



**FCC 47 CFR PART 15 SUBPART C  
CERTIFICATION TEST REPORT**

*For*

**Smart WiFi Multicolor Light Bulb**

**MODEL NUMBER: IOT-CL1B-5-E26-US**

**ADDITIONAL MODEL NUMBER:  
IOT-LB5C1-A60-H-E26-US; IOT-LB5C1-A19-H-E26-US**

**PROJECT NUMBER: 4790534905-2**

**REPORT NUMBER: 4790534905-2-1**

**FCC ID: 2AVYF-B5-E26-1**

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*Prepared for*

**Hangzhou Huacheng Network Technology Co., Ltd.**

*Prepared by*

**UL-CCIC COMPANY LIMITED  
No. 2, Chengwan Road, Suzhou Industrial Park, People's Republic of China  
Tel: +86 512-6808 6400  
Fax: +86 512-6808 4099  
Website: [www.ul.com](http://www.ul.com)**



Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V0	09/06/2022	Initial Issue	



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# 1. ATTESTATION OF TEST RESULTS

## Applicant Information

Company Name: Hangzhou Huacheng Network Technology Co., Ltd.  
Address: 13th Floor, Building 3, No. 1399, Binxing Road, Changhe Street, Binjiang District, Hangzhou, China (Zhejiang) Pilot Free Trade Zone

## Manufacturer Information

Company Name: Hangzhou Huacheng Network Technology Co., Ltd.  
Address: 13th Floor, Building 3, No. 1399, Binxing Road, Changhe Street, Binjiang District, Hangzhou, China (Zhejiang) Pilot Free Trade Zone

## EUT Description

Product Name: Smart WiFi Multicolor Light Bulb  
Model Name: IOT-CL1B-5-E26-US  
Additional Model Number: IOT-LB5C1-A60-H-E26-US; IOT-LB5C1-A19-H-E26-US  
Model Difference: Only the main model IOT-CL1B-5-E26-US was tested and only the data of this model is shown in this test report. Since their electrical circuit design, layout, components, and internal wiring are identical, only the color of the appearance is different.  
Sample Number: 5267991  
Data of Receipt Sample: Aug. 23, 2022  
Date Tested: Aug. 24, 2022 ~ Sep. 05, 2022

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS



Summary of Test Results			
Clause	Test Items	FCC Rules	Test Results
1	6dB Bandwidth and 99% Occupied Bandwidth	FCC 15.247 (a) (2)	PASS
2	Conducted Power	FCC 15.247 (b) (3)	PASS
3	Power Spectral Density	FCC 15.247 (e)	PASS
4	Conducted Band edge And Spurious emission	FCC 15.247 (d)	PASS
5	Radiated Band edges and Spurious emission	FCC 15.247 (d) FCC 15.209 FCC 15.205	PASS
6	Conducted Emission Test for AC Power Port	FCC 15.207	PASS
7	Antenna Requirement	FCC 15.203	PASS
Note: The measurement result for the sample received is <Pass> according to < ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15C> when <Accuracy Method> decision rule is applied.			

Prepared By:

*Tom Tang*

Tom Tang

Reviewed By:

*Leon Wu*

Leon Wu

Authorized By:

*Chris Zhong*

Chris Zhong  
EMC&RF Lab Operations Manager



## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

## 3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p><b>A2LA (Certificate No.: 4829.01)</b>  <b>UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA.</b></p> <p><b>FCC (FCC Designation No.: CN1247)</b>  <b>UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.</b></p> <p><b>IC (IC Designation No.: 25056; CAB No.: CN0073)</b>  <b>UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.</b></p>
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Note 1: All tests measurement facilities use to collect the measurement data are located at No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, People's Republic of China

Note 2: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. These measurements below 30MHz had been correlated to measurements performed on an OFS.

Note 3: The test anechoic chamber in UL-CCIC COMPANY LIMITED had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.



## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.1dB
Radiation Emission test (include Fundamental emission) (9kHz-30MHz)	3.4dB
Radiation Emission test (include Fundamental emission) (30MHz-1GHz)	3.4dB
Radiation Emission test (1GHz to 26GHz) (include Fundamental emission)	3.9dB (1GHz-18GHz)
	4.2dB (18GHz-26.5GHz)

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

Equipment	Smart WiFi Multicolor Light Bulb	
Model Name	IOT-CL1B-5-E26-US	
Product Description	Operation Frequency	2402 MHz ~ 2480 MHz
	Modulation Type	Data Rate
	GFSK	1Mbps
Rated Input	AC 120V/50Hz	
Bluetooth Version	LE	
Hardware Version	V1.0	
Test software of EUT:	SecureCRT (manufacturer declare)	
Antenna Type:	PCB Antenna	
Antenna Gain:	1.72 dBi	
	Note: This data is provided by customer and our lab isn't responsible for this data.	





### 5.2. MAXIMUM OUTPUT POWER

Bluetooth Mode	Frequency (MHz)	Channel Number	Max Output Power(dBm)
BLE	2402-2480	0-39[40]	8.84

### 5.3. CHANNEL LIST

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

### 5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel		Frequency
GFSK	Low Channel	CH 0	2402MHz
	Middle Channel	CH 19	2440MHz
	High Channel	CH 39	2480MHz

### 5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band				
Test Software		SecureCRT		
Modulation Type	Transmit Antenna Number	Test Channel		
		LCH	MCH	HCH
GFSK	1	default	default	default



### 5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2400-2483.5	PCB Antenna	1.72

Note: This data is provided by customer and our lab isn't responsible for this data.

Test Mode	Transmit and Receive Mode	Description
BLE	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna independently.

Note: BLE & WLAN 2.4G can't transmit simultaneously. (Declared by client)

### 5.7. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65%	
Atmospheric Pressure:	101kPa	
Temperature	TN	23 ~ 28°C
Voltage:	VL	N/A
	VN	AC 120V
	VH	N/A

Note: VL= Lower Extreme Test Voltage  
VN= Nominal Voltage  
VH= Upper Extreme Test Voltage  
TN= Normal Temperature

## 5.8. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Description
1	Laptop	ThinkPad	E550c	N/A
2	Fixed Frequency Board	N/A	N/A	Supply by UL Lab

### I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB	USB	USB to TTL	100cm Length (Supply by UL Lab)	/

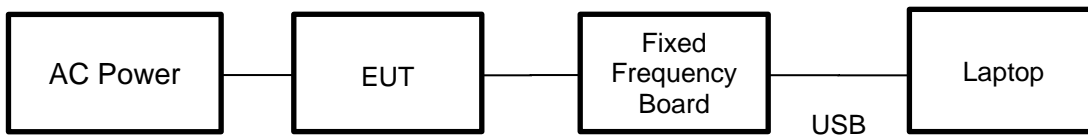
### ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	/	/	/	/

### TEST SETUP

The EUT can work in an engineer mode with a software through a table PC.

### SETUP DIAGRAM FOR TESTS





### 5.9. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions (Instrument)							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESR3	126700	2020-12-05	2021-12-04	2022-12-03
<input checked="" type="checkbox"/>	Two-Line V-Network	R&S	ENV216	126701	2020-12-05	2021-12-04	2022-12-03
<input checked="" type="checkbox"/>	Artificial Mains Networks	R&S	ENY81	126711	2021-10-12	2022-10-09	2023-10-08
Software							
Used	Description	Manufacturer	Name	Version			
<input checked="" type="checkbox"/>	Test Software for Conducted disturbance	R&S	EMC32	Ver. 9.25			
Radiated Emissions (Instrument)							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9010B	155727	2021-05-09	2022-04-09	2023-04-08
<input checked="" type="checkbox"/>	EMI test receiver	R&S	ESR26	126703	2020-12-05	2021-12-04	2022-12-03
<input checked="" type="checkbox"/>	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB 1513	155456	2018-06-15	2021-06-03	2024-06-02
<input checked="" type="checkbox"/>	Receiver Antenna (30MHz-1GHz)	SunAR RF Motion	JB1	177821	2019-01-19	2022-01-18	2025-01-17
<input checked="" type="checkbox"/>	Receiver Antenna (1GHz-18GHz)	R&S	HF907	126705	2019-01-27	2022-02-28	2025-02-27
<input checked="" type="checkbox"/>	Receiver Antenna (18GHz-26.5GHz)	Schwarzbeck	BBHA9170	126706	2019-02-29	2022-02-28	2025-02-27
<input checked="" type="checkbox"/>	Pre-amplification (To 18GHz)	Compliance Direction System Inc.	PAP-1G18-50	178825	2021-03-26	2022-03-01	2023-02-28
<input checked="" type="checkbox"/>	Pre-amplification (To 26.5GHz)	R&S	SCU-26D	135391	2020-12-05	2021-12-04	2022-12-03
<input checked="" type="checkbox"/>	Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	1	2021-05-09	2022-05-08	2023-05-07
<input checked="" type="checkbox"/>	Highpass Filter	Wainwright	WHKX10-2700-3000-18000-40SS	2	2021-05-09	2022-05-08	2023-05-07
Software							
Used	Description	Manufacturer	Name	Version			
<input checked="" type="checkbox"/>	Test Software for Radiated disturbance	Tonscend	TS+	Ver. 2.5			
Other instruments							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9010B	155368	2021-05-09	2022-05-08	2023-05-07
<input checked="" type="checkbox"/>	Power Meter	MW100-RFCB	221694	/	2022-05-23	2023-05-22	MW100-RFCB



## 6. MEASUREMENT METHODS

No.	Test Item	KDB Name	Section
1	6dB Bandwidth	KDB 558074 D01 15.247 Meas Guidance v05r02	8.2
2	Output Power	KDB 558074 D01 15.247 Meas Guidance v05r02	8.3.1.3/8.3.2.3
3	Power Spectral Density	KDB 558074 D01 15.247 Meas Guidance v05r02	8.4
4	Out-of-band emissions in non-restricted bands	KDB 558074 D01 15.247 Meas Guidance v05r02	8.5
5	Out-of-band emissions in restricted bands	KDB 558074 D01 15.247 Meas Guidance v05r02	8.6
6	Band-edge	KDB 558074 D01 15.247 Meas Guidance v05r02	8.7
7	Conducted Emission Test for AC Power Port	ANSI C63.10-2013	6.2



## 7. ANTENNA PORT TEST RESULTS

### 7.1. ON TIME AND DUTY CYCLE

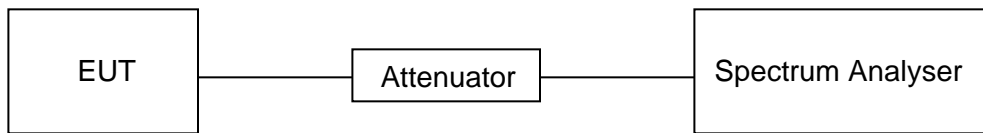
#### LIMITS

None; for reporting purposes only

#### PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

#### TEST SETUP



#### TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V

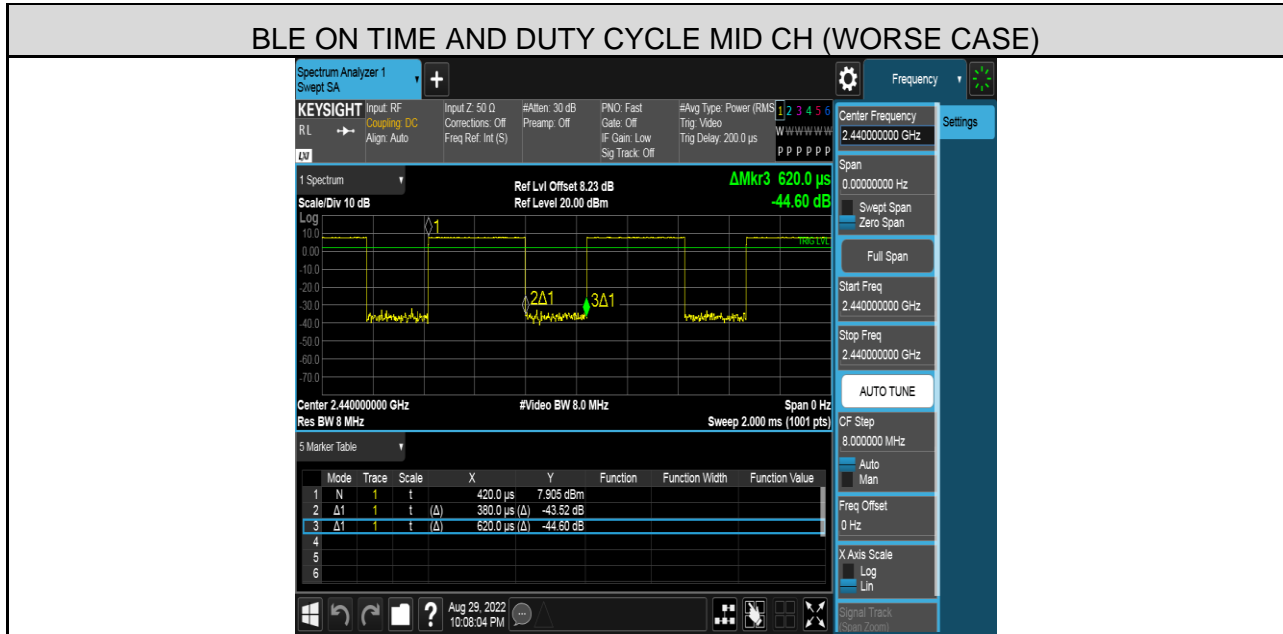
#### TEST RESULTS TABLE

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (kHz)	Final VBW (kHz)
BLE	0.38	0.62	0.6129	61.29%	2.13	2.63	3

Note: 1) Duty Cycle Correction Factor=10log(1/x).  
 2) Where: x is Duty Cycle (Linear)  
 3) Where: T is On Time (transmit duration)



TEST GRAPHS



## 7.2. 6 dB BANDWIDTH

### LIMITS

FCC Part15 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2)	6dB Bandwidth	$\geq 500\text{kHz}$	2400-2483.5

### TEST PROCEDURE

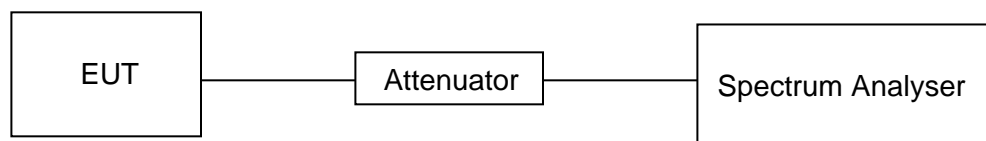
Refer to ANSI C63.10-2013 clause 11.8 for DTS bandwidth and clause 6.9 for Occupied Bandwidth.

Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth: 100 kHz
VBW	For 6 dB Bandwidth: $\geq 3 \times \text{RBW}$
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### TEST SETUP







