

FCC PART 15C TEST REPORT FOR CERTIFICATION On Behalf of

VTECH ELECTRONICS LTD

SANDY SNACKS-A-LOT

Model Number: 5601

Additional Model: 80-560100,80-560103,80-560104,80-560105,80-560122,
80-560123, 80-5601XX (XX=00~99)

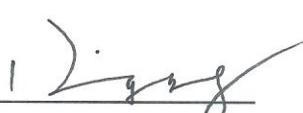
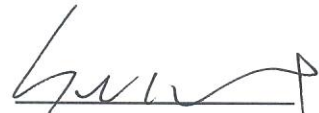

FCC ID: G2R-5601

Applicant :	VTECH ELECTRONICS LTD
Address:	23/F,TAI PING INDUSTRIAL CENTRE, BLOCK 1,
	57 TING KOK ROAD,TAI PO,HONG KONG
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

Report Number:	ESTE-R2403087
Date of Test:	Mar. 09, 2024~ Mar. 18, 2024
Date of Report:	Mar. 19, 2024

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Applicant:	VTECH ELECTRONICS LTD		
Address:	23/F,TAI PING INDUSTRIAL CENTRE, BLOCK 1, 57 TING KOK ROAD,TAI PO,HONG KONG		
Manufacturer:	VTECH ELECTRONICS LTD		
Address:	23/F,TAI PING INDUSTRIAL CENTRE, BLOCK 1, 57 TING KOK ROAD,TAI PO,HONG KONG		
Factory:	Vtech(DongGuan) Electronics Limited		
Address:	SanTun Precinct, HouJie, DongGuan, GuangDong, China		
E.U.T:	SANDY SNACKS-A-LOT		
Model Number:	5601		
Additional Model:	80-560100,80-560103,80-560104,80-560105,80-560122, 80-560123, 80-5601XX (XX=00~99) Note: They are identical except model name.		
Power Supply:	DC 6V From 4*1.5V Battery		
Trade Name:	VTECH	Serial No.:	-----
Date of Receipt:	Mar. 09, 2024	Date of Test:	Mar. 09, 2024~ Mar. 18, 2024
Test Specification:	FCC Part 15 Subpart C (15.225) ANSI C63.10:2013		
Test Result:	<p>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 C requirements.</p> <p>This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.</p>		
Prepared by:	Reviewed by:	Date: Mar. 19, 2024 Approved by:	
			
Ring Yang / Assistant	Seven Wang / Engineer	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)

Product Name	:	SANDY SNACKS-A-LOT
Model Number	:	5601
Software Version	:	1.0
Hardware Version	:	1.0
Operation frequency	:	13.56MHz
Number of channel	:	1
Modulation Type	:	ASK
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. Antenna Information

Ant No.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	-	-	Internal	-	0

Note:

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.

1.3. Information of RF Cable

Cable Loss(dB)	Provided by
1.0	VTECH ELECTRONICS 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	AC Power Line Conducted Emissions	15.207	N/A
2	Radiated Emission	15.225(a)(b)(c)(d)	PASS
3	Frequency Tolerance	15.225(e)	PASS
4	20dB Bandwidth&99% Occupied Bandwidth	15.215	PASS
5	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

Test Item	Uncertainty
Uncertainty for Conduction emission test	$\pm 3.48\text{dB}$
Uncertainty for spurious emissions test (Below 30MHz)	$\pm 1.62\text{ dB}$
Uncertainty for spurious emissions test (30MHz-1GHz)	$\pm 4.60\text{ dB(Polarize: H)}$
	$\pm 4.68\text{ dB(Polarize: V)}$
Uncertainty for spurious emissions test (1GHz to 18GHz)	$\pm 4.96\text{dB}$
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	1.08dB
Uncertainty for Power density test	0.26dB

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
-	-	-	-	-

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.

EUT

DC 6V

(EUT: SANDY SNACKS-A-LOT)

2.6. Test mode

The final test as listed below.

Test Item	Modulation Type	Operating Mode
Radiated Emission	ASK	TX Mode
Frequency Tolerance	ASK	TX Mode
20dB Bandwidth&99% Occupied Bandwidth	ASK	TX Mode

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

Channel No.	Frequency (MHz)
1	13.56

2.8. Test Equipment

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 12,23	1 Year
Active Loop Antenna	SCHWABE BECK	FMZB 1519B	EST-E054	LISAI	June 12,23	1 Year
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 12,23	1 Year
Bilog Antenna	Teseq	CBL 6111D	EST-E034	LISAI	June 12,23	1 Year
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 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 12,23	1 Year
Signal and Spectrum Analyzer	Rohde &Schwarz	FSV 40	EST-E136	LISAI	June 12,23	1 Year

3. RADIATED EMISSION

3.1. Limit

Frequency (MHz)	Field Strength($\mu\text{V/m}$)	Distance(m)
0.009~ 0.490	2400/F(KHz)	300
0.490~ 1.705	24000/F(KHz)	30
1.705~ 13.110	30	30
13.110 ~ 13.410	106	30
13.410 ~ 13.553	334	30
13.553 ~13.567	15.848	30
13.567 ~ 13.710	334	30
13.710 ~14.010	106	30
14.010~30	30	30
30~ 88	100	3
88~ 216	150	3
216~ 960	200	3
Above 960	500	3

