

TEST REPORT

Product : Single mode Bluetooth(5.0) Module
Trade mark : Richmat
Model/Type reference : HJ8258
Serial Model : /
Report Number : EED39O81604501
FCC ID : 2AJJGHJ8258
Date of Issue : November 11, 2022

Test Standards	Result
☒ 47 CFR Part 15 Subpart C	PASS

Prepared for:

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NO. 78 Kongquehe 4th Road Qingdao Clothing Industry park Jimo,
Qingdao, Shandong Province 266000, China

Prepared by:

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Date:

November 11, 2022

Jeff Fang

Authorized Signatory



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Modification Record

No.	Last Report No.	Modification Description
1	EED39O81604501	First report

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1. 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	PASS
AC Power Line Conducted Emission*	47 CFR Part 15Subpart C Section 15.207	ANSI C63.10-2013	N/A
Maximum conducted output power*	47 CFR Part 15Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013	PASS
DTS Bandwidth*	47 CFR Part 15Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013	PASS
Maximum Power Spectral Density*	47 CFR Part 15Subpart C Section 15.247 (e)	ANSI C63.10-2013	PASS
Band-edge for RF Conducted Emissions*	47 CFR Part 15Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
RF Conducted Spurious Emissions*	47 CFR Part 15Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
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	PASS

Remark:

1. The product is supplied by DC power.
2. Test according to ANSI C63.4-2014 & ANSI C63.10-2013.
3. 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.
4. "*" Detailed test results, please reference reported EED32M00310701

2. Test Requirement

2.1. Test Environment

Operating Environment:	
Temperature:	23.5°C
Humidity:	51.4% RH
Atmospheric Pressure:	1020mbar

2.2. Test Condition

Test channel:

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
GFSK	2402MHz ~2480 MHz	Channel 1	Channel 20	Channel 40
		2402MHz	2440MHz	2480MHz
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.			

3. General Information

3.1. 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

3.2. General Description of EUT

Product Name:	Single mode Bluetooth(5.0) Module
Model No.(EUT)*:	HJ8258
Trade Mark:	Richmat
EUT Supports Radios application:	Bluetooth V5.0 BLE
Power Supply:	Model No: ZB-H290020-B Input: AC100-240V 1.6A, 50/60Hz Output: DC 29.0V 2.0A 58W
Sample Received Date:	October 17, 2022
Sample Tested Date:	Nov 10, 2022

3.3. Product Specification subjective to this standard

Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	BLE 5.0
Modulation Type:	GFSK
Number of Channel:	40
Sample Type:	Mobile production
Test Software of EUT:	EMI Tool (manufacturer declare)
Antenna Type:	PCB Antenna

Report No. : EED39081604501

Antenna Gain ^① :	5.3dBi
Test Voltage:	AC 120V/60Hz

Note: 1 The antenna gain is provided by the client and we Centre Testing International (Suzhou) CO., LTD. test lab is not responsible for the accuracy of the antenna gain information.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
3	2406MHz	13	2426MHz	23	2446MHz	33	2466MHz
4	2408MHz	14	2428MHz	24	2448MHz	34	2468MHz
5	2410MHz	15	2430MHz	25	2450MHz	35	2470MHz
6	2412MHz	16	2432MHz	26	2452MHz	36	2472MHz
7	2414MHz	17	2434MHz	27	2454MHz	37	2474MHz
8	2416MHz	18	2436MHz	28	2456MHz	38	2476MHz
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

3.4. Tested System Details

Product	Manufacturer	Model No.
handset	Richmat	Model Name.: HJH159B Ble

3.5. Description of Support Units

The EUT has been tested with associated equipment below.

1) support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
NB	ThinkPad	E490	FCC ID and DOC	CTI

3.6. Test Location

All test facilities used to collect the test data are located at Building 18, Zhihui New Town Ecological Industrial Park, No. 1206, Jinyang East Road, Lujia Town, Kunshan, Jiangsu, China.

3.7. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No. 5734.01

Centre Testing International (Suzhou) CO., LTD. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration. Laboratories and any additional program requirements in the identified field of testing.

FCC-Designation No.:CN1290

Centre Testing International Group Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The American association for Centre Testing International Group Co., Ltd. EMC laboratory accreditation Designation No.:CN1290

3.8. Deviation from Standards

None.

3.9. Abnormalities from Standard Conditions

None.

3.10. Other Information Requested by the Customer

None.

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

No.	Item	Measurement Uncertainty
1	Occupied Bandwidth	0.56%
2	RF Power conducted	0.59 dB
3	Power Spectral Density, conducted	2.37 dB
4	Unwanted Emission, conducted	2.68 dB
5	All Emission, radiated	4.41 dB(30MHz-1GHz)
		4.99 dB(1GHz-18GHz)
		5.307 dB(18GHz-40GHz)
6	Temperature test	0.54°C
7	Humidity test	1.62%
8	DC and low frequency voltages test	1.14%

4. Equipment List

966 Semi-anechoic Chamber					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Receiver	R&S	ESU8	100537	2021-12-06	2022-12-05
Spectrum analyzer	R&S	FSV40	101185	2021-12-06	2022-12-05
Preamplifier (30MHz~1GHz)	R&S	SCU-08	100748	2022-05-24	2023-05-23
Preamplifier (1GHz~18GHz)	R&S	SCU-18D	1987397	2021-12-09	2022-12-08
Preamplifier (18GHz~40GHz)	/	MTLNA1804003 0235	12009007	2022-10-14	2023-10-13
Loop Antenna (9kHz~30MHz)	TESEQ	HLA6121	54575	2022-02-26	2023-02-25
Antenna (30MHz~1GHz)	SCHWARZBEC K	VULB9163	9163-965	2022-10-22	2023-10-21
Antenna (1GHz~18GHz)	R&S	HF907	102524	2021-12-14	2022-12-13
Antenna (18GHz~40GHz)	R&S	BBHA9170	1032	2022-10-16	2023-10-15
Band rejection filter	Xi'an xingbo	XBLBQ-DZA81	200827-1-02	/	/

5. Radio Technical Requirements Specification

5.1. 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

5.2. Test Results List

Test requirement	Test method	Test item	Verdict	Note
Part15C Section 15.205/15.209	ANSI C63.10 Section 6.10.5	Restricted bands around fundamental frequency (Radiated Emission)	PASS	Appendix A)
Part15C Section 15.205/15.209	ANSI C63.10 Section 6.4,6.5,6.6	Radiated Spurious Emissions	PASS	Appendix B)

Appendix A): Restricted bands around fundamental frequency (Radiated)

Receiver Setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr><tr><td>Peak</td><td>1MHz</td><td>1/T</td><td>Average</td></tr></table>	Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak	Above 1GHz	Peak	1MHz	3MHz	Peak	Peak	1MHz	1/T	Average	
Frequency	Detector	RBW	VBW	Remark																	
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak																	
Above 1GHz	Peak	1MHz	3MHz	Peak																	
	Peak	1MHz	1/T	Average																	
Test Procedure:	Below 1GHz test procedure as below: a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. 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 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. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel Above 1GHz test procedure as below: a. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter). b. Test the EUT in the lowest channel , the Highest channel c. 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. d. Repeat above procedures until all frequencies measured was complete.																				
Limit:	<table><tr><td>Frequency</td><td>Limit (dBμV/m @3m)</td><td>Remark</td></tr><tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr><tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr><tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr><tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr><tr><td>74.0</td><td>Peak Value</td></tr></table>	Frequency	Limit (dBμV/m @3m)	Remark	30MHz-88MHz	40.0	Quasi-peak Value	88MHz-216MHz	43.5	Quasi-peak Value	216MHz-960MHz	46.0	Quasi-peak Value	960MHz-1GHz	54.0	Quasi-peak Value	Above 1GHz	54.0	Average Value	74.0	Peak Value
Frequency	Limit (dBμV/m @3m)	Remark																			
30MHz-88MHz	40.0	Quasi-peak Value																			
88MHz-216MHz	43.5	Quasi-peak Value																			
216MHz-960MHz	46.0	Quasi-peak Value																			
960MHz-1GHz	54.0	Quasi-peak Value																			
Above 1GHz	54.0	Average Value																			
	74.0	Peak Value																			

