

FCC PART 15E TEST REPORT FOR CERTIFICATION On Behalf of

Zhongshan City Richsound Electronic Industrial Ltd.

Satelite Speaker

Model Number: HT Saturn

Addition Model:

U412, U4120K, HT4120K, U412N, HT412N, HT Glory, HT Starlight, HT Planet,
HT satellite, HT Jupiter, HT Uranus, HT Neptune

FCC ID: Z8M-FS412

Applicant :	Zhongshan City Richsound Electronic Industrial Ltd.
Address:	No.16, East Shagang Road, Gangkou, Zhongshan,
	Guangdong 528447, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
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Report Number:	ESTE-R2411101
Date of Test:	Sep. 06, 2024 ~ Nov. 27, 2024
Date of Report:	Nov. 28, 2024

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Applicant: Address:	Zhongshan City Richsound Electronic Industrial Ltd. No.16, East Shagang Road, Gangkou, Zhongshan, Guangdong 528447, China		
Manufacturer: Address:	Zhongshan City Richsound Electronic Industrial Ltd. No.16, East Shagang Road, Gangkou, Zhongshan, Guangdong 528447, China		
Factory: Address:	Zhongshan City Richsound Electronic Industrial Ltd. No.16, East Shagang Road, Gangkou, Zhongshan, Guangdong 528447, China		
E.U.T:	Satelite Speaker		
Model Number:	HT Saturn		
Addition Model:	U412, U4120K, HT4120K, U412N, HT412N, HT Glory, HT Starlight, HT Planet, HT satellite, HT Jupiter, HT Uranus, HT Neptune Note: They are identical except model names.		
Power Supply:	AC 120V/60Hz		
Trade Name:	Hisense; TOSHIBA	Serial No.:	-----
Date of Receipt:	Sep. 06, 2024	Date of Test:	Sep. 06, 2024 ~ Nov. 27, 2024
Test Specification:	FCC Part 15 Subpart E 15.407 ANSI C63.10:2013 FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 FCC KDB 662911 D01 Multiple Transmitter Output v02r01		
Test Result:	The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart E requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd. Date: Nov. 28, 2024		
Prepared by: Zephyr Zhu Zephyr Zhu / Assistant		Reviewed by: Seven Wang Seven Wang / Engineer	
		Approved by: Iceman Hu Iceman Hu / Manager	
Other Aspects: None.			
Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested			
This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.			

1.GENERAL INFORMATION

1.1.Description of Device (EUT)

FCC ID	:	Z8M-FS412
Product Name	:	Satelite Speaker
Model Number	:	HT Saturn
Software Version	:	N/A
Hardware Version	:	N/A
Operation frequency	:	U-NII-1: 5150 MHz~5250 MHz
Number of channel	:	24 Channels
Modulation	:	GFSK
Channels Spacing	:	4MHz
Transmit Power	:	6.34dBm
Sample Type	:	Prototype production

Note: For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

1.2.The antenna information for EUT

Ant No.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
5.2G Ant 1	-	-	PCB	-	1.23
5.2G Ant 2	-	-	PCB	-	1.96

Remark:

- (1) The antenna gain is declared by the customer and the laboratory is not responsible for the accuracy of the antenna gain.
- (2) The test results of this report only apply to the sample as received.
- (3) Only the SISO mode is supported.

1.3.Information of RF Cable

Cable Loss(dB)	Provided by
1.0	Zhongshan City Richsound Electronic Industrial Ltd.

Note:

- 1.The customer declared the loss value of the RF Cable. and the test results of this report only apply to the sample as received.
- 2.The laboratory is not responsible for the accuracy of the cable loss.

2.SUMMARY OF TEST

2.1.Summary of test result

No.	Description of Test Item	FCC Standard Section	Results
1	26dB Bandwidth & 99% Occupied Bandwidth	15.407(a) 15.407(e)	PASS
2	Maximum Conducted Output Power	15.407(a)	PASS
3	Peak Power Spectral Density	15.407(a)	PASS
4	Unwanted Emissions and Band Edge	15.205 15.209 15.407(b)	PASS
5	Frequency Stability	15.407(g)	PASS
6	AC Power Line Conducted Emissions	15.207 15.407(b)(9)	PASS
7	Antenna Requirement	15.203	PASS

Note:“N/A” denotes test is not applicable in this test report.

2.2.Test Facilities

EMC Lab : Accredited by CNAS, CHINA
Registration No.: L5288
This Accreditation is valid until: November 12, 2029

Recognized by FCC, USA
Designation Number: CN1215
This Recognition is valid until: January 31, 2026

Accredited by A2LA, USA
Registration No.: 4366.01
This Accreditation is valid until: January 31, 2026

Recognized by Industry Canada
CAB identifier No.: CN0035
This Recognition is valid until: January 31, 2026

Recognized by VCCI, Japan
Registration No.:C-14103; T-20073; R-13663;
R-20103; G-20097
Date of registration: Apr. 20, 2020
This Recognition is valid until: Apr. 19, 2026

Recognized by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Recognized by Intertek
Registration No.: 2011-RTL-L2-64
Date of registration: November 08, 2018

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan,
Guangdong, China

2.3.Measurement uncertainty for EST Technology Co., Ltd.

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.54dB
Uncertainty for spurious emissions test (Below 30MHz)	± 1.62 dB
Uncertainty for Radiation Emission test (30MHz-1GHz)	3.62
Uncertainty for Radiation Emission test (1GHz to 18GHz)	4.86
Uncertainty for spurious emissions test (18GHz to 40GHz)	4.67
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	1.08dB
Uncertainty for Power density test	0.26dB
Temperature	$\pm 0.6^{\circ}\text{C}$
Humidity	± 4.0 %
Volatage DC	$\pm 1.0\%$
Volatage (AC, <10KHz)	$\pm 1.5\%$

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

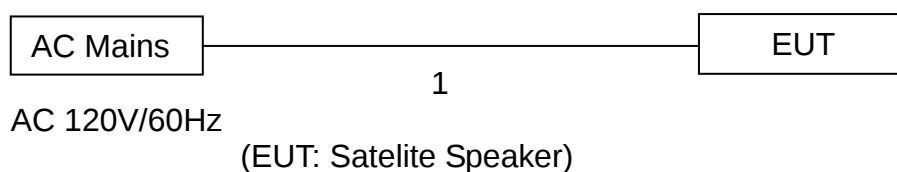
2.4.Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	FCC ID	Series No.
-	-	-	-	-	-

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.5m	AC Cable

2.5.Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground.



2.6.Test Mode

Pre-scan has been combined all possible modulations and data rates to determine the worst case test mode,the worst case test mode was selected for the final test as listed below.

Test Item	Test Mode	Channel	Modulation
26dB Bandwidth	5.2G TX	5155/5195/5245MHz	GFSK
99% Occupied Bandwidth	5.2G TX	5155/5195/5245MHz	GFSK
Maximum Conducted Output Power	5.2G TX	5155/5195/5245MHz	GFSK
Peak Power Spectral Density	5.2G TX	5155/5195/5245MHz	GFSK
Unwanted Emissions and Band Edge(Above 1GHz)	5.2G TX	5155/5195/5245MHz	GFSK
Unwanted Emissions Below 1GHz	5.2G TX	5155MHz	GFSK
Frequency Stability	5.2G TX	5155MHz	GFSK
AC Power Line Conducted Emissions	5.2G TX	5155MHz	GFSK

Note: In radiated measurement,the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on **X-plane**.

2.7.Channel List

Band	Mode	Channel	Frequency (MHz)
U-NII-1	GFSK	1	5155
		2	5159
		3	5163
		4	5167
		5	5171
		6	5175
		7	5179
		8	5183
		9	5187
		10	5191
		11	5195
		12	5199
		13	5203
		14	5207
		15	5211
		16	5215
		17	5219
		18	5223
		19	5227
		20	5231
		21	5235
		22	5239
		23	5241
		24	5245

2.8.Power Setting of Test Software

Software Name	SSCOM V5.13.1		
U-NII-1			
Frequency(MHz)	5155	5195	5245
Setting	Default	Default	Default

Note: This information is provided by the applicant.

2.9.Duty Cycle of Test Signal

Refer to section 10: Appendix B

Note:

1. Duty Cycle=On Time/Total Time×100%.
2. Duty Factor=10×LOG(1/Duty Cycle).
3. If duty cycle <98 %, the conducted average output power and average power spectral density should be add duty factor.
4. If duty cycle ≥98 %,the EUT is consider to be transmitting continuously,the conducted average output power and average power spectral density no need to add duty factor.
5. The on-time time is transmission duration(T).
6. The VBW Setting is use for RMS measurement in Unwanted Emissions and Band Edge(Above 1GHz) Test.

2.10. Test Equipment List

For conducted emission test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESRP3	EST-E070	LISAI	June 11,24	June 10,25
Artificial Mains Network	Rohde & Schwarz	ENV216	EST-E048	LISAI	June 11,24	June 10,25
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	EST-E078	LISAI	June 11,24	June 10,25
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

For radiated emission test(9kHz-30MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 11,24	June 10,25
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	EST-E054	LISAI	June 11,24	June 10,25
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
9kHz-30MHz Cable	N/A	EST-001	N/A	N/A	N/A	N/A

For radiated emissions test (30MHz-1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 11,24	June 10,25
Bilog Antenna	Teseq	CBL 6111D	EST-E034	LISAI	June 11,24	June 10,25
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
30-1000MHz Cable	N/A	EST-002	N/A	N/A	N/A	N/A

For radiated emission test(Above 1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
Horn Antenna	SCHWARZBECK	BBHA9120D	EST-E144	LISAI	June 11,24	June 10,25
Horn Antenna	Com-Power	AHA-840	EST-E133	LISAI	June 11,24	June 10,25
Low Noise Amplifier	RF	TRLA-010180 G45N	EST-E142	LISAI	June 11,24	June 10,25
Spectrum Analyzer	Rohde & Schwarz	FSV40	EST-E069	LISAI	June 11,24	June 10,25
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
Above 1GHz Cable	N/A	EST-003	N/A	N/A	N/A	N/A

For connect EUT antenna terminal test

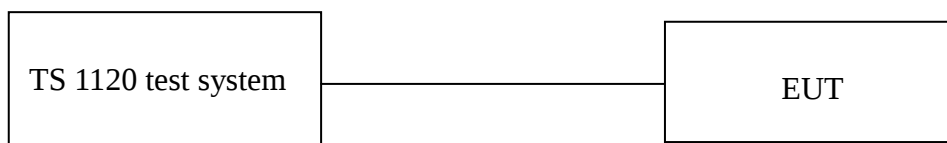
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
TS 1120	Tonscend	/	/	/	/	/
Test Software	Tonscend	TS1120-3	3.3.38	/	/	/
RF Control Unit	Tonscend	JS0806-2	EST-E134	LISAI	June 11,24	June 10,25
Signal and Spectrum Analyzer	Keysight	N9010B	EST-E141	LISAI	June 11,24	June 10,25

3.26dB BANDWIDTH & 99% OCCUPIED BANDWIDTH

3.1.Limit

Band	Frequency (MHz)	Test Item	Limit
U-NII-1	5150-5250	26dB Bandwidth&99% Occupied Bandwidth	N/A

3.2.Test Setup



3.3.Spectrum Analyzer Setting

26dB Bandwidth	
Spectrum Parameters	Setting
RBW	approximately 1% of the emission bandwidth
VBW	>RBW
Span	between 1.5 times and 5.0 times the emission bandwidth
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

99% Occupied Bandwidth	
Spectrum Parameters	Setting
RBW	1% to 5% of the OBW
VBW	approximately three times the RBW
Span	between 1.5 times and 5.0 times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

3.4.Test Procedure

For 26dB Bandwidth Measurement :

- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 3.3.
- Set the EUT transmit continuously with maximum output power.
- Allow trace to stabilize, measure the maximum width of the emission that is 26 dB down from the peak of the emission.Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
- Repeat above procedures until all modes and channels were measured.

- f. Record the results in the test report.

For 99% Occupied Bandwidth Measurement :

- a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- b. Spectrum analyzer setting parameters in accordance with section 3.3.
- c. Set the EUT transmit continuously with maximum output power.
- d. Allow trace to stabilize, use the 99% power bandwidth function to measure bandwidth.
- e. Repeat above procedures until all modes and channels were measured.
- f. Record the results in the test report.

3.5.Test Result

Refer to section 10: Appendix A1/A2

4. MAXIMUM CONDUCTED OUTPUT POWER

4.1. Limit

Band	EUT Type	Limit
U-NII-1	Outdoor Access Point	1W(30dBm) (Max. e.i.r.p $\leq$ 125mW at any elevation angle above 30 degrees as measured from the horizon)
	Indoor Access Point	1W(30dBm)
	Fixed point-to-point Access Point	1W(30dBm)
	Mobile and Portable Client Device	250mW(23.98dBm)

4.2. Test Setup



4.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	1MHz
VBW	3MHz
Span	encompass the entire 26 dB EBW or 99% OBW of the signal
Sweep Time	Auto
Detector	RMS
Trace Mode	Max Hold

4.4. Test Procedure

- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 4.3.
- Set the EUT transmit continuously with maximum output power.
- Use the channel power function to measure maximum peak output power, allow trace to stabilize, save test pictures.
- Repeat above procedures until all modes and channels were measured.
- Record the results in the test report.

4.5. Test Result

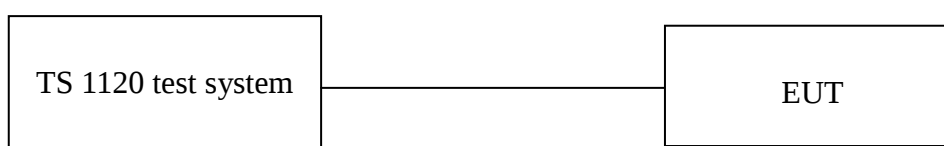
Refer to section 10: Appendix C

5. PEAK POWER SPECTRAL DENSITY

5.1. Limit

Band	EUT Type	Limit
U-NII-1	Outdoor Access Point	17dBm/MHz
	Indoor Access Point	17dBm/MHz
	Fixed point-to-point Access Point	17dBm/MHz
	Mobile and Portable Client Device	11dBm/MHz

5.2. Test Setup



5.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	1MHz(For U-NII-1&U-NII-2A&U-NII-2C) 500KHz(For U-NII-3)
VBW	3MHz(For U-NII-1&U-NII-2A&U-NII-2C) 2MHz(For U-NII-3)
Span	encompass the entire 26 dB EBW or 99% OBW of the signal
Sweep Time	Auto
Number of Sweep Point	$\geq 2 \times \text{SPAN} / \text{RBW}$
Detector	RMS(power averaging)
Trace Average	≥ 100 traces

5.4. Test Procedure

- Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- Spectrum analyzer setting parameters in accordance with section 5.3.
- Set the EUT transmit continuously with maximum output power.
- Allow trace to stabilize, use the marker-to-peak function to set the marker to the average of the emission.
- If the duty cycle of test signal $< 98\%$, the result = max measured value + $10 \times \log(1/\text{duty cycle})$;
If the duty cycle of test signal $\geq 98\%$, the result = max measured value.
- Repeat above procedures until all modes and channels were measured.
- Record the results in the test report.

