

# FCC Test Report

**FCC ID** : IPH-02973  
**Equipment** : GNX Wind  
**Model No.** : A02973  
**Brand Name** : GARMIN  
**Applicant** : Garmin International  
**Address** : 1200 E. 151st Street Olathe, KS 66062  
**Standard** : 47 CFR FCC Part 15.249  
**Received Date** : Dec. 09, 2015  
**Tested Date** : Jan. 30 ~ Feb. 01, 2016

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Approved & Reviewed by:

  
\_\_\_\_\_  
Gary Chang / Manager



---

## Table of Contents

<b>1</b>	<b>GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1	Information.....	5
1.2	Local Support Equipment List .....	7
1.3	Test Setup Chart .....	7
1.4	The Equipment List .....	8
1.5	Test Standards .....	9
1.6	Measurement Uncertainty .....	9
<b>2</b>	<b>TEST CONFIGURATION .....</b>	<b>10</b>
2.1	Testing Condition .....	10
2.2	The Worst Test Modes and Channel Details .....	10
<b>3</b>	<b>TRANSMITTER TEST RESULTS.....</b>	<b>11</b>
3.1	Radiated Emission .....	11
3.2	20dB and Occupied Bandwidth .....	25
<b>4</b>	<b>TEST LABORATORY INFORMATION .....</b>	<b>26</b>

---

## Release Record

Report No.	Version	Description	Issued Date
FR5D0903	Rev. 01	Initial issue	Mar. 01, 2016

## Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	Note	N/A
15.249(a)	Field Strength of Fundamental	Meet the requirement of limit	Pass
15.249(a)(d)	Field Strength of Harmonics and Emissions Radiated outside of the Specified Frequency Bands	Meet the requirement of limit	Pass
15.215(c)	20dB bandwidth	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

Note: The EUT consumes DC power from battery, therefore this test is not required.

# 1 General Description

## 1.1 Information

The device is a GNX Wind with 1.85m non-shielded power cable.

### 1.1.1 Specification of the Equipment under Test (EUT)

RF General Information				
Frequency Range (MHz)	Modulation	Ch. Freq. (MHz)	Channel Number	Data Rate
2402-2479	GFSK	2402-2479	1-78 [78]	1 Mbps

### 1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Antenna Gain (dBi)
1	105-02973-10	PCB	N/A	0

### 1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	9-32V 150mA Max
-------------------	-----------------

### 1.1.4 Accessories

N/A

### 1.1.5 Channel List

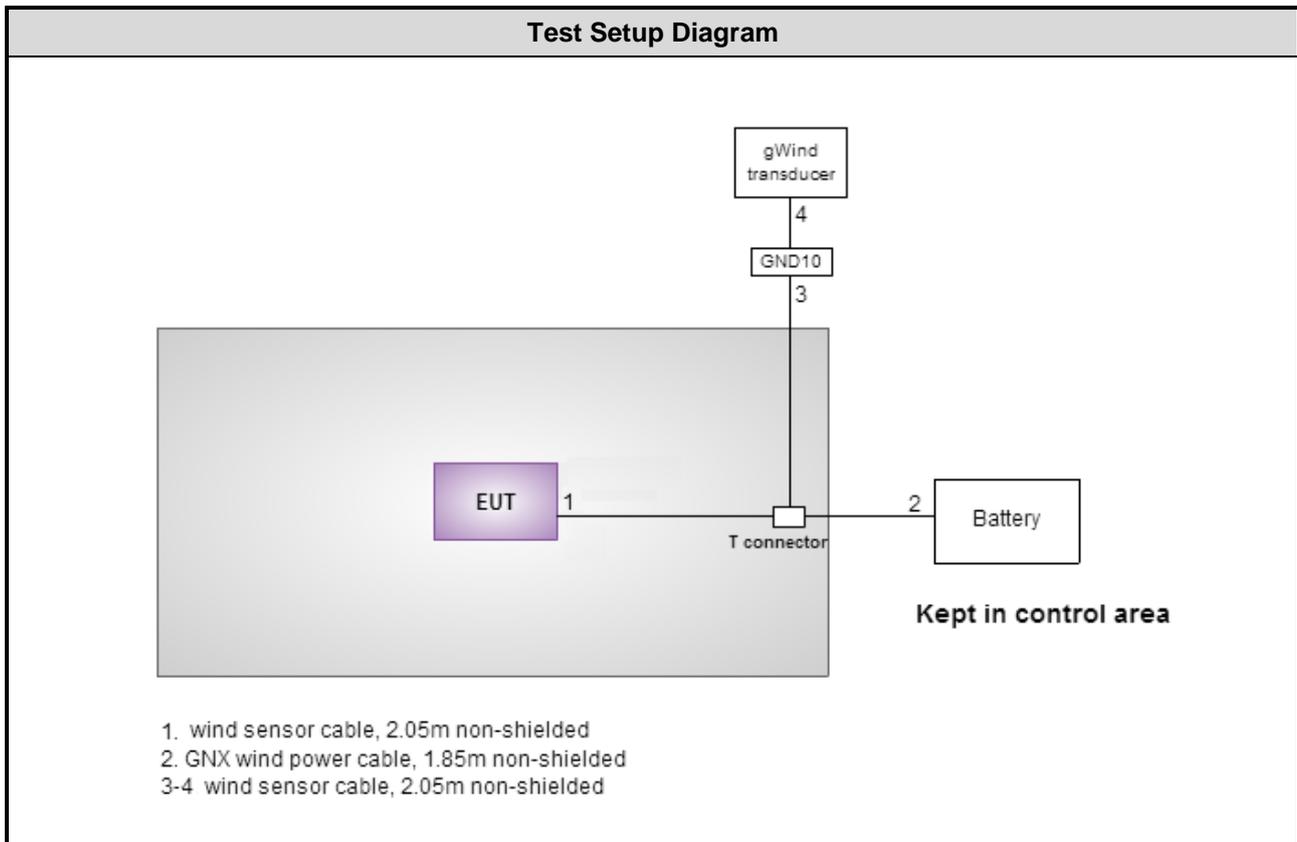
Frequency band (MHz)				2400~2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	21	2422	41	2442	61	2462
2	2403	22	2423	42	2443	62	2463
3	2404	23	2424	43	2444	63	2464
4	2405	24	2425	44	2445	64	2465
5	2406	25	2426	45	2446	65	2466
6	2407	26	2427	46	2447	66	2467
7	2408	27	2428	47	2448	67	2468
8	2409	28	2429	48	2449	68	2469
9	2410	29	2430	49	2450	69	2470
10	2411	30	2431	50	2451	70	2471
11	2412	31	2432	51	2452	71	2472
12	2413	32	2433	52	2453	72	2473
13	2414	33	2434	53	2454	73	2474
14	2415	34	2435	54	2455	74	2475
15	2416	35	2436	55	2456	75	2476
16	2417	36	2437	56	2457	76	2477
17	2418	37	2438	57	2458	77	2478
18	2419	38	2439	58	2459	78	2479
19	2420	39	2440	59	2460	---	---
20	2421	40	2441	60	2461	---	---

