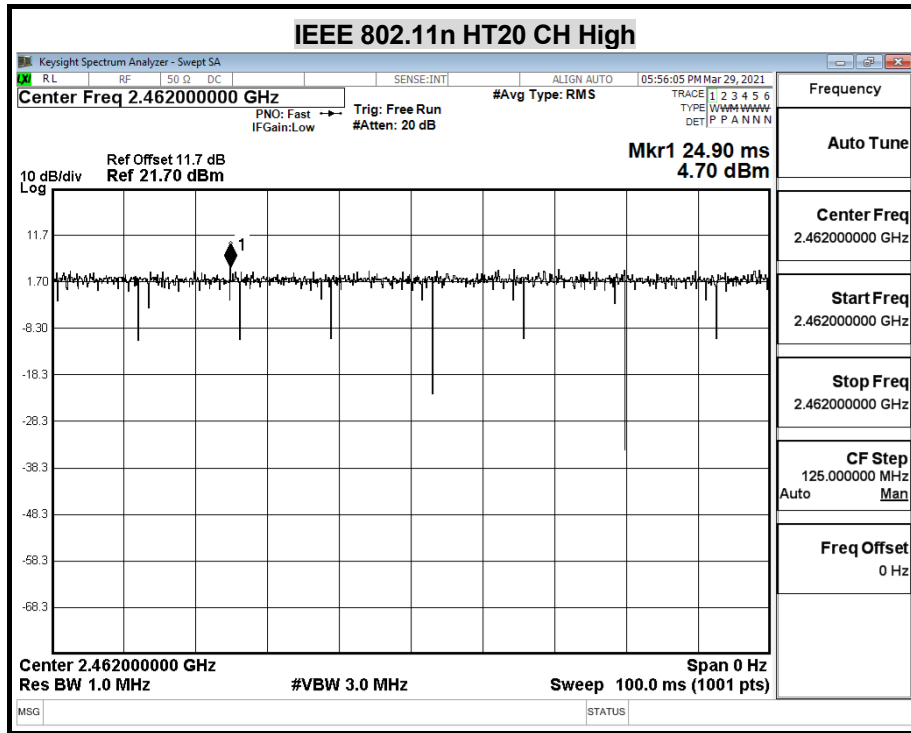
Rev.: 01













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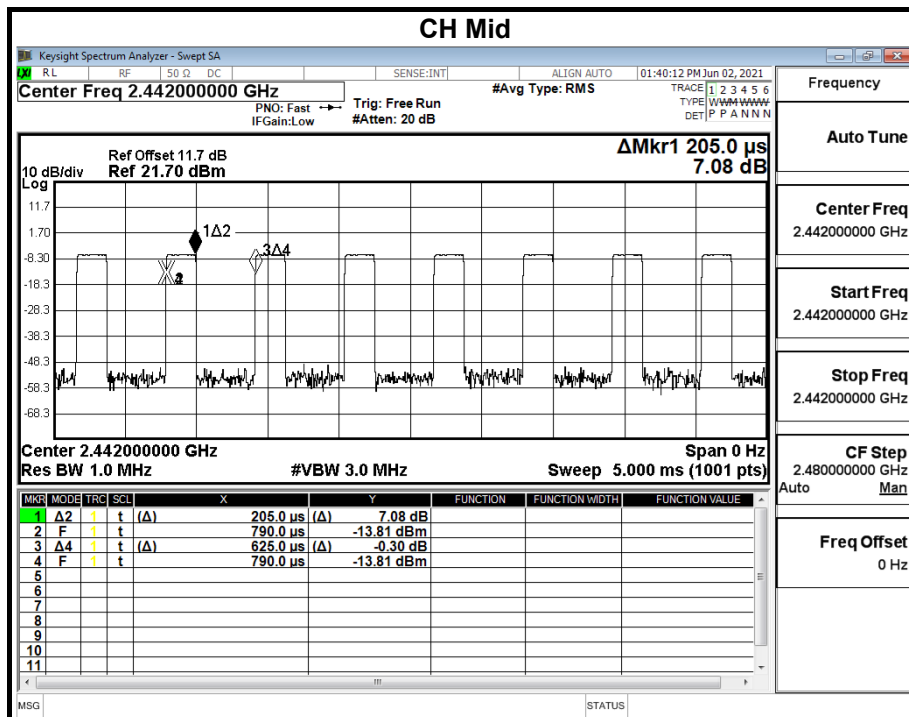
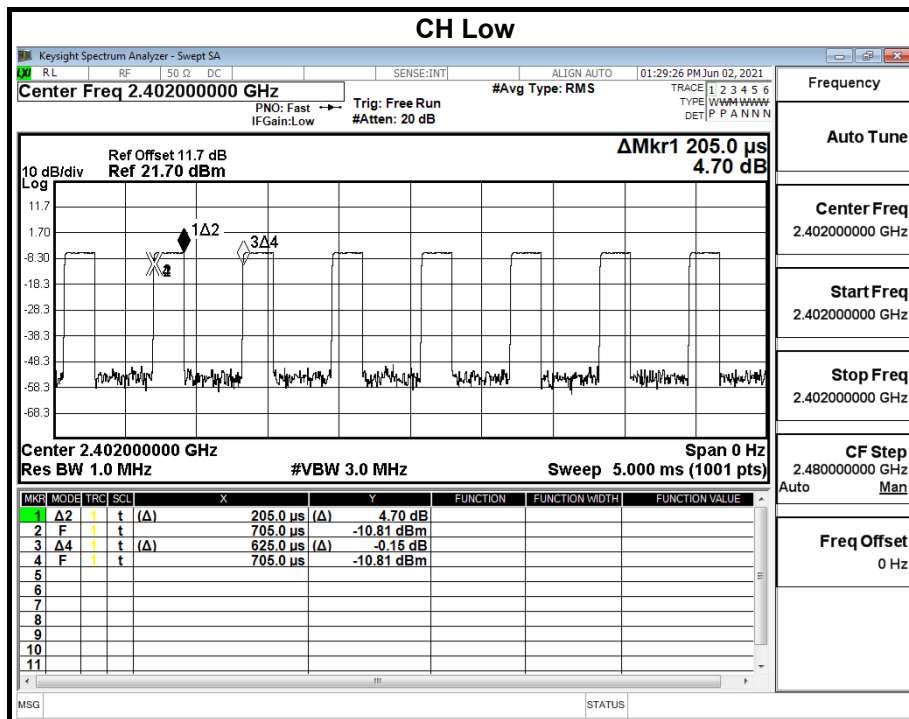
Bluetooth 5.0:

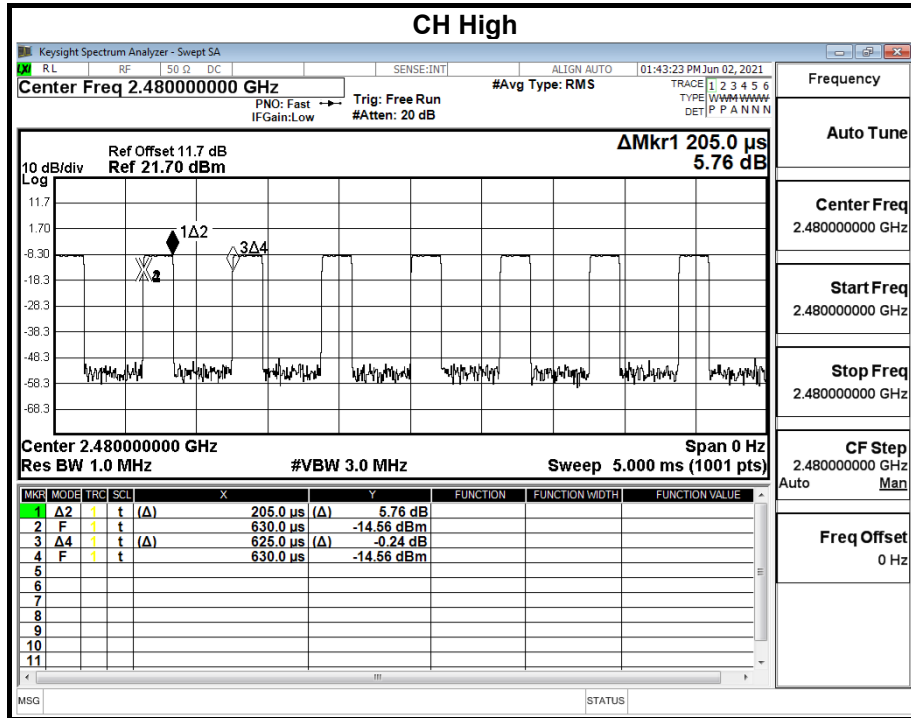
Model Name	MIXSTREAM	Test By	Ted Huang
Temp & Humidity	31.9°C, 51%	Test Date	2021/06/02

	us	Times	Ton	Total Ton time(ms)
Ton1	205	1	205	
Ton2			0	
Ton3			0	0.205
Tp				0.625

