



FCC Test Report

Report No: FCS202309170W01

Issued for

Applicant:	Lookout Lab, Inc
Address:	3130 Flavin Lane, Pebble Beach, CA, USA 93953
Product Name:	bluebot
Brand Name:	bluebot [®]
Model Name:	100-RF-PTP
Series Model:	100-W,W-L,100-RF,100-RF-WAN,100-RF-PTP-L, 100-RF-WAN-L
FCC ID:	2BC9Y-100-RF-PTP
Issued By: Flux Compliance Service Laboratory Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan Tel: 769-27280901 Fax:769-27280901 http://www.fcs-lab.com	

TEST RESULT CERTIFICATION

Applicant's Name.....: Lookout Lab, Inc

Address.....: 3130 Flavin Lane, Pebble Beach, CA, USA 93953

Manufacture's Name.....: Gentos Measurement & Control Co., Ltd

Address.....: 12F,Block A5,Nanshan Ipark,No.1001 College Road,Nanshan District,Shenzhen, 518055,China

Product Description

Product Name.....: bluebot

Brand Name: bluebot®

Model Name.....: 100-RF-PTP

Series Model.....: 100-W,W-L,100-RF,100-RF-WAN,100-RF-PTP-L,100-RF-WAN-L

Test Standards.....: FCC Rules and Regulations Part 15 Subpart C, Section 249

Test Procedure.....: ANSI C63.10:2013

This device described above has been tested FCS, 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 FCS, this document may be altered or revised by FCS, personal only, and shall be noted in the revision of the document..

Date of Test.....:

Date (s) of performance of tests.: Sep 21, 2023 ~ Oct 16, 2023

Date of Issue.....: Oct 16, 2023

Test Result.....: Pass

Tested by

:

Scott Shen

(Scott Shen)

Reviewed by

:

Duke Qian

(Duke Qian)

Approved by

:

Jack Wang

(Jack Wang)



Table of Contents	Page
1. SUMMARY OF TEST RESULTS	5
1.1 TEST FACTORY	6
1.2 MEASUREMENT UNCERTAINTY	6
2. GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF THE EUT	7
2.2 DESCRIPTION OF THE TEST MODES	9
2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS	10
2.4 EQUIPMENTS LIST	11
3. RADIATED EMISSION MEASUREMENT	12
3.1 LIMIT	12
3.2 TEST PROCEDURE	13
3.3 TEST SETUP	14
3.4 TEST RESULTS	15
4. BAND EDGE TEST	21
4.1 LIMIT	21
4.2 TEST PROCEDURE	21
4.3 TEST SETUP	22
4.4 TEST RESULTS	23
5. 20 DB BANDWIDTH TEST	24
5.1 LIMIT	24
5.2 TEST PROCEDURE	24
5.3 TEST SETUP	24
5.4 TEST RESULTS	25
6. ANTENNA REQUIREMENT	27
6.1 STANDARD REQUIREMENT	27
6.2 EUT ANTENNA	27

Revision History

Rev.	Issue Date	Effect Page	Contents
00	Oct 16, 2023	N/A	N/A

1. SUMMARY OF TEST RESULTS

FCC Part 15.249,Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	--
15.205(a), 15.209(a), 15.249(a), 15.249(c)	Radiated Spurious Emission	PASS	--
15.209	Field strength of fundamental	PASS	
15.249(d)	Band Edge Emission	PASS	--
15.215(c)	20dB Bandwidth	PASS	--
15.203	Antenna Requirement	PASS	--

NOTE:

- (1)" N/A" denotes test is not applicable in this Test Report
- (2) All tests are according to ANSI C63.10-2013

1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number: 5545.01	

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	RF output power, conducted	± 0.71 dB
2	Unwanted Emissions, conducted	± 2.98 dB
3	Conducted Emission (9KHz-150KHz)	± 4.13 dB
4	Conducted Emission (150KHz-30MHz)	± 4.74 dB
5	All emissions,radiated(<1G) 9KHz-30MHz	± 3.1 dB
6	All emissions,radiated(<1G) 30MHz-1000MHz	± 3.2 dB
7	All emissions,radiated 1GHz -18GHz	± 3.66 dB
8	All emissions,radiated 18GHz -40GHz	± 4.31 dB
9	Occupied bandwidth	4(%)