## 1.2 Local Support Equipment List

Support Equipment List						
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)
1	Notebook	DELL	Latitude E6440	4NF4Z52	DoC	---
2	Battery	YUASA	115E4R	---	---	---
3	gWind Wired transducer	GARMIN	---	---	---	Wind sensor cable, 2.05m.
4	GND 10 Box Bridge	GARMIN	---	---	---	Wind sensor cable, 2.05m.

Note: No.3-4 & Wind sensor cables are supplied by applicant.

## 1.3 Test Setup Chart



## 1.4 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber 2 / (03CH02-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Dec. 17, 2015	Dec. 16, 2016
Receiver	R&S	ESR3	101657	Jan. 12, 2016	Jan. 11, 2017
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-523	Nov. 09, 2015	Nov. 08, 2016
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Oct. 07, 2015	Oct. 06, 2016
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 04, 2015	Nov. 03, 2016
Loop Antenna	R&S	HFH2-Z2	11900	Nov. 16, 2015	Nov. 15, 2016
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 10, 2015	Dec. 09, 2016
Preamplifier	Burgeon	BPA-530	100218	Nov. 03, 2015	Nov. 02, 2016
Preamplifier	Agilent	83017A	MY39501309	Sep. 22, 2015	Sep. 21, 2016
Preamplifier	EMC	EMC184045B	980192	Sep. 01, 2015	Aug. 31, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16140/4	Dec. 10, 2015	Dec. 09, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 10, 2015	Dec. 09, 2016
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16015/4	Dec. 10, 2015	Dec. 09, 2016
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Dec. 10, 2015	Dec. 09, 2016
LF cable 10M	EMCC	CFD400-E	CFD400-001	Dec. 10, 2015	Dec. 09, 2016
Measurement Software	AUDIX	e3	6.120210g	NA	NA

Note: Calibration Interval of instruments listed above is one year.

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016
Spectrum Analyzer	Agilent	N9010A	MY53400091	Sep. 14, 2015	Sep. 13, 2016
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Nov. 27, 2015	Nov. 26, 2016
Power Meter	Anritsu	ML2495A	1241002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor	Anritsu	MA2411B	1207366	Sep. 21, 2015	Sep. 20, 2016
Signal Generator	R&S	SMB100A	175727	Oct. 05, 2015	Oct. 04, 2016
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA

Note: Calibration Interval of instruments listed above is one year.

## 1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.249

ANSI C63.10-2013

## 1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ( $k=2$ ))

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	$\pm 34.134$ Hz
AC conducted emission	$\pm 2.92$ dB
Radiated emission $\leq 1$ GHz	$\pm 3.87$ dB
Radiated emission $> 1$ GHz	$\pm 5.60$ dB

## 2 Test Configuration

### 2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
Radiated Emissions	03CH02-WS	20°C / 69%	Morgan Chen
RF Conducted	TH01-WS	22°C / 65%	Brad Wu

- FCC site registration No.: 657002
- IC site registration No.: 10807A-2

### 2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Field Strength of Fundamental	GFSK	2402, 2460, 2479	1 Mbps	1
Radiated Emissions ≤ 1GHz	GFSK	2402	1 Mbps	1, 2
Radiated Emissions > 1GHz	GFSK	2402, 2460, 2479	1 Mbps	1
20dB bandwidth	GFSK	2402, 2460, 2479	1 Mbps	1

**NOTE:**

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.
2. According to the power range of the device, the EUT had been tested by following test configurations for radiated emission below 1GHz.
  - 1) Configuration 1 : 12Vdc mode
  - 2) Configuration 2 : 24Vdc mode
3. 2 configurations had been pretested for radiated emission above 1GHz and found that the 12Vdc mode was the worst case and was selected for final test.

## 3 Transmitter Test Results

### 3.1 Radiated Emission

This section includes field strength of fundamental, field strength of harmonics and emissions radiated outside of the operating frequency bands.

#### 3.1.1 Limit of field strength of fundamental and field strength of harmonics

Fundamental Frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
2400–2483.5 MHz	50	500

#### 3.1.2 Limit of Unwanted Emissions

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Radiated emission limits in §15.209			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

**Note 1:**

Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

**Note 2:**

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

### 3.1.3 Test Procedures

1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

1. Radiated emission below 1GHz  
120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission
2. Radiated emission above 1GHz / Peak value except fundamental  
RBW=1MHz, VBW=3MHz and Peak detector  
Radiated emission above 1GHz / Average value for field strength of fundamental and harmonics  
The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

