



FCC Part 15C TEST REPORT

FCC ID:2AWA3-POLAR15MK2

Prepared for : Stamer Musikanlagen GmbH
Address : Magdeburger Str. 8, 66606 St Wendel, GERMANY

Trade Name : 

E.U.T : Sound Column Audio System
Model Number : POLAR 15 MK2

Prepared by : Keyway Testing Technology(Guangdong) Co., Ltd.
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Report No. : 2026062604078195-00
Date of Test: : Jun. 06, 2026 ~ Jun. 20, 2026
Date of Report : Jun. 26, 2026

Laboratory Address: Room 2102, Building 6, Dongyi Intelligent Equipment New Energy Vehicle Park, No.30 of Tangxia District, Dongshen Road, Tangxia Town, Dongguan, 523710, People's Republic of China

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Keyway Testing Technology (Guangdong) Co., Ltd.

Applicant:	Stamer Musikanlagen GmbH	
Address:	Magdeburger Str. 8, 66606 St Wendel, GERMANY	
Manufacturer:	Stamer Musikanlagen GmbH	
Address:	Magdeburger Str. 8, 66606 St Wendel, GERMANY	
E.U.T:	Sound Column Audio System	
Model Number:	POLAR 15 MK2	
Trade Name:		
Date of Receipt:	Jun. 05, 2026	
Date of Test:	Jun. 06, 2026 ~ Jun. 20, 2026	
Test Specification :	FCC CFR47 Part 15 Section 15.247 ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied. Issue Date: Jun. 26, 2026	
Tested by:	Reviewed by:	Authorized by:
		
Bear Xiong / Engineer	Billy Zeng / Supervisor	Cherry Chen / Manager
<i>Abbreviations: OK/P=passed fail/F=failed N/A=not applicable E.U.T=equipment under tested</i>		
<i>This device described above has been tested by Keyway, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report. This report shall not be reproduced except in full, without the written approval of Keyway, this document may be altered or revised by Keyway, personal only, and shall be noted in the revision of the document.</i>		

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1 Test Summary

Test Items	Test Requirement	Result
Radiated Spurious Emissions and Restricted Bandedge	15.205(a) 15.209 15.247(d)	PASS
Conducted Unwanted emissions and Band edge	15.247(d) 15.205(a)	PASS
Conduct Emission	15.207	PASS
20dB Bandwidth & 99% OCB	15.247(a)(1)	PASS
Maximum Peak Output Power	15.247(b)(1)	PASS
Frequency Separation	15.247(a)(1)	PASS
Number of Hopping Frequency	15.247(a)(1)(iii)	PASS
Dwell time	15.247(a)(1)(iii)	PASS
Antenna Requirement	FCC part 15.203/15.247 (c)	PASS

Remark:

1. "N/A" denotes test is not applicable in this Test Report.



2 TEST FACILITY

Lab Qualifications	: Certificated by CMA Registration No.: 202319016955 Date of registration: July 23, 2024 Certificated by CNAS Registration No.: CNAS L5783 Date of registration: March 07, 2025 Certificated by A2LA Certificate Number:7404.01 Valid To: March 31.2027 FCC Designation No.: CN1412 Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules. ISED (Company No.: 33959) The test lab Conformity Assessment Body Identifier (CABID) is CN0186 Certificated by VCCI Member No.3498 R-20091:966 Chamber 2 Below 1 G G-20227:966 Chamber 2 above 1 G C-20064:Conducted Emissions at Mains ports T-20120:Conducted Emissions at Wired network port Date of Valid until: Sept. 19, 2027 Certificated by Nemko Registration No.: ELA 814 Date of registration: September 25, 2024 Certificated by UL Registration No.: 100567237 Date of registration: September 25, 2024
Name of Firm	: Keyway Testing Technology(Guangdong) Co., Ltd.
Site Location	: Room 2102, Building 6, Dongyi Intelligent Equipment New Energy Vehicle Park, No.30 of Tangxia District, Dongshen Road, Tangxia Town, Dongguan, 523710, People's Republic of China

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China



3 General Information

3.1 General Description of E.U.T.

Product Name	:	Sound Column Audio System
Model Name	:	POLAR 15 MK2
Sample ID	:	33000275925
Sample(s) Status:	:	Engineer sample
Operating frequency	:	2402-2480MHz
Numbers of Channel	:	79 channels
Antenna Type	:	PCB Antenna
Antenna Gain	:	1.7dBi
Type of Modulation	:	GFSK, $\pi/4$ -DQPSK, 8DPSK
Power supply	:	100-240V~, 50-60 Hz, 0.8A
Model Difference	:	All models are available in white and black.
Hardware Version	:	N/A
Software Version	:	N/A
Remark: the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.		



3.2 Channel List

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

The EUT has been associated with peripherals pursuant to ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 KHz to the 10th harmonics of the highest fundamental frequency or to 40 GHz, whichever is lower).

The EUT has been tested under TX operating condition.

This EUT is a FHSS system, were conducted to determine the final configuration from all possible combinations. We use software control the EUT, Let EUT hopping on and transmit with highest power, all the modes GFSK, $\pi/4$ -DQPSK, 8DPSK have been tested. 79 Channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for test.

Channel List:

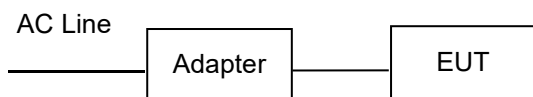
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	1	2403	2	2404	3	2405
4	2406	5	2407	6	2408	7	2409
8	2410	9	2411	10	2412	11	2413
12	2414	13	2415	14	2416	15	2417
16	2418	17	2419	18	2420	19	2421
20	2422	21	2423	22	2424	23	2425
24	2426	25	2427	26	2428	27	2429
28	2430	29	2431	30	2432	31	2433
32	2434	33	2435	34	2436	35	2437
36	2438	37	2439	38	2440	39	2441
40	2442	41	2443	42	2444	43	2445
44	2446	45	2447	46	2448	47	2449
48	2450	49	2451	50	2452	51	2453
52	2454	53	2455	54	2456	55	2457
56	2458	57	2459	58	2460	59	2461
60	2462	61	2463	62	2464	63	2465
64	2466	65	2467	66	2468	67	2469
68	2470	69	2471	70	2472	71	2473
72	2474	73	2475	74	2476	75	2477
76	2478	77	2479	78	2480	-	-



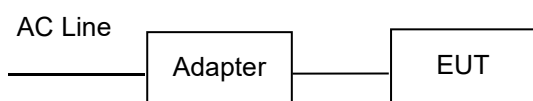
Channel	Frequency(MHz)
0	2402
39	2441
78	2480

3.3 Test Setup Configuration

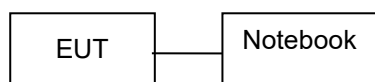
Conducted Emission



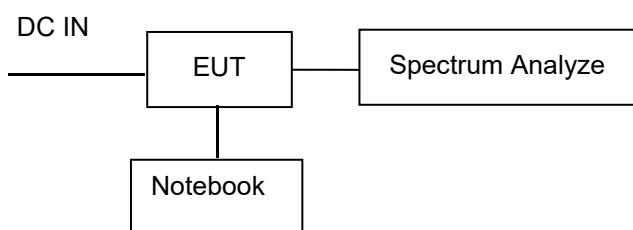
Radiated Emission (Below 1G)



Radiated Emission (Above 1G)



Conducted Spurious



3.4 Test Mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. For battery operated equipment, the equipment tests shall be performed using a new battery. So the report just shows that condition's data.	

Test Software	bt_tool_v1.1.2
Power level setup	≤10dBm



4 Equipment During Test

4.1 Equipments List

Equipment	Manufacturer	Model No.	Serial No.	Date of Cal.	Valid until
For conducted emission at the mains terminals and signal port test 744 Shielded Room					
Test Software	FARAD	EZ-EMC Ver.FARAD-3A1+	KWET-090	/	/
EMI Test Receiver	R&S	ESPI	101868	Apr 13, 26	Apr 12, 27
ArtificialMains Network	PMM	PMM L3-64	1102220306	Apr 13, 26	Apr 12, 27
Pulse limiter	Schwarzbeck	ESH3-Z2	102696	Apr 13, 26	Apr 12, 27
RF Cable	Junkosha	MWX322-2m	1305G008	Apr 13, 26	Apr 12, 27
For radiated emission test (Below 1GHz)966 Chamber 2					
Test Software	FARAD	EZ-EMC Ver.FARAD-3A1+	KWET-087	/	/
EMI Test Receiver	R&S	ESCI	101178	Apr 14, 26	Apr 13, 27
TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	1991	Apr 19, 26	Apr 18, 27
3m Semi-anechoic Chamber	YIHENDIANZI	966	YH-KW-966-02	Mar 08, 26	Mar 07, 27
RF Cable	EMC Instruments	EMCCFD400-NM-NM-2000	240307	Apr 14, 26	Apr 13, 27
RF Cable	EMC Instruments	EMCCFD400-NM-NM-9000	240309	Apr 14, 26	Apr 13, 27
For radiated emission test (Above 1GHz)966 Chamber 2					
Test Software	FARAD	EZ-EMC Ver.FARAD-3A1+	KWET-087	/	/
EMI Test Receiver	R&S	ESCI	101178	Apr 14, 26	Apr 13, 27
Spectrum Analyzer	Agilent	N9020A	MY56070279	Apr 13, 26	Apr 12, 27

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Spectrum Analyzer	Agilent	N9020A	MY56070279	Apr 13, 26	Apr 12, 27
Horn Antenna	DAZE	ZN30701	11003	Apr 19, 26	Apr 18, 27
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	1368	Apr 19, 26	Apr 18, 27
LNA	WCS Technology	DLNA-18000-40000	231031	Apr 23, 26	Apr 22, 27
3m anechoic Chamber	YIHENDIANZI	966	YH-KW-966-02	Mar 09, 26	Mar 08, 26
RF Cable(1G-18GHz)	EMC Instruments	EMC105-SM-SM-1000	240301	Apr 14, 26	Apr 13, 27
RF Cable(1G-18GHz)	EMC Instruments	EMC105-SM-SM-2000	240302	Apr 14, 26	Apr 13, 27
RF Cable(1G-18GHz)	EMC Instruments	EMC105-SM-SM-9000	240303	Apr 14, 26	Apr 13, 27
RF Cable(18G-40GHz)	WCS Technology	CA360P-29M29M-1M	W2415130001	Apr 13, 26	Apr 12, 27
RF Cable(18G-40GHz)	WCS Technology	CA360P-29M29M-2M	W2415120001	Apr 13, 26	Apr 12, 27
Band-stop filter	QUANCE	2390MHz-2500MHz	KWET-074	May 15, 27	May 14, 27
For conducted emission test (RF)					
MXA Signal Analyzer	Agilent	N9020A	MY56070279	Apr 13, 26	Apr 12, 27
RF SWITCH BOX	CSKJ	SMU-1003	/	Apr 14, 26	Apr 13, 27
Pulse limiter	Schwarzbeck	ESH3-Z2	102696	Apr 13, 26	Apr 12, 27
RF sma cable	Keysight	MIL-C-17F	0332	Apr 14, 26	Apr 13, 27
RF sma cable	Keysight	MIL-C-17F	0330	Apr 14, 26	Apr 13, 27
RF sma cable	Keysight	MIL-C-17F	0331	Apr 14, 26	Apr 13, 27
RF sma cable	Keysight	MIL-C-17F	0329	Apr 14, 26	Apr 13, 27
Coupler	Keysight	ZHDC-10-63-S+	SF331801603	Apr 15, 26	Apr 14, 27
Test Software (BT/WIFI)	CSKJ	RED-WCN-Regulatoty Protocol	KWET-149	/	/



