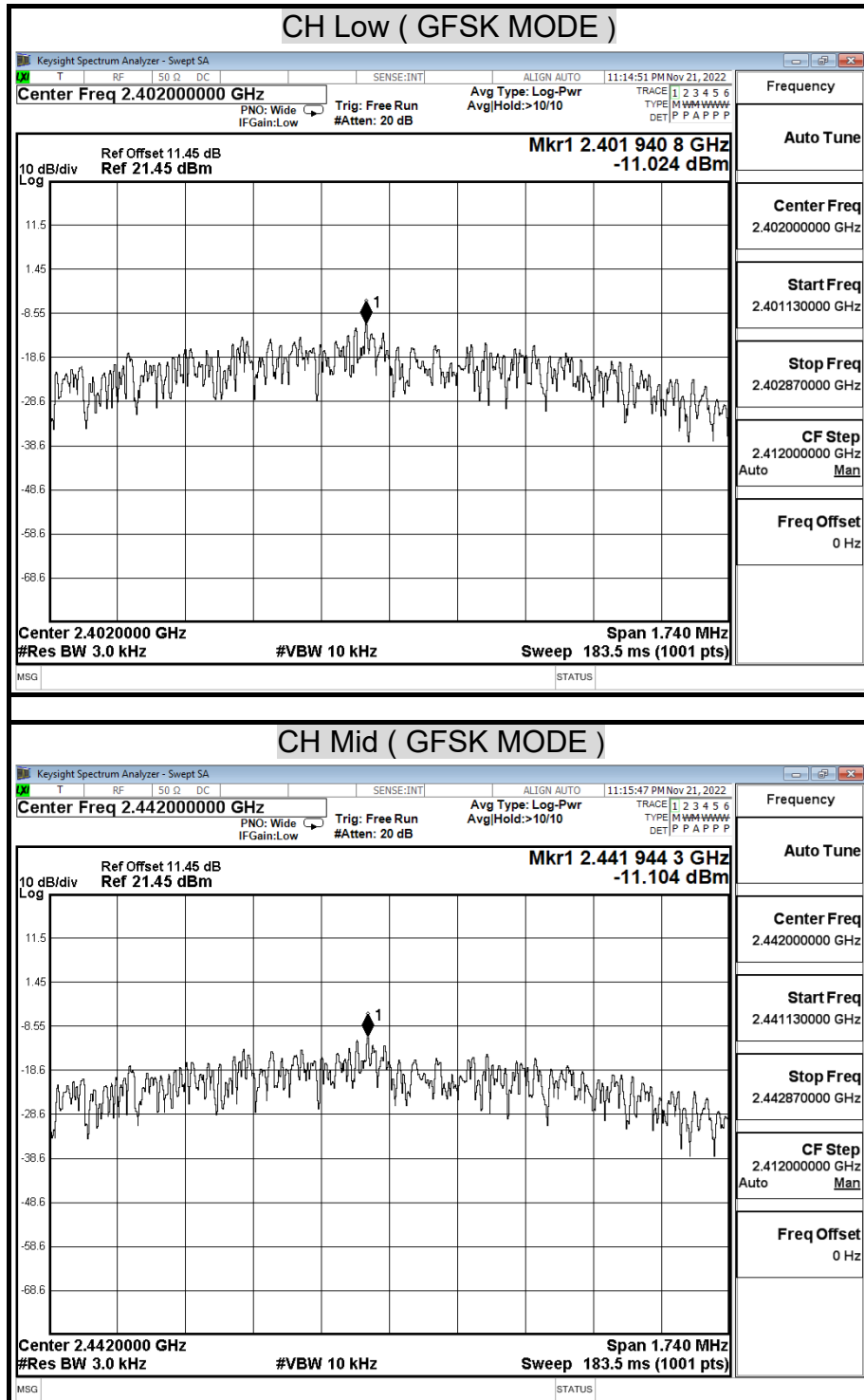
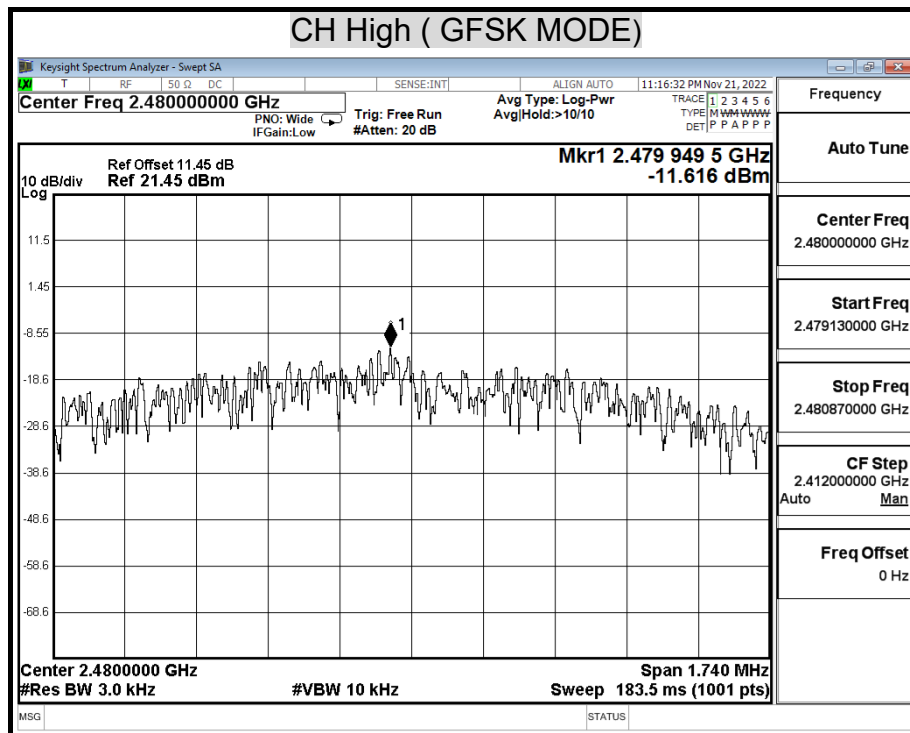


## POWER SPECTRAL DENSITY ( Bluetooth 5.0 (GFSK) MODE )





## 8.5 CONDUCTED SPURIOUS EMISSION

### LIMITS

§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

### TEST EQUIPMENTS

Chamber Room #1166					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	08/11/2022	08/10/2023
SMA Cable+10dB Attenuator	CCS	SMA+10dB ATT	SMA/10dB	01/28/2022	01/27/2023
Software	Excel(ccs-o6-2020 v1.1)				

**TEST SETUP****TEST PROCEDURE**

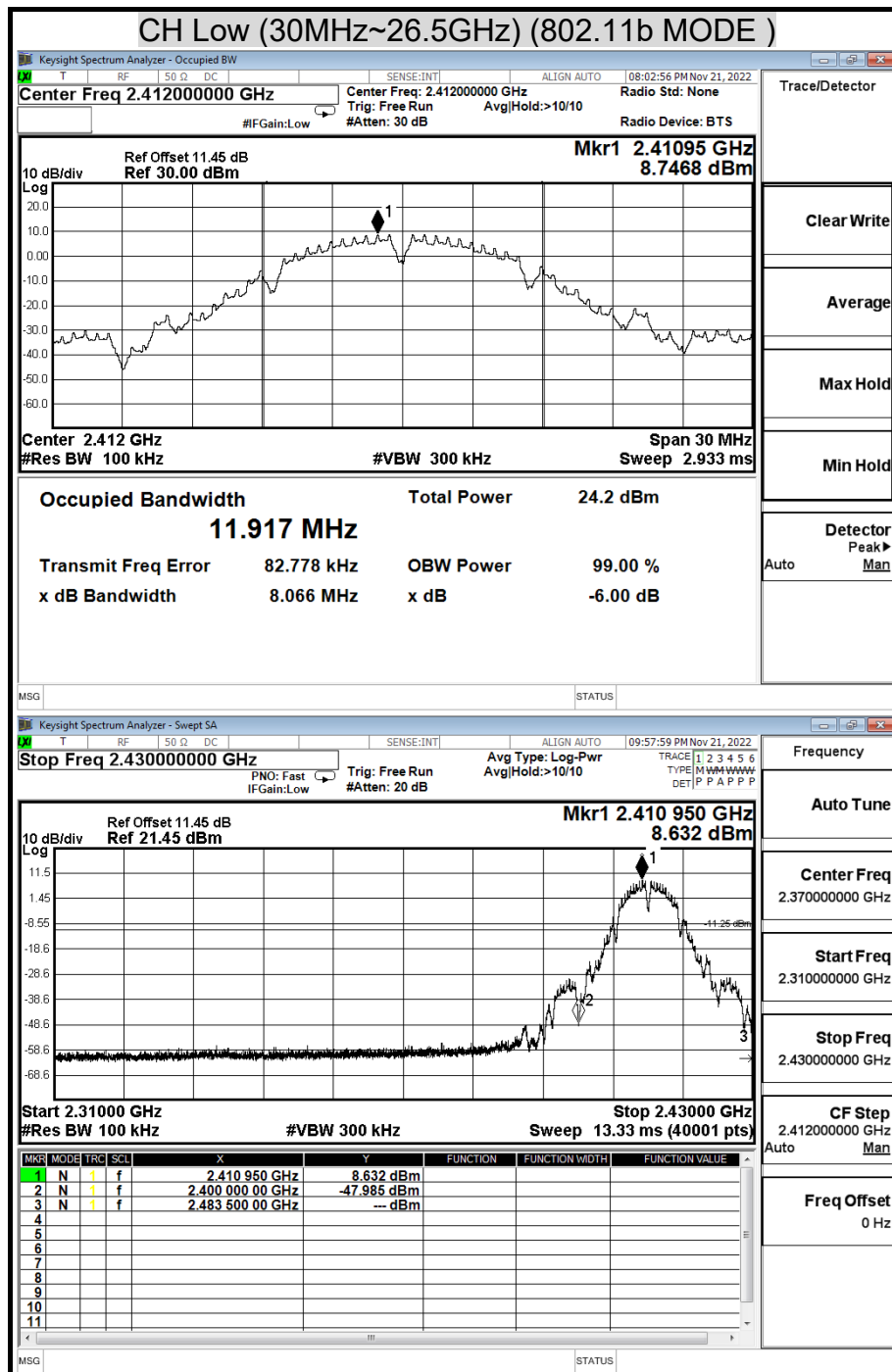
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

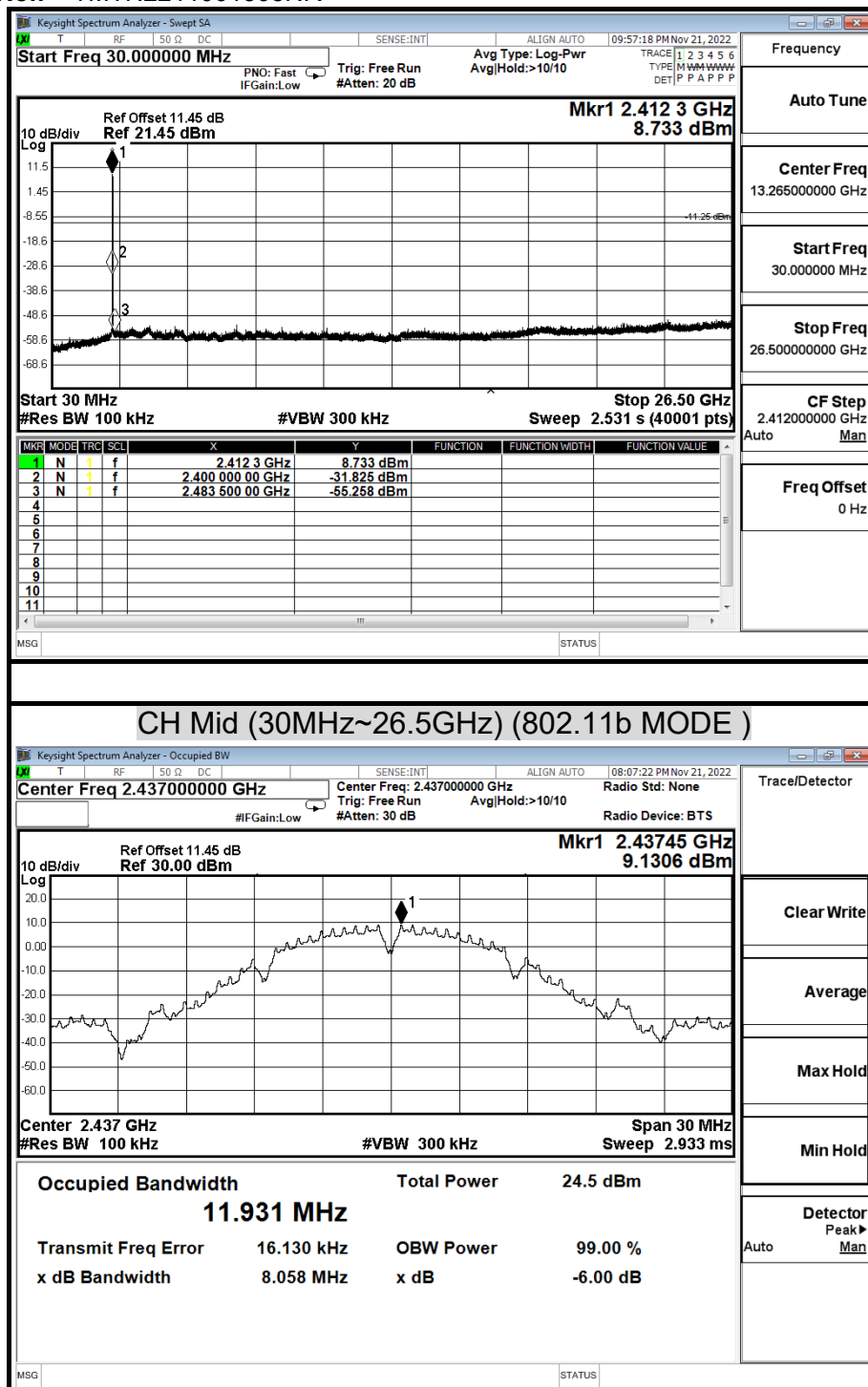
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

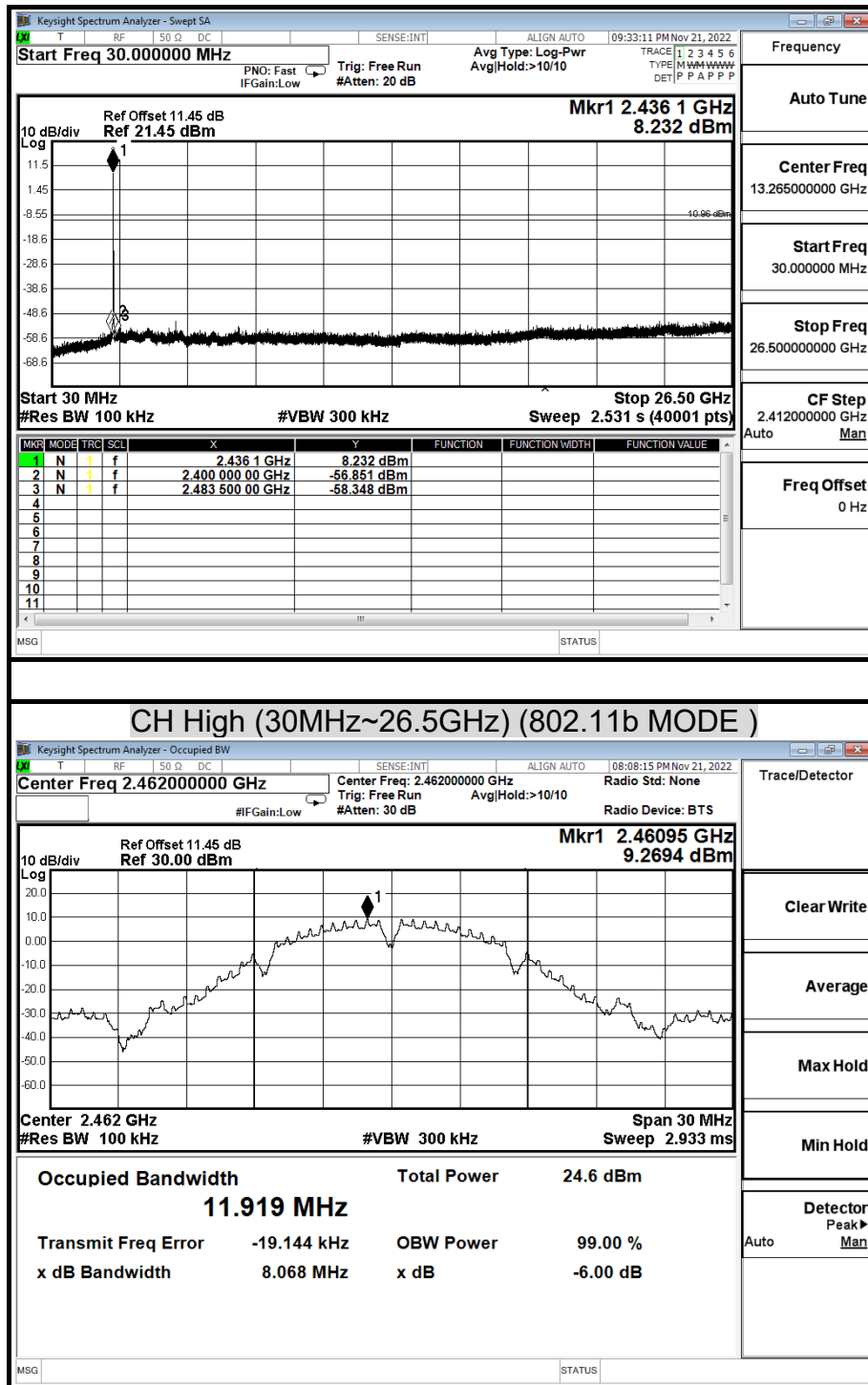
## OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

Model Name	ACVA2	Test By	Peter Chu
Temp & Humidity	22.5°C, 54%	Test Date	2022/11/21

( IEEE 802.11b MODE )





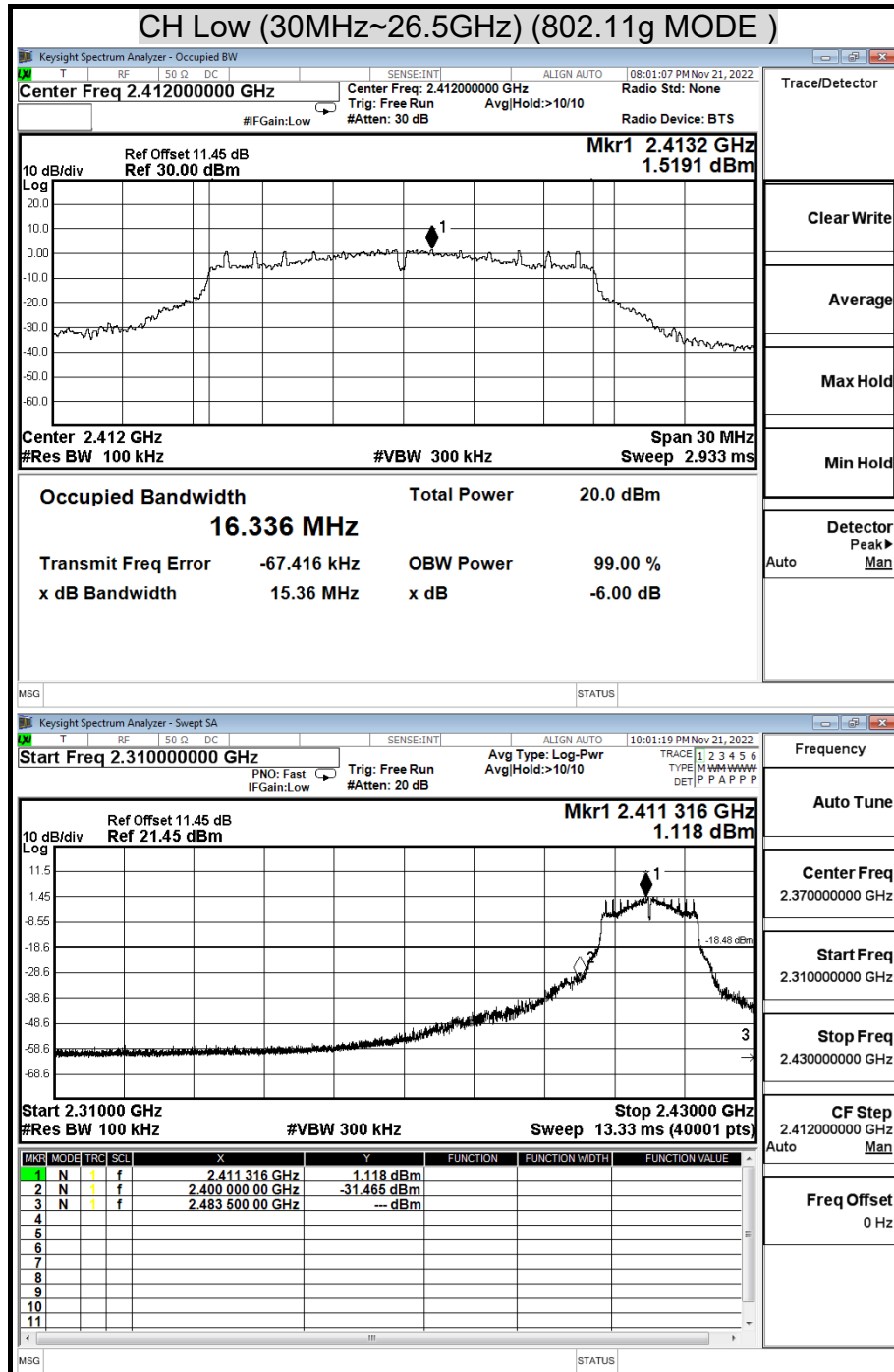


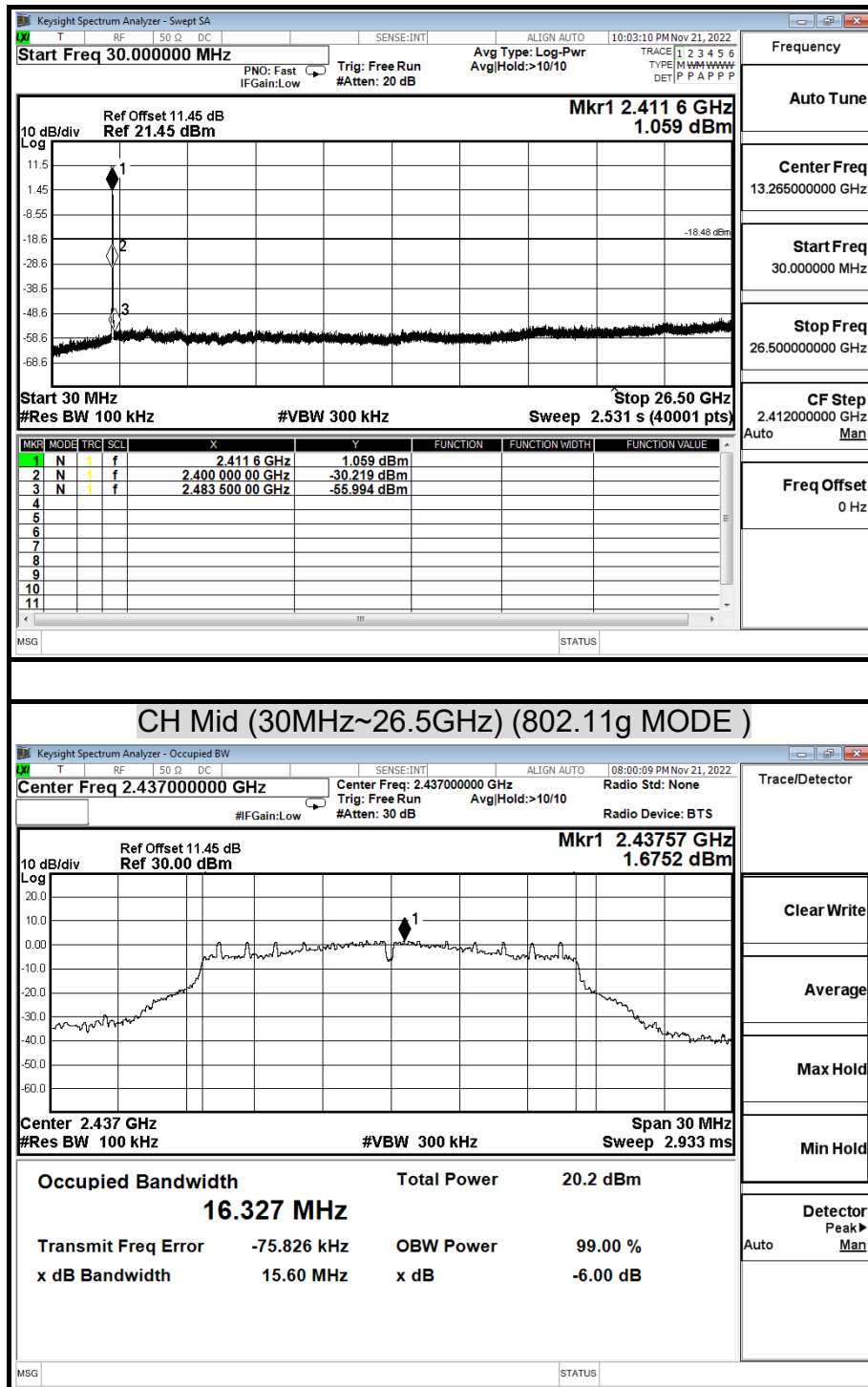


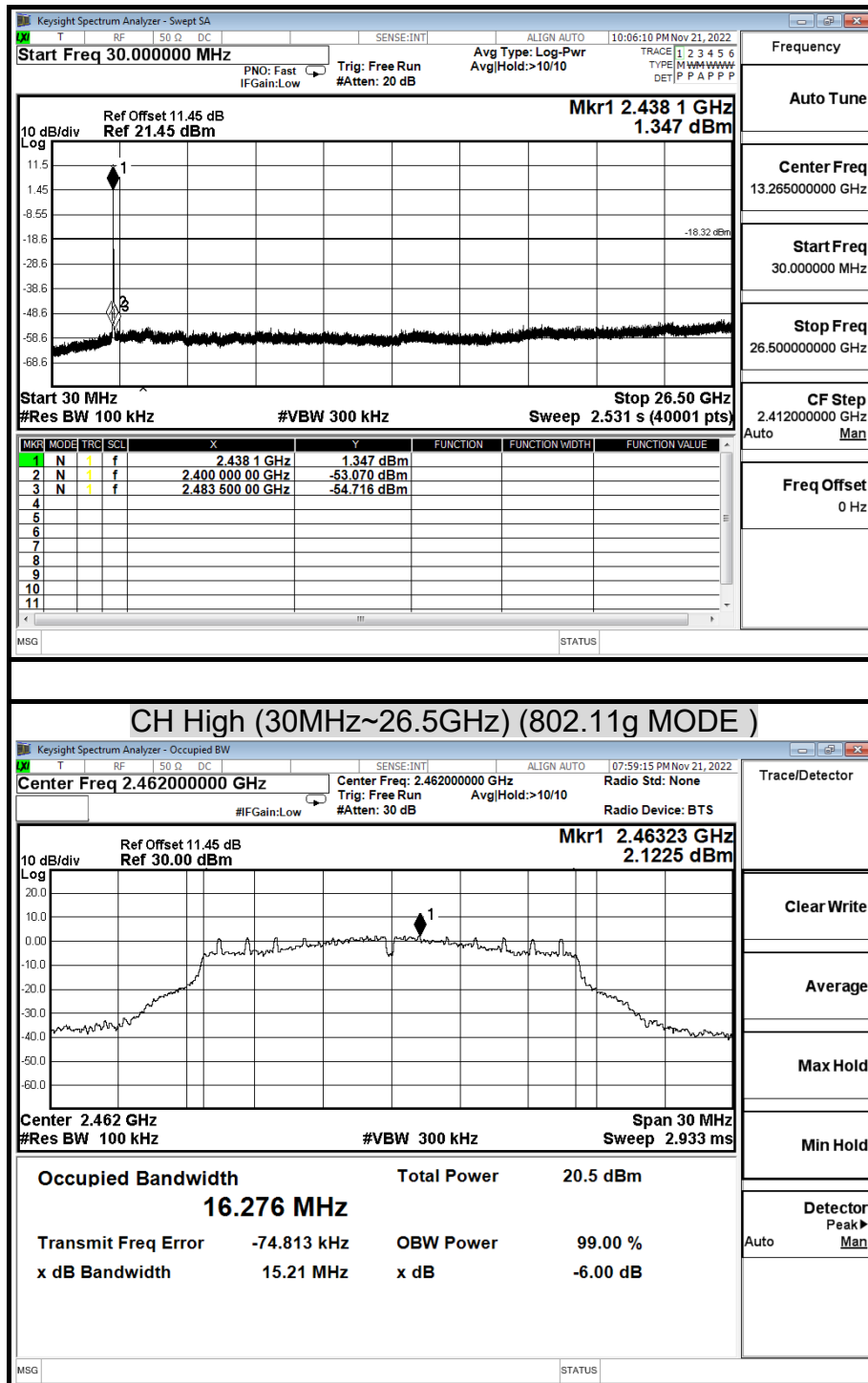


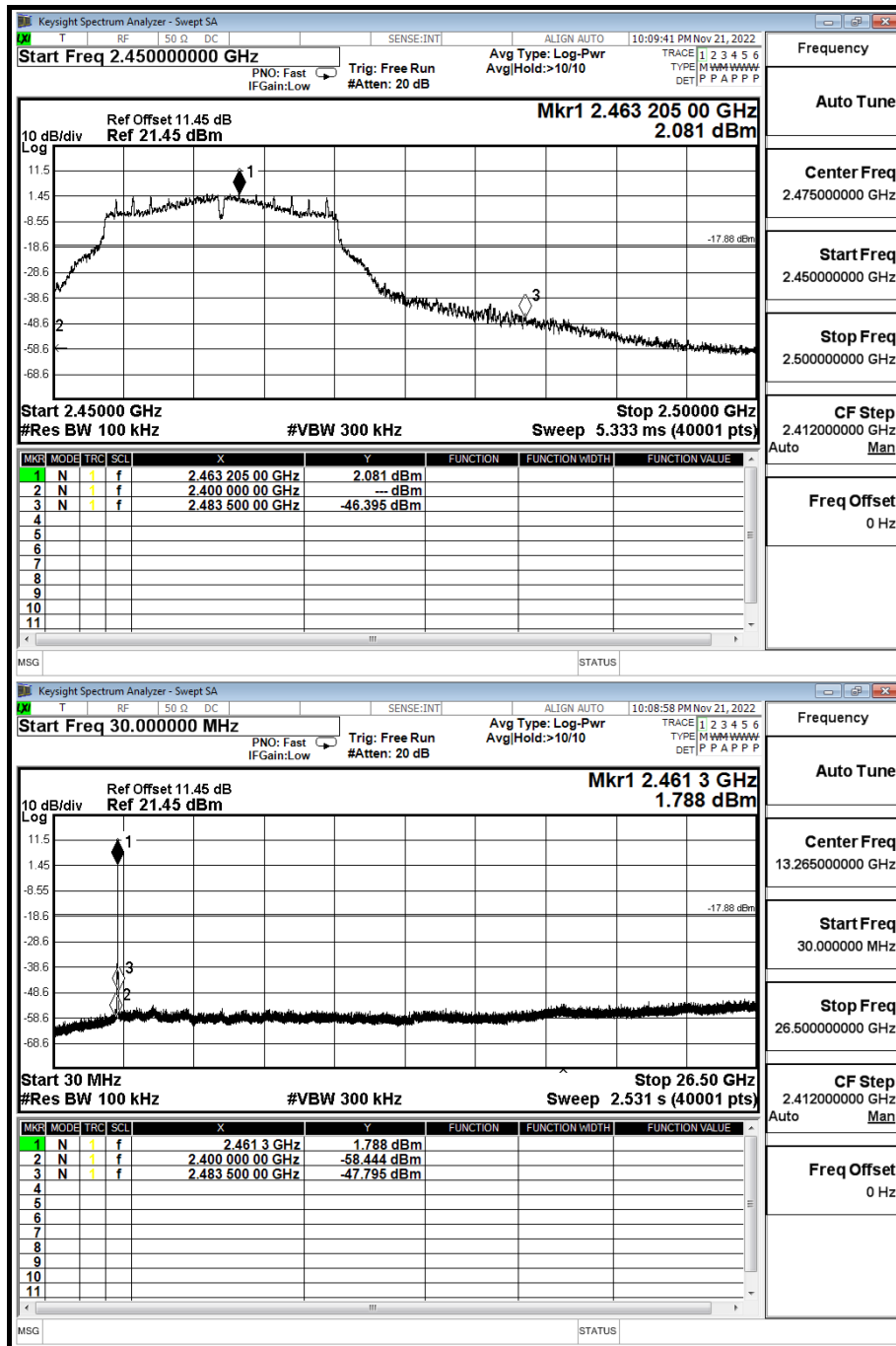
## OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

( 802.11g MODE )