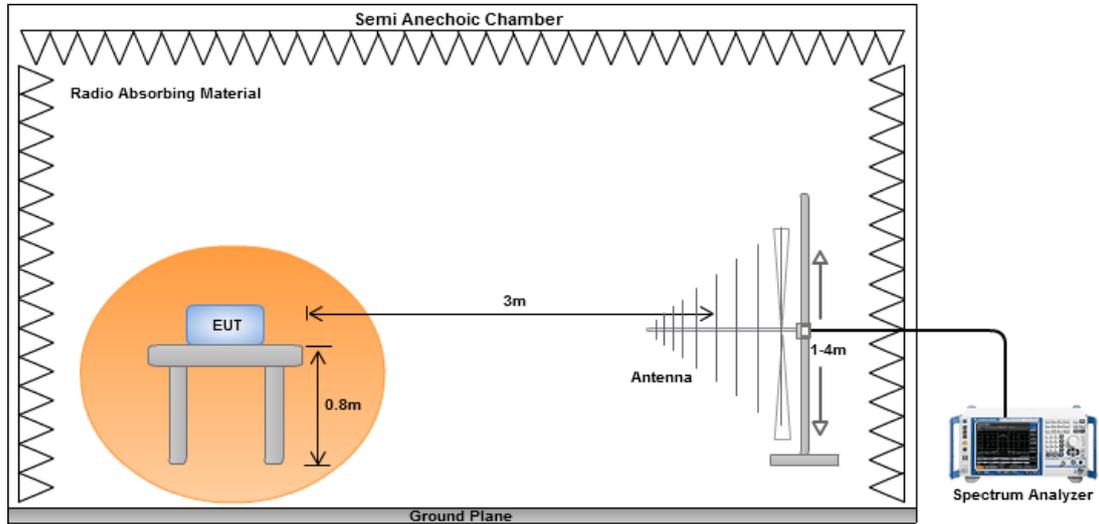
3. 
$$20\log(\text{Duty cycle}) = 20\log \frac{0.27 \text{ ms}}{100 \text{ ms}} = -51.37\text{dB}$$

Please see page 24 for plotted duty

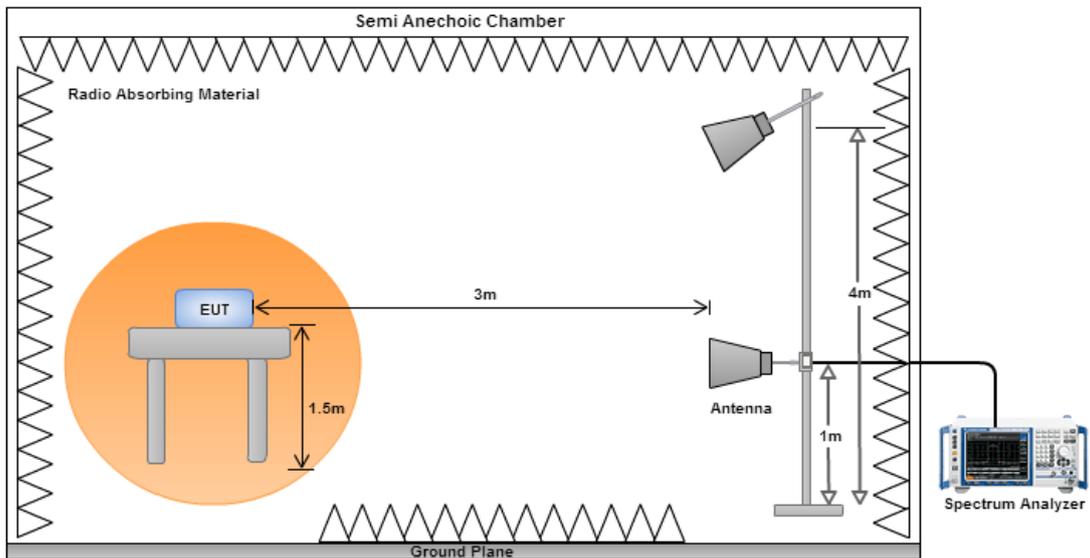
4. Radiated emission above 1GHz / Average value for other emissions  
RBW=1MHz, VBW=10Hz and Peak detector
5. Radiated emission Peak value for fundamental  
RBW=3MHz, VBW=10MHz and Peak detector

### 3.1.4 Test Setup

#### Radiated Emissions below 1 GHz

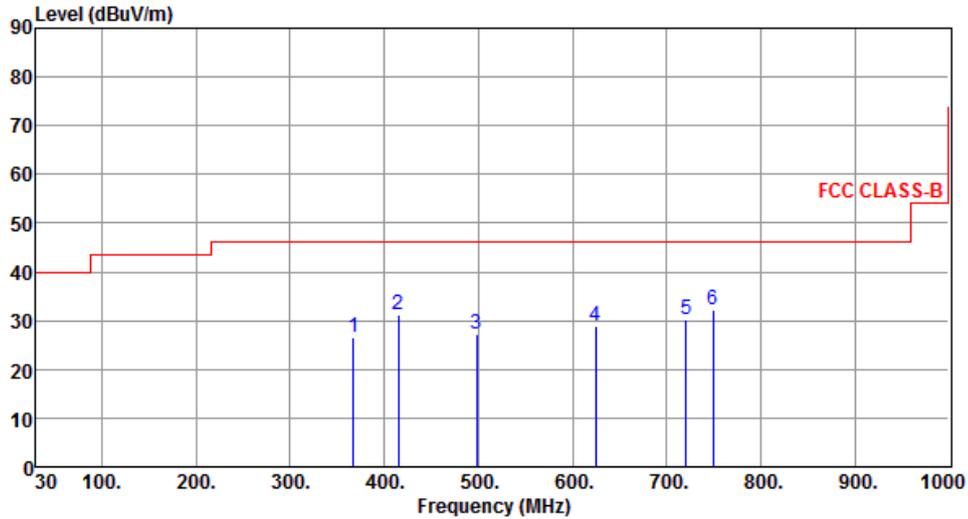


#### Radiated Emissions above 1 GHz



### 3.1.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)

<b>Modulation</b>	GFSK	<b>Test Freq. (MHz)</b>	2402
<b>Polarization</b>	Horizontal	<b>Test Configuration</b>	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	367.56	26.43	46.00	-19.57	35.96	-9.53	Peak	---	---
2	415.09	31.11	46.00	-14.89	39.43	-8.32	Peak	---	---
3	498.51	27.37	46.00	-18.63	33.91	-6.54	Peak	---	---
4	624.61	29.03	46.00	-16.97	33.32	-4.29	Peak	---	---
5	720.64	30.19	46.00	-15.81	33.04	-2.85	Peak	---	---
6	749.74	32.32	46.00	-13.68	34.69	-2.37	Peak	---	---

