TEST REPORT

Test item description:	Sub1G Module
FCC ID:	2ATPO-AISG01P
Trademark(s):	B&T 博安通 Ai 安信可科技 Ai-Thinker
Model/Type reference:	Ai-SG01-P
Applicant's name:	Shenzhen Ai-Thinker Technology Co., Ltd
Address:	410, Block C, Huafeng Smart Innovation Port.Gushu 2nd Road, Gushu Community, Xixiang Street, Baoan District, Shenzhen, China
Manufacturer:	Shenzhen Ai-Thinker Technology Co., Ltd
Address:	410, Block C, Huafeng Smart Innovation Port.Gushu 2nd Road, Gushu Community, Xixiang Street, Baoan District, Shenzhen, China
Prepared By:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	1&2/F., Building A, No.26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	Nov. 28, 2025
Sample tested Date:	Nov. 28, 2025 to Dec. 30, 2025
Issue Date:	Dec. 30, 2025
Report No.:	CTB25112809206RF01
Test Standards	FCC CFR Title 47 Part 15 Subpart C Section 15.231 ANSI C63.10:2020
Test Results	PASS
Remark:	This is 433MHz radio test report.

Compiled by:	Reviewed by:	Approved by:
Kai Chen	Martin Feng	Bin Mei / Director

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report r Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

TABLE OF CONTENT

(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB25112809206RF01	Dec. 30, 2025	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Radiated Emission	47 CFR Part 15 Subpart C Section 15.209; 15.231(b)	ANSI C63.10-2013	PASS
Dwell Time	47 CFR Part 15 Subpart C Section 15.231 (a)	ANSI C63.10-2013	PASS
Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.231(c)	ANSI C63.10-2013	PASS
Antenna requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2013	PASS

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in C ISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	U=±54.3Hz
Conducted output power Above 1G	U=±1.0dB
Conducted output power below 1G	U=±0.9dB
Power Spectral Density , Conduction	U=±1.0dB
Conduction spurious emissions	U=±2.8dB
Out of band emission	U=±54Hz
3m camber Radiated spurious emission(30MHz-1GHz)	U=±4.3dB
3m chamber Radiated spurious emission(1GHz-18GHz)	U=±4.5dB
humidity uncertainty	U=±5.3%
Temperature uncertainty	U=±0.59℃
Supply voltages	U=±3%
Time	U=±5%

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model/Type reference:	Ai-SG01-P
Model Description:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	470.93-510MHz
Type of Modulation:	FSK
Antenna installation:	External antenna
Antenna Gain:	1.0dBi
Ratings:	DC 3.3V powering from PC

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1.	Laptop	DELL	Vostro 5490	N/A	AE
2.	Adapter	JIYIN	JY-05100C	/	AE

Notes:

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

4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode
Keep the EUT in transmitting mode with modulation.

4.5 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):	3.3V
Normal Temperature(℃)	23

4.6 Test Channel

Channel	Frequency （MHz）	Channel	Frequency （MHz）
0	470.93	21	491
1	471	22	492
2	472	23	493
3	473	24	494
4	474	25	495
5	475	26	496
6	476	27	497
7	477	28	498
8	478	29	499
9	479	30	500
10	480	31	501
11	481	32	502
12	482	33	503
13	483	34	504
14	484	35	505.95
15	485	36	506
16	486	37	507
17	487	38	508
18	488	39	509
19	489	40	510
20	490.3		

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Calibrated Date	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	A.14.16	2025/5/23	2026/5/22
2	Power Sensor	Agilent	U2021XA	MY56120032	/	2025/5/23	2026/5/22
3	Power Sensor	Agilent	U2021XA	MY56120034	/	2025/5/23	2026/5/22
4	Communication test set	R&S	CMW500	108058	V3.5.80	2025/5/23	2026/5/22
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/5/23	2026/5/22
6	Signal Generator	Agilent	N5181A	MY50140365	A.01.60	2025/5/22	2026/5/21
7	Vector signal generator	Agilent	N5182A	MY47420195	A.01.87	2025/5/22	2026/5/21
8	Communication test set	Agilent	E5515C	MY50102567	B.19.07 （E1962B ）	2025/5/22	2026/5/21
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	/	2025/6/18	2026/6/17
10	5 GHz Filter	Shenxiang	MSF5150-5850MS-1155	20181015001	/	2025/6/18	2026/6/17
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	/	2025/5/24	2026/5/23
12	BT&WI-FI Automatic test software	Micowave	MTS8310	Ver. 2.0.0.0	/	/	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	/	2025/10/20	2026/10/19
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	/	2025/5/22	2026/5/21
15	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	/	/	/
16	966 chamber	C.R.T.	966	/	/	2024/6/23	2027/6/22
17	Receiver	R&S	ESPI	100362	RF_ATTEN_7 （104489/003 ）	2025/5/23	2026/5/22
18	Amplifier	HP	8447E	2945A02747	/	2025/5/23	2026/5/22
19	Amplifier	Agilent	8449B	3008A01838	/	2025/6/2	2026/6/1
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2025/6/29	2026/6/28

21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	/	2025/6/1	2026/5/31
22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/	/	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/2	2026/6/1
24	loop antenna	ZHINAN	ZN30900A	GTS534	/	/	/
25	40G Horn antenna	A/H/System	SAS-574	588	/	2025/6/2	2026/6/1
26	Amplifier	AEROFLEX	Aeroflex	097	/	2025/6/2	2026/6/1
27	Power Metter	KEYSIGHT	N1912AP	N/A	A.05.00	2025/6/2	2026/6/1

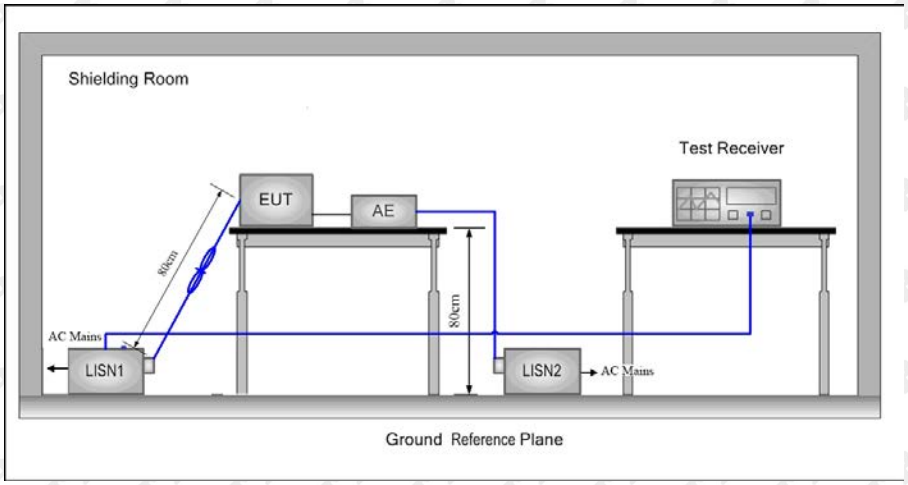
Continuous disturbance							
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated Date	Calibrated until
1	843 Shield Room	C/ R/ T	843	/	/	2024/6/22	2027/6/21
2	LISN	ROHDE&SCHWARZ	ESH3-Z5	831551852	/	2025/5/22	2026/5/21
3	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428	V4.42.SP3	2025/5/22	2026/5/21
4	Coaxial cable	ZDECL	Z302S	18091904	/	2025/5/22	2026/5/21
5	ISN	Schwarzbeck	NTFM8158	183	/	2025/6/18	2026/6/17
6	Voltage sensor	Schwarzbeck	TK 9420	01189	/	2025/9/19	2026/9/18
7	EZ-EMC	Frad	EMC-con3A1.1	/	/	/	/
8	Current Probe	FCC	F-52B	199453	/	2025/5/24	2026/5/23
9	Communication test set	R&S	CMW500	108058	B.19.07 （E1962B ）	2025/5/23	2026/5/22
10	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/5/23	2026/5/22

Radiated emission(No.2 Chamber)							
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated Date	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2024/6/8	2027/6/7
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	/	2025/6/1	2026/5/31
3	Broadband Antenna	Schwarzbeck	VULB 9168	1471	/	2025/9/19	2026/9/18
4	Amplifier	Agilent	8449B	3008A01838	/	2025/6/3	2026/6/2
5	Preamplifier	Schwarzbeck	BBV 9743 B	00500	/	2025/5/30	2026/5/29
6	EMI TEST RECEIVER	R&S	ESCI7	100861	/	2025/9/19	2026/9/18
7	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/5/23	2026/5/22
8	EMI test software	Farad	EZ-EMC	/	Ver. FARAD-3A1+	/	/
9	Coaxial cable	Rosenberg	8m	/	/	2025/9/19	2026/9/18
10	Coaxial cable	Times	2m	/	/	2025/9/19	2026/9/18

11	Coaxial cable	Times	2m	/	/	2025/9/19	2026/9/18
12	Coaxial cable	Times	1m	/	/	2025/9/19	2026/9/18
13	loop antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/2	2026/6/1
14	Communication test set	R&S	CMW500	108058	B.19.07 (E1962B)	2025/5/23	2026/5/22
15	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/5/23	2026/5/22

6.AC POWER LINE CONDUCTED EMISSION

6.1 Block Diagram Of Test Setup



6.2 Limit

* Decreasing linearly with the logarithm of the frequency

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

6.3 Test procedure

1) The mains terminal disturbance voltage test was conducted in a shielded room.

