



Test Report

FCC Part15 Subpart C & RSS-247 Issue 2

Product Name : Computer BOX
Model No. : ESY00I4
FCC ID : RBWESY00I4
IC : 10757B-ESY00I4

Applicant : Elo Touch Solutions, Inc
Address : 670 N. McCarthy Blvd., Suite 100,
Milpitas, CA 95035, USA.

Date of Receipt : Apr. 09, 2021
Test Date : Apr. 10, 2021 ~ May. 10, 2021
Issued Date : Jun. 02, 2021
Report No. : 2140225R-RF-US-P06V03
Report Version : V1.1

The test results presented in this report relate only to the object tested.

The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.

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Test Report Certification

Issued Date: Jun. 02, 2021

Report No. : 2140225R-RF-US-P06V03



Product Name : Computer BOX
Applicant : Elo Touch Solutions, Inc
Address : 670 N. McCarthy Blvd., Suite 100, Milpitas, CA 95035, USA.
Manufacturer : Elo Touch Solutions, Inc
Address : 670 N. McCarthy Blvd., Suite 100, Milpitas, CA 95035, USA.
Model No. : ESY00I4
Brand : Elo
FCC ID : RBWESY00I4
IC : 10757B-ESY00I4
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C
ANSI C63.10:2013;
KDB 558074 D01v05r02
KDB 662911 D01 Multiple Transmitter Output v02r01
RSS-Gen Issue 5 / RSS-247 Issue 2
Test Result : Complied
Performed Location : DEKRA Testing and Certification (Suzhou) Co., Ltd.
No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006,
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FCC Designation Number: CN1199
ISED CAB identifier: CN0040

Documented By :



(Project Engineer: Scott Shen)

Approved By :



(Supervisor: Jack Zhang)

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
2140225R-RF-US-P06V03	V1.0	Initial Issued Report	May. 18, 2021
2140225R-RF-US-P06V03	V1.1	1. Added power setting at clause 2.3. 2. Modified some typos.	Jun. 02, 2021

1. General Information

1.1. EUT Description

Product Name	Computer BOX
Model No.	ESY00I4
Hardware Version	R04
Software Version	Android10
Firmware Version	9.87.51.11.45
EUT Voltage	19 Vdc
Frequency Range	For 2.4GHz Band 802.11b/g/n(20MHz): 2412~2462MHz
Channel Number	For 2.4GHz Band 802.11b/g/n(20MHz): 11
Type of Modulation	802.11b: DSSS-DBPSK, DQPSK, CCK 802.11g/n: OFDM-BPSK, QPSK, 16QAM, 64QAM
Data Rate	802.11b: 1/2/5.5/11 Mbps 802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11n: up to 144.4 Mbps
Channel Control	Auto

Note1: Client claims the EUT has the same BT/WIFI module of DEKRA report No.

2140224R-RF-US-P06V03, so only conducted emission, band edge and radiated test items is re-evaluated.

Note2: Test samples SN we used for test is B215A40105.

1.2. Working Frequency of Each Channel:

802.11b/g/n(20MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz	04	2427 MHz
05	2432 MHz	06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	10	2457 MHz	11	2462 MHz	N/A	N/A

1.3. Antenna information

Antenna model / type number .. :		N/A			
Antenna serial number		N/A			
Antenna Delivery		☒	1TX + 1RX		
		☒	2TX + 2RX		
		☐	Others:.....		
Antenna technology		☒	SISO		
		☒	MIMO	☒	CDD
				☐	Beam-forming
Antenna Type		☒	External	☒	Dipole
				☐	Sectorized
		☐	Internal	☐	PIFA
				☐	PCB
				☐	Metal Antenna
				☐	Others.....
		SISO	Antenna 1 Gain	2 dBi	
Antenna 2 Gain.....	2 dBi				
CDD		2 dBi for Power; 5 dBi for PSD			

1.4. Mode of Operation

Test Modes List
Mode 1: Transmit by 802.11b
Mode 2: Transmit by 802.11g
Mode 3: Transmit by 802.11n(20MHz)

Note 1: Regards to the frequency band operation: the lowest, middle and highest frequency channel were selected to perform the test, then shown on this report.

Note 2: For portable device, radiated tests was verified over X, Y, Z axis, and shown the worst case on this report.

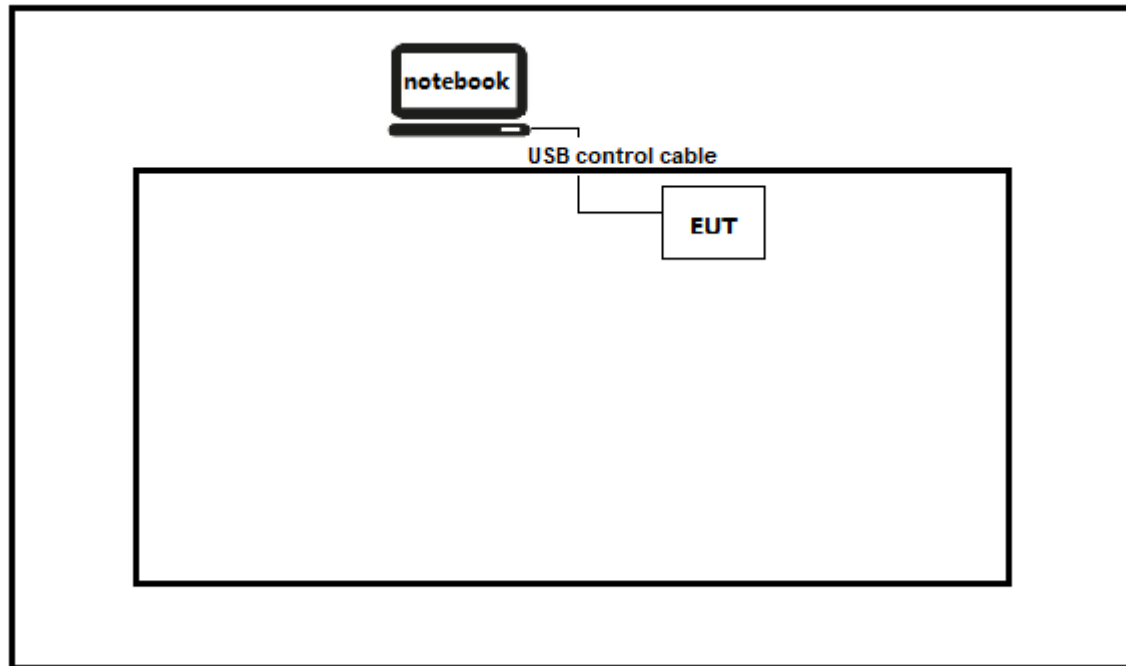
1.5. Tested System Details

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

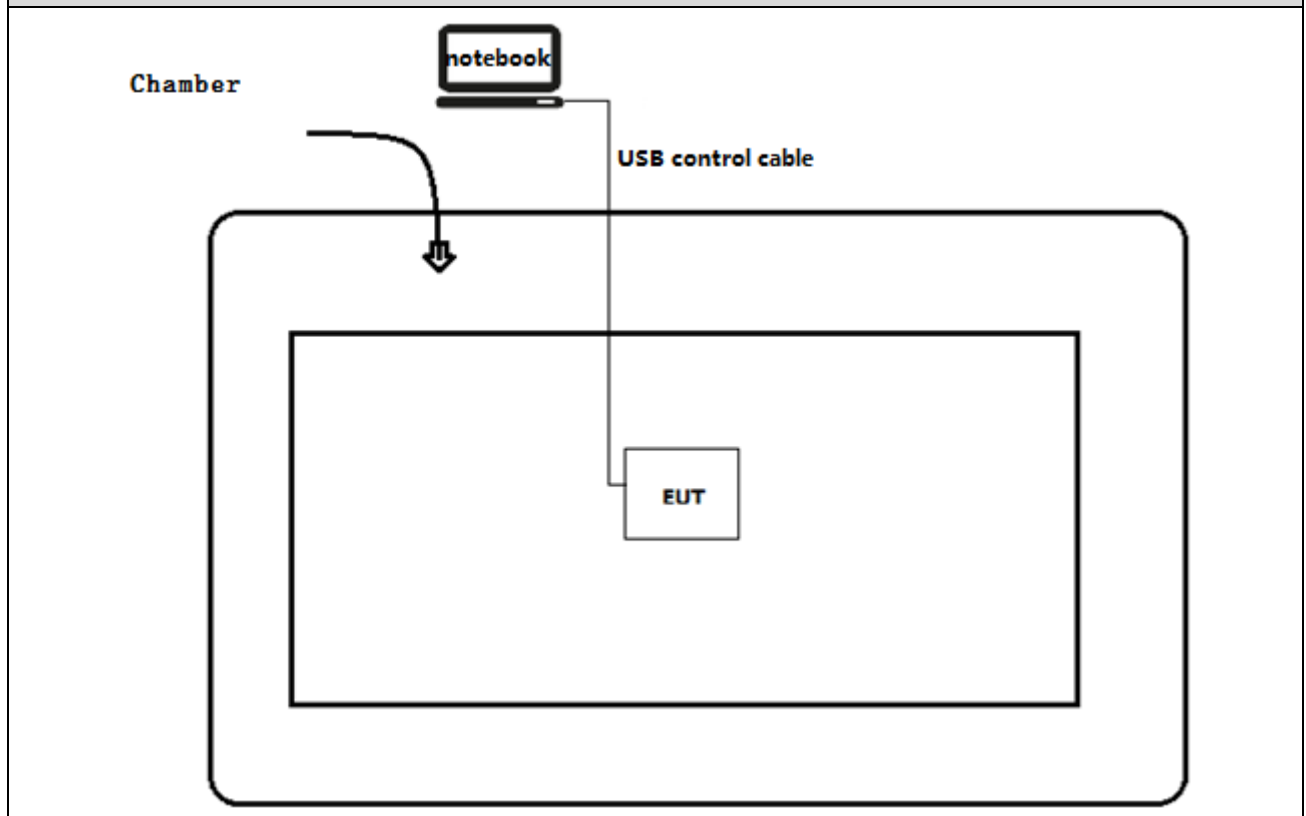
No.	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Think Pad	2526	LV-A3285	Power by adapter

1.6. Configuration of Tested System

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated Emission



1.7. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of equipment.
3	Run the ADB command.
4	Select the transmission mode and test channel, then start test.

2. Technical Test

2.1. Summary of Test Result

For FCC

Performed Test Item	Normative References	Limit	Result
AC Power Line Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: Section 15.207	FCC 15.207	PASS
Emissions in restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: Section 15.209	FCC 15.209	PASS
Emissions in non-restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(d)	$\geq 30\text{dBc}$	PASS
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: Section 15.205	FCC 15.209	PASS
Occupied Bandwidth	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(a)(2)	$\geq 500\text{kHz}$	PASS
Fundamental emission output power	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(b)(3)	$\leq 30\text{dBm}$	PASS
Power Spectral Density	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(e)	$\leq 8\text{dBm}/3\text{kHz}$	PASS
Antenna Requirement	FCC CFR Title 47 Part 15 Subpart C: Section 15.203	FCC 15.203	PASS

For ISED

Performed Test Item	Normative References	Limit	Result
AC Power Line Conducted Emission	RSS-Gen Issue 5 Section 8.8	RSS-Gen	N/A
Emissions in restricted frequency bands	RSS-Gen Issue 5 Section 8.9	RSS-Gen	PASS
Emissions in non-restricted frequency bands	RSS-247 Issue 2 Section 5.5	$\geq 30\text{dBc}$	PASS
Radiated Emission Band Edge	RSS-Gen Issue 5 Section 8.10	RSS-247	PASS
Occupied Bandwidth	RSS-Gen Issue 5 Section 6.7 RSS-247 Issue 2 Section 5.2(a)	Within Band $\geq 500\text{kHz}$	PASS
Fundamental emission output power	RSS-247 Issue 2 Section 5.4(d)	$\leq 30\text{dBm}$	PASS
Power Spectral Density	RSS-247 Issue 2 Section 5.2(b)	$\leq 8\text{dBm}/3\text{kHz}$	PASS
Antenna Requirement	RSS-Gen Issue 5 Section 6.8	RSS-Gen Issue 5	PASS

2.2. Test Frequency configuration:

Modulation Mode	Channel	Frequency	Channel	Frequency	Channel	Frequency
802.11b	01	2412 MHz	06	2437 MHz	11	2462 MHz
802.11g	01	2412 MHz	06	2437 MHz	11	2462 MHz
802.11n(20MHz)	01	2412 MHz	06	2437 MHz	11	2462 MHz

2.3. Power Index:

Mode	Frequency(MHz)	Power Index
802.11b	2412	12.0
	2437	12.0
	2462	12.0
802.11g	2412	12.0
	2437	12.0
	2462	12.0
802.11n(20MHz)	2412	12.0
	2437	12.0
	2462	12.0

Note: This power setting is used for both SISO and MIMO mode.

2.4. Power vs Data Rate

MCS Index for 802.11n	Spatial Streams	20MHz Bandwidth			
		802.11b	802.11g	20MHz Bandwidth	
				800ns GI	400ns GI
0	1	1	6	6.5	7.2
1	1	2	9	13.0	14.4
2	1	5.5	12	19.5	21.7
3	1	11	18	26.0	28.9
4	1	---	24	39.0	43.3
5	1	---	36	52.0	57.8
6	1	---	48	58.5	65.0
7	1	---	54	65.0	72.2
8	2	---	---	13.0	14.4
9	2	---	---	26.0	28.9
10	2	---	---	39.0	43.3
11	2	---	---	52.0	57.8
12	2	---	---	78.0	86.7
13	2	---	---	104.0	115.6
14	2	---	---	117.0	130.0
15	2	---	---	130.0	144.4

Note 1: The blue form is the maximum power data rate.

Note 2: The EUT supports two spatial streams.

2.5. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

2.6. Measurement Uncertainty

Test Items	Uncertainty
AC Power Line Conducted Emission	± 2.02 dB
Radiated Emission	Below 1GHz ± 3.8 dB
	Above 1GHz ± 3.9 dB
RF Antenna Port Conducted Emission	± 1.27 dB
Radiated Emission Band Edge	± 3.9 dB
Occupied Bandwidth	± 1 kHz
Power Spectral Density	± 1.27 dB

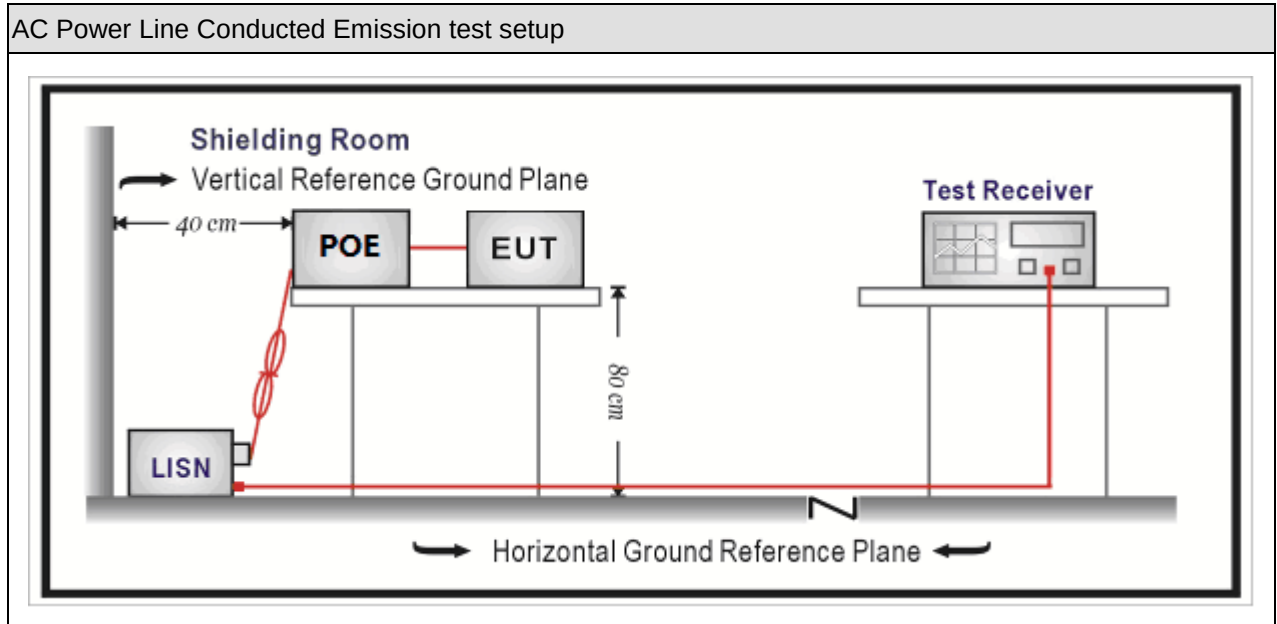
3. AC Power Line Conducted Emission

3.1. Test Equipment

AC Power Line Conducted Emission / TR-1					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100906	2021.04.28	2022.04.27
Two-Line V-Network	R&S	ENV216	101044	2021.03.20	2022.03.19
50ohm Termination	SHX	TF2	7081402	2020.09.23	2021.09.22
50ohm Termination	SHX	TF2	7081403	2020.09.23	2021.09.22
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	TR1-TH	2020.08.23	2021.08.22
Dekra test software	Dekra	-	-	-	-

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

3.2. Test Setup



3.3. Limit

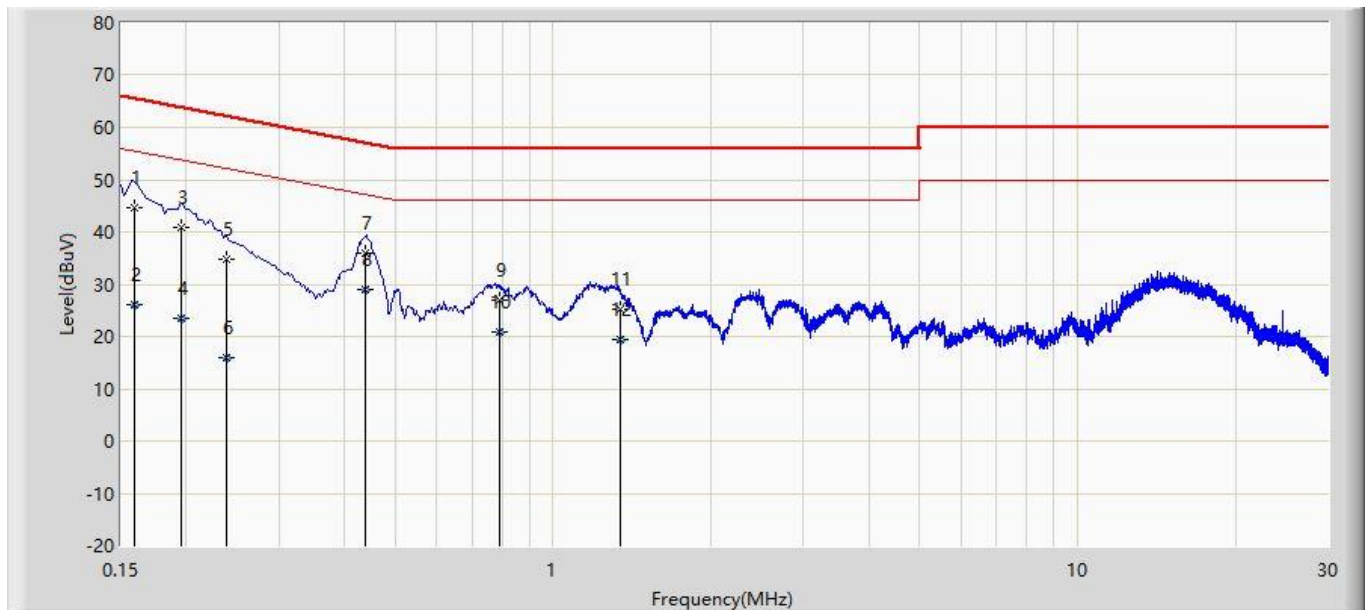
Frequency of Emission (MHz)	Conducted Limit	
	Quasi-peak (dB μ V)	Average(dB μ V)
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50
Note 1: The lower limit shall apply at the transition frequencies.		
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

3.4. Test Procedure

Test Method			
	References Rule	Chapter	Item
☒	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