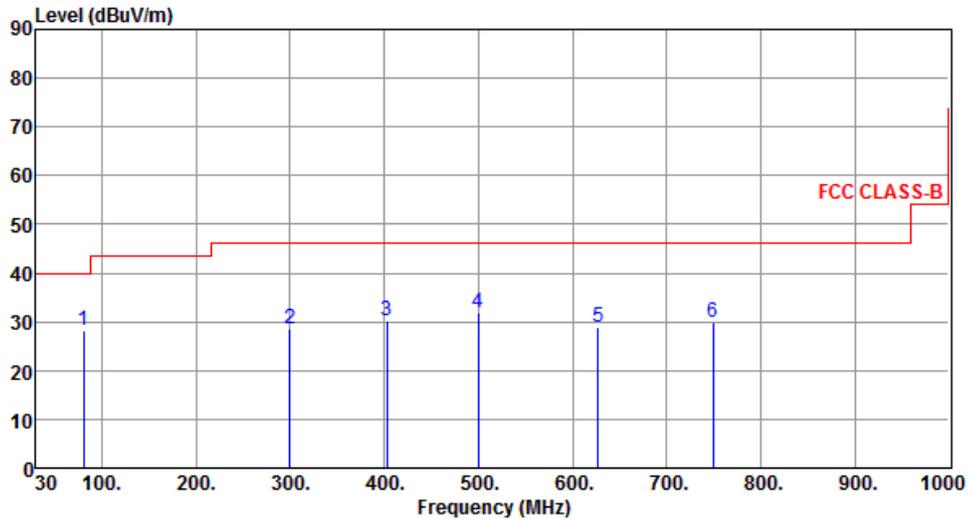
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

<b>Modulation</b>	GFSK	<b>Test Freq. (MHz)</b>	2402
<b>Polarization</b>	Vertical	<b>Test Configuration</b>	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	80.44	28.36	40.00	-11.64	44.59	-16.23	Peak	---	---
2	299.66	28.50	46.00	-17.50	39.62	-11.12	Peak	---	---
3	402.48	30.13	46.00	-15.87	38.73	-8.60	Peak	---	---
4	499.48	31.84	46.00	-14.16	38.36	-6.52	Peak	---	---
5	627.52	28.74	46.00	-17.26	32.99	-4.25	Peak	---	---
6	749.74	29.73	46.00	-16.27	32.10	-2.37	Peak	---	---

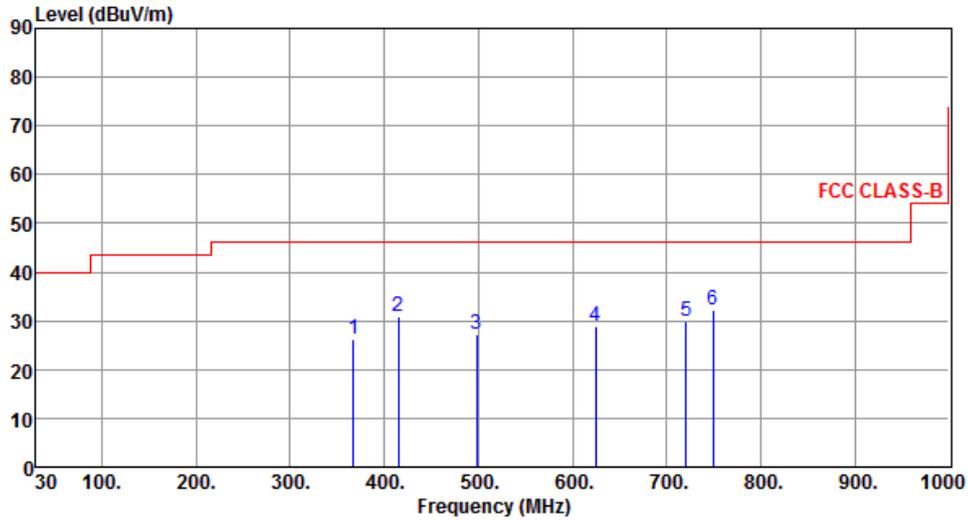
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

<b>Modulation</b>	GFSK	<b>Test Freq. (MHz)</b>	2402
<b>Polarization</b>	Horizontal	<b>Test Configuration</b>	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	367.42	26.15	46.00	-19.85	35.69	-9.54	Peak	---	---
2	415.21	31.04	46.00	-14.96	39.35	-8.31	Peak	---	---
3	498.48	27.25	46.00	-18.75	33.79	-6.54	Peak	---	---
4	624.53	28.87	46.00	-17.13	33.16	-4.29	Peak	---	---
5	720.51	30.04	46.00	-15.96	32.89	-2.85	Peak	---	---
6	749.56	32.14	46.00	-13.86	34.52	-2.38	Peak	---	---

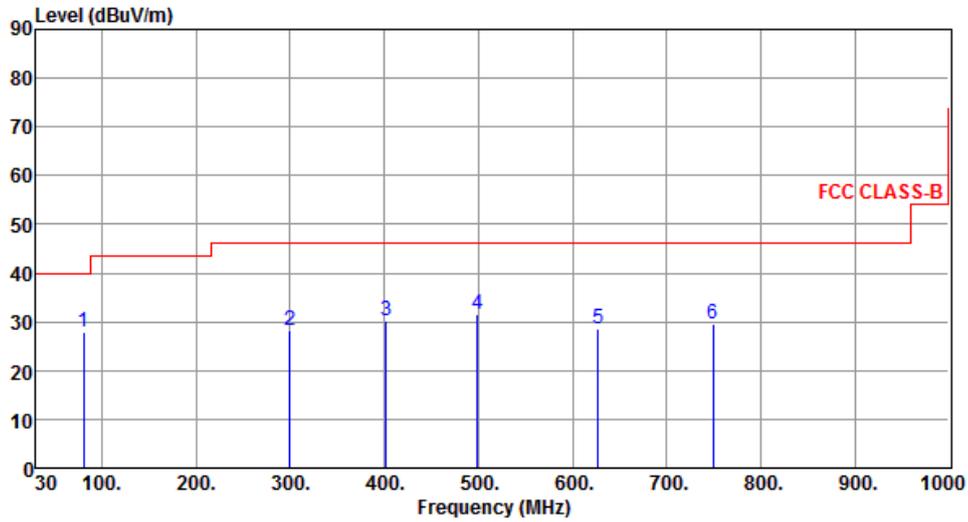
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