Ton	0.205
Tp(Ton+Toff)	0.625
Duty Cycle	0.328
$10 * \log (1/x) =$	4.84

Plot





8.4 POWER SPECTRAL DENSITY

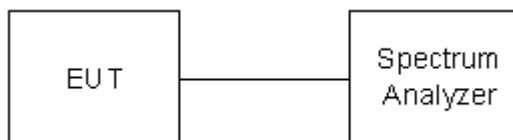
LIMIT

§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/20/2020	07/19/2021
Power Meter	Anritsu	ML2487A	6K00003888	11/20/2019	05/19/2021
Power Sensor	Anritsu	MA2491A	033265	11/20/2019	05/19/2021
SMA Cable + 10dB Attenuator	CCS	SMA+10dB ATT	SMA/10dB	01/29/2021	01/28/2022
Software	Excel(ccs-o6-2020 v1.1)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/20/2020	07/19/2021
Power Meter	Anritsu	ML2487A	6K00003888	05/18/2021	05/17/2023
Power Sensor	Anritsu	MA2491A	033265	05/18/2021	05/17/2023
SMA Cable + 10dB Attenuator	CCS	SMA+10dB ATT	SMA/10dB	01/29/2021	01/28/2022
Software	Excel(ccs-o6-2020 v1.1)				

TEST SETUP



TEST PROCEDURE

The tests were performed in accordance with KDB 558074 5.3.1.

5.3.1 Measurement Procedure PKPSD:

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the *DTS bandwidth*.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \text{ RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST RESULTS

Model Name	MIXSTREAM	Test By	Ted Huang
Temp & Humidity	25.6°C, 52%	Test Date	2021/04/01

IEEE 802.11b mode

Channel	Frequency (MHz)	PPSD/3kHz (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	2412	-9.01	8.00	-17.01	PASS
Middle	2437	-10.21	8.00	-18.21	PASS
High	2462	-7.84	8.00	-15.84	PASS

NOTE : 1. At final test to get the worst-case emission at 1long Mbps long.
 2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD/3kHz (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	2412	-15.89	8.00	-23.89	PASS
Middle	2437	-16.04	8.00	-24.04	PASS
High	2462	-15.80	8.00	-23.80	PASS

NOTE : 1. At final test to get the worst-case emission at 6long Mbps long.
 2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	PPSD/3kHz (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	2412	-16.30	8.00	-24.30	PASS
Middle	2437	-16.62	8.00	-24.62	PASS
High	2462	-16.36	8.00	-24.36	PASS

NOTE : 1. At final test to get the worst-case emission at 6.5long Mbps long.
 2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

