

# Global United Technology Services Co., Ltd.

Report No.: GTS201605000303E03

# FCC Report

# (NFC)

Applicant: FengShun Peiying Electro-Acoustic Co., Ltd

**Address of Applicant:** No.8, Fengda Road, Tangkeng Town Ind. Area, Fengshun

County, Guangdong, China

**Equipment Under Test (EUT)** 

**Product Name:** Bluetooth Speaker

Trade Name: V2, V3, V8, V13, V16

FCC ID: 2AFXA-V2

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.225: 2012

Date of sample receipt: June 06, 2016

**Date of Test:** Jun 06-08, 2016

Date of report issued: June 12, 2016

Test Result: PASS \*

In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



#### **Robinson Lo Laboratory Manager**

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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## 2 Version

Version No.	Date	Description
00	June 12, 2016	Original

Prepared By:	Yang, lin	Date:	June 12, 2016
	Project Engineer		
Check By:	Andy un	Date:	June 12, 2016
	Reviewer		



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## 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field Strength of Fundamental Emissions and Mask Measurement	15.225	Pass
Radiated Emission	15.209	Pass
20dB Emission Bandwidth	15.225	Pass
Frequency Stability Measurement	15.225	Pass

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.10 2013 and ANSI C63.4: 2014.

#### 4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes				
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)				
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)				
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)				
AC Power Line Conducted Emission 0.15MHz ~ 30MHz ± 3.45dB (1)							
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.							



## 5 General Information

#### 5.1 Client Information

Applicant:	FengShun Peiying Electro-Acoustic Co., Ltd					
Address of Applicant:	No.8, Fengda Road, Tangkeng Town Ind. Area, Fengshun County, Guangdong, China					
Manufacturer/Factory:	FengShun Peiying Electro-Acoustic Co., Ltd					
Address of Manufacturer/ Factory:	No.8, Fengda Road, Tangkeng Town Ind. Area, Fengshun County, Guangdong, China					

## 5.2 General Description of E.U.T.

Product Name:	Bluetooth Speaker
Model No.:	V2, V3, V8, V13, V16
Operation Frequency:	13.56MHz
Channel Number:	1
Modulation:	ASK
Antenna type:	PCB antenna
Antenna gain:	0dBi
Adapter information :	DC 3.7V, 1200mAh, Li-ion Battery



#### 5.3 Test mode

Transmitter mode Keep the EUT in continuously transmitting.

#### 5.4 Test Facility

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

#### • FCC —Registration No.: 600491

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission.

The acceptance letter from the FCC is maintained in out files. Registration 600491, July 20, 2010.

#### • Industry Canada (IC)

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-1.

#### 5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480 Fax: 0755-27798960

No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Telephone: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960

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## 6 Test Instruments list

Radiated Emission:								
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	3m Semi- Anechoic Chamber ZhongYu Electron		9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 26 2016	Mar. 25 2017		
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A		
3	Spectrum Analyzer	Agilent	E4440A	GTS533	Dec. 03 2015	Dec. 02 2016		
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 30 2015	June 29 2016		
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 30 2015	June 29 2016		
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 26 2015	June 25 2016		
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 26 2016	Mar. 25 2017		
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A		
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 27 2016	Mar. 26 2017		
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 27 2016	Mar. 26 2017		
11	Coaxial cable	GTS	N/A	GTS210	Mar. 27 2016	Mar. 26 2017		
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 27 2016	Mar. 26 2017		
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 30 2015	June 29 2016		
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 30 2015	June 29 2016		
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 26 2015	June 25 2016		
16	Band filter	Amindeon	82346	GTS219	Mar. 27 2016	Mar. 26 2017		
17	Power Meter	Anritsu	ML2495A	GTS540	June 30 2015	June 29 2016		
18	Power Sensor	Anritsu	MA2411B	GTS541	June 30 2015	June 29 2016		
19	Loop Antenna	ZHINAN	ZN30900A	GTS534	Feb. 21 2016	Feb. 20 2017		

