

TEST REPORT

Product Name : Wireless Repeater/Range Extender
Brand Mark : N/A
Model No. : RA1200
Extension Model : RA1200-FE, RA1200-A, RA1200-B, RA1200-C,
RA1200-D, RA1200-E, RA1200-F, RA300, RA1900,
RA2400
FCC ID : 2AZGQ-RA1200
Report Number : BLA-EMC-202107-A2801
Date of Sample Receipt : 2021/7/8
Date of Test : 2021/7/8 to 2021/8/4
Date of Issue : 2021/8/4
Test Standard : 47 CFR Part 15, Subpart C 15.247
Test Result : Pass

Prepared for:

Shenzhen Zoolan Technology Co., Ltd

**Floor 4, Building A5, Silicon Valley Power Digital Industrial Park, No. 22,
Dafu Industrial Zone, Dafu Community, Guanlan Street, Longhua District,
Shenzhen, Guangdong**

Prepared by:

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Date:

2021/8/4



REPORT REVISE RECORD

Version No.	Date	Description
00	2021/8/4	Original

BlueAsia

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1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5 & Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(1) & 15.247(b)(3)	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass

2 GENERAL INFORMATION

Applicant	Shenzhen Zoolan Technology Co.,Ltd
Address	Floor 4, Building A5, Silicon Valley Power Digital Industrial Park, No. 22, Dafu Industrial Zone, Dafu Community, Guanlan Street, Longhua District, Shenzhen, Guangdong
Manufacturer	Shenzhen Zoolan Technology Co.,Ltd
Address	Floor 4, Building A5, Silicon Valley Power Digital Industrial Park, No. 22, Dafu Industrial Zone, Dafu Community, Guanlan Street, Longhua District, Shenzhen,
Factory	Shenzhen Zoolan Technology Co.,Ltd
Address	Floor 4, Building A5, Silicon Valley Power Digital Industrial Park, No. 22, Dafu Industrial Zone, Dafu Community, Guanlan Street, Longhua District, Shenzhen,
Product Name	Wireless Repeater/Range Extender
Test Model No.	RA1200

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V2.0
Software Version	V13

Product Name:	Wireless Repeater/Range Extender
Model No.:	RA1200
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(H20)) 2422MHz~2452MHz (802.11n(H40))
Channel numbers:	802.11b/802.11g /802.11n(HT20): 11; 802.11n(H40): 7
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/802.11n(H20)/ 802.11n(H40) Orthogonal Frequency Division Multiplexing (OFDM)
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps
Data speed (IEEE 802.11n):	Up to 300 Mbps
Antenna Type:	Patch Antenna
Antenna gain:	3 dBi
Power supply:	AC110-230V/0.03A
Remark: The Antenna Gain is supplied by the customer.BlueAsia is not responsible for this data	

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25°C	AC120V

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the dutycycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30Mz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	HASEE	K610D	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co., Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673
No tests were sub-contracted.

9 TEST INSTRUMENTS LIST

Test Equipment Of Radiated Spurious Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	2020/11/10	2023/11/9
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Receiver	R&S	ESR7	101199	2020/10/12	2021/10/11
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2020/9/26	2022/9/25
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	2020/9/26	2022/9/25
Amplifier	SKET	PA-000318G-45	N/A	2020/10/16	2021/10/15
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2020/9/26	2022/9/25
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

Test Equipment Of Radiated Emissions which fall in the restricted bands					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	2020/11/10	2023/11/9
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Receiver	R&S	ESR7	101199	2020/10/12	2021/10/11
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2020/9/26	2022/9/25
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	2020/9/26	2022/9/25

Amplifier	SKET	PA-000318G-45	N/A	2020/10/16	2021/10/15
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2020/9/26	2022/9/25
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

Test Equipment Of Power Spectrum Density

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11

Test Equipment Of Conducted Peak Output Power

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11

Test Equipment Of Minimum 6dB Bandwidth

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11

Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11

Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Shield room	SKET	833	N/A	2020/11/25	2023/11/24
Receiver	R&S	ESPI3	101082	2020/10/12	2021/10/11
LISN	R&S	ENV216	3560.6550.15	2020/10/12	2021/10/11
LISN	AT	AT166-2	AKK1806000003	2020/10/12	2021/10/11
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A

10 RADIATED SPURIOUS EMISSIONS

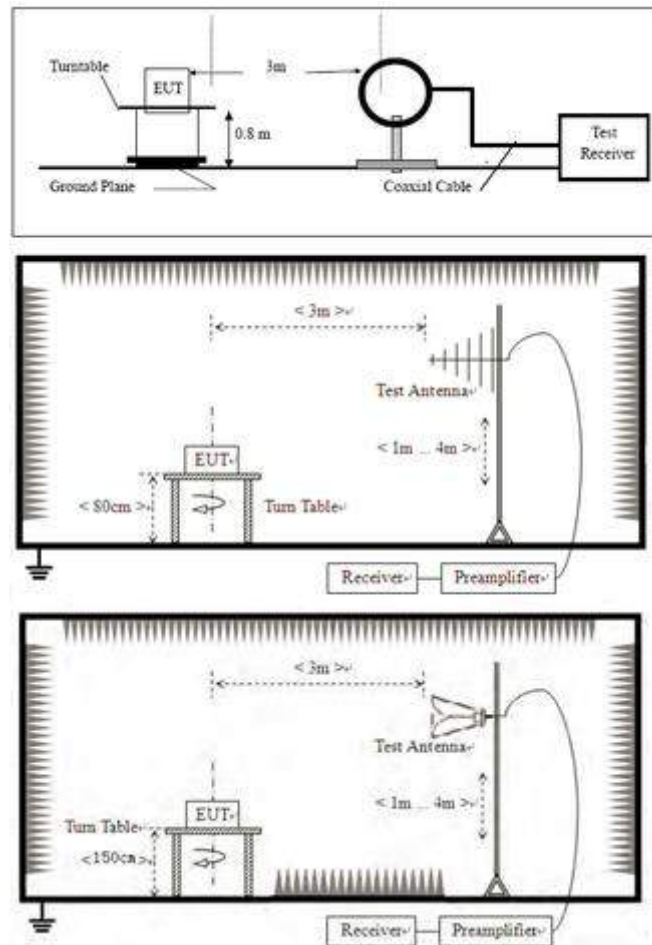
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Eason
Temperature	25℃
Humidity	52%

10.1 LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

10.2 BLOCK DIAGRAM OF TEST SETUP



10.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna 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 polarizations of the antenna are set to make the measurement.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB 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 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

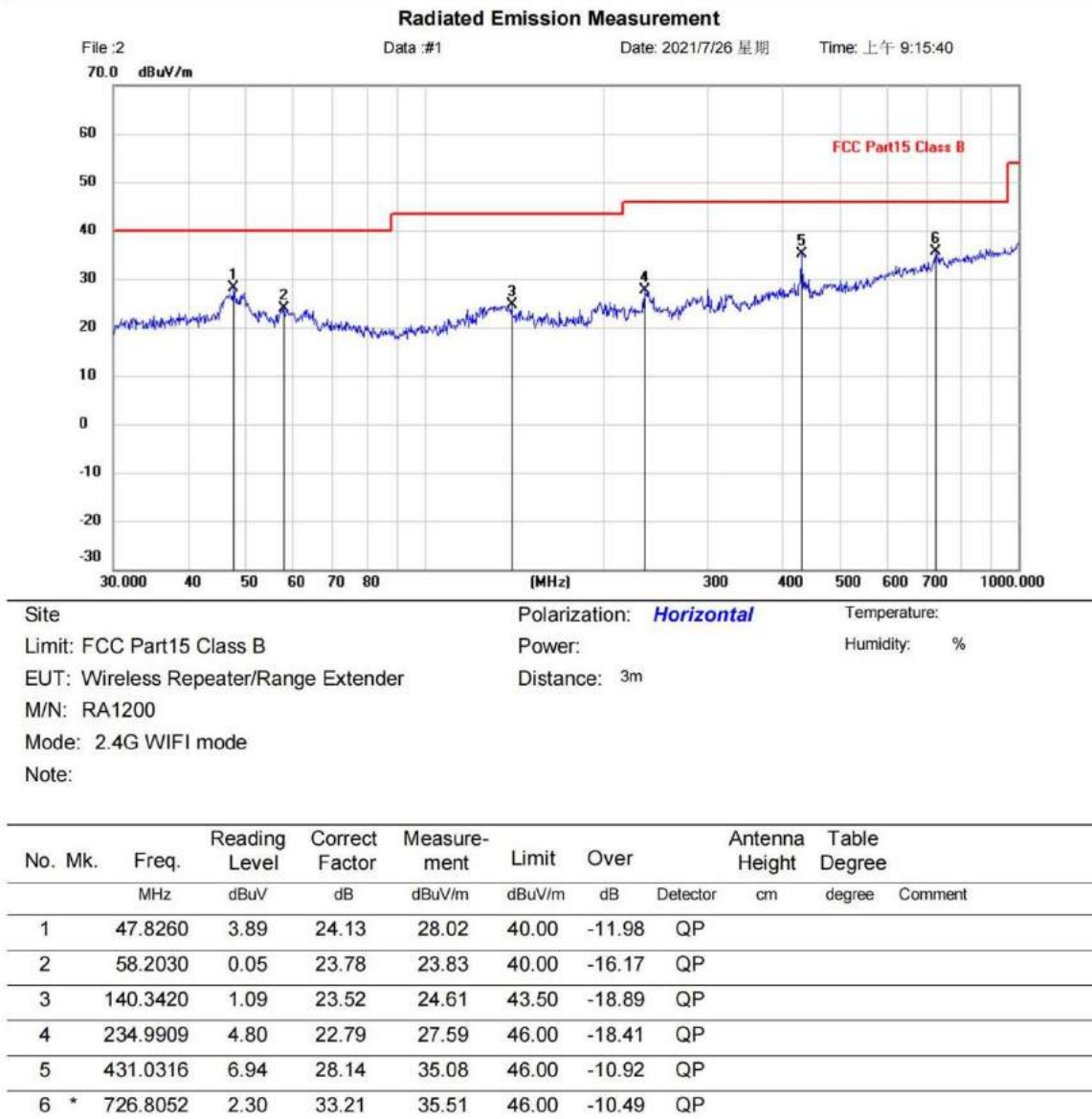
Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. fundamental frequency is blocked by filter, and only spurious emission is shown.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

10.4 TEST DATA

Below 1GHz:

[Test mode:TX mode][Polarity: Horizontal]

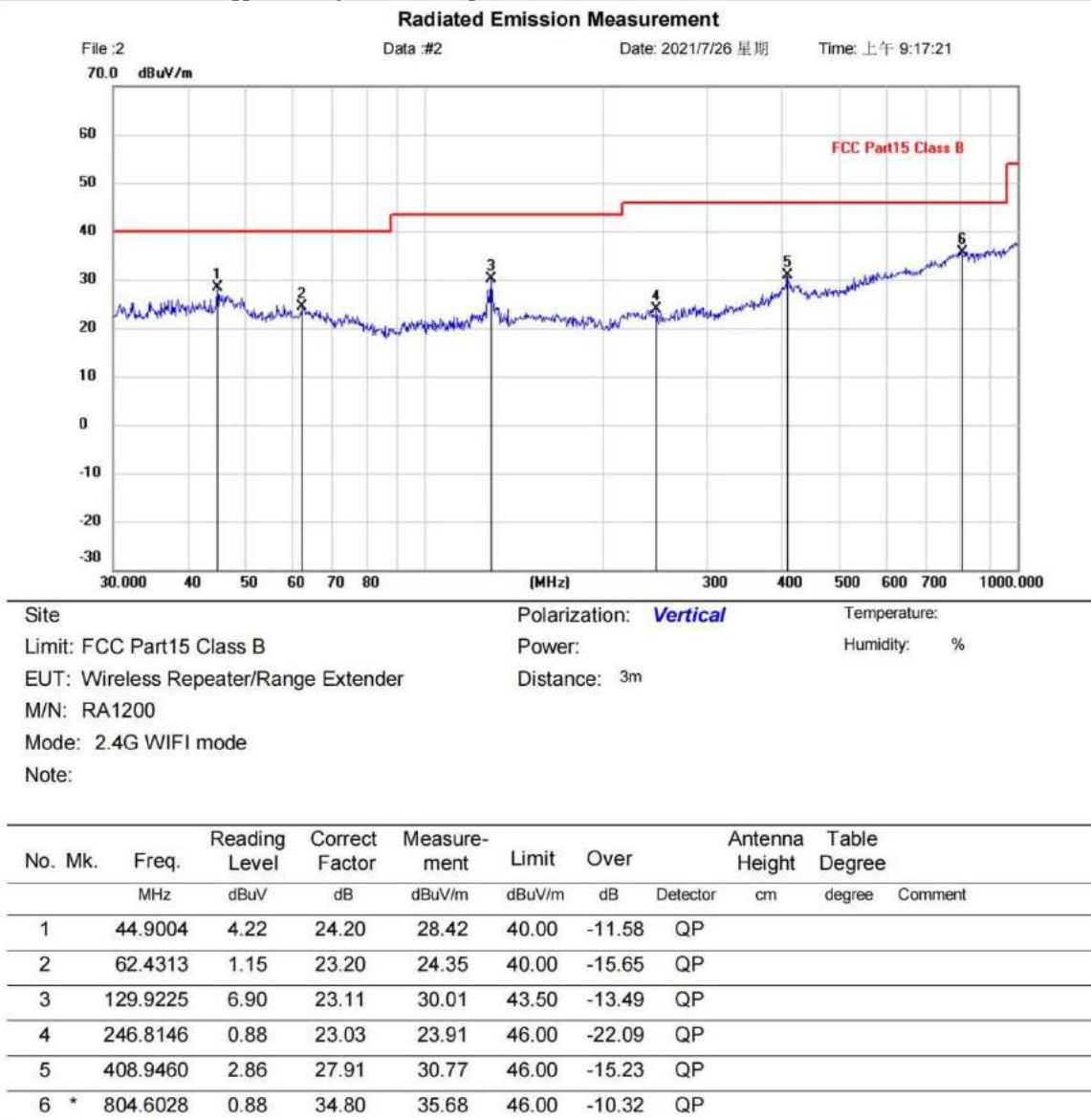


*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

[Test mode:TX mode][Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

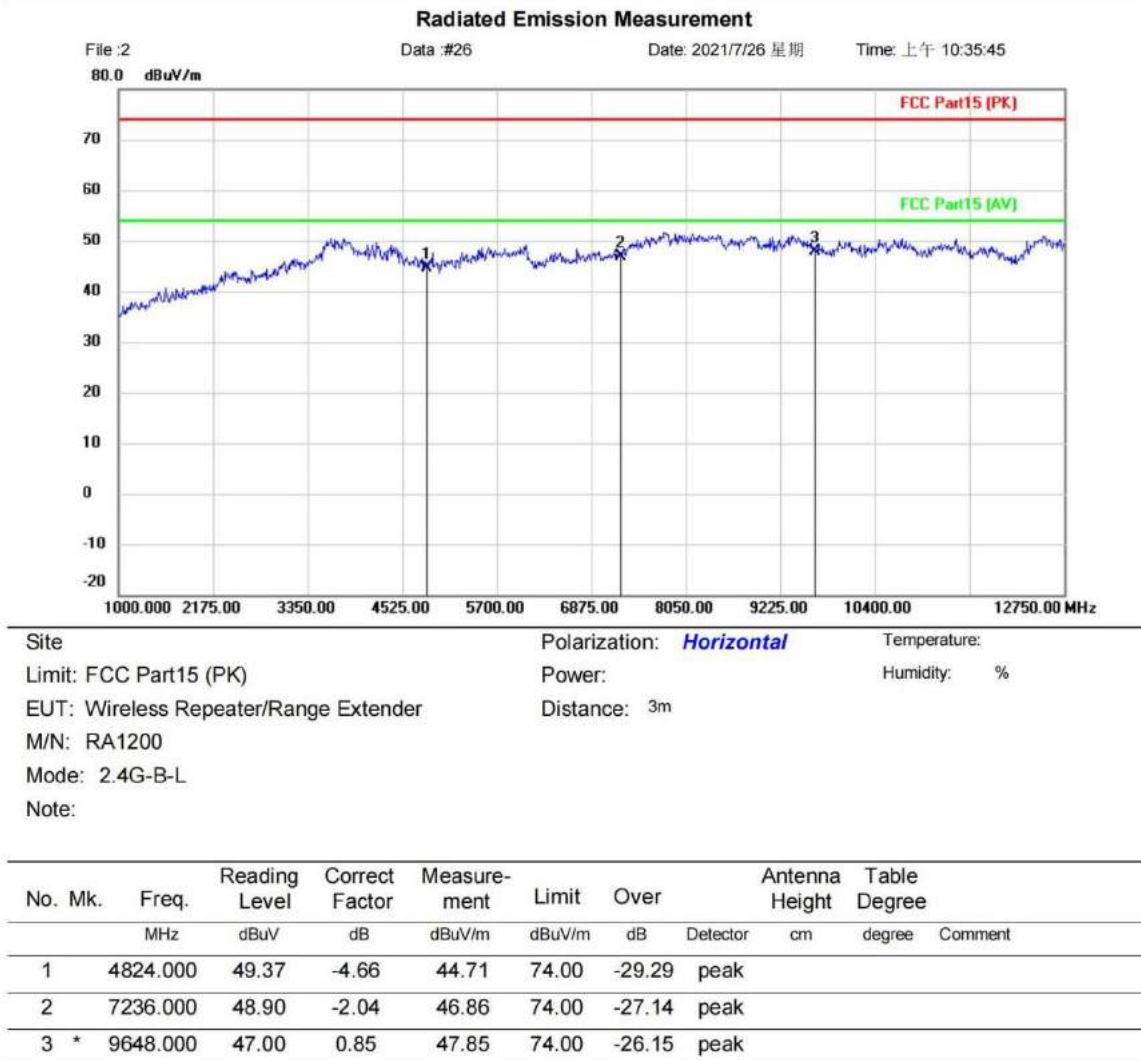
⟨Reference Only

Test Result: Pass

Above 1GHz:

Remark: During the test, pre-scan the 802.11b/g/n mode, and found the 802.11b mode which it is worse case.

[Test mode:802.11b-2412][Polarity: Horizontal]

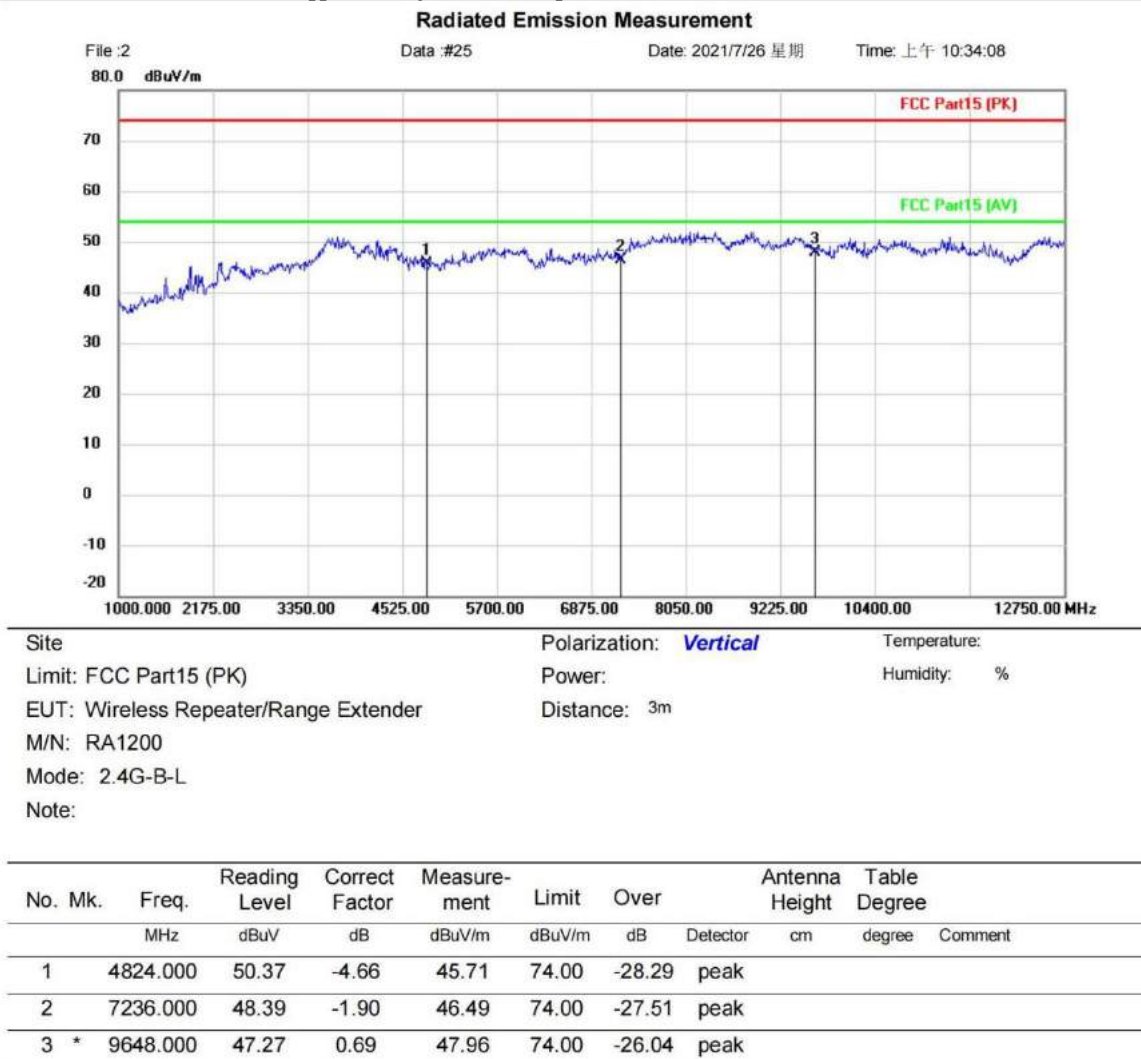


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11b-2412][Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11b-2437][Polarity: Horizontal]

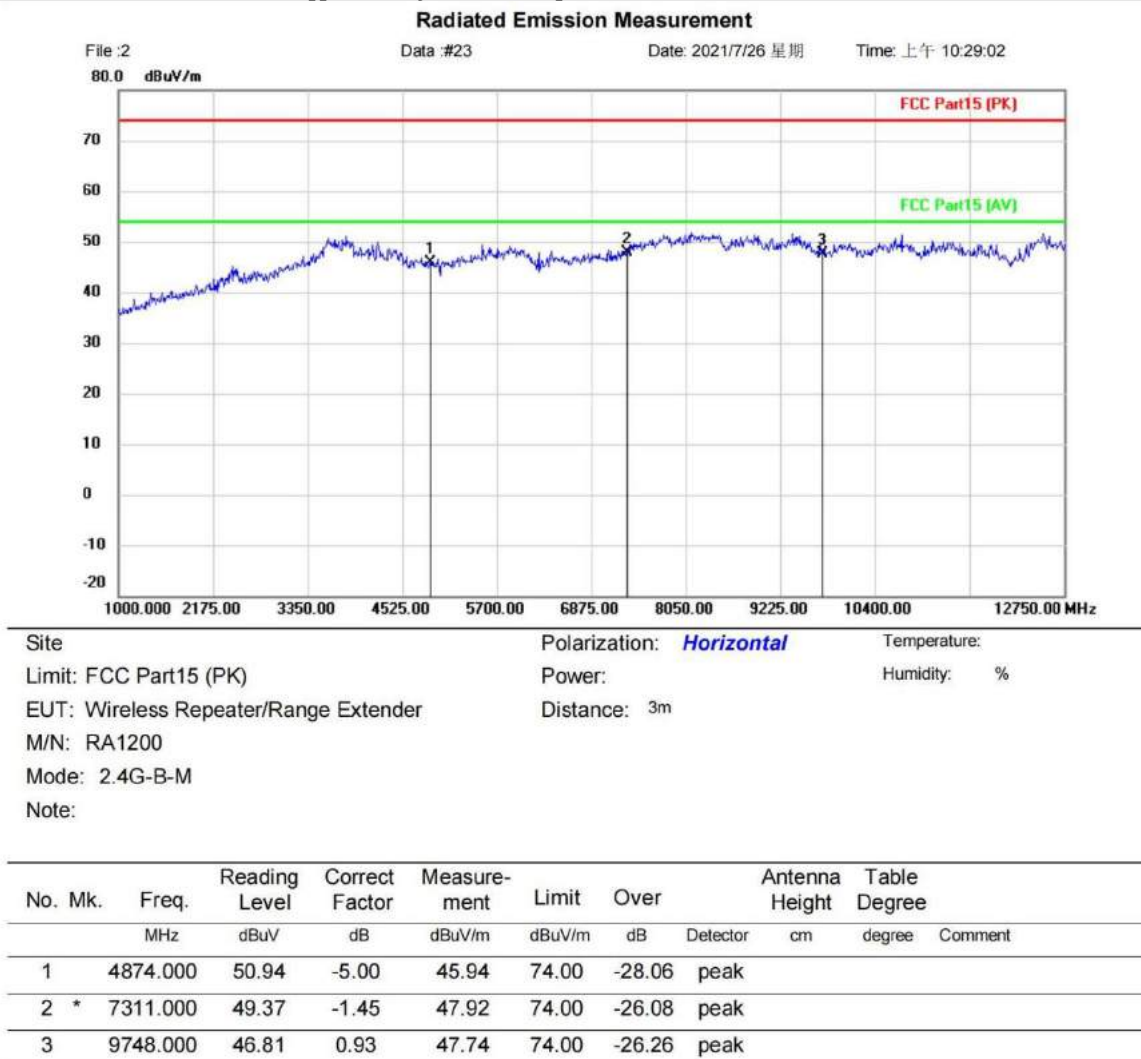


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11b-2437][Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11b-2462][Polarity: Horizontal]