**TEST ENVIRONMENT**

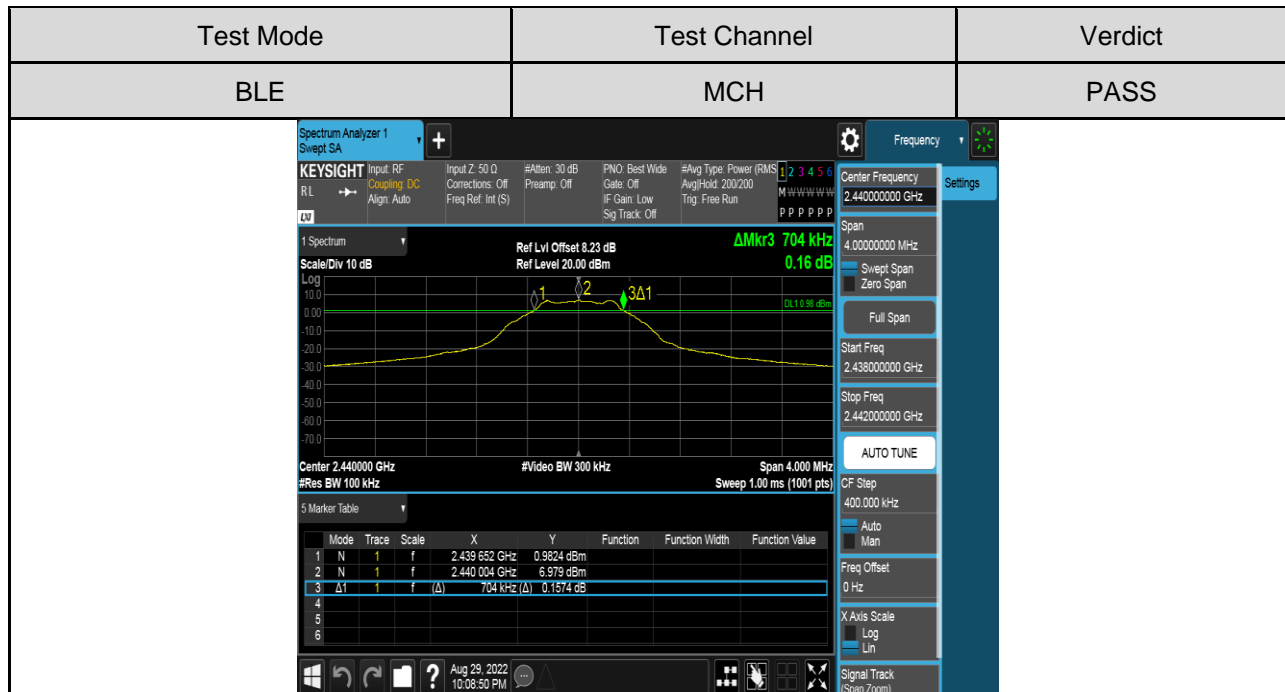
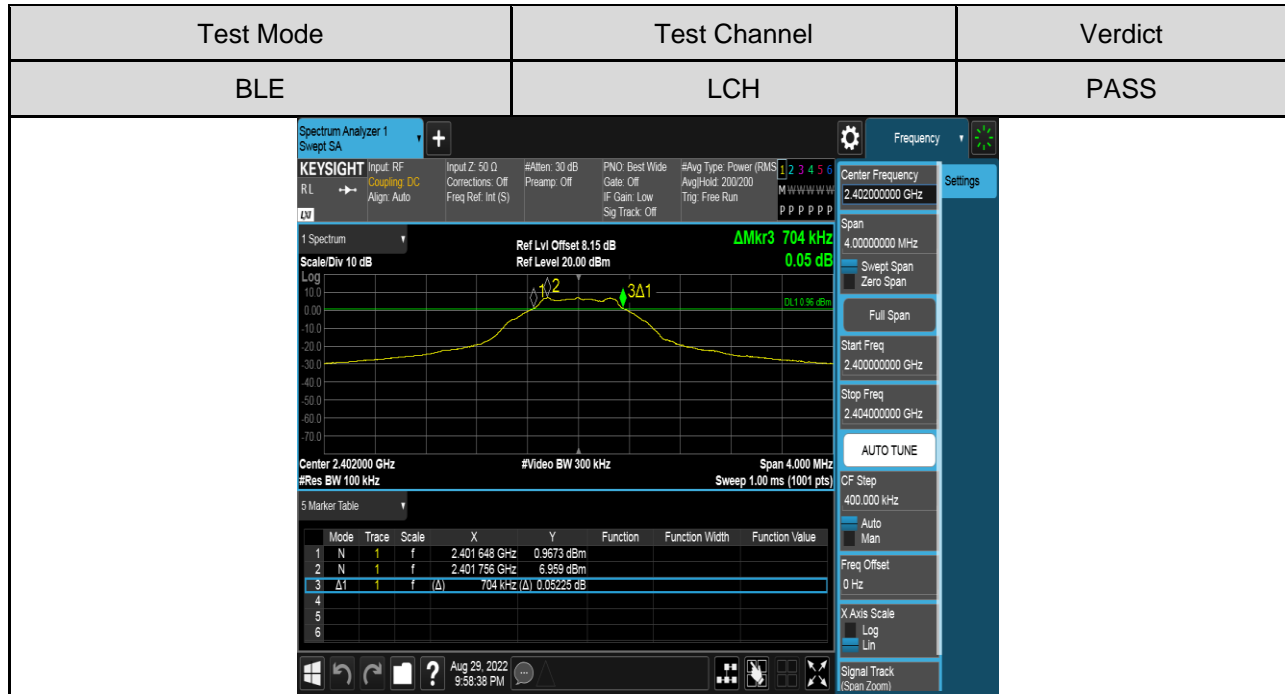
Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V

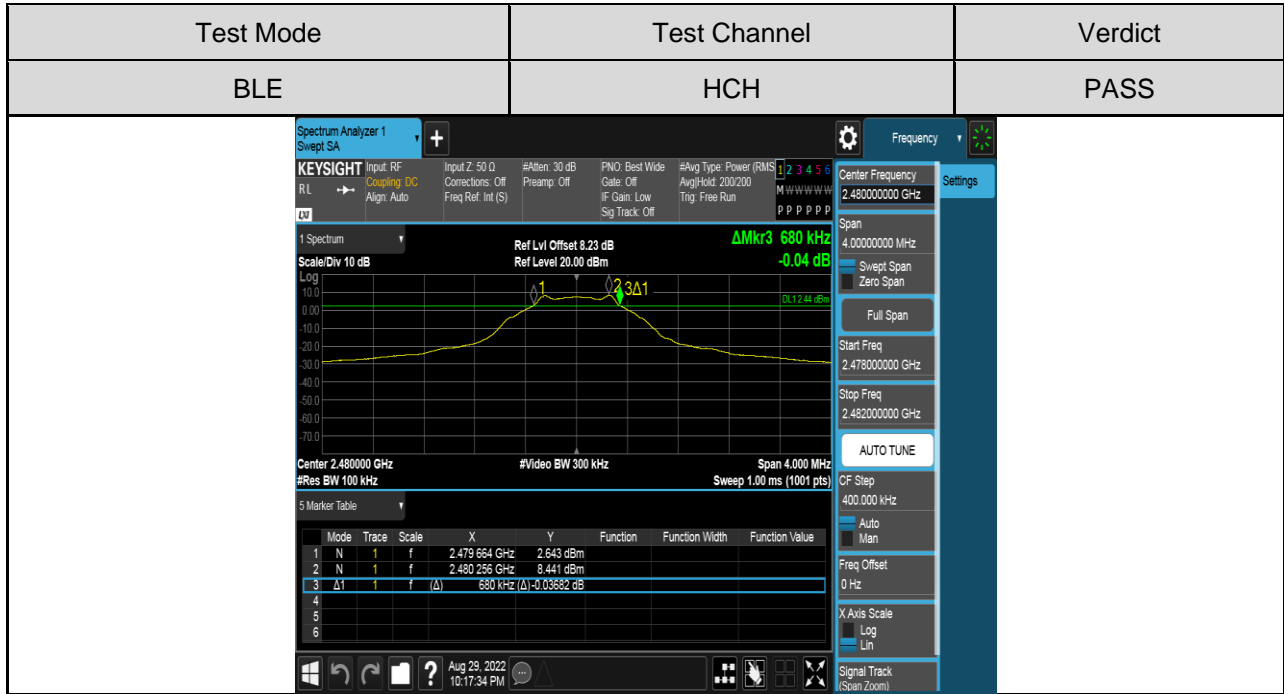
**TEST RESULTS TABLE**

Test Mode	Test Channel	6dB bandwidth (MHz)	Result
BLE	LCH	0.704	Pass
	MCH	0.704	Pass
	HCH	0.680	Pass



**TEST GRAPHS**







### 7.3. CONDUCTED OUTPUT POWER

#### LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3)	Peak Output Power	1 watt or 30dBm (See note1)	2400-2483.5
<b>Note:</b> If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.			

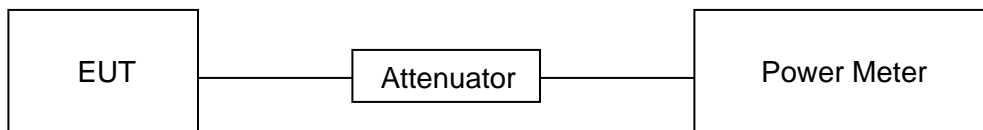
#### TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.  
 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.  
 Measure the power of each channel.  
 PK Detector used for PK result.

#### TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V

#### TEST SETUP





**TEST RESULTS TABLE**

Test Mode	Test Channel	Maximum Conducted Output Power (PK)	LIMIT
		dBm	dBm
BLE	LCH	7.83	30
	MCH	7.76	30
	HCH	8.84	30



## 7.4. POWER SPECTRAL DENSITY

### LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e)	Power Spectral Density	8 dBm/3 kHz (See note1)	2400-2483.5
<b>Note:</b> 1. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.			

### TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

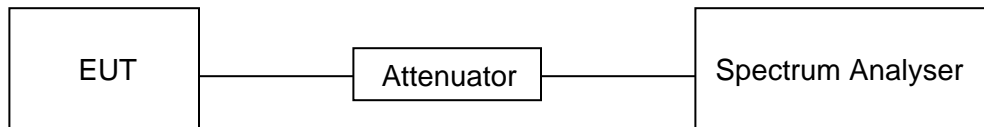
Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V

### TEST SETUP



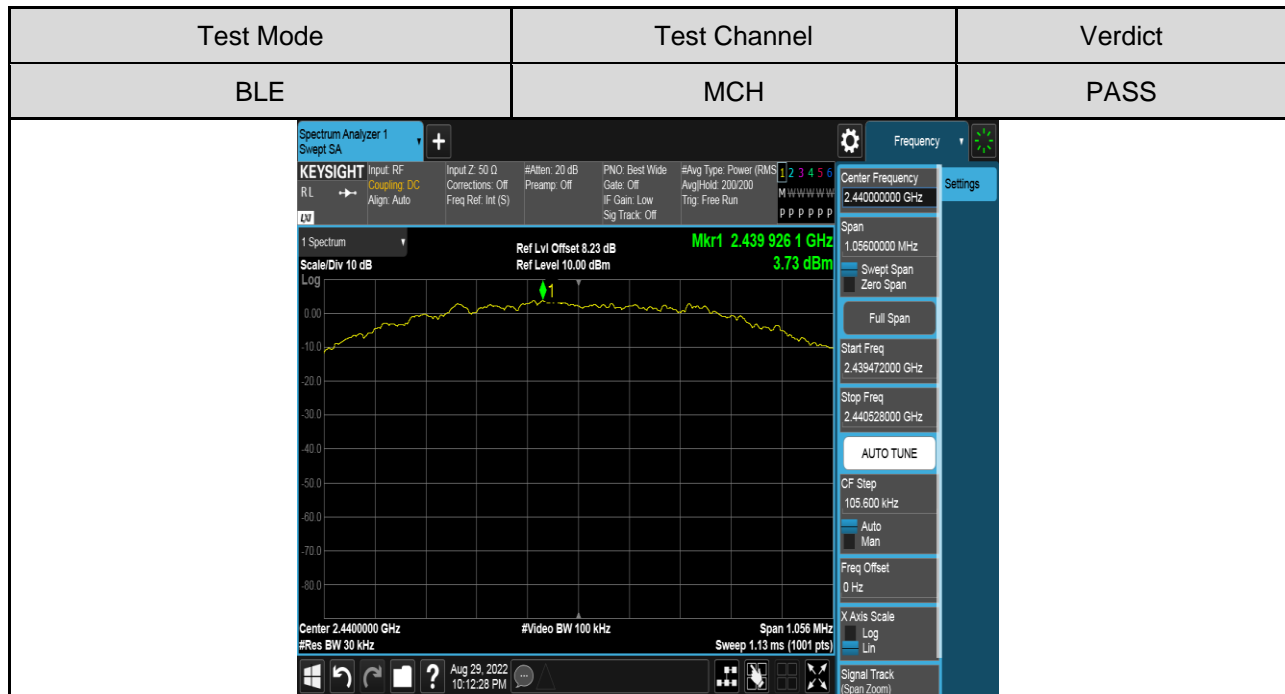
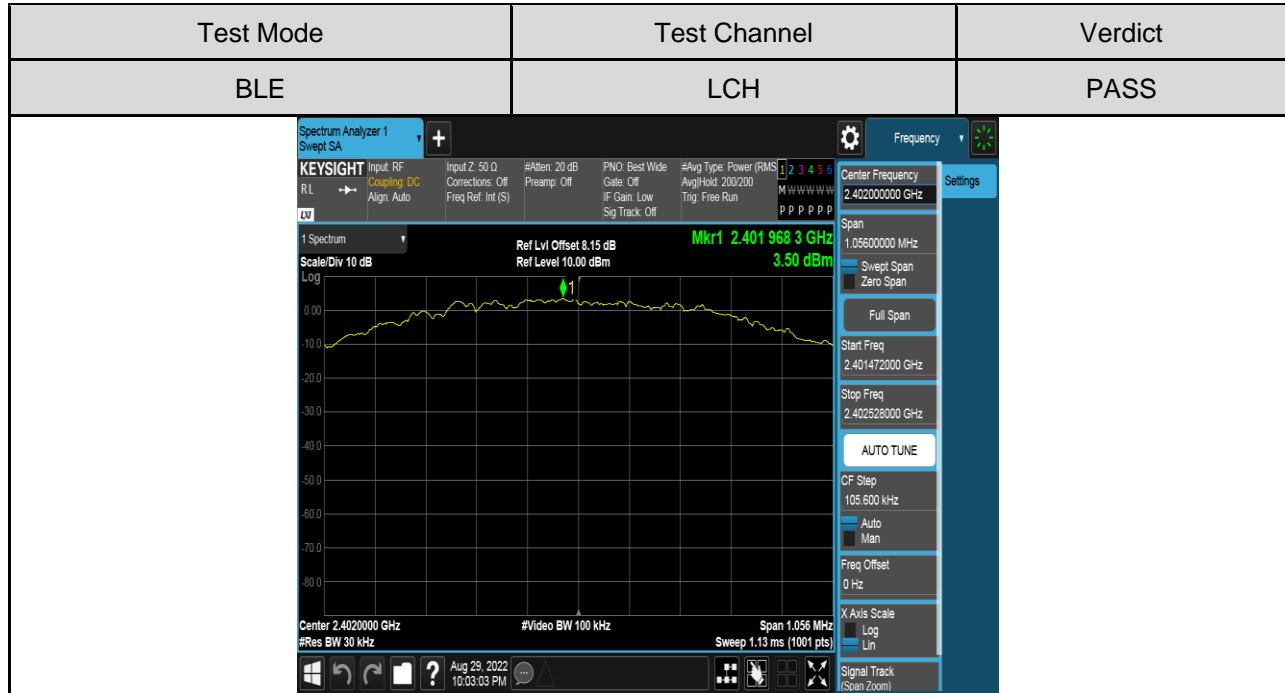


**TEST RESULTS TABLE**

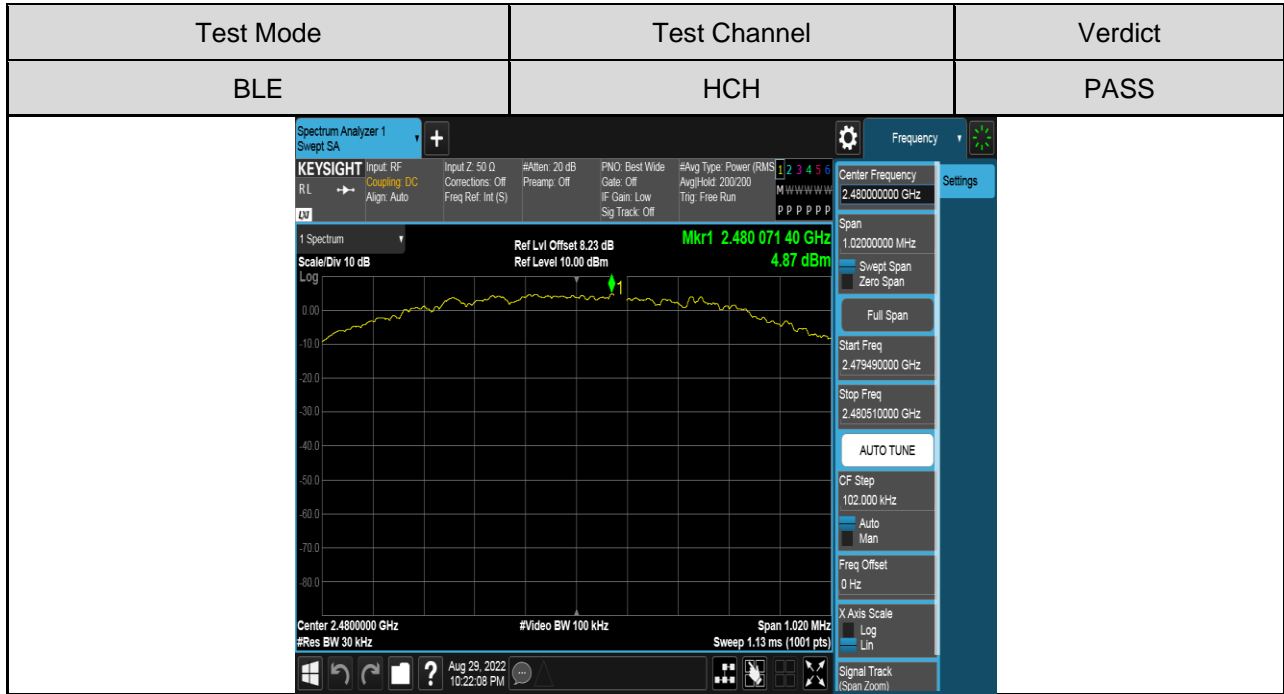
Test Mode	Test Channel	Maximum Peak power spectral density (dBm/30kHz)	Result
BLE	LCH	3.50	Pass
	MCH	3.73	Pass
	HCH	4.87	Pass



**TEST GRAPHS**







## 7.5. CONDUCTED BANDEGE AND SPURIOUS EMISSIONS

### LIMITS

FCC Part15 (15.247), Subpart C		
Section	Test Item	Limit
FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

### TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

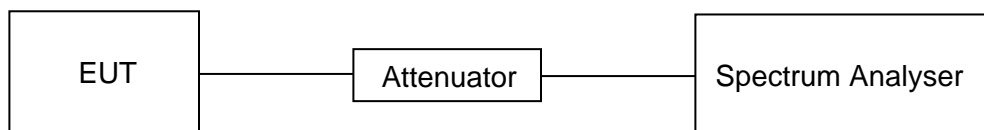
Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times \text{RBW}$
measurement points	$\geq \text{span}/\text{RBW}$
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level.