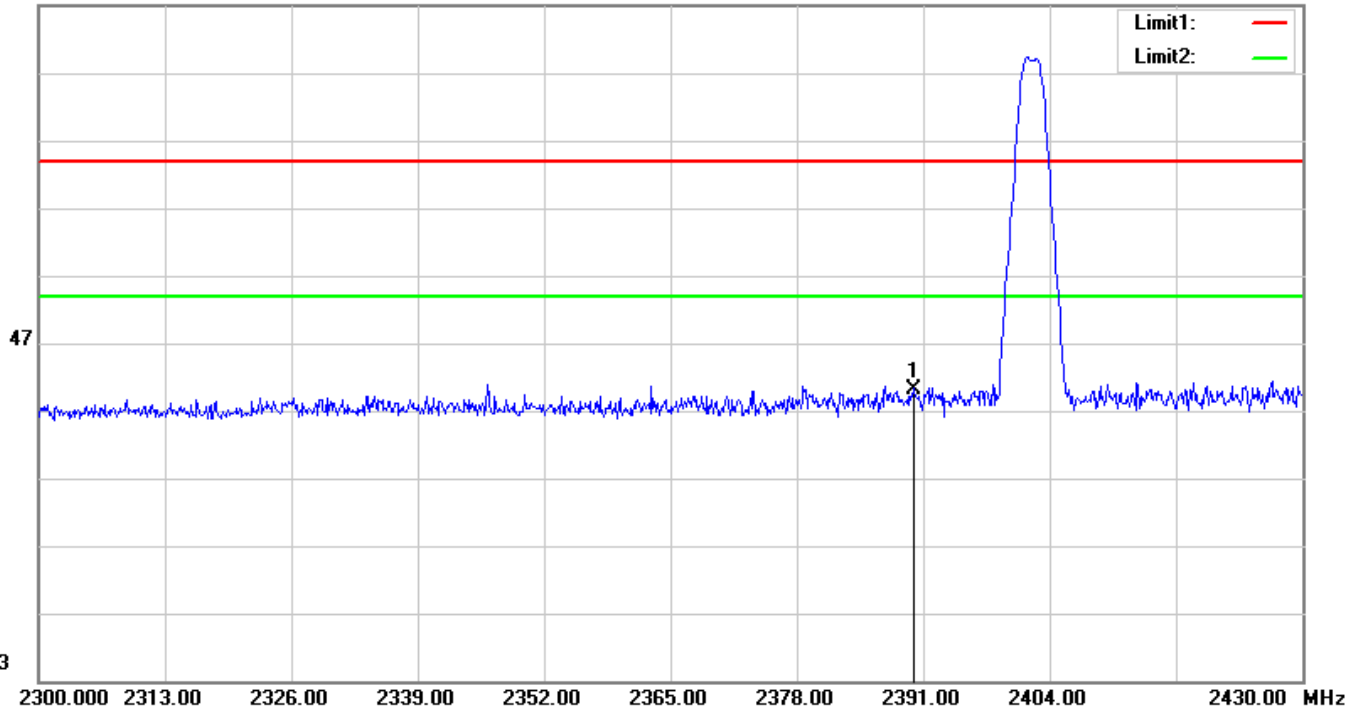
Report No. : EED39O81604501

Test plot as follows:

Mode:	BLE_1M	Channel:	2402
Remark:	Horizontal	Test model No.:	HJH159B Ble

Test Graph

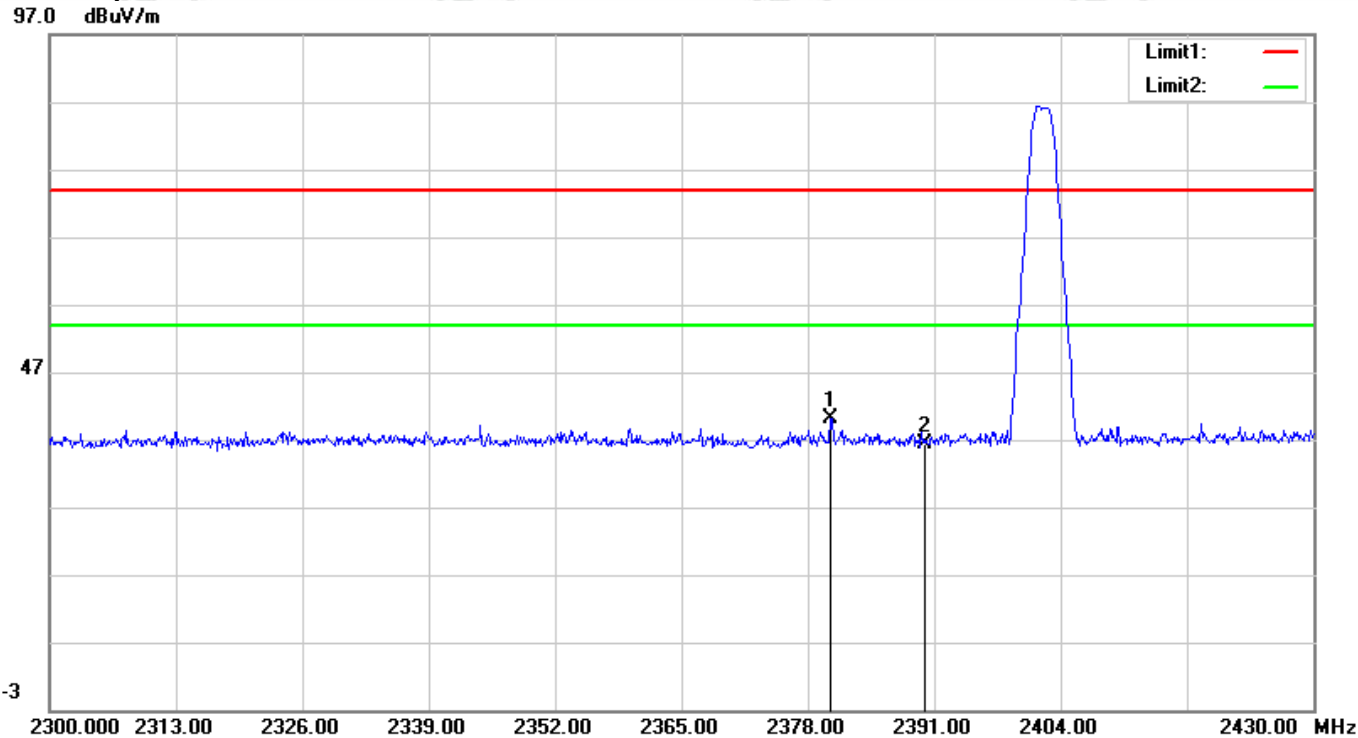
97.0 dBuV/m



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2390.000	37.47	2.71	40.18	74.00	-33.82	200	8	peak

Mode:	BLE_1M	Channel:	2402
Remark:	Vertical	Test model No.:	HJH159B Ble

Test Graph

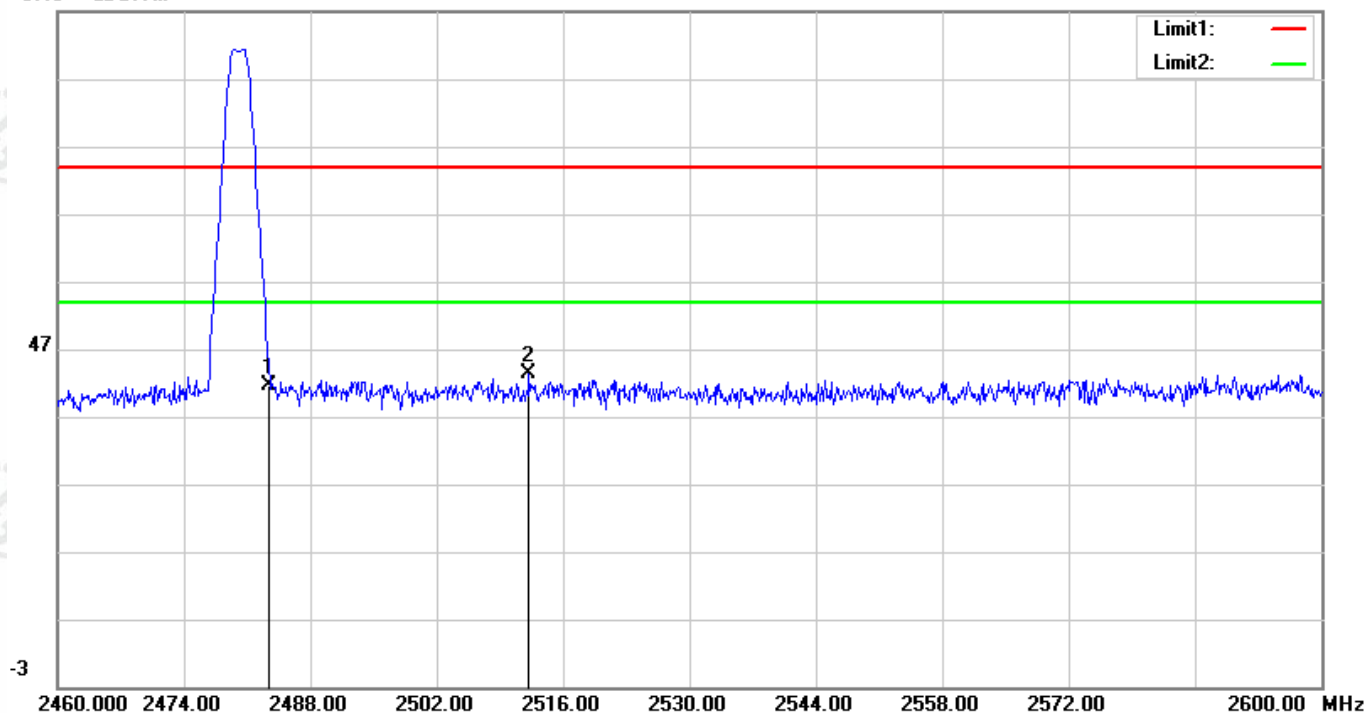


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2380.340	37.43	2.69	40.12	74.00	-33.88	200	290	peak
2	2390.000	33.79	2.71	36.50	74.00	-37.50	200	320	peak