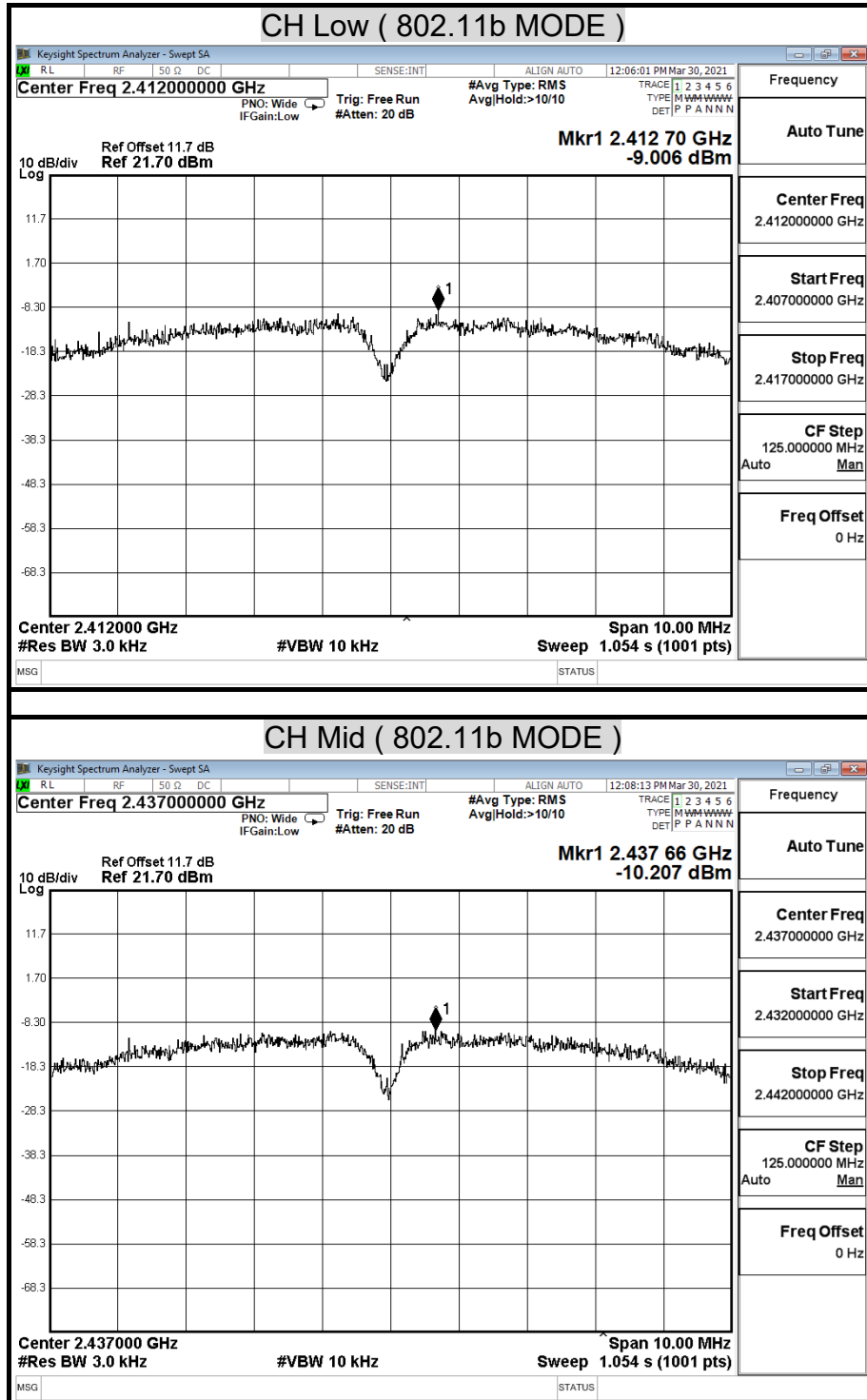
Model Name	MIXSTREAM	Test By	Ted Huang
Temp & Humidity	31.9°C, 51%	Test Date	2021/06/02

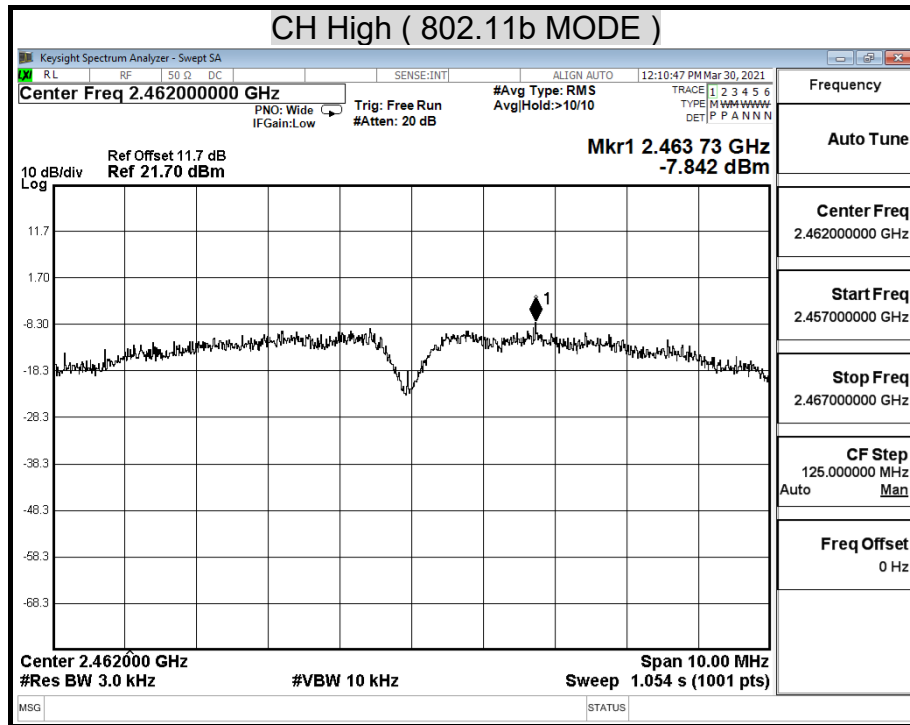
Bluetooth 5.0 (GFSK) mode

Channel	Frequency (MHz)	PPSD/3kHz (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	2402	-22.26	8.00	-30.26	PASS
Middle	2442	-23.50	8.00	-31.50	PASS
High	2480	-25.57	8.00	-33.57	PASS

