FCC Report (WIFI)

Product Name	:	set top box
Trade mark	:	N/A
Model No.	:	Claro STB SEI800CCOA
FCC ID	:	2AOVU-SEI800CCOA
Report Number	:	BLA-EMC-202103-A5204
Date of sample receipt	:	2021/3/17
Date of Test	:	2021/3/17 to 2021/4/15
Date of Issue	:	2021/4/16
Test standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Test result	:	PASS

Prepared for:

SHENZHEN SEI Robotics Co.,Ltd
4thfloor, Productivity Building D, #5 Hi-Tech Middle 2nd Road, Shenzhen Hi-Tech Industrial Park, Nanshan District, Shenzhen 518057, P.R.China.

Prepared by:

BlueAsia of Technical Services(Shenzhen) Co.,Ltd.
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Compiled by: Sven

Review by: Sweet. Liang

Approved by:

Date: 2021/4/16

2 Version

Version No.	Date	Description
00	*2021/4/16*	*Original*

3 Contents

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
Channel Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

Remark: Test according to ANSI C63.10:2013.

Pass: The EUT complies with the essential requirements in the standard.

N/A: Not applicable.

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	set top box
Model No.:	Claro STB SEI800CCOA
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:	PCB Antenna
Antenna gain:	1.9 dBi(declare by applicant)
Power supply:	DC 12V
Remark:The Antenna Gain is supplied by the customer.BlueAsia is not responsible for this data	

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	**Frequency (MHz)**
	802.11b/802.11g/802.11n(HT20)
Lowest channel	2412MHz
Middle channel	2437MHz
Highest channel	2462MHz
Test channel	802.11n(HT40)
Lowest channel	2422MHz
Middle channel	2437MHz
Highest channel	2452MHz

5.2 Test mode

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.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)
Data rate	1Mbps	6Mbps	6.5Mbps	13.5Mbps

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
Lenovo	Notebook computer	E470C	PF-10FB5C

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● FCC — Designation No.: CN1252

BlueAsia of Technical Services(Shenzhen) Co., Ltd has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Designation CN1252.

●ISED — CAB identifier No.: CN0028

BlueAsia of Technical Services(Shenzhen) Co., Ltd has been registered by Certification and Engineering Bureau of ISED for radio equipment testing with CAB identifier CN0028

5.5 Test Location

All tests were performed at:

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.

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Chamber	SKET	966	N/A	2020/11/10	2023/11/9
2	Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
3	Receiver	R&S	ESR7	101199	2020/10/12	2021/10/11
4	broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2020/9/26	2022/9/25
5	Horn Antenna	Schwarzbeck	9120D	01892 P:00331	2020/9/26	2022/9/25
6	Amplifier	SKET	PA-000318G-45	N/A	2020/10/16	2021/10/15
7	EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
8	Loop antenna	SCHNARZBECK	FMZB1519B	00102	2020/9/26	2022/9/25
9	Controller	SKET	N/A	N/A	N/A	N/A
10	Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
11	Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
12	Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shield room	SKET	833	N/A	2020/11/25	2023/11/24
2	Receiver	R&S	ESPI3	101082	2020/10/12	2021/10/11
3	LISN	R&S	ENV216	3560.6550.15	2020/10/12	2021/10/11
4	LISN	AT	AT166-2	AKK1806000003	2020/10/12	2021/10/11
5	EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
6	Coaxial Cable	BlueAsia	BLA-XC-05	N/A	N/A	N/A

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
2	Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11
3	Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11
4	Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11
5	Power Sensor	D.A.R.E	RPR3006W	17I00015SNO 27	2020/05/24	2021/05/23
6	Power Sensor	D.A.R.E	RPR3006W	17I00015SNO 28	2020/05/24	2021/05/23
7	DC Power Supply	LODESTAR	LP305DE	N/A	2020/07/19	2021/07/18
8	Temperature Humidity Chamber	Mingle	TH101B	N/A	2020/07/19	2021/07/18

7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

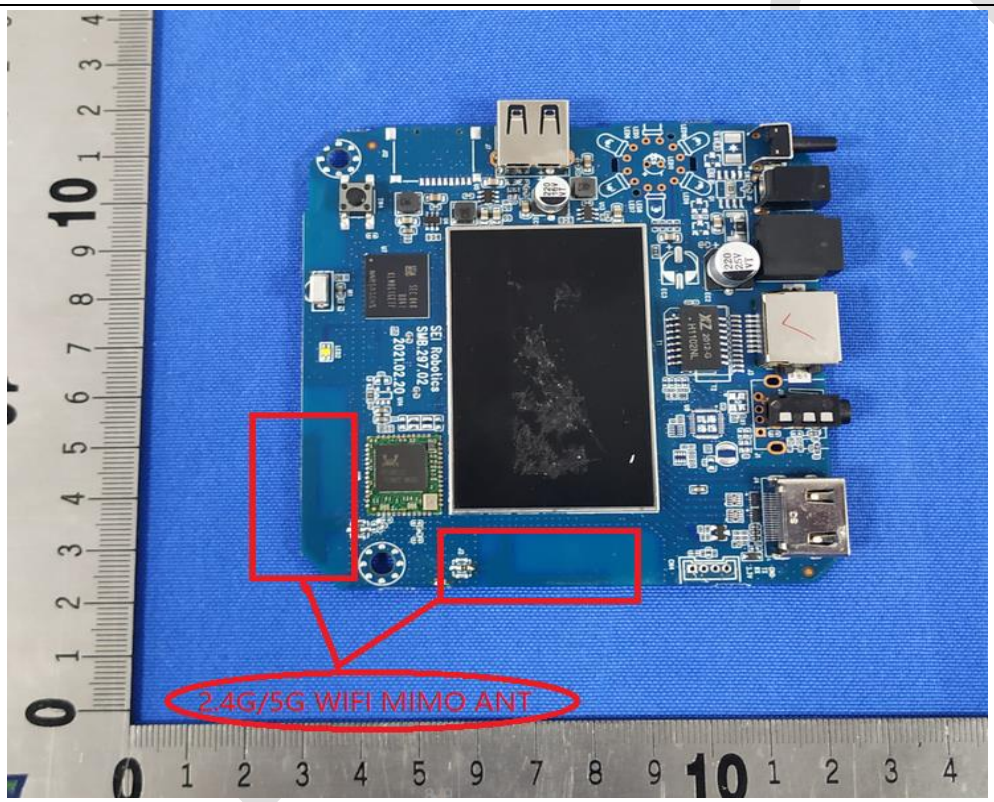
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit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

15.247(c) (1)(i) requirement:

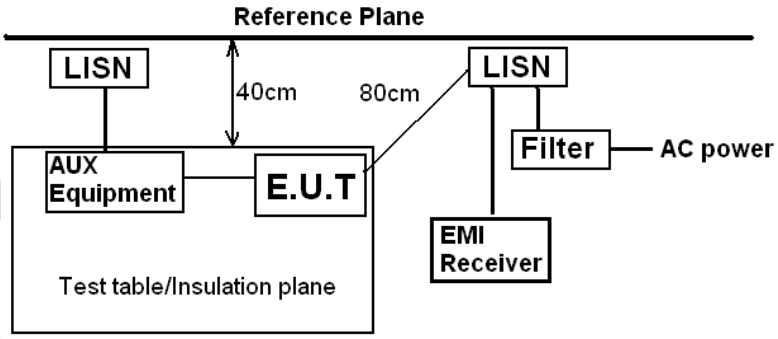
(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

EUT Antenna:

The antenna is External Antenna, the best case gain of the antenna is 1.9dBi



7.2 Conducted Emission

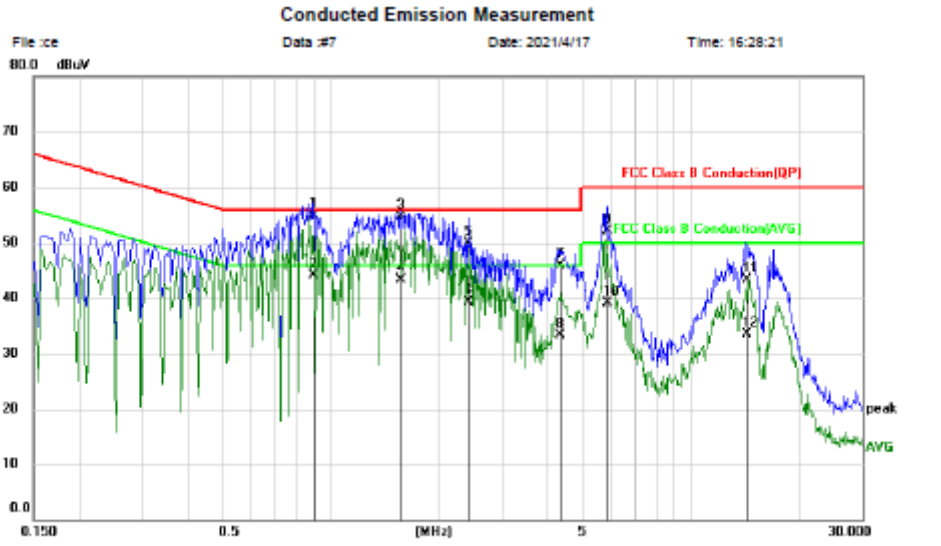
<table>
<tr><td>Test Requirement:</td><td colspan="3">FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td colspan="3">ANSI C63.10: 2013</td></tr>
<tr><td>TestFrequencyRange:</td><td colspan="3">150kHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="3">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="3">RBW=9kHz, VBW=30kHz</td></tr>
<tr><td>Limit:</td><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td></td><td>Quasi-peak</td><td>Average</td></tr>
<tr><td></td><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td></td><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td></td><td>5-30</td><td>60</td><td>50</td></tr>
<tr><td></td><td colspan="3">* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test procedure</td><td colspan="3">1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), whichprovides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.</td></tr>
<tr><td>Test setup:</td><td colspan="3"> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test Instruments:</td><td colspan="3">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="3">Refer to section 5.2 for details</td></tr>
<tr><td>Test results:</td><td colspan="3">Pass</td></tr>
</table>