5.5. Test Result

Refer to section 10: Appendix D

6.UNWANTED EMISSIONS AND BAND EDGE

6.1.Limit

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: 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.

The unwanted emissions which fall in Restricted bands shall not exceed the field strength levels specified in the following table:

15.209 Radiated emission limits

Frequency (MHz)	Field Strength(μ V/m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

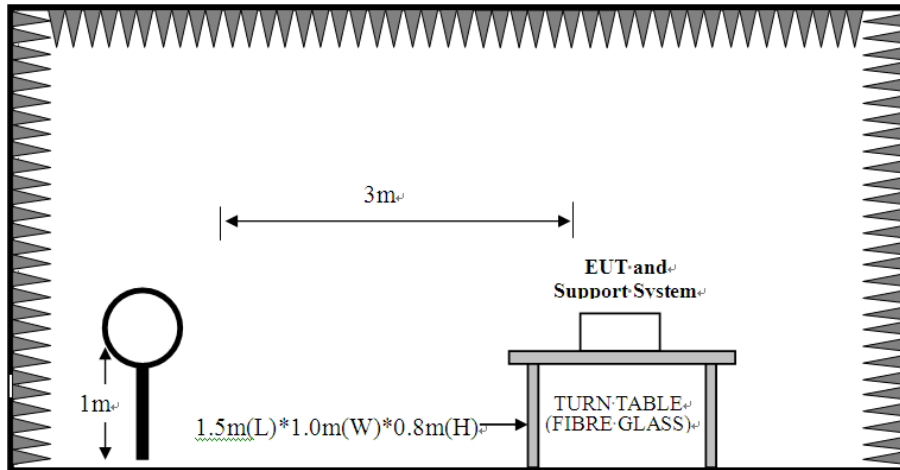
Note:

1. $\text{dB}\mu\text{V}/\text{m} = 20\text{Log}(\mu\text{V}/\text{m})$
2. Above 1GHz the formula is used to convert the EIRP to field strength

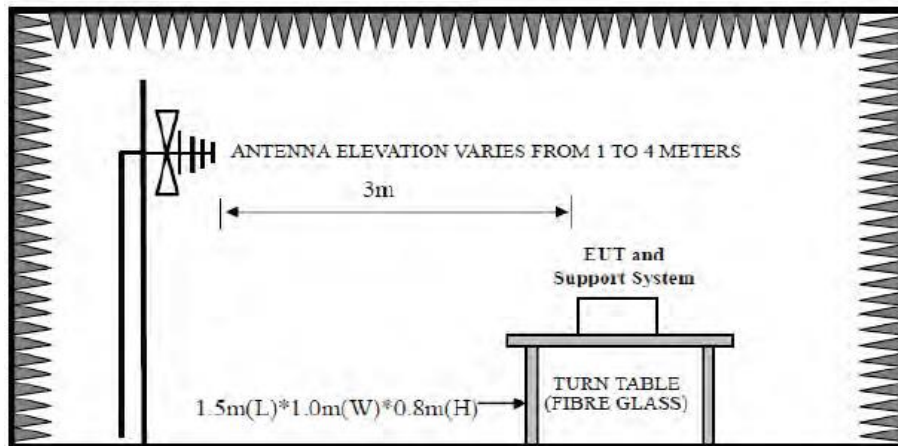
$$E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] - 20 \log(d[\text{m}]) + 104.77$$
 where E is field strength and d is distance at which the field strength limit is specified in the applicable requirements.
 for example, 3m field strength($\text{dB}\mu\text{V}/\text{m}$)= $\text{EIRP}-20\log(3)+104.77=\text{EIRP}+95.2$

6.2.Test Setup

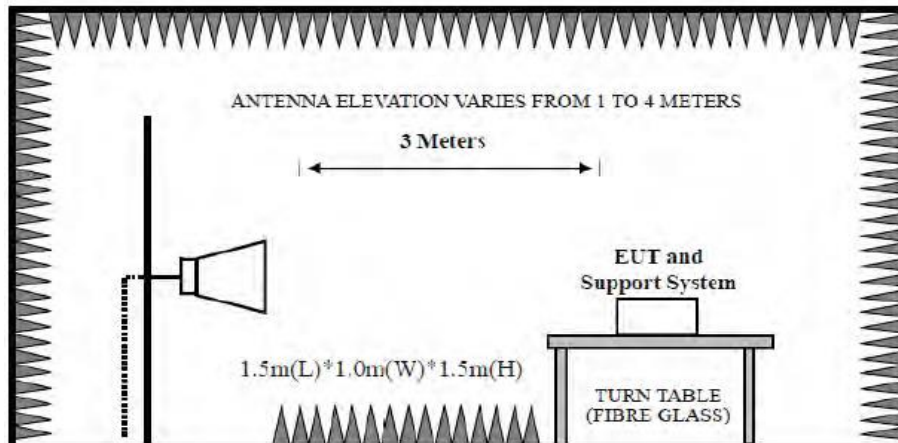
9kHz~30MHz



30~1000MHz



Above 1GHz



6.3.Spectrum Analyzer Setting

For 9KHz-150KHz

Spectrum Parameters	Setting
RBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
VBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
Start frequency	9KHz
Stop frequency	150KHz
Sweep Time	Auto
Detector	PEAK/QP/AVG
Trace Mode	Max Hold

Note : For 9KHz-90KHz&110KHz-150KHz,the detector is average,other frequency is CISPR QP detector.

For 150KHz-30MHz

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

Note : For 150KHz-490KHz,the detector is average,other frequency is CISPR QP detector.

For 30MHz-1GHz

Spectrum Parameters	Setting
RBW	120KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	1GHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

For Above 1GHz

Spectrum Parameters	Setting	
RBW	1MHz	
VBW	PEAK Measurement	AVG Measurement
	3MHz	Duty cycle≥98%,VBW=10Hz Duty cycle<98%,VBW≥1/T Video bandwidth mode=RMS (power averaging)
Start frequency	1GHz	
Stop frequency	40GHz	
Sweep Time	Auto	

Detector	PEAK
Trace Mode	Max Hold

Note : T is the on-time time of the duty cycle,when EUT transmit continuously with maximum output power,unit is seconds. reference section 2.9 for the on-time time.

6.4.Test Procedure

- a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
- b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- c. Set the EUT transmit continuously with maximum output power.
- d. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- e. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- f. Spectrum analyzer setting parameters in accordance with section 6.3.
- g. Repeat above procedures until all channels were measured.
- h. Record the results in the test report.

6.5.Test Result

Radiated Emissions Below 1GHz

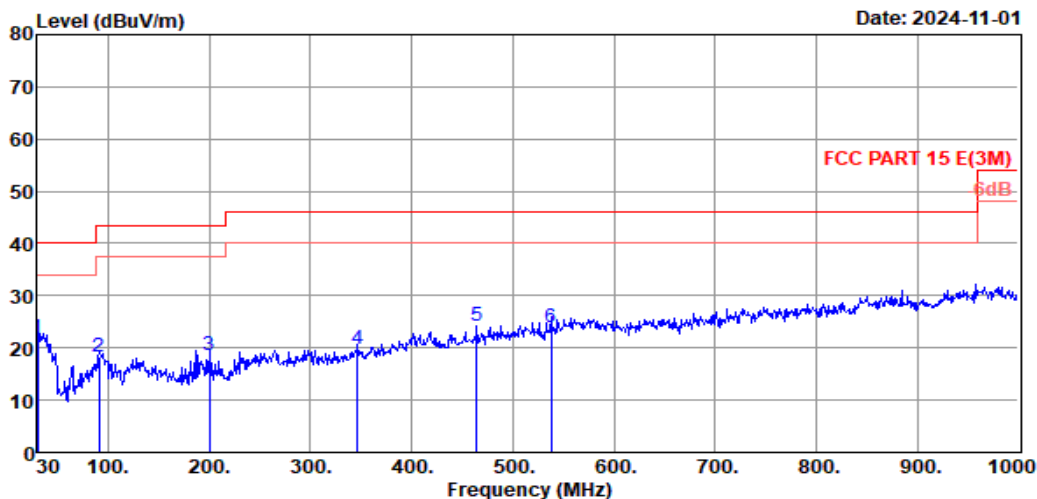
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Data: 13

File: \\emc-966-5\Test Data\2024\RF\X\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (50)

Date: 2024-11-01



Site no. : 5# 966 Chamber Data no. : 13
Dis. / Ant. : 3m 54681 Ant. pol. : VERTICAL
Limit : FCC PART 15 E(3M)
Env. / Ins. : Temp:23°C;Humi:54%;Prwss:101.1kPa
Engineer : Wind
EUT : Satellite Speaker
Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX Mode
Surround

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.00	19.20	0.91	1.87	21.98	40.00	18.02	QP
2	91.11	8.90	1.17	8.32	18.39	43.50	25.11	QP
3	199.75	9.20	2.45	6.95	18.60	43.50	24.90	QP
4	346.22	14.62	3.26	1.93	19.81	46.00	26.19	QP
5	464.56	17.40	3.83	2.84	24.07	46.00	21.93	QP
6	538.28	18.34	4.14	1.45	23.93	46.00	22.07	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

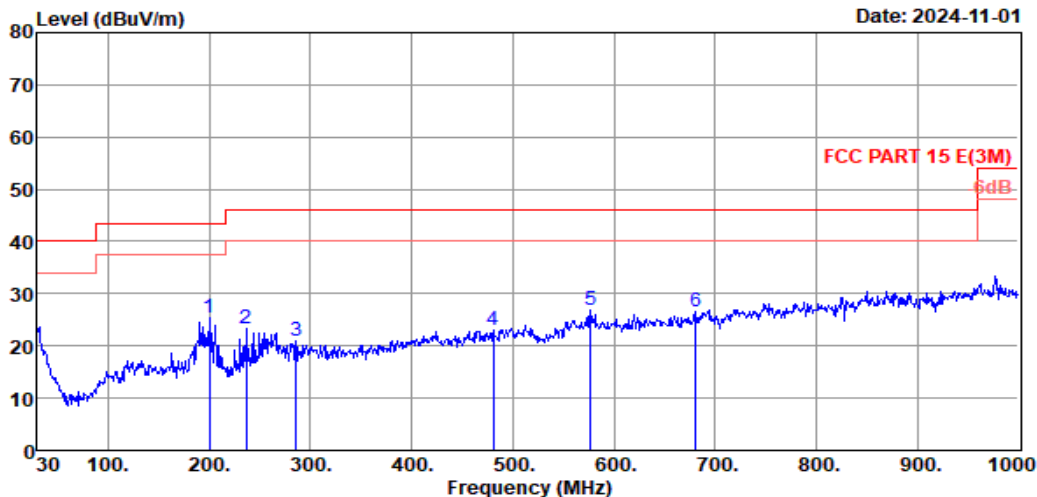
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Data: 14

File: \\emc-966-5\Test Data\2024\RF\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (50)

Date: 2024-11-01



Site no. : 5# 966 Chamber Data no. : 14
Dis. / Ant. : 3m 54681 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 E(3M)
Env. / Ins. : Temp:23°C;Humi:54%;Prwss:101.1kPa
Engineer : Wind
EUT : Satellite Speaker
Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX Mode
Surround

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	199.75	9.20	2.45	13.66	25.31	43.50	18.19	QP
2	236.61	11.30	2.66	9.42	23.38	46.00	22.62	QP
3	286.08	13.04	2.95	4.93	20.92	46.00	25.08	QP
4	481.05	17.74	3.90	1.38	23.02	46.00	22.98	QP
5	577.08	20.10	4.30	2.34	26.74	46.00	19.26	QP
6	680.87	20.68	4.70	1.21	26.59	46.00	19.41	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Note:

1. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
2. All channels had been pre-test, only the worst case was reported.

Radiated Emissions Above 1G

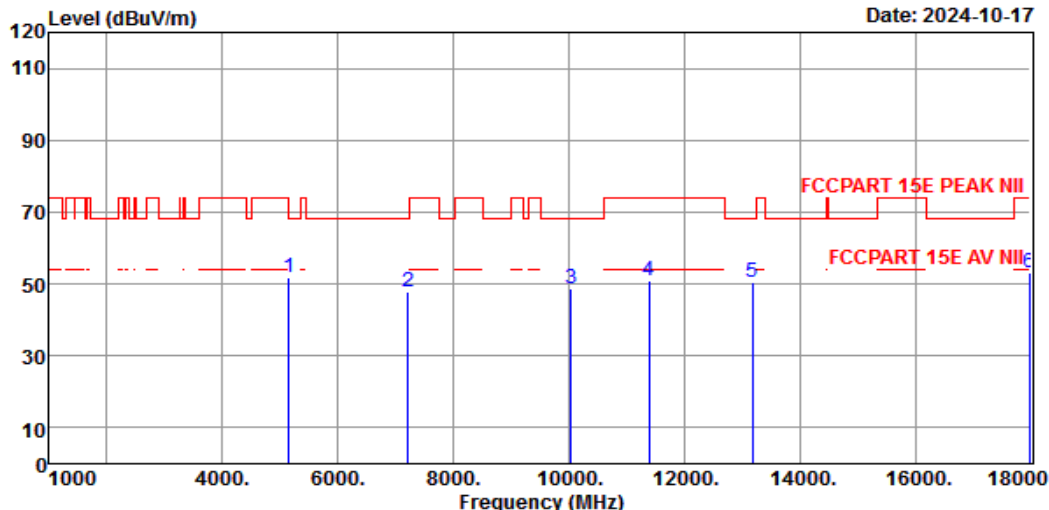
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Data: 55

File: \\EMC-966-1\test data\2024\RF\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (96)

Date: 2024-10-17



Site no. : 1# 966 Chamber Data no. : 55
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL
Limit : FCCPART 15E PEAK NII
Env. / Ins. : Temp:19.5°C;Humi:50%;Press:101.55kPa
Engineer : Aron
EUT : Satellite Speaker

Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX 5155MHz
Surround

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5148.00	33.70	7.09	43.05	54.22	51.96	74.00	22.04	Peak
2	7222.00	37.47	8.41	42.90	44.66	47.64	68.20	20.56	Peak
3	10044.00	38.75	9.83	41.67	41.89	48.80	68.20	19.40	Peak
4	11387.00	40.20	10.77	40.98	41.09	51.08	74.00	22.92	Peak
5	13189.00	40.62	11.32	39.57	38.09	50.46	68.20	17.74	Peak
6	17983.00	45.20	14.37	41.32	34.79	53.04	74.00	20.96	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

