Shenzhen HTT Technology Co., Ltd.

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.225

Report Reference No.....:	**HTT202502516F01**
FCC ID..... :	**2AQKM-T-420**
Compiled by (position+printed name+signature)..:	File administrators
Supervised by (position+printed name+signature)..:	Project Engineer
Approved by (position+printed name+signature)..:	RF Manager
Date of issue.....:	Feb. 25, 2025

Testing Laboratory Name .....:	**Shenzhen HTT Technology Co.,Ltd.**
Address.....:	1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China
Applicant's name.....:	**GUANGDONG UNIS TECHNOLOGY CO., LTD**
Address .....:	No.1 Zheng An Road, West District,, Zhongshan, GuangDong, China
Test specification .....:	
Standard .....:	**FCC Part 15.225**

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Test item description .....:	**Dragon Treasure GMP**
Trade Mark .....:	UNIS
Manufacturer .....:	GUANGDONG UNIS TECHNOLOGY CO., LTD
Model/Type reference.....:	T-420
Listed Models .....:	N/A
Modulation Type .....:	ASK
Operation Frequency.....:	13.56MHz
Rating .....:	AC 120V
Result.....:	**PASS**

TEST REPORT

Equipment under Test	:	Dragon Treasure GMP
Model /Type	:	T-420
Listed Models	:	N/A
Applicant	:	**GUANGDONG UNIS TECHNOLOGY CO., LTD**
Address	:	No.1 Zheng An Road, West District,, Zhongshan, GuangDong, China
Manufacturer	:	**GUANGDONG UNIS TECHNOLOGY CO., LTD**
Address	:	No.1 Zheng An Road, West District,, Zhongshan, GuangDong, China

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.225: Operation within the band 13.110–14.010 MHz.
ANSI C63.10-2020: American National Standard for Testing Unlicensed Wireless Devices

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Feb. 19, 2025
Testing commenced on	:	Feb. 19, 2025
Testing concluded on	:	Feb. 25, 2025

2.2 Product Description

Product Name:	Dragon Treasure GMP
Model/Type reference:	T-420
Power Supply:	AC 120V
Testing sample ID：	HTT202502516-1(Engineer sample) HTT202502516-2(Normal sample)
Software version:	/
Hardware version:	/
13.56MHz RFID	
Operation frequency:	13.56MHz
Modulation :	ASK
No. of Channel :	1
Antenna type:	PCB Antenna
Antenna gain:	0.00 dBi

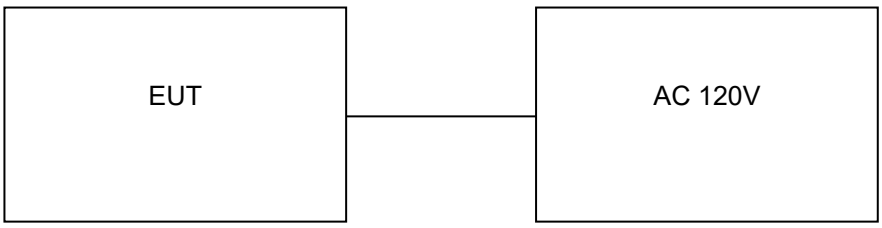
2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	●	120V / 60Hz
		○	12 V DC	○	24 V DC
		○	Other (specified in blank below)		

/

2.4 Block Diagram of Test Setup



2.5 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by

/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/

2.6 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for the EUT filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules.

2.7 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen HTT Technology Co.,Ltd.
1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China

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3.2 Test Facility

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

FCC-Registration No.: 779513 Designation Number: CN1319
Shenzhen HTT Technology Co.,Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6435.01
Shenzhen HTT Technology Co.,Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

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3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:
Radiated Emission:

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

AC Power Conducted Emission:

Temperature:	25 ° C
Humidity:	46 %
Atmospheric pressure:	950-1050mbar

Conducted testing:

Temperature:	25 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

3.4 Test Description

FCC PART 15 .225		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 2.1049	20dB Bandwidth	PASS
FCC Part 15.225(a) (b) (c)	In-band Emissions	PASS
FCC Part 15.225(d)/15.207	Out-of-band Emissions	PASS
FCC Part 15.225(e)	Frequency Stability Tolerance	PASS

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen HTT Technology Co.,Ltd.quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen HTT Technology Co.,Ltd. laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MHz	3.12 dB	(1)
Radiated Emission	30~1000MHz	4.37 dB	(1)
Radiated Emission	1~18GHz	5.40 dB	(1)
Radiated Emission	18-40GHz	5.45 dB	(1)
Conducted Disturbance	0.15~30MHz	2.68 dB	(1)