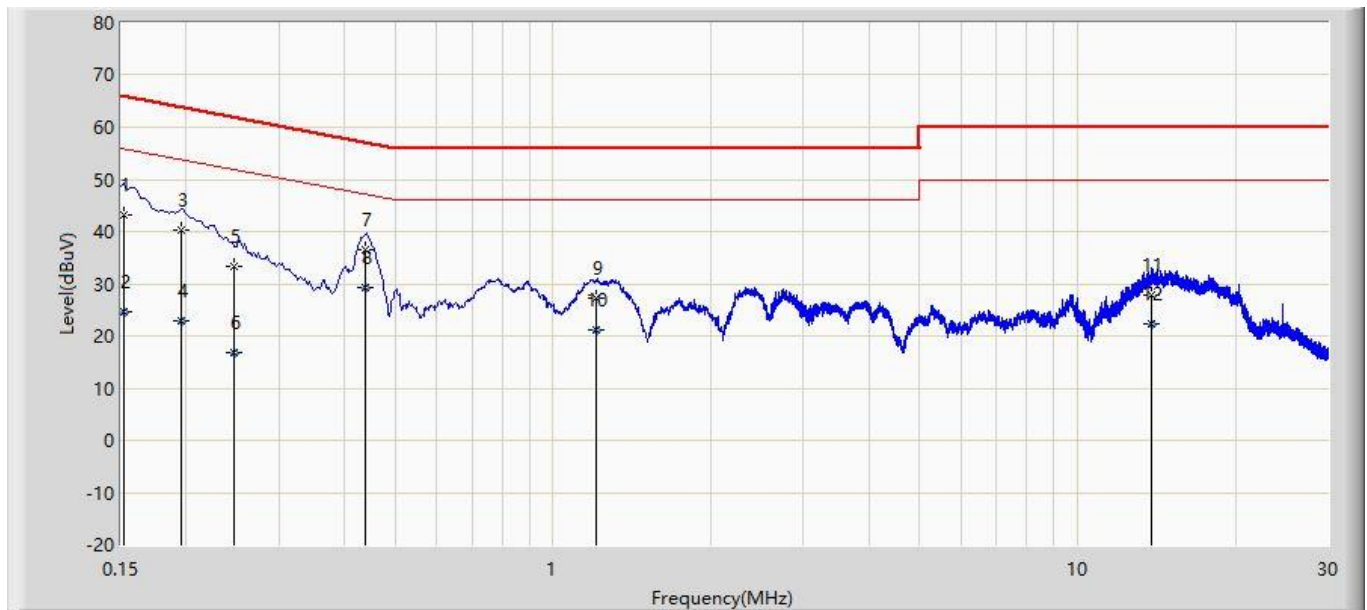
3.5. Test Result

Profile: 2140225R	Page No.: 16
Engineer: Juliuszhou	
Site: TR1	Time: 2021/04/28 - 19:35
Limit: FCC_Part15.207_CE_AC Power	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.159	44.549	34.889	-20.967	65.516	9.660	QP
2		0.159	26.185	16.525	-29.331	55.516	9.660	AV
3		0.195	40.839	31.155	-22.982	63.821	9.684	QP
4		0.195	23.368	13.684	-30.453	53.821	9.684	AV
5		0.238	34.734	25.028	-27.441	62.174	9.705	QP
6		0.238	15.864	6.159	-36.310	52.174	9.705	AV
7		0.440	36.059	26.255	-20.998	57.057	9.804	QP
8	*	0.440	28.915	19.112	-18.142	47.057	9.804	AV
9		0.789	27.048	17.123	-28.952	56.000	9.925	QP
10		0.789	20.814	10.889	-25.186	46.000	9.925	AV
11		1.340	25.273	15.282	-30.727	56.000	9.991	QP
12		1.340	19.450	9.458	-26.550	46.000	9.991	AV

Profile: 2140225R	Page No.: 21
Engineer: Juliuszhou	
Site: TR1	Time: 2021/04/28 - 19:42
Limit: FCC_Part15.207_CE_AC Power	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Neutral
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.152	43.133	33.397	-22.743	65.876	9.736	QP
2		0.152	24.588	14.851	-31.289	55.876	9.736	AV
3		0.195	40.209	30.446	-23.612	63.821	9.763	QP
4		0.195	22.988	13.225	-30.832	53.821	9.763	AV
5		0.247	33.401	23.621	-28.465	61.866	9.780	QP
6		0.247	16.699	6.920	-35.167	51.866	9.780	AV
7		0.440	36.595	26.767	-20.463	57.057	9.828	QP
8	*	0.440	29.221	19.393	-17.836	47.057	9.828	AV
9		1.210	27.332	17.384	-28.668	56.000	9.948	QP
10		1.210	21.123	11.176	-24.877	46.000	9.948	AV
11		13.855	27.956	17.564	-32.044	60.000	10.392	QP
12		13.855	22.333	11.941	-27.667	50.000	10.392	AV

4. Emissions in restricted frequency bands

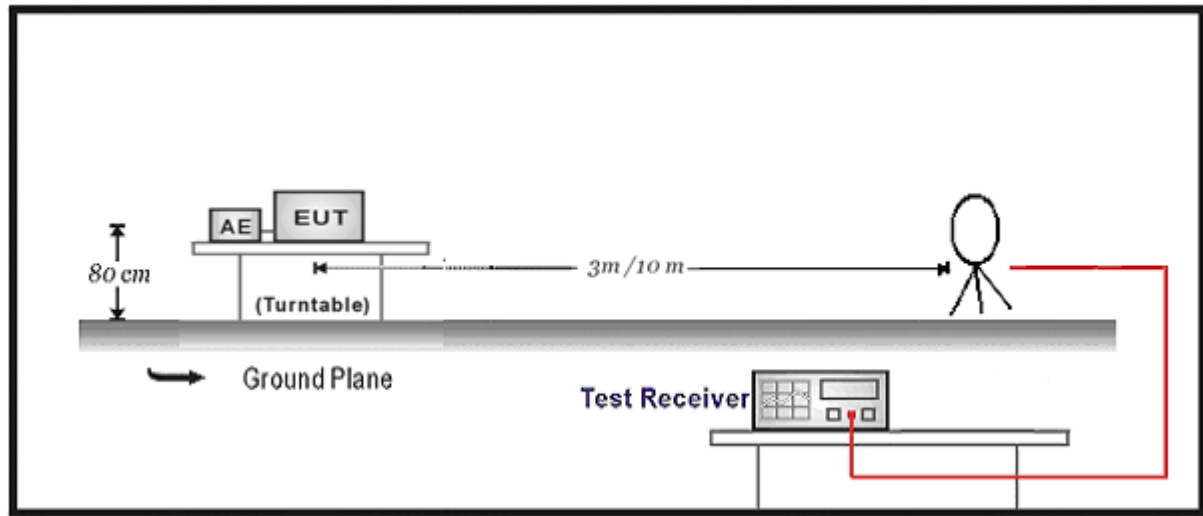
4.1. Test Equipment

Radiated Emission(Below 1GHz) / AC-3					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100176	2020.08.15	2021.08.14
Loop Antenna	R&S	HFH2-Z2	833799/003	2021.03.04	2022.03.03
Bilog Antenna	Teseq GmbH	CBL6112D	27613	2020.08.19	2021.08.18
Coaxial Cable	Huber+Suhner	RG 214	AC3-C	2021.03.31	2022.03.30
Temperature/Humidity Meter	RTS	RTS-8S	AC3-TH	2020.08.13	2021.08.12
Dekra test software	Dekra	-	-	-	-
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

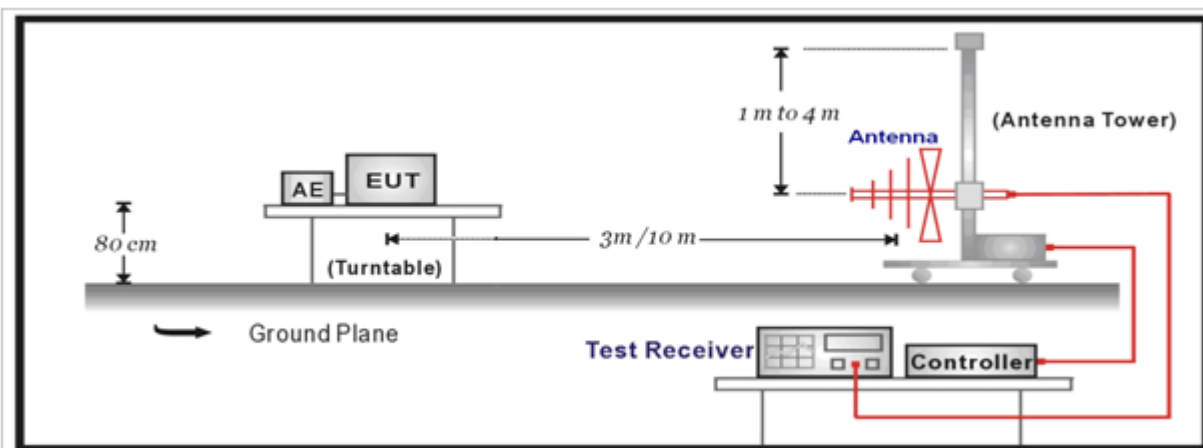
Radiated Emission(Above 1GHz) / AC-5					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2021.03.20	2022.03.19
Amplifier	Keleto	LNPA	SK20190225	2020.09.25	2021.09.24
Preamplifier	EMCI	EMC184045SE	980263	2020.05.24	2021.05.23
DRG Horn Antenna	ETS-Lindgren	3117	00167055	2020.08.06	2021.08.05
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2021.04.14	2023.04.13
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2021.03.31	2022.03.30
Coaxial Cable	ROSENBERGER	LA1-C011-2000/3000	AC5-40G	2021.03.20	2022.03.19
Temperature/Humidity Meter	RTS	RTS-8S	AC5-TH	2020.08.13	2021.08.12
Dekra test software	Dekra	-	-	-	-
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

4.2. Test Setup

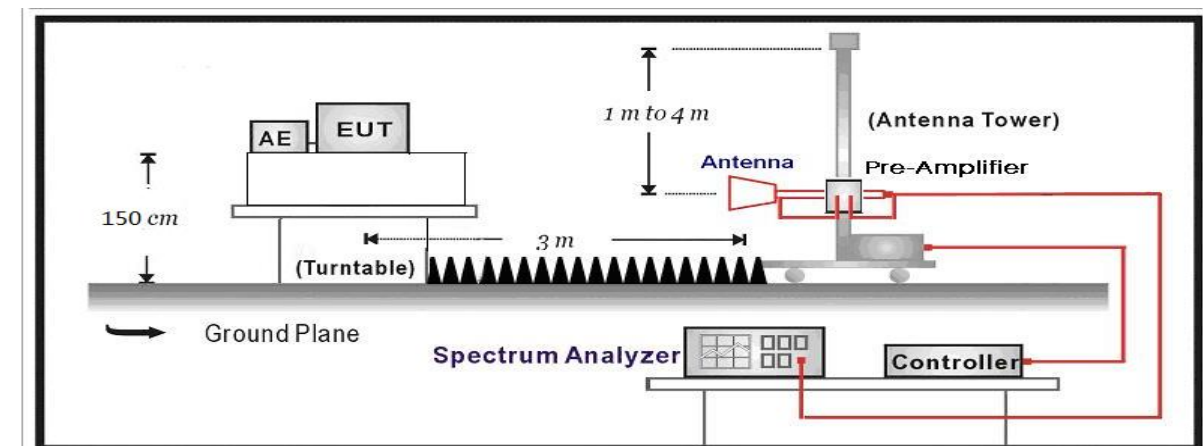
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limit

For FCC

Restricted Bands of operation			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
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	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	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 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	
13.36 – 13.41			

For ISED:

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138		

Restricted Band Emissions Limit			
Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300 _(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30 _(Note 1)
1.705 - 30	30	29.5	30 _(Note 1)
30 - 88	100	40	3 _(Note 2)
88 - 216	150	43.5	3 _(Note 2)
216 - 960	200	46	3 _(Note 2)
Above 960	500	54	3 _(Note 2)

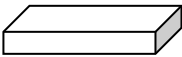
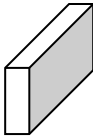
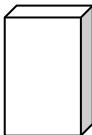
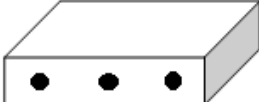
Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.4. Test Procedure

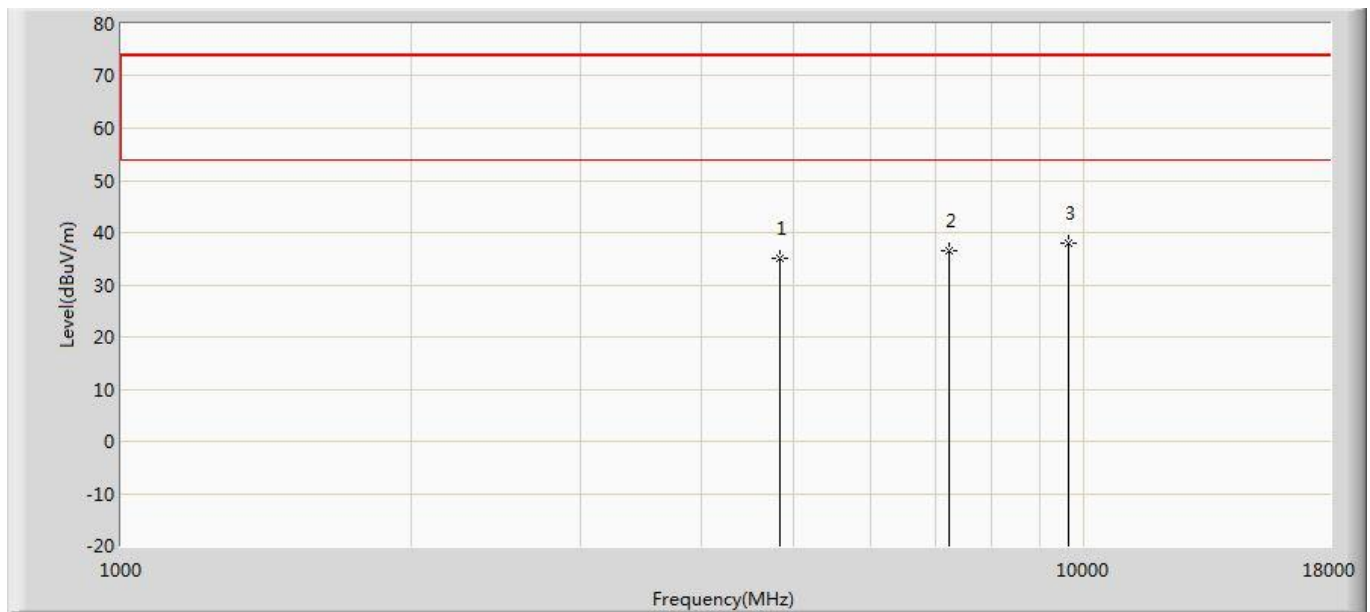
Test Method						
	References Rule			Chapter	Description	
☐	ANSI C63.10			11.11	Emissions in non-restricted frequency bands	
	☐	ANSI C63.10		11.11.2	Reference level measurement	
	☐	ANSI C63.10		11.11.3	Emission level measurement	
☒	ANSI C63.10			11.12	Emissions in restricted frequency bands	
	☒	ANSI C63.10		11.12.1	Radiated emission measurements	
	☒	ANSI C63.10		11.12.2.7	Radiated spurious emission test	
		☒	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz	
		☒	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz	
		☒	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz	
	☐	ANSI C63.10		11.12.2	Antenna-port conducted measurements	
		☐	ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure	
		☐	ANSI C63.10	11.12.2.4	Peak power measurement procedure	
		☐	ANSI C63.10	11.12.2.5	Average power measurement procedures	
			☐	ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
			☐	ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
			☐	ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

4.5. EUT test Axis definition

Item	Emissions in restricted frequency bands			
Device Category	☐	Fixed point-to-point		
	☐	Emit multiple directional beams, simultaneously or sequentially		
	☒	Other cases		
Test mode	Mode 1~3			
Test method	☒	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☒	Worst Axis ☐	Worst Axis ☐
	☐	Conducted		
	☐	Chain 1		
				
	☐	Chain 1	Chain 2	
				
	☐	Chain 1	Chain 2	Chain 3
				

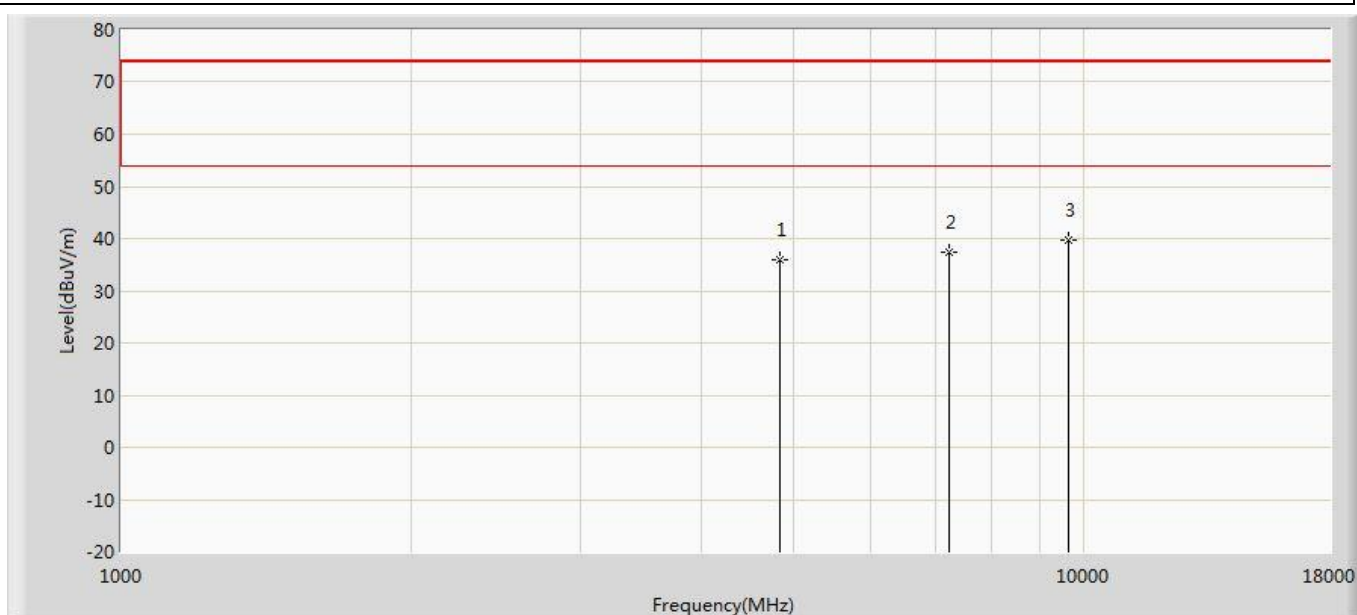
4.6. Test Result

Profile: 2140225R	Page No.: 127
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2412MHz by 802.11b	



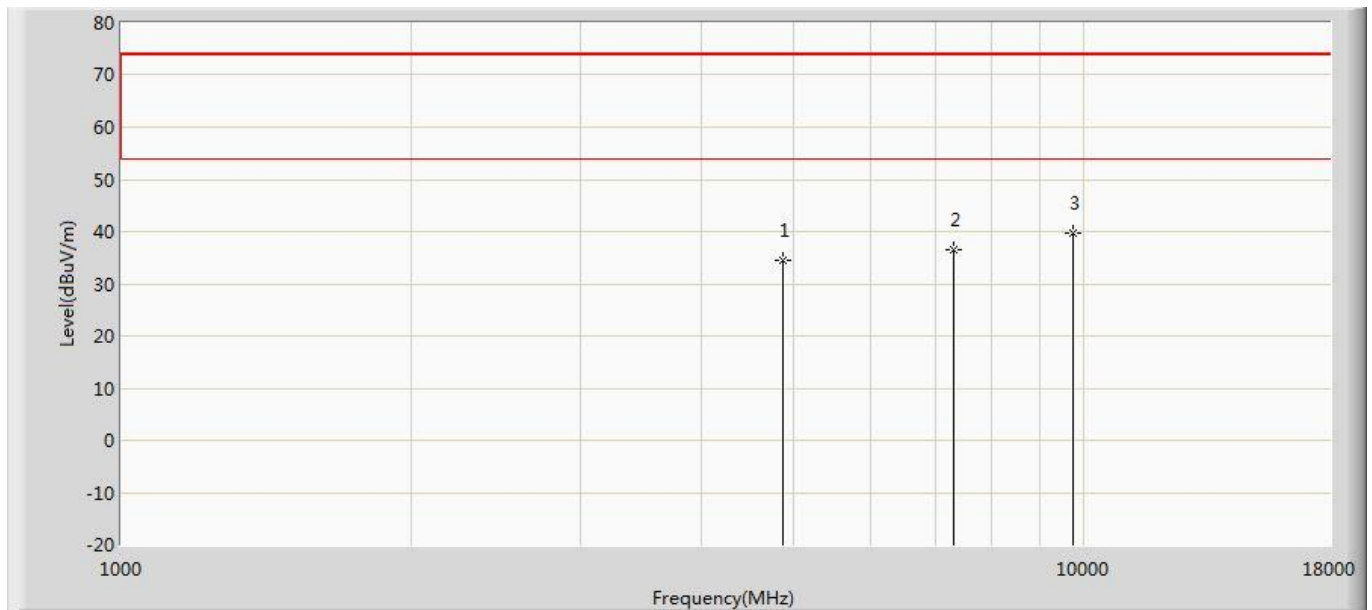
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4824.000	35.143	41.557	-38.857	74.000	-6.414	PK
2		7236.000	36.600	39.326	-37.400	74.000	-2.726	PK
3	*	9648.000	38.111	39.309	-35.889	74.000	-1.198	PK

Profile: 2140225R	Page No.: 128
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2412MHz by 802.11b	



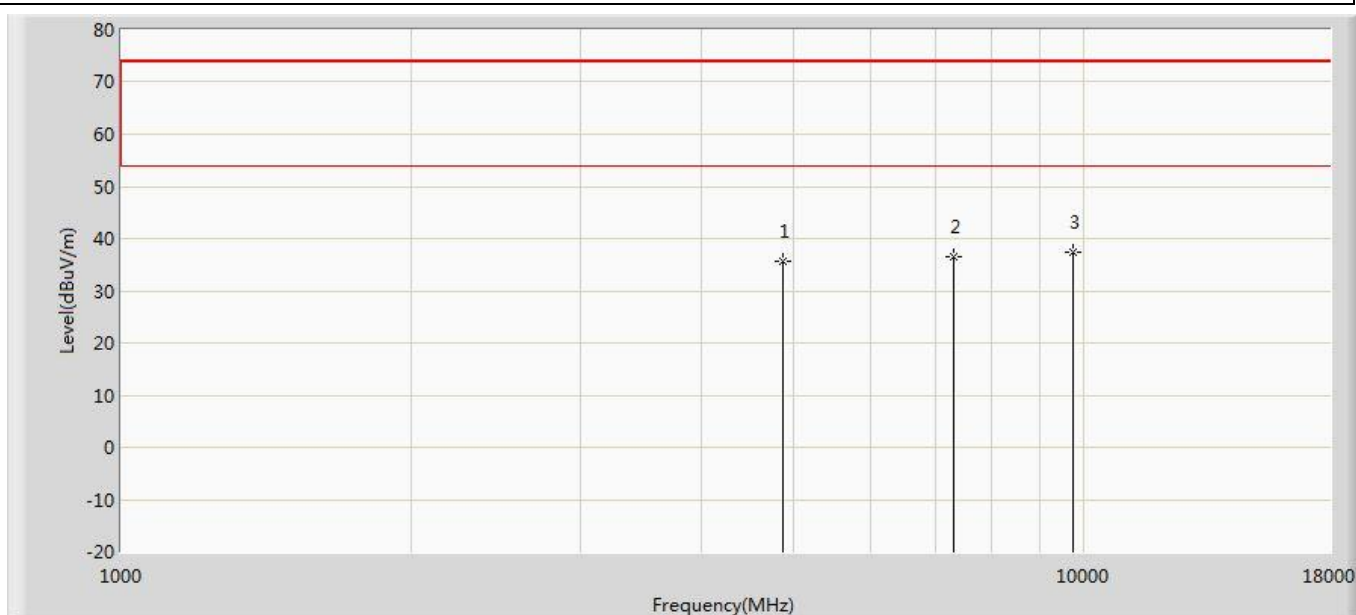
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4824.000	36.009	42.423	-37.991	74.000	-6.414	PK
2		7236.000	37.282	40.008	-36.718	74.000	-2.726	PK
3	*	9648.000	39.654	40.852	-34.346	74.000	-1.198	PK