<b>Modulation</b>	GFSK	<b>Test Freq. (MHz)</b>	2402
<b>Polarization</b>	Vertical	<b>Test Configuration</b>	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	80.35	28.05	40.00	-11.95	44.26	-16.21	Peak	---	---
2	299.51	28.36	46.00	-17.64	39.48	-11.12	Peak	---	---
3	402.38	30.26	46.00	-15.74	38.86	-8.60	Peak	---	---
4	499.34	31.62	46.00	-14.38	38.14	-6.52	Peak	---	---
5	627.44	28.57	46.00	-17.43	32.83	-4.26	Peak	---	---
6	749.55	29.45	46.00	-16.55	31.83	-2.38	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

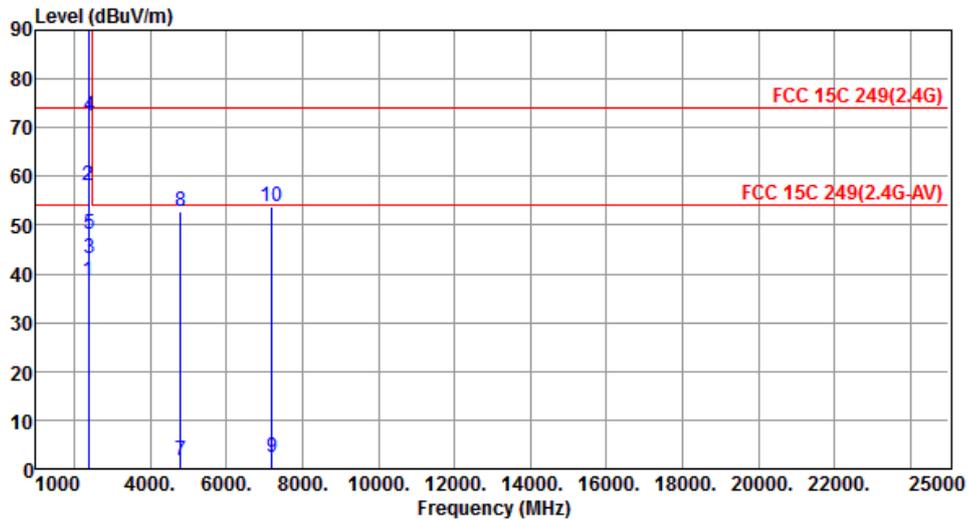
\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

### 3.1.6 Transmitter Radiated Unwanted Emissions (Above 1GHz)

<b>Modulation</b>	GFSK	<b>Test Freq. (MHz)</b>	2402
<b>Polarization</b>	Horizontal	<b>Test Configuration</b>	1



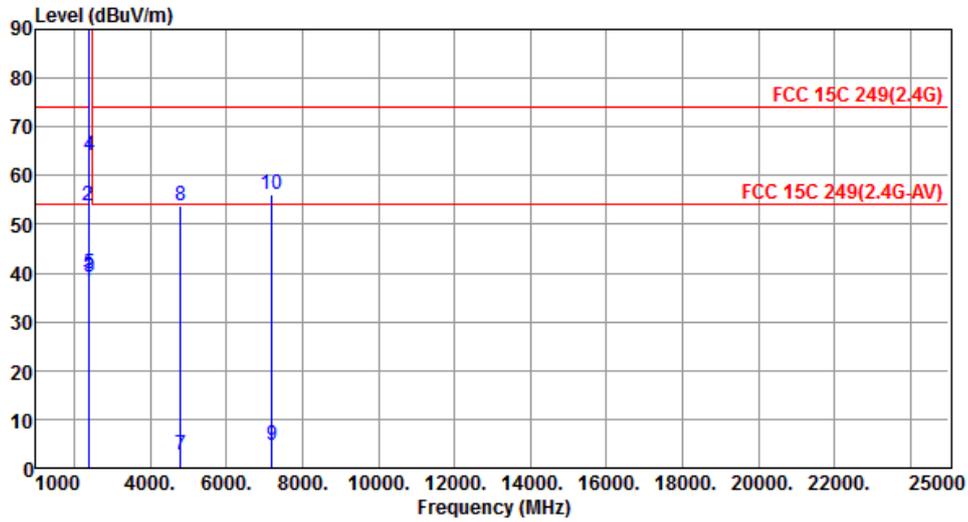
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	38.36	54.00	-15.64	41.42	-3.06	Average	105	136
2	2390.00	57.98	74.00	-16.02	61.04	-3.06	Peak	105	136
3	2400.00	43.28	54.00	-10.72	46.30	-3.02	Average	105	136
4	2400.00	72.50	74.00	-1.50	75.52	-3.02	Peak	105	136
5	2402.00	48.08	94.00	-45.92	51.09	-3.01	Average	105	136
6	2402.00	99.45	114.00	-14.55	102.46	-3.01	Peak	105	136
7	4804.00	1.58	54.00	-52.42	-2.63	4.21	Average	100	155
8	4804.00	52.95	74.00	-21.05	48.74	4.21	Peak	100	155
9	7206.00	2.29	54.00	-51.71	-6.68	8.97	Average	155	200
10	7206.00	53.66	74.00	-20.34	44.69	8.97	Peak	155	200

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	GFSK	<b>Test Freq. (MHz)</b>	2402
<b>Polarization</b>	Vertical	<b>Test Configuration</b>	1