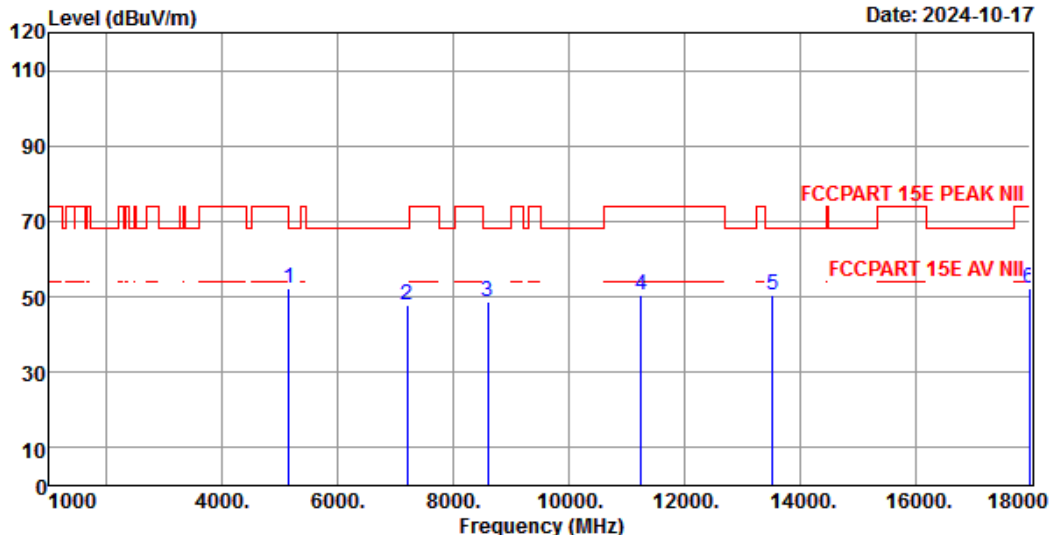
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Data: 56

File: \\EMC-966-1\test data\2024\RF\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (96)

Date: 2024-10-17



Site no. : 1# 966 Chamber Data no. : 56
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL
Limit : FCCPART 15E PEAK NII
Env. / Ins. : Temp:19.5°C;Humi:50%;Press:101.55kPa
Engineer : Aron
EUT : Satellite Speaker

Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX 5155MHz
Surround

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5148.00	33.70	7.09	43.05	54.53	52.27	74.00	21.73	Peak
2	7205.00	37.80	8.41	42.90	44.48	47.79	68.20	20.41	Peak
3	8599.00	38.10	8.97	42.54	43.98	48.51	68.20	19.69	Peak
4	11251.00	39.55	10.70	41.02	41.46	50.69	74.00	23.31	Peak
5	13529.00	41.03	11.29	39.87	38.09	50.54	68.20	17.66	Peak
6	17983.00	45.20	14.37	41.32	34.00	52.25	74.00	21.75	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

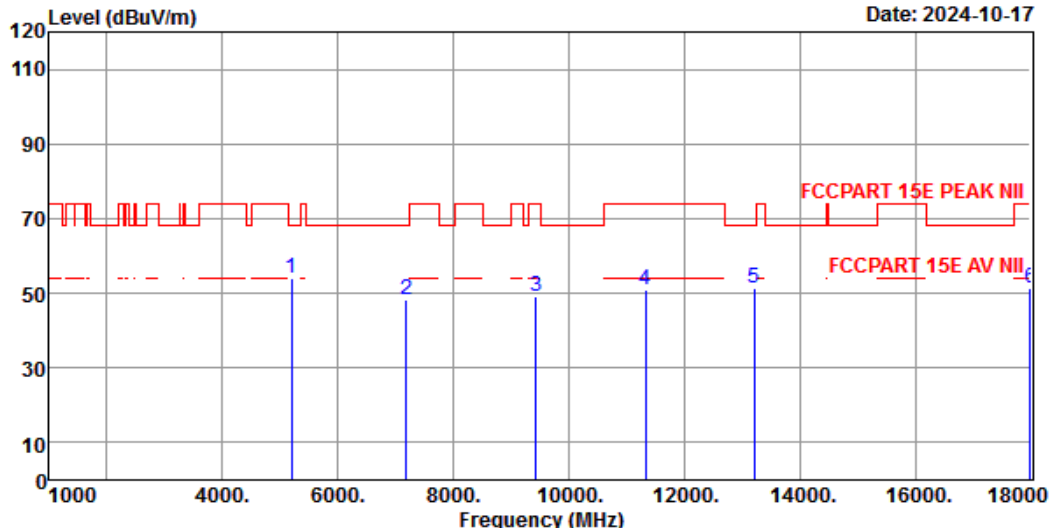
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Data: 57

File: \\EMC-966-1\test data\2024\RF\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (96)

Date: 2024-10-17



Site no. : 1# 966 Chamber Data no. : 57
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL
Limit : FCCPART 15E PEAK NII
Env. / Ins. : Temp:19.5°C;Humi:50%;Press:101.55kPa
Engineer : Aron
EUT : Satellite Speaker

Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX 5195MHz
Surround

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5199.00	33.80	7.14	43.04	56.29	54.19	68.20	14.01	Peak
2	7188.00	37.57	8.40	42.90	45.41	48.48	68.20	19.72	Peak
3	9432.00	38.37	9.45	42.04	43.29	49.07	74.00	24.93	Peak
4	11336.00	39.90	10.75	41.00	41.48	51.13	74.00	22.87	Peak
5	13206.00	40.70	11.32	39.58	38.80	51.24	68.20	16.96	Peak
6	18000.00	45.30	14.38	41.30	32.97	51.35	74.00	22.65	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

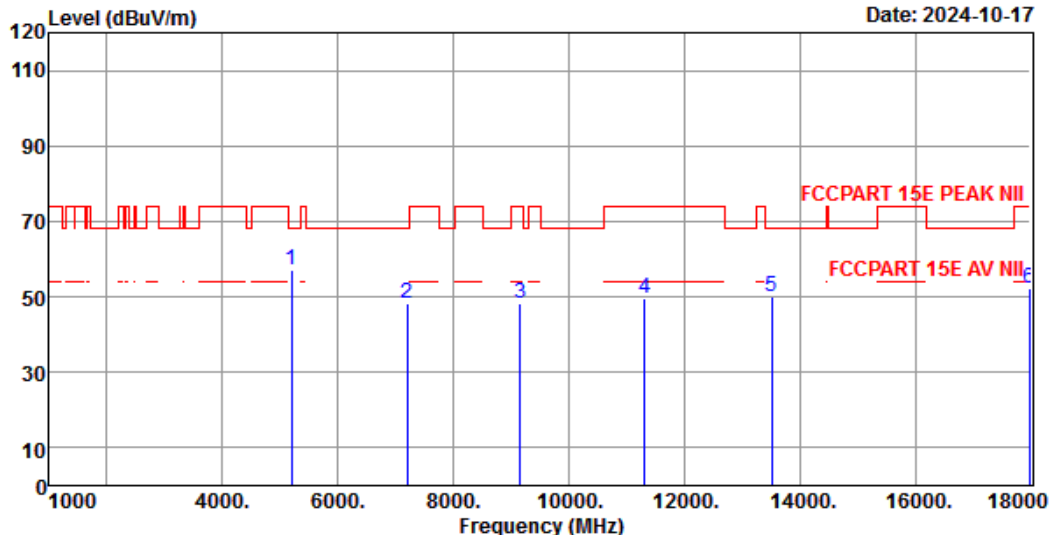
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Data: 58

File: \\EMC-966-1\test data\2024\RF\X\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (96)

Date: 2024-10-17



Site no. : 1# 966 Chamber Data no. : 58
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL
Limit : FCCPART 15E PEAK NII
Env. / Ins. : Temp:19.5°C;Humi:50%;Press:101.55kPa
Engineer : Aron
EUT : Satellite Speaker

Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX 5195MHz
Surround

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5199.00	33.80	7.14	43.04	59.16	57.06	68.20	11.14	Peak
2	7205.00	37.80	8.41	42.90	45.10	48.41	68.20	19.79	Peak
3	9160.00	38.13	9.28	42.21	43.17	48.37	74.00	25.63	Peak
4	11319.00	39.80	10.74	41.00	40.23	49.77	74.00	24.23	Peak
5	13512.00	41.07	11.29	39.86	37.63	50.13	68.20	18.07	Peak
6	17983.00	45.20	14.37	41.32	34.20	52.45	74.00	21.55	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

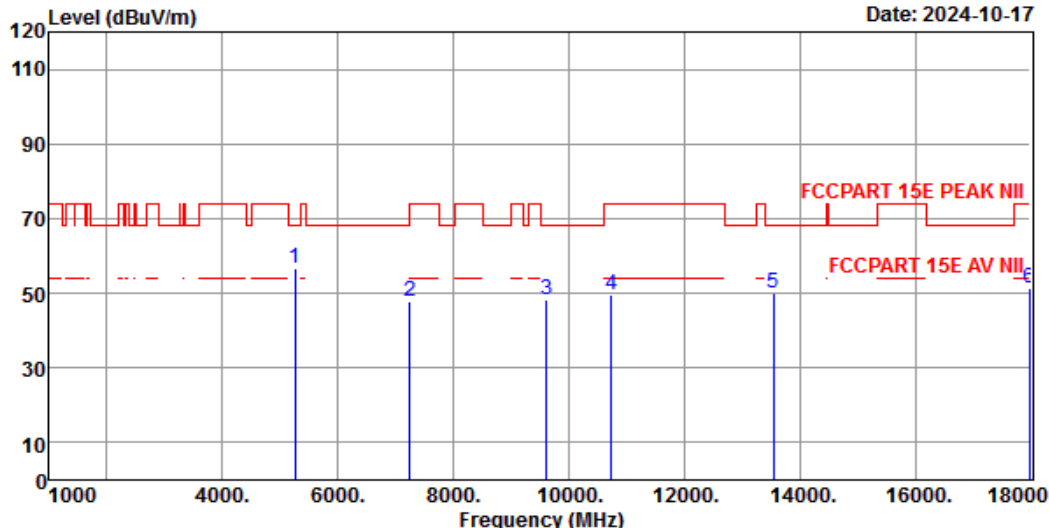
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Data: 59

File: \\EMC-966-1\test data\2024\RF\X\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (96)

Date: 2024-10-17



Site no. : 1# 966 Chamber Data no. : 59
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL
Limit : FCCPART 15E PEAK NII
Env. / Ins. : Temp:19.5°C;Humi:50%;Press:101.55kPa
Engineer : Aron
EUT : Satellite Speaker

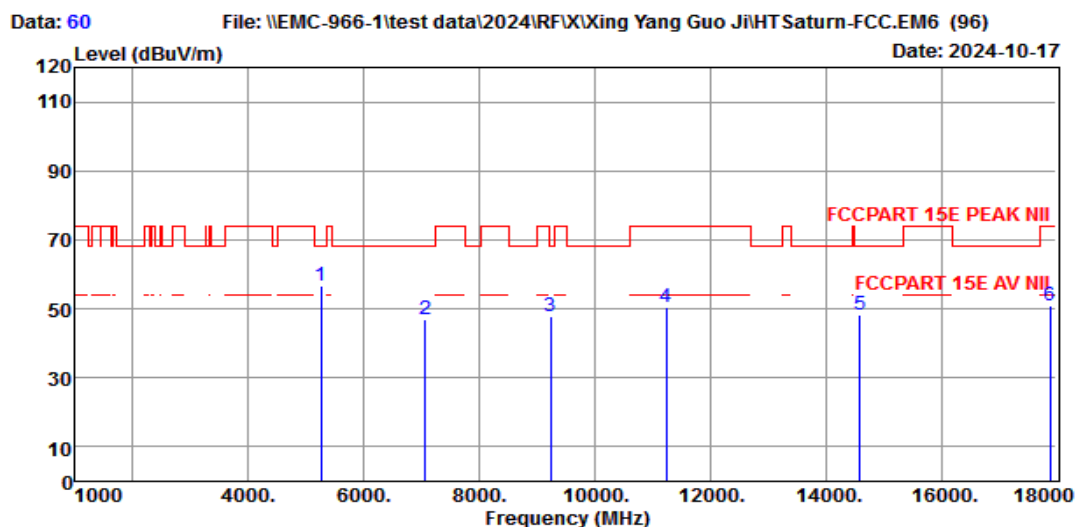
Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX 5245MHz
Surround

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5250.00	33.40	7.19	43.02	59.05	56.62	68.20	11.58	Peak
2	7239.00	37.13	8.42	42.90	45.07	47.72	68.20	20.48	Peak
3	9619.00	38.47	9.56	41.93	42.33	48.43	68.20	19.77	Peak
4	10741.00	38.56	10.38	41.25	42.03	49.72	74.00	24.28	Peak
5	13546.00	41.00	11.29	39.89	37.83	50.23	68.20	17.97	Peak
6	17983.00	45.20	14.37	41.32	32.90	51.15	74.00	22.85	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL
Limit : FCCPART 15E PEAK NII
Env. / Ins. : Temp:19.5°C;Humi:50%;Press:101.55kPa
Engineer : Aron
EUT : Satellite Speaker

Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX 5245MHz
Surround

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5250.00	33.40	7.19	43.02	59.01	56.58	68.20	11.62	Peak
2	7069.00	36.70	8.37	42.90	44.62	46.79	68.20	21.41	Peak
3	9228.00	38.13	9.32	42.17	42.63	47.91	68.20	20.29	Peak
4	11234.00	39.50	10.70	41.03	41.43	50.60	74.00	23.40	Peak
5	14600.00	39.00	11.19	41.55	39.83	48.47	68.20	19.73	Peak
6	17881.00	44.60	14.29	41.45	33.64	51.08	74.00	22.92	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Note:

1. The amplitude of 18GHz to 40GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
2. All test mode had been pre-test, only Low/Middle/High Channel of the worst case modulation mode was reported

Band Edge

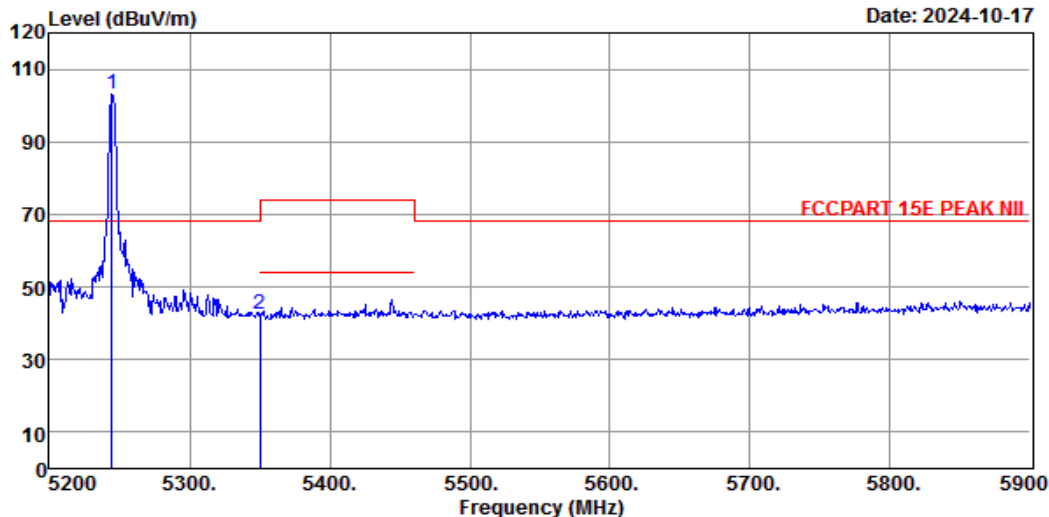
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Data: 61

File: \\EMC-966-1\test data\2024\RF\X\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (96)

Date: 2024-10-17



Site no. : site Data no. : 61
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL
Limit : FCCPART 15E PEAK NII
Env. / Ins. : Temp:19.5°C;Humi:50%;Press:101.55kPa
Engineer : Aron
EUT : Satellite Speaker

Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX 5245MHz
Surround

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5244.80	33.40	7.19	43.02	105.73	103.30	68.20	-35.10	Peak
2	5350.00	33.70	7.28	42.99	44.61	42.60	68.20	25.60	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official
limit are not reported.