Profile: 2140225R	Page No.: 129
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2437MHz by 802.11b	



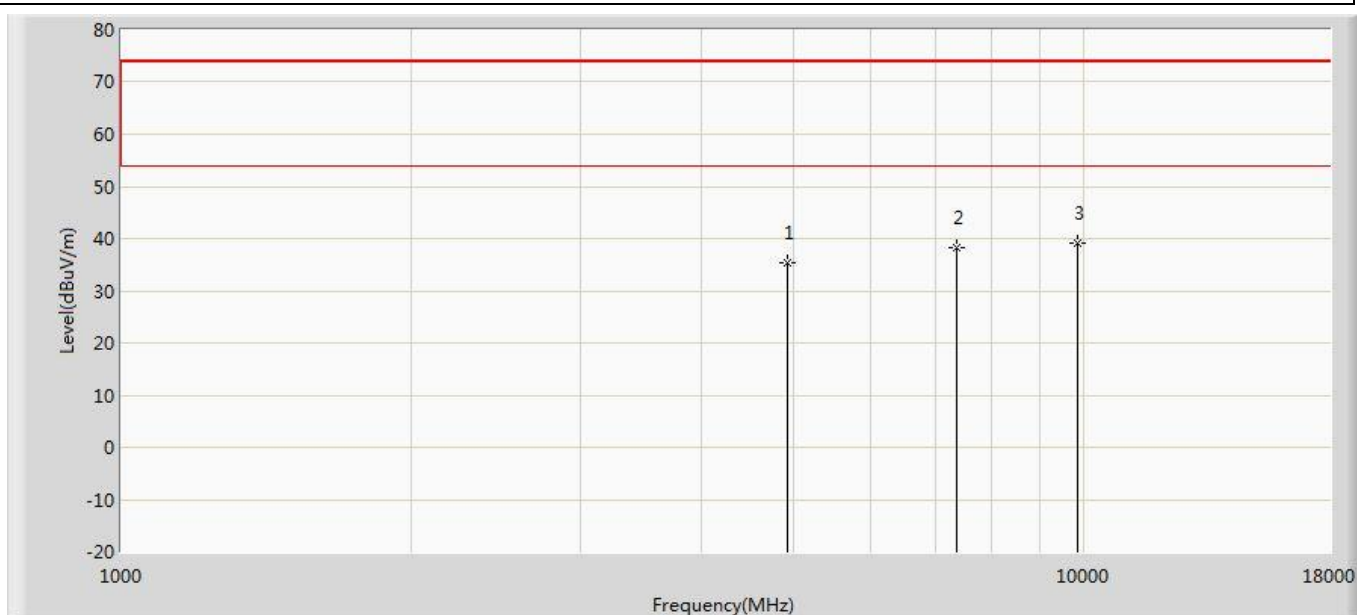
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4874.000	34.385	40.645	-39.615	74.000	-6.260	PK
2		7311.000	36.441	39.143	-37.559	74.000	-2.702	PK
3	*	9748.000	39.675	40.635	-34.325	74.000	-0.960	PK

Profile: 2140225R	Page No.: 130
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2437MHz by 802.11b	



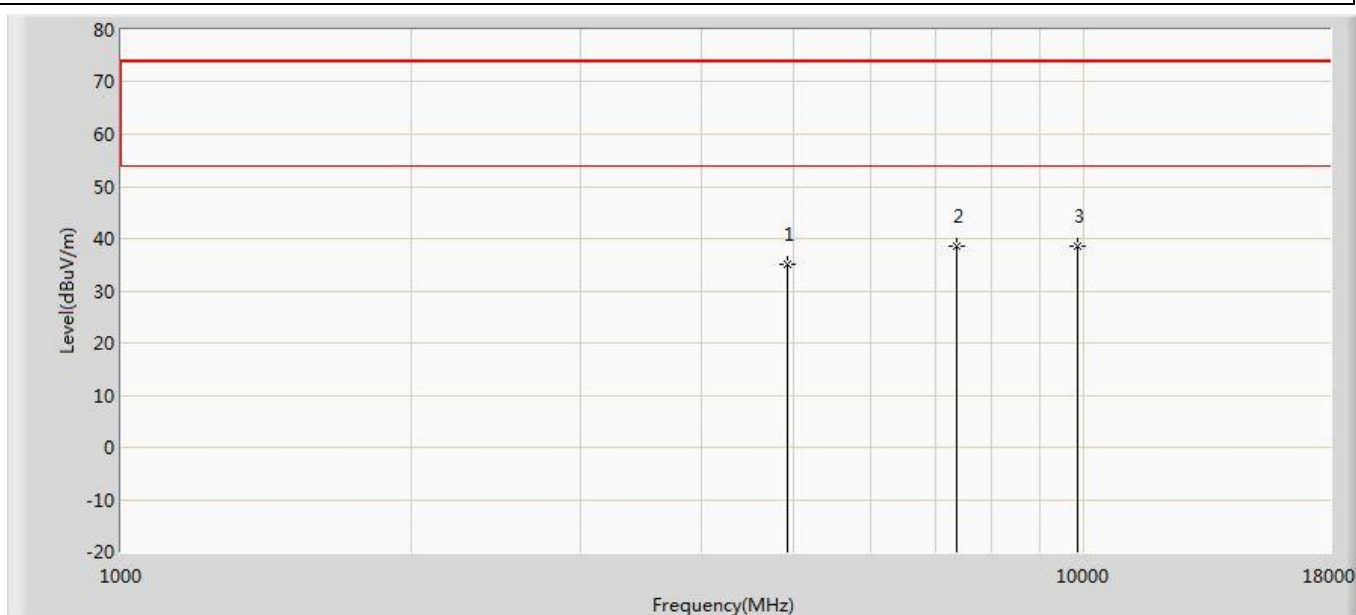
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4874.000	35.717	41.977	-38.283	74.000	-6.260	PK
2		7311.000	36.512	39.214	-37.488	74.000	-2.702	PK
3	*	9748.000	37.453	38.413	-36.547	74.000	-0.960	PK

Profile: 2140225R	Page No.: 131
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2462MHz by 802.11b	



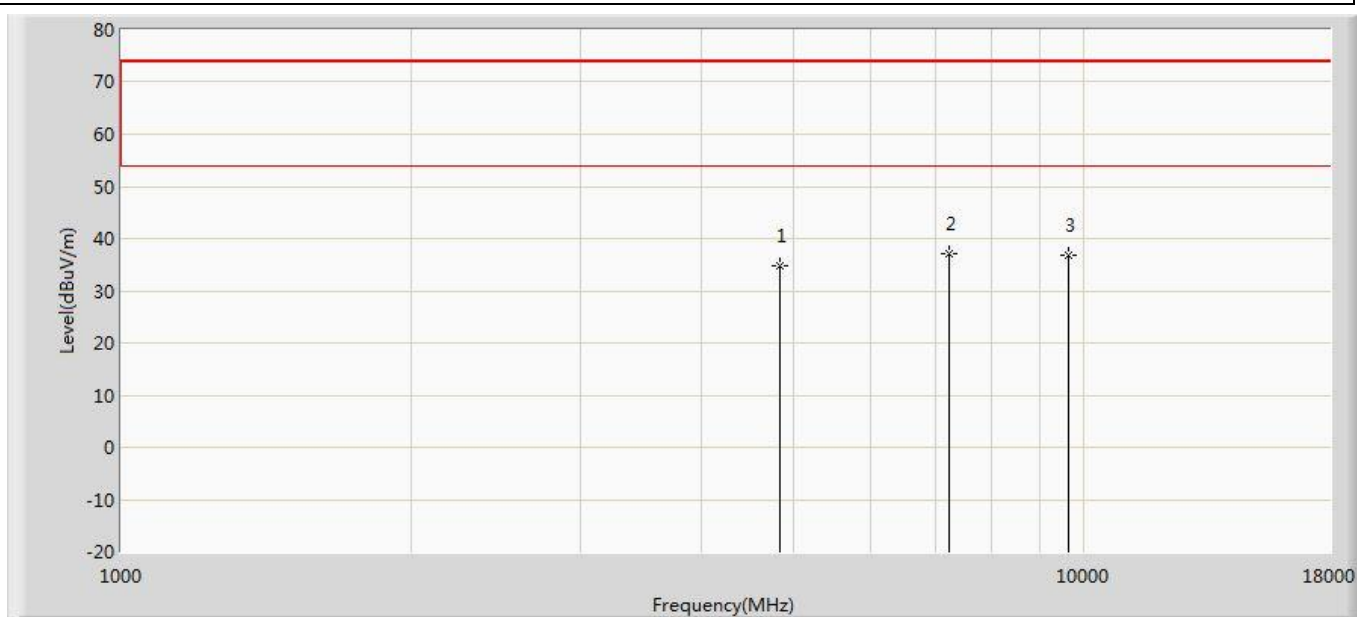
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4924.000	35.218	41.432	-38.782	74.000	-6.215	PK
2		7386.000	38.260	41.054	-35.740	74.000	-2.795	PK
3	*	9848.000	39.181	39.703	-34.819	74.000	-0.522	PK

Profile: 2140225R	Page No.: 132
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2462MHz by 802.11b	



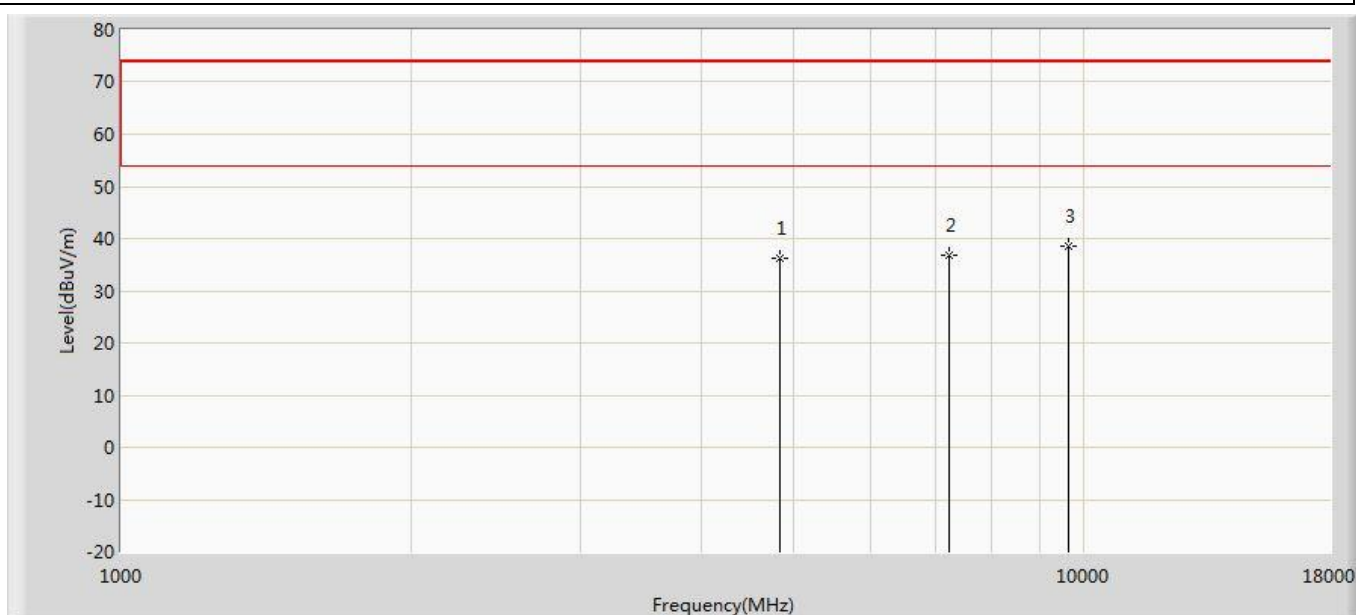
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4924.000	34.955	41.169	-39.045	74.000	-6.215	PK
2		7386.000	38.449	41.243	-35.551	74.000	-2.795	PK
3	*	9848.000	38.613	39.135	-35.387	74.000	-0.522	PK

Profile: 2140225R	Page No.: 133
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2412MHz by 802.11g	



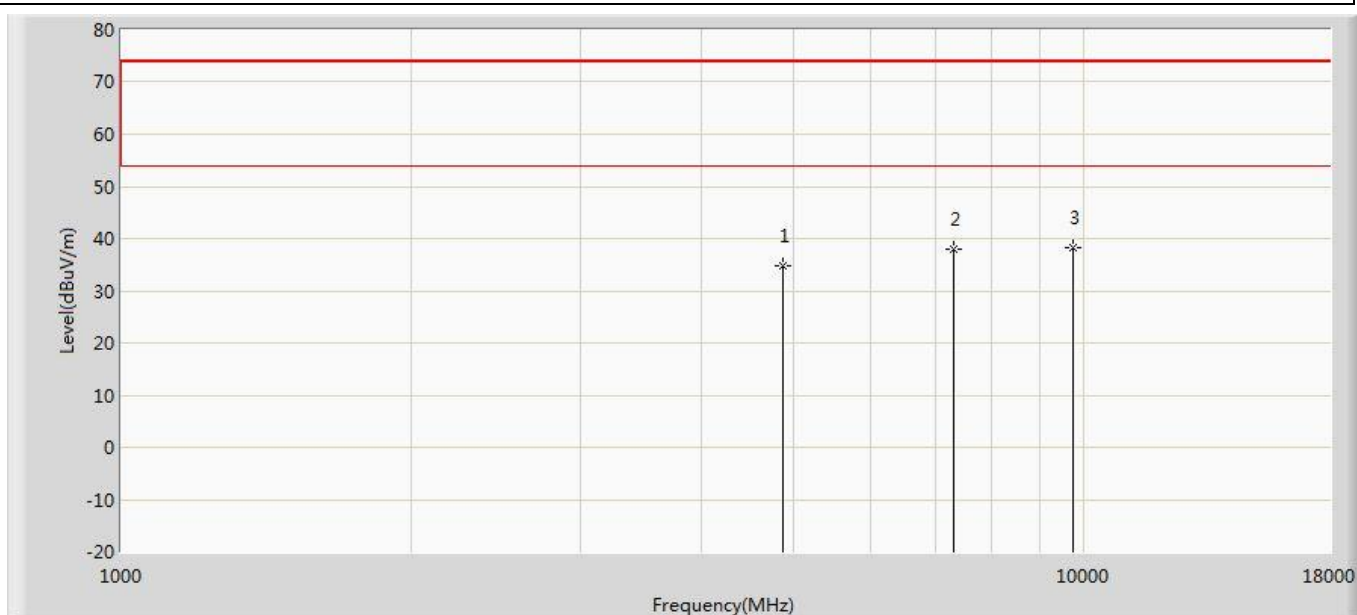
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4824.000	34.803	41.217	-39.197	74.000	-6.414	PK
2	*	7236.000	37.173	39.899	-36.827	74.000	-2.726	PK
3		9648.000	36.952	38.150	-37.048	74.000	-1.198	PK

Profile: 2140225R	Page No.: 134
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2412MHz by 802.11g	



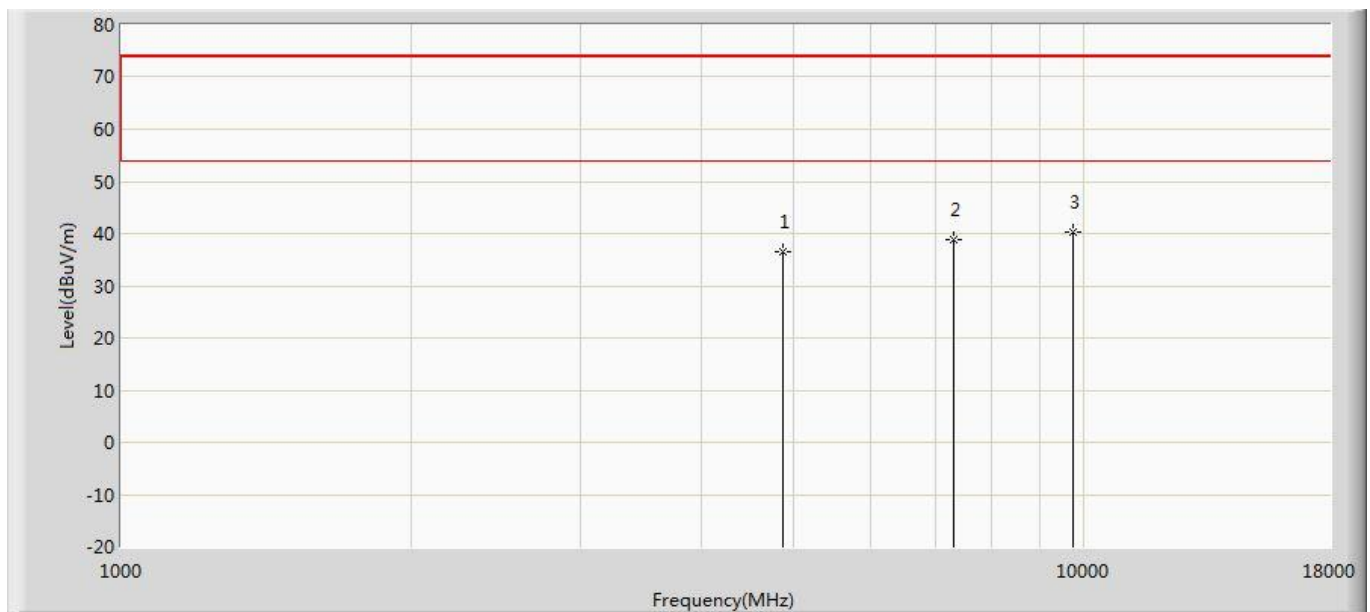
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4824.000	36.245	42.659	-37.755	74.000	-6.414	PK
2		7236.000	36.888	39.614	-37.112	74.000	-2.726	PK
3	*	9648.000	38.544	39.742	-35.456	74.000	-1.198	PK

Profile: 2140225R	Page No.: 135
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2437MHz by 802.11g	



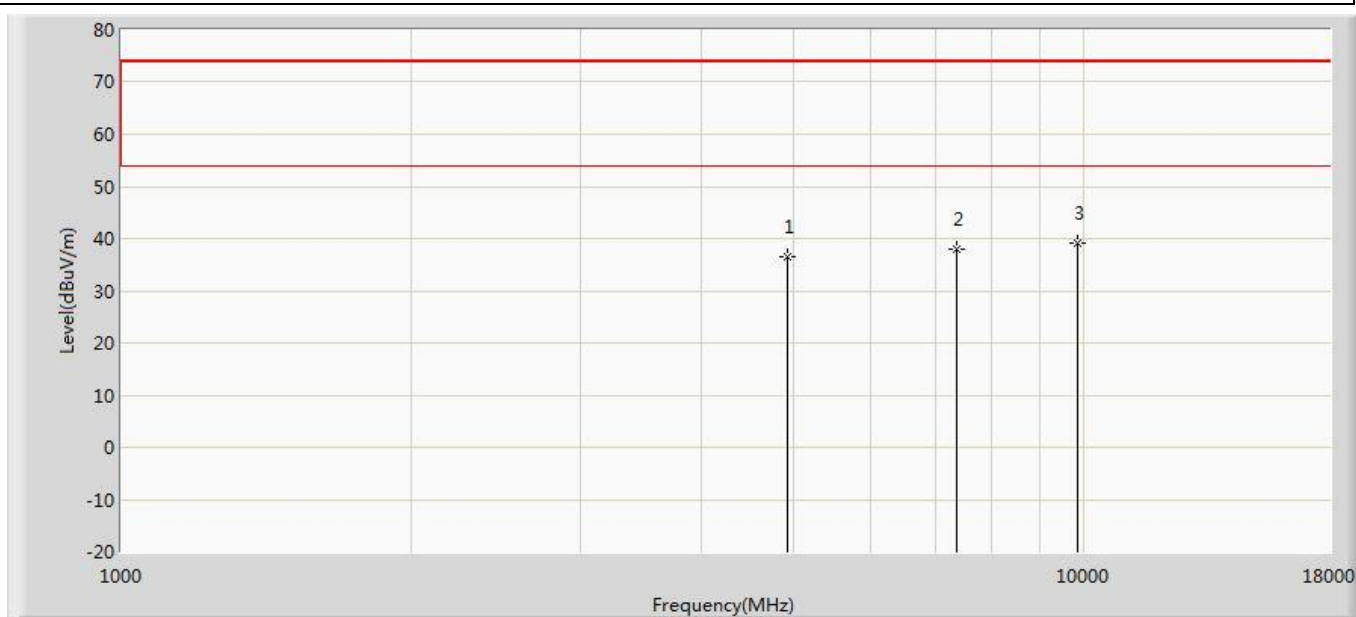
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4874.000	34.866	41.126	-39.134	74.000	-6.260	PK
2		7311.000	37.891	40.593	-36.109	74.000	-2.702	PK
3	*	9748.000	38.305	39.265	-35.695	74.000	-0.960	PK

Profile: 2140225R	Page No.: 136
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2437MHz by 802.11g	