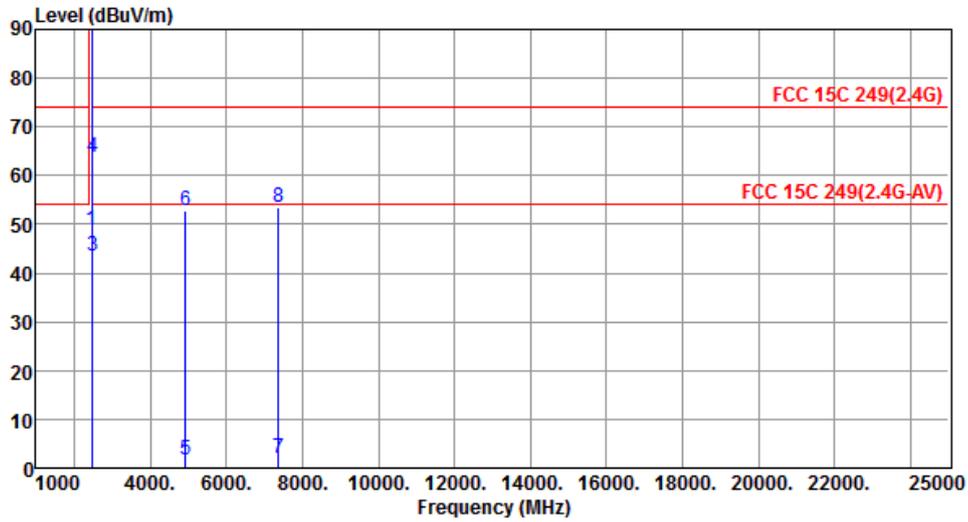
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	38.16	54.00	-15.84	41.22	-3.06	Average	100	91
2	2390.00	53.80	74.00	-20.20	56.86	-3.06	Peak	100	91
3	2400.00	39.13	54.00	-14.87	42.15	-3.02	Average	100	91
4	2400.00	64.17	74.00	-9.83	67.19	-3.02	Peak	100	91
5	2402.00	39.81	94.00	-54.19	42.82	-3.01	Average	100	91
6	2402.00	91.18	114.00	-22.82	94.19	-3.01	Peak	100	91
7	4804.00	2.58	54.00	-51.42	-1.63	4.21	Average	177	38
8	4804.00	53.95	74.00	-20.05	49.74	4.21	Peak	177	38
9	7206.00	4.61	54.00	-49.39	-4.36	8.97	Average	155	223
10	7206.00	55.98	74.00	-18.02	47.01	8.97	Peak	155	223

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	GFSK	<b>Test Freq. (MHz)</b>	2460
<b>Polarization</b>	Horizontal	<b>Test Configuration</b>	1



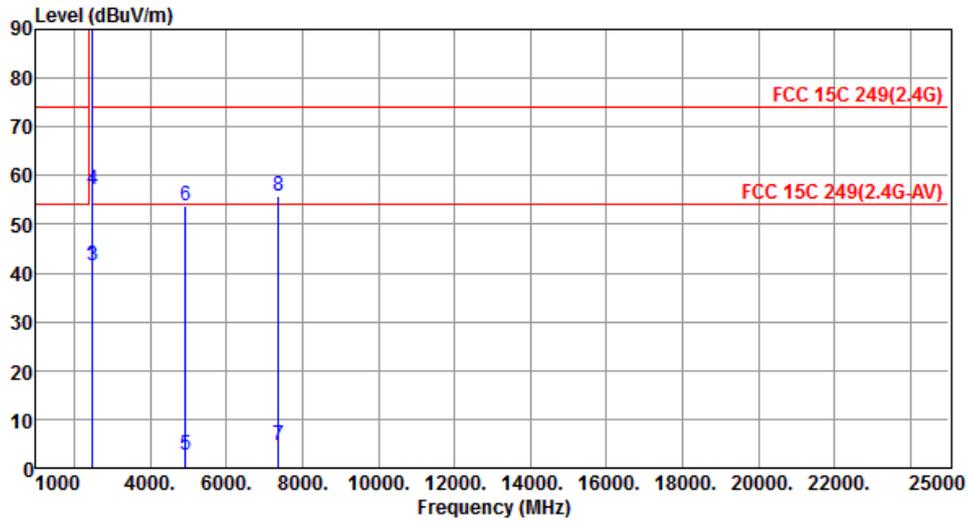
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2460.00	48.79	94.00	-45.21	51.58	-2.79	Average	100	133
2	2460.00	100.16	114.00	-13.84	102.95	-2.79	Peak	100	133
3	2492.00	43.45	54.00	-10.55	46.12	-2.67	Average	100	133
4	2492.00	63.88	74.00	-10.12	66.55	-2.67	Peak	100	133
5	4920.00	1.50	54.00	-52.50	-3.03	4.53	Average	166	175
6	4920.00	52.87	74.00	-21.13	48.34	4.53	Peak	166	175
7	7380.00	2.15	54.00	-51.85	-7.23	9.38	Average	185	322
8	7380.00	53.52	74.00	-20.48	44.14	9.38	Peak	185	322

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	GFSK	<b>Test Freq. (MHz)</b>	2460
<b>Polarization</b>	Vertical	<b>Test Configuration</b>	1



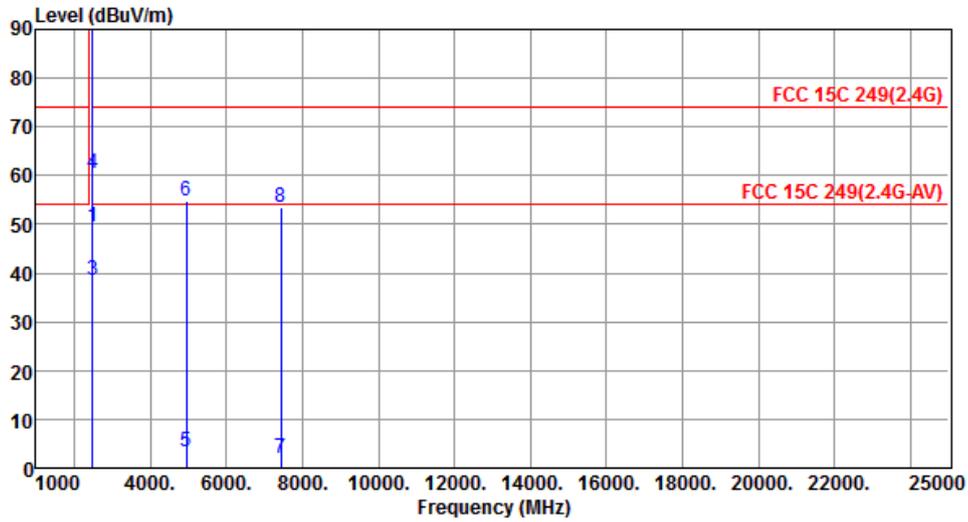
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2460.00	41.40	94.00	-52.60	44.19	-2.79	Average	106	101
2	2460.00	92.77	114.00	-21.23	95.56	-2.79	Peak	106	101
3	2492.00	41.44	54.00	-12.56	44.11	-2.67	Average	104	116
4	2492.00	57.20	74.00	-16.80	59.87	-2.67	Peak	104	116
5	4920.00	2.51	54.00	-51.49	-2.02	4.53	Average	177	22
6	4920.00	53.88	74.00	-20.12	49.35	4.53	Peak	177	22
7	7380.00	4.52	54.00	-49.48	-4.86	9.38	Average	100	132
8	7380.00	55.89	74.00	-18.11	46.51	9.38	Peak	100	132