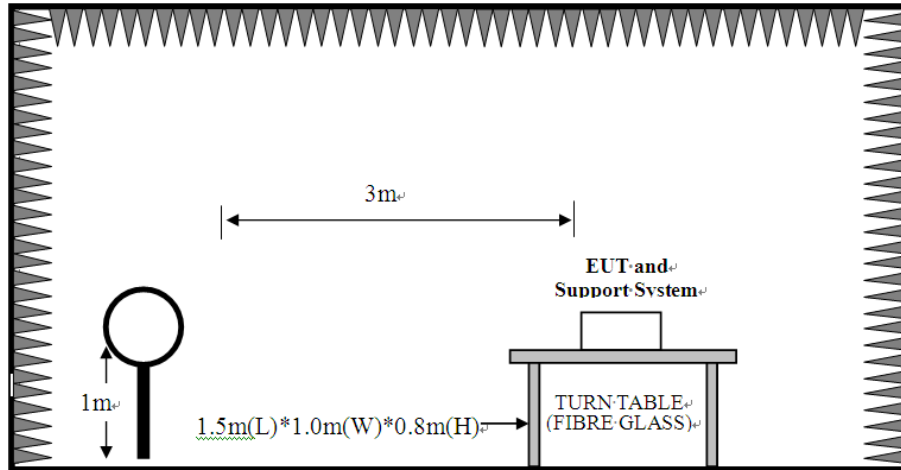
Note:

1. Field Strength ($\text{dB}\mu\text{V/m}$) = $20 \times \log[\text{Field Strength } (\mu\text{V/m})]$.
2. At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
For example:When measurement the frequencies form 13.553MHz to 13.567Mhz at 3m distance,the Limit show in below:

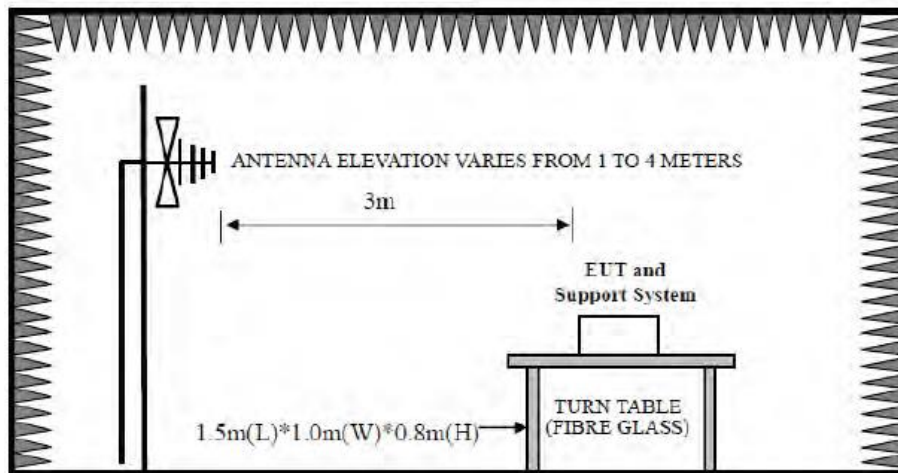
$$\text{Limit}(\text{dB}\mu\text{V/m})@3\text{m} = 20 \times \log(15,848)\text{dB}\mu\text{V/m} + 40 \times \log(30/3)\text{dB} = 124\text{dB}\mu\text{V/m}$$

3.2. Test Setup

9kHz~30MHz



30~1000MHz



3.3. 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

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

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

3.4. Test Procedure

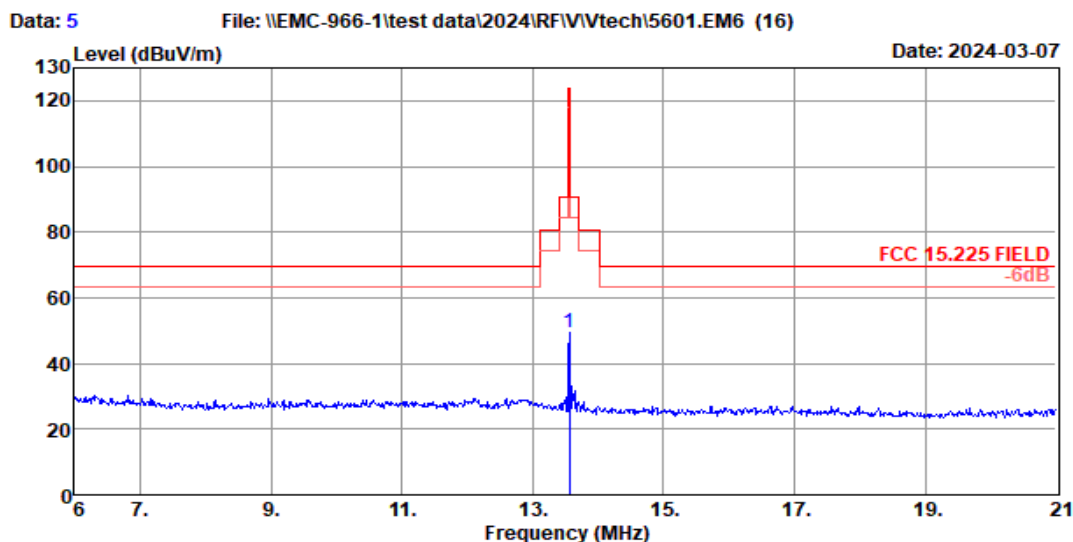
- EUT was placed on a turn table, which is 0.8 meter high above ground.
- EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- Set the EUT transmit continuously with maximum output power.
- Spectrum analyzer setting parameters in accordance with section 4.3.
- The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- For below 30MHz test, the center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates both horizontal and vertical polarization to find out the maximum emission level.
- For above 30MHz test, 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.
- Record the results in the test report.

