FCC Part 15C TEST REPORT

FCC ID: 2BKB3-A51PROA512

IC:33206-A51PROA512

Product	:	**AT-S510, AT-S512W**
Model Name	:	**A51 PRO, A512**
Brand	:	**Hiwill**
Report No.	:	**NCT24052599-2**

Prepared for

Hiwill Intelligent Technology (Dongguan) Co., Ltd

603, No. 5 Lucheng West Road, Qingxi Town, Dongguan City, Guangdong Province, China.

Prepared by

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1 TEST RESULT CERTIFICATION

Applicant's name	:	Hiwill Intelligent Technology (Dongguan) Co., Ltd
Address	:	603, No. 5 Lucheng West Road, Qingxi Town, Dongguan City, Guangdong Province, China.
Manufacture's name	:	Hiwill Intelligent Technology (Dongguan) Co., Ltd
Address	:	603, No. 5 Lucheng West Road, Qingxi Town, Dongguan City, Guangdong Province, China.
Product name	:	AT-S510, AT-S512W
Model name	:	A51 PRO, A512
Additional model	:	N/A
Standards	:	FCC CFR Title 47 Part 15 Subpart C Section 15.407 RSS-247 Issue 3: August 2023
Test procedure	:	ANSI C63.10:2013 RSS-GEN Issue5, Amendment 2, February,2021
Test Date	:	Nov. 28, 2024 to Dec. 30, 2024
Date of Issue	:	Dec. 30, 2024
Test Result	:	Pass

This device described above has been tested by NCT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Test Engineer:

Keven Wu / Engineer

Technical Manager:

Henry Wang / Manager

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2 Test Summary

Test Items	Test Requirement	Result
FCC part 15.203 RSS-Gen 6.8	Antenna requirement	PASS
FCC part 15.207 RSS-Gen 8.8	AC Power Line Conducted Emission	PASS
FCC part 15.407 (a) RSS-247 Section 6.2.4.2 RSS-247 Section 6.2.5.2	Conducted Peak Output Power & EIRP	PASS
FCC part 15.407 (e) RSS-Gen.6.7	6dB Bandwidth& 99% OCB	PASS
FCC part 15.407 (a) RSS-247 Section 6.2.4.2	Power Spectral Density	PASS
FCC part 15.407(b) RSS-247 Section 6.2.4.3 RSS-Gen 8.10	Conducted Bandedge	PASS
FCC part 15.407(b)/15.209 RSS-247 Section 6.2.4.3 RSS-Gen 8.9	Radiated Emission and Restricted Bands	PASS

Remark:

1. “N/A” denotes test is not applicable in this Test Report.

3 TEST FACILITY

Site Description

EMC Lab. : Accredited by CNAS, 2022-09-27

The certificate is valid until 2028.01.07

The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)

The Certificate Registration Number is L8251

Designation Number: CN1347

Test Firm Registration Number: 894804

Accredited by A2LA, June 14, 2023

The Certificate Registration Number is 6837.01

Accredited by Industry Canada, November 09, 2018

The Conformity Assessment Body Identifier is CN0150

Company Number: 30806

Name of Firm : Shenzhen NCT Testing Technology Co., Ltd.

Site Location : A101&2F B2, Fuqiao 6th Area, Xintian Community, Fuhai Street, Baoan District, Shenzhen, People's Republic of China

4 General Information

4.1 General Description of E.U.T.

Product Name	:	AT-S510, AT-S512W
Model Name	:	A51 PRO, A512
Sample ID	:	A51 PRO:241209202 A512:241203077
Sample(s) Status:	:	Engineer sample
Additional model	:	N/A
Model difference	:	All the models are electrical identical including the same (i.e., circuit design, PCB Layout, RF module/circuit, antenna type(s) and antenna location, components on PCB.), The difference are that the model name, product enclosure. are different.
Operating frequency	:	5726-5850MHz
Numbers of Channel	:	32 channels
Antenna Type	:	PCB Antenna
Antenna Gain	:	4.24dBi
Type of Modulation	:	FSK
Power supply	:	DC 24V/2.85A from Adapter
Hardware Version	:	A51Pro_SPA300_V05, A512_SPA300_V09
Software Version	:	A51Pro_SPA300_V05, A512_SPA300_V09
Adapter Information	:	Manufacturer:Guangdong Tiantongjiuheng Technology Co.,Ltd Model:TJ07201W2402850US Input:100-240V ~ 50/60Hz 1.5A MAX Output:DC 24V/2850mA
Remark：the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.		

4.2 Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5726	9	5758	17	5790	25	5822
2	5730	10	5762	18	5794	26	5826
3	5734	11	5766	19	5798	27	5830
4	5738	12	5770	20	5802	28	5834
5	5742	13	5774	21	5806	29	5838
6	5746	14	5778	22	5810	30	5842
7	5750	15	5782	23	5814	31	5846
8	5754	16	5786	24	5818	32	5850

4.3 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

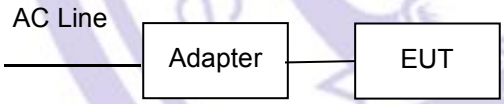
Pretest Mode	Description	
Mode 1	CH01	FSK
Mode 2	CH16	
Mode 3	CH32	
For Conducted & Radiated Emission		
Final Test Mode	Description	
Mode 1	CH01	FSK
Mode 2	CH16	
Mode 3	CH32	

Note:

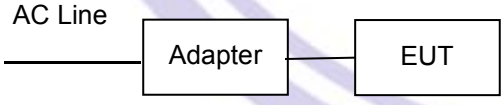
(1) The measurements are performed at the highest, middle, lowest available channels.

4.4 Test Setup Configuration

Conducted Emission



Radiated Emission



Conducted Spurious

4.5 Test Mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, 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.	

Test Software	wn_audio_mptool.exe
Power level setup	0dBm

5 Equipment During Test

5.1 Equipments List

Conducted emission Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	944 Room	/	EMToni	2022/5/31	2025/5/30
EMI Test Receiver	ESPI	101604	Rohde & Schwarz	2024/6/17	2025/6/16
LISN	ENV 216	102796	Rohde & Schwarz	2024/6/17	2025/6/16
LISN	VN1-13S	004023	CRANAGE	2024/6/17	2025/6/16
Cable	RG223-1500MM	NA	RG	2024/6/17	2025/6/16

Radiated emission & Radio Frequency Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2022/5/31	2025/5/30
EMI Test Receiver	ESCI	101178	Rohde & Schwarz	2024/6/17	2025/6/16
Spectrum Analyze（10Hz-26.5GHz）	N9020A	MY50510202	Agilent	2024/6/17	2025/6/16
Amplifi（30MHz-1GHz）	BBV 9743 B	00374	SCHNARZBECK	2024/6/17	2025/6/16
Bilog Antenna（30MHz-1GHz）	VULB9162	00473	SCHNARZBECK	2023/3/19	2025/3/18
Horn antenna（1GHz-18GHz）	BBHA 9120 D	02622	SCHNARZBECK	2023/3/19	2025/3/18
Pream plifier（1GHz-18GHz）	BBV 9718D	0024	SCHNARZBECK	2024/6/17	2025/6/16
Spectrum Analyze（1GHz-40GHz）	FSV 40	100952	Rohde & Schwarz	2024/6/17	2025/6/16
Pream plifier（15GHz-40GHz）	BBV 9718D	0024	SCHNARZBECK	2024/6/17	2025/6/16
Broadband Antenna（15GHz-40GHz）	SAS-574	588	A.H.System	2023/3/19	2025/3/18
Loop Antenna (9KHz-30MHz)	FMZB1519B	014	SCHNARZBECK	2024/6/20	2025/6/19

Amplifier (9KHz-30MHz)	CVP 9222 C	00109	SCHNARZBECK	2024/6/18	2025/6/17
MXG Signal Analyzer	N9020A	101178	RS	2024/6/17	2025/6/16
MXG Vector Signal Generator	N5182A	MY50510202	Agilent	2024/6/17	2025/6/16
MXG Analog Signal Generator	N5181A	00374	SCHWARZBECK	2024/6/17	2025/6/16
Power Sensor	TR1029-2	00473	SCHNARZBECK	2024/6/17	2025/6/16
RF Swith	TR1029-1	02622	SCHNARZBECK	2024/6/17	2025/6/16
Cable	DA800-4000MM	NA	DA	2024/6/17	2025/6/16
Cable	DA800-11000MM	NA	DA	2024/6/17	2025/6/16

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	AUDIX	e3	6.120718
2	EMC radiation test system	AUDIX	e3	6.120718
3	RF test system	TACHOY	RFTest	V1.0.0
4	RF communication test system	TACHOY	RFTest	V1.0.0

5.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Conducted spurious emission	±2.76dB
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB

5.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	AT-S510, AT-S512W	Hiwill	A51 PRO, A512	N/A	EUT
E-2	Notebook	lenovo	B40-80	MP07F6JD	Auxiliary

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

6 Conducted Emission

Test Requirement:	:	FCC CFR 47 Part 15 Section 15.207 & RSS-Gen 8.8
Test Method:	:	ANSI C63.10:2013
Test Result:	:	PASS
Frequency Range:	:	150kHz to 30MHz
Class/Severity:	:	Class B
Detector:	:	Peak for pre-scan (9kHz Resolution Bandwidth)

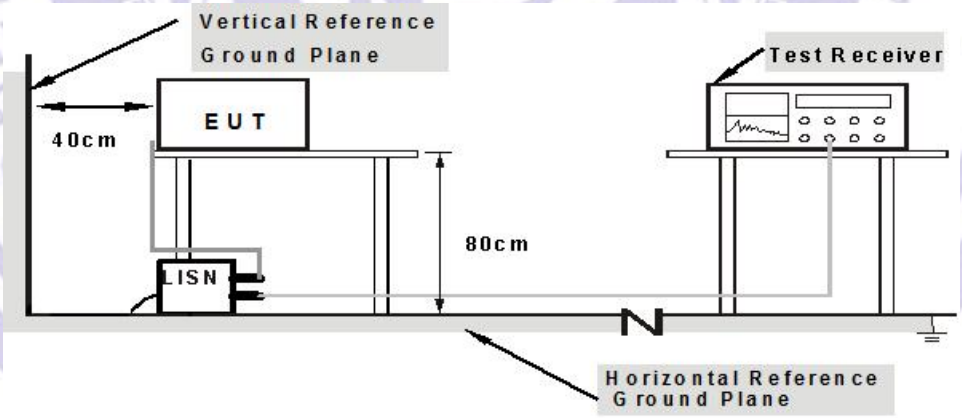
6.1 E.U.T. Operation

Operating Environment **:**

Temperature:	:	23.2°C
Humidity:	:	51 % RH
Atmospheric Pressure:	:	101.12 kPa
Test Voltage	:	AC 120V/60Hz