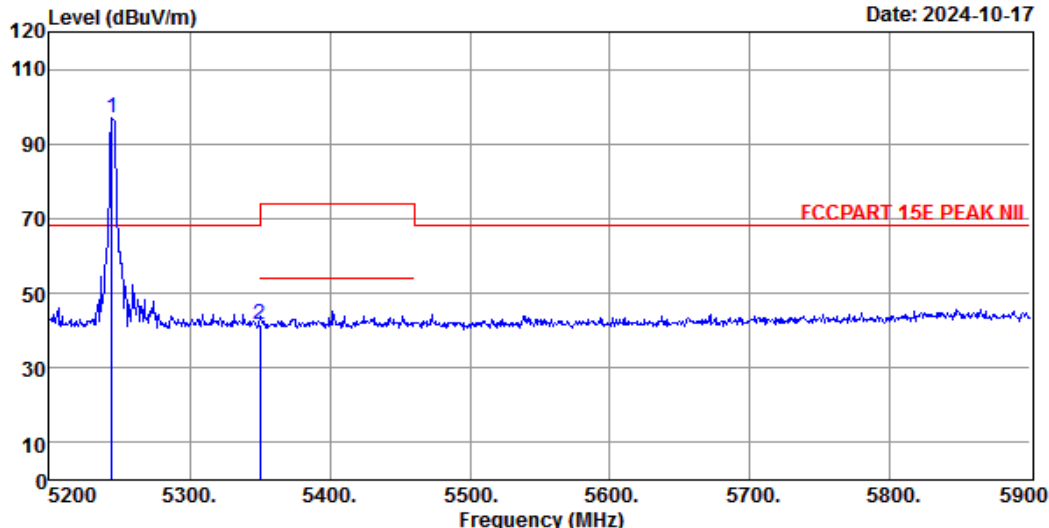
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Data: 62

File: \\EMC-966-1\test data\2024\RF\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (96)

Date: 2024-10-17



Site no. : 1# 966 Chamber Data no. : 62
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL
Limit : FCCPART 15E PEAK NII
Env. / Ins. : Temp:19.5°C;Humi:50%;Press:101.55kPa
Engineer : Aron
EUT : Satellite Speaker

Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX 5245MHz
Surround

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5244.80	33.40	7.19	43.02	99.55	97.12	68.20	-28.92	Peak
2	5350.00	33.70	7.28	42.99	43.55	41.54	68.20	26.66	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

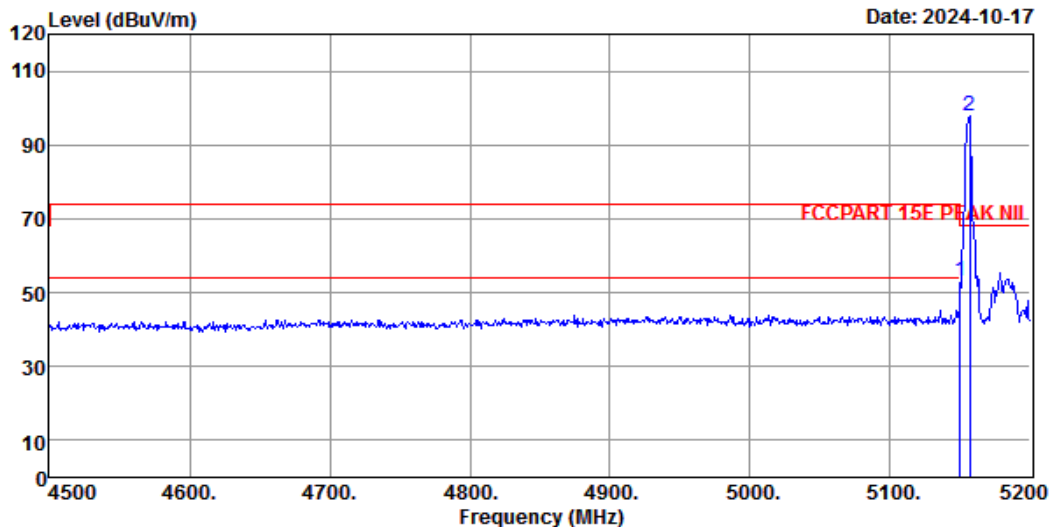
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Data: 63

File: \\EMC-966-1\test data\2024\RF\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (96)

Date: 2024-10-17



Site no. : 1# 966 Chamber Data no. : 63
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : HORIZONTAL
Limit : FCCPART 15E PEAK NII
Env. / Ins. : Temp:19.5°C;Humi:50%;Press:101.55kPa
Engineer : Aron
EUT : Satellite Speaker

Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX 5155MHz
Surround

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5150.00	33.70	7.09	43.05	55.38	53.12	68.20	15.08	Peak
2	5156.60	33.73	7.11	43.05	100.05	97.84	68.20	-29.64	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.

2. Margin= Limit - Emission Level.

3. The emission levels that are 20dB below the official
limit are not reported.

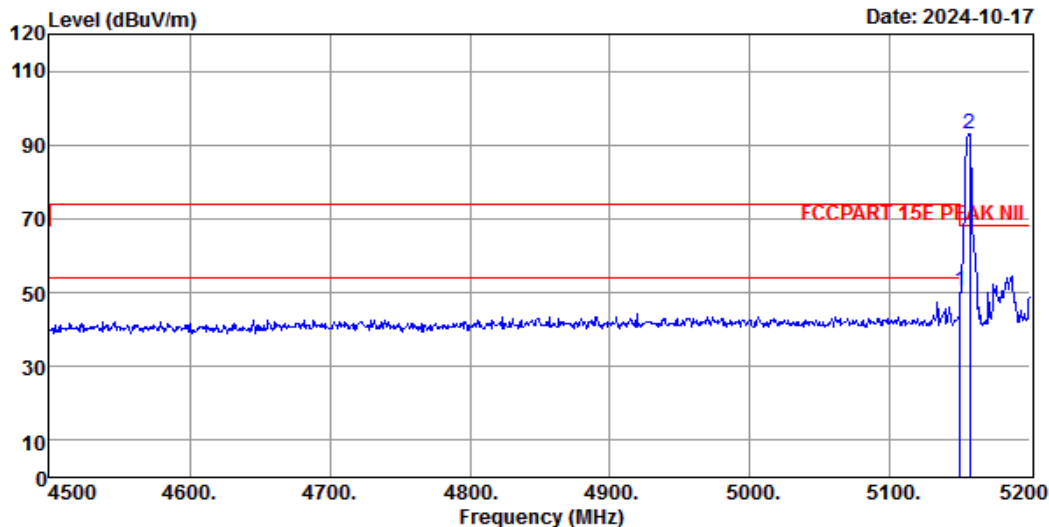
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Data: 64

File: \\EMC-966-1\test data\2024\RF\X\Xing Yang Guo Ji\HT Saturn-FCC.EM6 (96)

Date: 2024-10-17



Site no. : 1# 966 Chamber Data no. : 64
Dis. / Ant. : 3m BBHA9120D-2667 Ant. pol. : VERTICAL
Limit : FCCPART 15E PEAK NII
Env. / Ins. : Temp:19.5°C;Humi:50%;Press:101.55kPa
Engineer : Aron
EUT : Satellite Speaker

Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX 5155MHz
Surround

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5150.00	33.70	7.09	43.05	52.91	50.65	68.20	17.55	Peak
2	5156.60	33.73	7.11	43.05	95.07	92.86	68.20	-24.66	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official
limit are not reported.

18000MHz-40000MHz

Pass

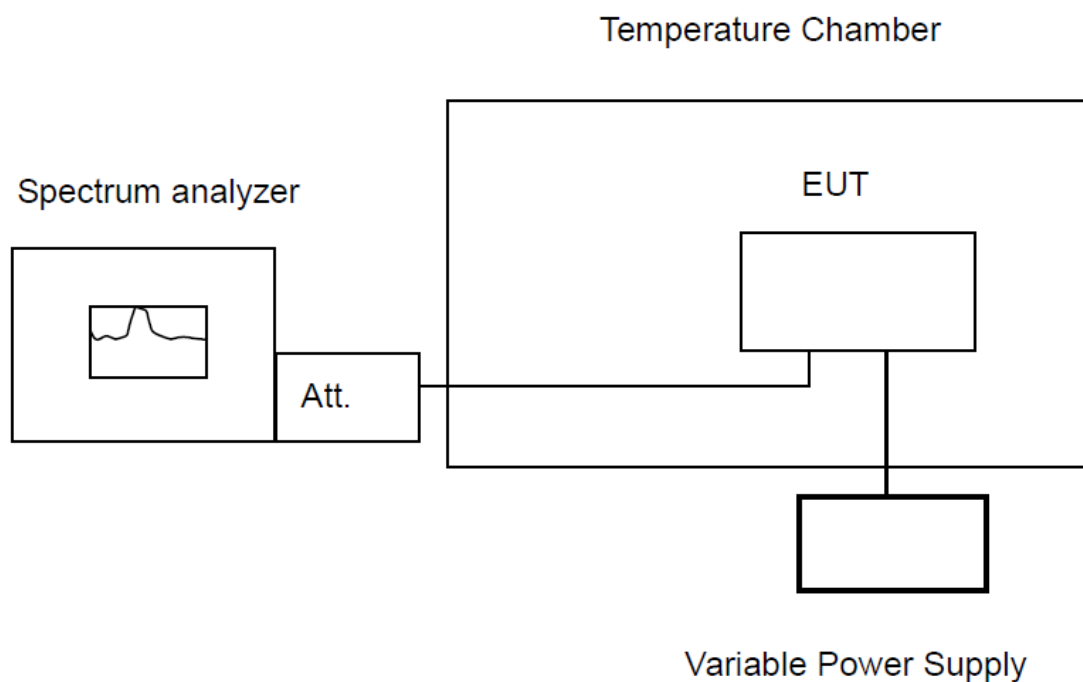
Note: The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

7.FREQUENCY STABILITY

7.1.Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the operational description.

7.2.Test Setup



7.3.Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	10KHz
VBW	10KHz
Span	200KHz
Sweep Time	Auto
Detector	PEAK
Trace Mode	Max Hold

7.4.Test Procedure

For measurement frequency stability under temperature variation :

- a. Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT.
- b. Turn the EUT OFF and place it inside the environmental temperature chamber.
- c. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- d. Spectrum analyzer setting parameters in accordance with section 7.3.
- e. Set the temperature control on the chamber to the Specified temperature and allow the oscillator heater and the chamber temperature to stabilize.
- f. Turn the EUT ON with the rated voltage, and the EUT transmit continuously with maximum output power.
- g. Record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized.
- h. Repeat step d through step f to measured the temperature form -20°C to $+50^{\circ}\text{C}$ in 10°C steps.

For frequency stability under voltage variation:

- a. Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT.
- b. Turn the EUT OFF and place it inside the environmental temperature chamber.
- c. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
- d. Spectrum analyzer setting parameters in accordance with section 7.3.
- e. Unless otherwise specified, set the temperature control on the chamber to the ambient room temperature ($+15^{\circ}\text{C}$ to $+25^{\circ}\text{C}$) and allow the oscillator heater and the chamber temperature to stabilize.
- f. Turn the EUT ON with the rated voltage, and the EUT transmit continuously with maximum output power.
- g. Record the operating frequency.
- h. Repeat step d through step f to measured the varied from 85% to 115% of the rated voltage.