Mode:	BLE_1M	Channel:	2480
Remark:	Horizontal	Test model No.:	HJH159B Ble

Test Graph

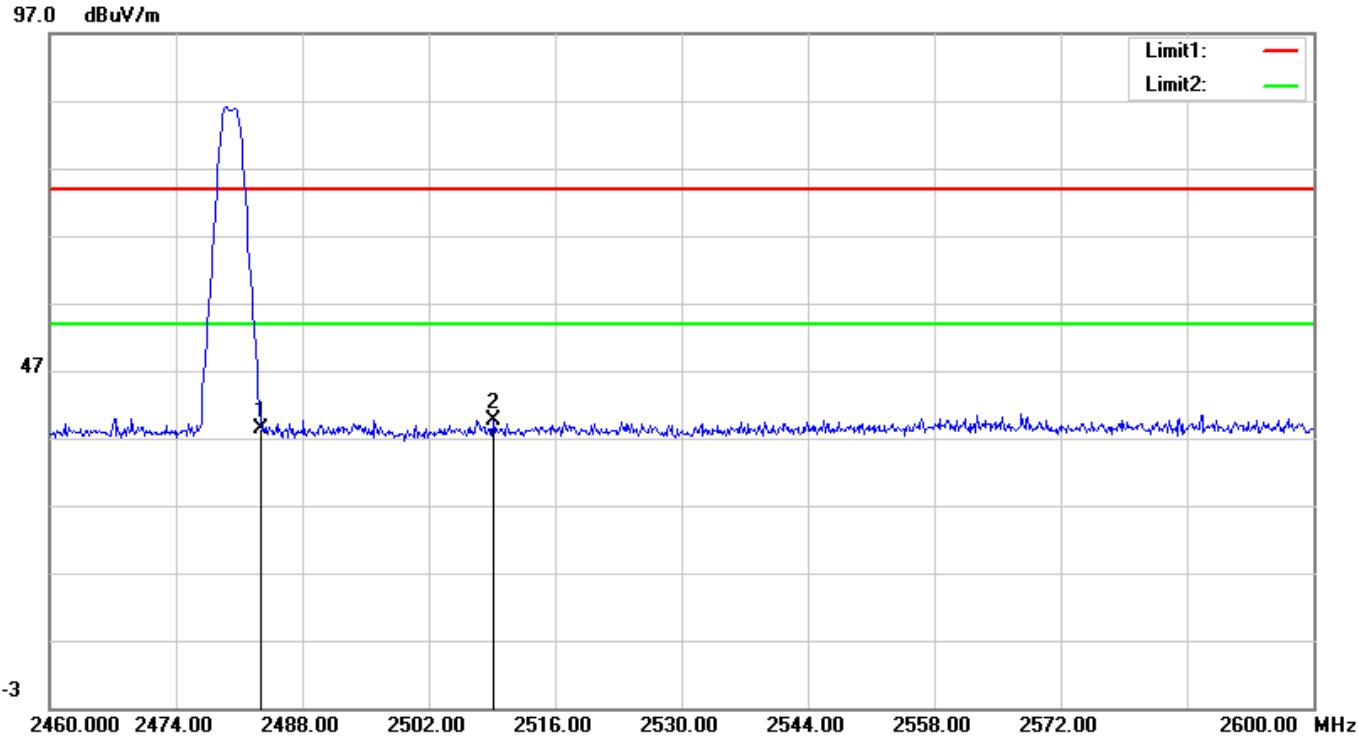
97.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	38.62	2.92	41.54	74.00	-32.46	175	0	peak
2	2512.220	40.47	2.98	43.45	74.00	-30.55	149	0	peak

Mode:	BLE_1M	Channel:	2480
Remark:	Vertical	Test model No.:	HJH159B Ble

Test Graph

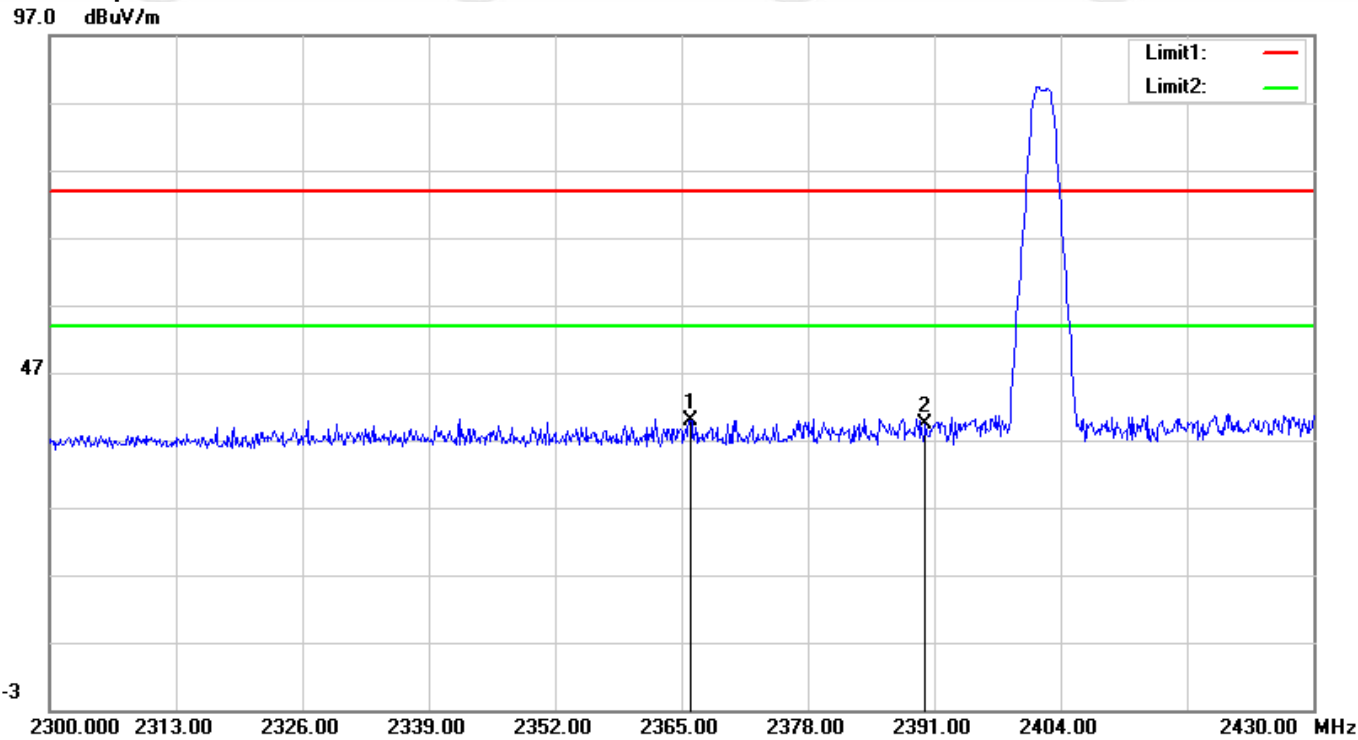


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	35.36	2.92	38.28	74.00	-35.72	162	0	peak
2	2509.140	36.74	2.97	39.71	74.00	-34.29	100	269	peak

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Mode:	BLE_2M	Channel:	2402
Remark:	Horizontal	Test model No.:	HJH159B Ble

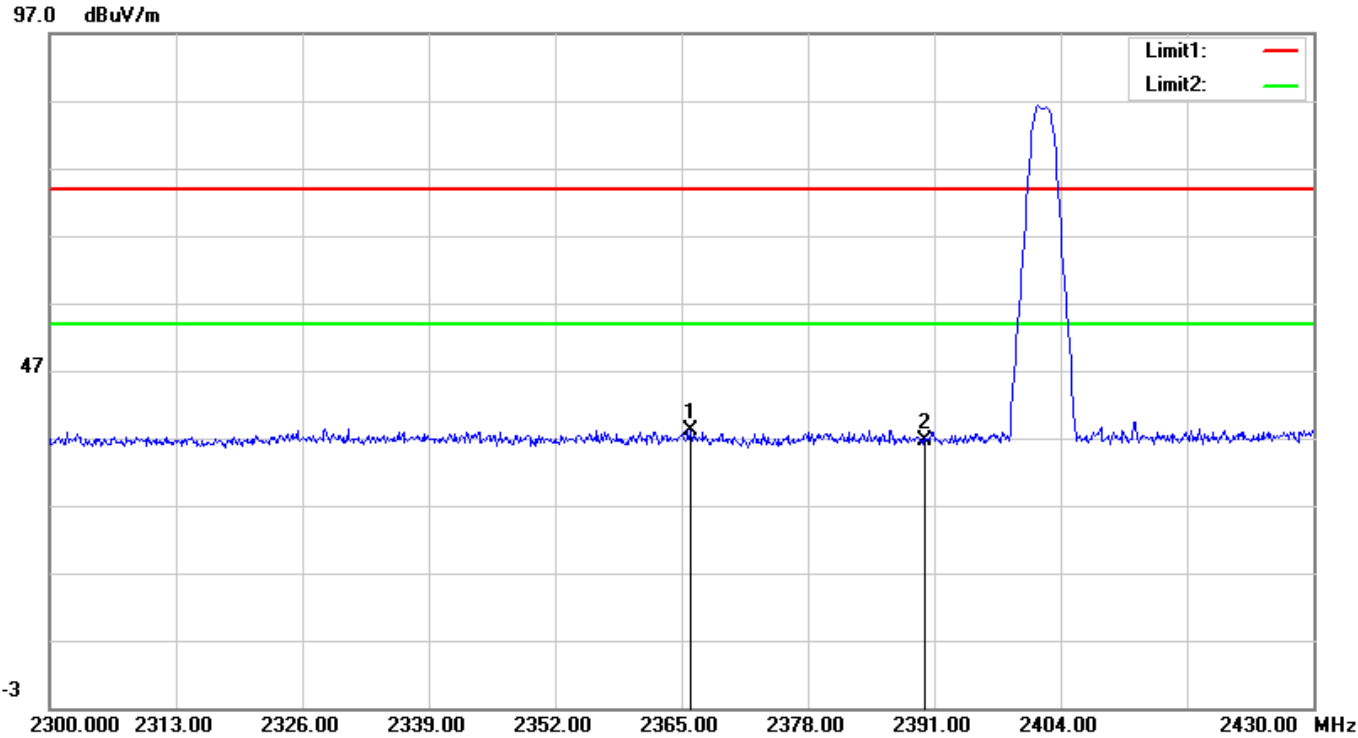
Test Graph



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2365.910	37.23	2.65	39.88	74.00	-34.12	184	0	peak
2	2390.000	36.78	2.71	39.49	74.00	-34.51	100	2	peak

