

FCC C2PC Test Report

FCC ID : SQG-WB50NBT
Equipment : Wireless 802.11abgn + BT4.1 intelligent module
Model No. : WB50NBT
Brand Name : Laird Connectivity
Applicant : Laird Connectivity
Address : W66N220 Commerce Court, Cedarburg, Wisconsin 53012, USA
Standard : 47 CFR FCC Part 15.247
Received Date : Apr. 02, 2020
Tested Date : Jun. 01 ~ Jun. 04, 2020

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.

Reviewed by:

Approved by:



Along Chen / Assistant Manager



Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR631002-07AE	Rev. 01	Initial issue	Jun. 29, 2020

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	[dBuV]: 0.350MHz 36.54 (Margin -12.42dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2483.50MHz 50.71 (Margin -3.29dB) - AV	Pass

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

This is a Class II Permissive Change report (C2PC).

This report is issued as a supplementary report to the original project no. FR631002AE. The modification is concerned with

- ✧ adding new antennas.
- ✧ Updated brand name and applicant.

Therefore, conducted emission and radiated emission tests were performed for this C2PC.

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information				
Frequency Range (MHz)	Bluetooth Mode	Ch. Freq. (MHz)	Channel Number	Data Rate
2400-2483.5	V4.1 LE	2402-2480	0-39 [40]	1 Mbps

Note 1: Bluetooth LE (Low energy) uses GFSK modulation.

1.1.2 Antenna Details (New set of antennas were marked in boldface.)

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
				2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	Laird MAF94051	Dipole	RP-SMA	2.1	2.4	2.6	3.4	3.4
2	Laird NanoBlade-IP04	PCB Dipole	IPEX MHF	2	3.9	3.9	4	4
3	Laird MAF95310 Mini NanoBlade Flex	PCB Dipole	IPEX MHF	2.79	3.38			
4	Laird NanoBlue-IP04	PCB Dipole	IPEX MHF	2	---	---	---	---
5	Ethertronics WLAN_1000146	Isolated Magnetic Dipole	IPEX MHF	2.5	3.5			
6	Ethertronics 1004450	PCB Dipole	U.FI	1.3	2.69	2.69	2	1.9
7	Ethertronics 1004788	Dipole	U.FI	2.2	2.7			
8	Ethertronics 1004791	Dipole	U.FI	1.8	2.6			

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3Vdc from host
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1.1.4 Accessories

N/A

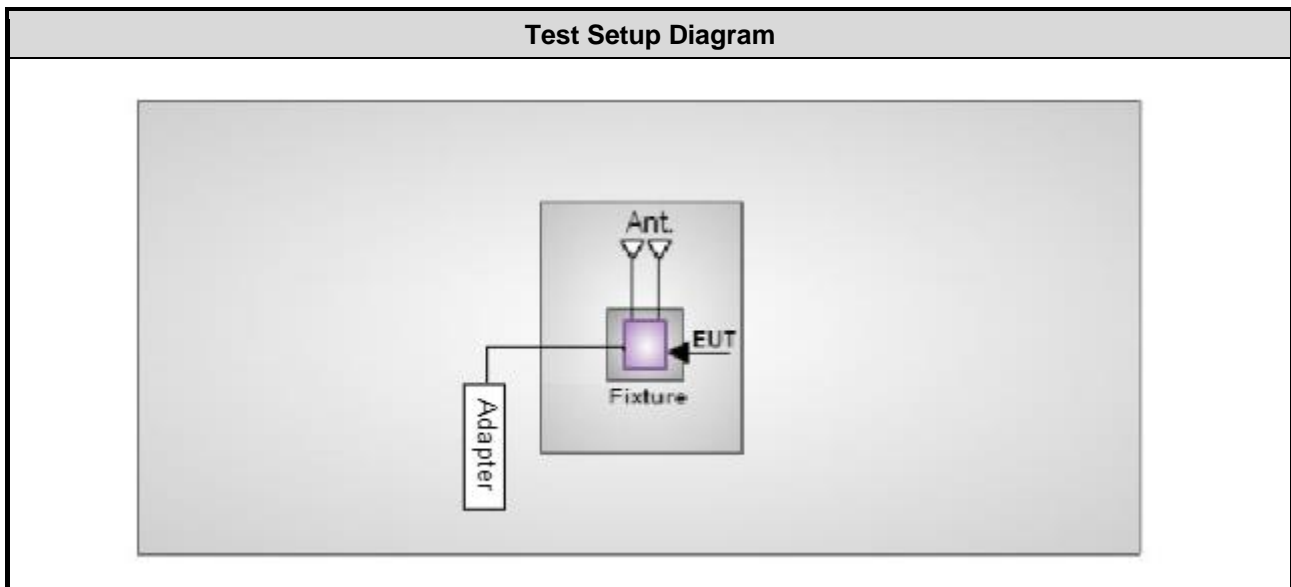
1.1.5 Channel List

Frequency band (MHz)				2400~2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
37	2402	9	2422	18	2442	28	2462
0	2404	10	2424	19	2444	29	2464
1	2406	38	2426	20	2446	30	2466
2	2408	11	2428	21	2448	31	2468
3	2410	12	2430	22	2450	32	2470
4	2412	13	2432	23	2452	33	2472
5	2414	14	2434	24	2454	34	2474
6	2416	15	2436	25	2456	35	2476
7	2418	16	2438	26	2458	36	2478
8	2420	17	2440	27	2460	39	2480

1.2 Local Support Equipment List

Support Equipment List						
No.	Equipment	Brand	Model	S/N	FCC ID	Remarks
1	Notebook	DELL	Latitude E6430	9ZFB4X1	DoC	---
2	Fixture	---	---	---	---	Provided by applicant
3	Adapter	OEM	ADS0128-W 120100	---	---	Provided by applicant

1.3 Test Setup Chart



Note: The support notebook was disconnected from EUT and removed from test table when EUT is set to transmit continuously.