3.5. Test Result

Field strength of fundamental

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Site no. : 1# 966 Chamber Data no. : 5
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COPLANAR
Limit : FCC 15.225 FIELD
Env. / Ins. : Temp:22.8°C;Humi:50.6%;Press:101.55kPa
Engineer : ZQL
EUT : SANDY SNACKS-A-LOT
Power : DC 6V
M/N : 5601
Test Mode : TX Mode

Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1 13.56000	20.00	0.15	29.13	49.28	124.00	74.72	Peak

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.

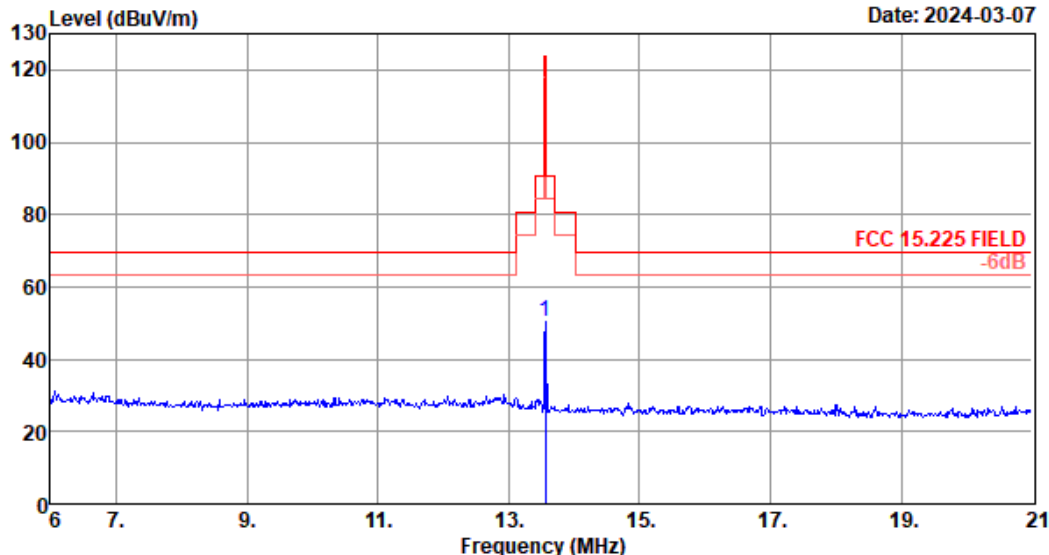
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Data: 6

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Date: 2024-03-07



Site no. : 1# 966 Chamber Data no. : 6
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COAXIAL
Limit : FCC 15.225 FIELD
Env. / Ins. : Temp:22.8°C;Humi:50.6%;Press:101.55kPa
Engineer : ZQL
EUT : SANDY SNACKS-A-LOT
Power : DC 6V
M/N : 5601
Test Mode : TX Mode

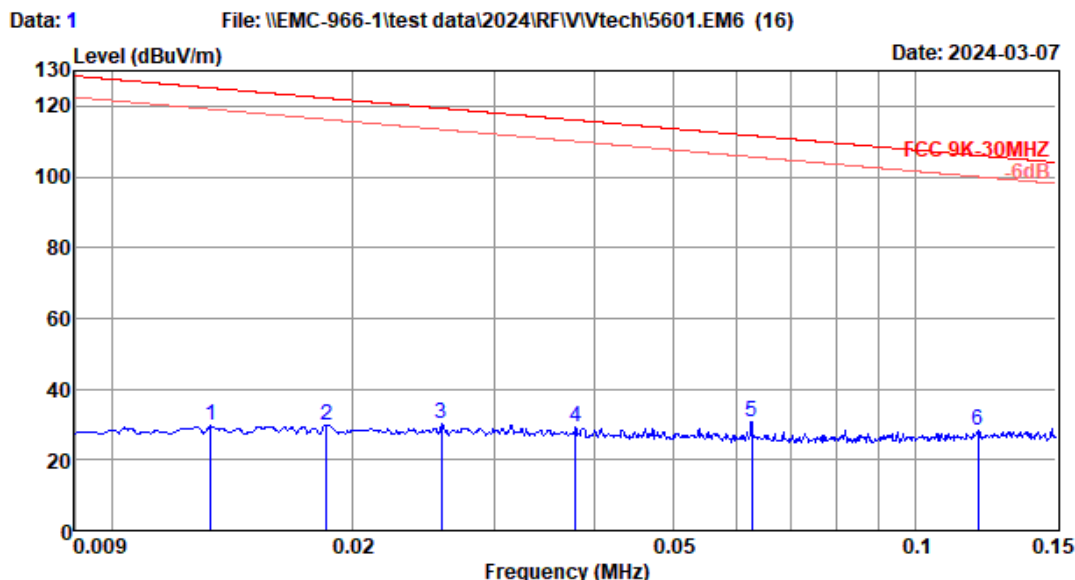
Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1 13.56000	20.00	0.15	30.17	50.32	124.00	73.68	Peak

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.

Below 30MHz Spurious Emission

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Site no. : 1# 966 Chamber Data no. : 1
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COPLANAR
Limit : FCC 9K-30MHz
Env. / Ins. : Temp:22.8°C;Humi:50.6%;Press:101.55kPa
Engineer : ZQL
EUT : SANDY SNACKS-A-LOT
Power : DC 6V
M/N : 5601
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.01331	20.10	0.10	9.36	29.56	125.12	95.56	Peak
2	0.01855	20.10	0.10	9.65	29.85	122.24	92.39	Peak
3	0.02578	20.60	0.10	9.39	30.09	119.38	89.29	Peak
4	0.03779	20.60	0.10	8.51	29.21	116.06	86.85	Peak
5	0.06271	20.90	0.10	9.72	30.72	111.66	80.94	Peak
6	0.11977	19.80	0.10	8.32	28.22	106.04	77.82	Peak

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.