7.5.Test Result

Refer to section 10: Appendix E

8.AC POWER LINE CONDUCTED EMISSIONS

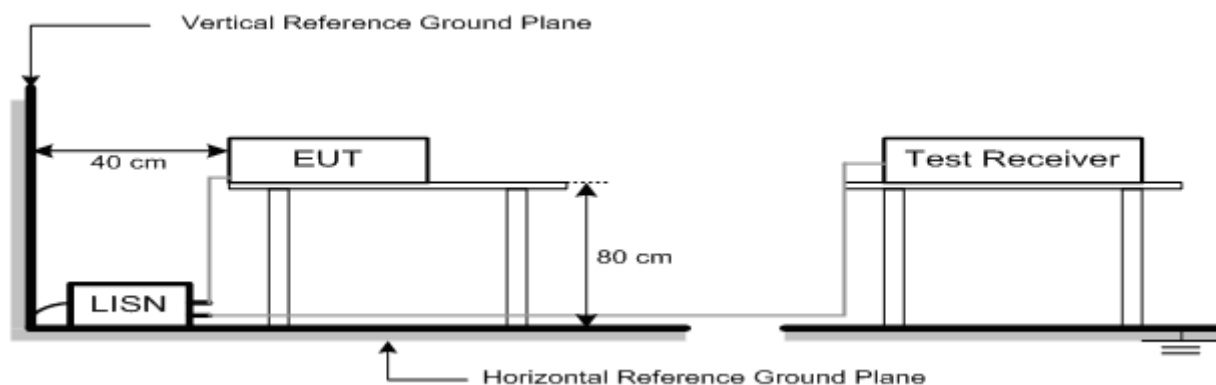
8.1.Limit

Frequency			Maximum RF Line Voltage	
			Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz	~	500kHz	66 ~ 56*	56 ~ 46*
500kHz	~	5MHz	56	46
5MHz	~	30MHz	60	50

Notes:

1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

8.2.Test Setup



8.3.Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP/AVG
Trace Mode	Max Hold

8.4.Test Procedure

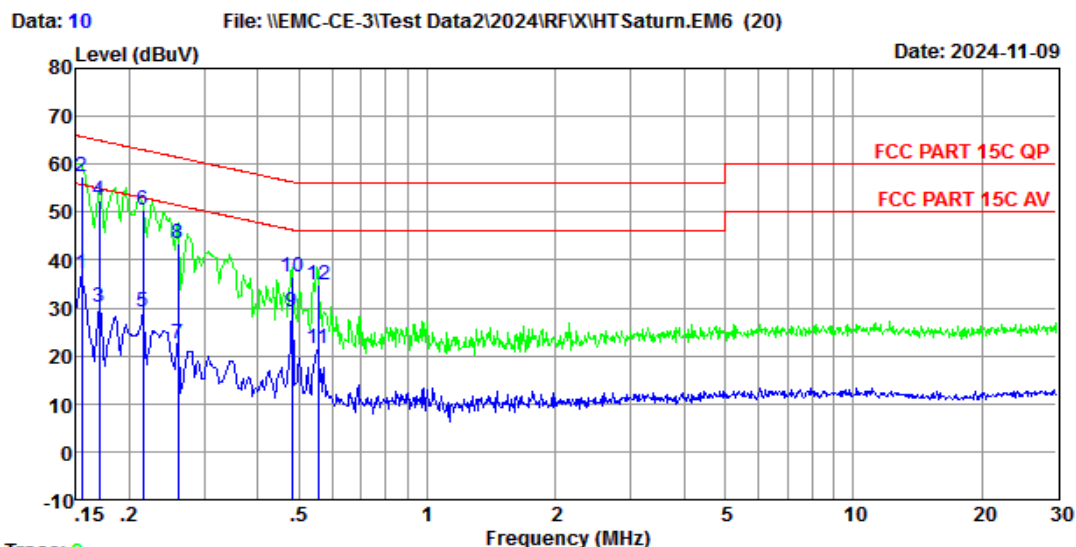
- a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
- b. The EUT Power connected to the power mains through a line impedance stabilization network.
- c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
- d. Set the EUT transmit continuously with maximum output power.
- e. Spectrum analyzer setting parameters in accordance with section 8.3.

- f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.
- g. Record the results in the test report.

8.5.Test Result

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878



Trace: 9

Site no : 3#CE Shield Room Data no. : 10

Env. / Ins. : Temp:23.7℃;Humi:45%;Press:101.1kPa LINE Phase : NEUTRAL

Limit : FCC PART 15C QP

Engineer : Wind

EUT : Satellite Speaker

Power : AC 120V/60Hz

M/N : HT Saturn

Test Mode : TX Mode

Surround

	Freq. (MHz)	LISN Factor (db)	Cable Loss (db)	Reading dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15	9.99	9.82	17.37	37.18	55.74	18.56	Average
2	0.15	9.99	9.82	37.68	57.49	65.74	8.25	QP
3	0.17	9.99	9.82	10.43	30.24	54.94	24.70	Average
4	0.17	9.99	9.82	32.66	52.47	64.94	12.47	QP
5	0.22	10.22	9.82	9.22	29.26	53.01	23.75	Average
6	0.22	10.22	9.82	30.56	50.60	63.01	12.41	QP
7	0.26	10.23	9.82	2.36	22.41	51.42	29.01	Average
8	0.26	10.23	9.82	23.57	43.62	61.42	17.80	QP
9	0.48	10.16	9.83	9.08	29.07	46.32	17.25	Average
10	0.48	10.16	9.83	16.34	36.33	56.32	19.99	QP
11	0.56	10.14	9.83	1.49	21.46	46.00	24.54	Average
12	0.56	10.14	9.83	14.77	34.74	56.00	21.26	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector,
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

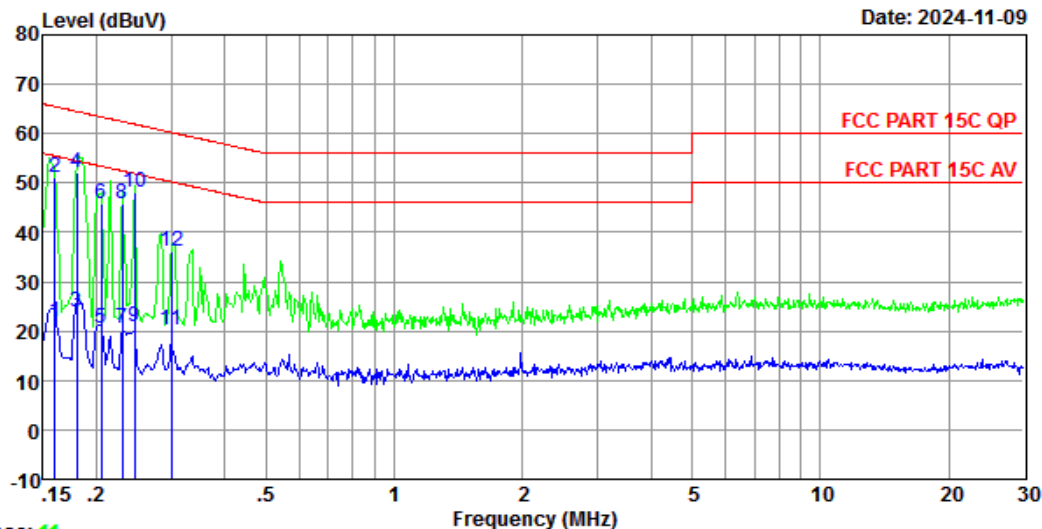
EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

Data: 12

File: \\EMC-CE-3\Test Data2\2024\RF\X\HT Saturn.EM6 (20)

Date: 2024-11-09



Trace: 11

Site no : 3#CE Shield Room Data no. : 12
Env. / Ins. : Temp:23.7℃;Humi:45%;Press:101.1kPa LINE Phase : LINE
Limit : FCC PART 15C QP
Engineer : Wind
EUT : Satellite Speaker
Power : AC 120V/60Hz
M/N : HT Saturn
Test Mode : TX Mode
Surround

	Freq. (MHz)	LISN Factor (db)	Cable Loss (db)	Reading dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.16	10.19	9.82	1.84	21.85	55.47	33.62	Average
2	0.16	10.19	9.82	31.12	51.13	65.47	14.34	QP
3	0.18	10.00	9.82	4.20	24.02	54.50	30.48	Average
4	0.18	10.00	9.82	32.35	52.17	64.50	12.33	QP
5	0.21	10.00	9.82	0.67	20.49	53.40	32.91	Average
6	0.21	10.00	9.82	25.84	45.66	63.40	17.74	QP
7	0.23	10.00	9.82	0.75	20.57	52.44	31.87	Average
8	0.23	10.00	9.82	25.93	45.75	62.44	16.69	QP
9	0.25	10.01	9.82	1.00	20.83	51.91	31.08	Average
10	0.25	10.01	9.82	28.24	48.07	61.91	13.84	QP
11	0.30	10.01	9.82	0.28	20.11	50.24	30.13	Average
12	0.30	10.01	9.82	16.44	36.27	60.24	23.97	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector,
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

9.ANTENNA REQUIREMENTS

9.1.Limit

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

9.2.Test Result

The antennas used for this product is PCB antenna, so compliance with antenna requirements. (Please refer to the EUT photo for details)

10.APPENDIX

Appendix A1: Emission Bandwidth Test Result

Test Mode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
GFSK	Ant1	5155	4.424	5152.760	5157.184	---	---
GFSK	Ant2	5155	4.368	5152.824	5157.192	---	---
GFSK	Ant1	5195	4.520	5192.768	5197.288	---	---
GFSK	Ant2	5195	4.712	5192.784	5197.496	---	---
GFSK	Ant1	5245	4.256	5242.904	5247.160	---	---
GFSK	Ant2	5245	4.616	5242.608	5247.224	---	---

Test Graphs

GFSK-Ant1-5155



GFSK-Ant2-5155



GFSK-Ant1-5195



GFSK-Ant2-5195



GFSK-Ant1-5245



GFSK-Ant2-5245



Appendix A2: Occupied channel bandwidth

Test Result

Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
GFSK	Ant1	5155	2.6847	5153.7077	5156.3924	---	---
GFSK	Ant2	5155	2.5997	5153.6991	5156.2988	---	---
GFSK	Ant1	5195	2.8657	5193.5960	5196.4617	---	---
GFSK	Ant2	5195	2.8822	5193.5012	5196.3834	---	---
GFSK	Ant1	5245	2.7756	5243.6593	5246.4349	---	---
GFSK	Ant2	5245	2.8011	5243.5076	5246.3087	---	---

Test Graphs

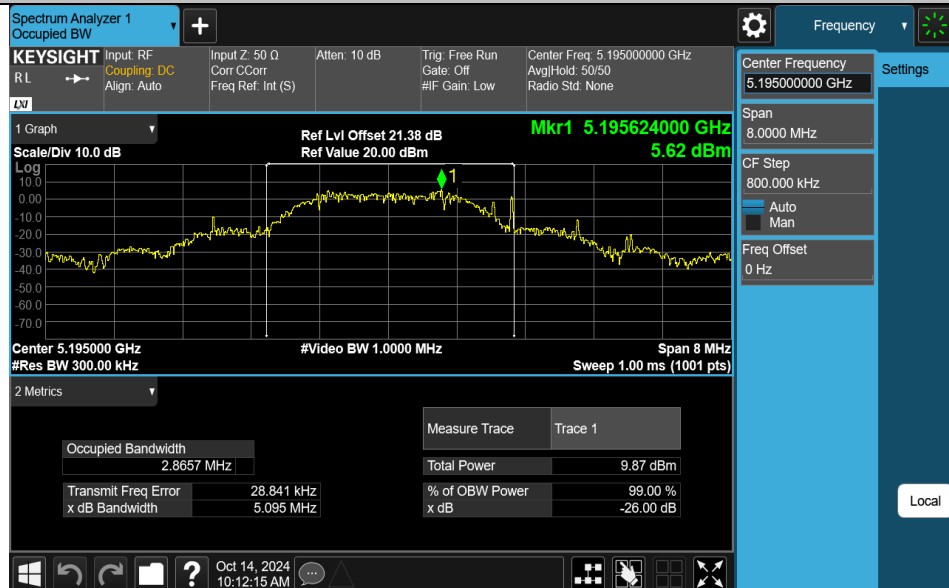
GFSK-Ant1-5155



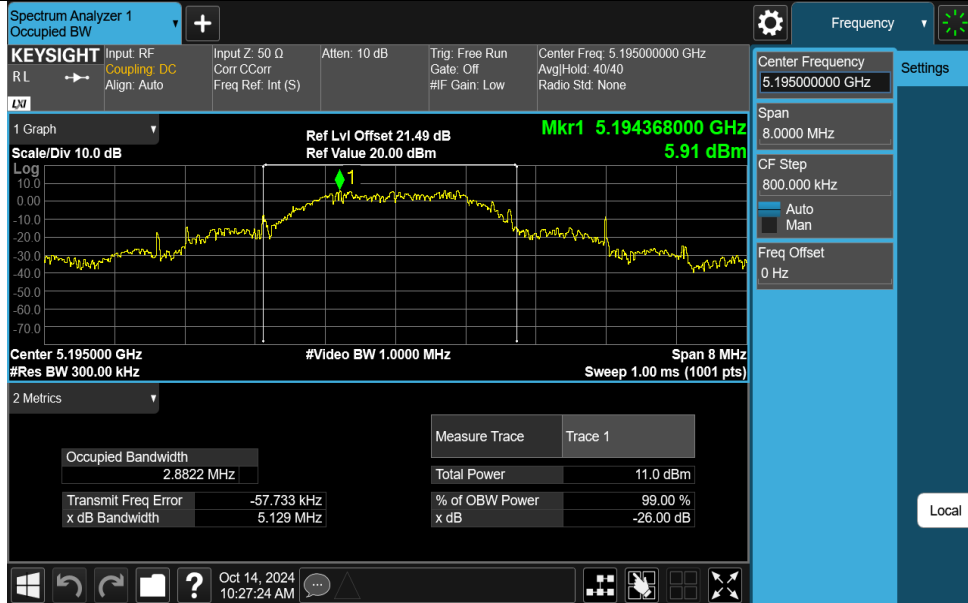
GFSK-Ant2-5155



GFSK-Ant1-5195



GFSK-Ant2-5195



GFSK-Ant1-5245



GFSK-Ant2-5245

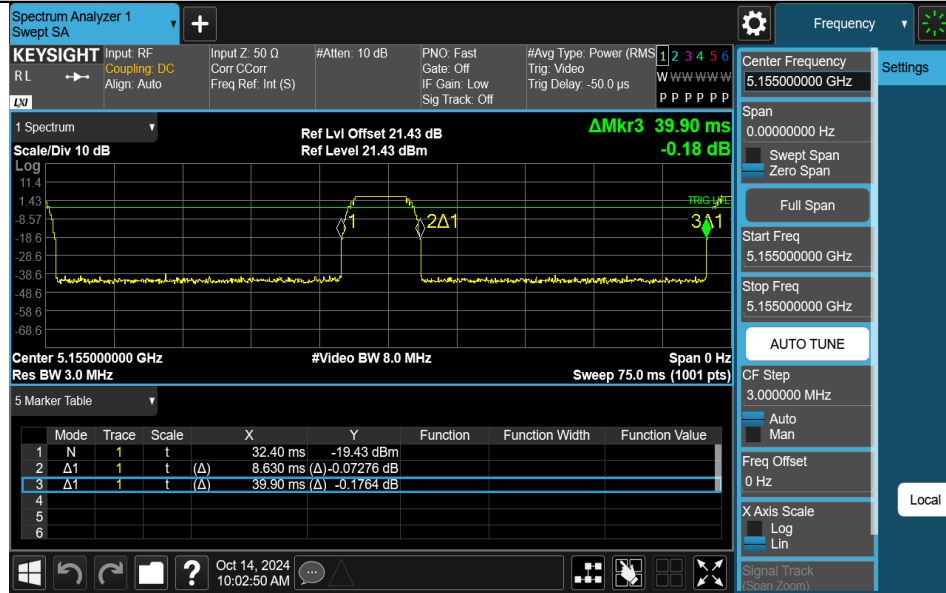


Appendix B: Duty Cycle Test Result

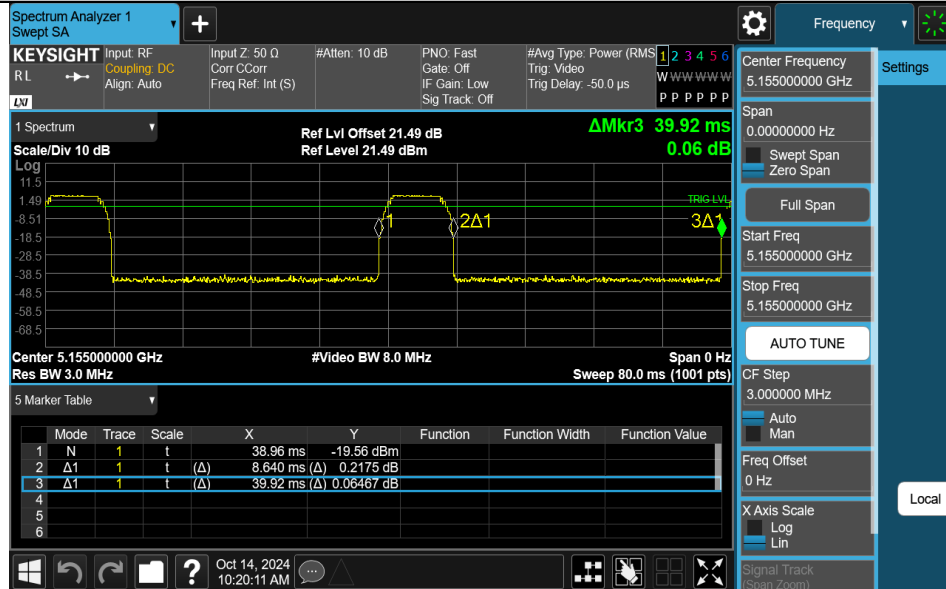
Test Mode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
GFSK	Ant1	5155	8.63	39.90	21.63
GFSK	Ant2	5155	8.64	39.92	21.64
GFSK	Ant1	5195	8.32	39.92	20.84
GFSK	Ant2	5195	8.32	39.92	20.84
GFSK	Ant1	5245	8.32	39.84	20.88
GFSK	Ant2	5245	8.32	39.84	20.88