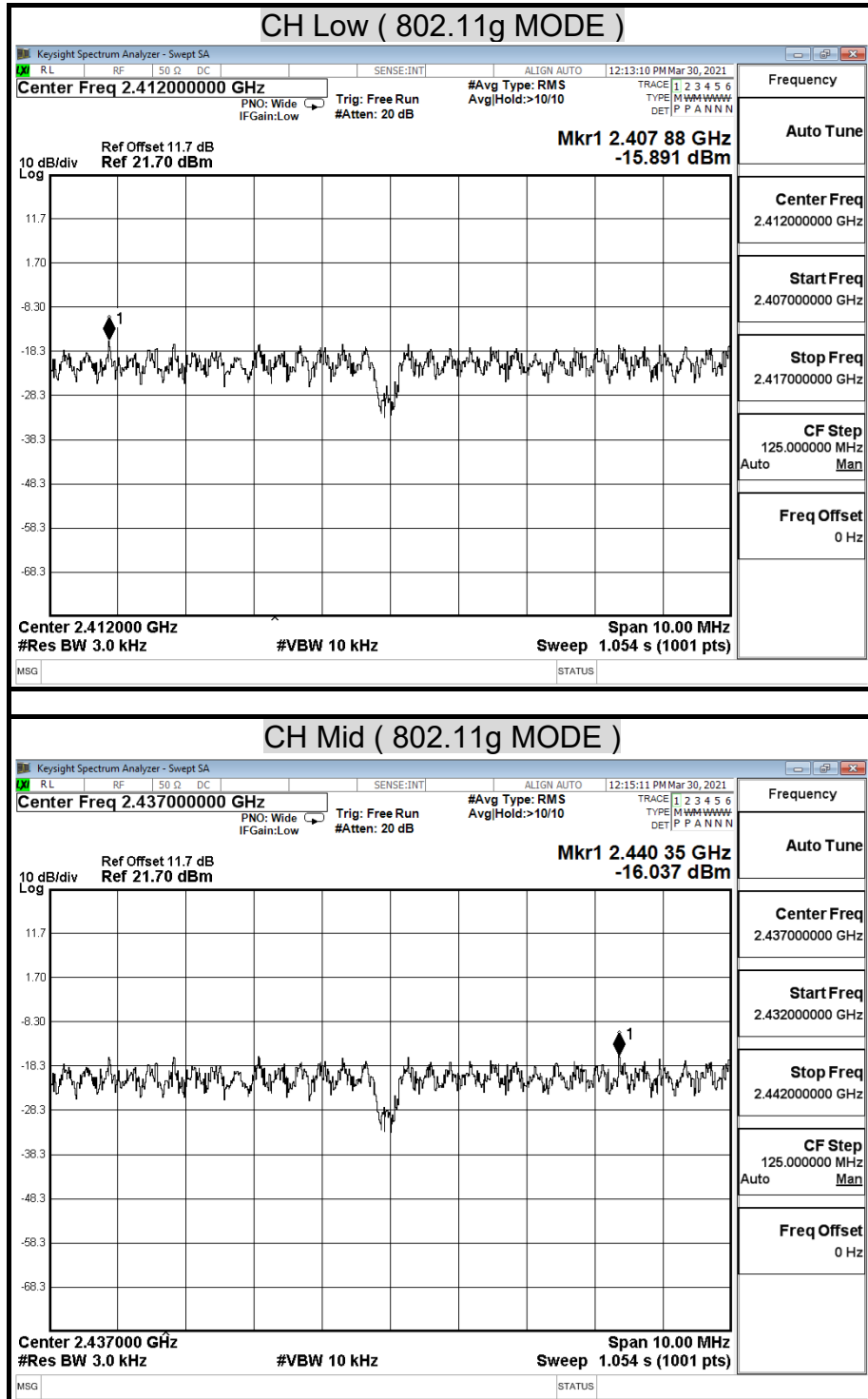
NOTE : 1. At final test to get the worst-case emission at 1long Mbps long.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