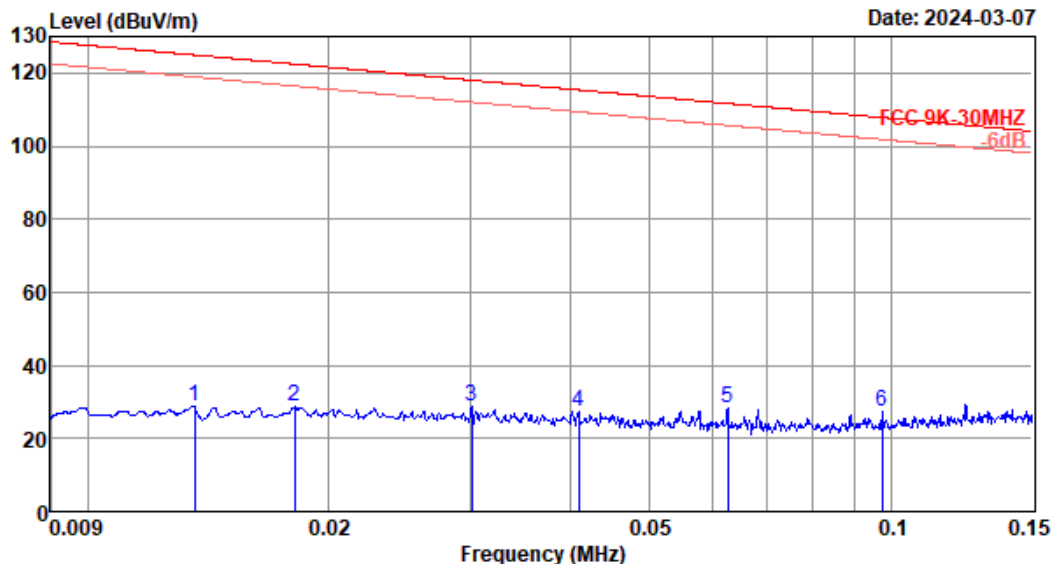
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Data: 4

File: \\EMC-966-1\test data\2024\RF\VVtech\5601.EM6 (16)

Date: 2024-03-07



Site no. : site Data no. : 4
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COAXIAL
Limit : FCC 9K-30MHz
Env. / Ins. : Temp:22.8°C;Humi:50.6%;Press:101.55kPa
Engineer : ZQL
EUT : SANDY SNACKS-A-LOT
Power : DC 6V
M/N : 5601
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.01361	20.10	0.10	8.75	28.95	124.93	95.98	Peak
2	0.01813	20.10	0.10	8.38	28.58	122.44	93.86	Peak
3	0.03009	20.60	0.10	7.86	28.56	118.04	89.48	Peak
4	0.04089	20.60	0.10	6.46	27.16	115.37	88.21	Peak
5	0.06271	20.90	0.10	7.16	28.16	111.66	83.50	Peak
6	0.09753	20.10	0.10	6.93	27.13	107.82	80.69	Peak

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.

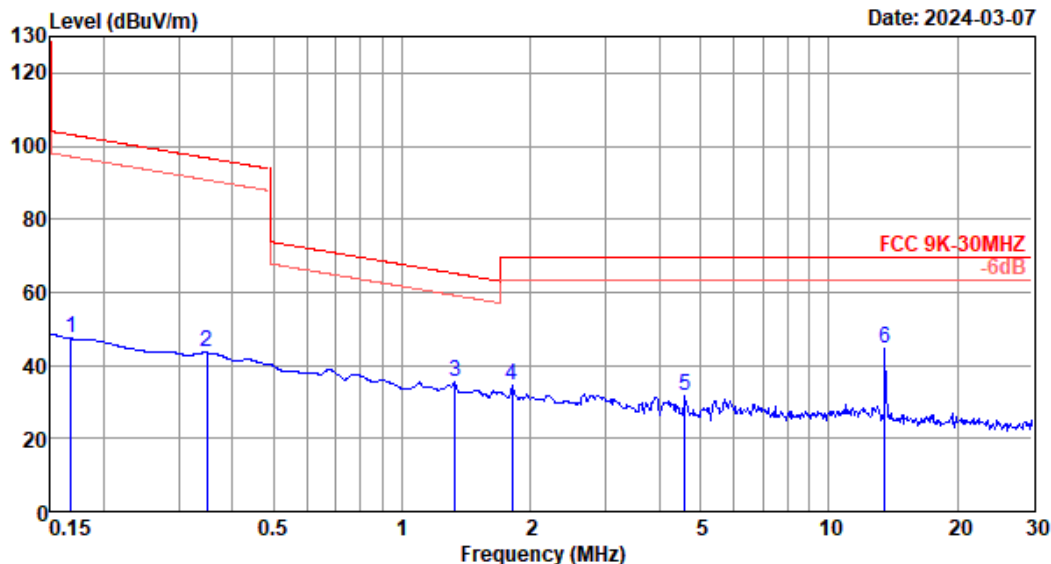
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Data: 2

File: \\EMC-966-1\test data\2024\RF\VVtech\5601.EM6 (16)

Date: 2024-03-07



Site no. : 1# 966 Chamber Data no. : 2
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COPLANAR
Limit : FCC 9K-30MHZ
Env. / Ins. : Temp:22.8°C;Humi:50.6%;Press:101.55kPa
Engineer : ZQL
EUT : SANDY SNACKS-A-LOT
Power : DC 6V
M/N : 5601
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.16765	19.90	0.10	27.28	47.28	103.12	55.84	Peak
2	0.34830	20.45	0.10	22.93	43.48	96.76	53.28	Peak
3	1.33081	20.60	0.10	14.72	35.42	65.12	29.70	Peak
4	1.80957	20.60	0.11	13.68	34.39	69.54	35.15	Peak
5	4.59787	20.36	0.12	11.30	31.78	69.54	37.76	Peak
6	13.55086	20.00	0.15	24.35	44.50	69.54	25.04	Peak

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.