Mode:	BLE_2M	Channel:	2402
Remark:	Vertical	Test model No.:	HJH159B Ble

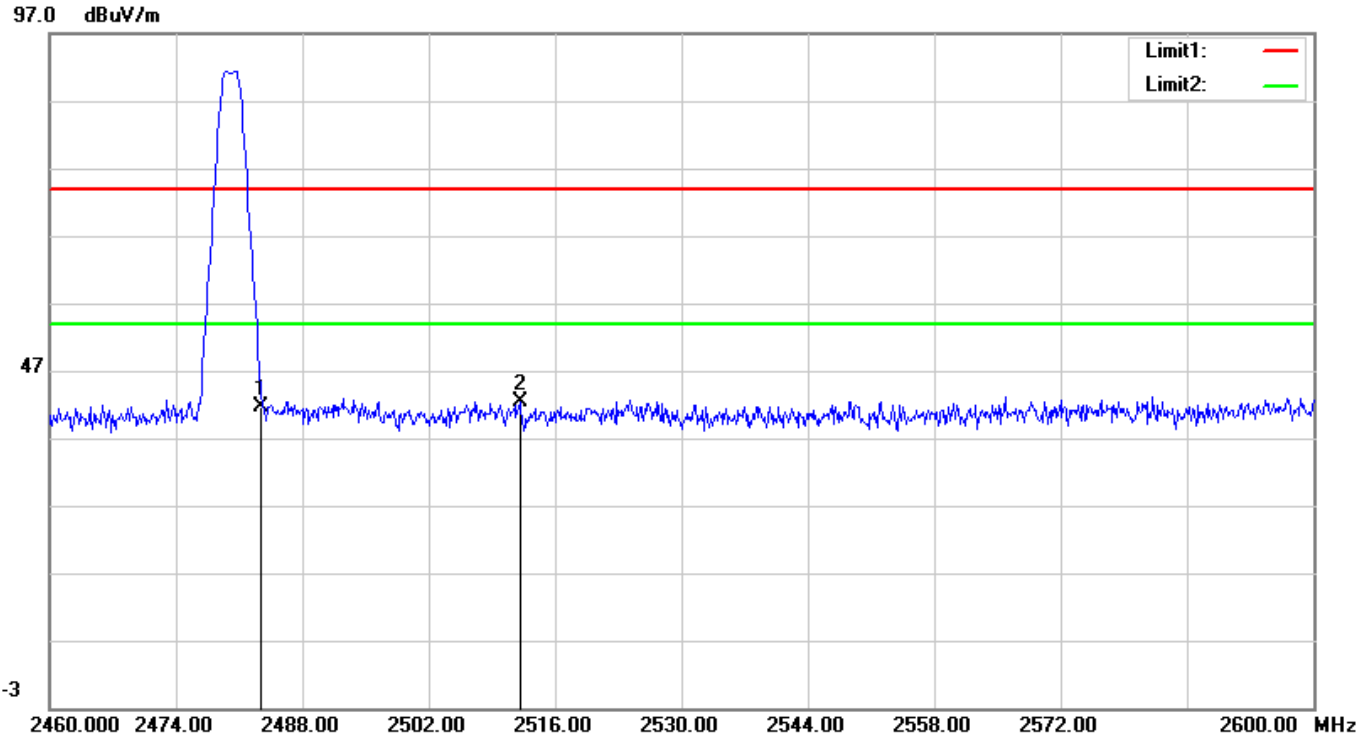
Test Graph



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2365.910	35.55	2.65	38.20	74.00	-35.80	169	0	peak
2	2390.000	33.80	2.71	36.51	74.00	-37.49	146	0	peak

Mode:	BLE_2M	Channel:	2480
Remark:	Horizontal	Test model No.:	HJH159B Ble

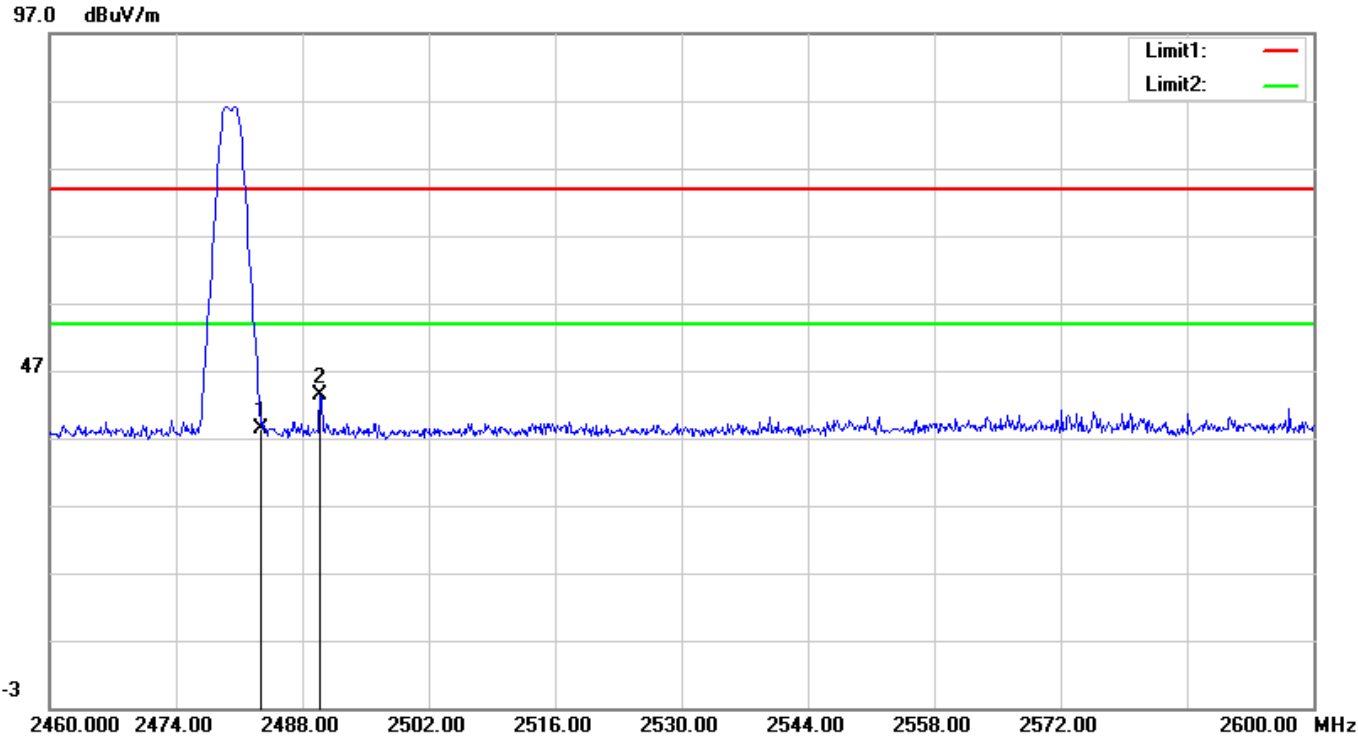
Test Graph



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	38.63	2.92	41.55	74.00	-32.45	194	0	peak
2	2512.080	39.33	2.98	42.31	74.00	-31.69	160	0	peak