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

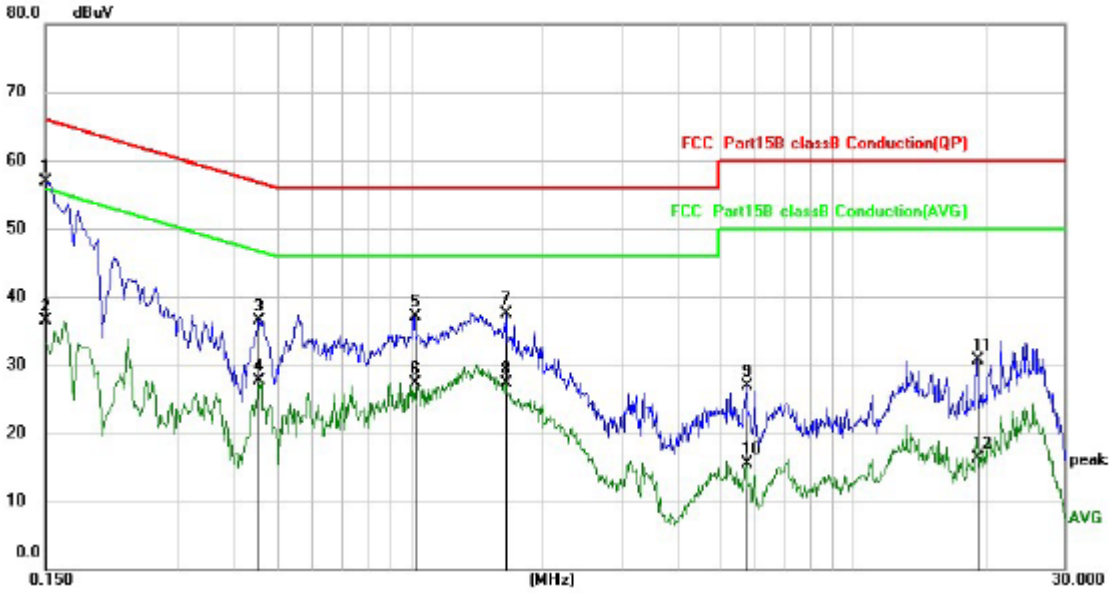
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

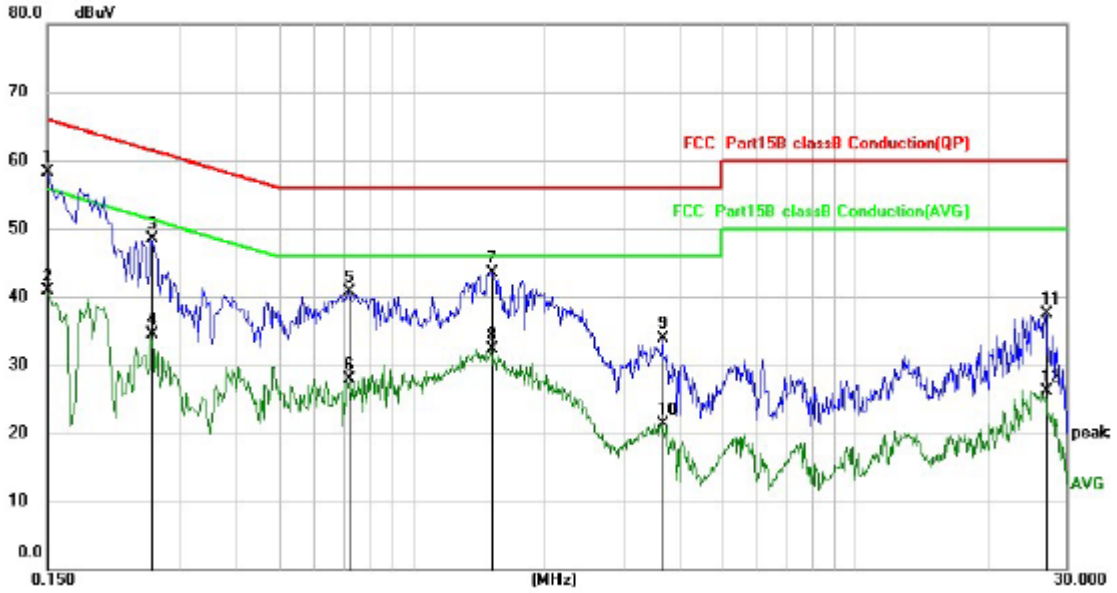
6.4 Test Result

L:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1500	46.74	10.07	56.81	66.00	-9.19	QP
2		0.1500	26.42	10.07	36.49	56.00	-19.51	AVG
3		0.4540	26.40	10.09	36.49	56.80	-20.31	QP
4		0.4540	17.61	10.09	27.70	46.80	-19.10	AVG
5		1.0220	27.01	10.13	37.14	56.00	-18.86	QP
6		1.0220	17.08	10.13	27.21	46.00	-18.79	AVG
7		1.6460	27.39	10.16	37.55	56.00	-18.45	QP
8		1.6460	17.24	10.16	27.40	46.00	-18.60	AVG
9		5.7460	16.59	10.32	26.91	60.00	-33.09	QP
10		5.7460	5.18	10.32	15.50	50.00	-34.50	AVG
11		19.1020	19.70	10.92	30.62	60.00	-29.38	QP
12		19.1020	5.43	10.92	16.35	50.00	-33.65	AVG

N:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1500	48.29	10.07	58.36	66.00	-7.64	QP
2		0.1500	30.93	10.07	41.00	56.00	-15.00	AVG
3		0.2580	38.43	10.08	48.51	61.50	-12.99	QP
4		0.2580	24.44	10.08	34.52	51.50	-16.98	AVG
5		0.7180	30.57	10.11	40.68	56.00	-15.32	QP
6		0.7180	17.88	10.11	27.99	46.00	-18.01	AVG
7		1.5140	33.43	10.15	43.58	56.00	-12.42	QP
8		1.5140	22.14	10.15	32.29	46.00	-13.71	AVG
9		3.6980	23.64	10.23	33.87	56.00	-22.13	QP
10		3.6980	11.07	10.23	21.30	46.00	-24.70	AVG
11		26.9500	26.23	11.22	37.45	60.00	-22.55	QP
12		26.9500	14.88	11.22	26.10	50.00	-23.90	AVG

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement – Limit All modes have been tested with only the worst data 411MHz

7. RADIATED EMISSION

7.1 Block Diagram Of Test Setup

Figure 1. Below 30MHz

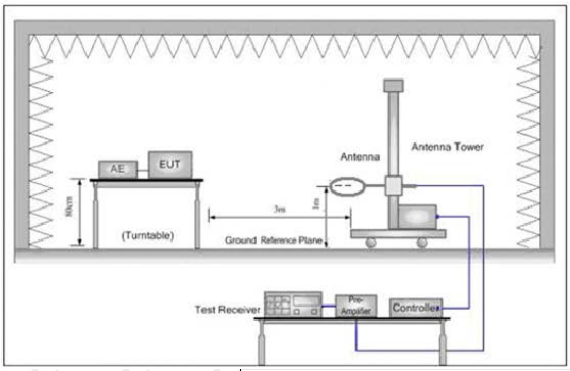
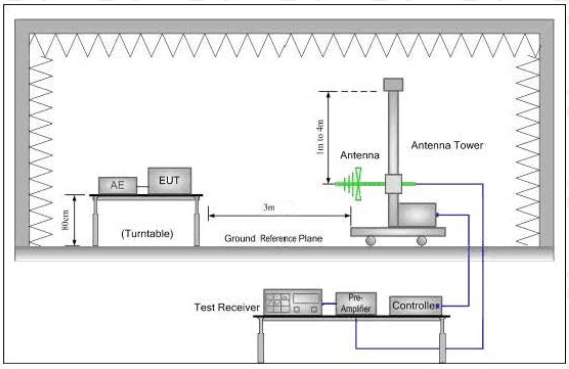


Figure 2. 30MHz to 1GHz



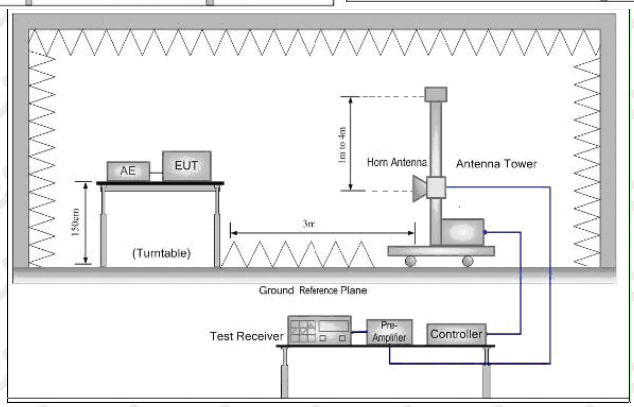


Figure 3. Above 1GHz

7.2 Limit

Spurious Emissions:

Frequency	Field strength (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	20log 2400/F (kHz) + 80	-	3
0.490MHz-1.705MHz	20log 24000/F (kHz) + 40	-	3
1.705MHz-30MHz	20log 30 + 40	-	3
30MHz-88MHz	40.0	Quasi-peak	3
88MHz-216MHz	43.5	Quasi-peak	3
216MHz-960MHz	46.0	Quasi-peak	3
960MHz-1GHz	54.0	Quasi-peak	3
Above 1GHz	54.0	Average	3

Note: 15. 35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Field Strength of Fundamental Limit:

Fundamental and harm onics emission limits Frequency(MHz)	Field strength of Fundamental((microvolts/meter)	Field strength of spurious emissions(microvolts/meter)
40.66-40.70	2280	225
70-130	1250	125
130-174	1250 to 3750**	125 to 375**
174-260	3750	375
260-470	3750 to 12500**	375 to 1250**
Above 470	12500	1250

** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, μV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

Frequency	Limit (dBμV/m @3m)	Remark
470.93MHz	81.94	Average Value
	101.94	Peak Value
490.3MHz	81.94	Average Value
	101.94	Peak Value
505.95MHz	81.94	Average Value
	101.94	Peak Value
510MHz	81.94	Average Value
	101.94	Peak Value

7.3 Test procedure

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The ant enna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizont al and vertical pol arizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30M Hz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and S pecified Bandwidth with M aximum Hold Mode.

f. 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.

Above 1GHz test procedure as below:

g. Different bet ween above is the test site, change from S emi- Anechoic Cham ber to fully Anec hoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter). h.Test the EUT in the lowest channel ,the middle channel ,the Highest channel

j.Repeat above procedures until all frequencies measured was complete.