Test Graphs

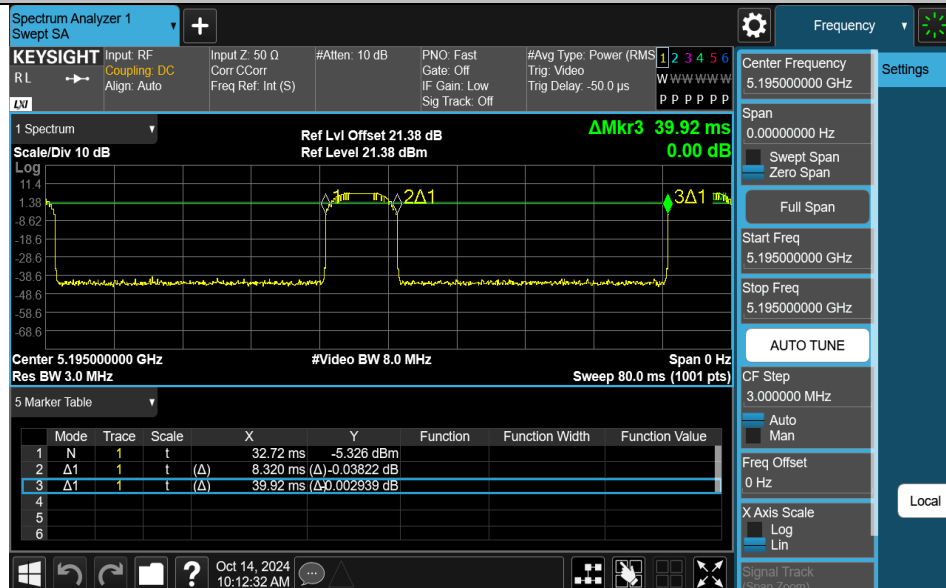
NTNV-GFSK-Ant1-5155



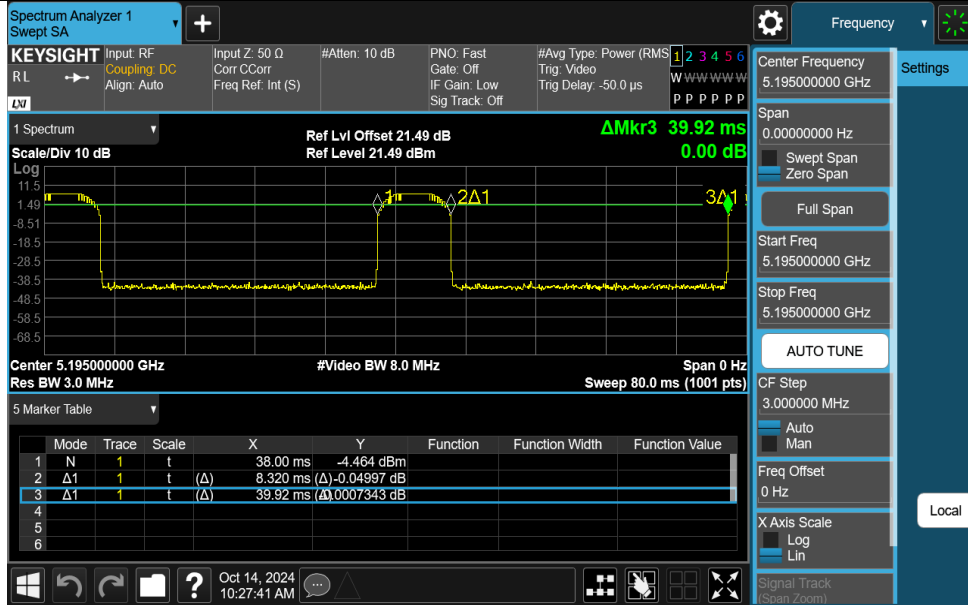
NTNV-GFSK-Ant2-5155



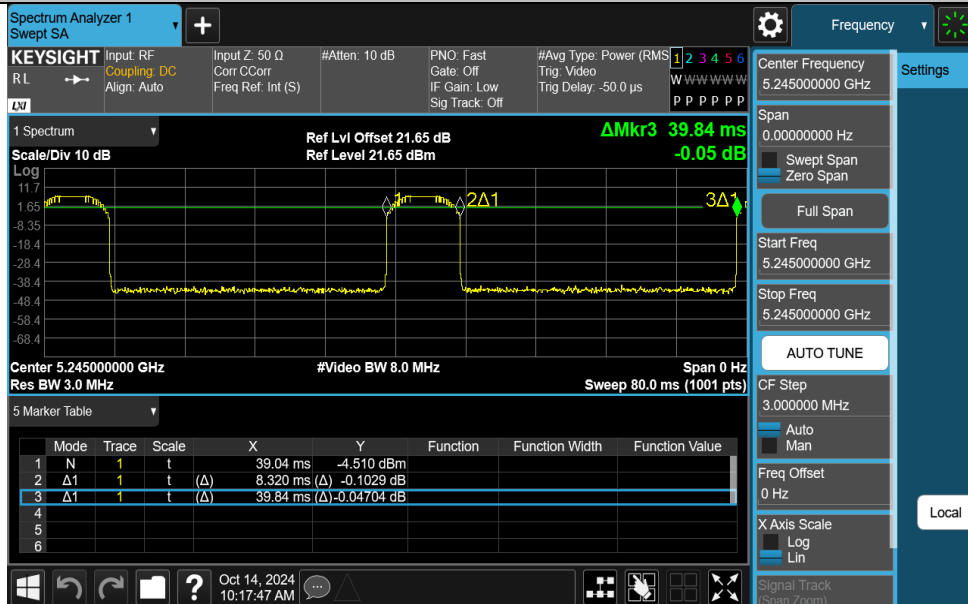
NTNV-GFSK-Ant1-5195



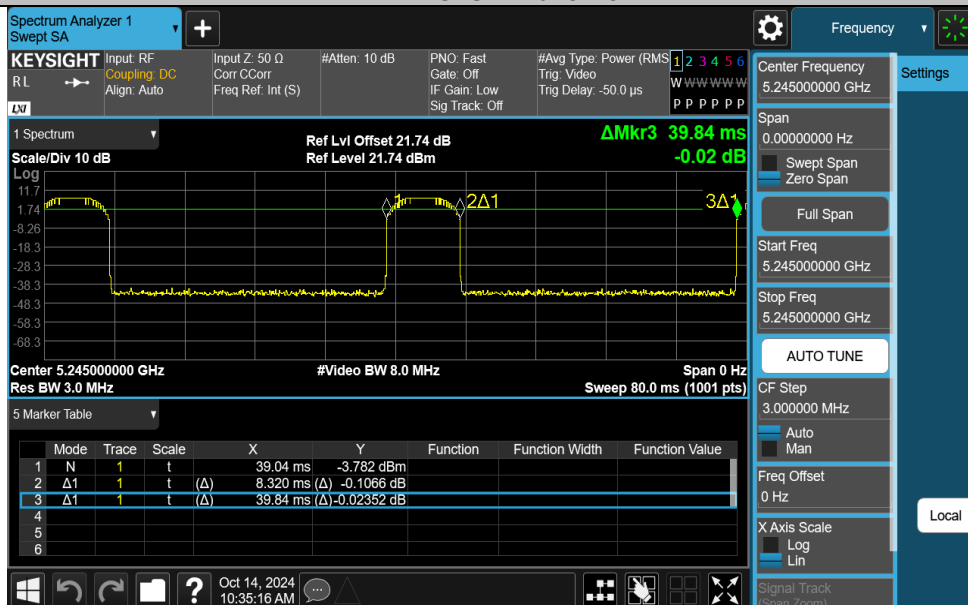
NTNV-GFSK-Ant2-5195



NTNV-GFSK-Ant1-5245



NTNV-GFSK-Ant2-5245



Appendix C: Maximum conducted output power

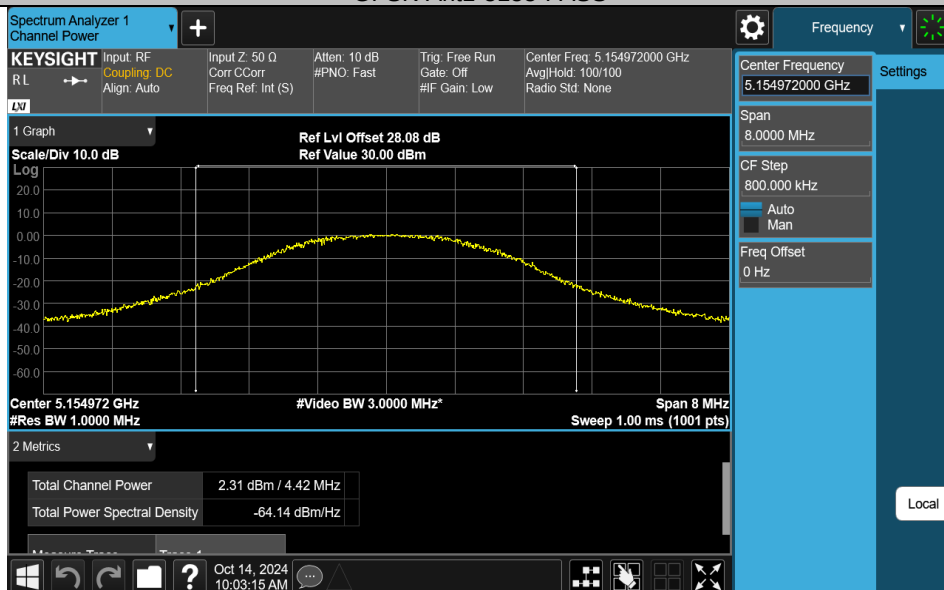
Test Result Channel Power

Test Mode	Antenna	Frequency[M Hz]	Channel Power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	Verdict
GFSK	Ant1	5155	-4.34	21.63	6.65	2.31	≤23.98	PASS
GFSK	Ant2	5155	-3.58	21.64	6.65	3.07	≤23.98	PASS
GFSK	Ant1	5195	-2.44	20.84	6.81	4.37	≤23.98	PASS
GFSK	Ant2	5195	-2.13	20.84	6.81	4.68	≤23.98	PASS
GFSK	Ant1	5245	-2.32	20.88	6.80	4.48	≤23.98	PASS
GFSK	Ant2	5245	-0.46	20.88	6.80	6.34	≤23.98	PASS

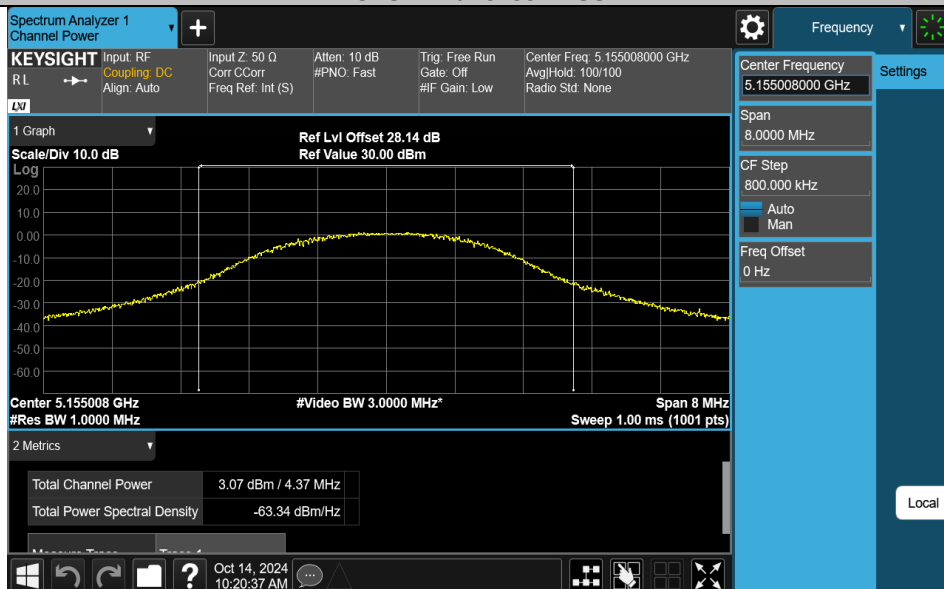
Note : The Duty Cycle Factor is compensated in the graph.