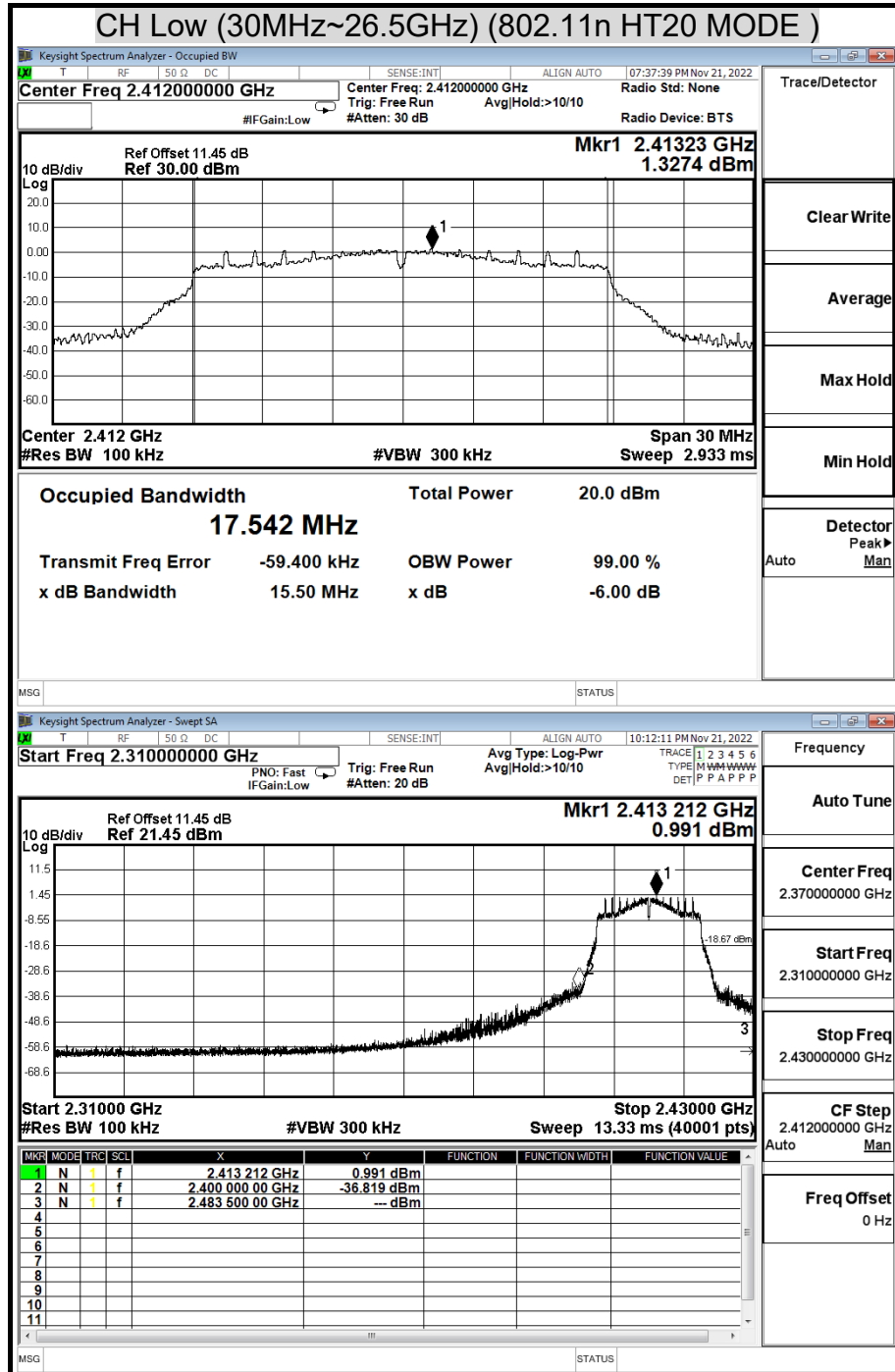


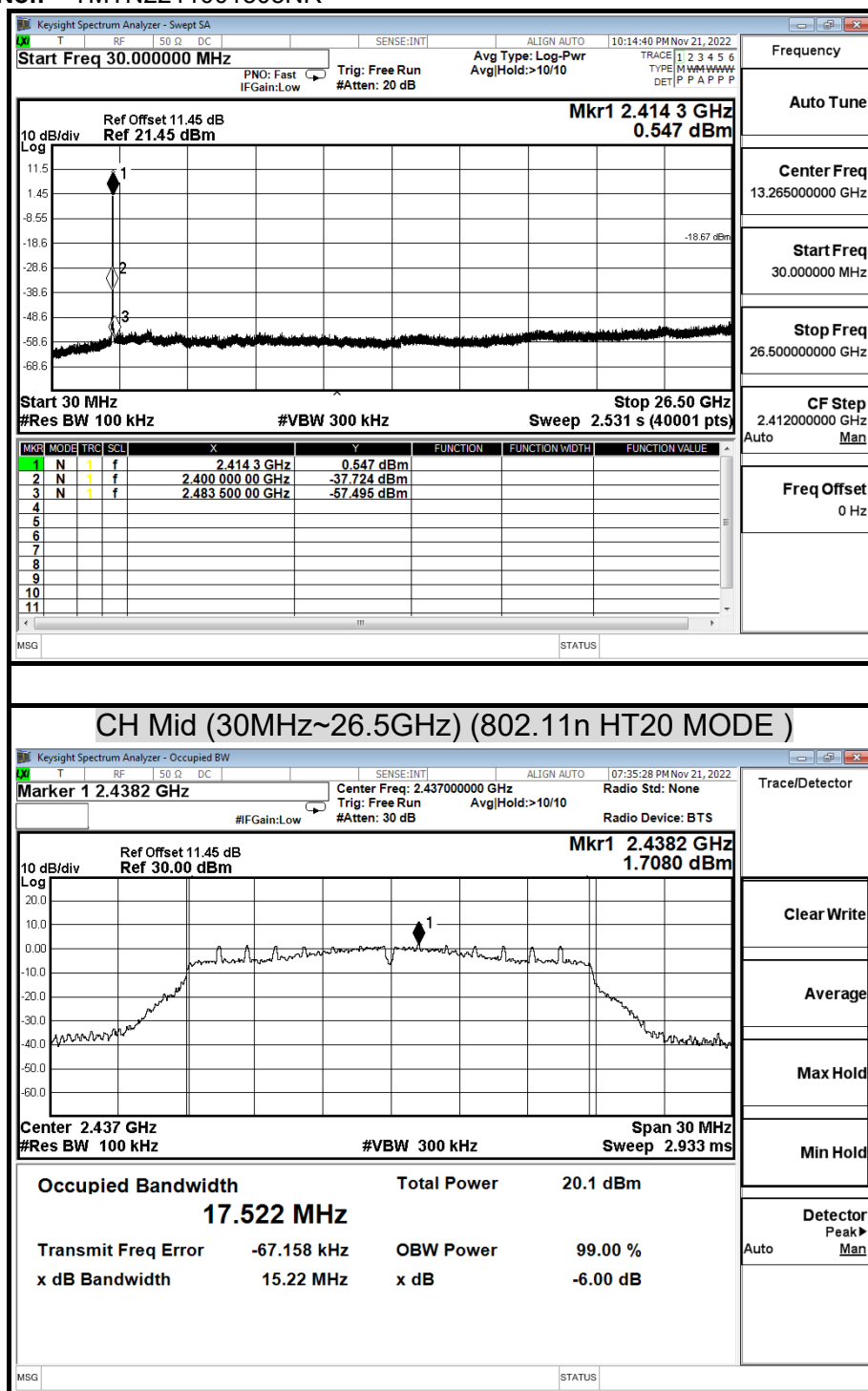


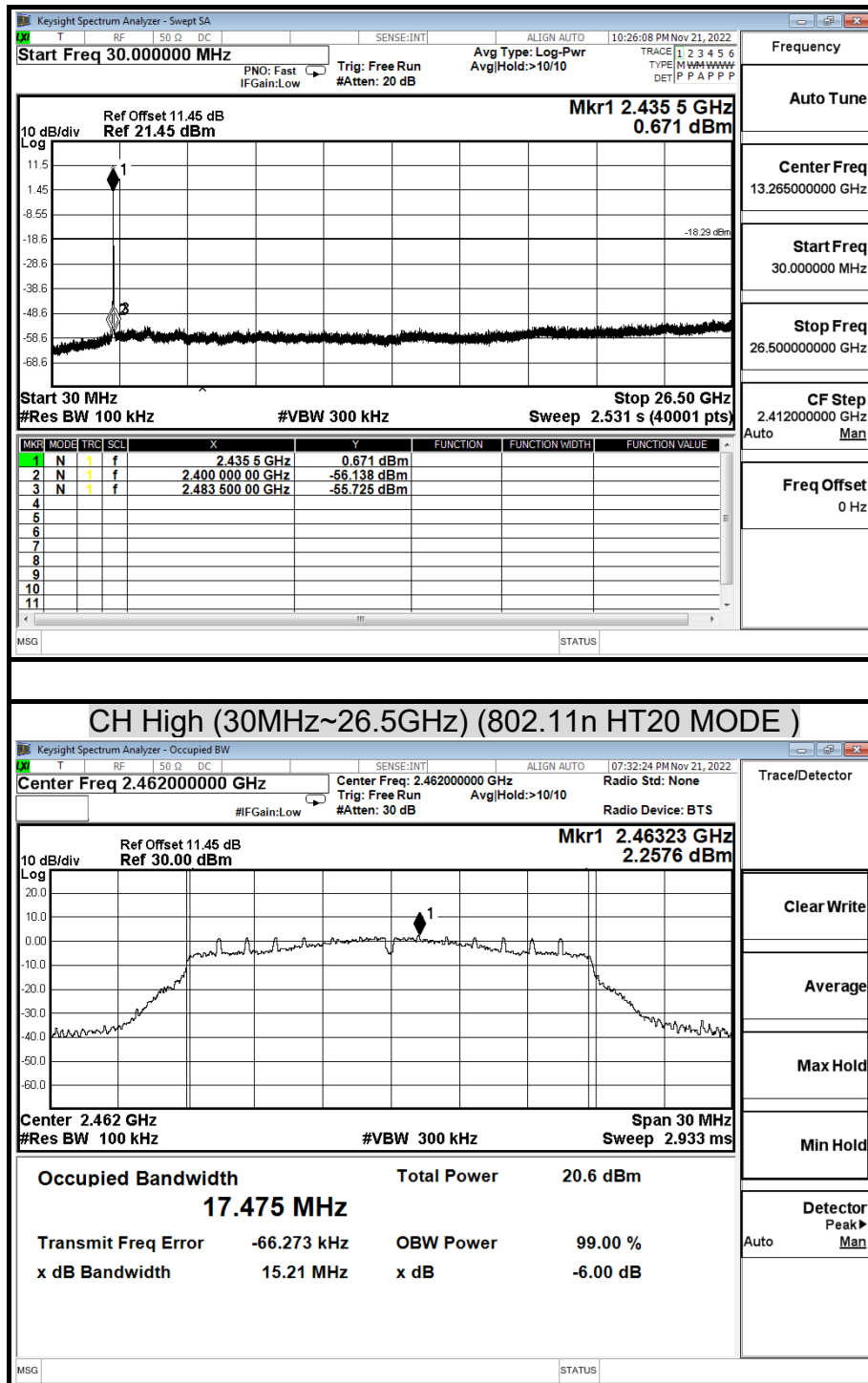


## OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

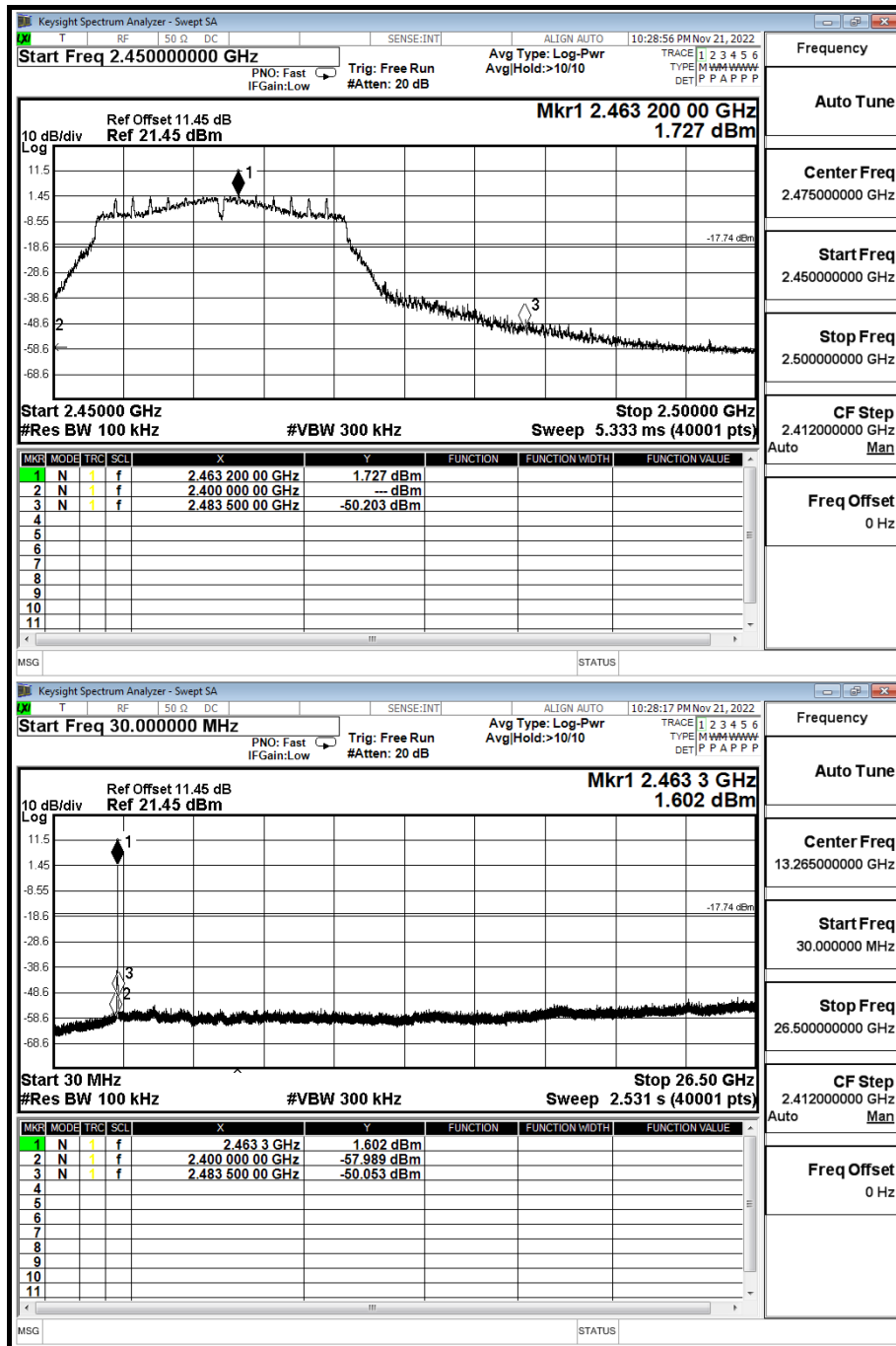
( 802.11n HT20 MODE )







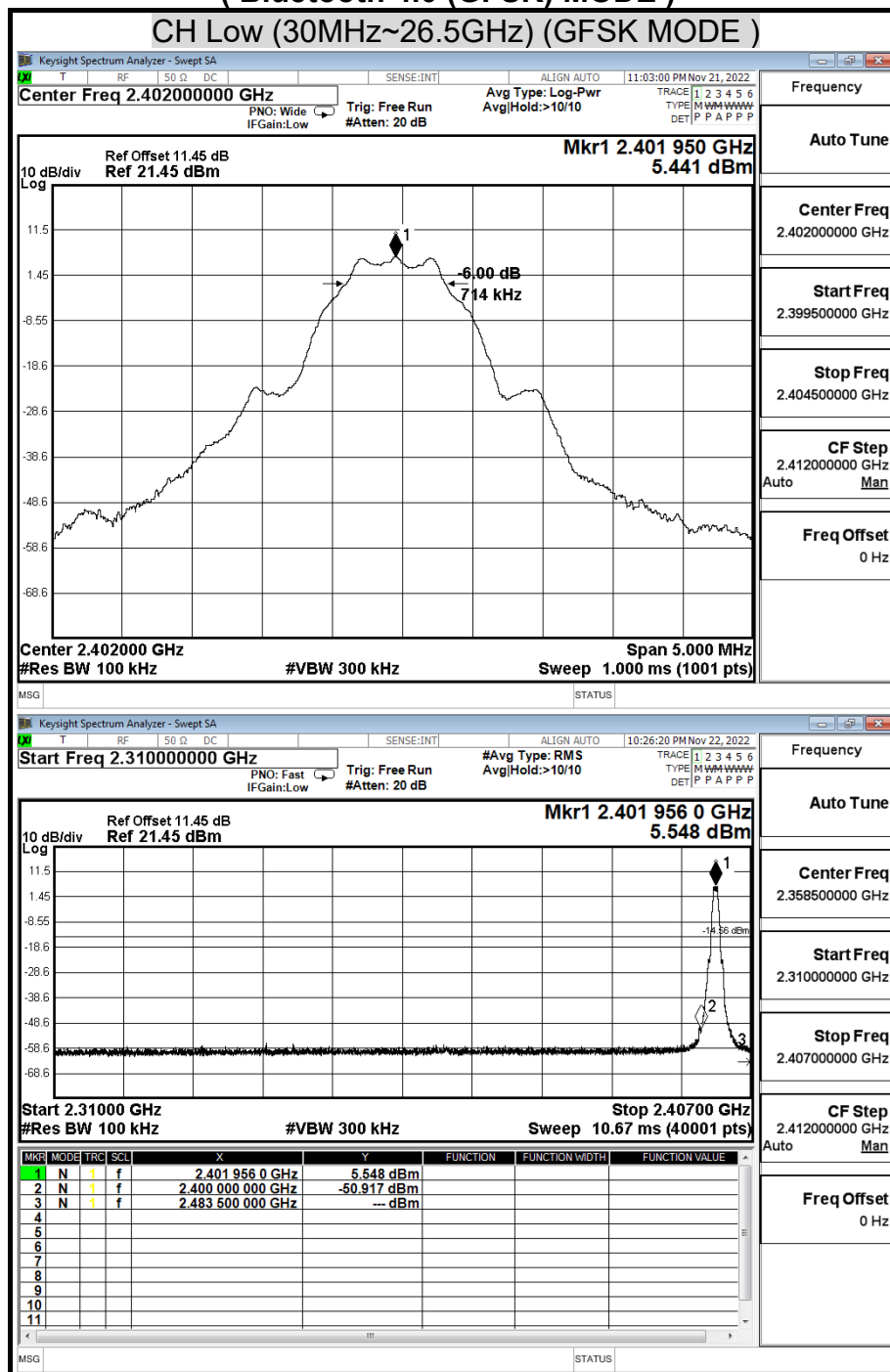


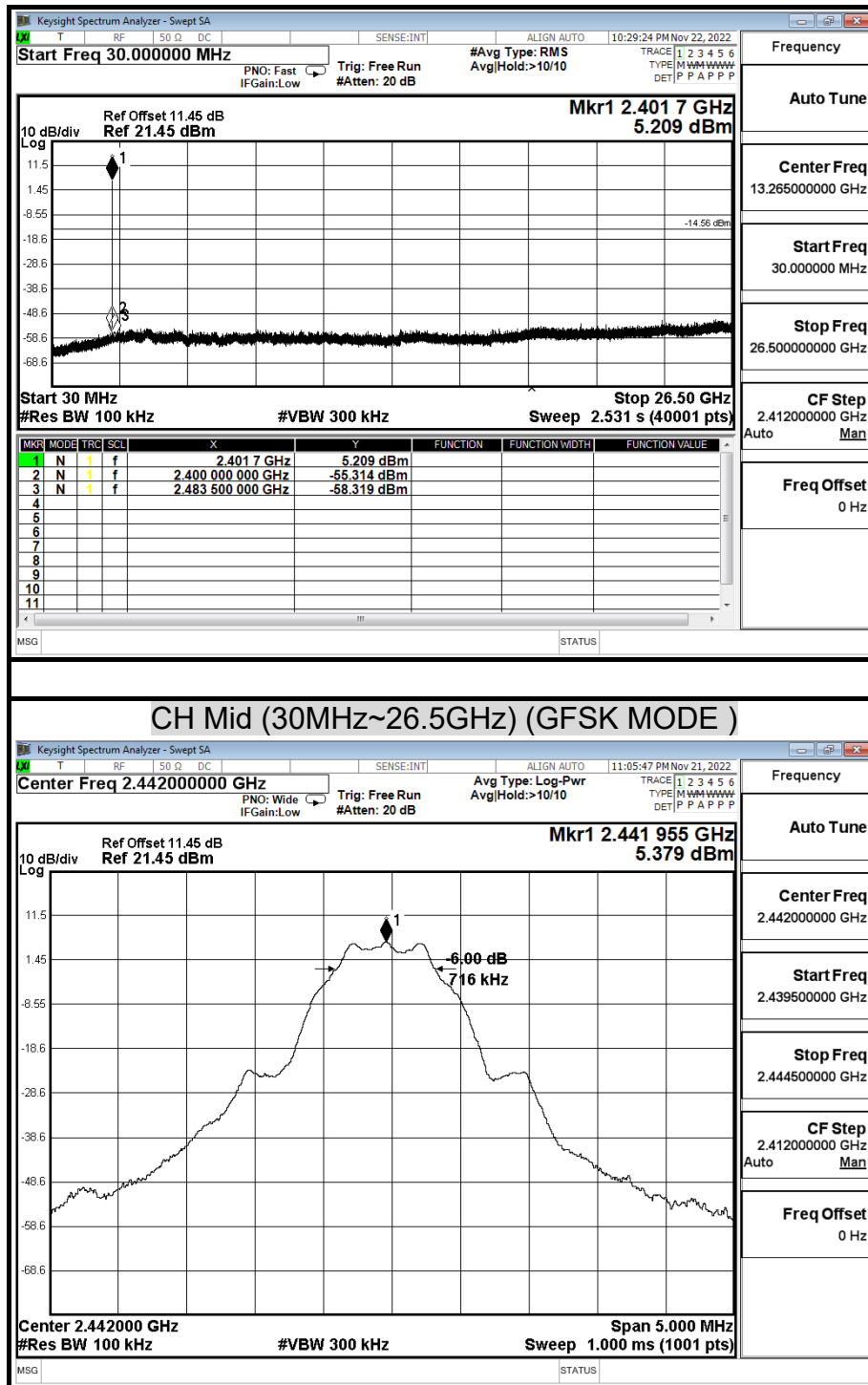


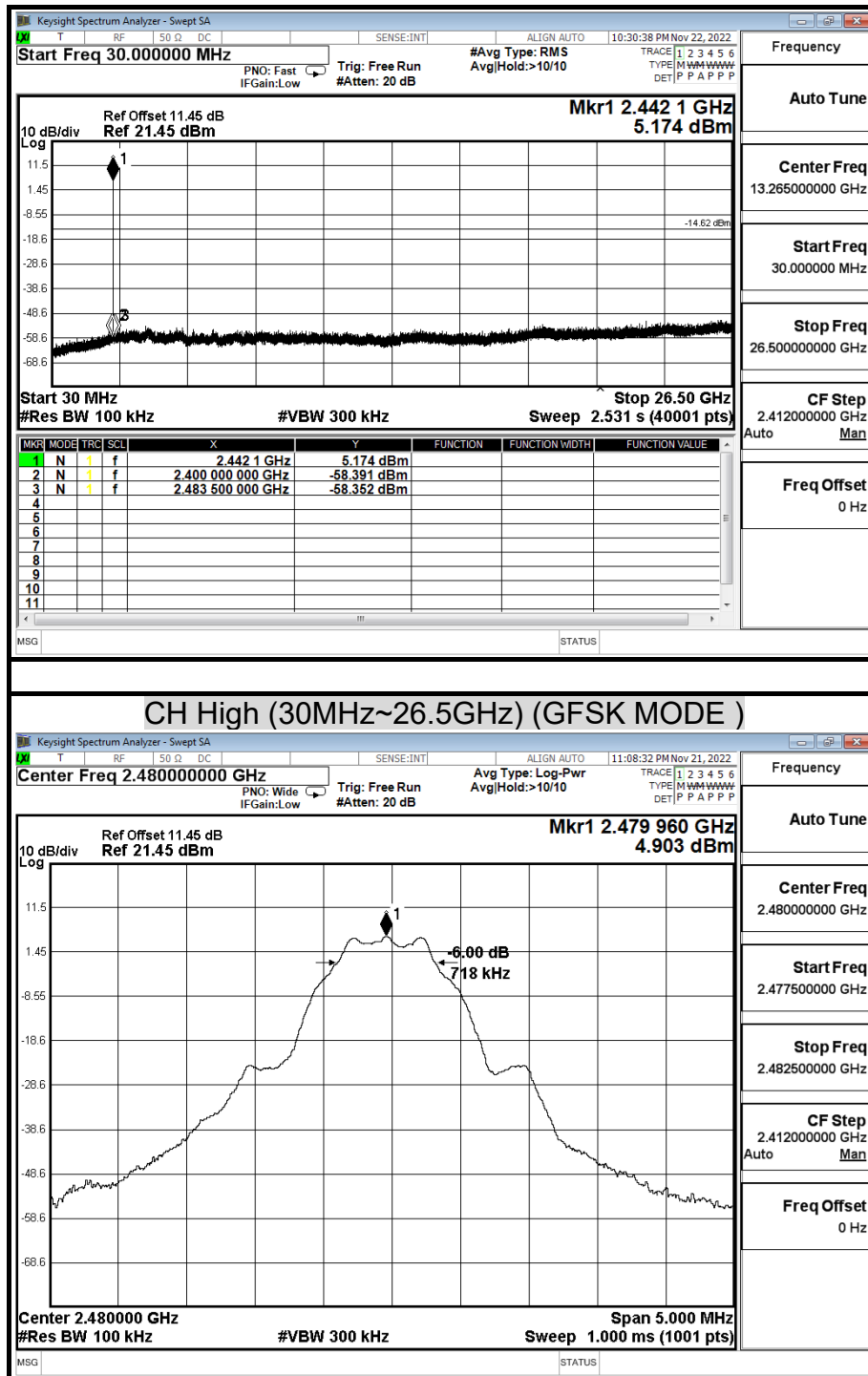
## OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

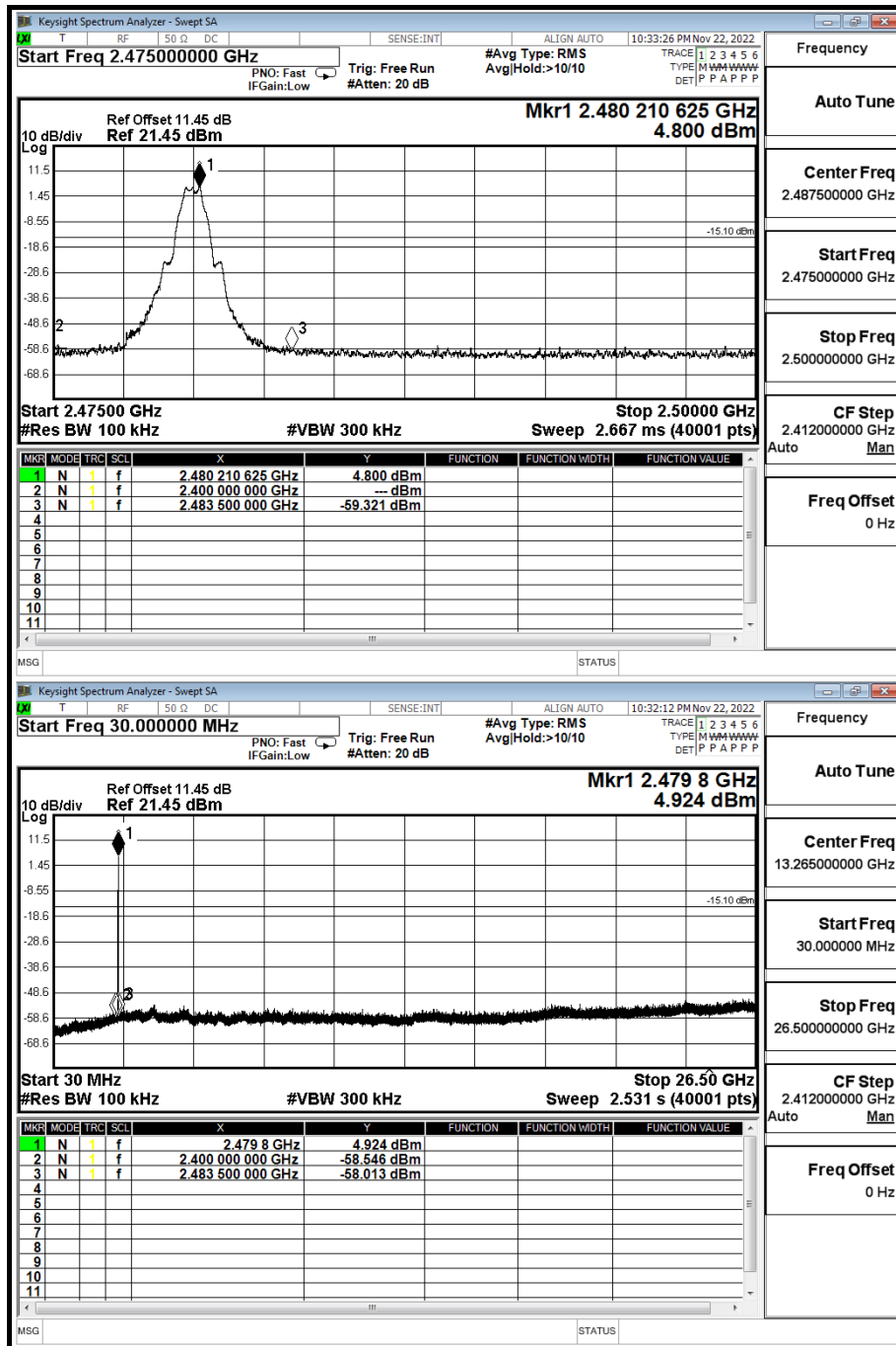
Model Name	ACVA2	Test By	Peter Chu
Temp & Humidity	22.0°C, 51%	Test Date	2022/11/21

