



Certificate #5376.01



EUROFINS ELECTRICAL TESTING SERVICE (SHENZHEN) CO., LTD.

RADIO TEST - REPORT

FCC Compliance Test Report

Product name: Beacon Transmitter

Model name: BCON-11, BCON-11(C), BCON-11(CNTX), BCON-11(NRX)

FCC ID: WNG-BCON-11

Test Report Number: EFGX25010139-IE-01-E01

Content

1	General Information	3
1.1	Notes	3
1.2	Testing laboratory	4
1.3	Details of approval holder	4
1.4	Details of Manufacturer	4
1.5	Application details	5
1.6	Test item	5
1.7	Test standards	6
2	Technical test	7
2.1	Summary of test results	7
2.2	Test environment	7
2.3	Measurement uncertainty	7
2.4	Test mode	7
2.5	Test equipment utilized	8
2.6	Auxiliary Equipment Used during Test:	8
2.7	Test software information	8
2.8	Customized Configurations	8
2.9	Test Environments	8
2.10	Test results	9
3	Technical Requirement	10
3.1	Conducted Emission	10
3.2	20dB bandwidth	11
3.3	Spurious radiated emission	13

1 General Information

1.1 Notes

The results of this test report relate exclusively to the item tested as specified in chapter "Description of test item" and are not transferable to any other test items.

Eurofins Product Testing Service (Shenzhen) Co., Ltd. is not responsible for any generalisations and conclusions drawn from this report. Any modification of the test item can lead to invalidity of test results and this test report may therefore be not applicable to the modified test item.

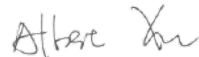
The test report may only be reproduced or published in full. Reproducing or publishing extracts of the report requires the prior written approval of the Eurofins Product Testing Service (Shenzhen) Co., Ltd.

This document is subject to the General Terms and Conditions and the Testing and Certification System of Eurofins Product Testing Service (Shenzhen) Co., Ltd., available on request or accessible at www.eurofins.com.

Operator:

2025-01-22		Bruce Zheng / Project Engineer	
Date	Eurofins-Lab.	Name / Title	Signature

Technical responsibility for area of testing:

2025-01-22		Abert Xu / Lab Manager	
Date	Eurofins-Lab.	Name / Title	Signature

1.2 Testing laboratory

Eurofins Electrical Testing Service (Shenzhen) Co., Ltd.

1st Floor, Building 2, Chungu, Meisheng Huigu Science and Technology Park, No. 83 Dabao Road, Bao'an District, Shenzhen. P.R.China.

Telephone : +86-755-82911867

Fax : +86-755-82910749

The Laboratory has passed the Accreditation by the American Association for Laboratory Accreditation (A2LA). The Accreditation number is 5376.01

The Laboratory has been listed by industry Canada to perform electromagnetic emission measurements, The CAB identifier is CN0088

1.3 Details of approval holder

Name : Rondish CO.,LTD

Address : Unit G & H, 4/F, Block 1, Kwai Tak Ind. Ctr, 15-33 Kwai Tak St., Kwai Chung, N.T. Hong Kong

Telephone : ./.

Fax : ./.

1.4 Details of Manufacturer

Name : Rondish CO.,LTD

Address : Unit G & H, 4/F, Block 1, Kwai Tak Ind. Ctr, 15-33 Kwai Tak St., Kwai Chung, N.T. Hong Kong

Telephone : ./.

Fax : ./.

1.5 Application details

Date of receipt of application : 2024-12-25
Date of receipt of test item : 2024-12-25
Date of test : 2024-12-25 to 2025-01-22
Date of issue : 2025-01-22

1.6 Test item

Product type : Beacon Transmitter
Model name : BCON-11, BCON-11(C), BCON-11(CNTX), BCON-11(NRX)
Sample ID : 250106-20-008
Brand : ./.
Serial number : ./.
Ratings : DC 24V from Ethernet
Test voltage : DC 24V
Additional information : N/A

RadioTechnical data

Frequency range : 125KHz
Radio Tech. : SRD
Frequency channel : 1 Channel
Modulation : FSK
Antenna type : Internal antenna

1.7 Test standards

Test Standards	
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

Test Method

- 1: ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
- 2: ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices.