Cond	Conducted Emission:								
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)			
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Sep. 06 2015	Sep. 05 2017			
2	<b>EMI Test Receiver</b>	Rohde & Schwarz	ESCS30	GTS223	June 30 2015	June 29 2016			
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	June 30 2015	June 29 2016			
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 30 2015	June 29 2016			
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	June 30 2015	June 29 2016			
6	Coaxial Cable	GTS	N/A	GTS227	June 30 2015	June 29 2016			
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A			



#### 7 Test results and Measurement Data

#### 7.1 Antenna requirement:

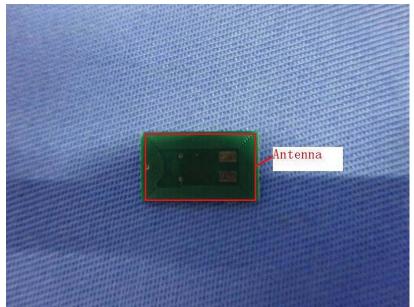
**Standard requirement:** FCC Part15 C Section 15.203

#### 15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### E.U.T Antenna:

The antenna is PCB antenna, the best case gain of the antenna is 0dBi





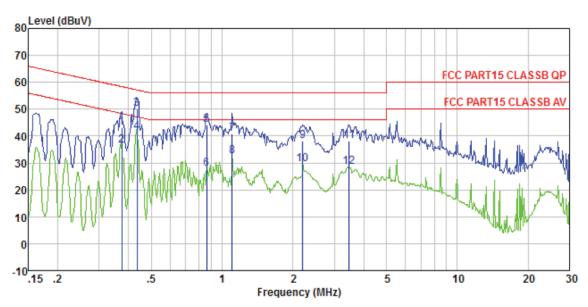
#### 7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sv	weep time=auto				
Limit:	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		50			
Test setup:	Reference Plane	i or the frequency.				
Test procedure:	AUX Equipment E.U.T  Test table/Insulation plane  Remark E.U.T: Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m  1. The E.U.T and simulators a	Filter AC pow				
rest procedure.	line impedance stabilization 50ohm/50uH coupling impedance at LISN that provides a 50ol termination. (Please refer to photographs).  3. Both sides of A.C. line are dinterference. In order to find positions of equipment and changed according to ANS measurement.	n network (L.I.S.N.). The dance for the measuri also connected to the hm/50uH coupling import the block diagram of checked for maximum d the maximum emissionall of the interface cab	nis provides a ng equipment. main power through edance with 500hm the test setup and conducted on, the relative bles must be			
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Pass					

#### Measurement data:



Line:



Site

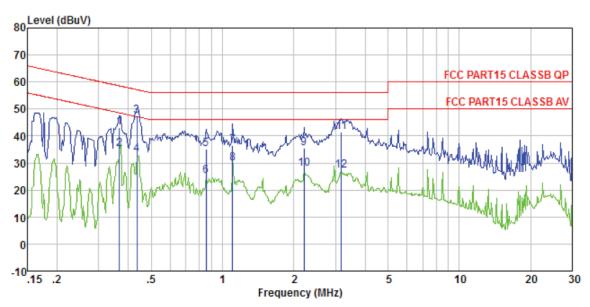
: Shielded room : FCC PART15 CLASSB QP LISN-2013 LINE Condition

Job No. Test Mode : 0303 : NFC mode Test Engineer: Sky

	Freq	Read Level	Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.375	43.02	43.23	0.11	0.10	58.39	-15.16	QP
2	0.375	36.36	36.57	0.11	0.10	48.39	-11.82	Average
3	0.435	49.88	50.11	0.12	0.11	57.15	-7.04	QP
4 5	0.435	41.32	41.55	0.12	0.11	47.15	-5.60	Average
5	0.862	43.72	43.99	0.14	0.13	56.00	-12.01	QP
6	0.862	27.65	27.92	0.14	0.13	46.00	-18.08	Average
7	1.106	40.47	40.73	0.13	0.13	56.00	-15.27	QP
8	1.106	32.24	32.50	0.13	0.13	46.00	-13.50	Average
9	2. 201	37.87	38.14	0.12	0.15	56.00	-17.86	QP
10	2. 201	29.39	29.66	0.12	0.15	46.00	-16.34	Average
11	3.472	37.93	38.26	0.18	0.15	56.00	-17.74	QP
12	3.472	28.15	28.48	0.18	0.15	46.00	-17.52	Average