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	bluebot
Trade Name	bluebot [®]
Model Name	100-RF-PTP
Series Model	100-W,W-L,100-RF,100-RF-WAN,100-RF-PTP-L,100-RF-WAN-L
Model Difference	The above product with same circuit, PCB layout, electrical parts, materials and wiring structures, Appearance shape, the materials of decorative accessories is same, the only difference is the model name.
Channel List	Please refer to the Note 2.
Technical Parameters	Frequency:902.3MHz-914.9MHz Modulation:DSB-ASK Data Rate:125Kbps Channel number: 8CH
Power Supply	DC 5V
Hardware version number	V1.0
Software version number	V1.0
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2. Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	902.3	05	908.5
02	904.1	06	911.3
03	905.9	07	913.1
04	907.7	08	914.9

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	External Antenna	N/A	2.0	Antenna

2.2 DESCRIPTION OF THE TEST MODES

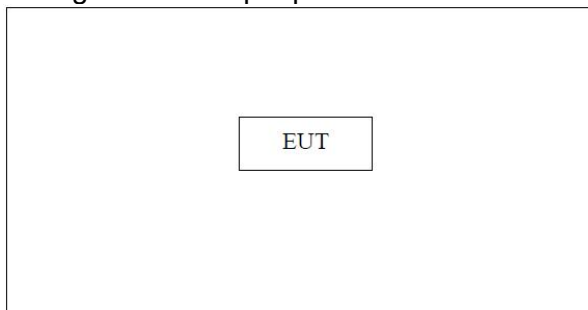
To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test software: FCC tool

The test software was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table

No.	Test model descrption
1	Low channel GFSK(902.3MHz)
2	Middle channel GFSK(908.5MHz)
3	High channel GFSK(914.9MHz)
<p>Note:</p> <ol style="list-style-type: none"> 1. All the test modes can be supply by battery, only the result of the worst case recorded in the report. GFSK mode is worst mode. 2. For radiated emission, 3 axis were chosen for testing for each applicable mode. 3. The EUT used fully charge battery when tested. 4. During the test, the dutycycle>98%, the test voltage was tuned from 85% to 115% of the Nominal rate supply votage, and found that the worst case was the nominal rated supply condition, So the report just shows that condition's data 	

Configuration and peripherals



2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
1	filter	N/A	ZRN9201	N/A	This filter is for testing only in report.

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2023.08.29	2024.08.28
Signal Analyzer	R&S	FSV40-N	FCS-E012	2023.08.29	2024.08.28
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2023.08.29	2024.08.28
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2023.08.29	2024.08.28
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2023.08.29	2024.08.28
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2023.08.29	2024.08.28
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2023.08.29	2024.08.28
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2023.08.29	2024.08.28
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2023.08.29	2024.08.28
Temperature & Humidity	HTC-1	victor	FCS-E005	2023.08.29	2024.08.28
Filter	N/A	ZRN9201	FCS-E037	2023.08.29	2024.08.28

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2023.08.29	2024.08.28
LISN	R&S	ENV216	FCS-E007	2023.08.29	2024.08.28
LISN	ETS	3810/2NM	FCS-E009	2023.08.29	2024.08.28
Temperature & Humidity	HTC-1	victor	FCS-E008	2023.08.29	2024.08.28

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
Spectrum Analyzer	Keysight	N9020A	FCS-E015	2023.08.29	2024.08.28
Spectrum Analyzer	Agilent	E4447A	MY50180039	2023.08.29	2024.08.28
Spectrum Analyzer	R&S	FSV-40	101499	2023.08.29	2024.08.28

3. RADIATED EMISSION MEASUREMENT

3.1 LIMIT

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009mhz - 1000mhz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

LIMITS OF FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
902.0-928.0	114	94

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2 TEST PROCEDURE

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz /10 Hz (Peak detector is for Both)