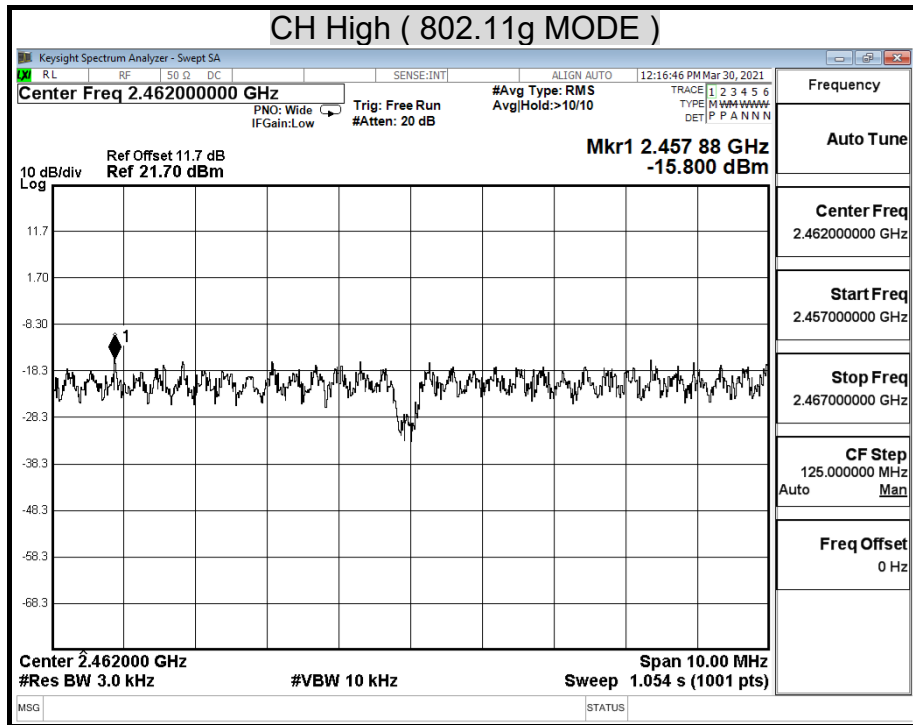
POWER SPECTRAL DENSITY (IEEE 802.11b MODE)



