

TEST REPORT

Product : HANDSET
Trade mark : Richmat
Model/Type reference : HJH173 Ble
Serial Number : N/A
Report Number : EED32N80428901
FCC ID : 2AJJGHJ8258
Date of Issue : Jun. 09, 2021
Test Standards : 47 CFR Part 15Subpart C
Test result : PASS

Prepared for:

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Date:

Jun. 09, 2021

Check No.:3011010621

2 Version

Version No.	Date	Description
00	Jun. 09, 2021	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	Note ¹
AC Power Line Conducted Emission	47 CFR Part 15Subpart C Section 15.207	ANSI C63.10-2013	N/A
Conducted Peak Output Power	47 CFR Part 15Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013	Note ¹
6dB Occupied Bandwidth	47 CFR Part 15Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013	Note ¹
Power Spectral Density	47 CFR Part 15Subpart C Section 15.247 (e)	ANSI C63.10-2013	Note ¹
Band-edge for RF Conducted Emissions	47 CFR Part 15Subpart C Section 15.247(d)	ANSI C63.10-2013	Note ¹
RF Conducted Spurious Emissions	47 CFR Part 15Subpart C Section 15.247(d)	ANSI C63.10-2013	Note ¹
Radiated Spurious Emissions	47 CFR Part 15Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15Subpart C Section 15.205/15.209	ANSI C63.10-2013	Note ¹

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

Company Name and Address shown on Report, the sample(s) and sample Information was/ were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.

Note¹: All test data refer to FCC ID:2AJJGHJ8258 and it was come from the report of No. EED32M00310701, the report modified the product name.

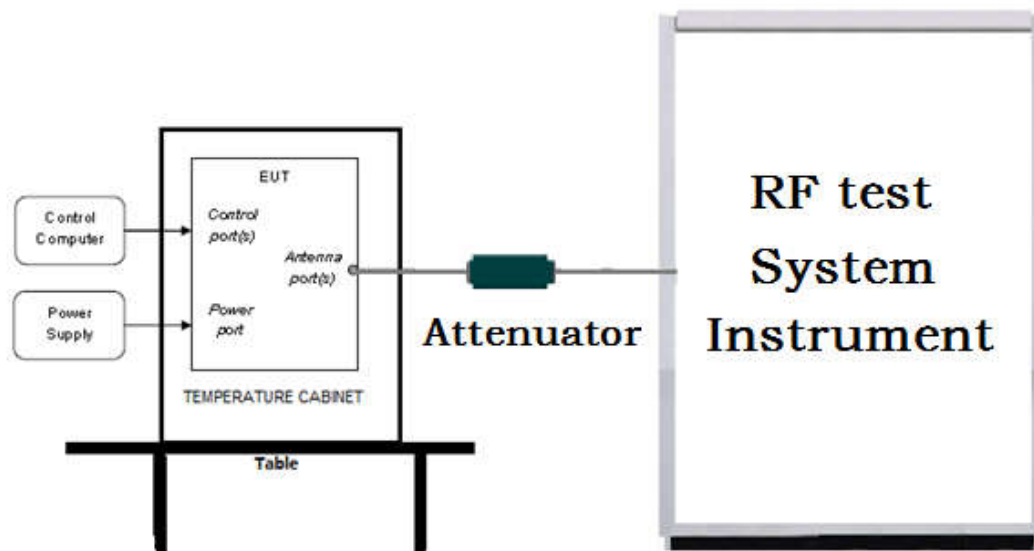
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5 Test Requirement

