

# FCC TEST REPORT

## FCC ID: 2ADACNGC-1

Product : Intel Braswell Fanless Mini PC

Model Name : NGC-1

Brand : MINIX

Report No. : PT800156160119E-FC04

### Prepared for

MINIX TECHNOLOGY LIMITED

Unit 01, 15/F, Chevalier Commercial Center, No.8 Wang Hoi Road, Kowloon Bay, Kowloon,  
Hong Kong

### Prepared by

DongGuan Precise Testing Service Co.,Ltd.

Building D, Baoding Technology Park, Guangming Road 2, Guangming Community

Dongcheng District, Dongguan, Guangdong, China



**TEST RESULT CERTIFICATION**

Applicant's name : MINIX TECHNOLOGY LIMITED  
Address : Unit 01, 15/F, Chevalier Commercial Center, No.8 Wang Hoi Road, Kowloon Bay, Kowloon, Hong Kong  
Manufacture's name : XIANGUAN ELECTRONICS LIMITED  
Address : 13F., Building B, Haisong Edifice, Tairan 9th Rd., Futian District, Shenzhen, China 518040  
Product name : Intel Braswell Fanless Mini PC  
Model name : NGC-1  
Standards : FCC CFR47 Part 15 Section 15.247  
Test procedure : ANSI C63.10:2013, DA 00-705  
Test Date : Jan. 13 - Feb. 29, 2016  
Date of Issue : Feb. 29, 2016  
Test Result : Pass

This device described above has been tested by PTS, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of PTS, this document may be altered or revised by PTS, personal only, and shall be noted in the revision of the document.

Testing Engineer

August Qiu

Technical Manager

Hack Ye

Authorized Signatory

Chris Du



## Contents

	<b>Page</b>
<b>2 TEST SUMMARY.....</b>	<b>5</b>
<b>3 GENERAL INFORMATION.....</b>	<b>6</b>
3.1 GENERAL DESCRIPTION OF E.U.T.....	6
3.2 CHANNEL LIST .....	7
3.3 TEST MODE .....	8
<b>4 EQUIPMENT DURING TEST.....</b>	<b>9</b>
4.1 EQUIPMENTS LIST.....	9
4.2 MEASUREMENT UNCERTAINTY.....	10
<b>5 CONDUCTED EMISSION.....</b>	<b>11</b>
5.1 E.U.T. OPERATION.....	11
5.2 EUT SETUP .....	11
5.3 MEASUREMENT DESCRIPTION.....	12
5.4 CONDUCTED EMISSION TEST RESULT.....	12
<b>6 RADIATED SPURIOUS EMISSIONS.....</b>	<b>16</b>
6.1 EUT OPERATION.....	16
6.2 TEST SETUP.....	17
6.3 SPECTRUM ANALYZER SETUP.....	18
6.4 TEST PROCEDURE.....	19
6.5 SUMMARY OF TEST RESULTS.....	20
<b>7 BAND EDGE MEASUREMENT .....</b>	<b>28</b>
7.1 TEST PROCEDURE.....	28
7.2 TEST RESULT.....	29
<b>8 6DB BANDWIDTH MEASUREMENT.....</b>	<b>30</b>
8.1 TEST PROCEDURE.....	30
8.2 TEST RESULT.....	30
<b>9 MAXIMUM PEAK OUTPUT POWER .....</b>	<b>33</b>
9.1 TEST PROCEDURE.....	33
9.2 TEST RESULT.....	33
<b>10 POWER SPECTRAL DENSITY.....</b>	<b>34</b>
10.1 TEST PROCEDURE.....	34
10.2 TEST RESULT .....	34
<b>11 ANTENNA REQUIREMENT.....</b>	<b>37</b>



**PRECISE TESTING**

Report No.: PT800156160119E-FC05

**12 TEST SETUP .....38**



## 2 Test Summary

Test Items	Test Requirement	Result
Conduct Emission	15.207	PASS
Radiated Spurious Emissions	15.205(a) 15.209 15.247(d)	PASS
Band edge	15.247(d) 15.205(a)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(1)	PASS
Power Spectral Density	15.247(e)	PASS
Antenna Requirement	15.203	PASS

Remark:

N/A: Not Applicable



### 3 General Information

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

Product Name	:	Intel Braswell Fanless Mini PC
Model Name	:	NGC-1
Model Description	:	N/A
Bluetooth Version	:	V4.2
Operating frequency	:	For BT3.0: 2402-2480MHz, 79 channels
	:	For BLE: 2402-2480MHz, 40 channels
Antenna Type:	:	Detachable R-SMA Antenna
Antenna Gain:	:	5.0dBi; For BT only the antenna port 2 transmit signal
Type of Modulation	:	For BT3.0: GFSK, Pi/4DQPSK, 8DPSK
	:	For BLE: GFSK
Power supply	:	DC 12.0V



### 3.2 Channel List

BT 3.0							
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	-	-
BLE							
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480



### 3.3 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Modulation	Test mode	Low channel	Middle channel	High channel
GFSK(BLE)	Transmitting	2402MHz	2440MHz	2480MHz
Tests Carried Out Under FCC part 15.207				
Test Item		Test Mode		
Conduction Emission, 0.15MHz to 30MHz		BT Communication		





## 4 Equipment During Test

### 4.1 Equipments List

RF Conducted Test							
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	EMC Analyzer (9k~26.5GHz)	Agilent	E4407B	MY45109572	Aug.04, 2015	Aug.03, 2016	1 year
2	EXA Signal Analyzer	Keysight	N9010A	MY50520207 526B25MPB W7X	Aug.04, 2015	Aug.03, 2016	1 year
3	EMI Test Receiver	R&S	ESCI	101155	July 15, 2015	July 14, 2016	1 year
Radiated Emissions							
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	EMI Test Receiver	Rohde&Schwarz	ESCI	101417	July 15, 2015	July 14, 2016	1 year
2	Trilog Broadband Antenna	SCHWARZECK	VULB9160	9160-3355	July 15, 2015	July 14, 2016	1 year
3	Amplifier	EM	EM-30180	060538	July 15, 2015	July 14, 2016	1 year
4	Horn Ant (1G-18GHz)	SCHWARZECK	BBHA9120D	9120D-1246	July 15, 2015	July 14, 2016	1 year
5	Horn Ant (18G-40GHz)	SCHWARZECK	BBHA 9170	9170-181	June 6, 2015	June 5, 2016	1 year
6	Coaxial Cable(below 1GHz)	LARGE	CALB1	-	July 15, 2015	July 14, 2016	1 year
7	Coaxial Cable(above 1GHz)	LARGE	CALB2	-	July 15, 2015	July 14, 2016	1 year
Conducted Emissions							
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	EMI Test Receiver	R&S	ESCI	101155	July 15, 2015	July 14, 2016	1 year
2	LISN	SCHWARZECK	NSLK 8128	8128-289	July 15, 2015	July 14, 2016	1 year
3	Cable	LARGE	RF300	-	July 15, 2015	July 14, 2016	1 year



#### 4.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10 <sup>-6</sup>
Bandwidth	± 1.5 x 10 <sup>-6</sup>
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB

## 5 Conducted Emission

Test Requirement: : FCC CFR 47 Part 15 Section 15.207

Test Method: : ANSI C63.4:2014

Test Result: : PASS

Frequency Range: : 150kHz to 30MHz

Class/Severity: : Class B

Limit: : 66-56 dB $\mu$ V between 0.15MHz & 0.5MHz  
 : 56 dB $\mu$ V between 0.5MHz & 5MHz  
 : 60 dB $\mu$ V between 5MHz & 30MHz

Detector: : Peak for pre-scan (9kHz Resolution Bandwidth)

### 5.1 E.U.T. Operation

Operating Environment :