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.



or

The deviations as specified were ascertained in the course of the tests performed.



2.2 Test environment

Temperature : 20 ... 25°C
 Relative humidity content : 30 ... 60%
 Air pressure : 100 ... 101kPa

2.3 Measurement uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted RF test	RF Power Conducted: 1.16dB Frequency test involved: 1.05×10 ⁻⁷ or 1%
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.46dB; Vertical: 4.54dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.42dB; Vertical: 4.41dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 4.63dB; Vertical: 4.62dB;

2.4 Test mode

The EUT was set at continuously transmitting during the test.

2.5 Test equipment utilized

EQUIPMENT ID	EQUIPMENT NAME	MODEL NO.	CAL. DUE DATE
23-2-13-01	EMI Test Receiver	ESR7	2025-03-25
23-2-13-02	Signal Analyzer	N9020B-544	2025-03-25
23-2-12-01	Active Loop Antenna	FMZB 1519B	2025-03-25
23-2-12-02	TRILOG Broadband Antenna	VULB9168	2025-06-02
23-2-12-03	Horn Antenna	3117	2025-06-02
23-2-12-04	Horn Antenna	BBHA 9170	2025-06-02
23-2-10-01	Preamplifier	BBV9745	2025-03-25
23-2-10-02	Preamplifier	EMC001330	2025-03-25
23-2-10-03	Preamplifier	EMC051845SE	2025-03-25
23-2-10-14	Switch and Control Unit	ERIT-E-JS0806-SF1	N/A

2.6 Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
LAN to DC adapter	N/A	N/A	N/A
Battery	NEATA BATTERY MANUFACTURE CO.,LTD	NT12-7	N/A

2.7 Test software information

Test Software Version	N.A		
Modulation	Setting TX Power	TX Pattern	Packet Type
FSK	Default	Default	Default

2.8 Customized Configurations

EUT Conf.	Signal Description	Operating Frequency	Duty Cycle
TM1	FSK	125KHz	./.

2.9 Test Environments

Enviroment Parameter	Temperature	Voltage	Relative Humidity
101.7Kpa	26.5℃	24V	58.3%

2.10 Test results

☒ 1st test

☐ test after modification

☐ production test

Technical Requirements				
FCC Part 15 Subpart C				
Test Condition		Test Result	Verdict	Test Site
§15.207	Conducted emission AC power port	N.A	N.A	N.A
§15.209 & §15.205	Spurious radiated emission	Page 16	Pass	Site 1
§15.215	-20dB Bandwidth & 99%Bandwidth	Page 12	Pass	Site 1
§15.203	Antenna requirement	See note 1	Pass	--

Remark 1: N/A – Not Applicable.

Note 1: The EUT use internal antenna, According to §15.203, it is considered sufficiently to comply with the provisions of this section.

3 Technical Requirement

3.1 Conducted Emission

Test Method:

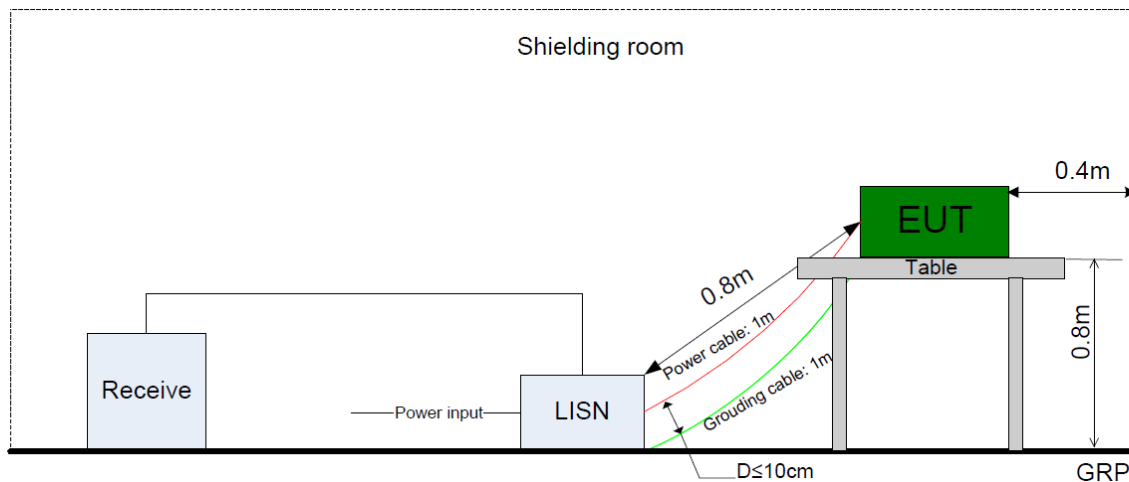
The test method was referred to the subclause 5.2 of ANSI C63.4-2014.

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Test Setup:

The mains cable of the EUT (per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.



Limit:

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linear.

Test Result: N.A

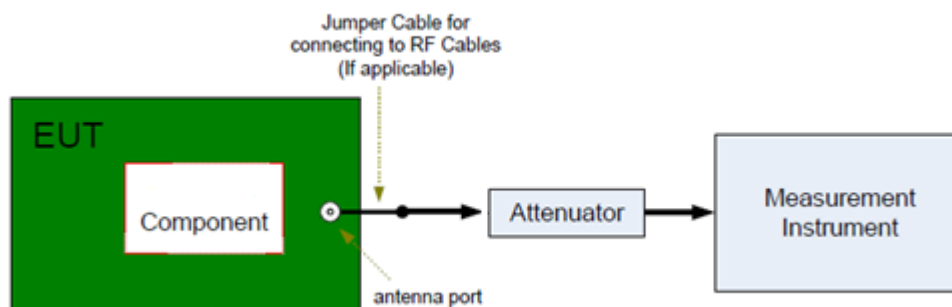
3.2 20dB bandwidth

Test Method:

1. Connect EUT test port to spectrum analyzer.
2. Set the EUT to transmit maximum output power at 2405MHz.
3. Then set the EUT to transmit at high, middle and low frequency separately.
4. Set Span = approximately 1.5 to 5 times the 99% bandwidth.
5. Set RBW $\geq$ 1% to 5% of the 99% bandwidth, VBW $\geq$ RBW.
6. Set Sweep = auto.
7. Set Detector function = Average.
8. Allow the trace to stabilize.
9. Repeat above procedures until all frequencies measured were complete.

Test Setup:

The component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The press a button of the EUT is to emit the specified signals for the purpose of measurements.



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.

Test Result

20dB Bandwidth (KHz)	Result
16.688	Pass



3.3 Spurious radiated emission

Test Method:

- 1: The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
- 3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5: Use the following spectrum analyzer settings According to C63.10:
For Above 1GHz
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW $\geq$ RBW for peak measurement and VBW = 10Hz for average measurement, Sweep = auto, Detector function = peak, Trace = max hold.
For Below 1GHz
Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 KHz, VBW $\geq$ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.
For Below 30MHz
Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 200 Hz, VBW $\geq$ RBW from 9KHz to 0.15MHz, RBW 9KHz VBW $\geq$ RBW from 0.15MHz to 30MHz for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