5.1 Test setup

5.1.1 For Conducted test setup



5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

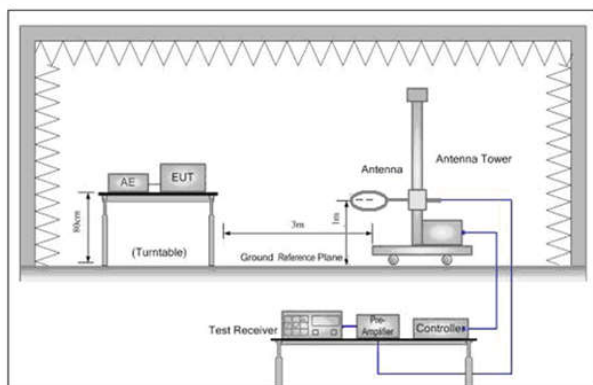


Figure 1. Below 30MHz

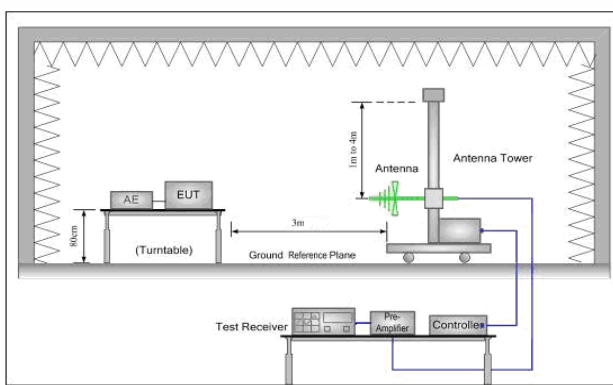


Figure 2. 30MHz to 1GHz

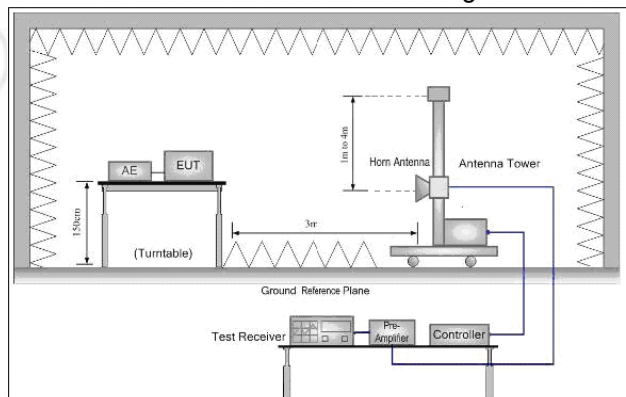
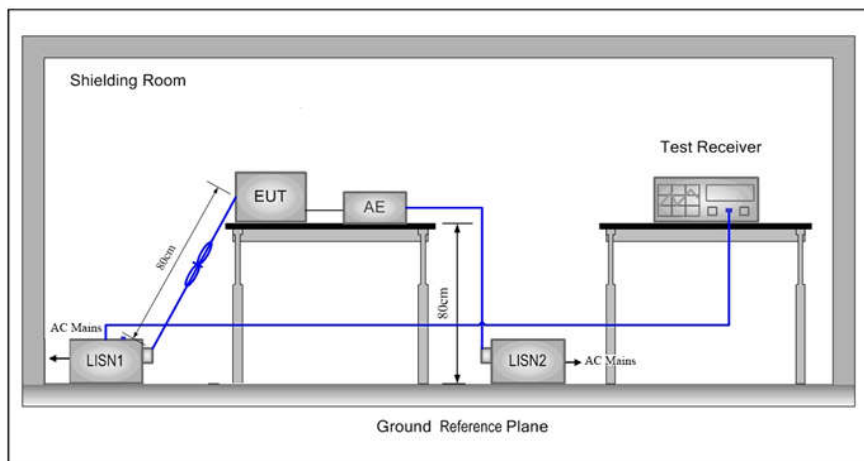


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:	
Temperature:	24.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	1010mbar

5.3 Test Condition

Test channel:

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
GFSK	2402MHz ~2480 MHz	Channel 0	Channel 19	Channel 39
		2402MHz	2440MHz	2480MHz
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.			

6 General Information

6.1 Client Information

Applicant:	Qingdao Richmat Intelligence Technology Inc
Address of Applicant:	NO. 78 Kongquehe 4th Road Qingdao Clothing Industry park Jimo, Qingdao, Shandong Province 266000, China
Manufacturer:	Qingdao Richmat Intelligence Technology Inc
Address of Manufacturer:	NO. 78 Kongquehe 4th Road Qingdao Clothing Industry park Jimo, Qingdao, Shandong Province 266000, China
Factory:	Qingdao Richmat Intelligence Technology Inc
Address of Factory:	NO. 78 Kongquehe 4th Road Qingdao Clothing Industry park Jimo, Qingdao, Shandong Province 266000, China