4.2 Measurement Uncertainty

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

Parameter	Uncertainty
RF output power, conducted	$\pm 1.0\text{dB}$
Power Spectral Density, conducted	$\pm 2.2\text{dB}$
Radio Frequency	$\pm 1 \times 10^{-6}$
Bandwidth	$\pm 1.5 \times 10^{-6}$
Duty Cycle	$\pm 2\%$
Spurious emissions, conducted	$\pm 0.21\text{dB}$
Temperature	$\pm 1^\circ\text{C}$
Humidity	$\pm 5\%$
DC and low frequency voltages	$\pm 3\%$
Conducted Emissions (150kHz~30MHz)	$\pm 3.64\text{dB}$
Radiated Emission(9KHz~30MHz)	$\pm 4.51\text{dB}$
Radiated Emission(30MHz~1GHz)	$\pm 5.03\text{dB}$
Radiated Emission(1GHz~25GHz)	$\pm 4.74\text{dB}$
Radiated Emission(25GHz~40GHz)	$\pm 3.38\text{dB}$



4.3 Description of 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Sound Column Audio System		POLAR 15 MK2	N/A	EUT
E-2	Notebook	lenovo	B40-80	MP07F6JD	AE

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.

5 Conducted Emission

Test Requirement:	: FCC CFR 47 Part 15 Section 15.207
Test Method:	: ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
Test Result:	: PASS
Frequency Range:	: 150kHz to 30MHz
Class/Severity:	: Class B
Detector:	: Peak for pre-scan (9kHz Resolution Bandwidth)

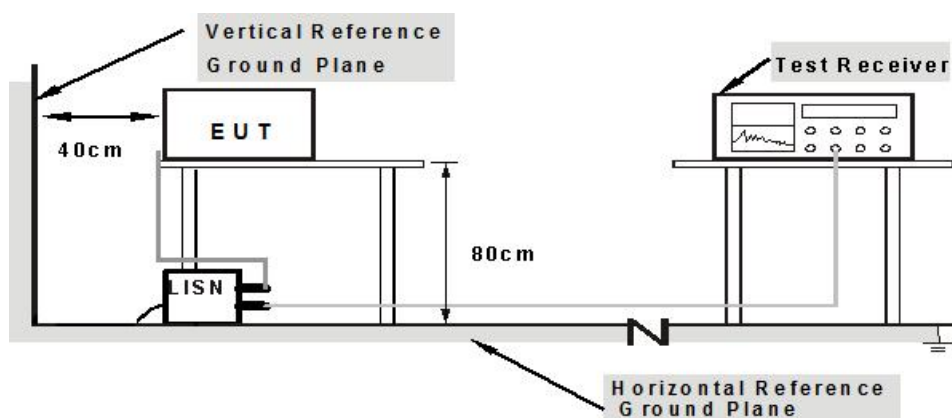
5.1 E.U.T. Operation

Operating Environment :

Temperature:	: 23.5°C
Humidity:	: 54 % RH
Atmospheric Pressure:	: 101.12 kPa
Test Voltage	: AC 120V/60Hz

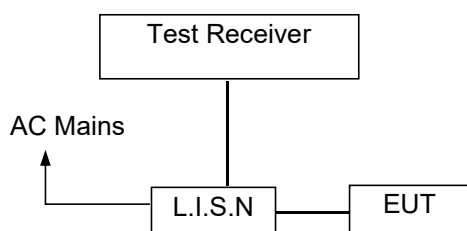
5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

5.3 Test SET-UP (Block Diagram of Configuration)



5.4 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

5.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.6 Measurement Description

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

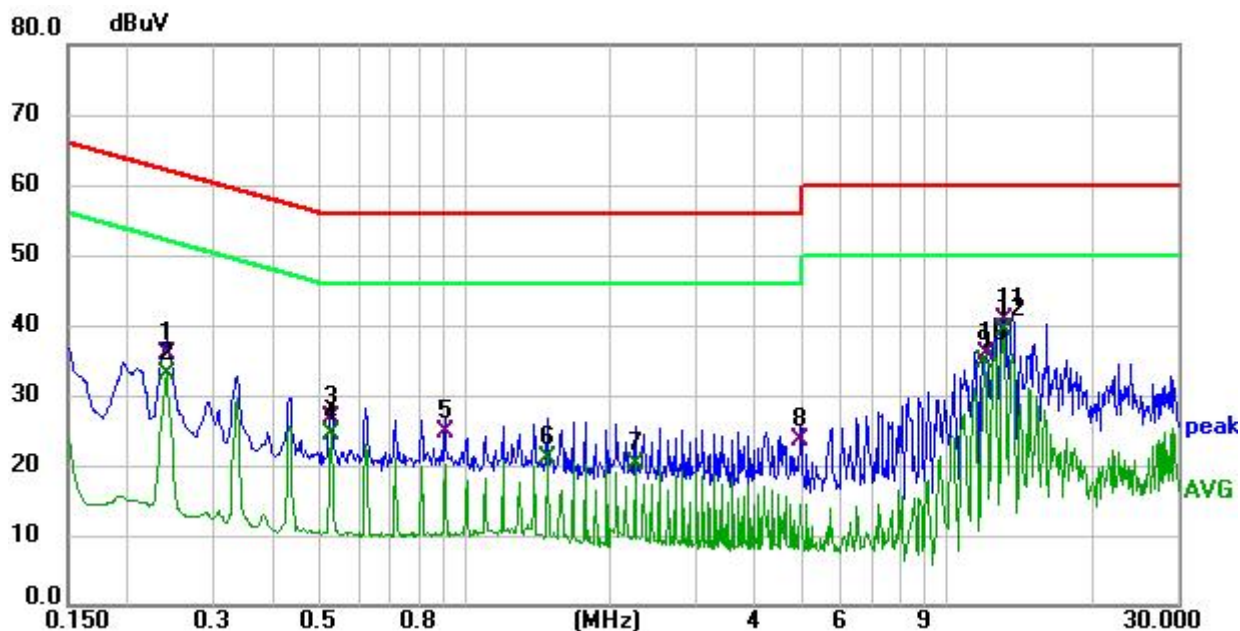
5.7 Conducted Emission Test Result

Pass

Conducted emission at both 120V & 240V is assessed, and emission at 120V represents the worst case. All the modulation modes were tested the data of the worst mode (8DPSK) are recorded in the following pages and the others modulation methods do not exceed the limits.



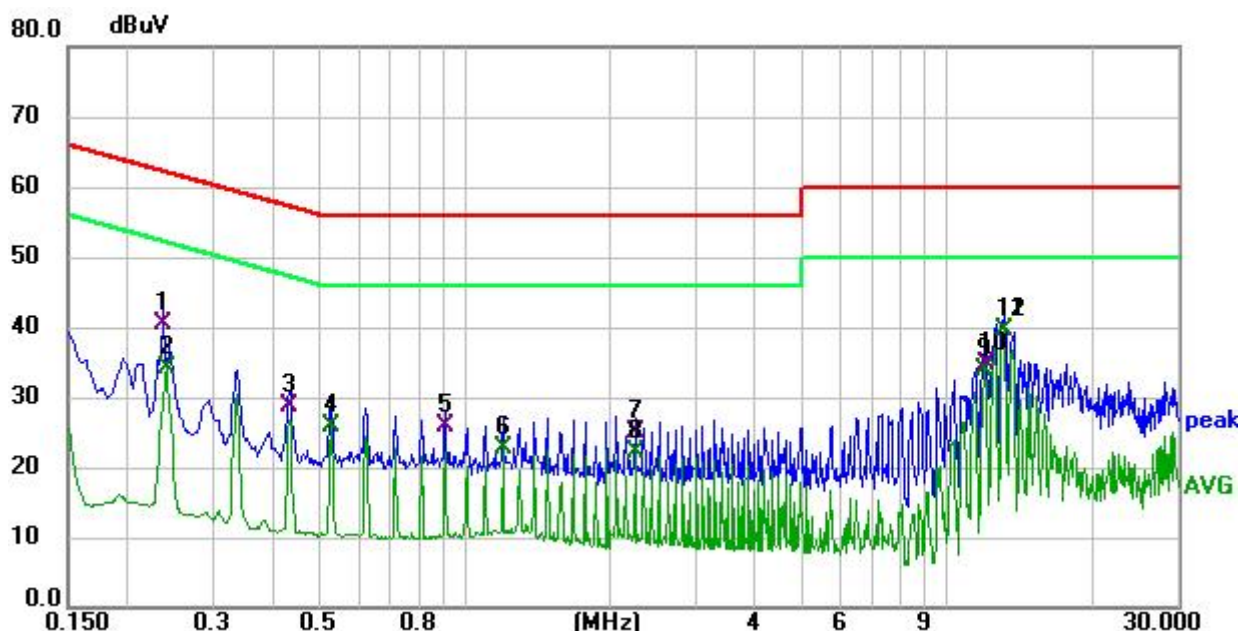
Channel:	High	Phase :	L
Model:	POLAR 15 MK2		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.240	24.19	11.53	35.72	62.10	-26.38	QP	P	
2	0.240	21.45	11.53	32.98	52.10	-19.12	AVG	P	
3	0.528	15.24	11.53	26.77	56.00	-29.23	QP	P	
4	0.528	12.92	11.53	24.45	46.00	-21.55	AVG	P	
5	0.910	13.11	11.54	24.65	56.00	-31.35	QP	P	
6	1.486	9.36	11.54	20.90	46.00	-25.10	AVG	P	
7	2.251	8.50	11.55	20.05	46.00	-25.95	AVG	P	
8	4.978	11.99	11.58	23.57	56.00	-32.43	QP	P	
9	11.975	22.95	11.72	34.67	50.00	-15.33	AVG	P	
10	12.025	24.19	11.72	35.91	60.00	-24.09	QP	P	
11	13.075	28.82	11.76	40.58	60.00	-19.42	QP	P	
12 *	13.075	27.57	11.76	39.33	50.00	-10.67	AVG	P	