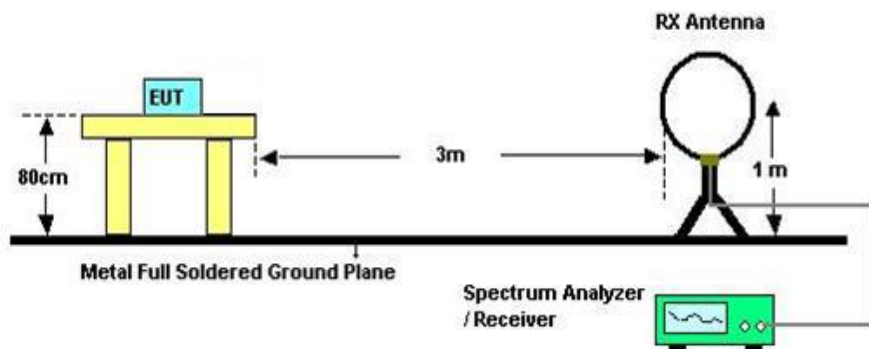
Note:

- 1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
- 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($20\log(1/\text{duty cycle})$).
- 4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

Test Setup:

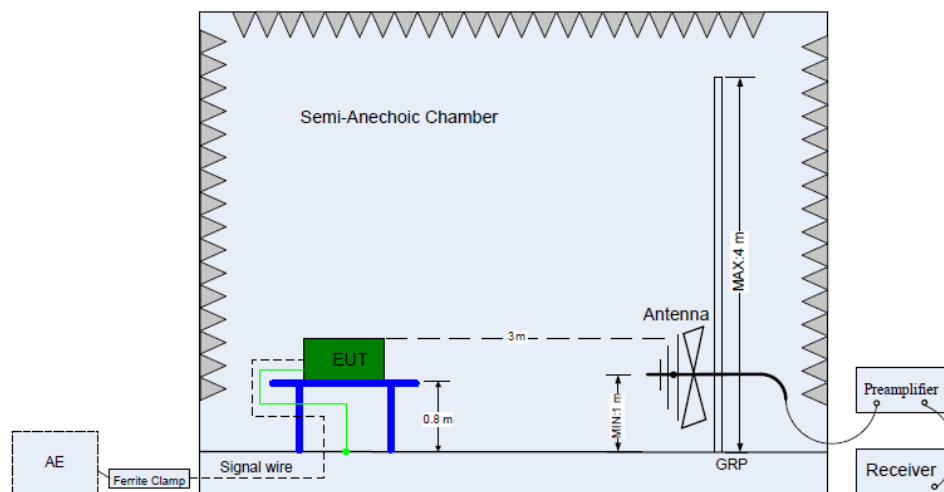
Test Setup 1: Radiated Emission test below 30MHz

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance is 3m. The setup is according to ANSI C63.4.



Test Setup 2: Radiated Emission test below 1GHz

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance is 3m. The setup is according to ANSI C63.4.



Limit:

Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

§ 15.209

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

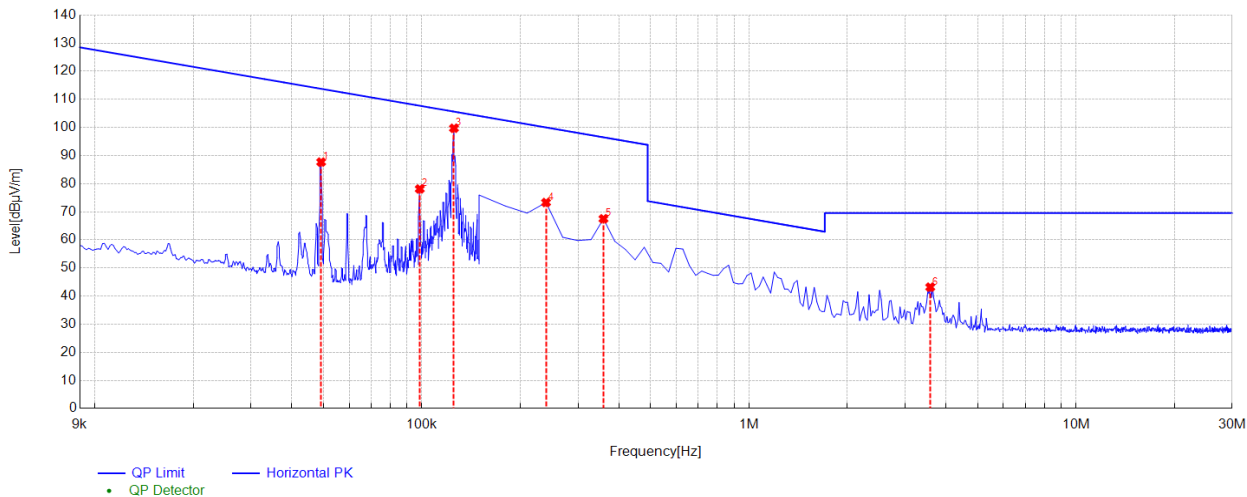
§15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