### TEST SETUP





**TEST ENVIRONMENT**

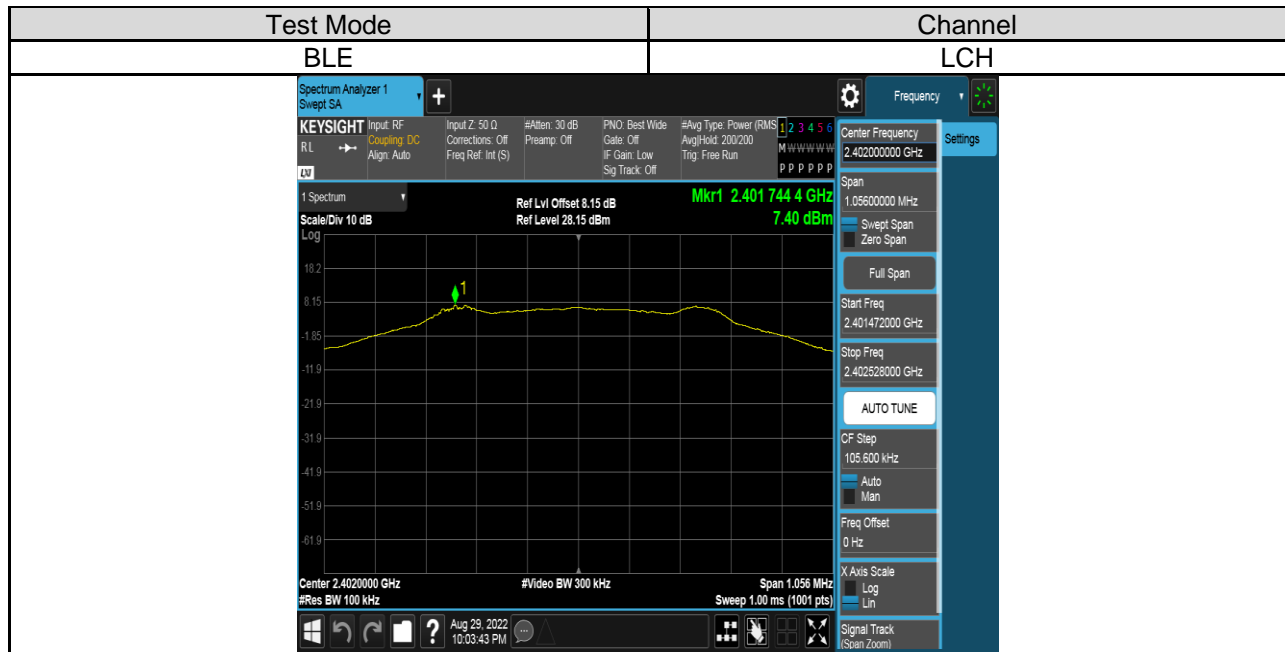
Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V

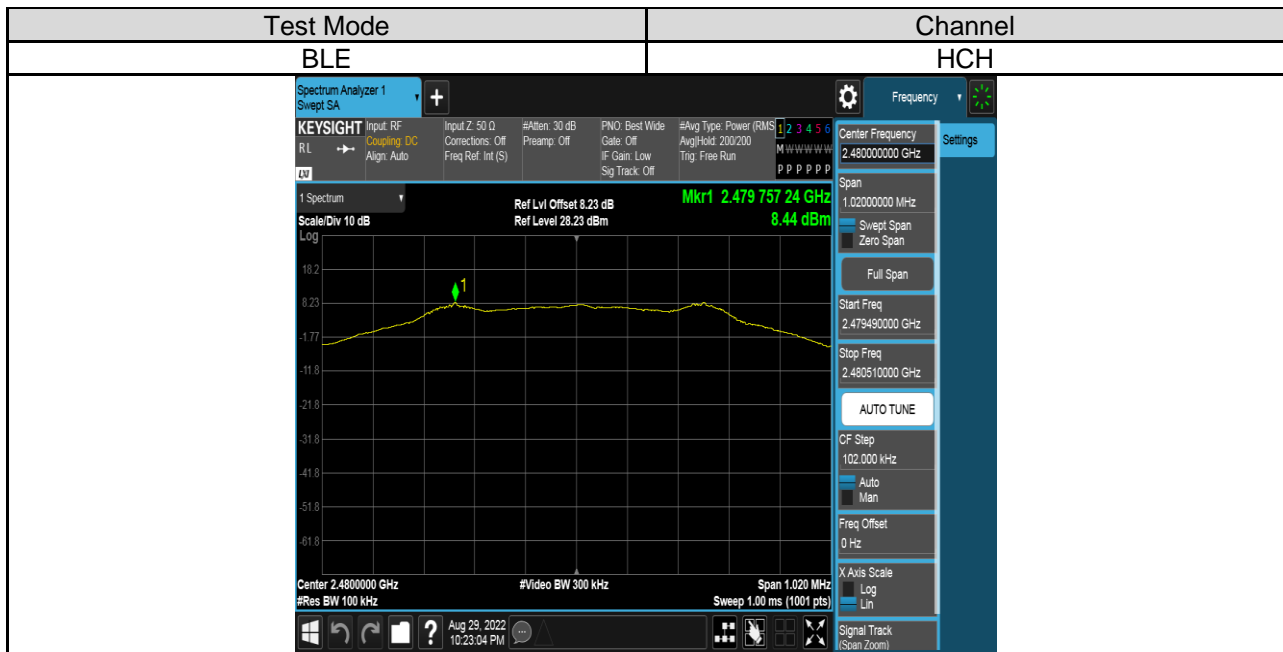
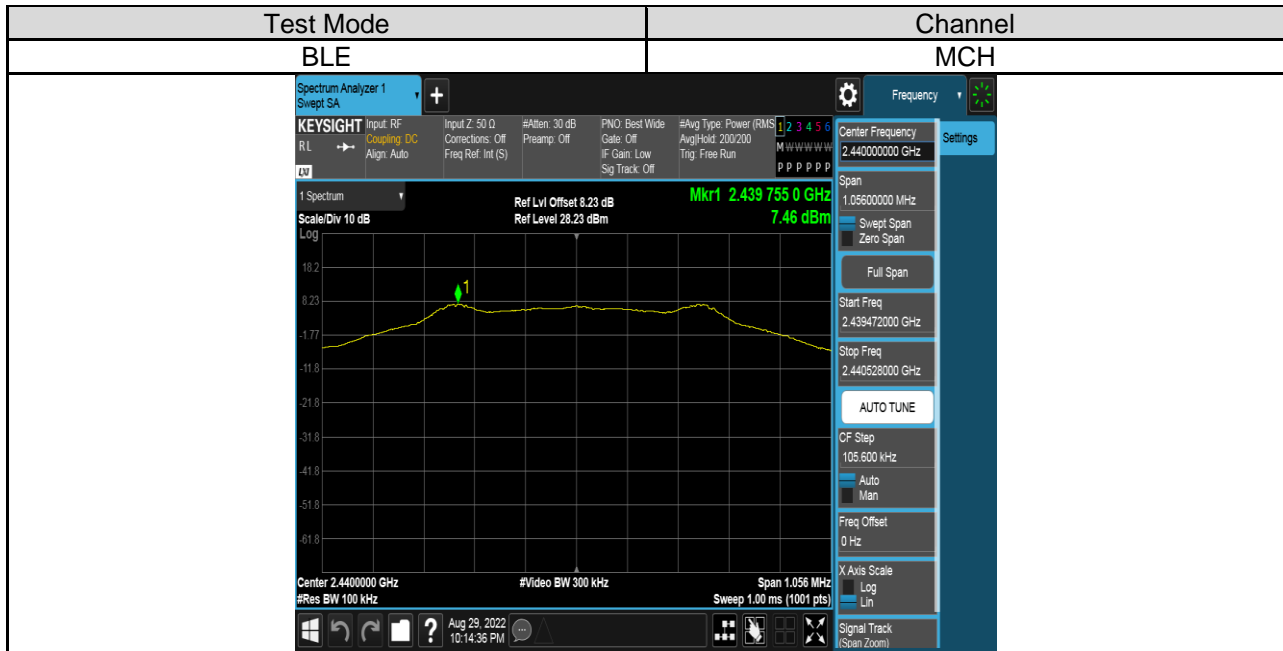
**PART 1: REFERENCE LEVEL MEASUREMENT**

**TEST RESULTS TABLE**

Test Mode	Test Channel	Result[dBm]
BLE	LCH	7.40
	MCH	7.46
	HCH	8.44

**TEST GRAPHS**







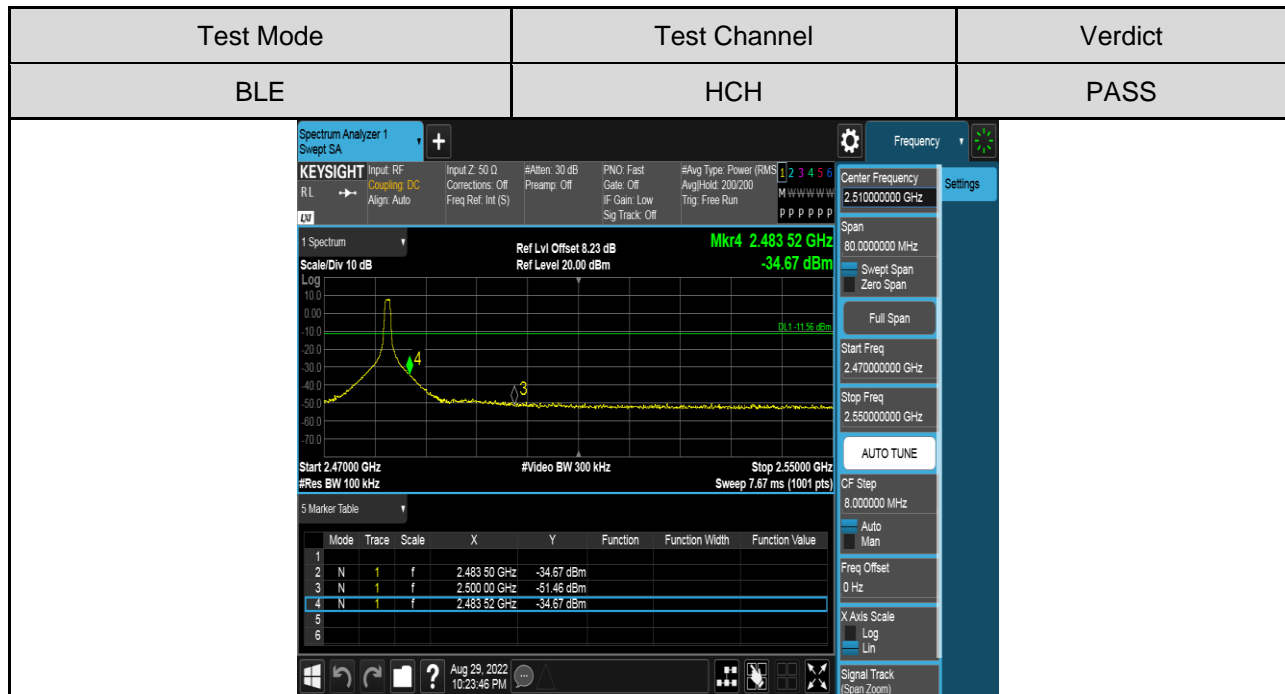
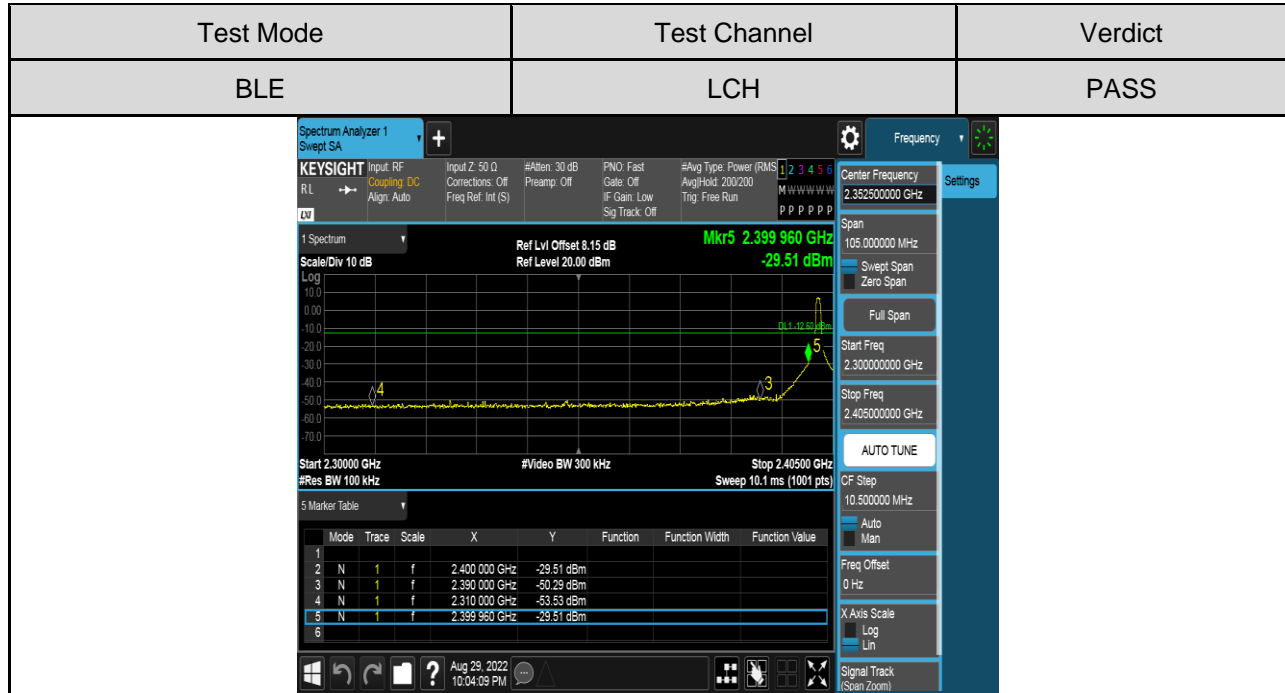
**PART 2: CONDUCTED BANDEDGE**

**TEST RESULTS TABLE**

Test Mode	Test Channel	Result	Verdict
BLE	LCH	Refer to the Test Graph	PASS
	HCH	Refer to the Test Graph	PASS