Test Graphs Channel Power

GFSK-Ant1-5155-PASS



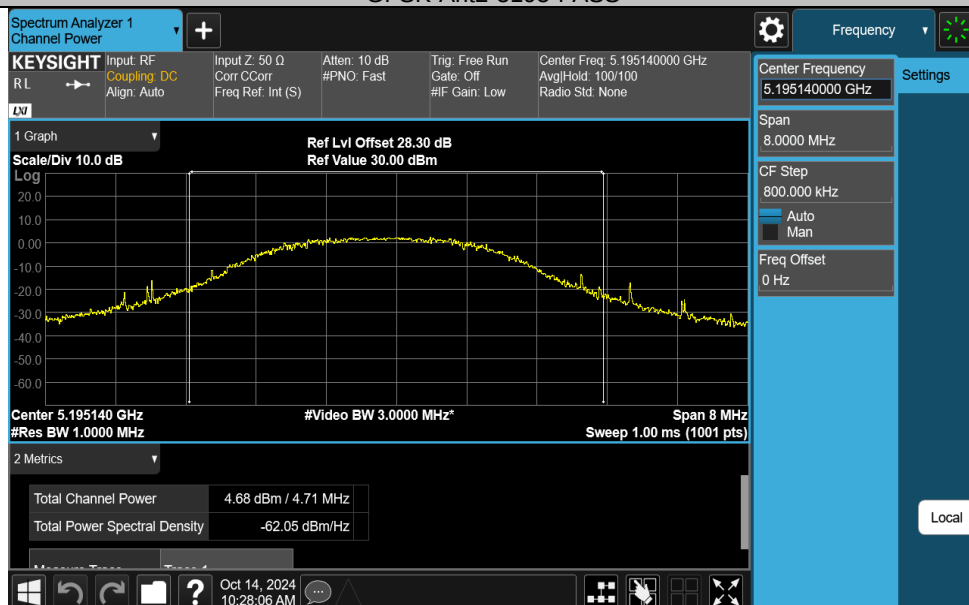
GFSK-Ant2-5155-PASS



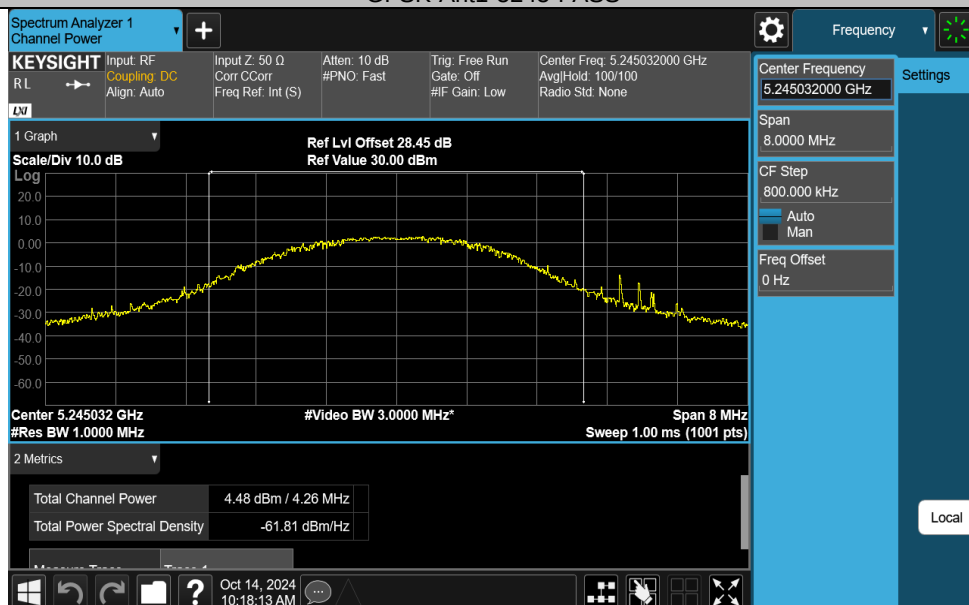
GFSK-Ant1-5195-PASS



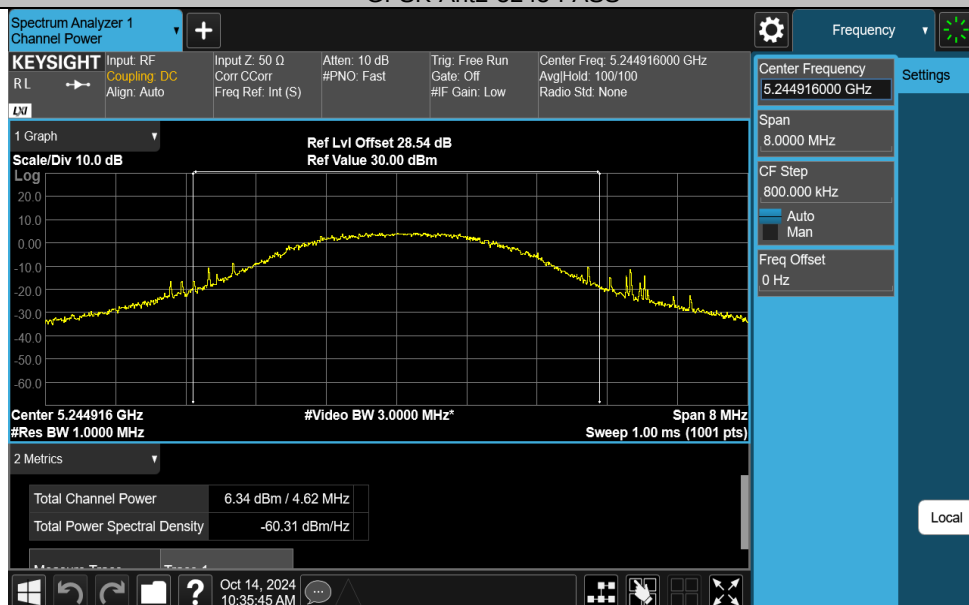
GFSK-Ant2-5195-PASS



GFSK-Ant1-5245-PASS



GFSK-Ant2-5245-PASS



Appendix D: Maximum power spectral density

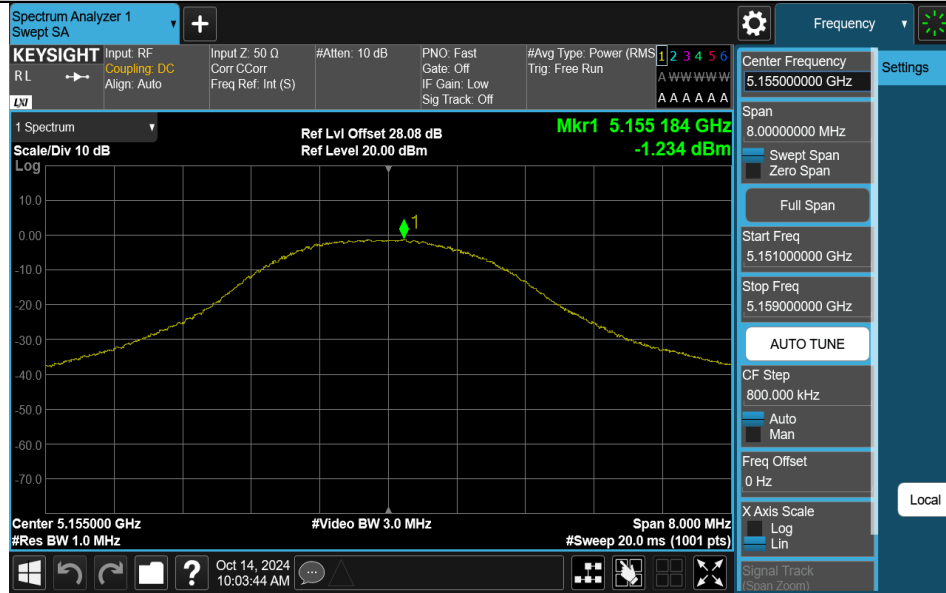
Test Result

Test Mode	Antenna	Frequency[MHz]	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
GFSK	Ant1	5155	-1.23	≤ 11.00	PASS
GFSK	Ant2	5155	-0.29	≤ 11.00	PASS
GFSK	Ant1	5195	1.74	≤ 11.00	PASS
GFSK	Ant2	5195	2.72	≤ 11.00	PASS
GFSK	Ant1	5245	2.86	≤ 11.00	PASS
GFSK	Ant2	5245	2.31	≤ 11.00	PASS

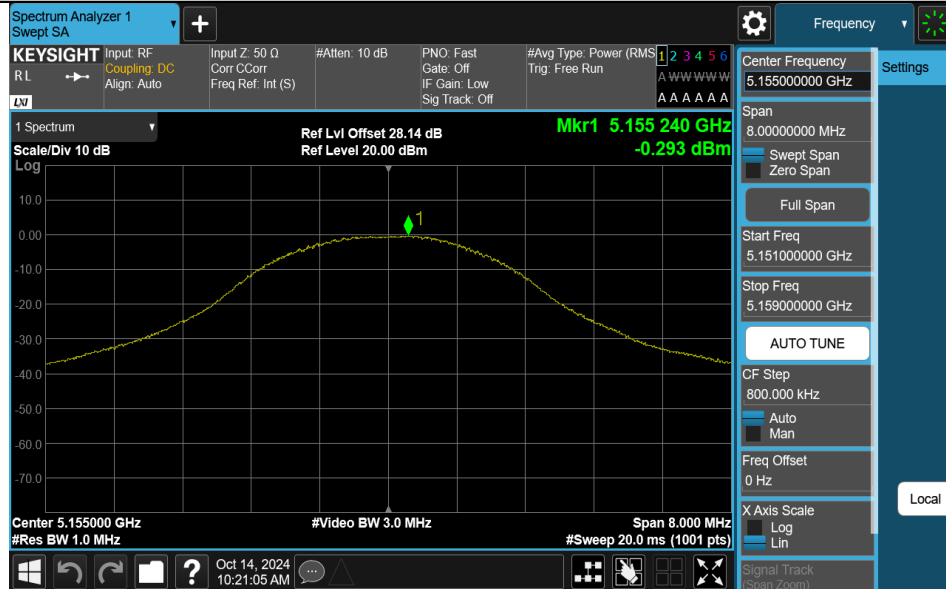
Note : The Duty Cycle Factor and RBW Factor is compensated in the graph.

Test Graphs

GFSK-Ant1-5155-PASS



GFSK-Ant2-5155-PASS



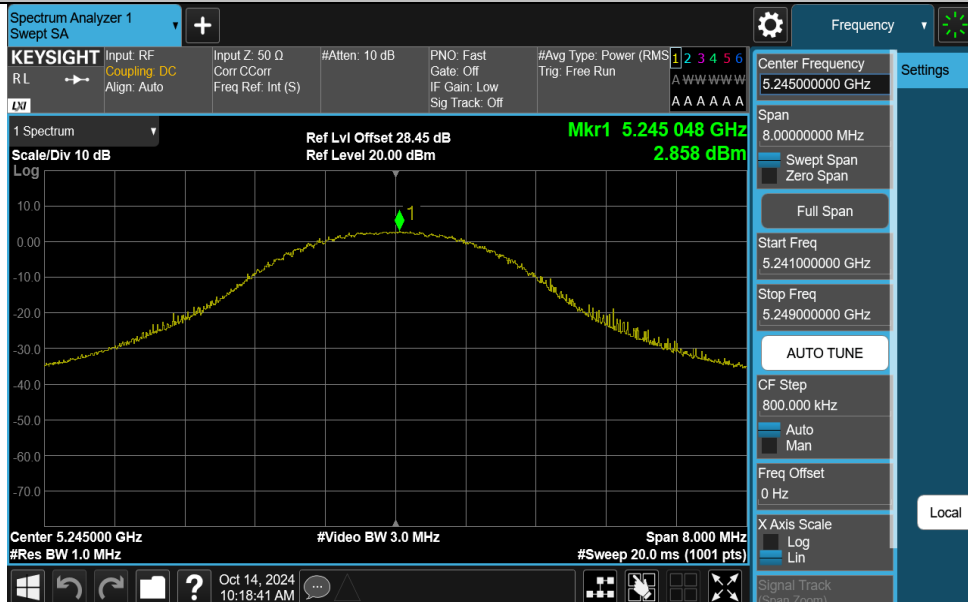
GFSK-Ant1-5195-PASS



GFSK-Ant2-5195-PASS



GFSK-Ant1-5245-PASS



GFSK-Ant2-5245-PASS



Appendix E: Frequency Stability Test Result

Test Mode	Antenna	Frequency[MHz]	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GFSK	Ant1	5155	NV	NT	8000.00	1.551891	20	PASS
GFSK	Ant1	5155	LV	NT	0.00	0.000000	20	PASS
GFSK	Ant1	5155	HV	NT	0.00	0.000000	20	PASS
GFSK	Ant2	5155	NV	NT	0.00	0.000000	20	PASS
GFSK	Ant2	5155	LV	NT	0.00	0.000000	20	PASS
GFSK	Ant2	5155	HV	NT	0.00	0.000000	20	PASS

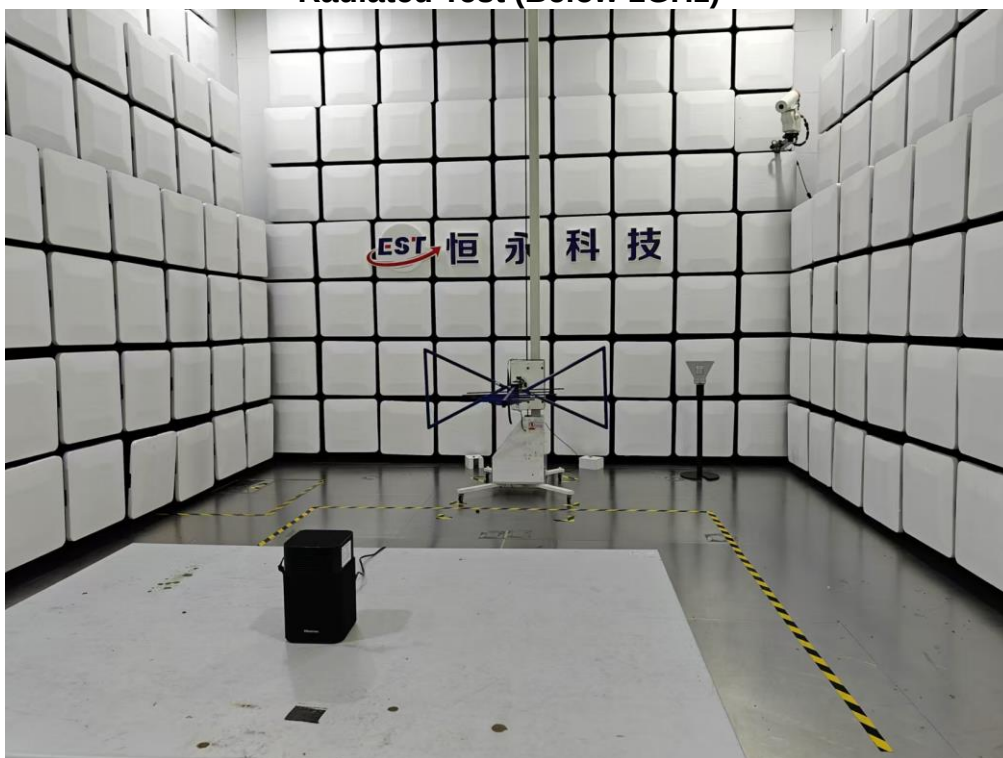
Test Mode	Antenna	Frequency[MHz]	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GFSK	Ant1	5155	NV	-30	0.00	0.000000	20	PASS
GFSK	Ant1	5155	NV	-20	0.00	0.000000	20	PASS
GFSK	Ant1	5155	NV	-10	0.00	0.000000	20	PASS
GFSK	Ant1	5155	NV	0	0.00	0.000000	20	PASS
GFSK	Ant1	5155	NV	10	0.00	0.000000	20	PASS
GFSK	Ant1	5155	NV	20	0.00	0.000000	20	PASS
GFSK	Ant1	5155	NV	30	0.00	0.000000	20	PASS
GFSK	Ant1	5155	NV	40	0.00	0.000000	20	PASS
GFSK	Ant1	5155	NV	50	0.00	0.000000	20	PASS
GFSK	Ant2	5155	NV	-30	0.00	0.000000	20	PASS
GFSK	Ant2	5155	NV	-20	0.00	0.000000	20	PASS
GFSK	Ant2	5155	NV	-10	0.00	0.000000	20	PASS
GFSK	Ant2	5155	NV	0	0.00	0.000000	20	PASS
GFSK	Ant2	5155	NV	10	0.00	0.000000	20	PASS
GFSK	Ant2	5155	NV	20	0.00	0.000000	20	PASS
GFSK	Ant2	5155	NV	30	0.00	0.000000	20	PASS
GFSK	Ant2	5155	NV	40	0.00	0.000000	20	PASS
GFSK	Ant2	5155	NV	50	0.00	0.000000	20	PASS