Temperature: : 25.5 °C

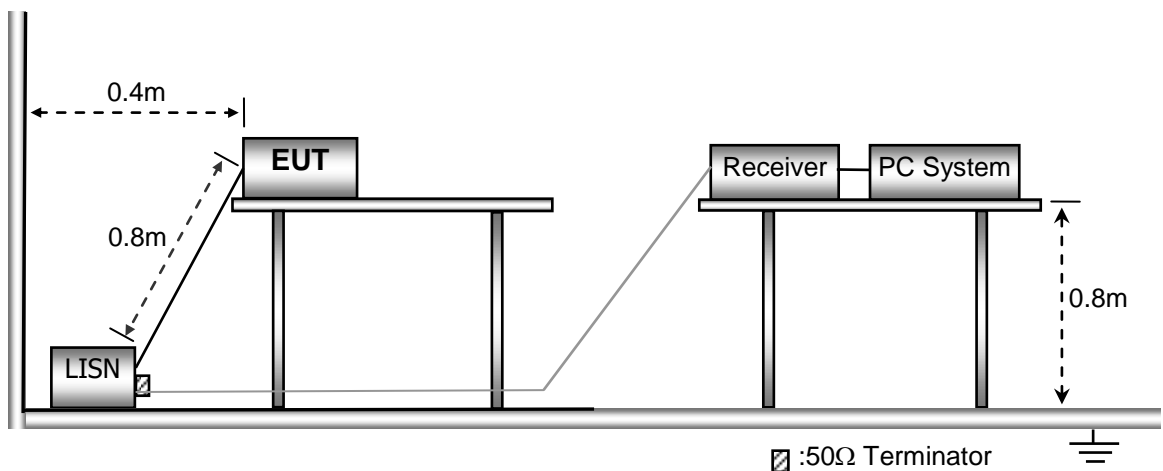
Humidity: : 51 % RH

Atmospheric Pressure: : 101.2kPa

EUT Operation : : Refer to section 3.3

### 5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003.



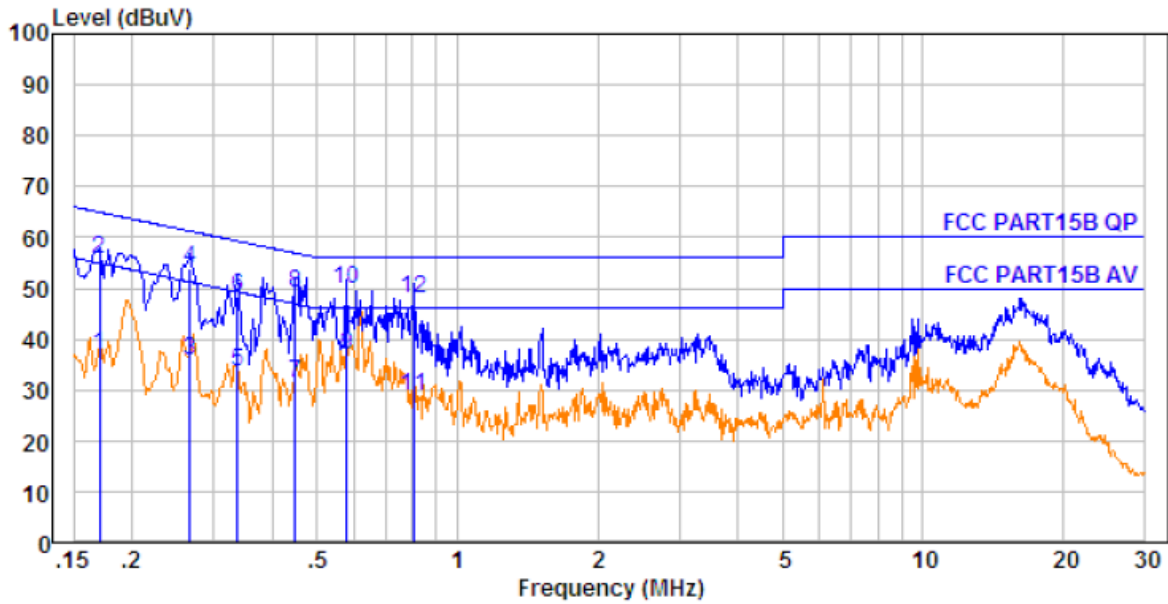


### 5.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

### 5.4 Conducted Emission Test Result

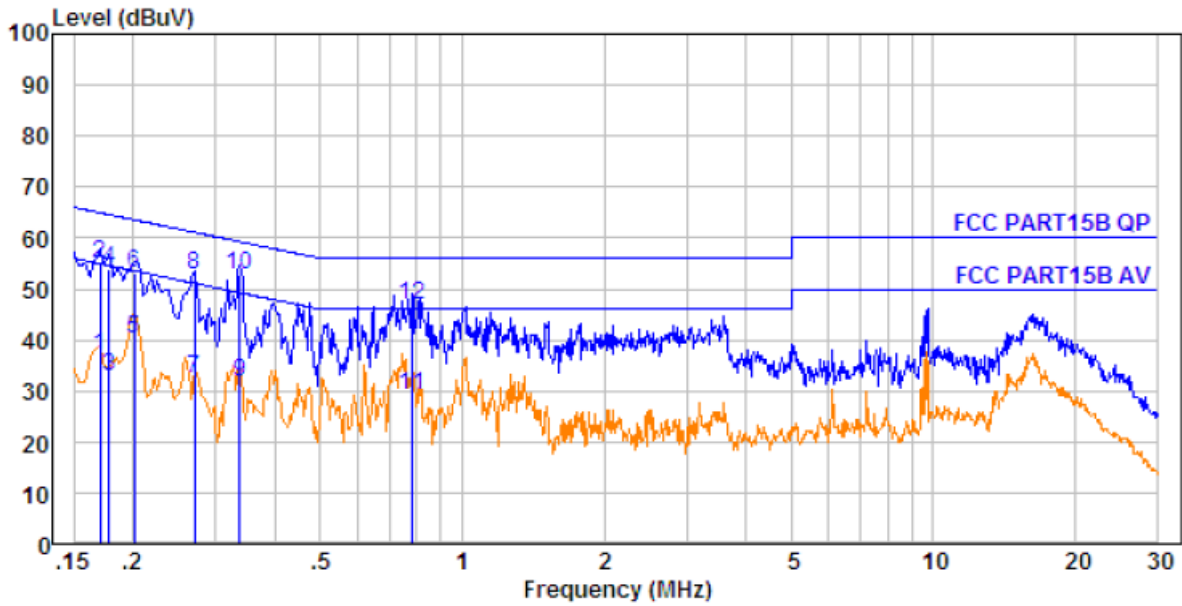
Live line-120V:



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBUV	Emission Level dBUV	Limit dBUV	Over Limit dB	Remark
1.	0.170	10.60	0.60	25.65	36.85	54.94	-18.09	Average
2.	0.170	10.60	0.60	44.65	55.85	64.94	-9.09	QP
3.	0.266	10.62	0.60	24.51	35.73	51.25	-15.52	Average
4.	0.266	10.62	0.60	42.51	53.73	61.25	-7.52	QP
5.	0.337	10.63	0.60	22.28	33.51	49.27	-15.76	Average
6.	0.337	10.63	0.60	37.28	48.51	59.27	-10.76	QP
7.	0.449	10.64	0.60	19.95	31.19	46.89	-15.70	Average
8.	0.449	10.64	0.60	37.95	49.19	56.89	-7.70	QP
9.	0.579	10.66	0.60	25.47	36.73	46.00	-9.27	Average
10.	0.579	10.66	0.60	38.47	49.73	56.00	-6.27	QP
11.	0.809	10.66	0.60	17.53	28.79	46.00	-17.21	Average
12.	0.809	10.66	0.60	36.53	47.79	56.00	-8.21	QP



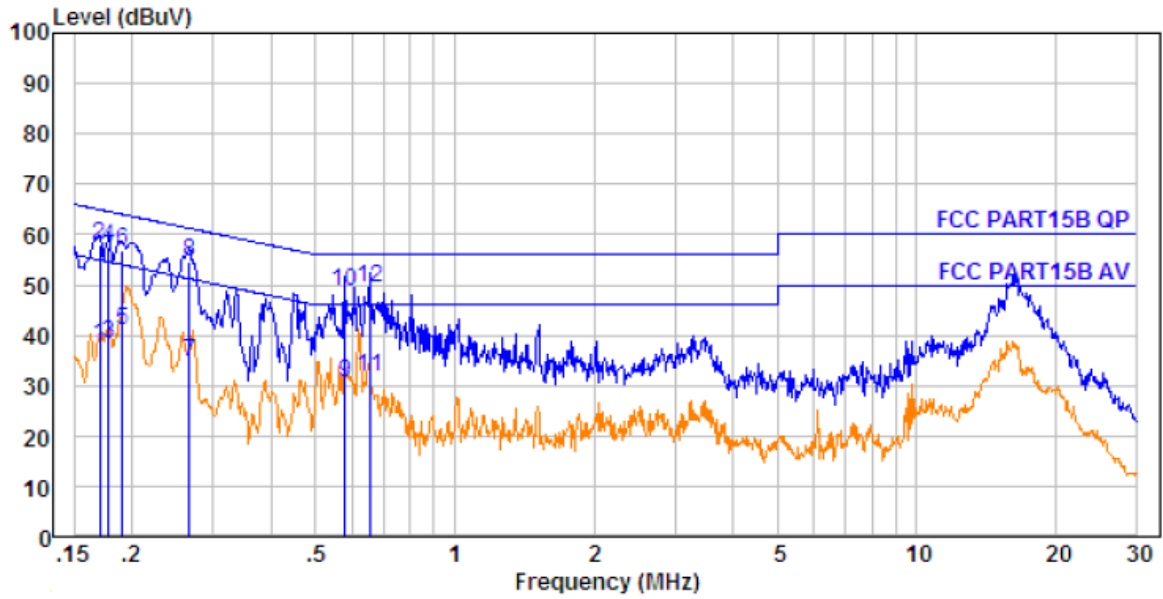
Neutral line-120V:



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBUV	Emission Level dBUV	Limit dBUV	Over Limit dB	Remark
1.	0.170	10.60	0.60	25.68	36.88	54.94	-18.06	Average
2.	0.170	10.60	0.60	43.68	54.88	64.94	-10.06	QP
3.	0.178	10.61	0.60	21.66	32.87	54.59	-21.72	Average
4.	0.178	10.61	0.60	42.66	53.87	64.59	-10.72	QP
5.	0.202	10.61	0.60	29.05	40.26	53.54	-13.28	Average
6.	0.202	10.61	0.60	42.05	53.26	63.54	-10.28	QP
7.	0.270	10.62	0.60	21.42	32.64	51.12	-18.48	Average
8.	0.270	10.62	0.60	41.42	52.64	61.12	-8.48	QP
9.	0.337	10.63	0.60	20.37	31.60	49.27	-17.67	Average
10.	0.337	10.63	0.60	41.37	52.60	59.27	-6.67	QP
11.	0.779	10.66	0.60	17.73	28.99	46.00	-17.01	Average
12.	0.779	10.66	0.60	35.73	46.99	56.00	-9.01	QP