Receiver

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average

set:

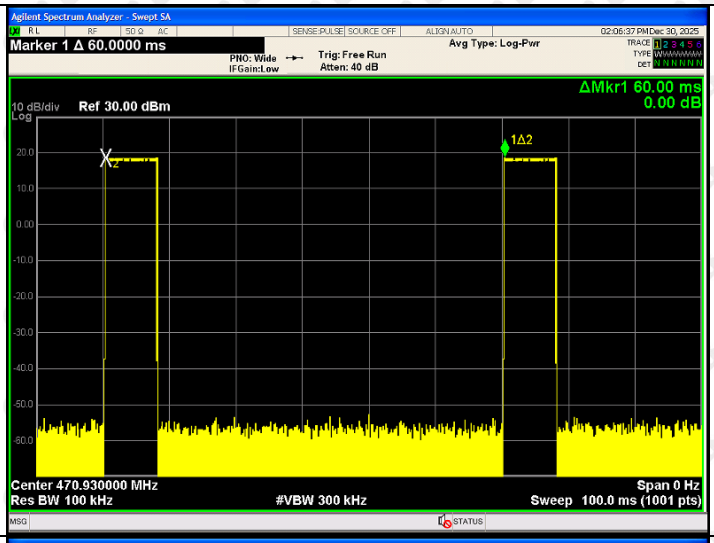
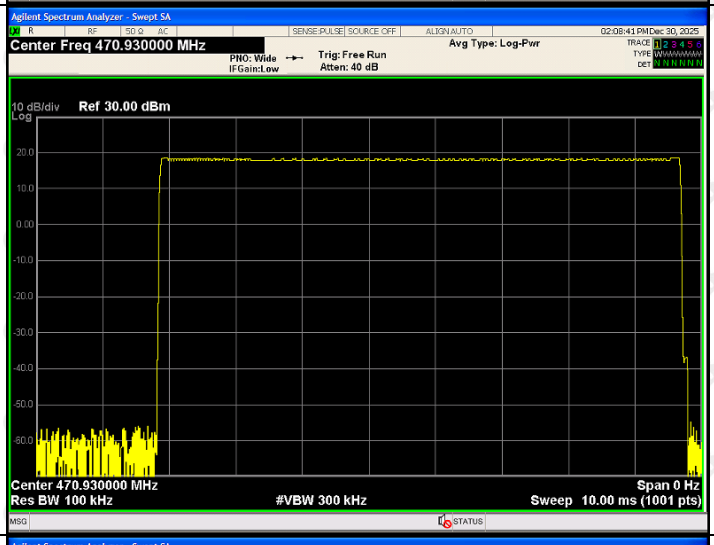
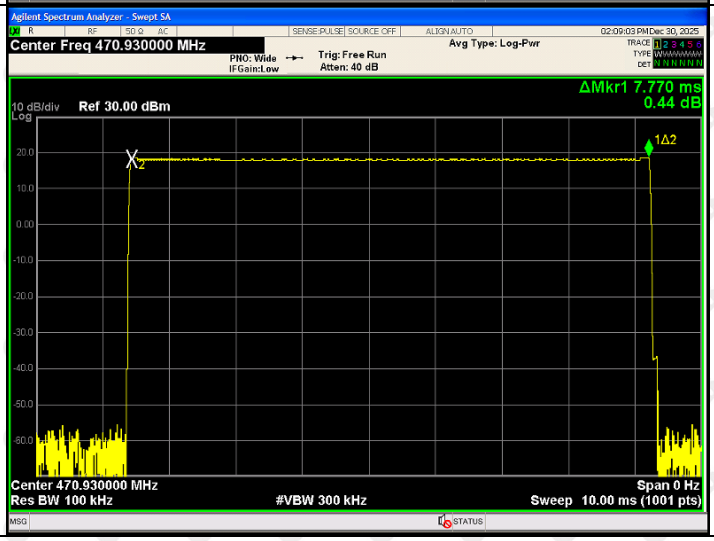
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

7.4 Test Result

Calculation of average factor

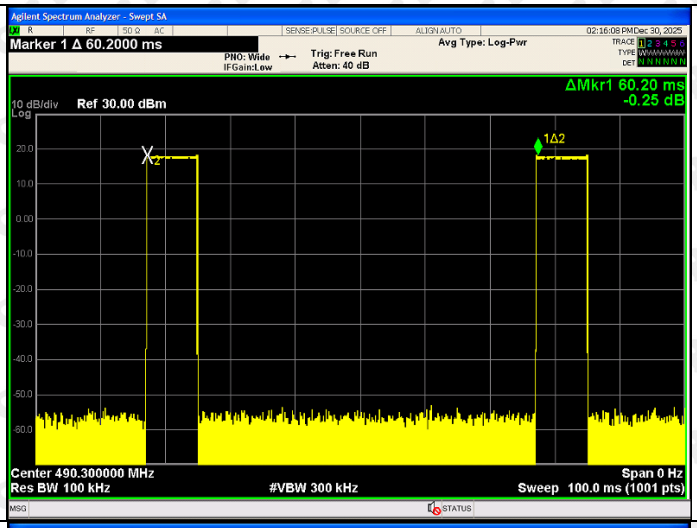
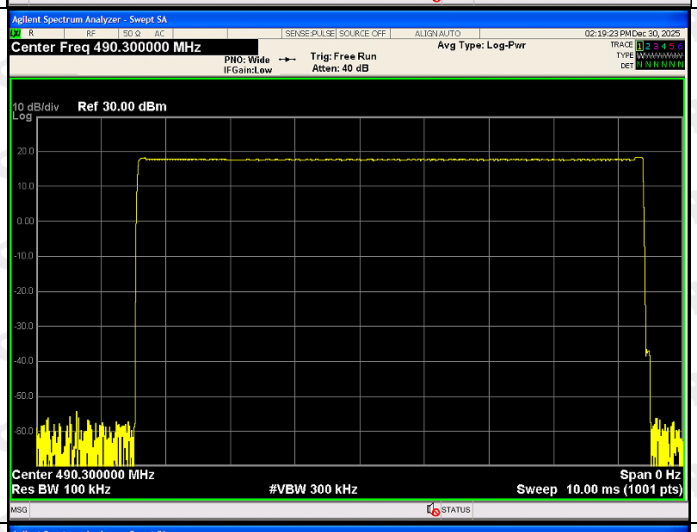
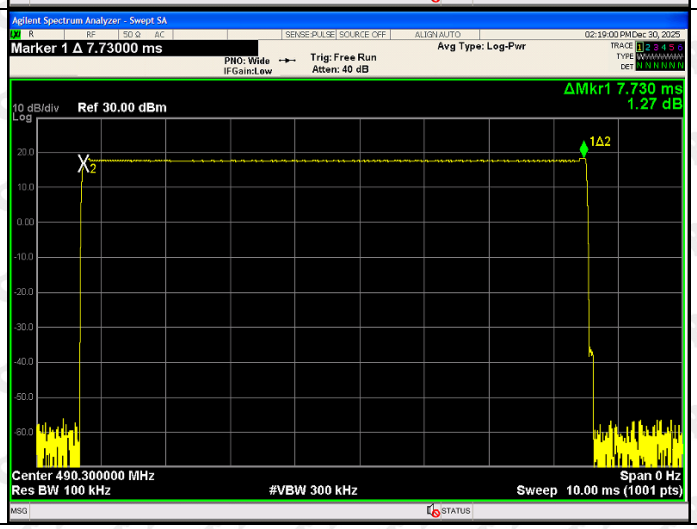
The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.
The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span at 100kHz resolution bandwidth.

470.93 MHz

Cycle		
Pulse		
On-time		

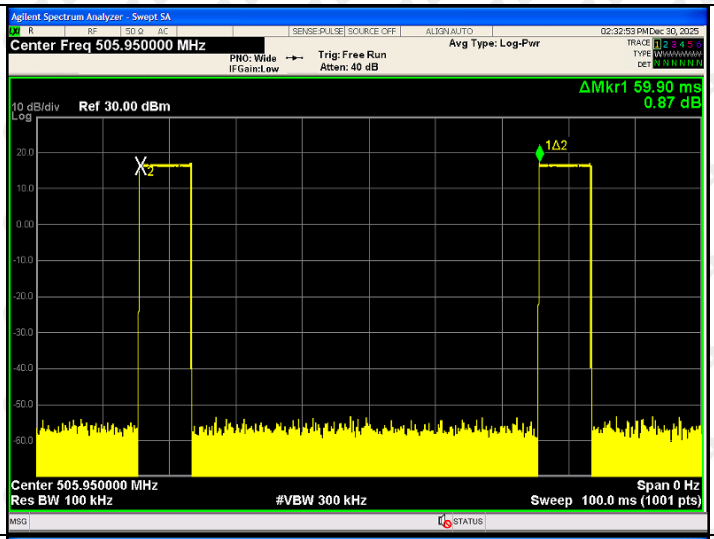
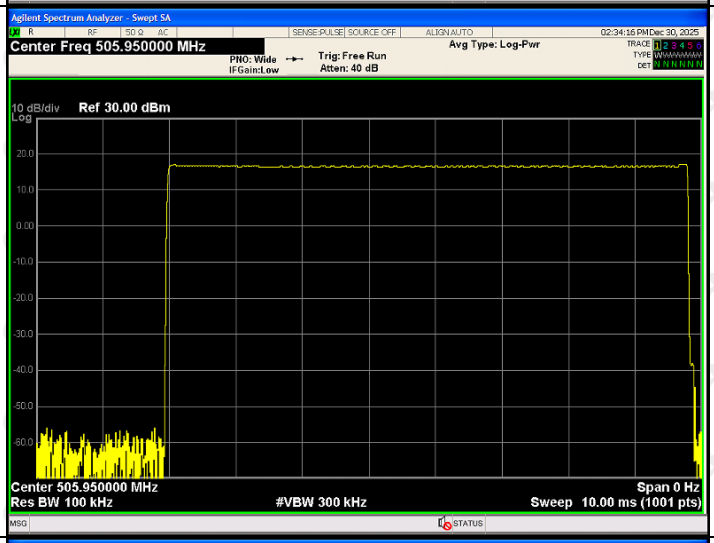
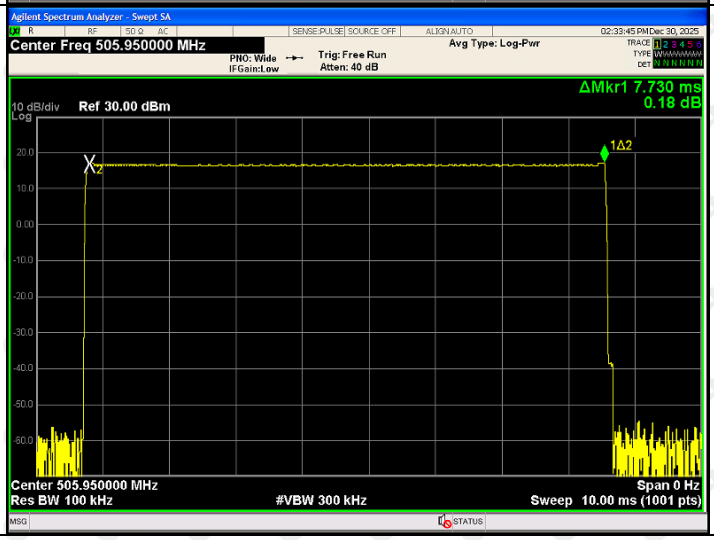
Average factor:	
Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20 log(Duty cycle)
	Duty cycle = T on time / 100ms
Calculated average factor:	Ton time =7.770(ms); T period =60.00(ms)
	PDCF = 20 log(7.770/60.00)=-17.75dB