### ( Bluetooth 4.0 (GFSK) MODE )





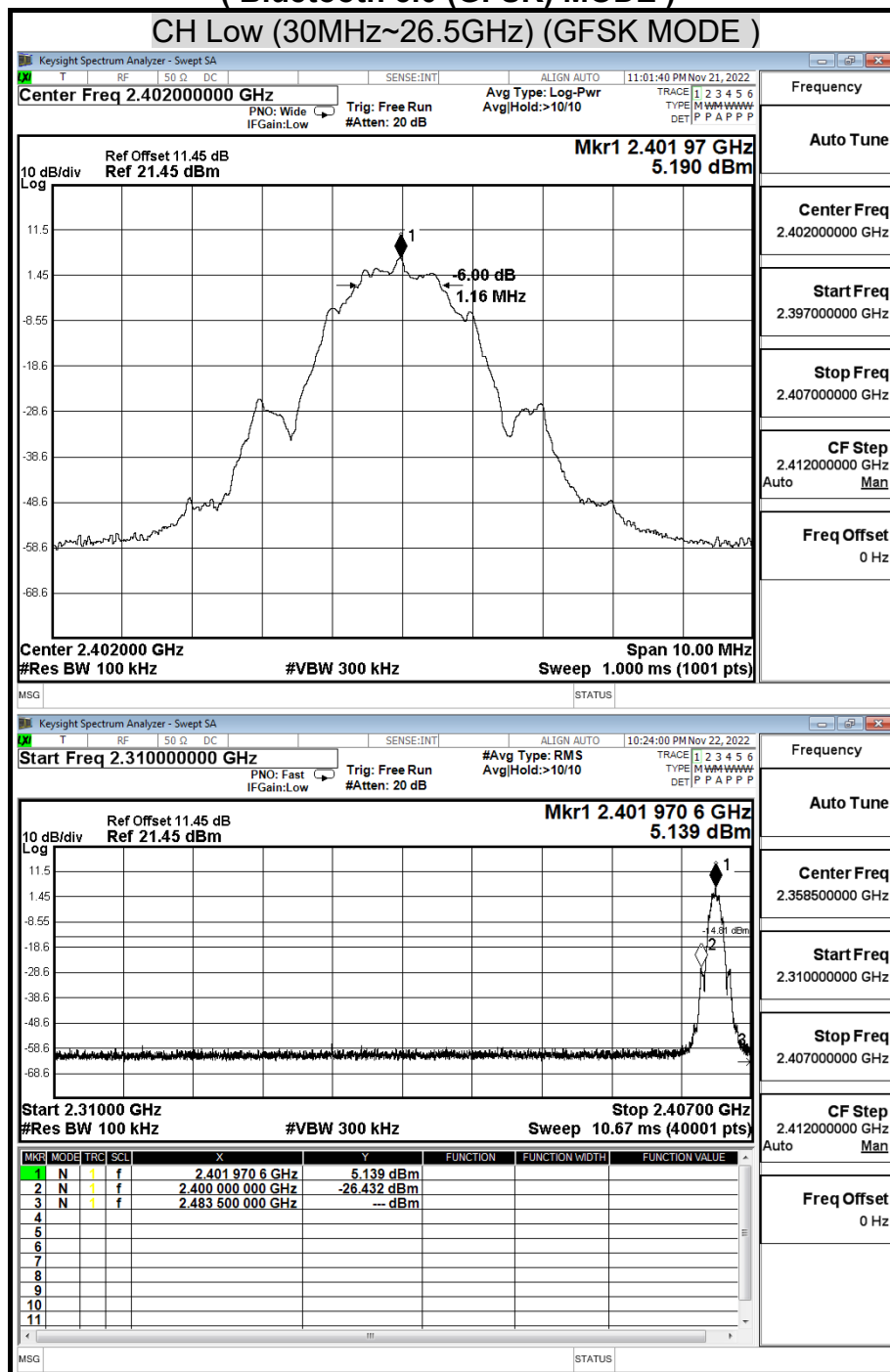


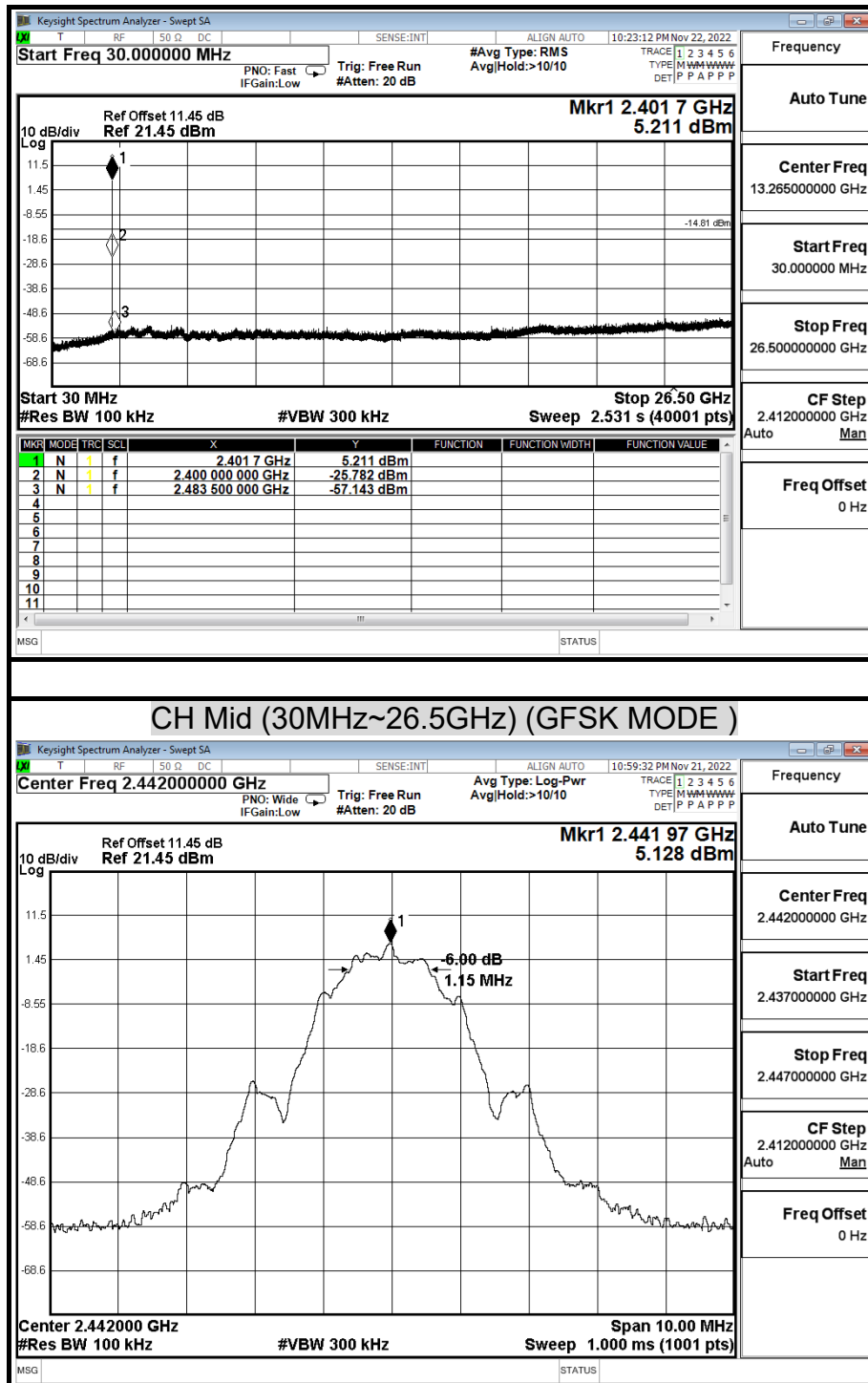


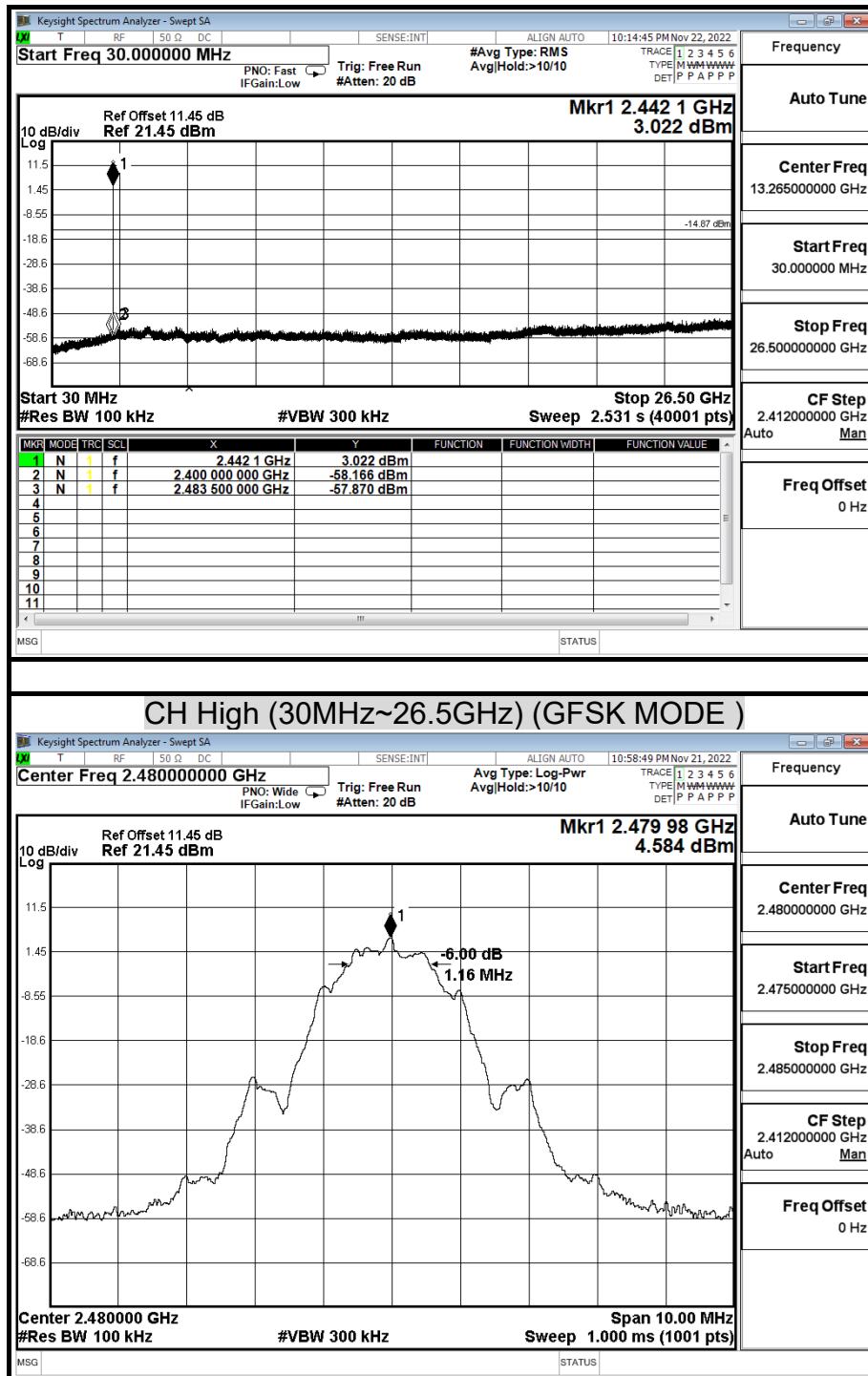
## OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

Model Name	ACVA2	Test By	Peter Chu
Temp & Humidity	22.0°C, 51%	Test Date	2022/11/21

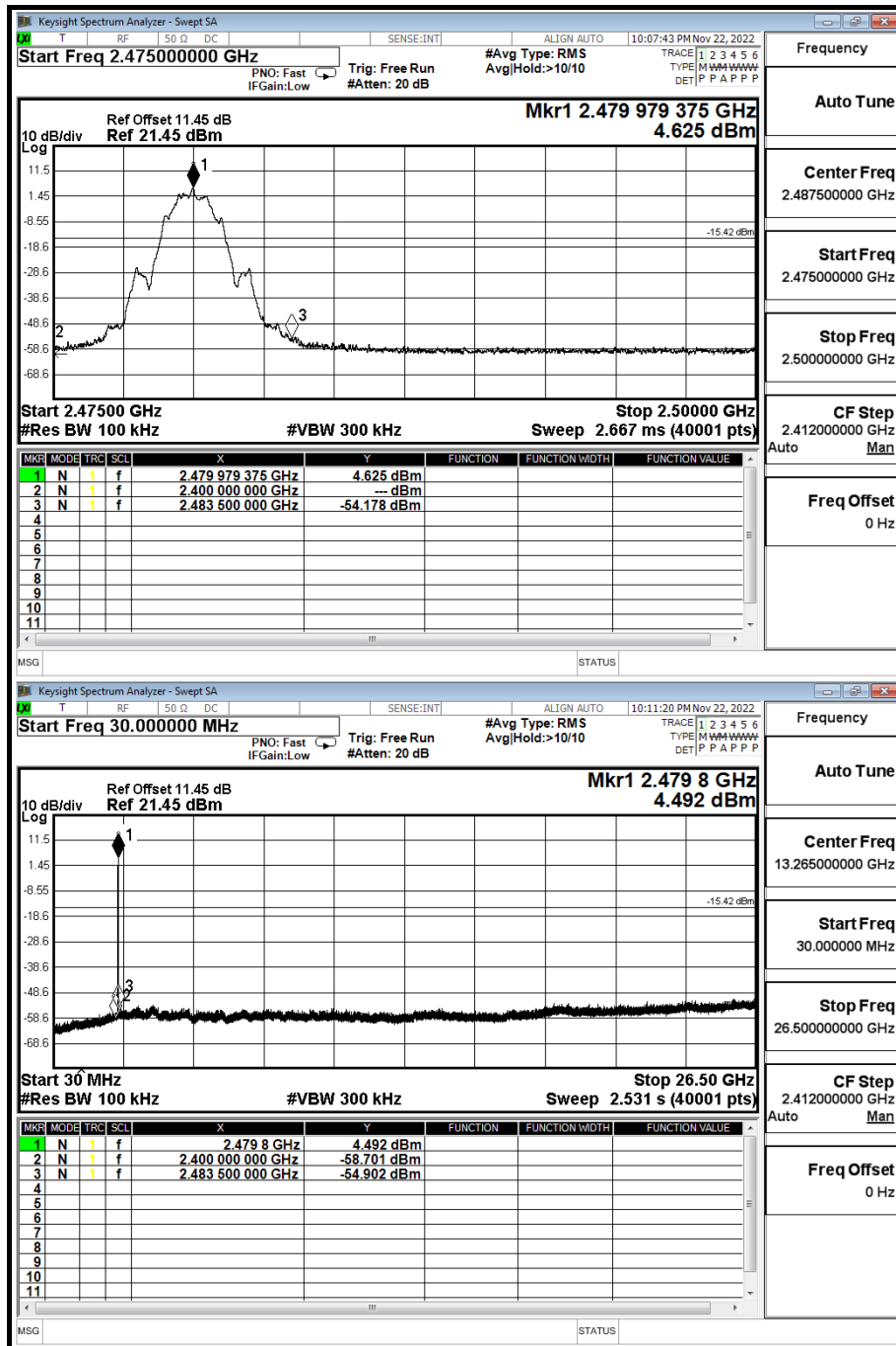
### ( Bluetooth 5.0 (GFSK) MODE )











## 8.6 RADIATED EMISSIONS

### 8.6.1 TRANSMITTER RADIATED SUPURIOUS EMSSIONS

#### LIMITS

§ 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

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§ 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz, However, operation within these frequency bands is permitted under other sections of this Part, e-g, Sections 15.231 and 15.241.

§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

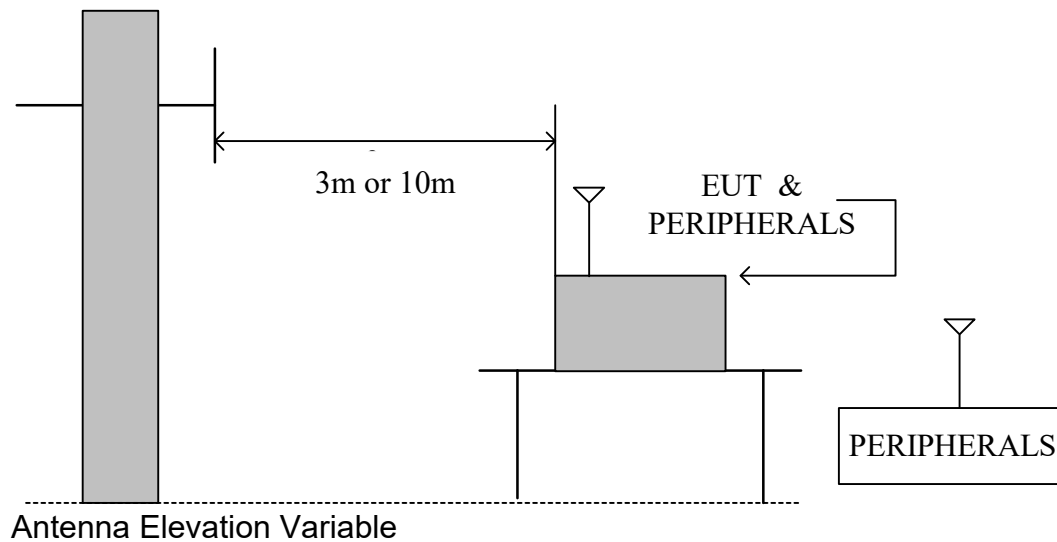
## TEST EQUIPMENTS

The following test equipments are utilized in making the measurements contained in this report.

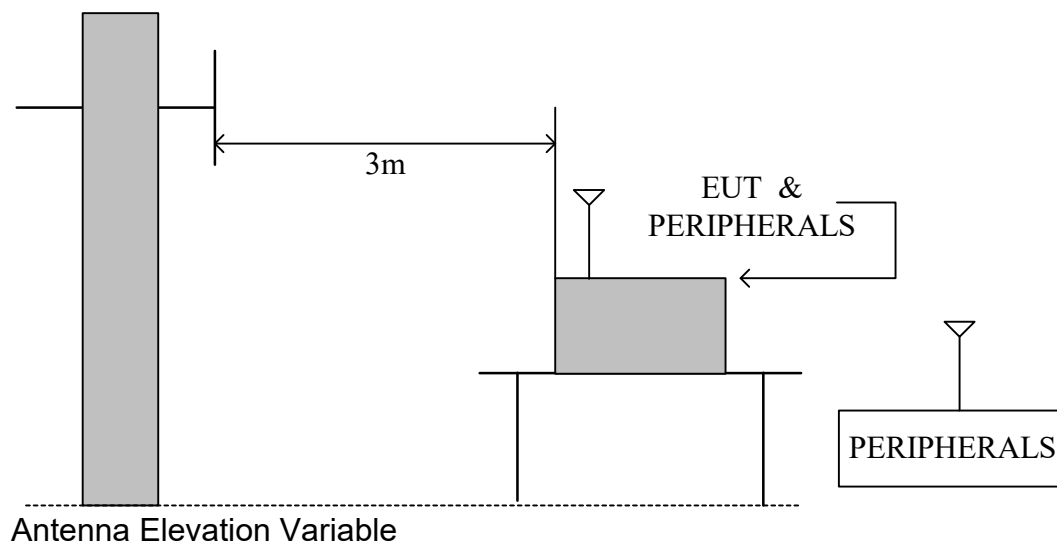
Chamber Room #1166					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Active Loop Antenna	ETS-LINDREN	6502	8905-2356	08/29/2022	08/28/2023
Attenuator	MCL	BW-S15W5	0535	01/28/2022	01/27/2023
Band Reject Filter	MICRO-TRONICS	HPM13525	006	01/28/2022	01/27/2023
Band Reject Filter	MICRO-TRONICS	HP50107-01	001	01/28/2022	01/27/2023
Bilog Antenna With 6dB Attenuator	SUNOL SCIENCES & EMCI	JB1 & N-6-06	A021306 & AT-N0682	10/11/2022	10/10/2023
Cable	EMCI	EM102-KMKM	CB1166-01	06/20/2022	06/19/2023
Double Ridged Guide Horn Antenna	ETS-LINDGREN	3116	00078900	03/18/2022	03/17/2023
EMI Test Receiver	R&S	ESCI 7	100856	06/21/2022	06/20/2023
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	08/11/2022	08/10/2023
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-788(98006)	04/19/2022	04/18/2023
Notch Filter	MICRO-TRONICS	BRM50702-01	018	01/28/2022	01/27/2023
Pre-Amplifier	EMCI	EMC012645	980098	01/28/2022	01/27/2023
Pre-Amplifier	Com-Power	PAM-840A	461378	06/28/2022	06/27/2023
Active Loop Antenna	ETS-LINDREN	6502	8905-2356	08/29/2022	08/28/2023
Attenuator	MCL	BW-S15W5	0535	01/28/2022	01/27/2023
Software	Excel(ccs-o6-2020 v1.1) , e3(v6.101222)				

## **TEST SETUP**

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



Report No.: TMTN2211001505NR

## **TEST PROCEDURE**

- a. The EUT was placed on the top of a rotating table 0.8/1.5 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. While measuring the radiated emission below 1GHz, the EUT was set 3/10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. The tests were performed in accordance with 558074 D01 DTS Meas Guidance v03r03.

### **NOTE :**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
4. No emission is found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)

## **TEST RESULTS**

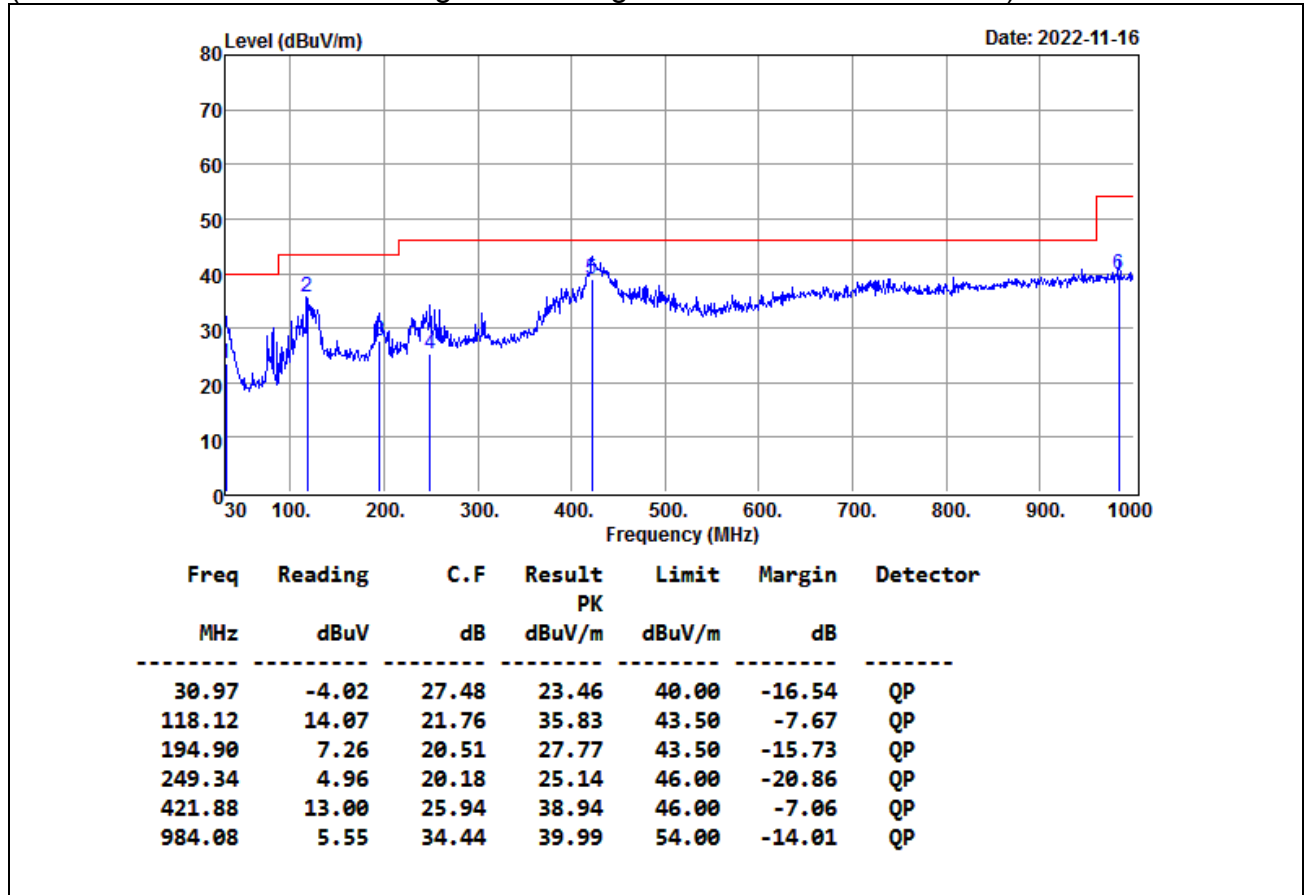
No non-compliance noted.

## 8.6.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	TX	TEMP& Humidity	22.3°C/52%

### Horizontal

(The chart below shows the highest readings taken from the final data.)



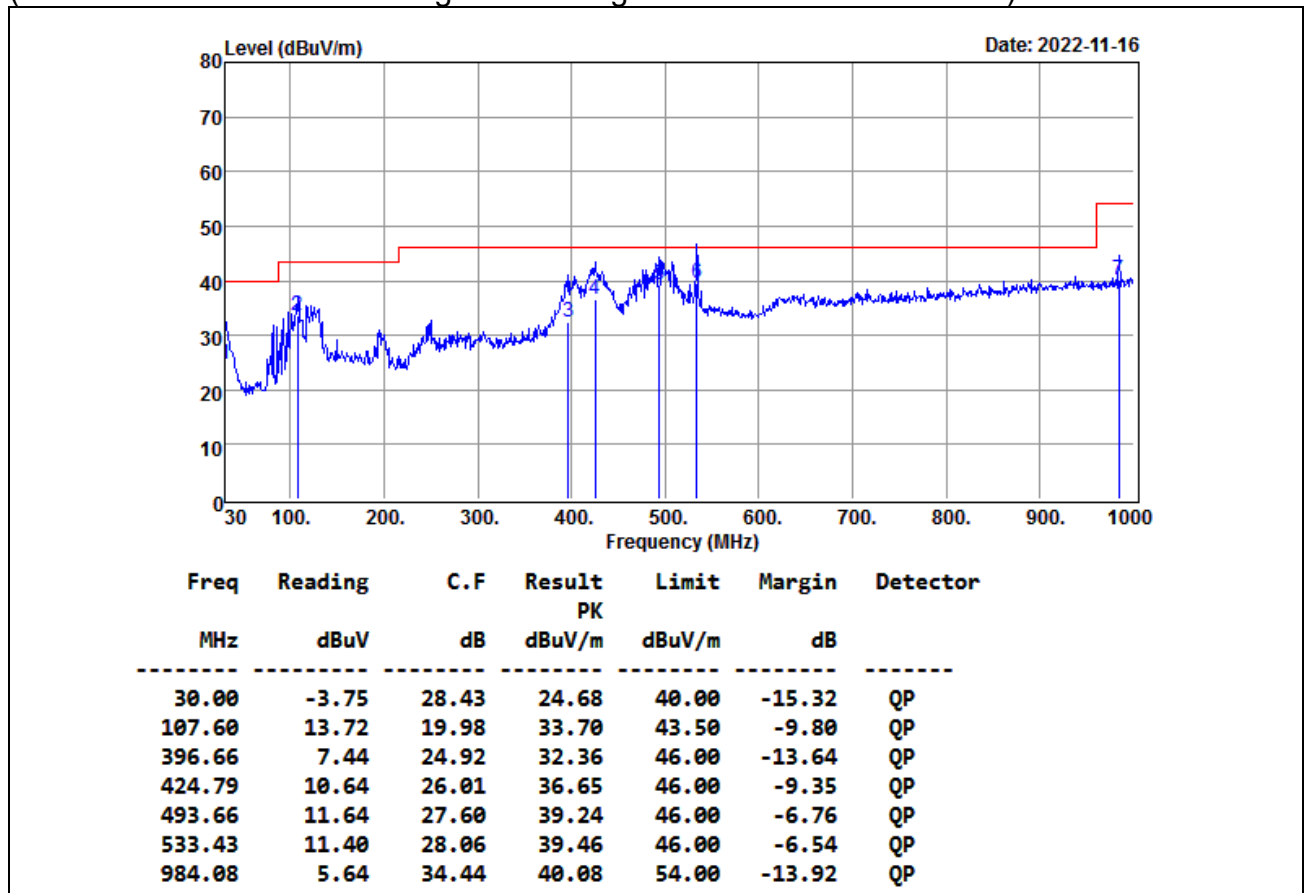
### Remark:

- No emission found between lowest internal used/generated frequency in 9kHz~30MHz.
- Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
- Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>10dB from the applicable limit) and considered that's already beyond the background noise floor.
- Result (Emission at 3m Level) = Meter Reading + C.F  
C.F = Antenna Factor +Cable Loss  
Margin= Result -Limits
- That the limit for signals below 1GHz is a QP limit and peak readings are below the QP limit.
- The fundamental signal is not shown in the test data because measurements at fundamental frequency are shown separately and were ignored during the 30 – 1000 MHz scan.

Product Name	Audio Device	Test Date	2022/11/21
Model	ACVA2	Test By	Peter Chu
Test Mode	TX	TEMP& Humidity	25.4°C/63%

## Vertical

(The chart below shows the highest readings taken from the final data.)



## Remark:

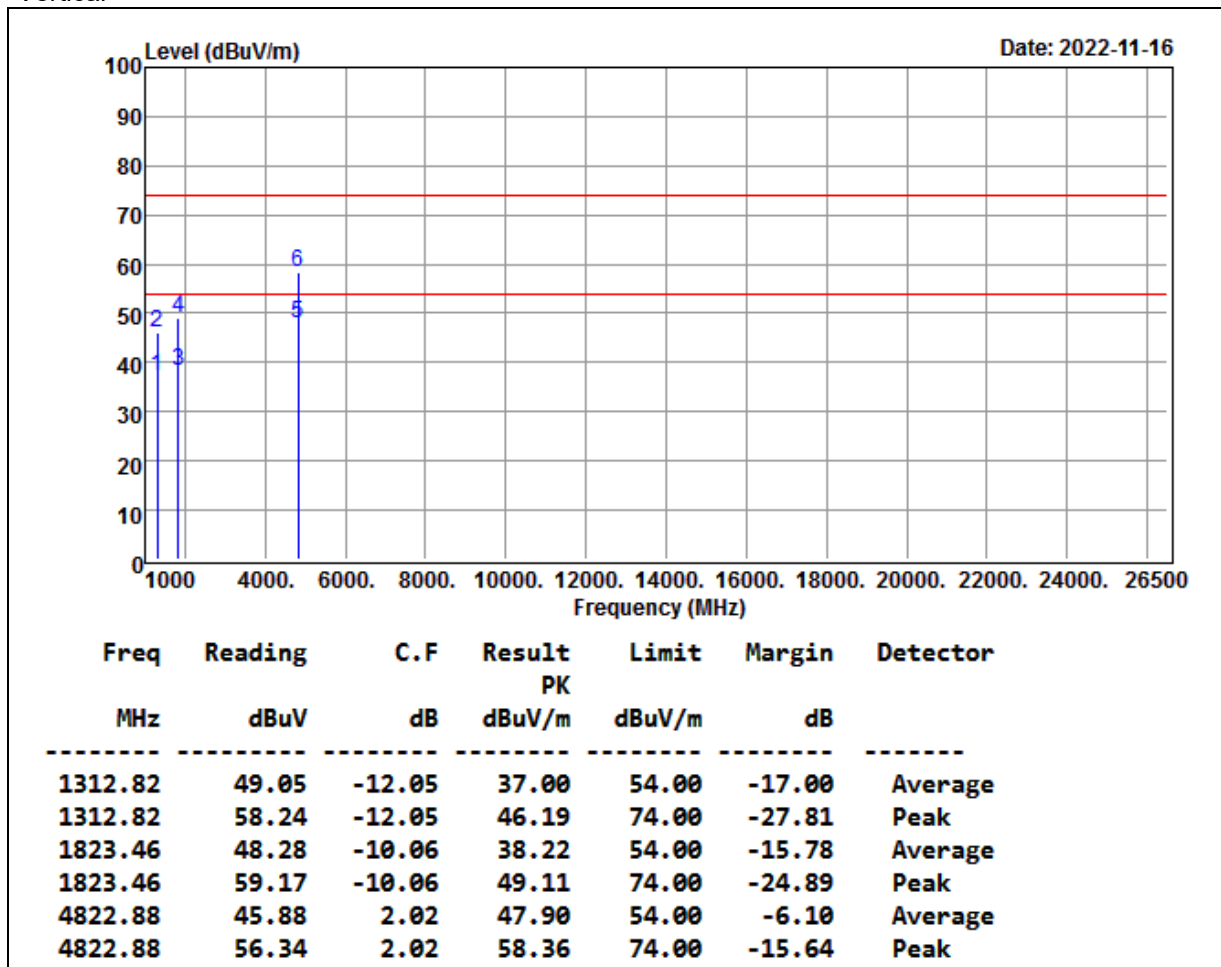
1. No emission found between lowest internal used/generated frequency in 9kHz~30MHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>10dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result (Emission at 3m Level) = Meter Reading + C.F  
C.F = Antenna Factor +Cable Loss  
Margin= Result -Limits
6. That the limit for signals below 1GHz is a QP limit and peak readings are below the QP limit.
7. The fundamental signal is not shown in the test data because measurements at fundamental frequency are shown separately and were ignored during the 30 – 1000 MHz scan.