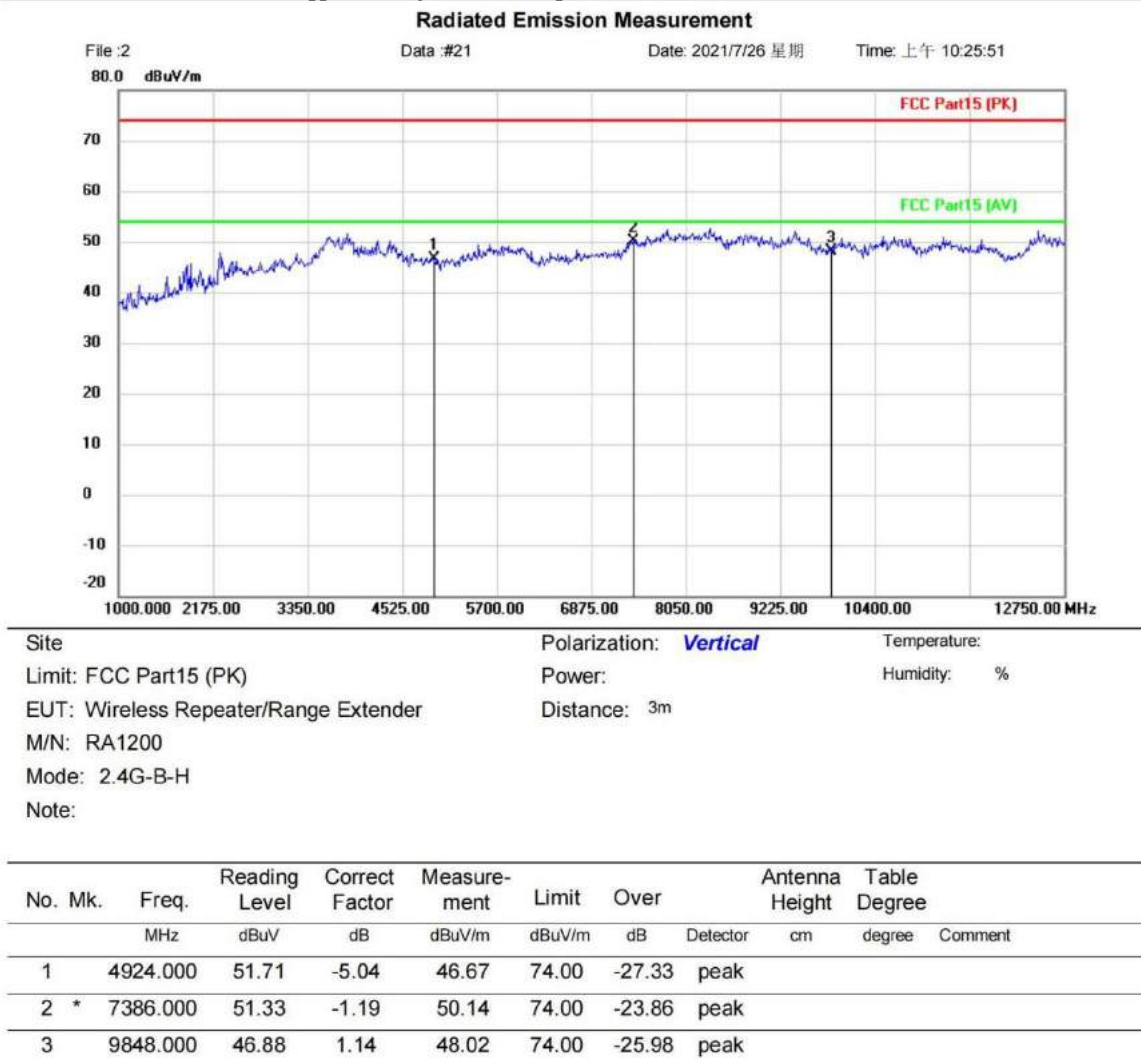


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11b-2462][Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

11 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

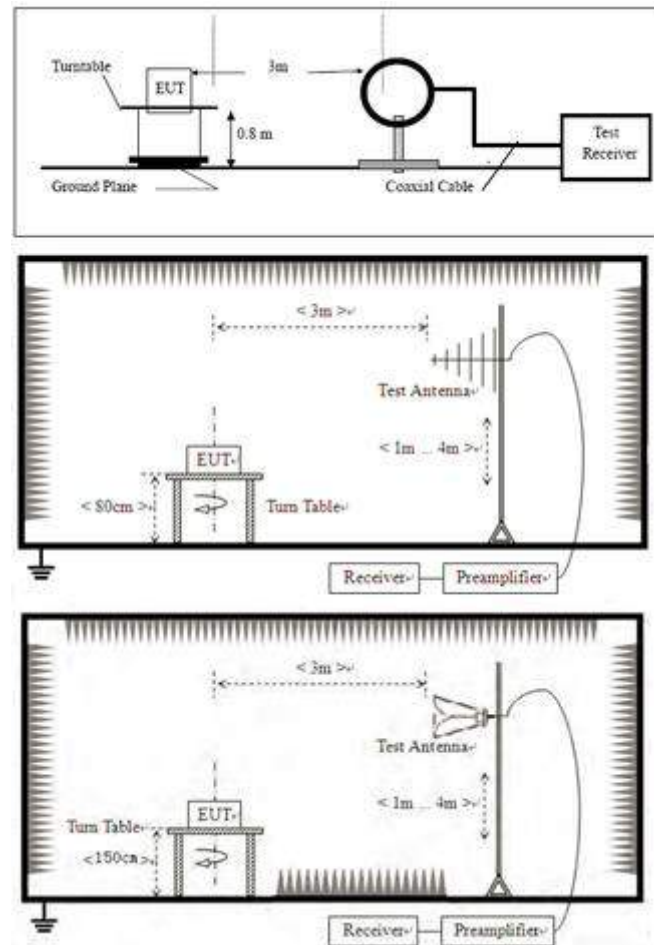
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Eason
Temperature	25℃
Humidity	52%

11.1 LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

11.2 BLOCK DIAGRAM OF TEST SETUP



11.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna 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 polarizations of the antenna are set to make the measurement.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB 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 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

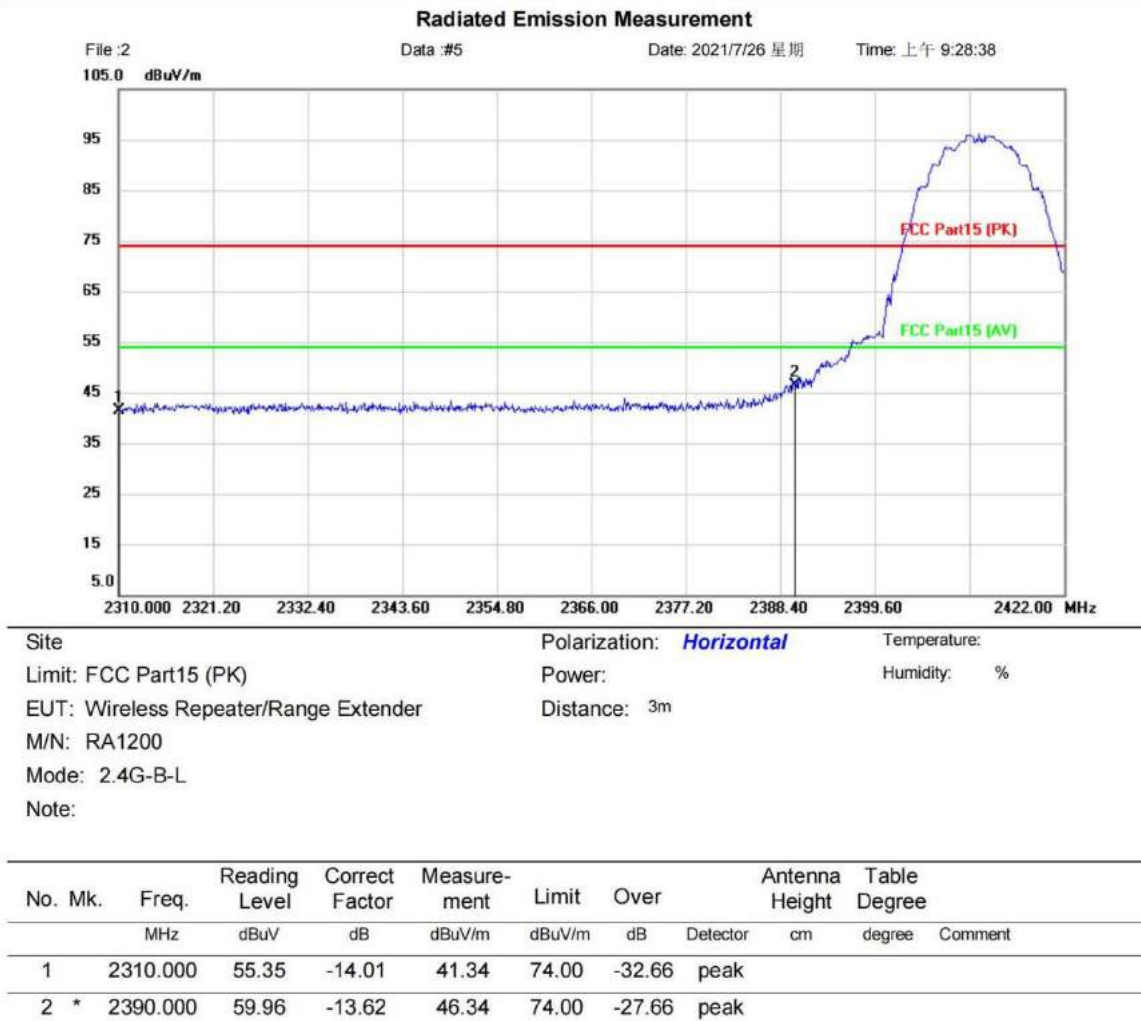
Remark 1: $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamplifier Factor}$

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

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11.4 TEST DATA

[Test mode:802.11b-2412][Polarity: Horizontal]

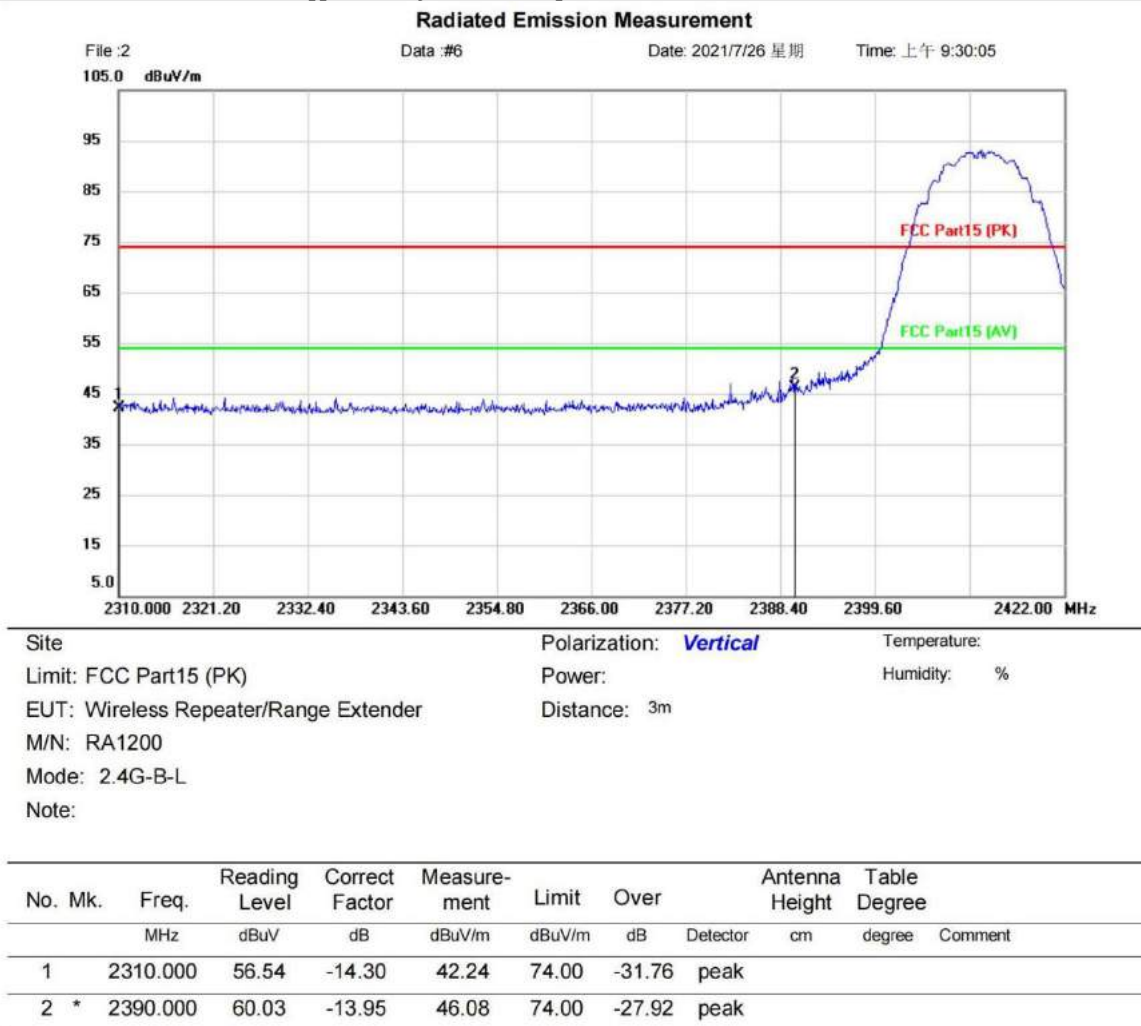


*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

[Test mode:802.11b-2412][Polarity: Vertical]

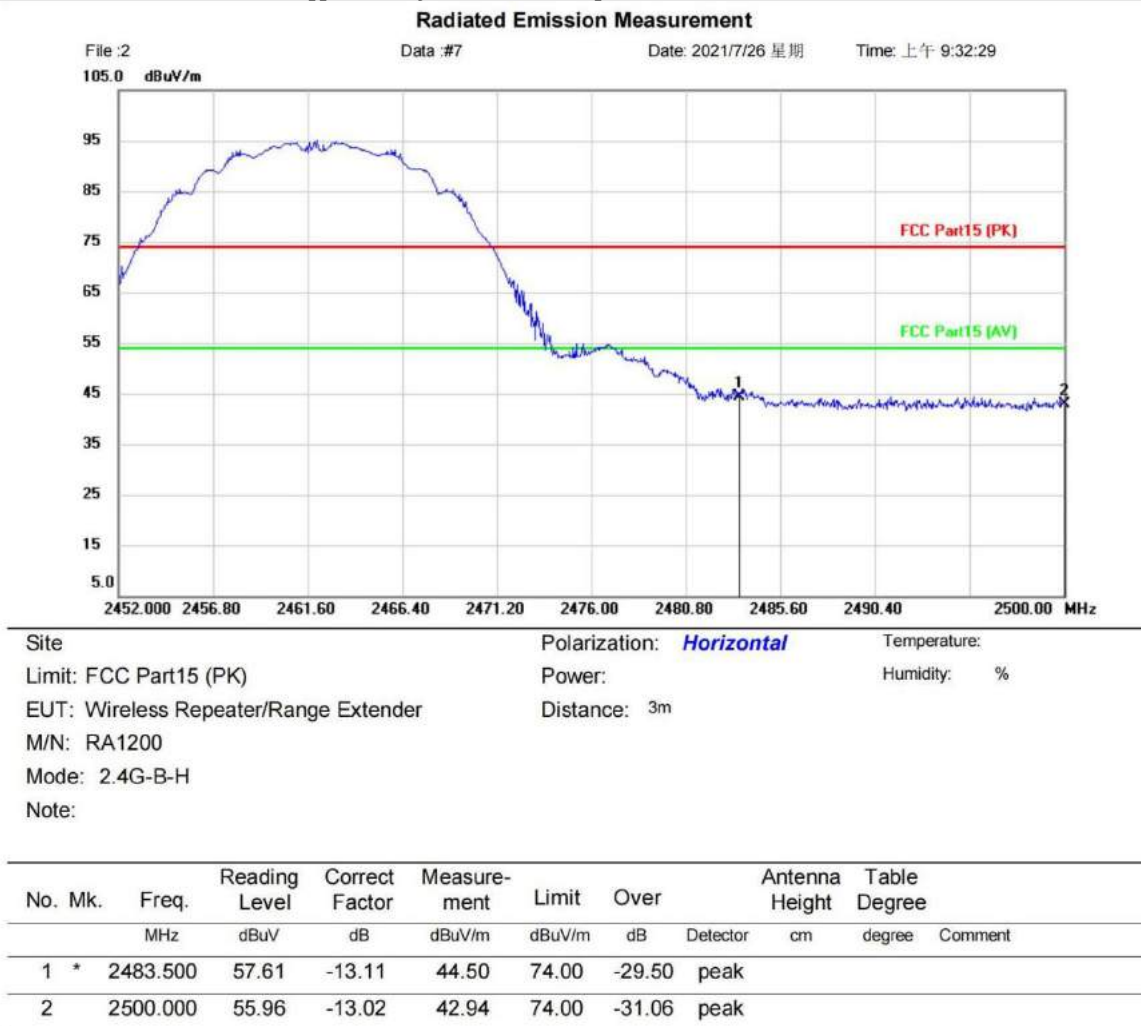


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11b-2462][Polarity: Horizontal]

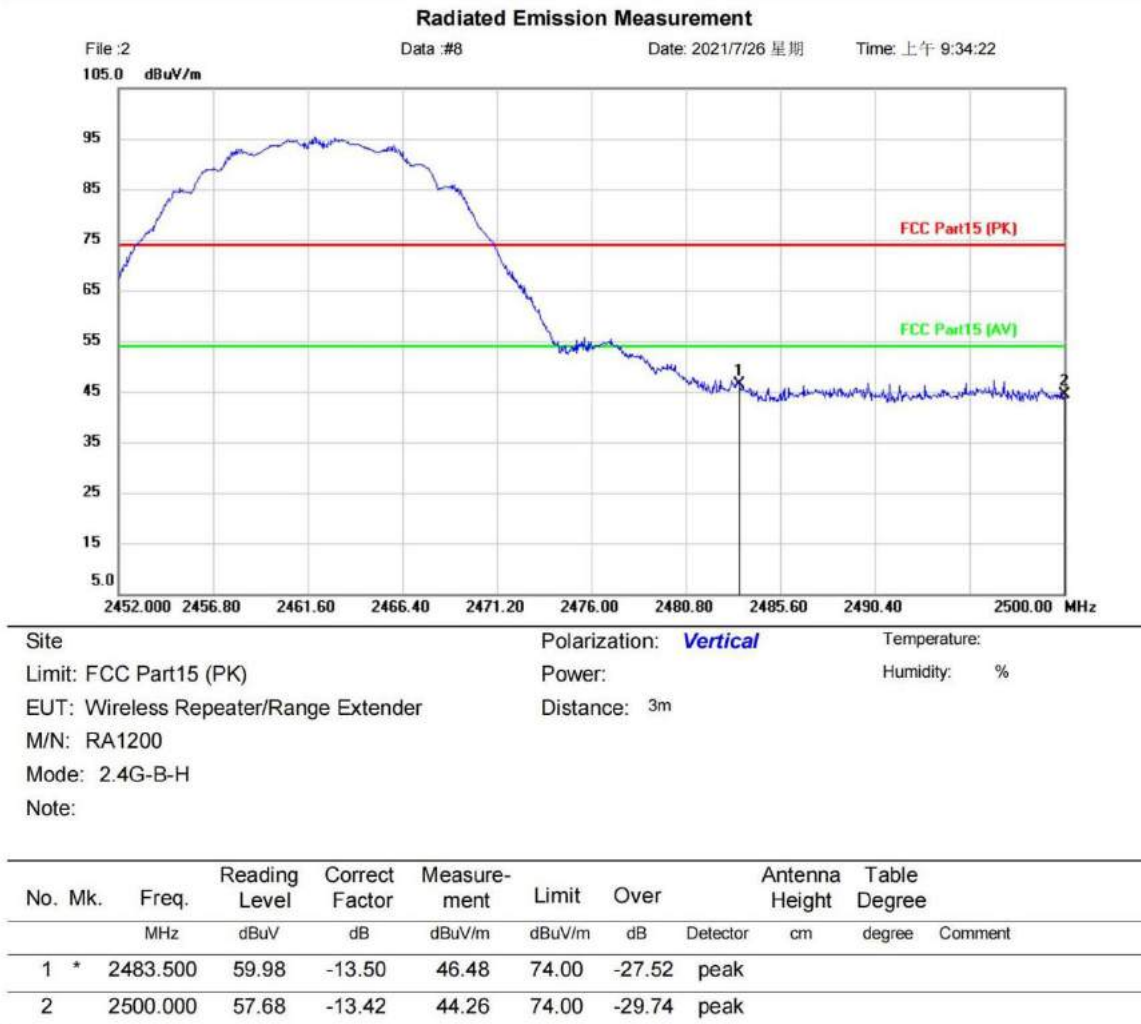


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11b-2462][Polarity: Vertical]