1.4 Test Equipment List and Calibration Data

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Jun. 04, 2020				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Dec. 12, 2019	Dec. 11, 2020
LISN	R&S	ENV216	101579	Mar. 12, 2020	Mar. 11, 2021
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 22, 2019	Oct. 21, 2020
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Tested Date	Jun. 01, 2020				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Jan. 09, 2020	Jan. 08, 2021
Receiver	R&S	ESR3	101657	Feb. 14, 2020	Feb. 13, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 29, 2020	Apr. 28, 2021
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Dec. 27, 2019	Dec. 26, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2019	Nov. 14, 2020
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 13, 2019	Nov. 12, 2020
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 07, 2019	Oct. 06, 2020
Preamplifier	EMC	EMC02325	980187	Aug. 14, 2019	Aug. 13, 2020
Preamplifier	Agilent	83017A	MY53270014	Aug. 07, 2019	Aug. 06, 2020
Preamplifier	EMC	EMC184045B	980192	Aug. 01, 2019	Jul. 31, 2020
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Sep. 27, 2019	Sep. 26, 2020
RF cable-8M	EMC	EMC104-SM-SM-8000	181107	Sep. 27, 2019	Sep. 26, 2020
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Sep. 27, 2019	Sep. 26, 2020
LF cable-0.8M	EMC	EMC8D-NM-NM-8000	EMC8D-NM-NM-800-001	Sep. 27, 2019	Sep. 26, 2020
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Sep. 27, 2019	Sep. 26, 2020
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Sep. 27, 2019	Sep. 26, 2020
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

47 CFR FCC Part 15.247

ANSI C63.10-2013

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

1.6 Deviation from Test Standard and Measurement Procedure

None

1.7 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

Measurement Uncertainty	
Parameters	Uncertainty
AC conducted emission	± 2.92 dB
Radiated emission ≤ 1 GHz	± 3.96 dB
Radiated emission > 1 GHz	± 4.51 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	25°C / 62%	Alex Tsai
Radiated Emissions	03CH03-WS	24°C / 64% 20°C / 64%	Brad Wu Aska Huang

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- ISED#: 10807A
- CAB identifier: TW2732

2.2 Testing Facility

Test Laboratory	International Certification Corp.
Test Site	CO01-WS
Address of Test Site	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.
Test Site	03CH03-WS
Address of Test Site	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

2.3 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Data Rate	Test Configuration
AC Power Line Conducted Emissions Radiated Emissions ≤ 1GHz	BT LE	2440	1Mbps	-
Radiated Emissions > 1GHz	BT LE	2402, 2440, 2480	1Mbps	-

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Z-plane** results were found as the worst case and were shown in this report.
2. The antennas (1004788 & 1004791) are used for final testing for this module: (See item 1.1.2 for more details.)