Channel:	High	Phase :	N
Model:	POLAR 15 MK2		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.235	28.91	11.52	40.43	62.27	-21.84	QP	P	
2	0.240	22.49	11.52	34.01	52.10	-18.09	AVG	P	
3	0.433	17.27	11.52	28.79	57.19	-28.40	QP	P	
4	0.528	14.28	11.52	25.80	46.00	-20.20	AVG	P	
5	0.910	14.25	11.53	25.78	56.00	-30.22	QP	P	
6	1.198	11.20	11.53	22.73	46.00	-23.27	AVG	P	
7	2.251	13.56	11.54	25.10	56.00	-30.90	QP	P	
8	2.251	10.60	11.54	22.14	46.00	-23.86	AVG	P	
9	11.925	22.29	11.71	34.00	50.00	-16.00	AVG	P	
10	12.025	23.13	11.72	34.85	60.00	-25.15	QP	P	
11	13.075	27.84	11.76	39.60	60.00	-20.40	QP	P	
12 *	13.075	27.71	11.76	39.47	50.00	-10.53	AVG	P	

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor



6 Radiated Spurious Emissions

Test Requirement : FCC CFR47 Part 15 Section 15.209 & 15.247
 Test Method : ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
 Test Result : PASS
 Measurement Distance : 3m
 Limit : See the follow table

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

6.1 EUT Operation

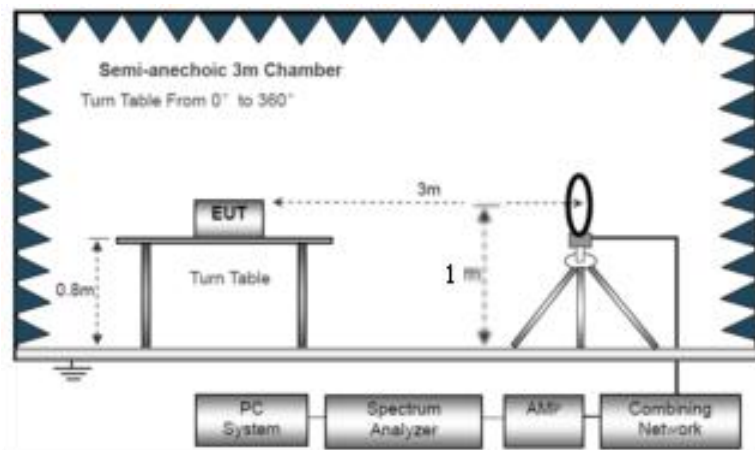
Operating Environment :

Temperature : 26 °C
 Humidity : 54% RH
 Atmospheric Pressure : 101.3kPa
 Test Voltage : AC 120V60Hz

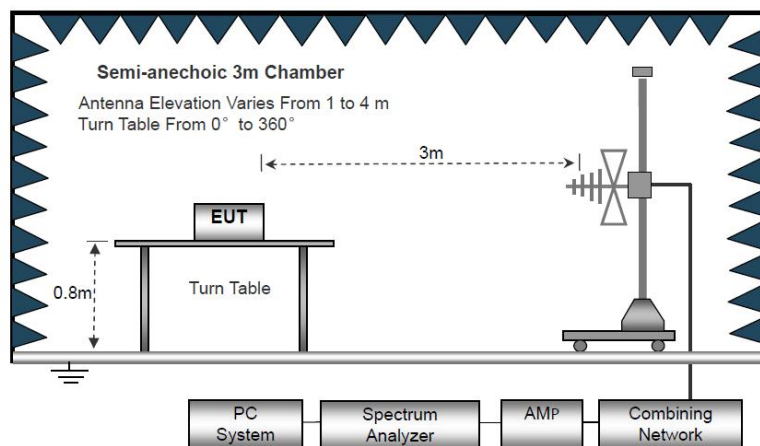
6.2 Test Setup

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

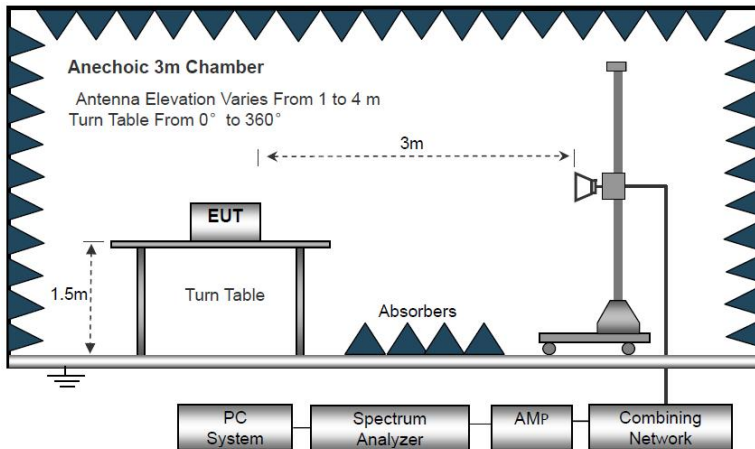
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



6.3 Spectrum Analyzer Setup

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

6.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024.
2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 0.8mm above ground plane.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.



4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.
7. Test Procedure of measurement (For Above 1GHz):
 - 1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).
 - 2) Change the antenna polarization and repeat 1) with vertical polarization.
 - 3) Make a hardcopy of the spectrum.
 - 4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
 - 5) Change the analyser mode to Clear/ Write and found the cone of emission.
 - 6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.
 - 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.
 - 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.
8. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.



6.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq.	Ant.Pol.	Emission Level	Limit 3m	Over
(MHz)	H/V	(dBuV/m)	(dBuV/m)	(dB)
--	--	--	--	>20

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

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

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

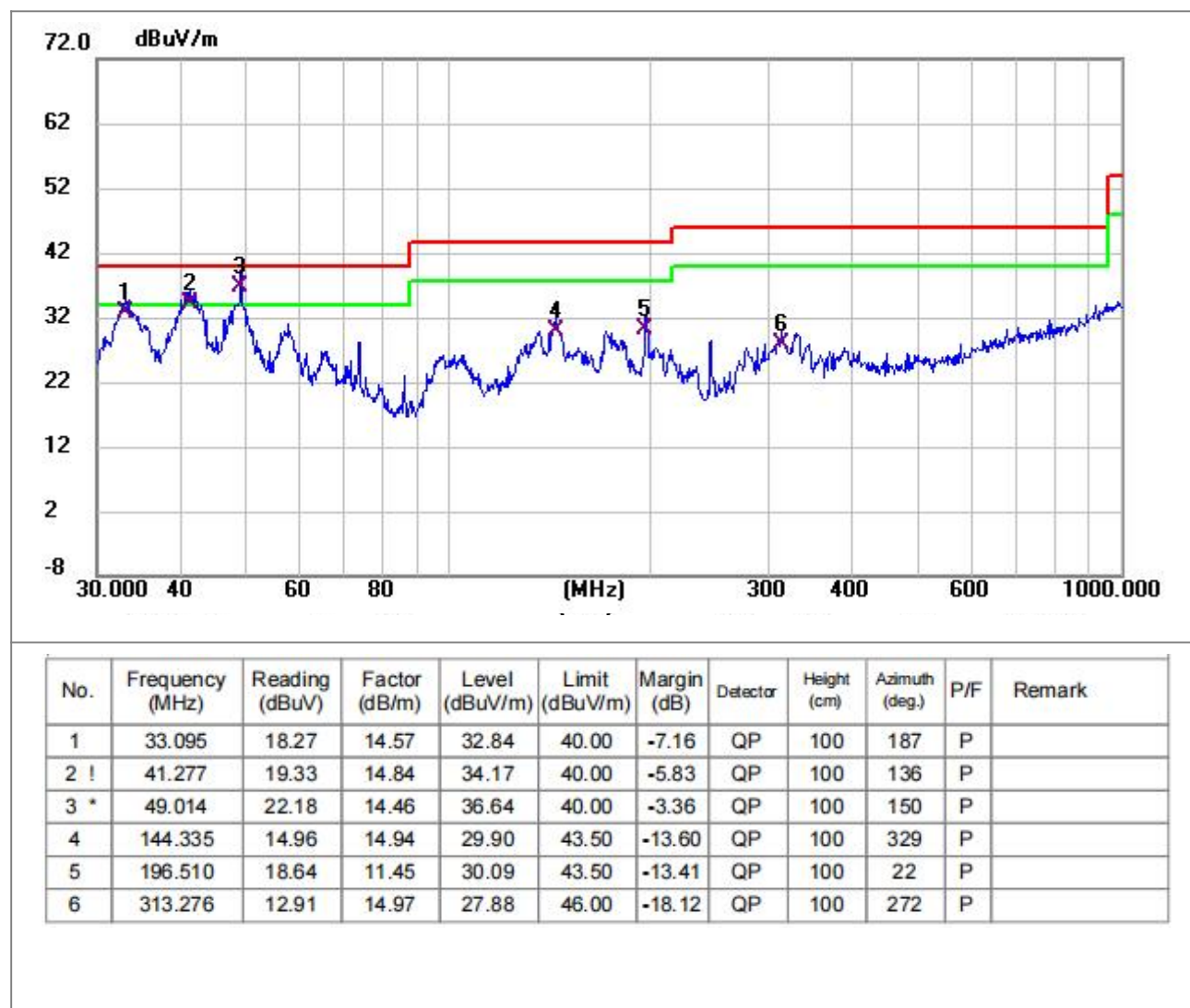
Test Frequency: 30MHz ~ 1GHz

Please refer to the following test plots, High Channel (2480MHz) Worst case 8DPSK for record:



Model:	POLAR 15 MK2
--------	--------------

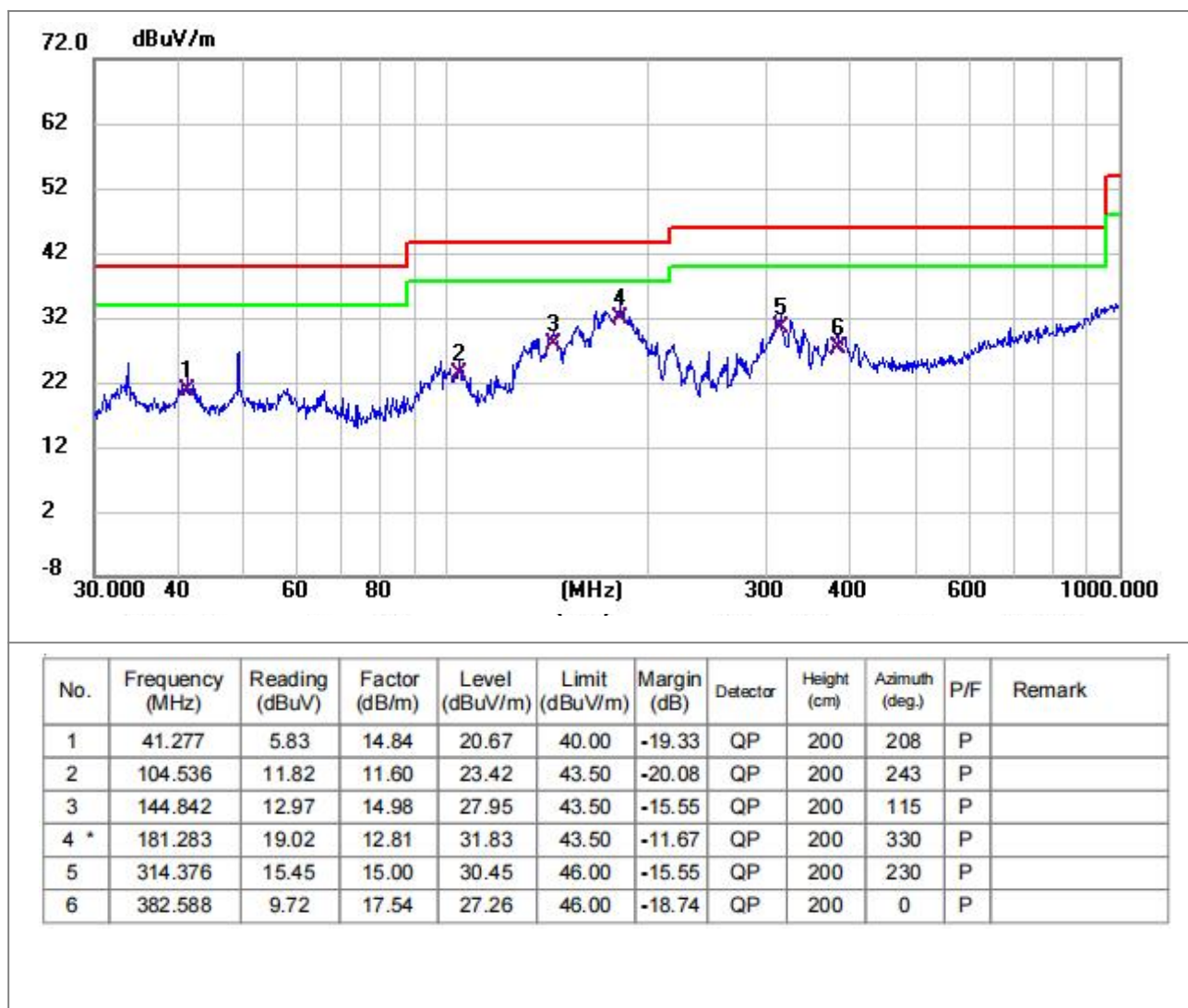
Test plot for Vertical



Remark:Emission Level=Reading+ Factor

Model: POLAR 15 MK2

Test plot for Horizontal



Remark:Emission Level=Reading+Factor



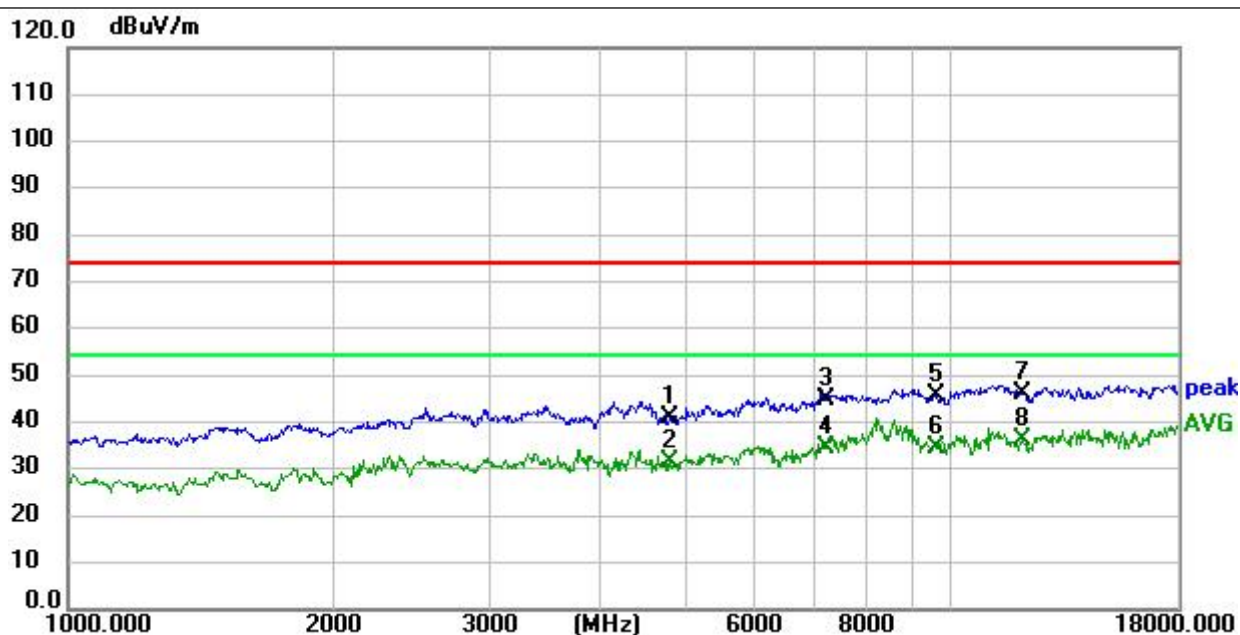
Test Frequency 1GHz-25GHz

Bluetooth (GFSK, $\pi/4$ -DQPSK, 8DPSK) mode have been tested, and the worst result (GFSK) was reported as below
M/N : POLAR 15 MK2

Operation Mode : TX GFSK Low Channel

Test Voltage : AC 120V/60Hz

Test Specification : Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4804.000	45.95	-4.95	41.00	74.00	-33.00	peak
2	4804.000	36.38	-4.95	31.43	54.00	-22.57	AVG
3	7206.000	44.58	0.24	44.82	74.00	-29.18	peak
4	7206.000	34.44	0.24	34.68	54.00	-19.32	AVG
5	9608.000	43.67	2.10	45.77	74.00	-28.23	peak
6	9608.000	32.36	2.10	34.46	54.00	-19.54	AVG
7	12010.000	42.26	3.87	46.13	74.00	-27.87	peak
8 *	12010.000	32.25	3.87	36.12	54.00	-17.88	AVG

Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamplifier Factor

Laboratory Address: Room 2102, Building 6, Dongyi Intelligent Equipment New Energy Vehicle Park, No.30 of Tangxia District, Dongshen Road, Tangxia Town, Dongguan, 523710, People's Republic of China

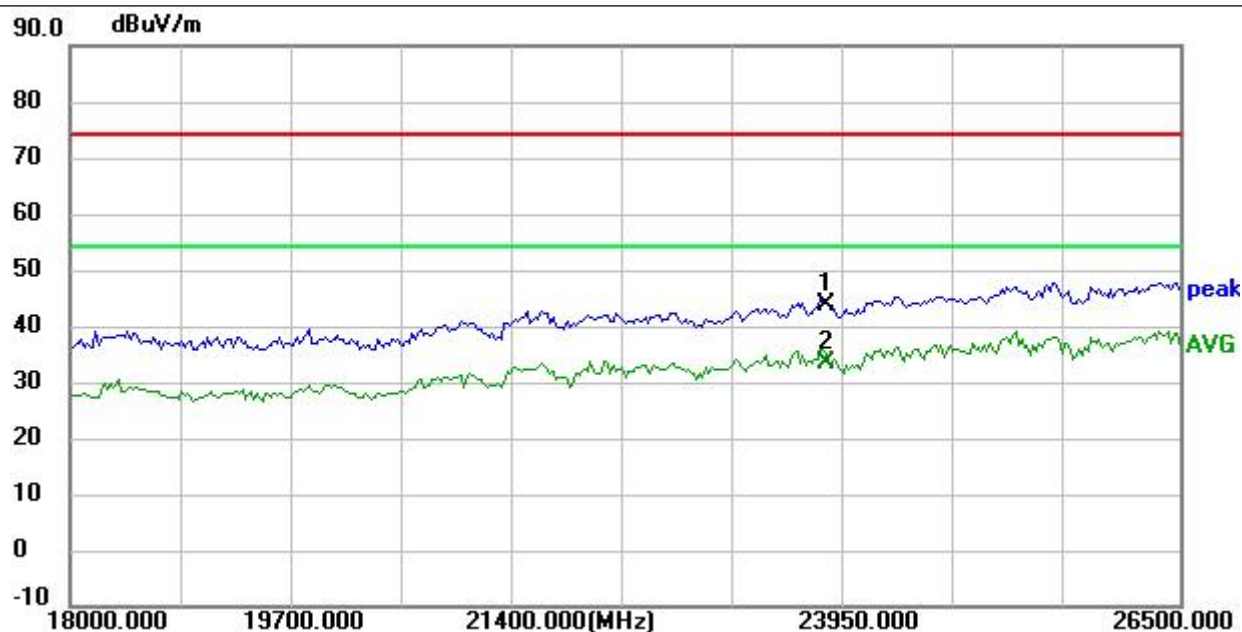
Tel: 0769-87182258

E-mail: kwtest@keywaytest.com

https: www.keywaytest.com



M/N : POLAR 15 MK2
Operation Mode : TX GFSK Low Channel
Test Voltage : AC 120V/60Hz
Test Specification : Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	23813.470	35.73	8.01	43.74	74.00	-30.26	peak
2 *	23813.470	25.43	8.01	33.44	54.00	-20.56	AVG

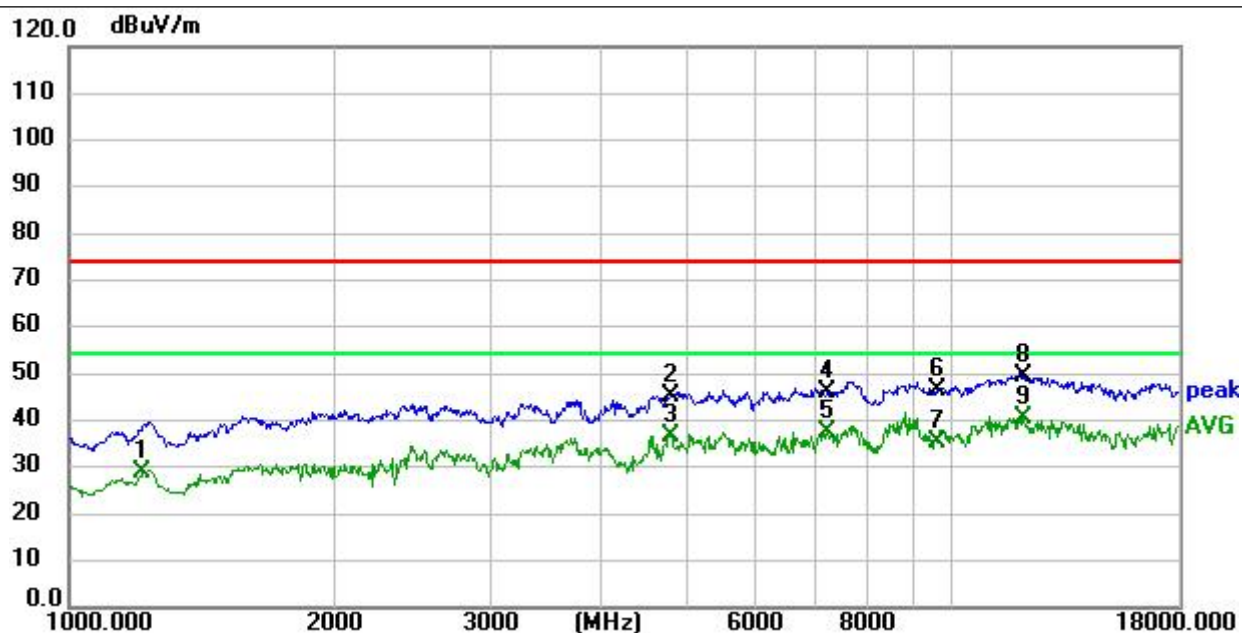
Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamplifier Factor