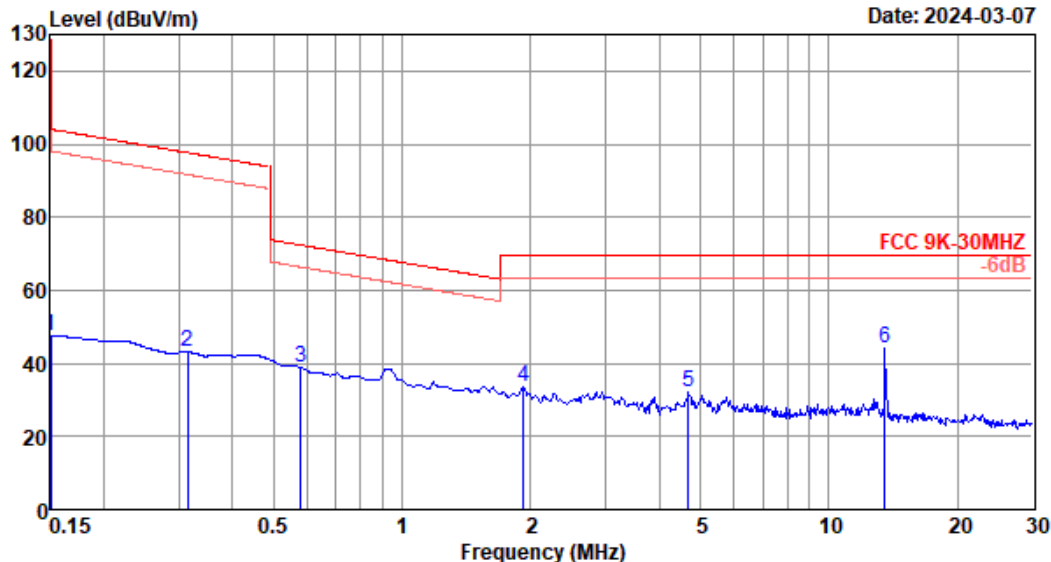
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Data: 3

File: \\EMC-966-1\test data\2024\RF\VVtech\5601.EM6 (16)

Date: 2024-03-07



Site no. : 1# 966 Chamber Data no. : 3
Dis. / Ant. : 3m FMZB 1519B Ant. pol. : COAXIAL
Limit : FCC 9K-30MHZ
Env. / Ins. : Temp:22.8°C;Humi:50.6%;Press:101.55kPa
Engineer : ZQL
EUT : SANDY SNACKS-A-LOT
Power : DC 6V
M/N : 5601
Test Mode : TX Mode

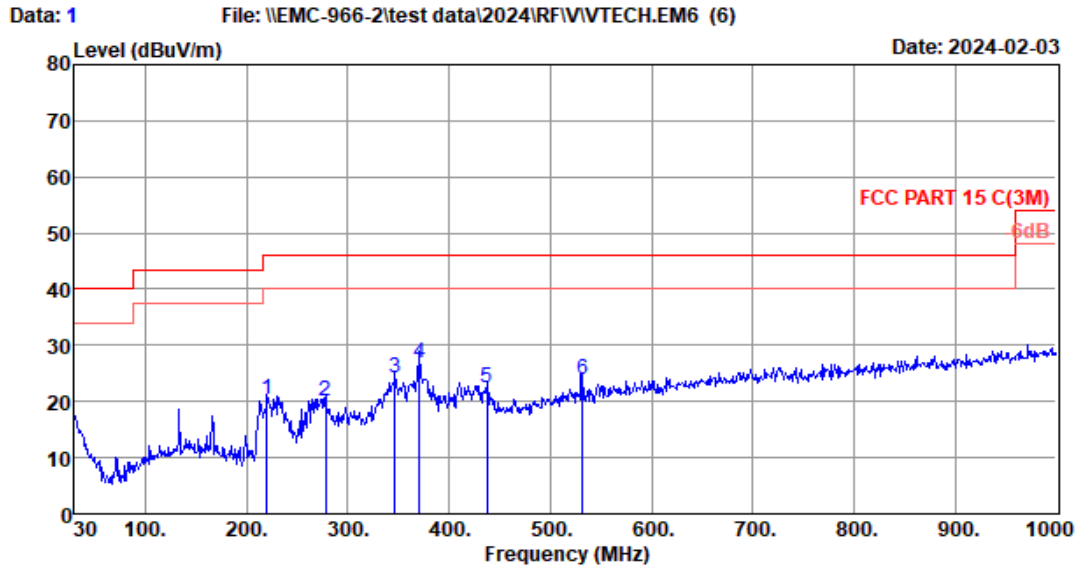
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.15000	19.90	0.10	27.69	47.69	104.08	56.39	Peak
2	0.31495	20.35	0.10	22.76	43.21	97.64	54.43	Peak
3	0.57923	20.85	0.10	17.93	38.88	72.35	33.47	Peak
4	1.92836	20.60	0.11	12.94	33.65	69.54	35.89	Peak
5	4.69635	20.35	0.12	11.44	31.91	69.54	37.63	Peak
6	13.55086	20.00	0.15	24.19	44.34	69.54	25.20	Peak

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.

