



# FCC RADIO TEST REPORT

**FCC ID** : 2BNGI-KWS83  
**Equipment** : Tusk Frequnce Intercom  
**Brand Name** : Tusk  
**Model Name** : 2138470001  
**Applicant** : Rocky Mountain ATV/MC  
1551 American Way, Payson, UT 84651  
**Manufacturer** : Rocky Mountain ATV/MC  
1551 American Way, Payson, UT 84651  
**Standard** : FCC Part 15 Subpart C §15.247

The product was received on Dec. 23, 2024 and testing was performed from Feb. 18, 2025 to Mar. 24, 2025. We, Sporton International (USA) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Neil Kao

**Sportun International (USA) Inc.**  
1175 Montague Expressway, Milpitas, CA 95035



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## History of this test report



## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Pass	-
3.2	15.247(b)(3) 15.247(b)(4)	Output Power	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges and Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Spurious Emission	Pass	-
3.6	15.207	AC Conducted Emission	Pass	-
3.7	15.203	Antenna Requirement	Pass	-

**Conformity Assessment Condition:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.



## 1 General Description

### 1.1 Product Feature of Equipment Under Test

Product Feature		
<b>General Specs</b>	Bluetooth.	
<b>Antenna Type</b>	Bluetooth: Monopole Antenna	
Antenna information		
2400 MHz ~ 2483.5 MHz	Peak Gain (dBi)	1.18

**Remark:** The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

### 1.2 Modification of EUT

No modifications made to the EUT during the testing.

### 1.3 Testing Location

<b>Test Site</b>	Sportun International (USA) Inc.
<b>Test Site Location</b>	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300
<b>Test Site No.</b>	<b>Sportun Site No.</b>
	TH01-CA, CO01-CA, 03CH02-CA

**Note:** The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: US1250

### 1.4 Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01
- ANSI C63.10-2020

**Remark:** All the test items were validated and recorded in accordance with the standards without any modification during the testing.



## 2 Test Configuration of Equipment Under Test

### 2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	0	2402	21	2444
	1	2404	22	2446
	2	2406	23	2448
	3	2408	24	2450
	4	2410	25	2452
	5	2412	26	2454
	6	2414	27	2456
	7	2416	28	2458
	8	2418	29	2460
	9	2420	30	2462
	10	2422	31	2464
	11	2424	32	2466
	12	2426	33	2468
	13	2428	34	2470
	14	2430	35	2472
	15	2432	36	2474
	16	2434	37	2476
	17	2436	38	2478
	18	2438	39	2480
	19	2440	-	-
	20	2442	-	-



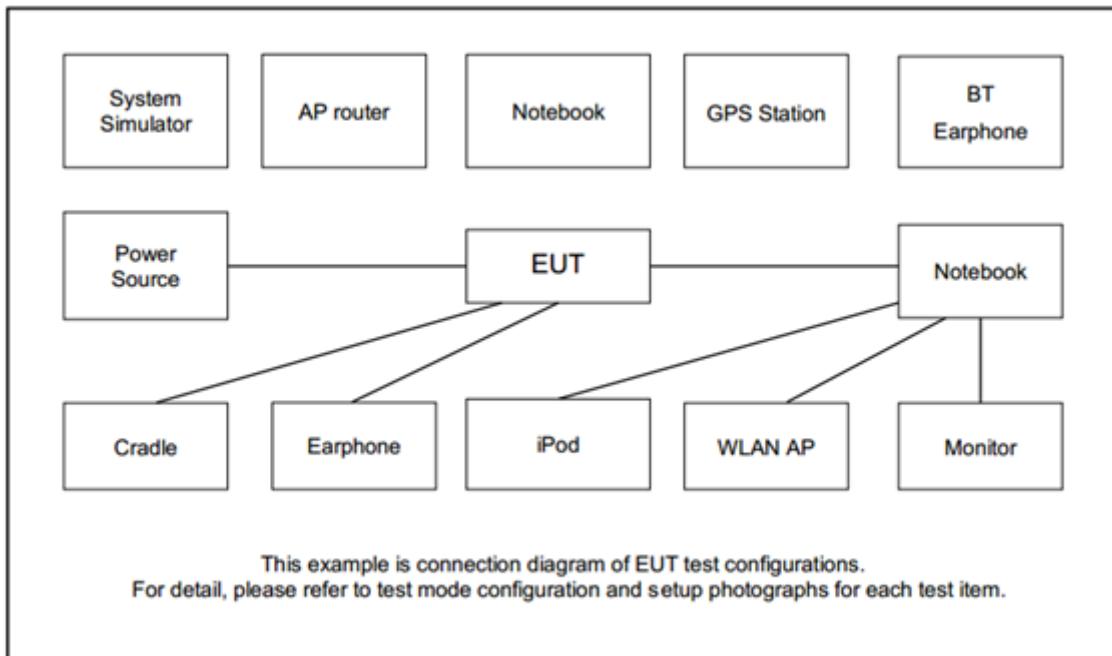
## 2.2 Test Mode

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst case emissions were reported in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Test Item	Data Rate / Modulation
Conducted Test Cases	Bluetooth – LE / GFSK
	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps
	Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps
	Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps
	Mode 4: Bluetooth Tx CH01_2404 MHz_2Mbps
	Mode 5: Bluetooth Tx CH19_2440 MHz_2Mbps
AC Conducted Emission	Mode 6: Bluetooth Tx CH37_2476 MHz_2Mbps
	Mode 1 :Bluetooth TX
	Mode 2 : Bluetooth-LE TX
<b>Remark:</b>	
1. The worst case of Conducted Emission is mode 2; only the test data of it was reported.	
2. For radiation spurious emission, the modulation and the data rate picked for testing are determined by the Max. RF conducted power.	
3. The detailed Radiated test modes are shown in Appendix C.	

## 2.3 Connection Diagram of Test System



## 2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	ASUS	ASUS EXPERTBOOK B1402CVA_B14 08CVA	PD9AX211NG	N/A	AC I/P : Unshielded, 1.2m DC O/P : Shielded, 1.8m
2.	Notebook	Dell	Latitude 3400	PD9AX211NG	N/A	AC I/P : Unshielded, 1.2m DC O/P : Shielded, 1.8m
3.	Adapter	Google	G1000-US`	N/A	FPS0D8AK02A3AM LPS	N/A
4.	ESP-PROG Dongle	Espressif System	N/A	N/A	N/A	N/A

## 2.5 EUT Operation Test Setup

The RF test items, utility “Tera Term Version 4.95” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.



## 2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 4.2 dB and 10 dB attenuator.

*Offset(dB) = RF cable loss(dB) + attenuator factor(dB).*

$$= 4.2 + 10 = 14.2 \text{ (dB)}$$

### 3 Test Result

#### 3.1 6dB and 99% Bandwidth Measurement

##### 3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

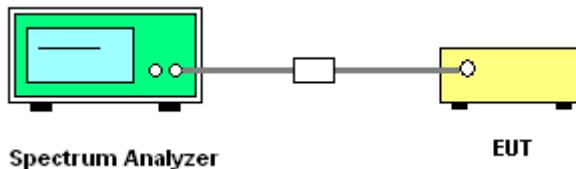
##### 3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

##### 3.1.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 11.8.1 (6dB BW).
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW)  $\geq 3 * \text{RBW}$ .
6. Measure and record the results in the test report.

##### 3.1.4 Test Setup



##### 3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

##### 3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5 MHz, the limit for output power is 30 dBm. If transmitting antenna of directional gain greater than 6 dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

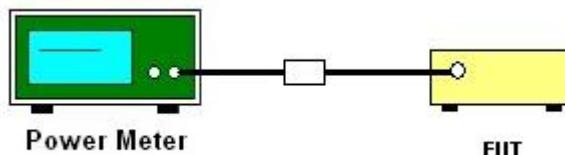
### 3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

### 3.2.3 Test Procedures

1. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
2. The RF output of EUT is connected to the power meter by RF cable and attenuator.
3. The path loss is compensated to the results for each measurement.
4. Set the maximum power setting and enable the EUT to transmit continuously.
5. Measure the conducted output power and record the results in the test report.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Average Output Power

Please refer to Appendix A.

### 3.3 Power Spectral Density Measurement

#### 3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band at any time interval of continuous transmission.

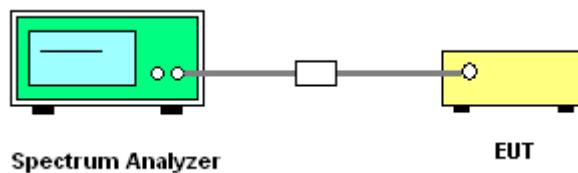
#### 3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

#### 3.3.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth (VBW) = 10 kHz. In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6 dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. The Measured power density (dBm)/ 100 kHz is a reference level and is used as 20 dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

#### 3.3.4 Test Setup



#### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

## 3.4 Conducted Band Edges and Spurious Emission Measurement

### 3.4.1 Limit of Conducted Band Edges and Spurious Emission

All harmonics/spurious must be at least 30 dB down from the highest emission level within the authorized band.

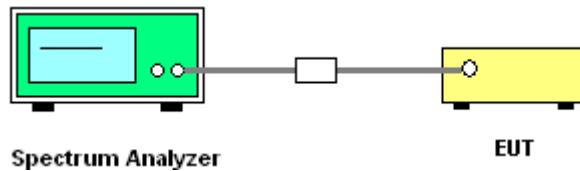
### 3.4.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

### 3.4.3 Test Procedure

1. The testing follows the ANSI C63.10 Section 11.11.3 Emission level measurement.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Set RBW = 100 kHz, VBW = 300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

### 3.4.4 Test Setup



### 3.4.5 Test Result of Conducted Band Edges Plots

Please refer to Appendix A.

### 3.4.6 Test Result of Conducted Spurious Emission Plots

Please refer to Appendix A.



## 3.5 Radiated Band Edges and Spurious Emission Measurement

### 3.5.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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
Above 960	500	3

### 3.5.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.



### 3.5.3 Test Procedures

1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT is 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.
3. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
4. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-”.
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-”.
8. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW = 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW = 3 MHz for  $f \geq 1$  GHz for peak measurement.For average measurement:  
Applied protocol-limited duty cycle measurement method as per KDB 558074 D01 QA.3  
Subtracted the Peak reading to derive the RMS average value.

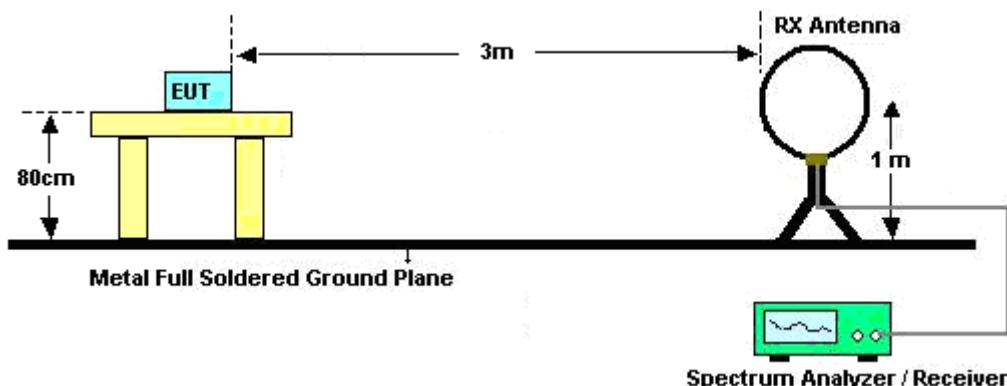
Calculation example,

Duty Cycle percentage is limited to maximum 20.06%, duty factor =  $20\log(0.2006) = 13.95$ (dB). Average value = Peak value (57.01dBuV/m) – 13.95 (dB) = 43.06 dBuV/m.

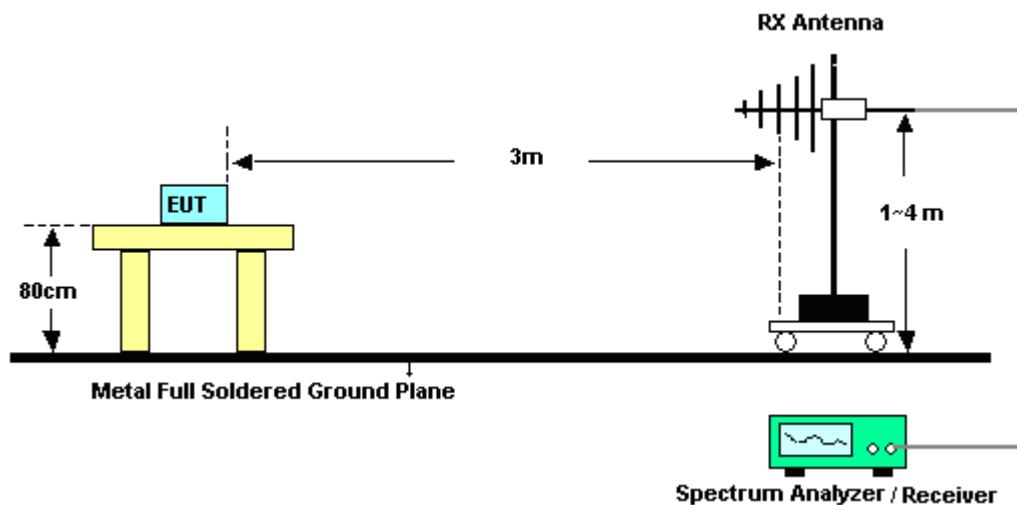
Detailed method to limit duty cycle will be addressed at the operation description from manufacturer.