Measurement data

Line:

EUT:	set top box	**Probe:**	L1
Model:	SEI800CCOA	**Power Source:**	AC120V/60Hz
Mode:	Wifi mode	**Test by:**	Sven
Temp./Hum.(%H):	26℃/60%RH		



Site Phase: L1 Temperature:

Limit: FCC Class B Conduction(QP) Power: Humidity: %

EUT: set top box

M/N: SEI800CCOA

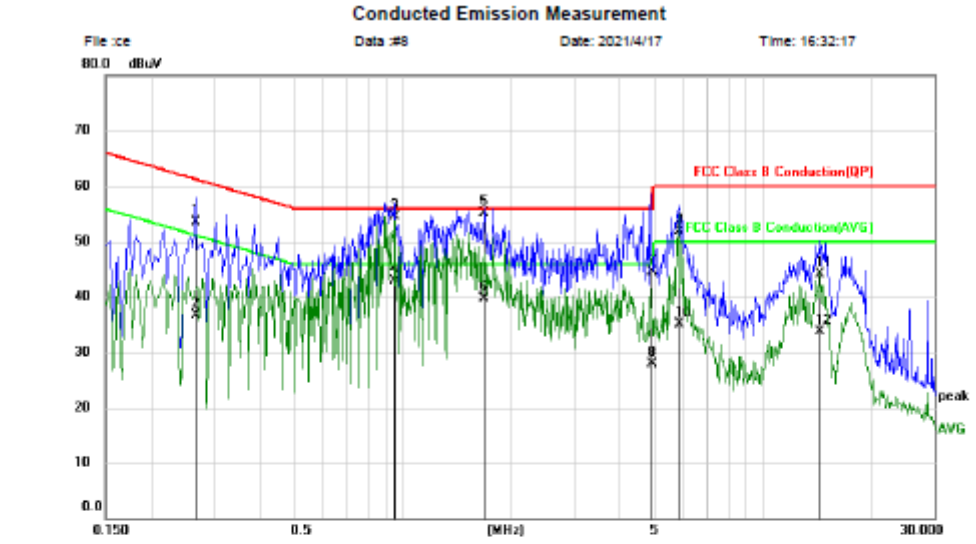
Mode: 2.4G Wifi mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.8980	44.90	9.91	54.81	56.00	-1.19	QP	
2		0.8980	34.18	9.91	44.09	46.00	-1.91	AVG	
3		1.5660	44.82	9.93	54.75	56.00	-1.25	QP	
4		1.5660	33.38	9.93	43.31	46.00	-2.69	AVG	
5		2.4140	40.05	9.95	50.00	56.00	-6.00	QP	
6		2.4140	29.45	9.95	39.40	46.00	-6.60	AVG	
7		4.3180	35.95	9.99	45.94	56.00	-10.06	QP	
8		4.3180	23.22	9.99	33.21	46.00	-12.79	AVG	
9		5.8659	42.04	10.05	52.09	60.00	-7.91	QP	
10		5.8659	29.09	10.05	39.14	50.00	-10.86	AVG	
11		14.2620	32.99	10.33	43.32	60.00	-16.68	QP	
12		14.2620	23.20	10.33	33.53	50.00	-16.47	AVG	

Neutral:

EUT:	set top box	**Probe:**	N
Model:	SEI800CCOA	**Power Source:**	AC120V/60Hz
Mode:	Wifi mode	**Test by:**	Sven
Temp./Hum.(%H):	26℃/60%RH		



Site Phase: N Temperature:
Limit: FCC Class B Conduction(QP) Power: Humidity: %
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G Wifi mode
Note:

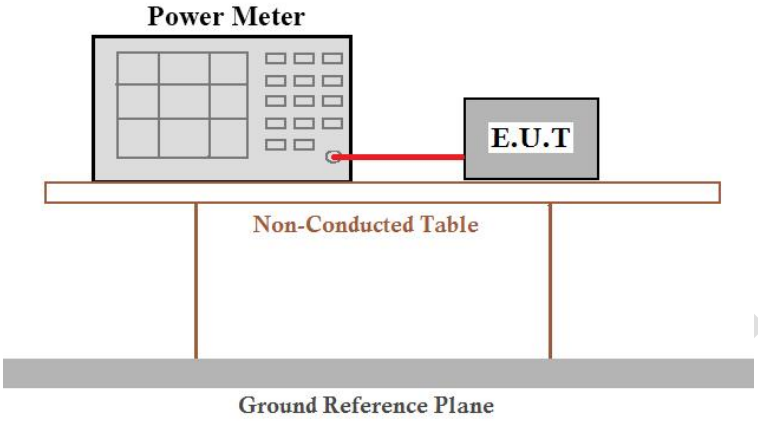
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2660	43.74	9.76	53.50	61.24	-7.74	QP	
2		0.2660	27.04	9.76	36.80	51.24	-14.44	AVG	
3		0.9500	44.75	9.83	54.58	56.00	-1.42	QP	
4		0.9500	33.17	9.83	43.00	46.00	-3.00	AVG	
5	*	1.6860	45.22	9.85	55.07	56.00	-0.93	QP	
6		1.6860	29.78	9.85	39.63	46.00	-6.37	AVG	
7		4.9100	34.63	9.95	44.58	56.00	-11.42	QP	
8		4.9100	17.95	9.95	27.90	46.00	-18.10	AVG	
9		5.8659	41.97	9.98	51.95	60.00	-8.05	QP	
10		5.8659	25.05	9.98	35.03	50.00	-14.97	AVG	
11		14.3660	33.85	10.29	44.14	60.00	-15.86	QP	
12		14.3660	23.32	10.29	33.61	50.00	-16.39	AVG	

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. *Final Level =Receiver Read level + Correct factor*
4. *Correct factor = LISN Factor + Cable Loss*

If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

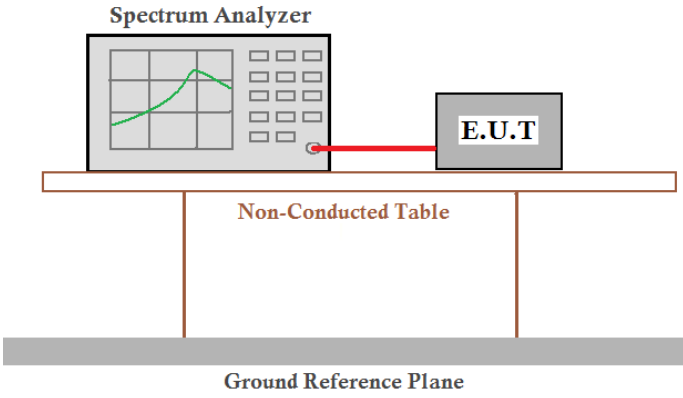
7.3 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB558074 D01 DTS Meas Guidance V05
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

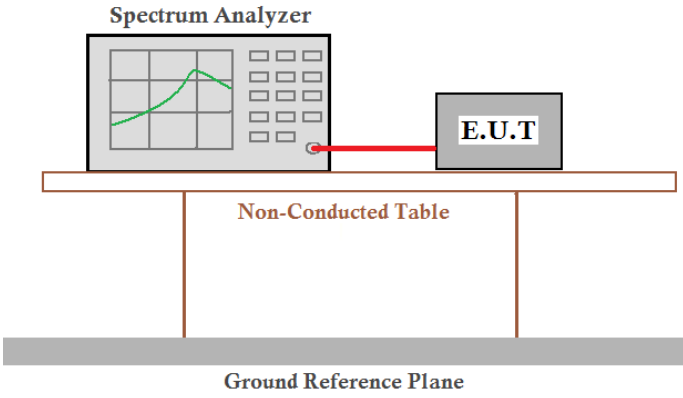
Please Refer To Appendix: Appendix1 For Details

7.4 Channel Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB558074 D01 DTS Meas Guidance V05
Limit:	>500KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data
Please Refer To Appendix: Appendix1 For Details

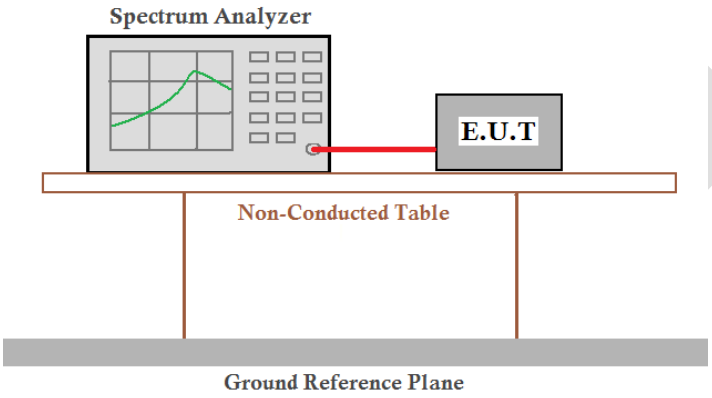
7.5 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074 D01 DTS Meas Guidance V05
Limit:	8dBm/3KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data
Please Refer To Appendix: Appendix1 For Details