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

3.6 Equipments Used during the Test

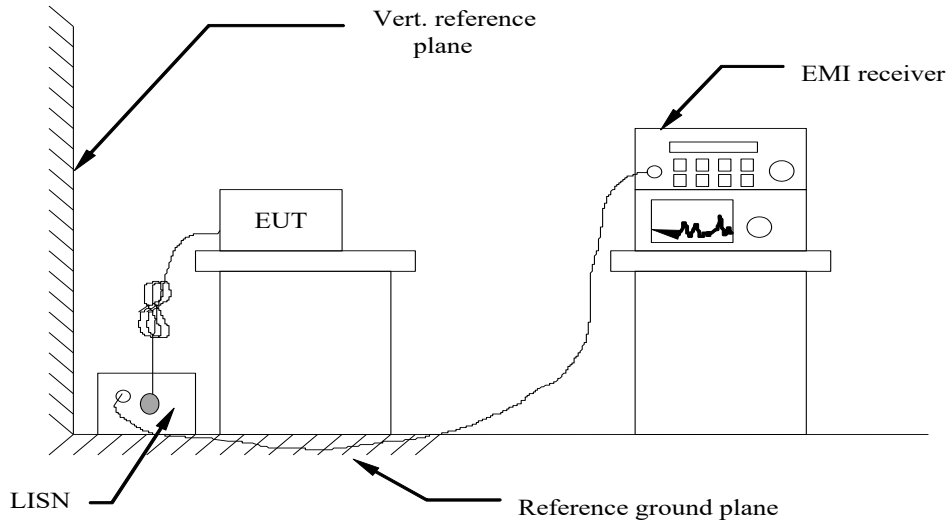
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	Shenzhen C.R.T technology co., LTD	9*6*6	HTT-E028	Aug. 10 2021	Aug. 09 2024
2	Control Room	Shenzhen C.R.T technology co., LTD	4.8*3.5*3.0	HTT-E030	Aug. 10 2021	Aug. 09 2024
3	EMI Test Receiver	Rohde&Schwar	ESCI7	HTT-E022	Apr. 26 2023	Apr. 25 2024
4	Spectrum Analyzer	Rohde&Schwar	FSP	HTT-E037	Apr. 26 2023	Apr. 25 2024
5	Coaxial Cable	ZDecl	ZT26-NJ-NJ-0.6M	HTT-E018	Apr. 26 2023	Apr. 25 2024
6	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-2M	HTT-E019	Apr. 26 2023	Apr. 25 2024
7	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-0.6M	HTT-E020	Apr. 26 2023	Apr. 25 2024
8	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-8.5M	HTT-E021	Apr. 26 2023	Apr. 25 2024
9	Composite logarithmic antenna	Schwarzbeck	VULB 9168	HTT-E017	May. 21 2023	May. 20 2024
10	Horn Antenna	Schwarzbeck	BBHA9120D	HTT-E016	May. 20 2023	May. 19 2024
11	Loop Antenna	Zhinan	ZN30900C	HTT-E039	Apr. 26 2023	Apr. 25 2024
12	Horn Antenna	Beijing Hangwei Dayang	OBH100400	HTT-E040	Apr. 26 2023	Apr. 25 2024
13	low frequency Amplifier	Sonoma Instrument	310	HTT-E015	Apr. 26 2023	Apr. 25 2024
14	high-frequency Amplifier	HP	8449B	HTT-E014	Apr. 26 2023	Apr. 25 2024
15	Variable frequency power supply	Shenzhen Anbiao Instrument Co., Ltd	ANB-10VA	HTT-082	Apr. 26 2023	Apr. 25 2024
16	EMI Test Receiver	Rohde & Schwarz	ESCS30	HTT-E004	Apr. 26 2023	Apr. 25 2024
17	Artificial Mains	Rohde & Schwarz	ESH3-Z5	HTT-E006	May. 23 2023	May. 22 2024
18	Artificial Mains	Rohde & Schwarz	ENV-216	HTT-E038	May. 23 2023	May. 22 2024
19	Cable Line	Robinson	Z302S-NJ-BNCJ-1.5M	HTT-E001	Apr. 26 2023	Apr. 25 2024
20	Attenuator	Robinson	6810.17A	HTT-E007	Apr. 26 2023	Apr. 25 2024
21	Variable frequency power supply	Shenzhen Yanghong Electric Co., Ltd	YF-650（5KVA）	HTT-E032	Apr. 26 2023	Apr. 25 2024
22	Control Room	Shenzhen C.R.T technology co., LTD	8*4*3.5	HTT-E029	Aug. 10 2021	Aug. 09 2024
23	DC power supply	Agilent	E3632A	HTT-E023	Apr. 26 2023	Apr. 25 2024
24	EMI Test Receiver	Agilent	N9020A	HTT-E024	Apr. 26 2023	Apr. 25 2024
25	Analog signal generator	Agilent	N5181A	HTT-E025	Apr. 26 2023	Apr. 25 2024
26	Vector signal generator	Agilent	N5182A	HTT-E026	Apr. 26 2023	Apr. 25 2024
27	Power sensor	Keysight	U2021XA	HTT-E027	Apr. 26 2023	Apr. 25 2024
28	Temperature and humidity meter	Shenzhen Anbiao Instrument Co., Ltd	TH10R	HTT-074	Apr. 28 2023	Apr. 27 2024
29	Radiated Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
30	Conducted Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
31	RF Test Software	panshanrf	TST	N/A	N/A	N/A

Note: The Cal.Interval was one year.