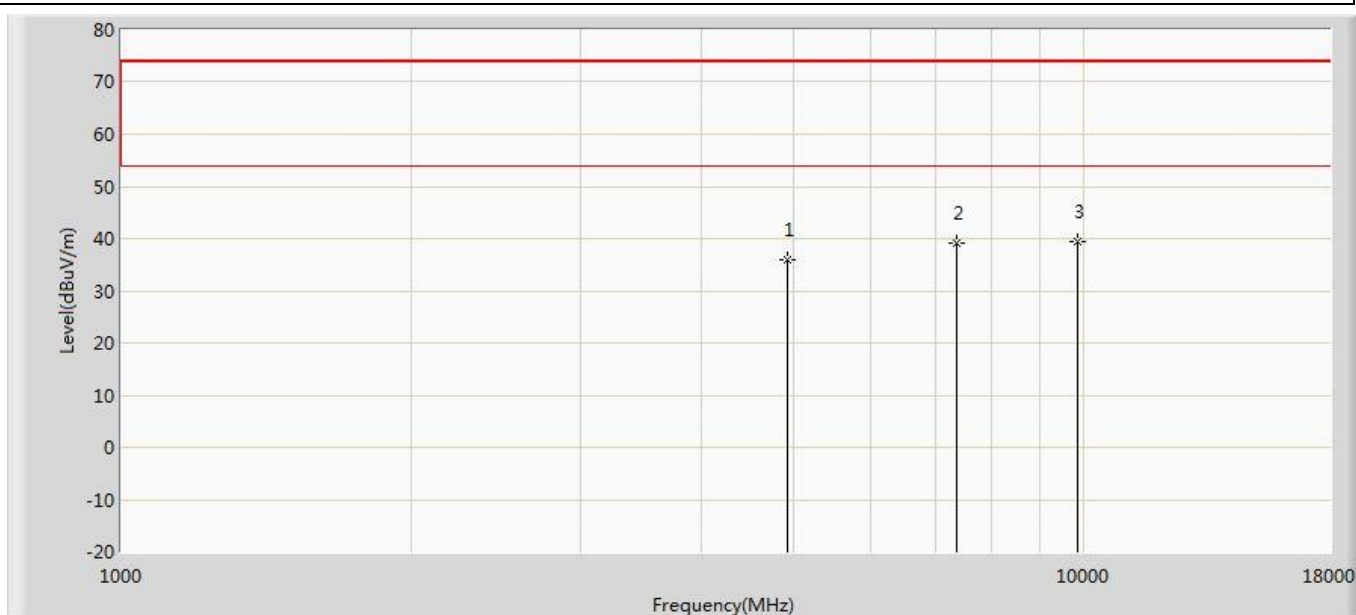
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4874.000	36.476	42.736	-37.524	74.000	-6.260	PK
2		7311.000	38.896	41.598	-35.104	74.000	-2.702	PK
3	*	9748.000	40.188	41.148	-33.812	74.000	-0.960	PK

Profile: 2140225R	Page No.: 137
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2462MHz by 802.11g	



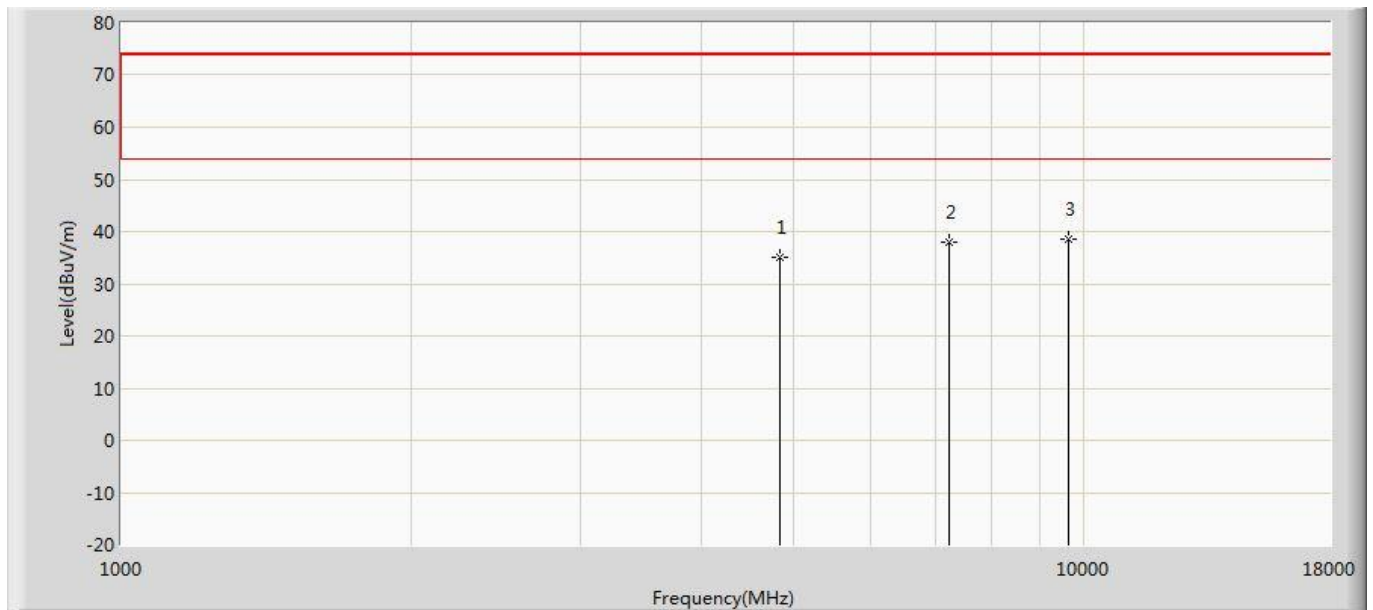
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4924.000	36.655	42.869	-37.345	74.000	-6.215	PK
2		7386.000	37.844	40.638	-36.156	74.000	-2.795	PK
3	*	9848.000	39.129	39.651	-34.871	74.000	-0.522	PK

Profile: 2140225R	Page No.: 138
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2462MHz by 802.11g	



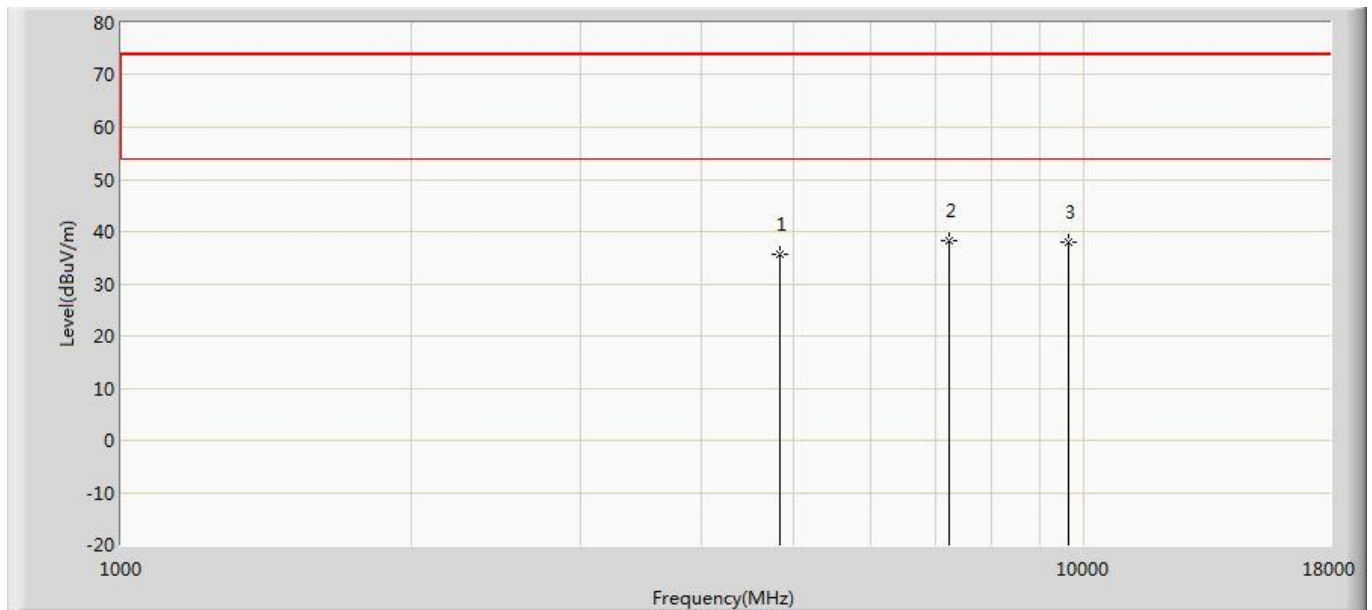
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4924.000	35.987	42.201	-38.013	74.000	-6.215	PK
2		7386.000	39.160	41.954	-34.840	74.000	-2.795	PK
3	*	9848.000	39.284	39.806	-34.716	74.000	-0.522	PK

Profile: 2140225R	Page No.: 139
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2412MHz by 802.11n(20MHz)	



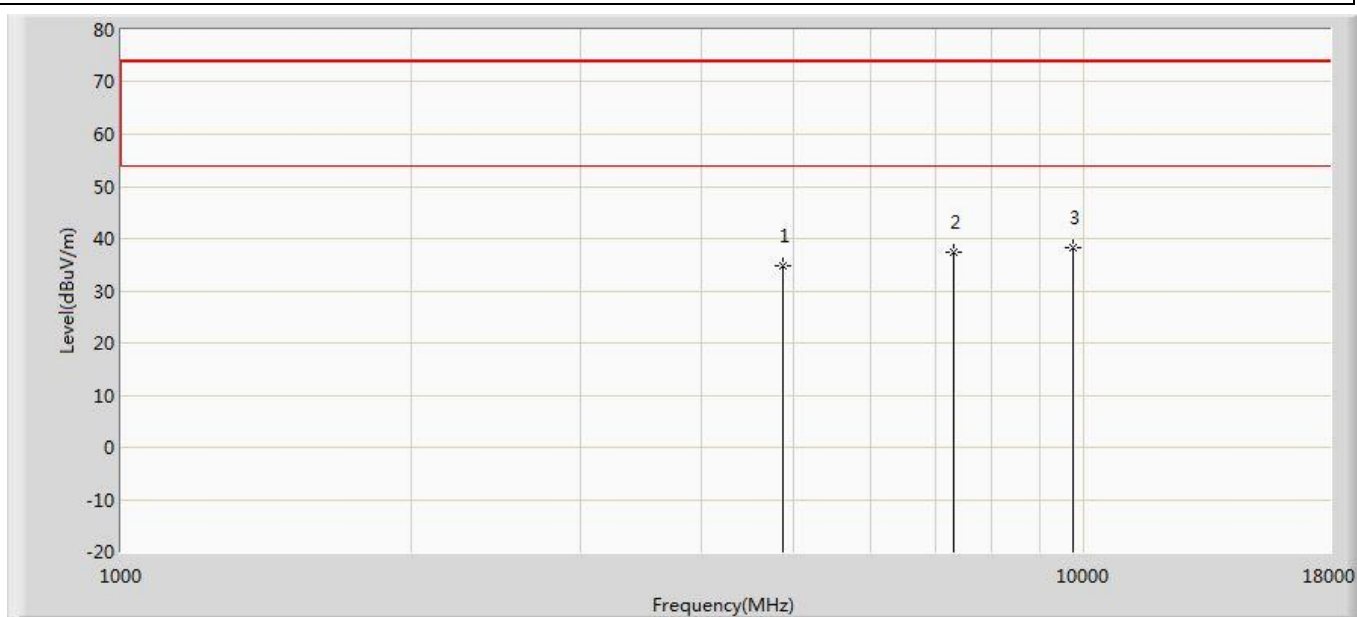
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4824.000	34.992	41.406	-39.008	74.000	-6.414	PK
2		7236.000	37.856	40.582	-36.144	74.000	-2.726	PK
3	*	9648.000	38.657	39.855	-35.343	74.000	-1.198	PK

Profile: 2140225R	Page No.: 140
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2412MHz by 802.11n(20MHz)	



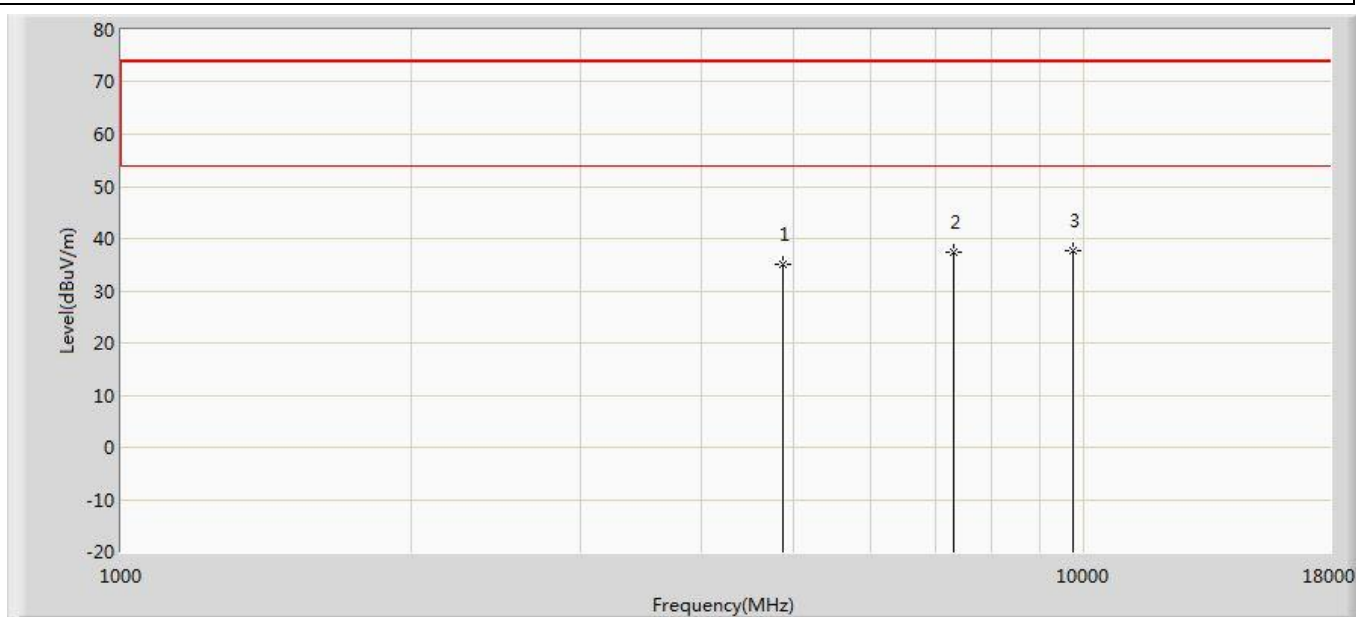
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4824.000	35.669	42.083	-38.331	74.000	-6.414	PK
2	*	7236.000	38.355	41.081	-35.645	74.000	-2.726	PK
3		9648.000	38.015	39.213	-35.985	74.000	-1.198	PK

Profile: 2140225R	Page No.: 141
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2437MHz by 802.11n(20MHz)	



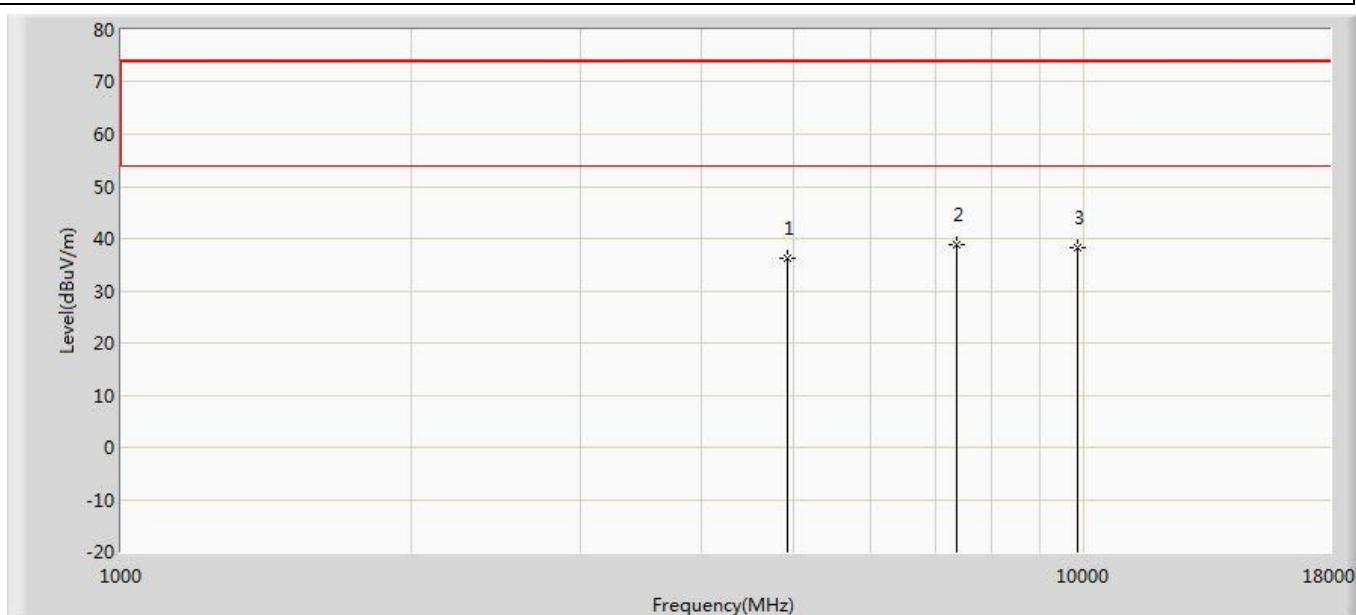
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4874.000	34.867	41.127	-39.133	74.000	-6.260	PK
2		7311.000	37.447	40.149	-36.553	74.000	-2.702	PK
3	*	9748.000	38.150	39.110	-35.850	74.000	-0.960	PK

Profile: 2140225R	Page No.: 142
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2437MHz by 802.11n(20MHz)	



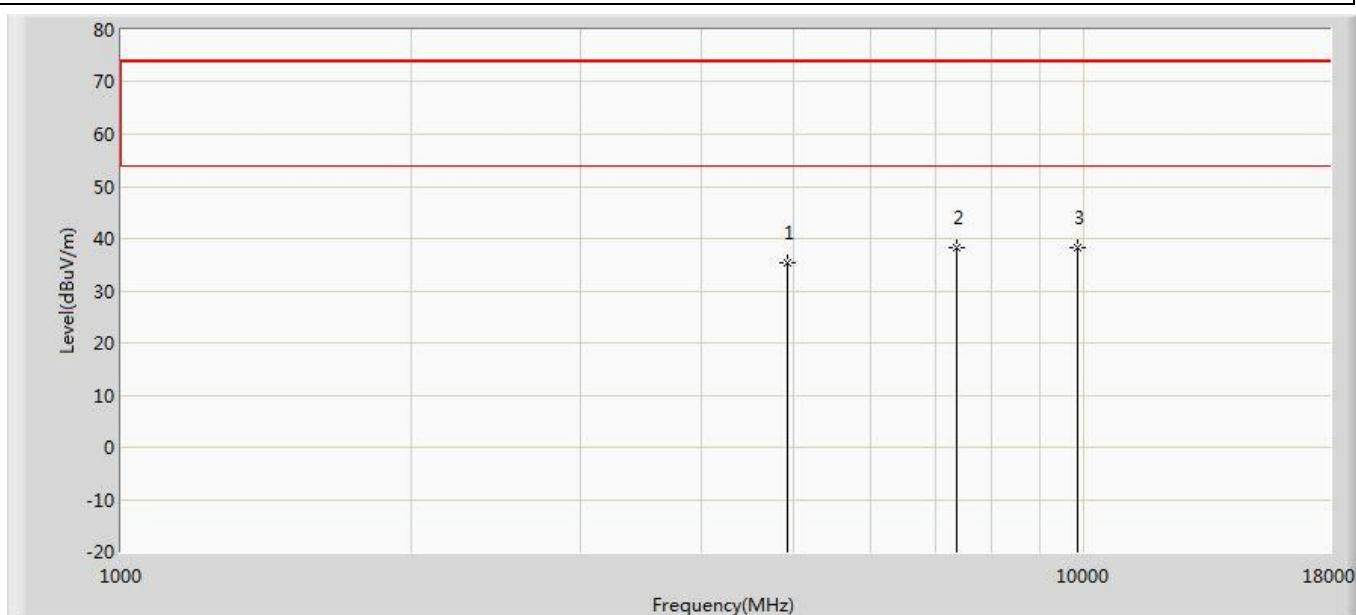
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4874.000	35.110	41.370	-38.890	74.000	-6.260	PK
2		7311.000	37.429	40.131	-36.571	74.000	-2.702	PK
3	*	9748.000	37.715	38.675	-36.285	74.000	-0.960	PK

Profile: 2140225R	Page No.: 143
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2462MHz by 802.11n(20MHz)	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4924.000	36.295	42.509	-37.705	74.000	-6.215	PK
2	*	7386.000	38.701	41.495	-35.299	74.000	-2.795	PK
3		9848.000	38.292	38.814	-35.708	74.000	-0.522	PK

Profile: 2140225R	Page No.: 144
Engineer: Juliuszhou	
Site: AC5	Time: 2021/04/23 - 20:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2462MHz by 802.11n(20MHz)	



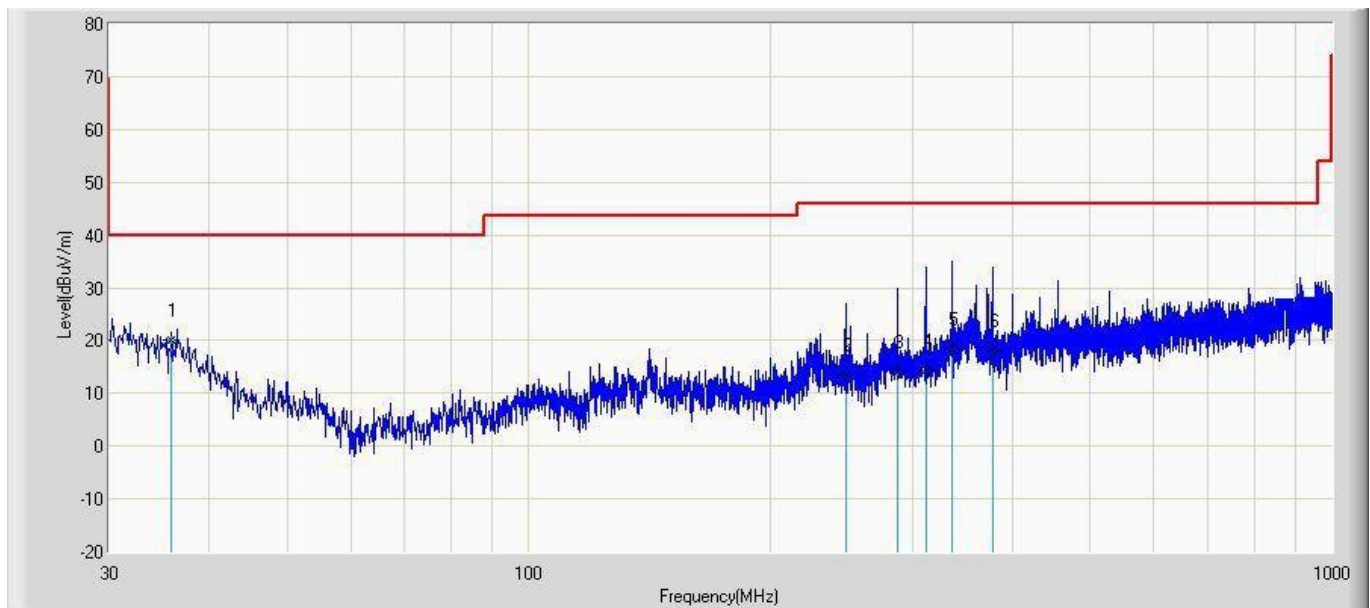
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4924.000	35.415	41.629	-38.585	74.000	-6.215	PK
2	*	7386.000	38.285	41.079	-35.715	74.000	-2.795	PK
3		9848.000	38.202	38.724	-35.798	74.000	-0.522	PK

Note:

1. We have evaluated both SISO and CDD mode, shown in the report is the worst data.
2. Measure Level = Reading Level + Factor.
3. The test frequency range, 9kHz~30MHz, 18GHz~25GHz, both of the worst case are at least 6dB below the limits, therefore no data appear in the report.
4. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
5. As the radiated emission was performed, so conducted emission was not tested.