## 8.6.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHz

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11b TX (CH Low)	TEMP& Humidity	22.3°C, 52%

Vertical

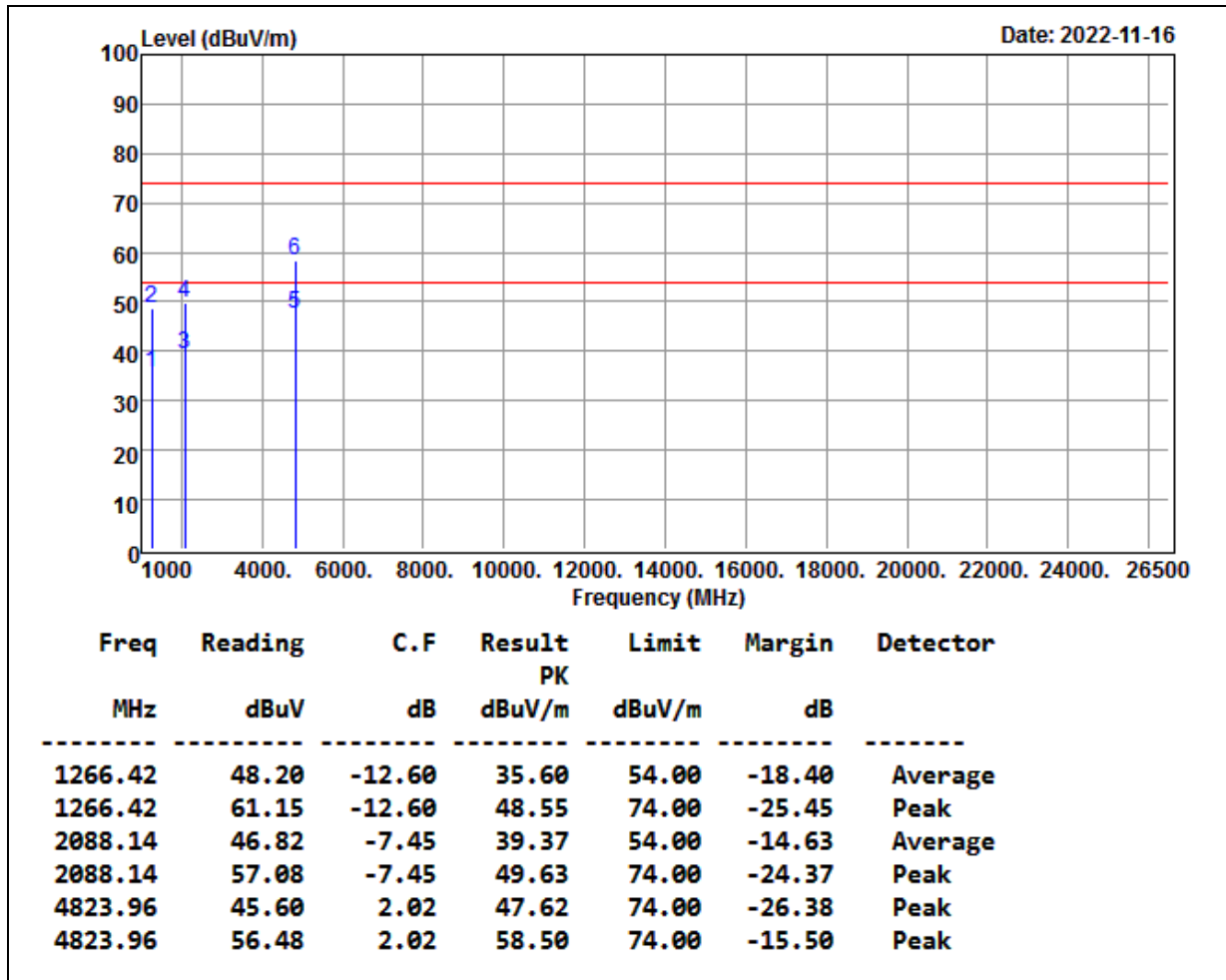


### Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

<b>Product Name</b>	Audio Device	<b>Test Date</b>	2022/11/16
<b>Model</b>	ACVA2	<b>Test By</b>	Peter Chu
<b>Test Mode</b>	IEEE 802.11b TX (CH Low)	<b>TEMP&amp; Humidity</b>	22.3°C, 52%

Horizontal

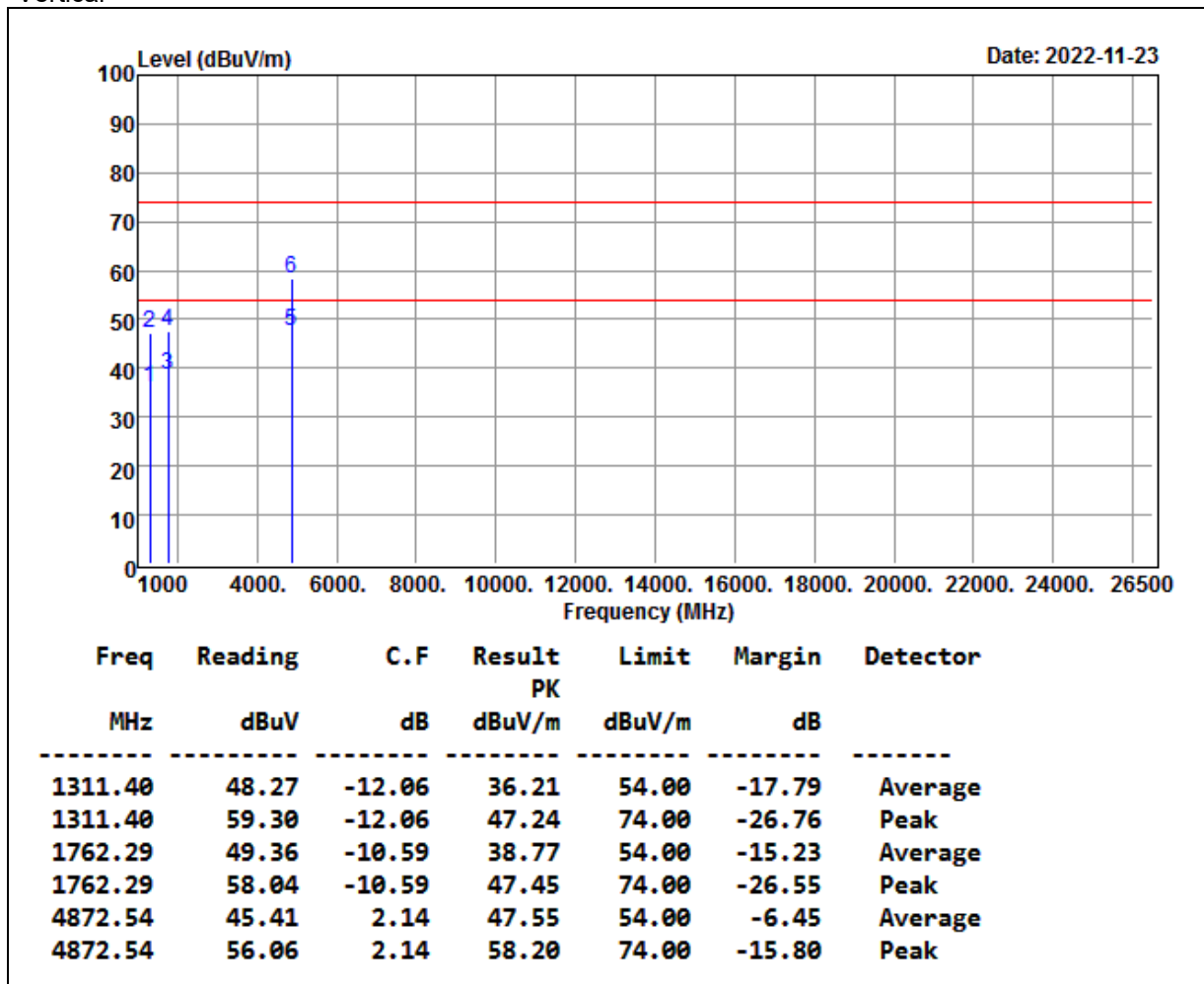


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11b TX (CH Middle)	TEMP& Humidity	22.3°C, 52%

Vertical

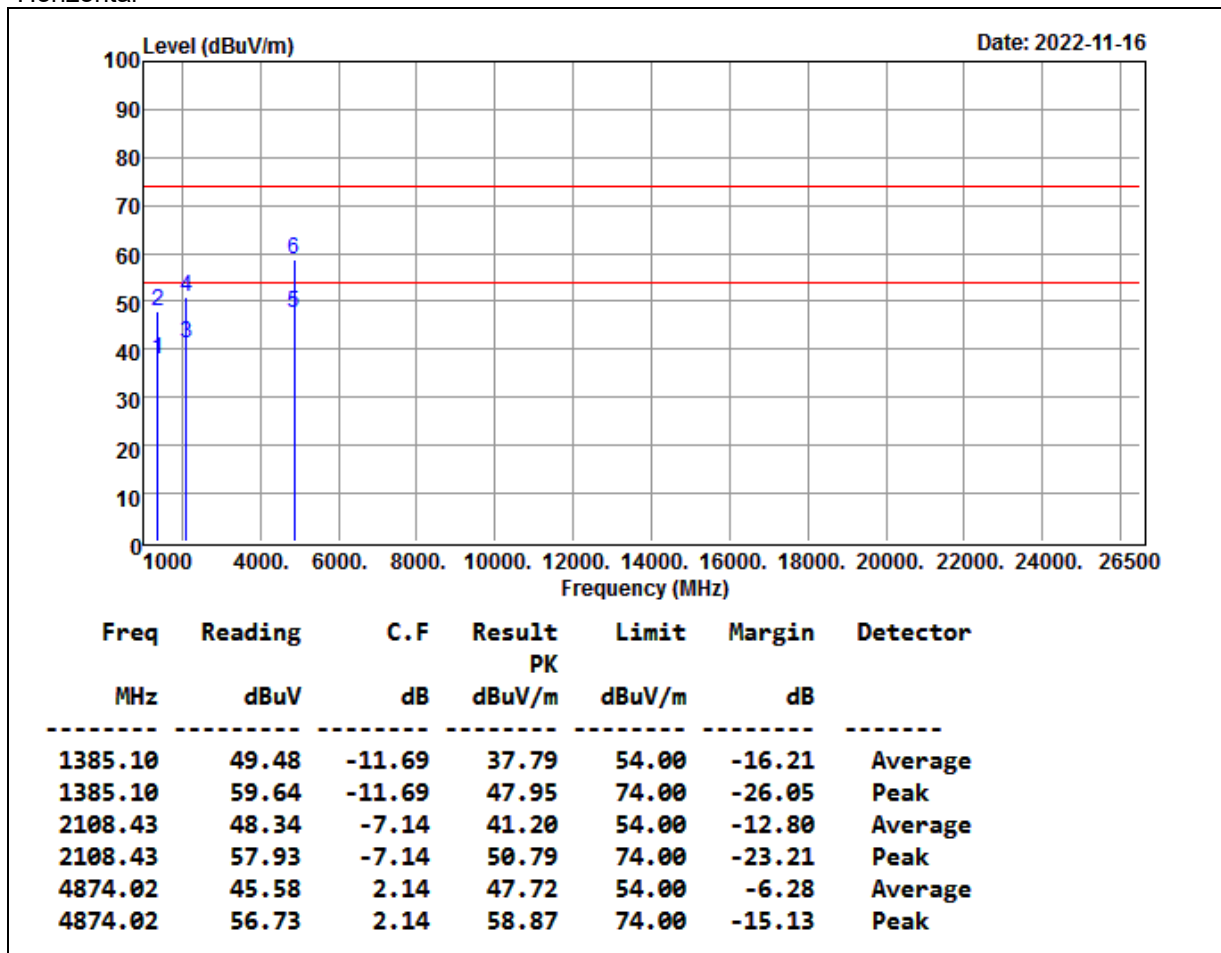


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11b TX (CH Middle)	TEMP& Humidity	22.3°C, 52%

Horizontal

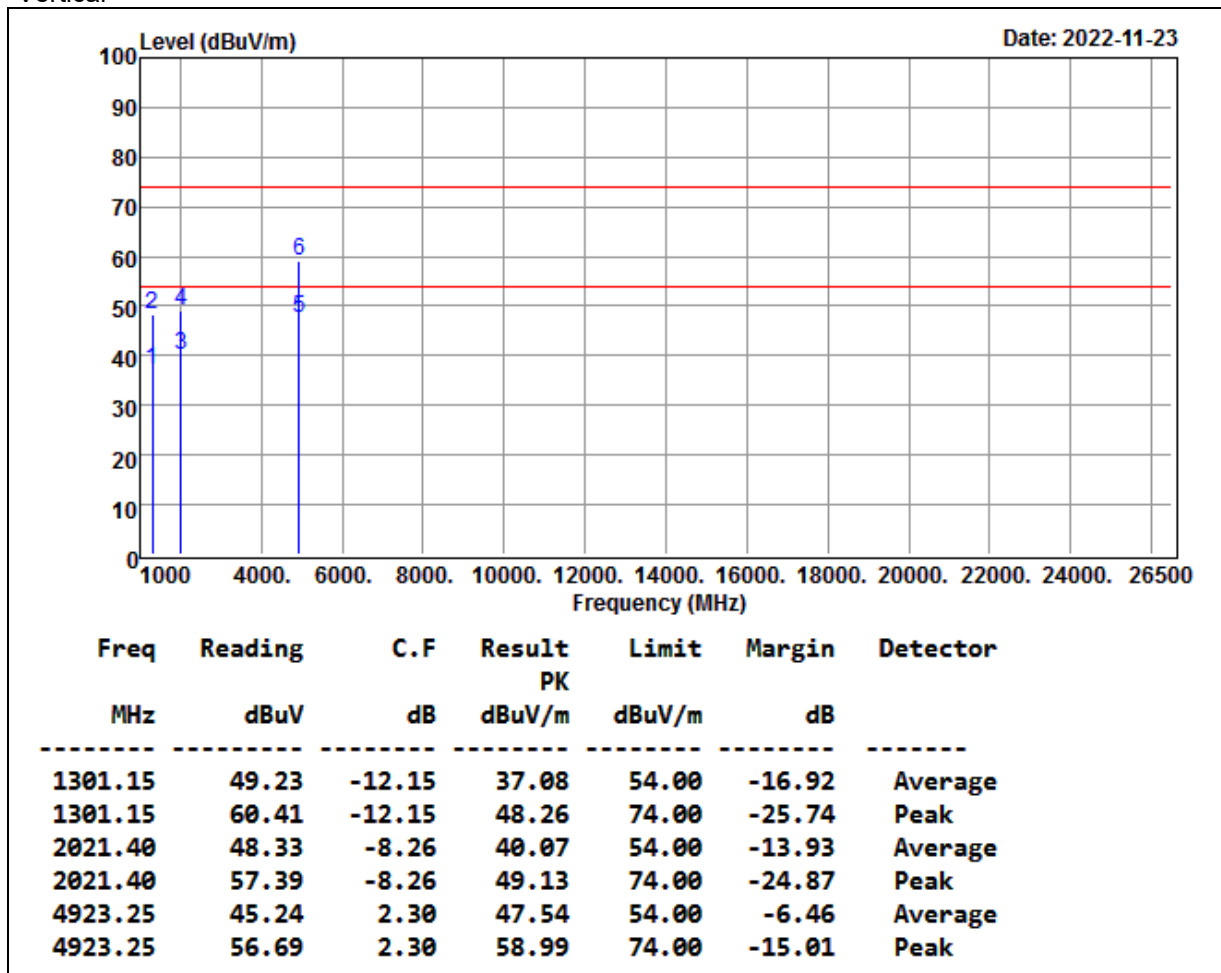


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11b TX (CH High)	TEMP& Humidity	22.3°C, 52%

Vertical

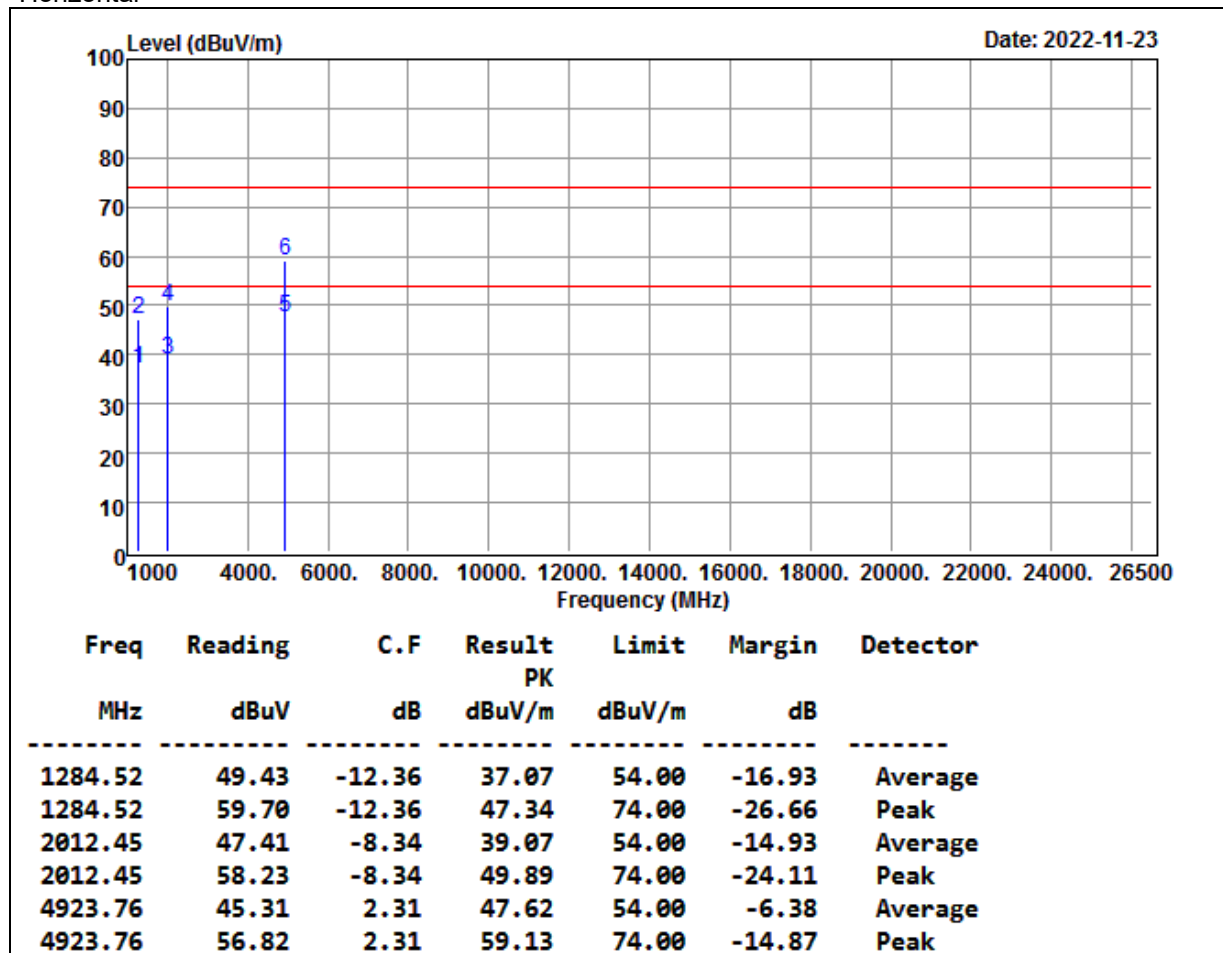


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11b TX (CH High)	TEMP& Humidity	22.3°C, 52%

Horizontal

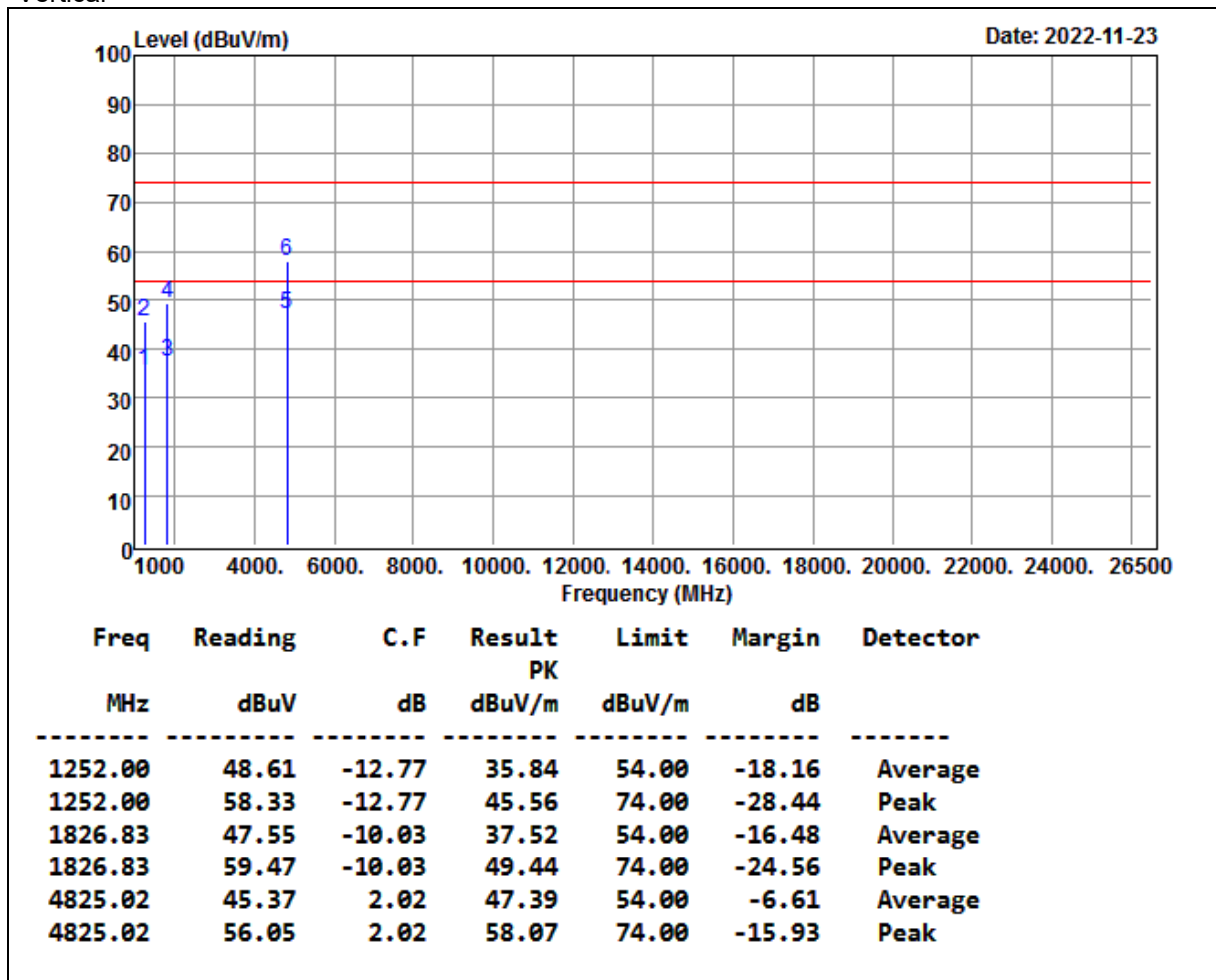


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11g TX (CH Low)	TEMP& Humidity	22.3°C, 52%

Vertical

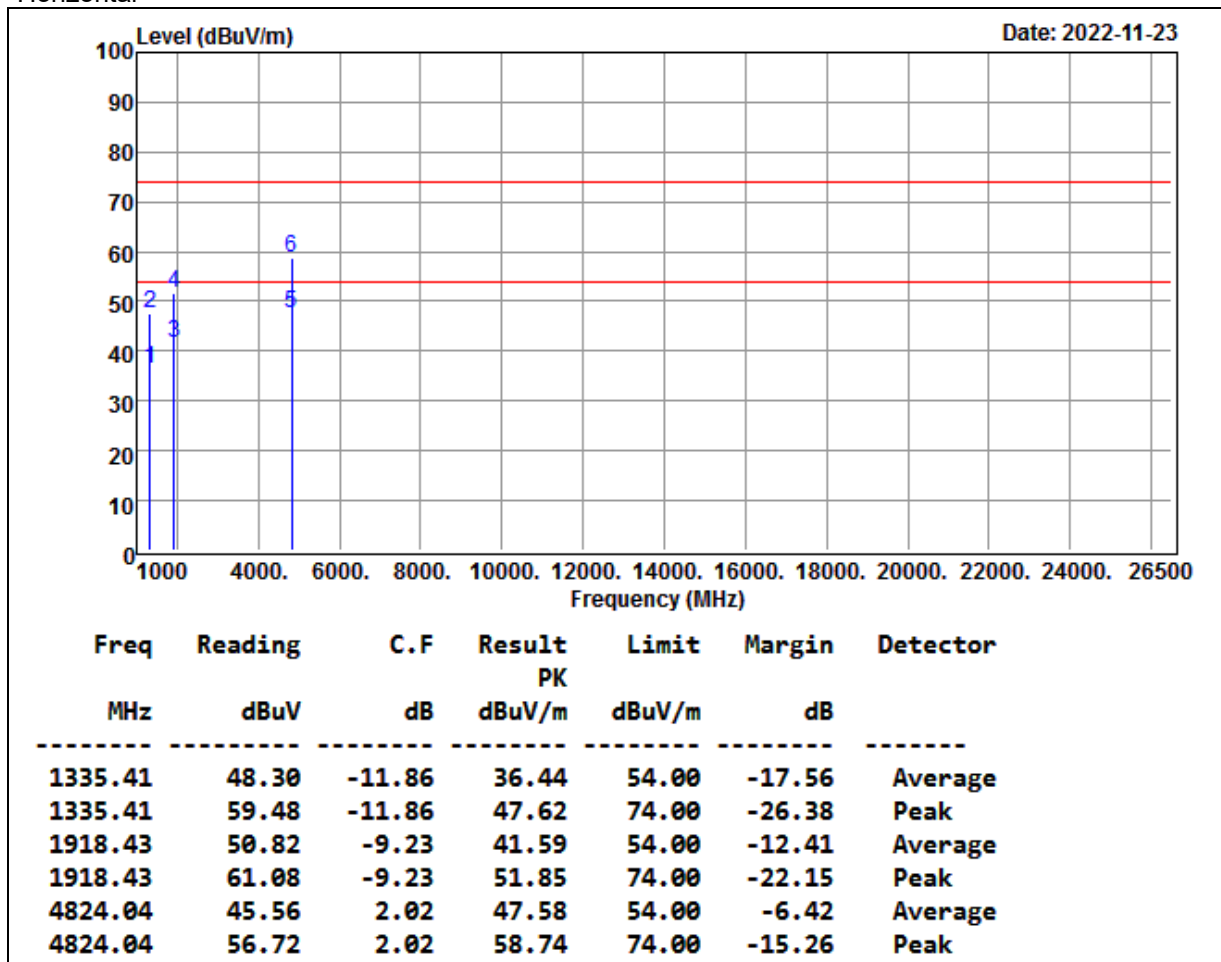


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11g TX (CH Low)	TEMP& Humidity	22.3°C, 52%

Horizontal



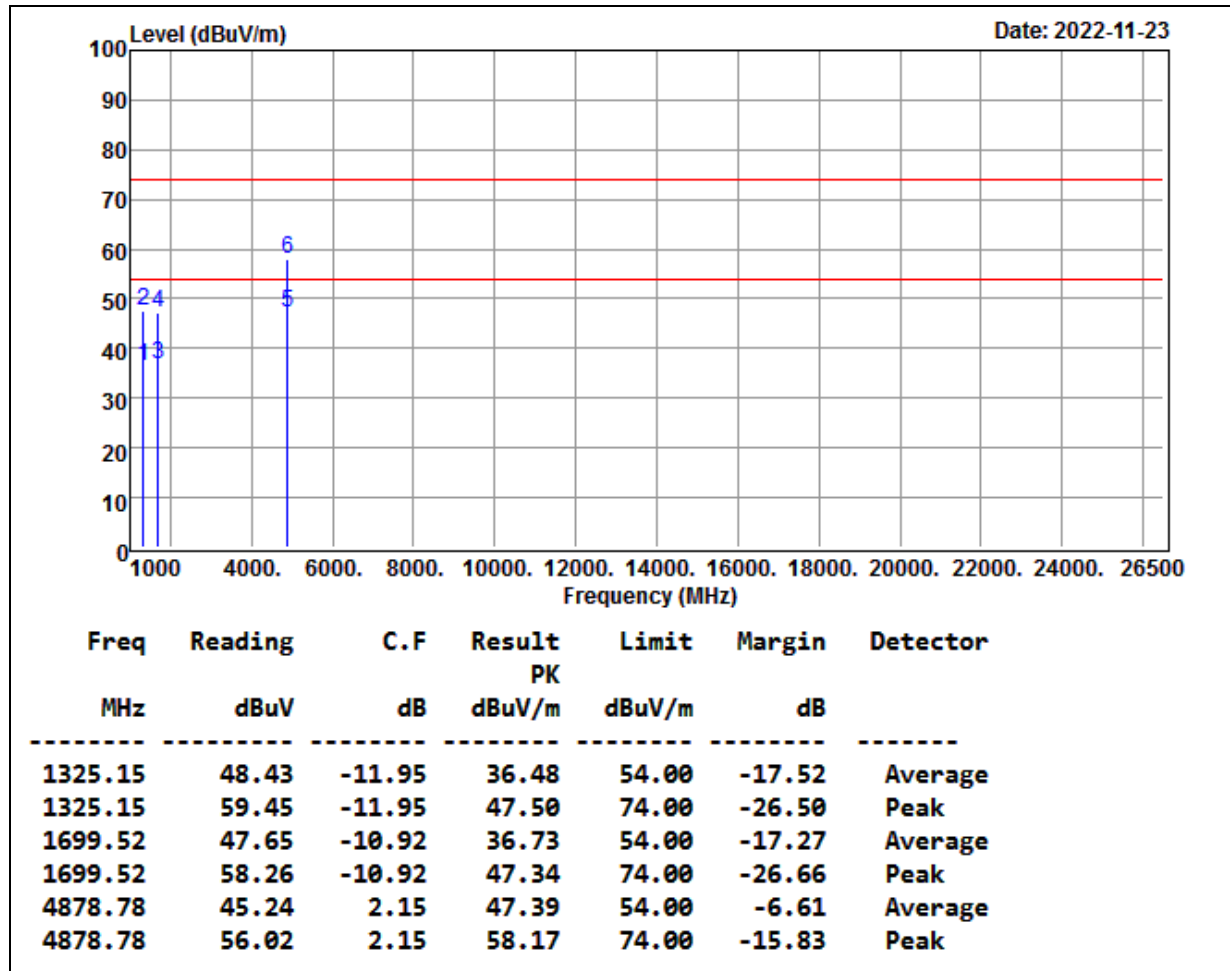
## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation



Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11g TX (CH Middle)	TEMP& Humidity	22.3°C, 52%

Vertical

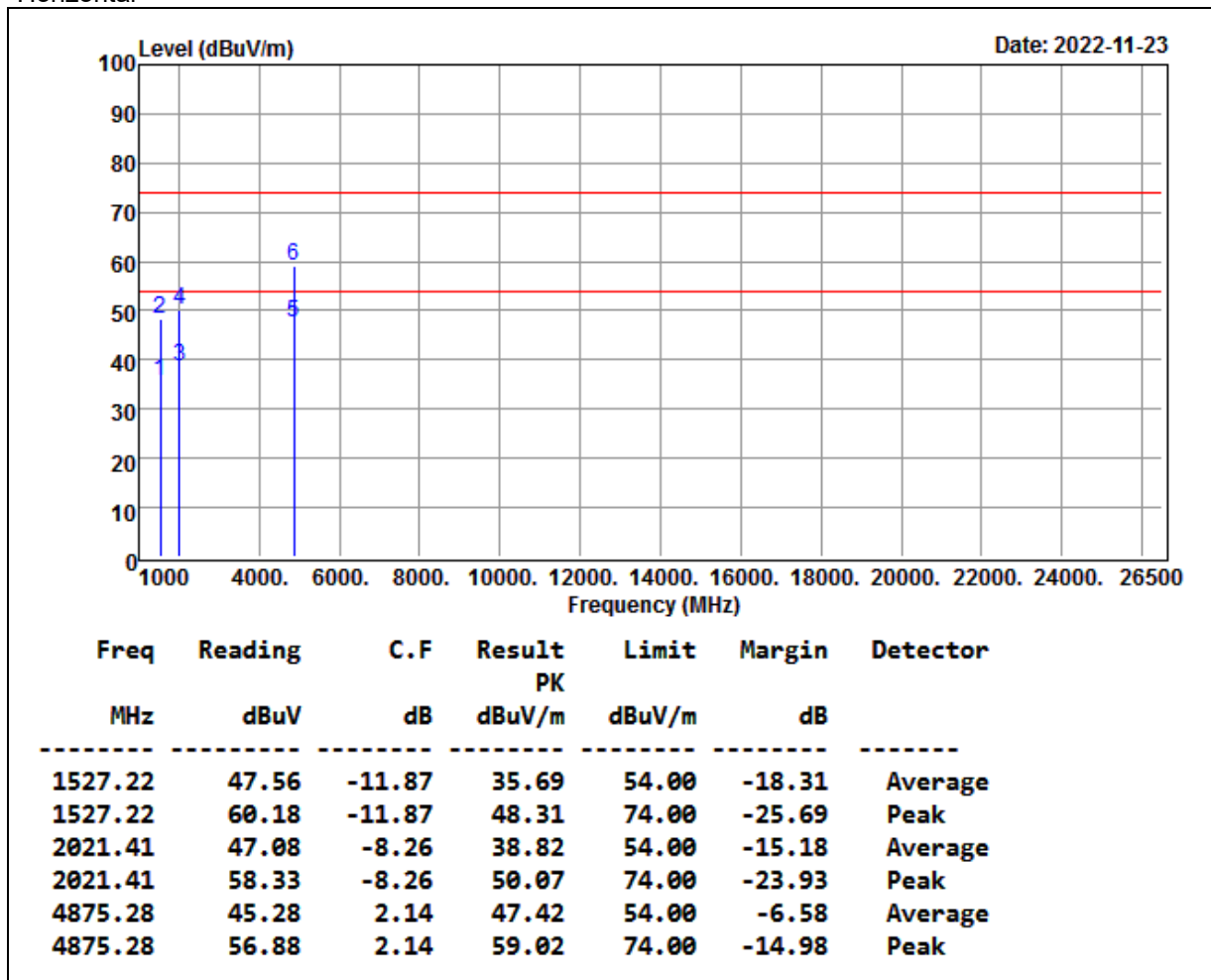


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11g TX (CH Middle)	TEMP& Humidity	22.3°C, 52%

Horizontal

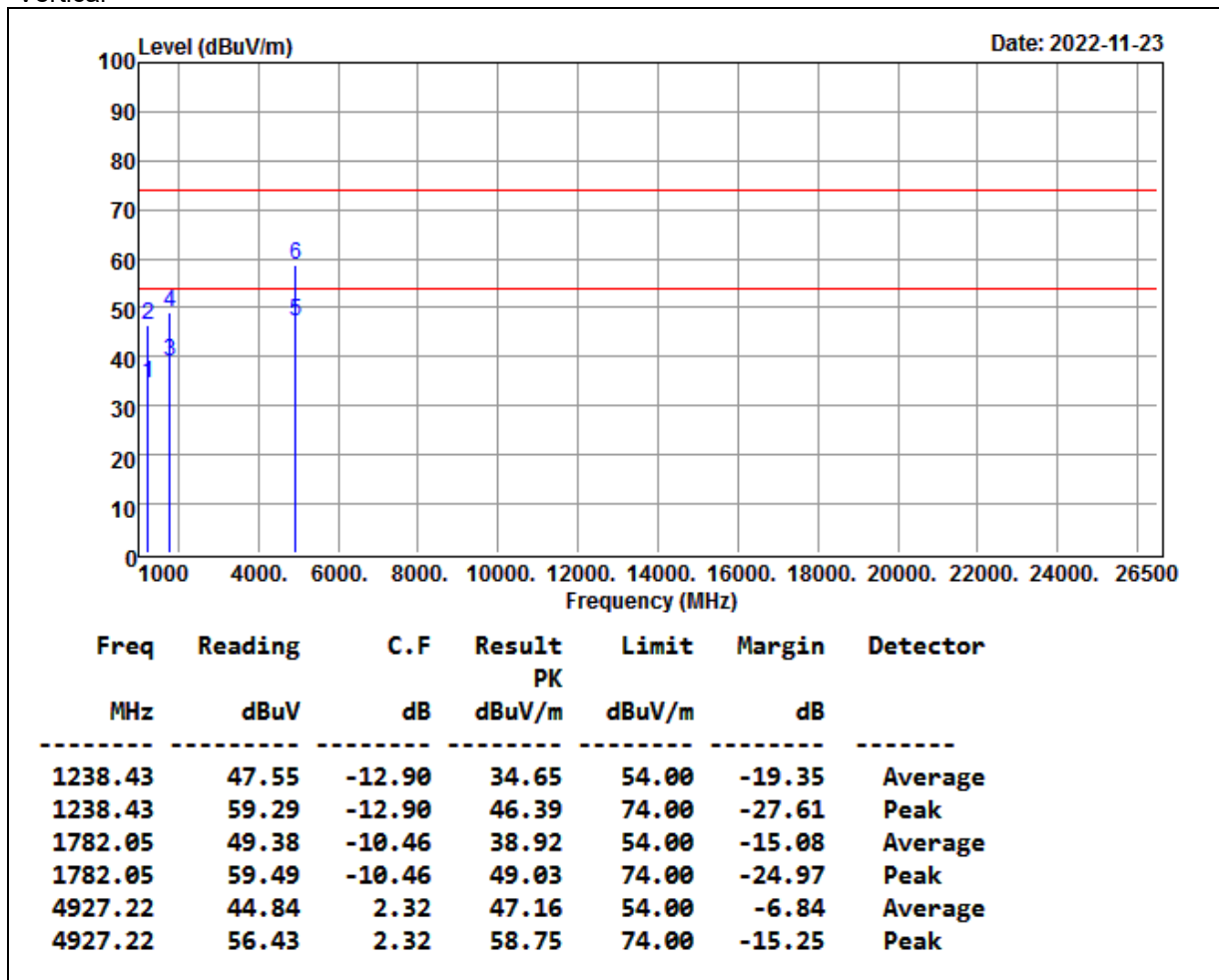


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11g TX (CH High)	TEMP& Humidity	22.3°C, 52%

