FCC TEST REPORT

FCC PART 15 SUBPART C 15.239

Test report

On Behalf of

INTRO UNION ELECTRONICS CO, LIMITED

For

BLUETOOTH FM TRANSMITTER

Model No.: HY-91, HY-62, HY-63, HY-65, HY-86, HY-90, HY-92, HY-93, HY-95, HY-96, HY-98, T19, C18, C20, C21, C22, C23, C26, C28, C30, C32, C33, C35, C36

FCC ID: 2AM87-HY91

Prepared for :	**INTRO UNION ELECTRONICS CO, LIMITED** **6F, F BUILDING, EAST AREA NO.8, SHANGXUE TECH-CITY, BANTIAN,LONGGANG, SHENZHEN , CHINA**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China**
Date of Test:	**Sep. 10, 2018 ~ Sep. 18, 2018**
Date of Report:	**Sep. 18, 2018**
Report Number:	**HK1809141093E**

TEST RESULT CERTIFICATION

Applicant's name ..... :	INTRO UNION ELECTRONICS CO, LIMITED
Address ..... :	6F, F BUILDING, EAST AREA NO.8, SHANGXUE TECH-CITY, BANTIAN,LONGGANG, SHENZHEN , CHINA
Manufacture's Name ..... :	INTRO UNION ELECTRONICS CO, LIMITED
Address ..... :	6F, F BUILDING, EAST AREA NO.8, SHANGXUE TECH-CITY, BANTIAN,LONGGANG, SHENZHEN , CHINA
Product description	
Trade Mark:	N/A
Product name ..... :	BLUETOOTH FM TRANSMITTER
Model and/or type reference ... :	HY-91, HY-62, HY-63, HY-65, HY-86, HY-90, HY-92, HY-93, HY-95, HY-96, HY-98, T19, C18, C20, C21, C22, C23, C26, C28, C30, C32, C33, C35, C36
Difference description	All the same except for the appearance.
Standards ..... :	FCC Rules and Regulations Part 15 Subpart C Section 15.239 ANSI C63.10: 2013

Date of Test ..... :	
Date (s) of performance of tests ..... :	Sep. 10, 2018 ~ Sep. 18, 2018
Date of Issue ..... :	Sep. 18, 2018
Test Result ..... :	**Pass**

Testing Engineer : 

(Gary Qian)

Technical Manager : 

(Eden Hu)

Authorized Signatory : 

(Jason Zhou)

Table of Contents **Page**

1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.209	Field Strength of Fundamental and Spurious Emission	Compliant
15.215	Bandwidth	Compliant
15.207	Line Conducted Emission	N/A

NOTE: N/A stands for not applicable. The device is only used in the car, so the conducted emission is not applicable.

1.2 TEST FACILITY

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.

Address : 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

Designation Number: : CN1229

Test Firm Registration Number : 616276

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Operation Frequency	88.1MHz-107.9MHz
Field Strength(3m)	43.14dBuV/m(AV)@3m
Modulation	FM
Number of channels	199(Channel spacing 100kHz)
Hardware Version	V1.0
Software Version	V1.0
Antenna Designation	Integrated Antenna (Met 15.203 Antenna requirement)
Power Supply	DC12/24V

2.2 OPERATION OF EUT DURING TESTING

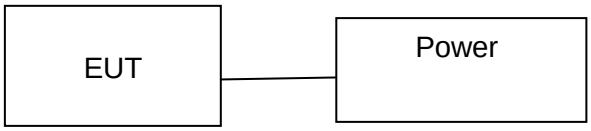
NO.	TEST MODE DESCRIPTION
1	Transmitting mode(Low channel)
2	Transmitting mode(Middle channel)
3	Transmitting mode(High channel)

Note:

1. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
2. All the requirements have been tested by modulating the transmitter with a 2.5 kHz tone at a fixed level which set to the manufacturer's maximum rated input to the modulator.

2.3 DESCRIPTION OF TEST SETUP

Operation of EUT during Radiation and Above1GHz Radiation testing:



2.4 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 28, 2017	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 28, 2017	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 28, 2017	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2017	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2017	1 Year
10.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 28, 2017	1 Year
11.	Pre-amplifier	EMCI	EMC051845SE	HKE-015	Dec. 28, 2017	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 28, 2017	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 28, 2017	N/A
14.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2017	3 Year