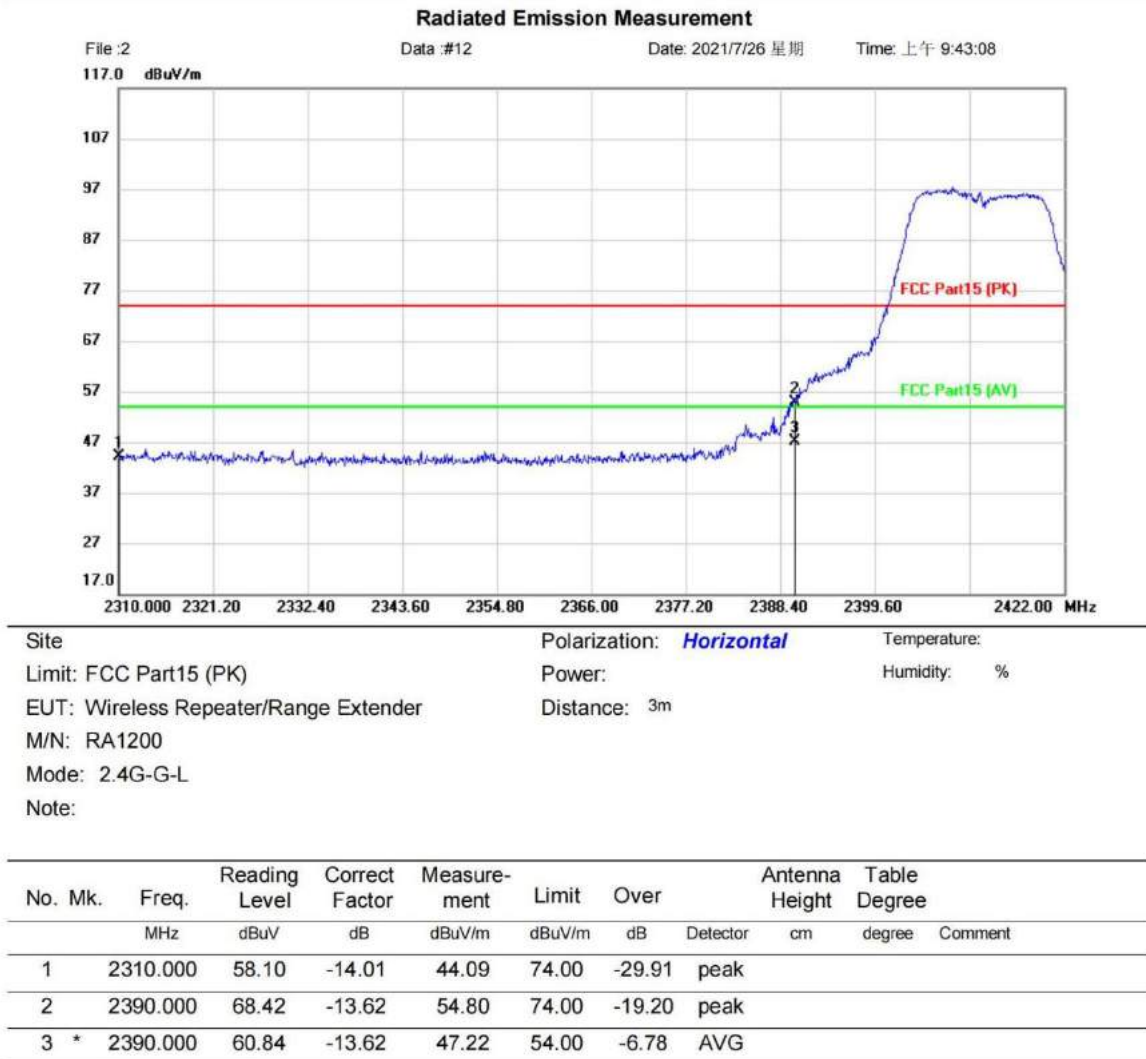


*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

[Test mode:802.11g-2412][Polarity: Horizontal]

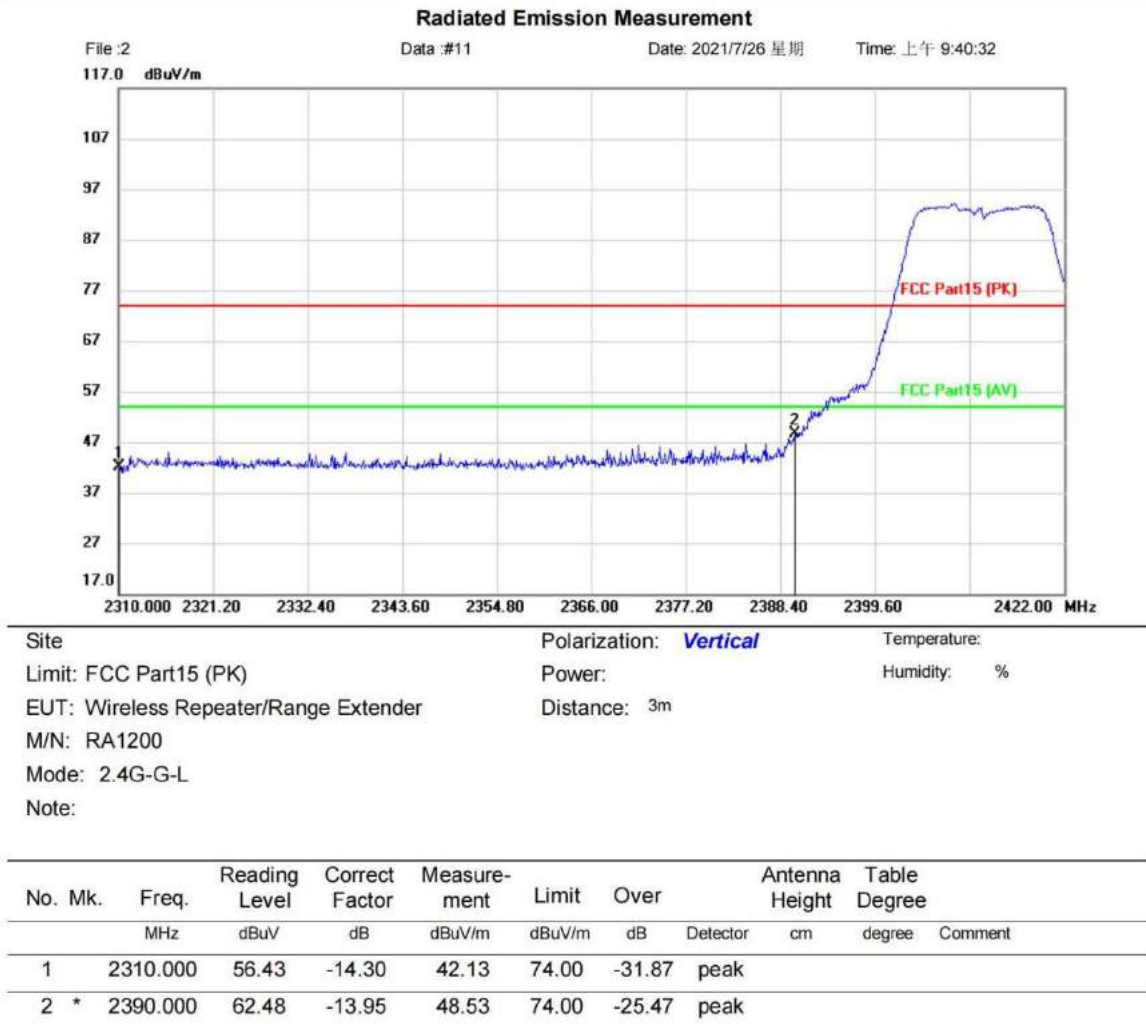


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11g-2412][Polarity: Vertical]

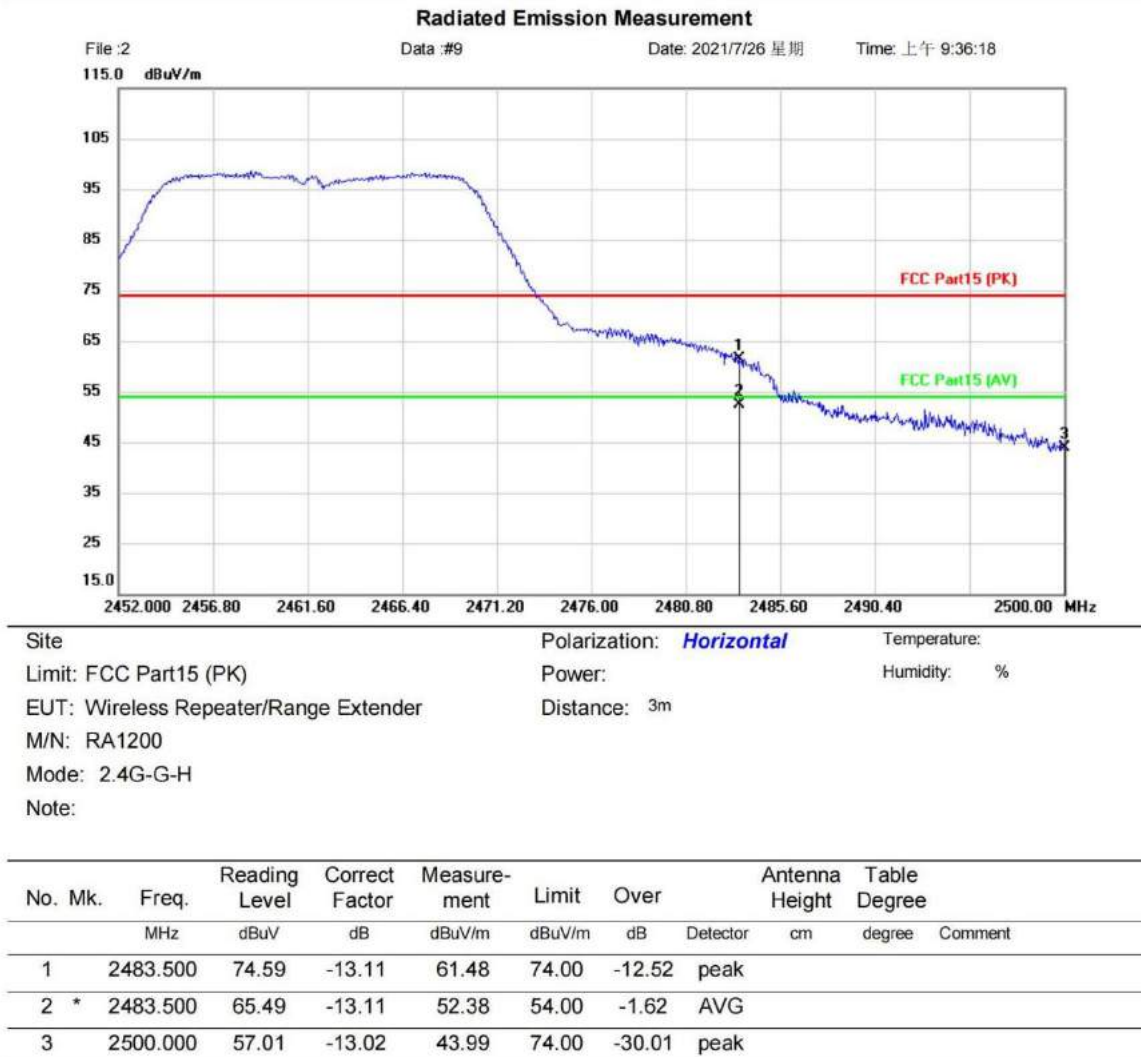


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11g-2462][Polarity: Horizontal]

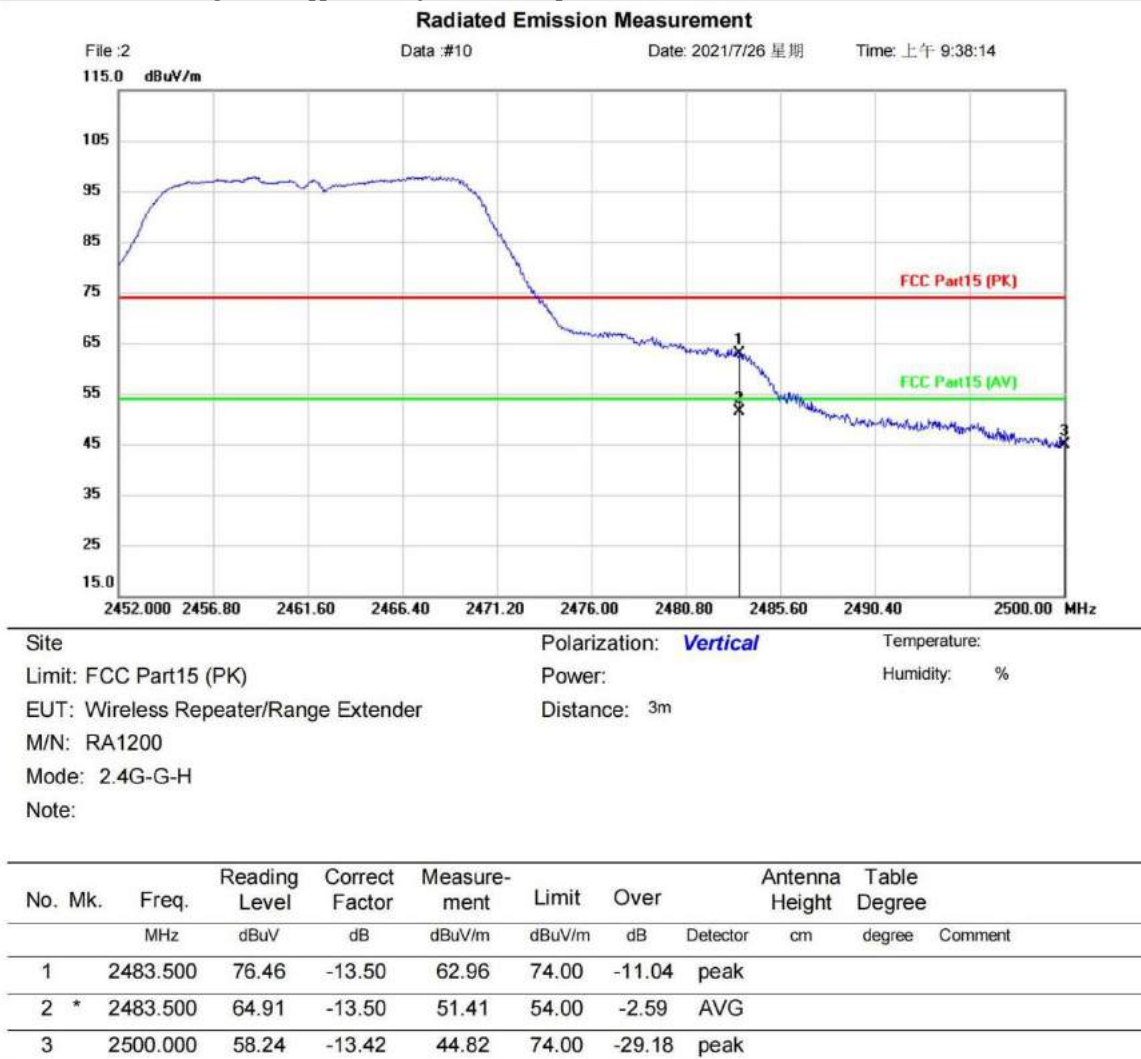


*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

[Test mode:802.11g-2462][Polarity: Vertical]

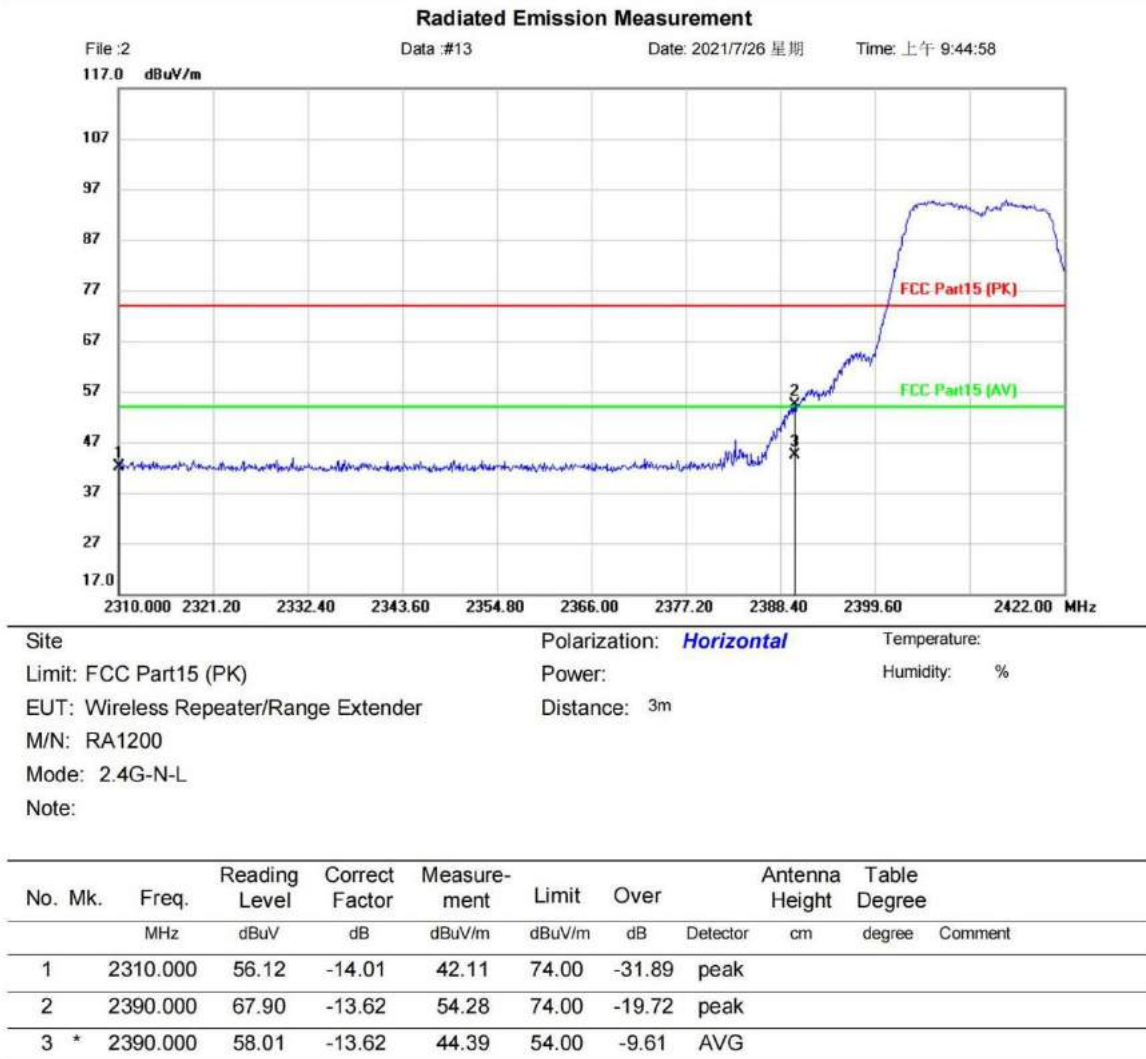


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11n-2412][Polarity: Horizontal]

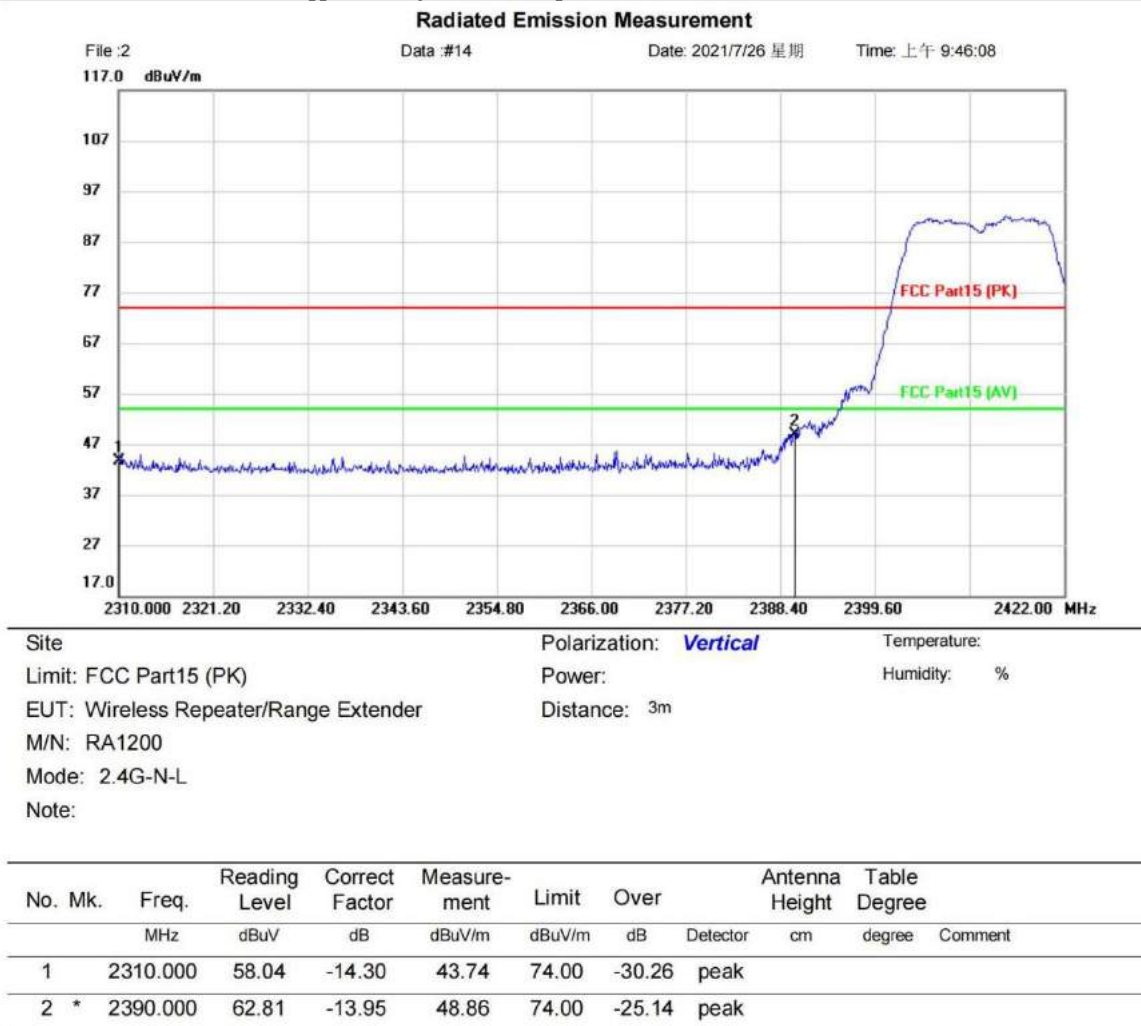


*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

[Test mode:802.11n-2412][Polarity: Vertical]

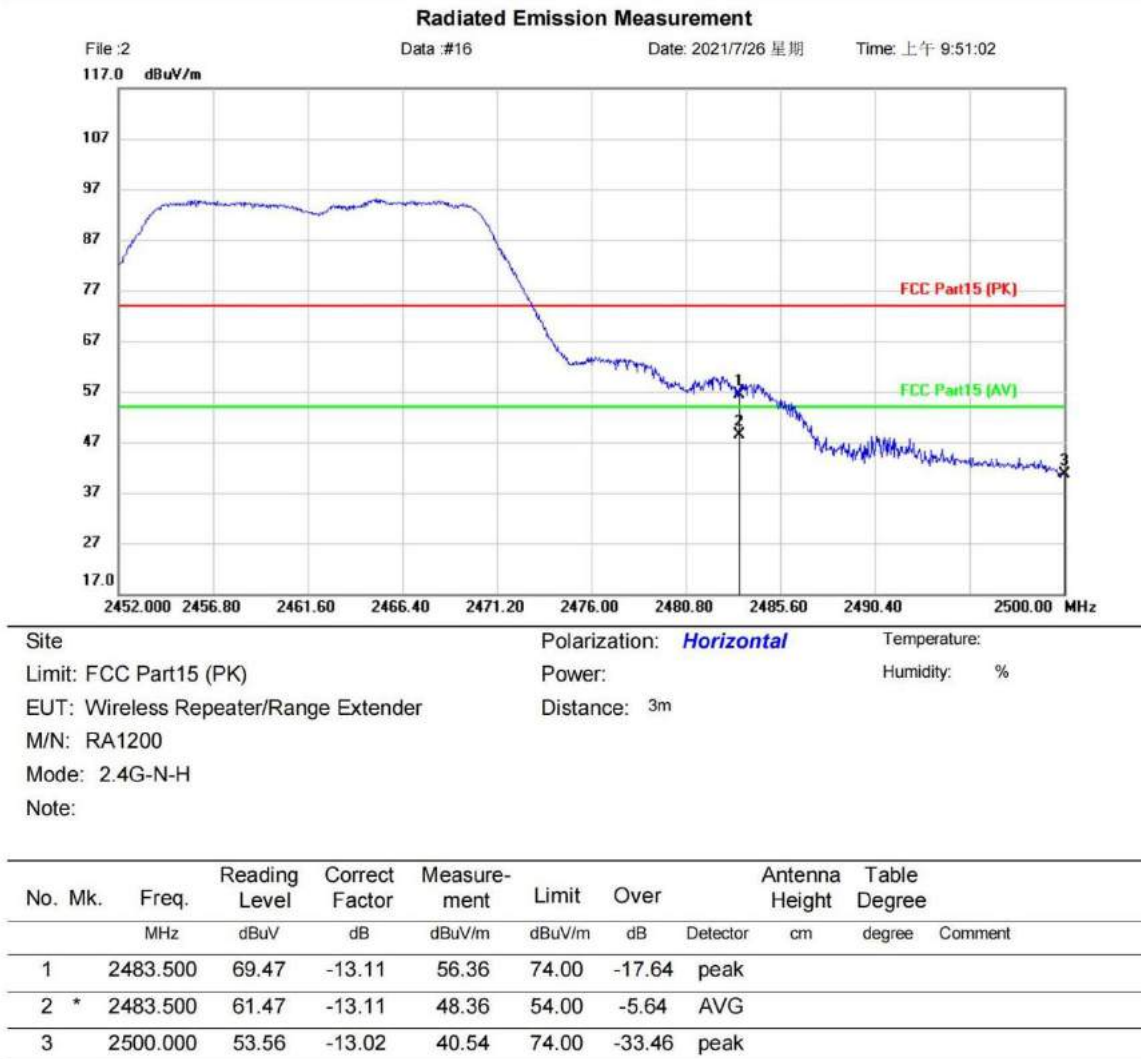


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11n-2462][Polarity: Horizontal]