### 3.5.4 Test Setup

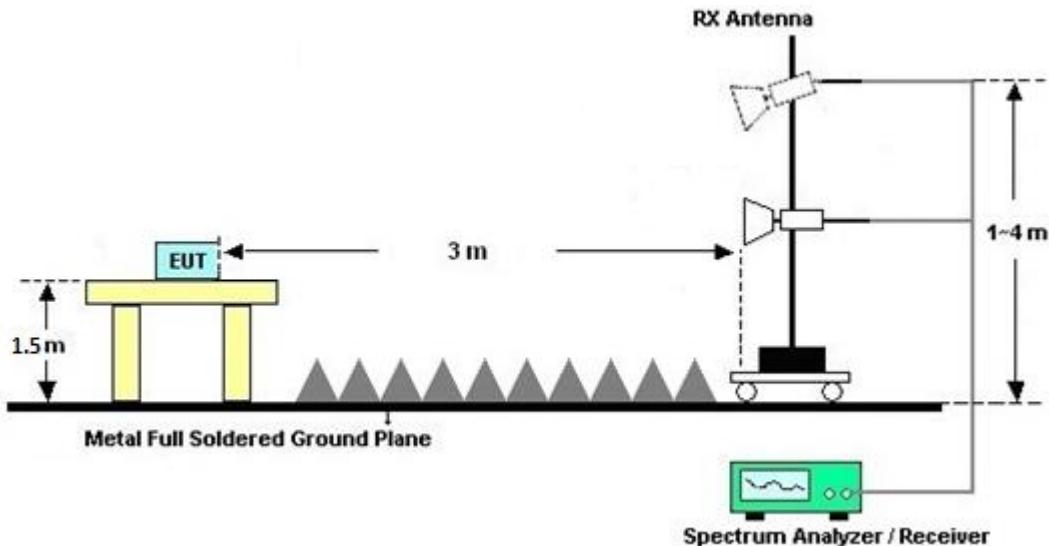
For radiated test below 30MHz



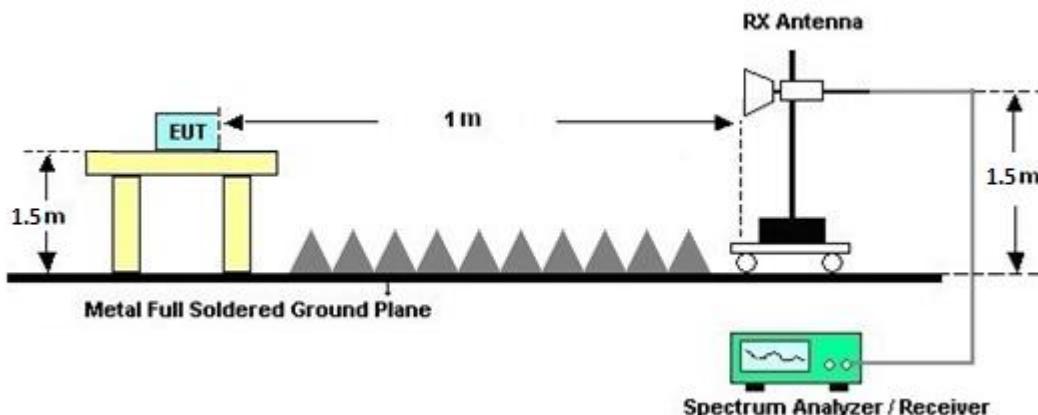
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



### 3.5.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result comes out very similar.

### 3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

### 3.5.7 Duty Cycle

Please refer to Appendix D.

### 3.5.8 Test Result of Radiated Spurious Emission (30 MHz ~ 10th Harmonic)

Please refer to Appendix C.



## 3.6 AC Conducted Emission Measurement

### 3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

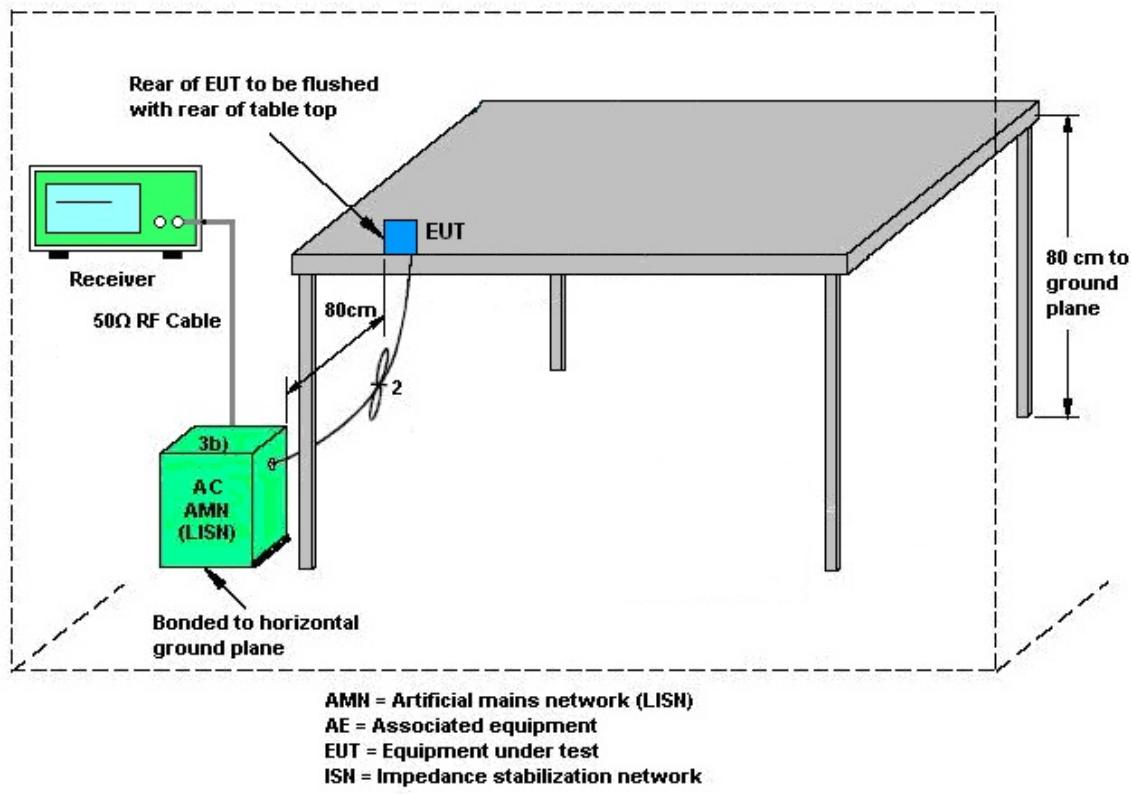
### 3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

### 3.6.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

### 3.6.4 Test Setup



### 3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



## 3.7 Antenna Requirements

### 3.7.1 Standard Applicable

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. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

### 3.7.2 Antenna Anti-Replacement Construction

Antenna permanently attached.



## 4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Bilog Antenna	TESEQ	6111D	50392	30MHz~1GHz	Aug.13, 2024	Feb. 18, 2025~Feb. 25, 2025	Nov. 12, 2025	Radiation (03CH02-CA)
Loop Antenna	R&S	HFH2-Z2E	100840	9kHz~30MHz	May 02, 2024	Feb. 18, 2025~Feb. 25, 2025	May. 01, 2025	Radiation (03CH02-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	02140	1GHz~18GHz	Feb. 07, 2025	Feb. 18, 2025~Feb. 25, 2025	Feb. 06, 2026	Radiation (03CH02-CA)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00841	18GHz~40GHz	Aug. 07, 2024	Feb. 18, 2025~Feb. 25, 2025	Aug. 06, 2025	Radiation (03CH02-CA)
Amplifier	SONOMA	310N	372240	9kHz~1GHz	Apr. 24, 2024	Feb. 18, 2025~Feb. 25, 2025	Apr. 23, 2025	Radiation (03CH02-CA)
Filter	Wainwright	WHKX10-2700-3000-18000-40SS	SN91	3GHz High Pass Filter	Jun. 04, 2024	Feb. 18, 2025~Feb. 25, 2025	Jun.03, 2025	Radiation (03CH02-CA)
Filter	Wainwright	WLK12-1200-1272-11000-40SS	SN1	1.2GHz Low Pass Filter	Jun. 04, 2024	Feb. 18, 2025~Feb. 25, 2025	Jun.03, 2025	Radiation (03CH02-CA)
Preamplifier	Keysight	83017A	MY53270321	1GHz~26.5GHz	Apr. 25, 2024	Feb. 18, 2025~Feb. 25, 2025	Apr.24, 2025	Radiation (03CH02-CA)
Preamplifier	E-instrument	ERA-100M-18 G-56-01-A70	EC1900251	1GHz~18GHz	Apr. 24, 2024	Feb. 18, 2025~Feb. 25, 2025	Apr.23, 2025	Radiation (03CH02-CA)
Preamplifier	EMEC	EMC18G40G	060726	18G-40G	Apr. 04, 2024	Feb. 18, 2025~Feb. 25, 2025	Apr.03, 2025	Radiation (03CH02-CA)
RF Cable	HUBER+SUHNER	SUCOFLEX 102	804209/2, 802406/2, 802875/2, 802952/2	N/A	Oct. 10, 2024	Feb. 18, 2025~Feb. 25, 2025	Oct.09, 2025	Radiation (03CH02-CA)
Hygrometer	TESEO	608-H1	45142602	N/A	Aug. 14, 2024	Feb. 18, 2025~Feb. 25, 2025	Aug. 13, 2025	Radiation (03CH02-CA)
Controller	Chaintek	EM-1000	060876	Control Turn Table & Antenna Mast	N/A	Feb. 18, 2025~Feb. 25, 2025	N/A	Radiation (03CH02-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Feb. 18, 2025~Feb. 25, 2025	N/A	Radiation (03CH02-CA)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Feb. 18, 2025~Feb. 25, 2025	N/A	Radiation (03CH02-CA)
Test Software	Audix E3	E3	N/A	N/A	N/A	Feb. 18, 2025~Feb. 25, 2025	N/A	Radiation (03CH02-CA)
Hygrometer	Testo	608-H1	45141354	N/A	Aug. 14, 2024	Feb. 26, 2025~Mar. 05, 2025	Aug. 13, 2025	Conducted (TH01-CA)
Power Sensor	DARE!!	RPR3006W	RPR6W-1901 027	10MHz-8GHz	Apr. 24, 2024	Feb. 26, 2025~Mar. 05, 2025	Apr. 23, 2025	Conducted (TH01-CA)
Spectrum analyzer	Rhodes & Schwarz	FSV40	101089	10Hz~40GHz	Apr. 24, 2024	Feb. 26, 2025~Mar. 05, 2025	Apr. 23, 2025	Conducted (TH01-CA)
Switch Box	EM Electronics	EMSW26	1090304	N/A	Oct. 04, 2024	Feb. 26, 2025~Mar. 05, 2025	Oct. 03, 2025	Conducted (TH01-CA)
LISN	TESEQ	NNB51	47415	N/A	Aug. 14, 2024	Mar. 24, 2025	Aug. 13, 2025	Conduction (CO01-CA)
LISN	TESEQ	NNB51	47407	N/A	Apr. 23, 2024	Mar. 24, 2025	Apr. 22, 2025	Conduction (CO01-CA)
EMI Test Receiver	R&S	ESR7	102177	9kHz~7GHz	Apr. 23, 2024	Mar. 24, 2025	Apr. 22, 2025	Conduction (CO01-CA)
Pulse limiter with 10dB attenuation	R&S	VTSD 9561-FN	9561-F-N00412	N/A	Jun. 04, 2024	Mar. 24, 2025	Jun. 03, 2025	Conduction (CO01-CA)
LISN Cable	HUBER+SUHNER	RG-214/U	LISN cable -01	N/A	Jun. 04, 2024	Mar. 24, 2025	Jun. 03, 2025	Conduction (CO01-CA)
Test Software	R&S	EMC32 V10.30.0	N/A	N/A	N/A	Mar. 24, 2025	N/A	Conduction (CO01-CA)



## 5 Measurement Uncertainty

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2U <sub>c</sub> (y))	3.9 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2U <sub>c</sub> (y))	5.0 dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2U <sub>c</sub> (y))	5.4 dB
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2U <sub>c</sub> (y))	4.5 dB
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## Appendix A. Test Result of Conducted Test Items

Test Engineer:	Rebecca Li	Temperature:	21~25	°C
Test Date:	2025/02/26 ~ 2025/3/5	Relative Humidity:	51~54	%

<b><u>TEST RESULTS DATA</u></b> <b><u>6dB and 99% Occupied Bandwidth</u></b>								
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.064	0.712	0.50	Pass
BLE	1Mbps	1	19	2440	1.064	0.701	0.50	Pass
BLE	1Mbps	1	39	2480	1.067	0.721	0.50	Pass

<b><u>TEST RESULTS DATA</u></b> <b><u>Average Power Table</u></b>										
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	21.02	30.00	1.18	22.20	36.00	Pass
BLE	1Mbps	1	19	2440	21.73	30.00	1.18	22.91	36.00	Pass
BLE	1Mbps	1	39	2480	21.19	30.00	1.18	22.37	36.00	Pass

<b><u>TEST RESULTS DATA</u></b> <b><u>Average Power Density</u></b>									
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	1	0	2402	14.42	1.65	1.18	8.00	Pass
BLE	1Mbps	1	19	2440	14.89	2.44	1.18	8.00	Pass
BLE	1Mbps	1	39	2480	14.69	1.86	1.18	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