Above 30MHz Spurious Emission

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Site no. : 2# 966 chamber Data no. : 1
Dis. / Ant. : 3m 47018 Ant. pol. : VERTICAL
Limit : FCC PART 15 C(3M)
Env. / Ins. : Temp:24.6°C;Humi:51%;Press:101.52kPa
Engineer : LST
EUT : SANDY SNACKS-A-LOT
Power : DC 6V
M/N : 5601
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	220.12	9.90	1.82	8.58	20.30	46.00	25.70	QP
2	278.32	13.04	2.10	4.98	20.12	46.00	25.88	QP
3	346.22	15.36	2.45	6.36	24.17	46.00	21.83	QP
4	370.47	16.00	2.52	8.39	26.91	46.00	19.09	QP
5	437.40	17.17	2.71	2.57	22.45	46.00	23.55	QP
6	531.49	19.19	3.04	1.79	24.02	46.00	21.98	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.

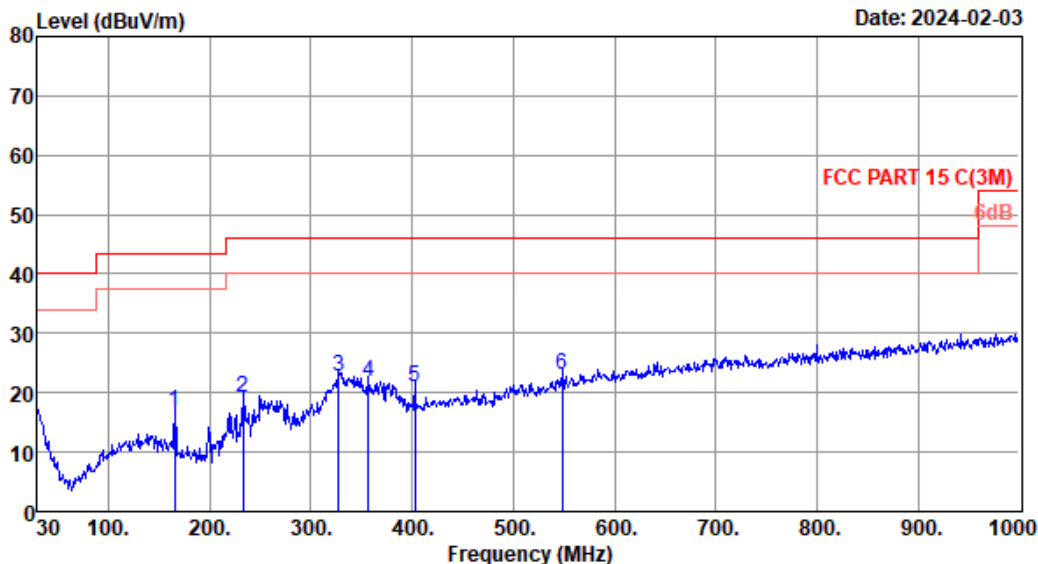
EST Technology

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Data: 2

File: \\EMC-966-2\\test data\\2024\\RF\\VIVTECH.EM6 (6)

Date: 2024-02-03



Site no. : 2# 966 chamber Data no. : 2
Dis. / Ant. : 3m 47018 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C(3M)
Env. / Ins. : Temp:24.6°C;Humi:51%;Press:101.52kPa
Engineer : LST
EUT : SANDY SNACKS-A-LOT
Power : DC 6V
M/N : 5601
Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	165.80	10.72	1.57	4.57	16.86	43.50	26.64	QP
2	232.73	11.18	1.87	6.22	19.27	46.00	26.73	QP
3	327.79	14.86	2.36	5.37	22.59	46.00	23.41	QP
4	356.89	15.74	2.49	3.57	21.80	46.00	24.20	QP
5	402.48	16.45	2.59	1.93	20.97	46.00	25.03	QP
6	547.98	19.76	3.10	0.15	23.01	46.00	22.99	QP

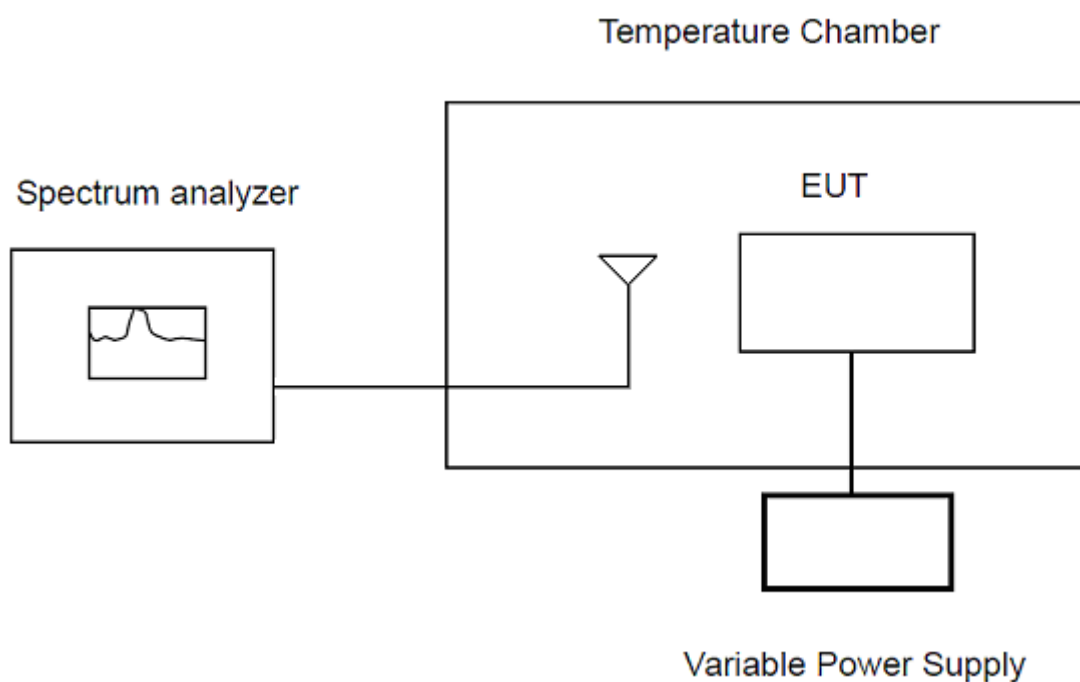
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