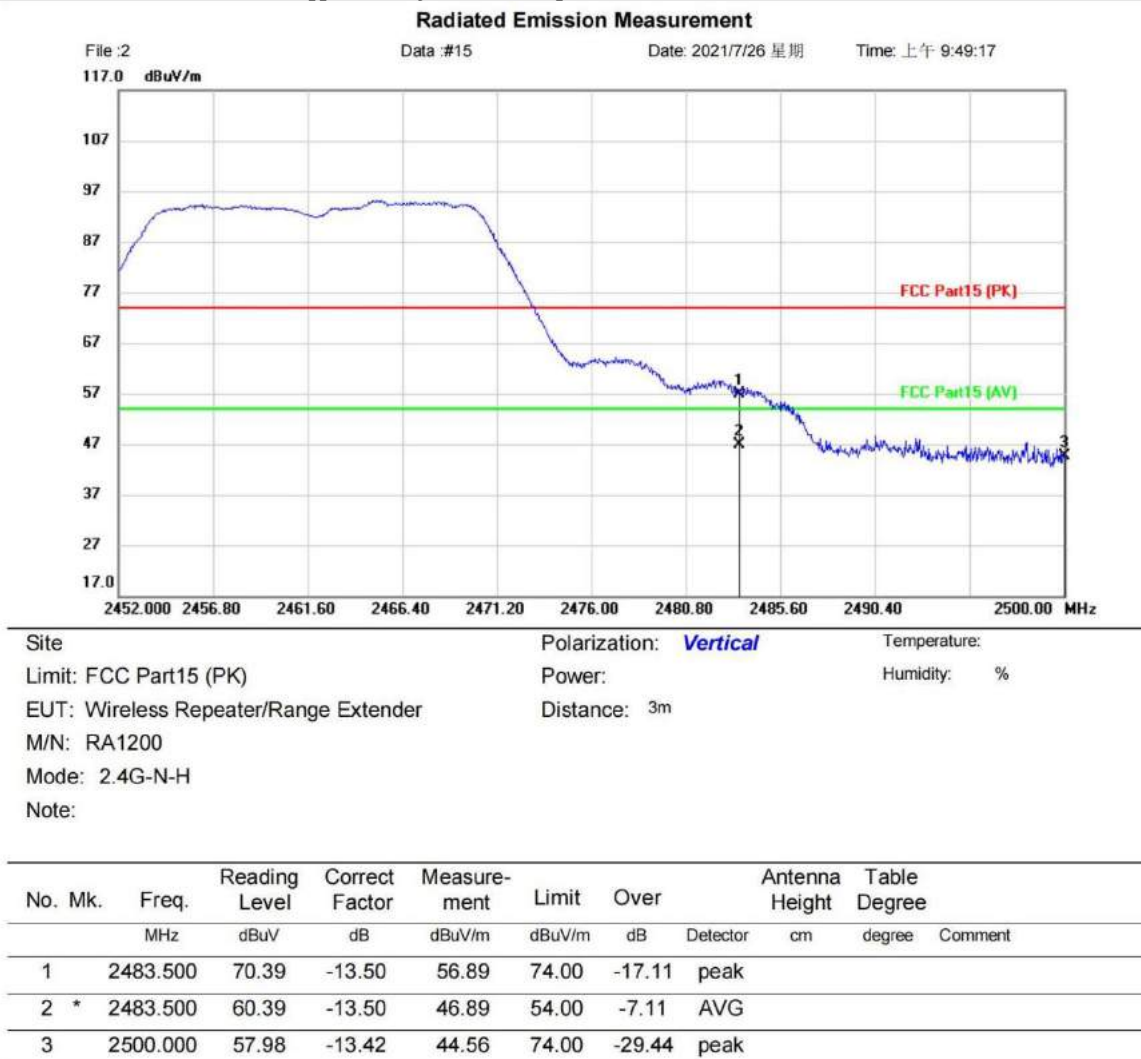


*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

[Test mode:802.11n-2462][Polarity: Vertical]

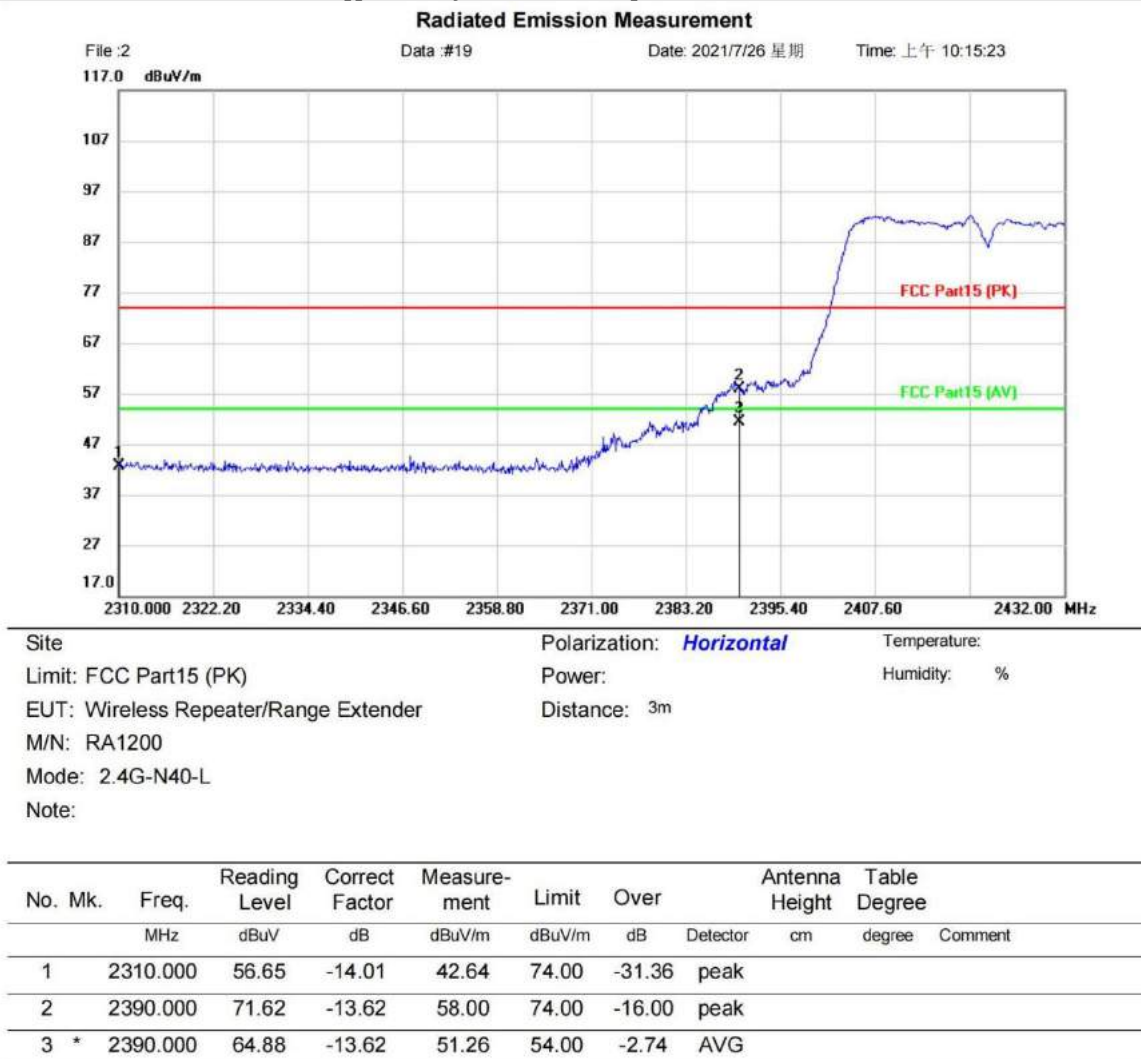


*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

[Test mode:802.11n40-2412][Polarity: Horizontal]

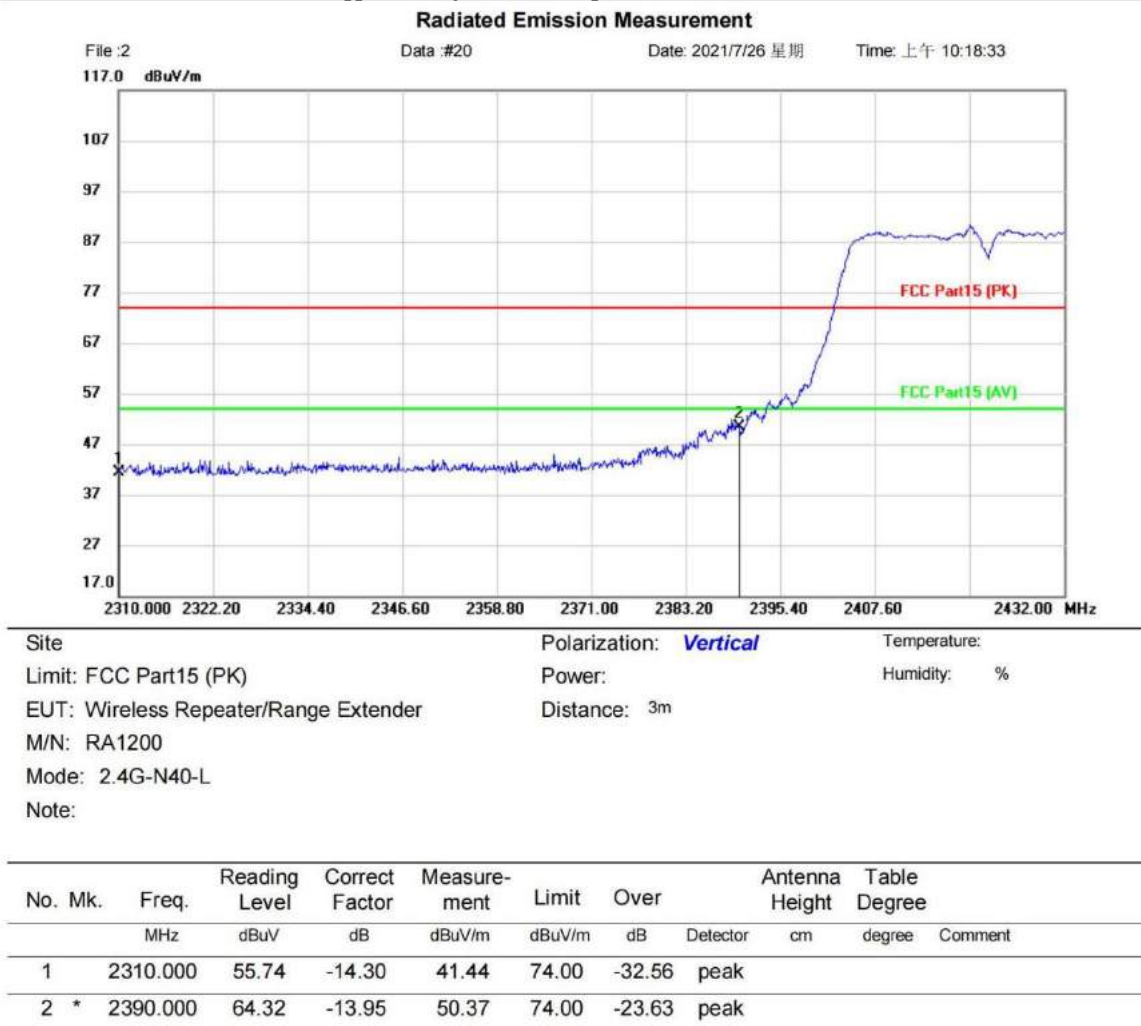


*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

[Test mode:802.11n40-2412][Polarity: Vertical]

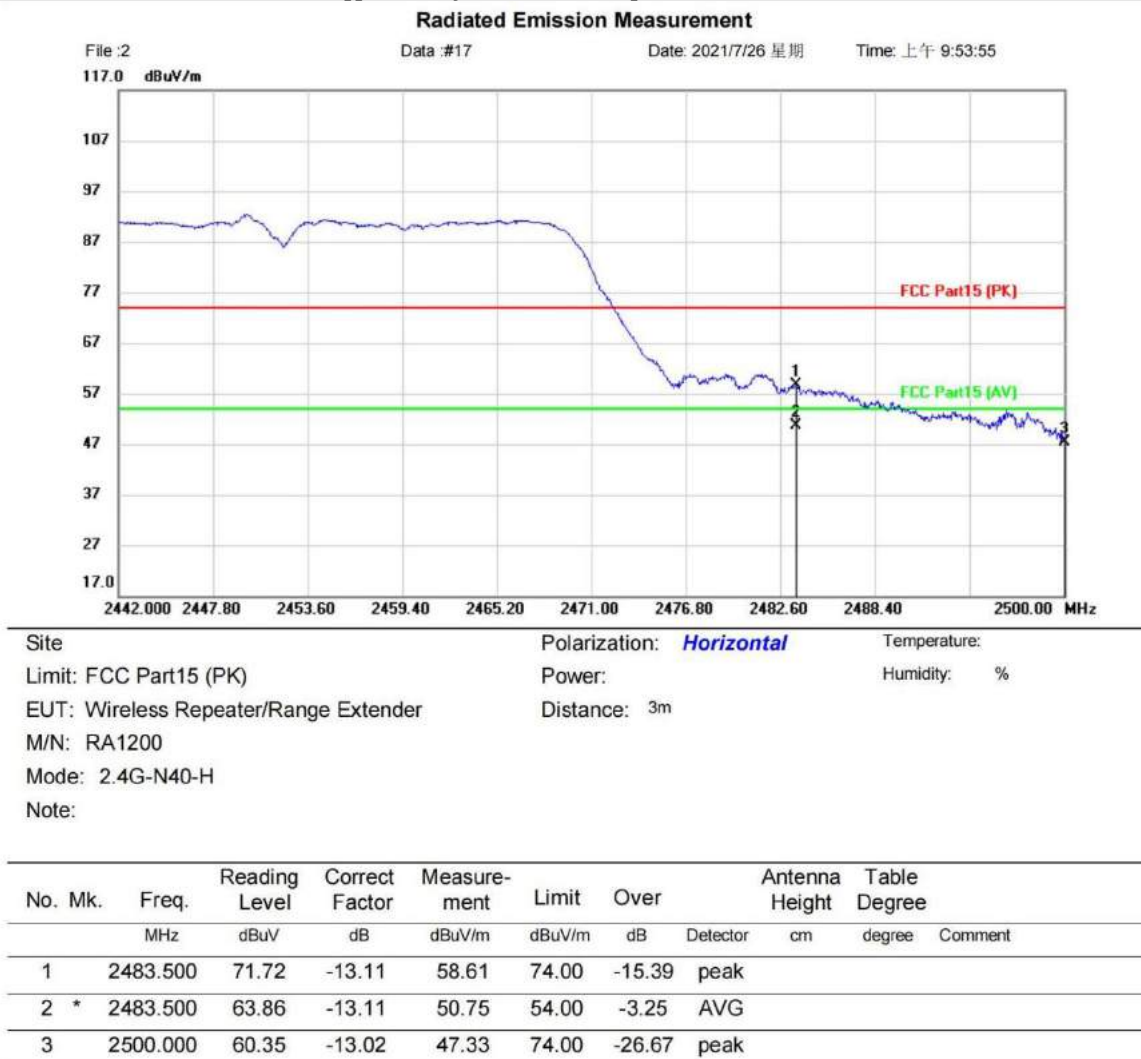


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11n40-2452][Polarity: Horizontal]

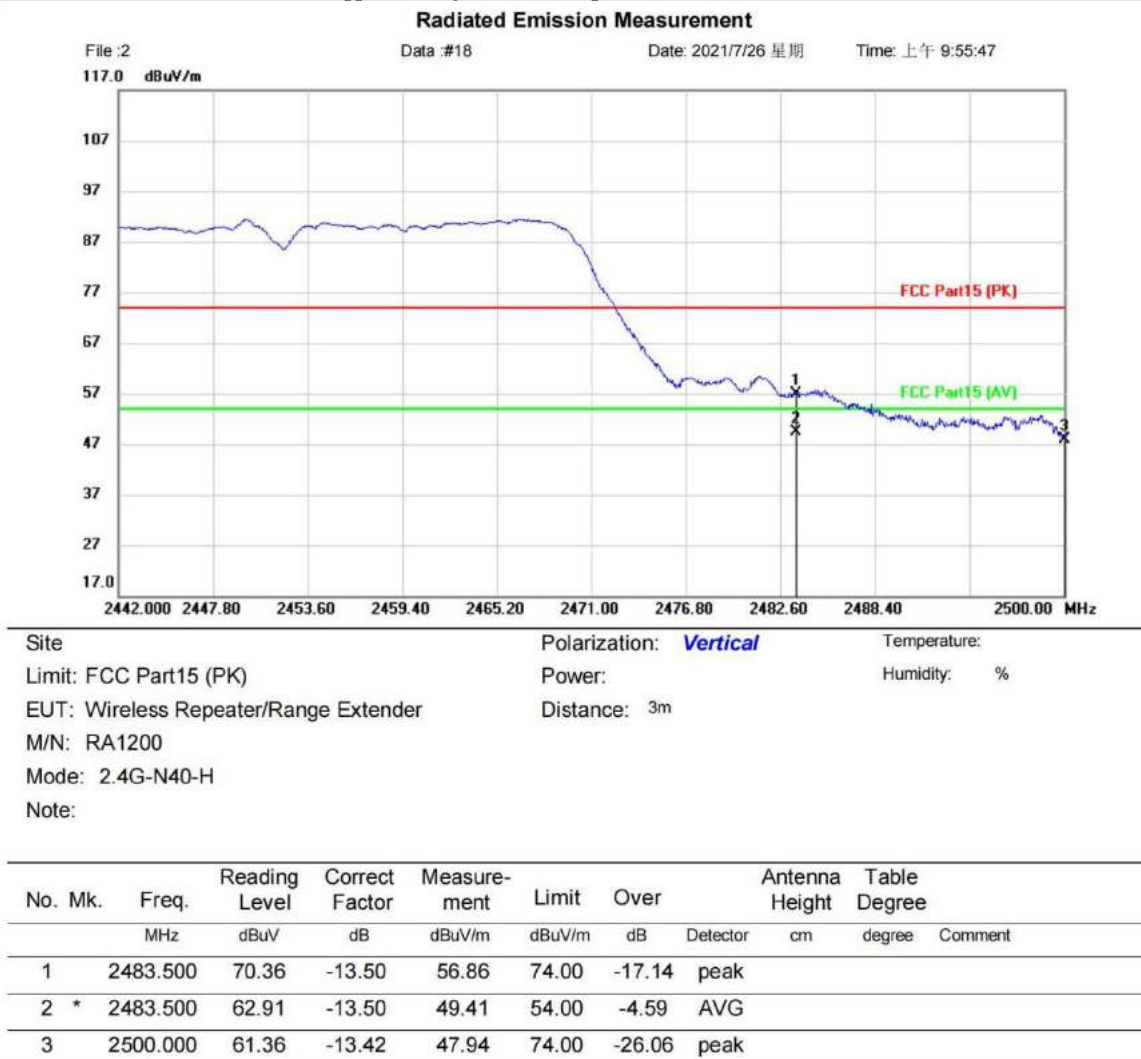


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:802.11n40-2452][Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

<Reference Only

Test Result: Pass

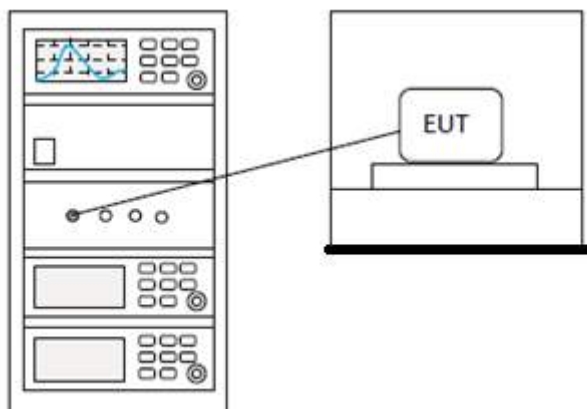
12 POWER SPECTRUM DENSITY

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.10.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Eason
Temperature	25°C
Humidity	52%

12.1 LIMITS

Limit:	$\leq 8\text{dBm}$ in any 3 kHz band during any time interval of continuous transmission
---------------	--

12.2 BLOCK DIAGRAM OF TEST SETUP



12.3 TEST DATA

Pass: Please Refer To Appendix: For Details

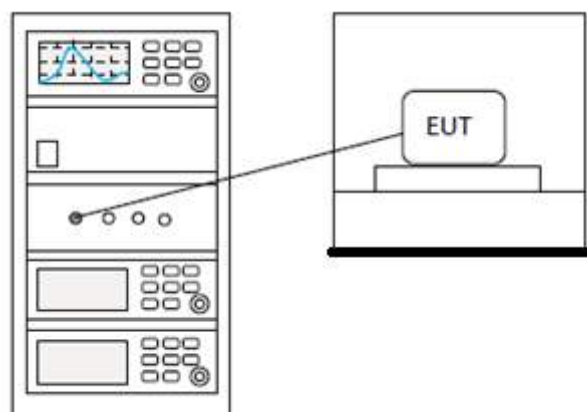
13 CONDUCTED PEAK OUTPUT POWER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.5 & Section 11.9.1
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Eason
Temperature	25°C
Humidity	52%

13.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq \text{hopping channels} < 50$
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

13.2 BLOCK DIAGRAM OF TEST SETUP



13.3 TEST DATA

Pass: Please Refer To Appendix: For Details

BlueAsia

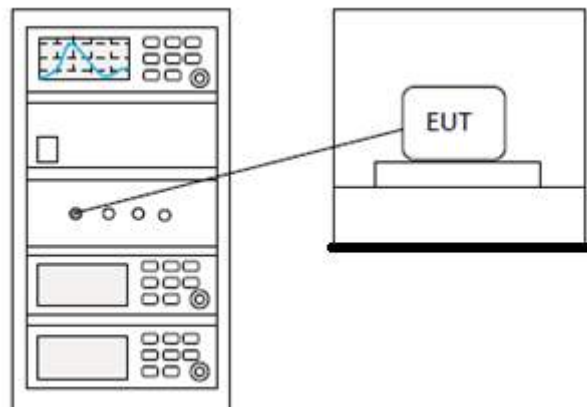
14 MINIMUM 6DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.8.1
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Eason
Temperature	25°C
Humidity	52%

14.1 LIMITS

Limit:	≥ 500 kHz
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14.2 BLOCK DIAGRAM OF TEST SETUP



14.3 TEST DATA

Pass: Please Refer To Appendix: For Details

15 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

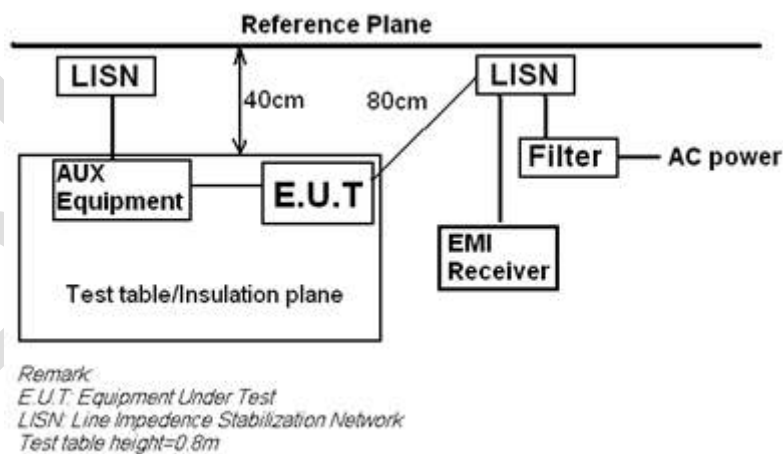
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Eason
Temperature	25°C
Humidity	52%