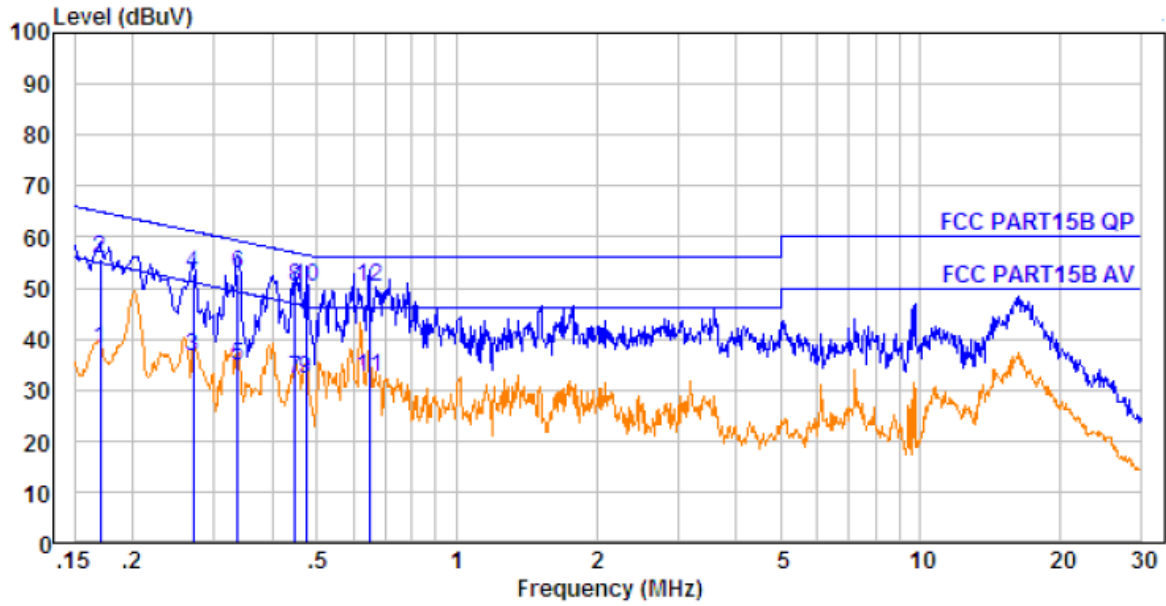
Live line-240V:



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBUV	Emission Level dBUV	Limit dBUV	Over Limit dB	Remark
1.	0.170	10.60	0.60	26.65	37.85	54.94	-17.09	Average
2.	0.170	10.60	0.60	46.65	57.85	64.94	-7.09	QP
3.	0.178	10.61	0.60	27.34	38.55	54.59	-16.04	Average
4.	0.178	10.61	0.60	46.34	57.55	64.59	-7.04	QP
5.	0.190	10.61	0.60	29.62	40.83	54.02	-13.19	Average
6.	0.190	10.61	0.60	45.62	56.83	64.02	-7.19	QP
7.	0.266	10.62	0.60	23.51	34.73	51.25	-16.52	Average
8.	0.266	10.62	0.60	43.51	54.73	61.25	-6.52	QP
9.	0.579	10.66	0.60	19.47	30.73	46.00	-15.27	Average
10.	0.579	10.66	0.60	37.47	48.73	56.00	-7.27	QP
11.	0.654	10.66	0.60	20.31	31.57	46.00	-14.43	Average
12.	0.654	10.66	0.60	38.31	49.57	56.00	-6.43	QP



Neutral line-240V:



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBUV	Emission Level dBUV	Limit dBUV	Over Limit dB	Remark
1.	0.170	10.60	0.60	26.68	37.88	54.94	-17.06	Average
2.	0.170	10.60	0.60	44.68	55.88	64.94	-9.06	QP
3.	0.270	10.62	0.60	25.42	36.64	51.12	-14.48	Average
4.	0.270	10.62	0.60	41.42	52.64	61.12	-8.48	QP
5.	0.337	10.63	0.60	23.37	34.60	49.27	-14.67	Average
6.	0.337	10.63	0.60	41.37	52.60	59.27	-6.67	QP
7.	0.449	10.64	0.60	21.04	32.28	46.89	-14.61	Average
8.	0.449	10.64	0.60	39.04	50.28	56.89	-6.61	QP
9.	0.474	10.64	0.60	20.94	32.18	46.45	-14.27	Average
10.	0.474	10.64	0.60	38.94	50.18	56.45	-6.27	QP
11.	0.647	10.66	0.60	21.10	32.36	46.00	-13.64	Average
12.	0.647	10.66	0.60	39.10	50.36	56.00	-5.64	QP



## 6 Radiated Spurious Emissions

Test Requirement: : FCC CFR47 Part 15 Section 15.209 & 15.247  
 Test Method: : ANSI C63.10:2013,KDB 558074 D01 DTS MEAS GUIDANCE V03R03  
 Test Result: : PASS  
 Measurement Distance: : 3m  
 Limit: : See the follow table

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log <sup>(2400/F(kHz))</sup> + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log <sup>(24000/F(kHz))</sup> + 40
1.705 ~ 30	30	30	100 * 30	20log <sup>(30)</sup> + 40
30 ~ 88	100	3	100	20log <sup>(100)</sup>
88 ~ 216	150	3	150	20log <sup>(150)</sup>
216 ~ 960	200	3	200	20log <sup>(200)</sup>
Above 960	500	3	500	20log <sup>(500)</sup>

### 6.1 EUT Operation

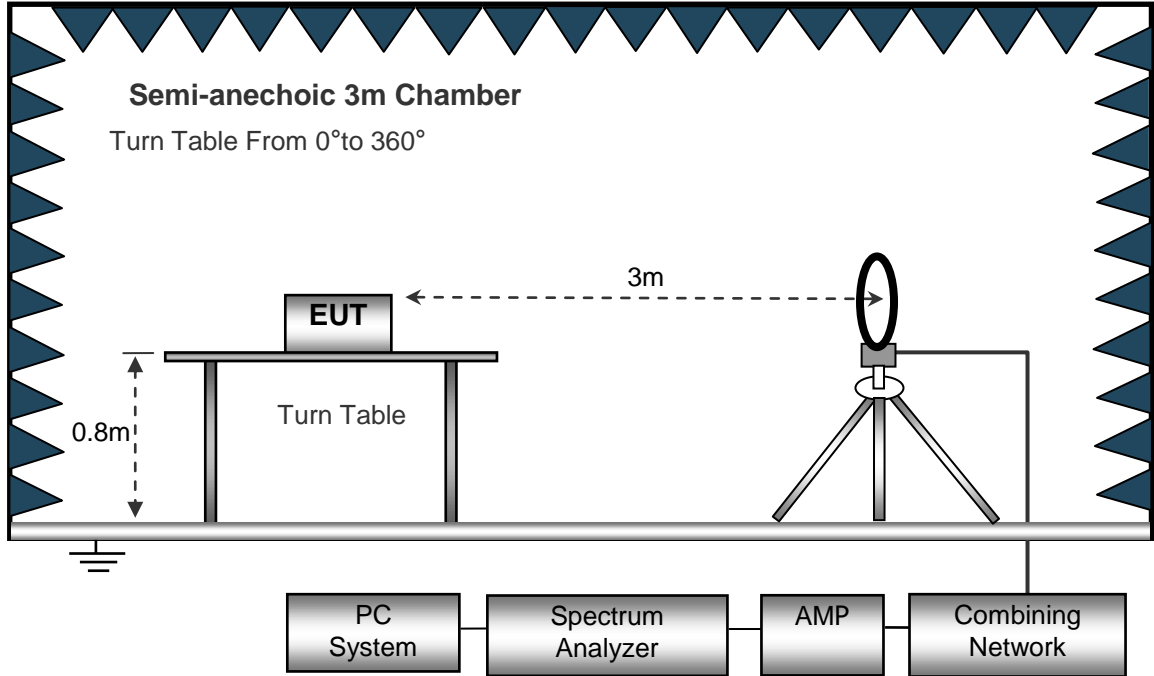
Operating Environment :  
 Temperature: : 23.5 °C  
 Humidity: : 51.1 % RH  
 Atmospheric Pressure: : 101.2kPa  
 EUT Operation : : Refer to section 3.3