4 TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received DC 12V power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

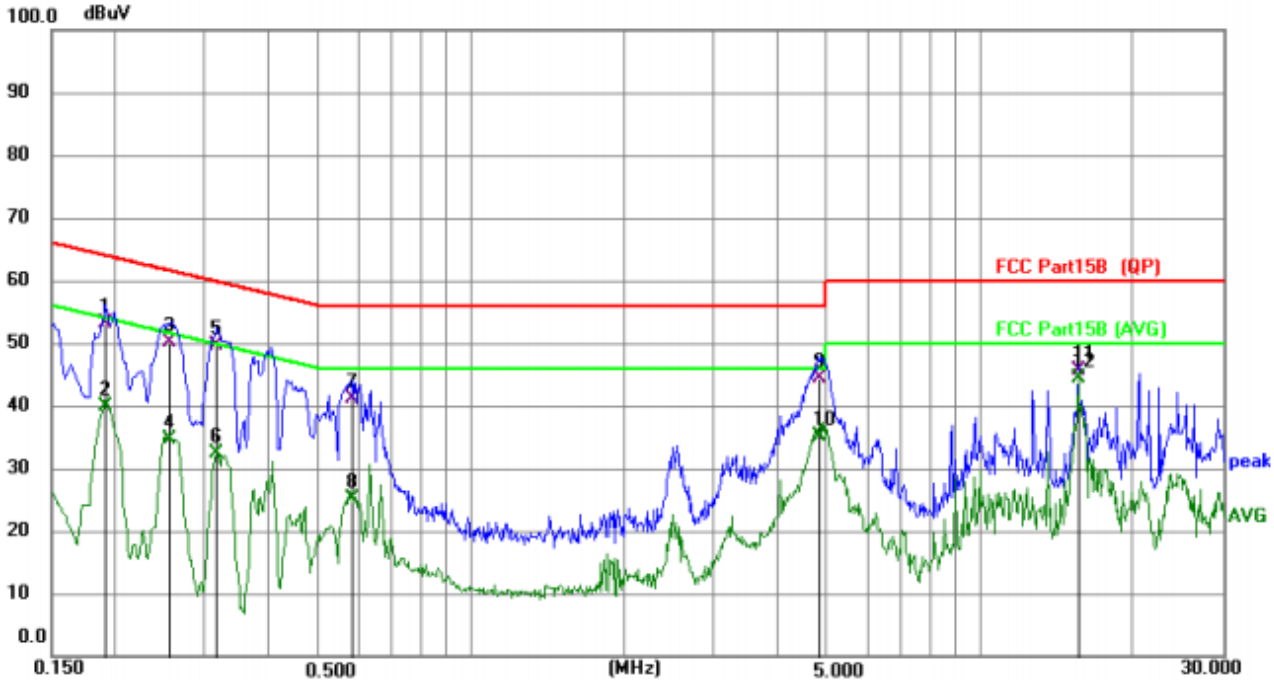
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

TEST RESULTS

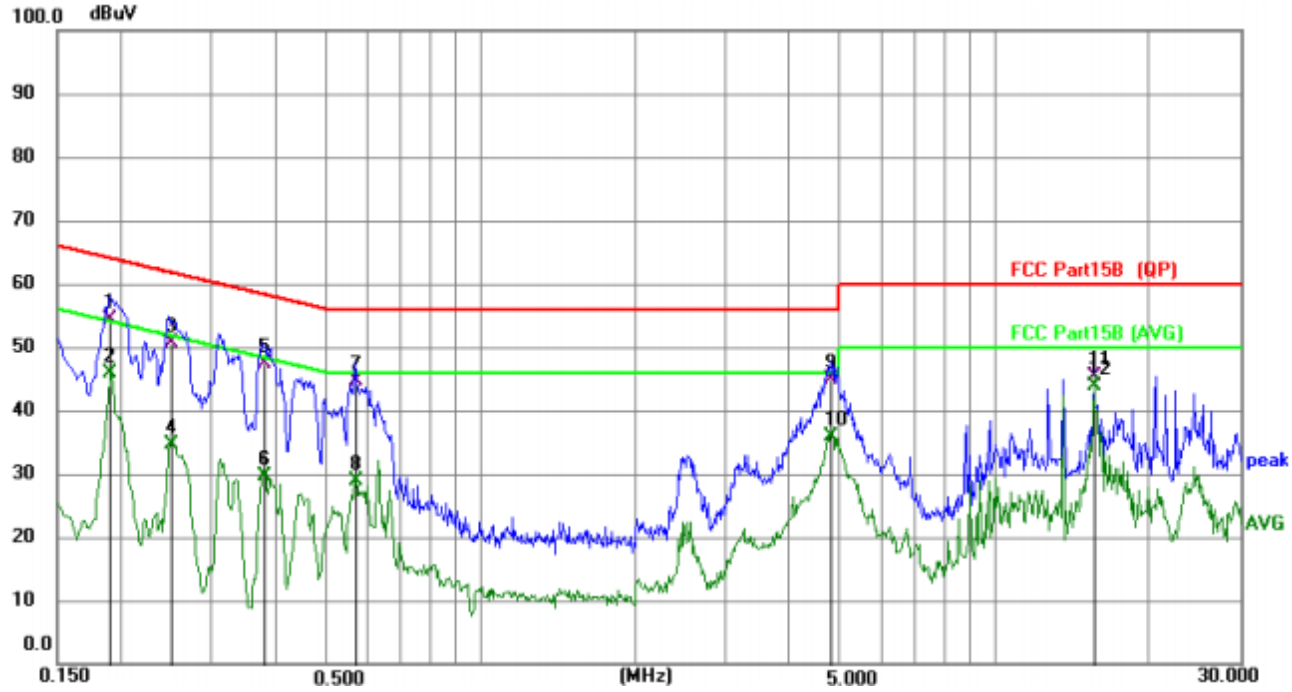
Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data:
Line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1905	43.07	10.16	53.23	64.01	-10.78	QP
2		0.1905	29.73	10.16	39.89	54.01	-14.12	AVG
3		0.2560	39.98	10.23	50.21	61.56	-11.35	QP
4		0.2560	24.39	10.23	34.62	51.56	-16.94	AVG
5		0.3165	39.54	10.19	49.73	59.80	-10.07	QP
6		0.3165	22.11	10.19	32.30	49.80	-17.50	AVG
7		0.5865	31.00	10.20	41.20	56.00	-14.80	QP
8		0.5865	14.94	10.20	25.14	46.00	-20.86	AVG
9		4.8659	34.18	10.12	44.30	56.00	-11.70	QP
10		4.8659	24.90	10.12	35.02	46.00	-10.98	AVG
11		15.6300	34.81	10.81	45.62	60.00	-14.38	QP
12	*	15.6300	33.55	10.81	44.36	50.00	-5.64	AVG