M/N : POLAR 15 MK2
Operation Mode : TX GFSK Low Channel
Test Voltage : AC 120V/60Hz
Test Specification : Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4804.000	50.32	-4.95	45.37	74.00	-28.63	peak
2	4804.000	41.40	-4.95	36.45	54.00	-17.55	AVG
3	7206.000	45.63	0.24	45.87	74.00	-28.13	peak
4	7206.000	37.09	0.24	37.33	54.00	-16.67	AVG
5	9608.000	44.42	2.10	46.52	74.00	-27.48	peak
6	9608.000	33.45	2.10	35.55	54.00	-18.45	AVG
7	12010.000	45.56	3.87	49.43	74.00	-24.57	peak
8 *	12010.000	36.68	3.87	40.55	54.00	-13.45	AVG

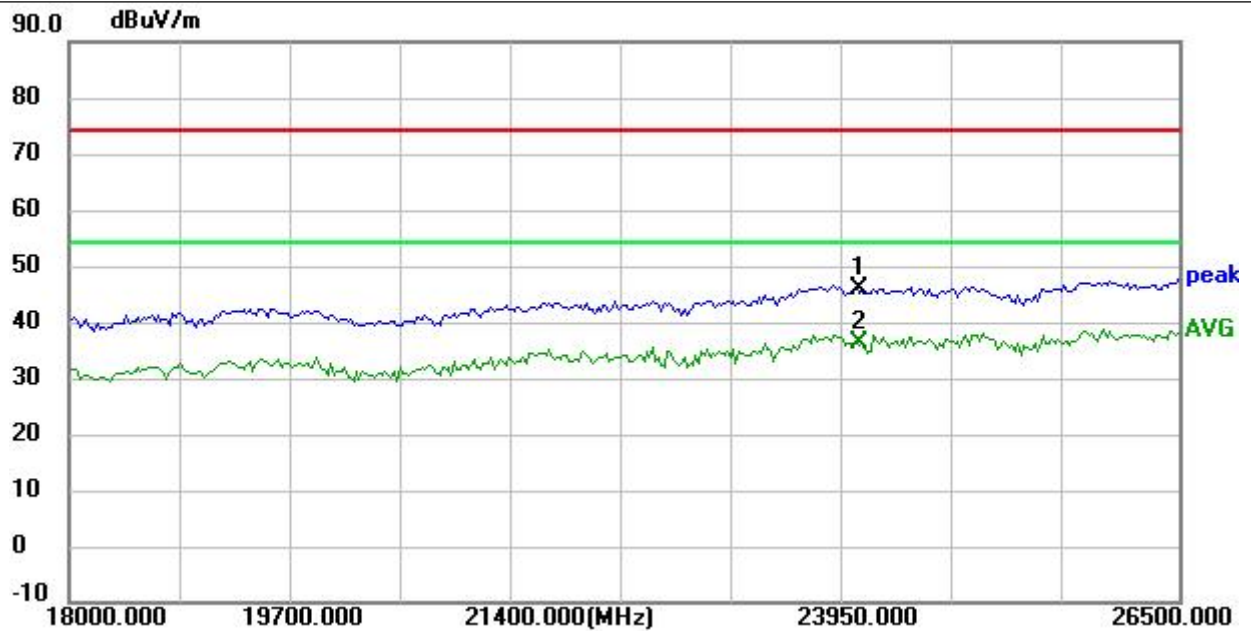
Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamplifier Factor



M/N : POLAR 15 MK2
Operation Mode : TX GFSK Low Channel
Test Voltage : AC 120V/60Hz
Test Specification : Vertical



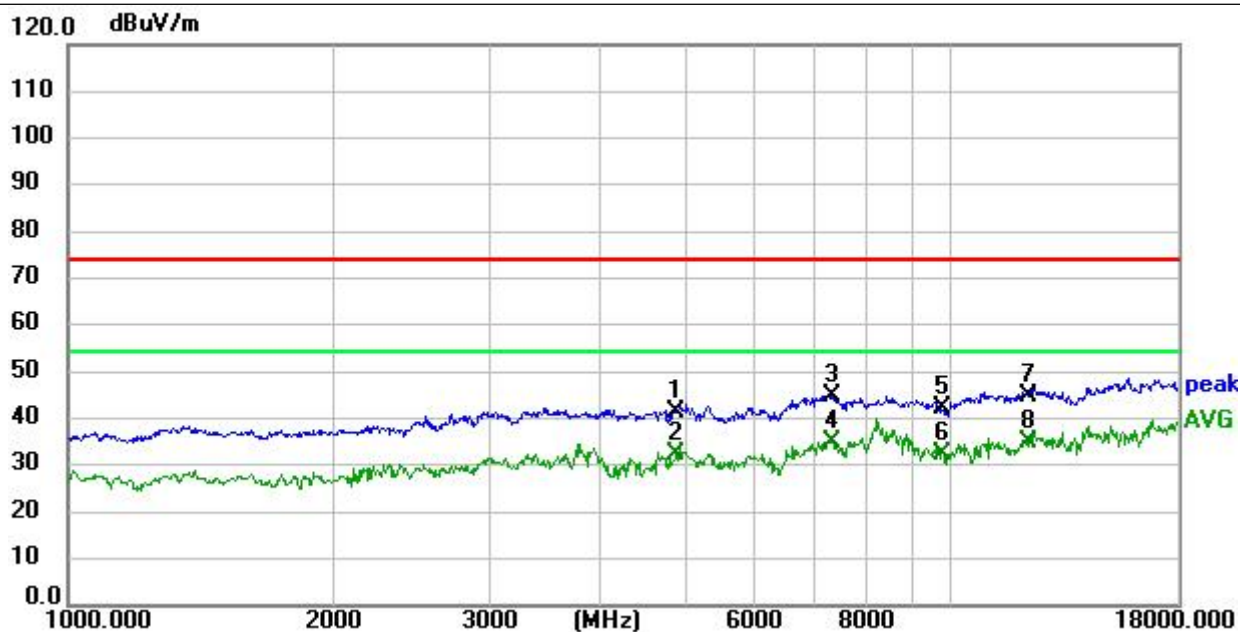
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	24077.000	37.28	8.61	45.89	74.00	-28.11	peak
2 *	24077.000	27.68	8.61	36.29	54.00	-17.71	AVG

Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamp Factor

M/N : POLAR 15 MK2
Operation Mode : TX GFSK Middle Channel
Test Voltage : AC 120V/60Hz
Test Specification : Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4882.000	46.01	-4.69	41.32	74.00	-32.68	peak
2	4882.000	37.12	-4.69	32.43	54.00	-21.57	AVG
3	7323.000	44.12	0.51	44.63	74.00	-29.37	peak
4 *	7323.000	34.58	0.51	35.09	54.00	-18.91	AVG
5	9764.000	40.32	1.76	42.08	74.00	-31.92	peak
6	9764.000	30.66	1.76	32.42	54.00	-21.58	AVG
7	12205.000	40.28	4.64	44.92	74.00	-29.08	peak
8	12205.000	30.40	4.64	35.04	54.00	-18.96	AVG

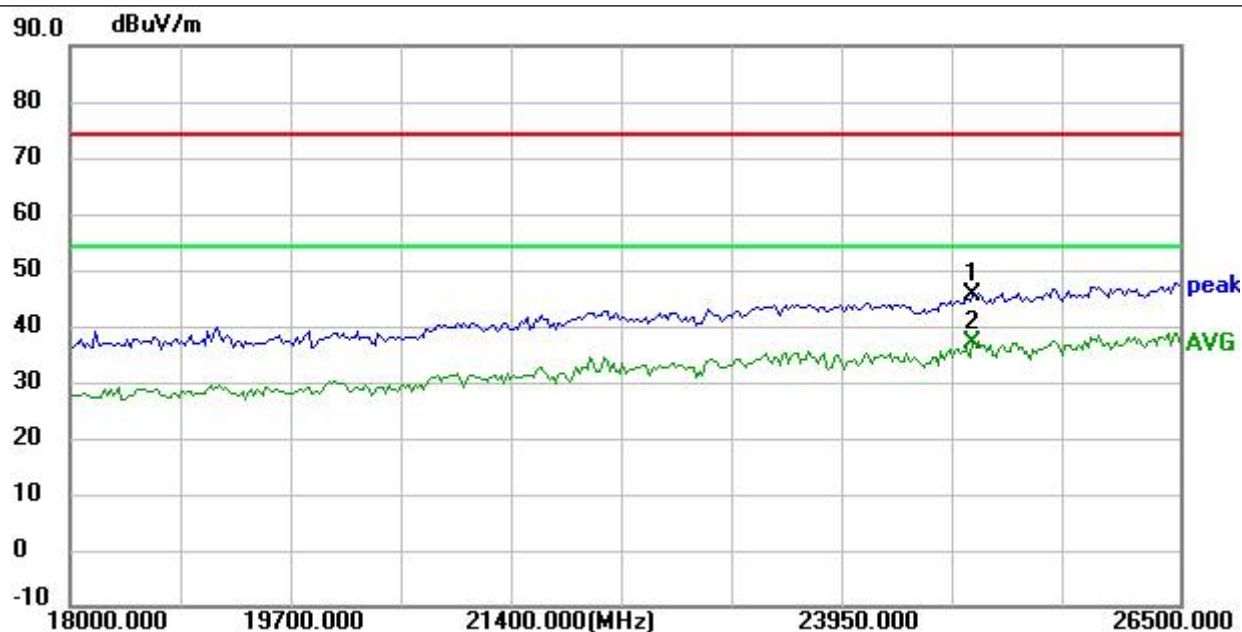
Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamplifier Factor



M/N : POLAR 15 MK2
Operation Mode : TX GFSK Middle Channel
Test Voltage : AC 120V/60Hz
Test Specification : Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	24936.000	35.73	9.97	45.70	74.00	-28.30	peak
2 *	24936.000	26.83	9.97	36.80	54.00	-17.20	AVG