- The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

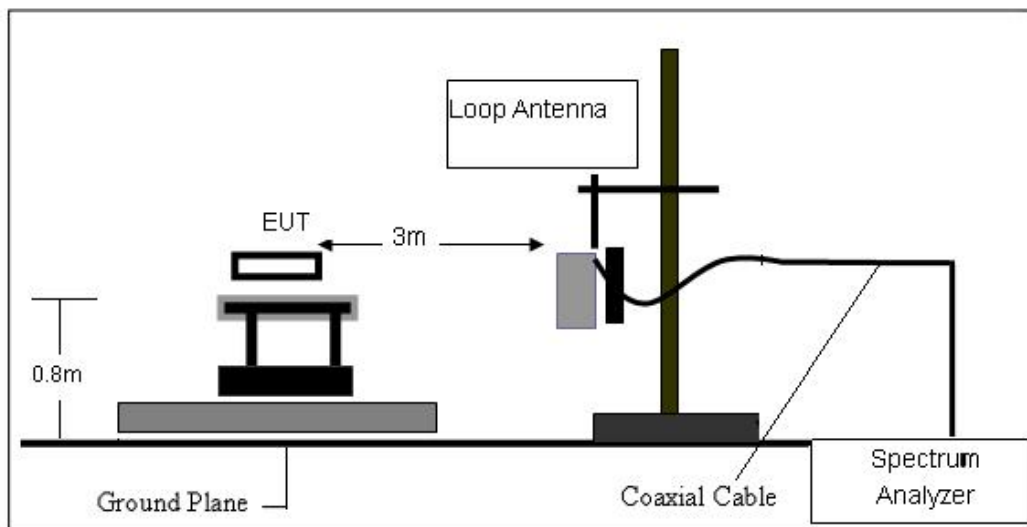
Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

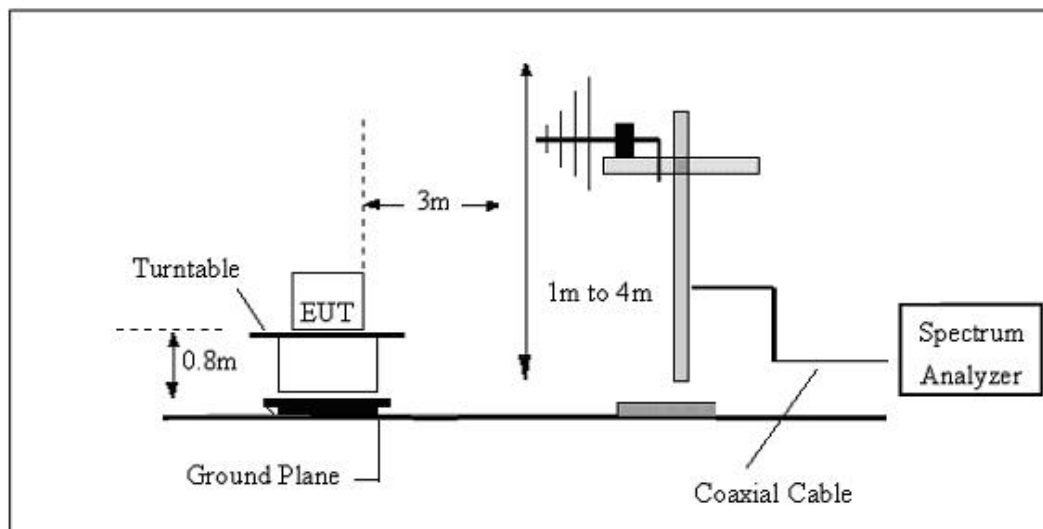
For fundamental frequency ,RBW>20dB BW ,VBW>RBW,PK detector for PK value, RMS detector for AV value.

3.3 TEST SETUP

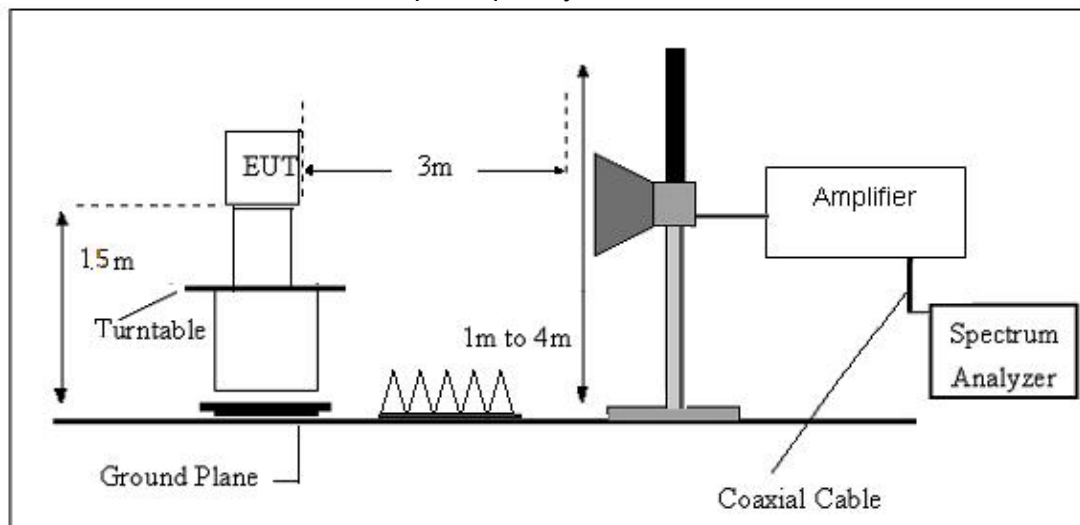
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.4 TEST RESULTS