3. RADIATED EMISSION

3.1. MEASUREMENT PROCEDURE

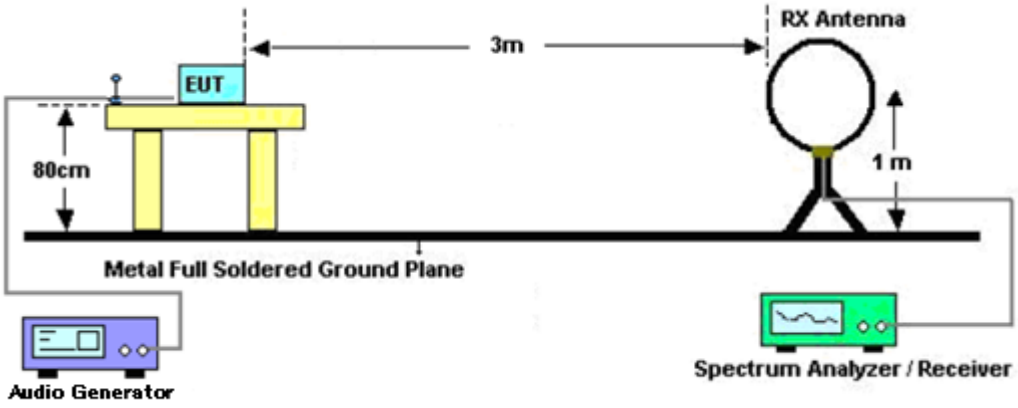
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground and opposite the horn antenna. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. 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.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions below 1GHz, use 120KHz RBW and VBW>=3RBW for QP reading.
7. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
8. Only the worst case is reported.

The following table is the setting of spectrum analyzer and receiver.

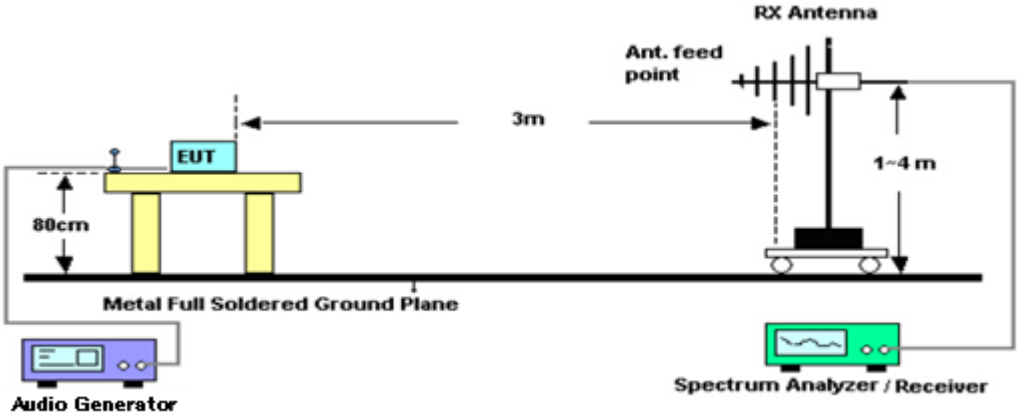
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

3.2. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



3.3. TEST RESULT FOR FIELD STRENGTH OF FUNDAMENTAL

Frequency MHz	Polarization	Level dB(uV/m) PK	Limit dB(uV/m) PK	Margin dB	Pass/Fail	Detector
88.100	H	38.54	67.96	29.42	Pass	PK
88.100	V	43.85	67.96	24.11	Pass	PK
98.000	H	39.15	67.96	28.81	Pass	PK
98.000	V	44.18	67.96	23.78	Pass	PK
107.900	H	40.11	67.96	27.85	Pass	PK
107.900	V	45.03	67.96	22.93	Pass	PK
Frequency MHz	Polarization	Level dB(uV/m) AV	Limit dB(uV/m) AV	Margin dB	Pass/Fail	Detector
88.100	H	36.72	47.96	11.24	Pass	AV
88.100	V	41.28	47.96	6.68	Pass	AV
98.000	H	37.54	47.96	10.42	Pass	AV
98.000	V	42.85	47.96	5.11	Pass	AV
107.900	H	38.51	47.96	9.45	Pass	AV
107.900	V	43.14	47.96	4.82	Pass	AV

3.4. TEST RESULT FOR FIELD STRENGTH OF BAND EDGE EMISSION

Frequency MHz	Polarization	Level dB(uV/m) QP	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Detector
88.000	H	31.54	40.00	8.46	Pass	QP
88.000	V	32.37	40.00	7.63	Pass	QP
108.000	H	30.52	43.50	12.98	Pass	QP
108.000	V	33.19	43.50	10.31	Pass	QP