7.6 Band edges

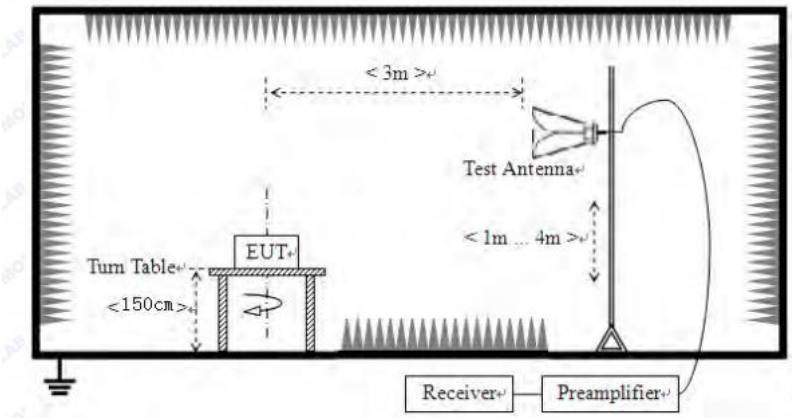
7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D01 DTS Meas Guidance V05
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

Please Refer To Appendix: Appendix1 For Details

7.6.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>All of the restrict bands were tested, only the worst band's (2310MHz to 2390MHz, 2483.5MHz to 2500MHz) data was showed.</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Average</td><td>1MHz</td><td>3MHz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average</td></tr>
<tr><td>74.00</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td> 
</td></tr>
<tr><td>Test Procedure:</td><td>1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. 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.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. 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.
7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.2 for details</td></tr>
<tr><td>Test results:</td><td>Pass</td></tr>
</table>

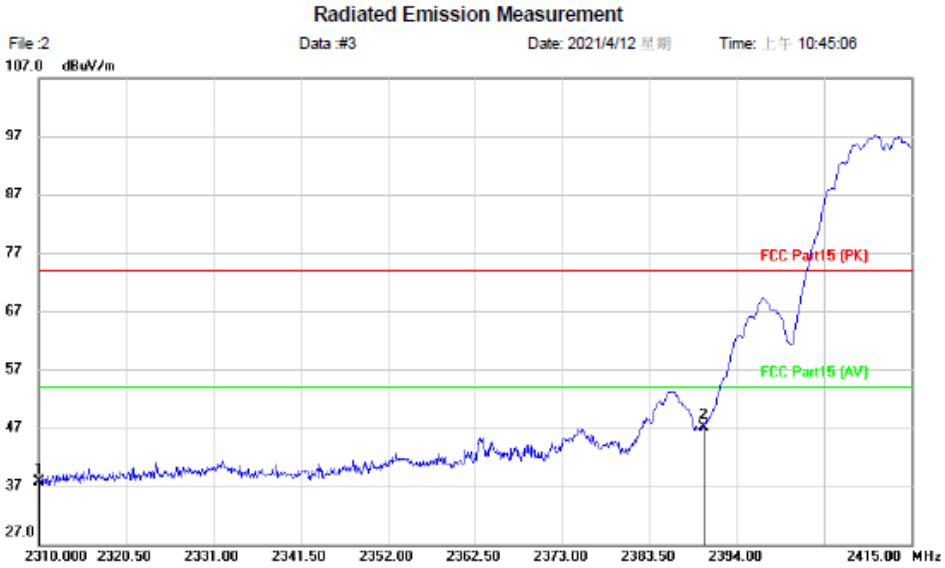
Remark: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits

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.

Measurement data:

802.11b (worst case of ANT1)

lowest channel



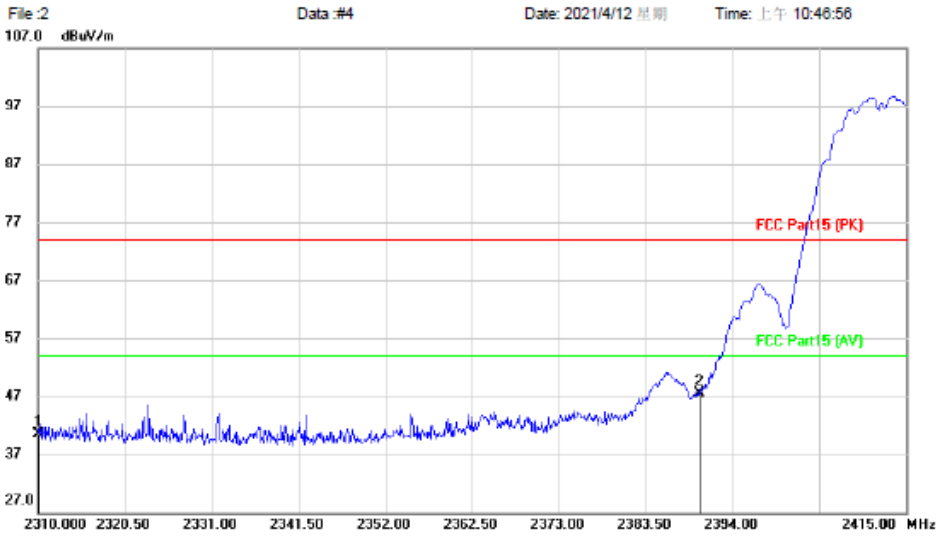
Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-B-L
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	42.24	-4.61	37.63	74.00	-36.37	peak			
2	*	2390.000	51.43	-4.27	47.16	74.00	-26.84	peak			

Radiated Emission Measurement



Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-B-L
Note:

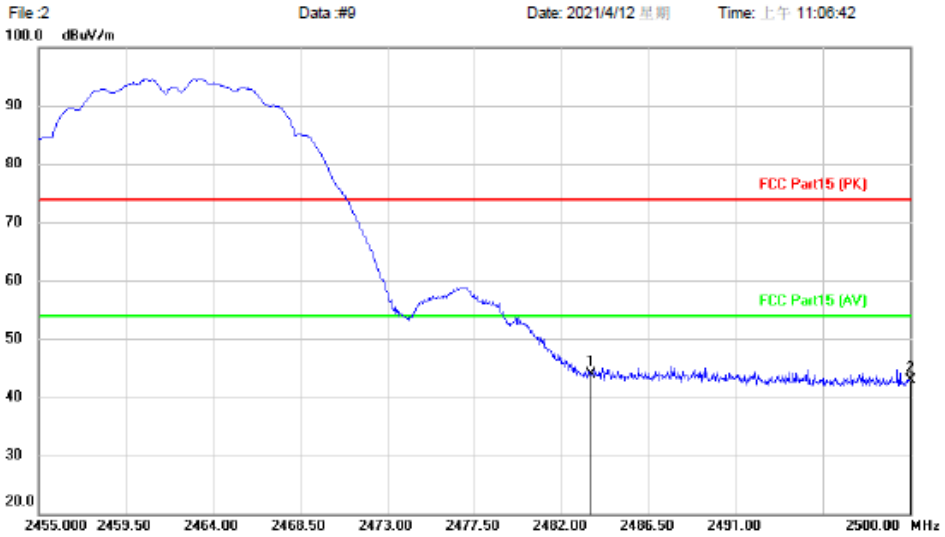
Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	45.06	-4.61	40.45	74.00	-33.55	peak			
2	*	2390.000	51.85	-4.27	47.58	74.00	-26.42	peak			

Highest channel

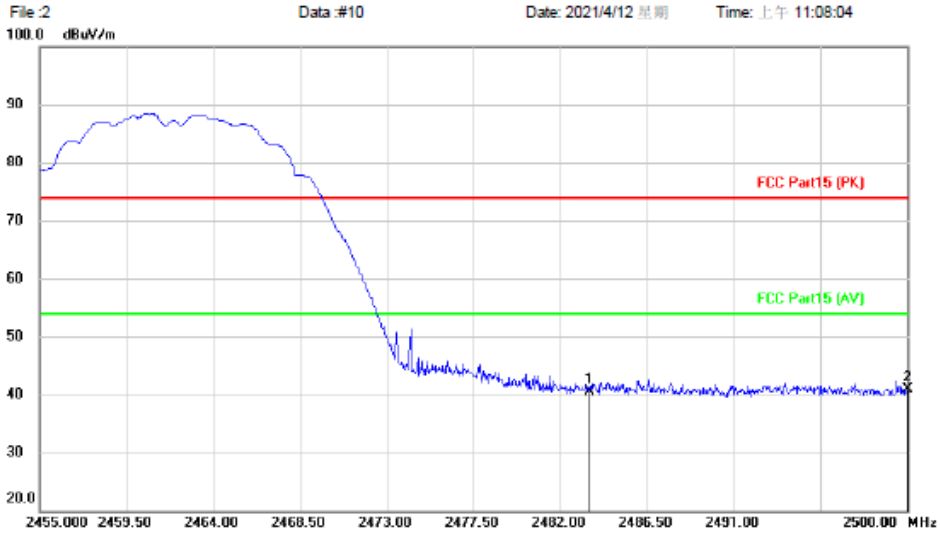
Radiated Emission Measurement



Site	Polarization: *Horizontal*	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: set top box	Distance: 3m	
M/N: SEI800CCOA		
Mode: 2.4G-B-H		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	47.76	-3.84	43.92	74.00	-30.08	peak			
2		2500.000	46.60	-3.78	42.82	74.00	-31.18	peak			

Radiated Emission Measurement



Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-B-H
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