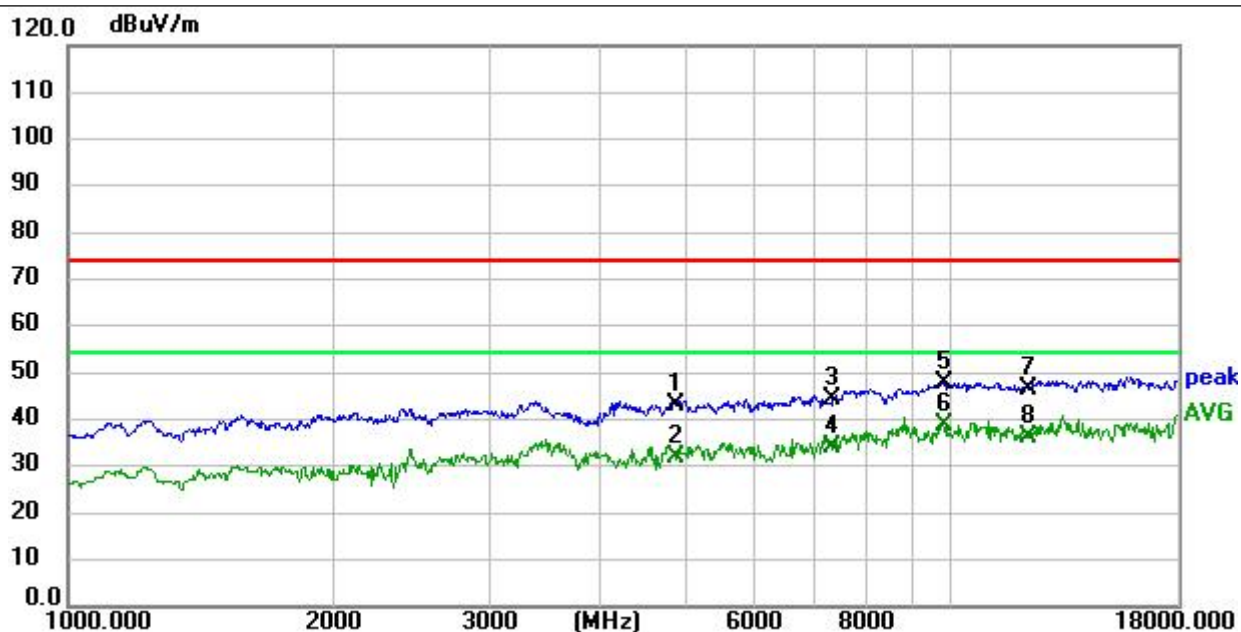
Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamplifier Factor



M/N : POLAR 15 MK2
Operation Mode : TX GFSK Middle Channel
Test Voltage : AC 120V/60Hz
Test Specification : Vertical



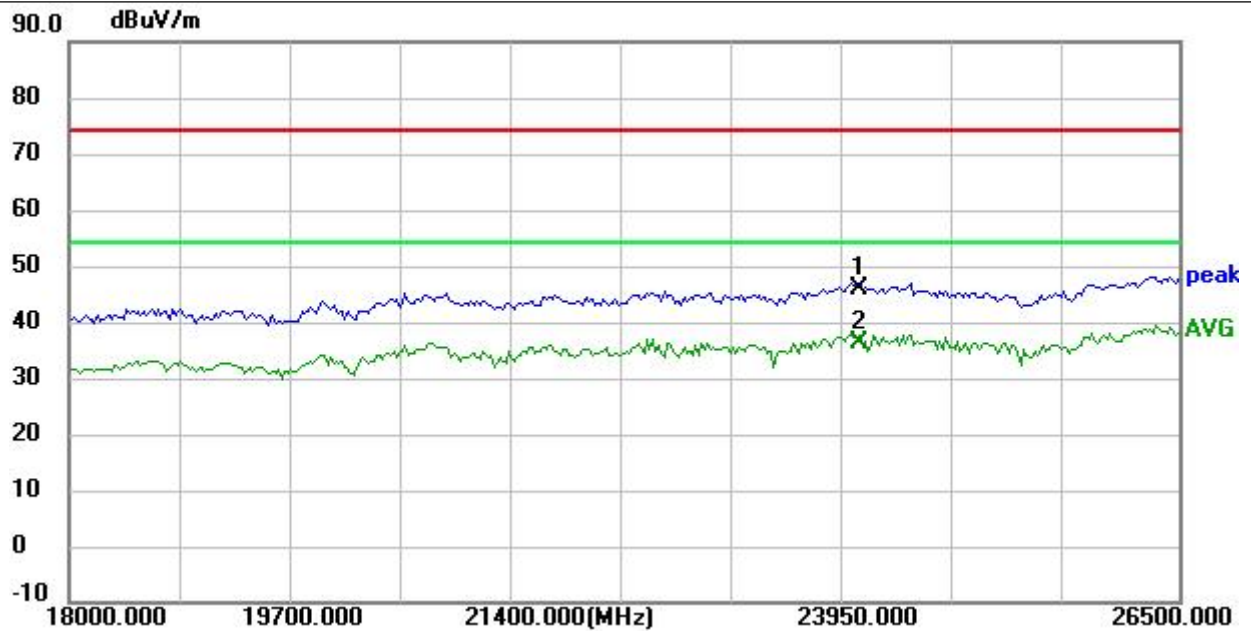
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4880.000	47.82	-4.69	43.13	74.00	-30.87	peak
2	4880.000	36.54	-4.69	31.85	54.00	-22.15	AVG
3	7323.000	43.93	0.51	44.44	74.00	-29.56	peak
4	7323.000	33.56	0.51	34.07	54.00	-19.93	AVG
5	9764.000	46.19	1.76	47.95	74.00	-26.05	peak
6 *	9764.000	36.93	1.76	38.69	54.00	-15.31	AVG
7	12205.000	42.00	4.64	46.64	74.00	-27.36	peak
8	12205.000	31.47	4.64	36.11	54.00	-17.89	AVG

Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamplifier Factor

M/N : POLAR 15 MK2
 Operation Mode : TX GFSK Middle Channel
 Test Voltage : AC 120V/60Hz
 Test Specification : Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	24077.000	37.28	8.61	45.89	74.00	-28.11	peak
2 *	24077.000	27.68	8.61	36.29	54.00	-17.71	AVG

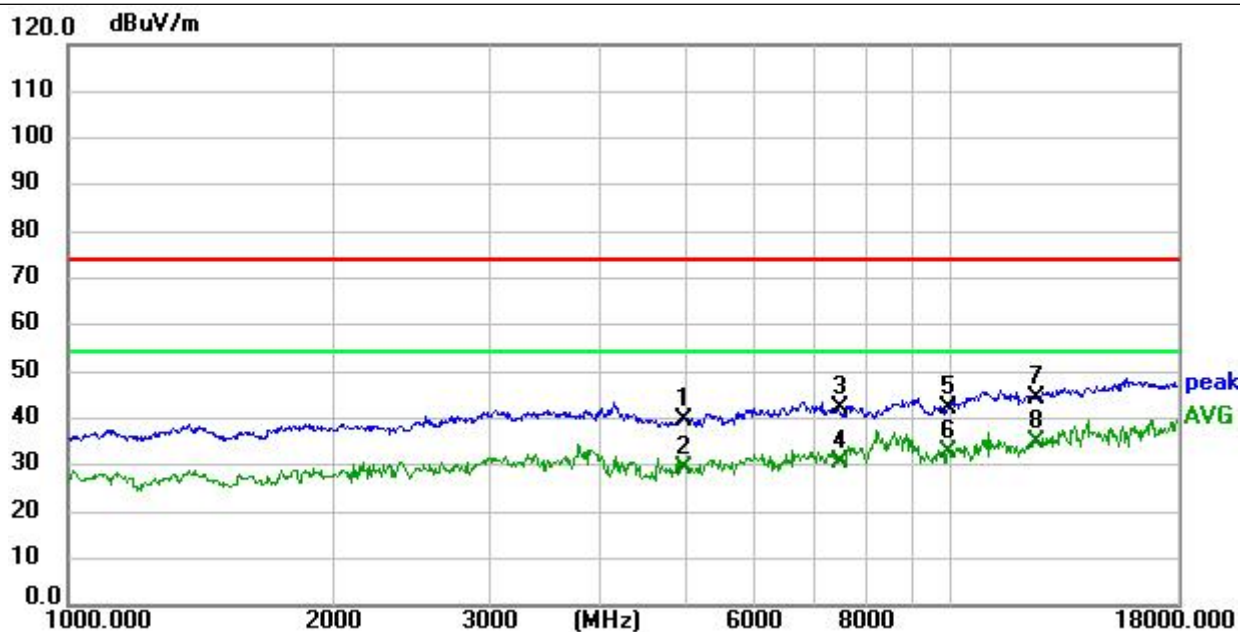
Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamp Factor



M/N : POLAR 15 MK2
Operation Mode : TX GFSK High Channel
Test Voltage : AC 120V/60Hz
Test Specification : Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4960.000	44.72	-5.15	39.57	74.00	-34.43	peak
2	4960.000	34.72	-5.15	29.57	54.00	-24.43	AVG
3	7440.000	41.15	0.88	42.03	74.00	-31.97	peak
4	7440.000	29.82	0.88	30.70	54.00	-23.30	AVG
5	9920.000	40.45	1.95	42.40	74.00	-31.60	peak
6	9920.000	30.75	1.95	32.70	54.00	-21.30	AVG
7	12400.000	39.92	4.47	44.39	74.00	-29.61	peak
8 *	12400.000	30.49	4.47	34.96	54.00	-19.04	AVG

Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamplifier Factor

Laboratory Address: Room 2102, Building 6, Dongyi Intelligent Equipment New Energy Vehicle Park, No.30 of Tangxia District, Dongshen Road, Tangxia Town, Dongguan, 523710, People's Republic of China