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	GFSK	<b>Test Freq. (MHz)</b>	2479
<b>Polarization</b>	Horizontal	<b>Test Configuration</b>	1



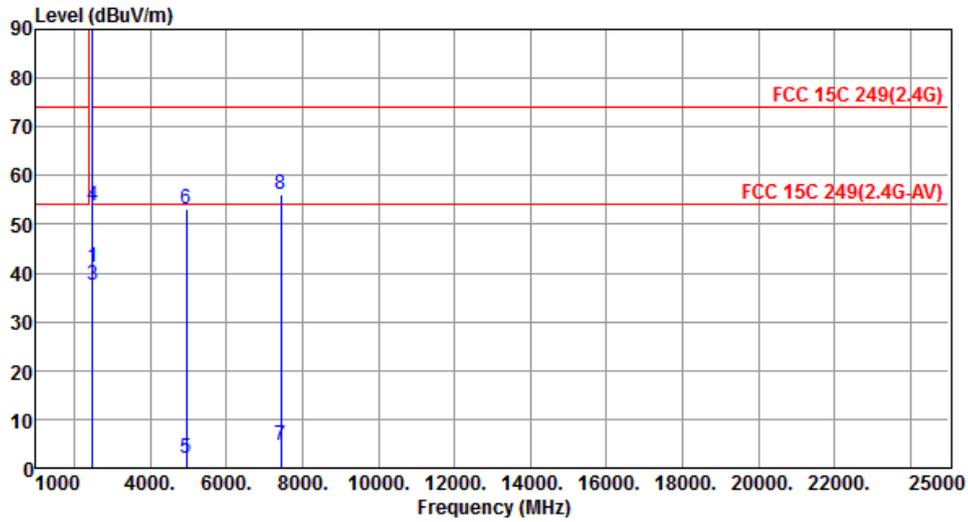
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2479.00	49.37	94.00	-44.63	52.09	-2.72	Average	106	130
2	2479.00	100.74	114.00	-13.26	103.46	-2.72	Peak	106	130
3	2483.50	38.54	54.00	-15.46	41.23	-2.69	Average	106	130
4	2483.50	60.55	74.00	-13.45	63.24	-2.69	Peak	106	130
5	4958.00	3.29	54.00	-50.71	-1.33	4.62	Average	150	335
6	4958.00	54.66	74.00	-19.34	50.04	4.62	Peak	150	335
7	7437.00	2.08	54.00	-51.92	-7.37	9.45	Average	220	215
8	7437.00	53.45	74.00	-20.55	44.00	9.45	Peak	220	215

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	GFSK	<b>Test Freq. (MHz)</b>	2479
<b>Polarization</b>	Vertical	<b>Test Configuration</b>	1

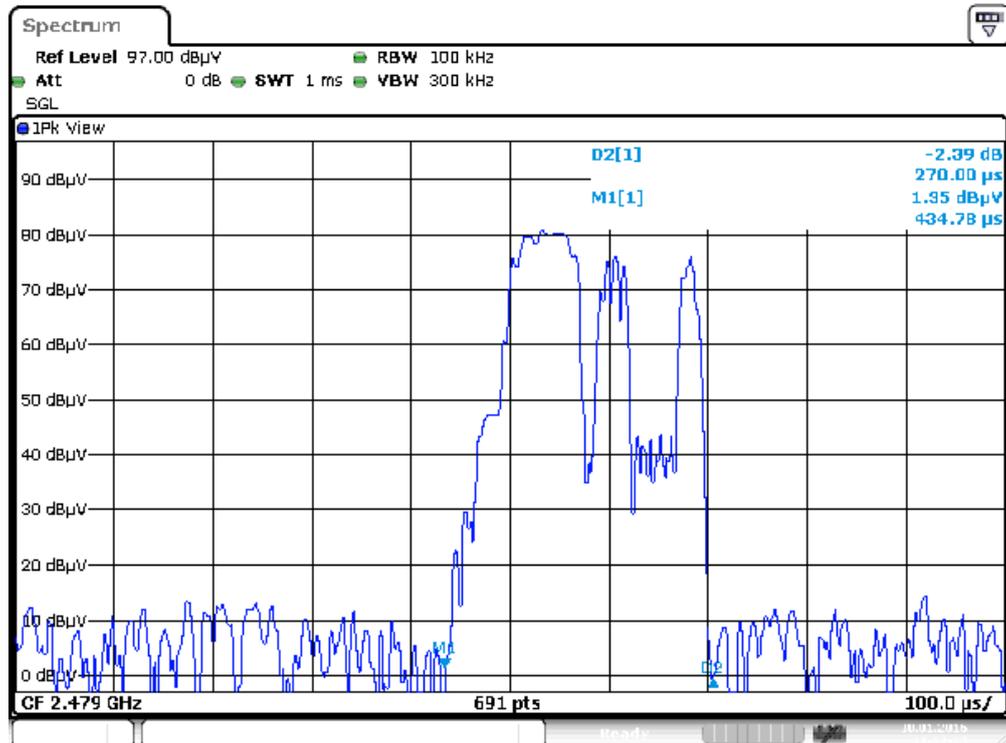
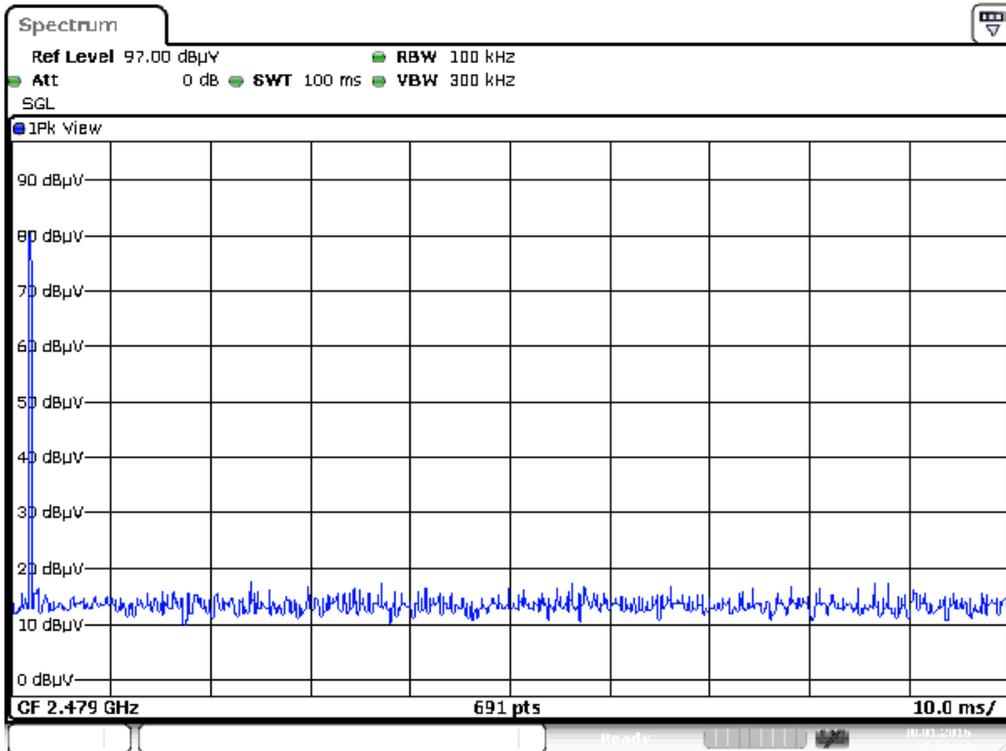