15.1 LIMITS

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

15.2 BLOCK DIAGRAM OF TEST SETUP



15.3 PROCEDURE

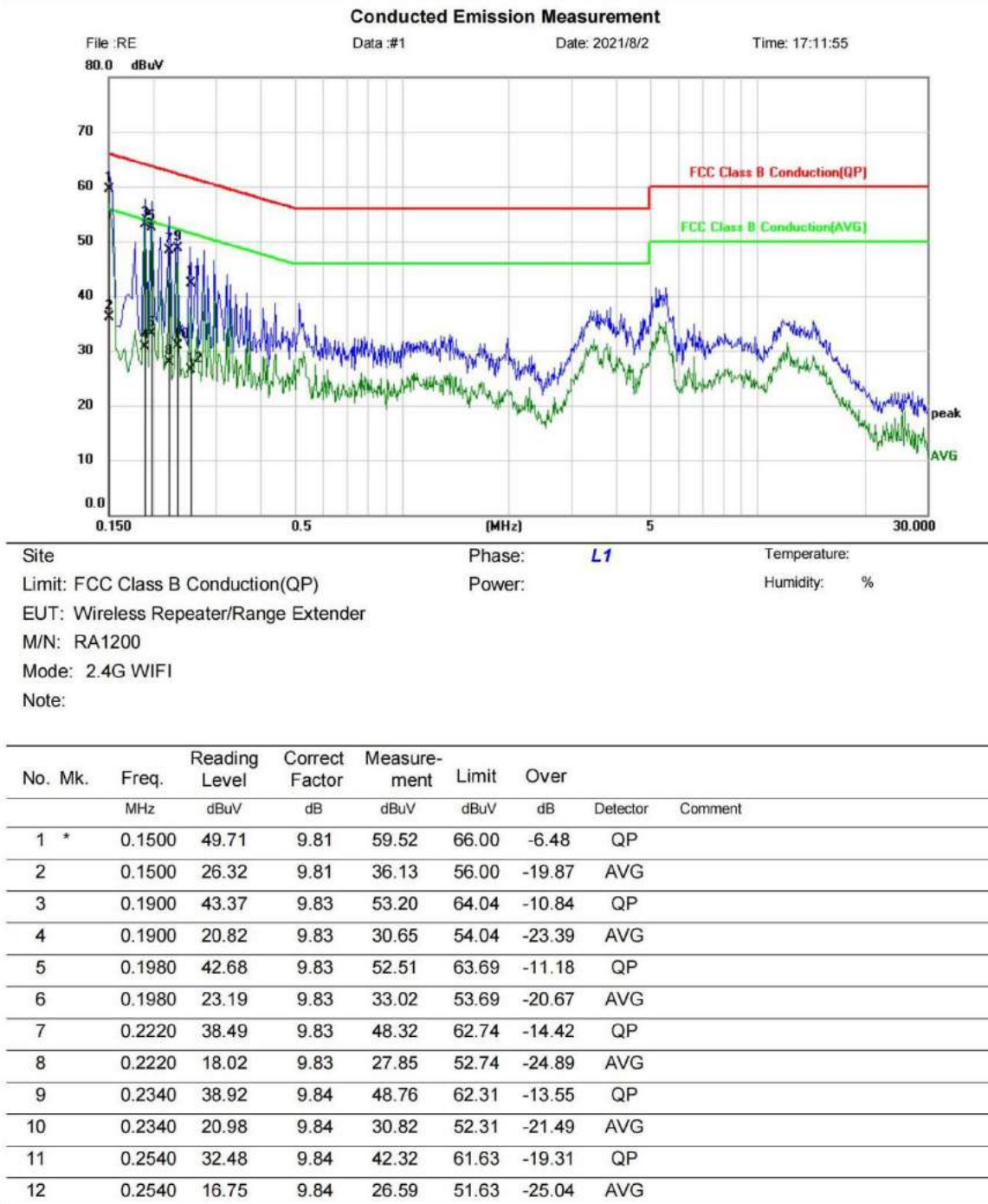
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: $LISN = Read\ Level + Cable\ Loss + LISN\ Factor$

15.4 TEST DATA

[Test mode:TX mode][Line: Line][Power:AC120V/60Hz]

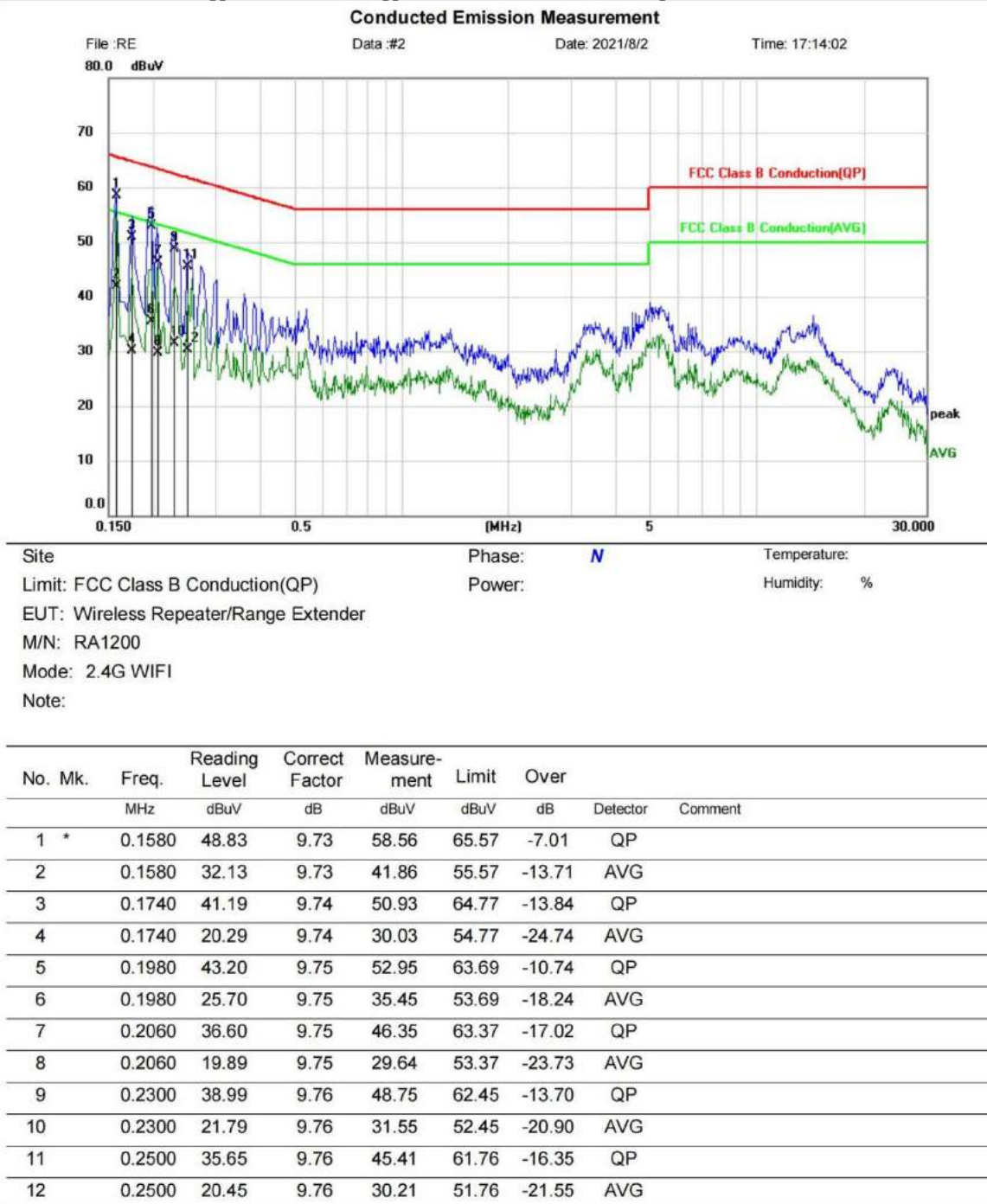


*:Maximum data x:Over limit !:over margin

⟨Reference Only

Test Result: Pass

[Test mode:TX mode][Line: Neutral][Power:AC120V/60Hz]



*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

16 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

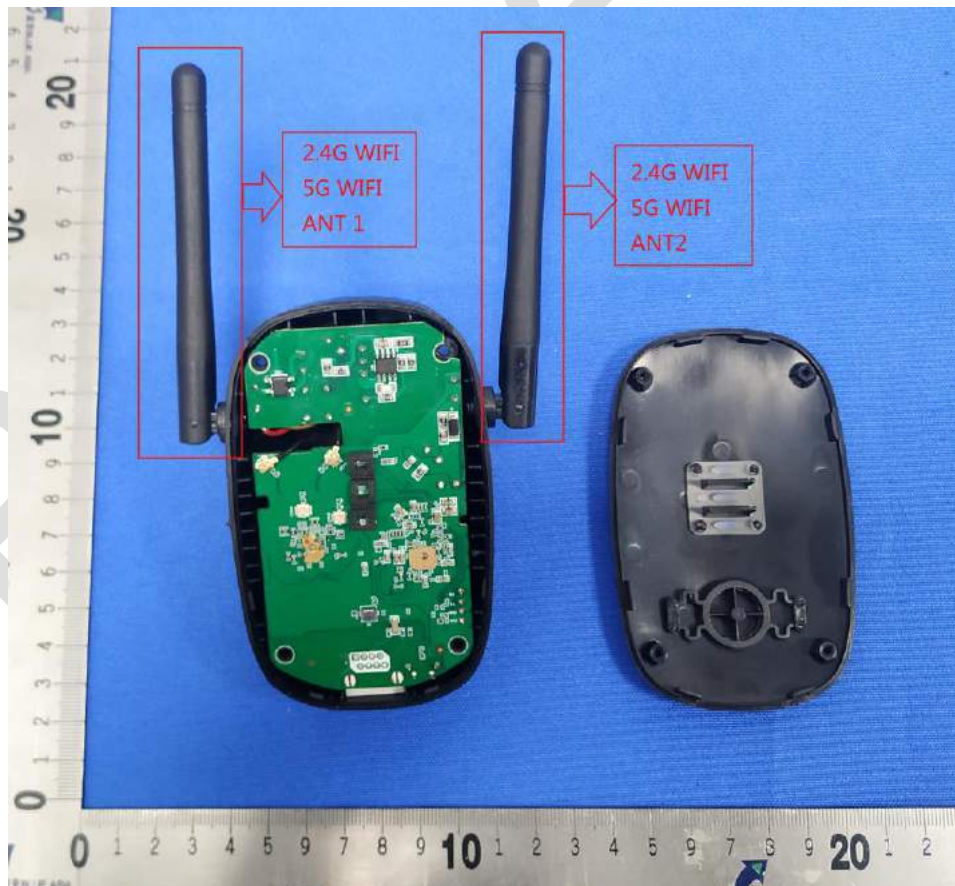
16.1 CONCLUSION

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3 dBi.

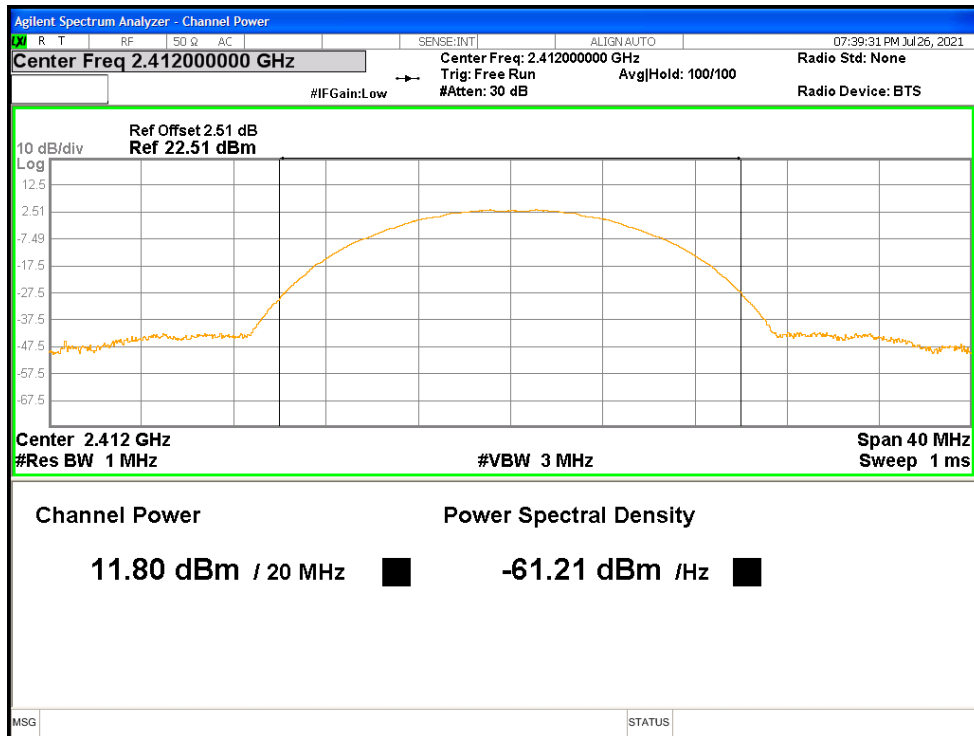


17 APPENDIX

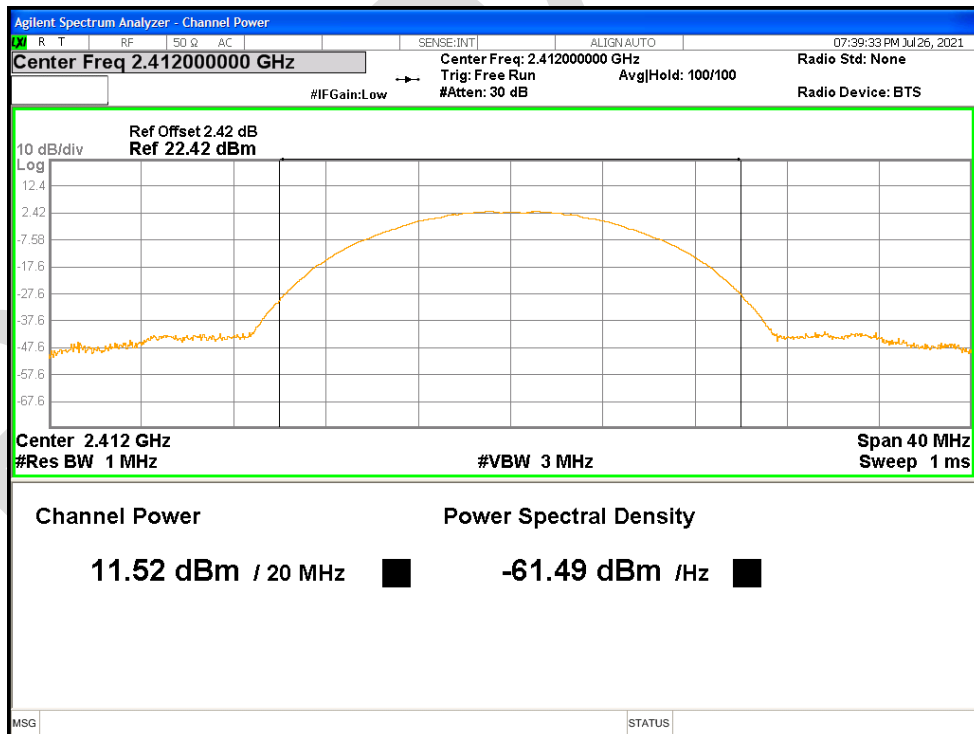
Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	11.803	30	Pass
NVNT	b	2412	Ant2	11.523	30	Pass
NVNT	b	2412	Sum	14.676	30	Pass
NVNT	b	2437	Ant1	11.838	30	Pass
NVNT	b	2437	Ant2	11.847	30	Pass
NVNT	b	2437	Sum	14.853	30	Pass
NVNT	b	2462	Ant1	12.429	30	Pass
NVNT	b	2462	Ant2	12.932	30	Pass
NVNT	b	2462	Sum	15.698	30	Pass
NVNT	g	2412	Ant1	12.425	30	Pass
NVNT	g	2412	Ant2	12.213	30	Pass
NVNT	g	2412	Sum	15.331	30	Pass
NVNT	g	2437	Ant1	12.337	30	Pass
NVNT	g	2437	Ant2	12.48	30	Pass
NVNT	g	2437	Sum	15.419	30	Pass
NVNT	g	2462	Ant1	12.875	30	Pass
NVNT	g	2462	Ant2	13.502	30	Pass
NVNT	g	2462	Sum	16.21	30	Pass
NVNT	n20	2412	Ant1	14.122	30	Pass
NVNT	n20	2412	Ant2	14.863	30	Pass
NVNT	n20	2412	Sum	17.519	30	Pass
NVNT	n20	2437	Ant1	14.454	30	Pass
NVNT	n20	2437	Ant2	15.243	30	Pass
NVNT	n20	2437	Sum	17.877	30	Pass
NVNT	n20	2462	Ant1	15.018	30	Pass
NVNT	n20	2462	Ant2	16.047	30	Pass
NVNT	n20	2462	Sum	18.573	30	Pass
NVNT	n40	2422	Ant1	11.123	30	Pass
NVNT	n40	2422	Ant2	10.874	30	Pass
NVNT	n40	2422	Sum	14.011	30	Pass
NVNT	n40	2437	Ant1	11.141	30	Pass
NVNT	n40	2437	Ant2	11.44	30	Pass
NVNT	n40	2437	Sum	14.303	30	Pass
NVNT	n40	2452	Ant1	11.294	30	Pass
NVNT	n40	2452	Ant2	11.433	30	Pass
NVNT	n40	2452	Sum	14.374	30	Pass