**TEST GRAPHS**





**PART 3: CONDUCTED SPURIOUS EMISSION**

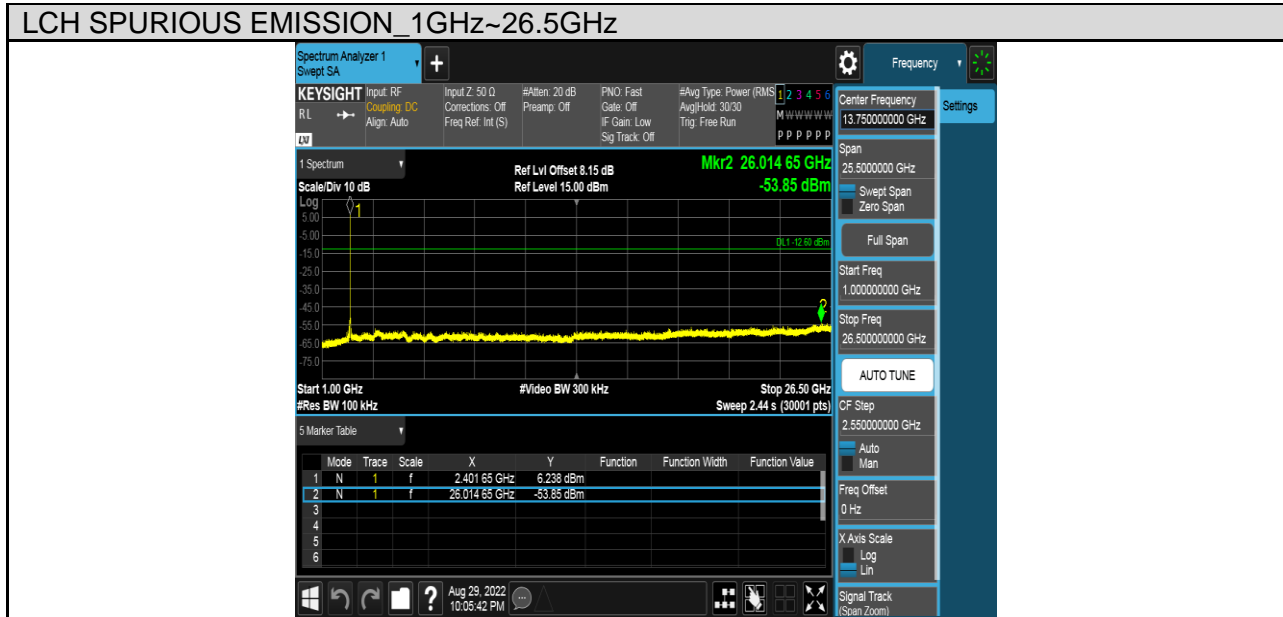
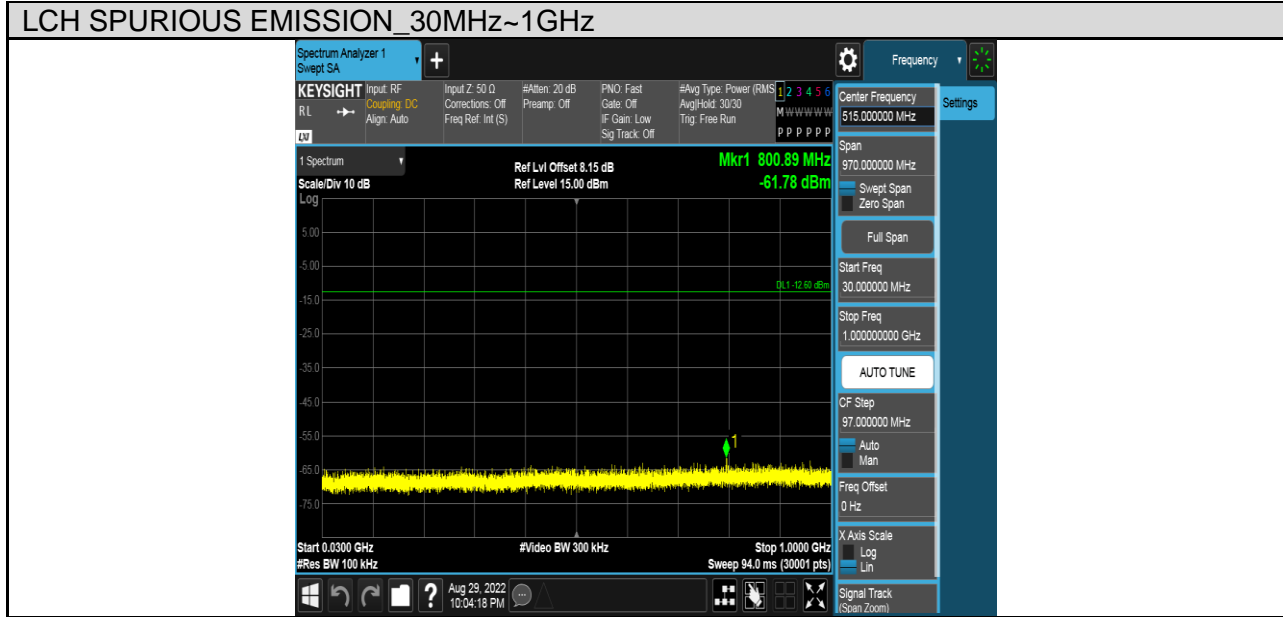
**TEST RESULTS TABLE**

Test Mode	Test Channel	Result	Verdict
BLE	LCH	Refer to the Test Graph	PASS
	MCH	Refer to the Test Graph	PASS
	HCH	Refer to the Test Graph	PASS



**TEST GRAPHS**

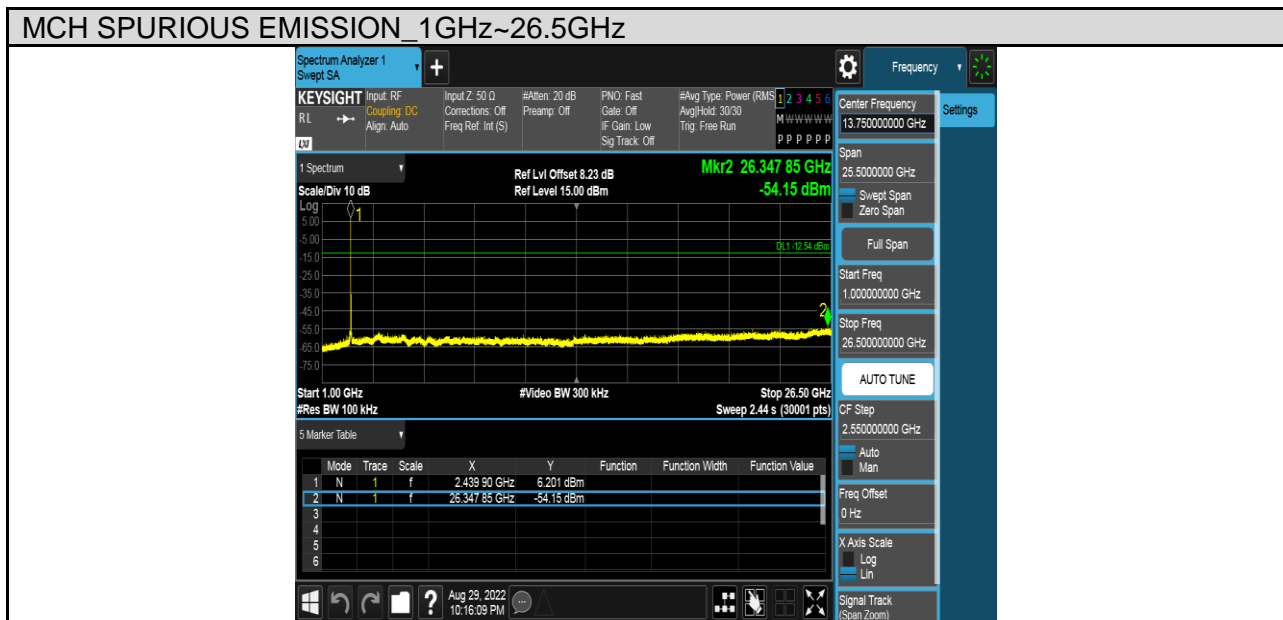
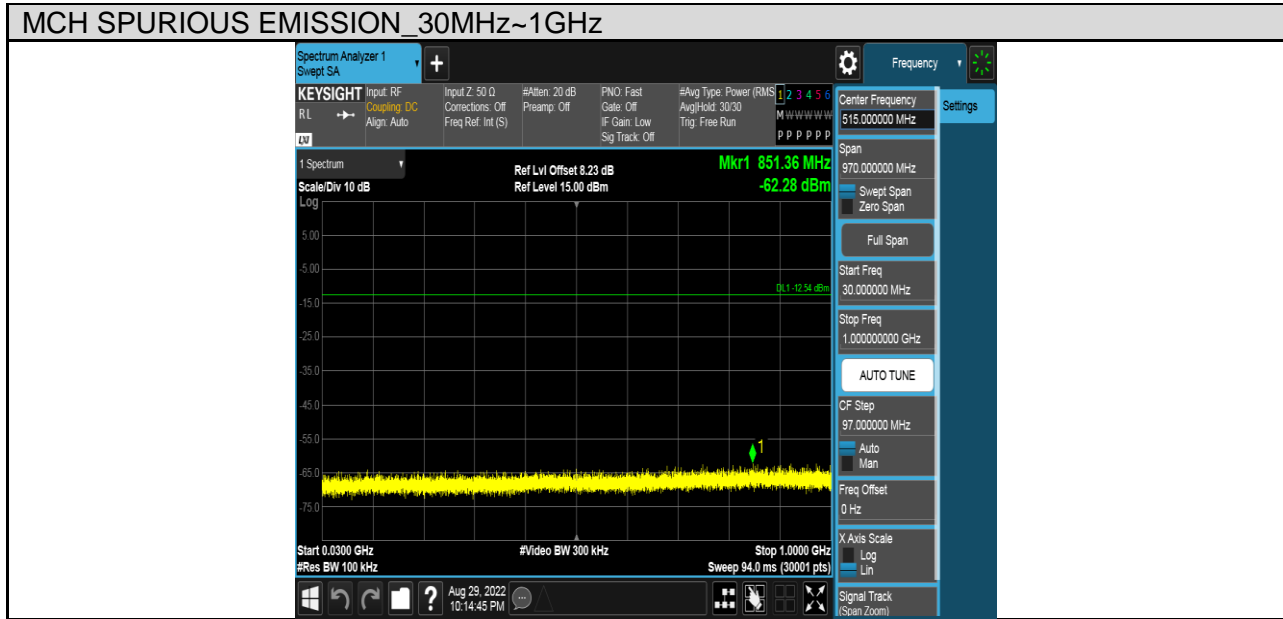
Test Mode	Channel	Verdict
BLE	LCH	PASS





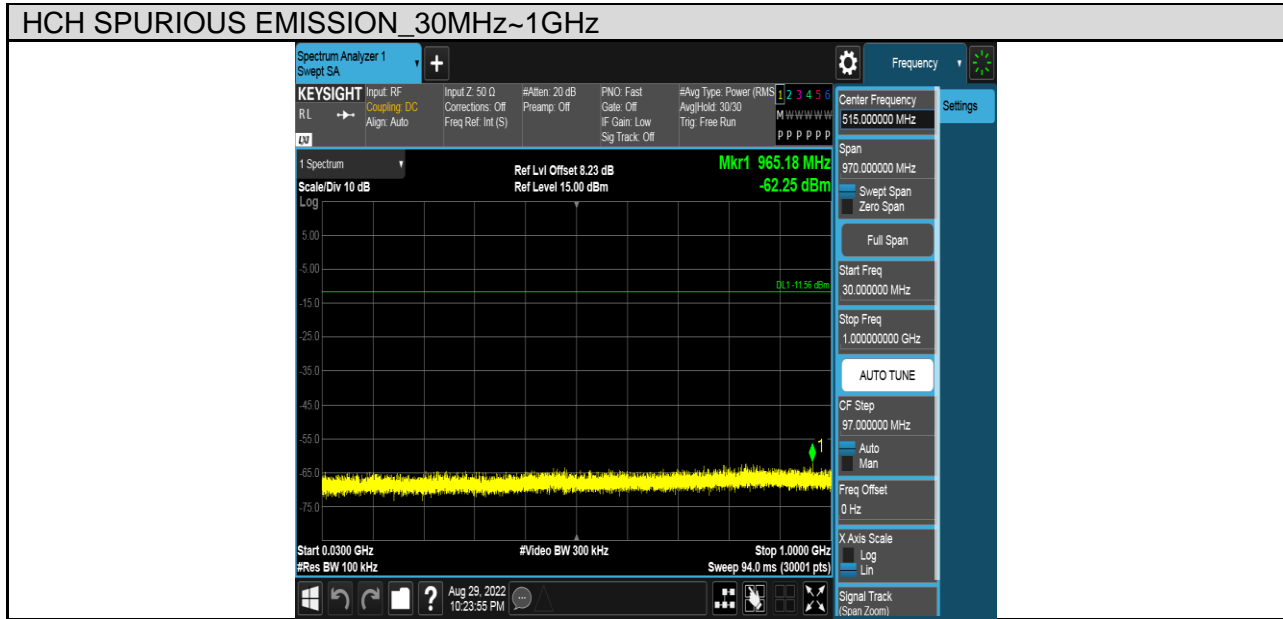


Test Mode	Channel	Verdict
BLE	MCH	PASS





Test Mode	Channel	Verdict
BLE	HCH	PASS





## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

Please refer to CFR 47 FCC §15.205 and §15.209

Radiation Disturbance Test Limit for FCC (Class B)(9KHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Note: 1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.



Radiation Disturbance Test Limit for FCC (Above 1G)

Frequency (MHz)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

Restricted bands of operation

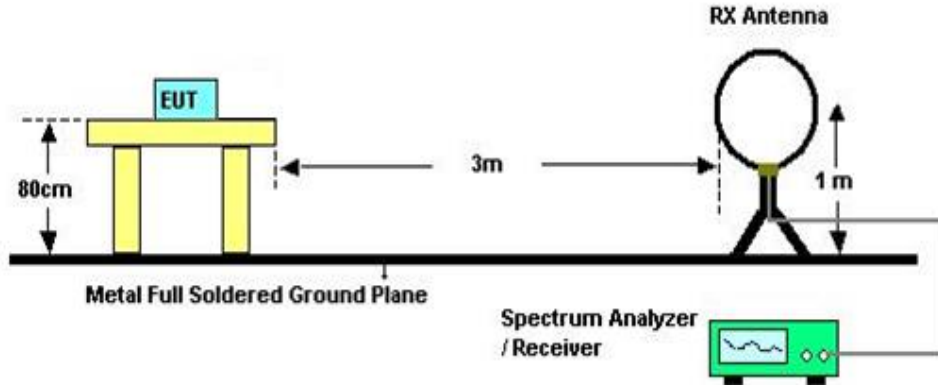
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
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	( <sup>2</sup> )
13.36-13.41			

Note: <sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup>Above 38.6c

**TEST SETUP AND PROCEDURE**

Below 30MHz

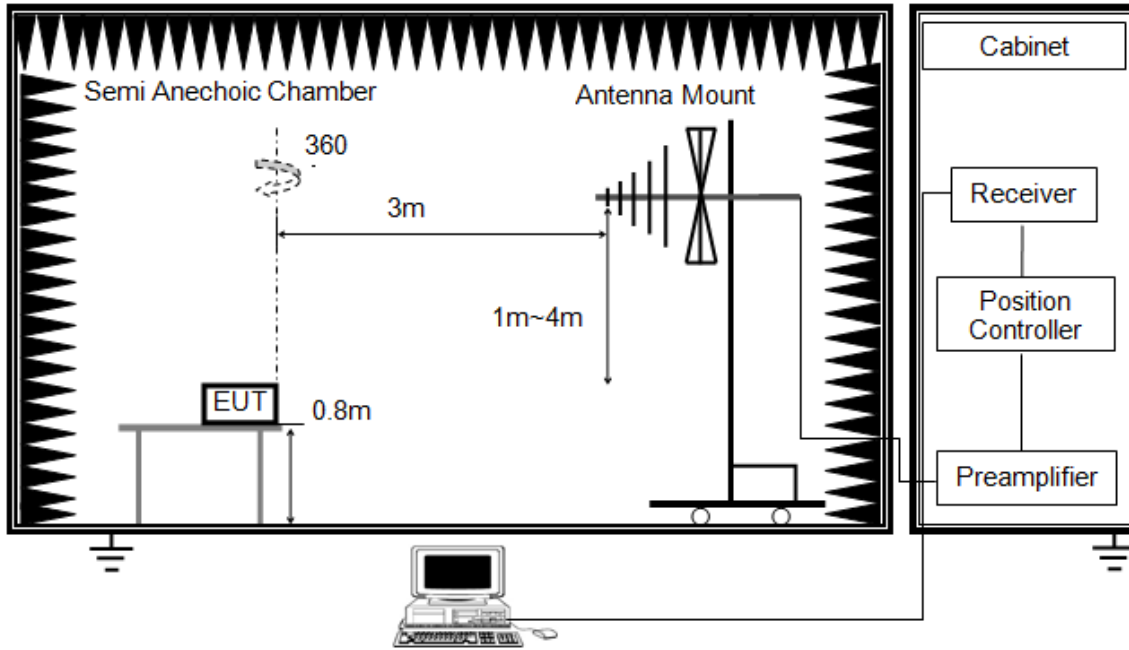


The setting of the spectrum analyser

RBW	200 Hz (From 9kHz to 0.15MHz) / 9kHz (From 0.15MHz to 30MHz)
VBW	200 Hz (From 9kHz to 0.15MHz) / 9kHz (From 0.15MHz to 30MHz)
Sweep	Auto
Detector	Peak/QP/Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) 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. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1m height antenna tower.
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector
6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

Below 1G

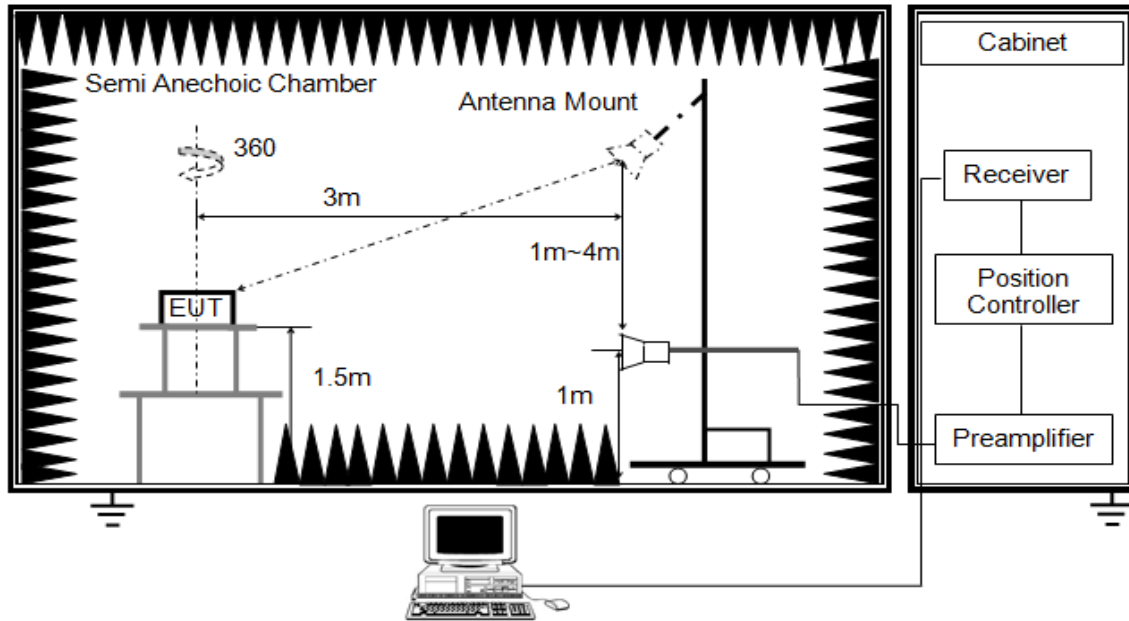


The setting of the spectrum analyser

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) 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. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
6. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

Above 1G

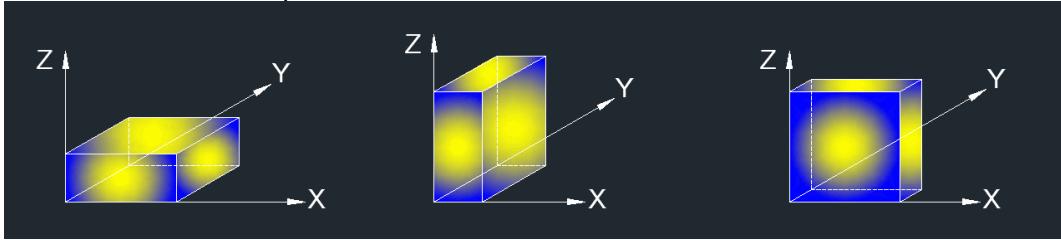


The setting of the spectrum analyser

RBW	1 MHz
VBW	PEAK:3 MHz AVG: See note6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) 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. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 1.5m above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.
6. For measurements above 1 GHz, the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements; and 1 MHz resolution bandwidth with video bandwidth  $\geq 1/T$  but not less than the setting list in section 7.1 when use peak detector, max hold to be run for at least  $[50*(1/Duty\ Cycle)]$  traces for average measurements. For the Duty Cycle need to refer the results in section 7.1.
7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

X axis, Y axis, Z axis positions:



Note: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worse case (Y axis) data recorded in the report.