The worst case of Radiated Emission below 1GHz:

Profile: 2140225R	Page No.: 12
Engineer: Julius zhou	
Site: AC3	Time: 2021/04/27 - 22:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC3_3m (30-1000MHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 1	

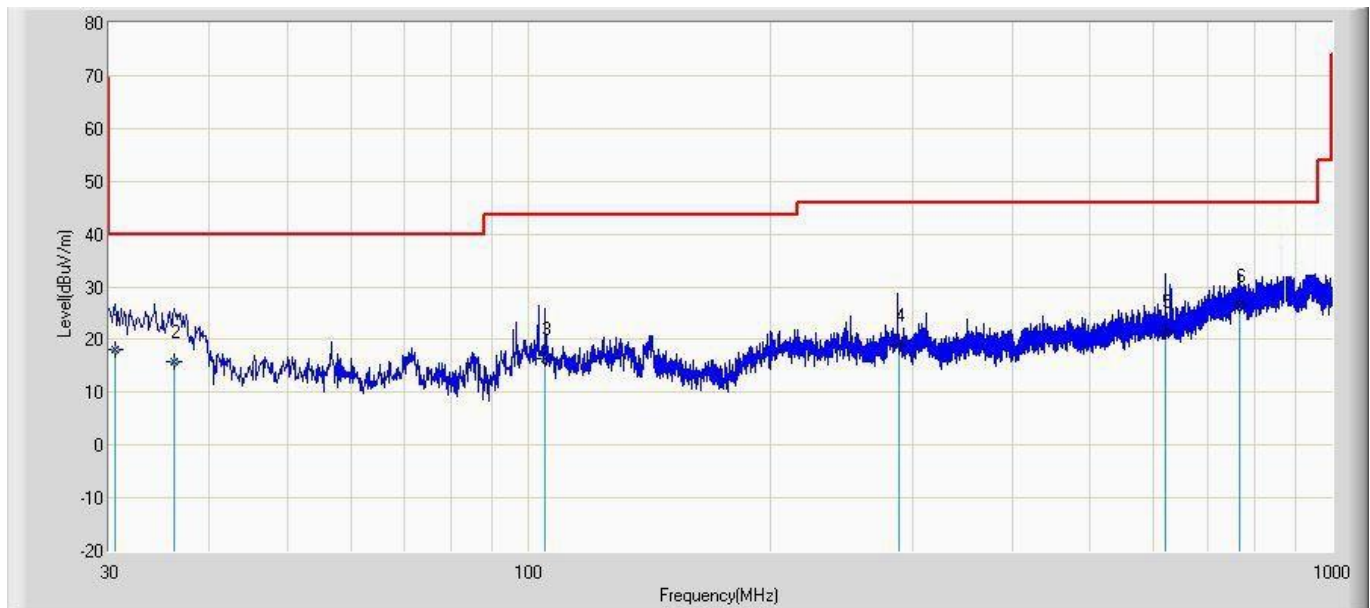


N o	Mar k	Frequen cy (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1	*	35.800	20.006	-5.630	-19.994	40.000	25.636	100	52	QP
2		248.122	13.477	-4.520	-32.523	46.000	17.996	100	46	QP
3		288.021	14.180	-6.520	-31.820	46.000	20.700	100	72	QP
4		311.950	14.467	-6.520	-31.533	46.000	20.987	100	4	QP
5		335.988	18.452	-4.520	-27.548	46.000	22.971	100	73	QP
6		377.520	18.175	-5.520	-27.825	46.000	23.695	100	45	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Profile: 2140225R	Page No.: 17
Engineer: Julius zhou	
Site: AC3	Time: 2021/04/27 - 22:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC3_3m (30-1000MHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Mode 1	



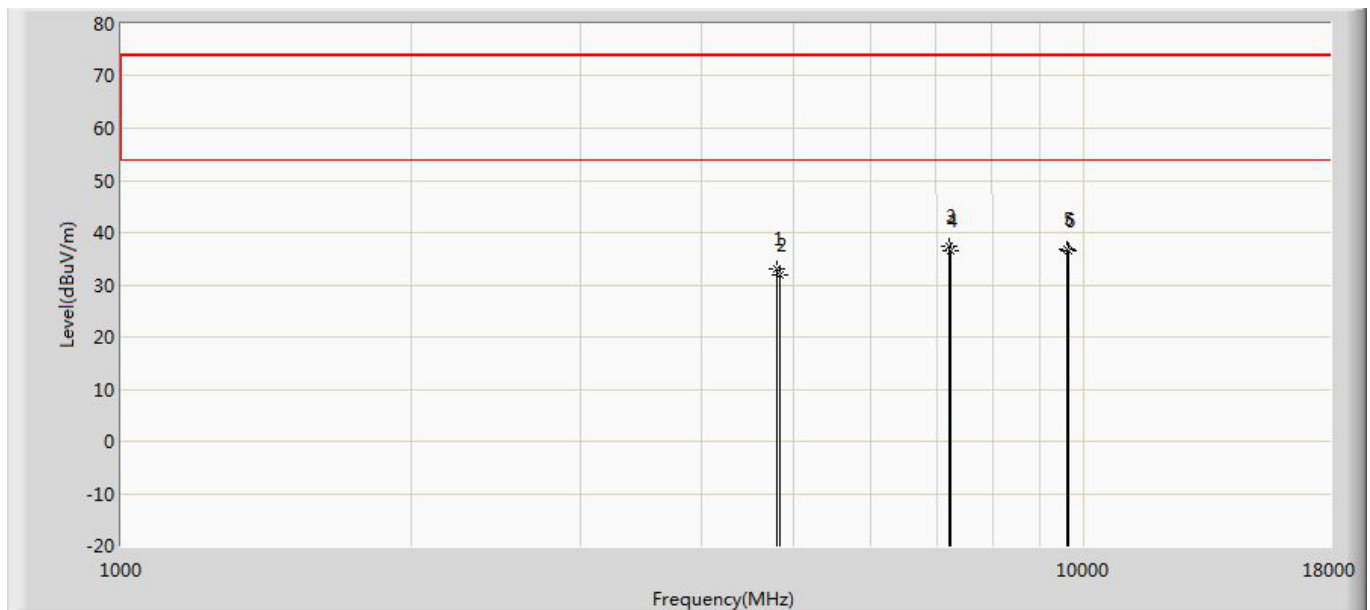
N o	Mar k	Frequen cy (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1		30.488	18.217	-5.600	-21.783	40.000	23.817	100	73	QP
2		36.185	15.887	-5.900	-24.113	40.000	21.787	100	45	QP
3		104.711	16.299	-5.630	-27.201	43.500	21.929	100	15	QP
4		288.630	18.869	-5.630	-27.131	46.000	24.499	100	2	QP
5		620.152	21.653	-5.630	-24.347	46.000	27.283	100	7	QP
6	*	767.550	26.485	-5.630	-19.515	46.000	32.115	100	73	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

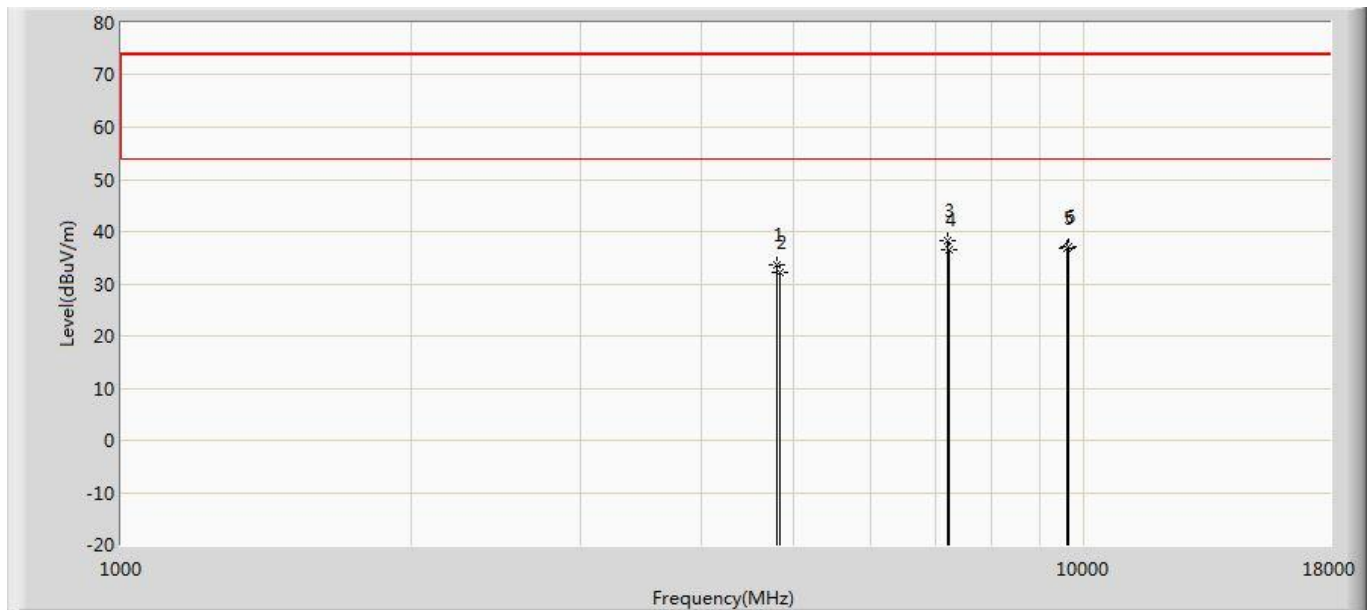
The worst case of Simultaneous Radiated Emission:

Profile: 2140225R	Page No.: 233
Engineer: Juliuszhou	
Site: AC5	Time: 2021/05/10 - 09:05
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Simultaneous transmission with BT + 2.4G WIFI	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	33.081	39.490	-40.919	74.000	-6.409	PK
2		4824.000	31.871	38.285	-42.129	74.000	-6.414	PK
3	*	7206.000	37.501	39.900	-36.499	74.000	-2.399	PK
4		7236.000	36.400	39.126	-37.600	74.000	-2.726	PK
5		9608.000	36.782	37.987	-37.218	74.000	-1.204	PK
6		9648.000	36.651	37.849	-37.349	74.000	-1.198	PK

Profile: 2140225R	Page No.: 234
Engineer: Juliuszhou	
Site: AC5	Time: 2021/05/10 - 09:05
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Computer BOX	Power: AC 120V/60Hz
Note: Simultaneous transmission with BT + 2.4G WIFI	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	33.521	39.930	-40.479	74.000	-6.409	PK
2		4824.000	32.074	38.488	-41.926	74.000	-6.414	PK
3	*	7206.000	38.310	40.709	-35.690	74.000	-2.399	PK
4		7236.000	36.412	39.138	-37.588	74.000	-2.726	PK
5		9608.000	36.694	37.899	-37.306	74.000	-1.204	PK
6		9648.000	37.137	38.335	-36.863	74.000	-1.198	PK

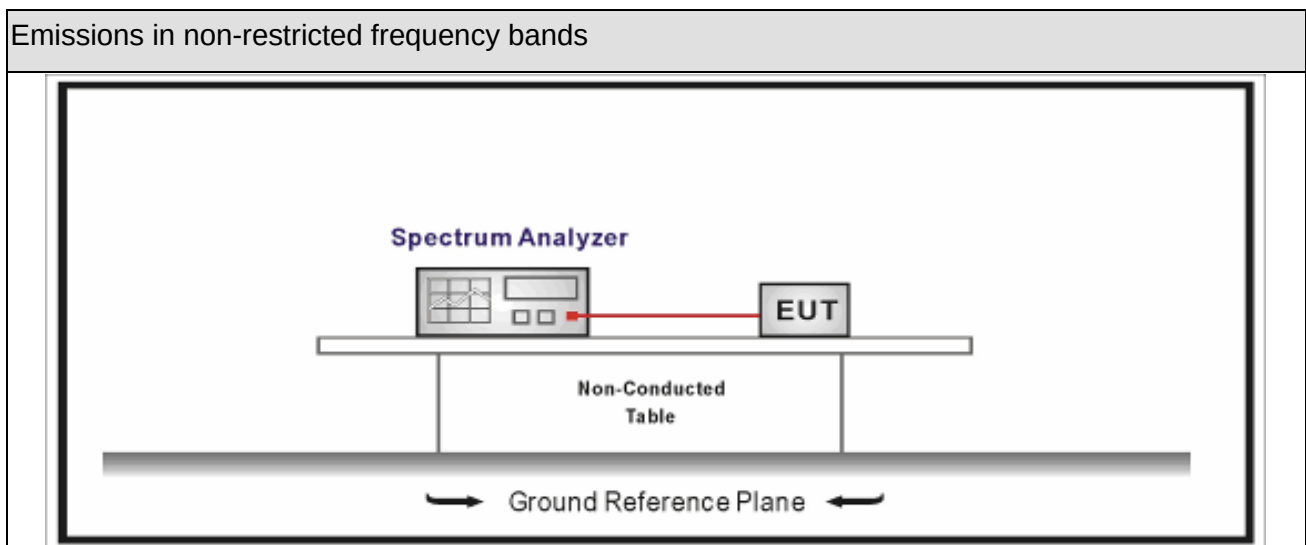
5. Emissions in non-restricted frequency bands

5.1. Test Equipment

Emissions in non-restricted frequency bands / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2020.08.15	2021.08.14
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2021.03.20	2022.03.19
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2020.08.15	2021.08.14
4TX MIMO Power Sensor	Keysight	X8750A	MY59400102	2021.02.11	2022.02.10
Coaxial Cable	Woken	SFL402	F02-150410-044	2021.01.01	2021.12.31
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2020.08.13	2021.08.12

Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

5.2. Test Setup



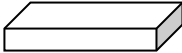
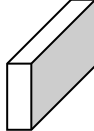
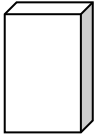
5.3. Limit

Un-Restricted Band Emissions Limit	
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30c(Note1)
RF Output power(PK detector)	20c(Note2)
Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc). Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).	

5.4. Test Procedure

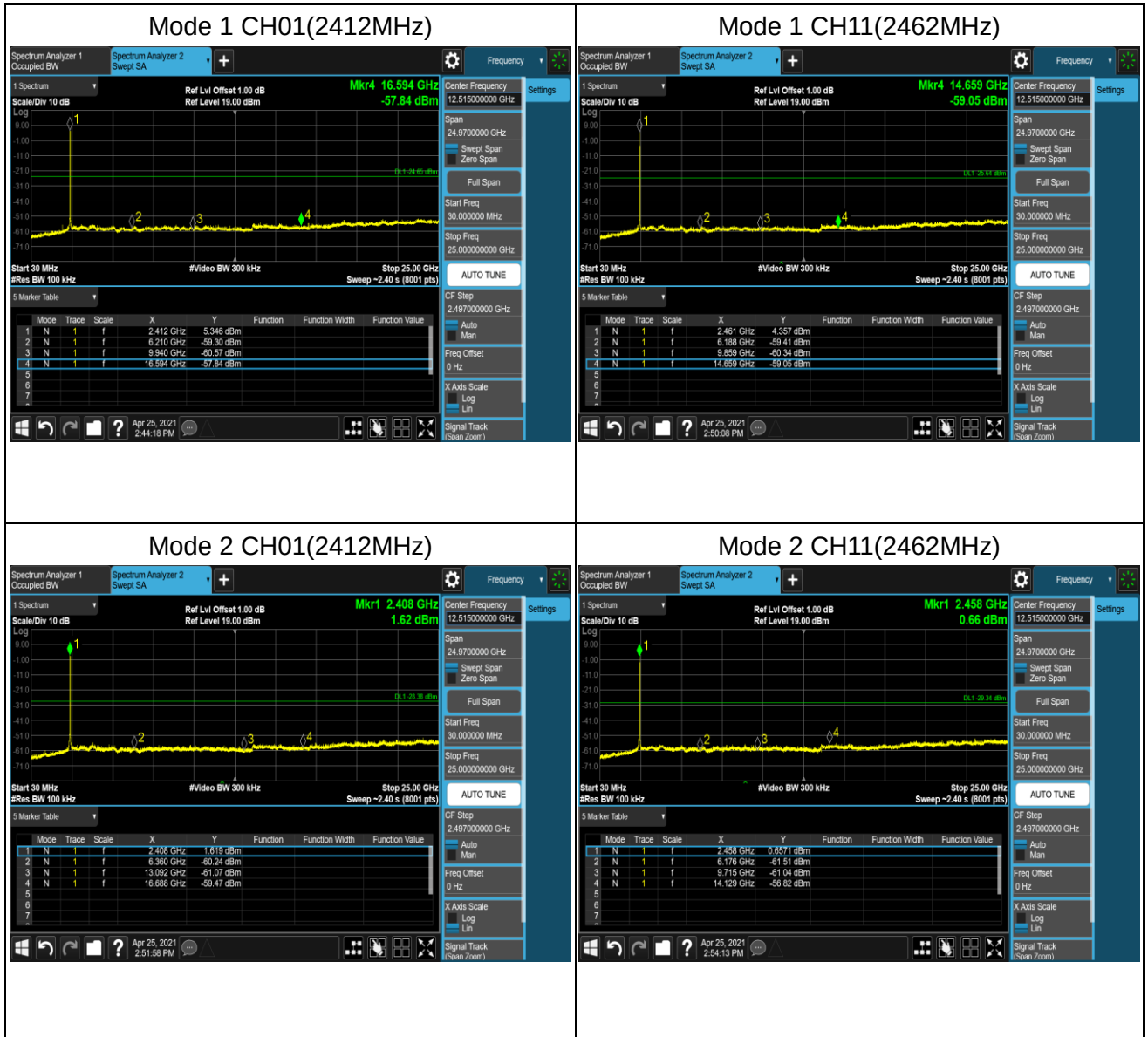
Test Method						
	References Rule			Chapter	Description	
☒	ANSI C63.10			11.11	Emissions in non-restricted frequency bands	
	☒	ANSI C63.10		11.11.2	Reference level measurement	
	☒	ANSI C63.10		11.11.3	Emission level measurement	
☐	ANSI C63.10			11.12	Emissions in restricted frequency bands	
	☐	ANSI C63.10		11.12.1	Radiated emission measurements	
	☐	ANSI C63.10		11.12.2.7	Radiated spurious emission test	
☐	ANSI C63.10			6.4	Radiated emissions from unlicensed wireless devices below 30 MHz	
☐	ANSI C63.10			6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz	
☐	ANSI C63.10			6.6	Radiated emissions from unlicensed wireless devices above 1 GHz	
	☐	ANSI C63.10		11.12.2	Antenna-port conducted measurements	
		☐	ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure	
		☐	ANSI C63.10	11.12.2.4	Peak power measurement procedure	
		☐	ANSI C63.10	11.12.2.5	Average power measurement procedures	
			☐	ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
			☐	ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
			☐	ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