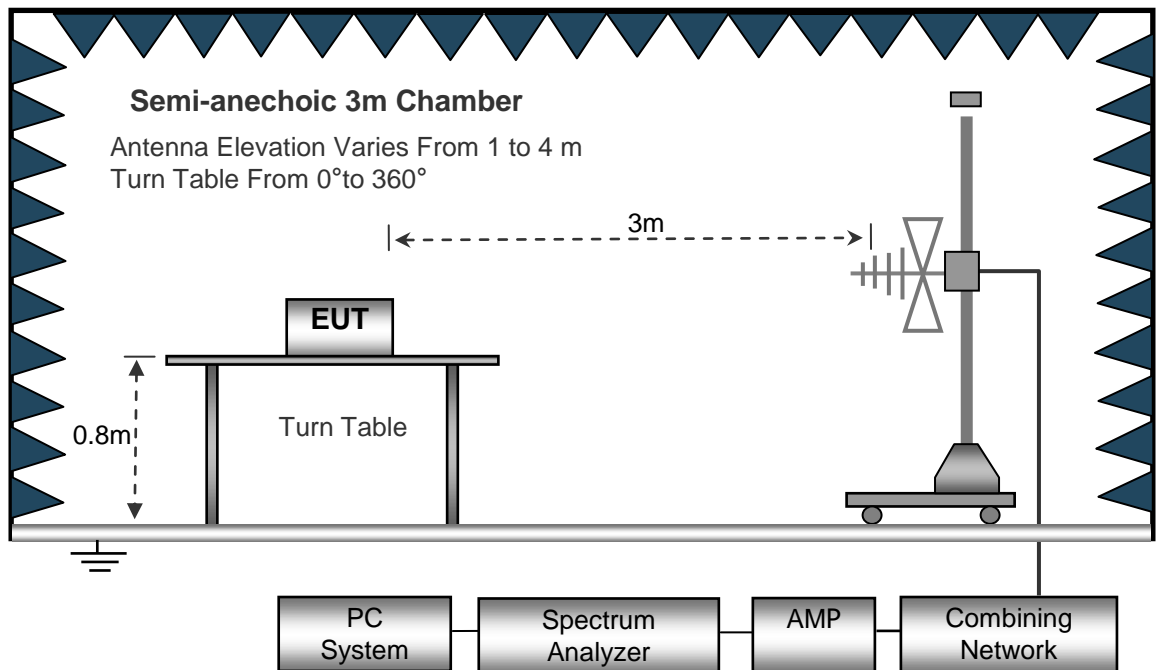
### 6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

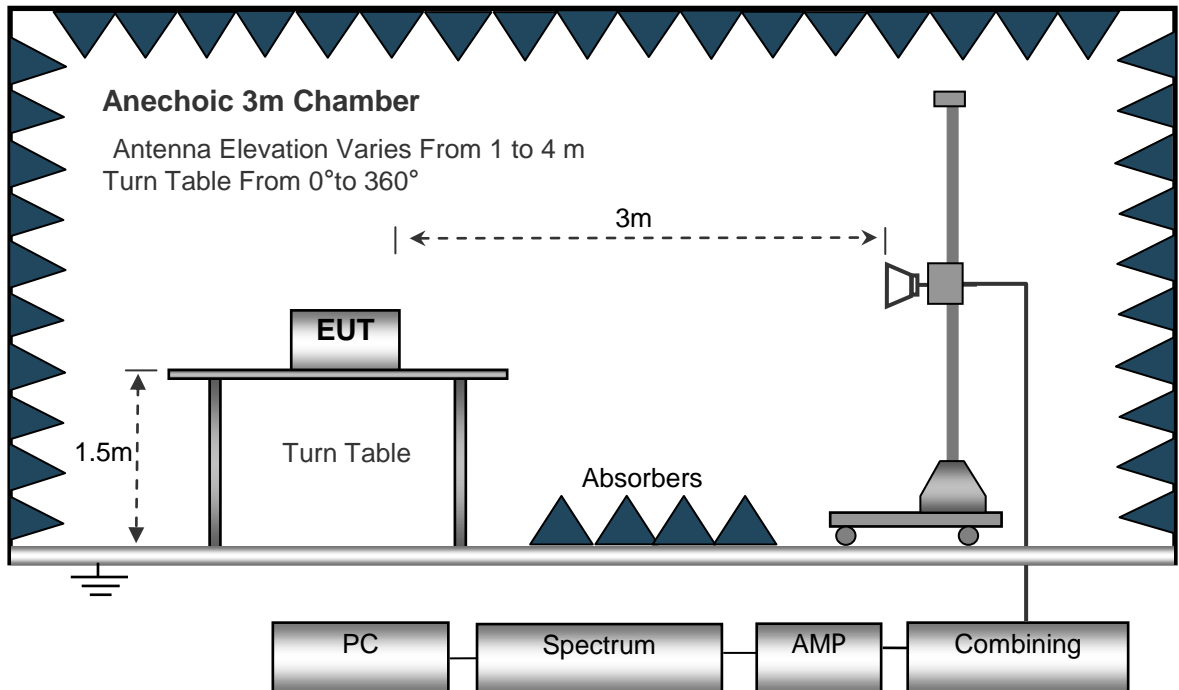
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



### 6.3 Spectrum Analyzer Setup

Below 30MHz

- Sweep Speed ..... Auto
- IF Bandwidth ..... 10kHz
- Video Bandwidth ..... 10kHz
- Resolution Bandwidth ..... 10kHz

30MHz ~ 1GHz

- Sweep Speed ..... Auto
- Detector ..... PK
- Resolution Bandwidth ..... 100kHz
- Video Bandwidth ..... 300kHz

Above 1GHz

- Sweep Speed ..... Auto
- Detector ..... PK
- Resolution Bandwidth ..... 1MHz
- Video Bandwidth ..... 3MHz
- Detector ..... Ave.
- Resolution Bandwidth ..... 1MHz
- Video Bandwidth ..... 10Hz



## 6.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.



## **6.5 Summary of Test Results**

### **Test Frequency: Below 30MHz**

The measurements were more than 20 dB below the limit and not reported.

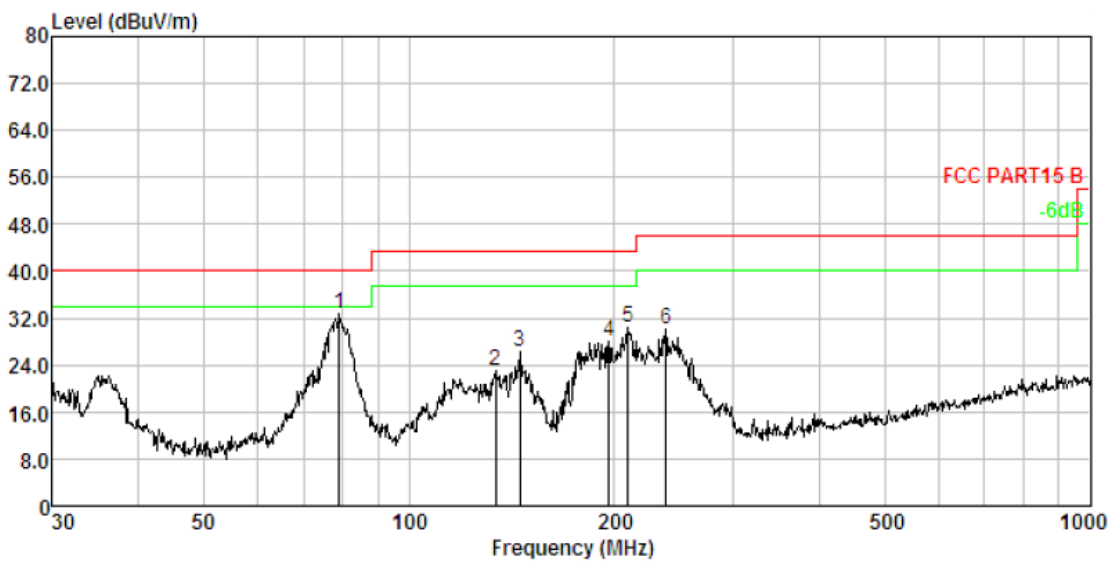
### **Test Frequency: 30MHz ~ 26.5GHz**

Remark: only the worst data (GFSK modulation mode) were reported.