## 8.2. TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V

## 8.3. RESTRICTED BANDEDGE

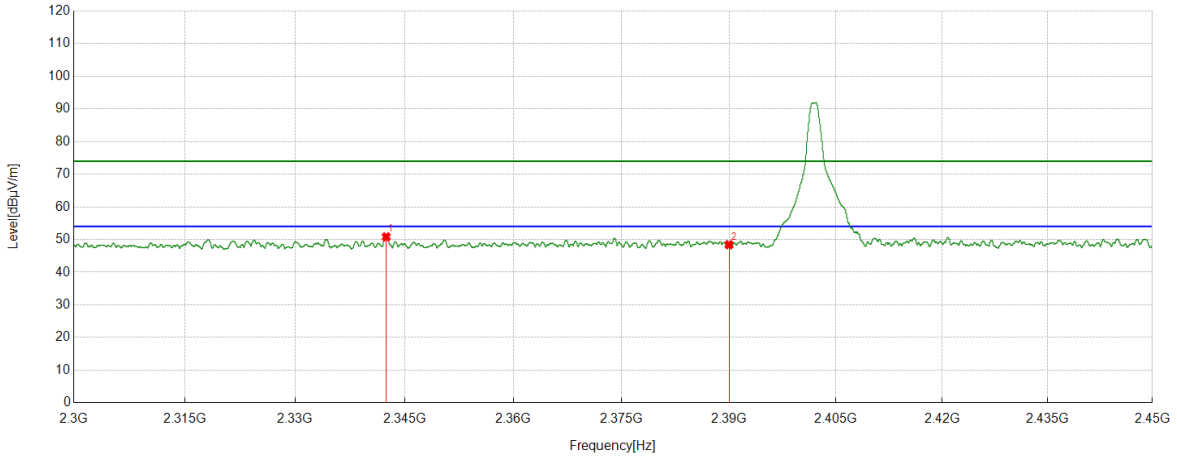
### TEST RESULT TABLE

Test Mode	Channel	P <sub>uw</sub> (dBm)	Verdict
BLE	LCH	<Limit	PASS
	HCH	<Limit	PASS
	LCH	<Limit	PASS
	HCH	<Limit	PASS



**TEST GRAPHS**

Test Mode	Channel	Polarization	Verdict
BLE	LCH	Horizontal	PASS



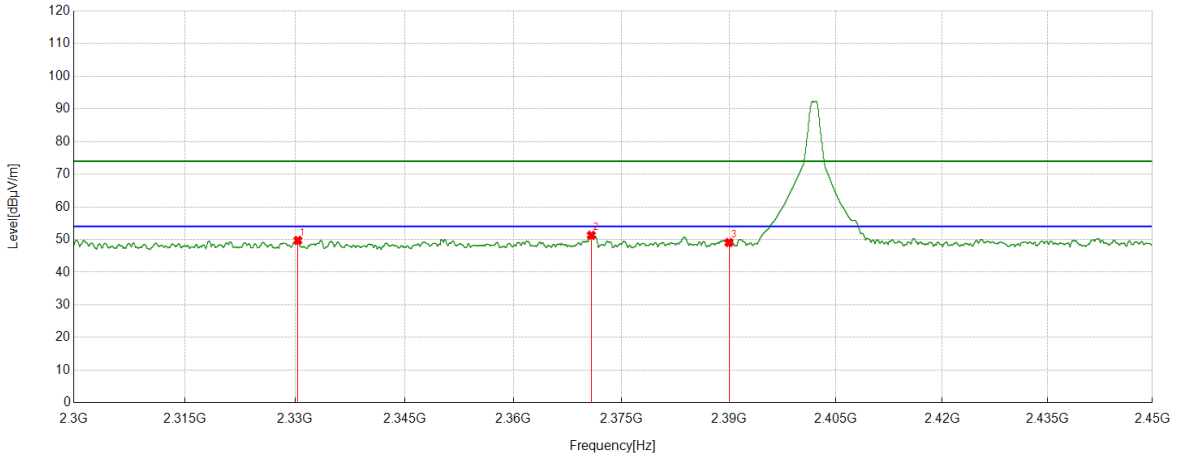
**PK Result:**

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2342.4928	39.70	11.13	50.83	74.00	-23.17	Horizontal
2	2390	37.16	11.25	48.41	74.00	-25.59	Horizontal

- Note: 1. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.  
 2. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz (refer to clause 7.1.).  
 3. Measurement = Reading Level + Correct Factor.  
 4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	LCH	Vertical	PASS



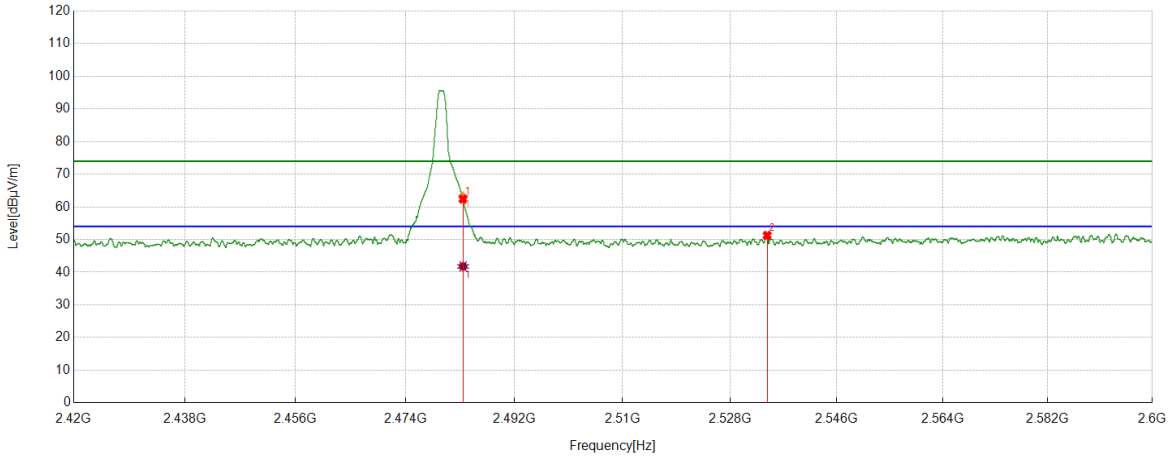
PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2330.3976	38.75	10.98	49.73	74.00	-24.27	Vertical
2	2370.8089	40.03	11.27	51.30	74.00	-22.70	Vertical
3	2390	37.85	11.25	49.10	74.00	-24.90	Vertical

- Note: 1. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.  
 2. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz (refer to clause 7.1.).  
 3. Measurement = Reading Level + Correct Factor.  
 4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	HCH	Horizontal	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2483.5	51.87	11.28	63.15	74.00	-10.85	Horizontal
2	2534.2468	39.40	11.87	51.27	74.00	-22.73	Horizontal

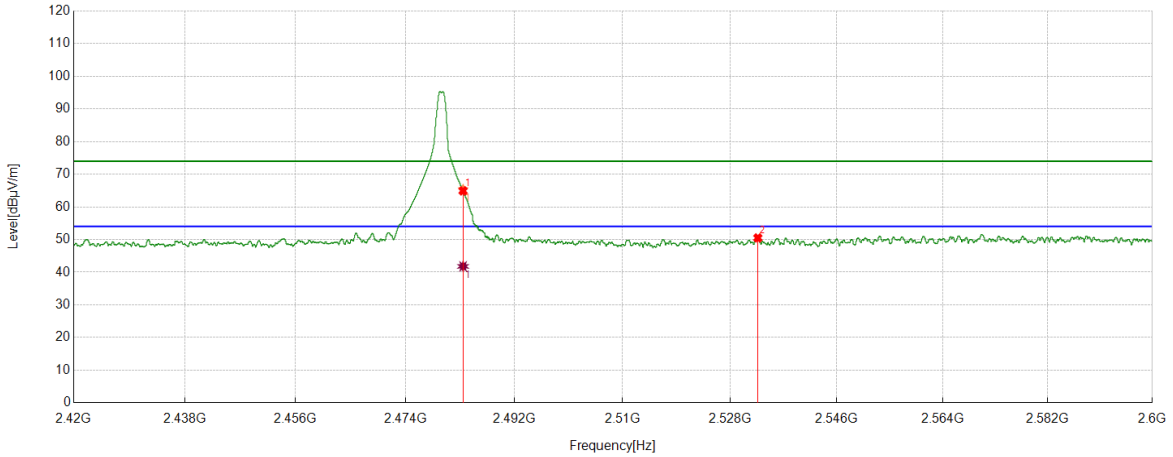
AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2483.5	30.49	11.28	41.77	54.00	-12.23	Horizontal

- Note: 1. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.  
 2. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz (refer to clause 7.1.).  
 3. Measurement = Reading Level + Correct Factor.  
 4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	HCH	Vertical	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2483.5	54.08	11.28	65.36	74.00	-8.64	Horizontal
2	2532.6716	38.63	11.87	50.50	74.00	-23.50	Horizontal

AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2483.5	30.51	11.28	41.79	54.00	-12.21	Horizontal

- Note: 1. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.  
 2. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz (refer to clause 7.1.).  
 3. Measurement = Reading Level + Correct Factor.  
 4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



## 8.4. SPURIOUS EMISSIONS

### TEST RESULTS TABLE

#### 1) For 1GHz~18GHz

Test Mode	Channel	Puw(dBm)	Verdict
BLE	LCH	<Limit	PASS
	MCH	<Limit	PASS
	HCH	<Limit	PASS

Note:

Through pre-testing all the test modes and test channels, but only the data of the worst case is included in this test report

#### 2) For 9kHz~30MHz

Test Mode	Channel	Puw(dBm)	Verdict
BLE	HCH	<Limit	PASS

Note:

Through pre-testing all the test modes and test channels, but only the data of the worst case is included in this test report

#### 3) For 30MHz~1GHz

Test Mode	Channel	Puw(dBm)	Verdict
BLE	HCH	<Limit	PASS

Note:

Through pre-testing all the test modes and test channels, but only the data of the worst case is included in this test report.

#### 4) For 18GHz~26.5GHz

Test Mode	Channel	Puw(dBm)	Verdict
BLE	HCH	<Limit	PASS

Note:

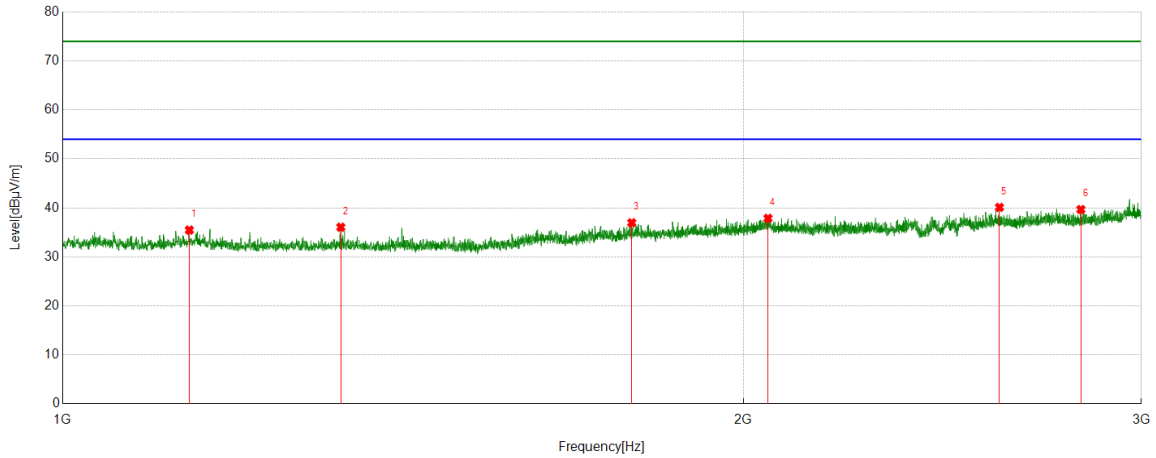
Through pre-testing all the test modes and test channels, but only the data of the worst case is included in this test report.



**Part 1: 1GHz~3GHz**

**HARMONICS AND SPURIOUS EMISSIONS**

Test Mode	Channel	Polarization	Verdict
BLE	LCH	Horizontal	PASS



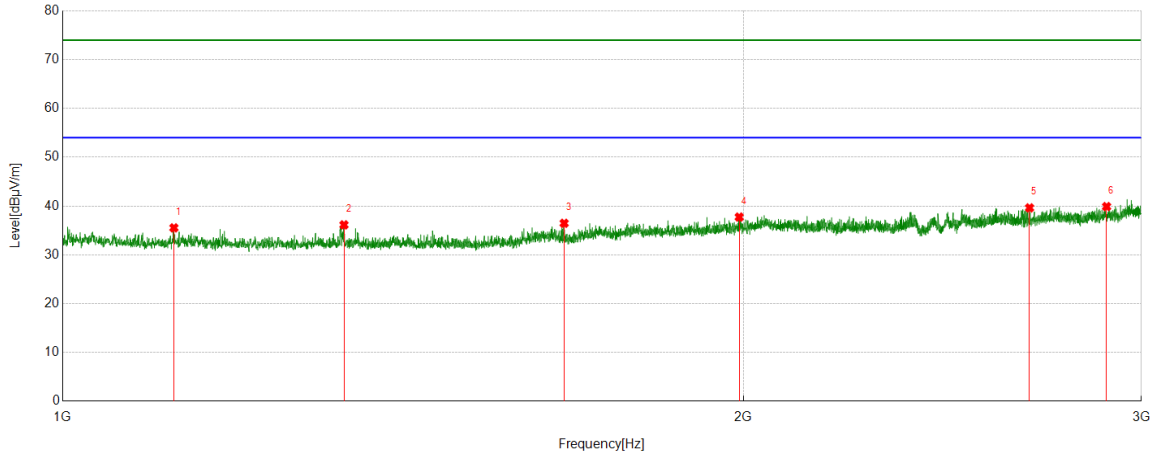
**PK Result:**

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1137.7672	41.53	-6.06	35.47	74.00	-38.53	Horizontal
2	1327.5409	42.46	-6.40	36.06	74.00	-37.94	Horizontal
3	1785.3482	41.34	-4.37	36.97	74.00	-37.03	Horizontal
4	2051.1314	40.43	-2.56	37.87	74.00	-36.13	Horizontal
5	2596.4496	41.95	-1.84	40.11	74.00	-33.89	Horizontal
6	2820.7276	41.12	-1.45	39.67	74.00	-34.33	Horizontal

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.  
 4. Peak: Peak detector.  
 5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	LCH	Vertical	PASS



PK Result:

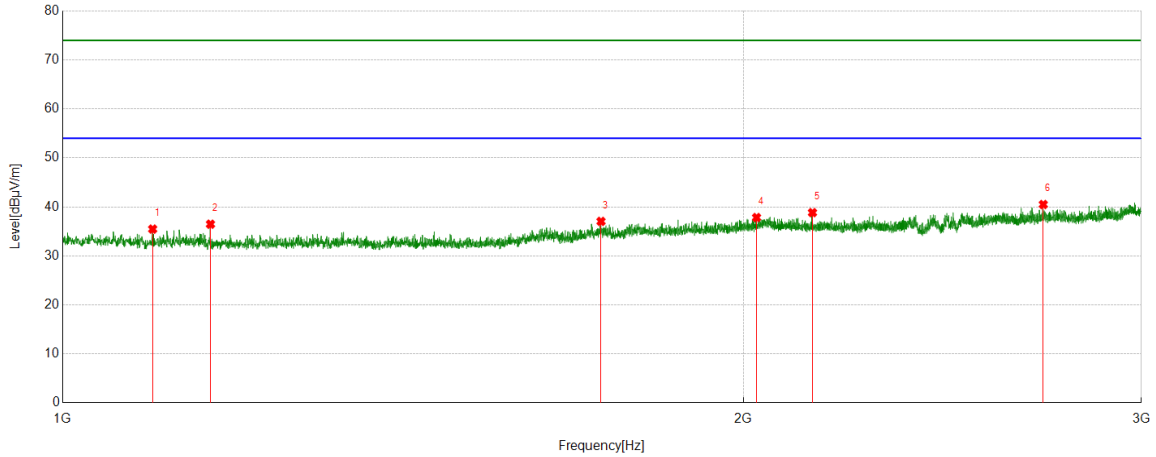
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1120.015	41.58	-6.05	35.53	74.00	-38.47	Vertical
2	1331.7915	42.56	-6.42	36.14	74.00	-37.86	Vertical
3	1666.5833	41.59	-5.12	36.47	74.00	-37.53	Vertical
4	1991.874	40.91	-3.17	37.74	74.00	-36.26	Vertical
5	2677.2097	41.42	-1.80	39.62	74.00	-34.38	Vertical
6	2895.737	40.63	-0.74	39.89	74.00	-34.11	Vertical

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.  
 4. Peak: Peak detector.  
 5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.