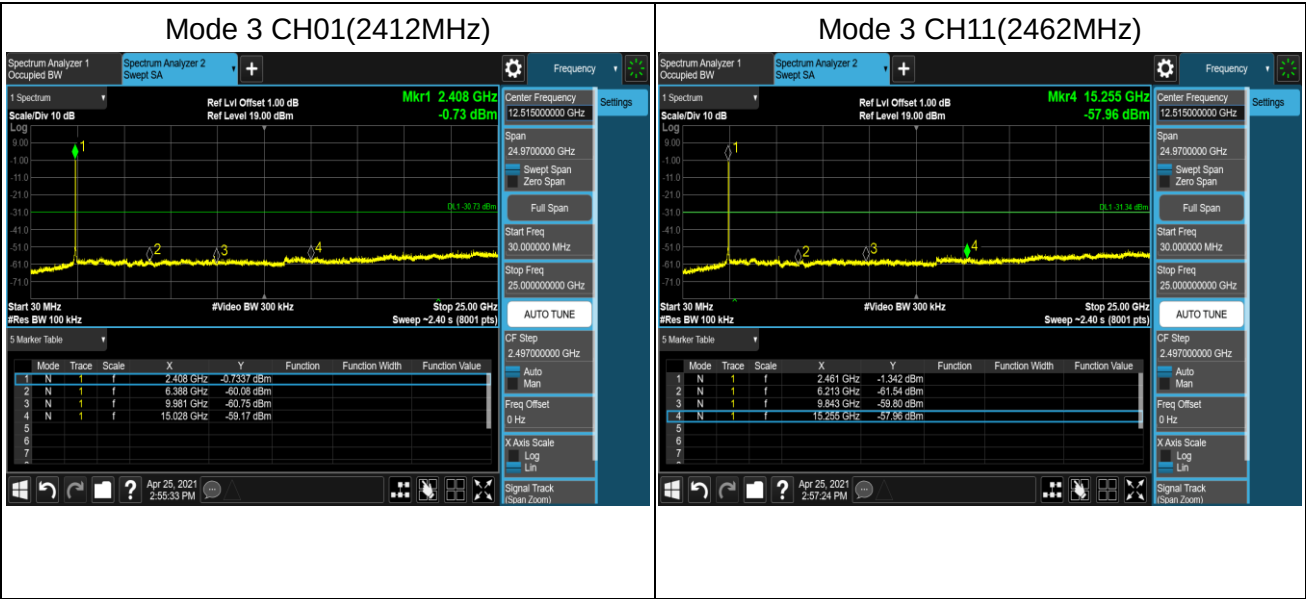
5.5. EUT test Axis definition

Item	Emissions in non-restricted frequency bands			
Device Category	☐	Fixed point-to-point		
	☐	Emit multiple directional beams, simultaneously or sequentially		
	☒	Other cases		
Test mode	Mode 1~3			
Test method	☐	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☐	Worst Axis ☐	Worst Axis ☐
	☒	Conducted		
	☒	Chain 1		
				
	☒	Chain 1	Chain 2	
				
	☐	Chain 1	Chain 2	Chain 3
				

5.6. Test Result

Product Name	: Computer BOX
Test Mode	: Mode 1~3



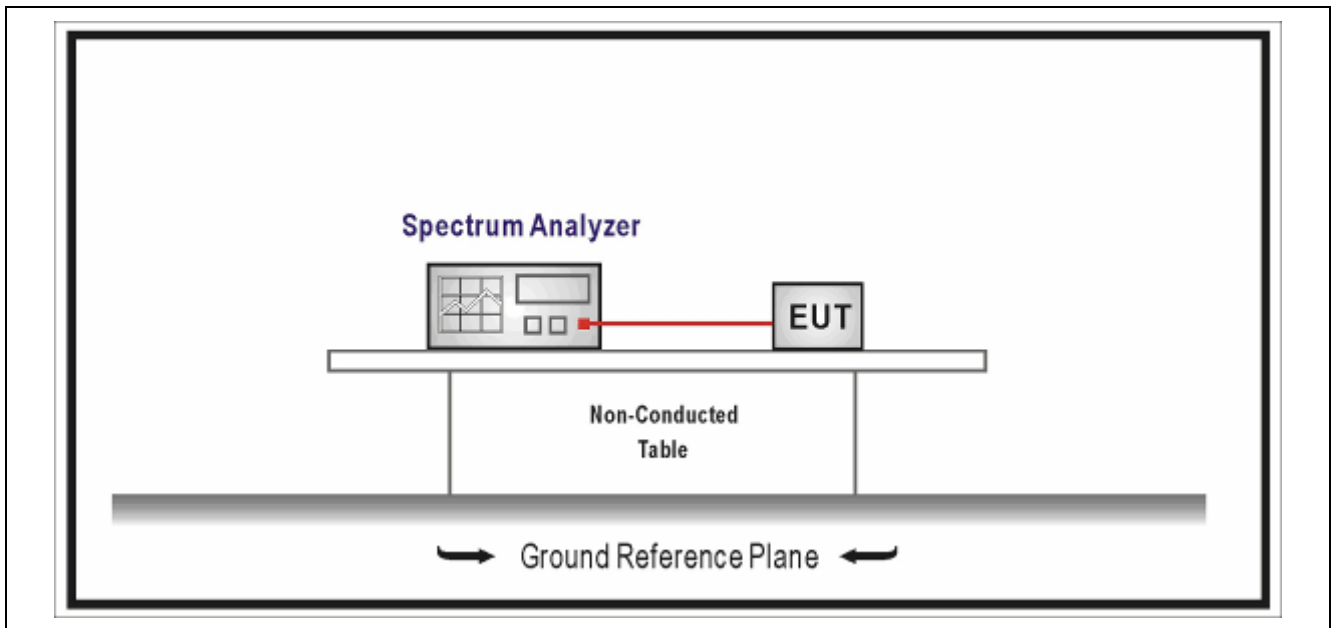


6. Band Edge

6.1. Test Equipment

Band Edge / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2020.08.15	2021.08.14
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2021.03.20	2022.03.19
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2020.08.15	2021.08.14
4TX MIMO Power Sensor	Keysight	X8750A	MY59400102	2021.02.11	2022.02.10
Coaxial Cable	Woken	SFL402	F02-150410-044	2021.01.01	2021.12.31
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2020.08.13	2021.08.12
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

6.2. Test Setup



6.3. Limit

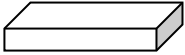
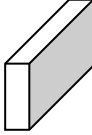
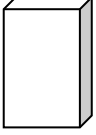
Band edge Limit				
Frequency bands (MHz)	Detector	Limit (dB μ V/m)	RBW (MHz)	Distance (m)
2310-2390	PK	74	1	3
2483.5-2500	AV	54	1	3

Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.

6.4. Test Procedure

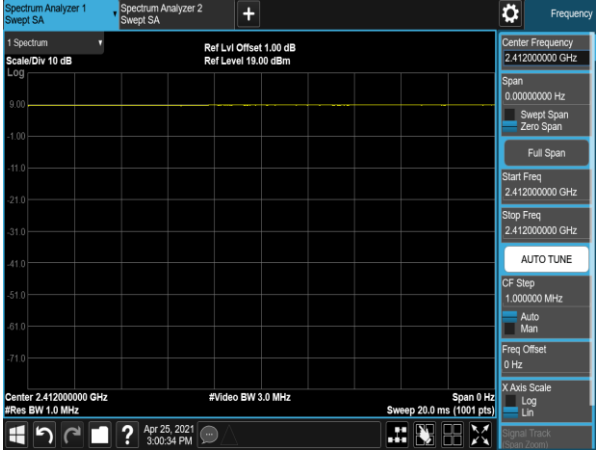
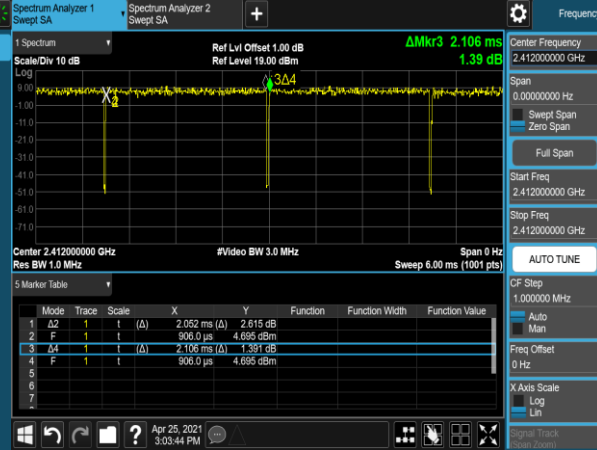
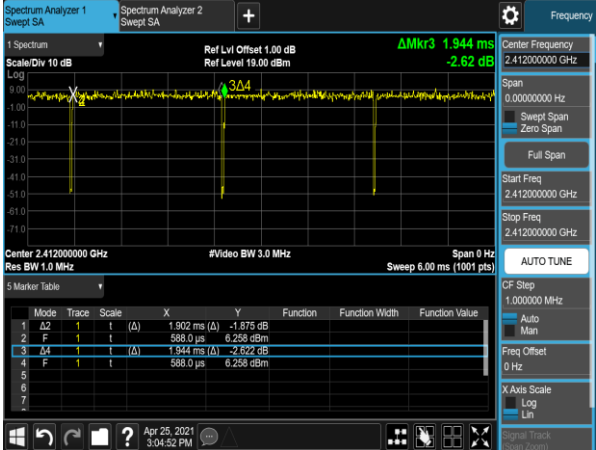
Test Method				
	References Rule		Chapter	Description
☒	ANSI C63.10		6.10	Band-edge testing
	☒	ANSI C63.10	6.10.5	Restricted-band band-edge measurements
	☐	ANSI C63.10	6.10.6	Marker-delta method
☐	ANSI C63.10		11.12	Emissions in restricted frequency bands
	☐	ANSI C63.10	11.12.1	Radiated emission measurements
	☐	ANSI C63.10	11.12.2.7	Radiated spurious emission test
☐	ANSI C63.10		6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
☐	ANSI C63.10		6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
☒	ANSI C63.10		6.6	Radiated emissions from unlicensed wireless devices above 1 GHz
	☒	ANSI C63.10	11.12.2	Antenna-port conducted measurements
	☐	ANSI C63.10	11.12.2.3	Quasi-peak measurement procedure
		ANSI C63.10	11.12.2.4	Peak power measurement procedure
		ANSI C63.10	11.12.2.5	Average power measurement procedures
	☐	ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
		ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
		ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

6.5. EUT test definition

Item	Band Edge			
Device Category	☐	Fixed point-to-point		
	☐	Emit multiple directional beams, simultaneously or sequentially		
	☒	Other cases		
Test mode	Mode 1~3			
Test method	☐	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☐	Worst Axis ☐	Worst Axis ☐
	☒	Conducted		
	☒	Chain 1		
				
	☒	Chain 1	Chain 2	
				
	☐	Chain 1	Chain 2	Chain 3
				

6.6. Duty Cycle

Test Mode	Tx On (ms)	Tx Off (ms)	VBW (Hz)	Tx On + Tx Off (ms)	Duty Cycle (%)
802.11b	N/A	N/A	10	N/A	100.00
802.11g	2.052	0.054	510	2.106	97.44
802.11n(20MHz)	1.902	0.042	560	1.944	97.84

802.11b			802.11g		
					
802.11n(20MHz)					
					

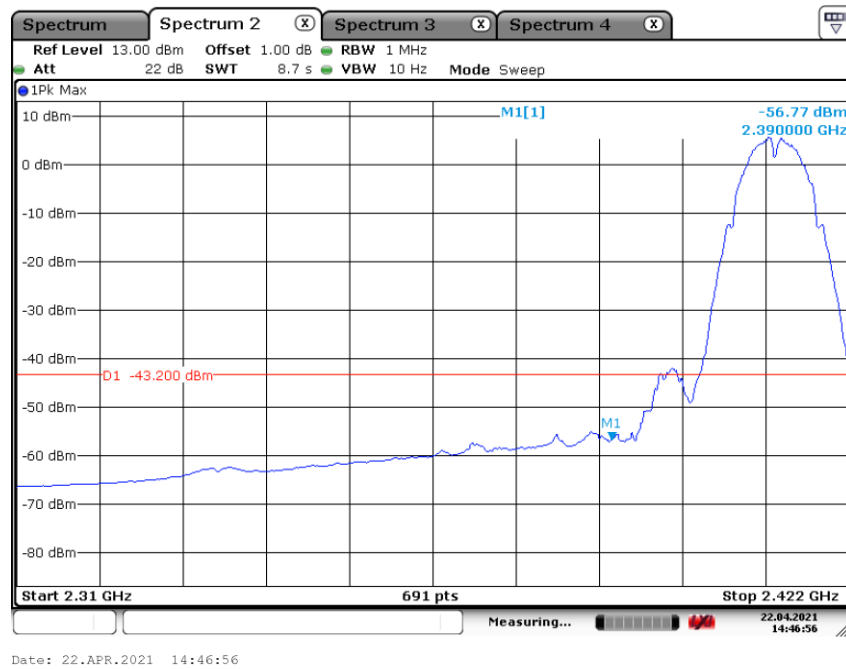
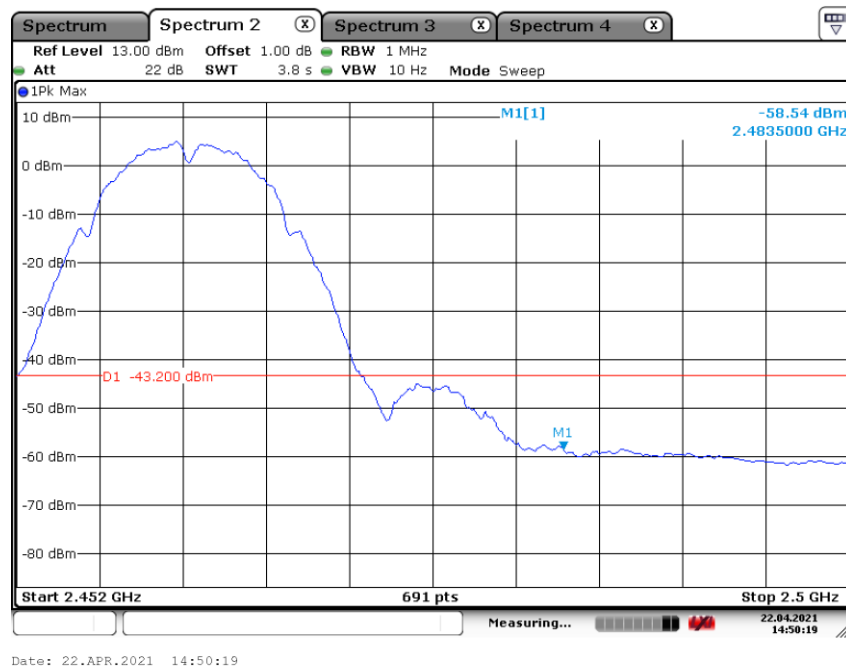
6.7. Test Result

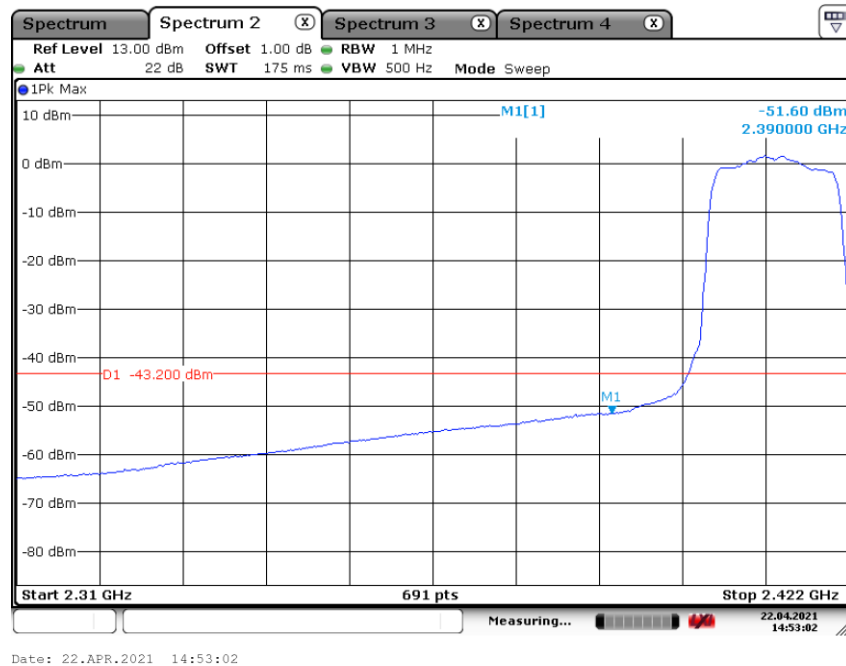
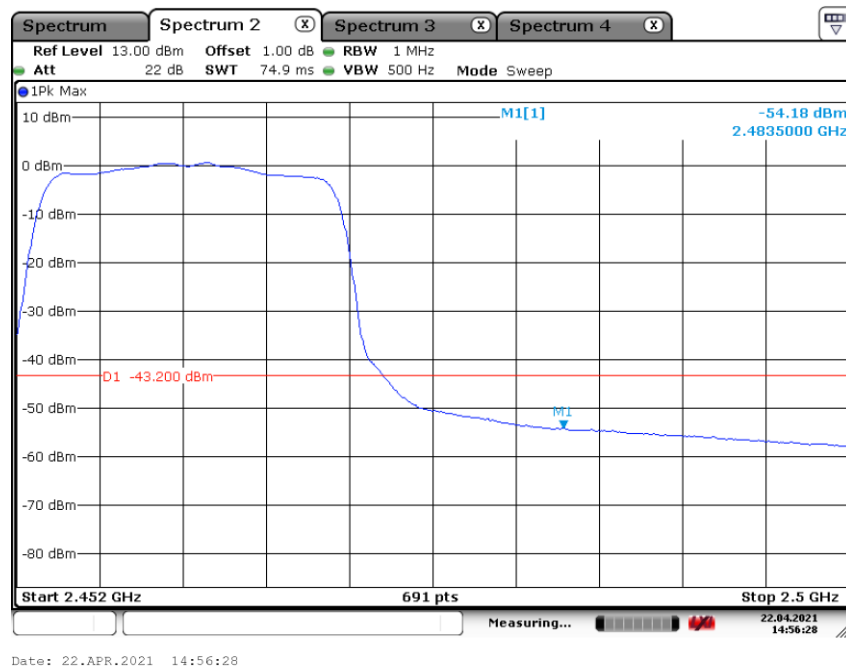
SISO PK Limit=74dBuV/m-95.2-2(Antenna Gain)=-23.2dBm

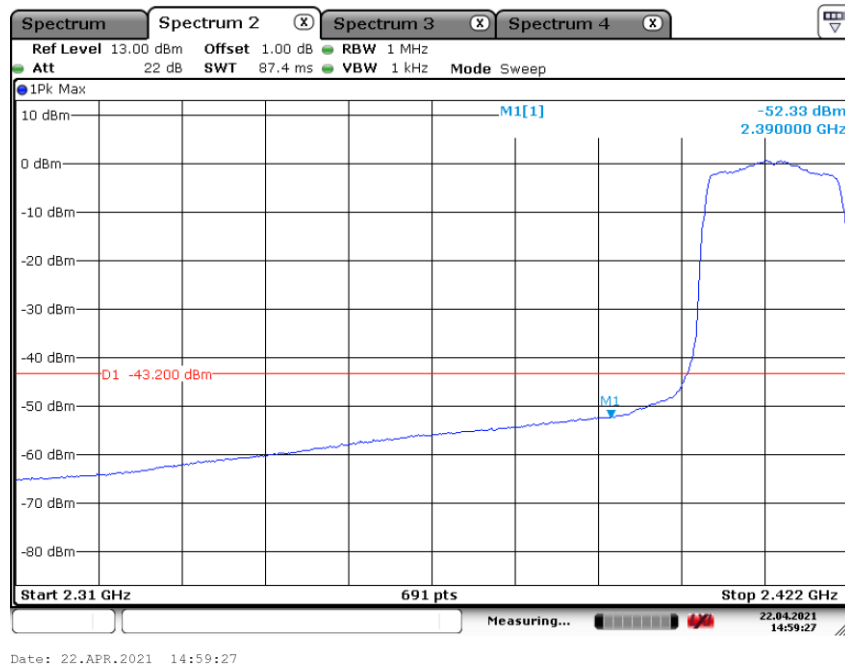
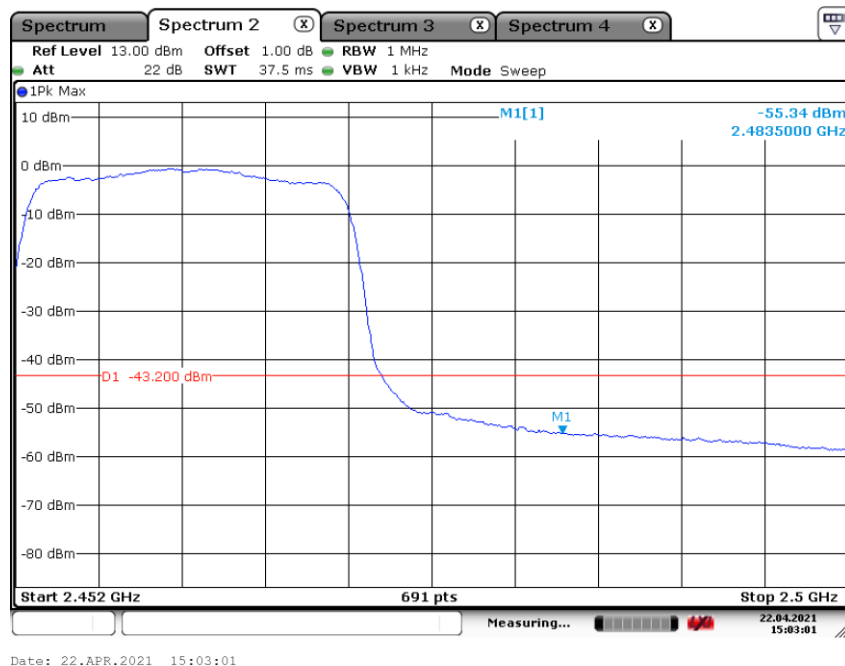
SISO AV Limit=54dBuV/m-95.2-2(Antenna Gain)=-43.2dBm