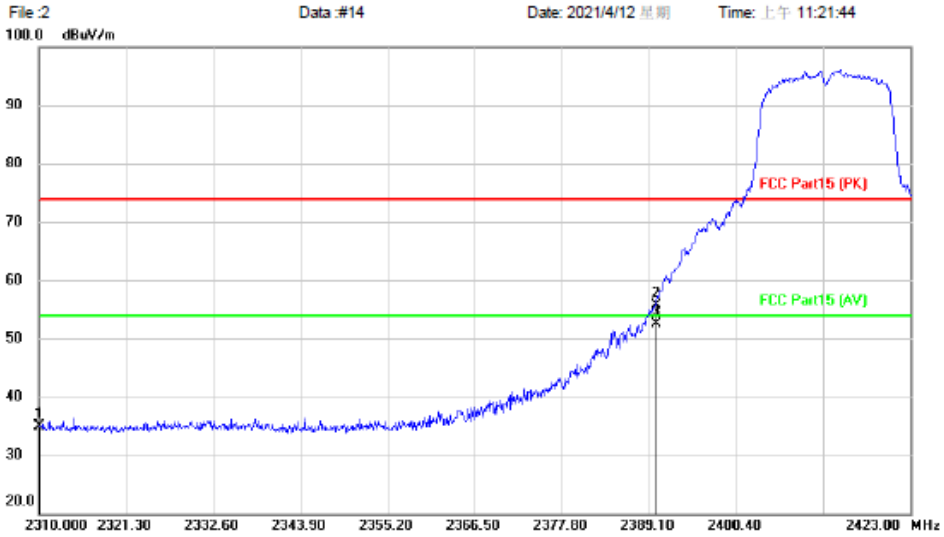
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	44.25	-3.84	40.41	74.00	-33.59	peak			
2	*	2500.000	44.70	-3.78	40.92	74.00	-33.08	peak			

802.11G(worst case of ANT1)

lowest channel

Peak Value

Radiated Emission Measurement



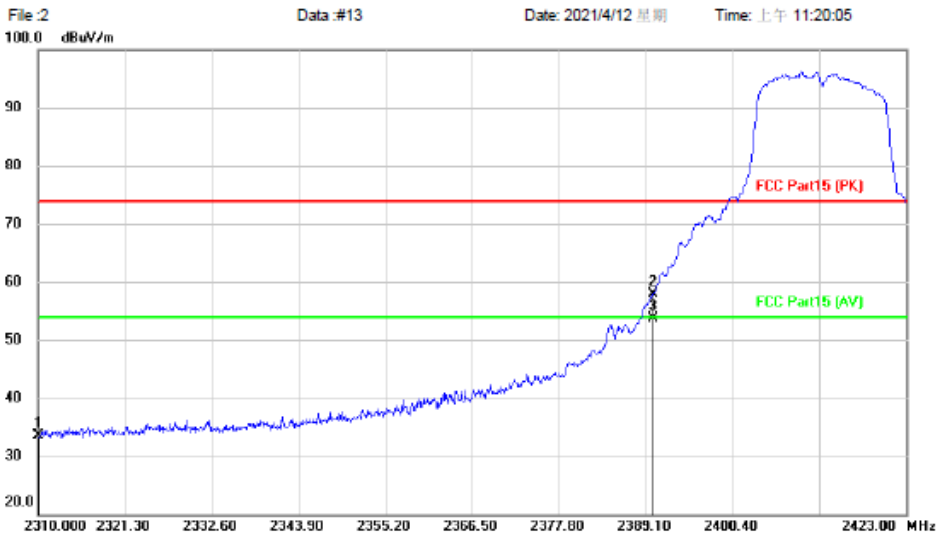
Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-G-L
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	39.54	-4.61	34.93	74.00	-39.07	peak			
2		2390.000	59.88	-4.27	55.61	74.00	-18.39	peak			
3	*	2390.000	56.76	-4.27	52.49	54.00	-1.51	AVG			

Radiated Emission Measurement



Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-G-L
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

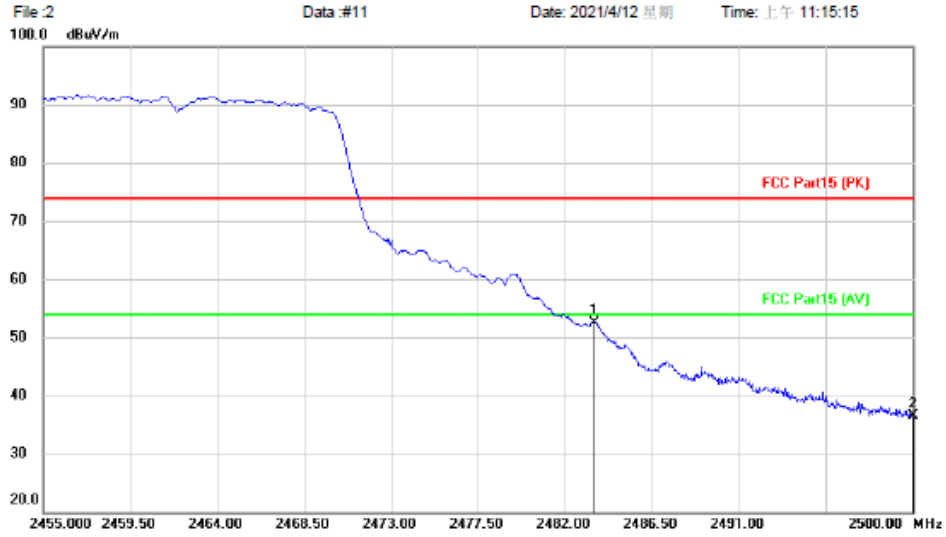
Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	38.15	-4.61	33.54	74.00	-40.46	peak			
2		2390.000	62.27	-4.27	58.00	74.00	-16.00	peak			
3	*	2390.000	58.01	-4.27	53.74	54.00	-0.26	AVG			

Highest channel

Peak Value

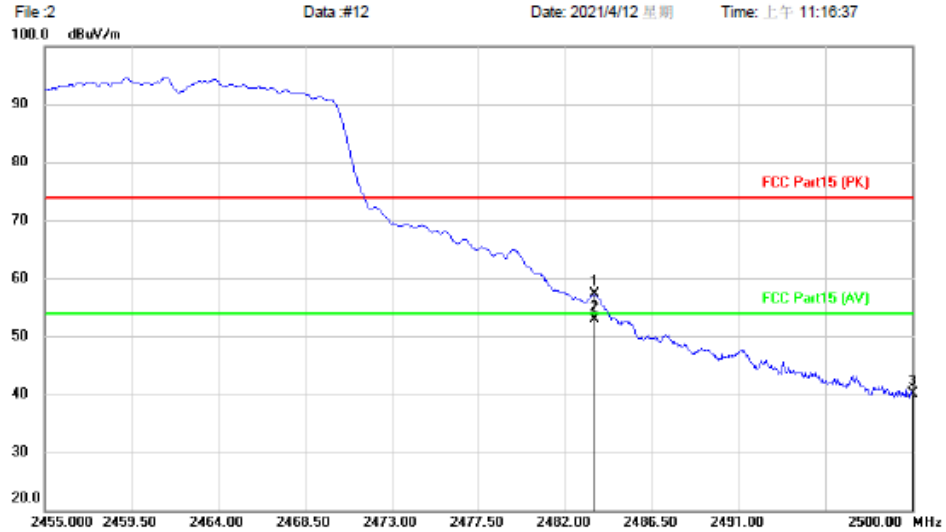
Radiated Emission Measurement



Site	Polarization: *Horizontal*	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: set top box	Distance: 3m	
M/N: SEI800CCOA		
Mode: 2.4G-G-H		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	56.42	-3.84	52.58	74.00	-21.42	peak			
2		2500.000	40.33	-3.78	36.55	74.00	-37.45	peak			

Radiated Emission Measurement



Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-G-H
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	61.06	-3.84	57.22	74.00	-16.78	peak			
2	*	2483.500	56.73	-3.84	52.89	54.00	-1.11	AVG			
3		2500.000	43.92	-3.78	40.14	74.00	-33.86	peak			

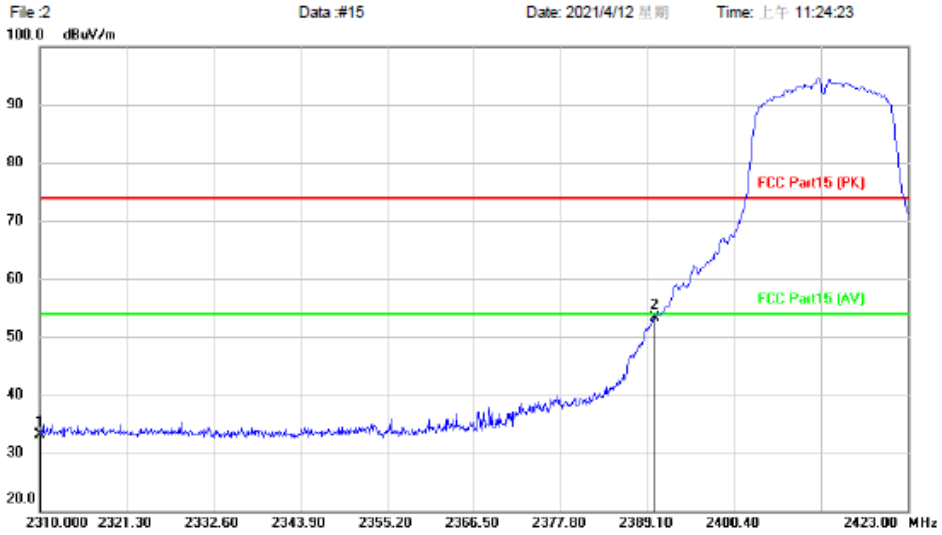
MIMO:

802.11N20

lowest channel

Peak Value

Radiated Emission Measurement



Site

Limit: FCC Part15 (PK)

EUT: set top box

M/N: SEI800CCOA

Mode: 2.4G-N20-L

Note:

Polarization: *Vertical*

Power:

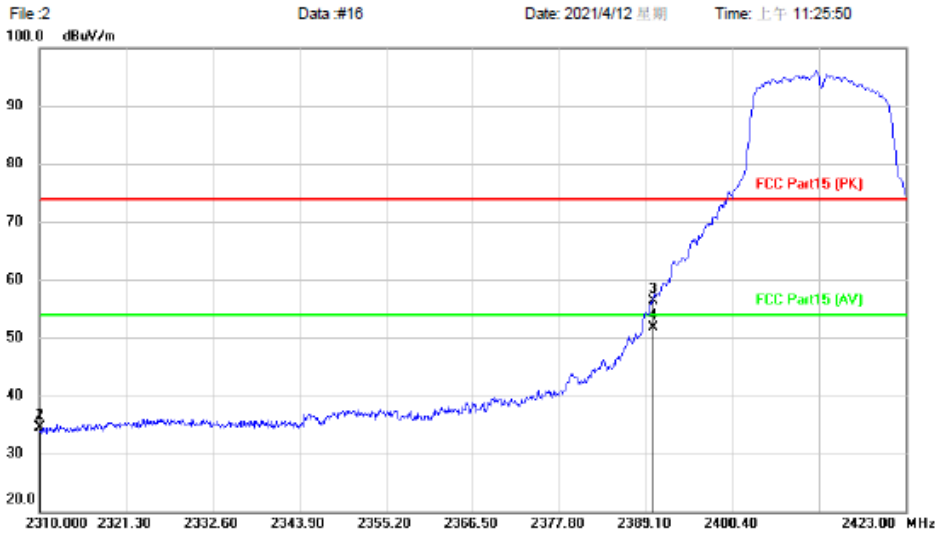
Distance: 3m

Temperature:

Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	37.75	-4.61	33.14	74.00	-40.86	peak			
2	*	2390.000	57.67	-4.27	53.40	74.00	-20.60	peak			

Radiated Emission Measurement



Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-N20-L
Note:

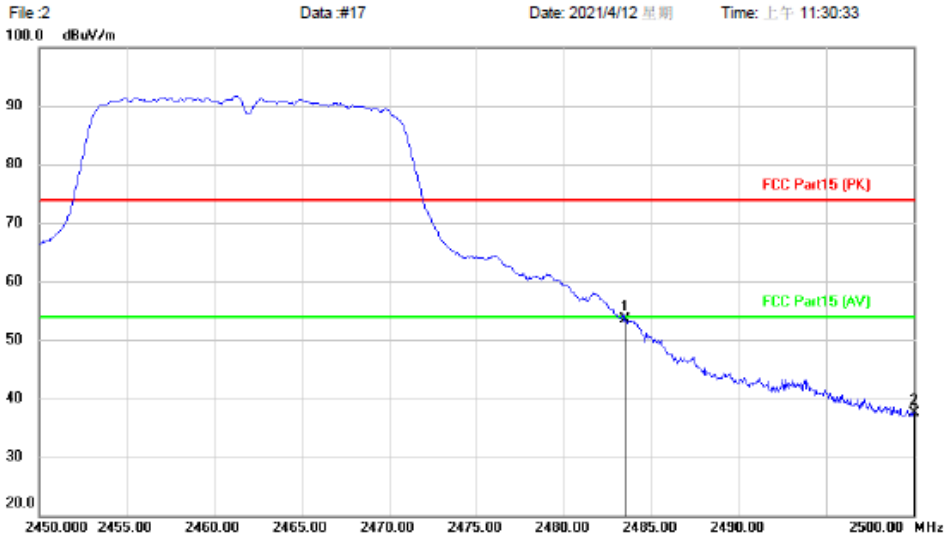
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	39.12	-4.61	34.51	74.00	-39.49	peak			
2		2310.000	39.12	-4.61	34.51	74.00	-39.49	peak			
3		2390.000	60.58	-4.27	56.31	74.00	-17.69	peak			
4	*	2390.000	56.00	-4.27	51.73	54.00	-2.27	AVG			

Highest channel
Peak Value

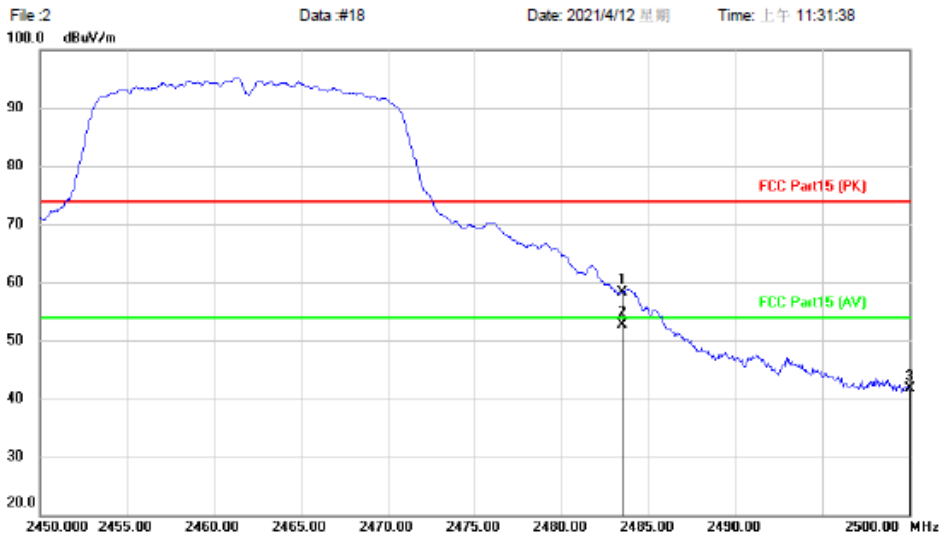
Radiated Emission Measurement



Site	Polarization: *Horizontal*	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: set top box	Distance: 3m	
M/N: SEI800CCOA		
Mode: 2.4G-N20-H		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	57.26	-3.84	53.42	74.00	-20.58	peak			
2		2500.000	41.38	-3.78	37.60	74.00	-36.40	peak			

Radiated Emission Measurement



Site	Polarization: *Vertical*	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: set top box	Distance: 3m	
M/N: SEI800CCOA		
Mode: 2.4G-N20-H		
Note:		

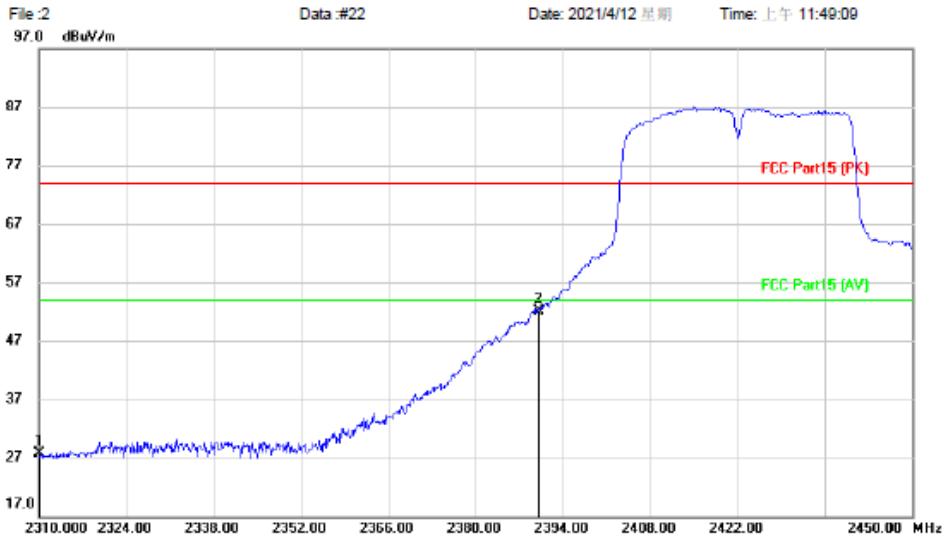
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	62.17	-3.84	58.33	74.00	-15.67	peak			
2	*	2483.500	56.51	-3.84	52.67	54.00	-1.33	AVG			
3		2500.000	45.49	-3.78	41.71	74.00	-32.29	peak			

802.11N40

lowest channel

Peak Value

Radiated Emission Measurement



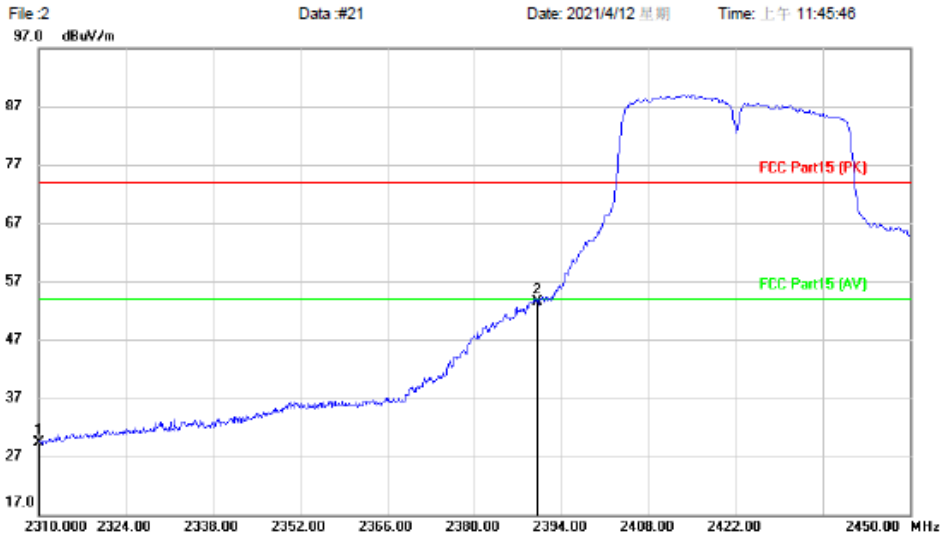
Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-N40-L
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	32.40	-4.61	27.79	74.00	-46.21	peak			
2	*	2390.000	56.47	-4.27	52.20	74.00	-21.80	peak			