<b><u>TEST RESULTS DATA</u></b> <b><u>6dB and 99% Occupied Bandwidth</u></b>								
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE5.0	2Mbps	1	1	2404	2.147	1.342	0.50	Pass
BLE5.0	2Mbps	1	19	2440	2.144	1.268	0.50	Pass
BLE5.0	2Mbps	1	37	2476	2.138	1.249	0.50	Pass

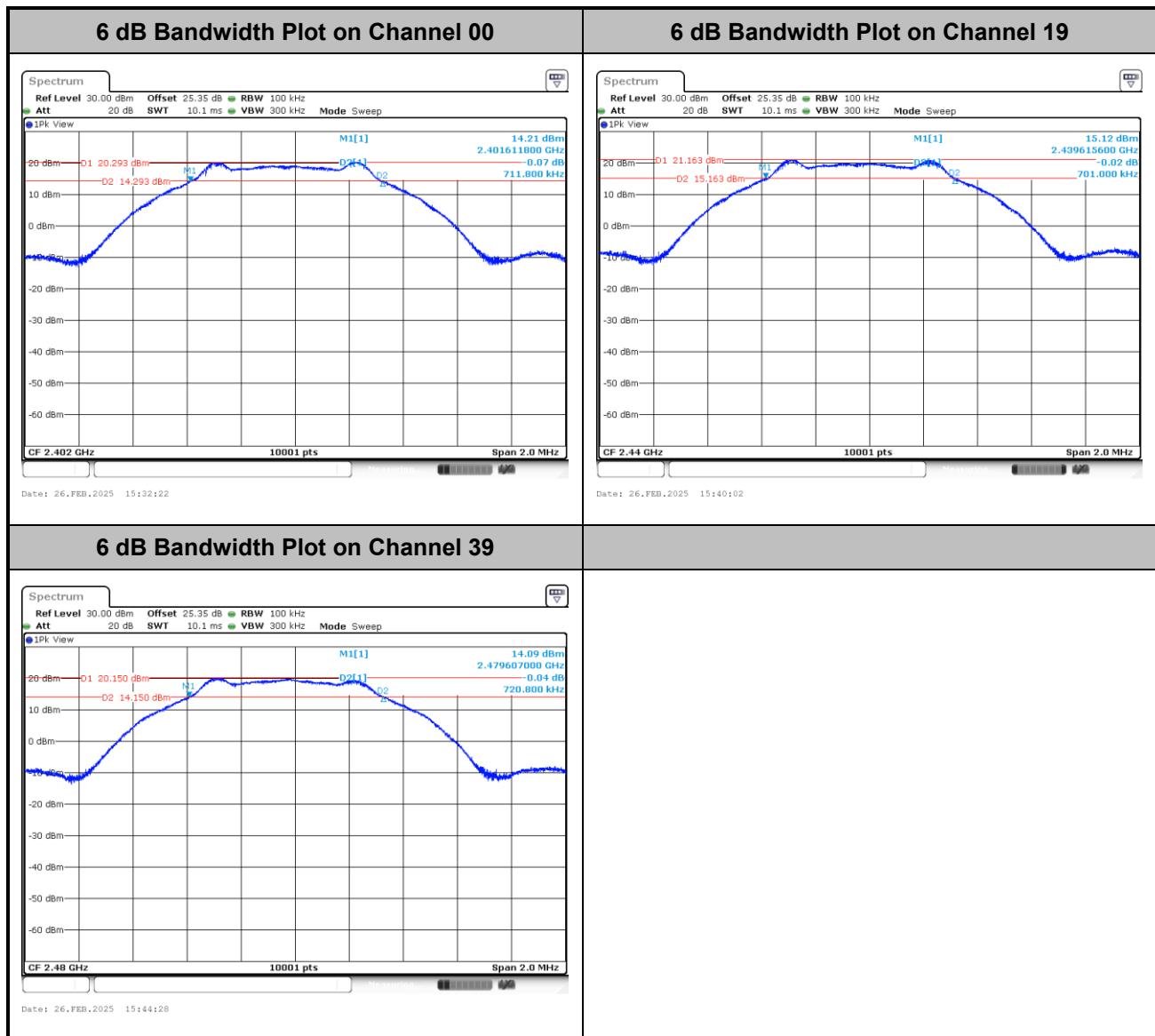
<b><u>TEST RESULTS DATA</u></b> <b><u>Average Power Table</u></b>										
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE5.0	2Mbps	1	1	2404	20.96	30.00	1.18	22.14	36.00	Pass
BLE5.0	2Mbps	1	19	2440	21.68	30.00	1.18	22.86	36.00	Pass
BLE5.0	2Mbps	1	37	2476	21.25	30.00	1.18	22.43	36.00	Pass

<b><u>TEST RESULTS DATA</u></b> <b><u>Average Power Density</u></b>									
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE5.0	2Mbps	1	1	2404	11.55	-0.76	1.18	8.00	Pass
BLE5.0	2Mbps	1	19	2440	12.53	1.04	1.18	8.00	Pass
BLE5.0	2Mbps	1	37	2476	12.09	-0.25	1.18	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

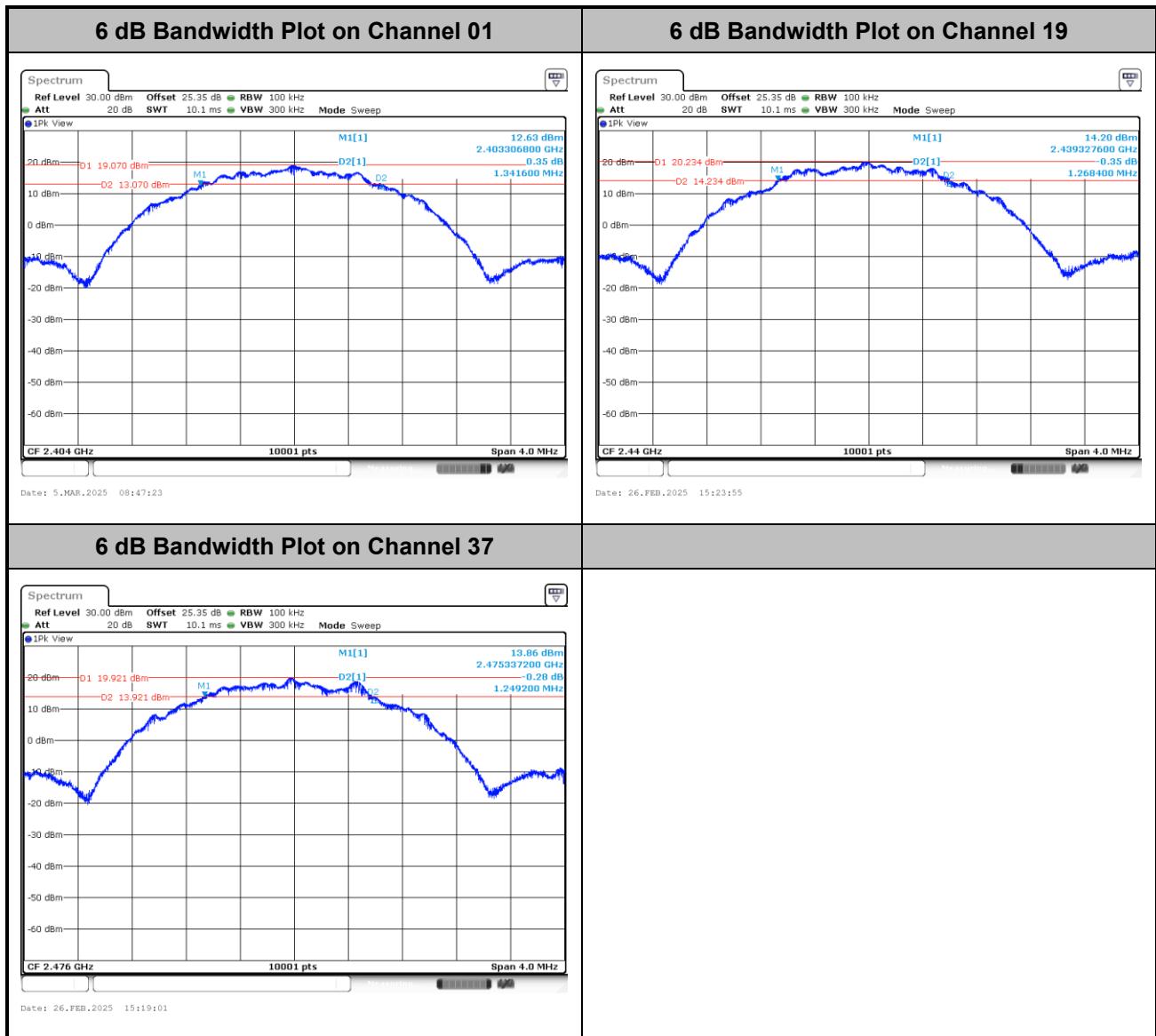
**6dB Bandwidth**

&lt;1M&gt;



