



FCC TEST REPORT

FCC ID: 2ABNA-P9V

On Behalf of

Guangzhou Geoelectron Science & Technology Company Limited

Wireless Handheld Terminal

Model No.: P9V, P9I, P9IV, P9VI, P9VII, P9VIII, P9IX, P9X, P9V Pro,
P9V Lite, P9V STD, P9VA, P9VB, P9VC, P9VD, P9VE, P9VF,
P9VG, P9VH, P9VJ, P9VK, P9VL, P9VM, P9VN, P9VO, P9VP,
P9VQ, P9VR, P9VS, P9VT, P9VU, P9VV, P9VW, P9VX, P9VY,
P9VZ

Prepared for : Guangzhou Geoelectron Science & Technology Company Limited
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Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
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Date of Receipt : March 12, 2025
Date of Test : March 12, 2025 – July 14, 2026
Date of Report : September 1, 2026
Version Number : V0
Result **Pass**

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TEST REPORT DECLARATION

Applicant : Guangzhou Geoelectron Science & Technology Company Limited
Address : Room 1201 and 1301, No. 203 Kezhu Road, Science City, Huangpu District,
Guangzhou, China
Manufacturer : Guangzhou Geoelectron Science & Technology Company Limited
Address : Room 1201 and 1301, No. 203 Kezhu Road, Science City, Huangpu District,
Guangzhou, China
EUT Description : Wireless Handheld Terminal

(A) Model No. : P9V, P9I, P9IV, P9VI, P9VII, P9VIII, P9IX, P9X, P9V Pro, P9V Lite, P9V STD, P9VA, P9VB, P9VC, P9VD, P9VE, P9VF, P9VG, P9VH, P9VJ, P9VK, P9VL, P9VM, P9VN, P9VO, P9VP, P9VQ, P9VR, P9VS, P9VT, P9VU, P9VV, P9VW, P9VX, P9VY, P9VZ
(B) Trademark : N/A

Measurement Standard Used:

**FCC Rules and Regulations Part 15 Subpart C Section 15.247,
ANSI C63.10-2020**

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Taylor Hu
Project Engineer



Approved by (name + signature).....: Alan Fan
Project Manager



Date of issue.....: September 1, 2026

Revision History

Revision	Issue Date	Revisions	Revised By
V0	September 1, 2026	Initial released Issue	Taylor Hu

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Standards Paragraph	Result
Conducted Emission	FCC Part 15: 15.207	P
6dB Bandwidth	FCC PART 15:15.247(a)(2)	P
Output Power	FCC Part 15: 15.247(b)(3)	P
Radiated Spurious Emission	FCC Part 15: 15.209, FCC Part 15: 15.247(d)	P
Conducted Spurious & Band Edge Emission	FCC Part 15: 15.247(d)	P
Power Spectral Density	FCC PART 15:15.247(e)	P
Radiated Band Edge Emission	FCC Part 15: 15.247(d)	P
Antenna Requirement	FCC Part 15: 15.203	P
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable.		

1. Pass: The EUT complies with the essential requirements in the standard.
2. Frequency Stability: The manufacturer stated in the user's manual.
3. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description/PMN	: Wireless Handheld Terminal
Model	: P9V, P9I, P9IV, P9VI, P9VII, P9VIII, P9IX, P9X, P9V Pro, P9V Lite, P9V STD, P9VA, P9VB, P9VC, P9VD, P9VE, P9VF, P9VG, P9VH, P9VJ, P9VK, P9VL, P9VM, P9VN, P9VO, P9VP, P9VQ, P9VR, P9VS, P9VT, P9VU, P9VV, P9VW, P9VX, P9VY, P9VZ
Diff.	: After verification there is no difference except the name of the model. All tests are made with the P9V model.
Test Voltage	: DC 5V from adapter and DC 3.8V from battery

Radio Technology	: Bluetooth BLE
Operation frequency	: 2402-2480MHz
Channel No.	: 40 channels
Data rate	: 1Mbps
Channel Separation	: 2MHz
Modulation	: GFSK
Antenna Type	: FPC antenna, max gain 0.62dBi (Antenna information is provided by applicant.) (Testing lab is not responsible for the accuracy of the information.)
Software Version	: V1.0
Hardware version	: V1.0
Intend use environment	: Residential, commercial and light industrial environment

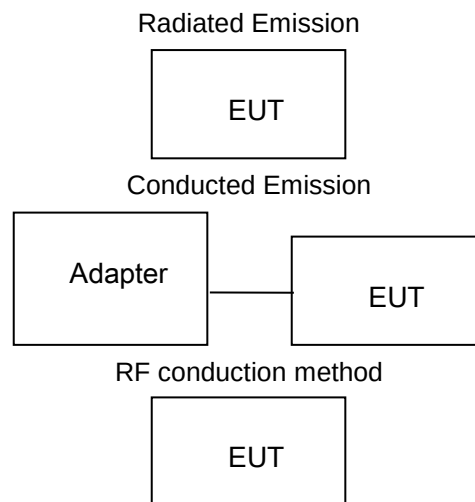
2.2. Accessories of Device (EUT)

Accessories	:	Power Supply
Manufacturer	:	Shenzhen ABP Technology Co., Ltd.
Model	:	PD0202C
Ratings	:	INPUT: 100-240V, 50~60Hz, 0.5A Max Output: 5.0V=3A 15.0W/ 9.0V=2.22A 19.98W/ 12.0V=1.67A 20.04W

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1.	N/A	N/A	N/A	N/A	N/A

2.4. Block Diagram of Test



2.5. Test Mode Description

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GFSK(1Mbps)	Low : CH0	2402
	Middle: CH19	2440
	High: CH39	2480

Use the Engineering software to control EUT work in Continuous TX mode, and select test channel, wireless mode, the power level of the test is set to default.

Channel list							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
CH0	2402	CH10	2422	CH20	2442	CH30	2462
CH1	2404	CH11	2424	CH21	2444	CH31	2464
CH2	2406	CH12	2426	CH22	2446	CH32	2466
CH3	2408	CH13	2428	CH23	2448	CH33	2468
CH4	2410	CH14	2430	CH24	2450	CH34	2470
CH5	2412	CH15	2432	CH25	2452	CH35	2472
CH6	2414	CH16	2434	CH26	2454	CH36	2474
CH7	2416	CH17	2436	CH27	2456	CH37	2476
CH8	2418	CH18	2438	CH28	2458	CH38	2478
CH9	2420	CH19	2440	CH29	2460	CH39	2480

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. So the report just shows that condition's data.