4. FREQUENCY TOLERANCE

4.1. Limit

The devices operating in the 13.553-13.567 MHz shall maintain the carrier frequency within 0.01% of the operating frequency over the temperature variation of -20°C to +50°C using an environmental chamber. The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

4.2. Test Setup



4.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	10KHz
VBW	10KHz
Span	50KHz
Sweep Time	Auto
Detector	PEAK
Trace Mode	Max Hold

4.4. 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. The spectrum analyzer connected a receive antenna and place near the EUT.
- d. Spectrum analyzer setting parameters in accordance with section 5.3.
- 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 g 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. The spectrum analyzer connected a receive antenna and place near the EUT.
- d. Spectrum analyzer setting parameters in accordance with section 5.3.
- 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 g to measured the varied from 85% to 115% of the rated voltage.

4.5. Test Result

Frequency Stability Under Temperature Variation							
Declared Frequency (MHz)	Voltage (V)	Temperature (°C)	Time (minutes)	Measurement Value (MHz)	Frequency Deviation (%)	Limit (%)	Test Result
13.56	6	50	0	13.5606015	0.0044358	±0.01	PASS
			2	13.5599015	-0.0007264	±0.01	PASS
			5	13.5606015	0.0044358	±0.01	PASS
			10	13.5606015	0.0044358	±0.01	PASS
		40	0	13.5606015	0.0044358	±0.01	PASS
			2	13.5606015	0.0044358	±0.01	PASS
			5	13.5606015	0.0044358	±0.01	PASS
			10	13.5606015	0.0044358	±0.01	PASS
		30	0	13.5606015	0.0044358	±0.01	PASS
			2	13.5606015	0.0044358	±0.01	PASS
			5	13.5606015	0.0044358	±0.01	PASS
			10	13.5606015	0.0044358	±0.01	PASS
		20	0	13.5606015	0.0044358	±0.01	PASS
			2	13.5606015	0.0044358	±0.01	PASS
			5	13.5606015	0.0044358	±0.01	PASS
			10	13.5606015	0.0044358	±0.01	PASS
		10	0	13.5606015	0.0044358	±0.01	PASS
			2	13.5606015	0.0044358	±0.01	PASS
			5	13.5606015	0.0044358	±0.01	PASS
			10	13.5606015	0.0044358	±0.01	PASS
		0	0	13.5606015	0.0044358	±0.01	PASS
			2	13.5606015	0.0044358	±0.01	PASS
			5	13.5606015	0.0044358	±0.01	PASS
			10	13.5606015	0.0044358	±0.01	PASS
		-10	0	13.5606015	0.0044358	±0.01	PASS
			2	13.5606015	0.0044358	±0.01	PASS
			5	13.5606015	0.0044358	±0.01	PASS
			10	13.5606015	0.0044358	±0.01	PASS
		-20	0	13.5606015	0.0044358	±0.01	PASS
			2	13.5606015	0.0044358	±0.01	PASS
			5	13.5606015	0.0044358	±0.01	PASS
			10	13.5606015	0.0044358	±0.01	PASS

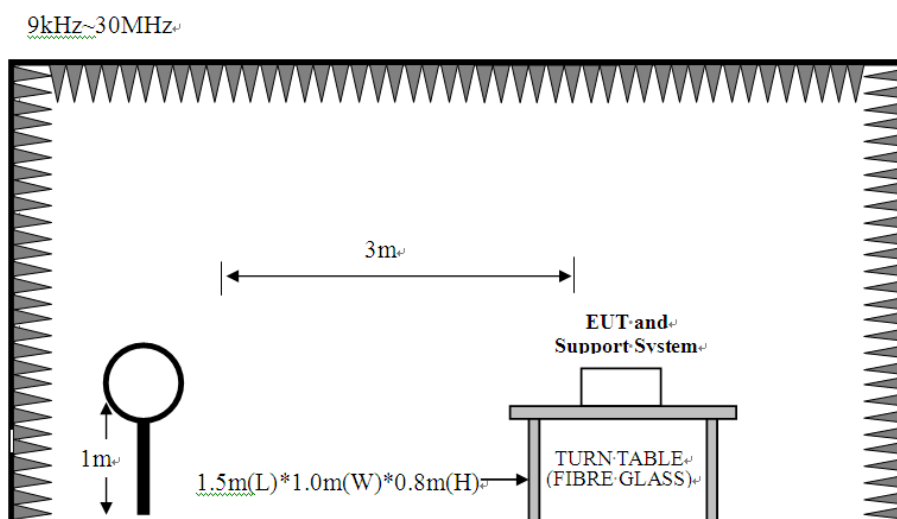
Note: Frequency Deviation(%)=[(Measurement Value- Declared Frequency)/ Declared Frequency]*100%.