Temperature:	25°C	Relative Humidity:	60%
Test Mode:	GFSK Mode	Test Voltage:	DC 5V

For field strength of the fundamental signal

PEAK

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	902.30	106.85	-9.61	97.24	114.00	-16.76	Horizontal
2	902.30	106.33	-9.61	96.72	114.00	-17.28	Vertical
3	908.50	99.87	-9.61	90.26	114.00	-23.74	Horizontal
4	908.50	99.25	-9.61	89.64	114.00	-24.36	Vertical
5	914.90	92.98	-9.61	93.37	114.00	-30.63	Horizontal
6	914.90	92.17	-9.61	82.56	114.00	-31.44	Vertical

AVG

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	902.30	100.57	-9.61	90.96	94.00	-3.04	Horizontal
2	902.30	100.15	-9.61	90.54	94.00	-3.46	Vertical
3	908.50	92.10	-9.61	82.49	94.00	-11.51	Horizontal
4	908.50	93.09	-9.61	83.48	94.00	-10.52	Vertical
5	914.90	79.83	-9.61	70.22	94.00	-23.78	Horizontal
6	914.90	84.50	-9.61	74.89	94.00	-19.11	Vertical

For spurious emission
(9KHz-30MHz)

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State P/F	Test Result
--	--	--	--	--	
--	--	--	--	--	PASS

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

(30MHz-1000MHz)

Temperature:	24.7°C	Relative Humidity:	61%
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	Mode 1		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		123.6985	10.25	15.55	25.80	43.50	-17.70	peak
2		199.9856	14.72	15.50	30.22	43.50	-13.28	peak
3		250.3012	14.49	17.06	31.55	46.00	-14.45	peak
4		451.1350	12.73	24.82	37.55	46.00	-8.45	peak
5	*	550.9480	17.22	23.39	40.61	46.00	-5.39	peak
6		900.1474	5.59	31.78	37.37	46.00	-8.63	peak

Note:

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

The mode 1 is the worst case, and only the data of the worst case recorded in this test report.

Temperature:	22.7°C	Relative Humidity:	61%
Test Voltage:	DC 5V	Phase:	Vertical
Test Mode:	Mode 1		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		42.0066	12.16	16.92	29.08	40.00	-10.92	peak
2		83.5222	17.31	16.42	33.73	40.00	-6.27	peak
3		123.2655	17.90	17.78	35.68	43.50	-7.82	peak
4		199.9856	10.83	17.90	28.73	43.50	-14.77	peak
5		400.4319	14.25	22.22	36.47	46.00	-9.53	peak
6	*	779.6068	12.40	27.42	39.82	46.00	-6.18	peak

Note:

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

The mode 1 is the worst case, and only the data of the worst case recorded in this test report.

■ Above 1GHz

For 1 GHz to 10GHz

Other emissions are attenuated 20dB below the limit, so it does not recorded in the report.

For 902.30MHz

Horizontal

Frequency	Reading Level	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1804.6	58.53	-9.12	49.41	74	-24.59	peak
1804.6	42.69	-9.12	33.57	54	-20.43	AVG
2706.9	61.37	-8.86	52.51	74	-21.49	peak
2706.9	49.49	-8.86	40.63	54	-13.37	AVG
3609.2	57.36	-4.09	53.27	74	-20.73	peak
3609.2	43.68	-4.06	39.62	54	-14.38	AVG

Remark: Factor = Antenna Factor + Cable Loss — Pre-amplifier.