6.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10: 2013



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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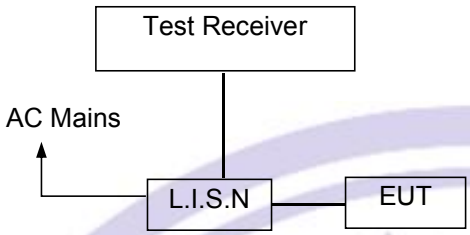
6.3 Test SET-UP (Block Diagram of Configuration)



6.4 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

6.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2.The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

6.6 Measurement Description

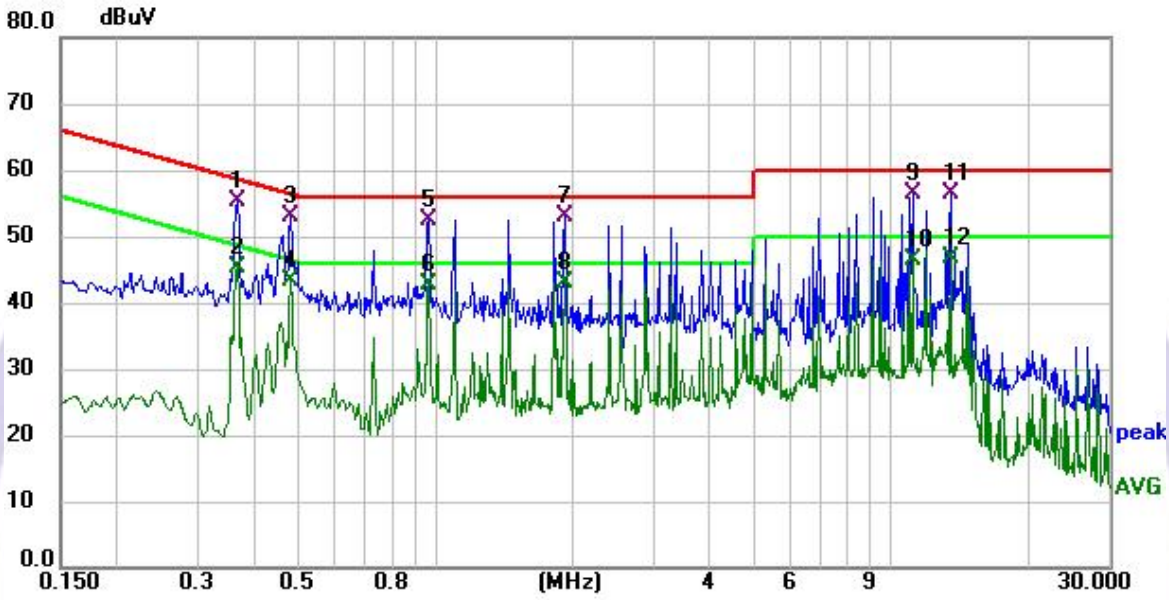
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.7 Conducted Emission Test Result

Pass

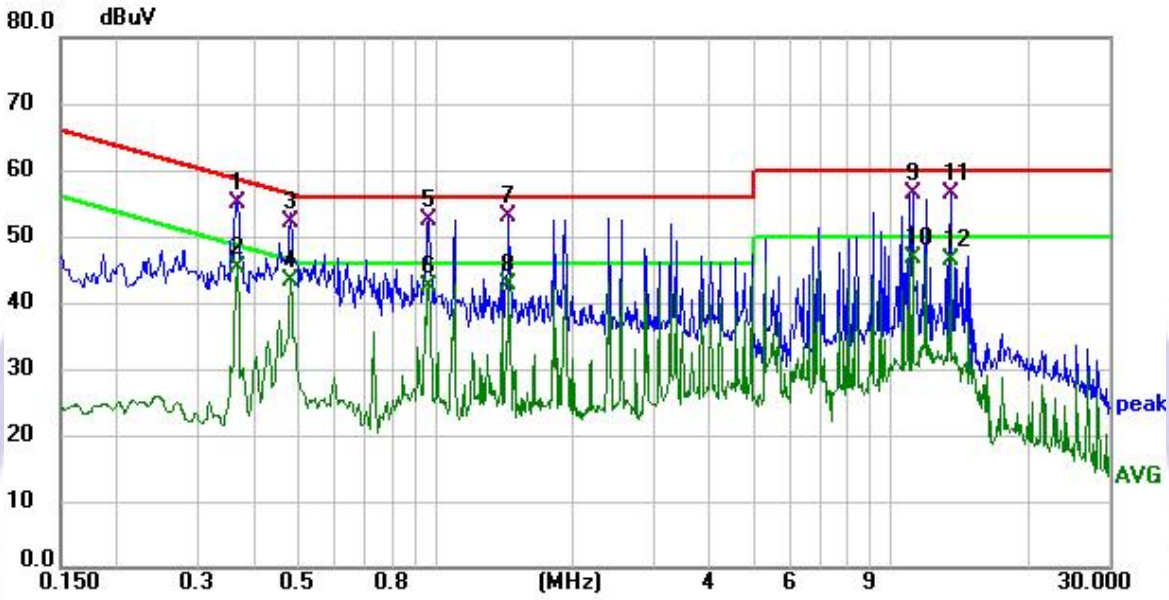
Conducted emission at both 120V & 240V is assessed, and emission at 120V represents the worst case. All the modulation modes were tested the data of the worst mode (FSK) are recorded in the following pages and the others modulation methods do not exceed the limits.

Channel:	Low	Phase :	L
Model:	A51 PRO		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.366	44.40	10.81	55.21	58.59	-3.38	QP	P
2	0.366	34.57	10.81	45.38	48.59	-3.21	AVG	P
3	0.480	42.33	10.65	52.98	56.34	-3.36	QP	P
4	0.480	32.61	10.65	43.26	46.34	-3.08	AVG	P
5	0.964	41.31	11.06	52.37	56.00	-3.63	QP	P
6	0.964	31.63	11.06	42.69	46.00	-3.31	AVG	P
7	1.927	41.86	11.01	52.87	56.00	-3.13	QP	P
8 *	1.927	31.98	11.01	42.99	46.00	-3.01	AVG	P
9	11.140	45.41	11.08	56.49	60.00	-3.51	QP	P
10	11.140	35.42	11.08	46.50	50.00	-3.50	AVG	P
11	13.520	45.11	11.28	56.39	60.00	-3.61	QP	P
12	13.520	35.57	11.28	46.85	50.00	-3.15	AVG	P

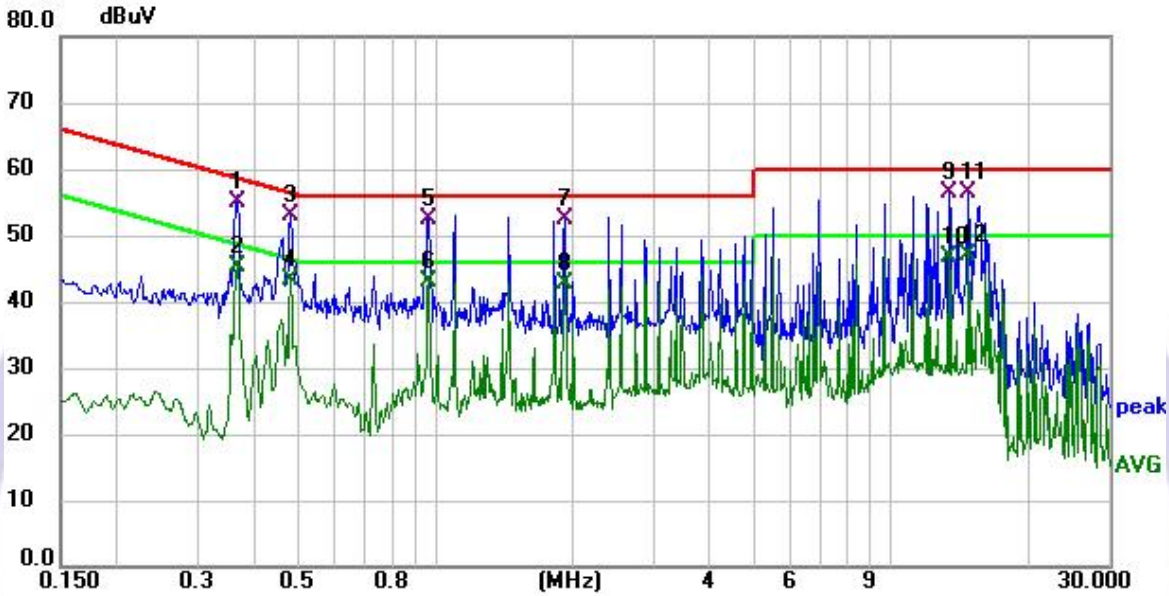
Channel:	High	Phase :	N
Model:	A51 PRO		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.366	44.21	10.81	55.02	58.59	-3.57	QP	P
2	0.366	34.44	10.81	45.25	48.59	-3.34	AVG	P
3	0.480	41.46	10.68	52.14	56.34	-4.20	QP	P
4 *	0.480	32.62	10.68	43.30	46.34	-3.04	AVG	P
5	0.964	41.34	11.05	52.39	56.00	-3.61	QP	P
6	0.964	31.52	11.05	42.57	46.00	-3.43	AVG	P
7	1.441	41.84	11.09	52.93	56.00	-3.07	QP	P
8	1.441	31.54	11.09	42.63	46.00	-3.37	AVG	P
9	11.140	45.32	11.05	56.37	60.00	-3.63	QP	P
10	11.140	35.75	11.05	46.80	50.00	-3.20	AVG	P
11	13.520	45.16	11.25	56.41	60.00	-3.59	QP	P
12	13.520	35.17	11.25	46.42	50.00	-3.58	AVG	P

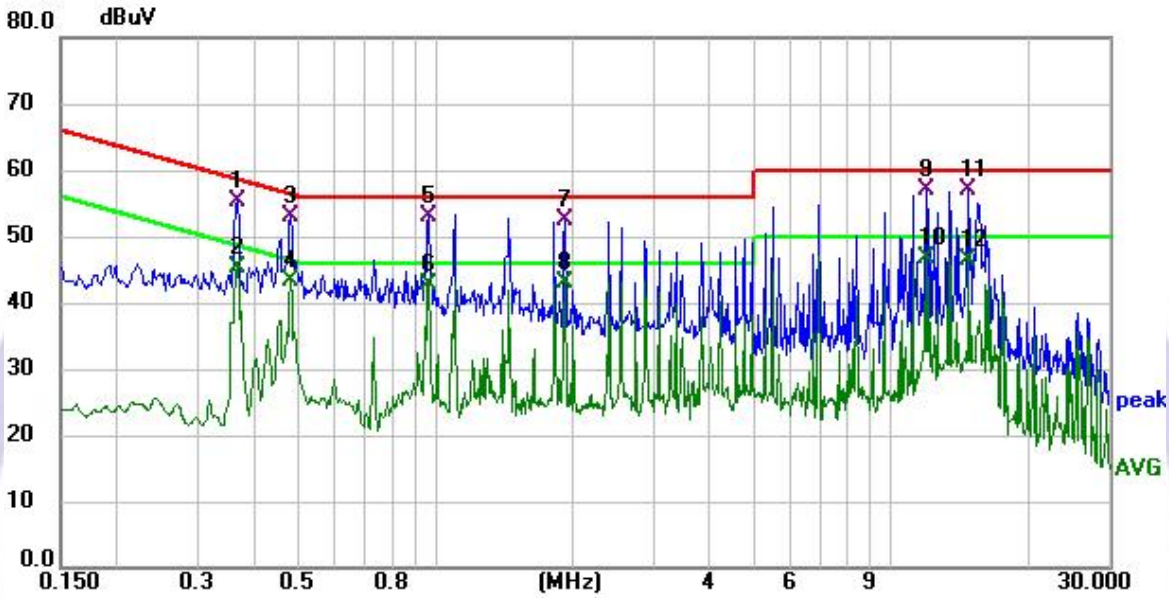
Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