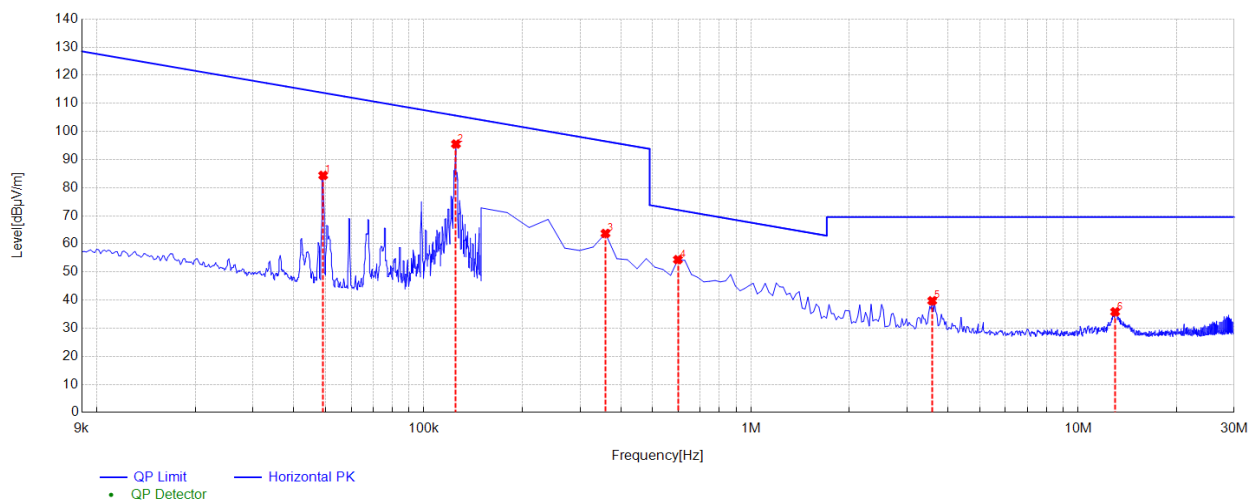
Remark:

- (1) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- (2) Data of measurement within this frequency range shown “--” in the table above means the reading of emissions are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss - Amplifier Gain.
- (4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss - Amplifier Gain.