Vertical

Frequency	Ivleter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1804.6	59.83	-9.12	50.71	74	-23.29	peak
1804.6	43.97	-9.12	34.85	54	-19.15	AVG
2706.9	63.39	-8.86	54.53	74	-19.47	peak
2706.9	48.45	-8.86	39.59	54	-14.41	AVG
3609.2	58.75	-4.09	54.66	74	-19.34	peak
3609.2	42.39	-4.06	38.33	54	-15.67	AVG

Remark: Factor = Antenna Factor + Cable Loss — Pre-amplifier.

For 908.50MHz

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1817.0	58.85	-9.12	49.73	74	-24.27	peak
1817.0	44.18	-9.12	35.06	54	-18.94	AVG
2725.5	66.36	-8.8	57.56	74	-16.44	peak
2725.5	48.45	-8.8	39.65	54	-14.35	AVG
3634.0	57.21	-4.07	53.14	74	-20.86	peak
3634.0	43.39	-4.07	39.32	54	-14.68	AVG

Remark: Factor = Antenna Factor + Cable Loss — Pre-amplifier.

Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1817.0	60.12	-9.12	51	74	-23	peak
1817.0	45.68	-9.12	36.56	54	-17.44	AVG
2725.5	62.39	-8.8	53.59	74	-20.41	peak
2725.5	46.85	-8.8	38.05	54	-15.95	AVG
3634.0	60.19	-4.07	56.12	74	-17.88	peak
3634.0	43.75	-4.07	39.68	54	-14.32	AVG

Remark: Factor = Antenna Factor + Cable Loss — Pre-amplifier.

For 914.90MHz

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1829.8	58.42	-9.12	49.3	74	-24.7	peak
1829.8	43.83	-9.12	34.71	54	-19.29	AVG
2744.7	62.74	-8.75	53.99	74	-20.01	peak
2744.7	47.79	-8.75	39.04	54	-14.96	AVG
3659.6	58.42	-4.03	54.39	74	-19.61	peak
3659.6	42.91	-4.03	38.88	54	-15.12	AVG
Remark: Factor = Antenna Factor + Cable Loss — Pre-amplifier.						

Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1829.8	58.95	-9.12	49.83	74	-24.17	peak
1829.8	45.83	-9.12	36.71	54	-17.29	AVG
2744.7	62.72	-8.75	53.97	74	-20.03	peak
2744.7	46.69	-8.75	37.94	54	-16.06	AVG
3659.6	55.32	-4.03	51.29	74	-22.71	peak
3659.6	41.33	-4.03	37.3	54	-16.7	AVG
Remark: Factor = Antenna Factor + Cable Loss — Pre-amplifier.						

4. BAND EDGE TEST

4.1 LIMIT

According to §15.249(d), 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.

4.2 TEST PROCEDURE

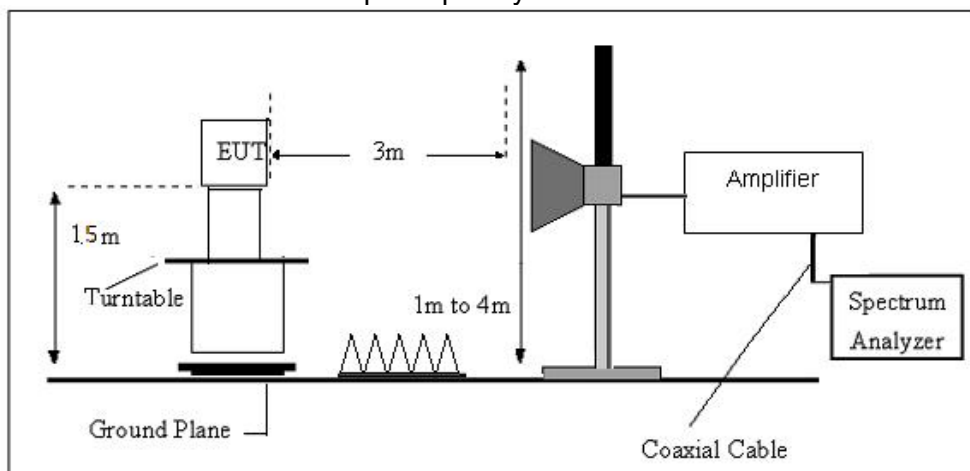
- a. The EUT is placed on a turntable, which is 1.5m above ground plane.
- b. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
Use the following spectrum analyzer settings:
 - c. Span = wide enough to fully capture the emission being measured, RBW = 1 MHz, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold
Follow the guidelines in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.
 - d. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with
 - e. the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from $20\log(\text{duty cycle}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Note:

For fundamental frequency ,RBW>20dB BW ,VBW>RBW,PK detector for PK value, RMS detector for AV value.