5. 20dB BANDWIDTH&99% OCCUPIED BANDWIDTH

5.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §13.553-13.567 MHz and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

5.2. Test Setup



5.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	10KHz
VBW	30KHz
Span	two times and five times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

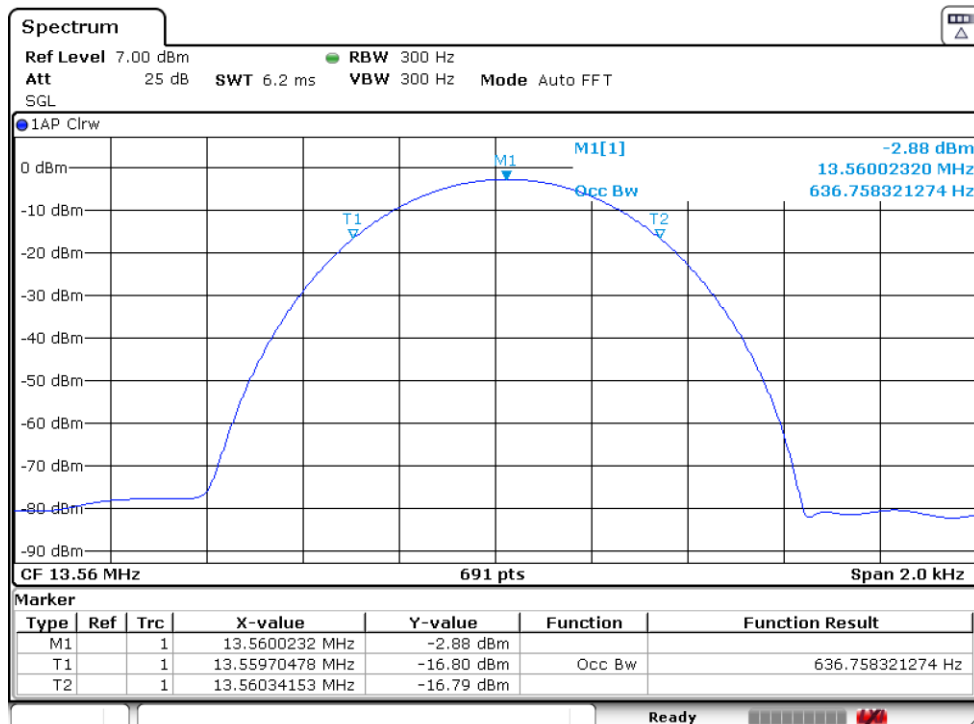
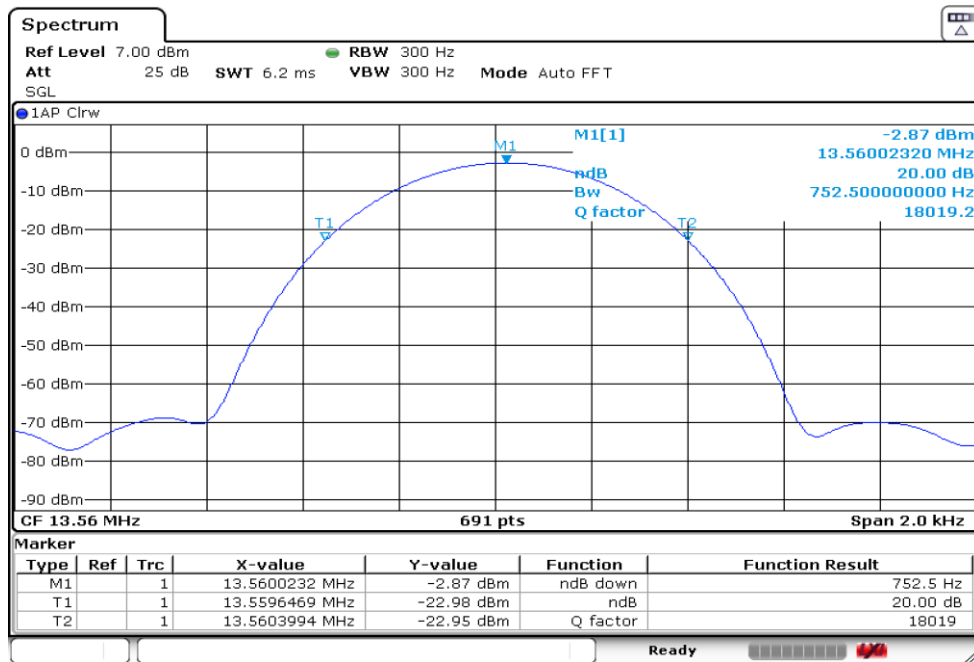
5.4. Test Procedure

- a. EUT was placed on a turn table, which is 0.8 meter high above ground
- 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. Spectrum analyzer setting parameters in accordance with section 6.3.
- f. Allow the trace to stabilize, Set the spectrum analyzer marker to the highest level of the displayed trace, use the 99% power bandwidth function to measure 99% occupied bandwidth, and use mark-delta function measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.
- g. Record the the value of 99% occupied bandwidth and 20 dB bandwidth.

5.5. Test Result

Temperature	23.5°C	Relative Humidity	53%	
Test Voltage	DC 6V			
Frequency (MHz)	20dB Bandwidth (Hz)	99% Occupied Bandwidth (Hz)	20 dB Bandwidth Limit (KHz)	Test Result
13.56	752.5	636.7	≤11.2	PASS

Note :For NFC devices,the permitted band is 13.553MHz-13.567MHz,the bandwidth is 14KHz,so the Limit=14KHz×80%=11.2KHz.



6. ANTENNA REQUIREMENTS

6.1. 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.

6.2. Test Result

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

7. TEST SETUP PHOTO

Refer to report no.: ESTE-R2405007 (Appendix A)

8. EUT PHOTO

Refer to report no.: ESTE-R2405008 (Appendix B) & ESTE-R2405009 (Appendix C)

End of Test Report