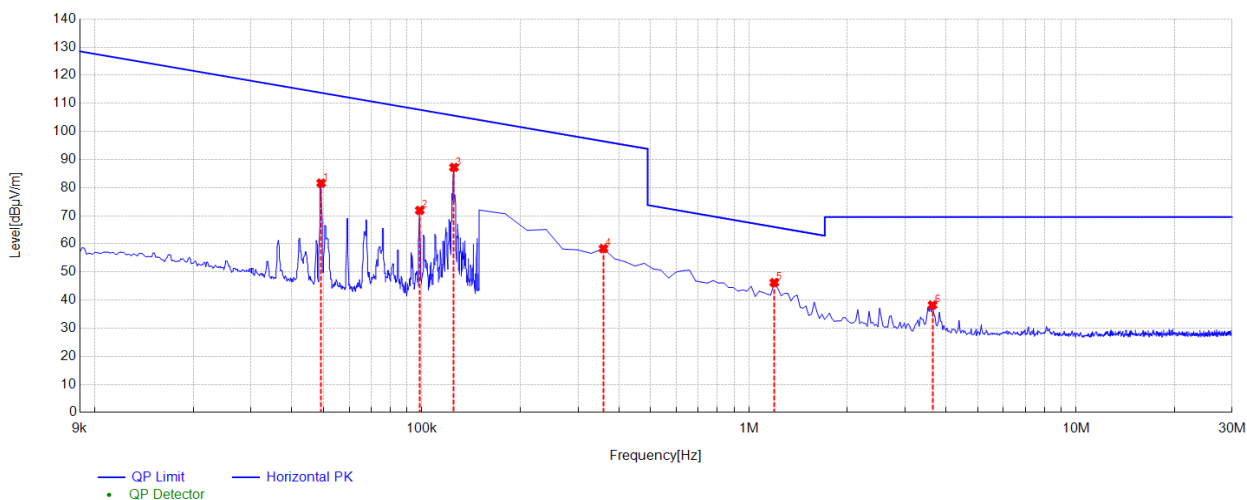
Spurious radiated emission 9KHz – 30MHz



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	0.0492	87.69	-10.80	113.76	26.07	100	32	X	PASS
2	0.0985	78.12	-10.36	107.72	29.60	100	34	X	PASS
3	0.1253	99.72	-10.39	105.64	5.92	100	98	X	PASS
4	0.2396	73.30	-10.36	100.01	26.71	100	281	X	PASS
5	0.3590	67.49	-10.35	96.50	29.01	100	276	X	PASS
6	3.5828	43.17	-9.93	69.50	26.33	100	13	X	PASS

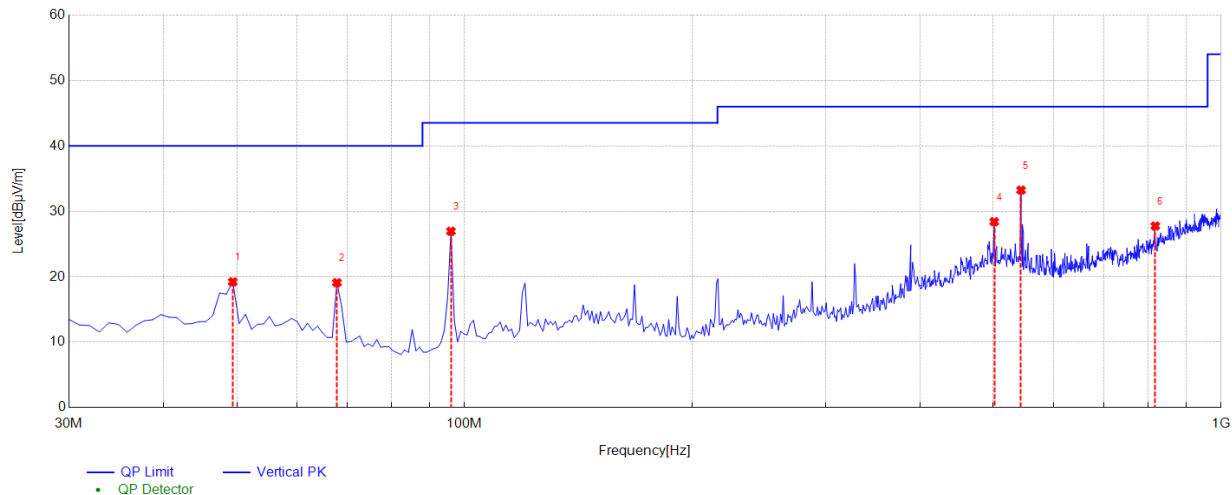


NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	0.0492	84.37	-10.80	113.76	29.39	100	328	Y	PASS
2	0.1253	95.53	-10.39	105.64	10.11	100	10	Y	PASS
3	0.3590	63.71	-10.35	96.50	32.79	100	9	Y	PASS
4	0.5978	54.40	-10.32	72.06	17.66	100	6	Y	PASS
5	3.5828	39.75	-9.93	69.50	29.75	100	313	Y	PASS
6	12.9855	35.82	-9.30	69.50	33.68	100	6	Y	PASS