Neutral:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1901	44.24	10.21	54.45	64.03	-9.58	QP
2		0.1901	35.61	10.21	45.82	54.03	-8.21	AVG
3		0.2490	40.34	10.20	50.54	61.79	-11.25	QP
4		0.2490	24.41	10.20	34.61	51.79	-17.18	AVG
5		0.3790	37.13	10.15	47.28	58.30	-11.02	QP
6		0.3790	19.37	10.15	29.52	48.30	-18.78	AVG
7		0.5730	34.40	10.18	44.58	56.00	-11.42	QP
8		0.5730	18.65	10.18	28.83	46.00	-17.17	AVG
9		4.8075	34.87	10.13	45.00	56.00	-11.00	QP
10		4.8075	25.81	10.13	35.94	46.00	-10.06	AVG
11		15.6300	34.59	10.89	45.48	60.00	-14.52	QP
12	*	15.6300	33.09	10.89	43.98	50.00	-6.02	AVG

Notes:

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

4.2 Radiated Emission

LIMIT

a The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

b Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

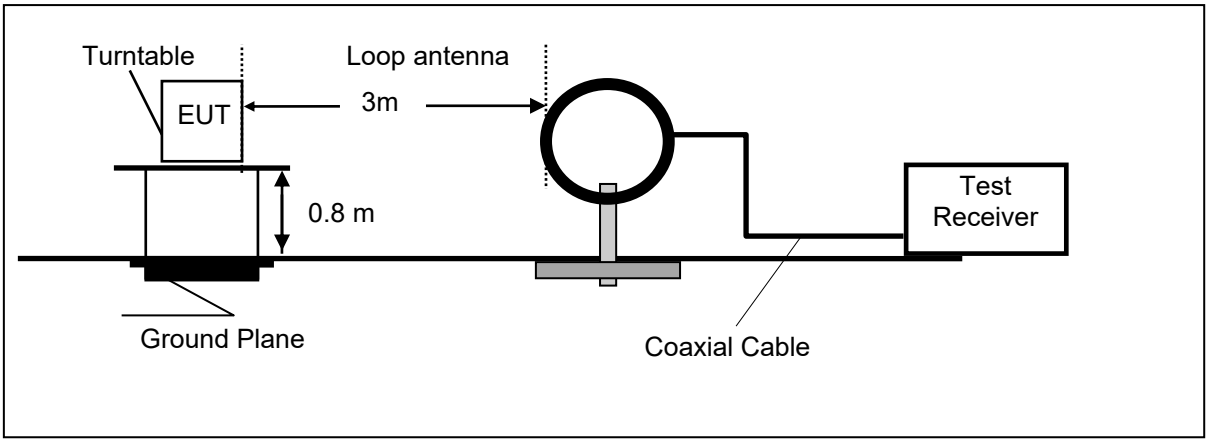
c Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

d The field strength of any emissions appearing outside of the 13.110– 14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