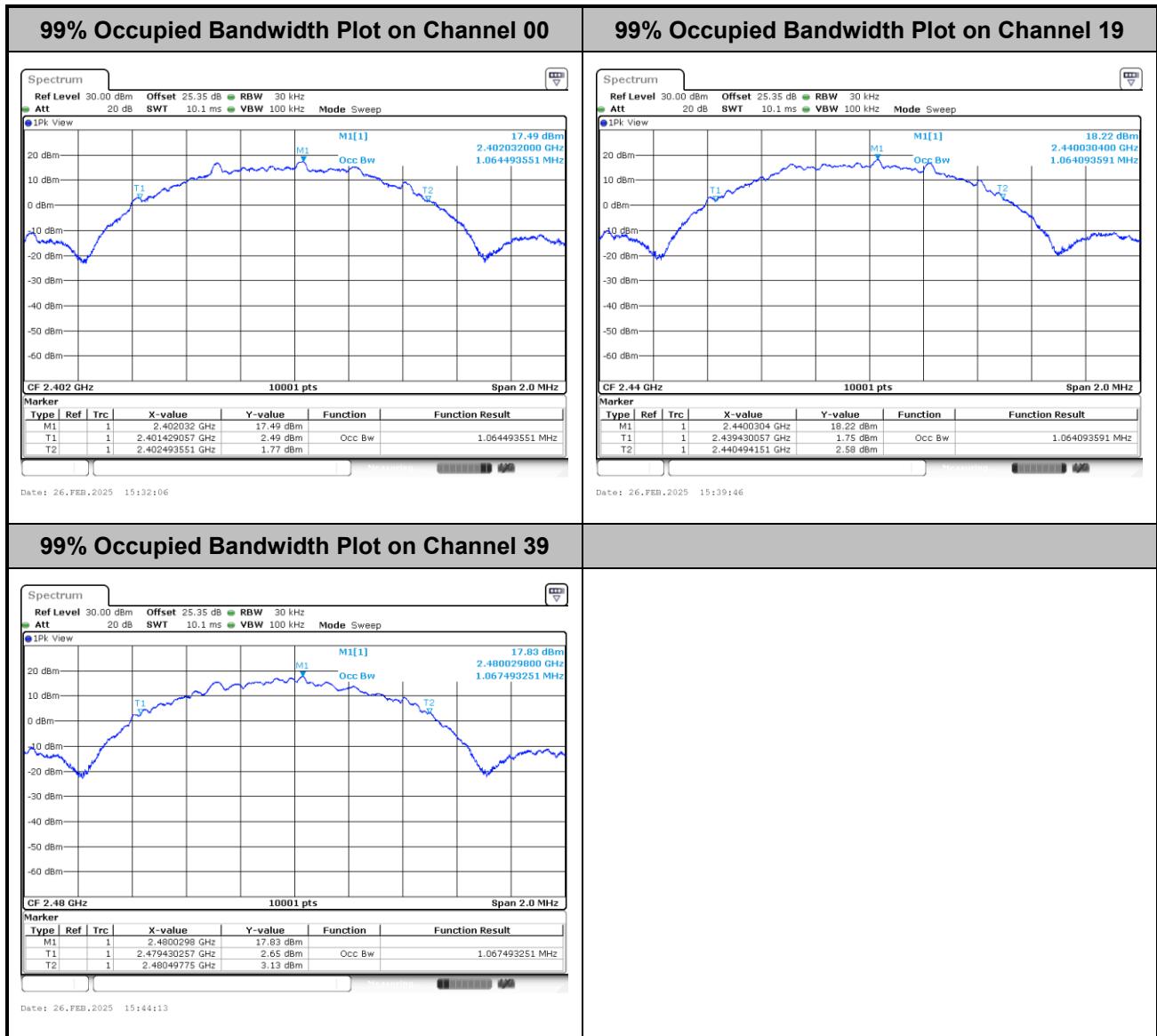


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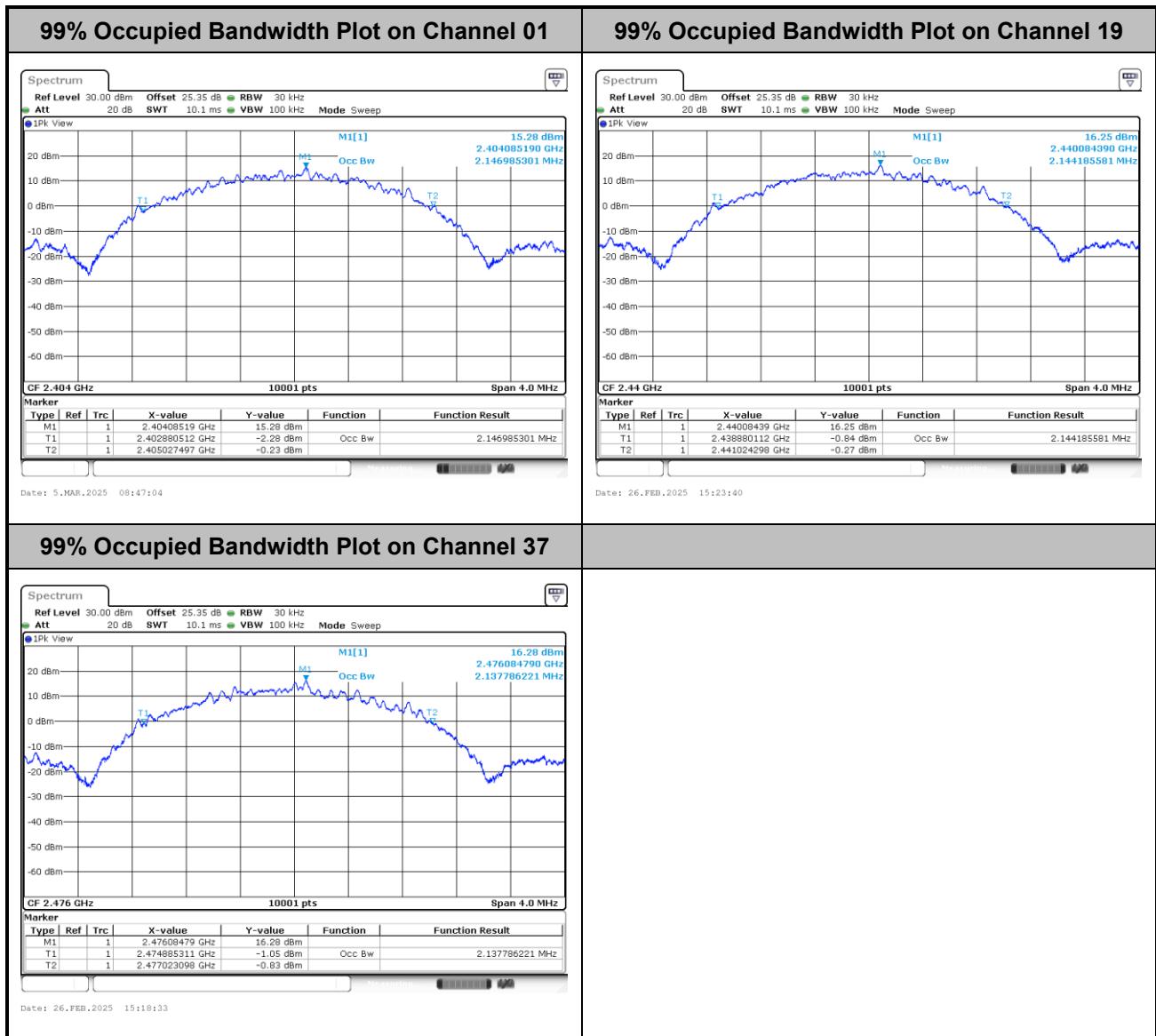
**99% Occupied Bandwidth**

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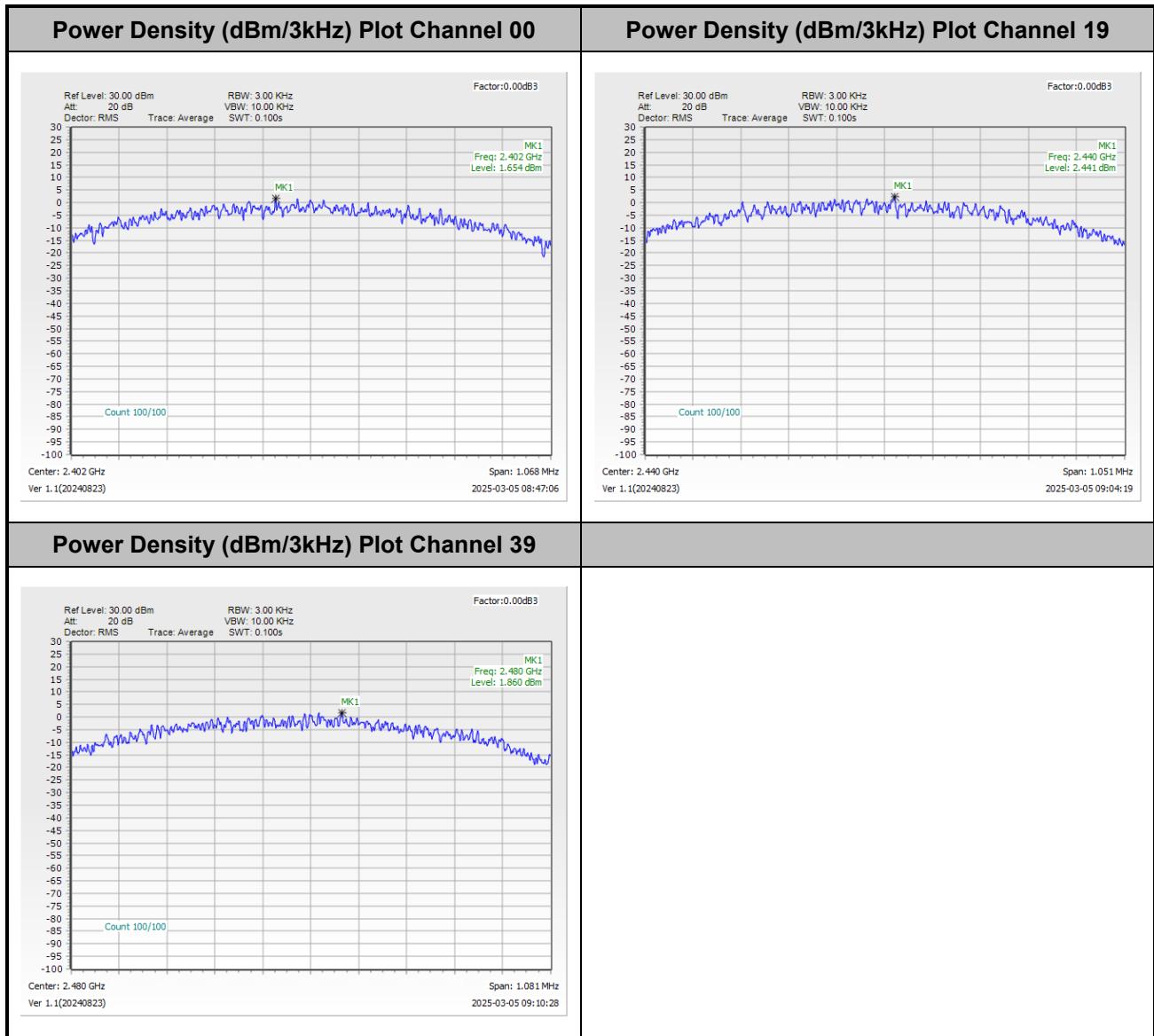


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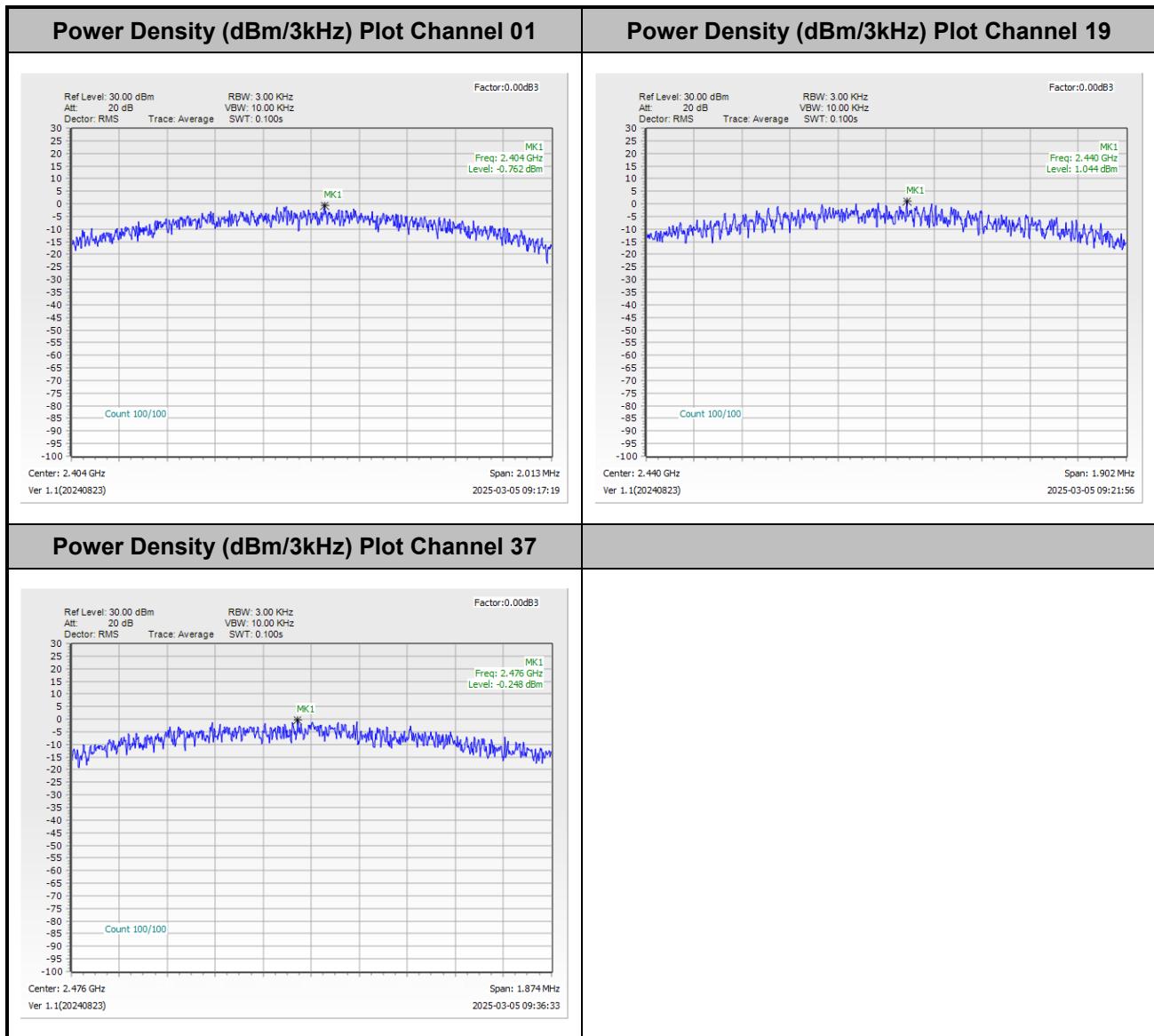
**Power Spectral Density (dBm/3kHz)**

&lt;1M&gt;