Radiated Emission Measurement



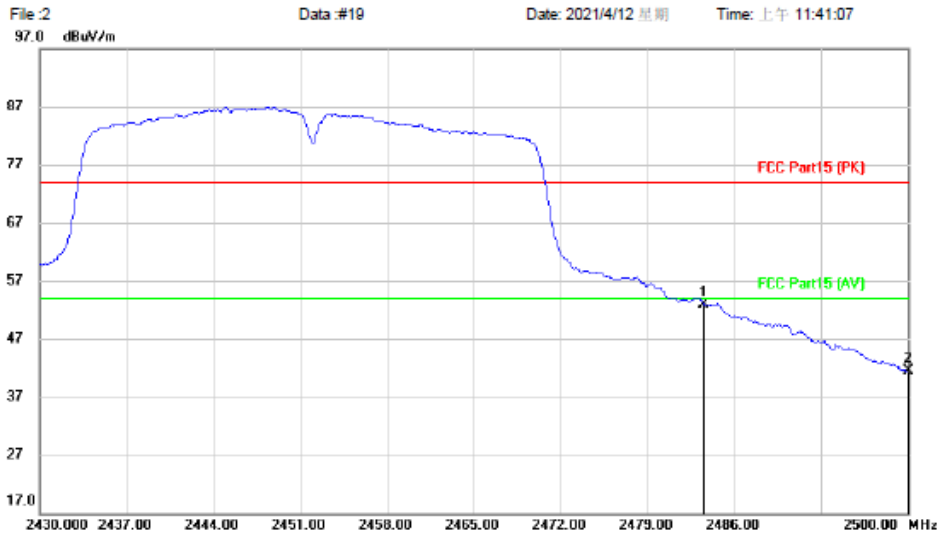
Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-N40-L
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	34.01	-4.61	29.40	74.00	-44.60	peak			
2	*	2390.000	57.83	-4.27	53.56	74.00	-20.44	peak			

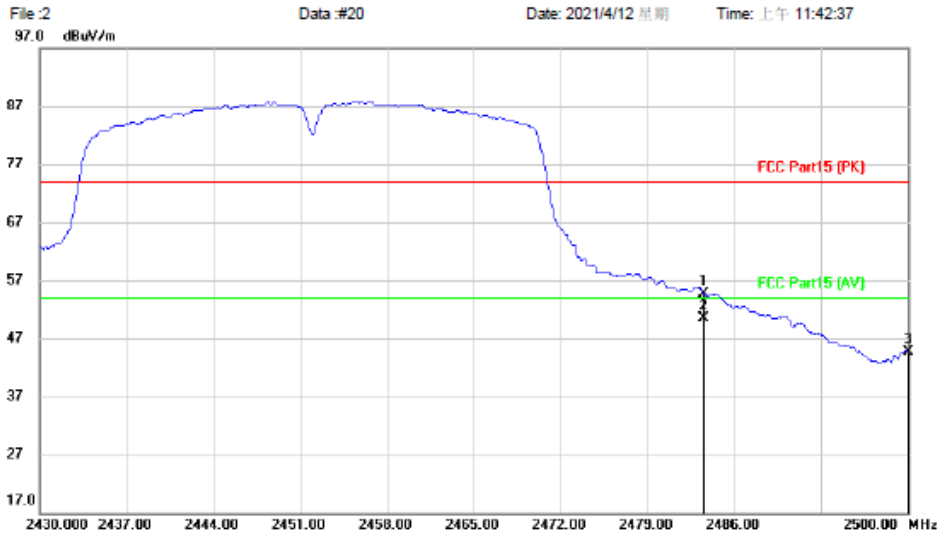
Highest channel
Peak Value
Radiated Emission Measurement



Site	Polarization: *Horizontal*	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: set top box	Distance: 3m	
M/N: SEI800CCOA		
Mode: 2.4G-N40-H		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	56.79	-3.84	52.95	74.00	-21.05	peak			
2		2500.000	45.28	-3.78	41.50	74.00	-32.50	peak			

Radiated Emission Measurement



Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-N40-H
Note:

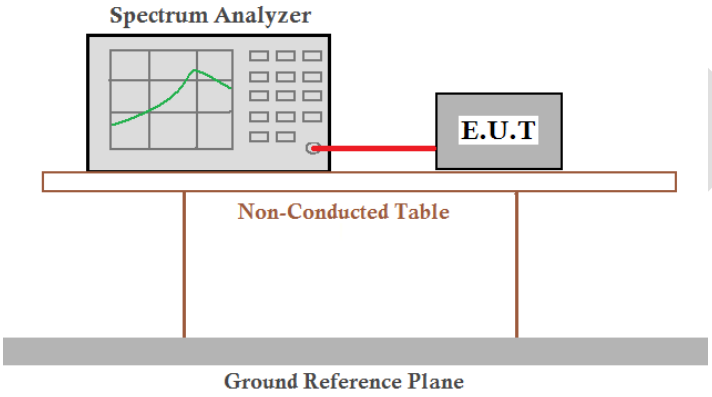
Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	58.61	-3.84	54.77	74.00	-19.23	peak			
2	*	2483.500	54.44	-3.84	50.60	54.00	-3.40	AVG			
3		2500.000	48.45	-3.78	44.67	74.00	-29.33	peak			

7.7 Spurious Emission

7.7.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D01 DTS Meas Guidance V04
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

Please Refer To Appendix: Appendix1 For Details

7.7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 25GHz
Test site:	Measurement Distance: 3m

Receiver setup:

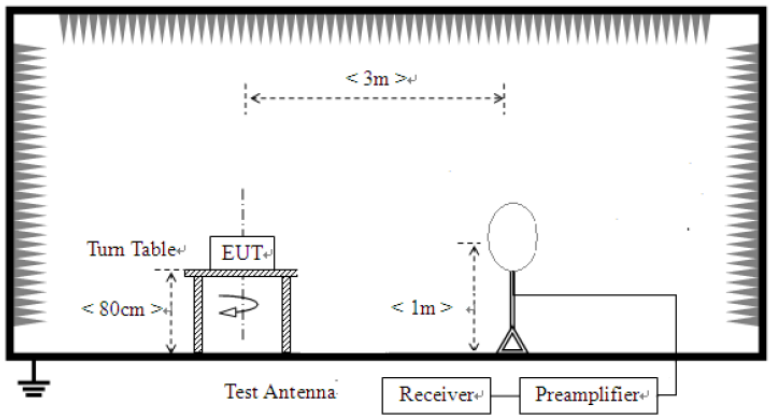
Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:

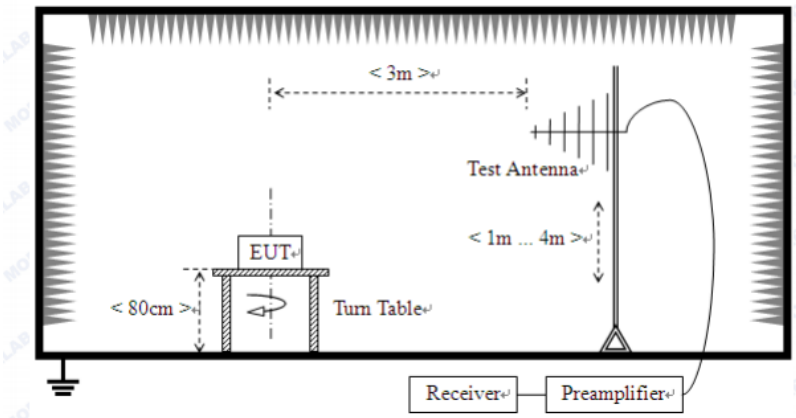
Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	300m
1.705MHz-30MHz	30	QP	30m
30MHz-88MHz	100	QP	3m
88MHz-216MHz	150	QP	
216MHz-960MHz	200	QP	
960MHz-1GHz	500	QP	
Above 1GHz	500	Average	
	5000	Peak	

Test setup:

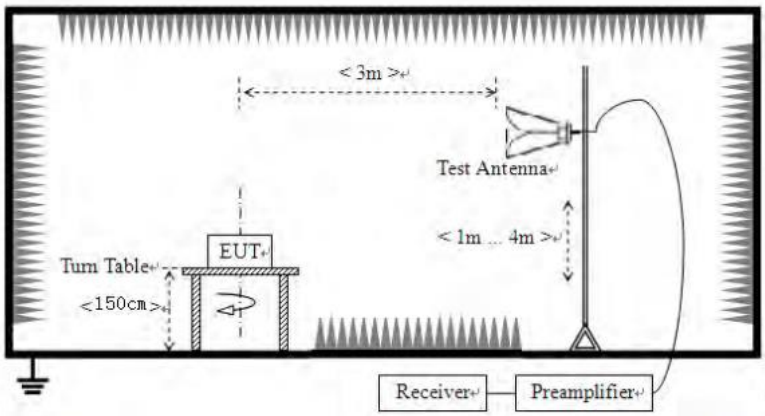
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details

Test results:	Pass
Test voltage:	AC120V 60Hz

Remark:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

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.