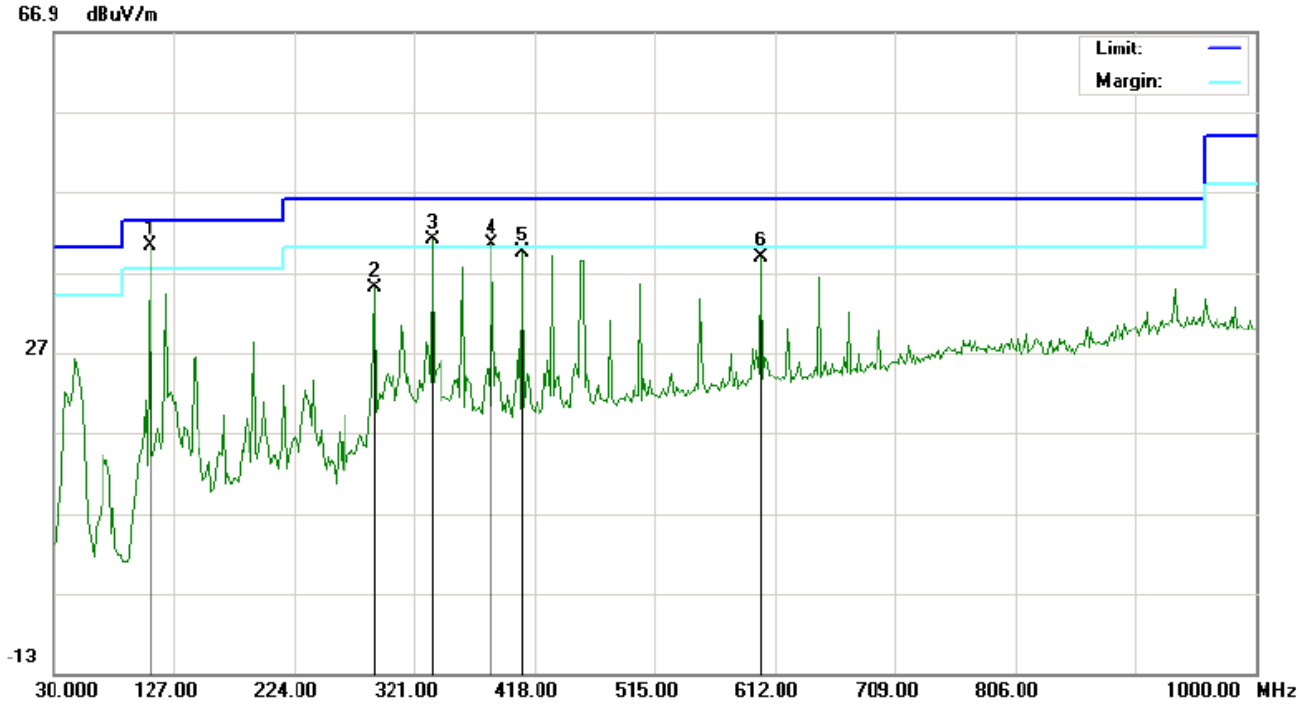
Note: The above two frequencies are the worst case for the band edge emission test.

3.5. TEST RESULT FOR SPURIOUS EMISSION

RADIATED EMISSION BELOW 30MHz

No emission found between lowest internal used/generated frequencies to 30MHz.