Channel:	Low	Phase :	L
Model:	A512		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.366	44.15	10.81	54.96	58.59	-3.63	QP	P
2	0.366	34.60	10.81	45.41	48.59	-3.18	AVG	P
3	0.480	42.49	10.65	53.14	56.34	-3.20	QP	P
4 *	0.480	32.61	10.65	43.26	46.34	-3.08	AVG	P
5	0.964	41.33	11.06	52.39	56.00	-3.61	QP	P
6	0.964	31.83	11.06	42.89	46.00	-3.11	AVG	P
7	1.927	41.36	11.01	52.37	56.00	-3.63	QP	P
8	1.927	31.77	11.01	42.78	46.00	-3.22	AVG	P
9	13.340	45.20	11.27	56.47	60.00	-3.53	QP	P
10	13.340	35.46	11.27	46.73	50.00	-3.27	AVG	P
11	14.800	45.01	11.38	56.39	60.00	-3.61	QP	P
12	14.800	35.51	11.38	46.89	50.00	-3.11	AVG	P

Channel:	Low	Phase :	N
Model:	A512		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.366	44.51	10.81	55.32	58.59	-3.27	QP	P
2	0.366	34.40	10.81	45.21	48.59	-3.38	AVG	P
3	0.480	42.44	10.68	53.12	56.34	-3.22	QP	P
4	0.480	32.57	10.68	43.25	46.34	-3.09	AVG	P
5	0.964	41.84	11.05	52.89	56.00	-3.11	QP	P
6	0.964	31.58	11.05	42.63	46.00	-3.37	AVG	P
7	1.927	41.28	11.03	52.31	56.00	-3.69	QP	P
8	1.927	31.83	11.03	42.86	46.00	-3.14	AVG	P
9 *	11.880	45.84	11.12	56.96	60.00	-3.04	QP	P
10	11.880	35.62	11.12	46.74	50.00	-3.26	AVG	P
11	14.800	45.53	11.36	56.89	60.00	-3.11	QP	P
12	14.800	35.17	11.36	46.53	50.00	-3.47	AVG	P

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.Mesurement Level = Reading level + Correct Factor

7 Radiated Spurious Emissions

Test Requirement	:	FCC part 15.407(b)/15.209 & RSS-247 Section 6.2.4.3 & RSS-Gen 8.9
Test Method	:	ANSI C63.10:2013
Test Result	:	PASS
Measurement Distance	:	3m
Limit	:	See the follow table

FCC

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))}$ + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))}$ + 40
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)}$ + 40
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

ISED

Frequency (MHz)	Magnetic field strength (H-Field) (μA/m)		Distance (m)
0.009 ~ 0.490	6.37/F(kHz)		300
0.490 ~ 1.705	63.7/F(kHz)		30
1.705 ~ 30	0.08		30
Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

7.1 EUT Operation

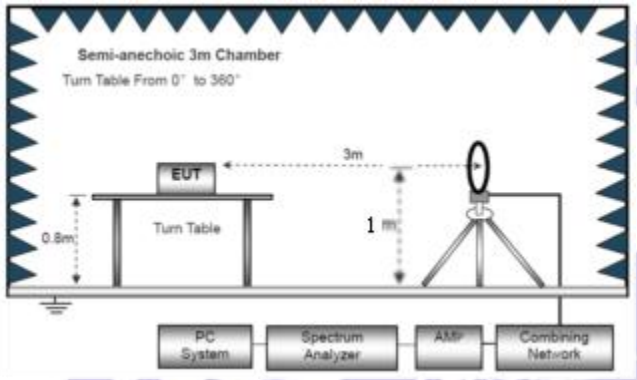
Operating Environment :

Temperature	:	24.5 °C
Humidity	:	55.5% RH
Atmospheric Pressure	:	101.3kPa
Test Voltage	:	AC 120V60Hz

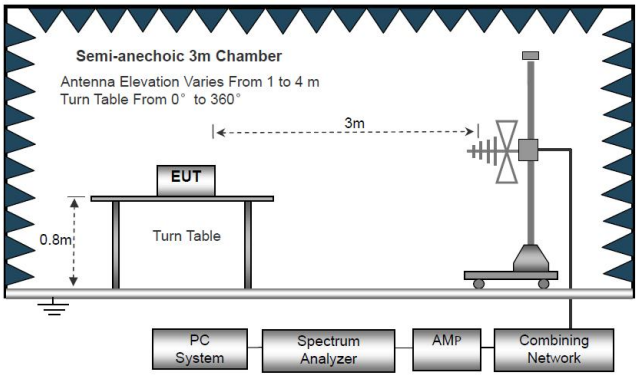
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

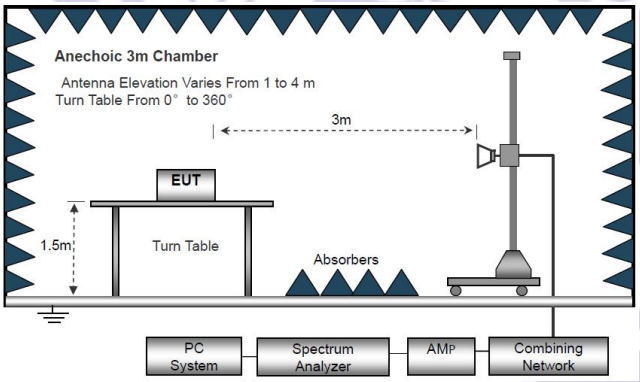
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



7.3 Spectrum Analyzer Setup

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / *10Hz* for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

7.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2013.

2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.

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

4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

5. Set to the maximum power setting and enable the EUT transmit continuously.

6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.

7. Test Procedure of measurement (For Above 1GHz):

1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).

2) Change the antenna polarization and repeat 1) with vertical polarization.

3) Make a hardcopy of the spectrum.

4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.

5) Change the analyser mode to Clear/ Write and found the cone of emission.

6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.

7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.

8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

7.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

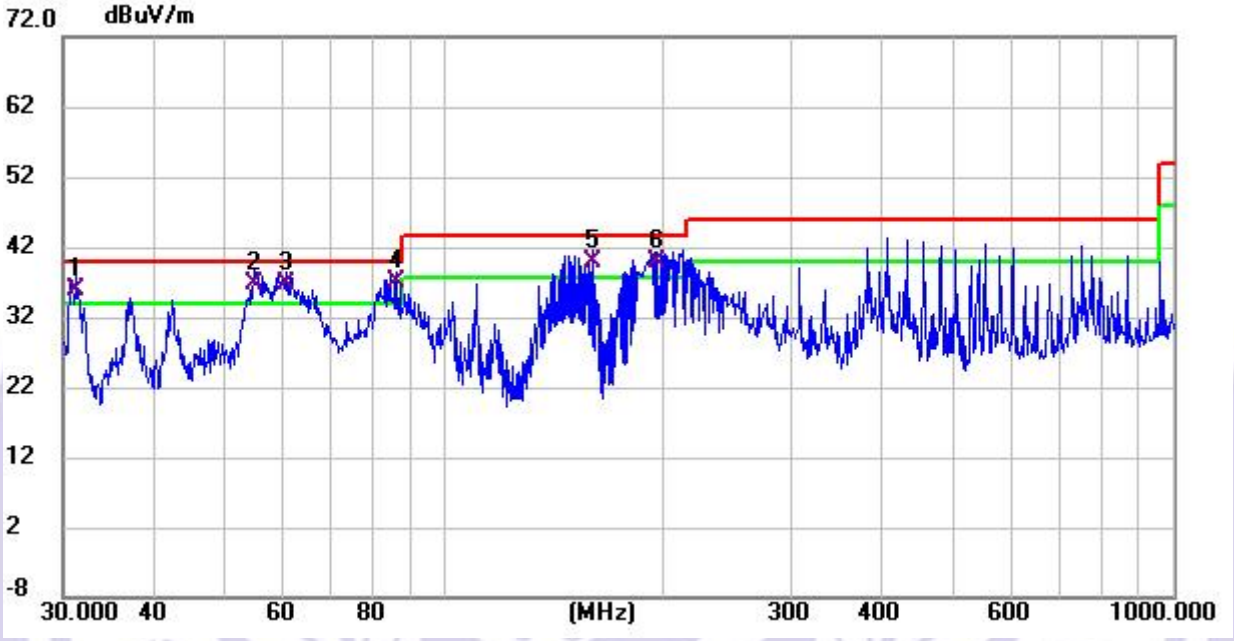
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

Please refer to the following test plots,Low Channel (5726MHz) Worst case FSK for record:

Model:	A51 PRO

Test plot for Horizontal

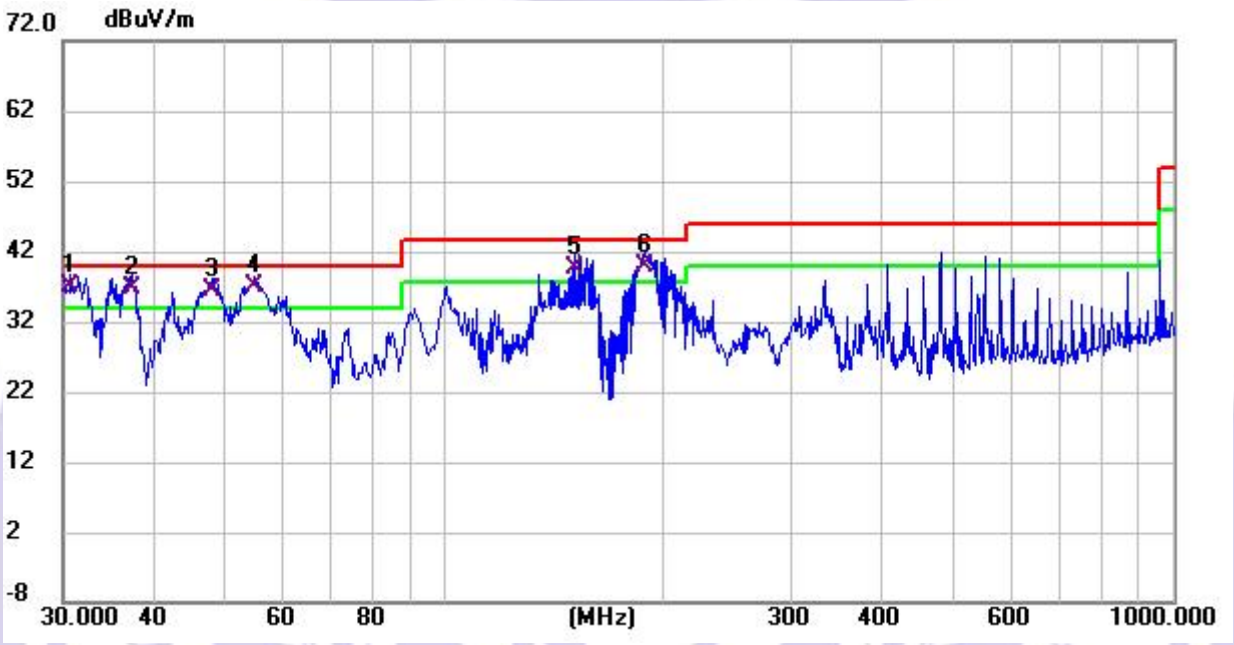


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 !	31.289	29.27	6.69	35.96	40.00	-4.04	QP
2 !	55.027	24.68	12.06	36.74	40.00	-3.26	QP
3 !	60.704	25.27	11.57	36.84	40.00	-3.16	QP
4 *	85.898	27.14	9.81	36.95	40.00	-3.05	QP
5 !	159.784	31.20	8.66	39.86	43.50	-3.64	QP
6 !	196.510	29.01	10.77	39.78	43.50	-3.72	QP

Remark:Emission Level=Reading+ Factor

Model:	A51 PRO

Test plot for Vertical

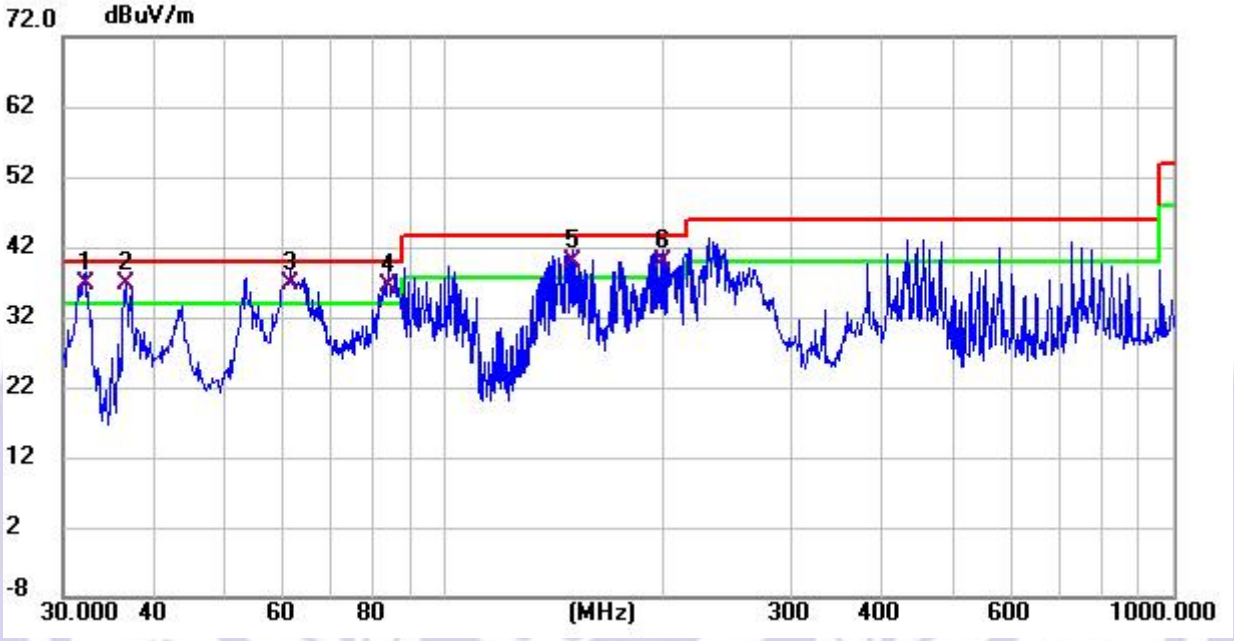


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	30.745	25.29	11.65	36.94	40.00	-3.06	QP
2 !	37.285	24.49	12.10	36.59	40.00	-3.41	QP
3 !	48.163	24.14	12.35	36.49	40.00	-3.51	QP
4 !	55.027	24.81	12.06	36.87	40.00	-3.13	QP
5 !	151.597	31.48	8.20	39.68	43.50	-3.82	QP
6 !	189.074	29.53	10.34	39.87	43.50	-3.63	QP

Remark:Emission Level=Reading+Factor

Model:	A512

Test plot for Horizontal

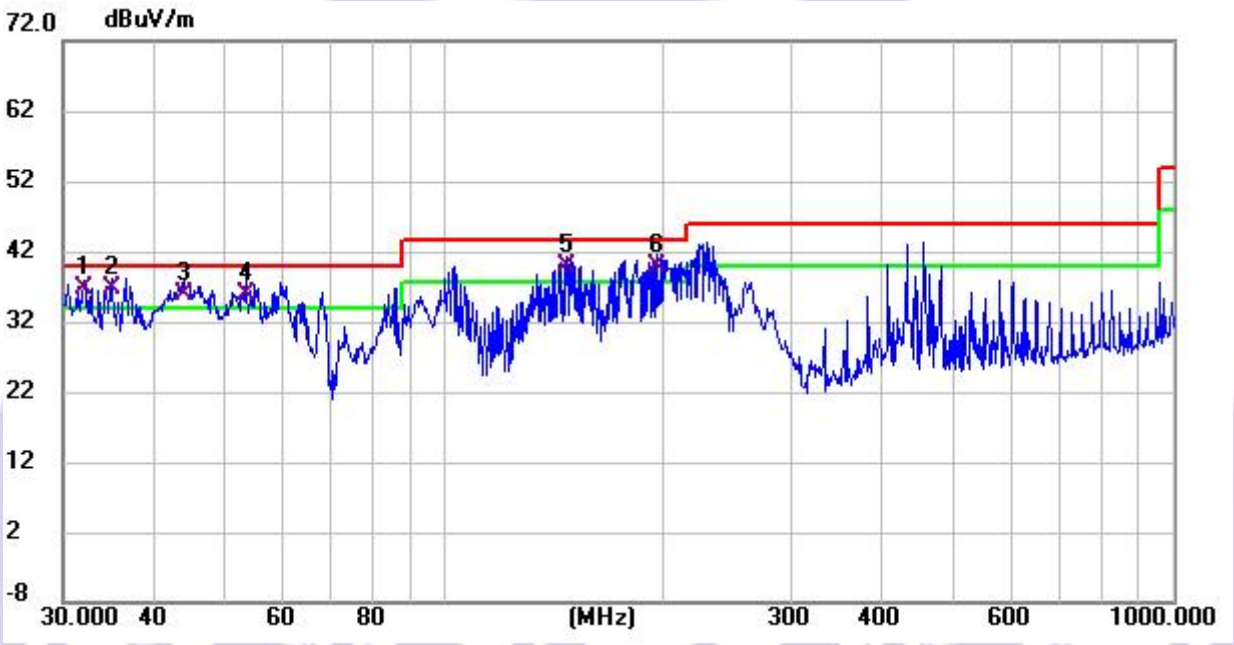


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	32.179	30.13	6.72	36.85	40.00	-3.15	QP
2 !	36.509	28.17	8.57	36.74	40.00	-3.26	QP
3 !	61.346	25.27	11.32	36.59	40.00	-3.41	QP
4 !	83.816	27.33	9.14	36.47	40.00	-3.53	QP
5 !	150.538	31.76	8.13	39.89	43.50	-3.61	QP
6 !	199.286	28.81	10.93	39.74	43.50	-3.76	QP

Remark:Emission Level=Reading+ Factor

Model:	A512

Test plot for Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	32.067	25.21	11.63	36.84	40.00	-3.16	QP
2 !	35.005	25.20	11.58	36.78	40.00	-3.22	QP
3 !	43.966	23.43	12.53	35.96	40.00	-4.04	QP
4 !	53.505	23.75	12.12	35.87	40.00	-4.13	QP
5 !	147.404	31.82	8.04	39.86	43.50	-3.64	QP
6 !	196.510	29.20	10.77	39.97	43.50	-3.53	QP

Remark:Emission Level=Reading+Factor

Test Frequency 1GHz-25GHz

FSK mode have been tested, and the worst result(FSK) was report as below

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5726									
V	11452.00	57.08	30.55	5.77	24.66	56.96	74	-17.04	PK
V	11452.00	46.59	30.55	5.77	24.66	46.47	54	-7.53	AV
V	17178.00	54.13	30.33	6.32	24.55	54.67	74	-19.33	PK
V	17178.00	43.67	30.33	6.32	24.55	44.21	54	-9.79	AV
V	22904.00	49.46	30.85	7.45	24.69	50.75	74	-23.25	PK
H	11452.00	57.19	30.55	5.77	24.66	57.07	74	-16.93	PK
H	11452.00	46.82	30.55	5.77	24.66	46.70	54	-7.30	AV
H	17178.00	53.30	30.33	6.32	24.55	53.84	74	-20.16	PK
H	17178.00	43.73	30.33	6.32	24.55	44.27	54	-9.73	AV
H	22904.00	51.00	30.85	7.45	24.69	52.29	74	-21.71	PK
operation frequency:5786									
V	11572.00	55.99	30.55	5.77	24.66	55.87	74	-18.13	PK
V	11572.00	46.15	30.55	5.77	24.66	46.03	54	-7.97	AV
V	17358.00	53.78	30.33	6.32	24.55	54.32	74	-19.68	PK
V	17358.00	44.33	30.33	6.32	24.55	44.87	54	-9.13	AV
V	23144.00	50.15	30.85	7.45	24.69	51.44	74	-22.56	PK
H	17358.00	56.17	30.55	5.77	24.66	56.05	74	-17.95	PK
H	17358.00	45.46	30.55	5.77	24.66	45.34	54	-8.66	AV
H	17358.00	54.18	30.33	6.32	24.55	54.72	74	-19.28	PK