Mode:	BLE_2M	Channel:	2480
Remark:	Vertical	Test model No.:	HJH159B Ble

Test Graph

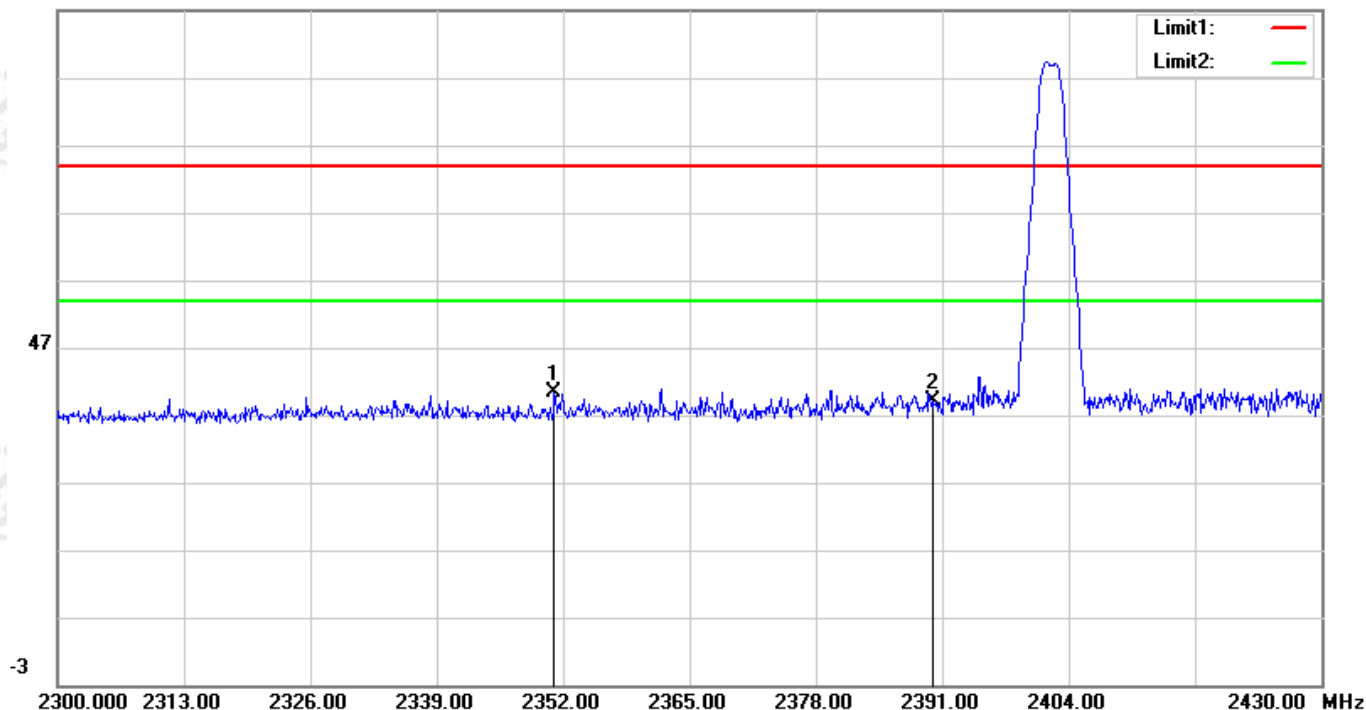


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	35.38	2.92	38.30	74.00	-35.70	198	0	peak
2	2489.960	40.41	2.93	43.34	74.00	-30.66	200	253	peak

Mode:	BLE_125kbps	Channel:	2402
Remark:	Horizontal	Test model No.:	HJH159B Ble

Test Graph

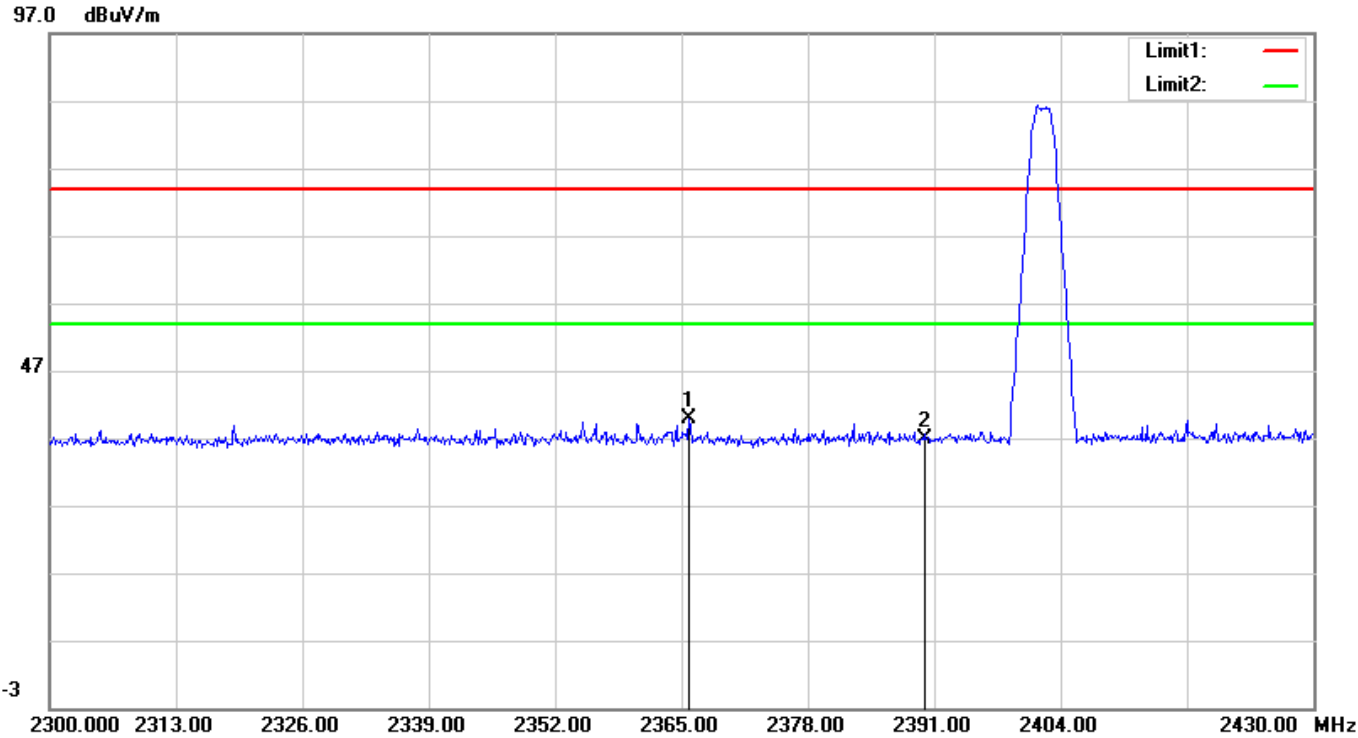
97.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2351.090	37.79	2.61	40.40	74.00	-33.60	100	260	peak
2	2390.000	36.40	2.71	39.11	74.00	-34.89	200	354	peak

Mode:	BLE_125kbps	Channel:	2402
Remark:	Vertical	Test model No.:	HJH159B Ble

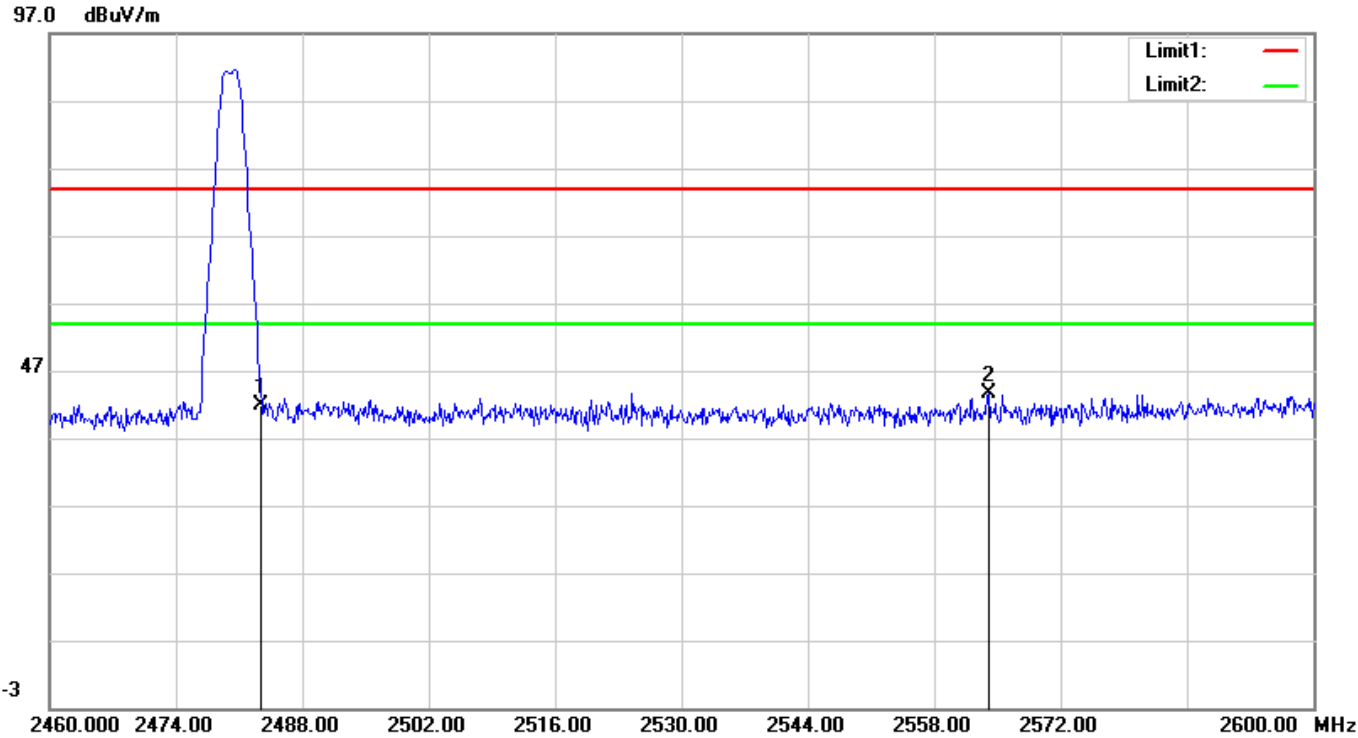
Test Graph



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2365.780	37.17	2.65	39.82	74.00	-34.18	200	299	peak
2	2390.000	34.14	2.71	36.85	74.00	-37.15	200	38	peak