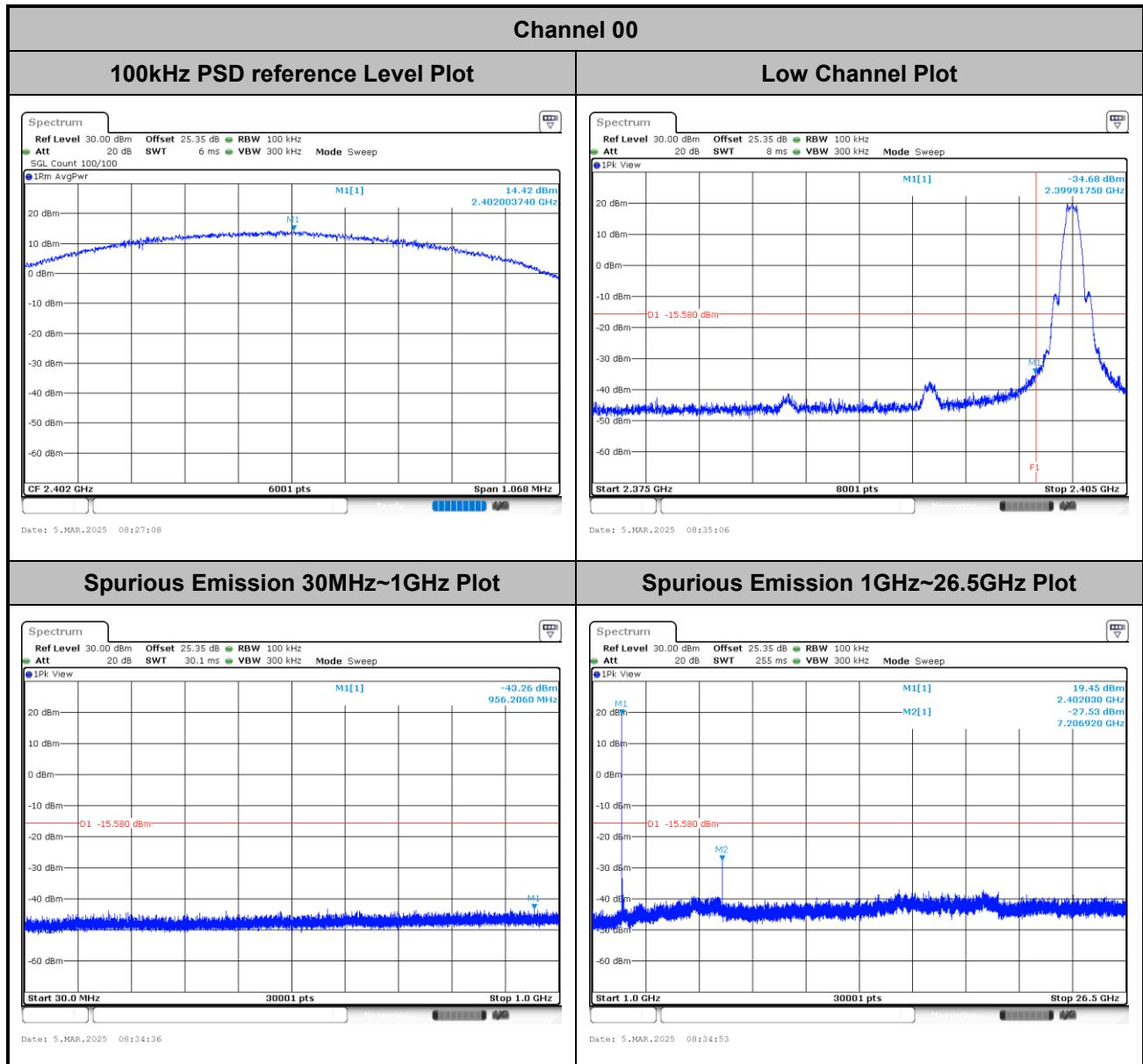


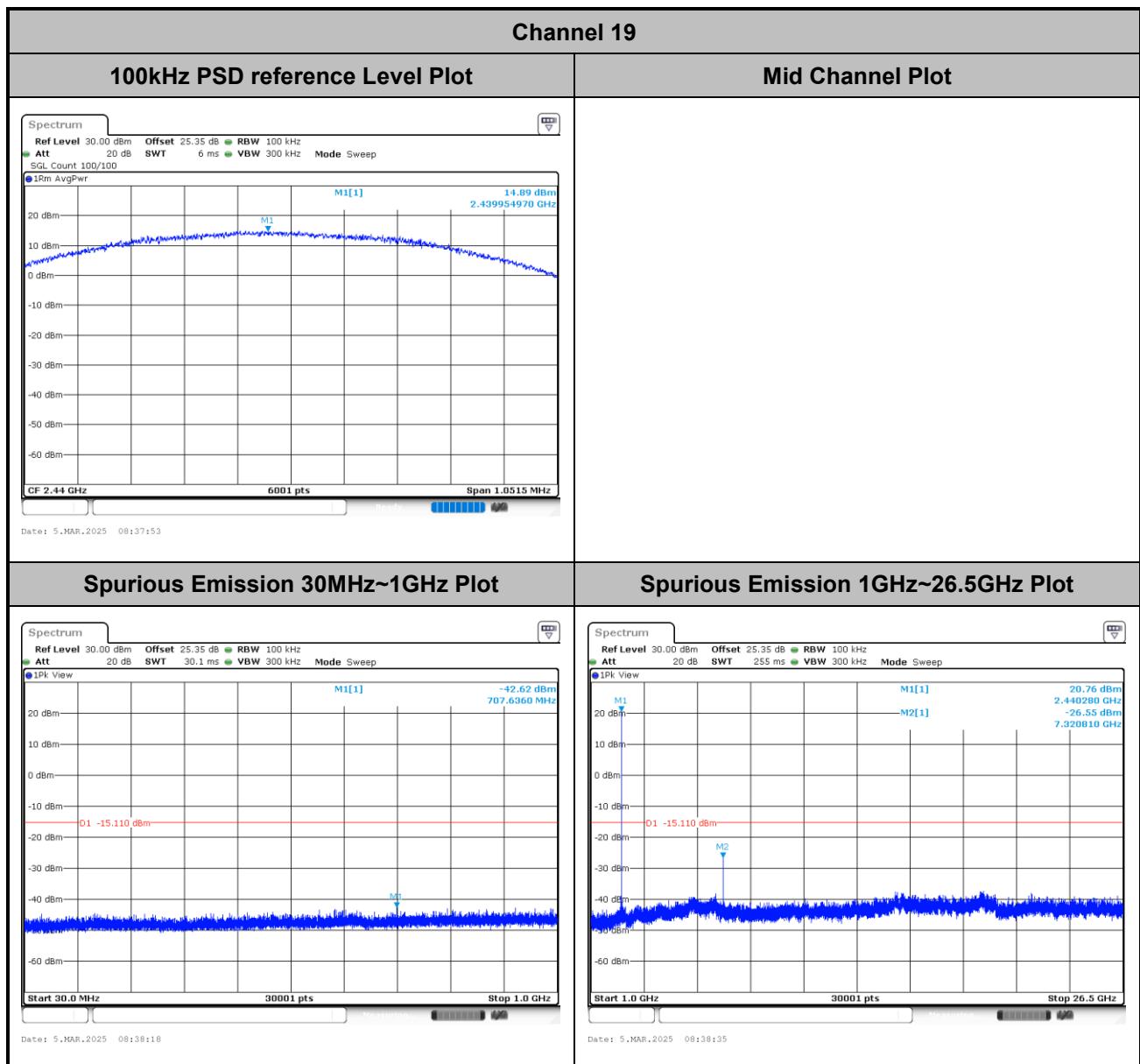
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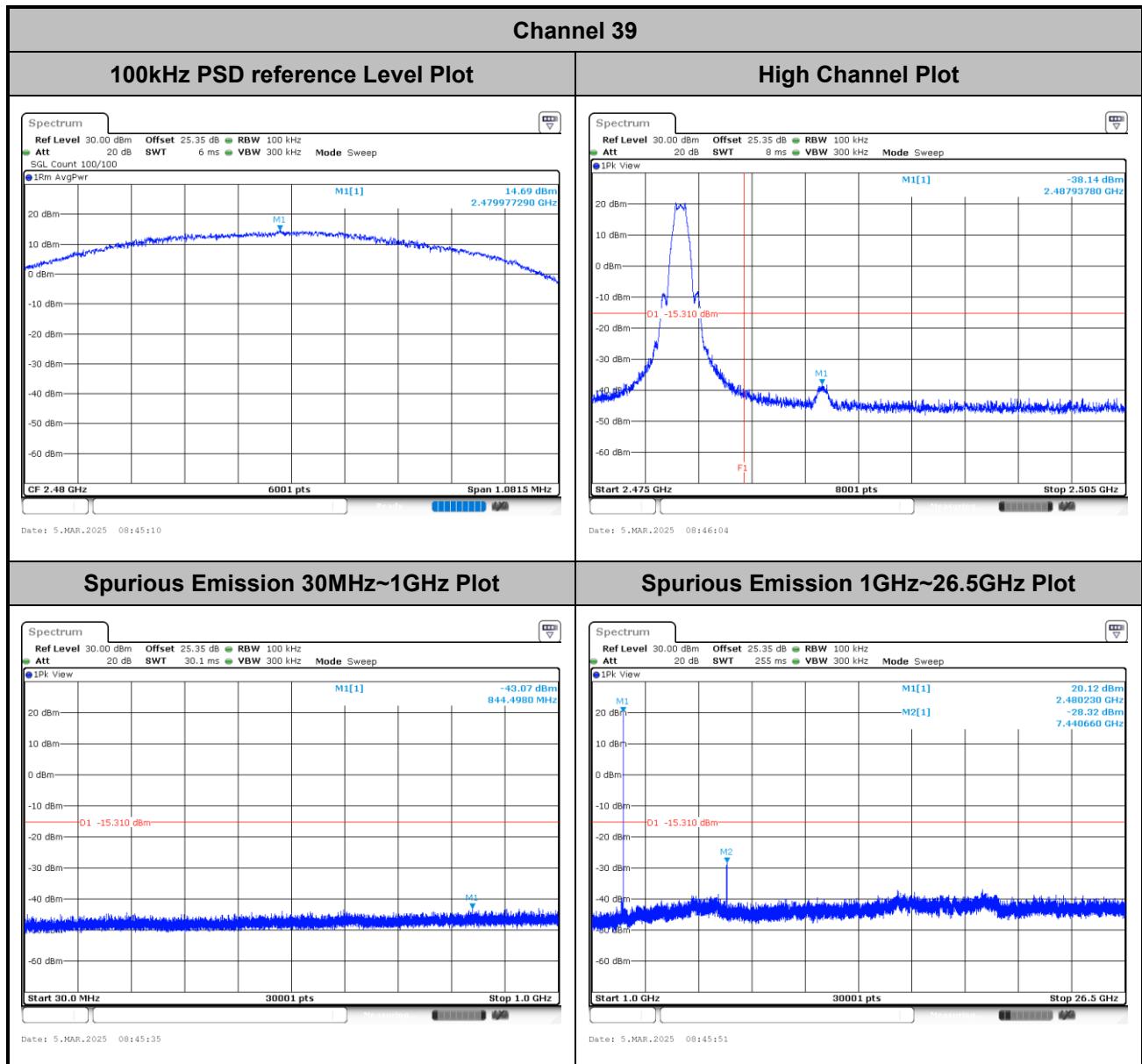


**Band Edge and Conducted Spurious Emission**

&lt;1M&gt;