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	27℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961
Designation Number: CN1236

July 15, 2019 Certificated by IC
Registration Number: 12135A
CAB identified: CN0085

2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	4.17dB(Polarize: V)
	4.08dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 18GHz)	4.29dB(Polarize: V)
	4.82dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31dB(Polarize: V)
	4.30dB(Polarize: H)
Uncertainty for radio frequency	5.06×10^{-8} GHz
Uncertainty for conducted RF Power	0.40dB
Uncertainty for temperature	0.3°C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%
Uncertainty for Power Spectral Density	0.69dB
Uncertainty for Occupied-Bandwidth	4.22%

2.9. Test Equipment List

Equipment	Manufacturer	Model No.	Firmware version	Serial No.	Last Cal.	Cal. Due day
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2025.03.09	2029.03.08
4*4*3 Shielded room	CHENYU	4*4*3	/	N/A	2025.03.09	2029.03.08
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2025.08.04	2026.08.03
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2025.08.04	2026.08.03
Spectrum analyzer	Keysight	N9020A	A.19.05	MY54500254	2025.08.04	2026.08.03
Spectrum analyzer	ROHDE&SCHWARZ	FSU	4.71.SP5	200002	2025.08.04	2026.08.03
CMW500	ROHDE&SCHWARZ	CMW500	V 3.7.22	1201.0002K50-117239-sM	2025.08.04	2026.08.03
UXM 5G Base Wireless Test Platform	Keysight	E7515E	1.8.1.2908 2(NR)(LTE)	MY62226130	2026.03.03	2027.03.02
Test Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-102082-Wa	2025.08.04	2026.08.03
Test Receiver	ROHDE&SCHWARZ	ESCI	4.42 SP1	101165	2025.08.04	2026.08.03
Bilog Antenna	SCHWARZBECK	VULB 9168	/	VULB 9168#627	2025.08.11	2027.08.10
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2025.08.11	2027.08.10
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2025.08.11	2027.08.10
RF Cable	Resenberger	Cable 1	/	RE1	2025.08.04	2026.08.03
RF Cable	Resenberger	Cable 2	/	RE2	2025.08.04	2026.08.03
RF Cable	Resenberger	Cable 3	/	CE1	2025.08.04	2026.08.03
Amplifier	HP	HP8347A	/	2834A00455	2025.08.04	2026.08.03
Amplifier	Agilent	8449B	/	3008A02664	2025.08.04	2026.08.03
Amplifier	SKET	LNPA_0118G-45	/	SK2020010801	2025.08.04	2026.08.03
Filter/Amplifier bank unit	SKET	RSESU-HPH-LNPP18G	/	SK20190712	2025.08.04	2026.08.03
L.I.S.N.#1	SCHWARZBECK	NSLK8126	/	8126-466	2025.08.04	2026.08.03
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2025.08.04	2026.08.03
Pulse Limiter	SCHWARZBECK	9516F	/	9618	2025.08.04	2026.08.03
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2025.08.11	2027.08.10
Preamplifier	SKET	LNPA_1840-50	/	SK2018101801	2025.08.04	2026.08.03
Vector Signal Generator	Agilent	N5182A	/	MY49060042	2025.08.04	2026.08.03
Vector Signal Generator	Agilent	N5172B	2.02	MY51350397	2025.08.04	2026.08.03
Analog Signal Generator	HP	83712B	10.02	US34490219	2025.08.04	2026.08.03
Power Meter	Agilent	E4419B	/	GB40202122	2025.08.04	2026.08.03
Power Sensor	Agilent	E9300A	/	MY41496628	2025.08.04	2026.08.03
Power Sensor	Agilent	E9304A	/	MY41496815	2025.08.04	2026.08.03
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2025.08.04	2026.08.03
Power Sensor	DARE	RPR3006W	/	15100041SNO92	2025.08.04	2026.08.03
Temp. & Humid. Chamber	Teelong	TL-HW408S	/	TL-20191205-01	2025.07.14	2026.07.13

Electronic Thermo-Hygrometer	S.H.Qixiang	HTC-1	/	N/A	2025.08.04	2026.08.03
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2025.08.04	2026.08.03
Adjustable attenuator	MWRFtest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A
6dB Fixed Attenuator	SKET	AP_DC01G-2 W-N-6dB	/	N/A	2025.08.04	2026.08.03
Temp. & Humid. Chamber	Teelong	TL-HW408S	/	TL-20191205-01	2026.07.07	2027.07.06

Software Information			
Test Item	Software Name	Manufacturer	Version
RE	EZ-EMC	Farad	Alpha-3A1
CE	EZ-EMC	Farad	Alpha-3A1
RF-CE	MTS 8310	MWRFtest	V2.0.0.0

3. SPURIOUS EMISSION

3.1. Test Limits

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

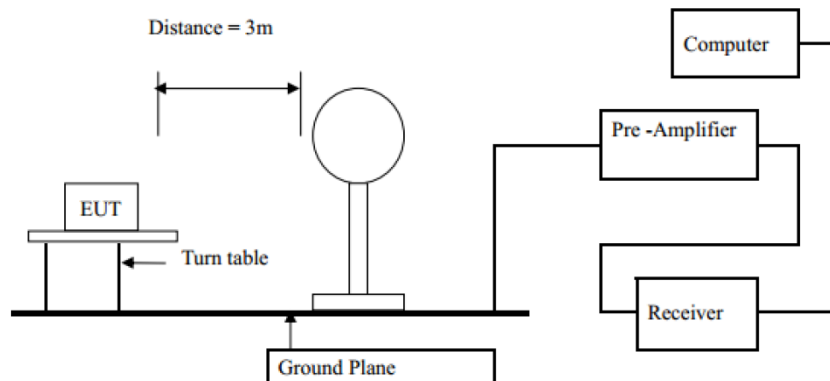
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 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)