11. TEST SETUP PHOTO

Conducted Test



Radiated Test (Below 1GHz)



Radiated Test (Above 1GHz)



12. EUT PHOTO

External Photos M/N: HT Saturn



External Photos
M/N: HT Saturn



External Photos
M/N: HT Saturn



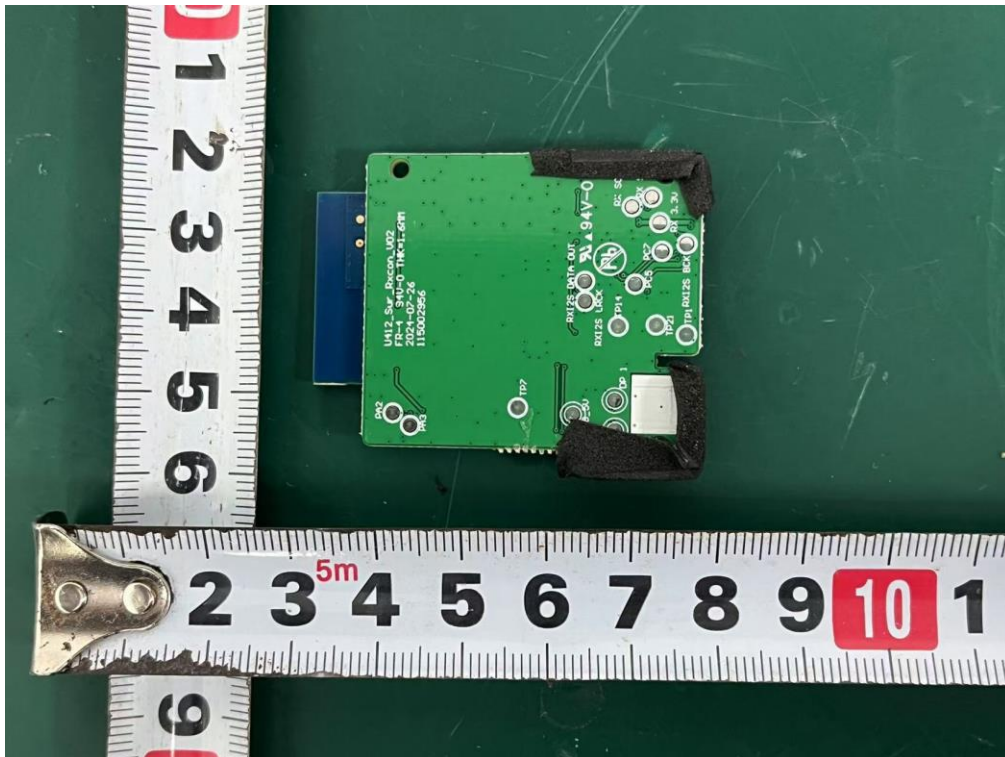
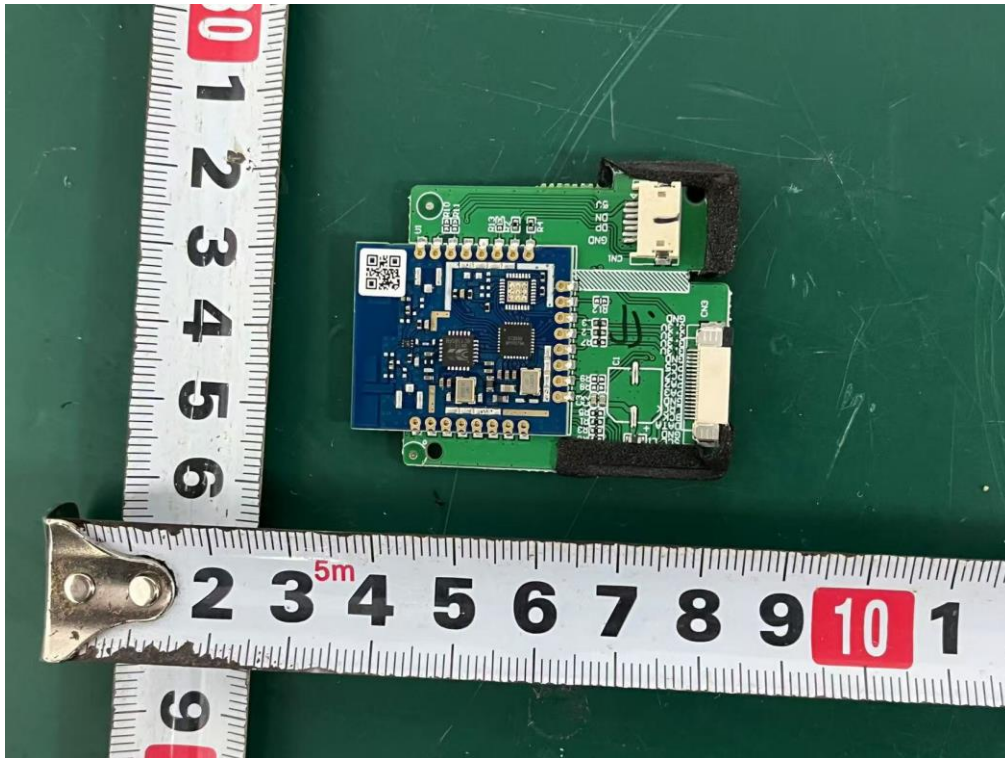
Internal Photos

M/N: HT Saturn



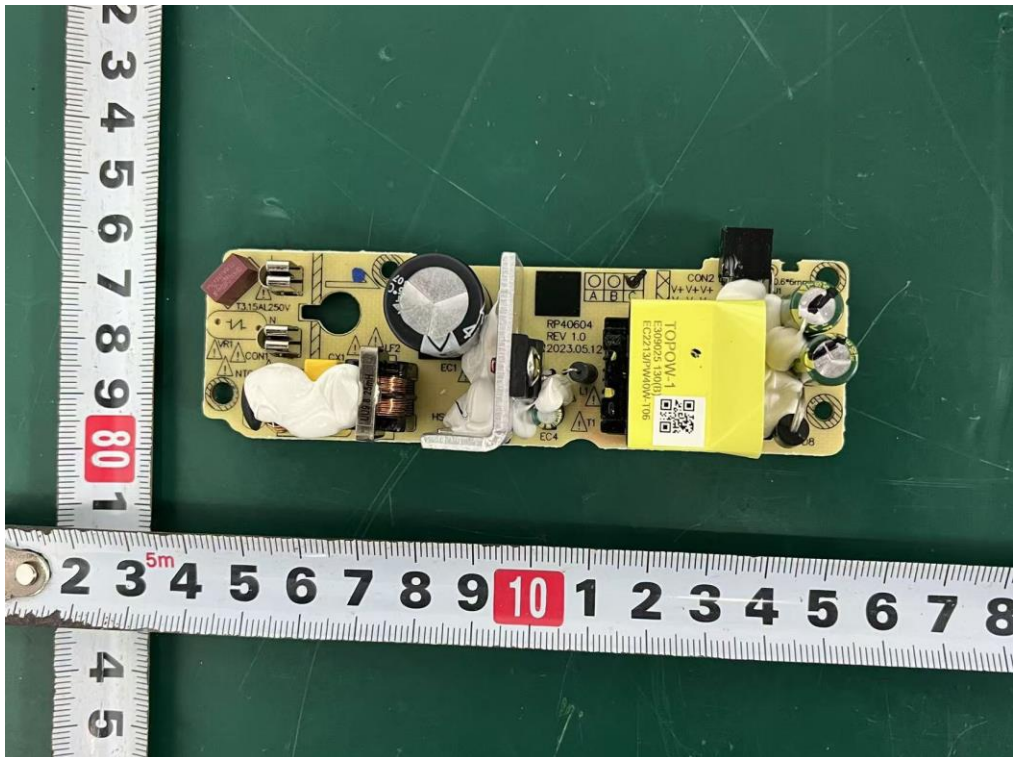
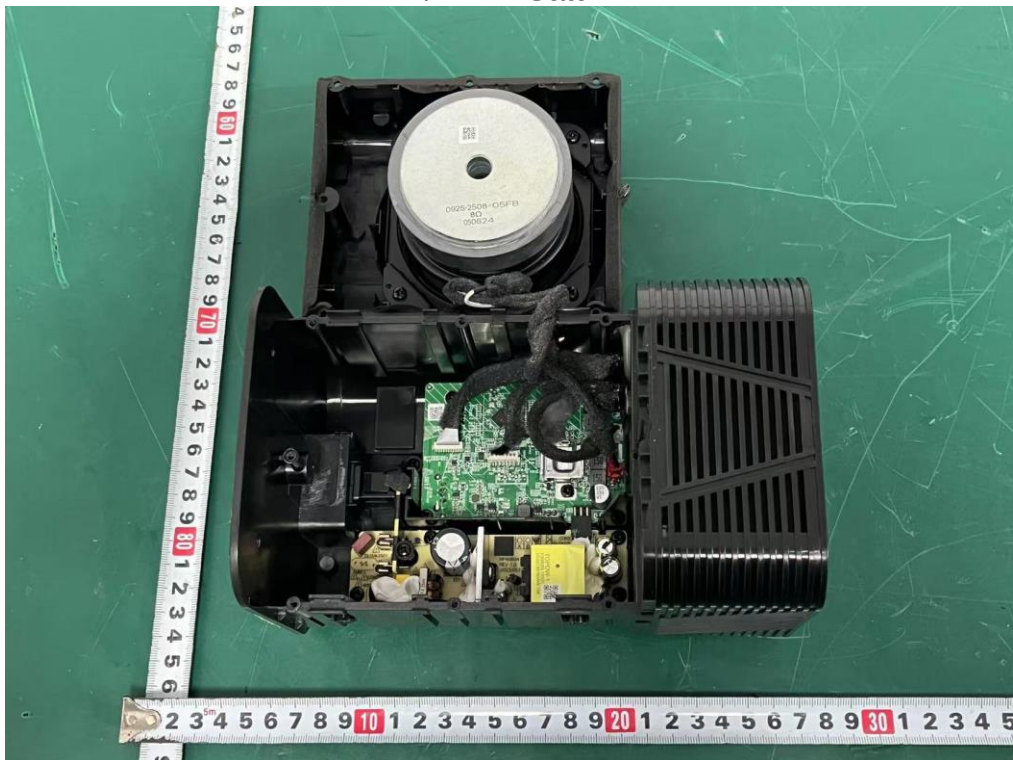
Internal Photos

M/N: HT Saturn



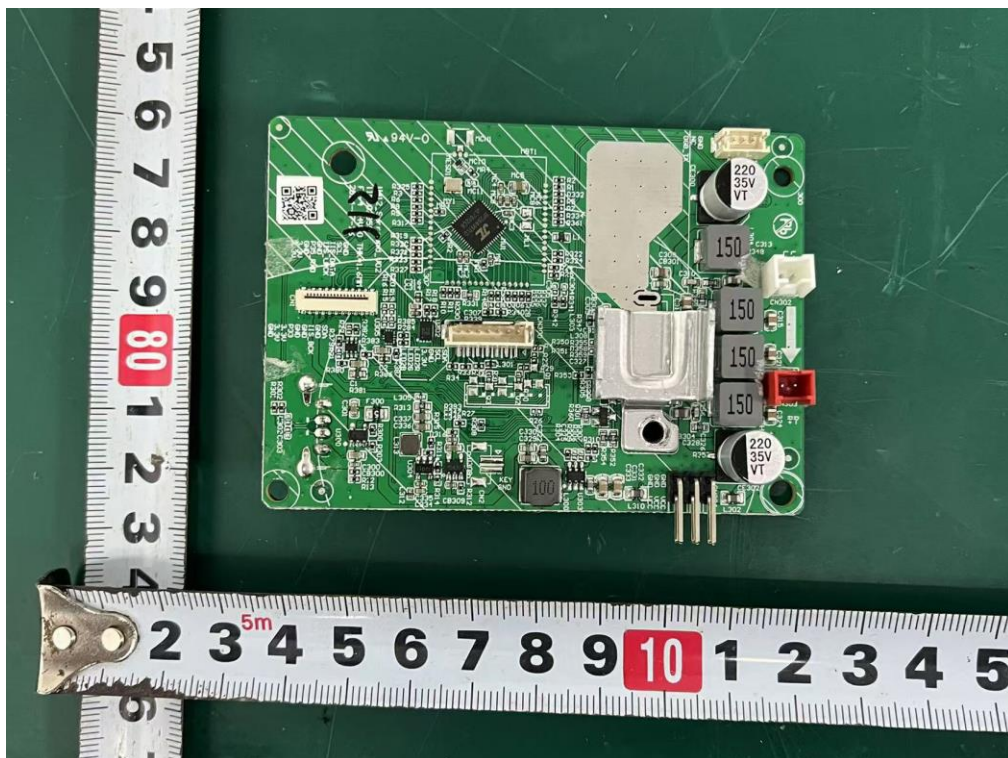
Internal Photos

M/N: HT Saturn



Internal Photos

M/N: HT Saturn



Internal Photos

M/N: HT Saturn



Internal Photos

M/N: HT Saturn

**End of Test Report**