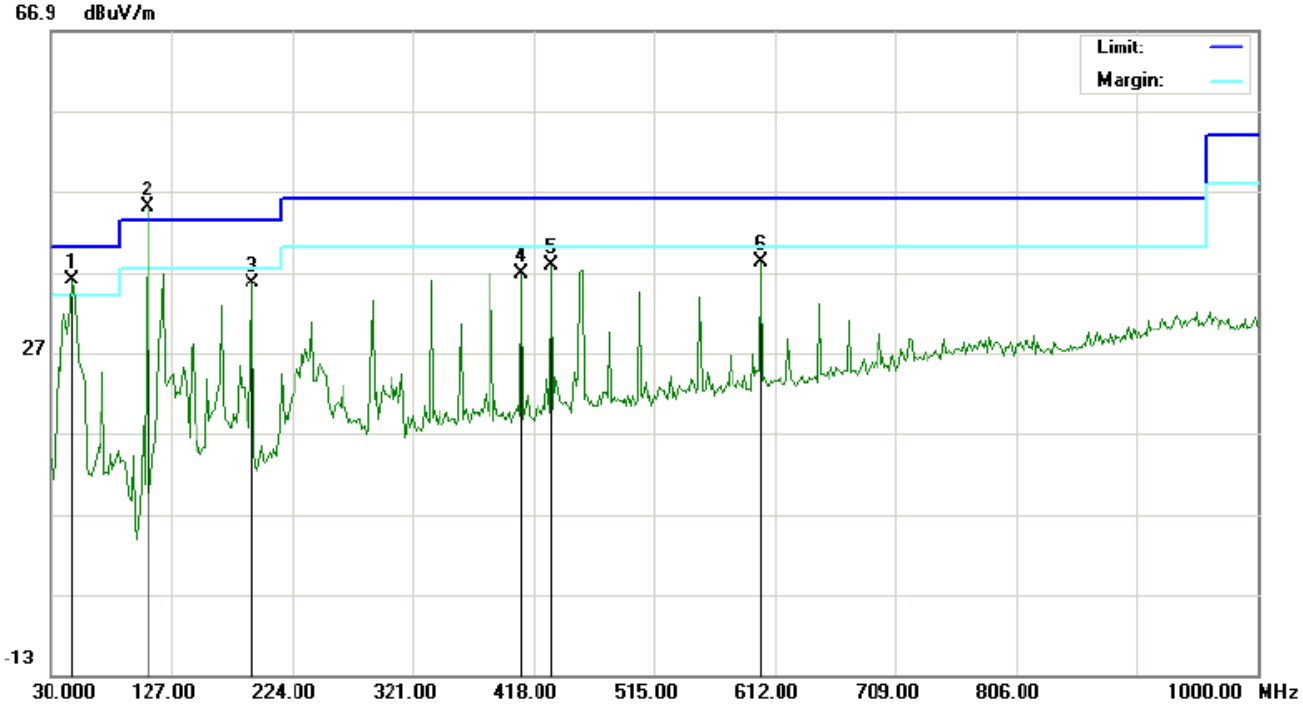
RADIATED EMISSION BELOW 1GHZ-Horizontal



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	107.9000	31.39	8.72	40.11	48.00					
2		288.6667	21.62	13.48	35.10	46.00	-10.90	peak			
3	!	335.5500	23.29	17.78	41.07	46.00	-4.93	peak			
4	!	384.0500	21.43	18.96	40.39	46.00	-5.61	peak			
5		408.3000	20.08	19.32	39.40	46.00	-6.60	peak			
6		600.6833	14.98	23.73	38.71	46.00	-7.29	peak			

RESULT: PASS

RADIATED EMISSION BELOW 1GHZ-Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	!	47.7832	27.54	8.39	35.93	40.00	-4.07	peak			
2	*	107.9000	44.35	0.68	45.03	48.00					
3		191.6667	24.51	11.11	35.62	43.50	-7.88	peak			
4		408.3000	17.43	19.32	36.75	46.00	-9.25	peak			
5		432.5500	17.70	20.06	37.76	46.00	-8.24	peak			
6		600.6833	15.39	22.75	38.14	46.00	-7.86	peak			

RESULT: PASS

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.

2 The “Factor” value can be calculated automatically by software of measurement system.

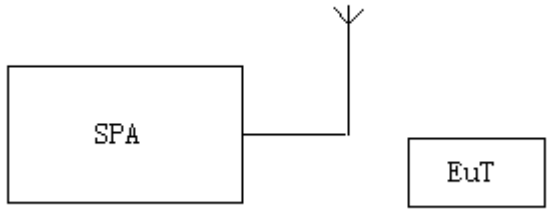
3 All test modes had been tested. The High channel is the worst case and recorded in the report.

4. BANDWIDTH

4.1. MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
   Centre frequency = Operation Frequency
   RBW=3KHz
   VBW=10KHz
   Span: 300kHz
   Sweep time: Auto
2. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
3. Record the plots and Reported.