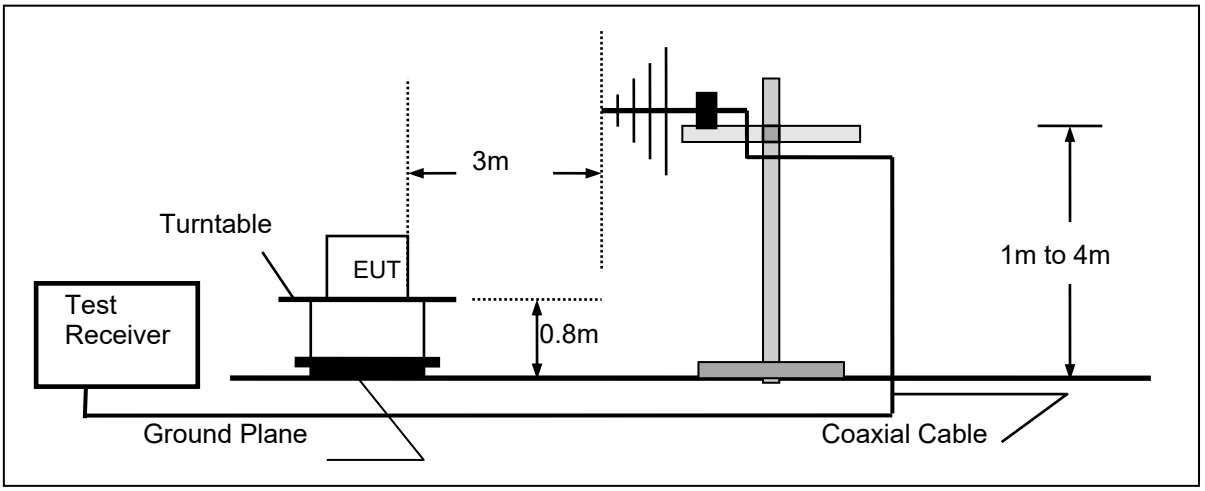
Frequency (MHz)	Distance (Meters)	Radiated (dBuV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-13.110	3	69.54	30
13.110-13.410	3	80.50	106
13410-13.553	3	90.47	334
13.553-13.567	3	124.00	15848
13.567-13.710	3	90.47	334
13.710-14.010	3	80.50	106
14.010-30.0	3	69.54	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

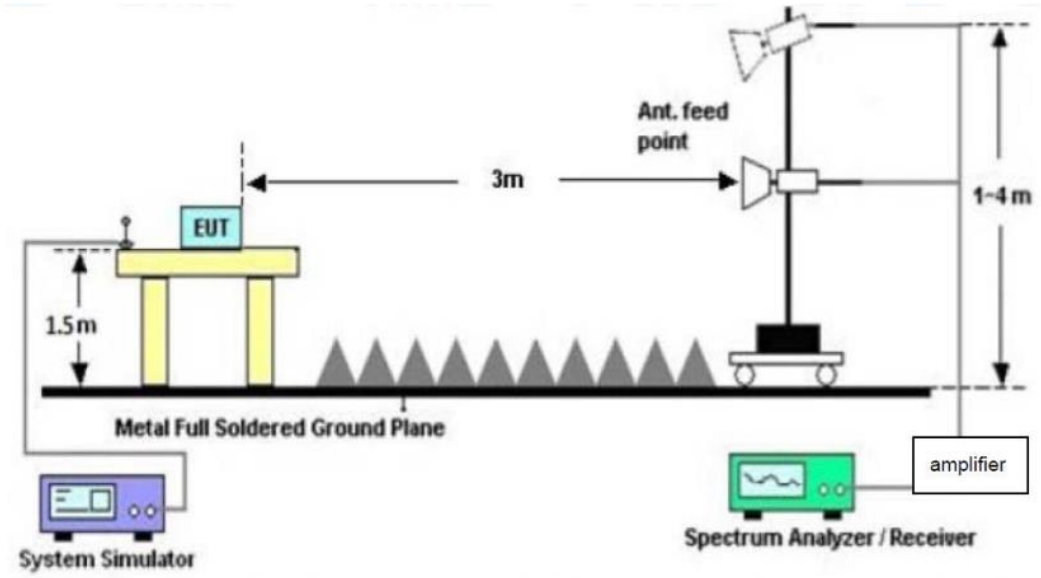
TEST CONFIGURATION

Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz




Ant. feed
point
3m
1~4 m
EUT
1.5 m
Metal Full Soldered Ground Plane
amplifier
System Simulator
Spectrum Analyzer / Receiver

TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 1GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

Remark:

1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

For 30MHz-1GHz

Horizontal

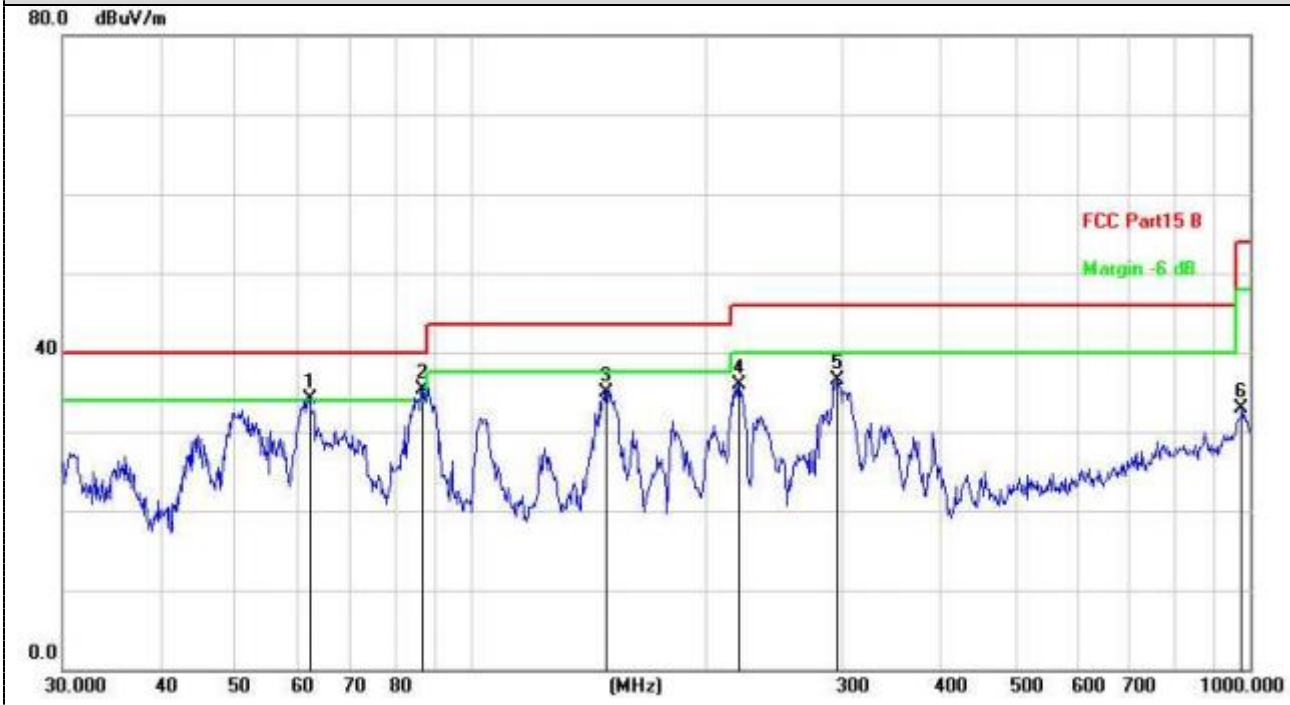
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1		30.3170	35.63	-12.15	23.48	40.00	-16.52	peak
2	*	86.8067	43.07	-15.46	27.61	40.00	-12.39	peak
3		150.5378	41.06	-10.56	30.50	43.50	-13.00	peak
4		217.5440	43.20	-13.24	29.96	46.00	-16.04	peak
5		400.4318	38.93	-8.04	30.89	46.00	-15.11	peak
6		982.6200	27.41	3.46	30.87	54.00	-23.13	peak

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1	!	62.2128	46.12	-12.00	34.12	40.00	-5.88	peak
2	*	86.8067	50.82	-15.46	35.36	40.00	-4.64	peak
3		149.4857	45.57	-10.63	34.94	43.50	-8.56	peak
4		221.3916	48.97	-13.12	35.85	46.00	-10.15	peak
5		296.1836	47.06	-10.60	36.46	46.00	-9.54	peak
6		975.7527	29.56	3.41	32.97	54.00	-21.03	peak

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

In-band Emissions

Frequency(MHz):			13.56			Polarity:		/	
No.	Frequency (MHz)	Emission Level (dBuV/m)	Detector	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Correction Factor (dB/m)
1	13.15	52.81	PK	80.50	27.69	48.09	5.41	-0.69	4.72
2	13.55	75.79	PK	90.47	14.68	71.03	5.45	-0.69	4.76
3	13.56	97.56	PK	124.00	26.44	92.80	5.45	-0.69	4.76
4	13.57	75.96	PK	90.47	14.51	71.20	5.45	-0.69	4.76
5	13.75	53.56	PK	80.50	26.94	48.75	5.5	-0.69	4.81

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)
3. Margin value = Limit value- Emission level.
4. The other emission levels were very low against the limit.

Out-of-band Emissions

Frequency(MHz):			13.56			Polarity:		HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)	Detector	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Correction Factor (dB/m)
1	27.12	40.36	PK	69.54	29.18	32.43	7.54	0.39	7.93
2	40.68	32.70	PK	40.00	7.30	23.78	8.31	0.61	8.92
3	54.24	27.68	PK	40.00	12.32	18.40	8.56	0.72	9.28
4	67.80	27.42	PK	40.00	12.58	17.70	8.71	1.01	9.72

Frequency(MHz):			13.56			Polarity:		VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)	Detector	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Correction Factor (dB/m)
1	27.12	41.20	PK	69.54	28.34	33.27	7.54	0.39	7.93
2	40.68	33.27	PK	40.00	6.73	24.35	8.31	0.61	8.92
3	54.24	30.55	PK	40.00	9.45	21.27	8.56	0.72	9.28
4	67.80	28.49	PK	40.00	11.51	18.77	8.71	1.01	9.72

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)
3. Margin value = Limit value- Emission level.
4. The other emission levels were very low against the limit.

4.3 20dB Bandwidth

Limit

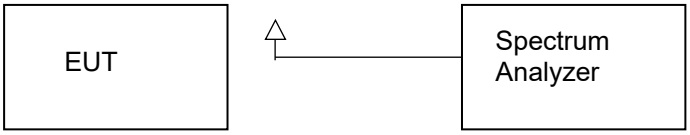
No limit for 20dB bandwidth.