H	17358.00	44.22	30.33	6.32	24.55	44.76	54	-9.24	AV
H	17358.00	49.77	30.85	7.45	24.69	51.06	74	-22.94	PK
operation frequency:5850									
V	11700.00	55.19	30.55	5.77	24.66	55.07	74	-18.93	PK
V	11700.00	46.59	30.55	5.77	24.66	46.47	54	-7.53	AV
V	17550.00	54.99	30.33	6.32	24.55	55.53	74	-18.47	PK
V	17550.00	44.71	30.33	6.32	24.55	45.25	54	-8.75	AV
V	23400.00	50.59	30.85	7.45	24.69	51.88	74	-22.12	PK
H	11700.00	55.88	30.55	5.77	24.66	55.76	74	-18.24	PK
H	11700.00	47.04	30.55	5.77	24.66	46.92	54	-7.08	AV
H	17550.00	53.71	30.33	6.32	24.55	54.25	74	-19.75	PK
H	17550.00	44.22	30.33	6.32	24.55	44.76	54	-9.24	AV
H	23400.00	51.36	30.85	7.45	24.69	52.65	74	-21.35	PK

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Spurious Emission in Restricted Band

FSK mode have been tested, and the worst result(FSK) was report as below

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Emission Level (dBm)	Limits (dBm)	Detector Type
V	5650.00	55.11	30.09	4.8	23.9	53.72	-41.48	-27	PK
V	5700.00	54.78	30.18	4.82	23.94	53.36	-41.84	10	PK
V	5720.00	55.81	30.2	4.85	23.98	54.44	-40.76	15.6	PK
V	5725.00	55.67	30.22	4.85	23.98	54.28	-40.92	27	PK
V	5850.00	54.96	30.22	4.85	23.98	53.57	-41.63	27	PK
V	5855.00	54.51	30.22	4.85	23.98	53.12	-42.08	15.6	PK
V	5875.00	56.06	30.24	4.86	24.01	54.69	-40.51	10	PK
V	5925.00	55.25	30.28	4.88	24.09	53.94	-41.26	-27	PK
H	5650.00	56.06	30.09	4.8	23.9	54.67	-40.53	-27	PK
H	5700.00	55.97	30.18	4.82	23.94	54.55	-40.65	10	PK
H	5720.00	56.4	30.2	4.85	23.98	55.03	-40.17	15.6	PK
H	5725.00	56.92	30.22	4.85	23.98	55.53	-39.67	27	PK
H	5850.00	54.34	30.22	4.85	23.98	52.95	-42.25	27	PK
H	5855.00	55.32	30.22	4.85	23.98	53.93	-41.27	15.6	PK
H	5875.00	55.53	30.24	4.86	24.01	54.16	-41.04	10	PK
H	5925.00	56.05	30.28	4.88	24.09	54.74	-40.46	-27	PK

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

8 PEAK OUTPUT POWER TEST

Test Requirement:	FCC Part15 C Section 15.407(a) & RSS-247 Section 6.2.4.2, RSS-247 Section 6.2.5.2
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01 RSS-GEN

8.1.1 Applied procedures / limit

FCC Part15 (15.407) , Subpart C, RSS-247 Section 6.2.4.2, RSS-247 Section 6.2.5.2				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.407(a) RSS-247 Section 6.2.4.2	Peak Output Power	1 watt or 30dBm	5725-5850	PASS
RSS-247 Section 6.2.5.2	EIRP	30dBm	5850-5895	PASS

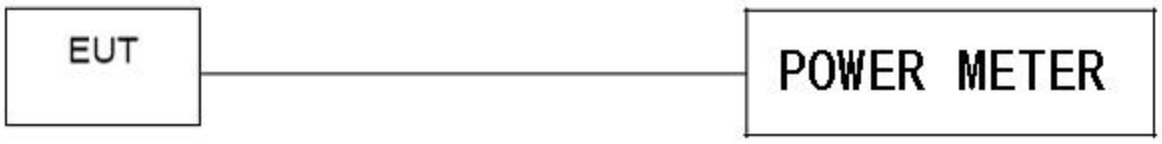
8.1.2 TEST PROCEDURE

a. The EUT was directly connected to the Power meter.

8.1.3 DEVIATION FROM STANDARD

No deviation.

8.1.4 TEST SETUP



8.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.1.6 test results

Temperature：	26℃	Relative Humidity：	54%
Test Mode ：	FSK	Test Voltage ：	AC 120V/60Hz

Test channel	Peak Output Power (dBm)	Antenna Gain	ISED EIRP (dBm)	Limit(dBm)	Result
Lowest	1.354	4.24	5.594	30.00	Pass
Middle	0.742	4.24	4.982		
Highest	1.124	4.24	5.364		
Note:Client devices operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands must not exceed an e.i.r.p. of 30 dBm.					

9 Channel Bandwidth

9.1.1 Applied procedures / limit

The bandwidth at 6 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033, at the appropriate frequencies.

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

9.1.2 TEST PROCEDURE

1. Occupied Bandwidth (OBW)

a) Set RBW = 1% to 5% of the actual occupied.

b) Set the VBW ≥ 3 × RBW.

c) Detector = Peak.

d) Trace mode = max hold.

2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band

5.725-5.85 GHz and 5.850-5.895 GHz bands. The following procedure shall be used for measuring this bandwidth:

a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 × RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) 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 6 dB relative to the maximum level measured in the fundamental emission.

9.1.3 DEVIATION FROM STANDARD

No deviation.

9.1.4 TEST SETUP

9.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

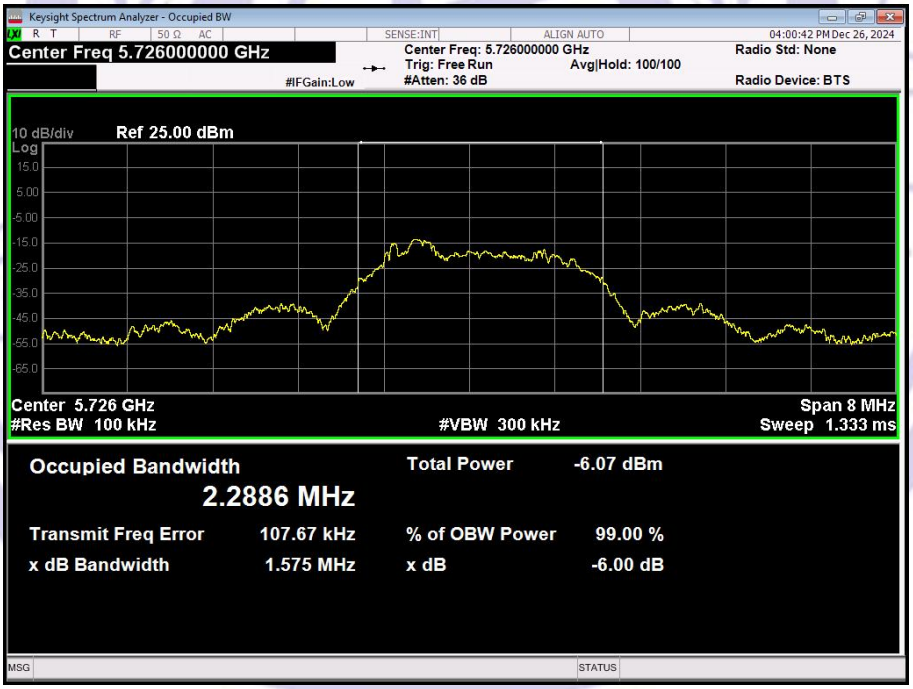
9.1.6 test results

Temperature：	26℃	Relative Humidity：	54%
Test Mode ：	FSK	Test Voltage ：	AC 120V/60Hz

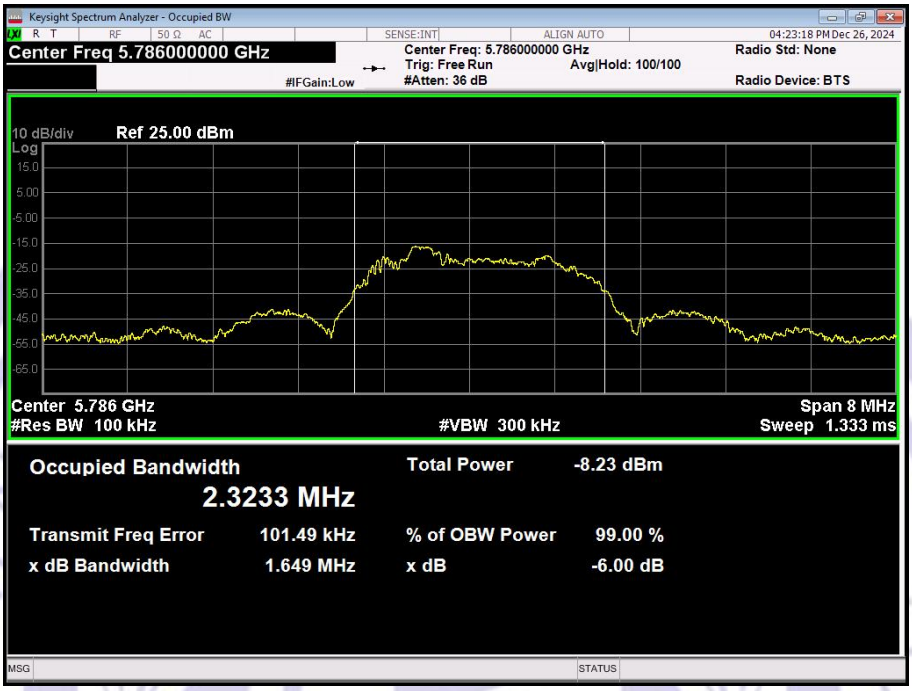
Test channel	6dB Bandwidth (MHz)	6dB Bandwidth Limit(KHz)	99% Occupied bandwidth(MHz)	Result
Lowest	1.575	>500	2.2604	Pass
Middle	1.649		2.2577	
Highest	1.438		2.5052	