Mode:	BLE_125kbps	Channel:	2480
Remark:	Horizontal	Test model No.:	HJH159B Ble

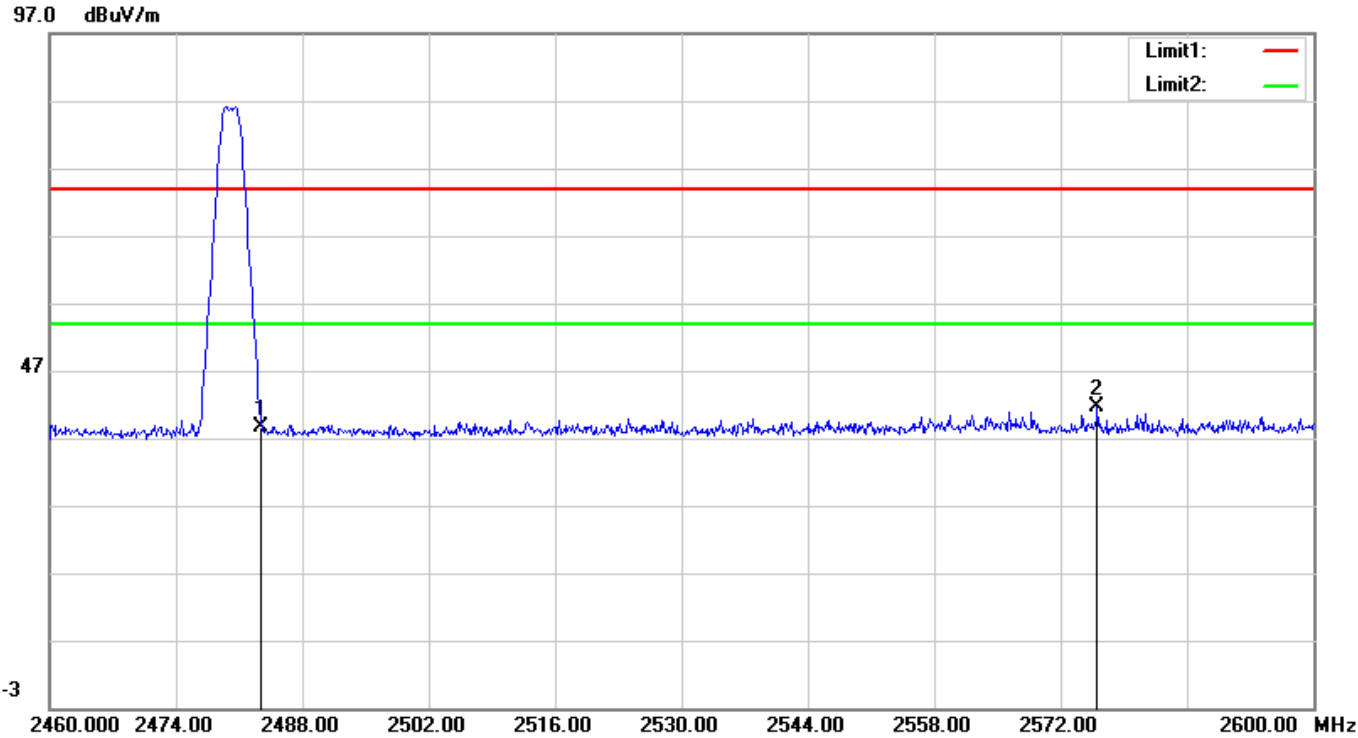
Test Graph



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	38.86	2.92	41.78	74.00	-32.22	145	0	peak
2	2564.020	40.45	3.08	43.53	74.00	-30.47	183	0	peak

Mode:	BLE_125kbps	Channel:	2480
Remark:	Vertical	Test model No.:	HJH159B Ble

Test Graph

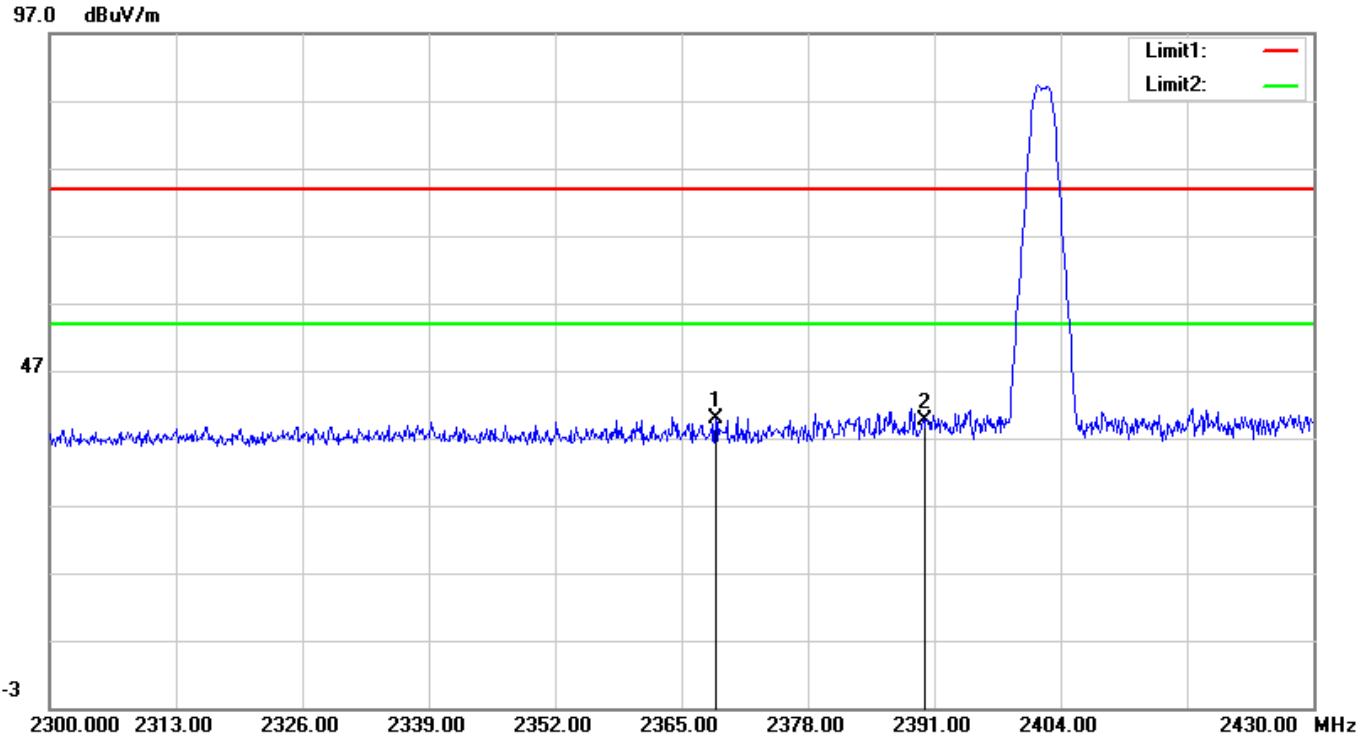


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	35.70	2.92	38.62	74.00	-35.38	200	206	peak
2	2576.060	38.61	3.11	41.72	74.00	-32.28	200	285	peak

Report No. : EED39O81604501

Mode:	BLE_500kbps	Channel:	2402
Remark:	Horizontal	Test model No.:	HJH159B Ble

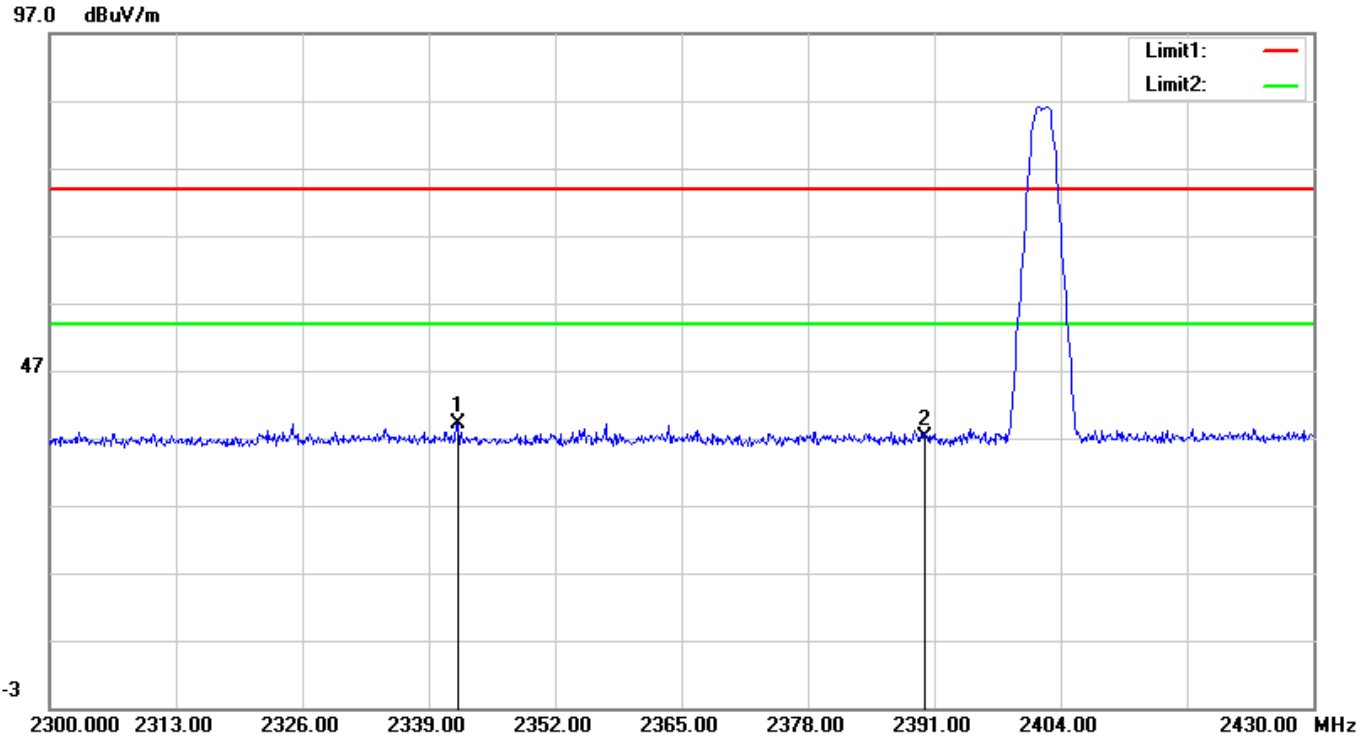
Test Graph



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2368.510	37.23	2.65	39.88	74.00	-34.12	200	354	peak
2	2390.000	36.82	2.71	39.53	74.00	-34.47	200	6	peak