490.3 MHz

Cycle		
Pulse		
On-time		

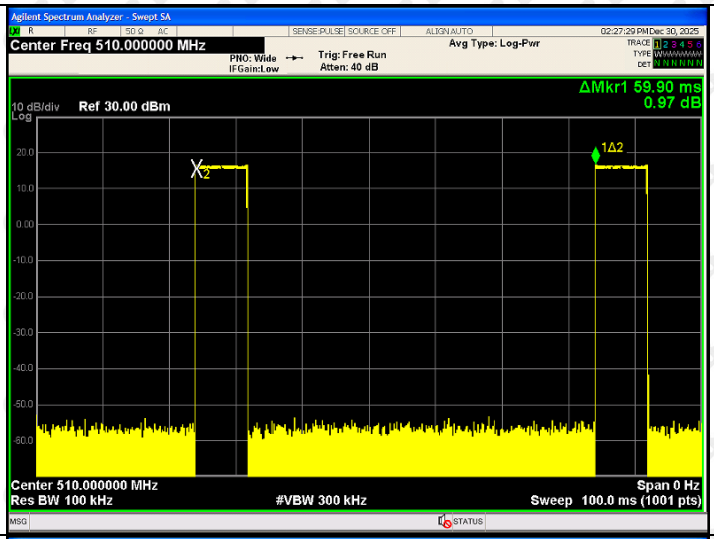
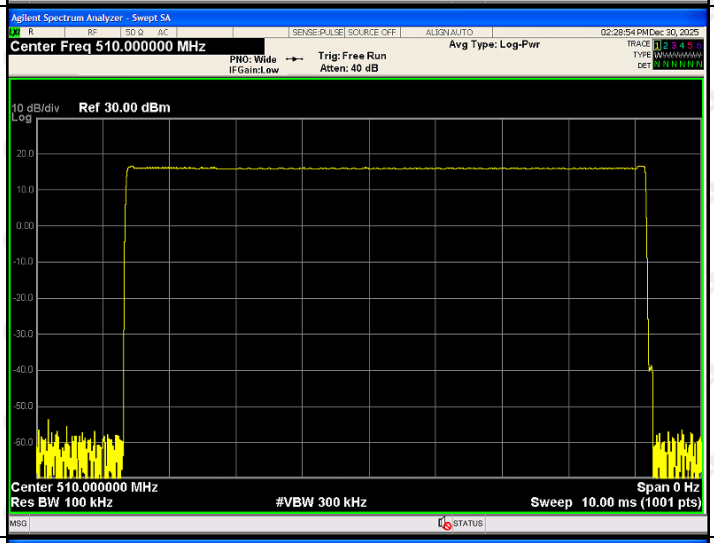
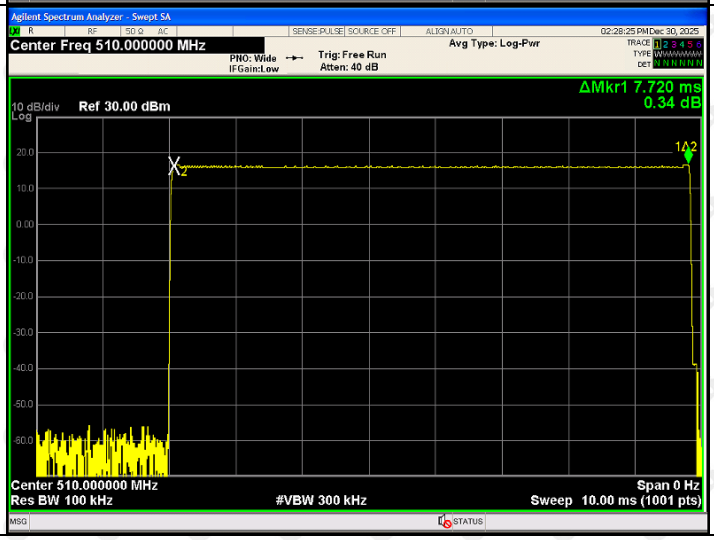
Average factor:	
Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20 log(Duty cycle)
	Duty cycle = T on time / 100ms
Calculated average factor:	Ton time =7.730(ms); T period =60.20(ms)
	PDCF = 20 log(7.730/60.20)=-17.83dB

505.95 MHz

Cycle		
Pulse		
On-time		

Average factor:	
Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20 log(Duty cycle)
	Duty cycle = T on time / 100ms
Calculated average factor:	Ton time =7.730(ms); T period =60.00(ms)
	PDCF = 20 log(7.730/59.90)=-17.78dB

510MHz

Cycle		
Pulse		
On-time		

Average factor:	
Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20 log(Duty cycle)
	Duty cycle = T on time / 100ms
Calculated average factor:	Ton time =7.720(ms); T period =59.90(ms)
	PDCF = 20 log(7.720/59.90)=-17.80dB

Radiated Spurious Emission Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
--	--	--
--	--	--
--	--	--
--	--	--

Note: *1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor*

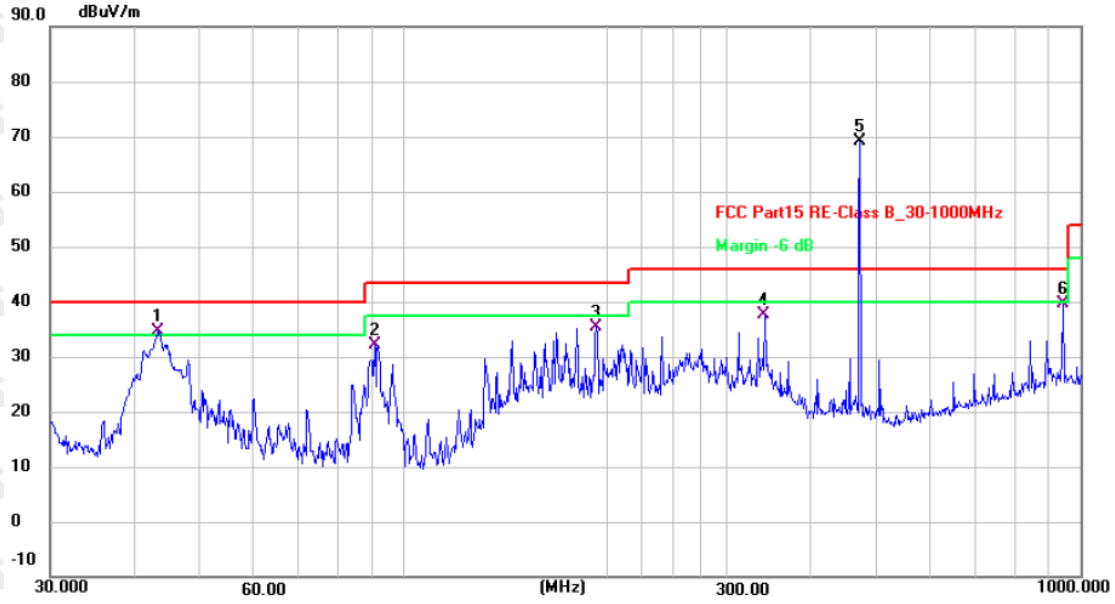
2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

470.93MHz:

About 30MHz-1GHz

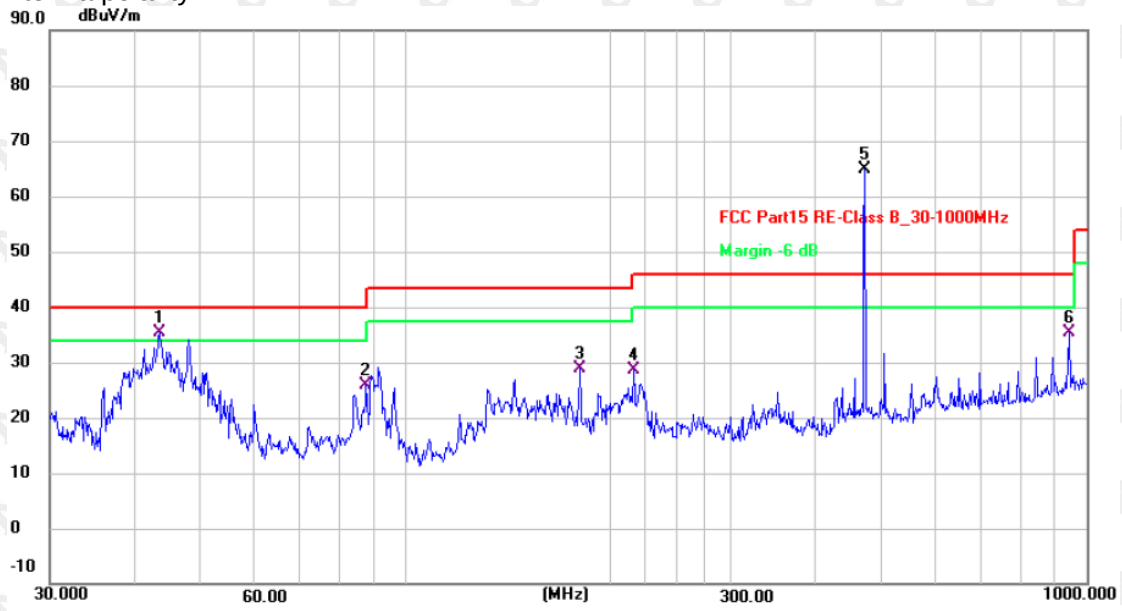
Test Results:

Antenna polarity: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 !	43.3534	47.83	-13.10	34.73	40.00	-5.27	QP
2	90.5374	49.95	-17.72	32.23	43.50	-11.27	QP
3	192.4182	50.83	-15.55	35.28	43.50	-8.22	QP
4	341.9786	48.90	-11.38	37.52	46.00	-8.48	QP
5 *	472.1760	77.67	-8.62	69.05	101.94	-32.89	peak
6	942.1304	39.93	-0.20	39.73	81.94	-42.21	QP

Antenna polarity: V

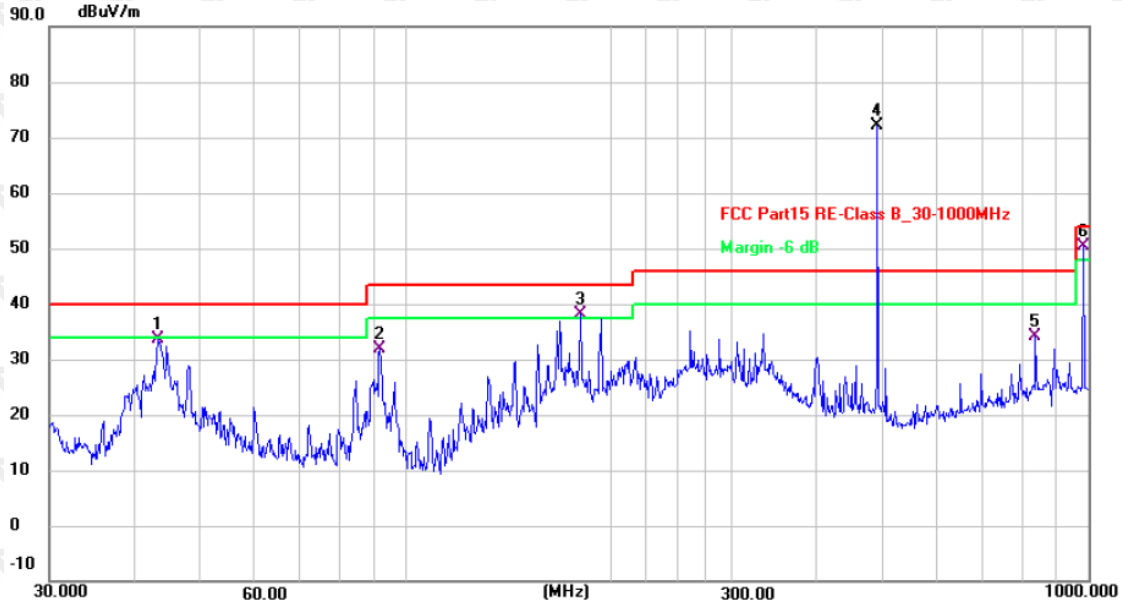


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 !	43.5056	48.53	-13.11	35.42	40.00	-4.58	QP
2	87.4175	43.48	-17.48	26.00	40.00	-14.00	QP
3	180.0164	43.32	-14.43	28.89	43.50	-14.61	QP
4	216.0240	43.74	-15.19	28.55	46.00	-17.45	QP
5 *	472.1760	73.40	-8.62	64.78	101.94	-37.16	peak
6	942.1304	35.58	-0.20	35.38	81.94	-46.56	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

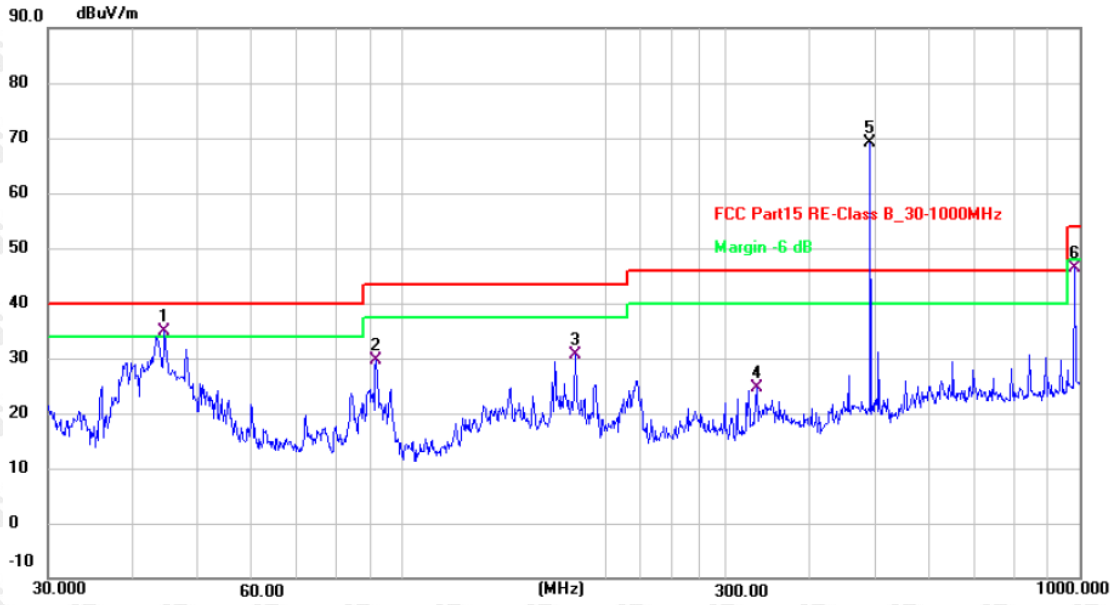
490.3MHz:

Antenna polarity: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	43.3534	46.85	-13.10	33.75	40.00	-6.25	QP
2	91.4946	49.59	-17.74	31.85	43.50	-11.65	QP
3 !	180.0164	52.61	-14.43	38.18	43.50	-5.32	QP
4 *	490.7445	80.32	-8.19	72.13	101.94	-29.81	peak
5	836.2441	35.91	-1.68	34.23	46.00	-11.77	QP
6 !	982.6200	49.94	0.38	50.32	81.94	-31.62	QP

Antenna polarity: V

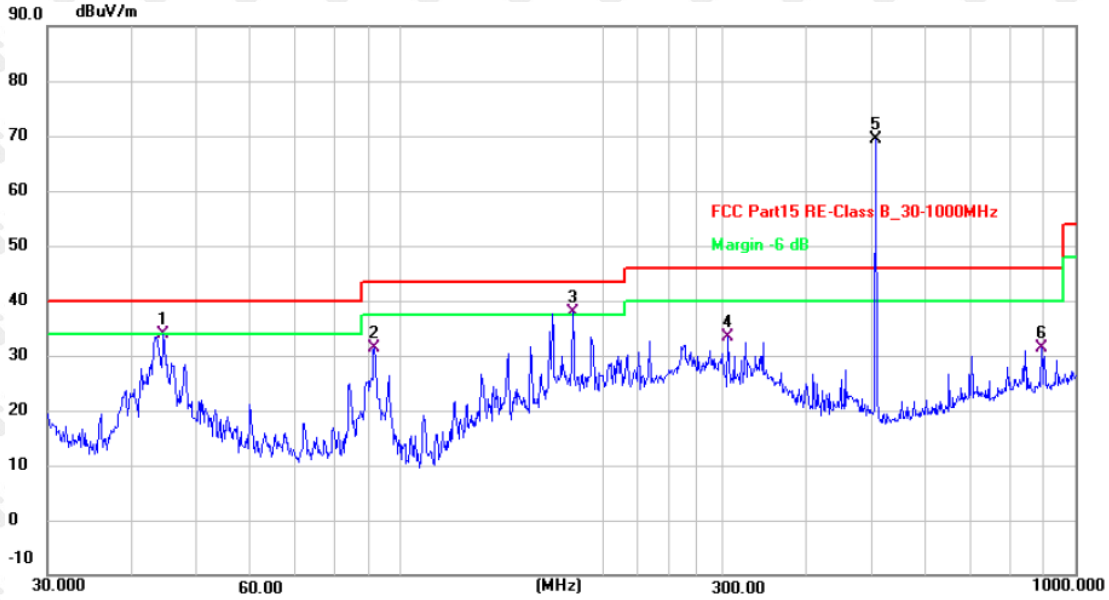


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 !	44.5867	48.00	-13.11	34.89	40.00	-5.11	QP
2	91.4946	47.27	-17.74	29.53	43.50	-13.97	QP
3	180.0164	44.99	-14.43	30.56	43.50	-12.94	QP
4	333.6865	36.19	-11.54	24.65	46.00	-21.35	QP
5 *	490.7445	77.40	-8.19	69.21	101.94	-32.73	peak
6	982.6200	46.08	0.38	46.46	81.94	-35.48	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