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

3.1.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V/60Hz

3.1.3 Test Setup

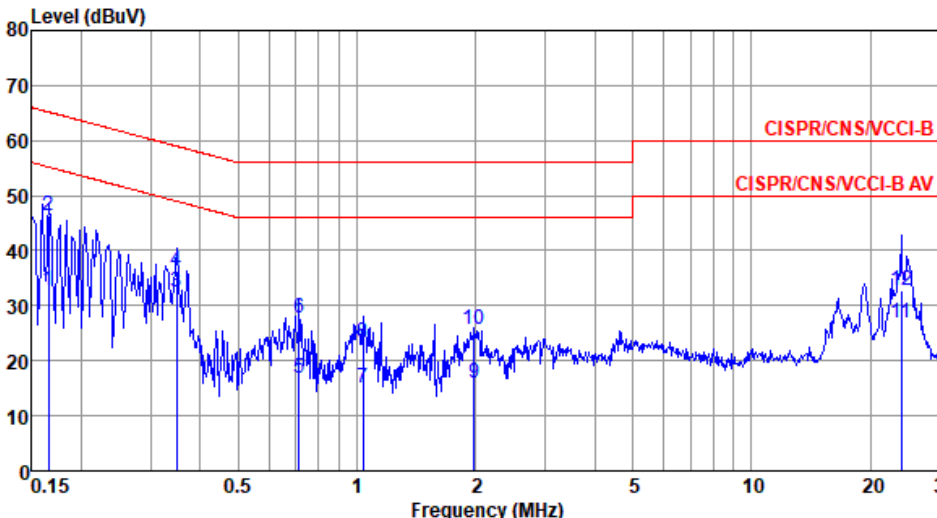


Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

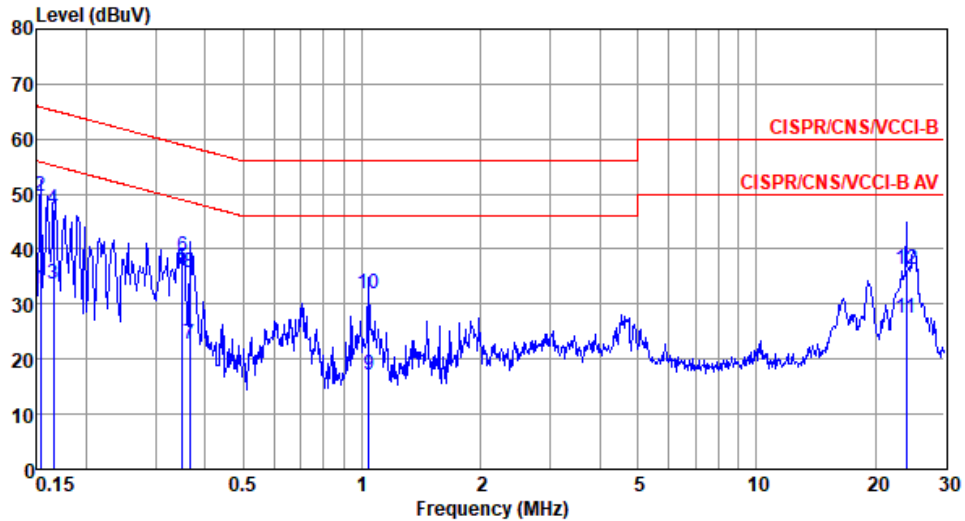
Modulation Mode	GFSK	Test Freq. (MHz)	2440
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.165	32.66	55.21	-22.55	22.80	9.64	0.05	Average
2	0.165	46.25	65.21	-18.96	36.39	9.64	0.05	QP
3*	0.348	32.49	49.00	-16.51	22.54	9.63	0.08	Average
4	0.348	36.32	59.00	-22.68	26.37	9.63	0.08	QP
5	0.712	16.76	46.00	-29.24	6.73	9.63	0.11	Average
6	0.712	27.84	56.00	-28.16	17.81	9.63	0.11	QP
7	1.037	15.13	46.00	-30.87	5.06	9.63	0.12	Average
8	1.037	23.29	56.00	-32.71	13.22	9.63	0.12	QP
9	1.980	16.05	46.00	-29.95	5.89	9.64	0.18	Average
10	1.980	25.59	56.00	-30.41	15.43	9.64	0.18	QP
11	24.015	26.92	50.00	-23.08	15.87	9.67	0.70	Average
12	24.015	32.83	60.00	-27.17	21.78	9.67	0.70	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation Mode	GFSK	Test Freq. (MHz)	2440
Power Phase	Neutral		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.153	32.67	55.82	-23.15	22.84	9.66	0.05	Average
2	0.153	49.45	65.82	-16.37	39.62	9.66	0.05	QP
3	0.165	33.72	55.21	-21.49	23.88	9.66	0.05	Average
4	0.165	47.14	65.21	-18.07	37.30	9.66	0.05	QP
5*	0.350	36.54	48.96	-12.42	26.64	9.65	0.08	Average
6	0.350	38.61	58.96	-20.35	28.71	9.65	0.08	QP
7	0.365	22.81	48.61	-25.80	12.91	9.65	0.08	Average
8	0.365	35.70	58.61	-22.91	25.80	9.65	0.08	QP
9	1.043	17.23	46.00	-28.77	7.26	9.65	0.12	Average
10	1.043	32.02	56.00	-23.98	22.05	9.65	0.12	QP
11	24.015	27.52	50.00	-22.48	16.36	9.81	0.70	Average
12	24.015	36.32	60.00	-23.68	25.16	9.81	0.70	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

3.2 Emissions in Restricted Frequency Bands

3.2.1 Limit of Emissions in Restricted Frequency Bands

Restricted Band Emissions Limit			
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.