6.2 General Description of EUT

Product Name:	HANDSET
Model No.:	HJH173 Ble
Trade mark:	Richmat
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	5.0 (BLE)
Modulation Technique:	DSSS
Modulation Type:	GFSK
Number of Channel:	40
Test Power Grade:	Default
Test Software of EUT:	EMI_TEST_v1.5
Antenna Type and Gain:	Type: PCB Antenna
	Gain: 3dBi
Power Supply:	3*AAA Battery
Test Voltage:	DC 4.5V
Sample Received Date:	June 1, 2021
Sample tested Date:	June 1, 2021 to June 4, 2021

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

6.3 Description of Support Units

The EUT has been tested independently.

6.4 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd
Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China
Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

6.5 Abnormalities from Standard Conditions

None.

6.6 Other Information Requested by the Customer

None.

6.7 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

7 Equipment List

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05-24-2019	05-23-2022
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	05-16-2021	05-15-2022
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-15-2021	04-14-2024
Receiver	R&S	ESC17	100938-003	10-16-2020	10-15-2021
Multi device Controller	matur	NCD/070/10711 112	---	---	---
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	06-29-2020	06-28-2021
Cable line	Fulai(7M)	SF106	5219/6A	---	---
Cable line	Fulai(6M)	SF106	5220/6A	---	---
Cable line	Fulai(3M)	SF106	5216/6A	---	---
Cable line	Fulai(3M)	SF106	5217/6A	---	---

3M full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	---	---
Receiver	Keysight	N9038A	MY57290136	03-04-2021	03-03-2022
Spectrum Analyzer	Keysight	N9020B	MY57111112	03-04-2021	03-03-2022
Spectrum Analyzer	Keysight	N9030B	MY57140871	03-04-2021	03-03-2022
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-28-2021	04-27-2024
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-15-2021	04-14-2024
Horn Antenna	ETS-LINDGREN	3117	00057407	07-10-2018	07-09-2021
Preamplifier	EMCI	EMC184055SE	980597	05-20-2021	05-19-2022
Preamplifier	EMCI	EMC001330	980563	04-15-2021	04-14-2022
Preamplifier	JS Tonscend	980380	EMC051845 SE	12-31-2020	12-30-2021
Temperature/ Humidity Indicator	biaozhi	GM1360	EE1186631	04-16-2021	04-15-2022
Fully Anechoic Chamber	TDK	FAC-3	---	01-09-2021	01-08-2024
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	---	---
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	---	---
Cable line	Times	EMC104-NMNM-1000	SN160710	---	---
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	---	---
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	---	---
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	---	---
Cable line	Times	HF160-KMKM-3.00M	393493-0001	---	---

8 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Test Results List:

Test Requirement	Test method	Test item	Verdict	Note
Part15C Section 15.205/15.209	ANSI C63.10	Radiated Spurious Emissions	PASS	Appendix A)