Test Mode	Channel	Polarization	Verdict
BLE	MCH	Horizontal	PASS



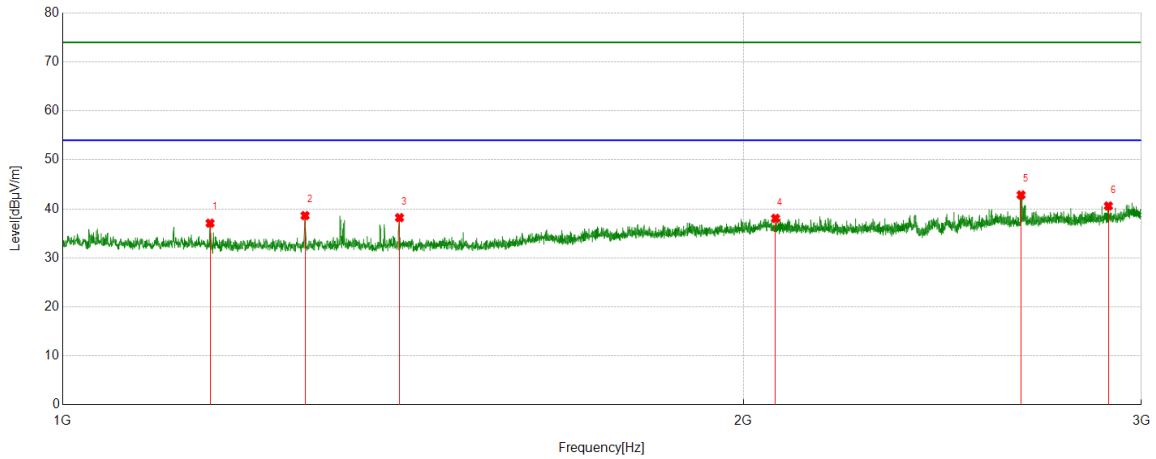
PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1096.012	41.62	-6.15	35.47	74.00	-38.53	Horizontal
2	1162.5203	42.66	-6.19	36.47	74.00	-37.53	Horizontal
3	1730.3413	41.70	-4.66	37.04	74.00	-36.96	Horizontal
4	2027.3784	40.68	-2.85	37.83	74.00	-36.17	Horizontal
5	2146.1433	41.90	-3.07	38.83	74.00	-35.17	Horizontal
6	2714.9644	41.72	-1.23	40.49	74.00	-33.51	Horizontal

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.  
 4. Peak: Peak detector.  
 5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	MCH	Vertical	PASS



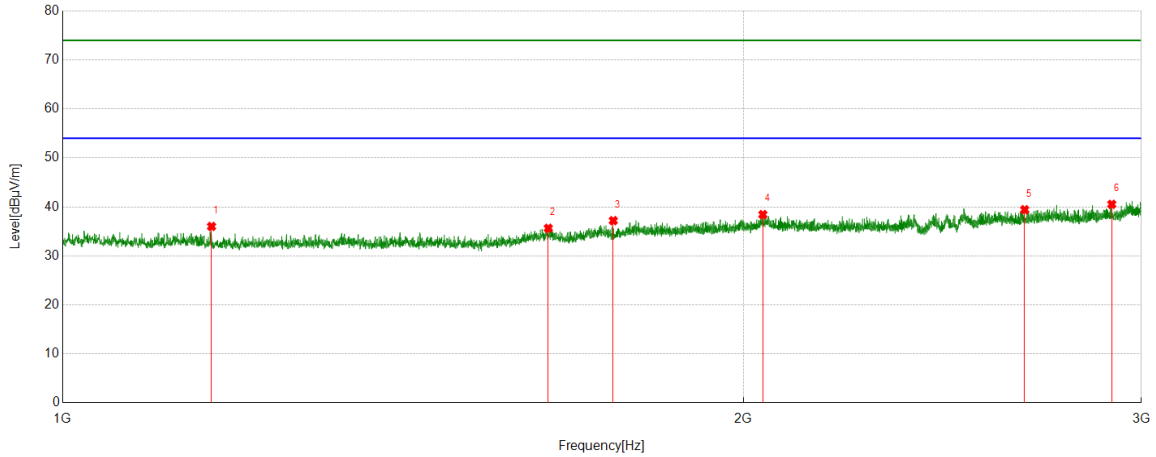
PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1162.0203	43.26	-6.18	37.08	74.00	-36.92	Vertical
2	1280.035	44.99	-6.36	38.63	74.00	-35.37	Vertical
3	1409.3012	44.85	-6.64	38.21	74.00	-35.79	Vertical
4	2066.8834	40.99	-2.92	38.07	74.00	-35.93	Vertical
5	2654.2068	44.73	-1.88	42.85	74.00	-31.15	Vertical
6	2900.9876	41.36	-0.77	40.59	74.00	-33.41	Vertical

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.  
 4. Peak: Peak detector.  
 5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	HCH	Horizontal	PASS



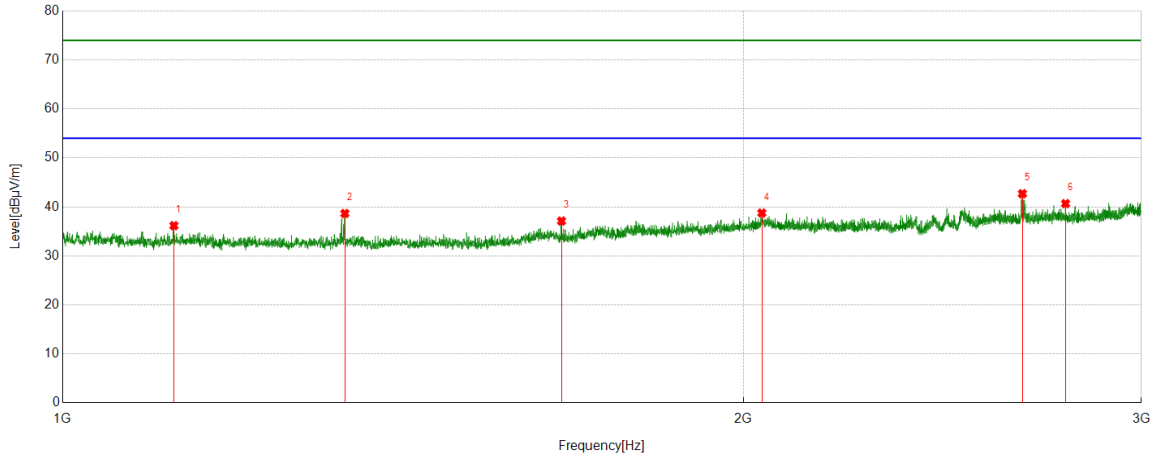
PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1163.7705	42.23	-6.22	36.01	74.00	-37.99	Horizontal
2	1639.83	40.99	-5.35	35.64	74.00	-38.36	Horizontal
3	1752.094	42.10	-4.90	37.20	74.00	-36.80	Horizontal
4	2040.38	40.92	-2.48	38.44	74.00	-35.56	Horizontal
5	2663.958	41.27	-1.84	39.43	74.00	-34.57	Horizontal
6	2910.9889	41.26	-0.73	40.53	74.00	-33.47	Horizontal

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.  
 4. Peak: Peak detector.  
 5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	HCH	Vertical	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1120.015	42.22	-6.05	36.17	74.00	-37.83	Vertical
2	1333.0416	45.08	-6.42	38.66	74.00	-35.34	Vertical
3	1662.0828	42.22	-5.10	37.12	74.00	-36.88	Vertical
4	2038.3798	41.28	-2.53	38.75	74.00	-35.25	Vertical
5	2657.7072	44.53	-1.84	42.69	74.00	-31.31	Vertical
6	2777.2222	42.02	-1.35	40.67	74.00	-33.33	Vertical

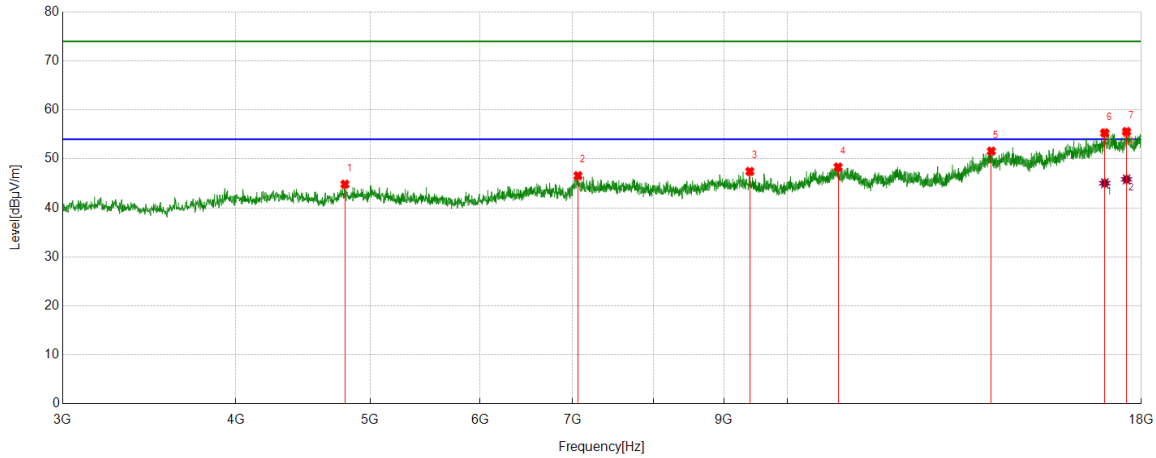
- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.  
 4. Peak: Peak detector.  
 5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



**Part 2: 3GHz~18GHz**

**HARMONICS AND SPURIOUS EMISSIONS**

Test Mode	Channel	Polarization	Verdict
BLE	LCH	Horizontal	PASS



**PK Result:**

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	4794.5993	39.35	5.48	44.83	74.00	-29.17	Horizontal
2	7061.7577	37.41	9.16	46.57	74.00	-27.43	Horizontal
3	9394.5493	37.97	9.47	47.44	74.00	-26.56	Horizontal
4	10877.8597	36.07	12.26	48.33	74.00	-25.67	Horizontal
5	14030.1288	35.56	16.02	51.58	74.00	-22.42	Horizontal
6	16938.6173	35.86	19.32	55.18	74.00	-18.82	Horizontal
7	17563.0704	35.62	19.66	55.28	74.00	-18.72	Horizontal

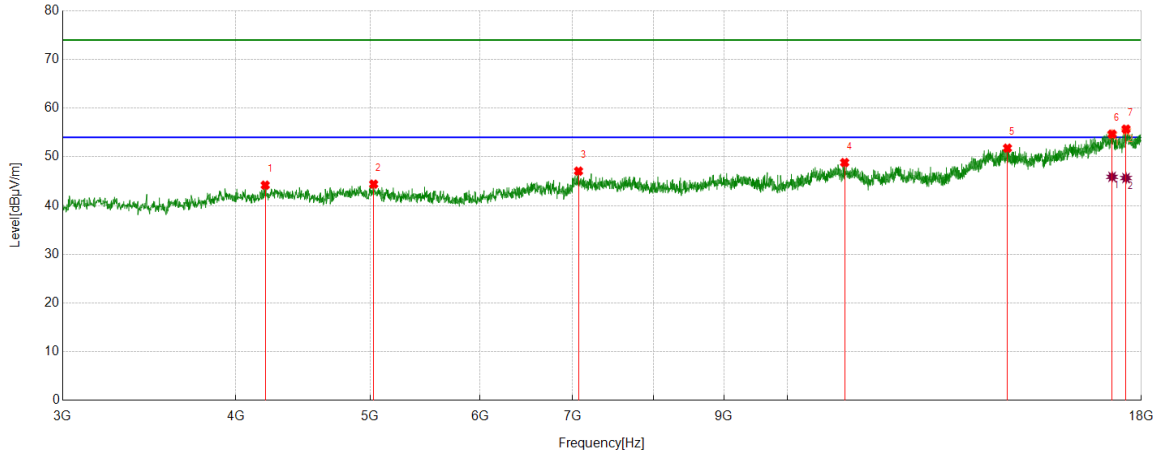
**AV Result:**

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	16938.6173	25.72	19.32	45.04	54.00	-8.96	Horizontal
2	17563.0704	26.16	19.66	45.82	54.00	-8.18	Horizontal

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If peak result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.  
 4. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).  
 5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	LCH	Vertical	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	4200.15	39.33	4.86	44.19	74.00	-29.81	Vertical
2	5029.0036	38.88	5.52	44.40	74.00	-29.60	Vertical
3	7067.3834	37.88	9.20	47.08	74.00	-26.92	Vertical
4	10995.9995	36.49	12.34	48.83	74.00	-25.17	Vertical
5	14410.8014	35.96	15.83	51.79	74.00	-22.21	Vertical
6	17146.7683	35.42	19.17	54.59	74.00	-19.41	Vertical
7	17548.0685	36.31	19.10	55.41	74.00	-18.59	Vertical

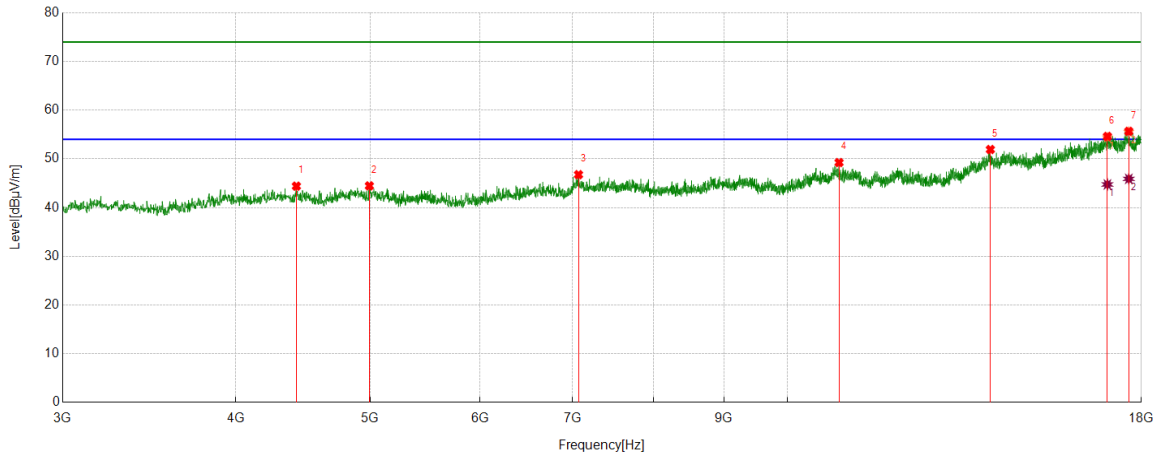
AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	17146.7683	26.73	19.17	45.90	54.00	-8.10	Vertical
2	17548.0685	26.56	19.10	45.66	54.00	-8.34	Vertical

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If peak result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.  
 4. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).  
 5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	MCH	Horizontal	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	4423.3029	39.53	4.87	44.40	74.00	-29.60	Horizontal
2	4993.3742	38.59	5.87	44.46	74.00	-29.54	Horizontal
3	7067.3834	37.56	9.20	46.76	74.00	-27.24	Horizontal
4	10894.7368	36.99	12.25	49.24	74.00	-24.76	Horizontal
5	14007.626	36.08	15.84	51.92	74.00	-22.08	Horizontal
6	17013.6267	35.39	19.00	54.39	74.00	-19.61	Horizontal
7	17628.7036	36.05	19.48	55.53	74.00	-18.47	Horizontal