Mode:	BLE_500kbps	Channel:	2402
Remark:	Vertical	Test model No.:	HJH159B Ble

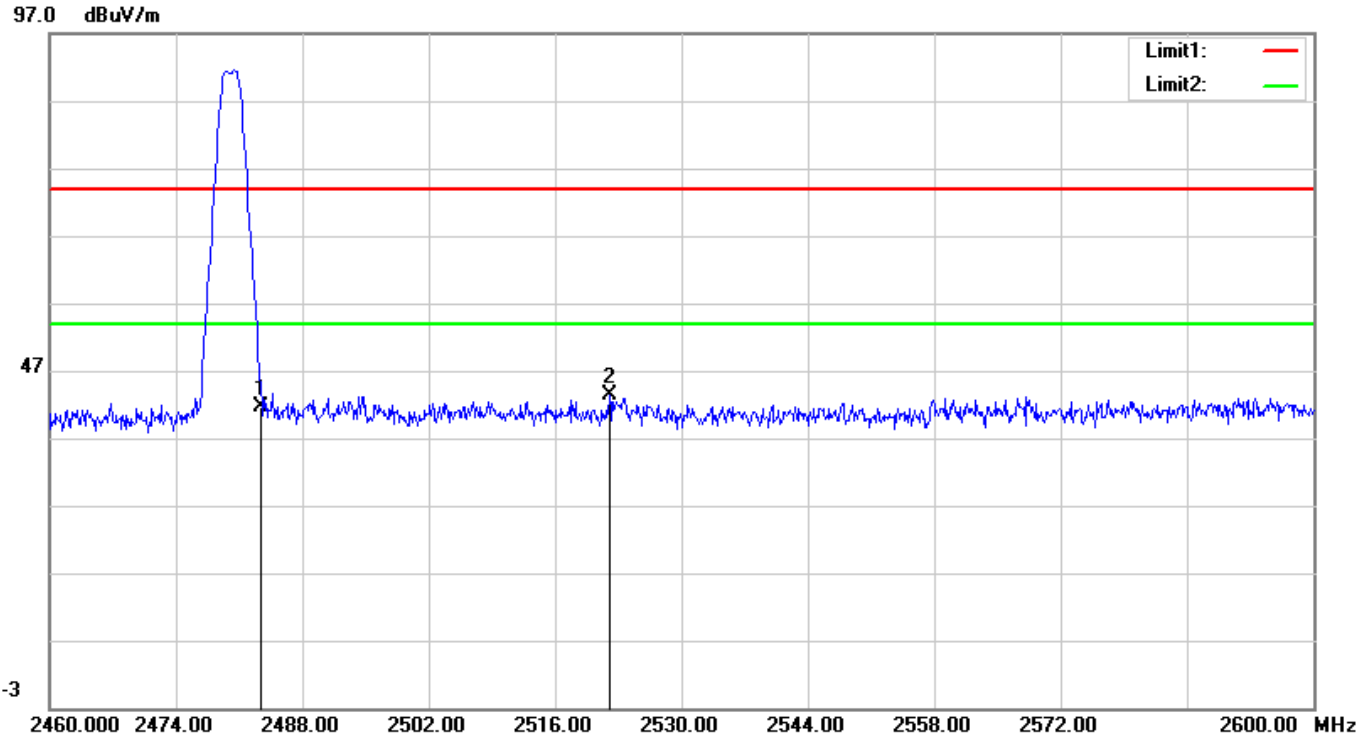
Test Graph



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2341.990	36.58	2.58	39.16	74.00	-34.84	200	40	peak
2	2390.000	34.36	2.71	37.07	74.00	-36.93	200	290	peak

Mode:	BLE_500kbps	Channel:	2480
Remark:	Horizontal	Test model No.:	HJH159B Ble

Test Graph

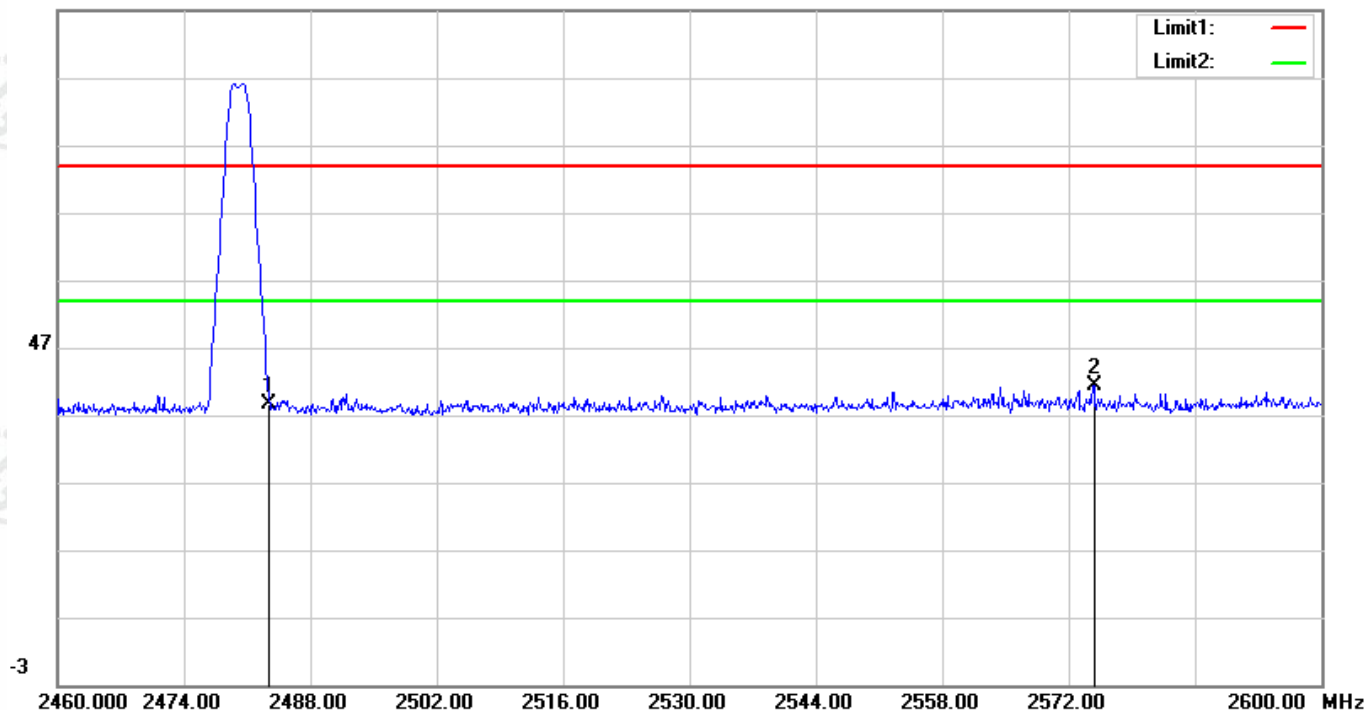


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	2483.500	38.59	2.92	41.51	74.00	-32.49	174	0	peak
2	2522.020	40.36	3.00	43.36	74.00	-30.64	167	0	peak

Mode:	BLE_500kbps	Channel:	2480
Remark:	Vertical	Test model No.:	HJH159B Ble

Test Graph

97.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	35.80	2.92	38.72	74.00	-35.28	134	0	peak
2	2574.800	38.24	3.11	41.35	74.00	-32.65	200	277	peak

Note:

1)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 20dB under any condition of modulation. So, only the peak values are measured:

2) The field strength is calculated by adding the correct Factor. The basic equation with a sample calculation is as follows:

Final Test Level = Reading +Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

Appendix B): Radiated Spurious Emissions

Receiver Setup:	<table><tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr><tr><td>0.009MHz-0.090MHz</td><td>Peak</td><td>10kHz</td><td>30kHz</td><td>Peak</td></tr><tr><td>0.009MHz-0.090MHz</td><td>Average</td><td>10kHz</td><td>30kHz</td><td>Average</td></tr><tr><td>0.090MHz-0.110MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr><tr><td>0.110MHz-0.490MHz</td><td>Peak</td><td>10kHz</td><td>30kHz</td><td>Peak</td></tr><tr><td>0.110MHz-0.490MHz</td><td>Average</td><td>10kHz</td><td>30kHz</td><td>Average</td></tr><tr><td>0.490MHz -30MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr><tr><td>Peak</td><td>1MHz</td><td>1/T</td><td>Average</td></tr></table>	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	1/T	Average
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	1/T	Average																																														
Test Procedure:	Below 1GHz test procedure as below: a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. 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: a. 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). b. Test the EUT in the lowest channel, the middle channel, the Highest channel c. 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. d. Repeat above procedures until all frequencies measured was complete.																																																	
Limit:	<table><tr><th>Frequency</th><th>Field strength microvolt/meter</th><th>Limit (dBµV/m)</th><th>Remark</th><th>Measurement distance (m)</th></tr><tr><td>0.009MHz-0.490MHz</td><td>2400/F(kHz)</td><td>-</td><td>-</td><td>300</td></tr><tr><td>0.490MHz-1.705MHz</td><td>24000/F(kHz)</td><td>-</td><td>-</td><td>30</td></tr><tr><td>1.705MHz-30MHz</td><td>30</td><td>-</td><td>-</td><td>30</td></tr><tr><td>30MHz-88MHz</td><td>100</td><td>40.0</td><td>Quasi-peak</td><td>3</td></tr><tr><td>88MHz-216MHz</td><td>150</td><td>43.5</td><td>Quasi-peak</td><td>3</td></tr><tr><td>216MHz-960MHz</td><td>200</td><td>46.0</td><td>Quasi-peak</td><td>3</td></tr><tr><td>960MHz-1GHz</td><td>500</td><td>54.0</td><td>Quasi-peak</td><td>3</td></tr><tr><td>Above 1GHz</td><td>500</td><td>54.0</td><td>Average</td><td>3</td></tr></table> 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.	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				
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																																														