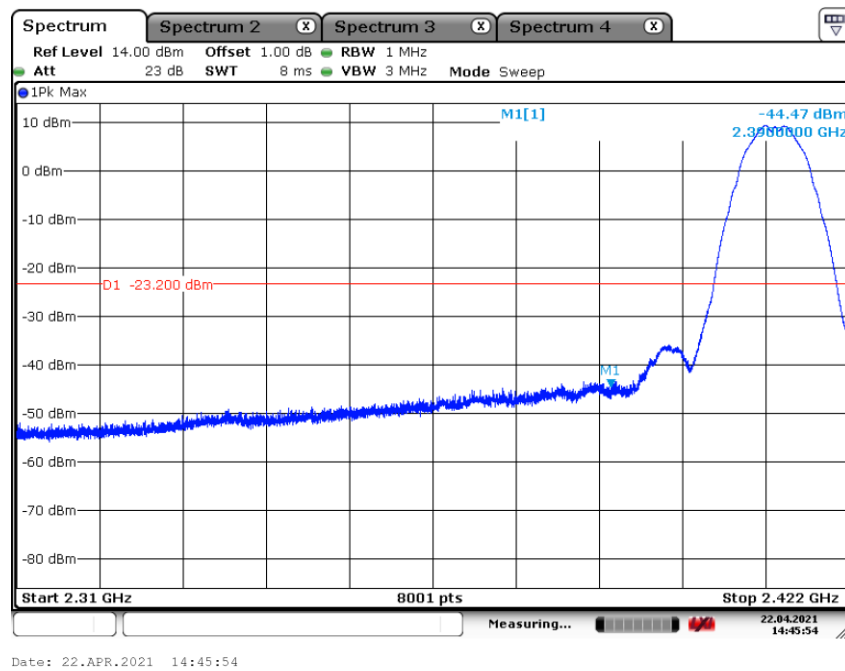
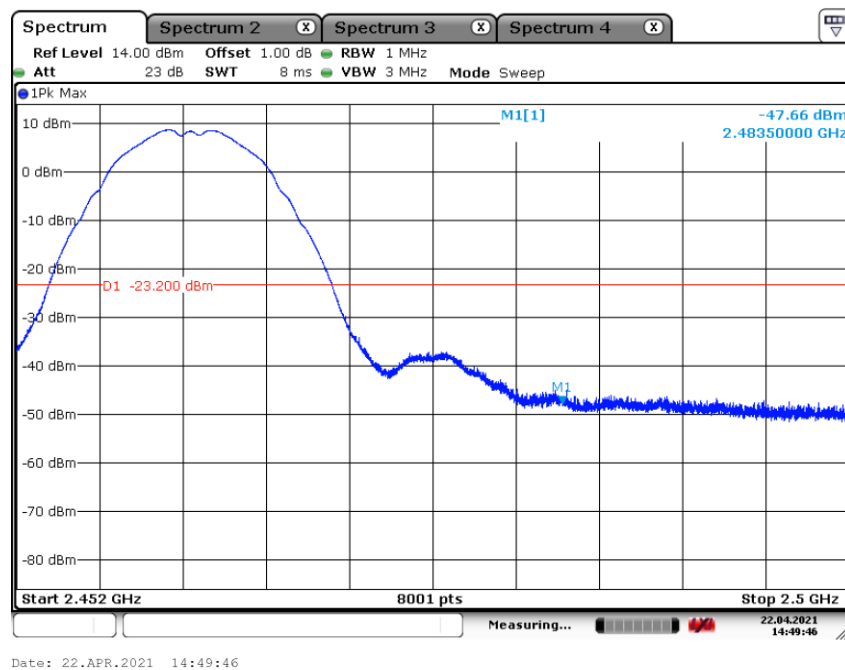
CDD PK Limit=74dBuV/m-95.2-10lg2(2Tx)-5(Directional Gain)=-29.2dBm

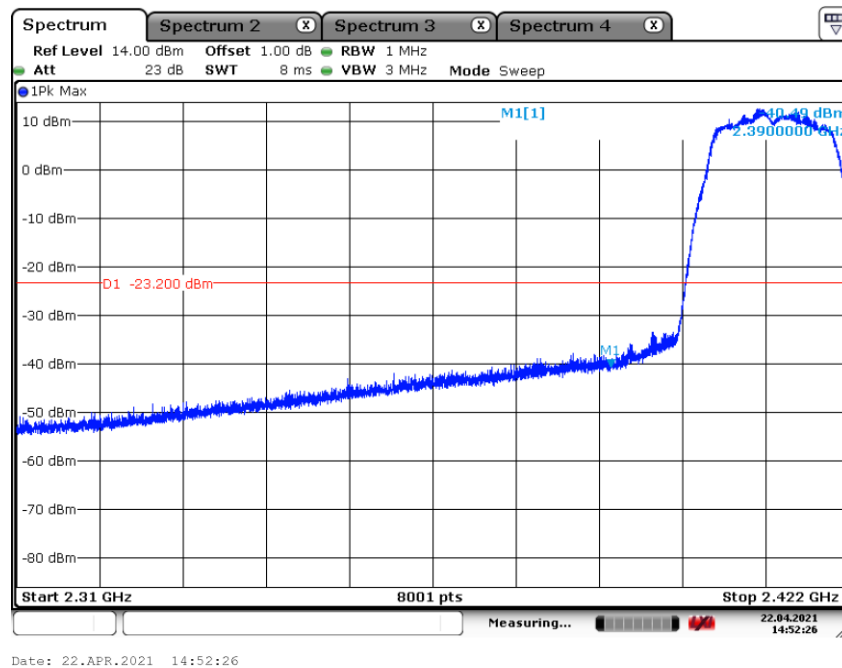
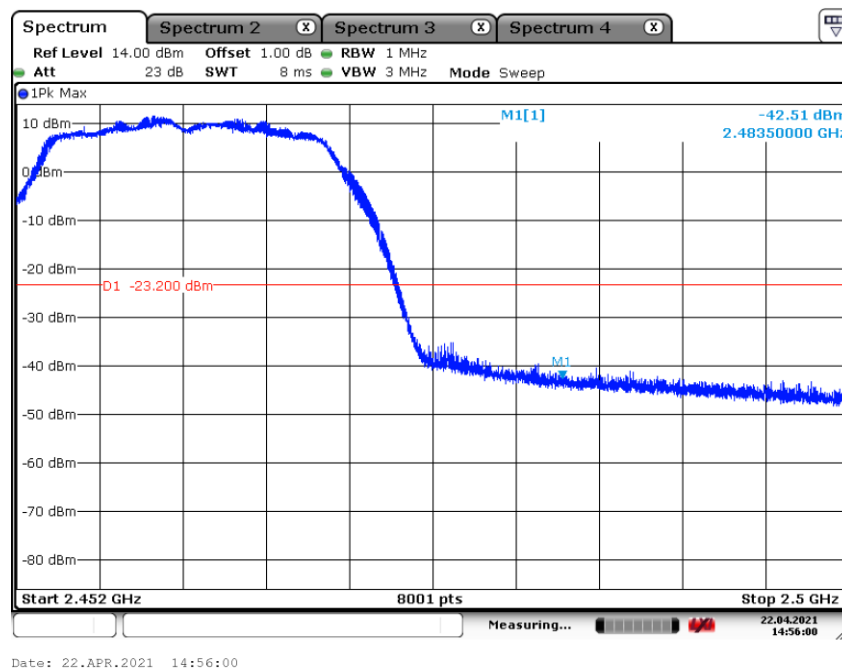
CDD AV Limit=54dBuV/m-95.2-10lg2(2Tx)-5(Directional Gain)=-49.2dBm

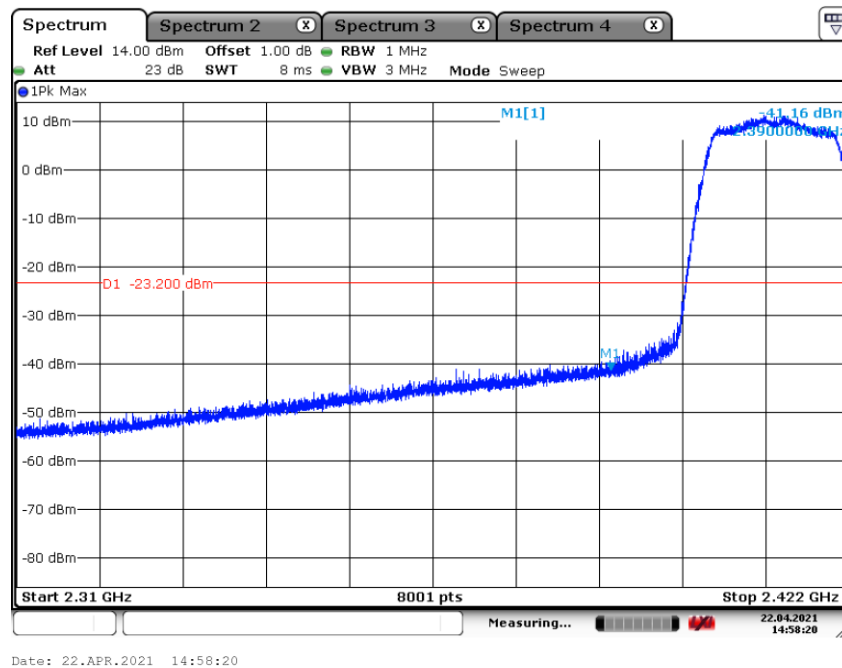
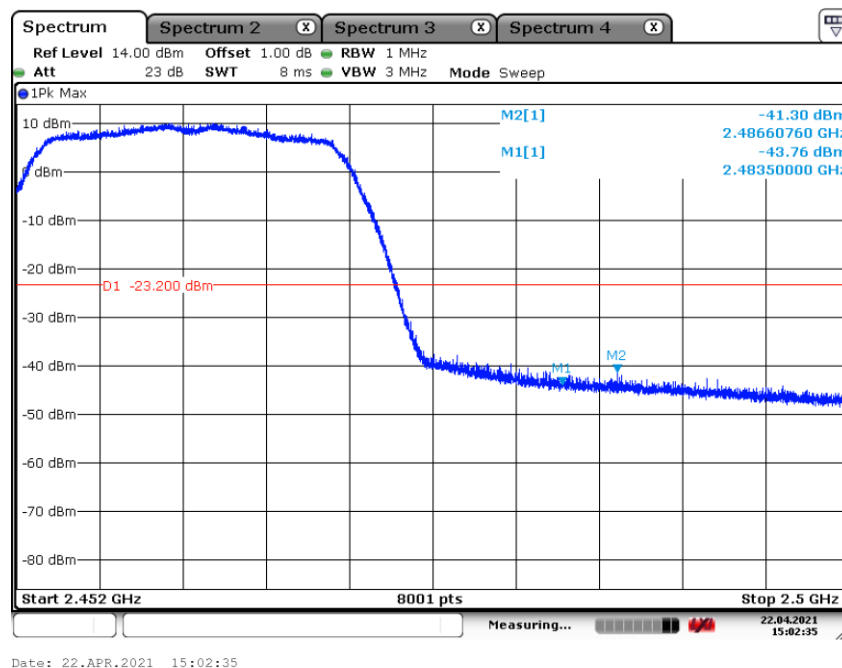
AV Limit-SISO:**2412MHz by 802.11b:****2462MHz by 802.11b:**

2412MHz by 802.11g:**2462MHz by 802.11g:**

2412MHz by 802.11n(20MHz):**2462MHz by 802.11n(20MHz):**

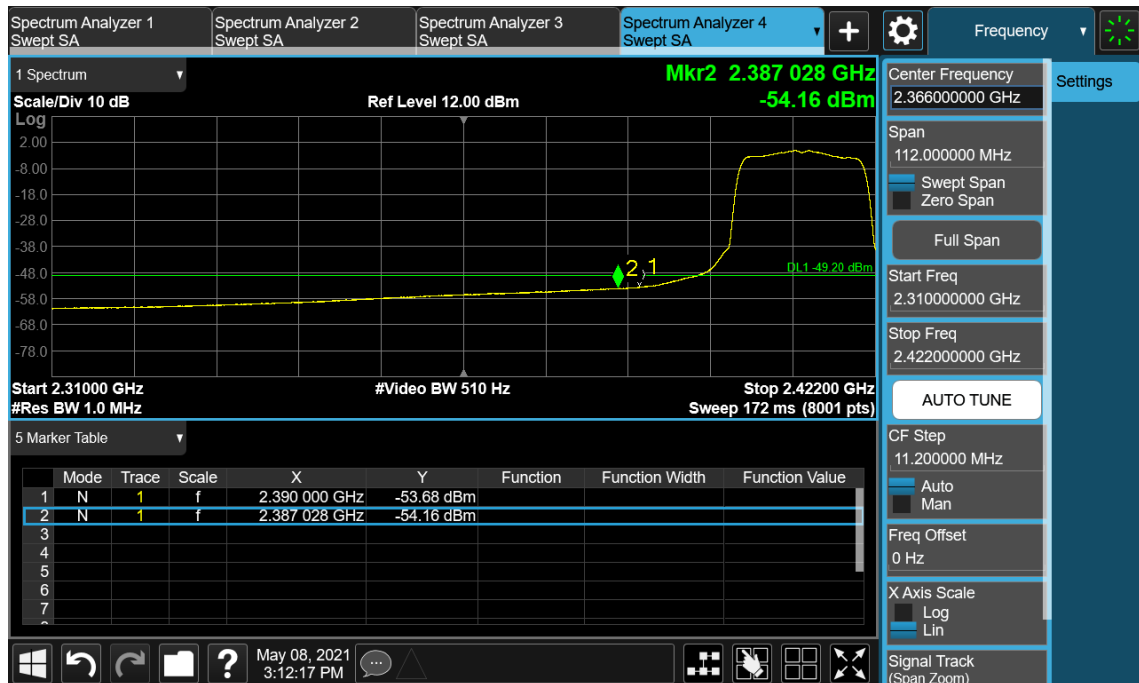
PK Limit-SISO:**2412MHz by 802.11b:****2462MHz by 802.11b:**

2412MHz by 802.11g:**2462MHz by 802.11g:**

2412MHz by 802.11n(20MHz):**2462MHz by 802.11n(20MHz):**

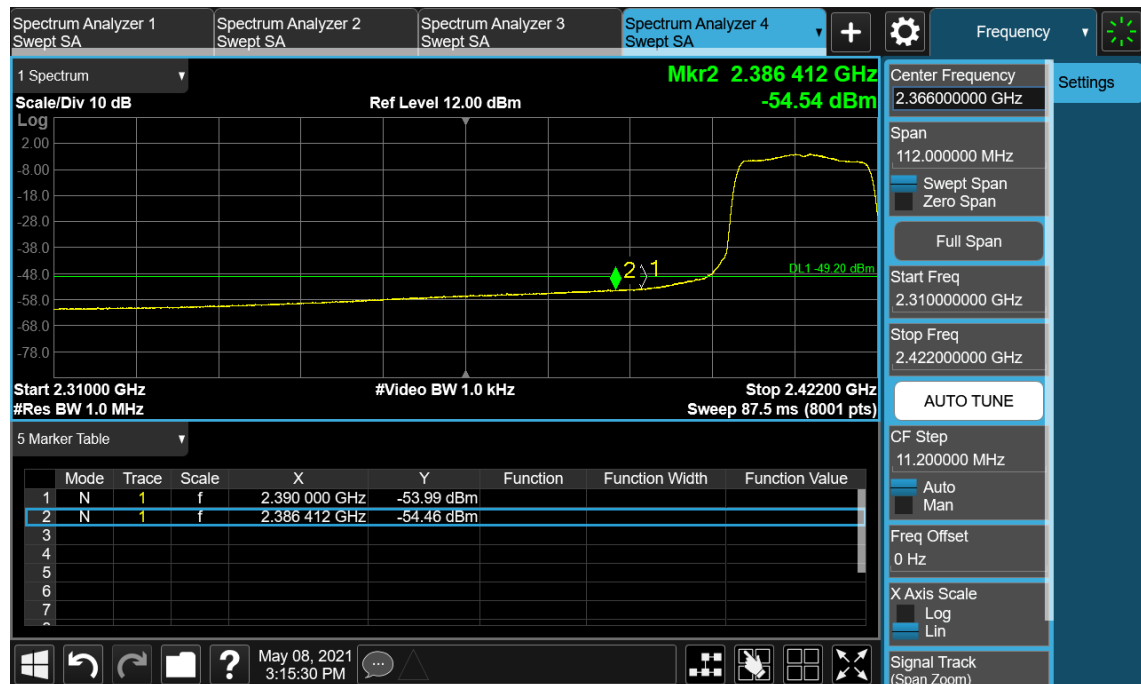
AV Limit-CDD:

2412MHz by 802.11g:



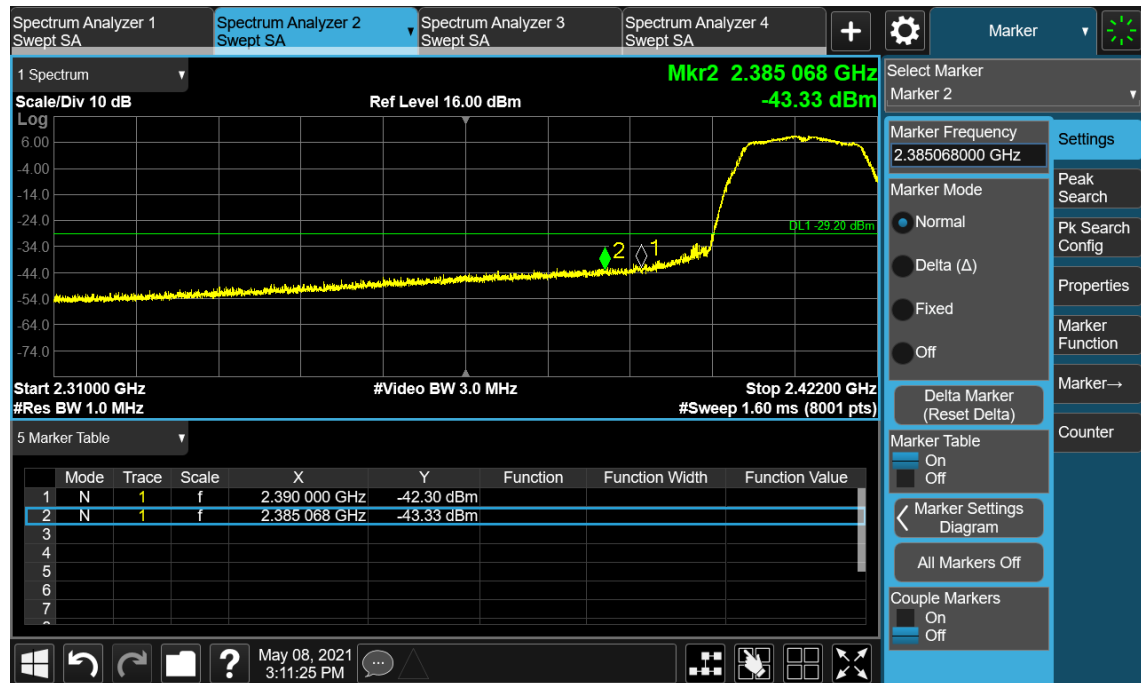
2462MHz by 802.11g:



2412MHz by 802.11n(20MHz):**2462MHz by 802.11n(20MHz):**

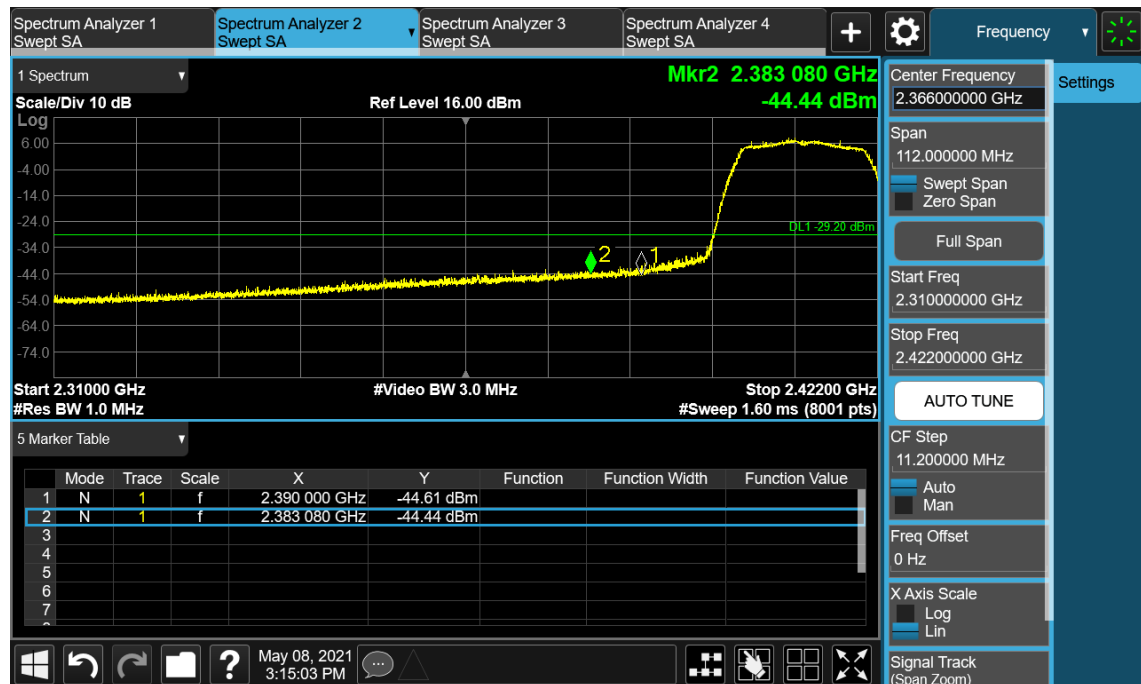
PK Limit-CDD:

2412MHz by 802.11g:



2462MHz by 802.11g:



2412MHz by 802.11n(20MHz):**2462MHz by 802.11n(20MHz):**

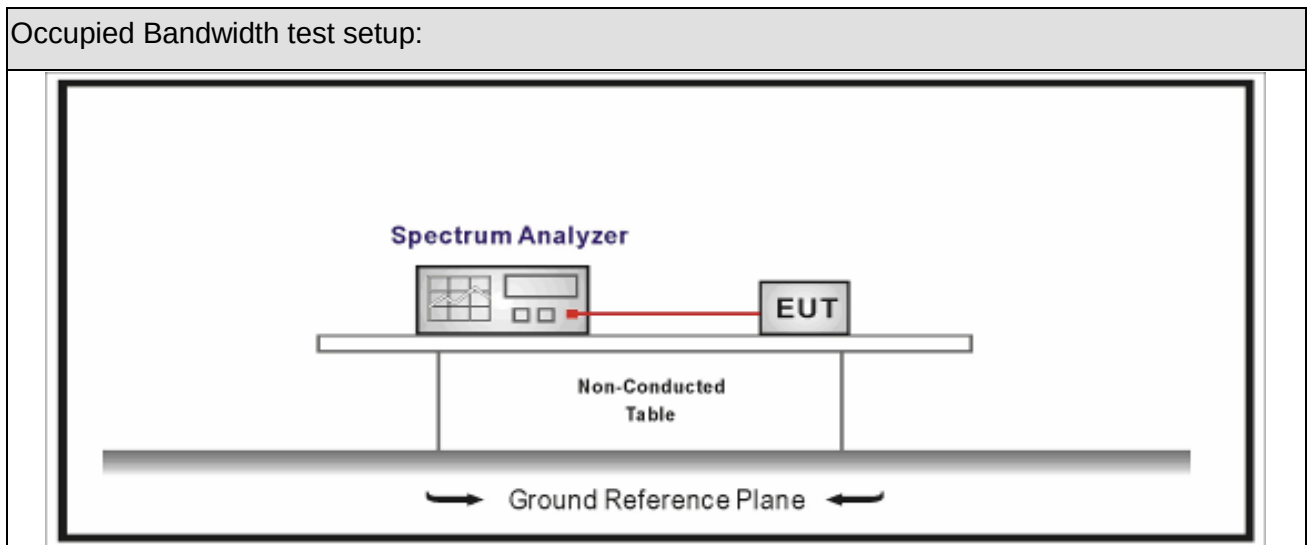
7. Occupied Bandwidth

7.1. Test Equipment

Occupied Bandwidth / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2020.08.15	2021.08.14
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2021.03.20	2022.03.19
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2020.08.15	2021.08.14
4TX MIMO Power Sensor	Keysight	X8750A	MY59400102	2021.02.11	2022.02.10
Coaxial Cable	Woken	SFL402	F02-150410-044	2021.01.01	2021.12.31
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2020.08.13	2021.08.12

Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

7.2. Test Setup



7.3. Limit

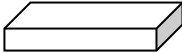
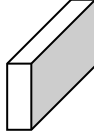
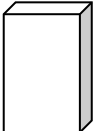
Occupied Bandwidth

Systems using digital modulation techniques operate in the 2400-2483.5 MHz. The minimum 6 dB bandwidth shall be at least 500 kHz

7.4. Test Procedure

Test Method				
	Reference Rule		Chapter	Description
☒	ANSI C63.10		11.8	DTS bandwidth
	☐	ANSI C63.10	11.8.1	Option 1
	☒	ANSI C63.10	11.8.2	Option 2

7.5. EUT test definition

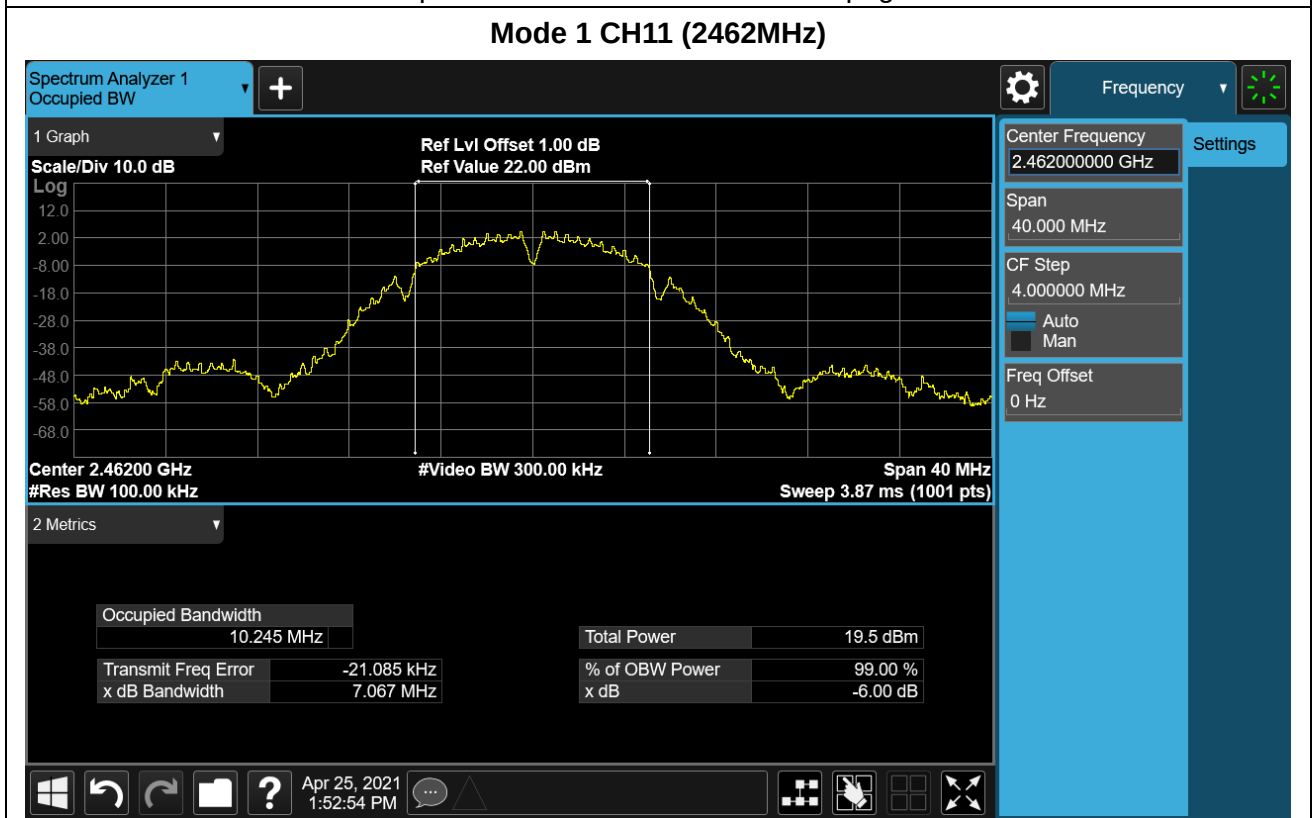
Item	Occupied Bandwidth			
Device Category	☐	Fixed point-to-point		
	☐	Emit multiple directional beams, simultaneously or sequentially		
	☒	Other cases		
Test mode	Mode 1~3			
Test method	☐	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☐	Worst Axis ☐	Worst Axis ☐
	☒	Conducted		
	☒	Chain 1		
				
	☒	Chain 1	Chain 2	
				
	☐	Chain 1	Chain 2	Chain 3
				

7.6. Test Result

Product Name	:	Computer BOX
Test Mode	:	Mode 1~3

Mode	CH.	Test Freq. (MHz)	99% Occupied Bandwidth (MHz)	6dB Occupied Bandwidth (MHz)	Limit (kHz)	Result
1	01	2412	10.366	7.129	>500	Pass
1	06	2437	10.32	7.091	>500	Pass
1	11	2462	10.316	7.067	>500	Pass
2	01	2412	16.544	16.38	>500	Pass
2	06	2437	16.554	16.36	>500	Pass
2	11	2462	16.592	16.4	>500	Pass
3	01	2412	17.725	17.63	>500	Pass
3	06	2437	17.716	17.63	>500	Pass
3	11	2462	17.703	17.62	>500	Pass

Note : The worst case of Occupied Bandwidth as below in next page:



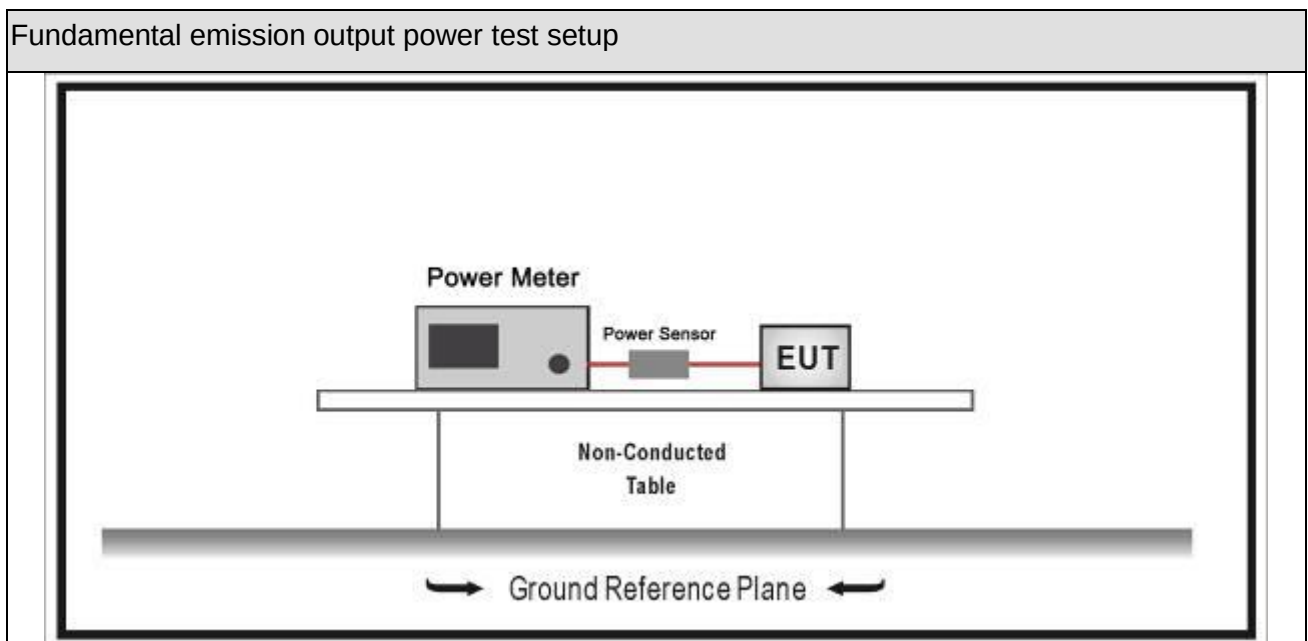
8. Fundamental emission output power

8.1. Test Equipment

Fundamental Emission output power / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2020.08.15	2021.08.14
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2021.03.20	2022.03.19
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2020.08.15	2021.08.14
4TX MIMO Power Sensor	Keysight	X8750A	MY59400102	2021.02.11	2022.02.10
Coaxial Cable	Woken	SFL402	F02-150410-044	2021.01.01	2021.12.31
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2020.08.13	2021.08.12

Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

8.2. Test Setup



8.3. Limit

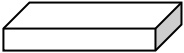
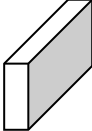
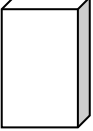
Fundamental emission output power Limit			
☒	$G_{TX} < 6\text{dBi}$		$P_{out} \leq 30\text{dBm}$
☐	$G_{TX} > 6\text{dBi}$		
	☐	Non-Fix point-point	$P_{out} \leq 30 - (G_{TX} - 6)$
	☐	Fix point-point	$P_{out} \leq 30 - [(G_{TX} - 6)]/3$
	☐	Point-to-multipoint	$P_{out} \leq 30 - (G_{TX} - 6)$
	☐	Overlap Beams	$P_{out} \leq 30 - [(G_{TX} - 6)]/3$
	☐	Aggregate power transmitted simultaneously on all beams	$P_{out} \leq 30 - [(G_{TX} - 6)]/3$
	☐	single directional beam	$P_{out} \leq 30 - [(G_{TX} - 6)]/3 + 8\text{dB}$
Note 1 : G_{TX} directional gain of transmitting antennas.			
Note 2 : P_{out} is maximum peak conducted output power .			

8.4. Test Procedure

Fundamental emission output power Test Method						
	References Rule			Chapter	Description	
☒	ANSI C63.10			11.9	Fundamental emission output power	
	☐	ANSI C63.10		11.9.1	Maximum peak conducted output power	
		☐	ANSI C63.10	11.9.1.1	RBW ≥ DTS bandwidth	
		☐	ANSI C63.10	11.9.1.2	Integrated band power method	
		☐	ANSI C63.10	11.9.1.3	PKPM1 Peak power meter method	
	☒	ANSI C63.10		11.9.2	Maximum conducted (average) output power	
		☐	ANSI C63.10		11.9.2.2	Measurement using a spectrum analyzer (SA)
			☐	ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle ≥ 98%)
			☐	ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle ≥ 98%)
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle ≤ 98%)
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle ≤ 98%)
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-3
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-3A
		☒	ANSI C63.10		11.9.2.3	Measurement using a power meter (PM)
			☒	ANSI C63.10	11.9.2.3.1	Method AVGPM
			☐	ANSI C63.10	11.9.2.3.2	Method AVGPM-G

Directional Gain Calculations for In-Band test method				
	References Rule		Chapter	Description
☐	KDB 662911		F2)a)	Basic methodology
	☐	KDB 662911	F2)a) (i)	transmit signals are correlated
	☐	KDB 662911	F2)a) (ii)	transmit signals are uncorrelated
☐	KDB 662911		F2)b)	Sectorized antenna systems.
☐	KDB 662911		F2)c)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (i)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (ii)	Multiple antennas
☐	KDB 662911		F2)e)	Spatial Multiplexing
	☐	KDB 662911	F2)e) (i)	Antennas have the same gain
	☐	KDB 662911	F2)e) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)e) (iii)	Antenna have the different gain with more than one spatial stream
☒	KDB 662911		F2)f)	Cyclic Delay Diversity (CDD)
	☒	KDB 662911	F2)f) (i)	Antennas have the same gain
	☐	KDB 662911	F2)f) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)f) (iii)	Antenna have the different gain with more than one spatial stream

8.5. EUT test definition

Item	Fundamental emission output power			
Device Category	☐	Fixed point-to-point		
	☐	Emit multiple directional beams, simultaneously or sequentially		
	☒	Other cases		
Test mode	Mode 1~3			
Test method	☐	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☐	Worst Axis ☐	Worst Axis ☐
	☒	Conducted		
	☒	Chain 1		
				
	☒	Chain 1	Chain 2	
				
	☐	Chain 1	Chain 2	Chain 3
				

8.6. Test Result

Product Name	:	Computer BOX
Test Mode	:	Mode 1~3

SISO:

Mode	Channel	Test Frequency (MHz)	Conducted Power Output (dBm)		EIRP (dBm)		Conducted Power Limit (dBm)	EIRP Limit (dBm)	Result
			Ant 1	Ant 2	Ant 1	Ant 2			
1	01	2412	12.44	12.78	14.44	14.78	30	36	Pass
1	06	2437	12.55	12.86	14.55	14.86	30	36	Pass
1	11	2462	11.97	12.37	13.97	14.37	30	36	Pass
2	01	2412	12.60	12.97	14.6	14.97	30	36	Pass
2	06	2437	12.47	12.81	14.47	14.81	30	36	Pass
2	11	2462	11.93	12.24	13.93	14.24	30	36	Pass
3	01	2412	12.17	12.51	14.17	14.51	30	36	Pass
3	06	2437	11.77	12.21	13.77	14.21	30	36	Pass
3	11	2462	11.55	11.89	13.55	13.89	30	36	Pass

CDD

Mode	Channel	Test Frequency (MHz)	Conducted Power Output (dBm)		Total Conducted Power (dBm)	Total EIRP (dBm)	Conducted Power Limit (dBm)	EIRP Limit (dBm)	Result
			Ant 1	Ant 2					
2	01	2412	12.72	13.04	15.89	17.89	30	36	Pass
2	06	2437	12.56	12.99	15.79	17.79	30	36	Pass
2	11	2462	12.02	12.38	15.21	17.21	30	36	Pass
3	01	2412	12.19	12.58	15.40	17.4	30	36	Pass
3	06	2437	11.96	12.27	15.13	17.13	30	36	Pass
3	11	2462	11.64	11.95	14.81	16.81	30	36	Pass

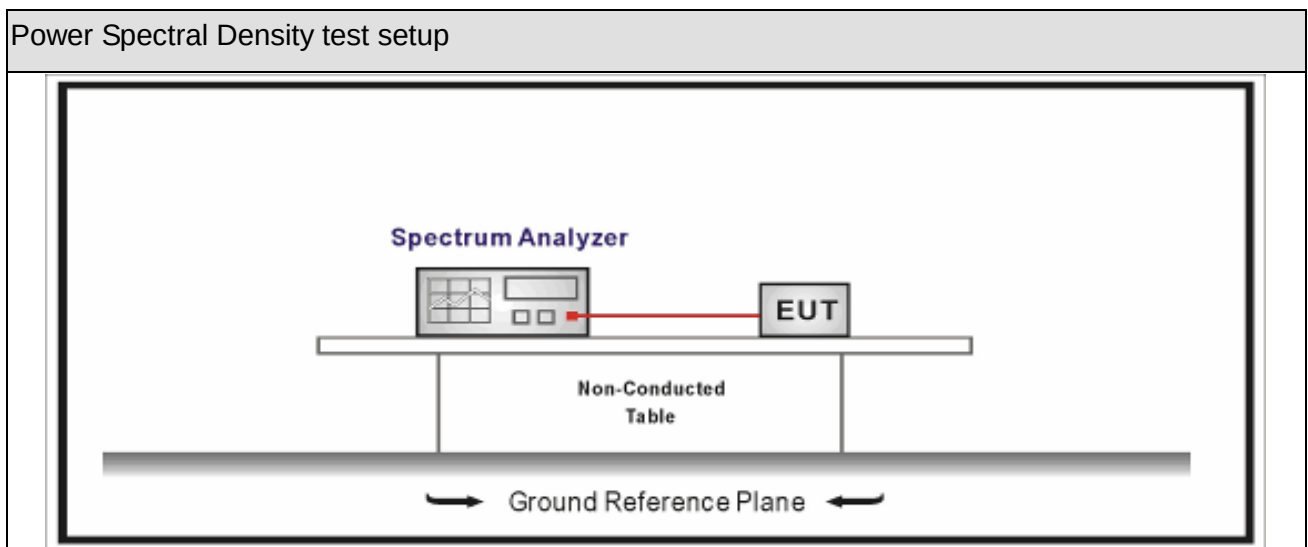
9. Power Spectral Density

9.1. Test Equipment

Power Spectral Density / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2020.08.15	2021.08.14
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2021.03.20	2022.03.19
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2020.08.15	2021.08.14
4TX MIMO Power Sensor	Keysight	X8750A	MY59400102	2021.02.11	2022.02.10
Coaxial Cable	Woken	SFL402	F02-150410-044	2021.01.01	2021.12.31
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2020.08.13	2021.08.12

Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

9.2. Test Setup



9.3. Limit

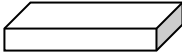
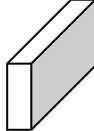
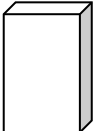
Power Spectral Density Limit
Power Spectral Density $\leq 8\text{dBm}/3\text{kHz}$

9.4. Test Procedure

Power Spectral Density Test Method				
	References Rule		Chapter	Description
☒	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	☒	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	☐	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle $\geq$ 98%)
	☐	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle $\geq$ 98%)
	☐	ANSI C63.10	11.10.5	Method AVGPSD-2(Duty cycle $<$ 98%)
	☐	ANSI C63.10	11.10.6	Method AVGPSD-2A(Duty cycle $<$ 98%)
	☐	ANSI C63.10	11.10.7	Method AVGPSD-3
	☐	ANSI C63.10	11.10.8	Method AVGPSD-3A

Directional Gain Calculations for In-Band test method				
	Referred Rule		Chapter	Description
☐	KDB 662911		F2)a)	Basic methodology
	☐	KDB 662911	F2)a) (i)	transmit signals are correlated
	☐	KDB 662911	F2)a) (ii)	transmit signals are uncorrelated
☐	KDB 662911		F2)b)	Sectorized antenna systems.
☐	KDB 662911		F2)c)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (i)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (ii)	Multiple antennas
☐	KDB 662911		F2)e)	Spatial Multiplexing
	☐	KDB 662911	F2)e) (i)	Antennas have the same gain
	☐	KDB 662911	F2)e) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)e) (iii)	Antenna have the different gain with more than one spatial stream
☒	KDB 662911		F2)f)	Cyclic Delay Diversity (CDD)
	☒	KDB 662911	F2)f) (i)	Antennas have the same gain
	☐	KDB 662911	F2)f) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)f) (iii)	Antenna have the different gain with more than one spatial stream

9.5. EUT test definition

Item	Power Spectral Density			
Device Category	☐	Fixed point-to-point		
	☐	Emit multiple directional beams, simultaneously or sequentially		
	☒	Other cases		
Test mode	Mode 1~3			
Test method	☐	Radiated		
		X Axis	Y Axis	Z Axis
				
		Worst Axis ☐	Worst Axis ☐	Worst Axis ☐
	☒	Conducted		
	☒	Chain 1		
				
	☒	Chain 1	Chain 2	
				
	☐	Chain 1	Chain 2	Chain 3
				

9.6. Test Result

Product Name	:	Computer BOX
Test Mode	:	Mode 1~3

Mode	Channel	Test Frequency (MHz)	Measurement PSD (dBm/3kHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
			Worst Chain			
1	01	2412	-17.907	-14.907	8	Pass
1	06	2437	-18.079	-15.079	8	Pass
1	11	2462	-19.125	-16.125	8	Pass
2	01	2412	-19	-16	8	Pass
2	06	2437	-19.561	-16.561	8	Pass
2	11	2462	-20.384	-17.384	8	Pass
3	01	2412	-21.128	-18.128	8	Pass
3	06	2437	-21.734	-18.734	8	Pass
3	11	2462	-22.61	-19.61	8	Pass

Note1: We have evaluated both SISO and CDD mode, shown in the report is the worst data.

Note2: Both of two chains are tested and only the worst chain of the PSD was showed.

10. Antenna Requirement

10.1. Limit

Antenna Requirement Limit
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 a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

10.2. Antenna Connector Construction

Antenna Connector Construction
☒ The use of a permanently attached antenna
☐ The antenna use of a unique coupling to the intentional radiator
☐ The use of a nonstandard antenna jack or electrical connector
Please refer to the attached document “Internal Photograph” to show the antenna connector.

_____ The End _____