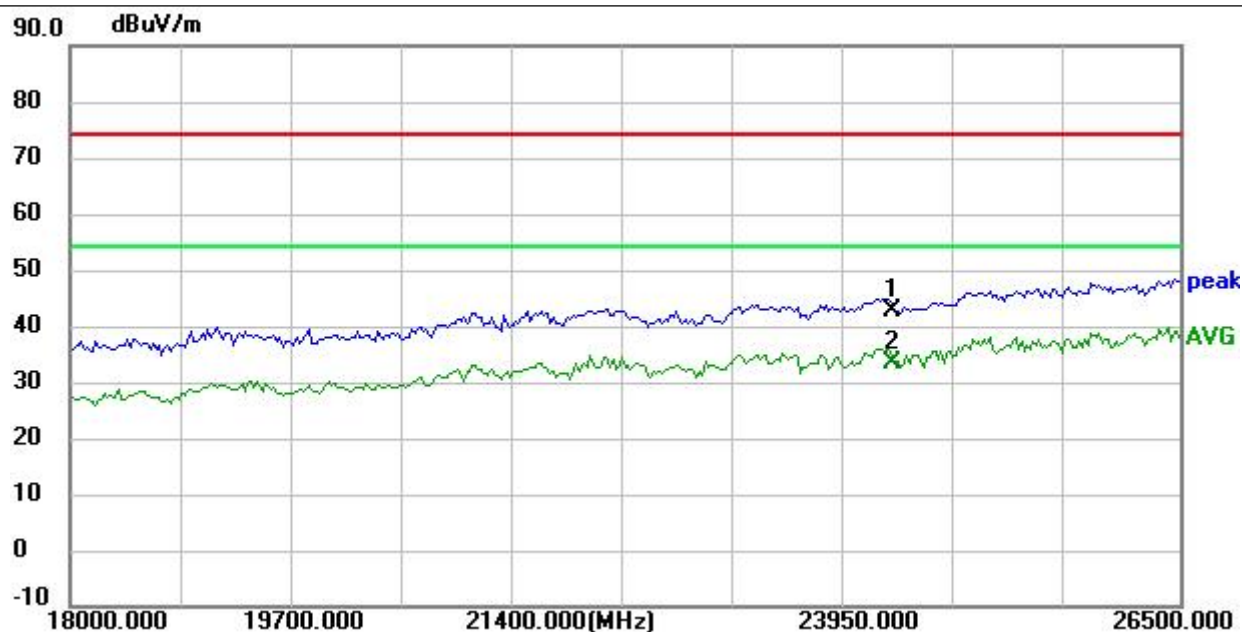
Tel: 0769-87182258

E-mail: kwtest@keywaytest.com

<https://www.keywaytest.com>



M/N : POLAR 15 MK2
Operation Mode : TX GFSK High Channel
Test Voltage : AC 120V/60Hz
Test Specification : Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	24298.000	33.56	9.05	42.61	74.00	-31.39	peak
2 *	24298.000	24.42	9.05	33.47	54.00	-20.53	AVG

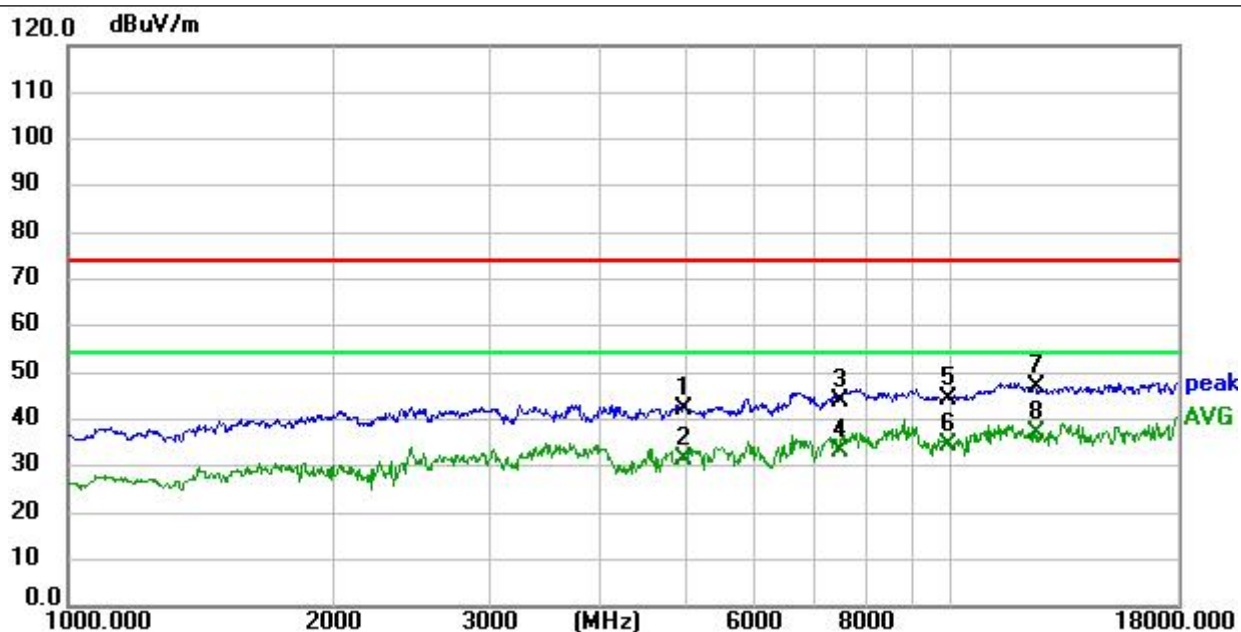
Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamplifier Factor



M/N : POLAR 15 MK2
Operation Mode : TX GFSK High Channel
Test Voltage : AC 120V/60Hz
Test Specification : Vertical



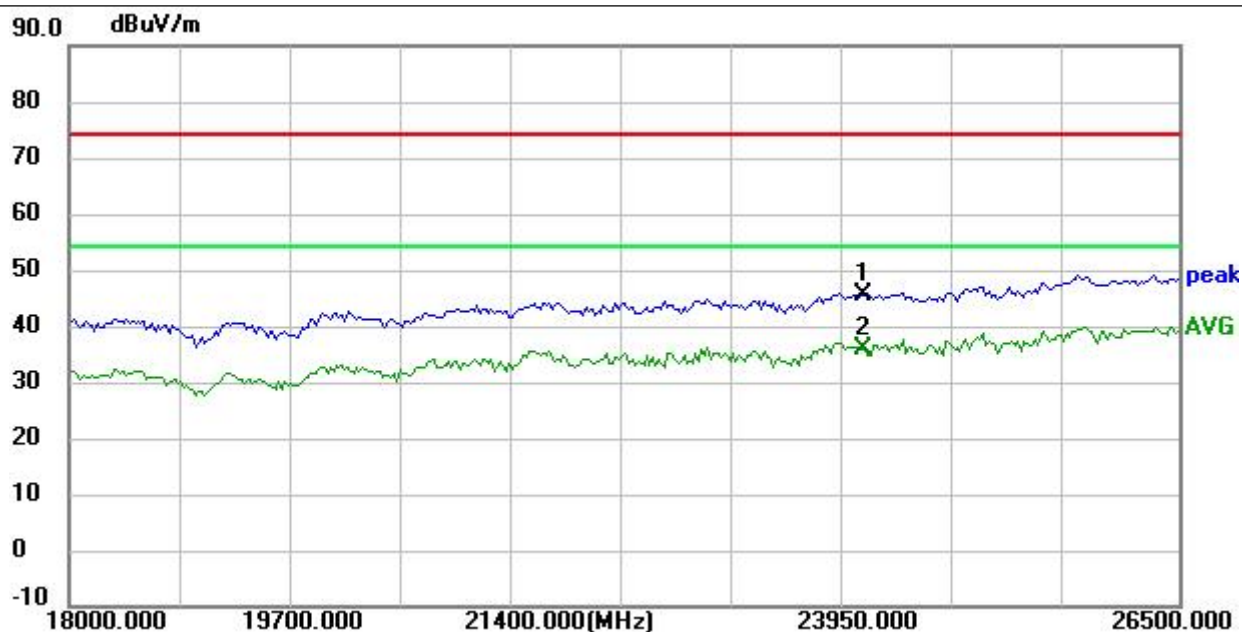
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4960.000	47.34	-5.15	42.19	74.00	-31.81	peak
2	4960.000	36.76	-5.15	31.61	54.00	-22.39	AVG
3	7440.000	43.10	0.88	43.98	74.00	-30.02	peak
4	7440.000	32.46	0.88	33.34	54.00	-20.66	AVG
5	9920.000	42.40	1.95	44.35	74.00	-29.65	peak
6	9920.000	32.62	1.95	34.57	54.00	-19.43	AVG
7	12400.000	42.51	4.47	46.98	74.00	-27.02	peak
8 *	12400.000	32.56	4.47	37.03	54.00	-16.97	AVG

Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamplifier Factor

M/N : POLAR 15 MK2
 Operation Mode : TX GFSK High Channel
 Test Voltage : AC 120V/60Hz
 Test Specification : Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	24077.720	36.78	8.61	45.39	74.00	-28.61	peak
2 *	24077.720	27.18	8.61	35.79	54.00	-18.21	AVG

Remark:

Emission Level=Reading+Factor

Factor=Cable Loss+ANT Factor-Preamp Factor

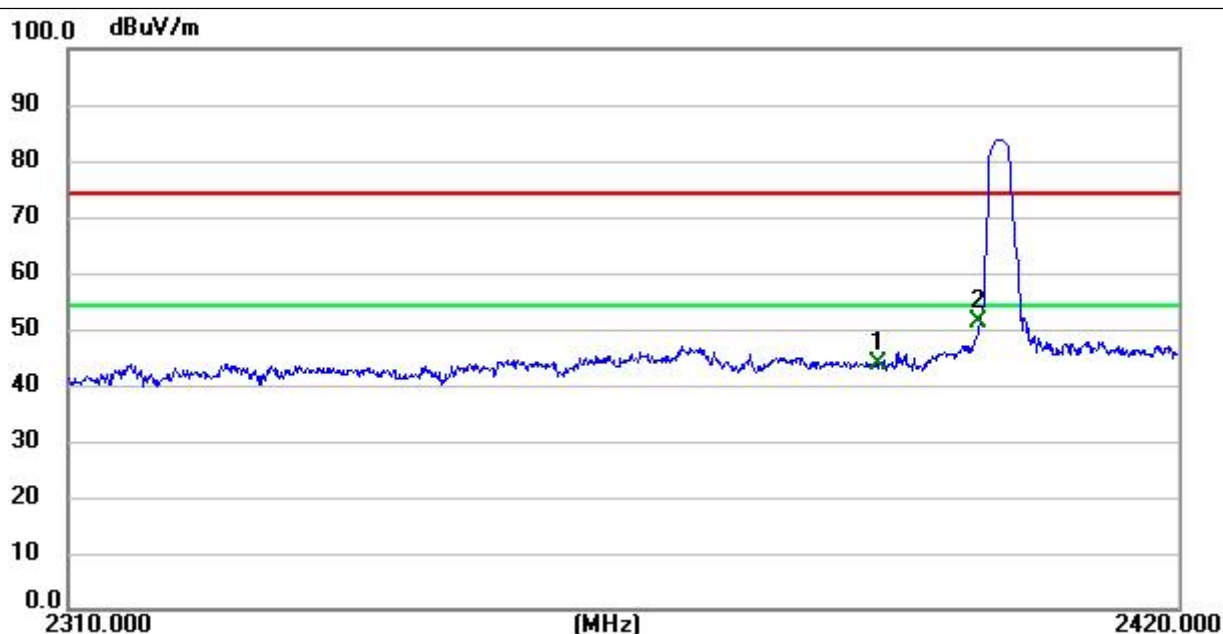
Note:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Radiated Band Emission Measurement:

Bluetooth (GFSK, $\pi/4$ -DQPSK, 8DPSK) mode have been tested, and the worst result (GFSK) was report as below

M/N : POLAR 15 MK2
Operation Mode : TX GFSK Low Channel
Test Voltage : AC 120V/60Hz
Test Specification : Horizontal