Report No. : EED39O81604501

Radiated Spurious Emissions test Data:

Radiated Emission below 1GHz:

Mode:	BLE_2M	Channel:	2402
Test model No.:	HJH159B Ble		

Frequency (MHz)	Ant. Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
120.2100	V	44.07	-25.11	18.96	43.50	-24.54	QP
303.5400	V	43.72	-22.20	21.52	46.00	-24.48	QP
558.6500	V	43.92	-17.38	26.54	46.00	-19.46	QP
722.5800	V	53.75	-16.94	36.81	46.00	-9.19	QP
815.7000	V	45.54	-16.03	29.51	46.00	-16.49	QP
901.0600	V	43.64	-13.46	30.18	46.00	-15.82	QP
304.5100	H	48.07	-22.18	25.89	46.00	-20.11	QP
377.2600	H	46.85	-20.54	26.31	46.00	-19.69	QP
717.7300	H	47.00	-16.99	30.01	46.00	-15.99	QP
729.3700	H	51.04	-16.86	34.18	46.00	-11.82	QP
752.6500	H	46.85	-16.59	30.26	46.00	-15.74	QP
909.7900	H	43.26	-13.40	29.86	46.00	-16.14	QP

Notes:

1) Through Pre-scan then find the BLE_2M -CH1 is the worst case mode and only the worst data was recorded.

Transmitter Emission above 1GHz:

Mode:	BLE_1M	Channel:	2402
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4791.000	44.44	9.12	53.56	74.00	-20.44	100	97	peak
2	6661.000	36.80	11.39	48.19	74.00	-25.81	144	0	peak
3	9602.000	35.22	14.87	50.09	74.00	-23.91	100	66	peak

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	3975.000	41.77	7.75	49.52	74.00	-24.48	200	346	peak
2	4791.000	42.45	9.12	51.57	74.00	-22.43	200	304	peak
3	7987.000	35.22	12.94	48.16	74.00	-25.84	200	209	peak
4	9602.000	34.70	14.87	49.57	74.00	-24.43	200	287	peak

Mode:	BLE_1M	Channel:	2440
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4876.000	39.69	9.31	49.00	74.00	-25.00	100	329	peak
2	7324.000	37.75	12.20	49.95	74.00	-24.05	183	0	peak
3	10588.000	34.42	15.96	50.38	74.00	-23.62	100	49	peak

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	3975.000	39.94	7.75	47.69	74.00	-26.31	100	352	peak
2	4876.000	40.85	9.31	50.16	74.00	-23.84	126	360	peak
3	9755.000	36.31	14.75	51.06	74.00	-22.94	100	310	peak

Mode:	BLE_1M	Channel:	2480
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4961.000	43.91	9.51	53.42	74.00	-20.58	200	99	peak
2	7443.000	39.85	12.35	52.20	74.00	-21.80	100	84	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4961.000	40.83	9.51	50.34	74.00	-23.66	200	321	peak
2	7443.000	37.94	12.35	50.29	74.00	-23.71	100	35	peak

Mode:	BLE_2M	Channel:	2402
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4791.000	44.14	9.12	53.26	74.00	-20.74	100	98	peak
2	7205.000	36.65	12.01	48.66	74.00	-25.34	200	63	peak
3	10673.000	34.08	16.08	50.16	74.00	-23.84	129	0	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	3992.000	44.99	7.83	52.82	74.00	-21.18	200	337	peak
2	4791.000	39.96	9.12	49.08	74.00	-24.92	148	360	peak
3	9602.000	35.17	14.87	50.04	74.00	-23.96	200	312	peak

Mode:	BLE_2M	Channel:	2440
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4876.000	43.93	9.31	53.24	74.00	-20.76	100	84	peak
2	7324.000	37.55	12.20	49.75	74.00	-24.25	140	0	peak
3	9755.000	34.38	14.75	49.13	74.00	-24.87	100	160	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	3975.000	40.61	7.75	48.36	74.00	-25.64	200	345	peak
2	4876.000	40.54	9.31	49.85	74.00	-24.15	107	360	peak
3	7324.000	38.06	12.20	50.26	74.00	-23.74	200	36	peak

Mode:	BLE_2M	Channel:	2480
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4961.000	46.40	9.51	55.91	74.00	-18.09	200	97	peak
2	4961.000	30.12	9.51	39.63	54.00	-14.37	200	97	AVG
3	7443.000	42.32	12.35	54.67	74.00	-19.33	200	72	peak
4	7443.000	26.12	12.35	38.47	54.00	-15.53	200	72	AVG

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4961.000	41.77	9.51	51.28	74.00	-22.72	100	326	peak
2	7443.000	40.24	12.35	52.59	74.00	-21.41	100	79	peak
3	9925.000	41.20	14.61	55.81	74.00	-18.19	100	318	peak
4	9925.000	24.65	14.61	39.26	54.00	-14.74	100	318	AVG

Mode:	BLE_125kbps	Channel:	2402
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4808.000	44.62	9.16	53.78	74.00	-20.22	100	91	peak
2	7205.000	35.44	12.01	47.45	74.00	-26.55	100	78	peak
3	10622.000	33.73	16.02	49.75	74.00	-24.25	133	0	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4791.000	43.45	9.12	52.57	74.00	-21.43	200	339	peak
2	7205.000	37.35	12.01	49.36	74.00	-24.64	200	16	peak
3	10673.000	33.83	16.08	49.91	74.00	-24.09	200	239	peak

Mode:	BLE_125kbps	Channel:	2440
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4876.000	44.67	9.31	53.98	74.00	-20.02	100	108	peak
2	6967.000	35.15	11.65	46.80	74.00	-27.20	100	356	peak
3	7324.000	36.57	12.20	48.77	74.00	-25.23	100	80	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4876.000	39.79	9.31	49.10	74.00	-24.90	100	339	peak
2	7324.000	37.56	12.20	49.76	74.00	-24.24	200	24	peak
3	9755.000	35.58	14.75	50.33	74.00	-23.67	100	320	peak

Mode:	BLE_125kbps	Channel:	2480
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	1884.000	49.91	0.63	50.54	74.00	-23.46	100	360	peak
2	4961.000	44.31	9.51	53.82	74.00	-20.18	200	100	peak
3	7443.000	40.24	12.35	52.59	74.00	-21.41	200	77	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	3975.000	40.28	7.75	48.03	74.00	-25.97	200	341	peak
2	4961.000	39.62	9.51	49.13	74.00	-24.87	200	329	peak
3	7443.000	35.60	12.35	47.95	74.00	-26.05	200	43	peak

Mode:	BLE_500kbps	Channel:	2402
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4791.000	41.63	9.12	50.75	74.00	-23.25	200	101	peak
2	7987.000	35.07	12.94	48.01	74.00	-25.99	150	0	peak
3	9602.000	35.22	14.87	50.09	74.00	-23.91	100	74	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4808.000	41.86	9.16	51.02	74.00	-22.98	200	328	peak
2	7205.000	37.33	12.01	49.34	74.00	-24.66	200	63	peak
3	9602.000	36.52	14.87	51.39	74.00	-22.61	200	328	peak

Mode:	BLE_500kbps	Channel:	2440
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4876.000	38.59	9.31	47.90	74.00	-26.10	100	106	peak
2	7324.000	37.95	12.20	50.15	74.00	-23.85	100	360	peak
3	9755.000	34.75	14.75	49.50	74.00	-24.50	141	0	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4876.000	40.91	9.31	50.22	74.00	-23.78	147	360	peak
2	7324.000	38.59	12.20	50.79	74.00	-23.21	200	72	peak
3	9755.000	37.38	14.75	52.13	74.00	-21.87	200	294	peak

Mode:	BLE_500kbps	Channel:	2480
Test model No.:	HJH159B Ble		

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	4961.000	43.54	9.51	53.05	74.00	-20.95	100	106	peak
2	7443.000	39.41	12.35	51.76	74.00	-22.24	100	75	peak
3	10571.000	34.38	15.91	50.29	74.00	-23.71	100	232	peak

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	3992.000	39.47	7.83	47.30	74.00	-26.70	200	25	peak
2	4961.000	39.02	9.51	48.53	74.00	-25.47	102	360	peak
3	7443.000	38.06	12.35	50.41	74.00	-23.59	184	360	peak

Note:

1) 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 values are measured:

2) The field strength is calculated by adding the correct Factor. The basic equation with a sample calculation is as follows:

Final Test Level = Reading + Correct Factor

Correct Factor = Preamplifier Factor – Antenna Factor – Cable Factor

3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.