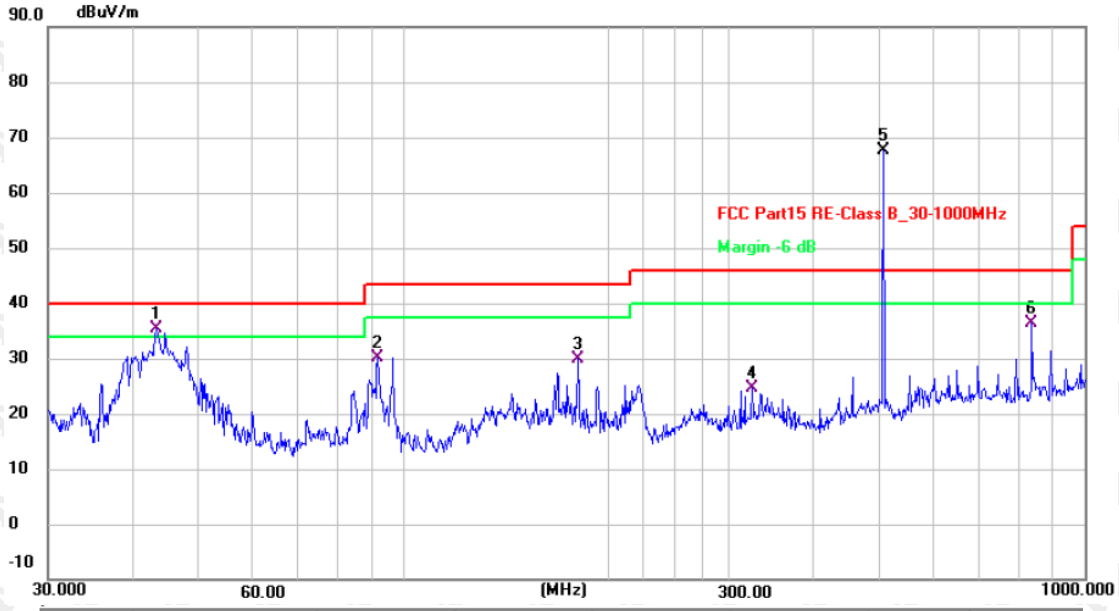
505.95MHz:

Antenna polarity: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	44.5867	47.08	-13.11	33.97	40.00	-6.03	QP
2	91.4946	49.11	-17.74	31.37	43.50	-12.13	QP
3 !	180.0164	52.23	-14.43	37.80	43.50	-5.70	QP
4	305.6800	45.36	-12.05	33.31	46.00	-12.69	QP
5 *	506.4790	77.11	-7.80	69.31	101.94	-32.63	peak
6	890.7277	32.25	-0.91	31.34	46.00	-14.66	QP

Antenna polarity: V

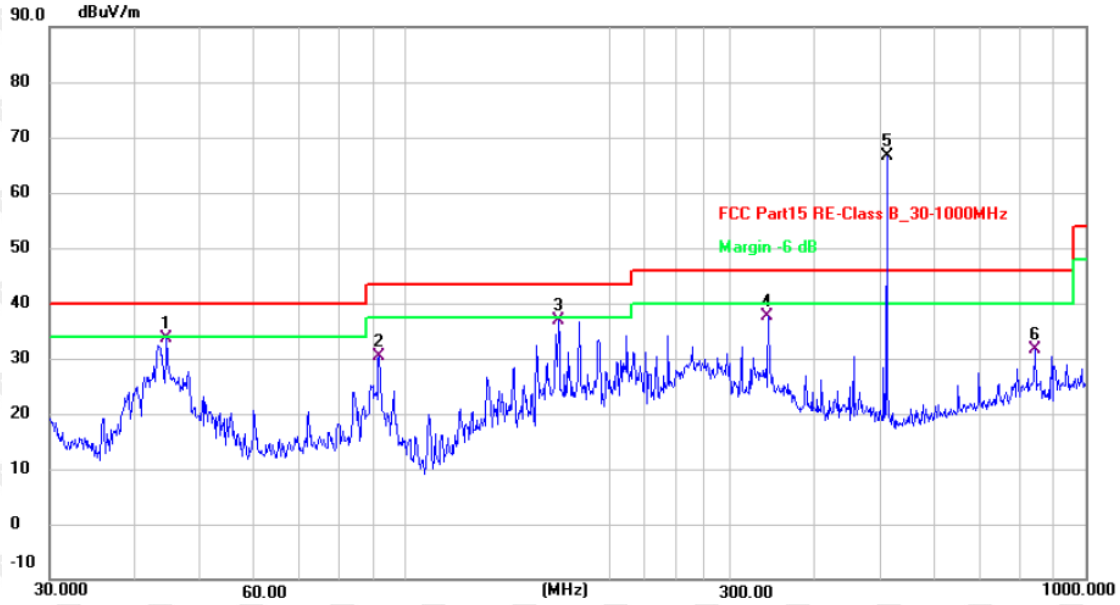


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 !	43.3534	48.54	-13.10	35.44	40.00	-4.56	QP
2	91.4946	47.99	-17.74	30.25	43.50	-13.25	QP
3	180.0164	44.19	-14.43	29.76	43.50	-13.74	QP
4	324.4560	36.38	-11.70	24.68	46.00	-21.32	QP
5 *	506.4790	75.37	-7.80	67.57	101.94	-34.37	peak
6	836.2441	37.97	-1.68	36.29	46.00	-9.71	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

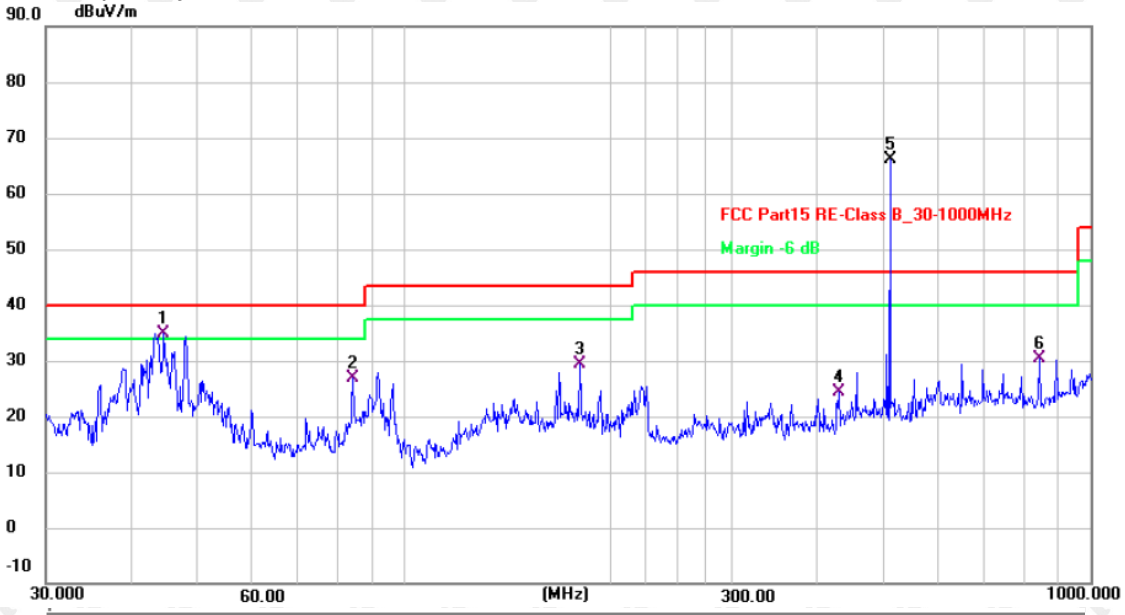
510MHz:

Antenna polarity: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	44.5867	46.70	-13.11	33.59	40.00	-6.41	QP
2	91.4946	48.19	-17.74	30.45	43.50	-13.05	QP
3	167.8240	49.70	-12.72	36.98	43.50	-6.52	QP
4	341.9786	49.01	-11.38	37.63	46.00	-8.37	QP
5 *	510.0434	74.40	-7.72	66.68	101.94	-35.26	peak
6	842.1295	33.14	-1.59	31.55	46.00	-14.45	QP

Antenna polarity: V



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 !	44.5867	48.07	-13.11	34.96	40.00	-5.04	QP
2	84.1100	43.98	-17.19	26.79	40.00	-13.21	QP
3	180.0164	43.93	-14.43	29.50	43.50	-14.00	QP
4	429.5228	34.09	-9.62	24.47	46.00	-21.53	QP
5 *	510.0434	73.78	-7.72	66.06	101.94	-35.88	peak
6	842.1295	32.09	-1.59	30.50	46.00	-15.50	QP

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

For average Emission

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	AverageLe v el dBuV/m	Limit AV	Margin	Polarizatio n
472.18	69.05	-17.75	51.3	81.94	-30.64	Horizontal
490.74	72.13	-17.75	54.38	81.94	-27.56	Horizontal
506.48	69.31	-17.75	51.56	81.94	-30.38	Horizontal
510.04	66.68	-17.75	48.93	81.94	-33.01	Horizontal
942.13	39.73	-17.75	21.98	61.94	-39.96	Horizontal
982.62	50.32	-17.75	32.57	61.94	-29.37	Horizontal
472.18	64.78	-17.75	47.03	81.94	-34.91	Vertical
490.74	69.21	-17.75	51.46	81.94	-30.48	Vertical
506.48	67.57	-17.75	49.82	81.94	-32.12	Vertical
510.04	66.06	-17.75	48.31	81.94	-33.63	Vertical
942.13	35.38	-17.75	17.63	61.94	-44.31	Vertical
982.62	46.46	-17.75	28.71	61.94	-33.23	Vertical

Notes: Average emission Level = Peak Level + Duty cycle factor

Above 1GHz Test Results

470.93MHz

Frequenc y MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
1412.79	50.12	-17.75	32.37	81.94	61.94	-31.82	-29.57	Vertical
1883.72	48.03	-17.75	30.28	81.94	61.94	-33.91	-31.66	Vertical
2354.65	44.21	-17.75	26.46	81.94	61.94	-37.73	-35.48	Vertical
2825.58	41.42	-17.75	23.67	81.94	61.94	-40.52	-38.27	Vertical
3296.51	40.28	-17.75	22.53	81.94	61.94	-41.66	-39.41	Vertical
3767.44	41.20	-17.75	23.45	81.94	61.94	-40.74	-38.49	Vertical
1412.79	48.81	-17.75	31.06	81.94	61.94	-33.13	-30.88	Horizontal
1883.72	48.17	-17.75	30.42	81.94	61.94	-33.77	-31.52	Horizontal
2354.65	43.33	-17.75	25.58	81.94	61.94	-38.61	-36.36	Horizontal
2825.58	42.80	-17.75	25.05	81.94	61.94	-39.14	-36.89	Horizontal
3296.51	41.14	-17.75	23.39	81.94	61.94	-40.8	-38.55	Horizontal
3767.44	40.50	-17.75	22.75	81.94	61.94	-41.44	-39.19	Horizontal