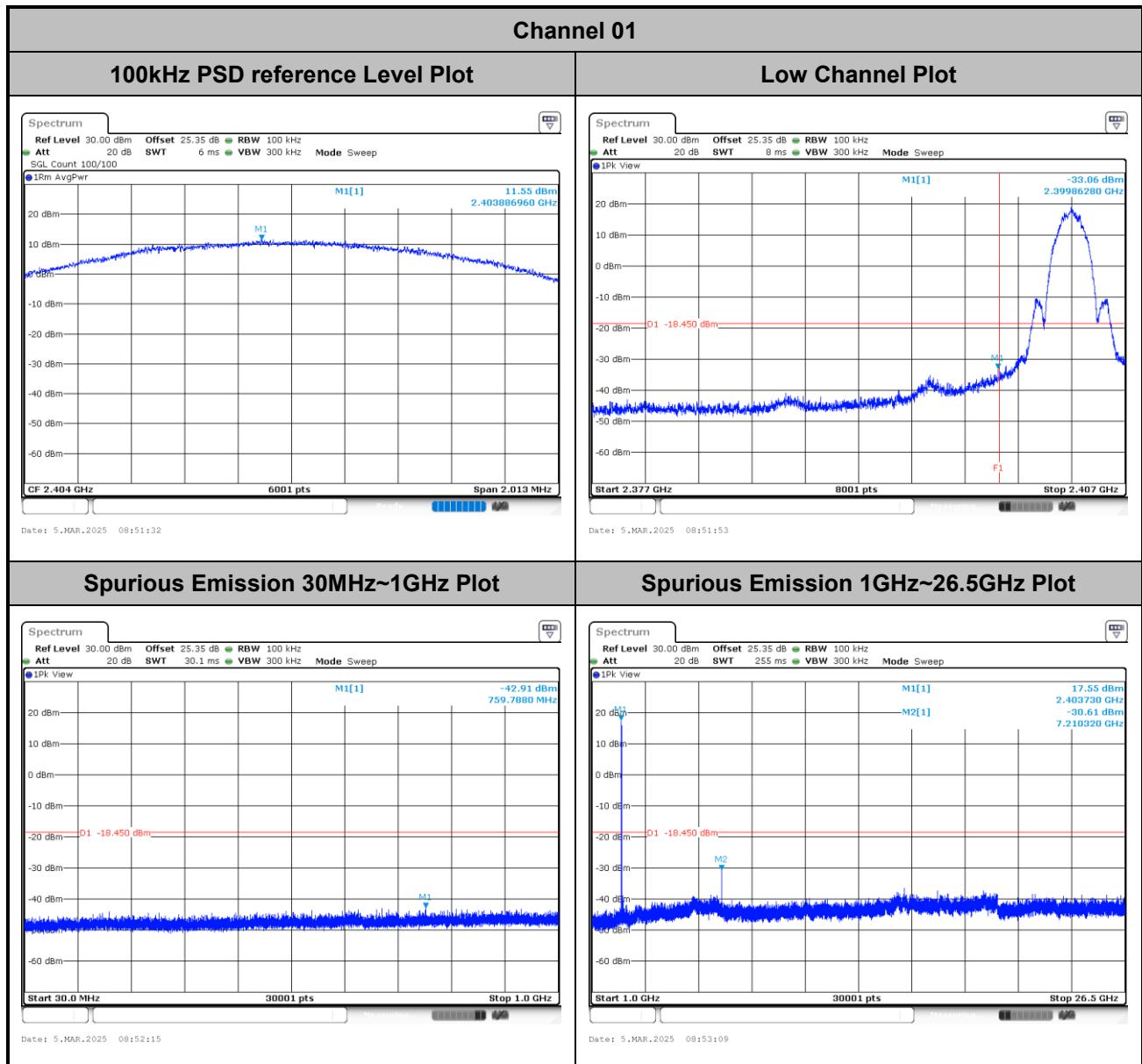


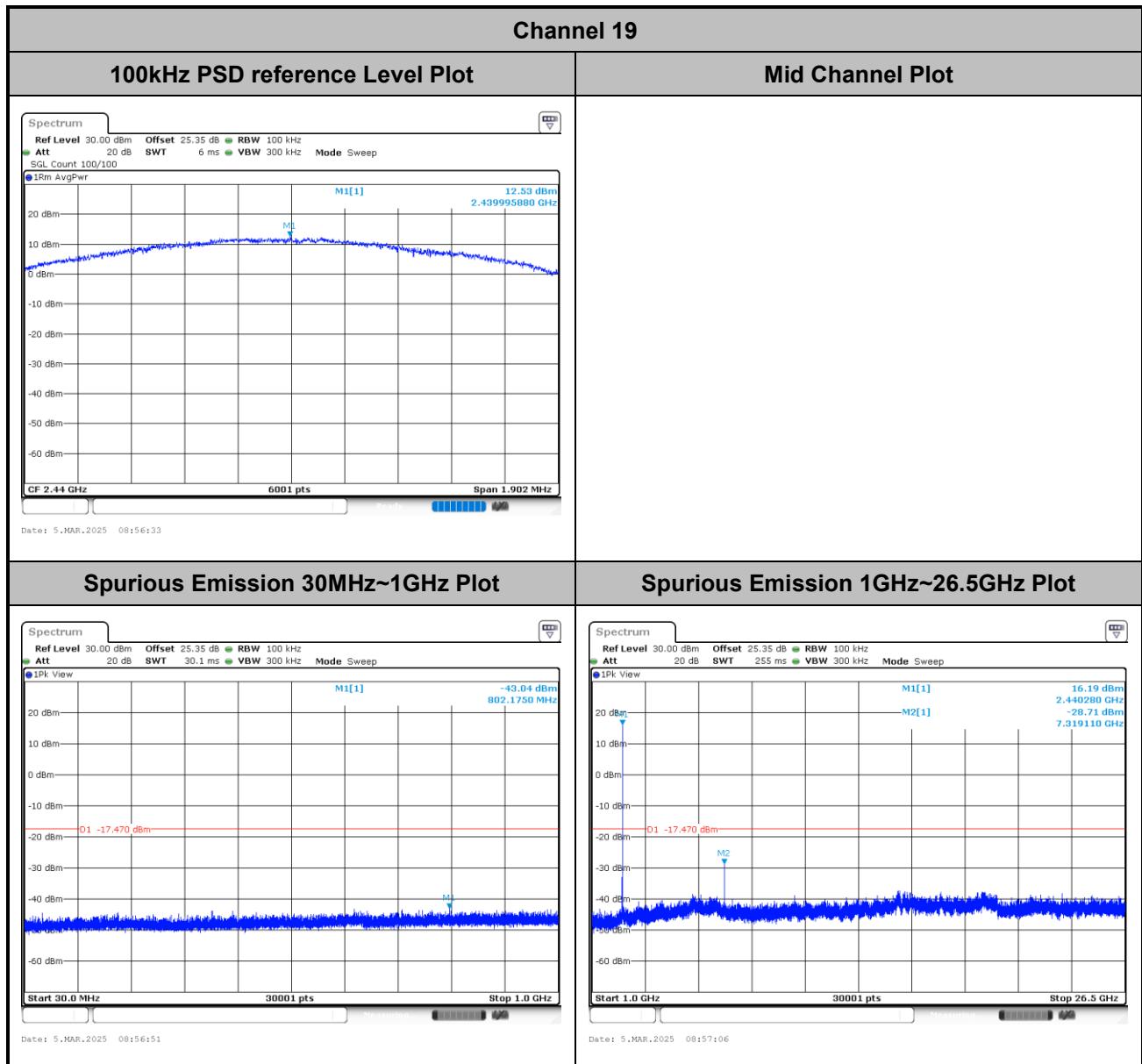


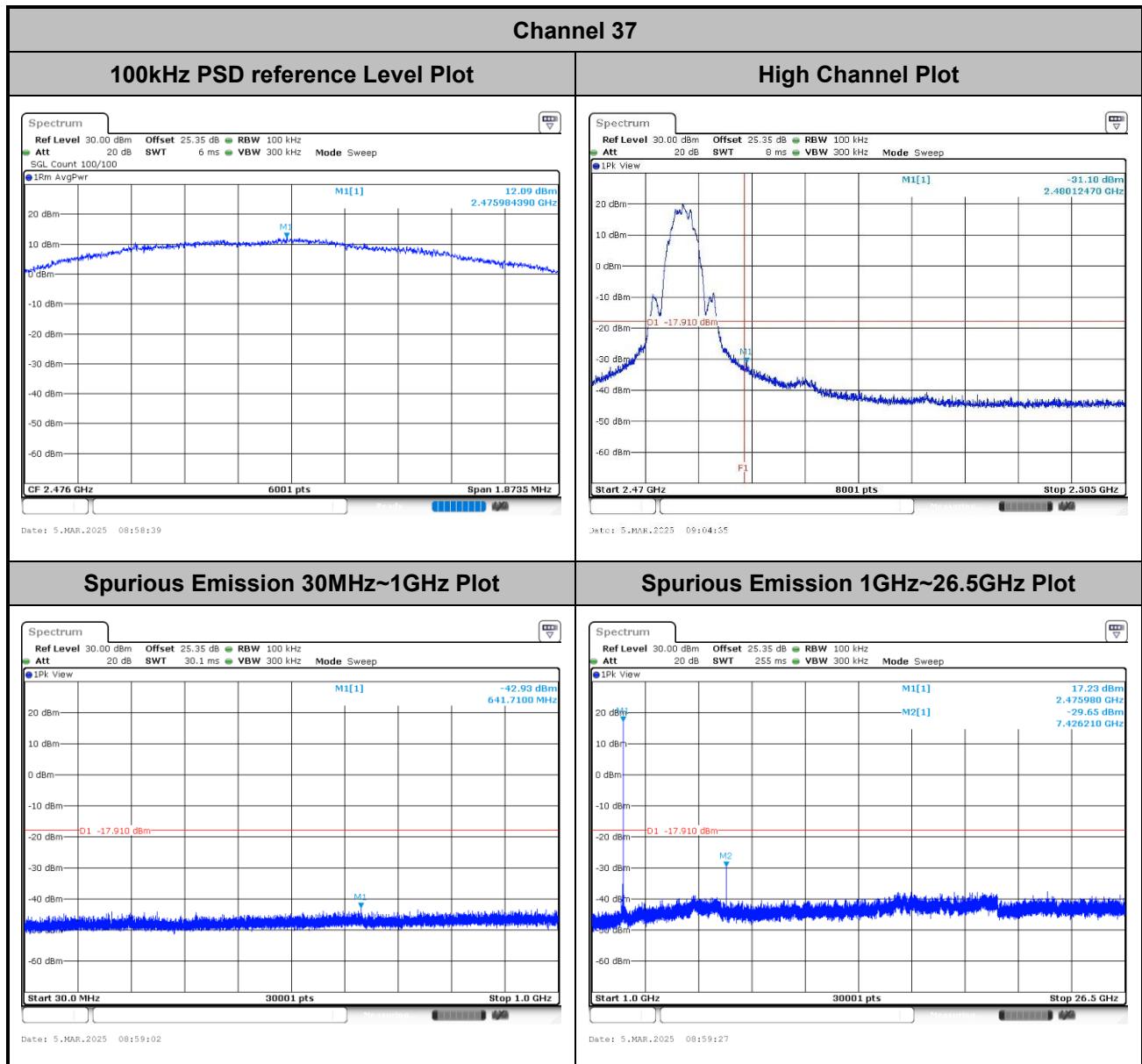




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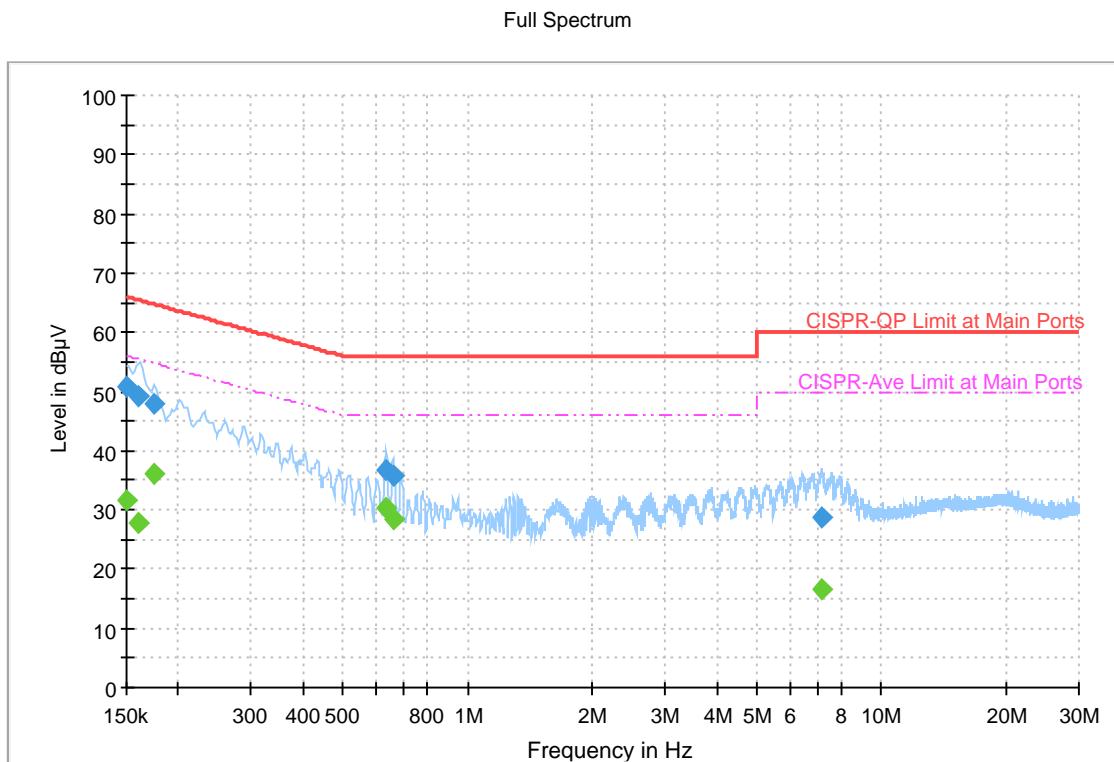


## Appendix B. AC Conducted Emission Test Results

<b>Test Engineer :</b>	Leo Liu	<b>Temperature :</b>	21.0~23.6°C
		<b>Relative Humidity :</b>	42.0~44.9%

## EUT Information

Test Site Location : CO01-CA  
 Project 241204002  
 Power: 120Vac/60Hz  
 Mode 2  
 LINE



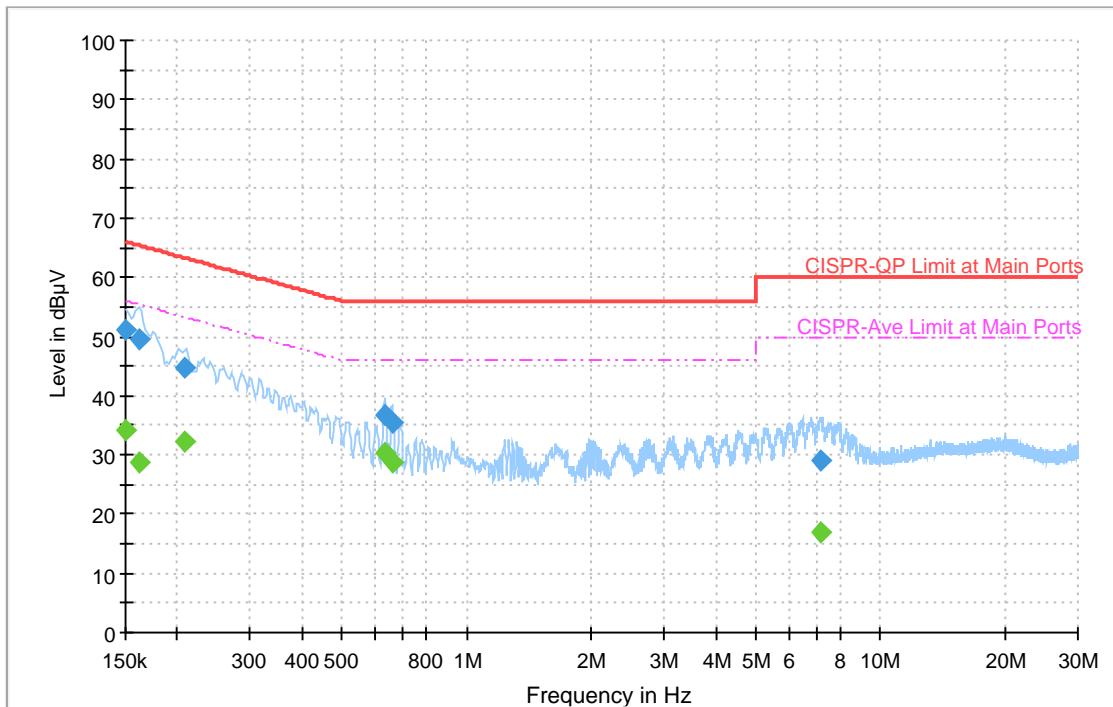
## Final Result

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	CAverage (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Line	Filter	Corr. (dB)
0.150230	---	31.75	55.99	24.24	L1	OFF	20.4
0.150230	50.94	---	65.99	15.05	L1	OFF	20.4
0.160935	---	27.86	55.42	27.56	L1	OFF	20.4
0.160935	49.09	---	65.42	16.33	L1	OFF	20.4
0.174930	---	36.19	54.72	18.53	L1	OFF	20.3
0.174930	47.98	---	64.72	16.74	L1	OFF	20.3
0.632634	---	30.43	46.00	15.57	L1	OFF	20.3
0.632634	36.69	---	56.00	19.31	L1	OFF	20.3
0.660156	---	28.29	46.00	17.71	L1	OFF	20.3
0.660156	35.70	---	56.00	20.30	L1	OFF	20.3
7.160937	---	16.53	50.00	33.47	L1	OFF	21.1
7.160937	28.91	---	60.00	31.09	L1	OFF	21.1

## EUT Information

Test Site Location : CO01-CA  
 Project 241204002  
 Power: 120Vac/60Hz  
 Mode 2  
 Neutral

Full Spectrum



## Final Result

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	CAverage (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Line	Filter	Corr. (dB)
0.150095	---	34.20	56.00	21.79	N	OFF	20.4
0.150095	51.16	---	66.00	14.83	N	OFF	20.4
0.161520	---	28.74	55.39	26.65	N	OFF	20.4
0.161520	49.53	---	65.39	15.86	N	OFF	20.4
0.208194	---	32.23	53.28	21.05	N	OFF	20.3
0.208194	44.69	---	63.28	18.59	N	OFF	20.3
0.632589	---	30.26	46.00	15.74	N	OFF	20.3
0.632589	36.65	---	56.00	19.35	N	OFF	20.3
0.661380	---	28.85	46.00	17.15	N	OFF	20.3
0.661380	35.53	---	56.00	20.47	N	OFF	20.3
7.149021	---	16.93	50.00	33.07	N	OFF	21.1
7.149021	29.12	---	60.00	30.88	N	OFF	21.1