EUT :	Intel Braswell Fanless Mini PC	Model Name. :	NGC-1
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Mode 1		

Test plot for Horizontal:



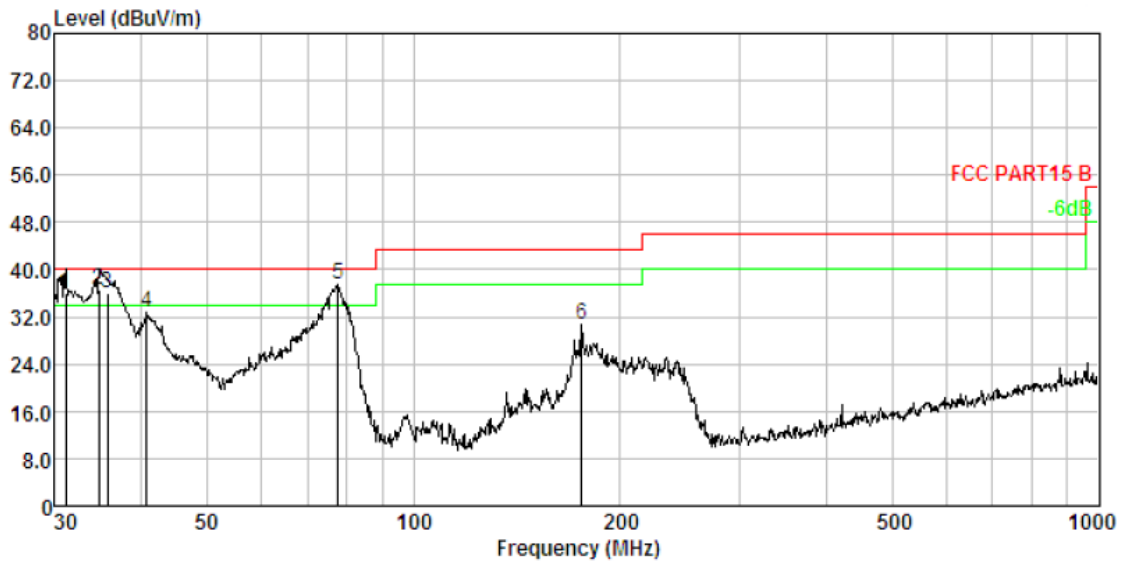
No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	78.965	1.93	8.99	52.05	30.31	32.66	40.00	-7.34	QP
2.	134.088	2.41	12.94	38.04	30.49	22.90	43.50	-20.60	QP
3.	145.351	2.48	13.65	40.52	30.52	26.13	43.50	-17.37	QP
4.	196.510	2.76	10.63	45.28	30.62	28.05	43.50	-15.45	QP
5.	210.048	2.82	10.58	47.59	30.65	30.34	43.50	-13.16	QP
6.	238.310	2.93	11.63	46.17	30.69	30.04	46.00	-15.96	QP

**Remark:**

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level



*Test plot for Vertical:*



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	31.071	1.09	13.23	51.70	29.98	36.04	40.00	-3.96	QP
2.	34.760	1.19	13.38	52.20	30.02	36.75	40.00	-3.25	QP
3.	35.749	1.21	13.43	51.54	30.03	36.15	40.00	-3.85	QP
4.	40.845	1.33	13.63	47.75	30.08	32.63	40.00	-7.37	QP
5.	77.593	1.92	9.29	56.70	30.30	37.61	40.00	-2.39	QP
6.	176.269	2.66	12.77	45.98	30.59	30.82	43.50	-12.68	QP

**Remark:**

Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level



Frequency	Receiver Reading	Detector	Corrected Factor	Corrected Amplitude	Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK(BLE) Low Channel						
4804.00	52.19	PK	-1.06	51.13	74.00	-22.87
4804.00	39.01	Ave	-1.06	37.95	54.00	-16.05
7206.00	51.31	PK	1.33	52.64	74.00	-21.36
7206.00	38.57	Ave	1.33	39.90	54.00	-14.10
2336.16	64.44	PK	-13.19	51.25	74.00	-22.75
2336.16	49.67	Ave	-13.19	36.48	54.00	-17.52
2376.33	63.98	PK	-13.14	50.84	74.00	-23.16
2376.33	48.67	Ave	-13.14	35.53	54.00	-18.47
2492.42	62.30	PK	-13.08	49.22	74.00	-24.78
2492.42	48.24	Ave	-13.08	35.16	54.00	-18.84
Remark: Corrected Factor=ANT Factor + Cable Loss – Amp Gain						



Frequency	Receiver Reading	Detector	Corrected Factor	Corrected Amplitude	Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK(BLE) Middle Channel						
4880.00	52.09	PK	-0.93	51.16	74.00	-22.84
4880.00	38.06	Ave	-0.93	37.13	54.00	-16.87
7320.00	50.82	PK	1.67	52.49	74.00	-21.51
7320.00	37.36	Ave	1.67	39.03	54.00	-14.97
2336.16	64.9	PK	-13.19	51.71	74.00	-22.29
2336.16	49.31	Ave	-13.19	36.12	54.00	-17.88
2376.33	63.82	PK	-13.14	50.68	74.00	-23.32
2376.33	48.36	Ave	-13.14	35.22	54.00	-18.78
2492.42	62.83	PK	-13.08	49.75	74.00	-24.25
2492.42	48.40	Ave	-13.08	35.32	54.00	-18.68
Remark: Corrected Factor=ANT Factor + Cable Loss – Amp Gain						





Frequency	Receiver Reading	Detector	Corrected Factor	Corrected Amplitude	Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK(BLE) High Channel						
4960.00	52.59	PK	-0.87	51.72	74.00	-22.28
4960.00	38.06	Ave	-0.87	37.19	54.00	-16.81
7440.00	51.01	PK	1.84	52.85	74.00	-21.15
7440.00	37.41	Ave	1.84	39.25	54.00	-14.75
2336.16	64.32	PK	-13.19	51.13	74.00	-22.87
2336.16	49.75	Ave	-13.19	36.56	54.00	-17.44
2376.33	63.53	PK	-13.14	50.39	74.00	-23.61
2376.33	49.11	Ave	-13.14	35.97	54.00	-18.03
2492.42	62.58	PK	-13.08	49.50	74.00	-24.5
2492.42	48.42	Ave	-13.08	35.34	54.00	-18.66
Remark: Corrected Factor=ANT Factor + Cable Loss – Amp Gain						

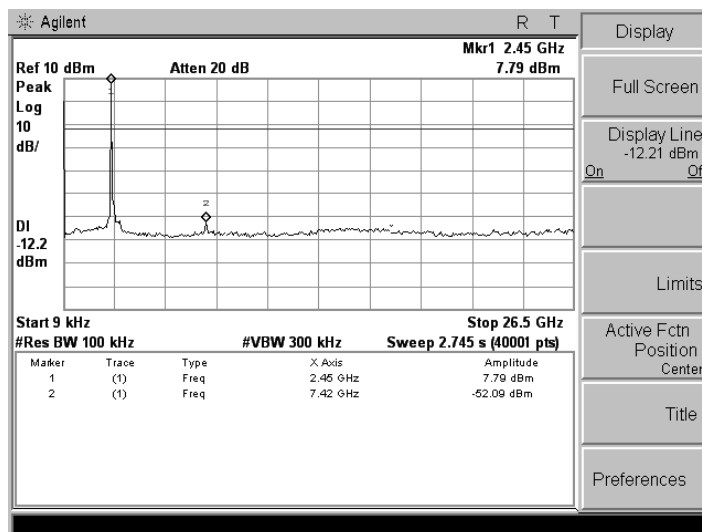
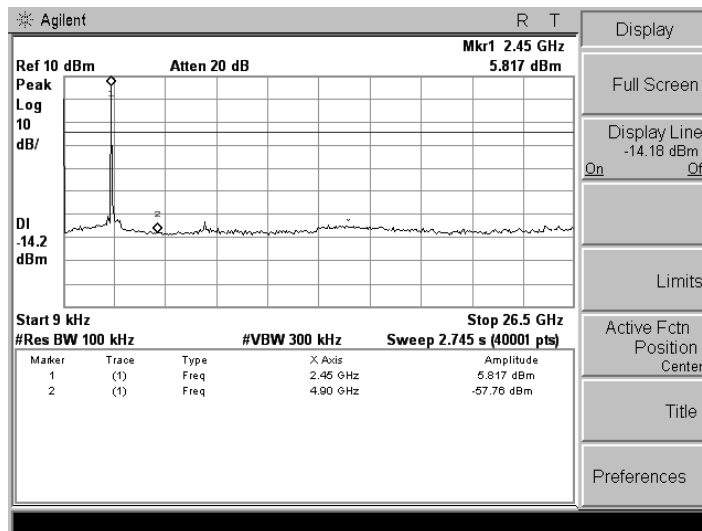
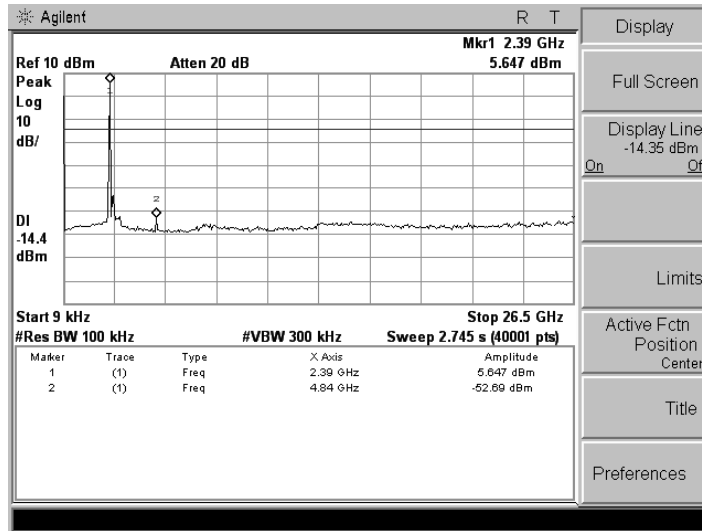
The measurements were more than 20 dB below the limit and not reported

Note:1. Measuring frequencies from 9k~26.5GHz, No emission found between lowest internal used/generated frequency to 30MHz.

2. Radiated emissions measured in frequency range from 9k~26.5GHz were made with an instrument using Peak detector mode.



Result of Conducted Spurious Emission of GFSK Mode:



Note: Only record the worst results.