Vertical

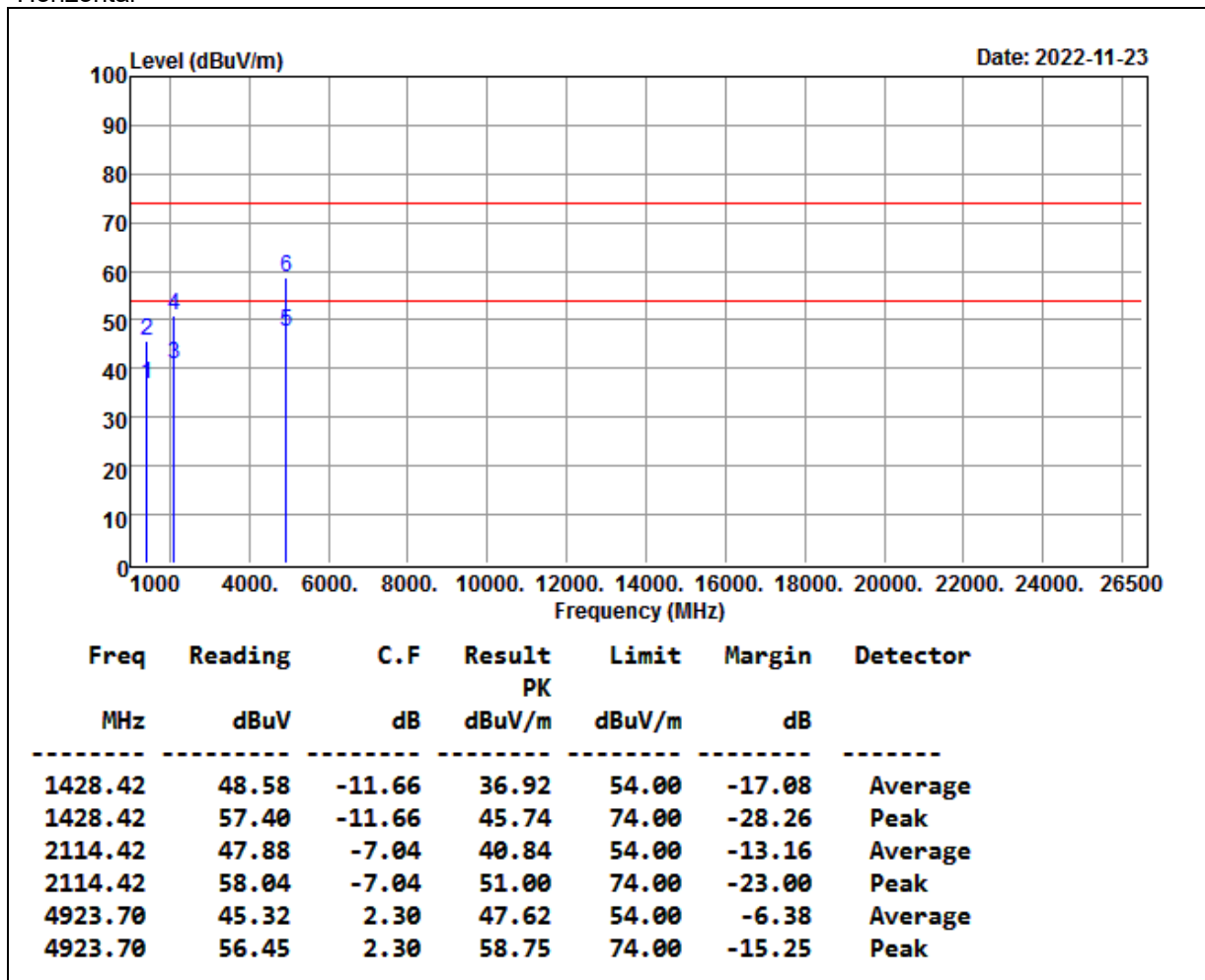


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11g TX (CH High)	TEMP& Humidity	22.3°C, 52%

Horizontal

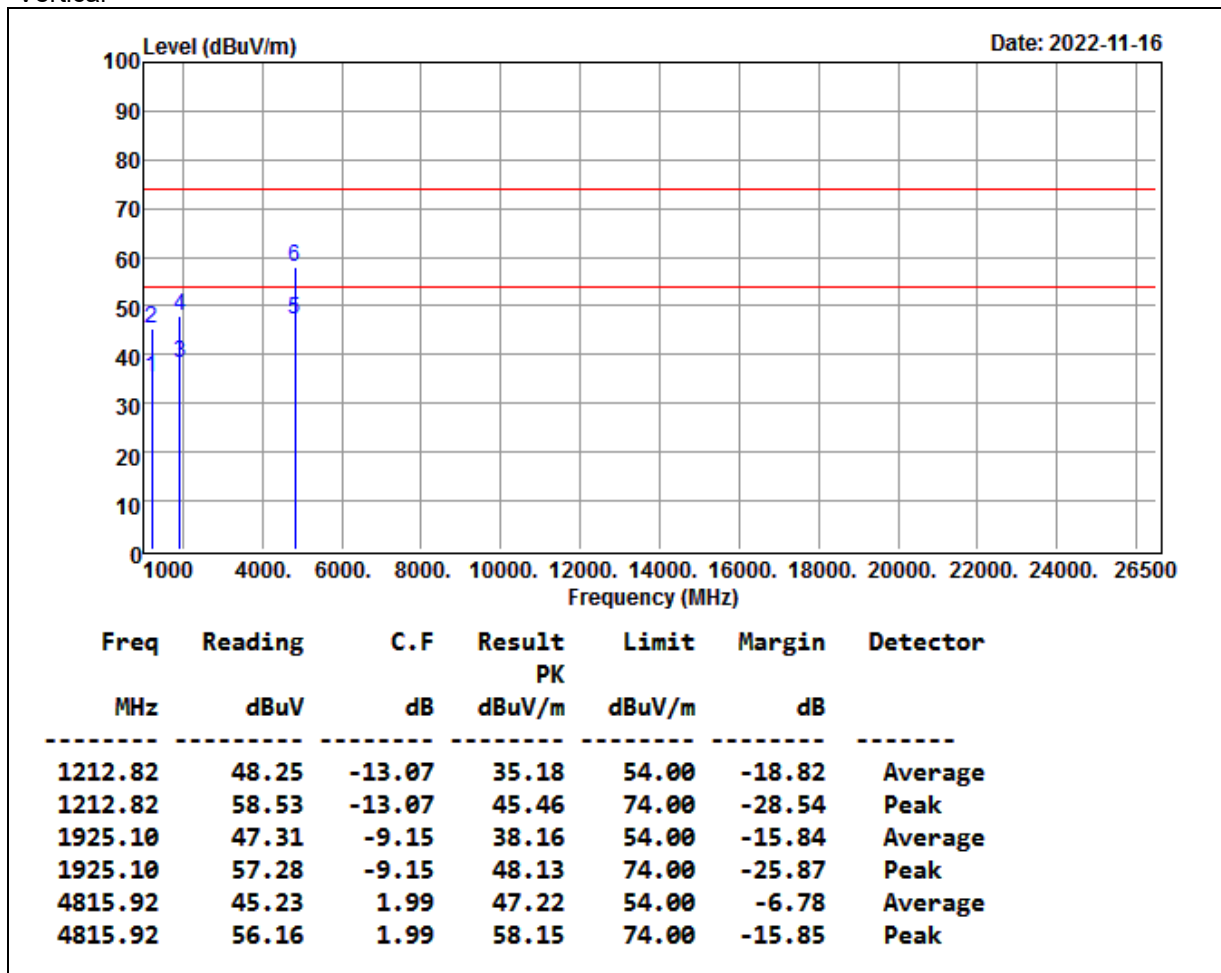


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW ≥ 1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11n HT20 TX (CH Low)	TEMP& Humidity	22.3°C, 52%

Vertical

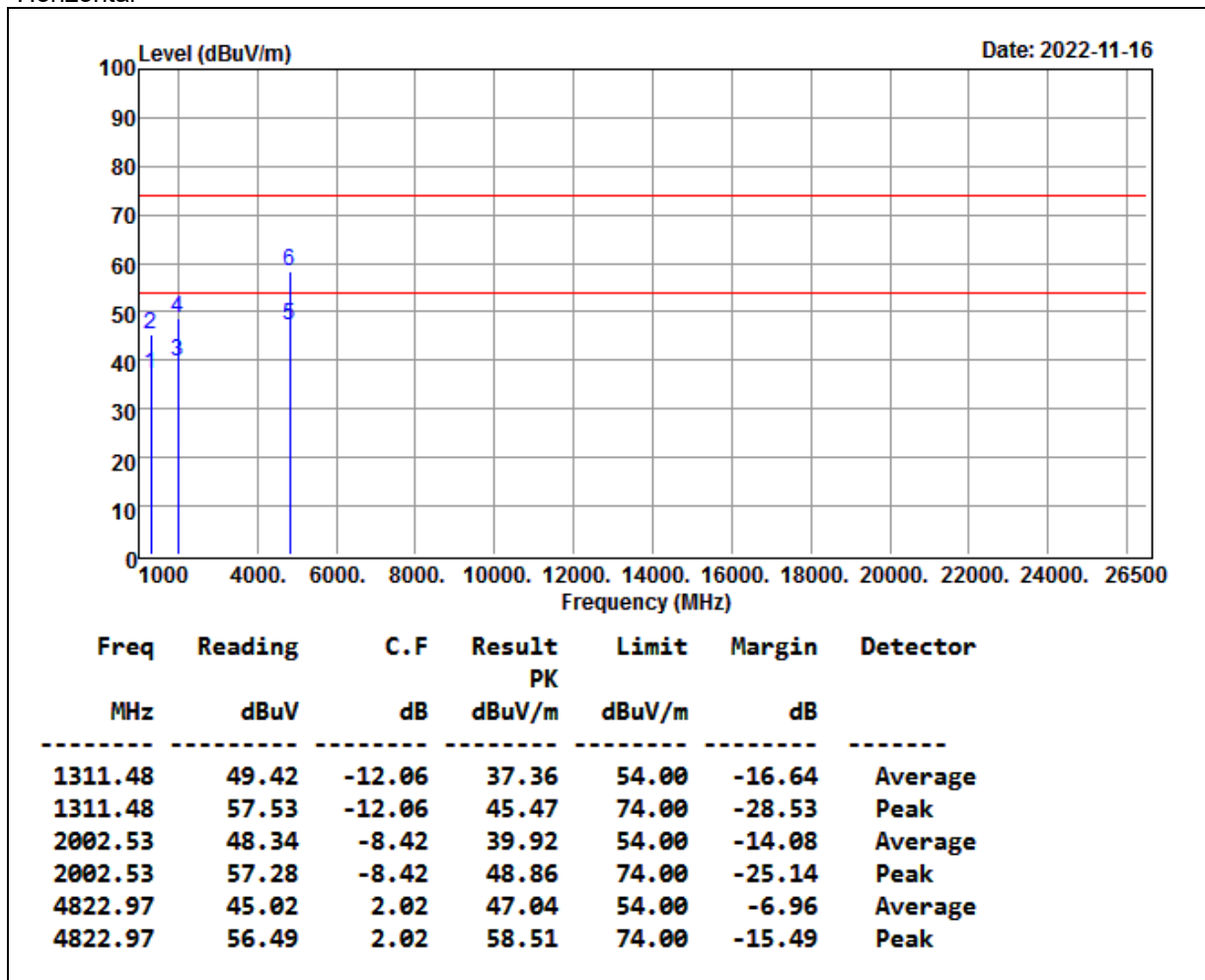


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11n HT20 TX (CH Low)	TEMP& Humidity	22.3℃, 52%

Horizontal

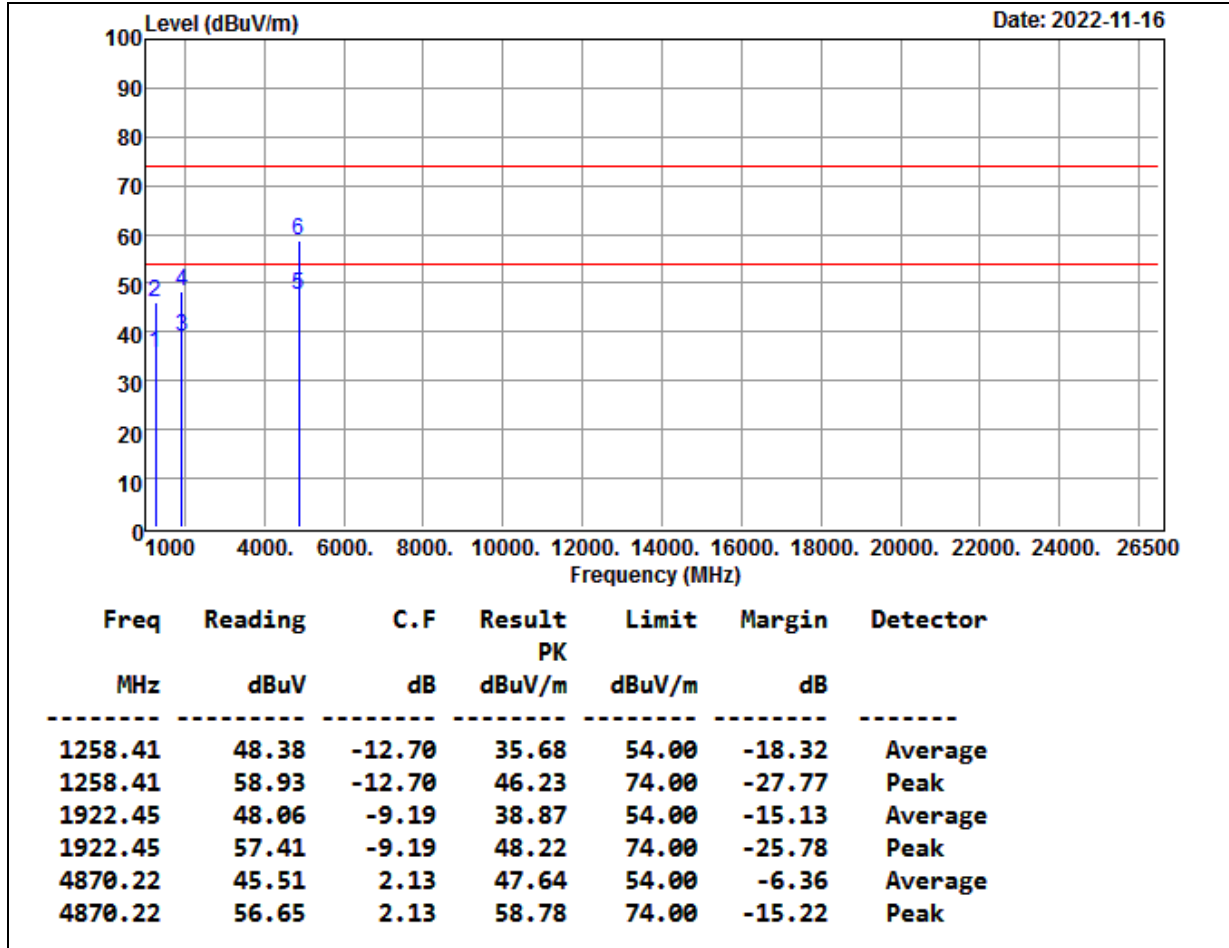


#### Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

<b>Product Name</b>	Audio Device	<b>Test Date</b>	2022/11/16
<b>Model</b>	ACVA2	<b>Test By</b>	Peter Chu
<b>Test Mode</b>	IEEE 802.11n HT20 TX (CH Middle)	<b>TEMP&amp; Humidity</b>	22.3°C, 52%

Vertical

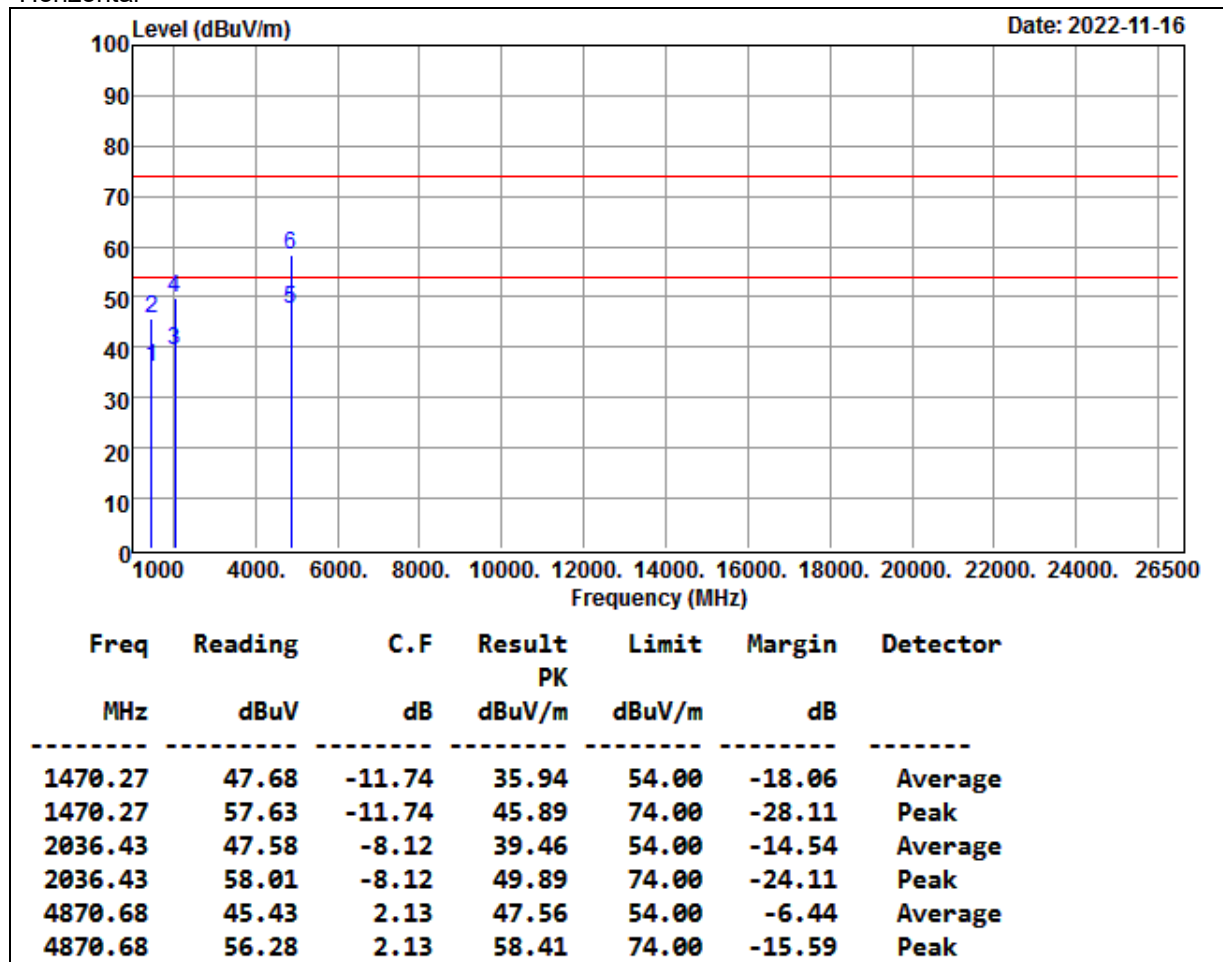


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11n HT20 TX (CH Middle)	TEMP& Humidity	22.3°C, 52%

Horizontal



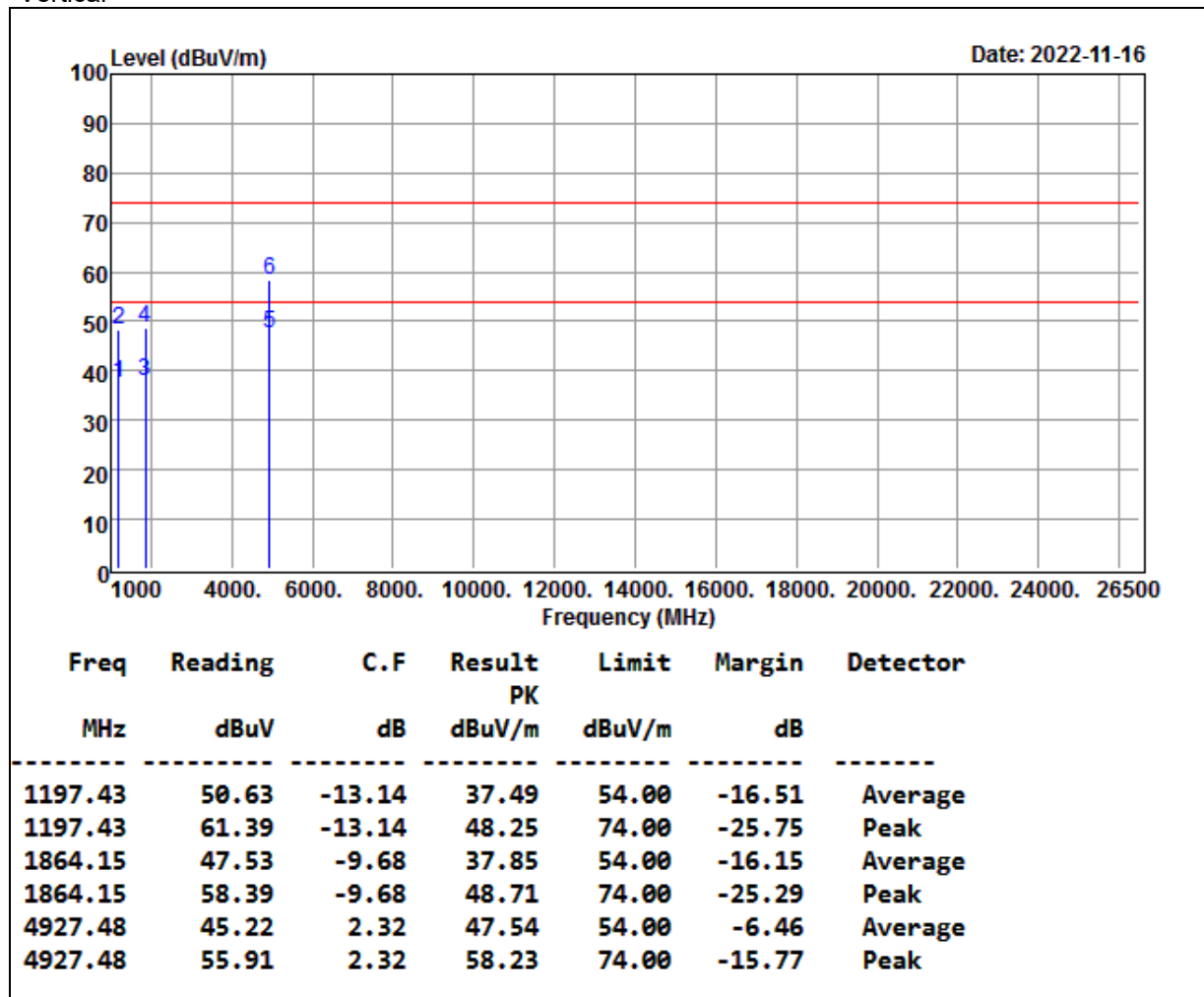
**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation



Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11n HT20 TX (CH High)	TEMP& Humidity	22.3°C, 52%

Vertical

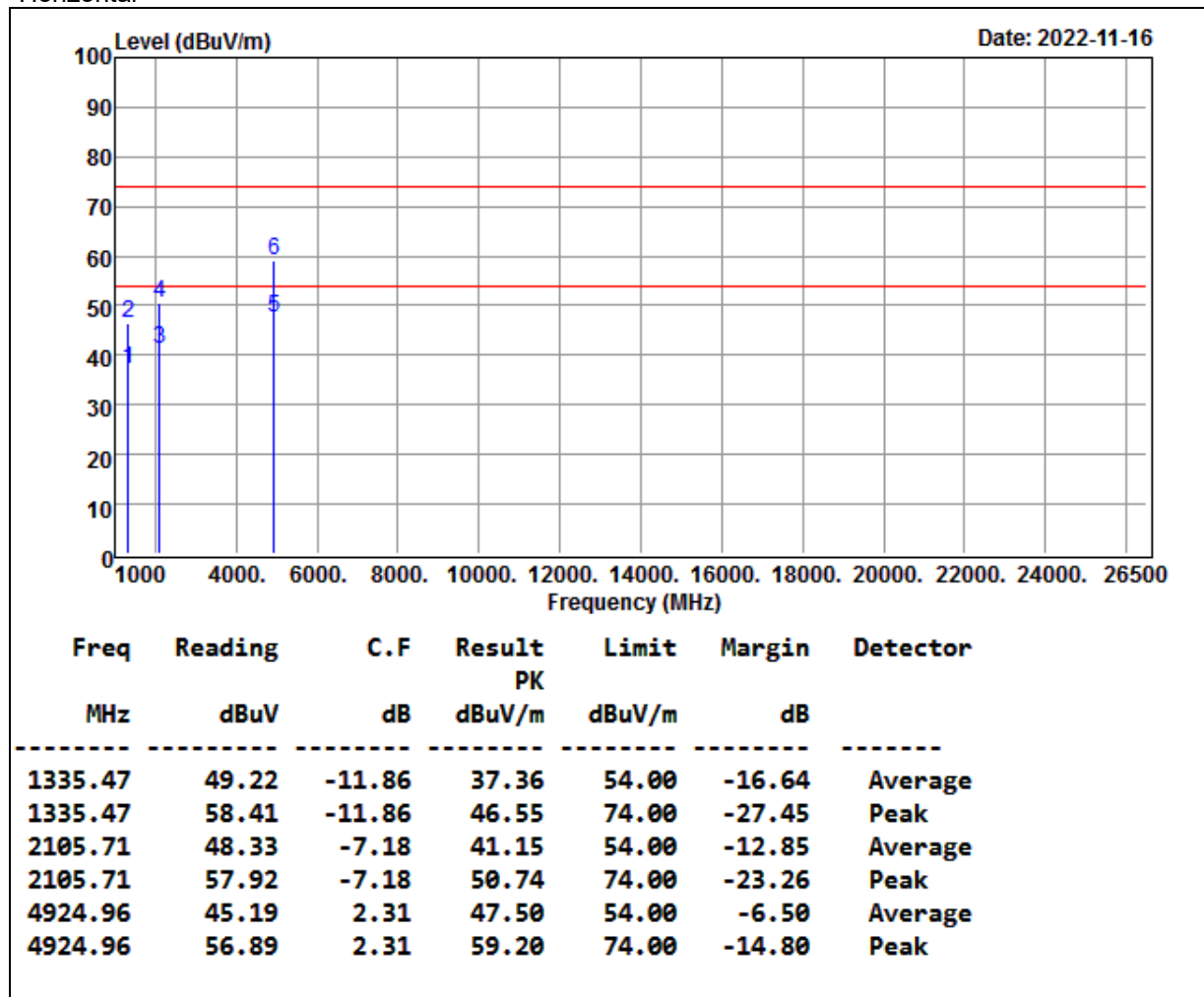


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11n HT20 TX (CH High)	TEMP& Humidity	22.3°C, 52%

Horizontal

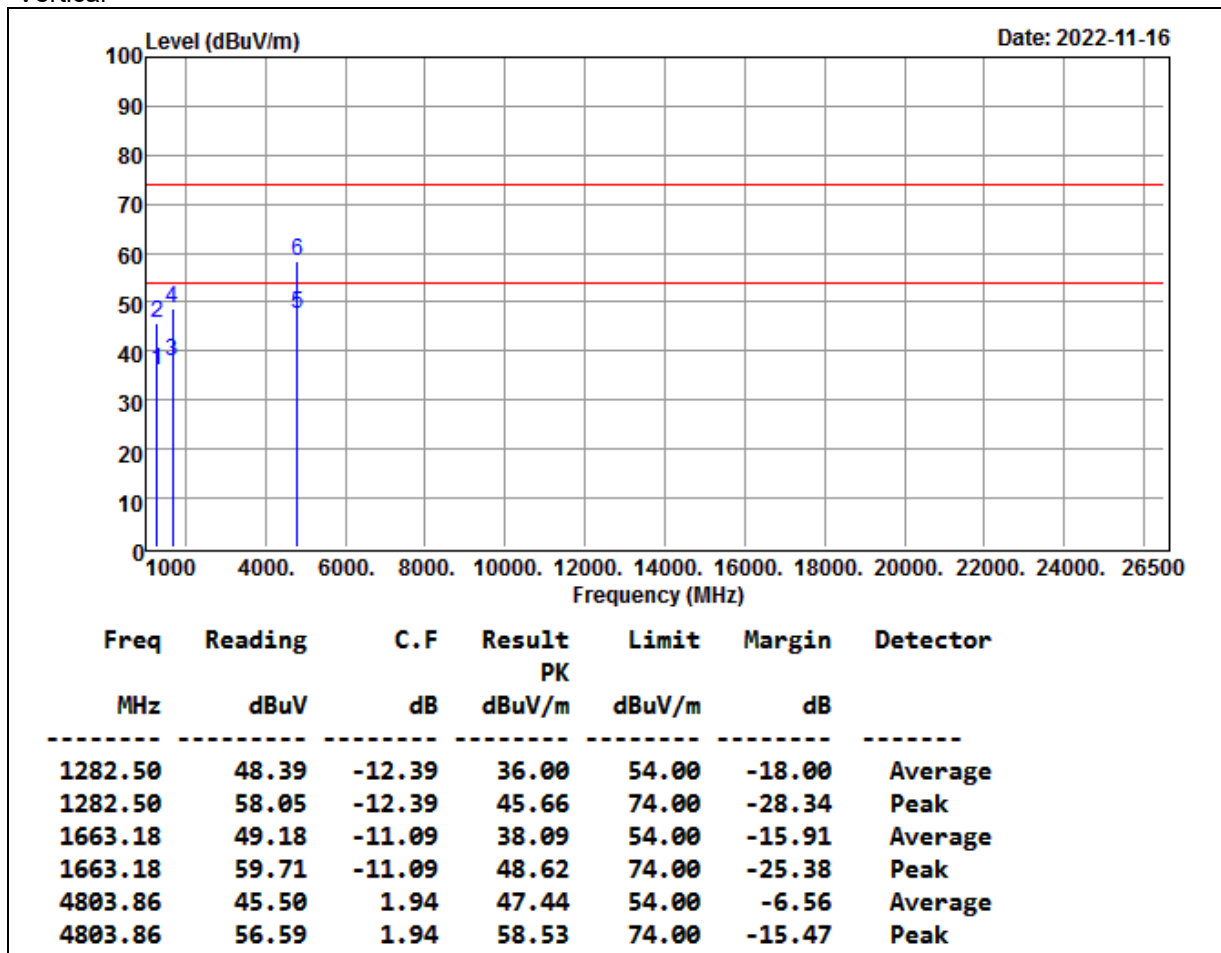


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 4.0 TX (CH Low)	TEMP& Humidity	22.3°C, 52%