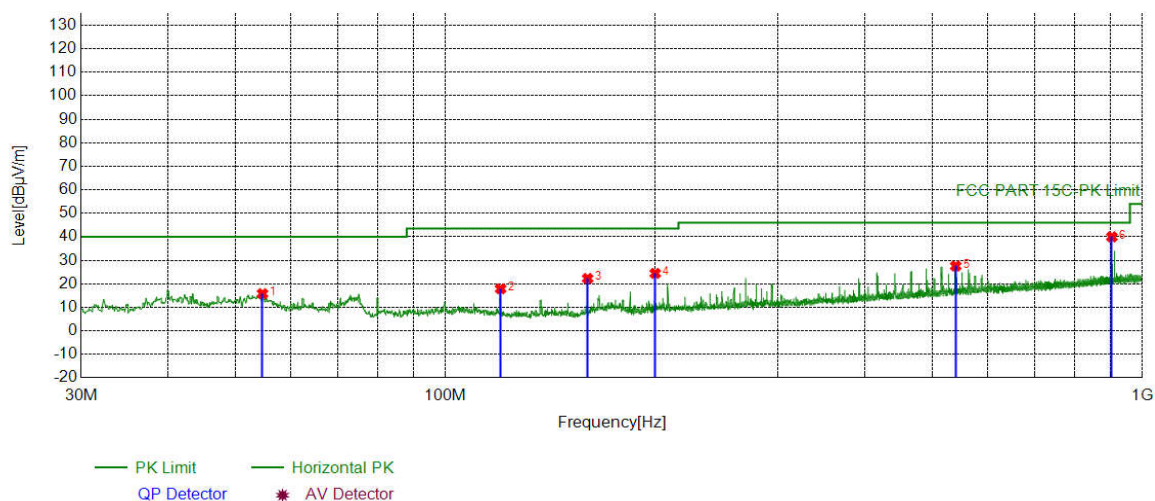
Appendix A) Radiated Spurious Emissions

Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
Peak		1MHz	10Hz	Average	
Test Procedure:					
Below 1GHz test procedure as below: Test method Refer as KDB 558074 D01, Section 12.1					
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.					
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.					
c. The antenna height 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.					
d. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.					
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.					
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.					
Above 1GHz test procedure as below:					
g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).					
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel					
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.					
j. Repeat above procedures until all frequencies measured was complete.					
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBµV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
	Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.				

Radiated Spurious Emission below 1GHz:

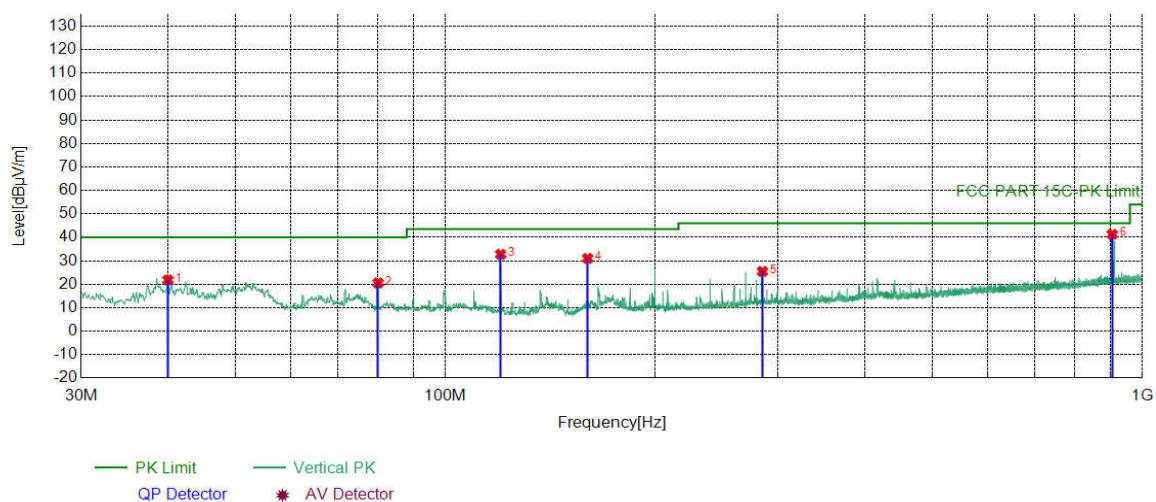
During the test, the Radiated Spurious Emissions from 30MHz to 1GHz was performed in all modes with all channels, GFSK, Channel 2440MHz was selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Test Graph



NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	54.6405	-17.79	33.60	15.81	40.00	24.19	PASS	Horizontal	Peak
2	120.0250	-20.08	37.98	17.90	43.50	25.60	PASS	Horizontal	Peak
3	159.9930	-21.15	43.42	22.27	43.50	21.23	PASS	Horizontal	Peak
4	200.0580	-17.84	42.29	24.45	43.50	19.05	PASS	Horizontal	Peak
5	539.8830	-10.04	37.62	27.58	46.00	18.42	PASS	Horizontal	Peak
6	904.5425	-4.94	44.92	39.98	46.00	6.02	PASS	Horizontal	Peak