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2479.00	41.32	94.00	-52.68	44.04	-2.72	Average	100	101
2	2479.00	92.69	114.00	-21.31	95.41	-2.72	Peak	100	101
3	2483.50	37.46	54.00	-16.54	40.15	-2.69	Average	100	101
4	2483.50	53.83	74.00	-20.17	56.52	-2.69	Peak	100	101
5	4958.00	1.89	54.00	-52.11	-2.73	4.62	Average	155	236
6	4958.00	53.26	74.00	-20.74	48.64	4.62	Peak	155	236
7	7437.00	4.75	54.00	-49.25	-4.70	9.45	Average	102	125
8	7437.00	56.12	74.00	-17.88	46.67	9.45	Peak	102	125

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



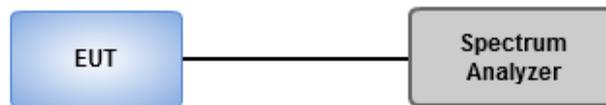
$$20\log(\text{Duty cycle}) = 20\log\left(\frac{0.27 \text{ ms}}{100 \text{ ms}}\right) = -51.37\text{dB}$$

## 3.2 20dB and Occupied Bandwidth

### 3.2.1 Test Procedures

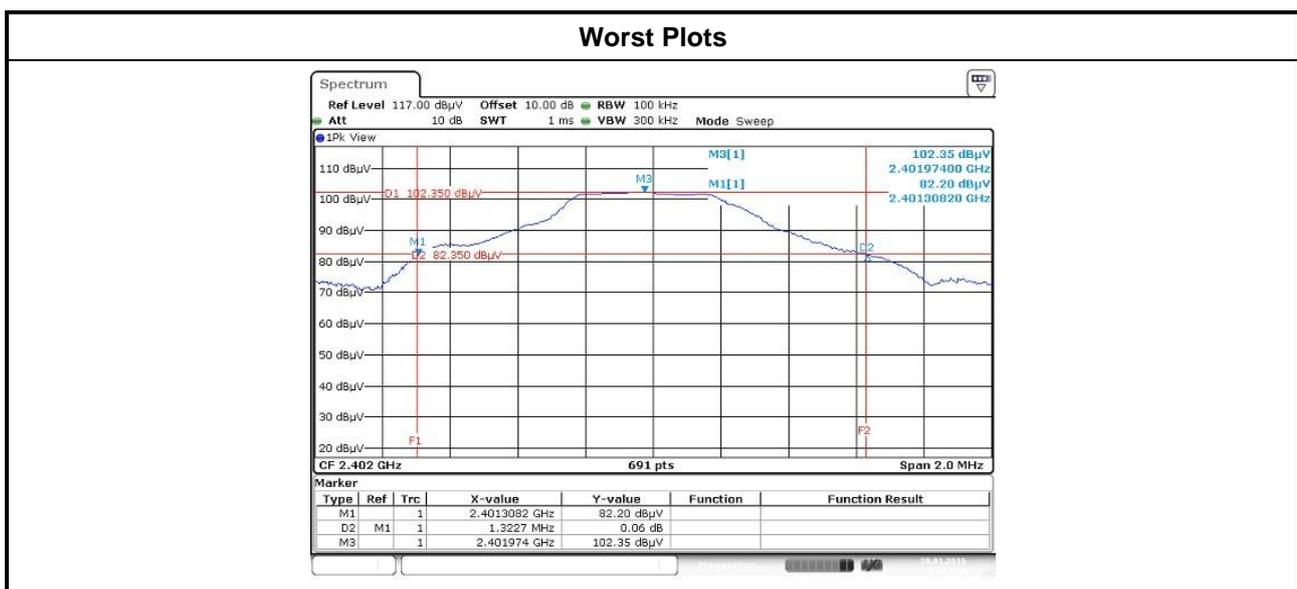
1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak(20dB BW) / Sample ( Occupied bandwidth), Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20dB relative to the maximum level measured in the fundamental emission.
5. Use the occupied measurement function of specturm analyzer to measure 99% occupied bandwidth

### 3.2.2 Test Setup



### 3.2.3 20dB and Occupied Bandwidth

Freq. (MHz)	20dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
2402	1.32	1.12
2460	1.28	1.05
2479	1.22	1.02



## 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp, it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website <http://www.icertifi.com.tw>.

### **Linkou**

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin Kou  
District, New Taipei City, Taiwan,  
R.O.C.

### **Kwei Shan**

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd  
St., Kwei Shan Hsiang, Tao Yuan  
Hsien 333, Taiwan, R.O.C.

### **Kwei Shan Site II**

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd  
St., Kwei Shan Hsiang, Tao Yuan  
Hsien 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666

Fax: 886-3-318-0155

Email: ICC\_Service@icertifi.com.tw

==END==