Notes: Average emission Level = Peak Level + Duty cycle factor

490.3MHz

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
1470.9	49.51	-17.83	31.68	81.94	61.94	-30.26	-32.43	Vertical
1961.2	47.77	-17.83	29.94	81.94	61.94	-32.00	-34.17	Vertical
2451.5	42.10	-17.83	24.27	81.94	61.94	-37.67	-39.84	Vertical
2941.8	42.36	-17.83	24.53	81.94	61.94	-37.41	-39.58	Vertical
3432.1	41.80	-17.83	23.97	81.94	61.94	-37.97	-40.14	Vertical
3922.4	41.88	-17.83	24.05	81.94	61.94	-37.89	-40.06	Vertical
1470.9	50.77	-17.83	32.94	81.94	61.94	-29.00	-31.17	Horizontal
1961.2	47.18	-17.83	29.35	81.94	61.94	-32.59	-34.76	Horizontal
2451.5	42.77	-17.83	24.94	81.94	61.94	-37.00	-39.17	Horizontal
2941.8	42.88	-17.83	25.05	81.94	61.94	-36.89	-39.06	Horizontal
3432.1	41.95	-17.83	24.12	81.94	61.94	-37.82	-39.99	Horizontal
3922.4	40.38	-17.83	22.55	81.94	61.94	-39.39	-41.56	Horizontal

Notes: Average emission Level = Peak Level + Duty cycle factor

505.95MHz

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
1011.9	50.70	-17.78	32.92	81.94	61.94	-31.24	-29.02	Vertical
1517.85	47.84	-17.78	30.06	81.94	61.94	-34.1	-31.88	Vertical
2023.8	43.90	-17.78	26.12	81.94	61.94	-38.04	-35.82	Vertical
2529.75	43.53	-17.78	25.75	81.94	61.94	-38.41	-36.19	Vertical
3035.7	41.67	-17.78	23.89	81.94	61.94	-40.27	-38.05	Vertical
3541.65	41.30	-17.78	23.52	81.94	61.94	-40.64	-38.42	Vertical
1011.9	48.31	-17.78	30.53	81.94	61.94	-33.63	-31.41	Horizontal
1517.85	47.03	-17.78	29.25	81.94	61.94	-34.91	-32.69	Horizontal
2023.8	43.06	-17.78	25.28	81.94	61.94	-38.88	-36.66	Horizontal
2529.75	40.69	-17.78	22.91	81.94	61.94	-41.25	-39.03	Horizontal
3035.7	41.17	-17.78	23.39	81.94	61.94	-40.77	-38.55	Horizontal
3541.65	41.87	-17.78	24.09	81.94	61.94	-40.07	-37.85	Horizontal

Notes: Average emission Level = Peak Level + Duty cycle factor

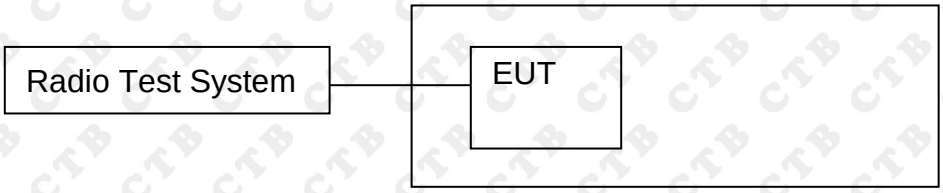
510MHz

Frequency MHz	Peak Level dBuV/m	Duty cycle factor	Average Level dBuV/m	Limit		Margin dB		Polarization
				PK	AV	PK	AV	
1020	49.66	-17.80	31.88	81.94	61.94	-32.28	-30.06	Vertical
1530	47.06	-17.80	29.28	81.94	61.94	-34.88	-32.66	Vertical
2040	44.11	-17.80	26.33	81.94	61.94	-37.83	-35.61	Vertical
2550	40.72	-17.80	22.94	81.94	61.94	-41.22	-39.00	Vertical
3060	41.14	-17.80	23.36	81.94	61.94	-40.8	-38.58	Vertical
3570	41.94	-17.80	24.16	81.94	61.94	-40.00	-37.78	Vertical
1020	49.52	-17.80	31.74	81.94	61.94	-32.42	-30.2	Horizontal
1530	46.10	-17.80	28.32	81.94	61.94	-35.84	-33.62	Horizontal
2040	42.64	-17.80	24.86	81.94	61.94	-39.3	-37.08	Horizontal
2550	39.63	-17.80	21.85	81.94	61.94	-42.31	-40.09	Horizontal
3060	41.97	-17.80	24.19	81.94	61.94	-39.97	-37.75	Horizontal
3570	40.95	-17.80	23.17	81.94	61.94	-40.99	-38.77	Horizontal

Notes: Average emission Level = Peak Level + Duty cycle factor

8. DWELL TIME

8.1 Block Diagram Of Test Setup



8.2 Limit

According to FCC 15.231(a) requirement:
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

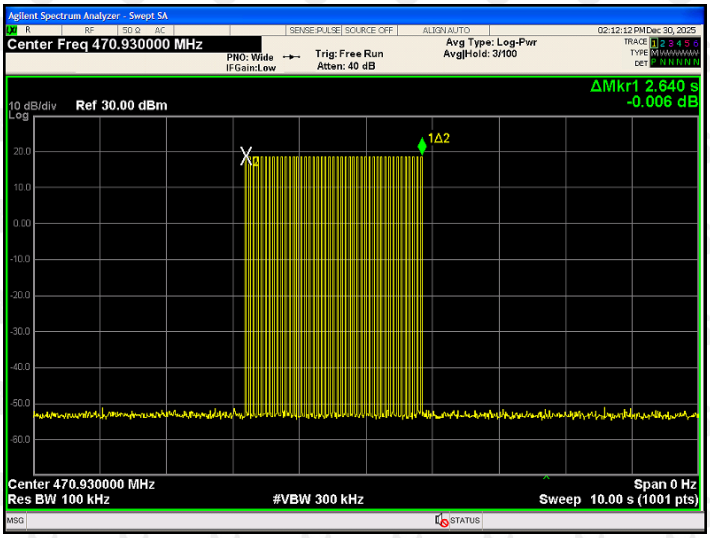
8.3 Test procedure

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
e) Repeat above procedures until all measured frequencies were complete.