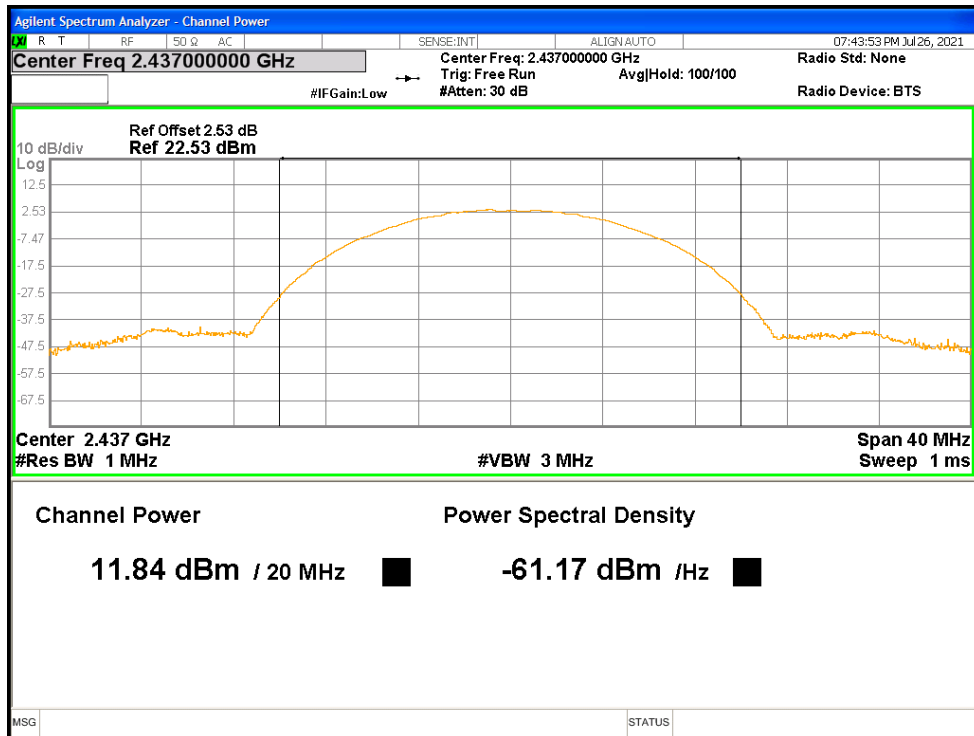
Power NVNT b 2412MHz Ant1



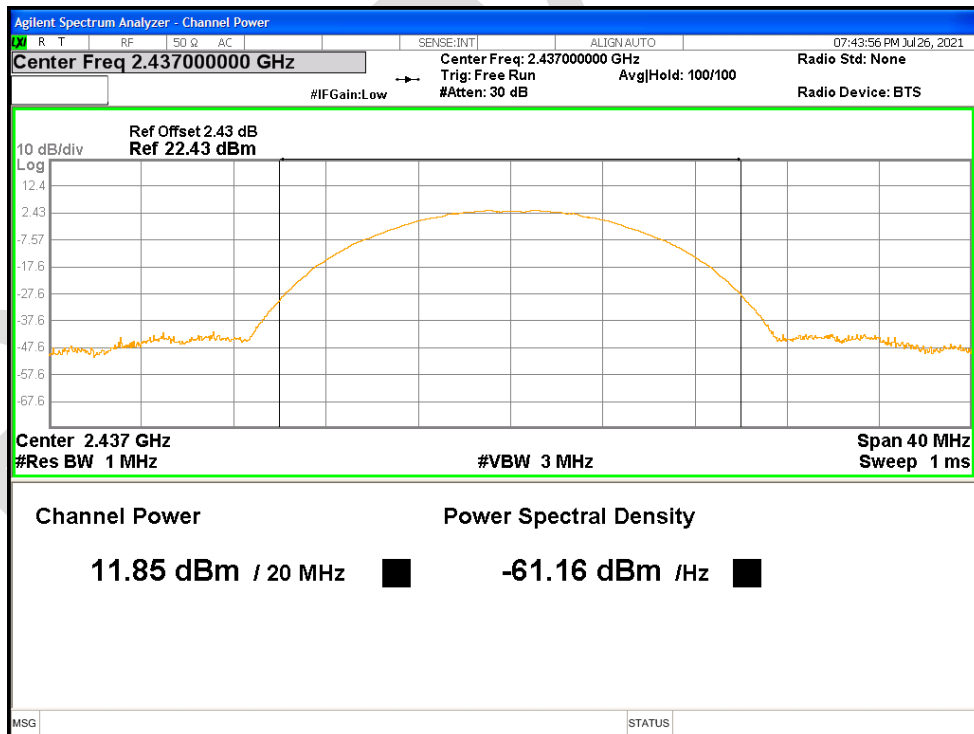
Power NVNT b 2412MHz Ant2



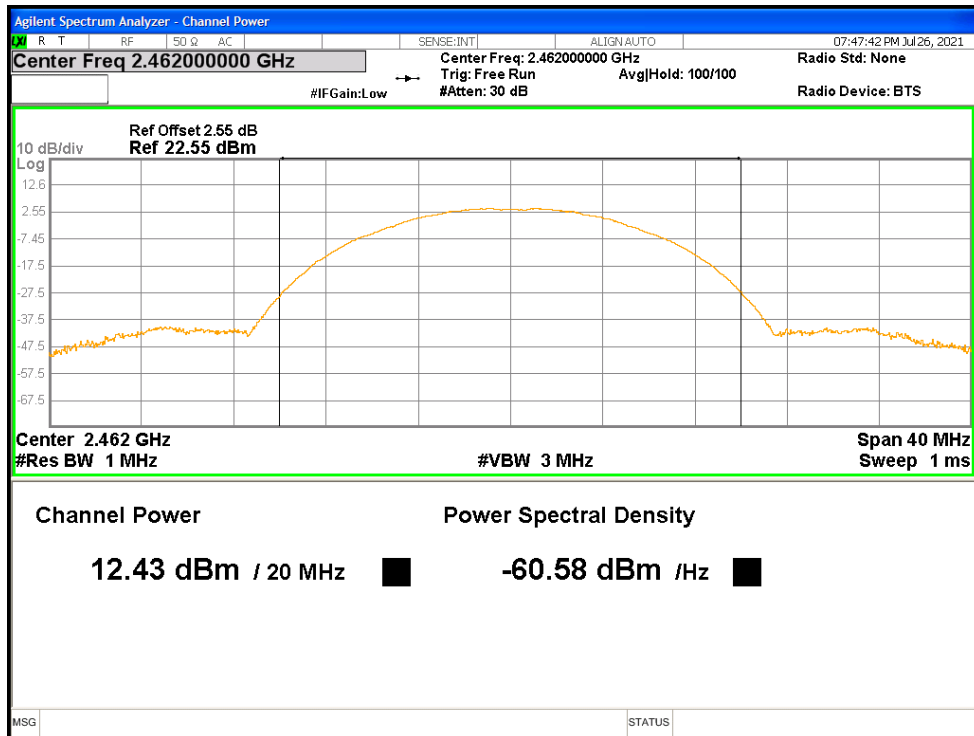
Power NVNT b 2437MHz Ant1



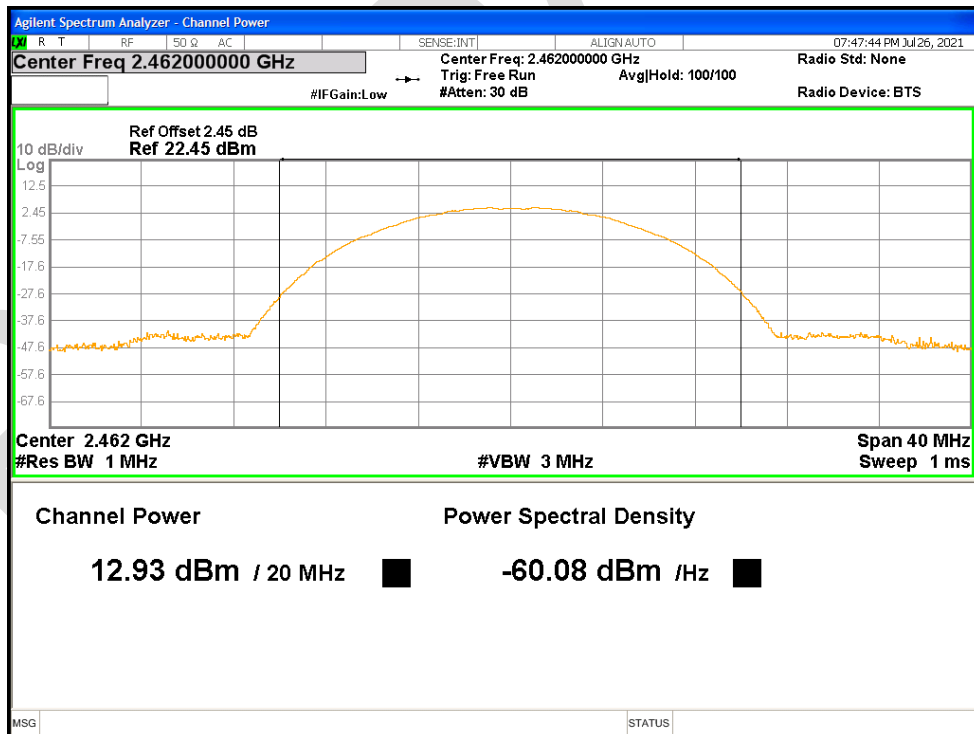
Power NVNT b 2437MHz Ant2



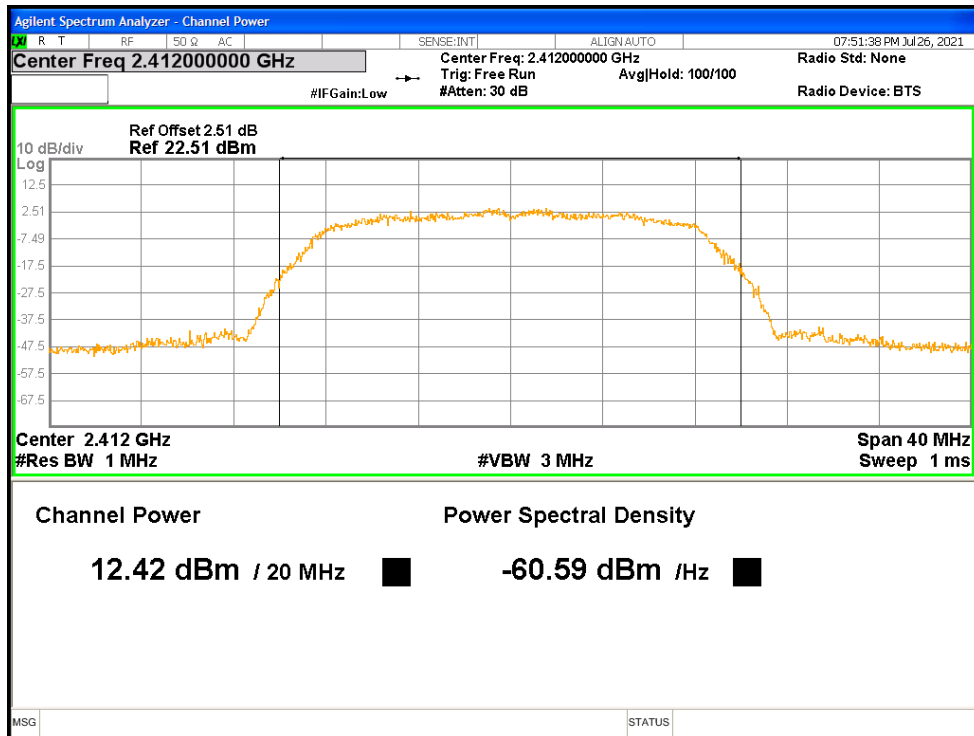
Power NVNT b 2462MHz Ant1



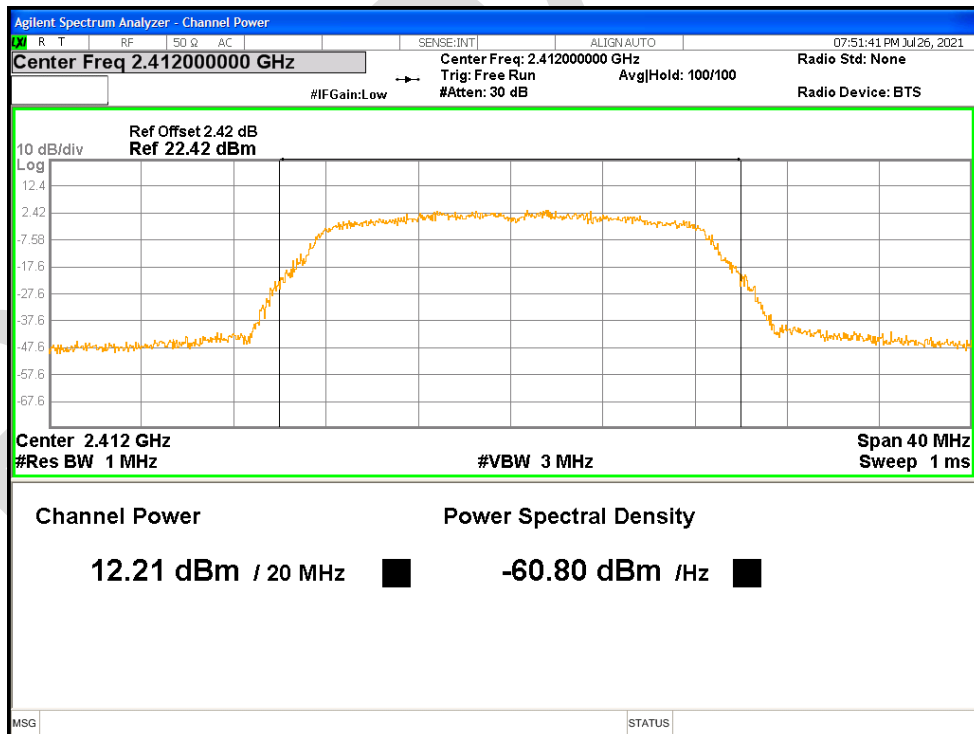
Power NVNT b 2462MHz Ant2



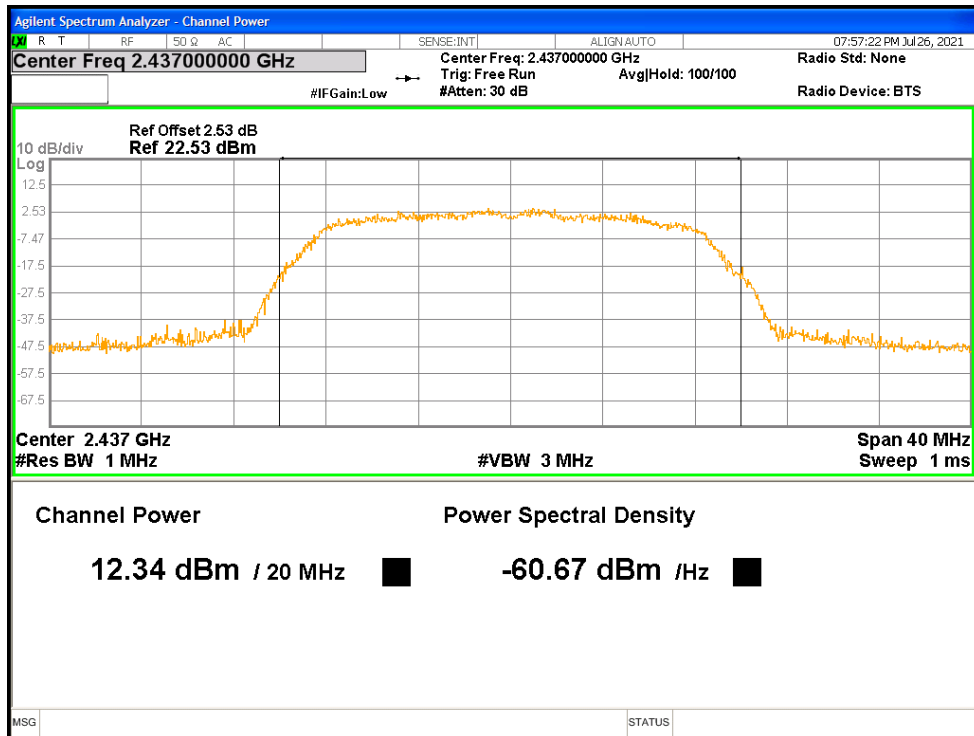
Power NVNT g 2412MHz Ant1



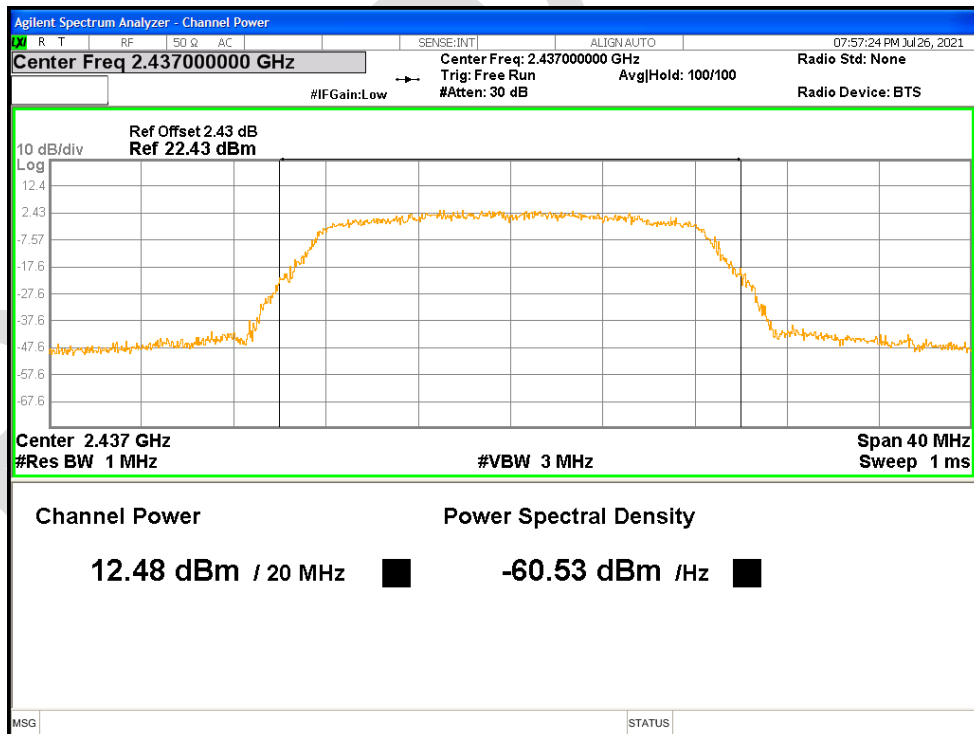
Power NVNT g 2412MHz Ant2



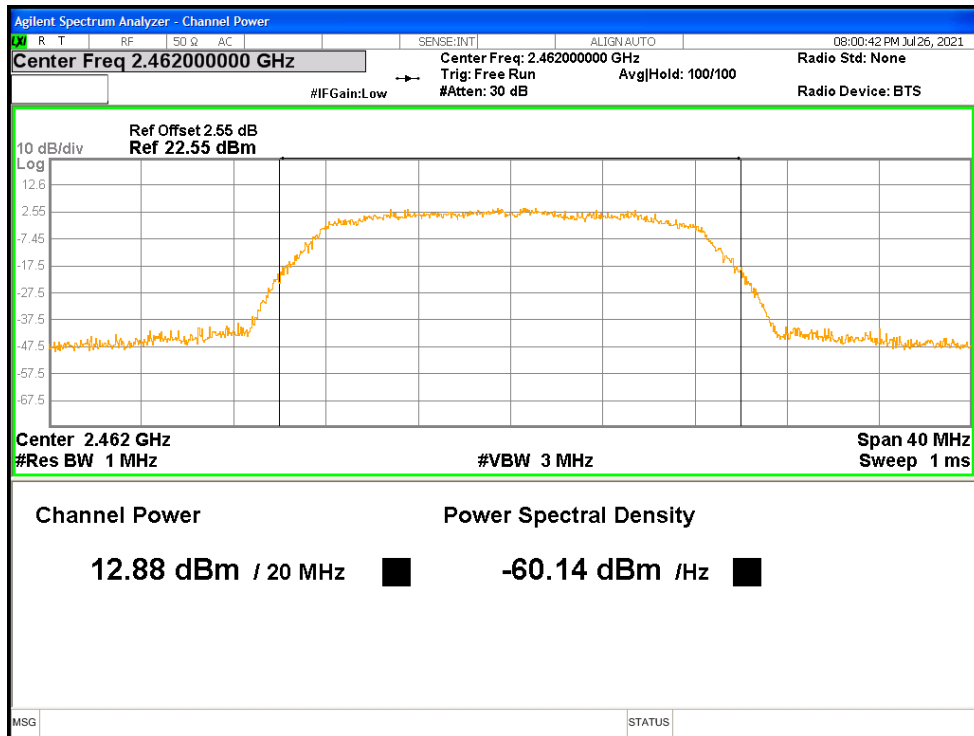
Power NVNT g 2437MHz Ant1



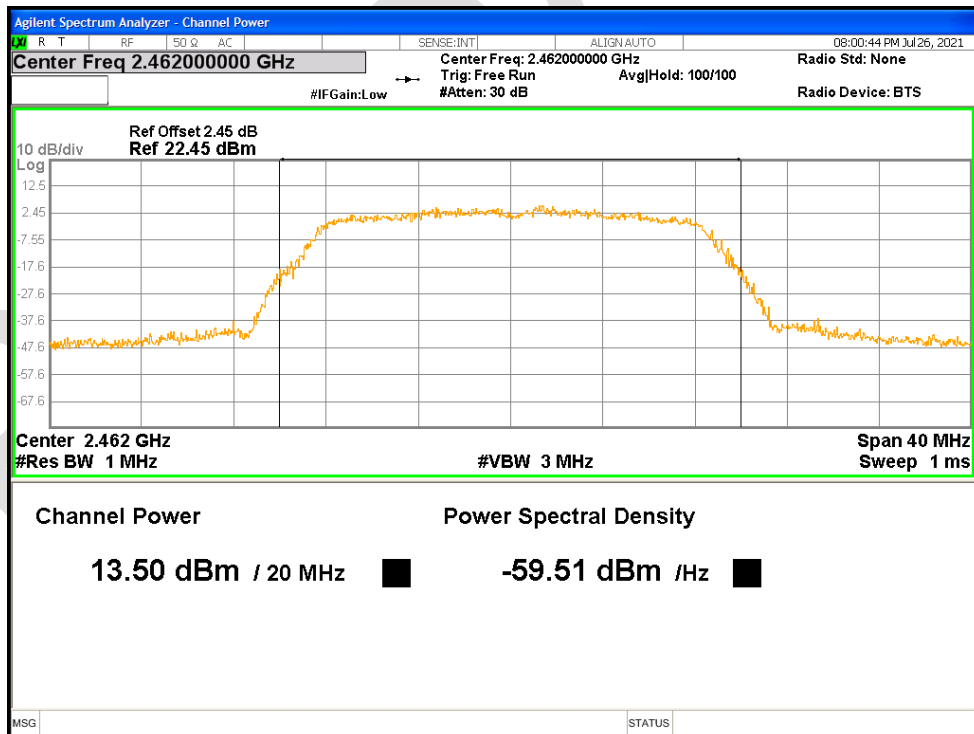
Power NVNT g 2437MHz Ant2



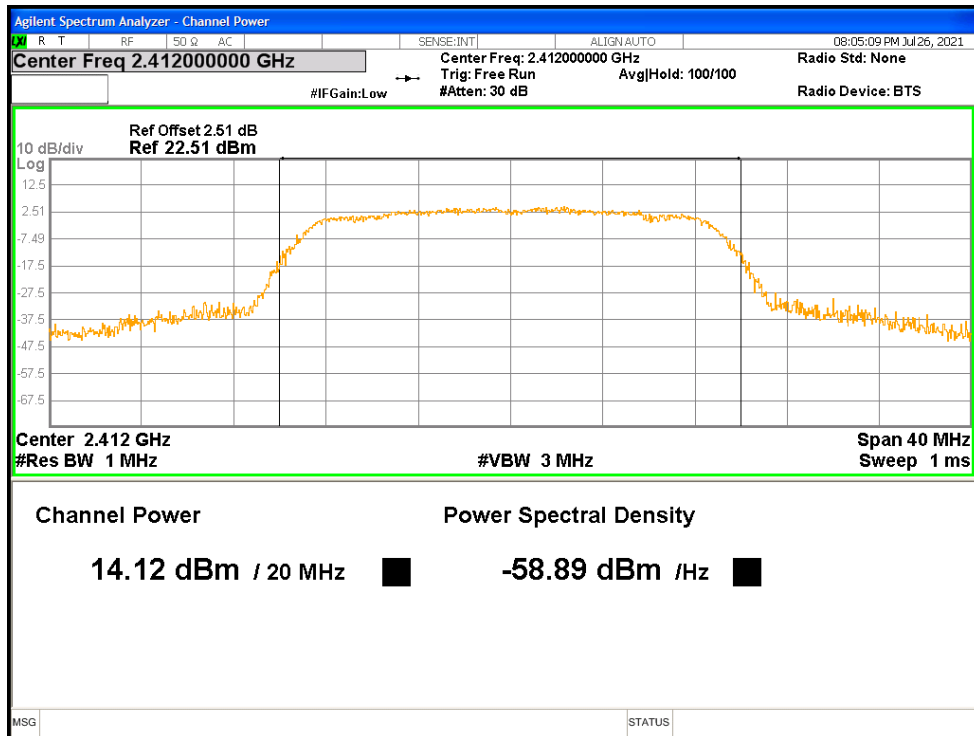
Power NVNT g 2462MHz Ant1



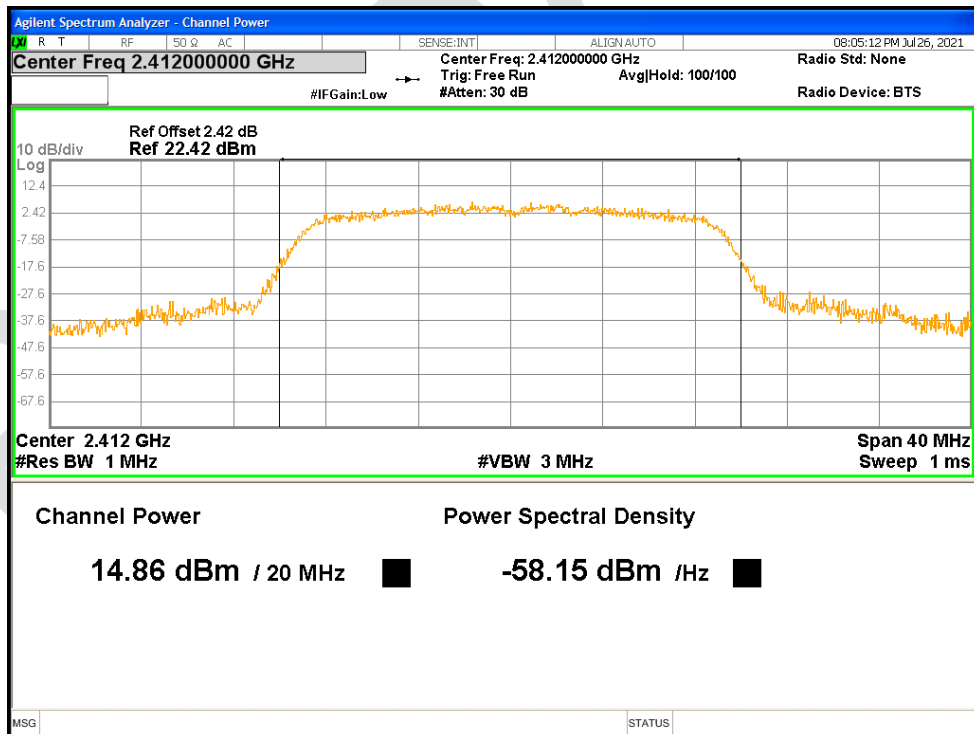
Power NVNT g 2462MHz Ant2



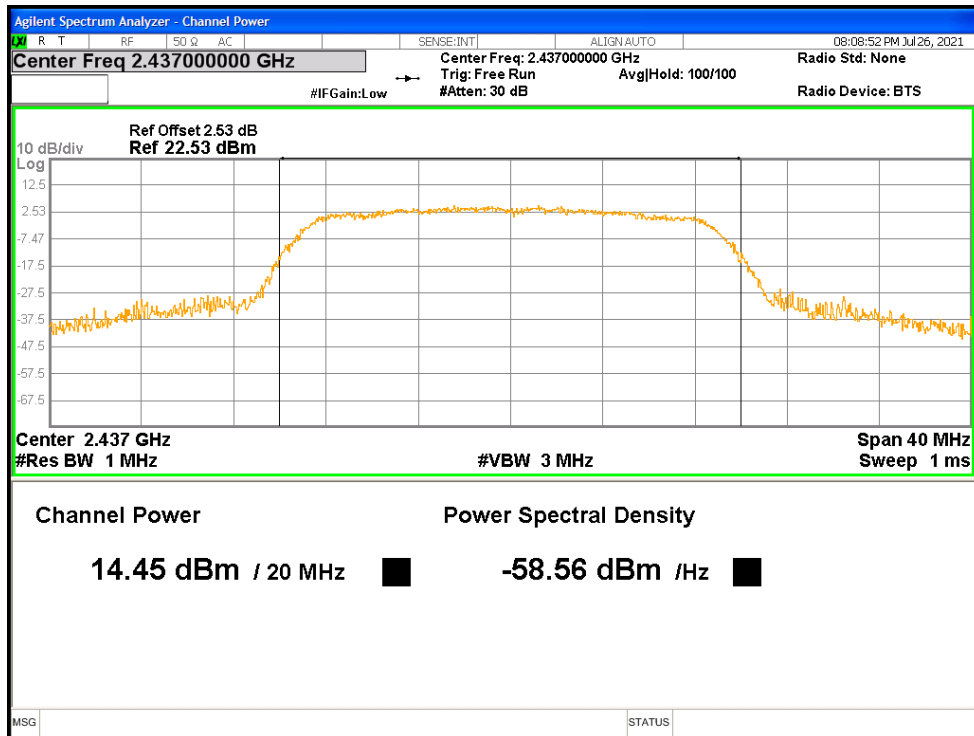
Power NVNT n20 2412MHz Ant1



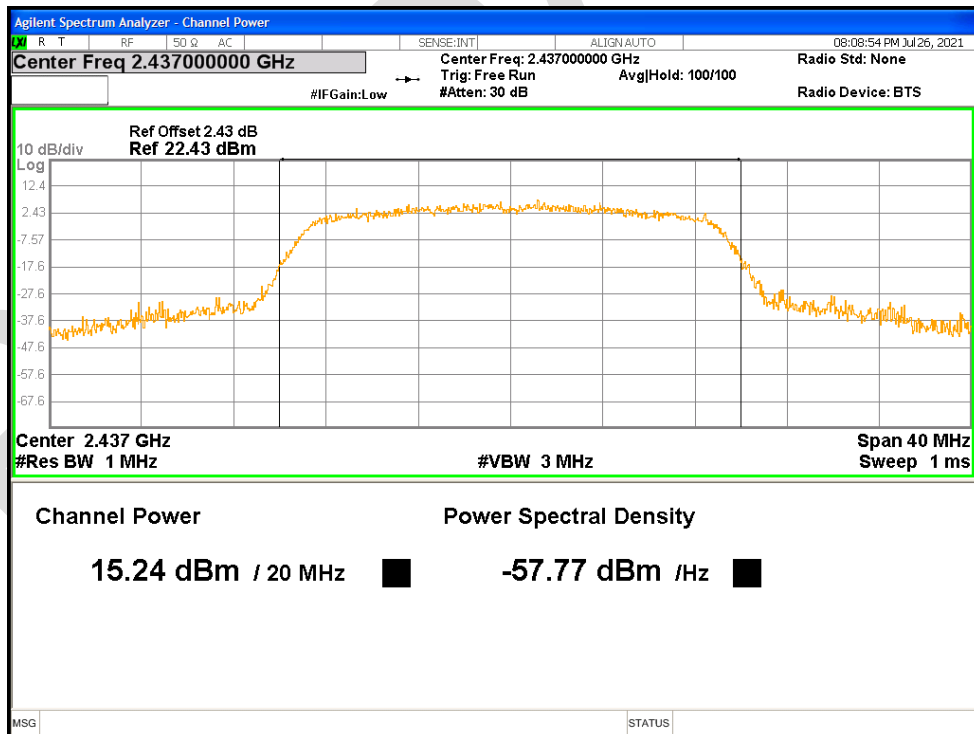
Power NVNT n20 2412MHz Ant2



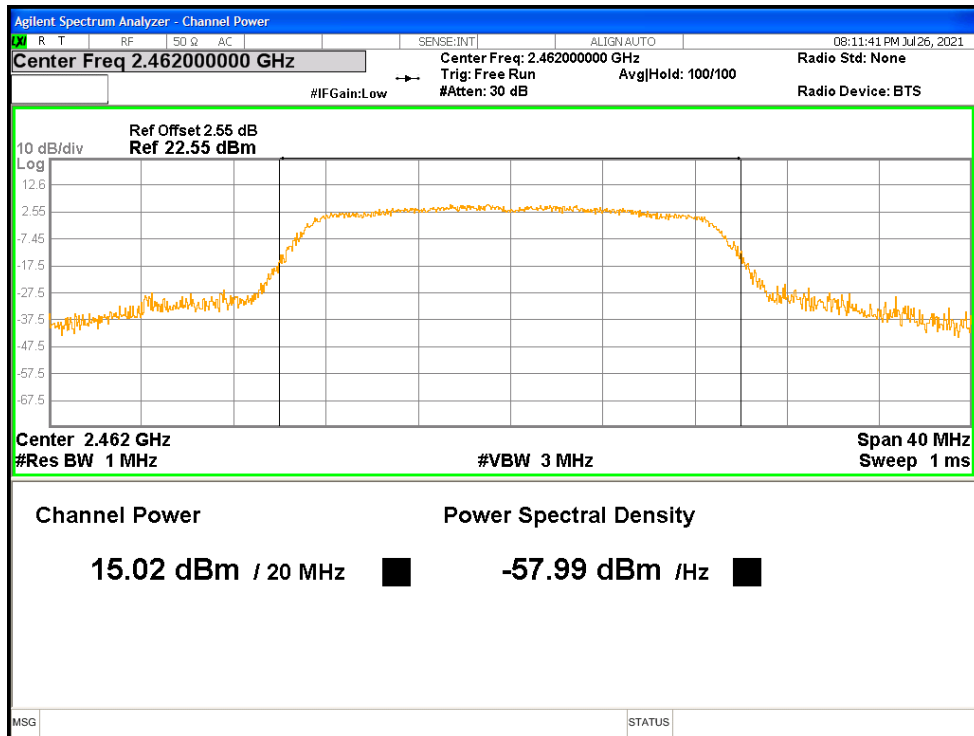
Power NVNT n20 2437MHz Ant1



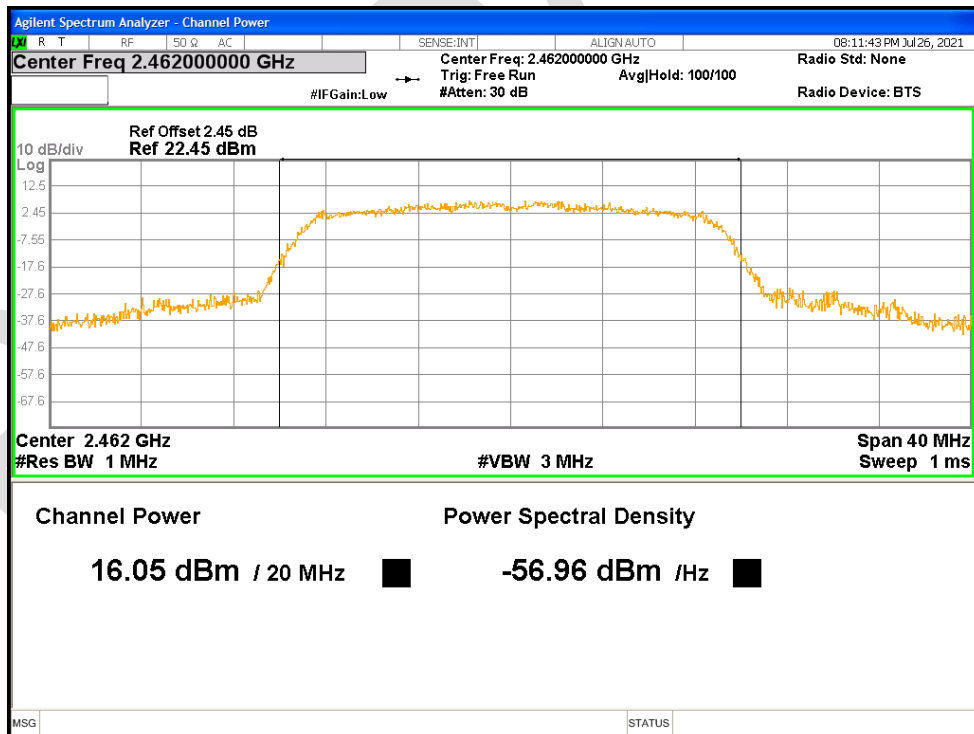
Power NVNT n20 2437MHz Ant2



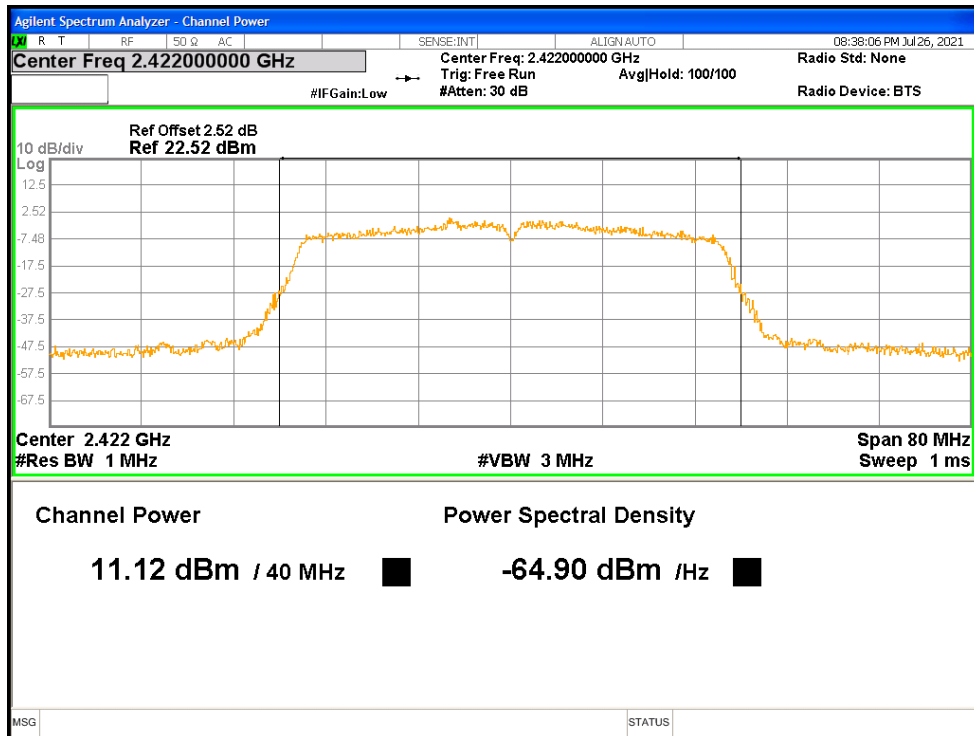
Power NVNT n20 2462MHz Ant1



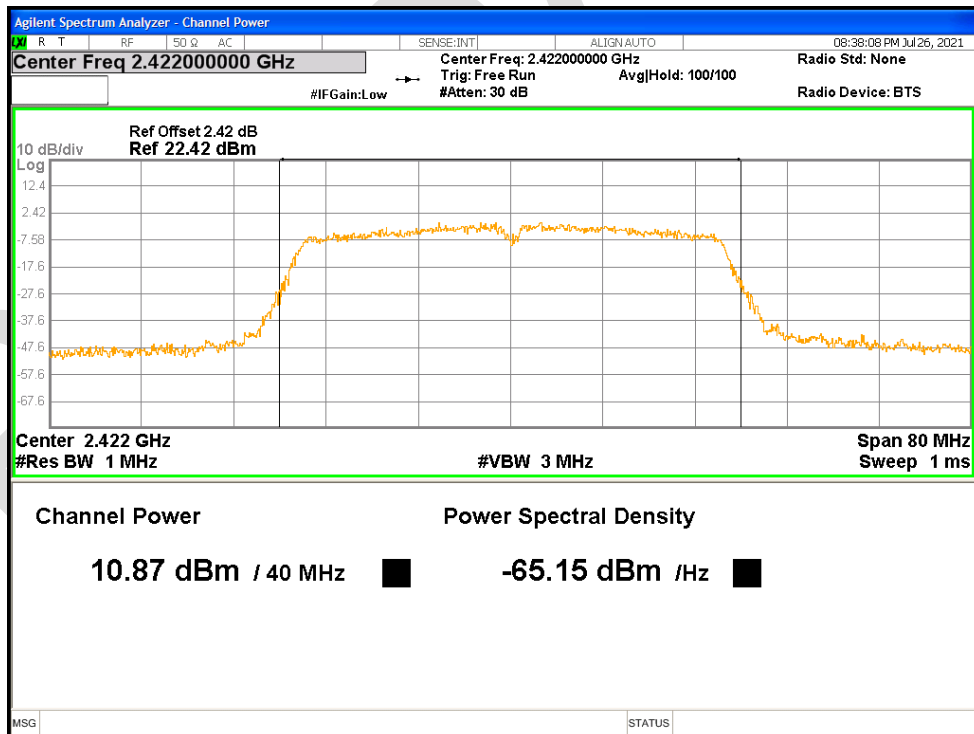
Power NVNT n20 2462MHz Ant2