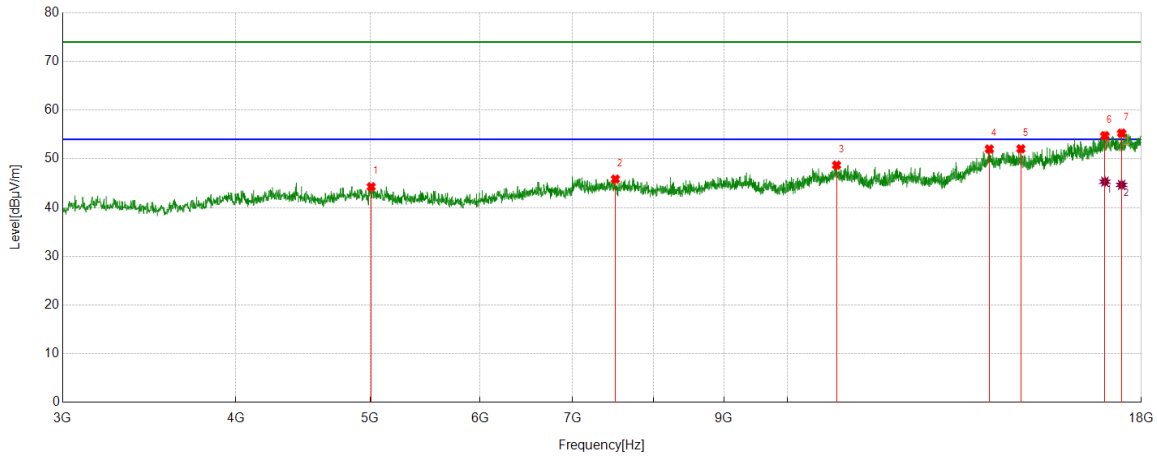
AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	17013.6267	25.75	19.00	44.75	54.00	-9.25	Horizontal
2	17628.7036	26.42	19.48	45.90	54.00	-8.10	Horizontal

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If peak result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.  
 4. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).  
 5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	MCH	Vertical	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	5008.376	38.73	5.54	44.27	74.00	-29.73	Vertical
2	7513.6892	37.59	8.26	45.85	74.00	-28.15	Vertical
3	10849.7312	36.56	12.15	48.71	74.00	-25.29	Vertical
4	13983.2479	36.05	15.97	52.02	74.00	-21.98	Vertical
5	14735.2169	36.67	15.39	52.06	74.00	-21.94	Vertical
6	16942.3678	35.27	19.41	54.68	74.00	-19.32	Vertical
7	17420.5526	36.09	19.09	55.18	74.00	-18.82	Vertical

AV Result:

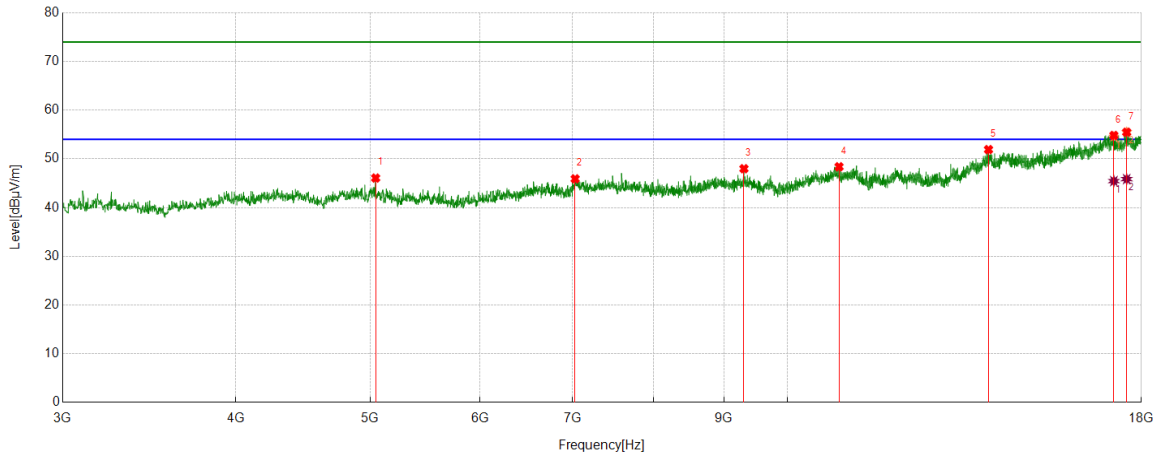
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	16942.3678	25.90	19.41	45.31	54.00	-8.69	Vertical
2	17420.5526	25.57	19.09	44.66	54.00	-9.34	Vertical

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If peak result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.  
 4. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).  
 5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.





Test Mode	Channel	Polarization	Verdict
BLE	HCH	Horizontal	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	5045.8807	40.43	5.64	46.07	74.00	-27.93	Horizontal
2	7028.0035	36.70	9.20	45.90	74.00	-28.10	Horizontal
3	9302.6628	38.66	9.32	47.98	74.00	-26.02	Horizontal
4	10894.7368	36.13	12.25	48.38	74.00	-25.62	Horizontal
5	13964.4956	36.28	15.63	51.91	74.00	-22.09	Horizontal
6	17197.3997	35.38	19.15	54.53	74.00	-19.47	Horizontal
7	17566.8209	35.59	19.88	55.47	74.00	-18.53	Horizontal

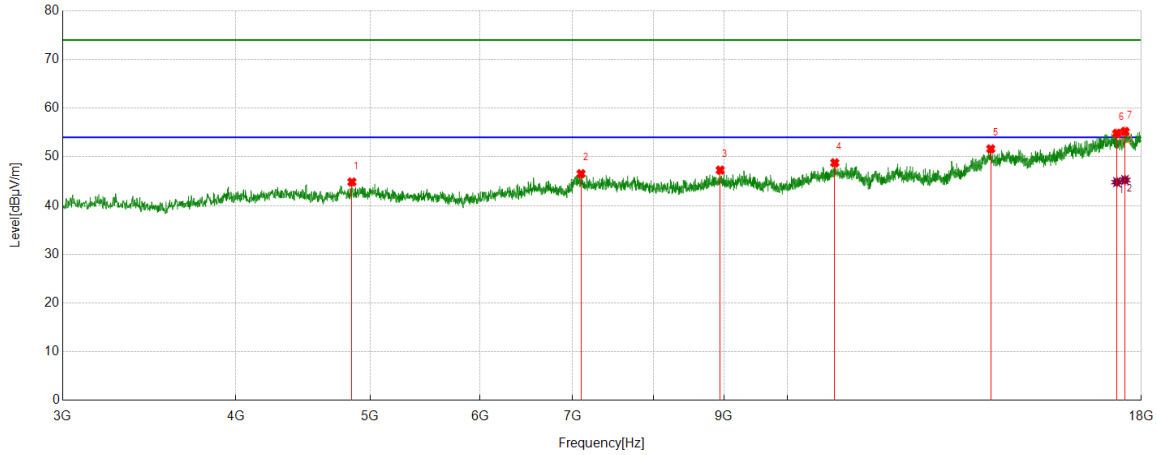
AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	17197.3997	26.29	19.15	45.44	54.00	-8.56	Horizontal
2	17566.8209	25.97	19.88	45.85	54.00	-8.15	Horizontal

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If peak result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.  
 4. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).  
 5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	HCH	Vertical	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	4850.8564	39.40	5.44	44.84	74.00	-29.16	Vertical
2	7097.3872	37.19	9.35	46.54	74.00	-27.46	Vertical
3	8942.6178	37.91	9.37	47.28	74.00	-26.72	Vertical
4	10817.8522	36.59	12.19	48.78	74.00	-25.22	Vertical
5	14017.0021	35.77	15.87	51.64	74.00	-22.36	Vertical
6	17283.6605	36.29	18.44	54.73	74.00	-19.27	Vertical
7	17516.1895	36.01	19.19	55.20	74.00	-18.80	Vertical

AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	17283.6605	26.37	18.44	44.81	54.00	-9.19	Vertical
2	17516.1895	26.06	19.19	45.25	54.00	-8.75	Vertical

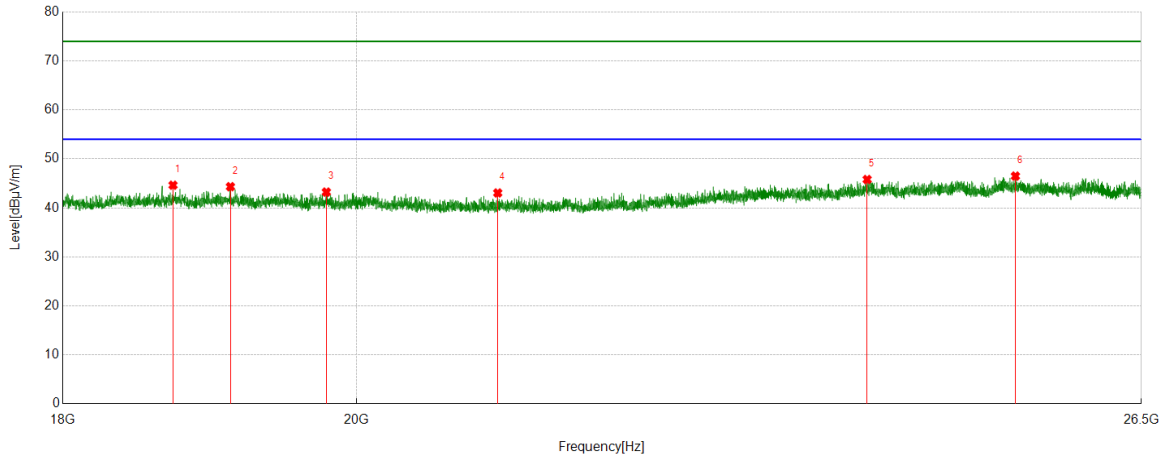
- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If peak result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.  
 4. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).  
 5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.  
 6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



**Part 3: 18GHz~26.5GHz**

**SPURIOUS EMISSIONS 18GHz TO 26.5GHz (WORST-CASE CONFIGURATION)**

Test Mode	Channel	Polarization	Verdict
BLE	MCH	Horizontal	PASS

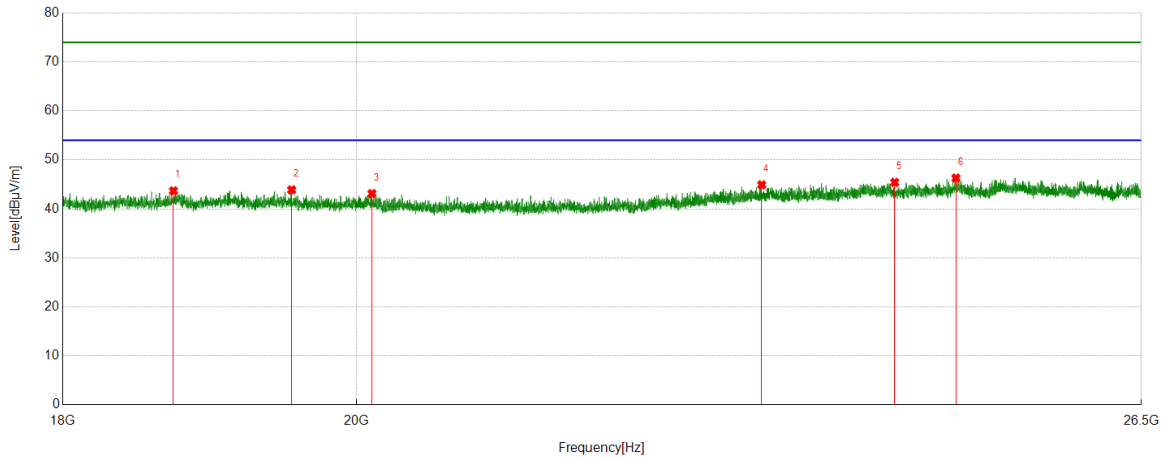


No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	18726.8227	50.87	-6.24	44.63	74.00	-29.37	Peak
2	19116.1616	50.21	-5.88	44.33	74.00	-29.67	Peak
3	19785.1785	48.56	-5.33	43.23	74.00	-30.77	Peak
4	21039.0539	49.05	-6.00	43.05	74.00	-30.95	Peak
5	24018.6019	48.43	-2.63	45.80	74.00	-28.20	Peak
6	25330.283	49.79	-3.30	46.49	74.00	-27.51	Peak

- Note: 1. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 2. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.  
 3. Measurement = Reading Level + Correct Factor.  
 4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



Test Mode	Channel	Polarization	Verdict
BLE	MCH	Vertical	PASS



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	18729.3729	49.93	-6.24	43.69	74.00	-30.31	Peak
2	19540.354	49.32	-5.45	43.87	74.00	-30.13	Peak
3	20111.6112	48.31	-5.18	43.13	74.00	-30.87	Peak
4	23127.7128	48.37	-3.46	44.91	74.00	-29.09	Peak
5	24257.4757	48.26	-2.84	45.42	74.00	-28.58	Peak
6	24795.5796	49.61	-3.32	46.29	74.00	-27.71	Peak

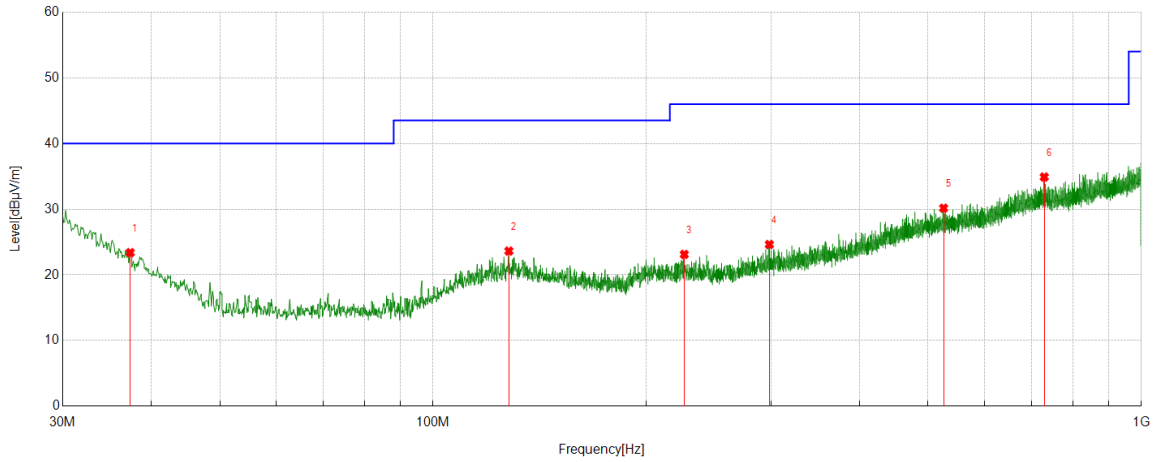
- Note: 1. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 2. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.  
 3. Measurement = Reading Level + Correct Factor.  
 4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



**Part 4: 30MHz~1GHz**

**SPURIOUS EMISSIONS 30M TO 1GHz (WORST-CASE CONFIGURATION)**

Test Mode	Channel	Polarization	Verdict
BLE	MCH	Horizontal	PASS

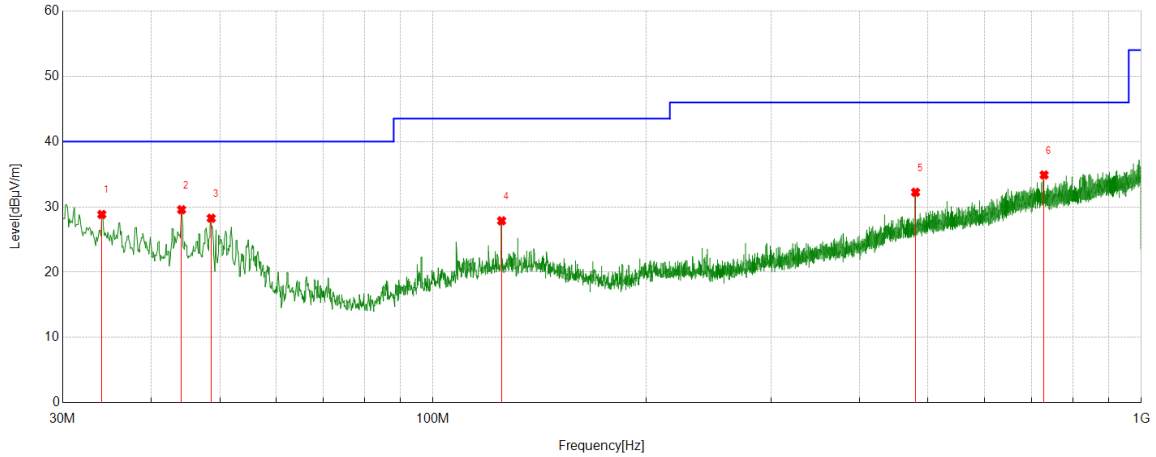


No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	37.3727	0.69	22.70	23.39	40.00	-16.61	Peak
2	127.9798	2.55	21.08	23.63	43.50	-19.87	Peak
3	226.3476	3.39	19.73	23.12	46.00	-22.88	Peak
4	298.4258	3.31	21.32	24.63	46.00	-21.37	Peak
5	525.8166	3.49	26.67	30.16	46.00	-15.84	Peak
6	729.3429	5.18	29.72	34.90	46.00	-11.10	Peak

Note: 1. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.  
 2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.  
 3. Measurement = Reading Level + Correct Factor.