8.4 Test Result

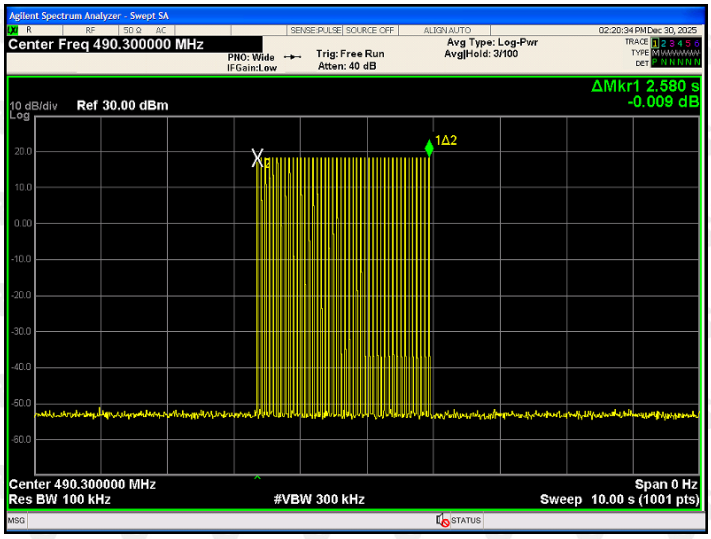
470.93MHz

Transmitting time(S)	Limit (S)	Results
2.640	≤5	Pass



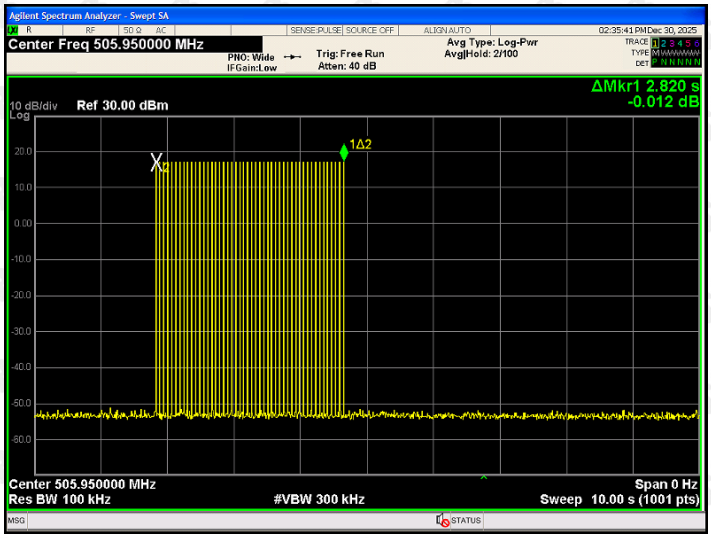
490.3MHz

Transmitting time(S)	Limit (S)	Results
2.580	≤5	Pass



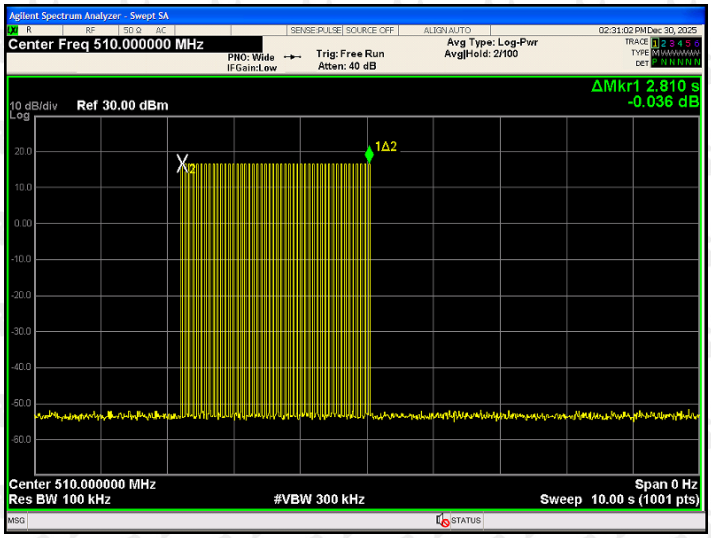
505.95MHz

Transmitting time(S)	Limit (S)	Results
2.820	≤5	Pass



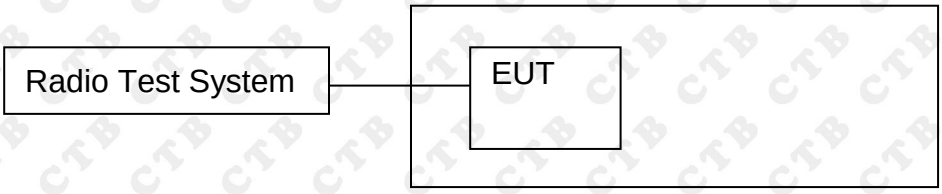
510MHz

Transmitting time(S)	Limit (S)	Results
2.810	≤5	Pass



9. OCCUPIED BANDWIDTH

9.1 Block Diagram Of Test Setup



9.2 Limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
B.W (20dBc) Limit = 0.25% * f(MHz) = 0.25% * 470.93MHz = 1.1773MHz
B.W (20dBc) Limit = 0.25% * f(MHz) = 0.25% * 490.3MHz = 1.2258MHz
B.W (20dBc) Limit = 0.25% * f(MHz) = 0.25% * 505.95MHz = 1.2649MHz
B.W (20dBc) Limit = 0.25% * f(MHz) = 0.25% * 510MHz = 1.2750MHz

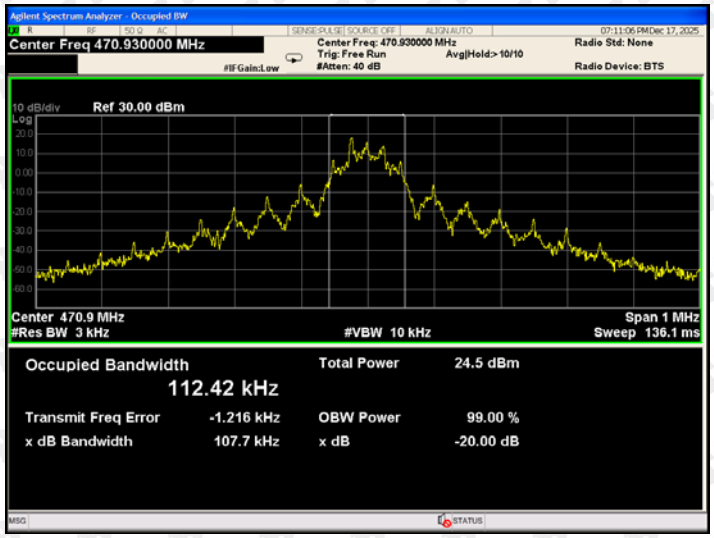
9.3 Test procedure

1. Set RBW = 10 kHz.
2. Set the video bandwidth (VBW) ≥RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

9.4 Test Result

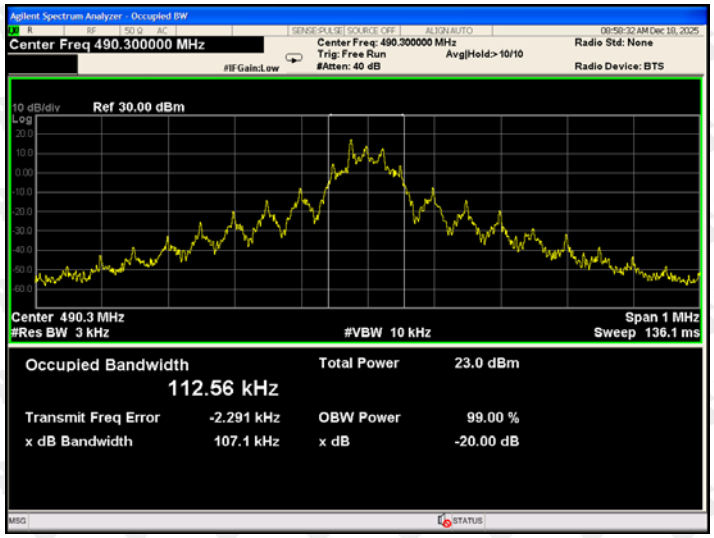
470.93MHz

20dB bandwidth (kHz)	Limit (MHz)	Results
107.7	1.1773	Pass



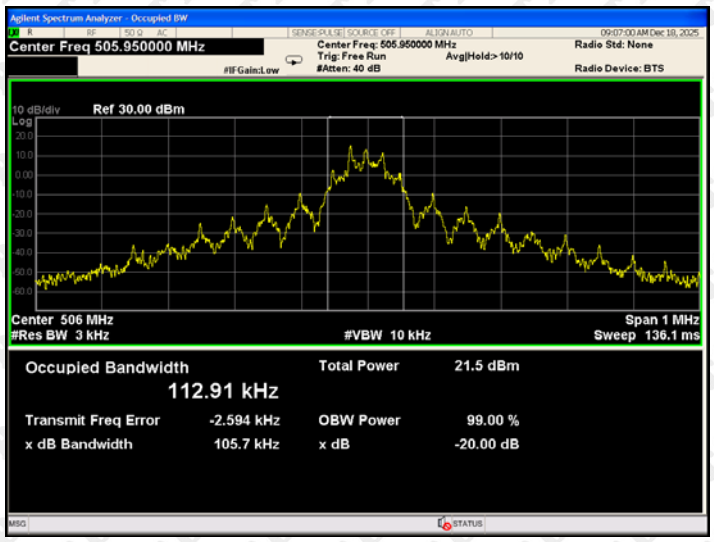
490.3MHz

20dB bandwidth (kHz)	Limit (MHz)	Results
107.1	1.2258	Pass



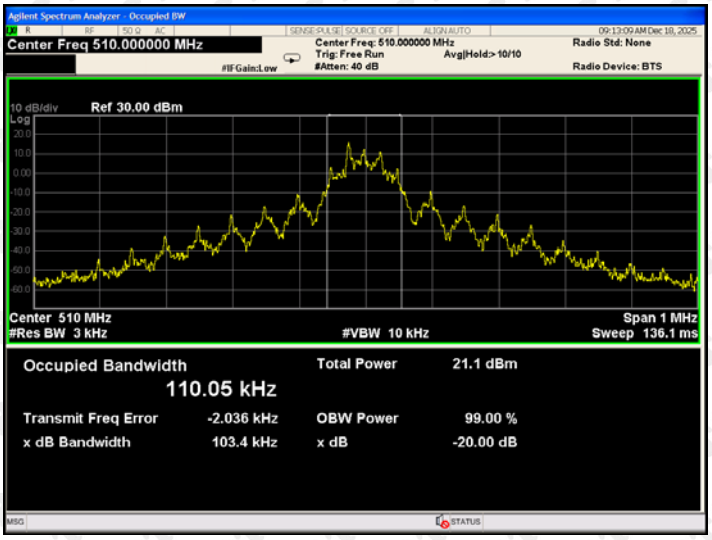
505.95MHz

20dB bandwidth (kHz)	Limit (MHz)	Results
105.7	1.2649	Pass



510MHz

20dB bandwidth (kHz)	Limit (MHz)	Results
103.4	1.2750	Pass



10. ANTENNA REQUIREMENT

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.

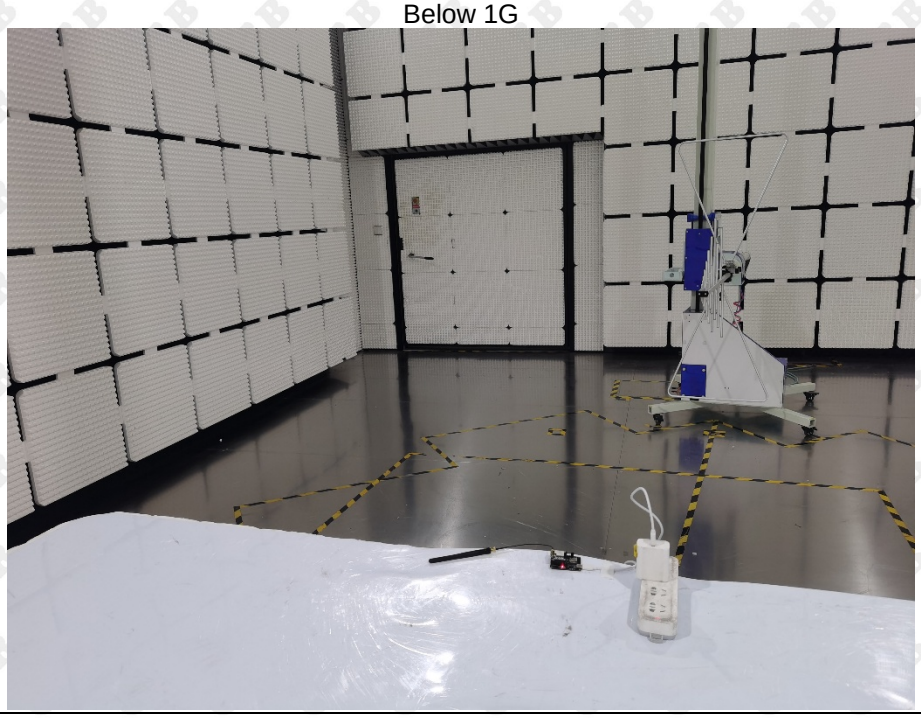
EUT Antenna:

The antenna is External antenna and no consideration of replacement. The best case gain of the antenna is 1.0dBi.

11. EUT TEST SETUP PHOTOGRAPHS

Radiated Emissions

Below 1G



Above 1G

Conducted emission

※※※※※ **END OF REPORT** ※※※※※