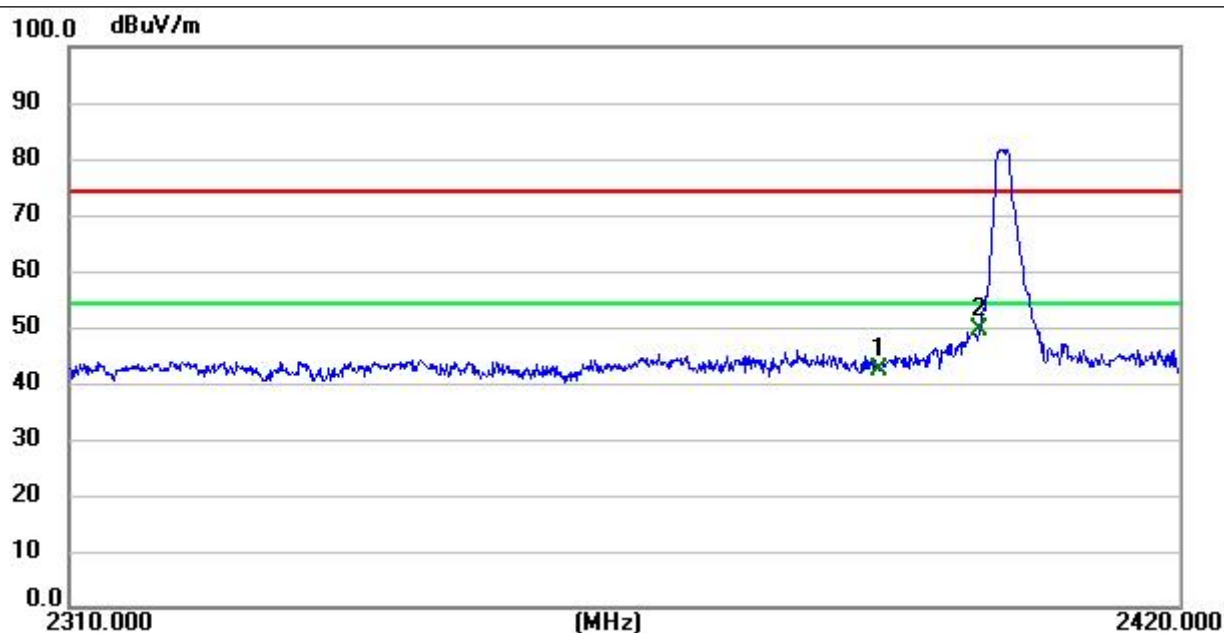
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.000	56.53	-12.67	43.86	54.00	-10.14	AVG
2 *	2400.000	63.83	-12.69	51.14	54.00	-2.86	AVG

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit



M/N : POLAR 15 MK2
Operation Mode : TX GFSK Low Channel
Test Voltage : AC 120V/60Hz
Test Specification : Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.000	54.98	-12.67	42.31	54.00	-11.69	AVG
2 *	2400.000	62.11	-12.69	49.42	54.00	-4.58	AVG

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

M/N : POLAR 15 MK2
 Operation Mode : TX GFSK High Channel
 Test Voltage : AC 120V/60Hz
 Test Specification : Horizontal

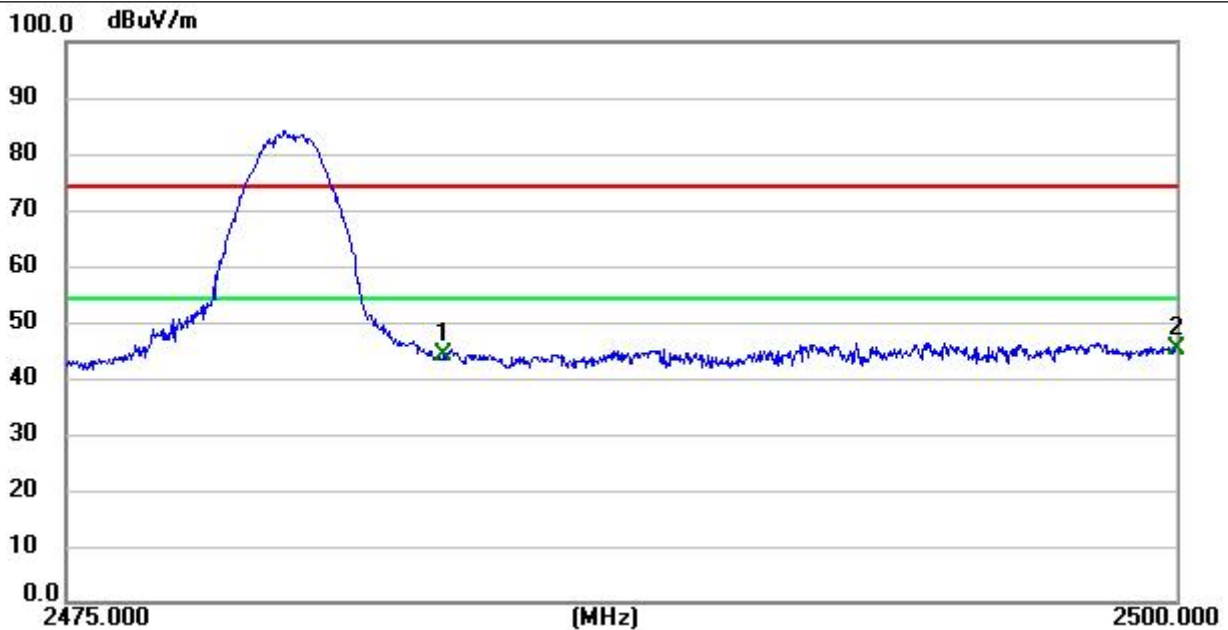


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	2483.500	60.20	-12.81	47.39	54.00	-6.61	AVG
2	2500.000	55.80	-12.63	43.17	54.00	-10.83	AVG

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

M/N : POLAR 15 MK2
 Operation Mode : TX GFSK High Channel
 Test Voltage : AC 120V/60Hz
 Test Specification : Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.500	56.84	-12.81	44.03	54.00	-9.97	AVG
2 *	2500.000	57.68	-12.63	45.05	54.00	-8.95	AVG

Remark:

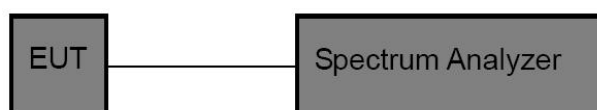
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

7 Maximum Peak Output Power Test

7.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (b)(1)
Test Limit	For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts. For FHSS operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W.

7.2 Test Setup



7.3 Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above,
2. Spectrum Setting:
 - RBW > the 20 dB bandwidth of the emission being measured
 - Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
 - VBW ≥ RBW
 - Sweep = auto
 - Detector function = peak
 - Trace = max hold

7.4 Test Data

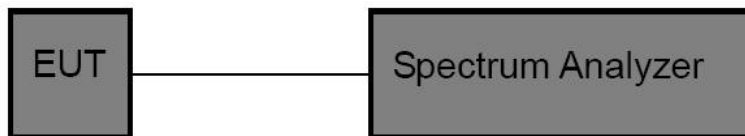
Please see the appendix III _BT_FCC_Test Data

8 20DB Occupy Bandwidth & 99% OCB Test

8.1 Test Standard

Test Standard	FCC Part15 C Section 15.247 (a)(1).5.1(b)
---------------	---

8.2 Test Setup



8.3 Test Procedure

Using the following spectrum analyzer settings:

1. Span= approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel.
2. Set the RBW = 30 kHz.
3. Set the VBW = 91 kHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

8.4 Test Data

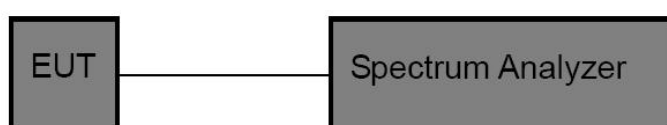
Please see the appendix III _BT_FCC_Test Data

9 Carrier Frequency Separation Test

9.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)
Test Limit	GFSK: 20dB bandwidth π /4-DQPSK & 8DPSK: 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)

9.2 Test Setup



9.3 Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer settings:

1. Span= Wide enough to capture the peaks of two adjacent channels
2. Set the RBW = 100 kHz.
3. Set the VBW = 300 kHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

9.4 Test Data

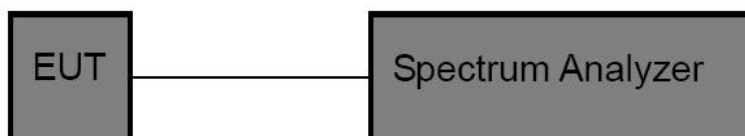
Please see the appendix III _BT_FCC_Test Data

10 Number of Hopping Channel Test

10.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)
Test Limit	≥15 channels

10.2 Test Setup



10.3 Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer setting:

1. Span= the frequency band of operation
2. Set the RBW = 100kHz.
3. Set the VBW = 300kHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

10.4 Test Data

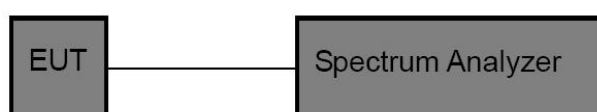
Please see the appendix III _BT_FCC_Test Data

12 Dwell Time Test

12.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)
Test Limit	0.4 sec

12.2 Test Setup



12.3 Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span= zero span, centered on a hopping channel
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Sweep time = as necessary to capture the entire dwell time per hopping channel.
5. Detector function = clear write.
6. Trace mode = normal.
7. Allow trace to fully stabilize.

12.4 Test Data

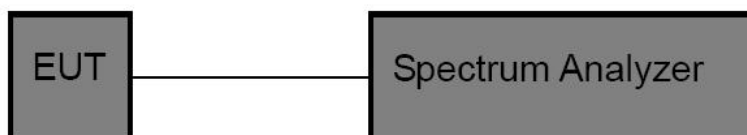
Please see the appendix III _BT_FCC_Test Data

13 100kHz Bandwidth of Frequency Band Edge Requirement

13.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (d)
Test Limit	in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

13.2 Test Setup



13.3 Test Procedure

The EUT must have its hopping/Non-hopping function enabled. Using the following spectrum analyzer setting:

1. Set the RBW = 100kHz.
2. Set the VBW = 300kHz.
3. Sweep time = auto couple.
4. Detector function = peak.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.

13.4 Test Data

Please see the appendix III _BT_FCC_Test Data

14 Antenna Requirement

14.1 Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /247(c)
Requirement	1) 15.203 requirement: 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 2) 15.247(c) (1)(i) requirement: Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below). When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer. The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

14.2 Antenna Connected Construction

The antenna is PCB Antenna which permanently attached, and the best case gain of the antenna is 1.7dBi. It complies with the standard requirement.



15 APPENDIX I -- TEST SETUP PHOTOGRAPH

Please see the attachment for details.



16 APPENDIX II -- EUT PHOTOGRAPH

Please see the attachment for details.

----- End of Report -----