15.209 Limit

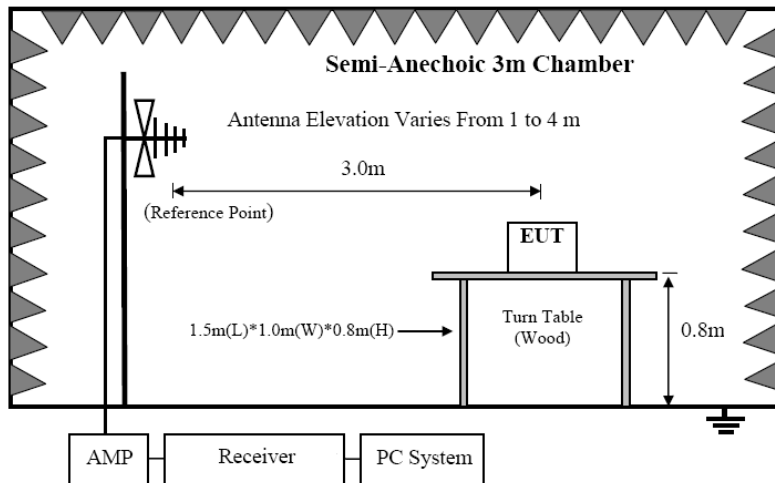
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	
Note 1: The peak limit is 20 dB higher than the average limit			
Note 2: Peak limit applies (AVG limit + 20 dB) as well as RSS-247 Section 5.5			

3.2. Block Diagram of Test Setup

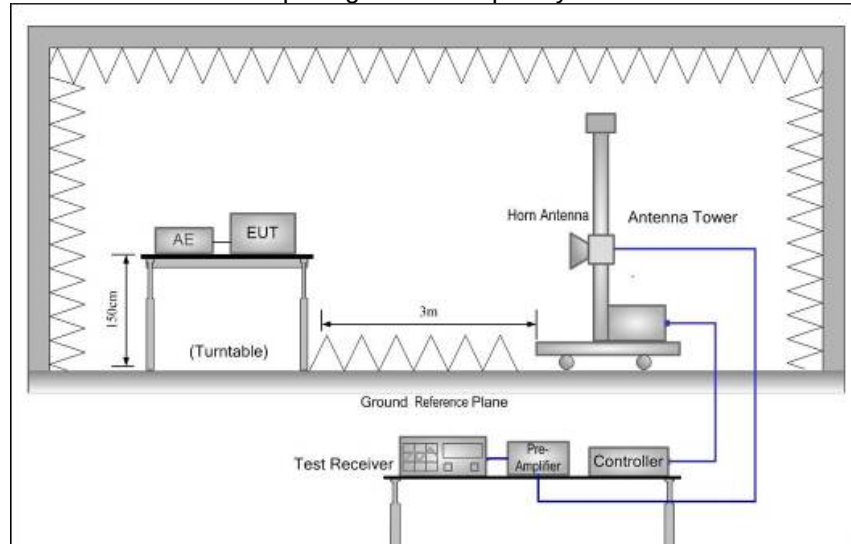
3.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



3.2.2 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



3.2.3 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

3.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and simulator as shown in section 2.4 and 3.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2020 on Radiated Emission test.
- (6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

3.4. Test Results

Test Condition

Continual Transmitting in maximum power.

9KHz~150KHz	RBW200Hz	VBW1KHz
150KHz~30MHz	RBW9KHz	VBW 30KHz
30MHz~1GHz	RBW120KHz	VBW 300KHz
Above1GHz	RBW1MHz	VBW 3MHz

We have scanned from 9 kHz to the 10th harmonic of the EUT.

Detailed information please see the following page.