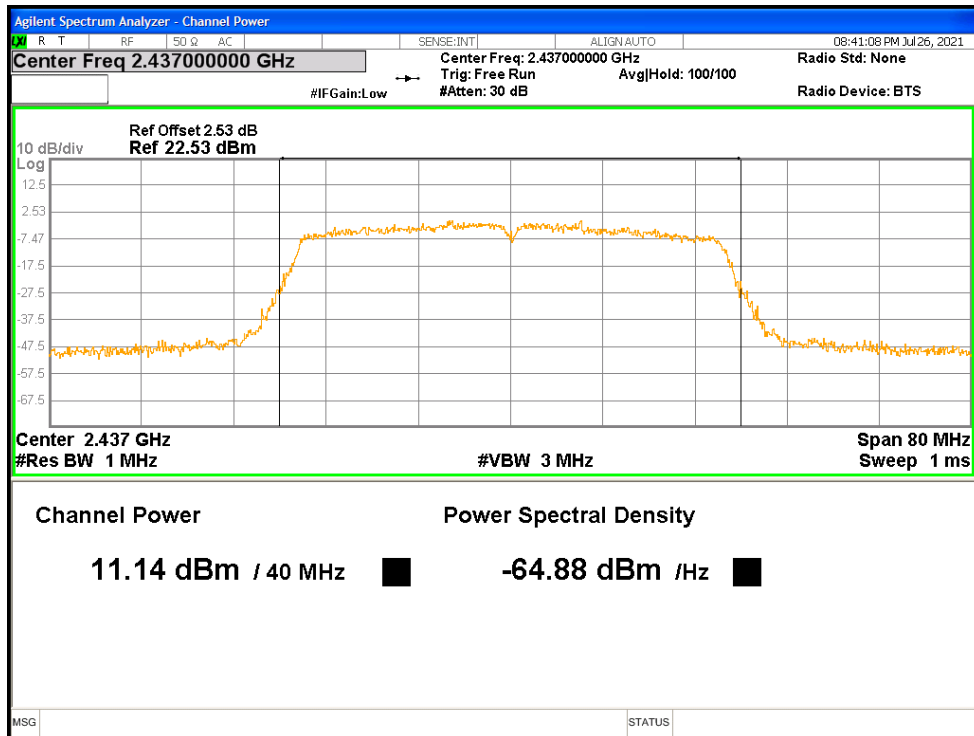
Power NVNT n40 2422MHz Ant1



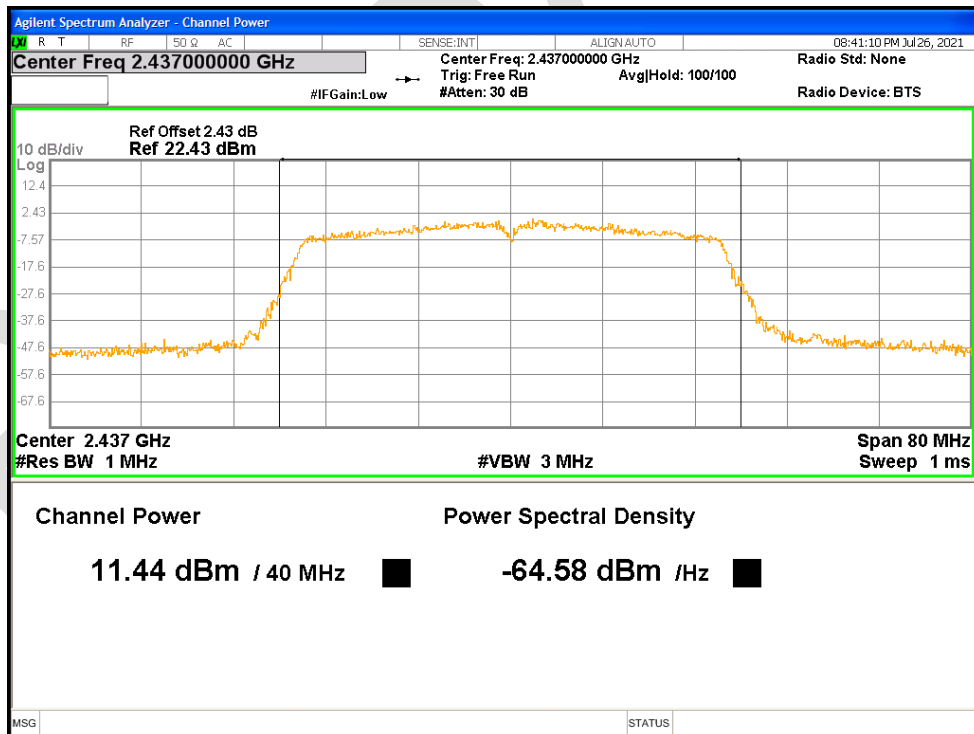
Power NVNT n40 2422MHz Ant2



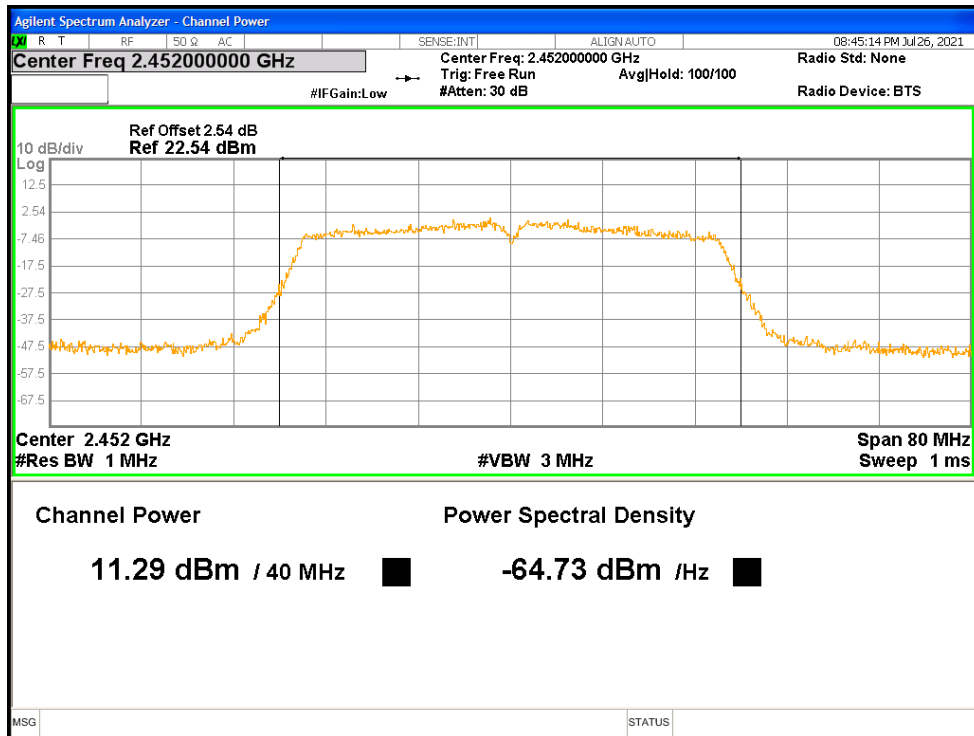
Power NVNT n40 2437MHz Ant1



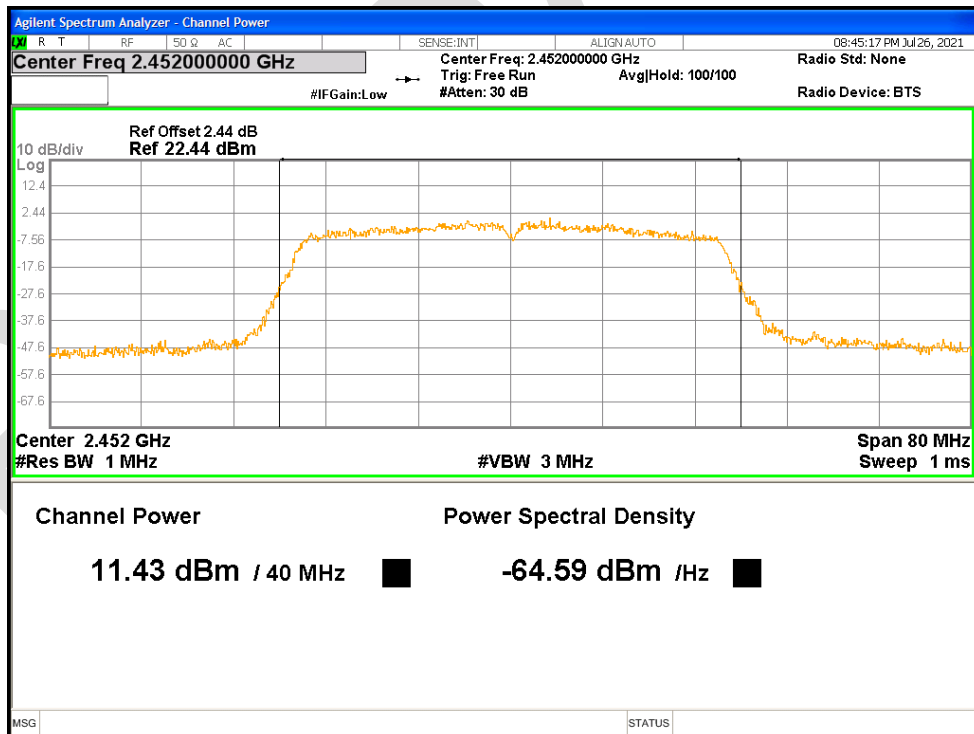
Power NVNT n40 2437MHz Ant2



Power NVNT n40 2452MHz Ant1



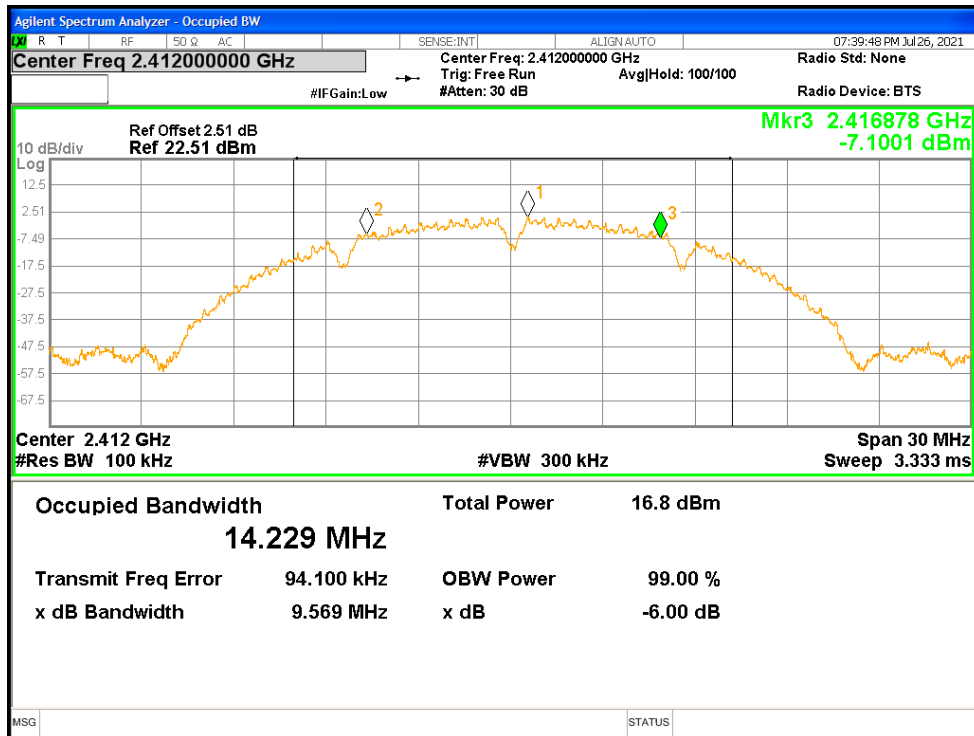
Power NVNT n40 2452MHz Ant2



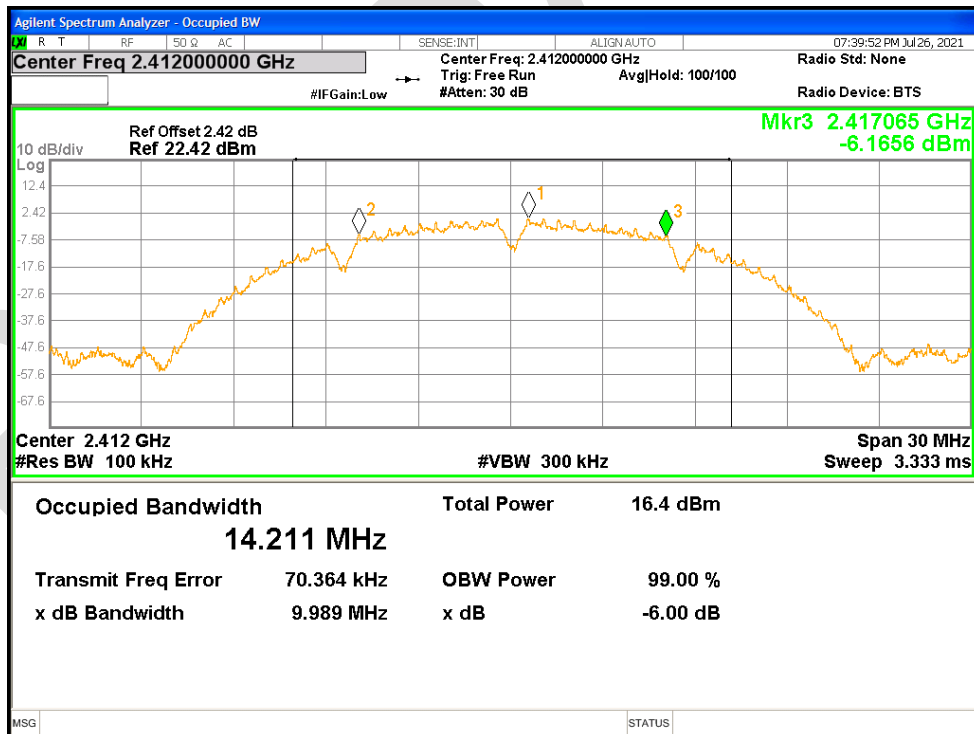
-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	b	2412	Ant1	9.569	0.5	Pass
NVNT	b	2412	Ant2	9.989	0.5	Pass
NVNT	b	2437	Ant1	9.578	0.5	Pass
NVNT	b	2437	Ant2	9.078	0.5	Pass
NVNT	b	2462	Ant1	9.561	0.5	Pass
NVNT	b	2462	Ant2	9.989	0.5	Pass
NVNT	g	2412	Ant1	15.088	0.5	Pass
NVNT	g	2412	Ant2	15.094	0.5	Pass
NVNT	g	2437	Ant1	15.028	0.5	Pass
NVNT	g	2437	Ant2	15.074	0.5	Pass
NVNT	g	2462	Ant1	15.056	0.5	Pass
NVNT	g	2462	Ant2	15.107	0.5	Pass
NVNT	n20	2412	Ant1	13.869	0.5	Pass
NVNT	n20	2412	Ant2	16.274	0.5	Pass
NVNT	n20	2437	Ant1	15.307	0.5	Pass
NVNT	n20	2437	Ant2	16.313	0.5	Pass
NVNT	n20	2462	Ant1	14.732	0.5	Pass
NVNT	n20	2462	Ant2	14.455	0.5	Pass
NVNT	n40	2422	Ant1	33.81	0.5	Pass
NVNT	n40	2422	Ant2	35.091	0.5	Pass
NVNT	n40	2437	Ant1	35.06	0.5	Pass
NVNT	n40	2437	Ant2	35.039	0.5	Pass
NVNT	n40	2452	Ant1	35.052	0.5	Pass
NVNT	n40	2452	Ant2	35.063	0.5	Pass