4.3 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



4.4 TEST RESULTS

NO.	Freq. [MHz]	Level [dBuV/m]	Factor [dB]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
1	902	36.01	31.57	46	9.99	150	356	Horizontal	QP
2	902	33.06	28.29	46	12.94	150	177	Vertical	QP

NO.	Freq. [MHz]	Level [dBuV/m]	Factor [dB]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
1	928	35.21	30.56	46	10.79	150	207	Horizontal	QP
2	928	29.38	25.52	46	16.62	150	4	Vertical	QP

5. 20 DB BANDWIDTH TEST

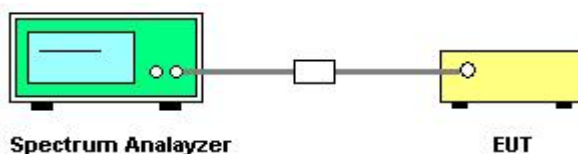
5.1 LIMIT

According to 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation

5.2 TEST PROCEDURE

- Check the calibration of the measuring instrument using either an internal calibrator or a
- known signal from an external generator
 - Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
 - Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

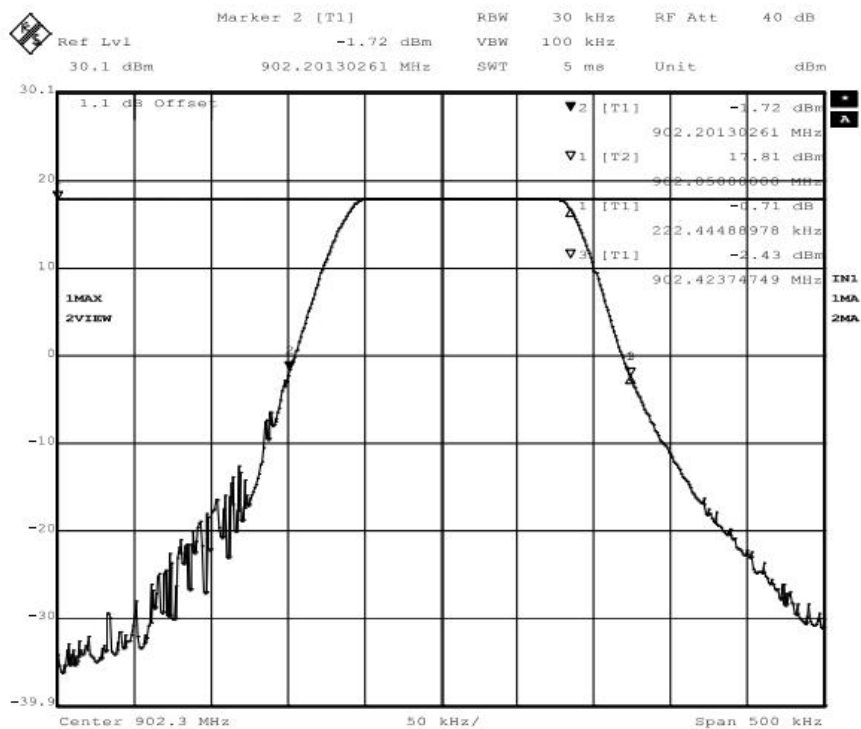
5.3 TEST SETUP

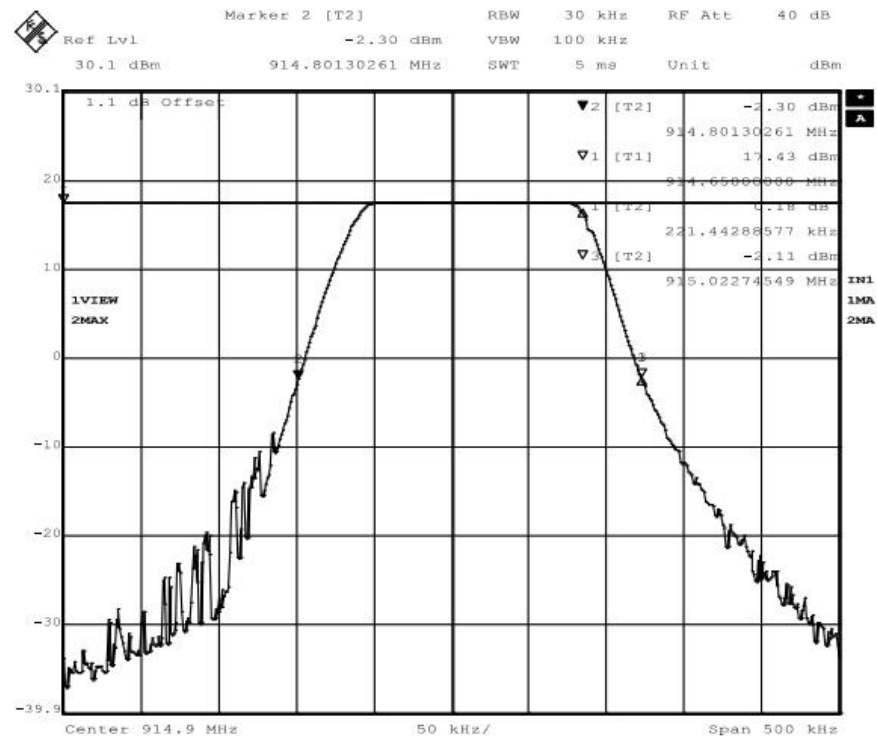
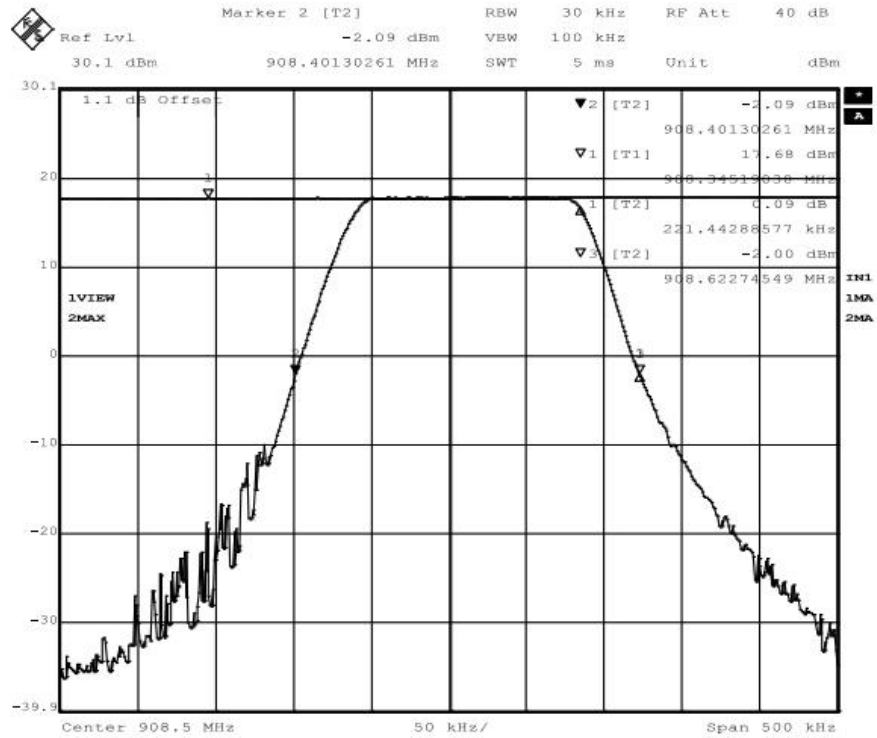


5.4 TEST RESULTS

Temperature:	25°C	Relative Humidity:	50%
Test Mode:	GFSK	Test Voltage:	DC 5V

Frequency	20dB Bandwidth (MHz)	Result
902.3 MHz	0.222	PASS
908.5 MHz	0.221	PASS
914.9 MHz	0.221	PASS





6. ANTENNA REQUIREMENT

6.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

6.2 EUT ANTENNA

The antennas used for this product are external antenna and no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 2.0dBi.

*****END OF THE REPORT*****