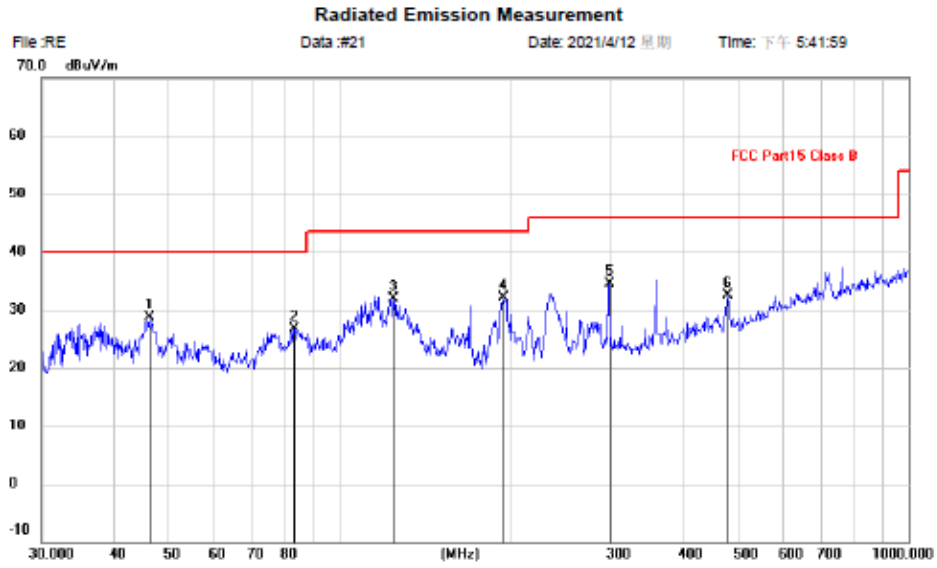
Measurement data:

■ **9kHz~30MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

■ **Below 1GHz**

Mode:	**Transmitting mode**	**Polarziation:**	**Horizontal**
Temp./Hum.(%H):	**26℃/56%RH**		



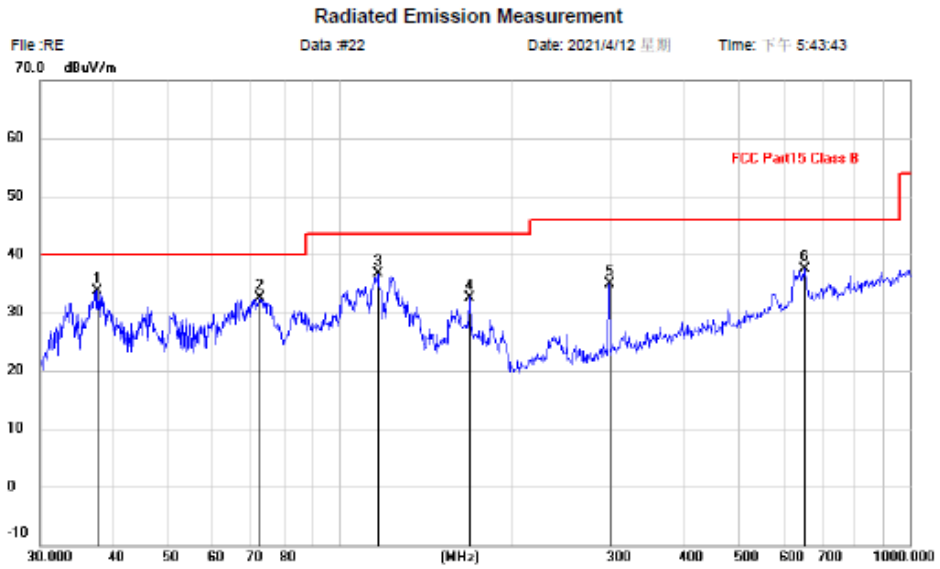
Site
Limit: FCC Part15 Class B
EUT: set top box
M/N: SEI800CCOA
Mode: wifi mode
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	46.3402	4.40	24.40	28.80	40.00	-11.20	QP			
2		83.2298	7.53	19.14	26.67	40.00	-13.33	QP			
3		124.5690	9.20	22.71	31.91	43.50	-11.59	QP			
4		194.4534	11.84	20.25	32.09	43.50	-11.41	QP			
5		297.2241	10.83	23.72	34.55	46.00	-11.45	QP			
6		480.5276	3.82	28.75	32.57	46.00	-13.43	QP			

Mode:	**Transmitting mode**	**Polarziation:**	**Vertical**
Temp./Hum.(%H):	**26℃/56%RH**		



Site
Limit: FCC Part15 Class B
EUT: set top box
M/N: SEI800CCOA
Mode: wifi mode
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

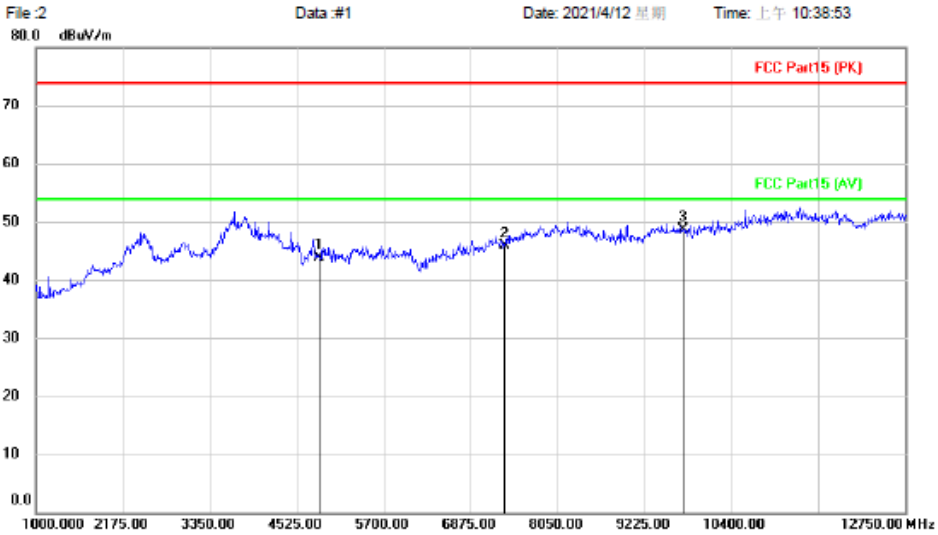
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	37.6798	10.07	23.65	33.72	40.00	-6.28	QP			
2		72.5916	11.84	20.58	32.42	40.00	-7.58	QP			
3		116.9495	14.41	22.26	36.67	43.50	-6.83	QP			
4		169.5990	10.58	22.02	32.60	43.50	-10.90	QP			
5		297.2241	11.10	23.72	34.82	46.00	-11.18	QP			
6		654.2318	5.08	32.48	37.56	46.00	-8.44	QP			

- **Above 1GHz**
- *Remark: During the test, pre-scan the 802.11b/g/n mode, and found the 802.11n40 mode which it is worse case.*

802.11n40

lowest channel

Radiated Emission Measurement



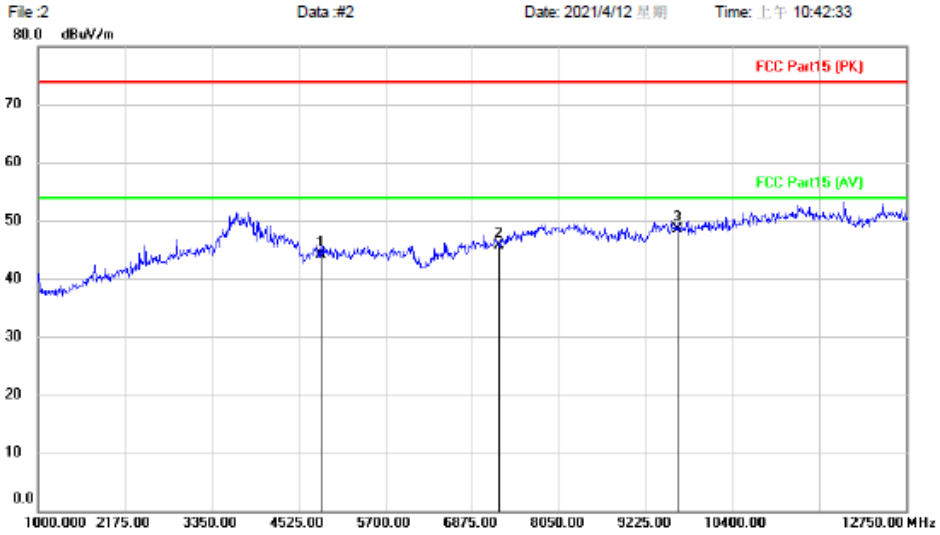
Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-n40 TX-L
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4824.000	40.38	3.62	44.00	74.00	-30.00	peak			
2		7326.000	39.56	6.44	46.00	74.00	-28.00	peak			
3	*	9748.000	39.11	9.59	48.70	74.00	-25.30	peak			

Radiated Emission Measurement



Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-n40 TX-L
Note:

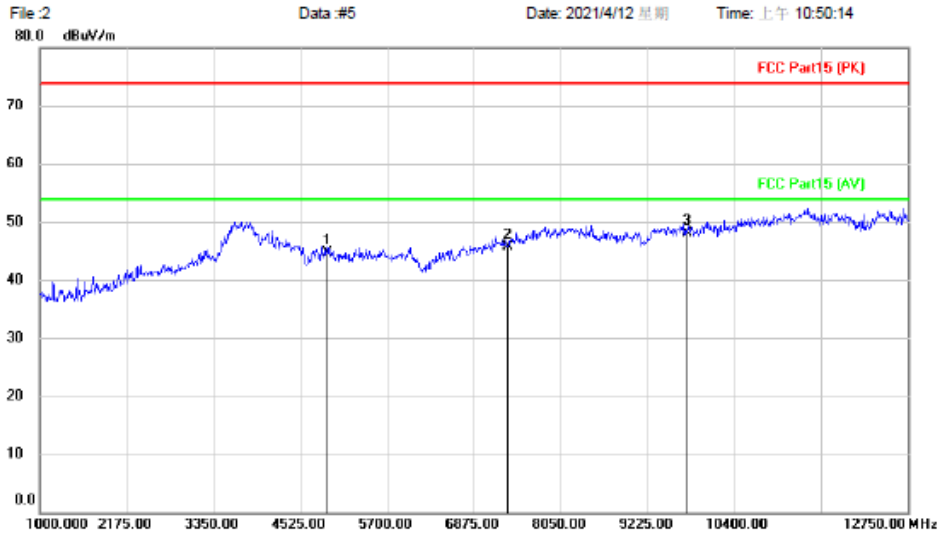
Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4824.000	40.51	3.62	44.13	74.00	-29.87	peak			
2		7236.000	39.72	6.07	45.79	74.00	-28.21	peak			
3	*	9648.000	39.10	9.37	48.47	74.00	-25.53	peak			