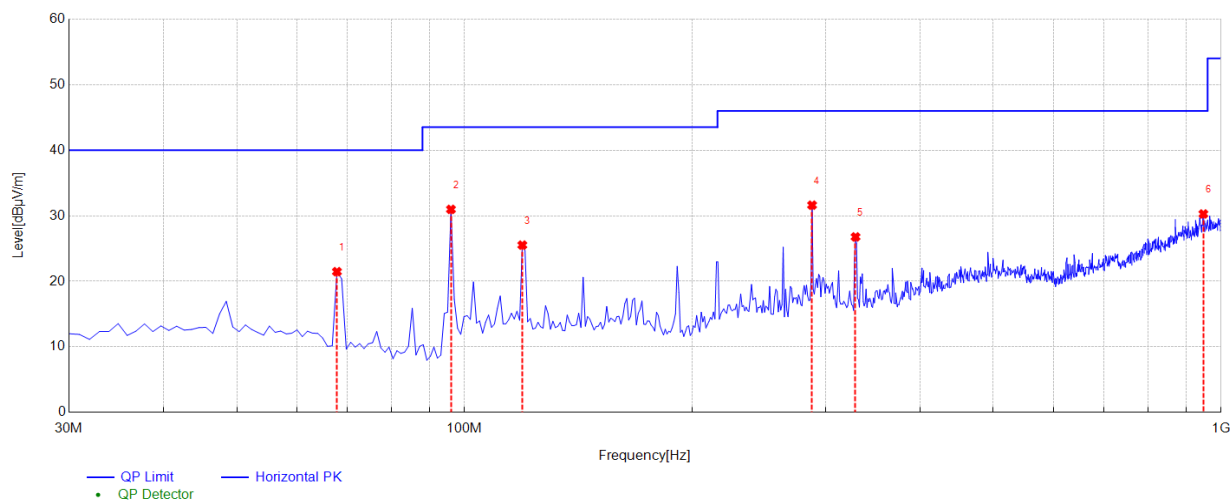


NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	0.0492	81.62	-10.80	113.76	32.14	100	27	Z	PASS
2	0.0985	71.93	-10.36	107.72	35.79	100	27	Z	PASS
3	0.1253	87.23	-10.39	105.64	18.41	100	87	Z	PASS
4	0.3590	58.32	-10.35	96.50	38.18	100	96	Z	PASS
5	1.1948	46.22	-10.14	66.01	19.79	100	354	Z	PASS
6	3.6424	38.23	-9.93	69.50	31.27	100	6	Z	PASS

Spurious radiated emission 30MHz – 1GHz



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	49.4000	19.23	-15.93	40.00	20.77	100	124	Vertical	PASS
2	67.8300	19.11	-18.10	40.00	20.89	100	249	Vertical	PASS
3	95.9600	26.96	-19.81	43.50	16.54	100	207	Vertical	PASS
4	501.420	28.41	-10.87	46.00	17.59	100	185	Vertical	PASS
5	544.100	33.24	-9.96	46.00	12.76	100	185	Vertical	PASS
6	818.610	27.76	-4.38	46.00	18.24	100	213	Vertical	PASS



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	67.8300	21.48	-18.10	40.00	18.52	100	170	Horizontal	PASS
2	95.9600	30.98	-19.81	43.50	12.52	100	142	Horizontal	PASS
3	119.240	25.53	-17.79	43.50	17.97	100	360	Horizontal	PASS
4	288.020	31.62	-16.01	46.00	14.38	100	256	Horizontal	PASS
5	328.760	26.78	-15.32	46.00	19.22	100	256	Horizontal	PASS
6	947.620	30.28	-1.54	46.00	15.72	100	274	Horizontal	PASS

END