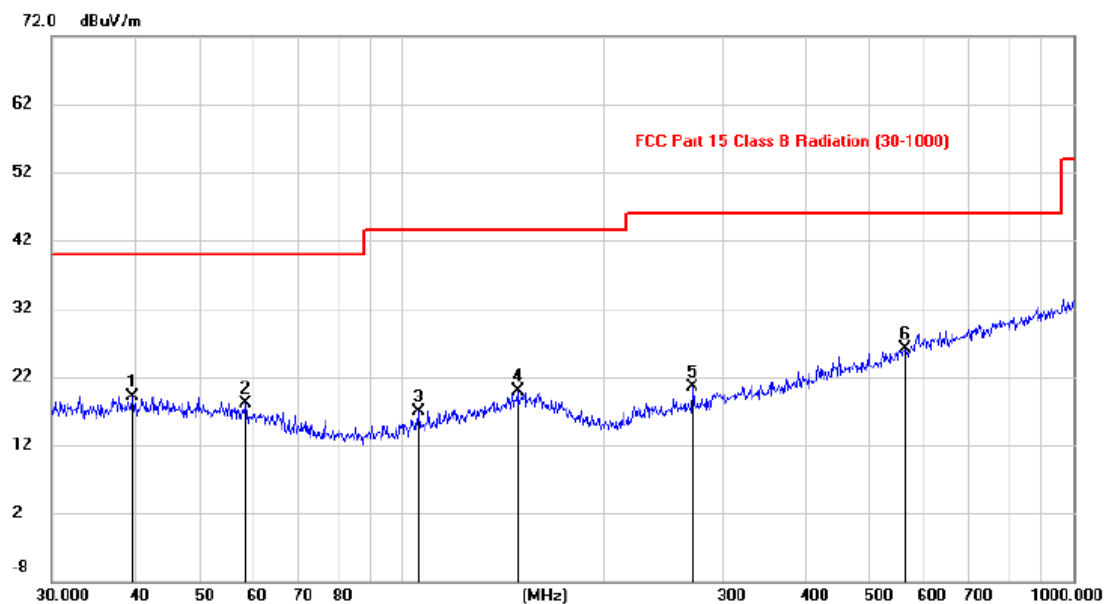
From 9KHz to 30MHz: Conclusion: Pass

Note: 1.The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

2. Only show the test data of the worst Channel in this report.

From 30MHz to 1000MHz: Conclusion: Pass

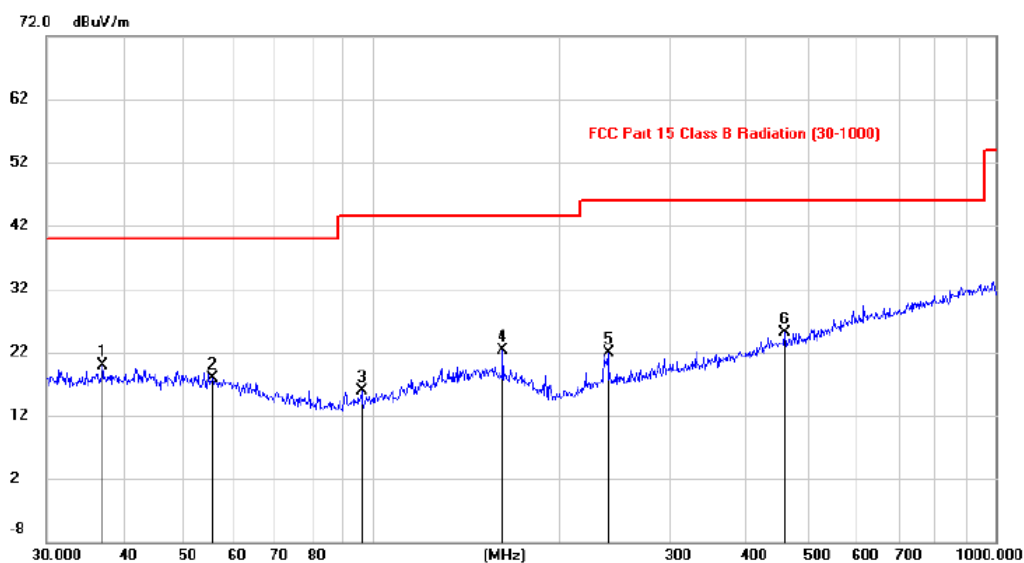
Vertical:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		39.6266	-0.64	19.80	19.16	40.00	-20.84	peak		
2		58.4348	-0.81	18.87	18.06	40.00	-21.94	peak		
3		105.8022	0.14	16.81	16.95	43.50	-26.55	peak		
4		148.5104	-0.53	20.45	19.92	43.50	-23.58	peak		
5		271.2928	1.08	19.33	20.41	46.00	-25.59	peak		
6	*	561.4798	0.14	25.92	26.06	46.00	-19.94	peak		

Note: 1. *: Maximum data; x: Over limit; !: over margin.

2. Measurement = Reading Level + Correct Factor; Correct Factor = Antenna Factor + Cable Loss.

Horizontal:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment			Height	Degree	
					dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	36.9729	0.51	19.47	19.98	40.00	-20.02	peak		
2		55.4147	-1.14	19.13	17.99	40.00	-22.01	peak		
3		96.3798	0.01	15.93	15.94	43.50	-27.56	peak		
4		162.4206	1.94	20.36	22.30	43.50	-21.20	peak		
5		239.7350	3.48	18.45	21.93	46.00	-24.07	peak		
6		459.6512	1.09	24.09	25.18	46.00	-20.82	peak		

Note: 1. *: Maximum data; x: Over limit; !: over margin.

2. Measurement = Reading Level + Correct Factor; Correct Factor = Antenna Factor + Cable Loss.

Notes: Above is below 1GHz test data. This report only shall the worst case mode for TX 2402MHz. (1Mbps)

Test Mode: GFSK TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804	44.98	V	33.95	10.18	34.26	54.85	74	-19.15	PK
4804	37.01	V	33.95	10.18	34.26	46.88	54	-7.12	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
4804	44.96	H	33.95	10.18	34.26	54.83	74	-19.17	PK
4804	34.18	H	33.95	10.18	34.26	44.05	54	-9.95	AV
7206	/	/	/	/	/	/	/	/	/
9608	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX Mid									
4880	42.26	V	33.93	10.2	34.29	52.10	74	-21.90	PK
4880	33.18	V	33.93	10.2	34.29	43.02	54	-10.98	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
4880	45.71	H	33.93	10.2	34.29	55.55	74	-18.45	PK
4880	36.00	H	33.93	10.2	34.29	45.84	54	-8.16	AV
7320	/	/	/	/	/	/	/	/	/
9760	/	/	/	/	/	/	/	/	/
Test Mode: GFSK TX High									
4960	45.70	V	33.98	10.22	34.25	55.65	74	-18.35	PK
4960	35.27	V	33.98	10.22	34.25	45.22	54	-8.78	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/
4960	45.40	H	33.98	10.22	34.25	55.35	74	-18.65	PK
4960	32.26	H	33.98	10.22	34.25	42.21	54	-11.79	AV
7440	/	/	/	/	/	/	/	/	/
9920	/	/	/	/	/	/	/	/	/

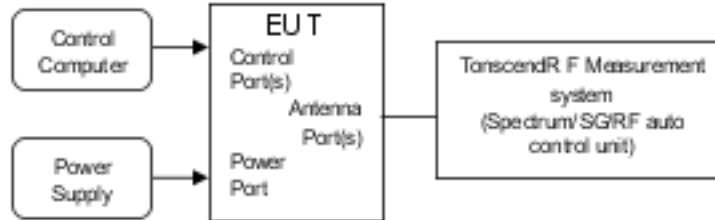
Note:

1, Result = Read level + Antenna factor + cable loss-Amp factor

2, All the other emissions not reported were too low to read and deemed to comply FCC limit.

4. RF CONDUCTED SPURIOUS EMISSIONS

4.1. Block diagram of test setup



4.2. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20dB.

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) (see § 15.205(c)).

4.3. Test procedure

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz. The detector is set to Peak. The trace mode is max hold.

4.4. Test result

Please refer to the Appendix of BLE 1M data.

5. POWER LINE CONDUCTED EMISSION

5.1. Test Limits

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

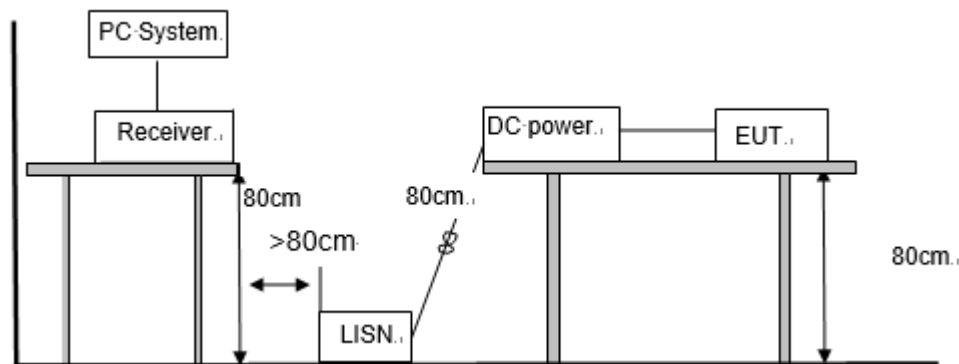
3. The limit decreases in line with the logarithm of the frequency in the rang of 0.15 to 0.50 MHz.