*Results of Restricted Band and Bandedge Test:*

**GFSK**

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
<b>operation frequency:2402</b>							
V	2390.00	54.73	-3.62	51.11	74.00	-22.89	Pk
V	2390.00	39.51	-3.62	35.89	54.00	-18.11	AV
V	2400.00	56.26	-3.62	52.64	74.00	-21.36	Pk
V	2400.00	40.44	-3.62	36.82	54.00	-17.18	AV
V	4804.00	54.26	-1.06	53.20	74.00	-20.80	Pk
V	4804.00	38.61	-1.06	37.55	54.00	-16.45	AV
H	2390.00	55.10	-3.62	51.48	74.00	-22.52	Pk
H	2390.00	38.74	-3.62	35.12	54.00	-18.88	AV
H	2400.00	56.28	-3.62	52.66	74.00	-21.34	Pk
H	2400.00	39.87	-3.62	36.25	54.00	-17.75	AV
H	4804.00	54.49	-1.06	53.43	74.00	-20.57	Pk
H	4804.00	39.18	-1.06	38.12	54.00	-15.88	AV
<b>Remark:</b>							
Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

**GFSK**

Normal Voltage

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
<b>operation frequency:2480</b>							
V	2483.50	55.58	-3.59	51.99	74.00	-22.01	Pk
V	2483.50	39.27	-3.59	35.68	54.00	-18.32	AV
V	4960.00	54.08	-0.87	53.21	74.00	-20.79	Pk
V	4960.00	38.69	-0.87	37.82	54.00	-16.18	AV
H	2483.50	54.93	-3.59	51.34	74.00	-22.66	Pk
H	2483.50	39.35	-3.59	35.76	54.00	-18.24	AV
H	4960.00	54.43	-0.87	53.56	74.00	-20.44	Pk
H	4960.00	38.10	-0.87	37.23	54.00	-16.77	AV
<b>Remark:</b>							
Absolute Level= ReadingLevel+ Factor, Margin= Limit- Absolute Level							

The measurements were more than 20 dB below the limit and not reported

Note: 1. Measuring frequencies from 9k~26.5GHz, No emission found between lowest internal used/generated frequency to 30MHz.

2. Radiated emissions measured in frequency range from 9k~26.5GHz were made with an instrument using Peak detector mode.

## 7 Band Edge Measurement

Test Requirement	:	Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method	:	ANSI C63.10:2013,KDB 558074 D01 DTS MEAS GUIDANCE V03R03
Test Limit	:	Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
Test Mode	:	Refer to section 3.3

### 7.1 Test Procedure

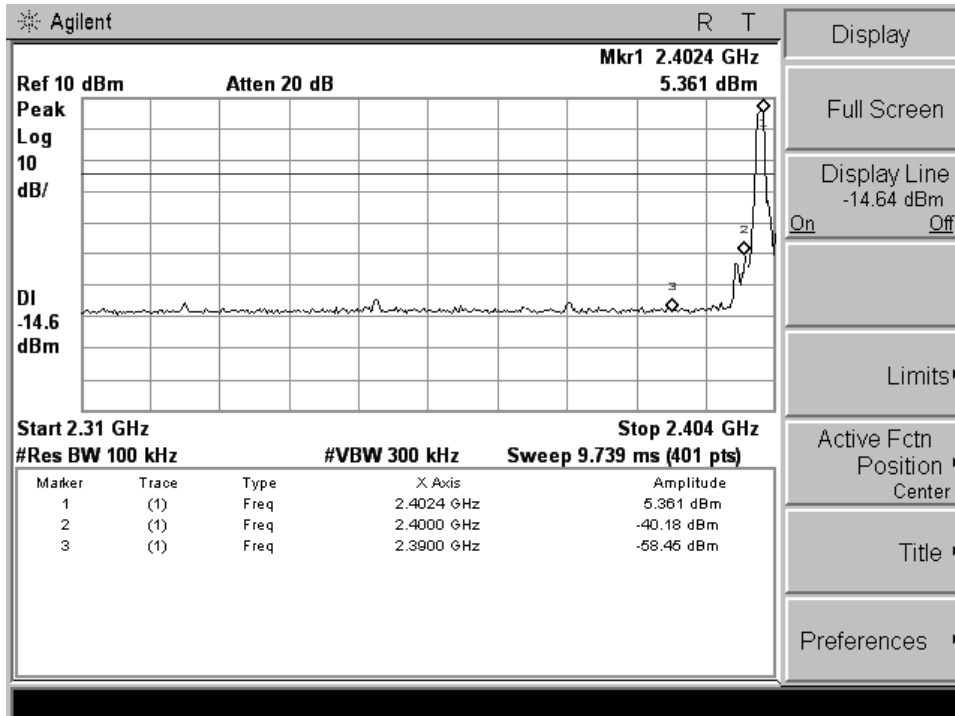
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

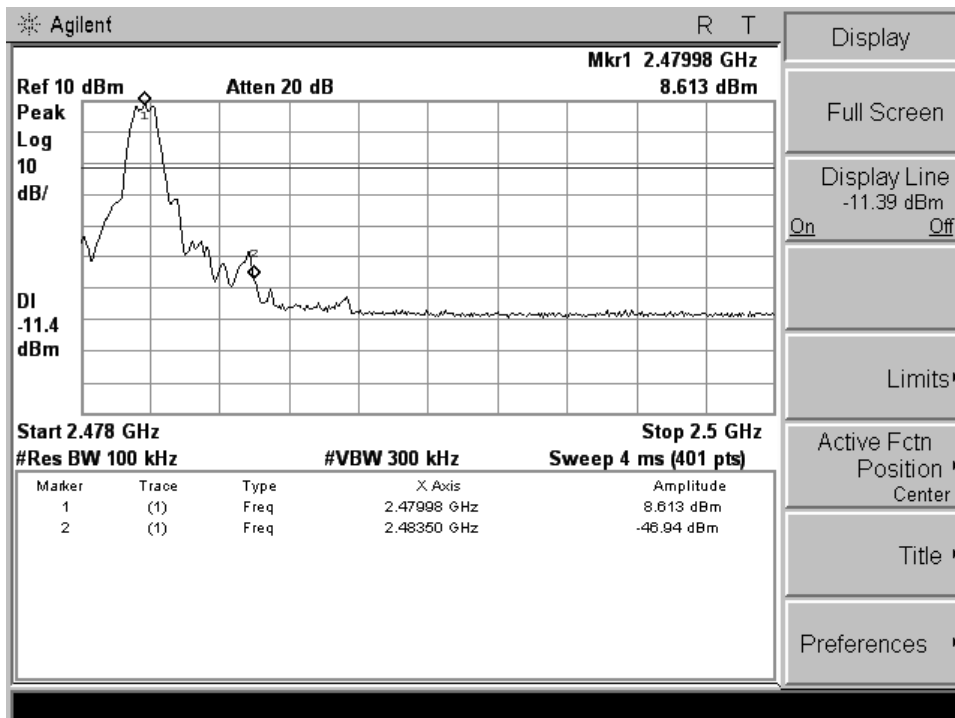


### 7.2 Test Result

GFSK Band edge-left side



GFSK Band edge-right side





### 8 6dB Bandwidth Measurement

- Test Requirement : FCC CFR47 Part 15 Section 15.247
- Test Method : ANSI C63.10:2013, KDB 558074 D01 DTS MEAS GUIDANCE V03R03
- Test Limit : Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
- Test Mode : Refer to section 3.3

#### 8.1 Test Procedure

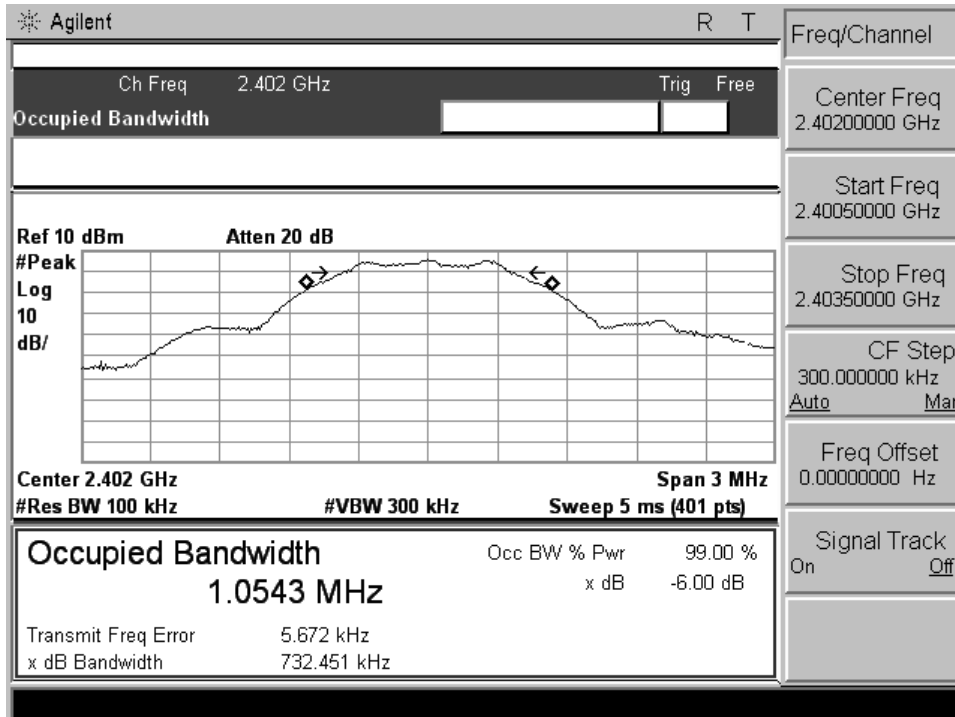
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: For BLE, RBW = 100 kHz, VBW = 300kHz, For WIFI, RBW = 100kHz, VBW = 300kHz,