6dB Bandwidth

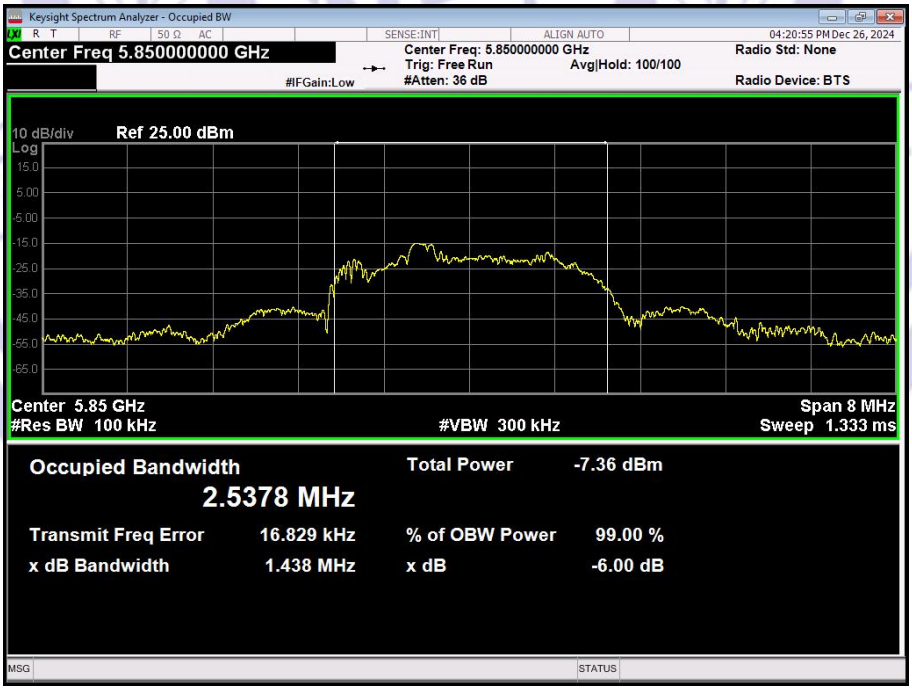
CH01

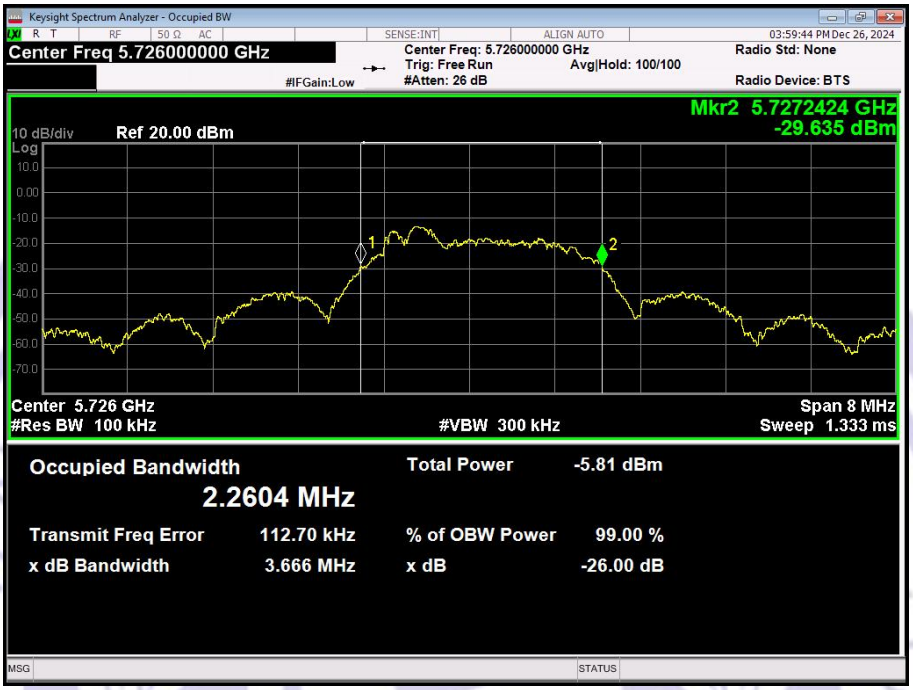
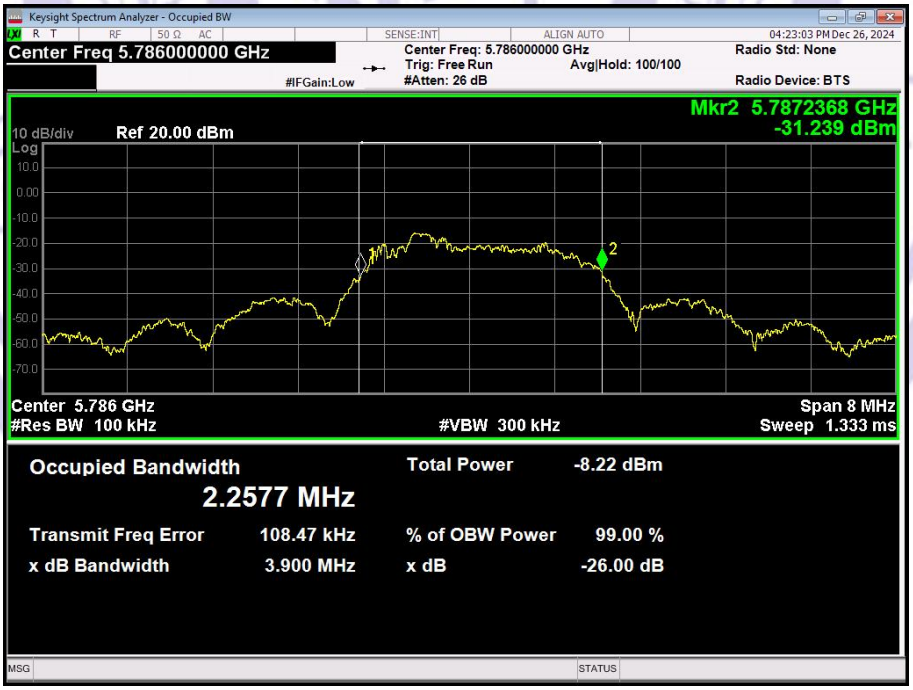


CH16


Keysight Spectrum Analyzer - Occupied BW
Center Freq 5.786000000 GHz
Center Freq: 5.786000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 36 dB
04:23:18 PM Dec 26, 2024
Radio Std: None
Radio Device: BTS
10 dB/div
Ref 25.00 dBm
Log
15.0
5.00
-5.00
-15.0
-25.0
-35.0
-45.0
-55.0
-65.0
Center 5.786 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 8 MHz
Sweep 1.333 ms
Occupied Bandwidth
2.3233 MHz
Total Power
-8.23 dBm
Transmit Freq Error
101.49 kHz
% of OBW Power
99.00 %
x dB Bandwidth
1.649 MHz
x dB
-6.00 dB
MSG
STATUS

CH32


Keysight Spectrum Analyzer - Occupied BW
Center Freq 5.850000000 GHz
Center Freq: 5.850000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 36 dB
04:20:55 PM Dec 26, 2024
Radio Std: None
Radio Device: BTS
10 dB/div
Ref 25.00 dBm
Log
15.0
5.00
-5.00
-15.0
-25.0
-35.0
-45.0
-55.0
-65.0
Center 5.85 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 8 MHz
Sweep 1.333 ms
Occupied Bandwidth
2.5378 MHz
Total Power
-7.36 dBm
Transmit Freq Error
16.829 kHz
% of OBW Power
99.00 %
x dB Bandwidth
1.438 MHz
x dB
-6.00 dB
MSG
STATUS

99% Bandwidth
CH01

CH16


CH32

Hotline: 400-8868-419 Fax: 86-755-27790922 http://www.ncttesting.cn

10 On Time and Duty Cycle

10.1.1 Standard Applicable

None; for reporting purpose only

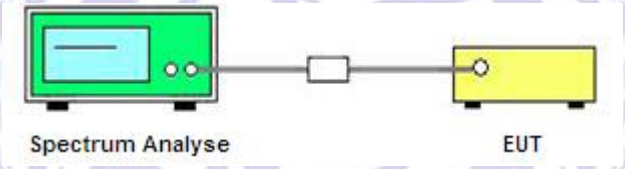
10.1.2 Measuring Instruments and Setting

Please refer to equipment list in this report. The following table is the setting of the spectrum analyzer.

10.1.3 Test Procedures

1). Set the Centre frequency of the spectrum analyzer to the transmitting frequency;
2). Set the span=0MHz, RBW=8MHz, VBW=8MHz, Sweep time=1001pts;
3). Detector = peak;
4). Trace mode = Single hold.

10.1.4 Test Setup Layout



10.1.5 EUT Operation during Test

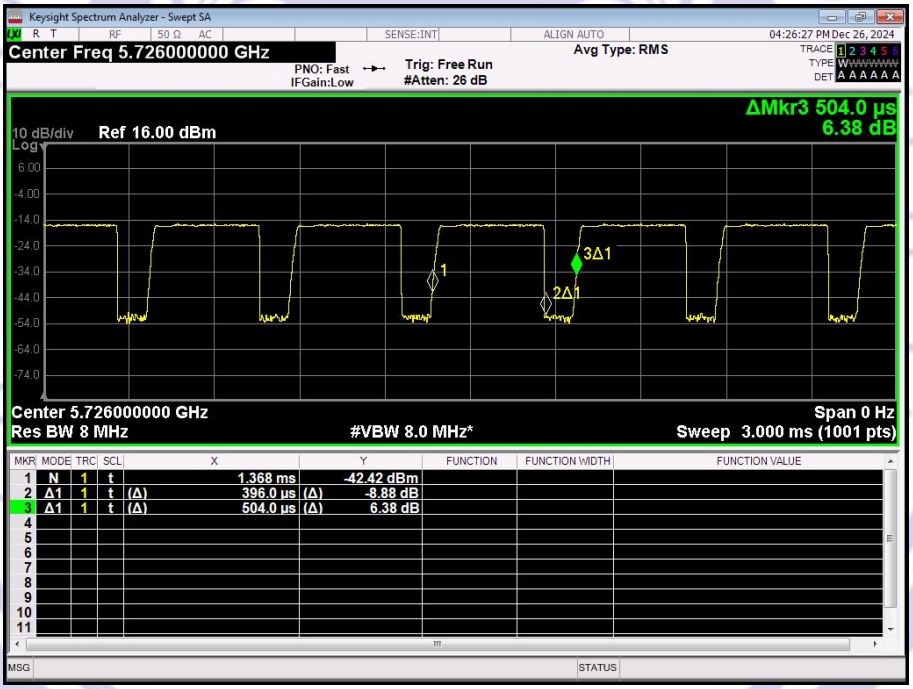
The EUT was programmed to be in continuously transmitting mode.