3.2.2 Test Procedures

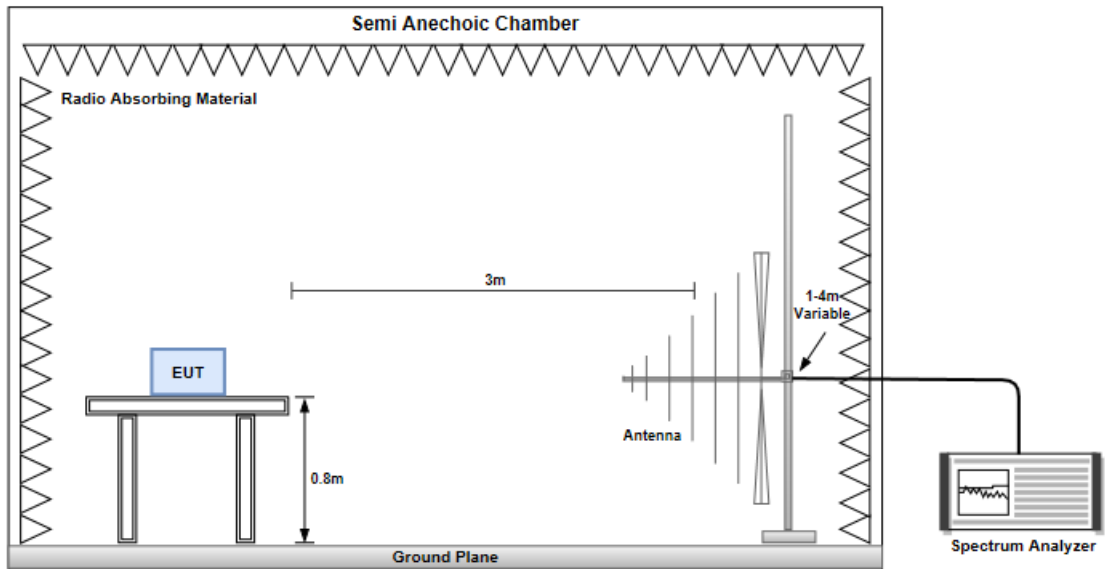
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission 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:

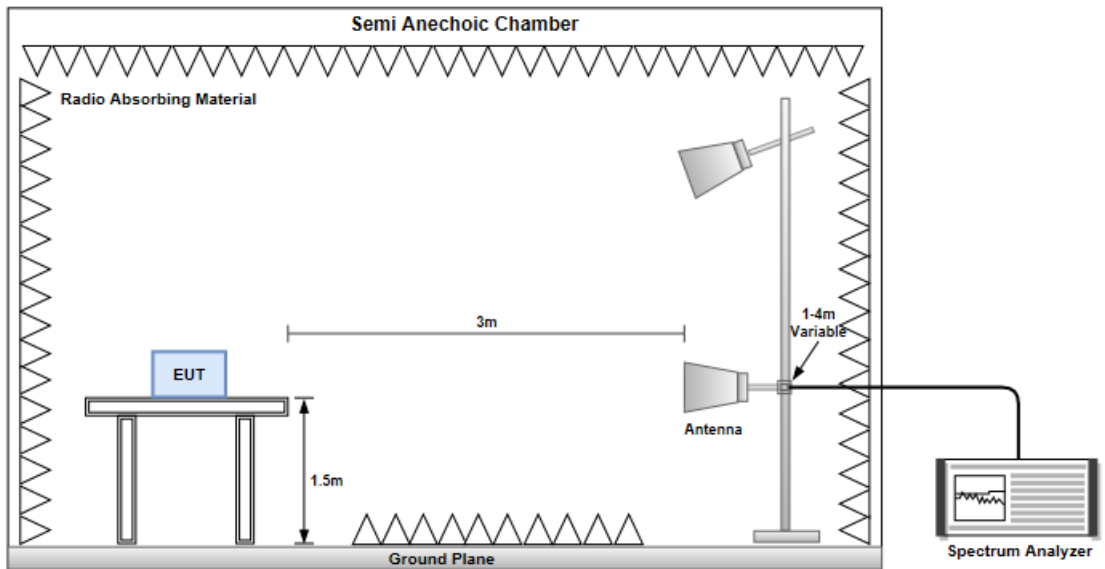
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
Radiated emission above 1GHz / Average value for band edge and harmonics
3. The average value is: Average = Peak value + 20log(Duty cycle)
Duty cycle of signal declared by applicant is 24 %
Duty factor = 20log(Duty cycle) = 20log(24%) = -12.4 dB
4. Radiated emission above 1GHz / Average value for other emissions
RBW=1MHz, VBW=1/T and Peak detector