5.2. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10-2020 on Conducted Emission Measurement.

The bandwidth of test receiver is set at 9 kHz.

5.3. Test Setup

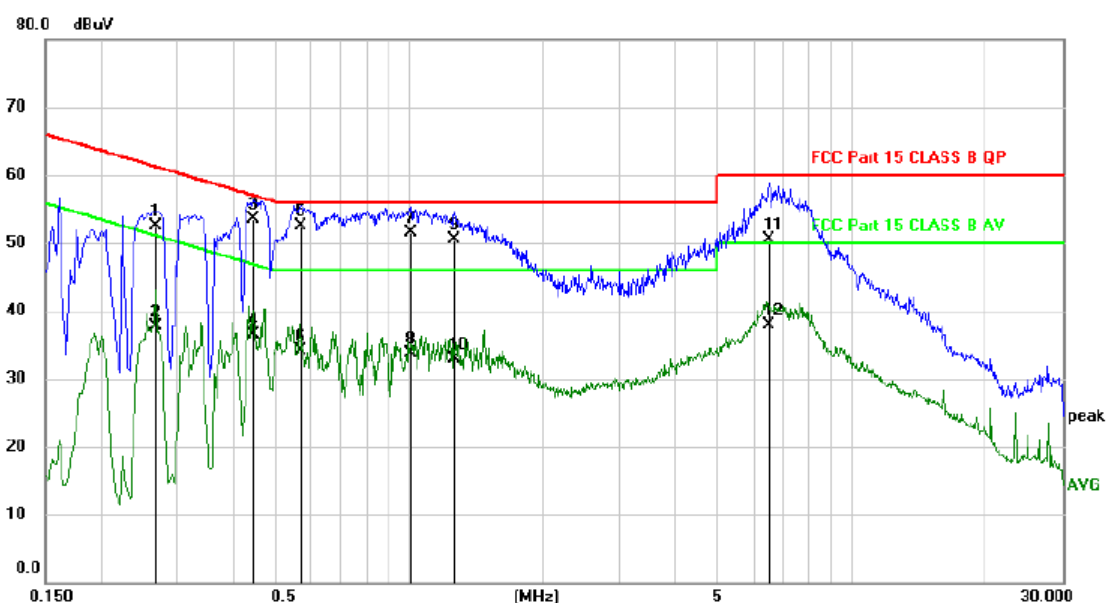


5.4. Test Results

PASS. (See below detailed test data)

Note: If peak Result comply with AV limit, QP and AV Result is deemed to comply with AV limit

Line:



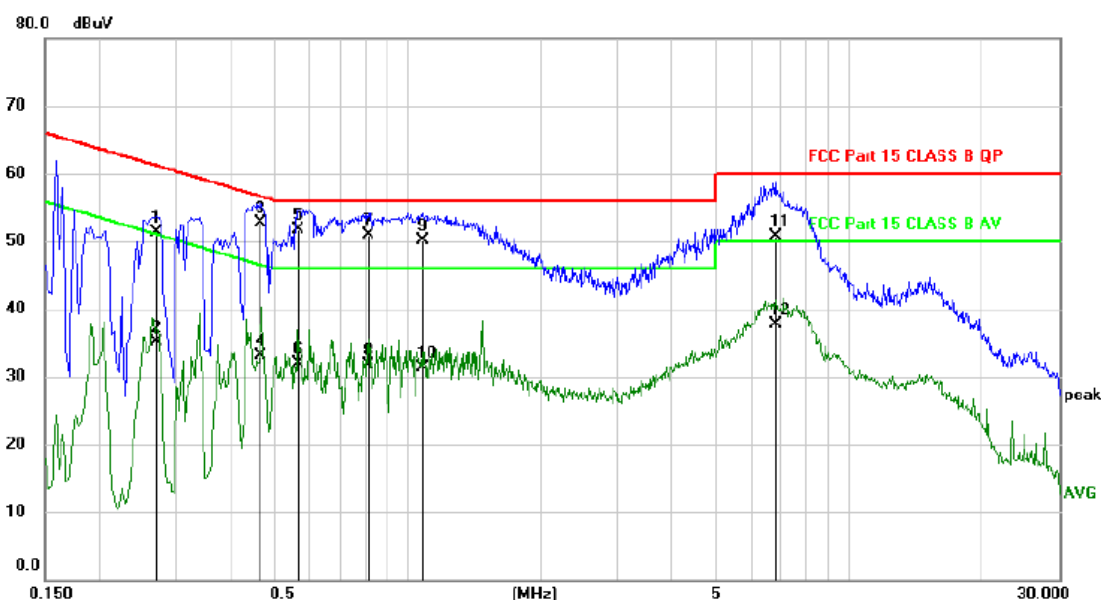
No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.2670	41.68	10.78	52.46	61.21	-8.75	QP	
2	0.2670	26.96	10.78	37.74	51.21	-13.47	AVG	
3	0.4440	42.38	11.03	53.41	56.99	-3.58	QP	
4	0.4440	25.38	11.03	36.41	46.99	-10.58	AVG	
5 *	0.5700	41.56	10.96	52.52	56.00	-3.48	QP	
6	0.5700	23.23	10.96	34.19	46.00	-11.81	AVG	
7	1.0079	40.46	10.96	51.42	56.00	-4.58	QP	
8	1.0079	22.72	10.96	33.68	46.00	-12.32	AVG	
9	1.2660	39.51	10.91	50.42	56.00	-5.58	QP	
10	1.2660	21.96	10.91	32.87	46.00	-13.13	AVG	
11	6.5010	39.45	11.08	50.53	60.00	-9.47	QP	
12	6.5010	26.75	11.08	37.83	50.00	-12.17	AVG	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Neutral:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.2700	40.45	10.79	51.24	61.12	-9.88	QP	
2		0.2700	24.32	10.79	35.11	51.12	-16.01	AVG	
3	*	0.4650	41.73	11.02	52.75	56.60	-3.85	QP	
4		0.4650	22.12	11.02	33.14	46.60	-13.46	AVG	
5		0.5670	40.75	10.97	51.72	56.00	-4.28	QP	
6		0.5670	21.00	10.97	31.97	46.00	-14.03	AVG	
7		0.8160	39.96	10.87	50.83	56.00	-5.17	QP	
8		0.8160	20.87	10.87	31.74	46.00	-14.26	AVG	
9		1.0770	39.07	10.94	50.01	56.00	-5.99	QP	
10		1.0770	20.31	10.94	31.25	46.00	-14.75	AVG	
11		6.8370	39.66	11.10	50.76	60.00	-9.24	QP	
12		6.8370	26.65	11.10	37.75	50.00	-12.25	AVG	

*:Maximum data x:Over limit !:over margin

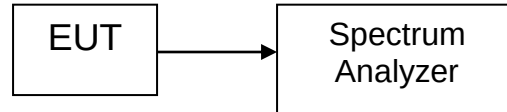
(Reference Only)

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Note: All modes and channels have been tested and only the GFSK 2402MHz (1Mbps) mode with the worst data is listed.