10.1.6 Test result

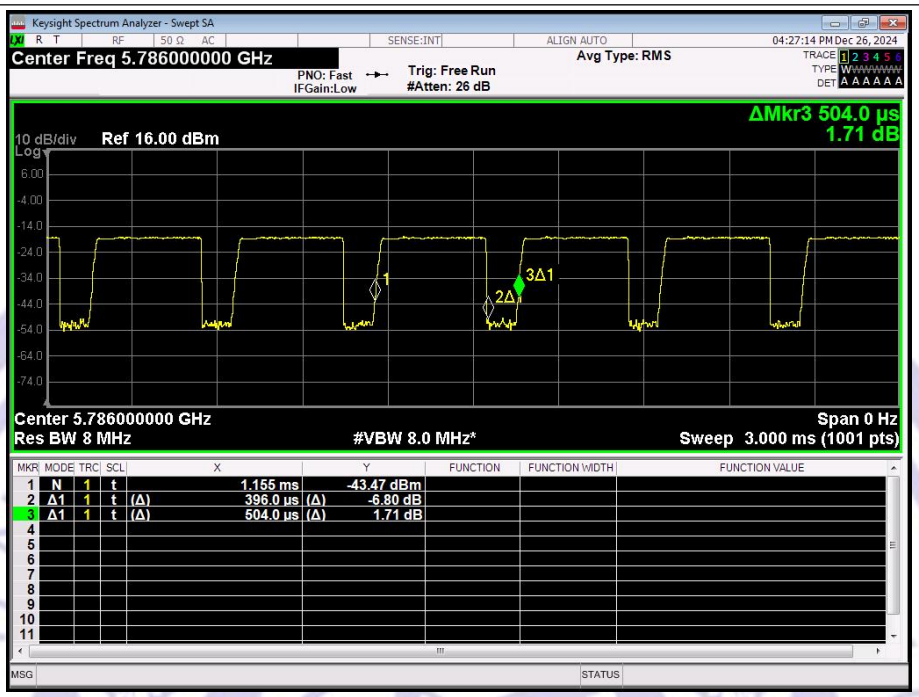
Mode	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)
FSK	01	0.396	0.504	78.57	0.7857	1.0474
	16	0.396	0.504	78.57	0.7857	1.0474
	32	0.393	0.504	77.98	0.7798	1.0802

Test Graphs

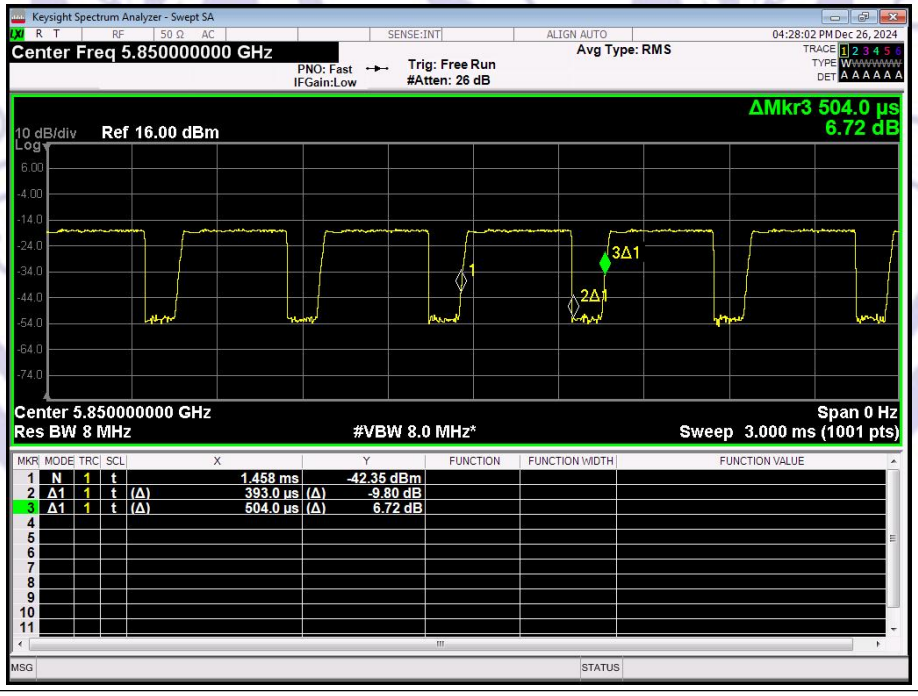
CH01



CH16


Keysight Spectrum Analyzer - Swept SA
Center Freq 5.786000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 26 dB
Avg Type: RMS
04:27:14 PM Dec 26, 2024
ΔMkr3 504.0 µs
1.71 dB
10 dB/div
Ref 16.00 dBm
Center 5.786000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz*
Span 0 Hz
Sweep 3.000 ms (1001 pts)
1 N 1 t 1.155 ms -43.47 dBm
2 Δ1 1 t (Δ) 396.0 µs (Δ) -6.80 dB
3 Δ1 1 t (Δ) 504.0 µs (Δ) 1.71 dB

CH32


Keysight Spectrum Analyzer - Swept SA
Center Freq 5.850000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 26 dB
Avg Type: RMS
04:28:02 PM Dec 26, 2024
ΔMkr3 504.0 µs
6.72 dB
10 dB/div
Ref 16.00 dBm
Center 5.850000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz*
Span 0 Hz
Sweep 3.000 ms (1001 pts)
1 N 1 t 1.458 ms -42.35 dBm
2 Δ1 1 t (Δ) 393.0 µs (Δ) -9.80 dB
3 Δ1 1 t (Δ) 504.0 µs (Δ) 6.72 dB

11 POWER SPECTRAL DENSITY TEST

Test Requirement:	FCC Part15 C Section 15.407 (e) & RSS-247 Section 6.2.4.2
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01 RSS-GEN

11.1.1 Applied procedures / limit

FCC Part15 (15.407) , Subpart C RSS-247 Section 6.2.4.2				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.407 (e) RSS-247 Section 6.2.4.2	Power Spectral Density	30dBm/500kHz	5725-5850	PASS

11.1.2 TEST PROCEDURE

Methods refer to FCC KDB 789033

a) Set RBW ≥ 1/T, where T is defined in II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (＜500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

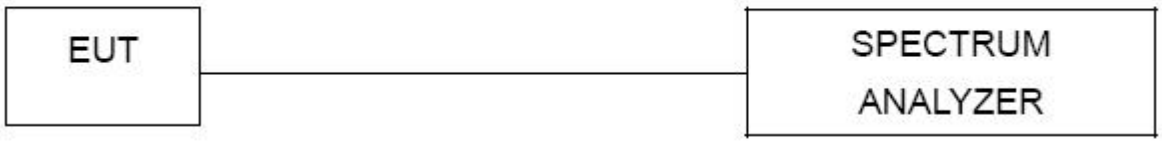
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW(＜1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

11.1.3 DEVIATION FROM STANDARD

No deviation.

11.1.4 TEST SETUP



11.1.5 EUT OPERATION CONDITIONS

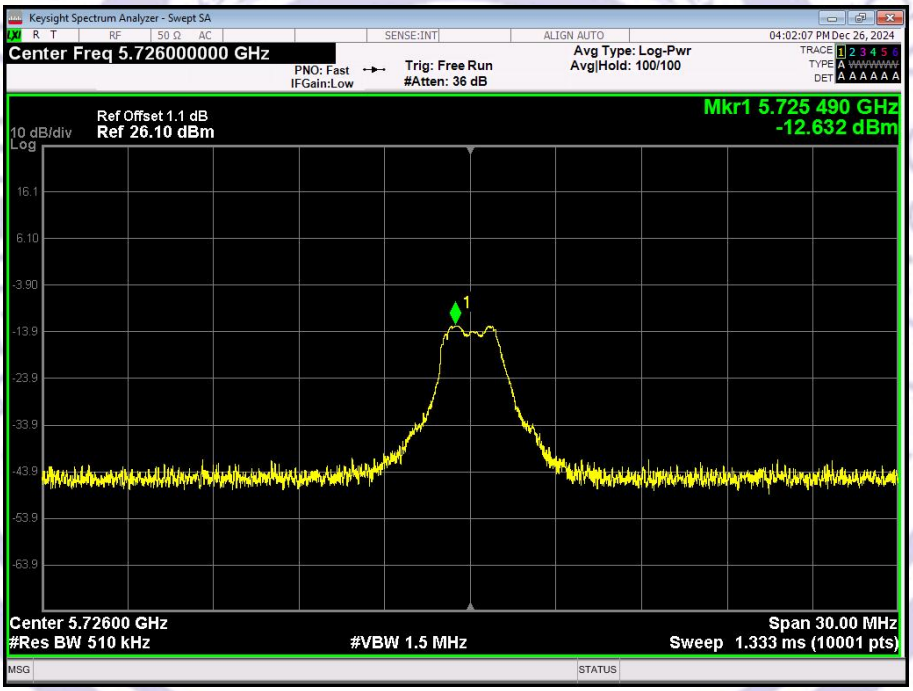
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

11.1.6 test results

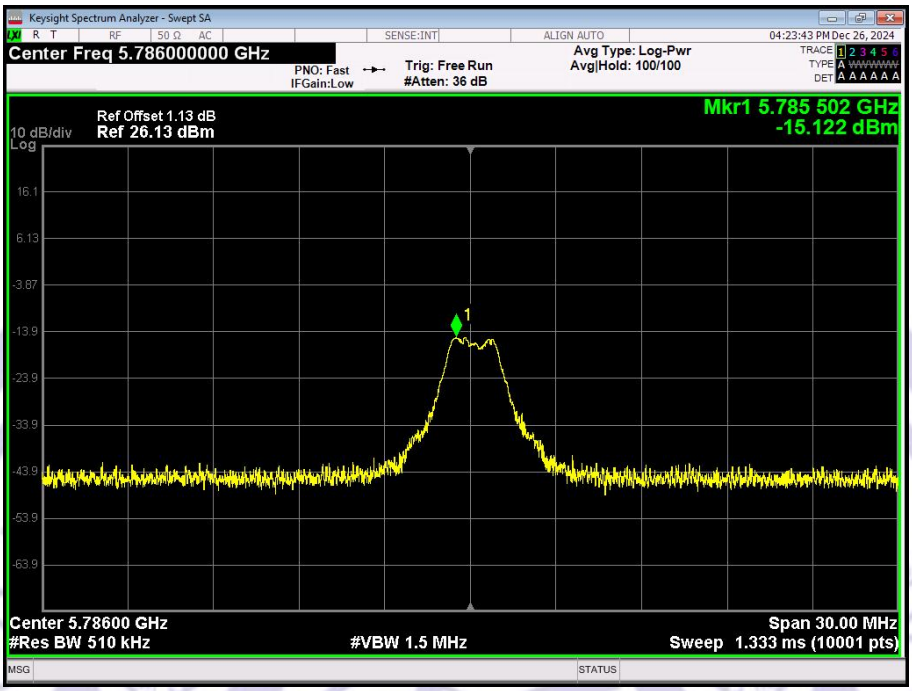
Temperature：	26℃	Relative Humidity：	54%
Test Mode ：	FSK	Test Voltage ：	AC 120V/60Hz

Frequency	Power Spectral Density (dBm/500kHZ)	Duty Cycle Factor (db)	Report Power Spectral Density (dBm/500kHZ)	Limit (dBm/500kHz)	Result
5726 MHz	-12.632	1.05	-11.582	30.00	PASS
5786 MHz	-15.122	1.05	-14.072	30.00	PASS
5850 MHz	-14.038	1.08	-12.958	30.00	PASS