3.2.3 Test Setup

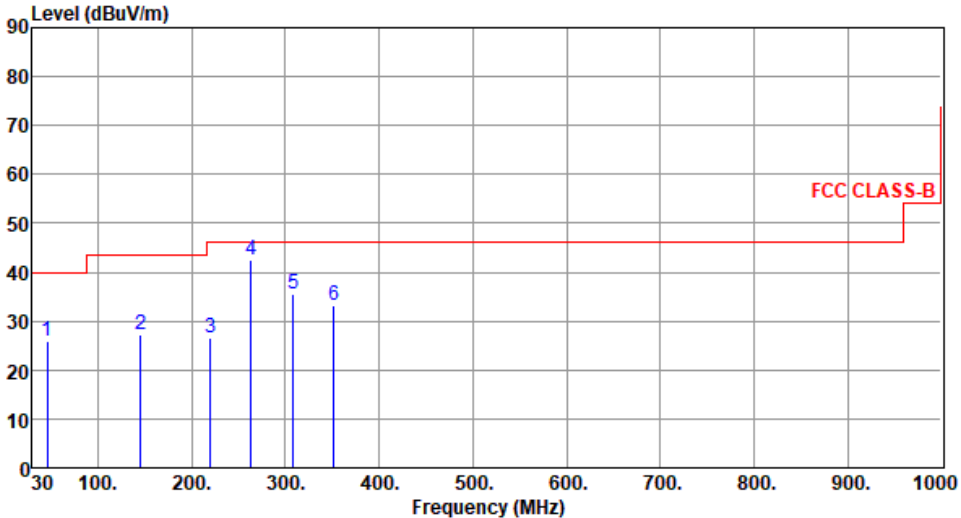
Radiated Emissions below 1 GHz



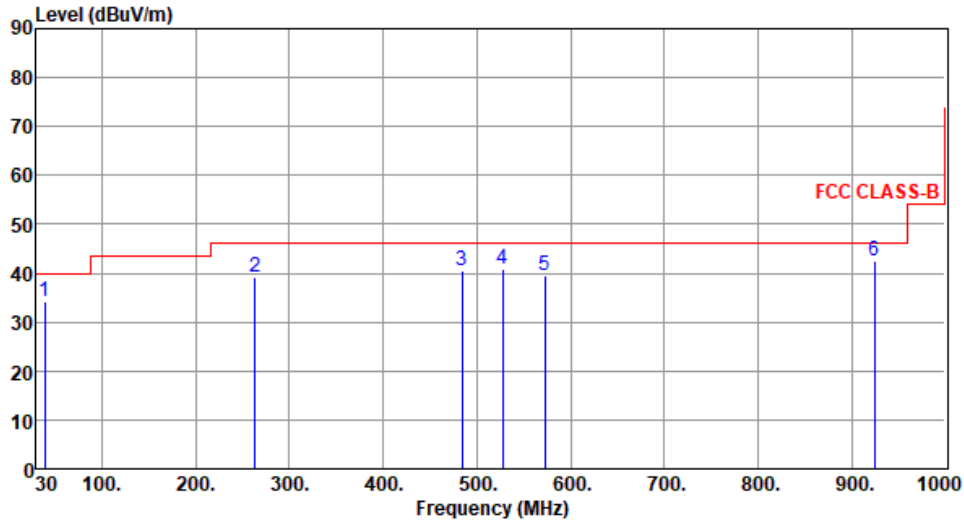
Radiated Emissions above 1 GHz



3.2.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	GFSK	Test Freq. (MHz)	2440																																																																						
Polarization	Horizontal																																																																								
																																																																									
	<table border="1"> <thead> <tr> <th>Freq.</th> <th>Emission level</th> <th>Limit</th> <th>Margin</th> <th>SA reading</th> <th>Factor</th> <th>Remark</th> <th>ANT High</th> <th>Turn Table</th> </tr> <tr> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> <th>cm</th> <th>deg</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>45.52</td> <td>25.88</td> <td>40.00</td> <td>-14.12</td> <td>34.64</td> <td>-8.76</td> <td>Peak</td> <td>---</td> </tr> <tr> <td>2</td> <td>145.43</td> <td>27.19</td> <td>43.50</td> <td>-16.31</td> <td>36.35</td> <td>-9.16</td> <td>Peak</td> <td>---</td> </tr> <tr> <td>3</td> <td>220.12</td> <td>26.70</td> <td>46.00</td> <td>-19.30</td> <td>39.09</td> <td>-12.39</td> <td>Peak</td> <td>---</td> </tr> <tr> <td>4</td> <td>263.77</td> <td>42.51</td> <td>46.00</td> <td>-3.49</td> <td>52.25</td> <td>-9.74</td> <td>Peak</td> <td>---</td> </tr> <tr> <td>5</td> <td>308.39</td> <td>35.43</td> <td>46.00</td> <td>-10.57</td> <td>43.65</td> <td>-8.22</td> <td>Peak</td> <td>---</td> </tr> <tr> <td>6</td> <td>352.04</td> <td>33.26</td> <td>46.00</td> <td>-12.74</td> <td>40.46</td> <td>-7.20</td> <td>Peak</td> <td>---</td> </tr> </tbody> </table>	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg	1	45.52	25.88	40.00	-14.12	34.64	-8.76	Peak	---	2	145.43	27.19	43.50	-16.31	36.35	-9.16	Peak	---	3	220.12	26.70	46.00	-19.30	39.09	-12.39	Peak	---	4	263.77	42.51	46.00	-3.49	52.25	-9.74	Peak	---	5	308.39	35.43	46.00	-10.57	43.65	-8.22	Peak	---	6	352.04	33.26	46.00	-12.74	40.46	-7.20	Peak	---
Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table																																																																	
MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg																																																																	
1	45.52	25.88	40.00	-14.12	34.64	-8.76	Peak	---																																																																	
2	145.43	27.19	43.50	-16.31	36.35	-9.16	Peak	---																																																																	
3	220.12	26.70	46.00	-19.30	39.09	-12.39	Peak	---																																																																	
4	263.77	42.51	46.00	-3.49	52.25	-9.74	Peak	---																																																																	
5	308.39	35.43	46.00	-10.57	43.65	-8.22	Peak	---																																																																	
6	352.04	33.26	46.00	-12.74	40.46	-7.20	Peak	---																																																																	
<p>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.</p>																																																																									

Modulation	GFSK	Test Freq. (MHz)	2440
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	38.73	34.27	40.00	-5.73	43.30	-9.03	Peak	---	---
2	263.77	39.12	46.00	-6.88	48.86	-9.74	Peak	---	---
3	483.96	40.54	46.00	-5.46	43.94	-3.40	Peak	---	---
4	527.61	40.73	46.00	-5.27	43.28	-2.55	Peak	---	---
5	572.23	39.39	46.00	-6.61	41.09	-1.70	Peak	---	---
6	924.04	42.44	46.00	-3.56	37.51	4.93	QP	100	135