6. DUTY CYCLE

6.1. Block diagram of test setup



6.2. Test Procedure

Details see the ANSI C63.10-2020

6.2.1 A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.

6.2.2 The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

- a) Set the center frequency of the instrument to the center frequency of the transmission.
- b) Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
- c) Set $VBW \geq RBW$. Set detector = peak or average.
- d) The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if $T \leq 16.7 \text{ us}$.)

6.3. Test Results

Please refer to the Appendix of BLE 1M data.

7. CONDUCTED MAXIMUM OUTPUT POWER

7.1. Test limits

Please refer section 15.247.

Regulation 15.247(b) The limit of Maximum Peak conducted output power Measurement is 1W(30dBm). The e.i.r.p. shall not exceed 4 W(36dBm).

7.2. Test Procedure

Details see the ANSI C63.10-2020

7.2.1 Place the EUT on the table and set it in transmitting mode.

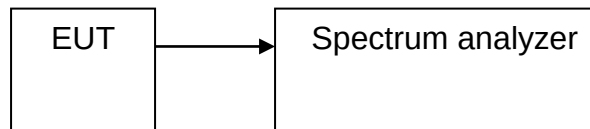
7.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3 This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

Set the spectrum analyzer as $RBW \geq DTS \text{ bandwidth}$, $VBW \geq 3 \times RBW$, $span \geq 3 \times RBW$, sweep time = auto couple, detector = peak, trace mode = max hold, allow trace to fully stabilize, use peak marker function to determine the peak amplitude level

7.2.4 Measure out each mode and each bands peak output power of EUT.

7.3. Test Setup



7.4. Test Results

Please refer to the Appendix of BLE 1M data.

8. PEAK POWER SPECTRAL DENSITY

8.1. Test limits

8.1.1 Please refer section 15.247.

8.1.2 For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

8.1.3 The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

8.2. Test Procedure

Details see the ANSI C63.10-2020

8.2.1 Place the EUT on the table and set it in transmitting mode.

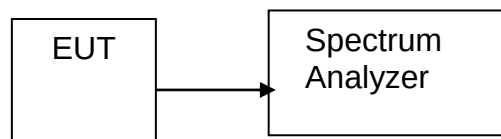
8.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

8.2.3 Set the spectrum analyzer as $RBW = 3\text{kHz}$ (Set the RBW to: $3\text{ kHz} \leq RBW \leq 100\text{ kHz}$.), $VBW = 10\text{kHz}$ (Set the $VBW \geq 3 \times RBW$), $\text{span} \geq 1.5 \times \text{DTS bandwidth}$, detector = peak, trace mode = max hold. Allow trace to fully stabilize, use the peak marker function to determine the maximum power level, if measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat, the resulting peak PSD level shall not be greater than 8 dBm in any 3 kHz band, detail see the test plot.

8.2.4 Record the max reading.

8.2.5 Repeat the above procedure until the measurements for all frequencies are completed.

8.3. Test Setup



8.4. Test Results

Please refer to the Appendix of BLE 1M data.

9. BANDWIDTH

9.1. Test limits

Please refer section 15.247

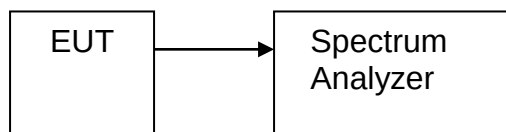
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

9.2. Test Procedure

Details see the ANSI C63.10-2020

- a) The bandwidth is measured at an amplitude level reduced 6dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.
- b) The test receiver set $RBW = 1-5\%BW$, $VBW \geq 3*RBW$, Sweep time set auto, detail see the test plot for 99% Bandwidth.
- c) The test receiver set $RBW = 100kHz$, $VBW \geq 3*RBW = 300kHz$, Sweep time set auto, detail see the test plot for 6dB Bandwidth.

9.3. Test Setup



9.4. Test Results

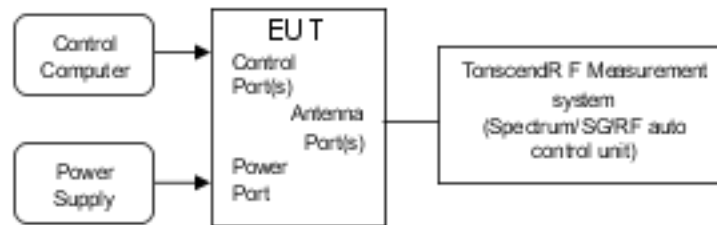
Please refer to the Appendix of BLE 1M data.

10. BAND EDGE (CONDUCTED)

10.1. Test limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. 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) (see § 15.205(c)).

10.2. Block diagram of test setup



10.3. Test Procedure

Details see the ANSI C63.10-2020

10.3.1. Place the EUT on the table and set it in transmitting mode.

10.3.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

10.3.3. Set center frequency of spectrum analyzer = operating frequency.

10.3.4. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz. The detector is set to Peak. The trace mode is max hold.

10.3.5. Repeat above procedures until all frequency measured were complete.

10.4. Test Results

Please refer to the Appendix of BLE 1M data.