Vertical

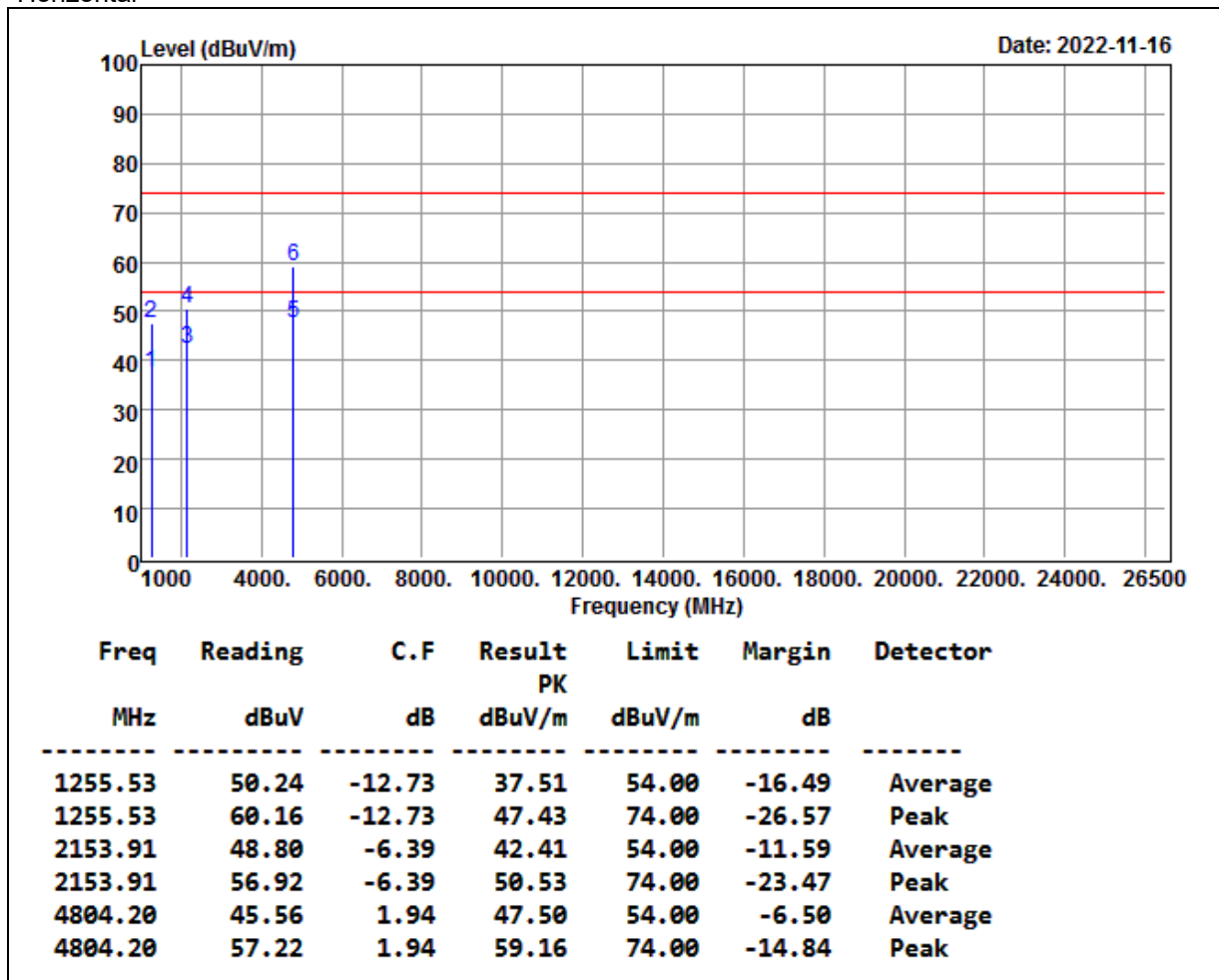


**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 4.0 TX (CH Low)	TEMP& Humidity	22.3°C, 52%

Horizontal

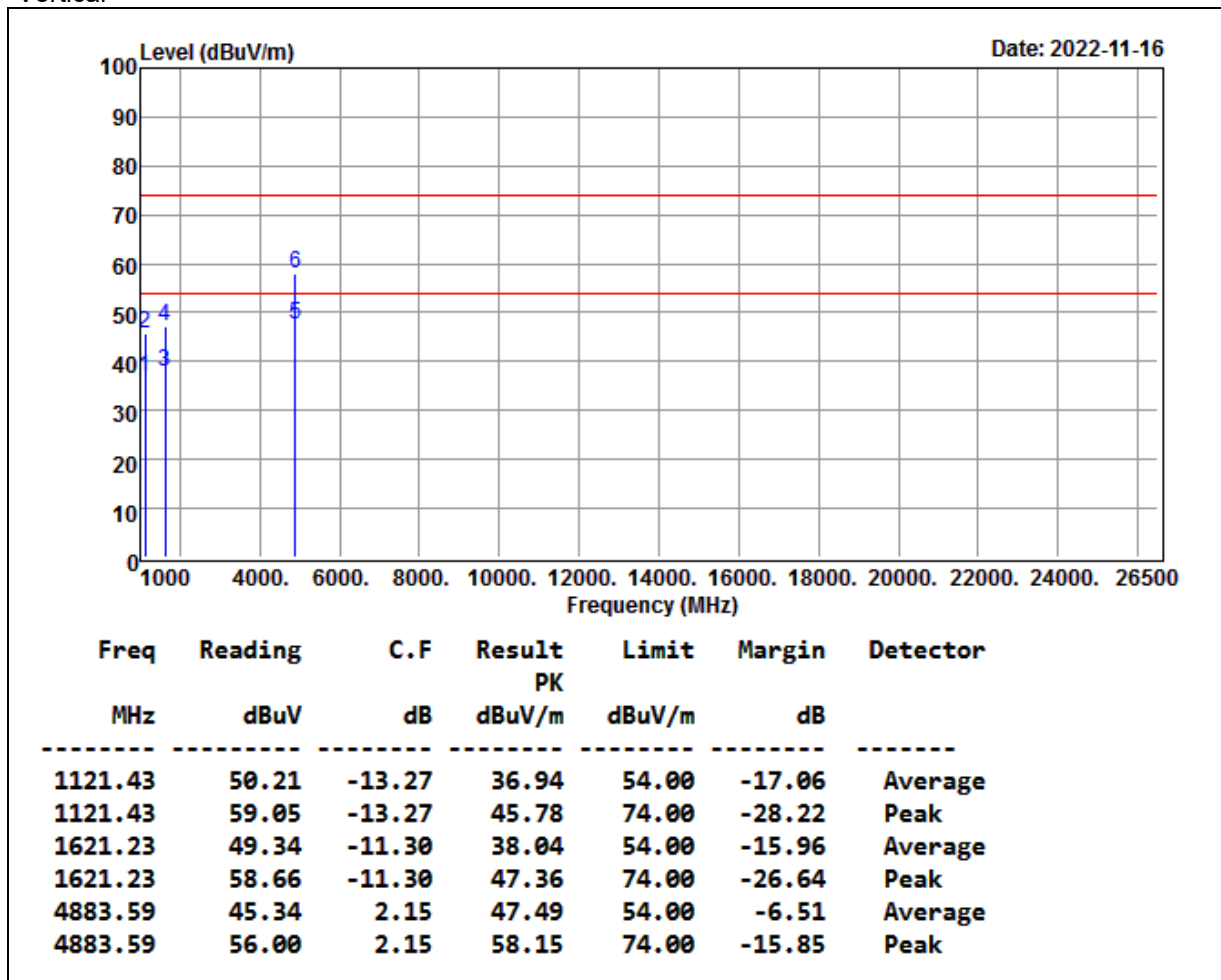


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 4.0 TX (CH Middle)	TEMP& Humidity	22.3°C, 52%

Vertical

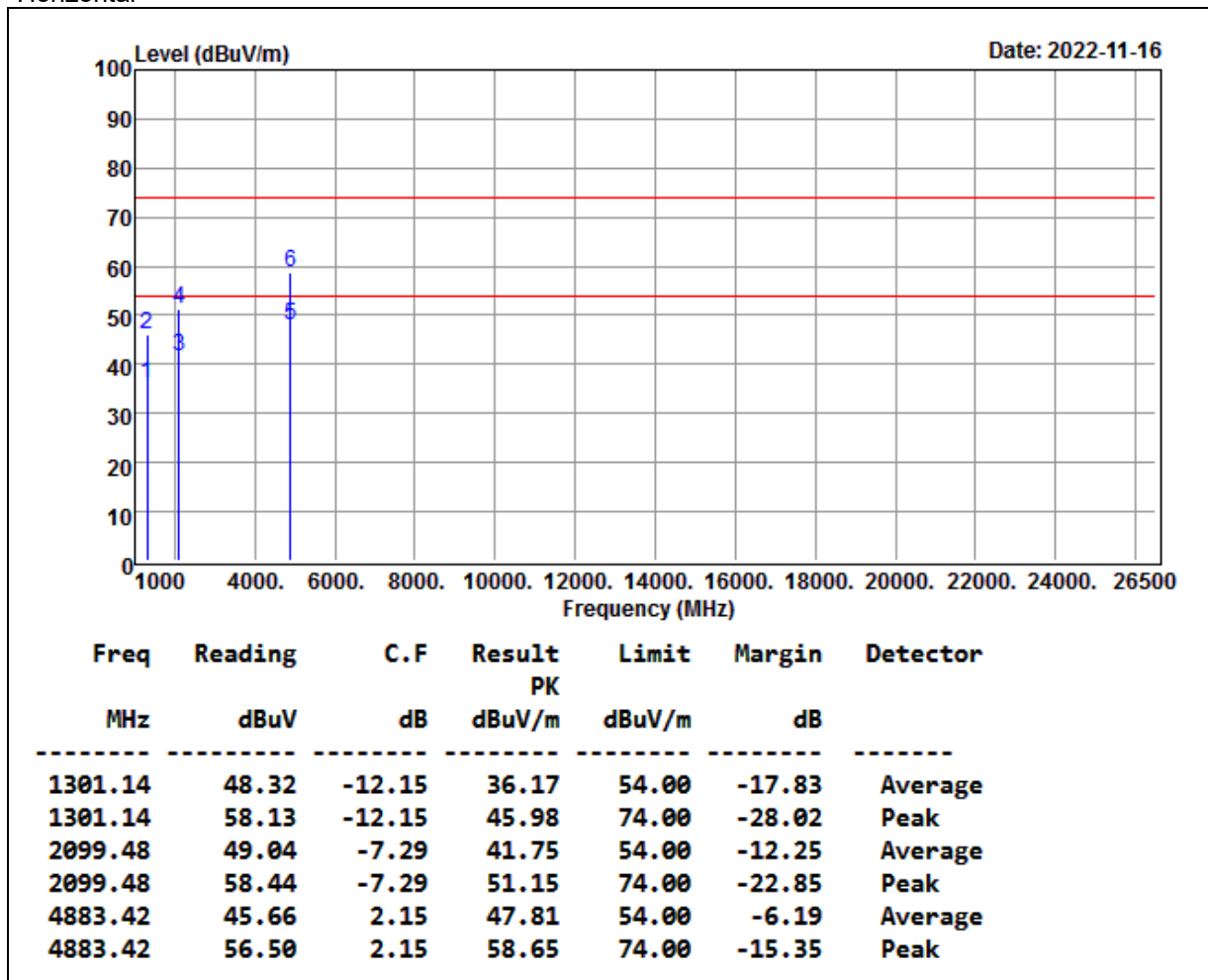


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 4.0 TX (CH Middle)	TEMP& Humidity	22.3°C, 52%

Horizontal

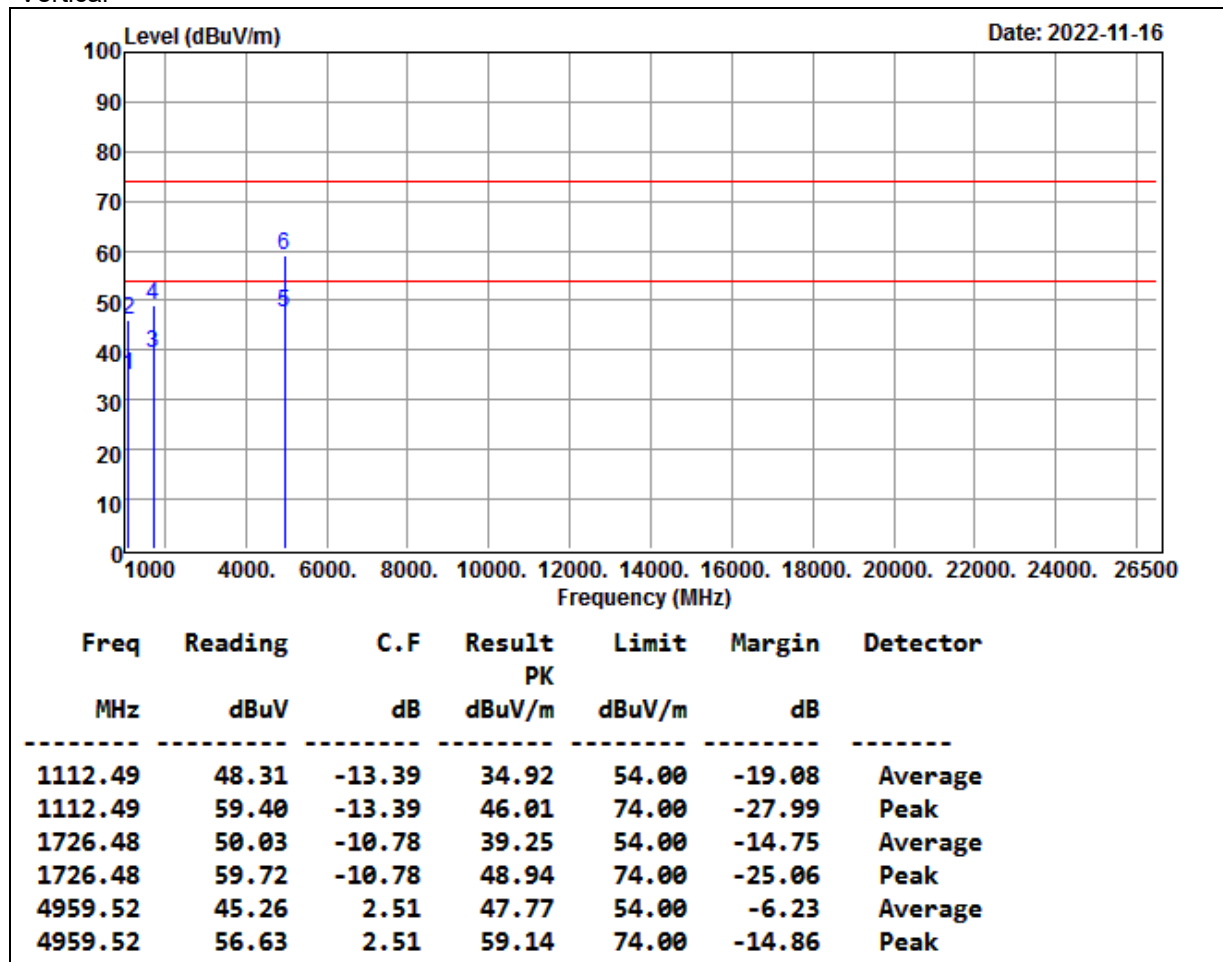


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 4.0 TX (CH High)	TEMP& Humidity	22.3°C, 52%

Vertical

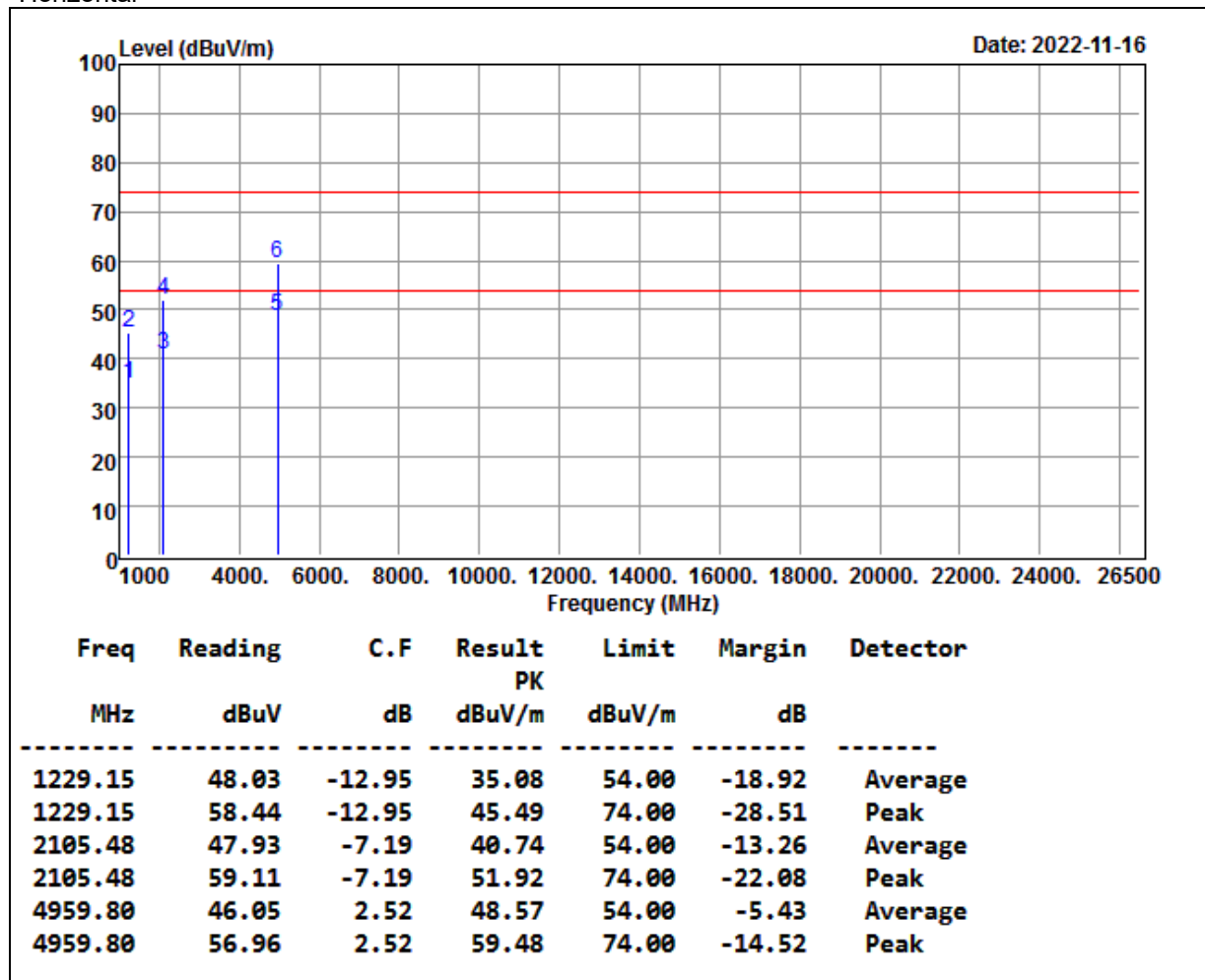


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 4.0 TX (CH High)	TEMP& Humidity	22.3°C, 52%

Horizontal



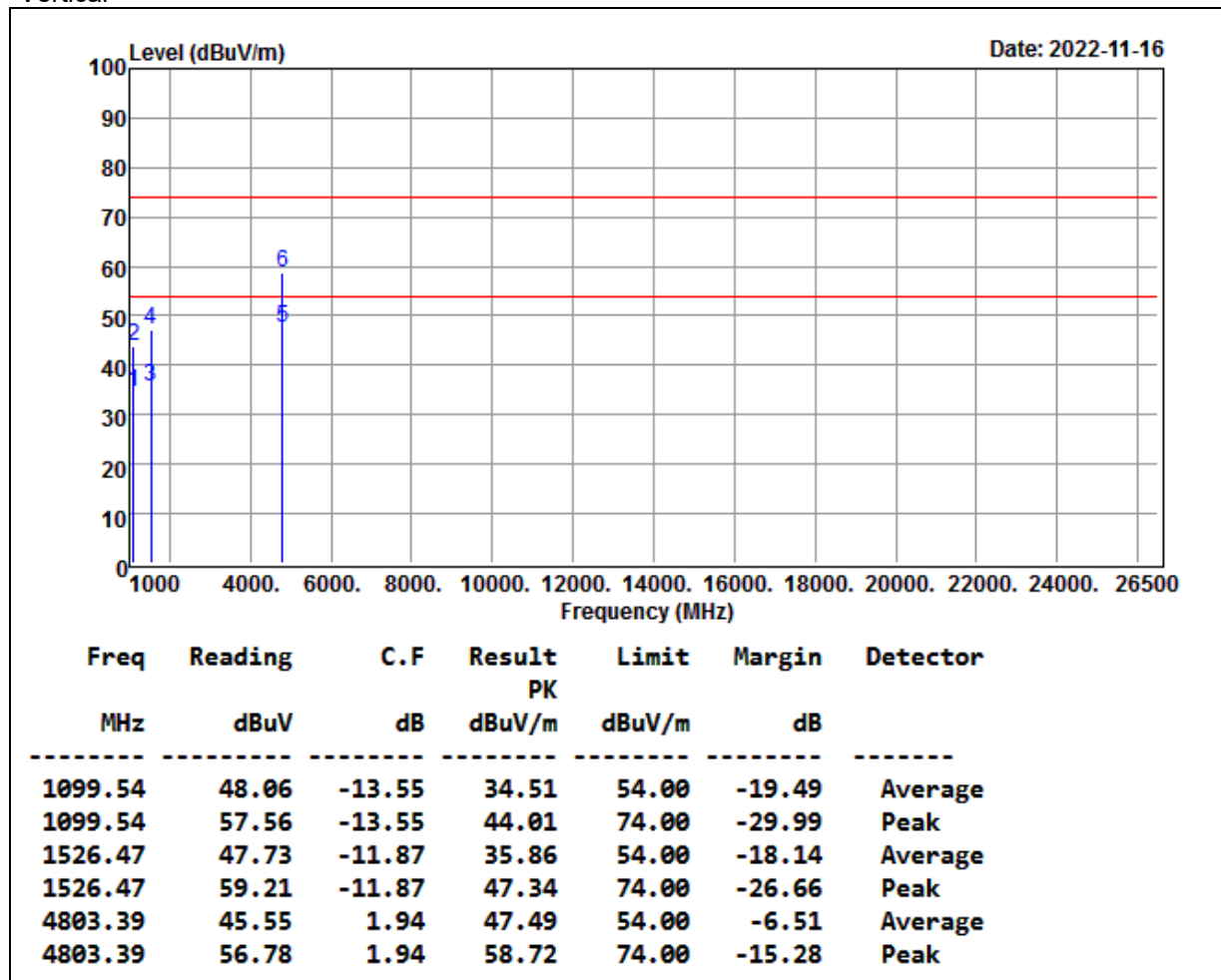
## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation



Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 5.0 TX (CH Low)	TEMP& Humidity	22.3°C, 52%

Vertical

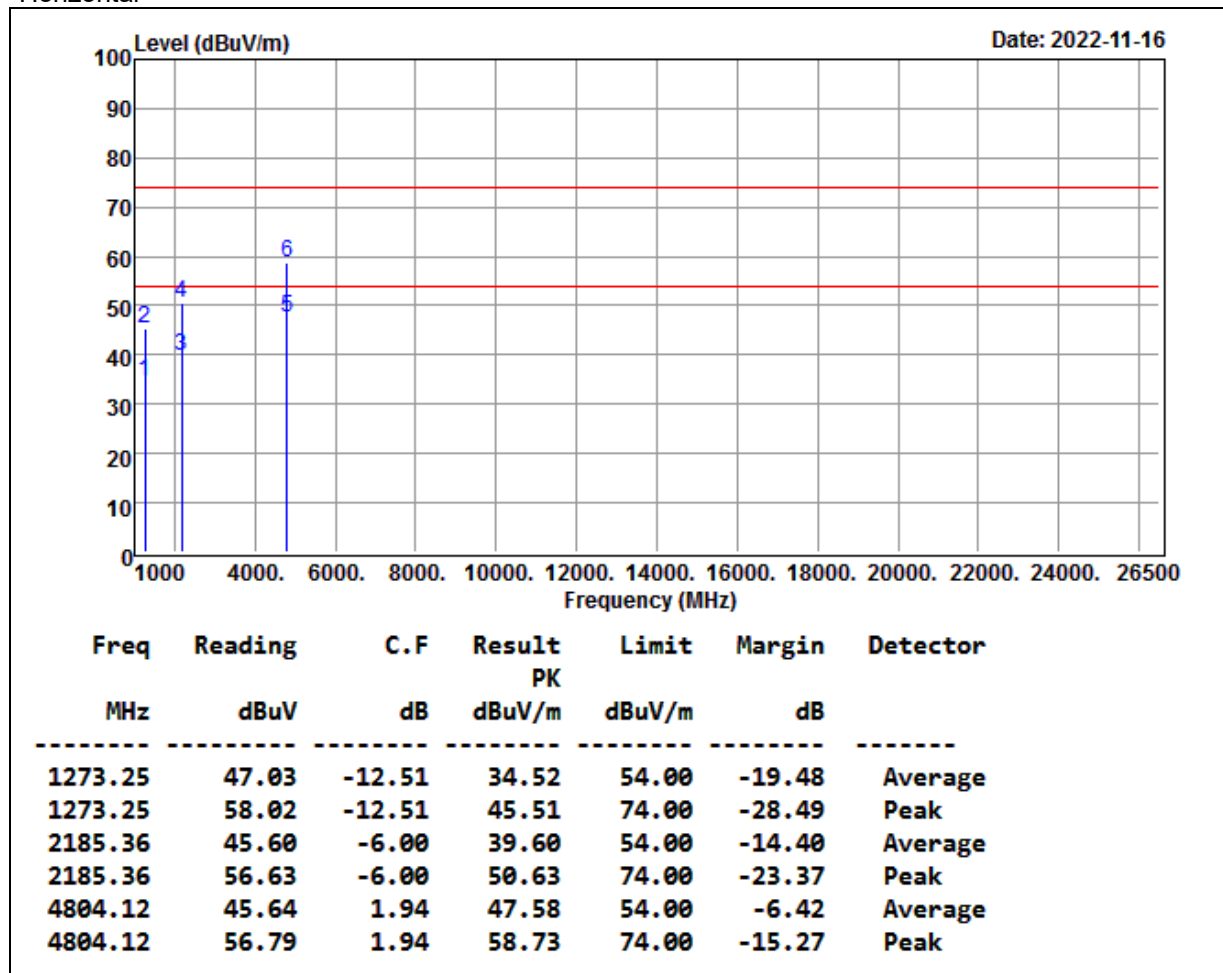


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 5.0 TX (CH Low)	TEMP& Humidity	22.3°C, 52%

Horizontal

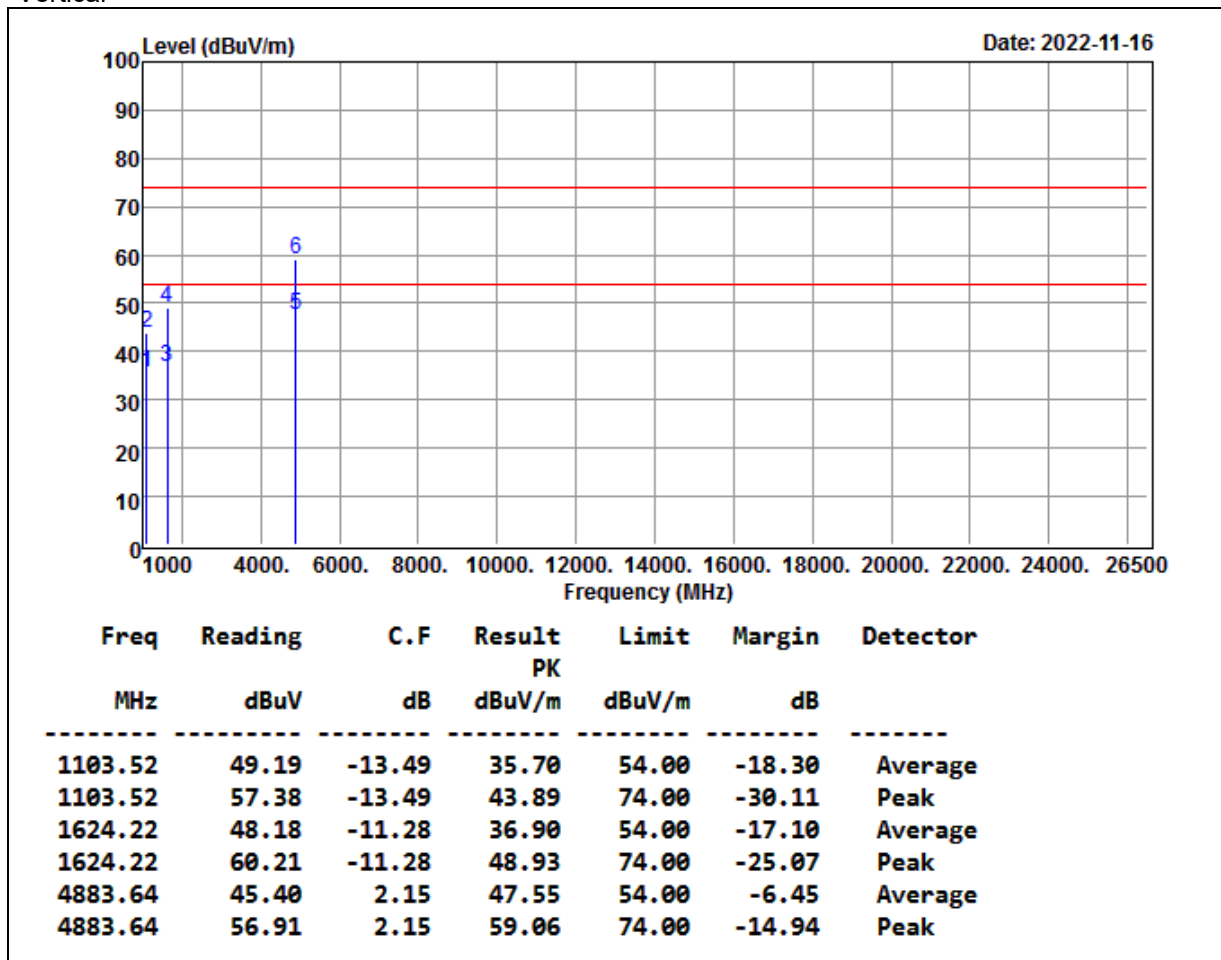


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 5.0 TX (CH Middle)	TEMP& Humidity	22.3°C, 52%

Vertical

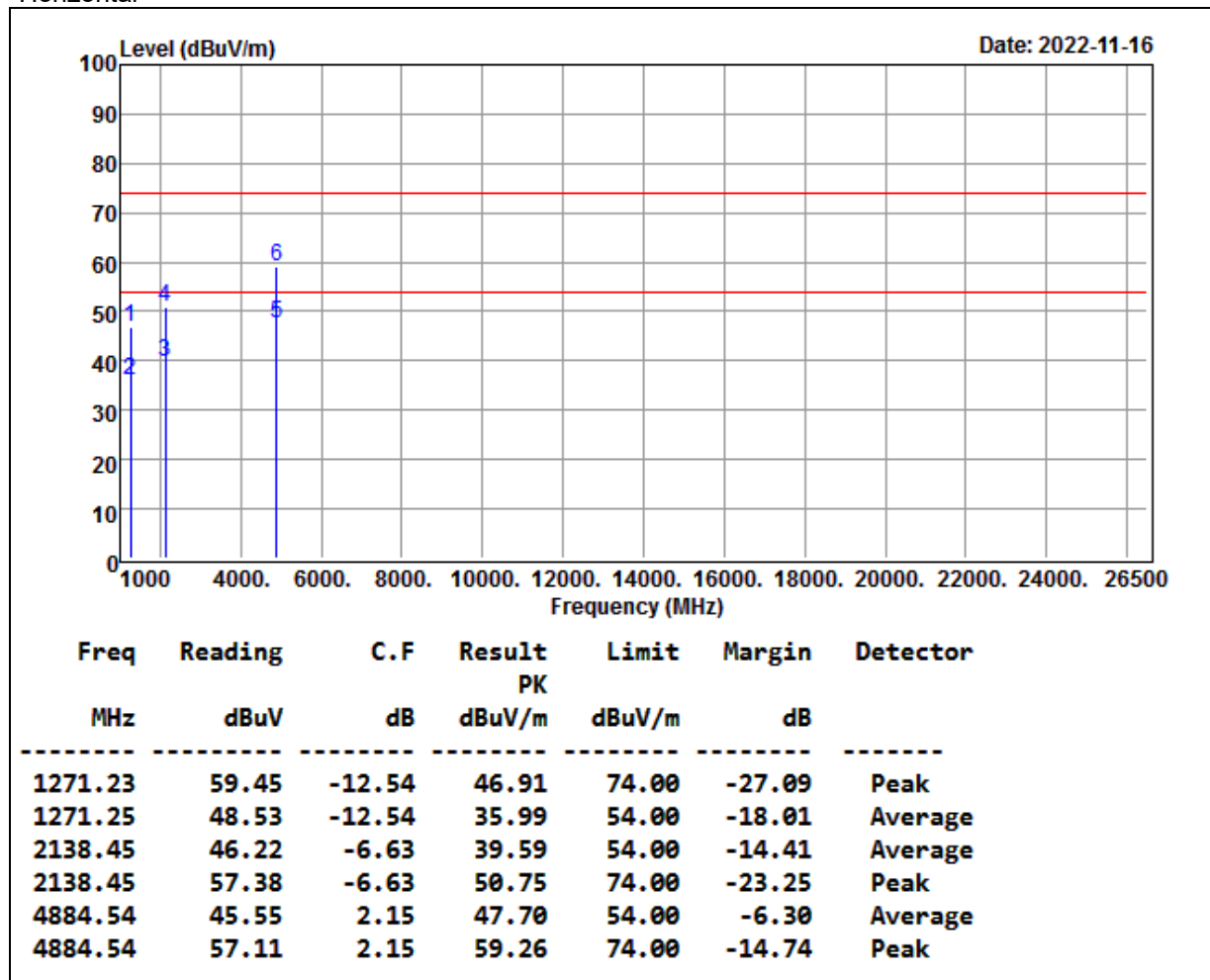


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq$  1/T
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 5.0 TX (CH Middle)	TEMP& Humidity	22.3°C, 52%