#### 8.2 Test Result

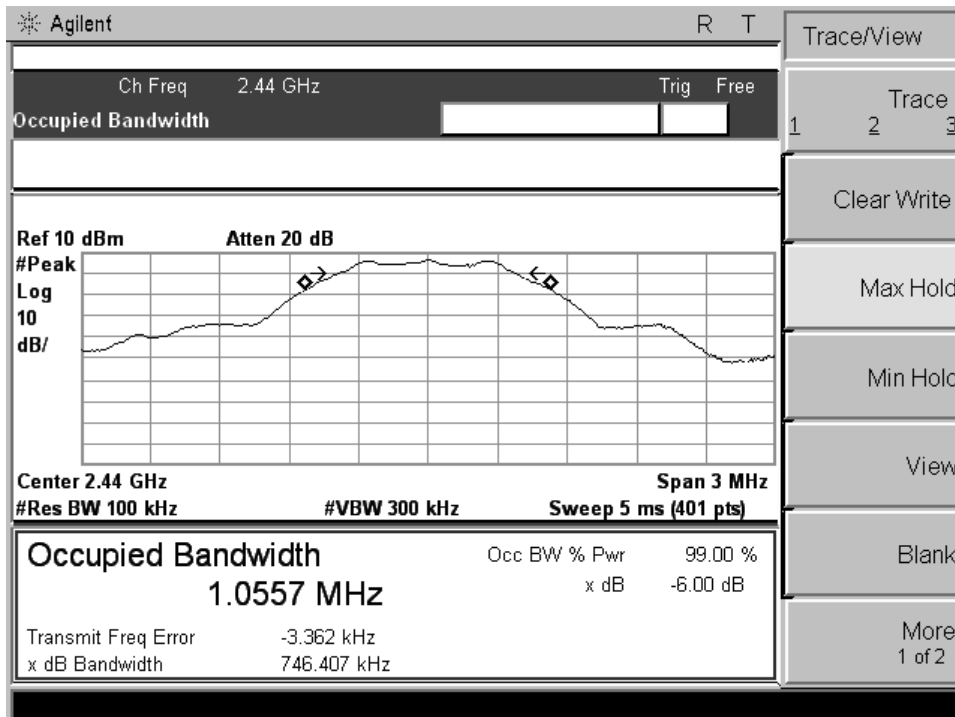
Modulation	Bandwidth(MHz)			Limit
	Low Channel	Middle Channel	High Channel	
GFSK(BLE)	0.732	0.746	0.742	≥500kHz
Test Result: Pass				



GFSK(BLE) Low Channel

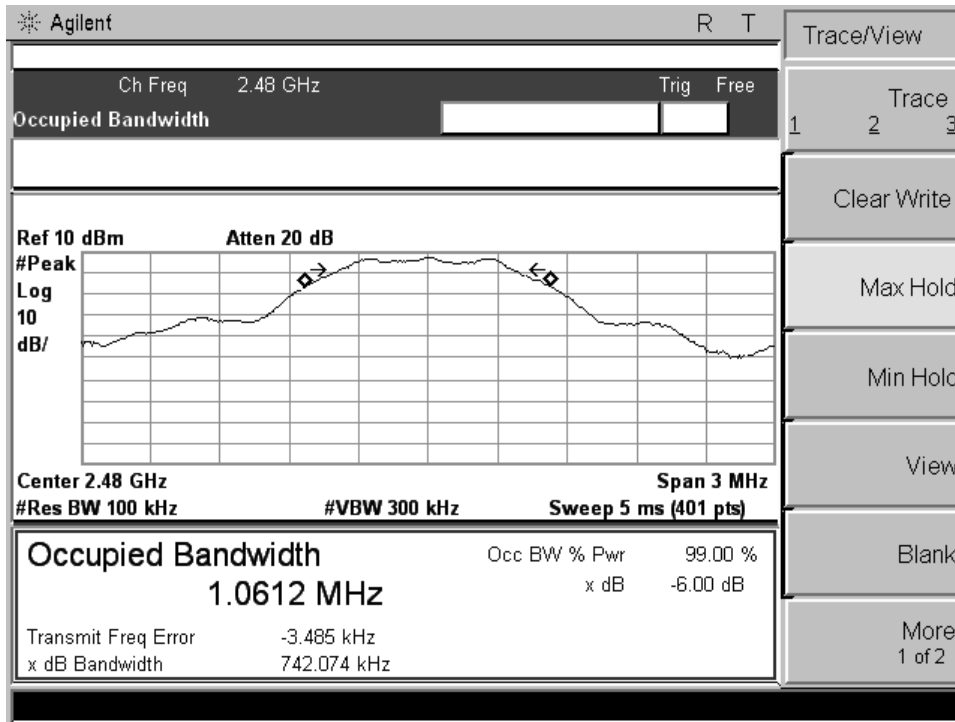


GFSK(BLE) Middle Channel





GFSK(BLE) High Channel







### 9 Maximum Peak Output Power

- Test Requirement : FCC CFR47 Part 15 Section 15.247
- Test Method : ANSI C63.10:2013, KDB 558074 D01 DTS MEAS GUIDANCE V03R03
- Test Limit : Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.
- Test Mode : Refer to section 3.3

#### 9.1 Test Procedure

KDB 558074 D01 DTS Meas Guidance v03r03

section 9.1.1 (For BLE)

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- a)Set the RBW  $\geq$  DTS bandwidth.
- b)Set VBW  $\geq$  3 RBW.
- c)Set span  $\geq$  3 x RBW
- d)Sweep time = auto couple.
- e)Detector = peak.
- f)Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

#### 9.2 Test Result

Modulation	Maximum Peak Output Power (dBm)			Limit
	Low Channel	Middle Channel	High Channel	
GFSK(BLE)	2.95	3.48	3.81	1W(30dBm)
Test Result: Pass				



### 10 Power Spectral density

- Test Requirement : FCC CFR47 Part 15 Section 15.247
- Test Method : ANSI C63.10:2013, KDB 558074 D01 DTS MEAS GUIDANCE V03R03
- Test Limit : Regulation 15.247(f) The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
- Test Mode : Refer to section 3.3

#### 10.1 Test Procedure

KDB 558074 D01 DTS Meas Guidance v03r03

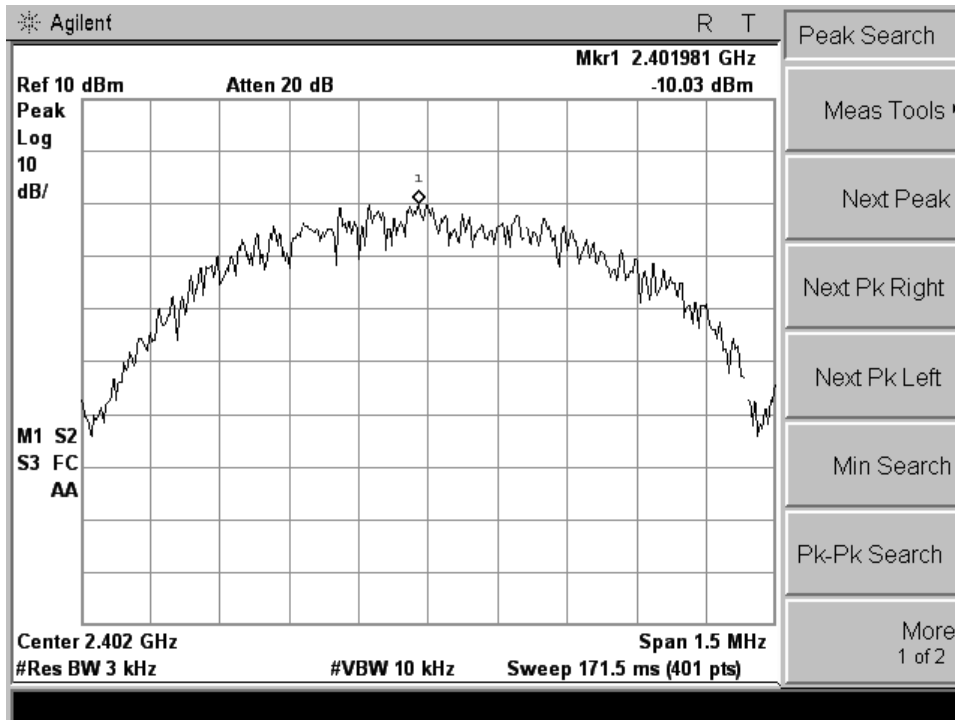
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