11. BAND EDGE(RADIATED)

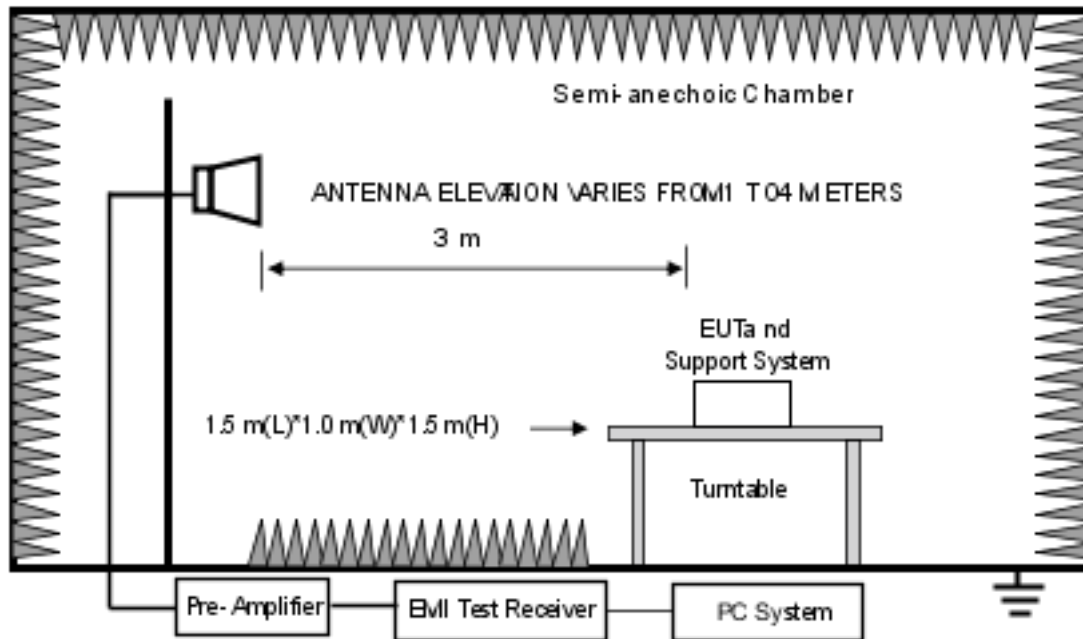
11.1. Test limits

Please refer FCC PART 15: 15.247

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

11.2. Block diagram of test setup



11.3. Test Procedure

Details see the ANSI C63.10-2020

10.3.1 Put the EUT on a 1.5m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission

10.3.2 Check the spurious emissions out of band.

10.3.3 RBW 1MHz, VBW 3MHz, peak detector for peak value, RBW 1MHz, VBW 3MHz, RMS detector for AV value.

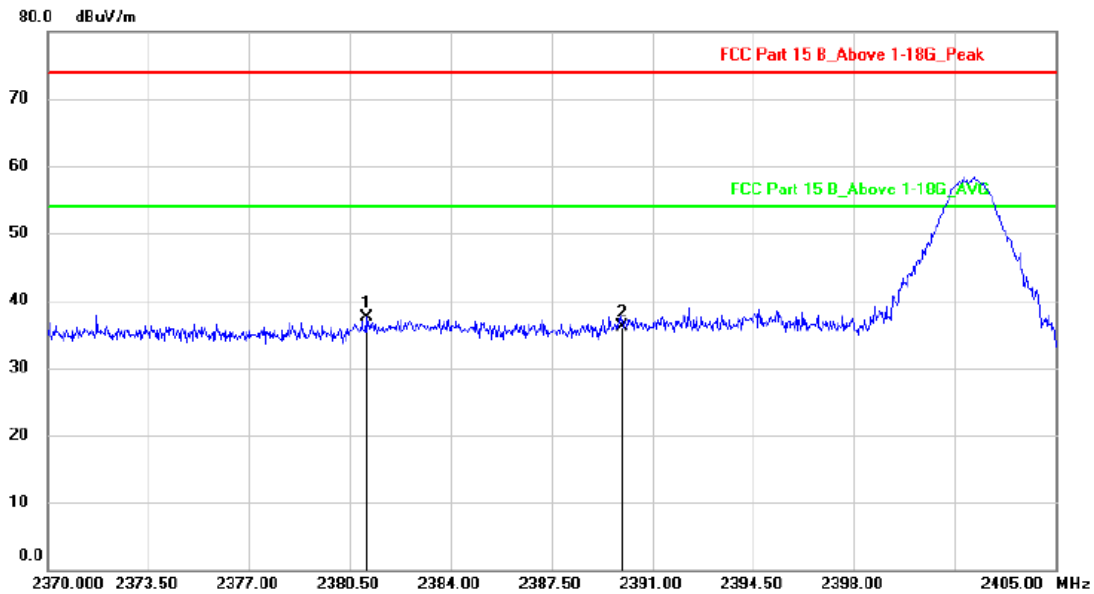
All restriction band and non- restriction band have been tested, only worse case is reported.

11.4. Test Results

PASS.

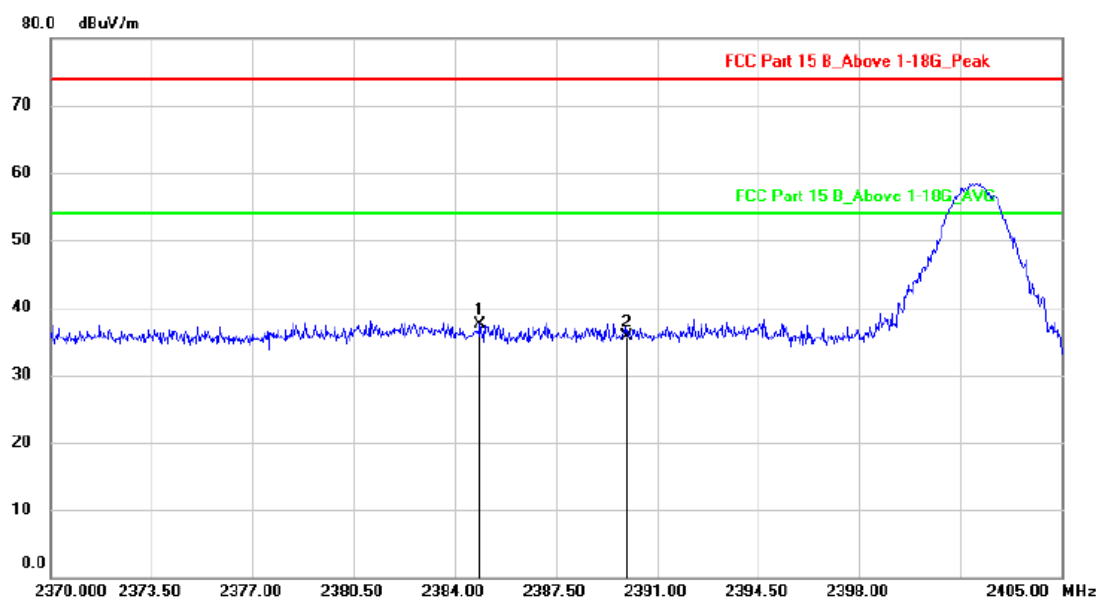
Detailed information please see the following page.