#### Neutral:



Site : Shielded room

Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL

Job No. : 0303 Test Mode : NFC mode Test Engineer: Sky

	Freq	Řead Level	Level	LISN Factor	Cable Loss	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	d₿	dBuV	dB	
1	0.367	43.11	43.27	0.06	0.10	58.56	-15.29	QP
2	0.367	34.90	35.06	0.06	0.10	48.56	-13.50	Average
3	0.435	47.18	47.35	0.06	0.11	57.15	-9.80	QP
4 5	0.435	33.08	33.25	0.06	0.11	47.15	-13.90	Average
5	0.853	34.94	35.14	0.07	0.13	56.00	-20.86	QP
6	0.853	24.93	25.13	0.07	0.13	46.00	-20.87	Average
7	1.106	36.42	36.63	0.08	0.13	56.00	-19.37	QP
8	1.106	29.72	29.93	0.08	0.13	46.00	-16.07	Average
9	2.213	35.36	35.60	0.09	0.15	56.00	-20.40	QP
10	2.213	27.62	27.86	0.09	0.15	46.00	-18.14	Average
11	3.173	41.18	41.45	0.12	0.15	56.00	-14.55	QP
12	3.173	27.00	27.27	0.12	0.15	46.00	-18.73	Average

#### 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 Loss



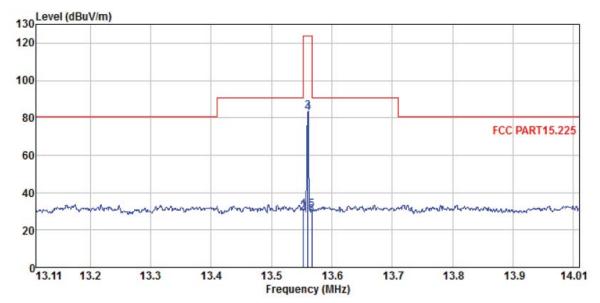
## 7.3 Field Strength of Fundamental Emissions and Mask Measurement

Test Requirement:	FCC Part15 C Section 15.225 and 15.209				
Test Method:	ANSI C63.10:2013				
Test site:	Measurement Distance	: 3m			
Receiver setup:	RBW=9KHz, VBW=30k	Hz, Sweep time=Auto			
Limit:	Frequency (MHz)	Field Strength (microvolts/meter) at 30m	Field Strength (dBuV/m) at 3m		
	13.553~13.567	15848	124 (QP)		
Mark limit:	Frequency (MHz)	Field Strength (microvolts/meter) at 30m	Field Strength (dBuV/m) at 3m		
	1.705~13.110	30	69.5		
	13.110~13.410	106	80.5		
	13.410~13.553	334	90.5		
	13.553~13.567	15848	124.0		
	13.567~13.710	334	90.5		
	13.710~14.010	106	80.5		
	14.010~30.000	30	69.5		
	Metal Full Soldered Ground Plane  Spectrum Analyzer / Receiver				
Test Procedure:	<ol> <li>Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.</li> <li>Power on the EUT, the turntable was rotated by 360 degrees to determine the position of the highest radiation.</li> <li>The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.</li> <li>For Fundamental emissions, use the receiver to measure QP reading.</li> <li>When the radiated emissions limits are expressed in terms of the average value of the emissions and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during</li> </ol>				



	a 0.1 second interval during which the field strength is at its maximum value.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

#### Measurement data:



Site

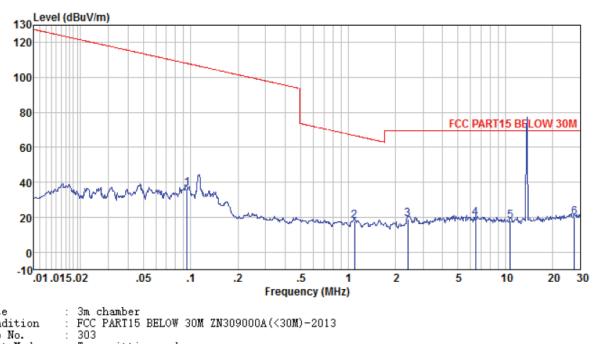
3m chamber FCC PART15.225 ZN309000A(<30M)-2013 303 Condition

Job No.