Test Procedure

The 20dB bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

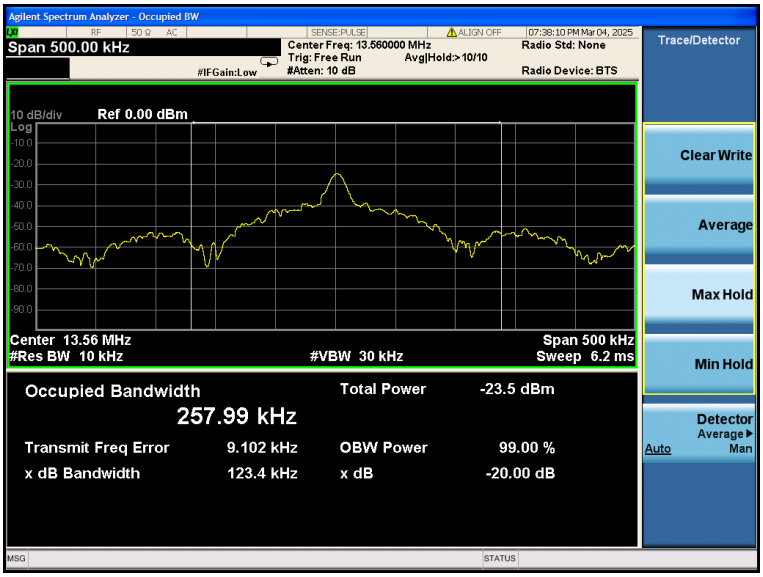
The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