Polarization:	Horizontal	Mode	GFSK 1M (2402MHz)
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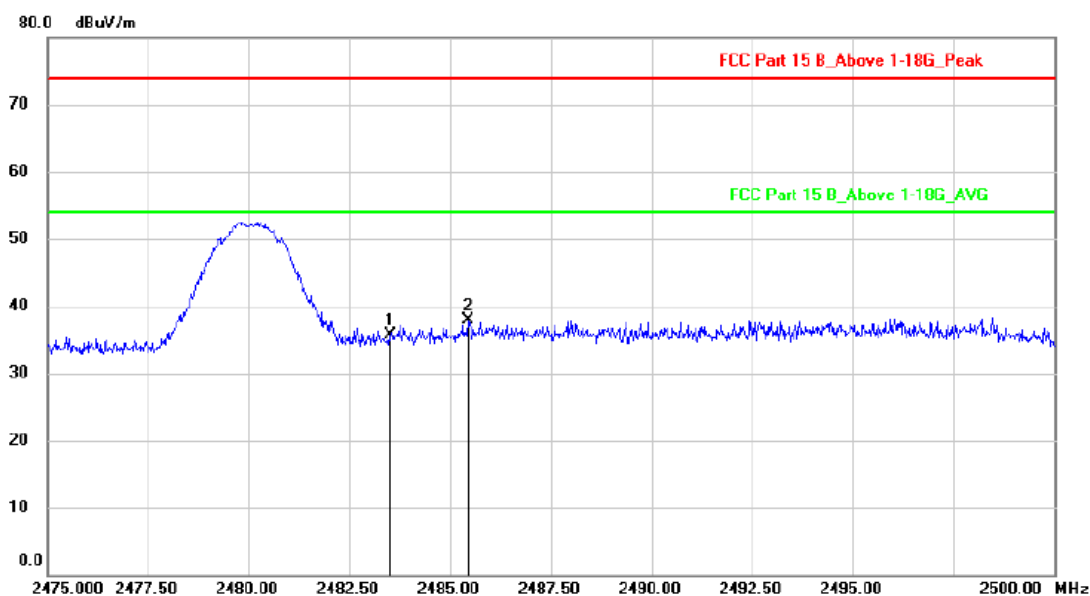
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Antenna Height cm	Table Degree	Comment
1	*	2381.079	56.23	-18.64	37.59	74.00	-36.41	peak			
2		2390.000	54.83	-18.66	36.17	74.00	-37.83	peak			

Polarization:	Vertical	Mode	GFSK 1M (2402MHz)
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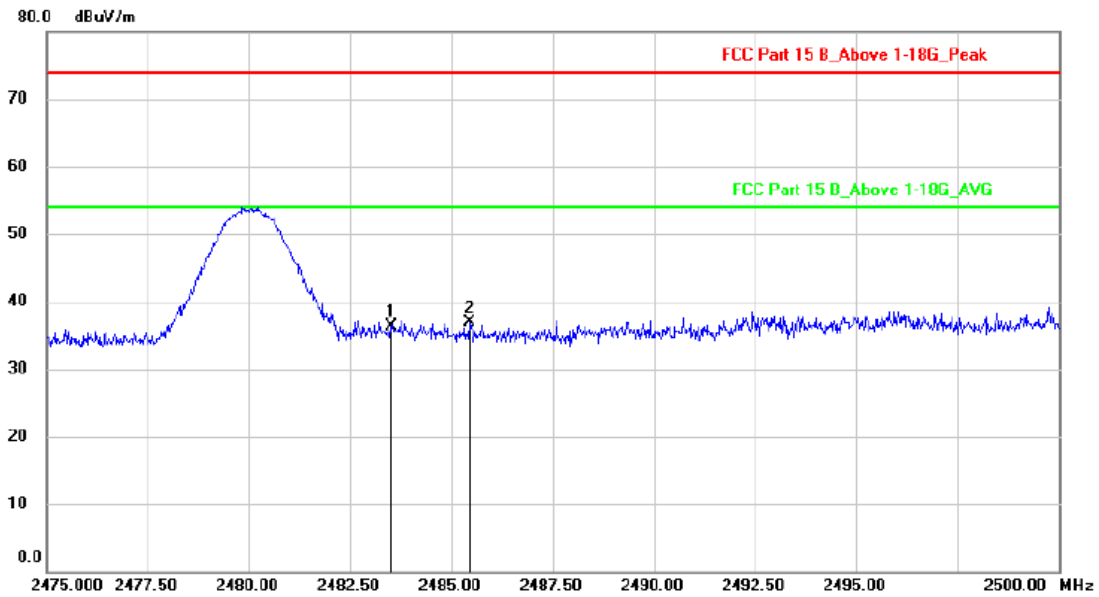
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree Comment
1	*	2384.887	56.15	-18.65	37.50	74.00	-36.50	peak		
2		2390.000	54.33	-18.66	35.67	74.00	-38.33	peak		

Polarization:	Horizontal	Mode	GFSK 1M (2480MHz)
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		2483.500	54.52	-18.76	35.76	74.00	-38.24	peak		
2	*	2485.463	56.73	-18.76	37.97	74.00	-36.03	peak		

Polarization:	Vertical	Mode	GFSK 1M (2480MHz)
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree Comment
1		2483.500	55.02	-18.76	36.26	74.00	-37.74	peak		
2	*	2485.463	55.73	-18.76	36.97	74.00	-37.03	peak		

12. ANTENNA REQUIREMENT

12.1.Limit

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

12.2.Results

The EUT antenna is FPC Antenna. It comply with the standard requirement.

13. Photos of Test Setup & EUT

Please refer to the Appendix of Test photos_RF and the Appendix of EUT photos.

-----END OF REPORT-----