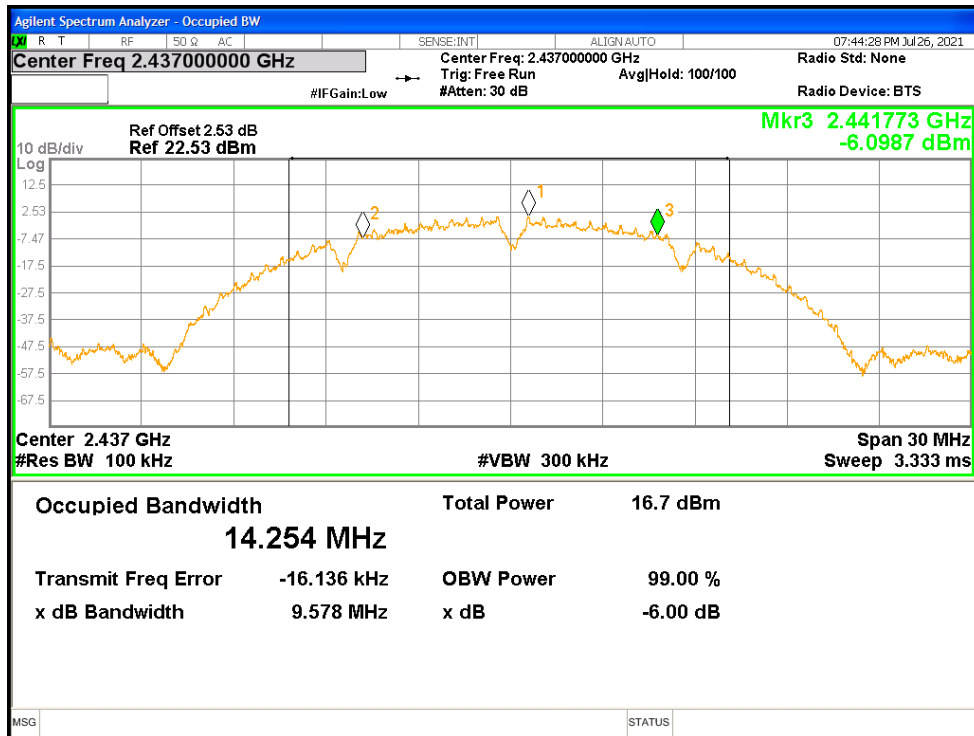
-6dB Bandwidth NVNT b 2412MHz Ant1



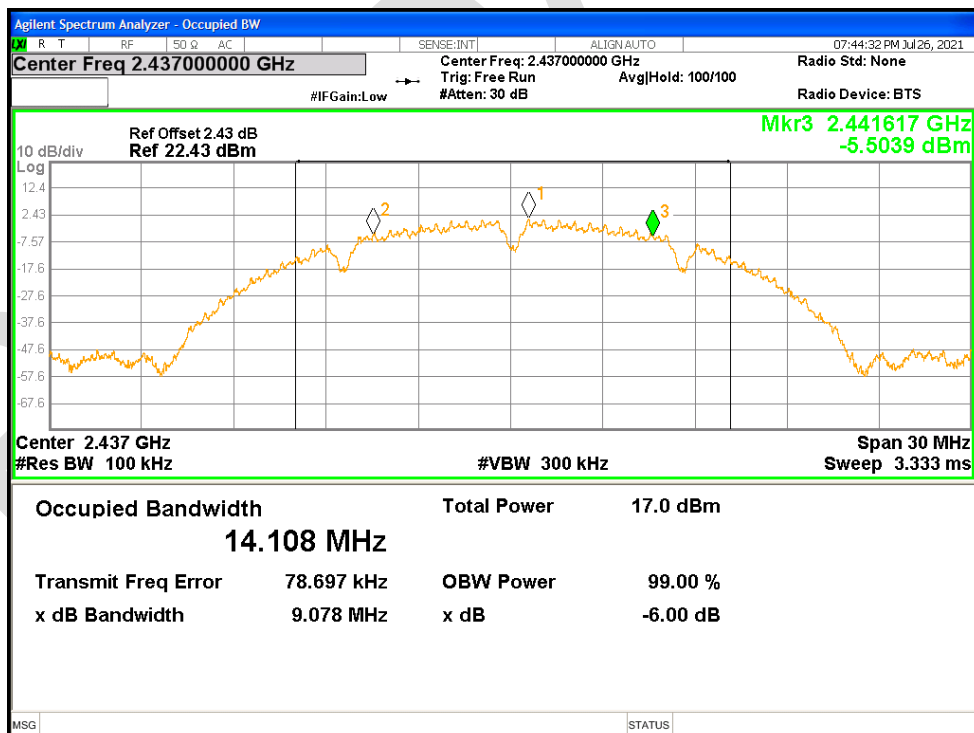
-6dB Bandwidth NVNT b 2412MHz Ant2



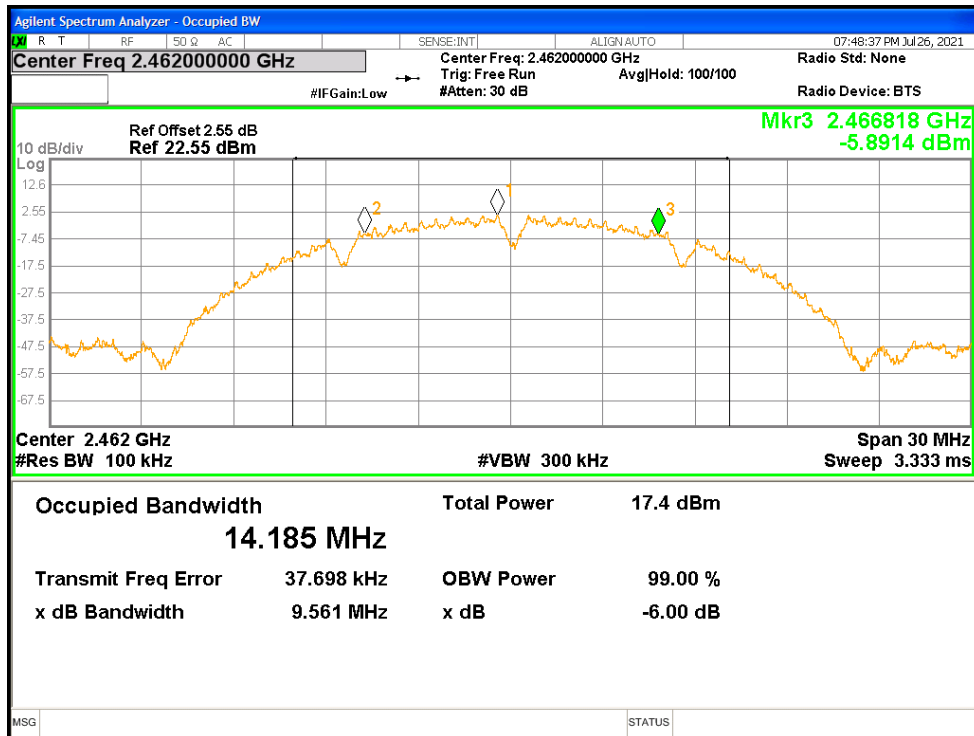
-6dB Bandwidth NVNT b 2437MHz Ant1



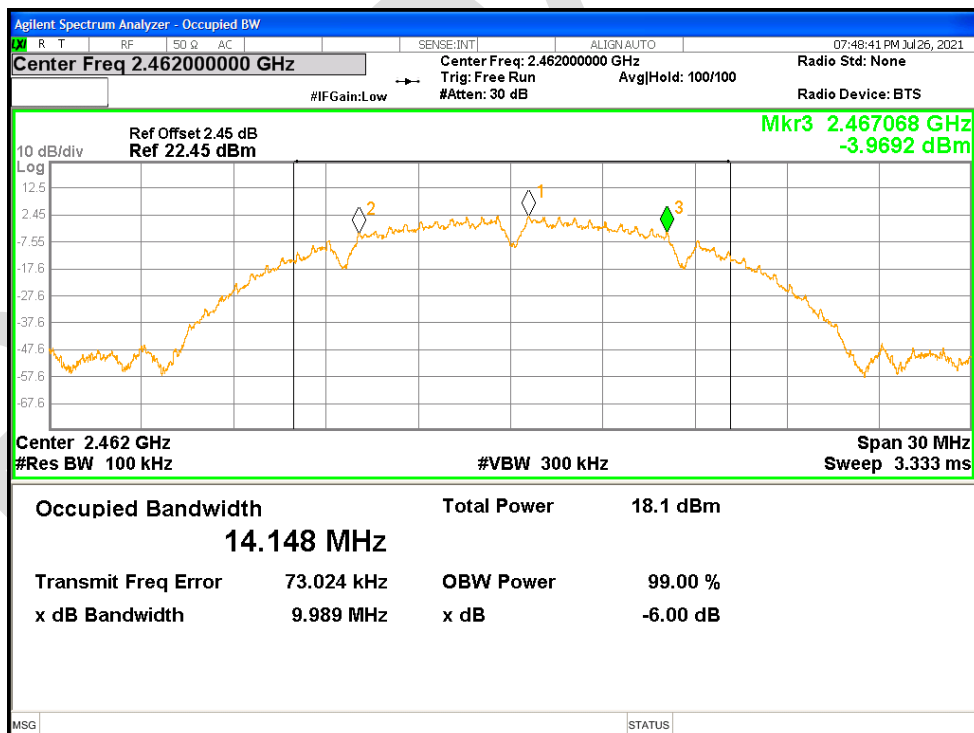
-6dB Bandwidth NVNT b 2437MHz Ant2



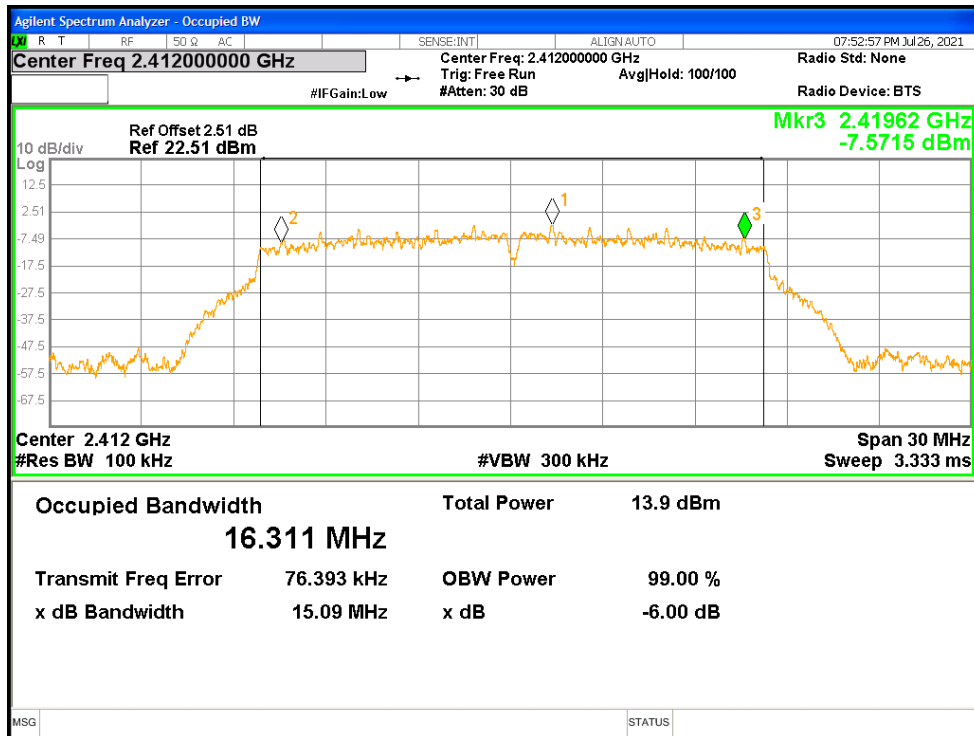
-6dB Bandwidth NVNT b 2462MHz Ant1



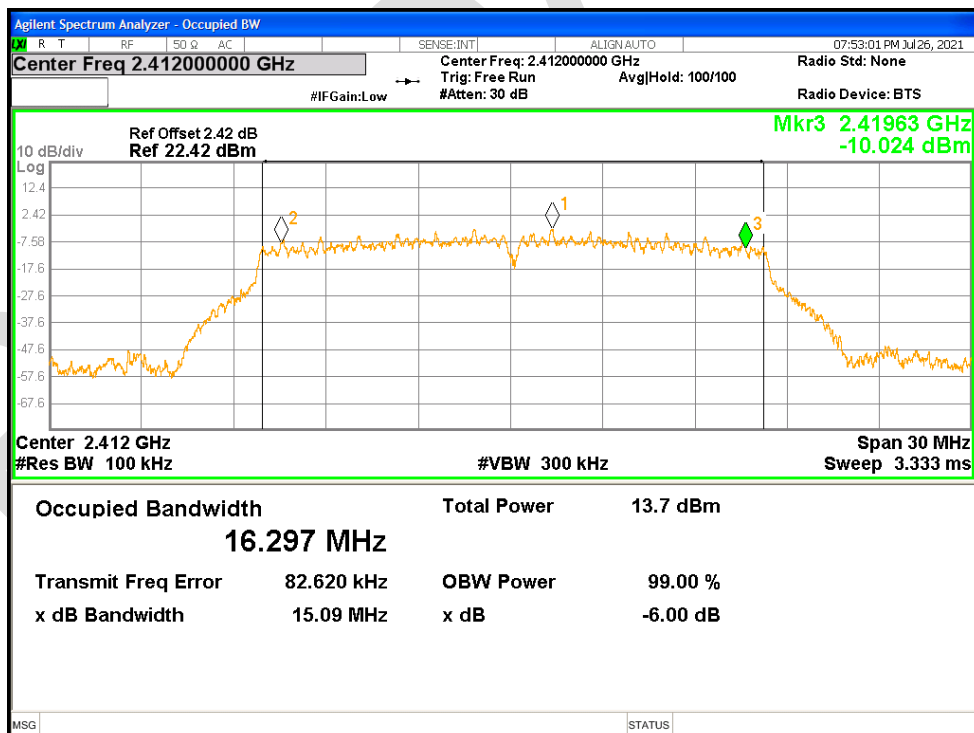
-6dB Bandwidth NVNT b 2462MHz Ant2



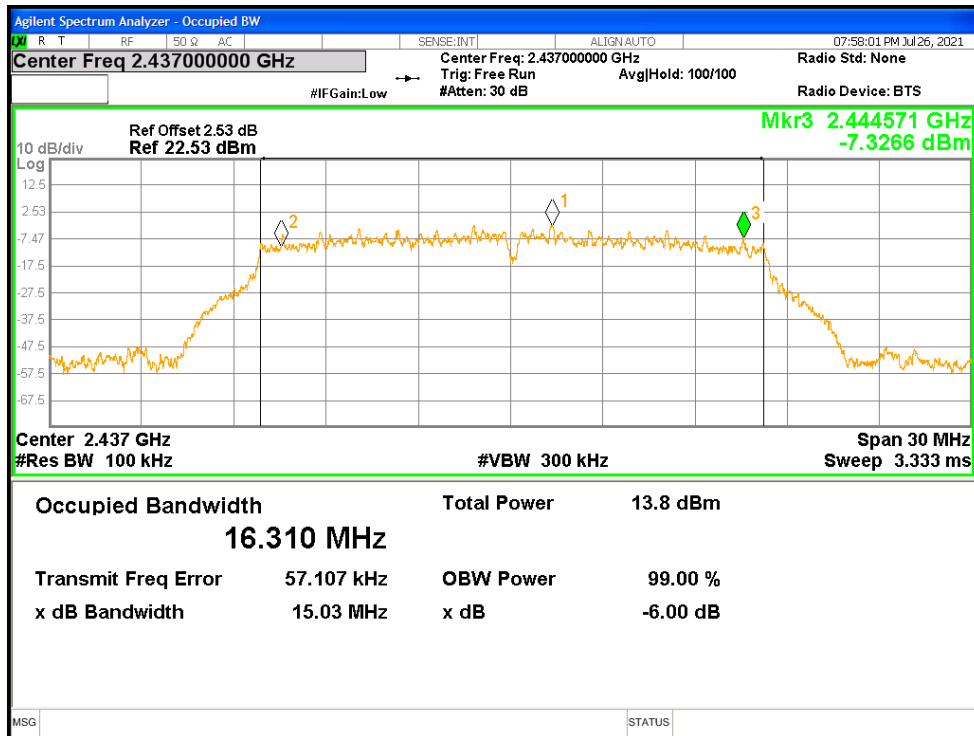
-6dB Bandwidth NVNT g 2412MHz Ant1



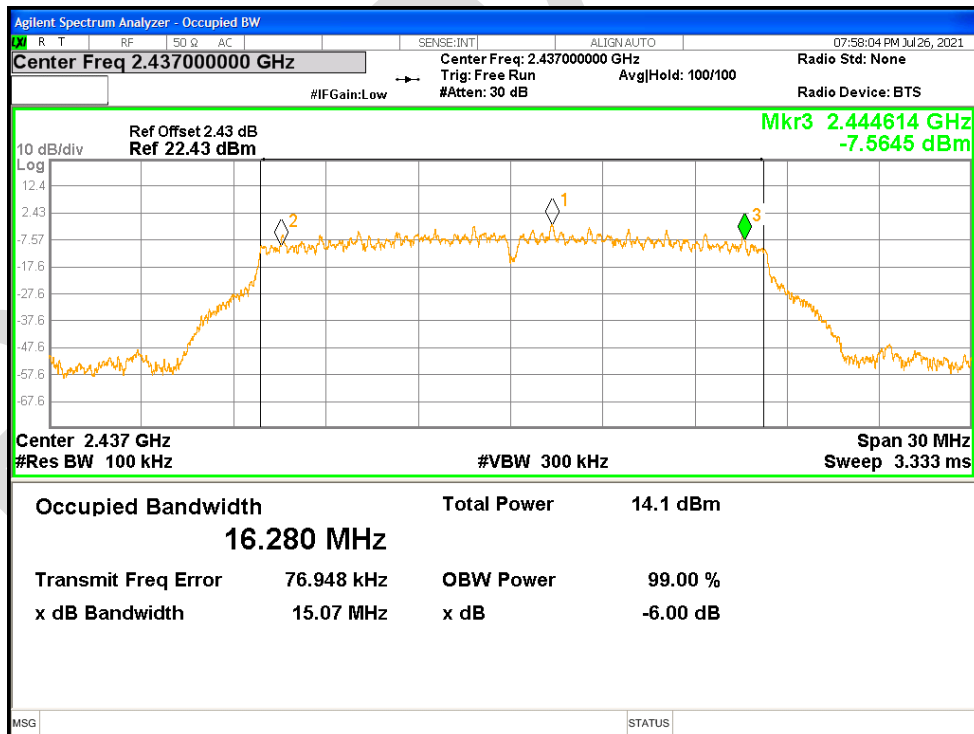
-6dB Bandwidth NVNT g 2412MHz Ant2



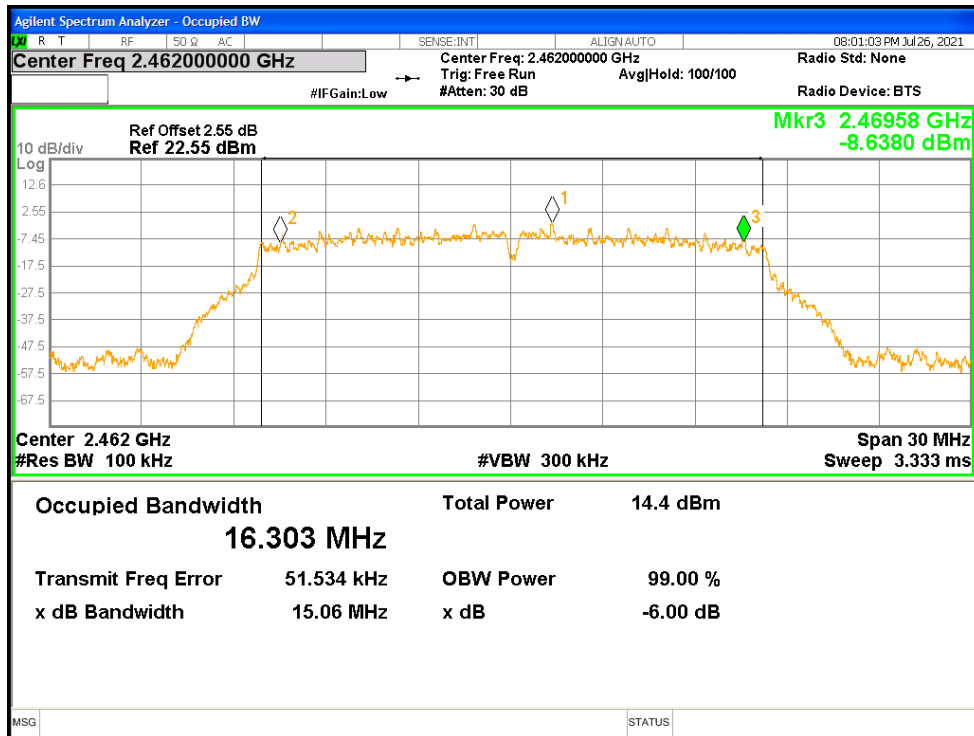
-6dB Bandwidth NVNT g 2437MHz Ant1



-6dB Bandwidth NVNT g 2437MHz Ant2



-6dB Bandwidth NVNT g 2462MHz Ant1



-6dB Bandwidth NVNT g 2462MHz Ant2