Horizontal

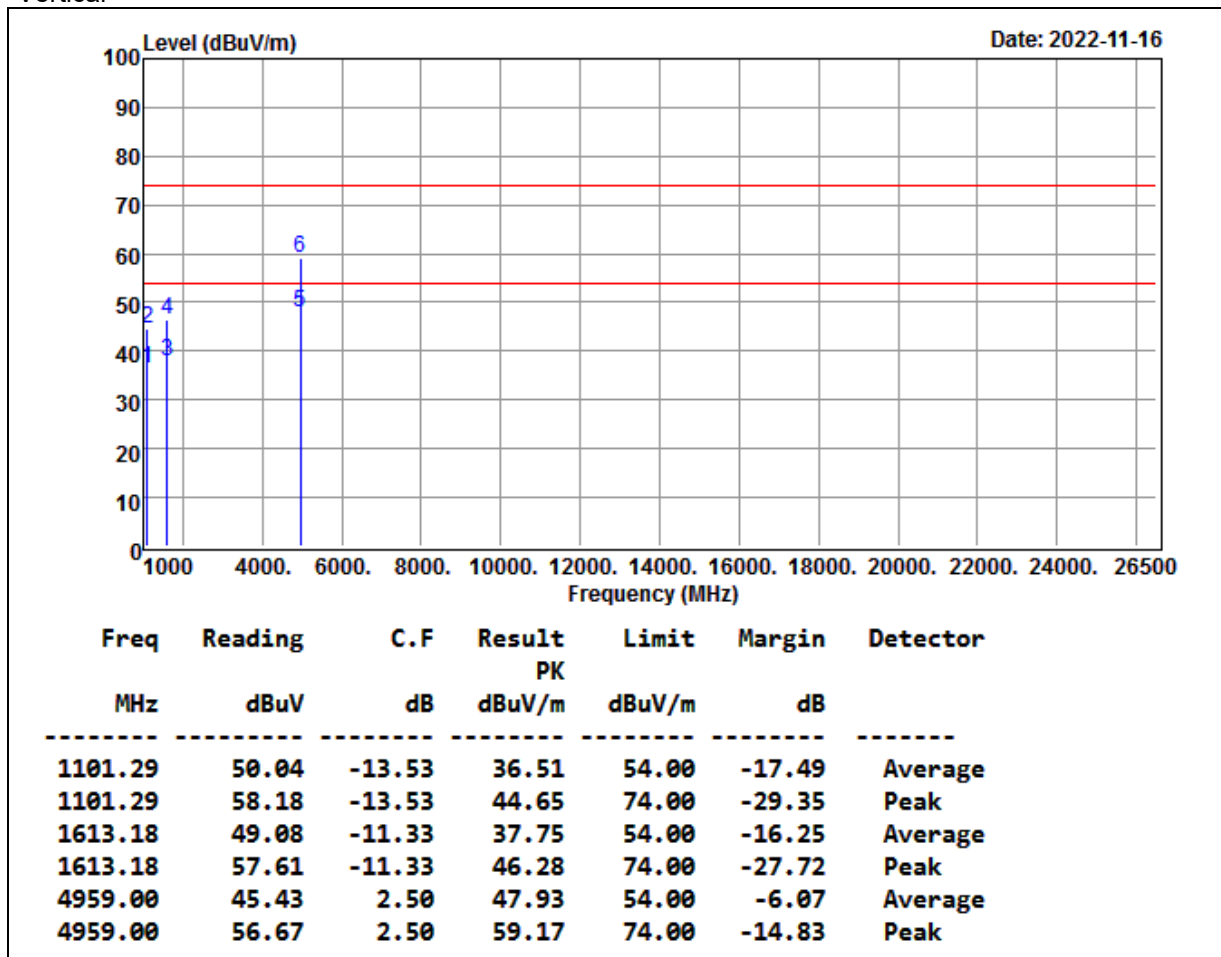


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 5.0 TX (CH High)	TEMP& Humidity	22.3°C, 52%

Vertical

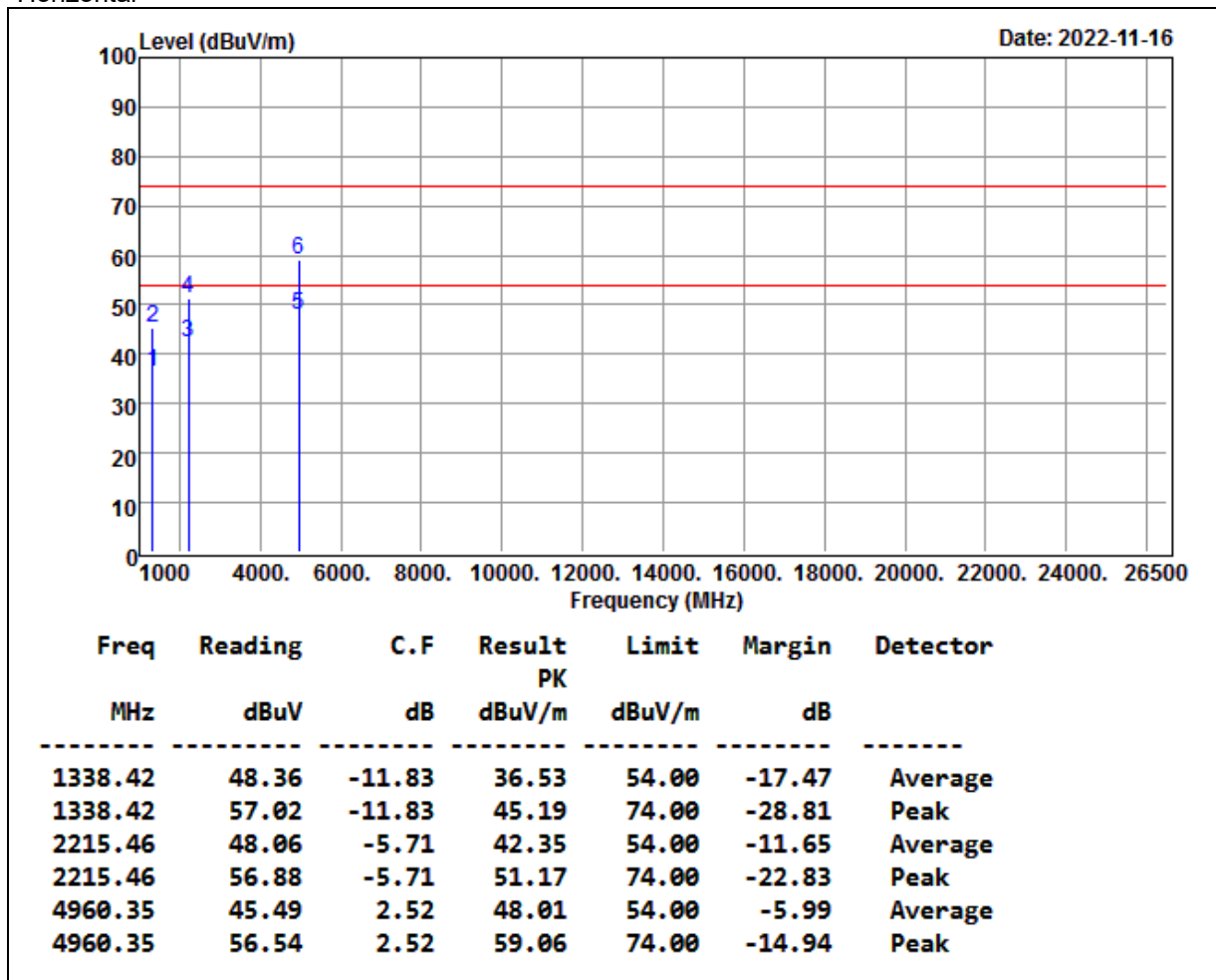


## Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 5.0 TX (CH High)	TEMP& Humidity	22.3°C, 52%

Horizontal



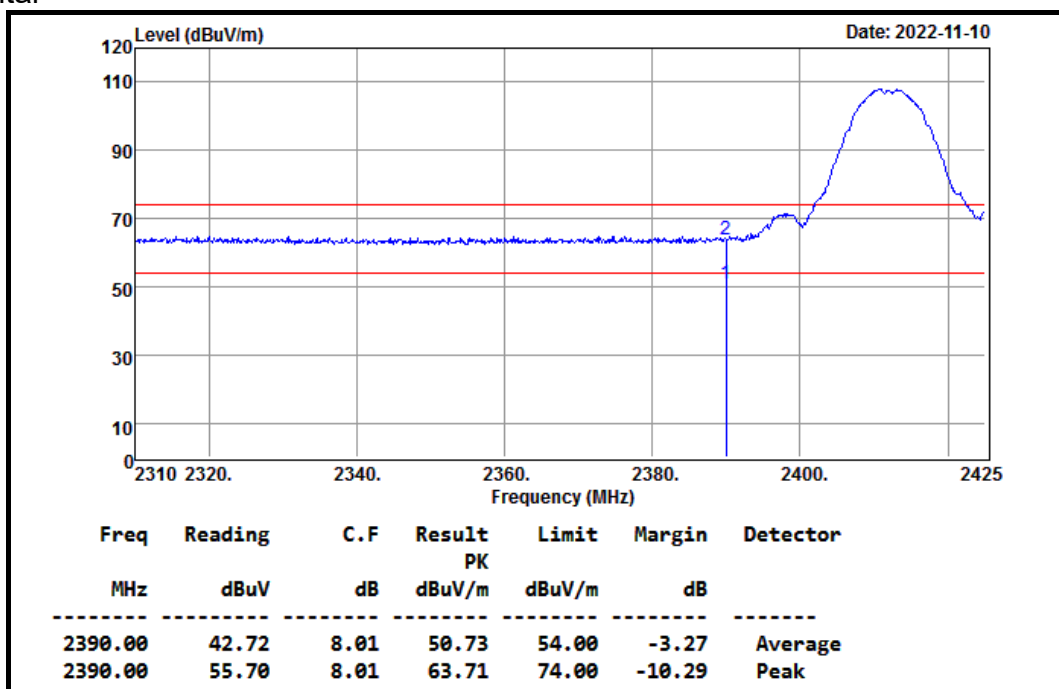
**Remark:**

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=3MHz, A(Average): RBW=1MHz, VBW  $\geq 1/T$
3. The result basic equation calculation is as follow:  
Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 10dB below the limit
5. The test distance is 3m.
6. \*=Restricted bands of operation

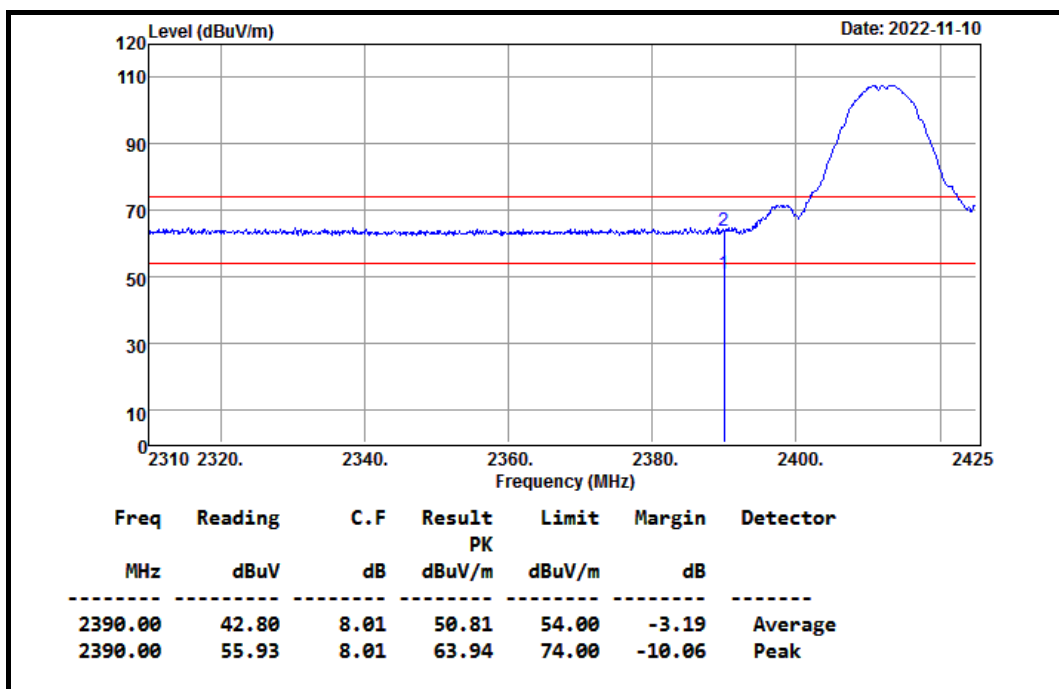
## 8.6.4 RESTRICTED BAND EDGES

Product Name	Audio Device	Test Date	2022/11/10
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11b TX (CH Low)	TEMP& Humidity	22.6°C, 51%

Horizontal

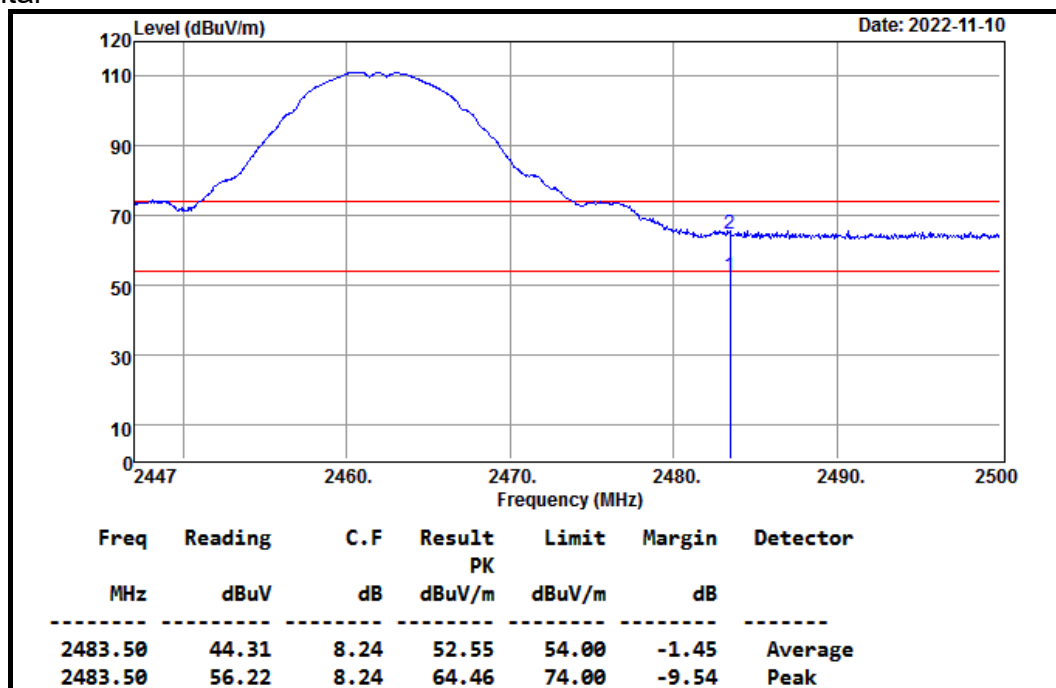


Vertical

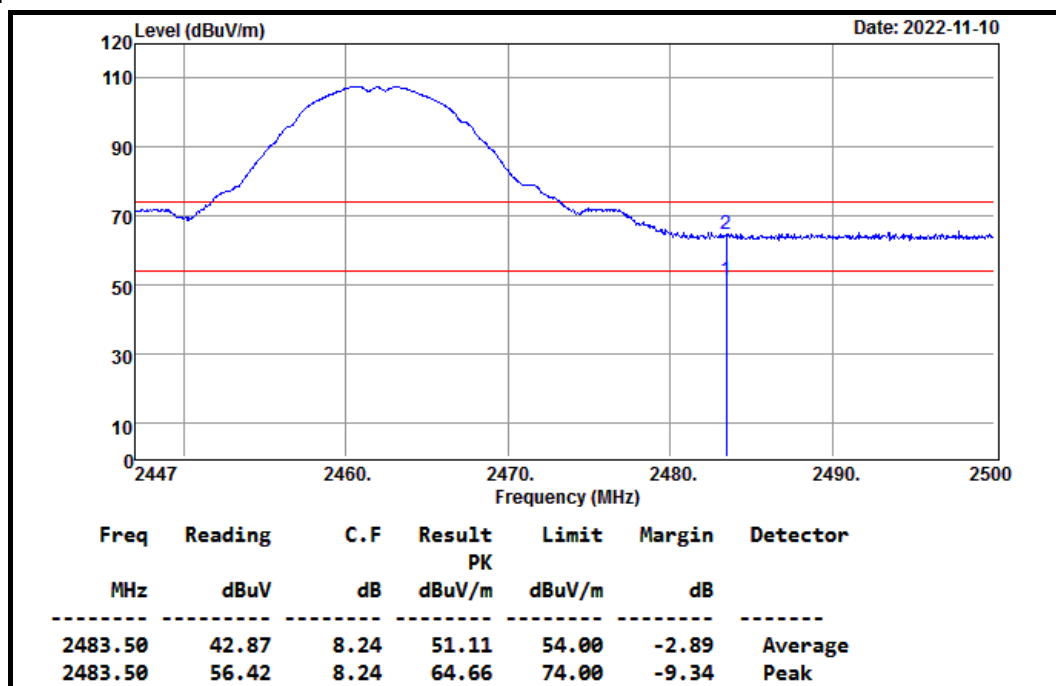


Product Name	Audio Device	Test Date	2022/11/10
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11b TX (CH High)	TEMP& Humidity	22.6°C, 51%

## Horizontal



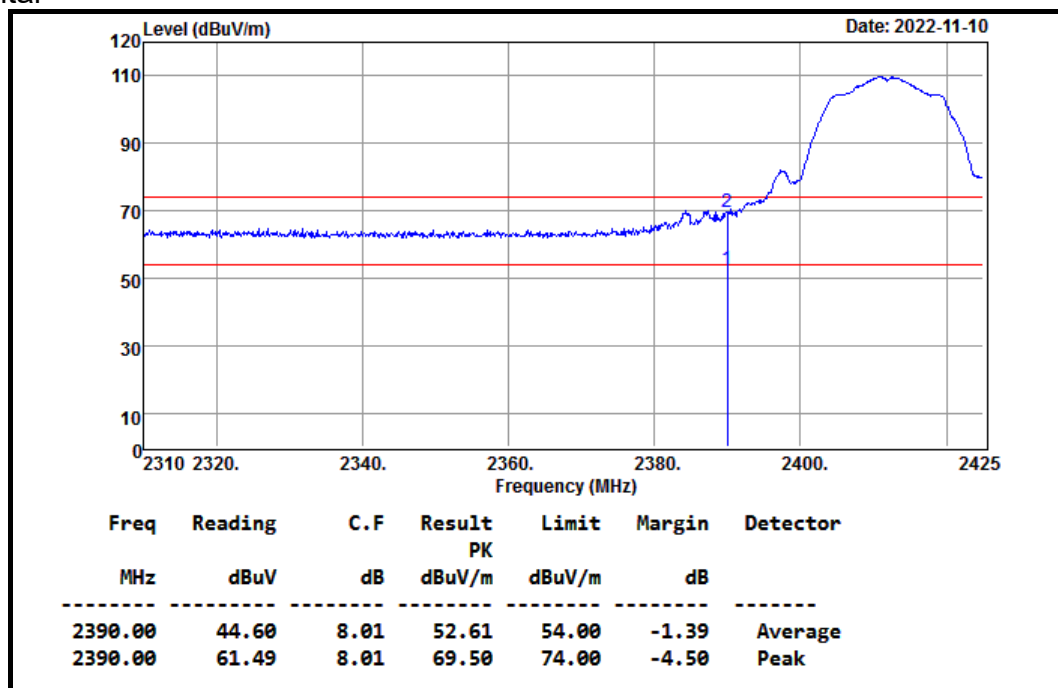
## Vertical



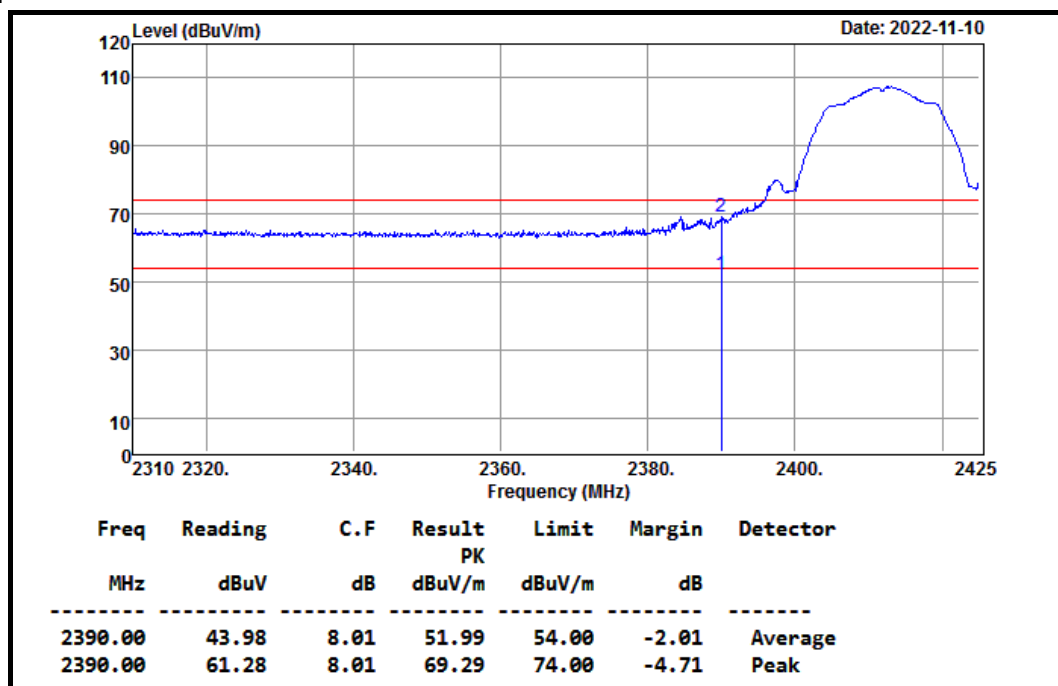


Product Name	Audio Device	Test Date	2022/11/10
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11g TX (CH Low)	TEMP& Humidity	22.6°C, 51%

## Horizontal

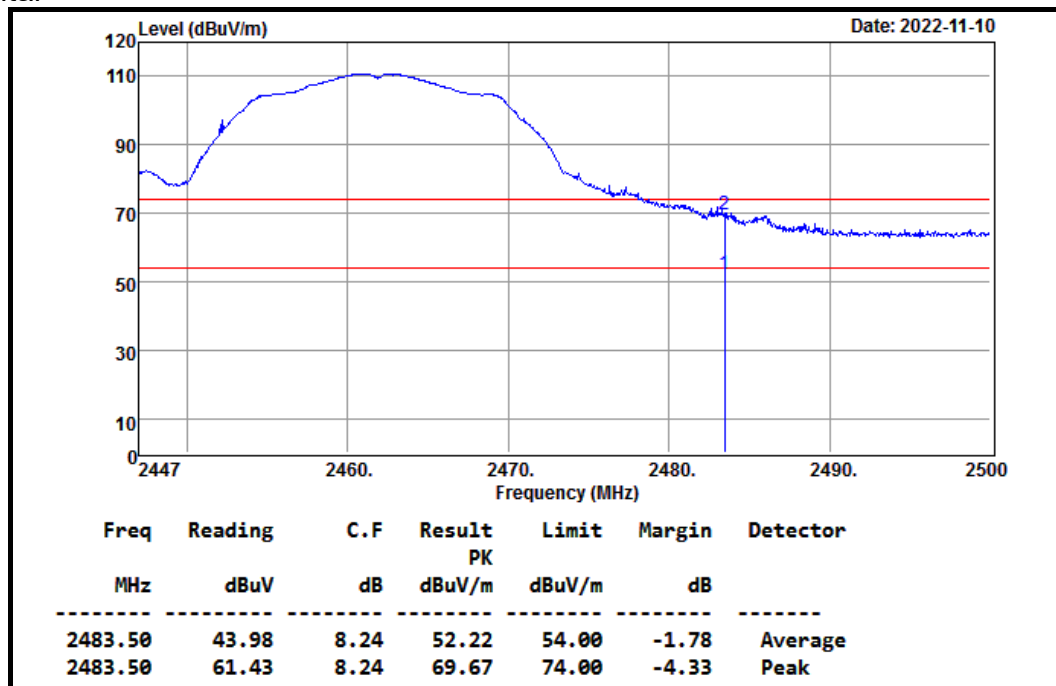


## Vertical

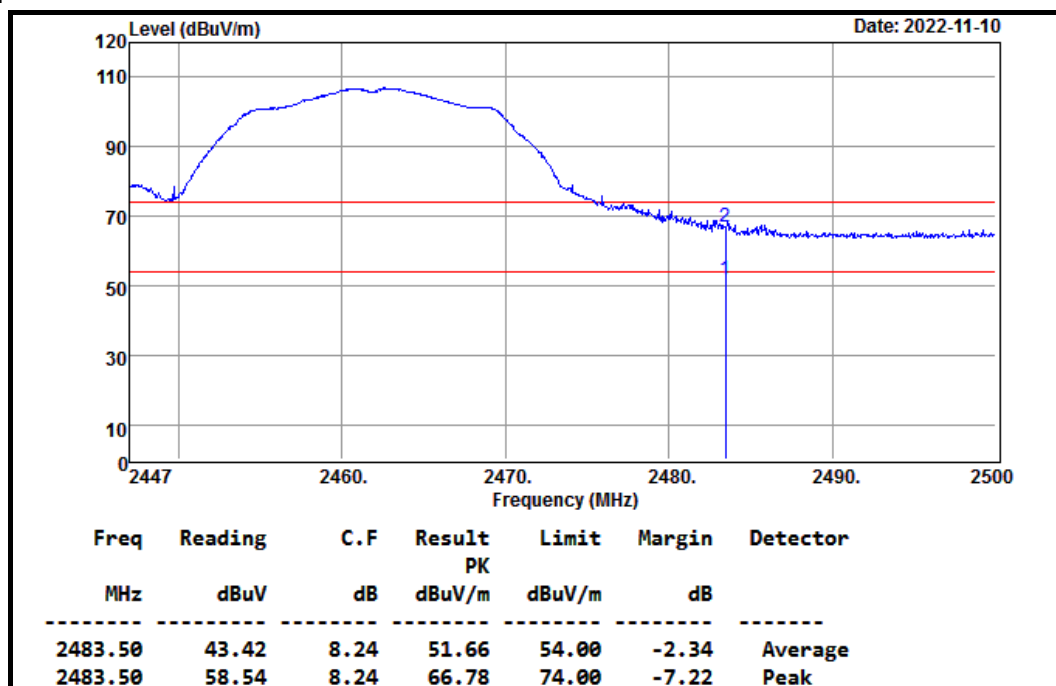


Product Name	Audio Device	Test Date	2022/11/10
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11g TX (CH High)	TEMP& Humidity	22.6°C, 51%

## Horizontal

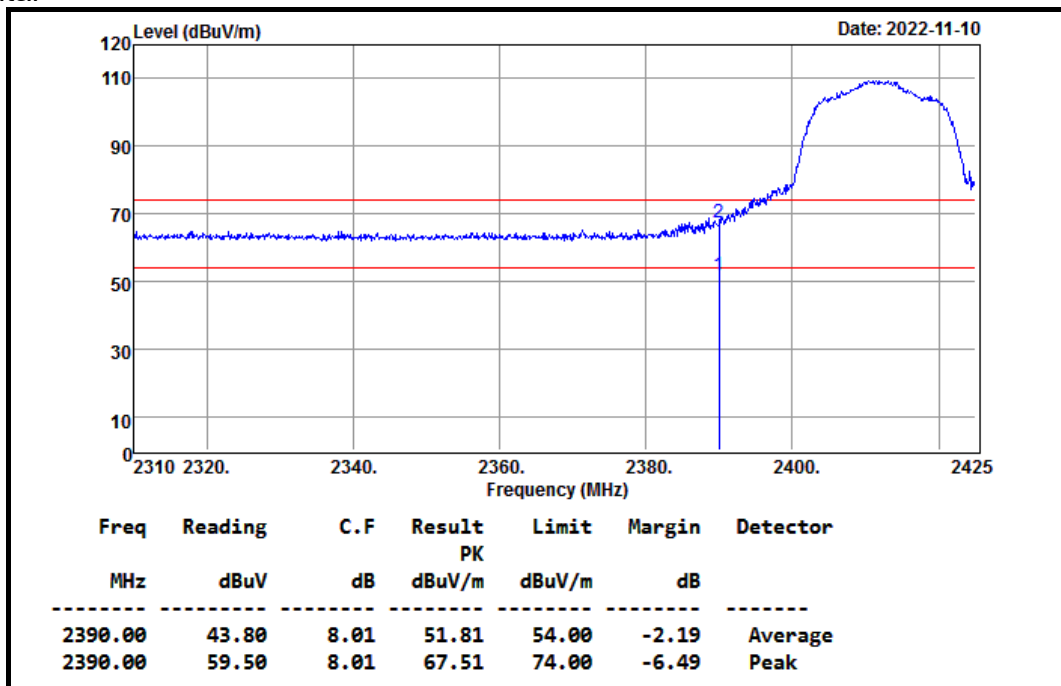


## Vertical

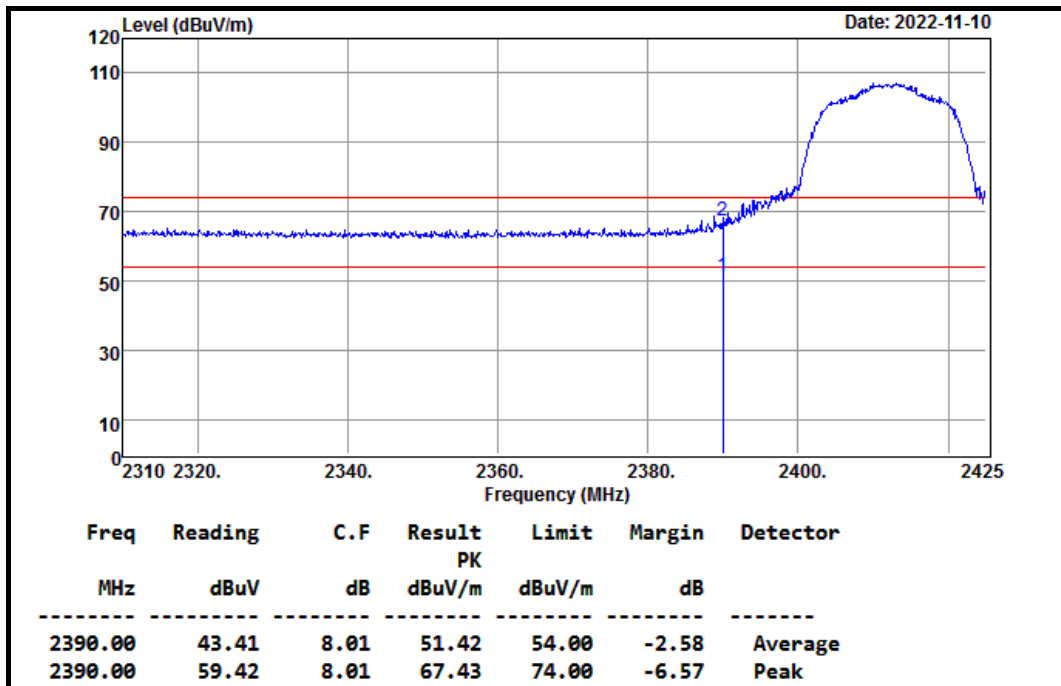


Product Name	Audio Device	Test Date	2022/11/10
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11n HT20 TX (CH Low)	TEMP& Humidity	22.6°C, 51%

## Horizontal

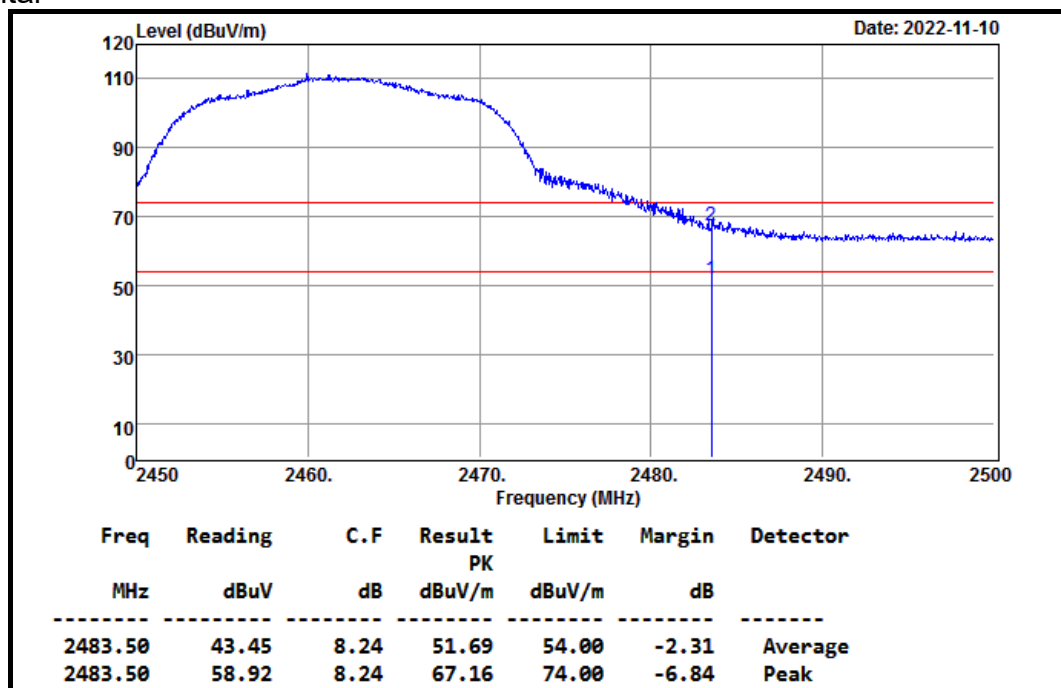


## Vertical

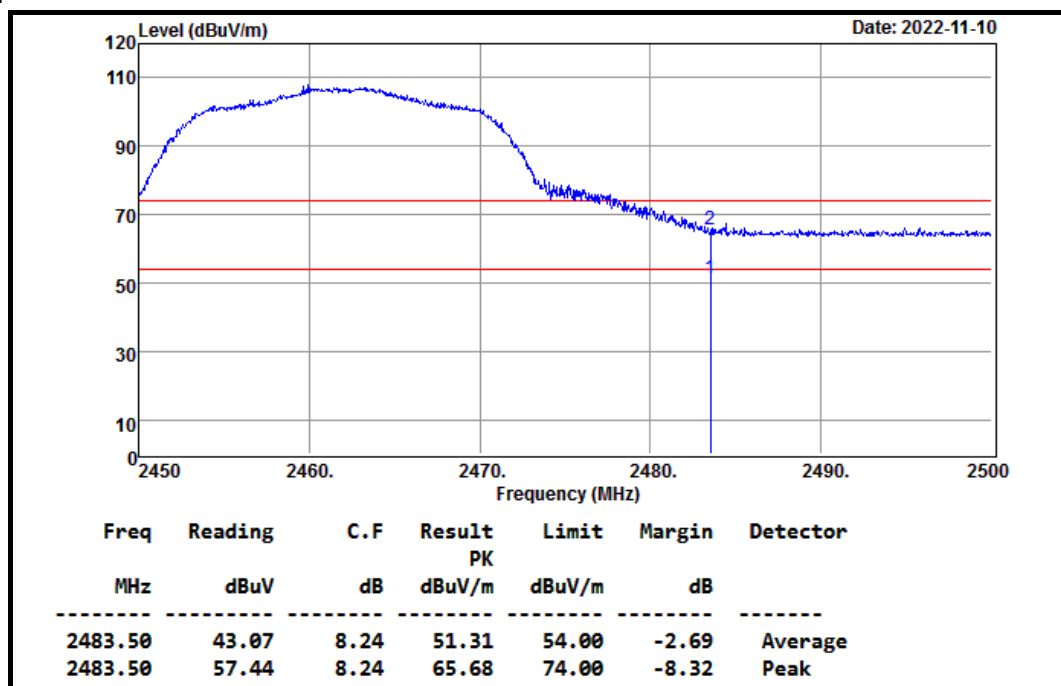


Product Name	Audio Device	Test Date	2022/11/10
Model	ACVA2	Test By	Peter Chu
Test Mode	IEEE 802.11n HT20 TX (CH High)	TEMP& Humidity	22.6°C, 51%