## Appendix C. Radiated Spurious Emission

Test Engineer :	Edward Liao	Temperature :	15.3~20.8°C
		Relative Humidity :	43.4~47.5%

### Note symbol

-L	Low channel location
-R	High channel location

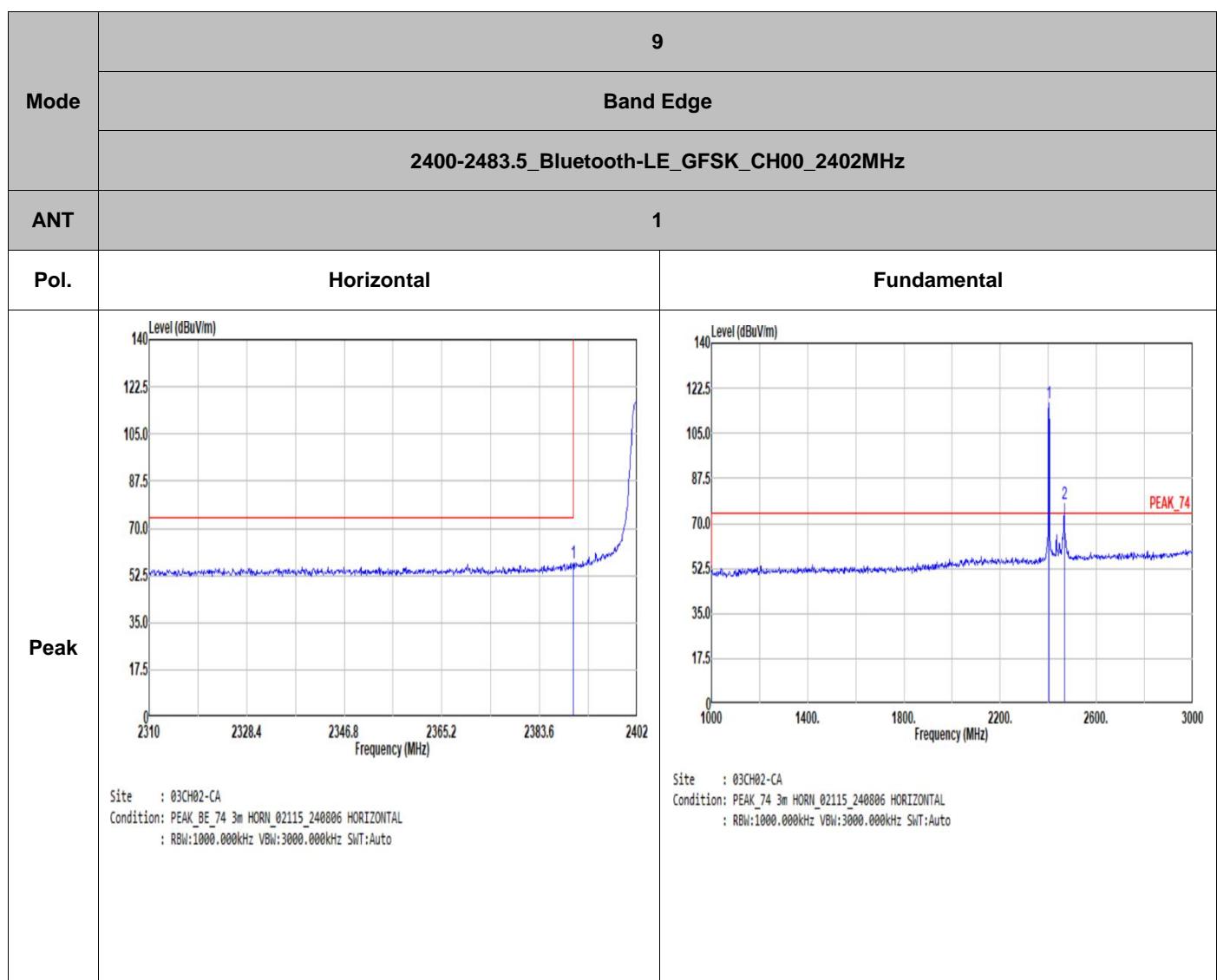
## C1. Radiated Spurious Emission Test Modes

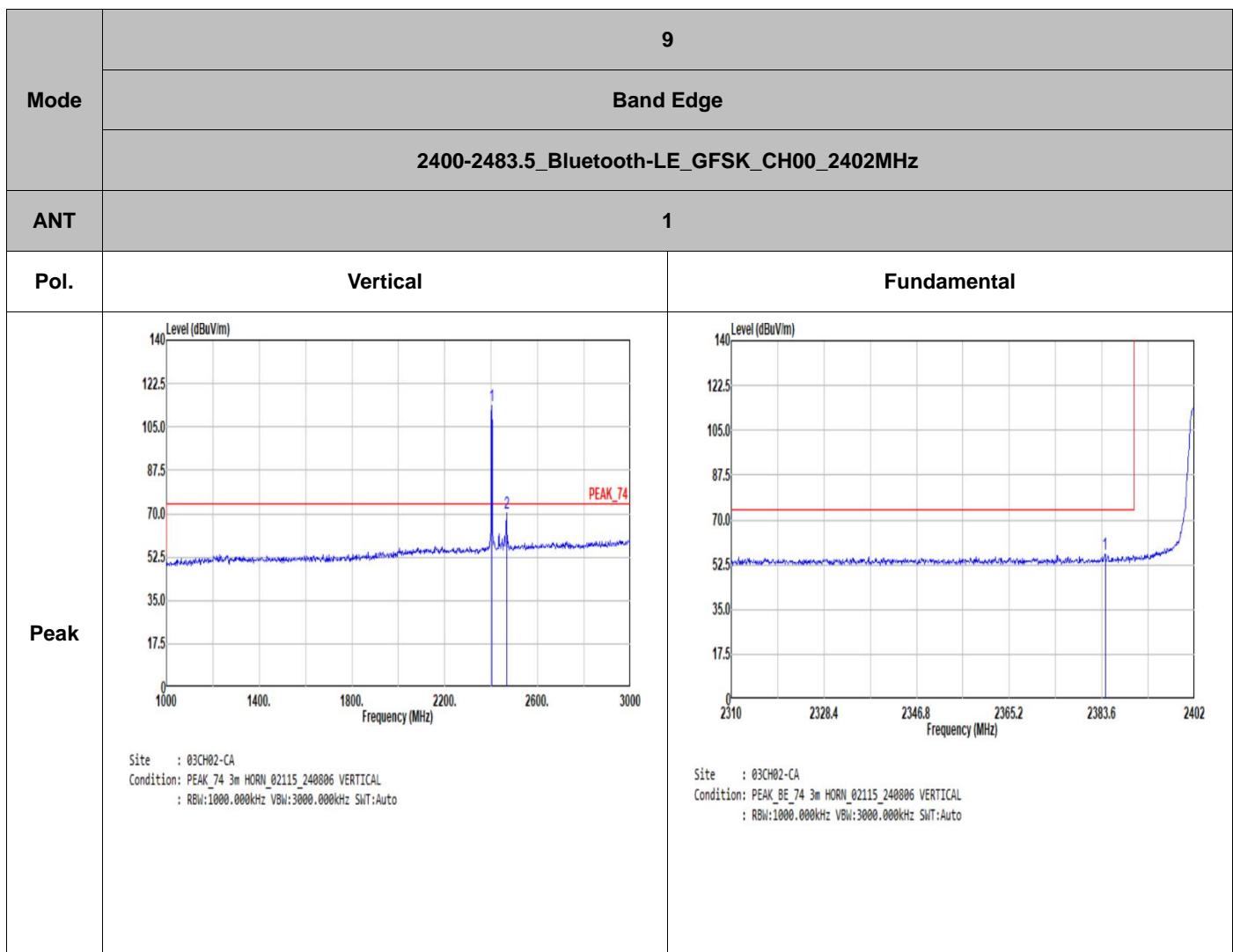
Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 9	2400-2483.5	1	Bluetooth-LE_GFSK	00	2402	1Mbps	-	-
Mode 10	2400-2483.5	1	Bluetooth-LE_GFSK	19	2440	1Mbps	-	-
Mode 11	2400-2483.5	1	Bluetooth-LE_GFSK	39	2480	1Mbps	-	-
Mode 12	2400-2483.5	1	Bluetooth-LE_GFSK	00	2402	2Mbps	-	-
Mode 13	2400-2483.5	1	Bluetooth-LE_GFSK	19	2440	2Mbps	-	-
Mode 14	2400-2483.5	1	Bluetooth-LE_GFSK	37	2476	2Mbps	-	-
Mode 15	2400-2483.5	1	Bluetooth-LE_GFSK	37	2476	2Mbps	-	LF
Mode 16	2400-2483.5	1	Bluetooth-LE_GFSK	37	2476	2Mbps	-	SHF



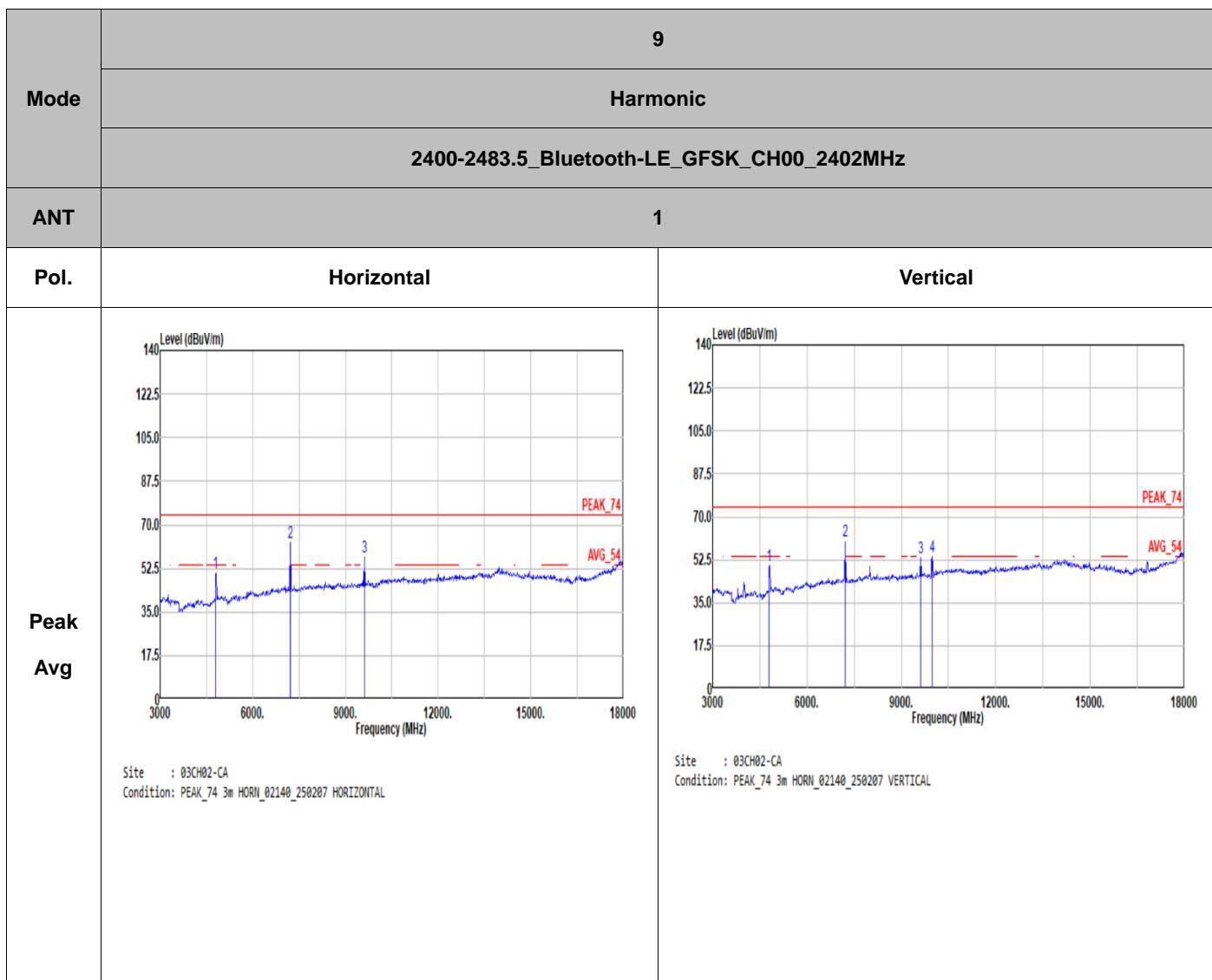
## C2. Summary of each worse mode

Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	RU	Remark
9	Bluetooth-LE_GFSK	00	2389.95	43.06	54.00	-10.94	H	Avg.	Pass	-	Band Edge
	Bluetooth-LE_GFSK	00	7206.00	48.67	54.00	-5.33	H	Avg.	Pass	-	Harmonic
10	Bluetooth-LE_GFSK	19	2485.60	44.60	54.00	-9.40	V	Avg.	Pass	-	Band Edge
	Bluetooth-LE_GFSK	19	7320.00	50.50	54.00	-3.50	H	Avg.	Pass	-	Harmonic
11	Bluetooth-LE_GFSK	39	2483.58	51.94	54.00	-2.06	H	Avg.	Pass	-	Band Edge
	Bluetooth-LE_GFSK	39	7440.00	49.01	54.00	-4.99	H	Avg.	Pass	-	Harmonic
12	Bluetooth-LE_GFSK	00	2388.84	44.05	54.00	-9.95	H	Avg.	Pass	-	Band Edge
	Bluetooth-LE_GFSK	00	7206.00	50.00	54.00	-4.00	H	Avg.	Pass	-	Harmonic
13	Bluetooth-LE_GFSK	19	2484.70	47.54	54.00	-6.46	H	Avg.	Pass	-	Band Edge
	Bluetooth-LE_GFSK	19	7320.00	50.12	54.00	-3.88	H	Avg.	Pass	-	Harmonic
14	Bluetooth-LE_GFSK	37	2483.54	52.38	54.00	-1.62	H	Avg.	Pass	-	Band Edge
	Bluetooth-LE_GFSK	37	7440.00	49.49	54.00	-4.51	H	Avg.	Pass	-	Harmonic
15	LF	37	115.36	33.22	43.50	-10.28	V	Peak	Pass	-	LF
16	SHF	37	19804.00	46.40	54.00	-7.60	V	Avg.	Pass	-	SHF