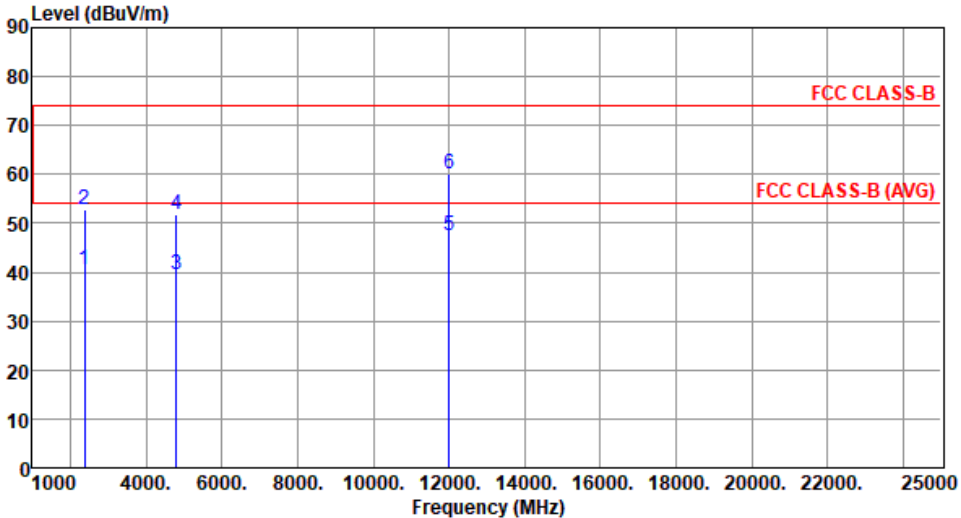
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

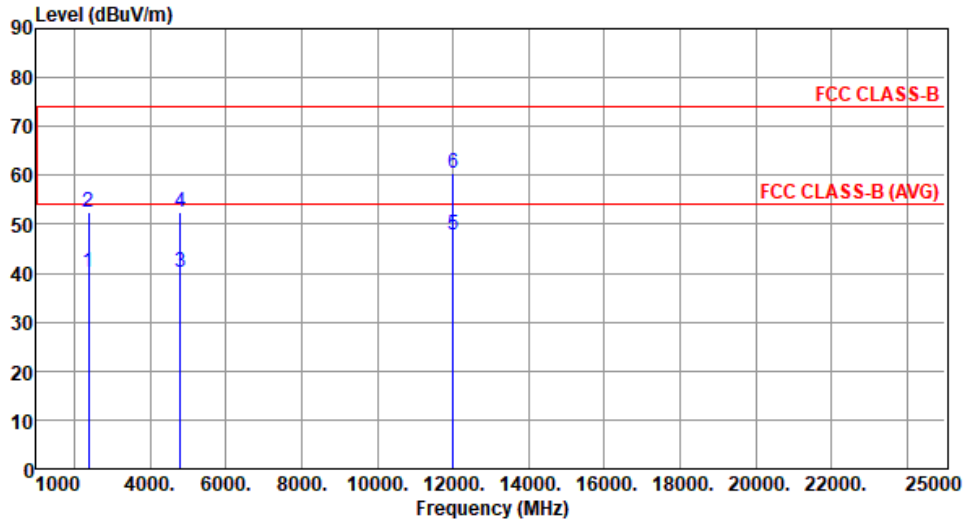
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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

3.2.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for GFSK

Modulation	GFSK	Test Freq. (MHz)	2402						
Polarization	Horizontal								
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	40.45	54.00	-13.55	40.21	0.24	Average	256	1
2	2390.00	52.80	74.00	-21.20	52.56	0.24	Peak	256	1
3	4804.00	39.48	54.00	-14.52	33.05	6.43	Average	149	193
4	4804.00	51.88	74.00	-22.12	45.45	6.43	Peak	149	193
5	12010.00	47.62	54.00	-6.38	31.56	16.06	Average	100	45
6	12010.00	60.02	74.00	-13.98	43.96	16.06	Peak	100	45
<p>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).</p>									

Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Vertical		



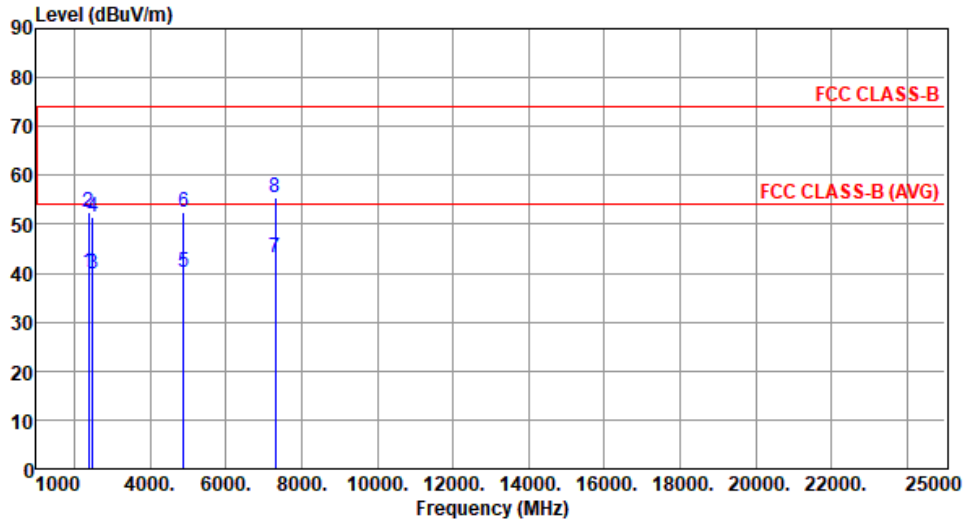
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	40.05	54.00	-13.95	39.81	0.24	Average	103	30
2	2390.00	52.33	74.00	-21.67	52.09	0.24	Peak	103	30
3	4804.00	40.19	54.00	-13.81	33.76	6.43	Average	131	356
4	4804.00	52.59	74.00	-21.41	46.16	6.43	Peak	131	356
5	12010.00	47.91	54.00	-6.09	31.85	16.06	Average	100	16
6	12010.00	60.31	74.00	-13.69	44.25	16.06	Peak	100	16

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).

Modulation	GFSK	Test Freq. (MHz)	2440
Polarization	Horizontal		



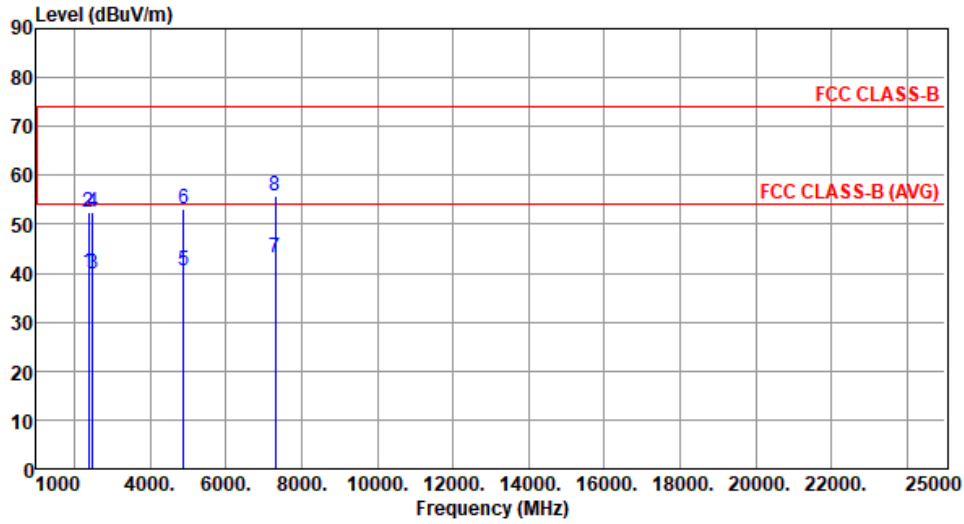
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	40.30	54.00	-13.70	40.06	0.24	Average	256	23
2	2390.00	52.38	74.00	-21.62	52.14	0.24	Peak	256	23
3	2483.50	39.92	54.00	-14.08	39.67	0.25	Average	256	23
4	2483.50	51.61	74.00	-22.39	51.36	0.25	Peak	256	23
5	4880.00	40.22	54.00	-13.78	33.76	6.46	Average	144	192
6	4880.00	52.62	74.00	-21.38	46.16	6.46	Peak	144	192
7	7320.00	43.22	54.00	-10.78	31.45	11.77	Average	100	24
8	7320.00	55.62	74.00	-18.38	43.85	11.77	Peak	100	24

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).

Modulation	GFSK	Test Freq. (MHz)	2440
Polarization	Vertical		



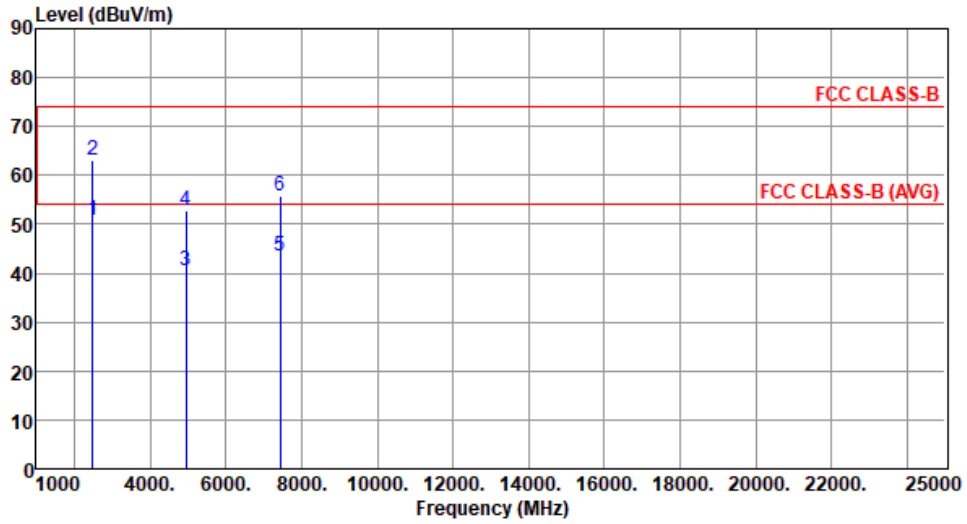
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	40.16	54.00	-13.84	39.92	0.24	Average	102	31
2	2390.00	52.45	74.00	-21.55	52.21	0.24	Peak	102	31
3	2483.50	39.71	54.00	-14.29	39.46	0.25	Average	102	31
4	2483.50	52.62	74.00	-21.38	52.37	0.25	Peak	102	31
5	4880.00	40.65	54.00	-13.35	34.19	6.46	Average	113	349
6	4880.00	53.05	74.00	-20.95	46.59	6.46	Peak	113	349
7	7320.00	43.28	54.00	-10.72	31.51	11.77	Average	100	43
8	7320.00	55.68	74.00	-18.32	43.91	11.77	Peak	100	43