Test Mode	Channel	Polarization	Verdict
BLE	MCH	Vertical	PASS



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	34.0744	3.89	24.95	28.84	40.00	-11.16	Peak
2	44.1634	11.29	18.28	29.57	40.00	-10.43	Peak
3	48.6259	12.79	15.47	28.26	40.00	-11.74	Peak
4	124.9725	6.99	20.88	27.87	43.50	-15.63	Peak
5	480.028	6.36	25.88	32.24	46.00	-13.76	Peak
6	728.9549	5.18	29.71	34.89	46.00	-11.11	Peak

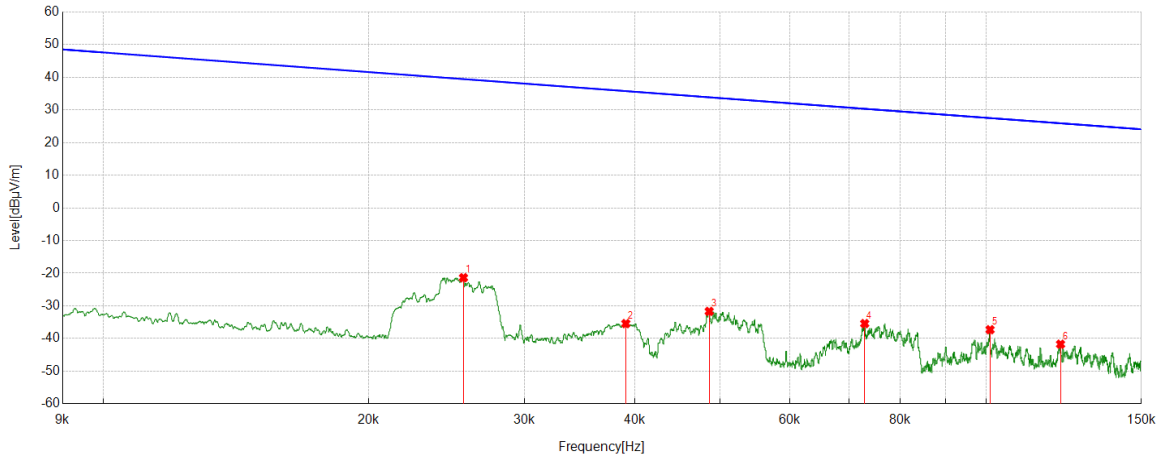
Note: 1. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.  
 2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.  
 3. Measurement = Reading Level + Correct Factor.



**Part 5: 9kHz~30MHz**

**SPURIOUS EMISSIONS Below 30MHz (WORST CASE CONFIGURATION-FACE ON)**

Test Mode	Channel	Frequency Range	Verdict
BLE	MCH	9kHz~150kHz	PASS

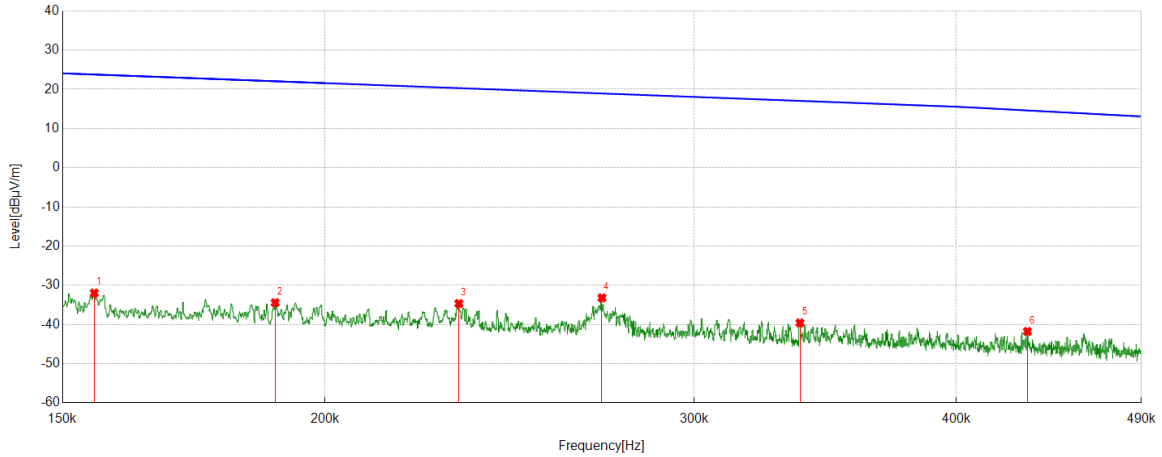


No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	0.0256	40.45	-61.83	-21.38	39.44	-60.82	Peak
2	0.0391	26.37	-61.79	-35.42	35.76	-71.18	Peak
3	0.0486	30.11	-61.79	-31.68	33.87	-65.55	Peak
4	0.0729	26.45	-61.87	-35.42	30.34	-65.76	Peak
5	0.1011	24.60	-61.89	-37.29	27.50	-64.79	Peak
6	0.1215	20.17	-61.90	-41.73	25.91	-67.64	Peak

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.  
 3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.



Test Mode	Channel	Frequency Range	Verdict
BLE	MCH	150kHz~490kHz	PASS



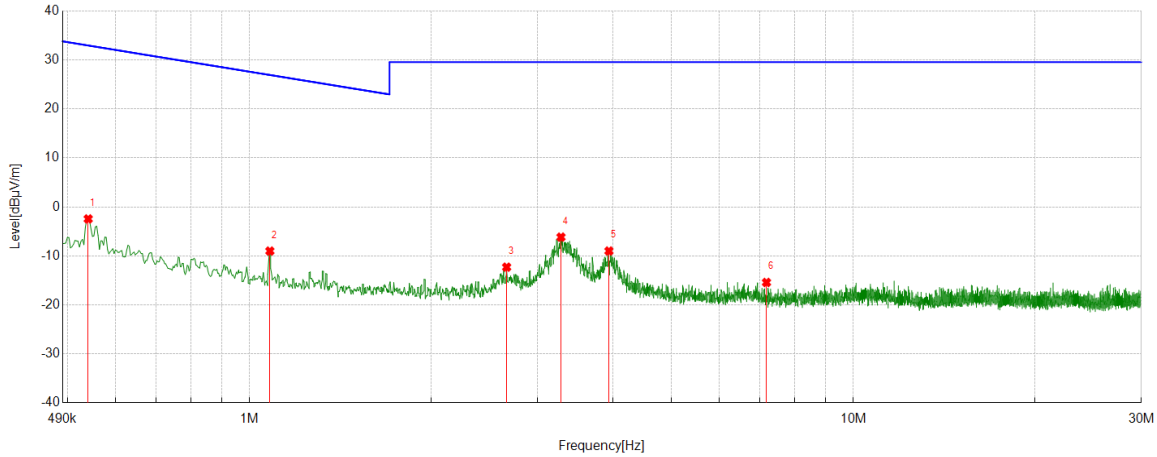
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	0.1553	29.93	-61.91	-31.98	23.78	-55.76	Peak
2	0.1894	27.47	-61.92	-34.45	22.06	-56.51	Peak
3	0.2317	27.27	-61.94	-34.67	20.30	-54.97	Peak
4	0.2711	28.75	-61.96	-33.21	18.94	-52.15	Peak
5	0.3369	22.38	-61.97	-39.59	17.05	-56.64	Peak
6	0.4324	20.18	-61.97	-41.79	14.61	-56.40	Peak

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.  
 3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.





Test Mode	Channel	Frequency Range	Verdict
BLE	MCH	490kHz~30MHz	PASS



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	0.5402	19.50	-21.95	-2.45	32.95	-35.40	Peak
2	1.0803	12.91	-21.92	-9.01	26.94	-35.95	Peak
3	2.6651	9.55	-21.85	-12.30	29.54	-41.84	Peak
4	3.279	15.66	-21.83	-6.17	29.54	-35.71	Peak
5	3.9371	12.82	-21.82	-9.00	29.54	-38.54	Peak
6	7.1806	6.33	-21.75	-15.42	29.54	-44.96	Peak

- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.  
 3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

## 9. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

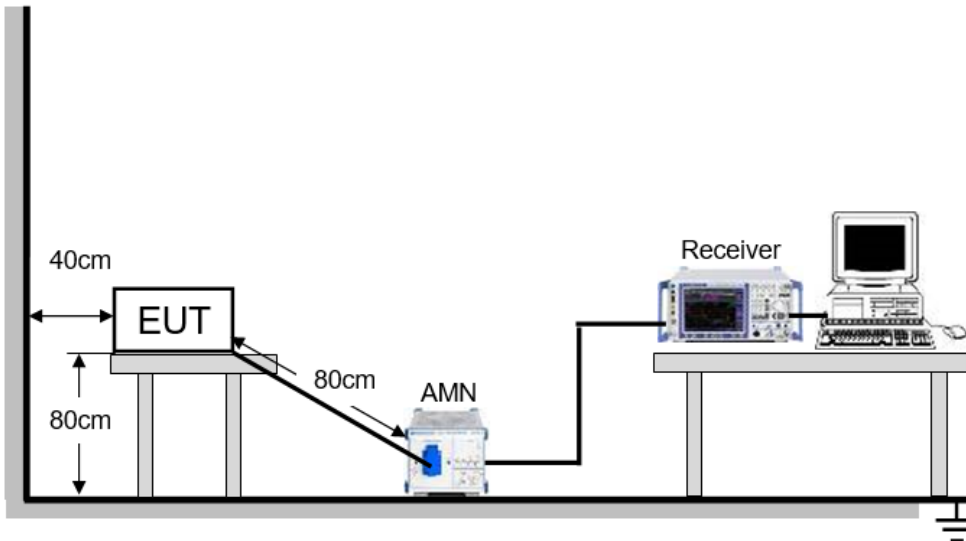
Please refer to FCC §15.207 (a)

FREQUENCY (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

### TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

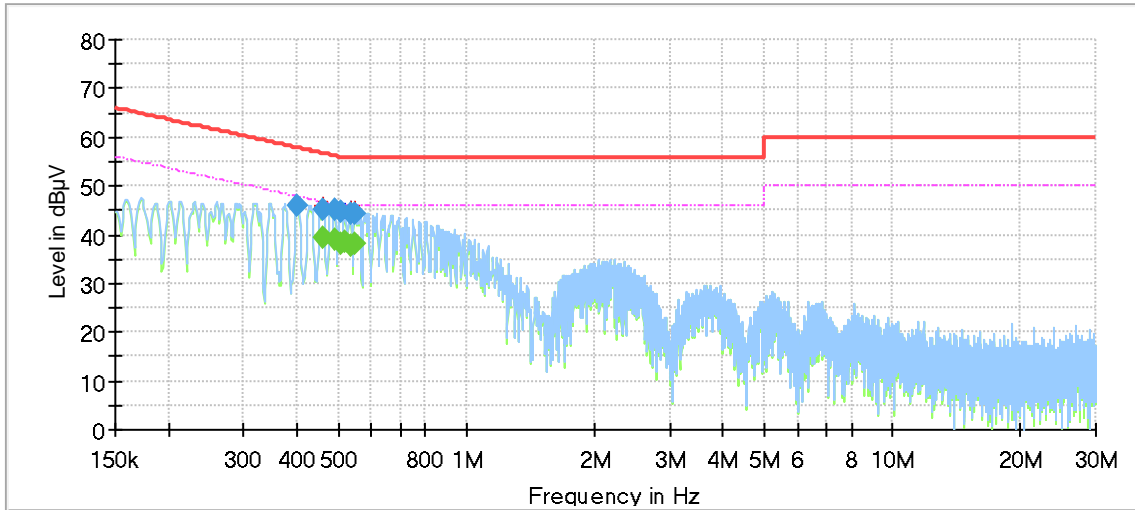
### TEST SETUP AND PROCEDURE



The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

**LINE L RESULTS (WORST-CASE CONFIGURATION)**



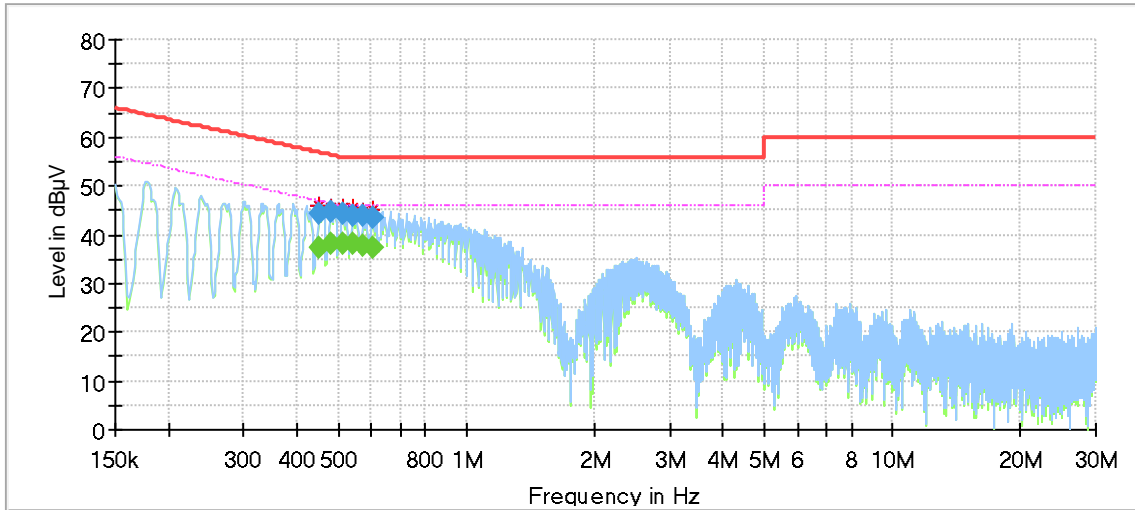
**Final Result**

Frequency [MHz]	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Meas. Time [ms]	Bandwidth [kHz]	Line	Filter	Corr. [dB]
0.400740	46.03	---	57.84	11.81	1000.0	9.000	L1	OFF	9.8
0.461933	---	39.22	46.66	7.44	1000.0	9.000	L1	OFF	9.7
0.461933	45.17	---	56.66	11.49	1000.0	9.000	L1	OFF	9.7
0.490290	---	38.89	46.16	7.27	1000.0	9.000	L1	OFF	9.7
0.490290	45.05	---	56.16	11.12	1000.0	9.000	L1	OFF	9.7
0.508200	---	38.00	46.00	8.00	1000.0	9.000	L1	OFF	9.7
0.508200	44.57	---	56.00	11.43	1000.0	9.000	L1	OFF	9.7
0.518648	---	38.49	46.00	7.51	1000.0	9.000	L1	OFF	9.6
0.535065	44.28	---	56.00	11.72	1000.0	9.000	L1	OFF	9.6
0.535065	---	37.54	46.00	8.46	1000.0	9.000	L1	OFF	9.6
0.548498	---	38.02	46.00	7.98	1000.0	9.000	L1	OFF	9.5
0.548498	44.19	---	56.00	11.81	1000.0	9.000	L1	OFF	9.5

- Note: 1. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 2. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).  
 3. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.  
 4. The extension cord/outlet strip was calibrated with the LISN as required by ANSI C63.10:2013 Clause 6.2.2.  
 5. Pre-testing all test modes and channels and find the HCH which is the worst case, so only the worst case is included in this test report.



**LINE N RESULTS (WORST-CASE CONFIGURATION)**



**Final Result**

Frequency [MHz]	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Meas. Time [ms]	Bandwidth [kHz]	Line	Filter	Corr. [dB]
0.452978	---	37.34	46.82	9.48	1000.0	9.000	N	OFF	9.6
0.452978	44.31	---	56.82	12.51	1000.0	9.000	N	OFF	9.6
0.482828	---	38.04	46.29	8.25	1000.0	9.000	N	OFF	9.6
0.482828	44.58	---	56.29	11.71	1000.0	9.000	N	OFF	9.6
0.512678	---	38.14	46.00	7.86	1000.0	9.000	N	OFF	9.6
0.512678	44.45	---	56.00	11.55	1000.0	9.000	N	OFF	9.6
0.542528	44.07	---	56.00	11.93	1000.0	9.000	N	OFF	9.6
0.542528	---	38.15	46.00	7.85	1000.0	9.000	N	OFF	9.6
0.573870	43.73	---	56.00	12.27	1000.0	9.000	N	OFF	9.5
0.573870	---	37.78	46.00	8.22	1000.0	9.000	N	OFF	9.5
0.603720	---	37.36	46.00	8.64	1000.0	9.000	N	OFF	9.5
0.603720	43.54	---	56.00	12.46	1000.0	9.000	N	OFF	9.5

- Note: 1. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 2. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).  
 3. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.  
 4. The extension cord/outlet strip was calibrated with the LISN as required by ANSI C63.10:2013 Clause 6.2.2.  
 5. Pre-testing all test modes and channels and find the HCH which is the worst case, so only the worst case is included in this test report.



## 10. ANTENNA REQUIREMENTS

### APPLICABLE REQUIREMENTS

Please refer to FCC §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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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.

Please refer to FCC §15.247(b)(4)

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### ANTENNA GAIN

The antenna gain of EUT is less than 6 dBi

**END OF REPORT**