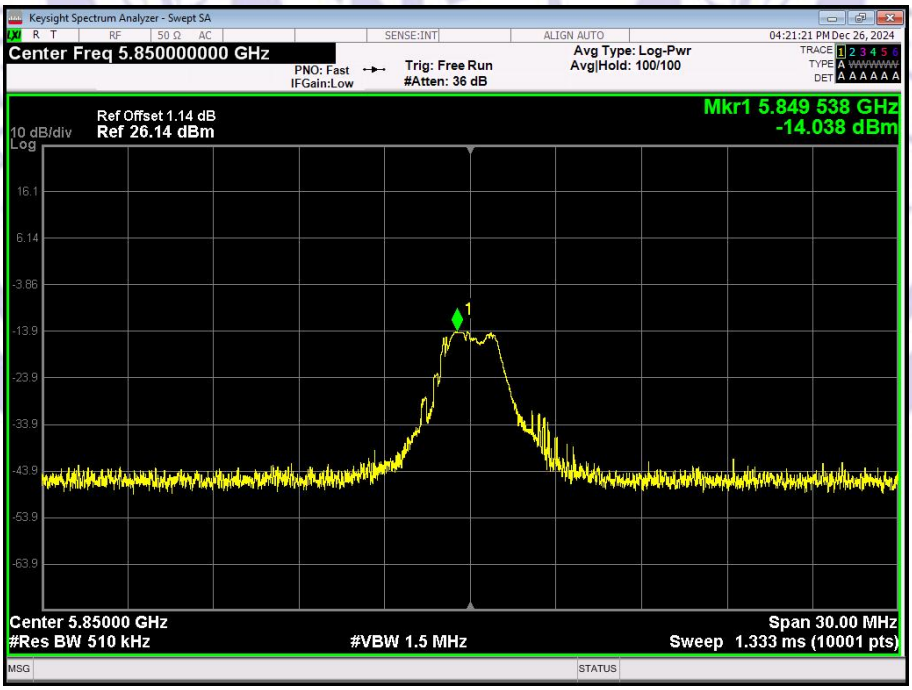
CH01



CH16


Keysight Spectrum Analyzer - Swept SA
Center Freq 5.786000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
04:23:43 PM Dec 26, 2024
Ref Offset 1.13 dB
10 dB/div
Ref 26.13 dBm
Log
Mkr1 5.785 502 GHz
-15.122 dBm
16.1
6.13
-3.87
-13.9
-23.9
-33.9
-43.9
-53.9
-63.9
Center 5.78600 GHz
#Res BW 510 kHz
#VBW 1.5 MHz
Span 30.00 MHz
Sweep 1.333 ms (10001 pts)
MSG
STATUS

CH32


Keysight Spectrum Analyzer - Swept SA
Center Freq 5.850000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
04:21:21 PM Dec 26, 2024
Ref Offset 1.14 dB
10 dB/div
Ref 26.14 dBm
Log
Mkr1 5.849 538 GHz
-14.038 dBm
16.1
6.14
-3.86
-13.9
-23.9
-33.9
-43.9
-53.9
-63.9
Center 5.85000 GHz
#Res BW 510 kHz
#VBW 1.5 MHz
Span 30.00 MHz
Sweep 1.333 ms (10001 pts)
MSG
STATUS

12 Conducted BAND EDGE

12.1.1 Applicable Standard

FCC: For the band 5725-5825 MHz, All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

ISED: Devices operating in the band 5725-5850 MHz shall comply with the following e.i.r.p. spectral density limits:

27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 Bm/MHz at 5 MHz above or below the band edges;

15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;

10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and

-27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

12.1.2 Test Procedure

Using the following spectrum analyzer setting:

A) Set the RBW = 1MHz.

B) Set the VBW = 3MHz.

C) Sweep time = auto couple.

D) Detector function = peak.

E) Trace mode = max hold.

F) Allow trace to fully stabilize.

G) Note: Antenna gain has been added to the spectrum at the time of testing and is considered during testing.

12.1.3 DEVIATION FROM STANDARD

No deviation.

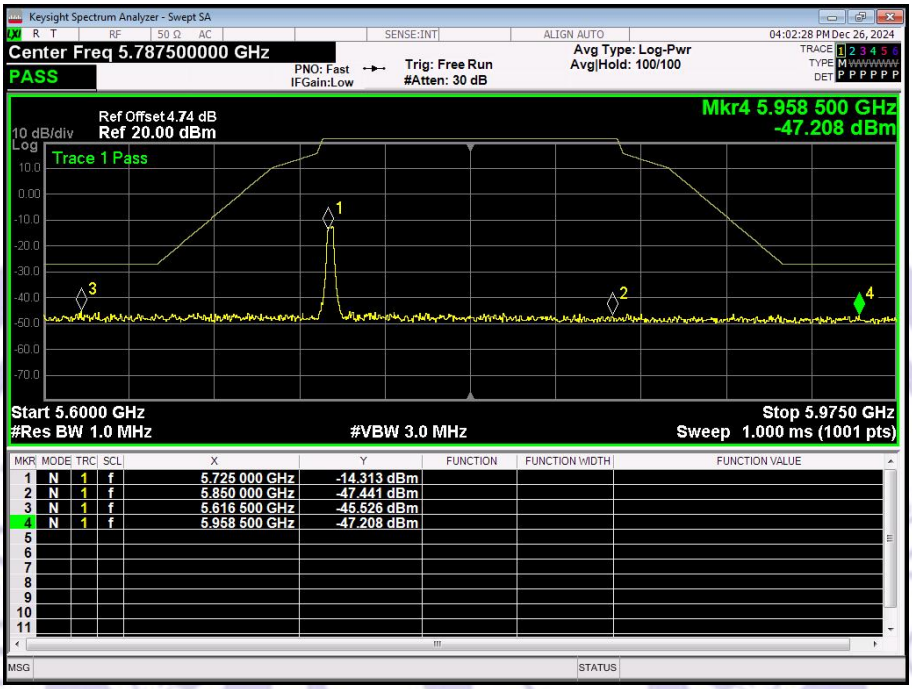
12.1.4 TEST SETUP

12.1.5 EUT OPERATION CONDITIONS

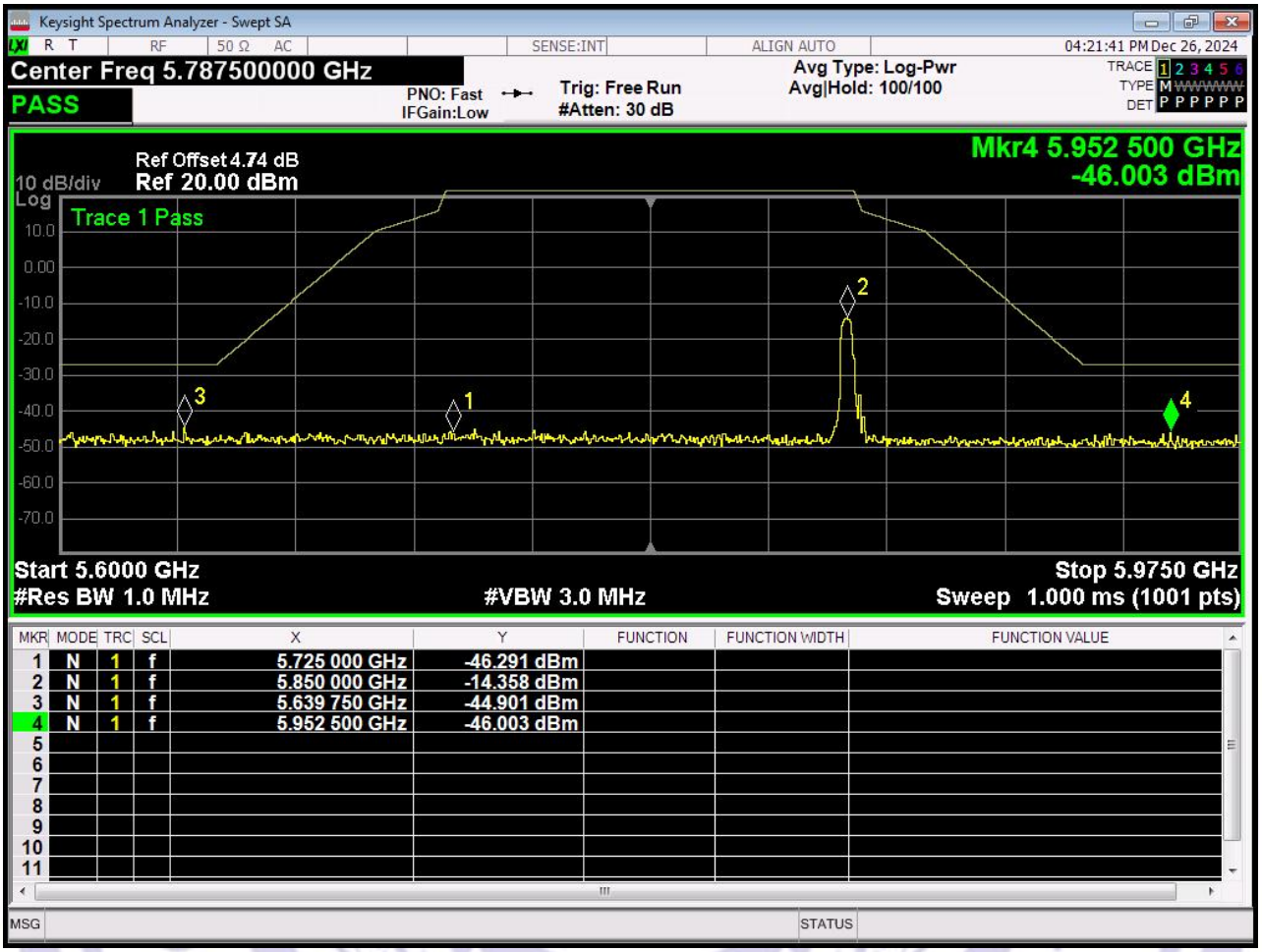
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

12.1.6 TEST RESULTS

5726MHz



5850MHz


Keysight Spectrum Analyzer - Swept SA
RT
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
04:21:41 PM Dec 26, 2024
Center Freq 5.787500000 GHz
PASS
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P P
Ref Offset 4.74 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr4 5.952 500 GHz
-46.003 dBm
Trace 1 Pass
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start 5.6000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 5.9750 GHz
Sweep 1.000 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 5.725 000 GHz -46.291 dBm
2 N 1 f 5.850 000 GHz -14.358 dBm
3 N 1 f 5.639 750 GHz -44.901 dBm
4 N 1 f 5.952 500 GHz -46.003 dBm
5
6
7
8
9
10
11
MSG
STATUS

12 Antenna Requirement

12.1 Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 & RSS-Gen 6.8
Requirement	For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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. According to RSS-GEN section 6.8 The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list. For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below). When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer. The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

12.2 Antenna Connected Construction

The antenna is PCB Antenna which permanently attached, and the best case gain of the antenna is 4.24dBi. It complies with the standard requirement.

13 APPENDIX I -- TEST SETUP PHOTOGRAPH

Please see the attachment for details.

14 APPENDIX II -- EUT PHOTOGRAPH

Please see the attachment for details.

---------- End of Report ----------