Test Graph



NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	39.9920	-18.03	39.84	21.81	40.00	18.19	PASS	Vertical	Peak
2	80.0570	-22.55	43.08	20.53	40.00	19.47	PASS	Vertical	Peak
3	120.0250	-20.08	52.85	32.77	43.50	10.73	PASS	Vertical	Peak
4	159.9930	-21.15	52.16	31.01	43.50	12.49	PASS	Vertical	Peak
5	285.0385	-15.83	41.31	25.48	46.00	20.52	PASS	Vertical	Peak
6	905.7066	-4.93	46.23	41.30	46.00	4.70	PASS	Vertical	Peak

Transmitter Emission above 1GHz

Mode:			BLE GFSK Transmitting			Channel:		2402 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1254.8255	0.94	42.77	43.71	74.00	30.29	Pass	H	PK
2	1975.6976	4.42	41.21	45.63	74.00	28.37	Pass	H	PK
3	3772.0515	-19.43	57.68	38.25	74.00	35.75	Pass	H	PK
4	7685.3124	-11.07	53.86	42.79	74.00	31.21	Pass	H	PK
5	12489.6326	-4.82	52.59	47.77	74.00	26.23	Pass	H	PK
6	16294.8863	1.69	50.83	52.52	74.00	21.48	Pass	H	PK
7	1216.0216	0.84	42.34	43.18	74.00	30.82	Pass	V	PK
8	2116.1116	4.70	41.17	45.87	74.00	28.13	Pass	V	PK
9	3683.0455	-20.00	57.78	37.78	74.00	36.22	Pass	V	PK
10	4897.1265	-16.20	55.81	39.61	74.00	34.39	Pass	V	PK
11	7764.3176	-11.26	54.24	42.98	74.00	31.02	Pass	V	PK
12	13677.7118	-1.74	50.56	48.82	74.00	25.18	Pass	V	PK

Mode:			BLE GFSK Transmitting			Channel:		2440 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1114.0114	0.84	42.64	43.48	74.00	30.52	Pass	H	PK
2	1995.0995	4.52	40.83	45.35	74.00	28.65	Pass	H	PK
3	3717.0478	-19.80	57.88	38.08	74.00	35.92	Pass	H	PK
4	6646.2431	-12.67	54.43	41.76	74.00	32.24	Pass	H	PK
5	9269.4180	-7.93	53.41	45.48	74.00	28.52	Pass	H	PK
6	14367.7579	0.68	49.59	50.27	74.00	23.73	Pass	H	PK
7	1044.6045	0.91	42.76	43.67	74.00	30.33	Pass	V	PK
8	1981.2981	4.45	41.11	45.56	74.00	28.44	Pass	V	PK
9	3850.0567	-19.17	57.85	38.68	74.00	35.32	Pass	V	PK
10	6082.2055	-13.12	54.53	41.41	74.00	32.59	Pass	V	PK
11	9708.4472	-7.68	53.20	45.52	74.00	28.48	Pass	V	PK
12	14366.7578	0.67	50.03	50.70	74.00	23.30	Pass	V	PK

Mode:			BLE GFSK Transmitting			Channel:		2480 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1147.0147	0.83	42.50	43.33	74.00	30.67	Pass	H	PK
2	1973.4974	4.41	40.37	44.78	74.00	29.22	Pass	H	PK
3	3433.0289	-20.14	57.37	37.23	74.00	36.77	Pass	H	PK
4	5768.1845	-13.68	55.65	41.97	74.00	32.03	Pass	H	PK
5	10307.4872	-6.45	52.35	45.90	74.00	28.10	Pass	H	PK
6	14384.7590	0.97	49.66	50.63	74.00	23.37	Pass	H	PK
7	10111.2011	0.94	43.81	44.75	74.00	29.25	Pass	V	PK
8	1966.4967	4.38	41.26	45.64	74.00	28.36	Pass	V	PK
9	3747.0498	-19.60	57.53	37.93	74.00	36.07	Pass	V	PK
10	6507.2338	-12.70	54.48	41.78	74.00	32.22	Pass	V	PK
11	10266.4844	-6.68	52.31	45.63	74.00	28.37	Pass	V	PK
12	15326.8218	-0.32	50.92	50.60	74.00	23.40	Pass	V	PK

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
 Final Test Level = Receiver Reading + Factor
 Factor = Antenna Factor + Cable Factor – Preamplifier Factor
- 2) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.