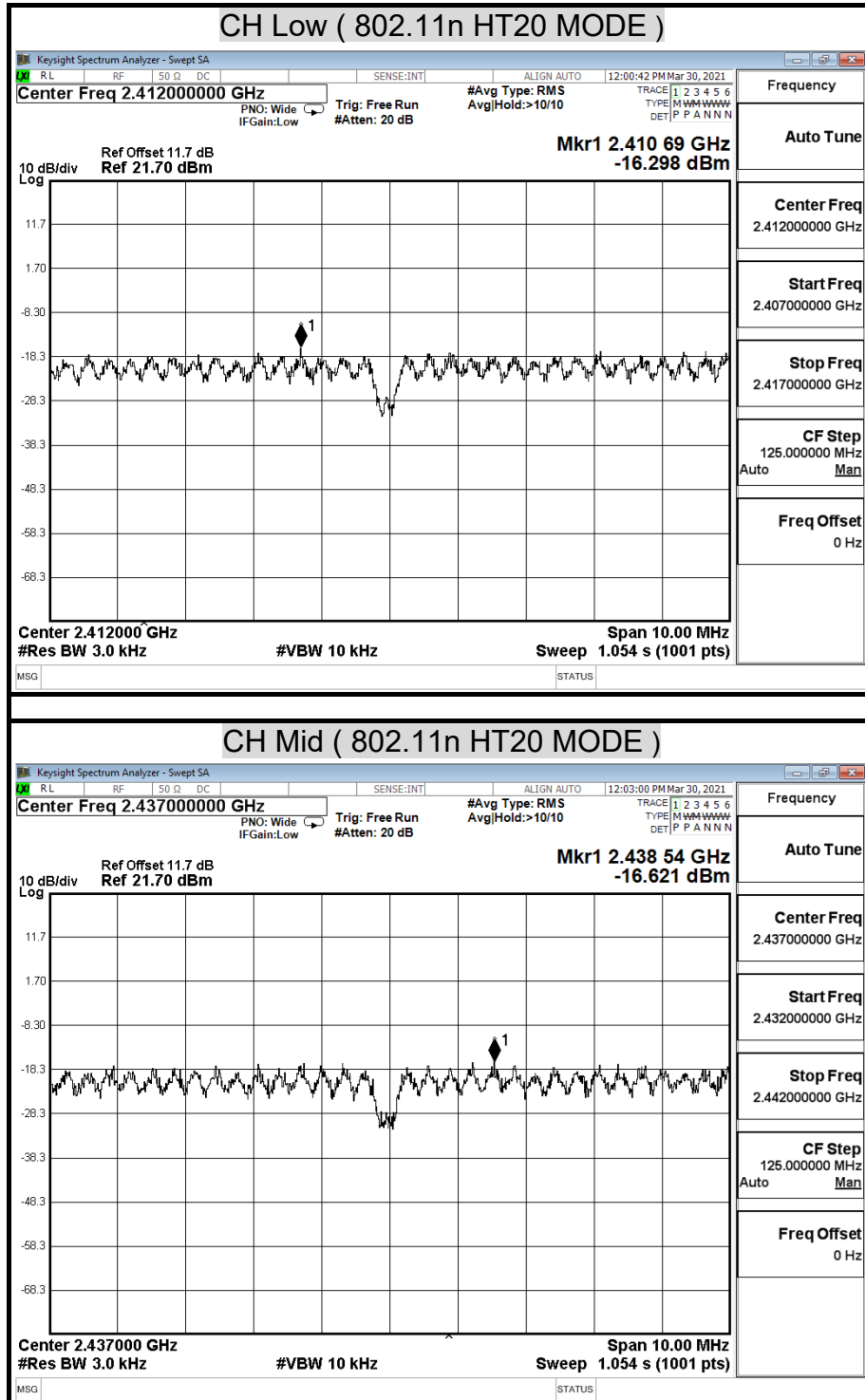


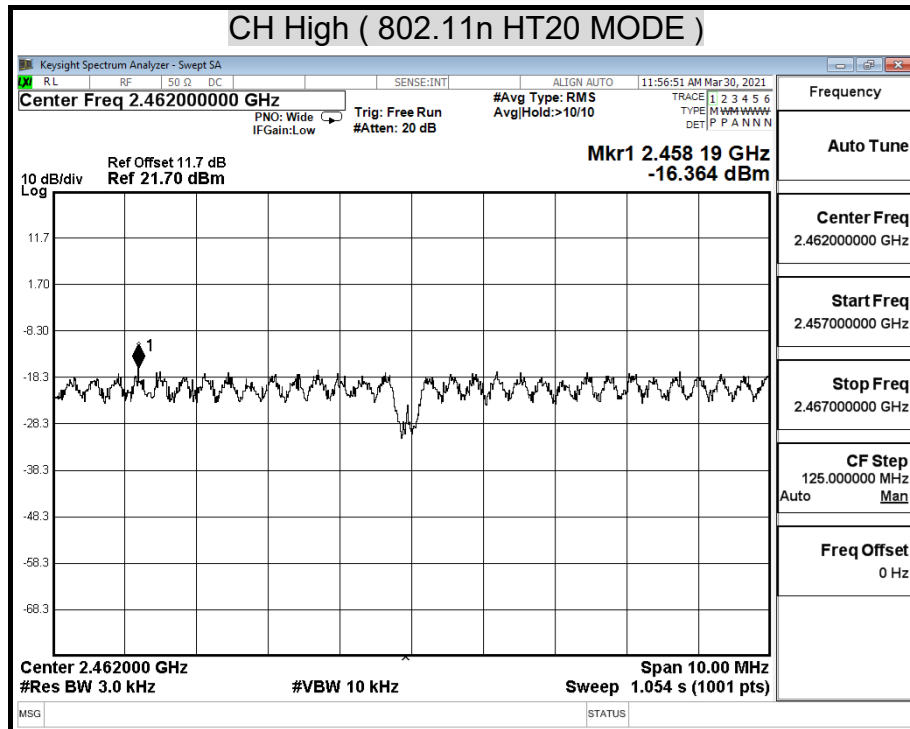
POWER SPECTRAL DENSITY (IEEE 802.11g MODE)





POWER SPECTRAL DENSITY (802.11n HT20 MODE)





POWER SPECTRAL DENSITY (Bluetooth 5.0 (GFSK) MODE)