Middle channel

Radiated Emission Measurement



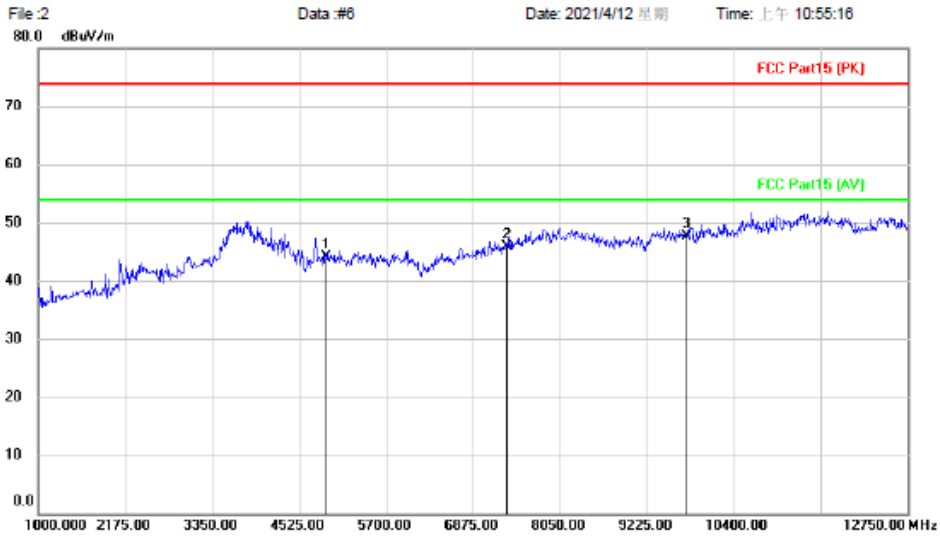
Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-n40 TX-M
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4884.000	41.29	3.34	44.63	74.00	-29.37	peak			
2		7326.000	39.33	6.44	45.77	74.00	-28.23	peak			
3	*	9764.000	38.38	9.63	48.01	74.00	-25.99	peak			

Radiated Emission Measurement



Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-n40 TX-M
Note:

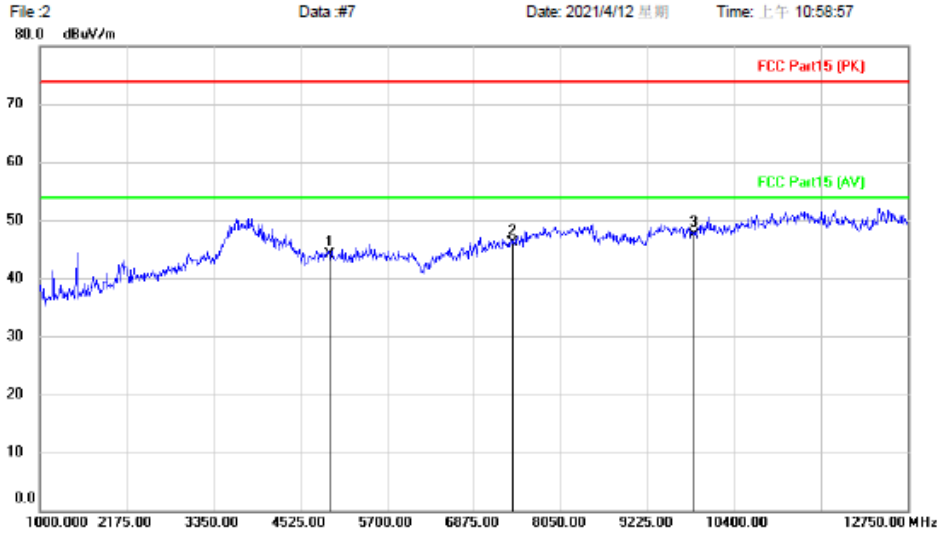
Polarization: *Vertical*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4884.000	40.72	3.34	44.06	74.00	-29.94	peak			
2		7326.000	39.54	6.44	45.98	74.00	-28.02	peak			
3	*	9764.000	38.11	9.63	47.74	74.00	-26.26	peak			

Highest channel

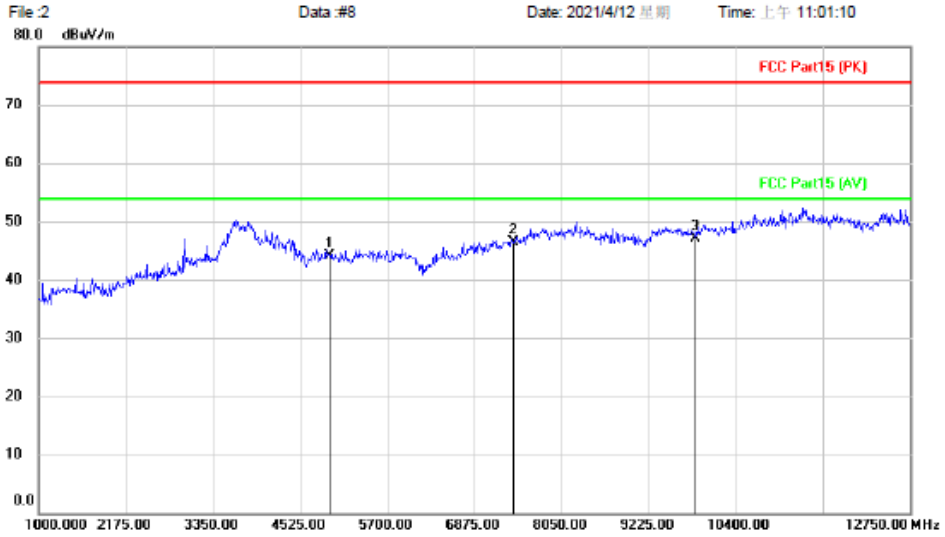
Radiated Emission Measurement



Site	Polarization: *Vertical*	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: set top box	Distance: 3m	
M/N: SEI800CCOA		
Mode: 2.4G-n40 TX-H		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4924.000	40.55	3.46	44.01	74.00	-29.99	peak			
2		7386.000	39.39	6.68	46.07	74.00	-27.93	peak			
3	*	9848.000	37.53	9.88	47.41	74.00	-26.59	peak			

Radiated Emission Measurement



Site
Limit: FCC Part15 (PK)
EUT: set top box
M/N: SEI800CCOA
Mode: 2.4G-n40 TX-H
Note:

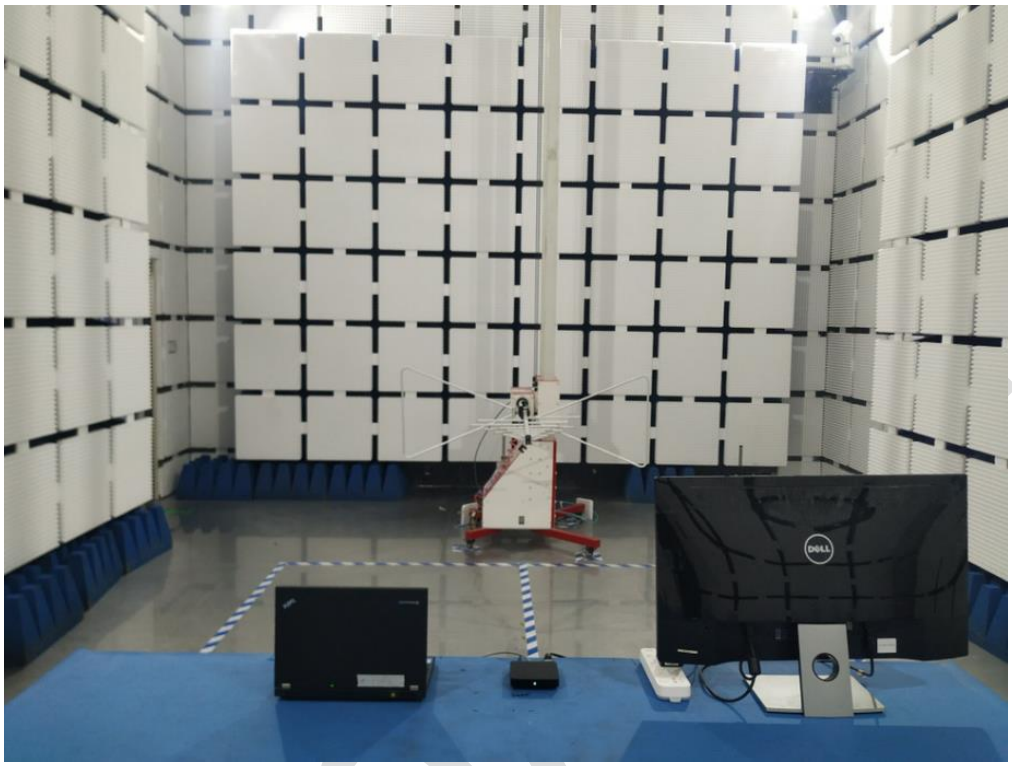
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4924.000	40.73	3.46	44.19	74.00	-29.81	peak			
2		7386.000	39.81	6.68	46.49	74.00	-27.51	peak			
3	*	9848.000	37.32	9.88	47.20	74.00	-26.80	peak			

8 Test Setup Photo

Radiated Emission



Conducted Emission

9 EUT Constructional Details

Reference to the test report No. BLA-EMC-202103-A5201

10 Appendix

*** End of Report ***