Test Mode Test Engin Transmitting mode

est	Engineer:	He						
	Eros		Antenna Factor			Limit		
	rreq	rever	ractor	F022	rever	Line	LIMIC	Kemark
	MHz	dBu∜	dB/m	d₿	dBuV/m	dBuV/m	₫B	
1	13.553	7.11	22.86	0.51	30.48	90.47	-59.99	Peak
2	13.553	5.84	22.86	0.51	29.21	90.47	-61.26	QP
3	13.560	60.00	22.86	0.51	83.37	124.00	-40.63	Peak
4	13.560	59.04	22.86	0.51	82.41	124.00	-41.59	QP
5	13.567	7.31	22.86	0.51	30.68	90.47	-59.79	Peak
6	13, 567	4.66	22.86	0.51	28.03	90.47	-62.44	QP





Site Condition

Job No. Test Mode Transmitting mode

est	Engineer:	He						
	•	Read	Antenna	Cable		Limit	Over	
	Freq	Level	Factor	Loss	Level	Line	Limit	Remark
	MHz	dBu∜	dB/m	<u>dB</u>	dBuV/m	dBuV/m	<u>dB</u>	
1	0.095	11.95	24.25	0.16	36.36	108.06	-71.70	QP
2	1.099	-3.63	20.96	0.33	17.66	66.79	-49.13	QP
3	2.390	-2.36	20.92	0.39	18.95	69.54	-50.59	QP
4	6.449	-3.96	22.79	0.45	19.28	69.54	-50.26	QP
5	10.766	-5.62	23.19	0.49	18.06	69.54	-51.48	QP
6	27.471	-7.79	27.35	0.55	20.11	69.54	-49.43	QP

Note: H and V all have been tested, only worse case is reported



#### 7.4 Radiated Emission

Te	est Requirement:	FCC Part15 C Section 15.209						
Те	est Method:	ANSI C63.10: 2013						
Те	st Frequency Range:	9KHz to 1000MHz						
Те	est site:	Measurement Distance: 3	Measurement Distance: 3m					
Re	eceiver setup:	Frequency (MHz)	RBW(KHz)	Detector				
		0.009~0.15	0.2	QP				
		0.15~30	9	QP				
		30~1000	120	QP				
Lin	nit:	The Field strength of any emissions which appear outside of 13.553~1 band shall not exceed the general radiated emissions limits  Frequency (MHz)  Field strength (micorvolts/meter)  Measur (micorvolts/meter)						
		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				
		960~1000	500	3				
Те	st setup:	Below 30MHz  EUT  Bocm  Metal Full Soldered Grow	3m und Plane Spectrum Ana	RX Antenna				



	Report No.: GTS201605000303E03
	Antenna Tower  Search Antenna  RF Test Receiver  Tum Table  Ground Plane
Test Procedure:	<ol> <li>Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.</li> <li>Power on the EUT, the turntable was rotated by 360 degrees to determine the position of the highest radiation.</li> <li>The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.</li> <li>For each suspected emissions, the antenna tower was scan (from 1M to 4M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.</li> <li>Set the test-receiver system to Peak or CISPR quasi-peak detect function with specified bandwidth under maximum hold mode.</li> <li>When the radiated emissions limits are expressed in terms of the average value of the emissions and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.</li> <li>In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP</li> </ol>
Test Instruments:	measured by receiver.  Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass



#### Measurement data:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	QP Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
35.62	45.76	14.49	0.62	30.07	30.80	40.00	-9.20	Vertical
47.99	43.42	15.36	0.75	30.01	29.52	40.00	-10.48	Vertical
125.89	55.11	11.51	1.41	29.53	38.50	43.50	-5.00	Vertical
151.07	52.40	10.29	1.58	29.40	34.87	43.50	-8.63	Vertical
206.40	45.82	12.77	1.88	29.27	31.20	43.50	-12.30	Vertical
576.64	38.03	20.03	3.63	29.30	32.39	46.00	-13.61	Vertical
81.50	36.21	11.13	1.04	29.79	18.59	40.00	-21.41	Horizontal
102.36	43.71	14.92	1.21	29.68	30.16	43.50	-13.34	Horizontal
139.85	55.19	10.19	1.50	29.46	37.42	43.50	-6.08	Horizontal
151.60	57.00	10.32	1.58	29.40	39.50	43.50	-4.00	Horizontal
220.62	50.26	13.20	1.96	29.39	36.03	46.00	-9.97	Horizontal
285.98	39.75	14.78	2.29	29.91	26.91	46.00	-19.09	Horizontal



#### 7.5 20dB Emission Bandwidth

Test Requirement:	FCC Part15 C Section 15.225 and 15.215		
Test Method:	ANSI C63.10:2013		
Limit:	N/A		
Test setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane		
Test Instruments:	Refer to section 6.0 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

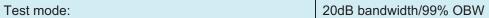
#### **Measurement Data**

Frequency (MHz)	20dB Bandwidth (KHz)	99% OBW (KHz)	Frequency range (MHz) fL>13.553MHz	Frequency range (MHz) fH>13.567MHz	Result
13.56MHz	294.048	417.0086	13.5583	13.5627	Pass



Test plot as follows:

Report No.: GTS201605000303E03







## 7.6 Frequency Stability Measurement

Test Desired						
Test Requirement:	FCC Part15 C Section 15.225					
Test Method:	ANSI C63.10: 2013					
Receiver setup:	RBW=1KHz, VBW=1KHz, Sweep time=Auto					
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,					
	for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.					
	For battery operated equipment, the equipment tests shall be performed using a new battery.					
Test setup:						
	Spectrum Analyzer  OVEN					
Test Procedure:	The transmitter output (antenna port) was connected to the spectrum analyzer.					
	EUT have transmitted absence of modulation signal and fixed channelize					
	Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.					
	Set RBW=1KHz, VBW=1KHz with peak detector and maxhold settings.					
	5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc $\times 10^6$ ppm and the limit is less than $\pm 100$ ppm.					
	6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value					
	7. Extreme temperature rule is -20℃ ~50℃					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.3 for details					
restillode.	1 tolol to scotloll old for details					
Test results:	Pass					



#### Measurement data:

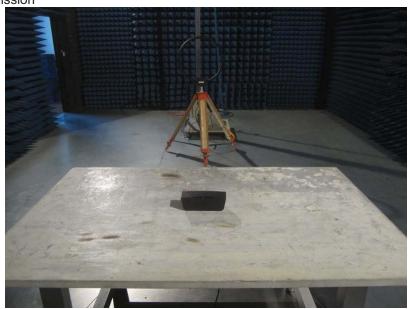
Reference Frequency: 13.56MHz							
Power supplied (VAC)	Temperature (°ℂ)	Frequer	ncy error		Decult		
Power supplied (VAC)	remperature (C)	Hz	%	Limit	Result		
	-20	54	0.00040%				
	-10	51	0.00038%		Pass		
120	0	61	0.00045%	+/- 0.01%			
	10	53	0.00039%				
	20	55	0.00041%	+/- 0.01 /6			
	30	60	0.00044%				
	40	64	0.00047%				
	50	68	0.00050%				

Reference Frequency: 13.56MHz						
Temperature (°ℂ)	Power supplied	Freque	ncy error	Limit	Result	
Temperature ( C)	(VAC)	Hz	ppm	LIIIII		
20	102	45	0.00033%		Pass	
	120	54	0.00040%	+/- 0.01%		
	138	75	0.00055%			



## 8 Test Setup Photo

Radiated Emission







Conducted Emission



## 9 EUT Constructional Details

Reference to the test report No. GTS201605000303E01

----- End -----