4.2. TEST SETUP

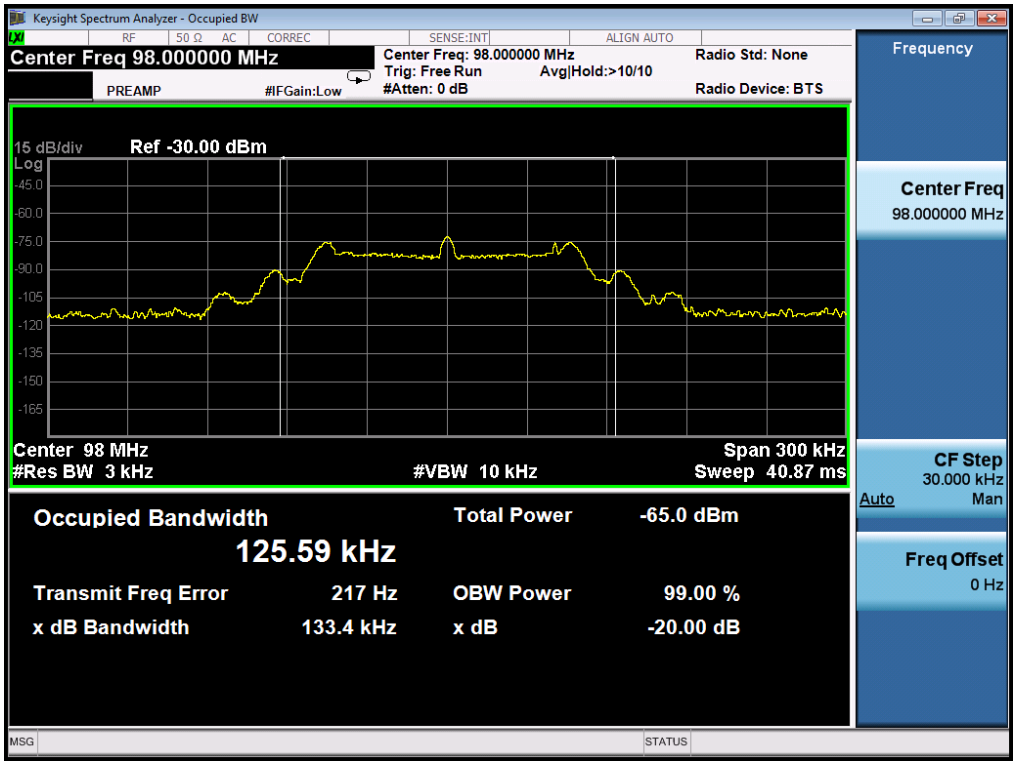


4.3. TEST RESULT

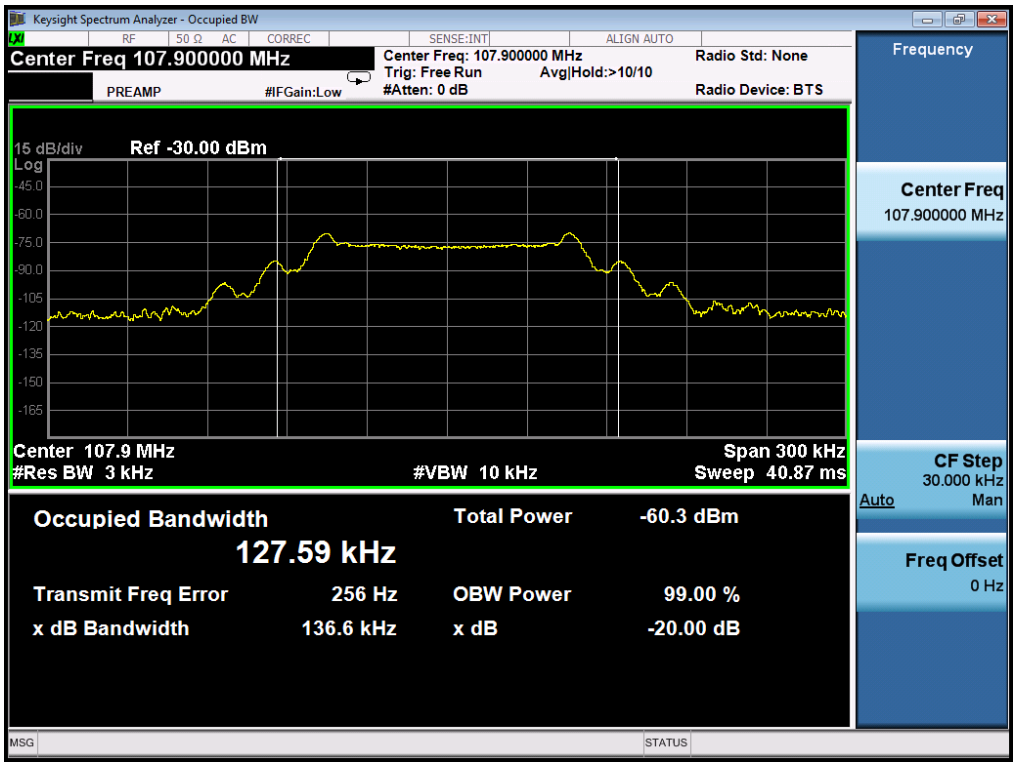
Channel	Channel Frequency(MHz)	-20dB bandwidth (kHz)	Limit(kHz)
Low	88.1	137.0	200
Middle	98.0	133.4	200
High	107.9	136.6	200

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



5. PHOTOGRAPH OF TEST

Radiated Emission