## Horizontal

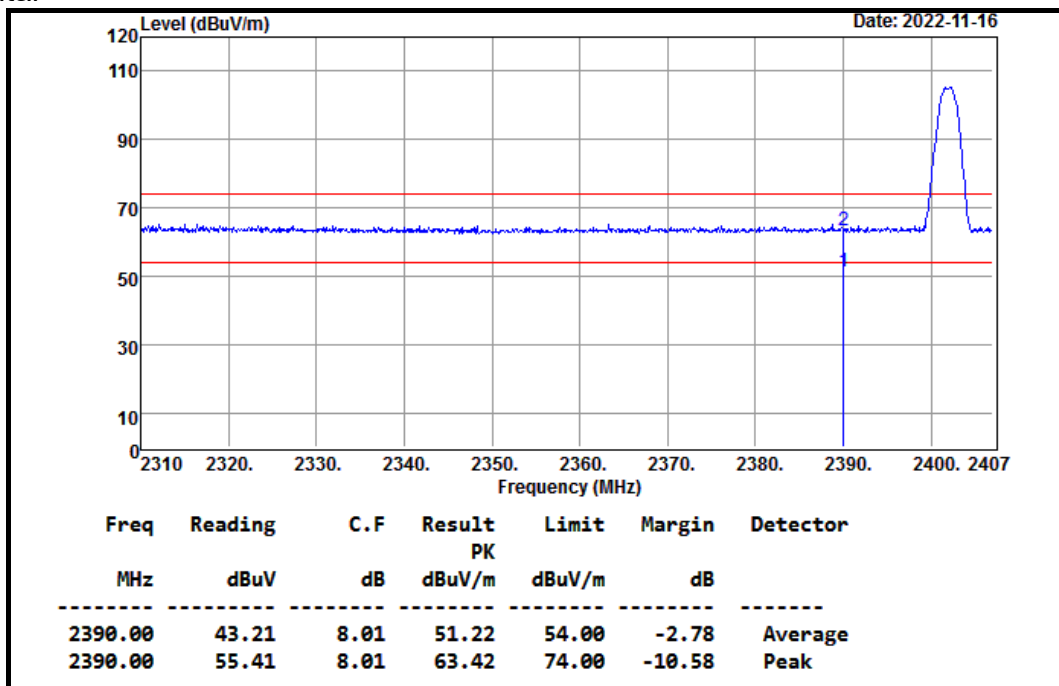


## Vertical

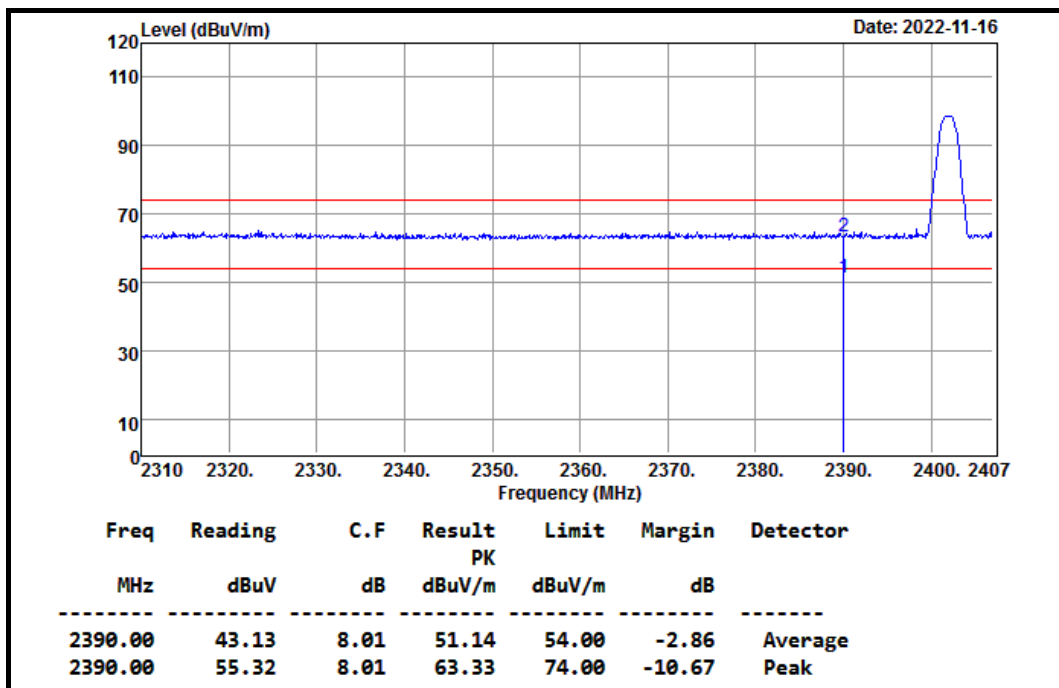


Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 4.0 TX (CH Low)	TEMP& Humidity	22.3℃, 52%

## Horizontal

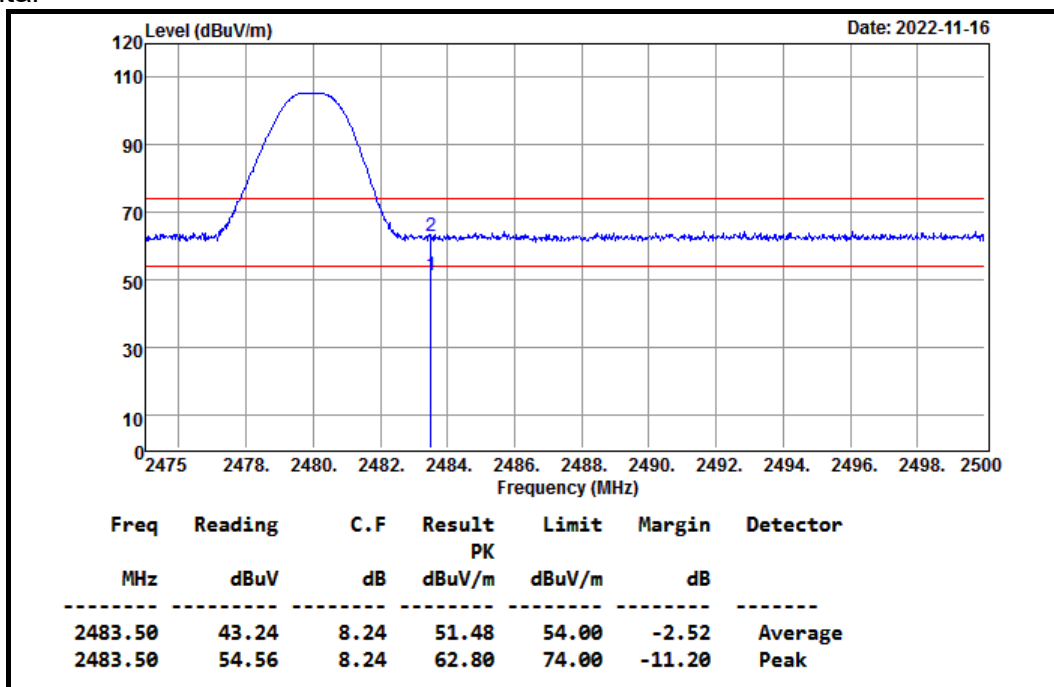


## Vertical

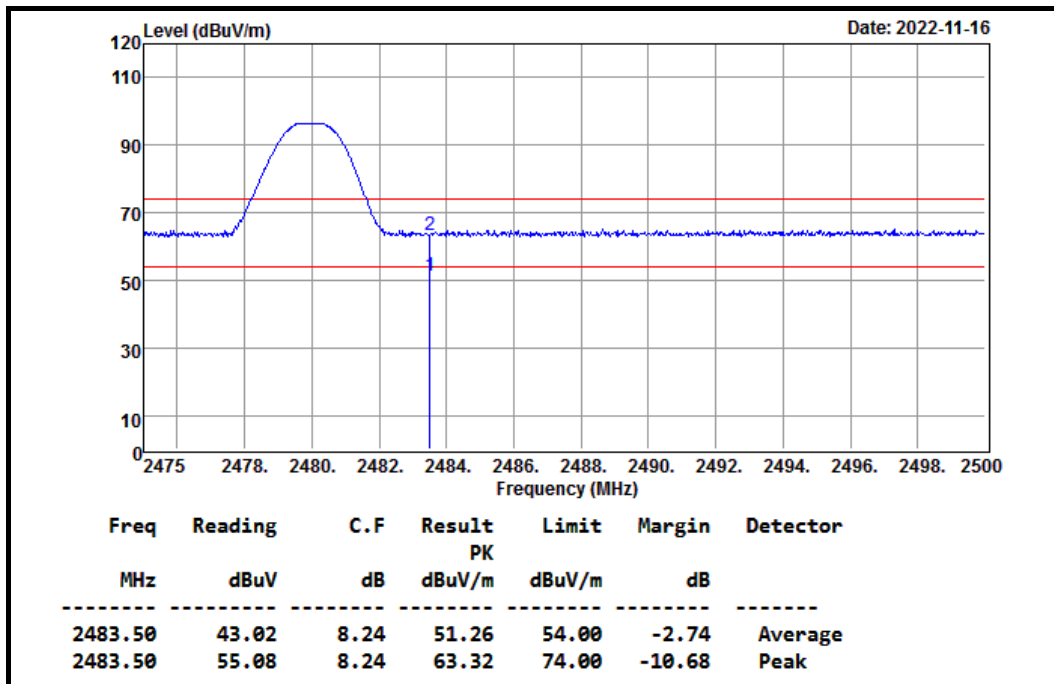


Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 4.0 TX (CH High)	TEMP& Humidity	22.3°C, 52%

## Horizontal

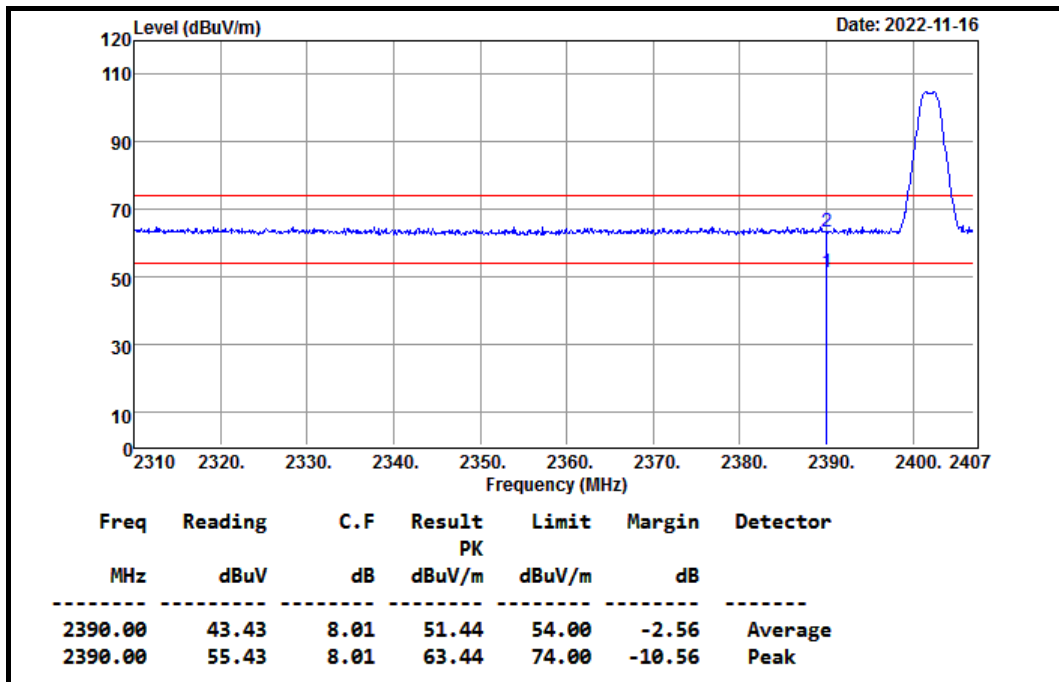


## Vertical

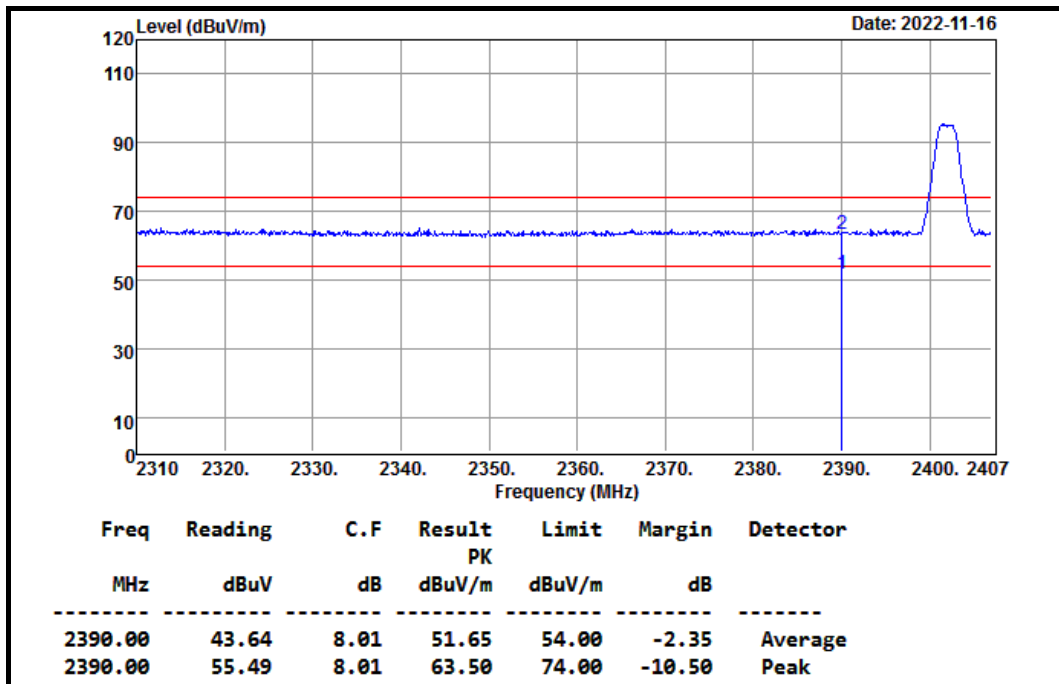


Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 5.0 TX (CH Low)	TEMP& Humidity	22.3°C, 52%

## Horizontal

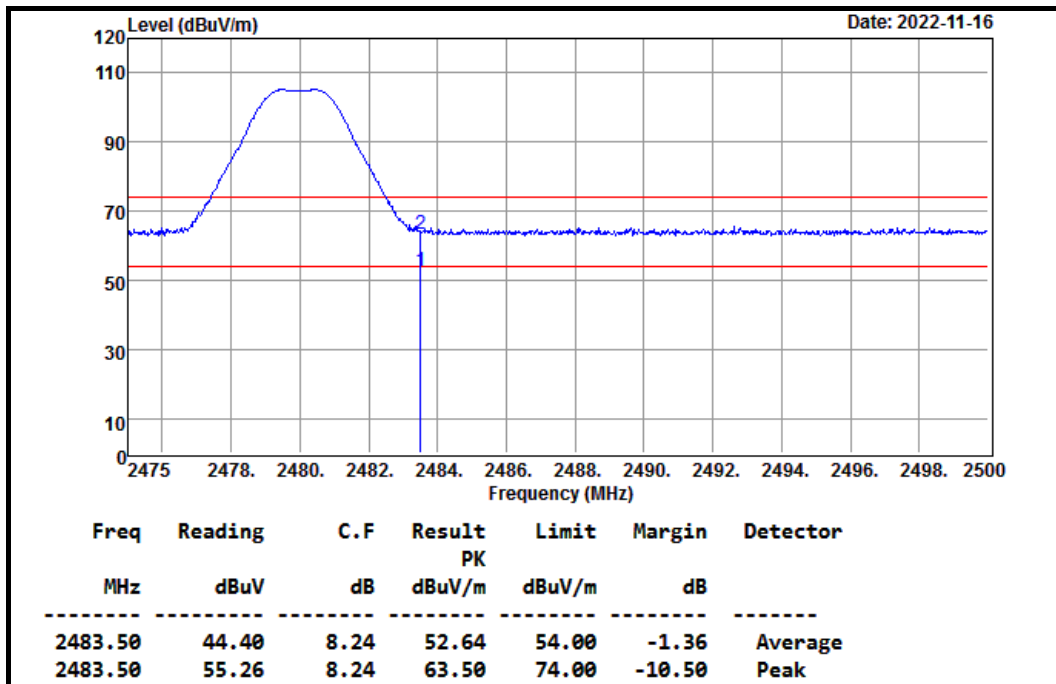


## Vertical

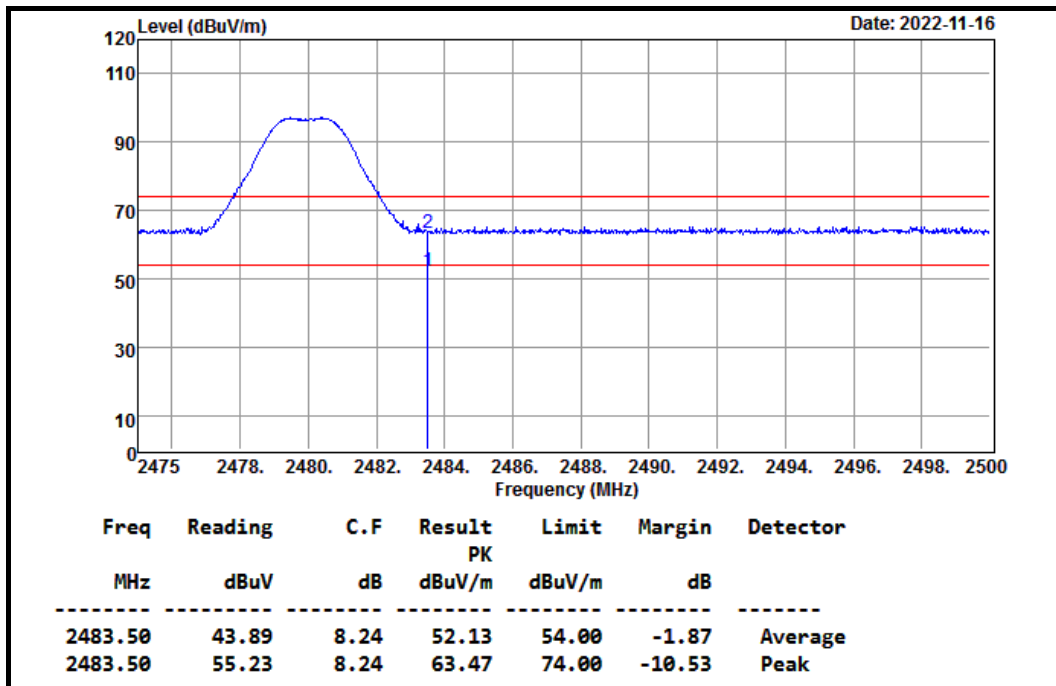


Product Name	Audio Device	Test Date	2022/11/16
Model	ACVA2	Test By	Peter Chu
Test Mode	Bluetooth 5.0 TX (CH High)	TEMP& Humidity	22.3°C, 52%

## Horizontal



## Vertical





## 8.7 POWERLINE CONDUCTED EMISSIONS

### LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

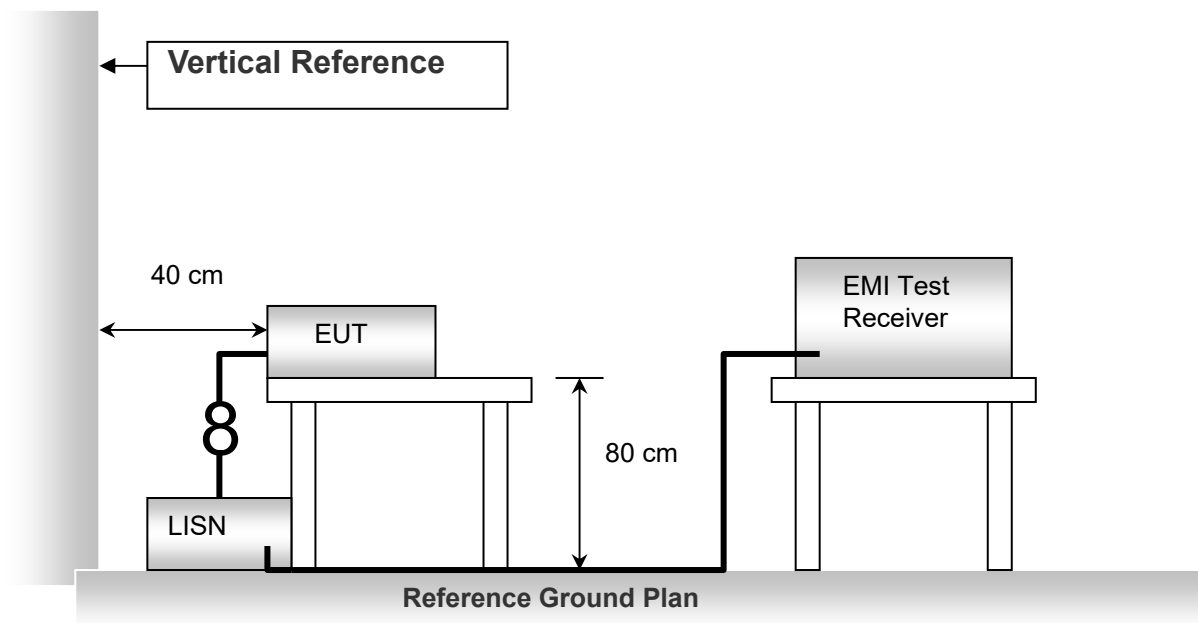
Frequency of Emission (MHz)	Conducted limit (dB $\mu$ v)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.5 - 5	56	46
5 - 30	60	50

### TEST EQUIPMENTS

The following test equipments are used during the conducted power line tests :

Conducted Emission room #1					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
BNC Coaxial Cable	CCS	BNC50	11	01/20/2022	01/19/2023
EMI Test Receiver	R&S	ESCI	100221	04/18/2022	04/17/2023
LISN	FCC	FCC-LISN-50-32-2	08009	07/15/2022	07/14/2023
LISN	SCHWARZBECK	NNLK8130	8130124	01/14/2022	01/13/2023
Pulse Limiter	R&S	ESH3-Z2	100116	01/20/2022	01/19/2023
Software	e3(v6.101222)				

## TEST SETUP



## TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80cm above the horizontal ground plane. The EUT IS CONFIGURED IN ACCORDANCE WITH ANSI C63.10.

The resolution bandwidth is set to 9 kHz for both quasi-peak detection and average detection measurements.

Line conducted data is recorded for both NEUTRAL and LINE.

## TEST RESULTS

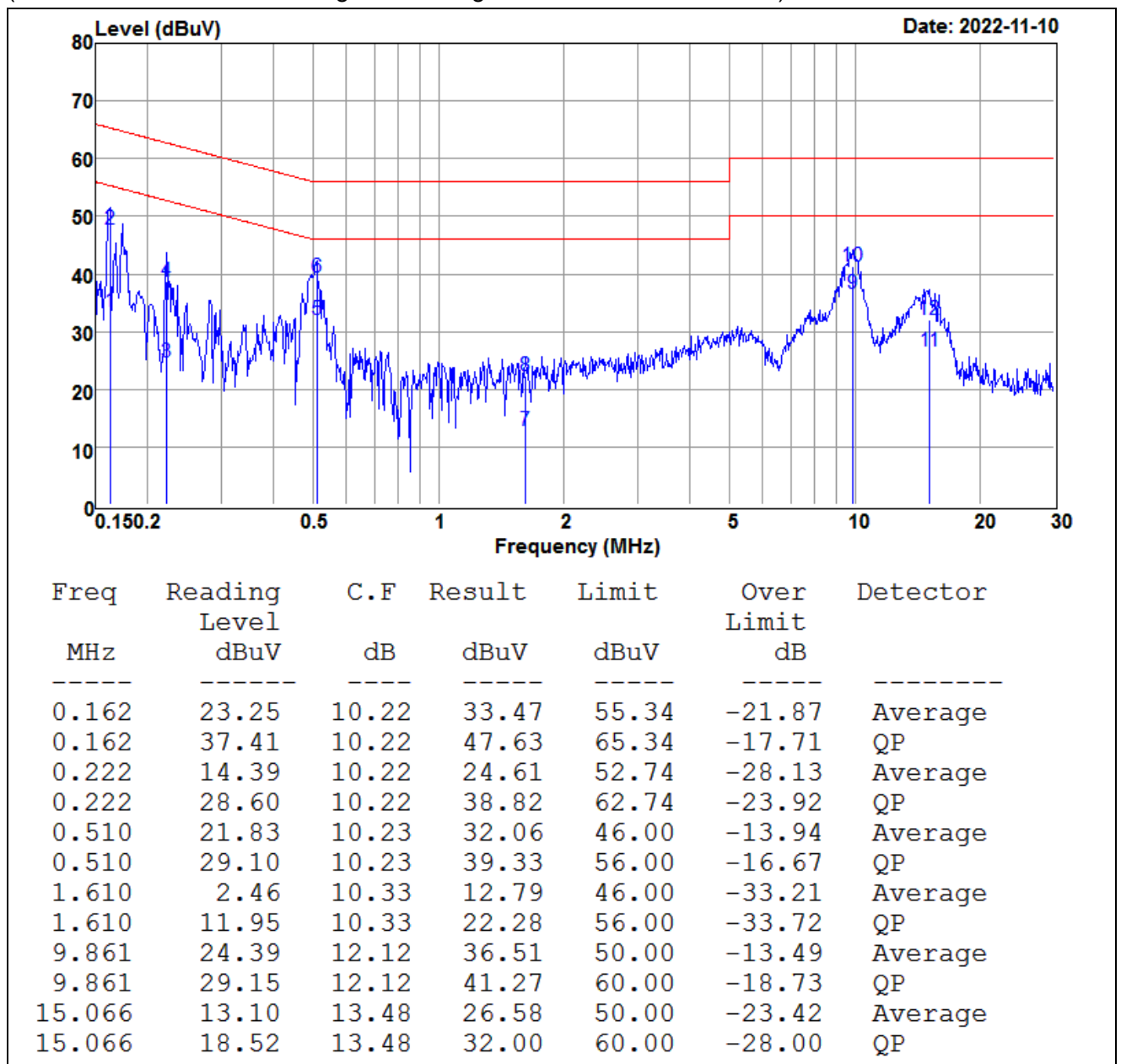
No non-compliance noted.

Test Voltage: AC 120V, 60Hz

Model No.	ACVA2	Test Mode	Normal Operation
Environmental Conditions	25.1°C, 55% RH	Resolution Bandwidth	9 kHz
Tested by	Jeremy Zhong		

### Line

(The chart below shows the highest readings taken from the final data.)



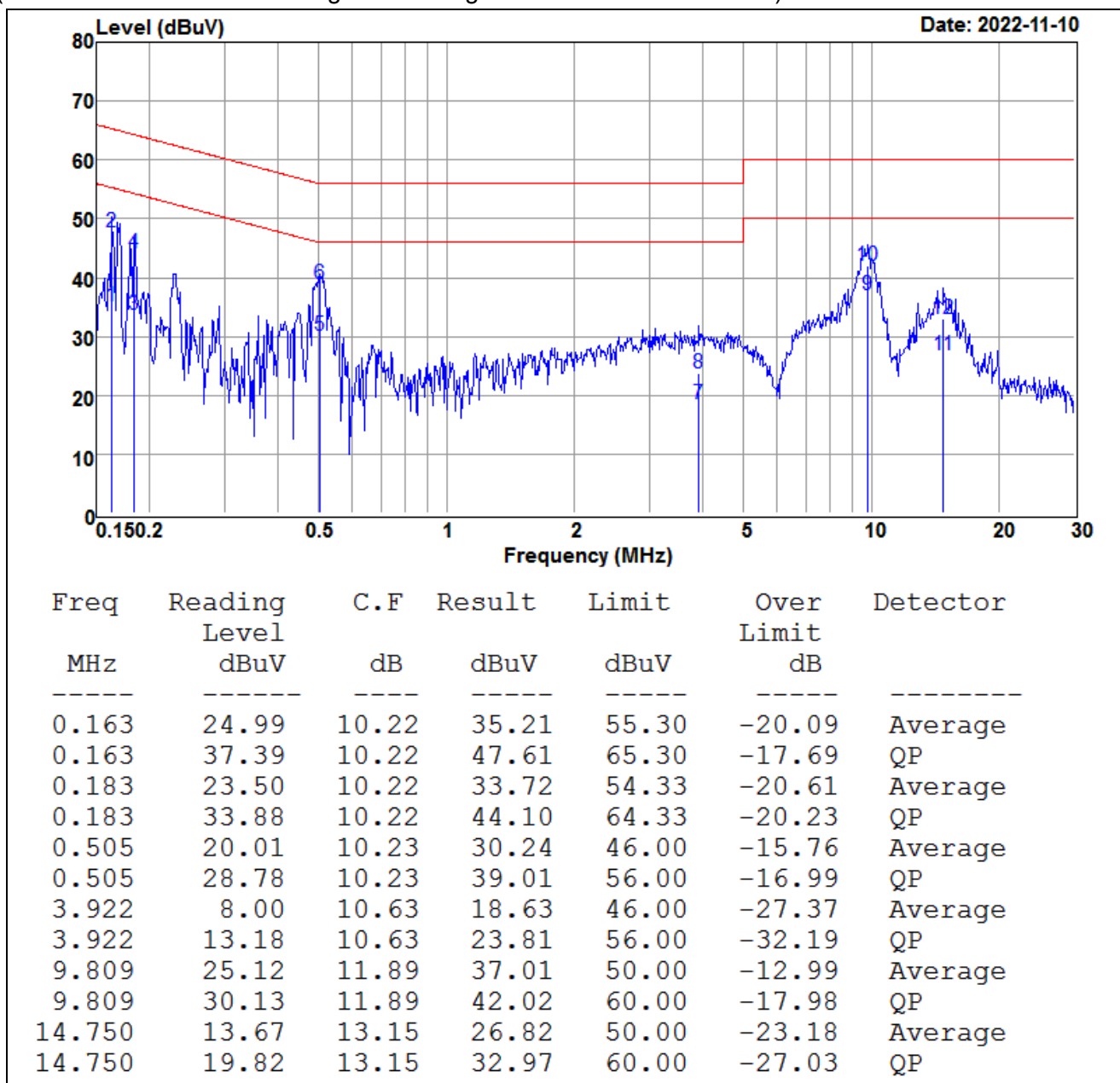
### NOTE:

1. Measured Level (dBuV) = LISN Factor (dB) + Cable Loss (dB) + Meter Reading (dBuV)
2. Over Limit (dBuV) = Measured Level (dBuV) - Limits (dBuV)

Model No.	ACVA2	Test Mode	Normal Operation
Environmental Conditions	25.1°C, 55% RH	Resolution Bandwidth	9 kHz
Tested by	Jeremy Zhong		

## Neutral

(The chart below shows the highest readings taken from the final data.)



## NOTE:

1. Measured Level (dBuV) = LISN Factor (dB) + Cable Loss (dB) + Meter Reading (dBuV)
2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

## 9. ANTENNA REQUIREMENT

### 9.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 9.2 ANTENNA CONNECTED CONSTRUCTION

Type: WLAN ANTENNA  
Model: DB1EM60-I0195  
Manufacturer: BRITO  
Gain: 6.46 dBi

**=== END of Report ===**