#### 10.2 Test Result

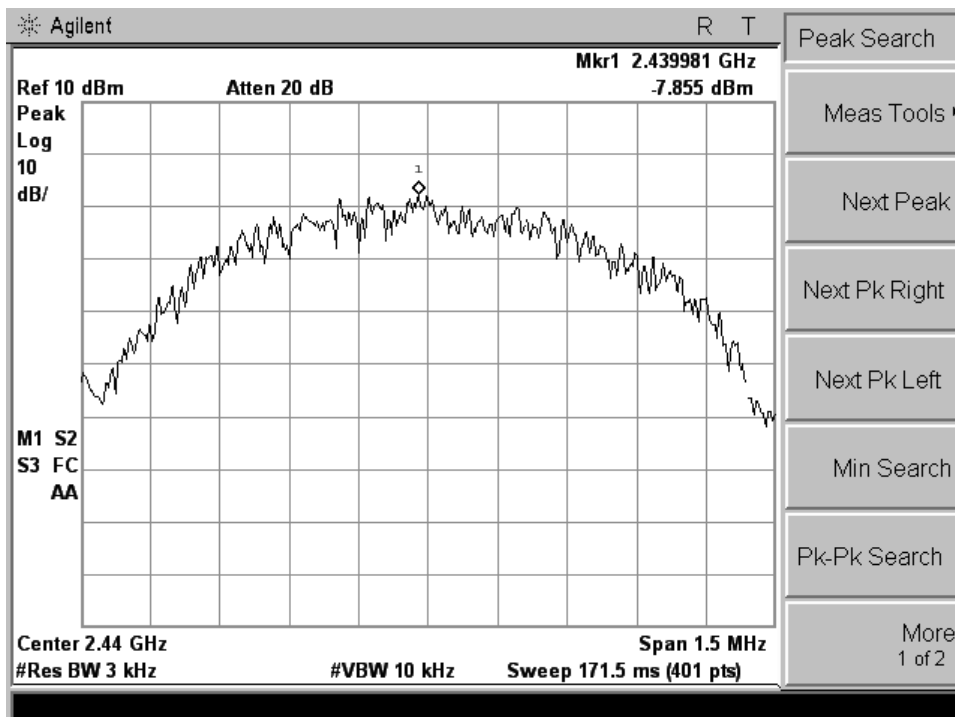
Modulation	Power Spectral density ( dBm/3kHz )			Limit
	Low Channel	Middle Channel	High Channel	
GFSK(BLE)	-10.03	-7.855	-6.880	8dBm/3kHz



### GFSK(BLE) Low Channel

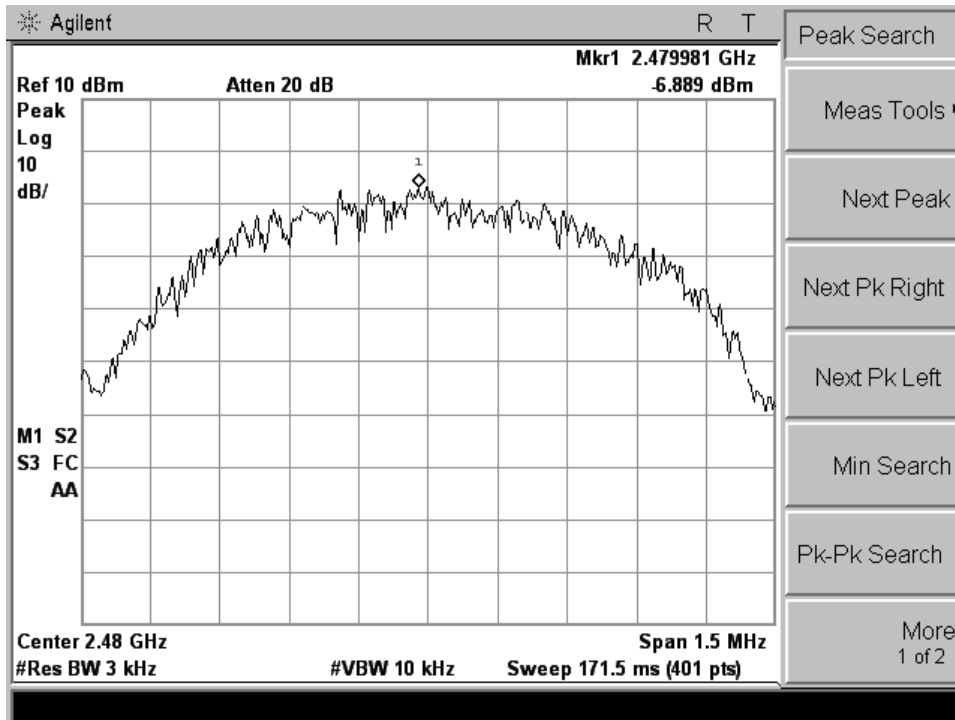


### GFSK(BLE) Middle Channel





GFSK(BLE) High Channel





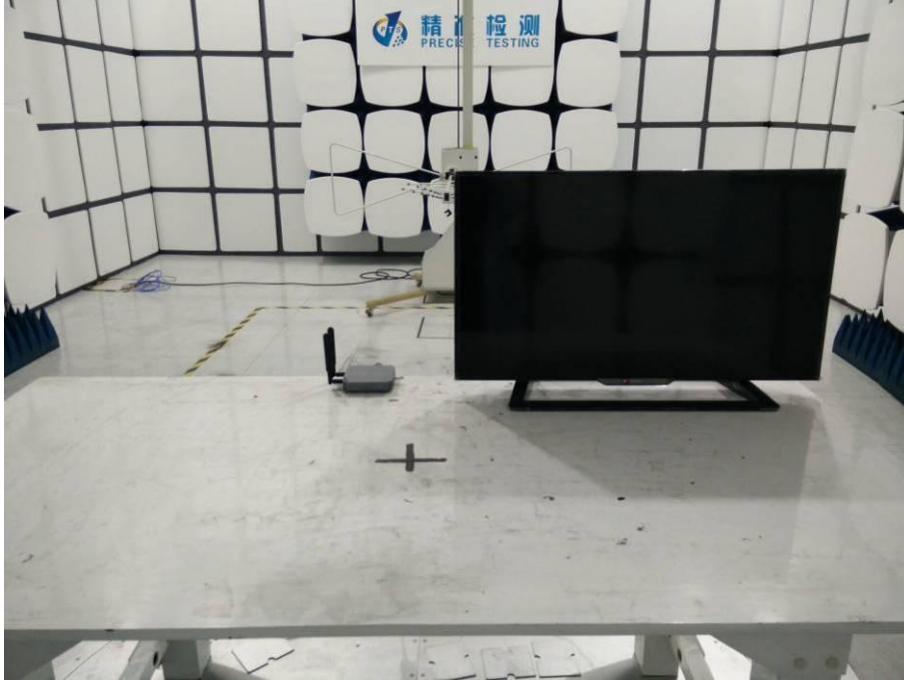
## 11 Antenna Requirement

According to the FCC part15.203, a transmitter can only be sold or operated with antennas with which it was approved. This product has an external antenna with RP-SMA connector, which meet the requirement of this section.

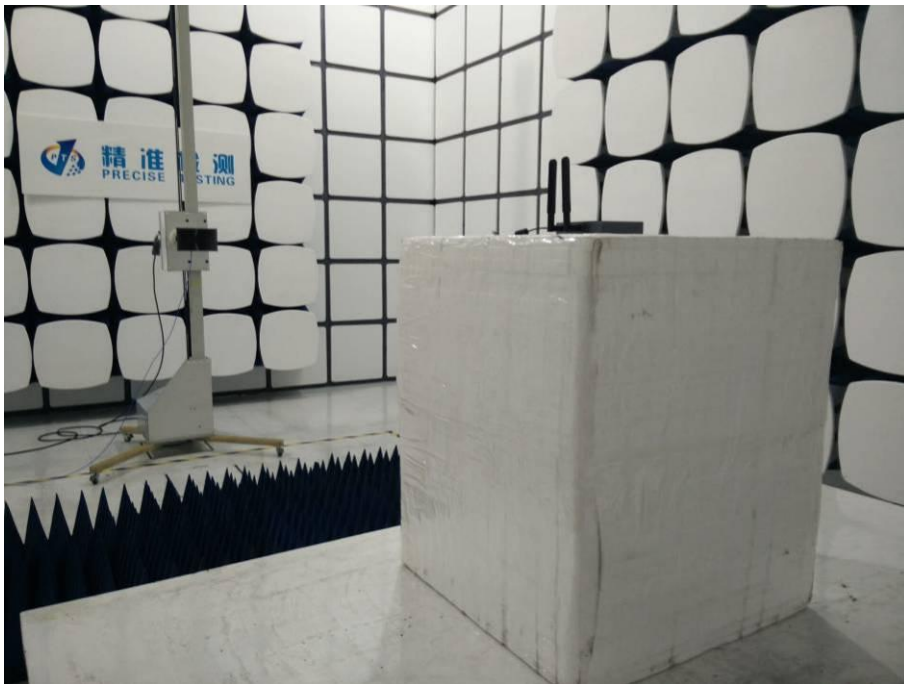


## 12 Test Setup

Conducted Emissions



Radiated Spurious Emissions  
From 30MHz-1000MHz





Above 1GHz



**\*\*\*\*\*THE END REPORT\*\*\*\*\***