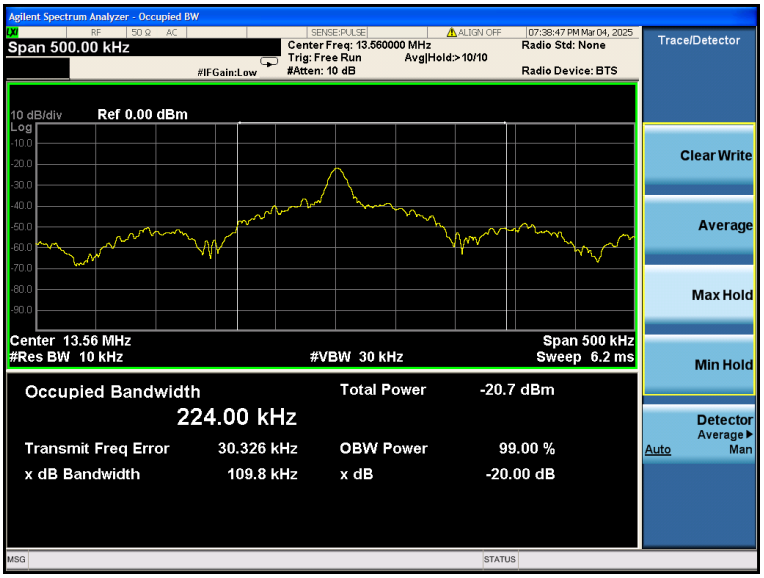
Test Configuration

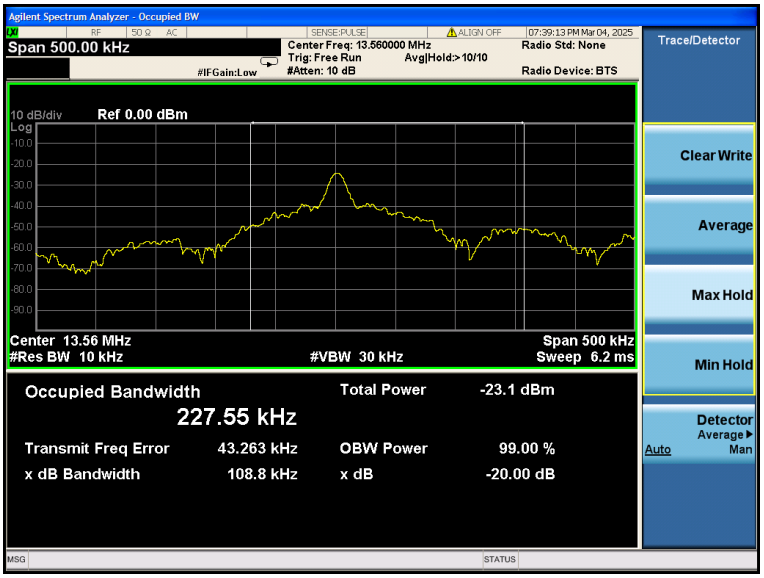


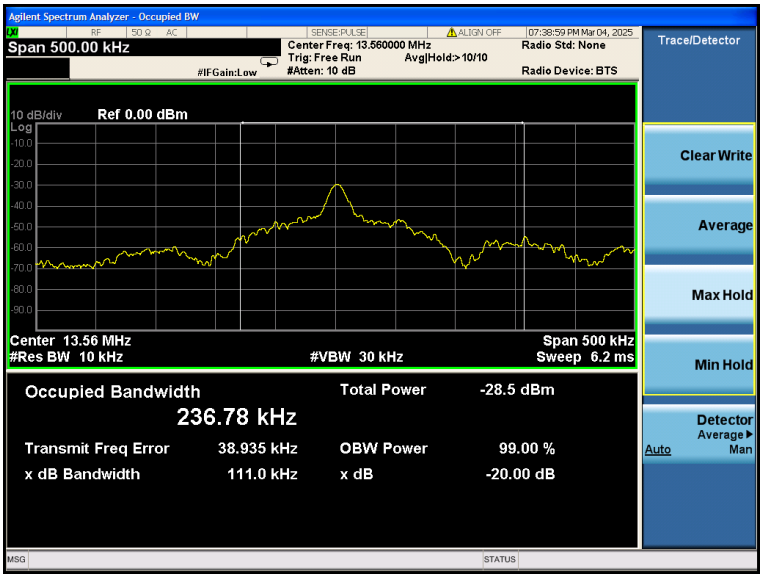
Test Results

Modulation	Frequency(MHz)	20dB bandwidth (KHz)	Result
ASK	13.56MHz	123.4	Pass
		109.8	
		108.8	
		111.0	




Agilent Spectrum Analyzer - Occupied BW
Span 500.00 kHz
Center Freq: 13.560000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
07:38:47 PM Mar 04, 2025
10 dB/div
Ref 0.00 dBm
Center 13.56 MHz
#Res BW 10 kHz
#VBW 30 kHz
Span 500 kHz
Sweep 6.2 ms
Occupied Bandwidth
224.00 kHz
Total Power -20.7 dBm
Transmit Freq Error 30.326 kHz
OBW Power 99.00 %
x dB Bandwidth 109.8 kHz
x dB -20.00 dB
Trace/Detector
Clear Write
Average
Max Hold
Min Hold
Detector
Average
Auto
Man


Agilent Spectrum Analyzer - Occupied BW
Span 500.00 kHz
Center Freq: 13.560000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
07:39:13 PM Mar 04, 2025
10 dB/div
Ref 0.00 dBm
Center 13.56 MHz
#Res BW 10 kHz
#VBW 30 kHz
Span 500 kHz
Sweep 6.2 ms
Occupied Bandwidth
227.55 kHz
Total Power -23.1 dBm
Transmit Freq Error 43.263 kHz
OBW Power 99.00 %
x dB Bandwidth 108.8 kHz
x dB -20.00 dB
Trace/Detector
Clear Write
Average
Max Hold
Min Hold
Detector
Average
Auto
Man

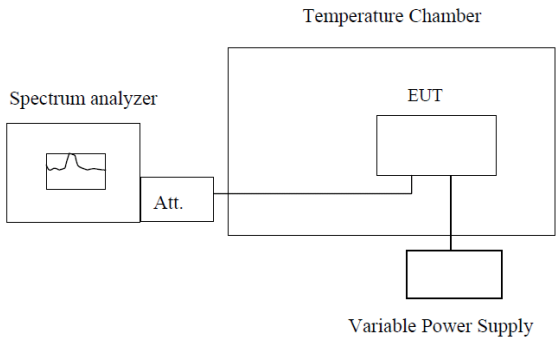

Agilent Spectrum Analyzer - Occupied BW
Span 500.00 kHz
Center Freq: 13.560000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
07:38:59 PM Mar 04, 2025
10 dB/div
Ref 0.00 dBm
Center 13.56 MHz
#Res BW 10 kHz
#VBW 30 kHz
Span 500 kHz
Sweep 6.2 ms
Occupied Bandwidth
236.78 kHz
Total Power -28.5 dBm
Transmit Freq Error 38.935 kHz
OBW Power 99.00 %
x dB Bandwidth 111.0 kHz
x dB -20.00 dB
Trace/Detector
Clear Write
Average
Max Hold
Min Hold
Detector
Average
Auto
Man

4.4 Frequency Stability

LIMIT

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

TEST CONFIGURATION



Note : Measurement setup for testing on Antenna connector

TEST PROCEDURE

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20℃ operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to –20℃. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.
7. Reduce the input voltage to specified extreme voltage variation (+/- 15%) or endpoint, record the maximum frequency change.

TEST RESULTS

Reference Frequency: 13.56MHz				
Voltage (V)	Temperature (℃)	Frequency (Hz)	Frequency Deviation(Hz)	Deviation (%)
3.3	+20(Ref)	13.560035	35	0.000258%
	-20	13.560064	64	0.000472%
	-10	13.560125	125	0.000922%
	0	13.560130	130	0.000959%
	+10	13.560165	165	0.001217%
	+20	13.560082	82	0.000605%
	+25	13.560077	77	0.000568%
	+30	13.560063	63	0.000465%
	+40	13.560025	25	0.000184%
	+50	13.560033	33	0.000243%
3.80	+20	13.560060	60	0.000442%
2.81	+20	13.560034	34	0.000251%

5 Test Setup Photos of the EUT

Reference to the **appendix I** for details

6 Photos of the EUT

Reference to the **appendix II** for details.

********** **End of Report** **********