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).

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Horizontal		



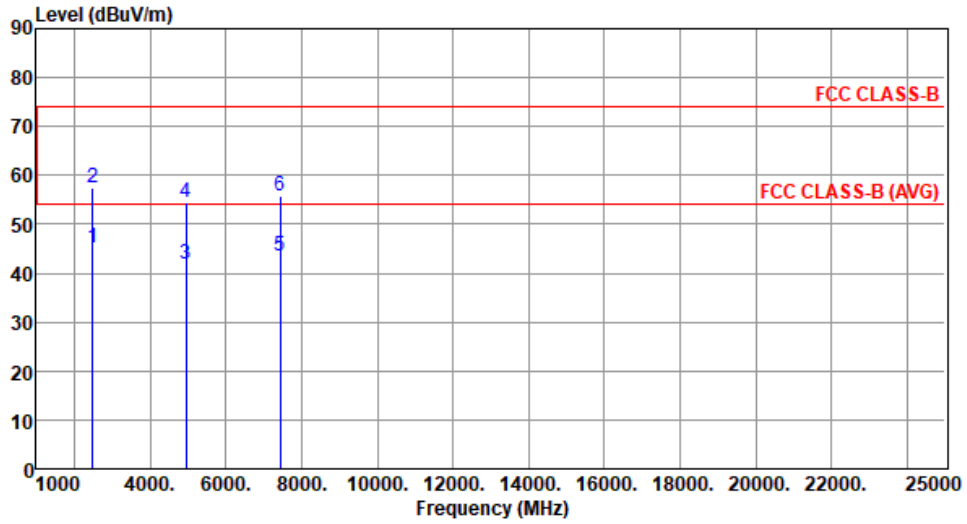
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	50.71	54.00	-3.29	50.46	0.25	Average	243	2
2	2483.50	63.11	74.00	-10.89	62.86	0.25	Peak	243	2
3	4960.00	40.44	54.00	-13.56	33.76	6.68	Average	141	186
4	4960.00	52.84	74.00	-21.16	46.16	6.68	Peak	141	186
5	7440.00	43.41	54.00	-10.59	31.63	11.78	Average	100	29
6	7440.00	55.81	74.00	-18.19	44.03	11.78	Peak	100	29

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).

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	45.22	54.00	-8.78	44.97	0.25	Average	100	18
2	2483.50	57.62	74.00	-16.38	57.37	0.25	Peak	100	18
3	4960.00	41.92	54.00	-12.08	35.24	6.68	Average	129	359
4	4960.00	54.32	74.00	-19.68	47.64	6.68	Peak	129	359
5	7440.00	43.54	54.00	-10.46	31.76	11.78	Average	100	29
6	7440.00	55.94	74.00	-18.06	44.16	11.78	Peak	100	29

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).

3.2.6 Band edge Re-evaluation by DCCF for original configurations

Below configurations and peak values are from original report, report No.: FR631002AE.

This is to calculate average value by using DCCF method.

Average Value = Peak value + 20log(Duty cycle)

Duty cycle of signal declared by applicant is 24 %

Duty factor = 20log(Duty cycle) = 20log(24%) = -12.4 dB

Antenna Configuration	Frequency (MHz)	Polarization	Emission Level (dBuV/m)	Limit (dBuV/m)	Pass / Fail
1 : MAF94051	2483.5	Horizontal	55.13(PK)	74	Pass
			42.73(AV)	54	Pass
		Vertical	59.49(PK)	74	Pass
			47.09(AV)	54	Pass
2: MAF95310 Mini NanoBlade Flex	2483.5	Horizontal	60.38(PK)	74	Pass
			47.98(AV)	54	Pass
		Vertical	56.57(PK)	74	Pass
			44.17(AV)	54	Pass
3 : WLAN_1000146	2483.5	Horizontal	56.07(PK)	74	Pass
			43.67(AV)	54	Pass
		Vertical	57.56(PK)	74	Pass
			45.16(AV)	54	Pass

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 (EMC and Wireless Communication Laboratory), 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 District. 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 District, Tao Yuan City
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 District, Tao Yuan
City 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==