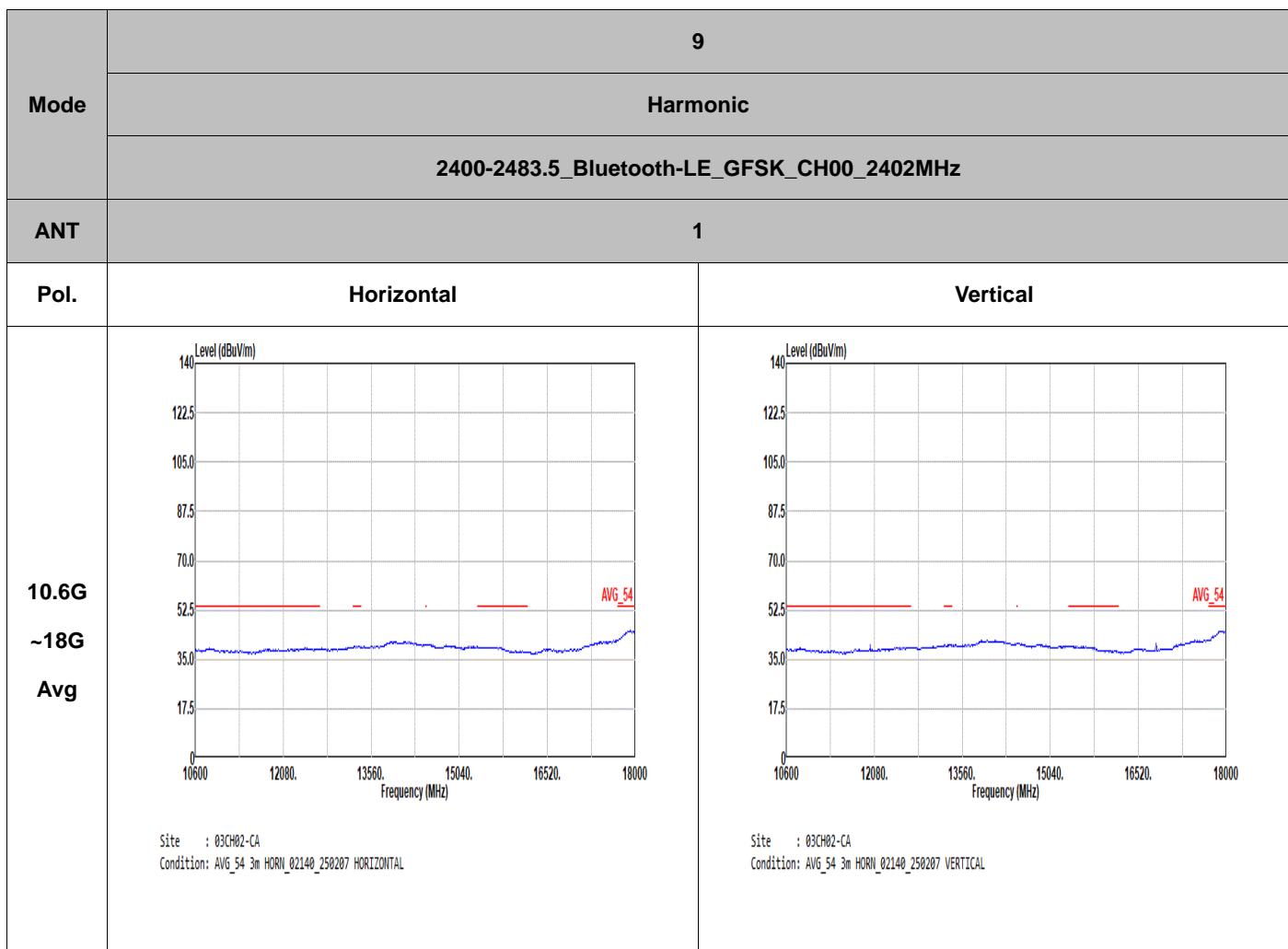


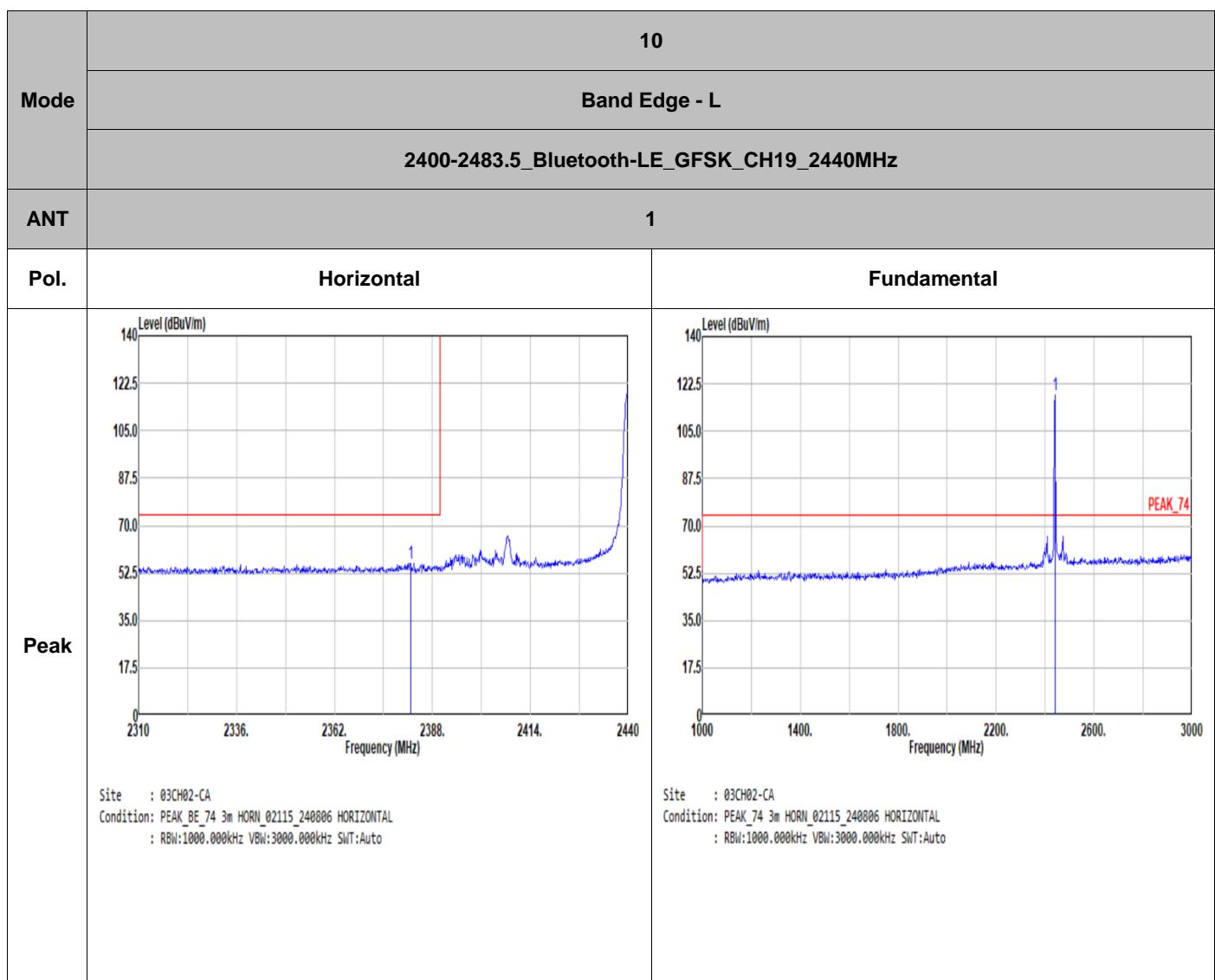


BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 00 2402MHz		2389.95	57.01	-16.99	74	42.48	27.46	18.16	31.09	100	55	P	H
		2389.95	43.06	-10.94	54	-	-	-	-	-	-	A	H
	*	2402.00	116.69	-	-	102.07	27.52	18.18	31.08	100	55	P	H
	*	2402.00	102.74	-	-	-	-	-	-	-	-	A	H
	*	2466.00	77.55	-	-	62.47	27.86	18.29	31.07	100	55	P	H
		2384.24	56.60	-17.4	74	42.14	27.40	18.15	31.09	300	190	P	V
		2384.24	42.65	-11.35	54	-	-	-	-	-	-	A	V
	*	2402.00	113.62	-	-	99.07	27.34	18.18	31.08	300	190	P	V
	*	2402.00	99.67	-	-	-	-	-	-	-	-	A	V

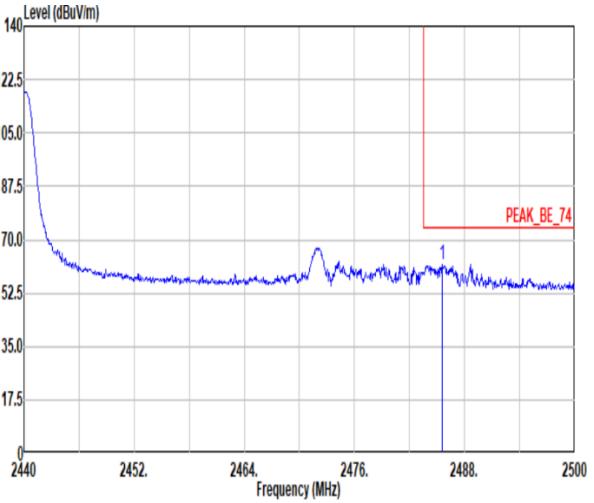


BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
BLE		4804.00	50.54	-23.46	74	73.08	32.49	12.32	67.35	-	-	P	H	
		7206.00	62.62	-11.38	74	77.11	36.82	14.67	65.98	400	5	P	H	
		7206.00	48.67	-5.33	54	-	-	-	-	400	5	A	H	
		9615.00	60.18	-13.82	74	69.77	38.22	17.21	68.28	-	-	P	H	
CH 00		4804.00	50.21	-23.79	74	72.62	32.62	12.32	67.35	-	-	P	V	
		7206.00	60.18	-13.82	74	74.57	36.92	14.67	65.98	400	291	P	V	
		7206.00	46.23	-7.77	54	-	-	-	-	400	291	A	V	
		9615.00	53.57	-20.43	74	66.38	38.26	17.21	68.28	-	-	P	V	
2402MHz		9990.00	53.71	-20.29	74	66.28	38.61	17.64	68.82	-	-	P	V	

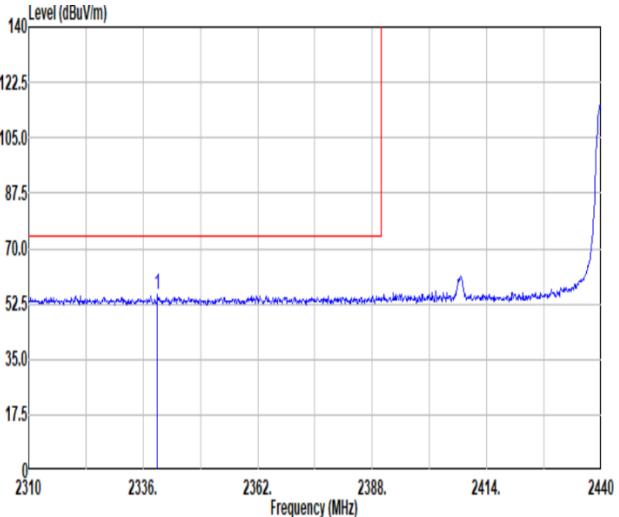
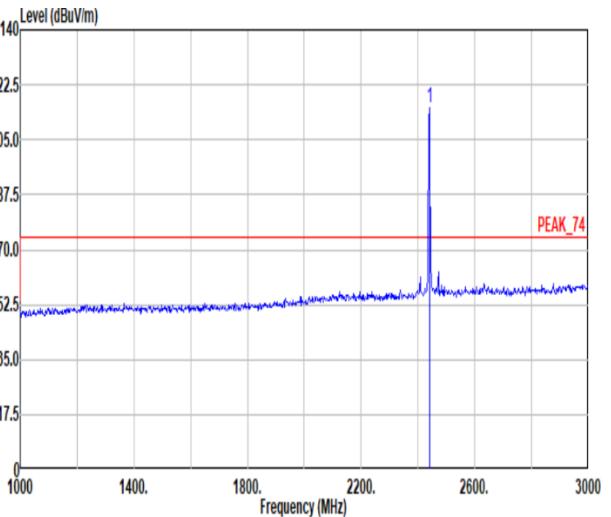




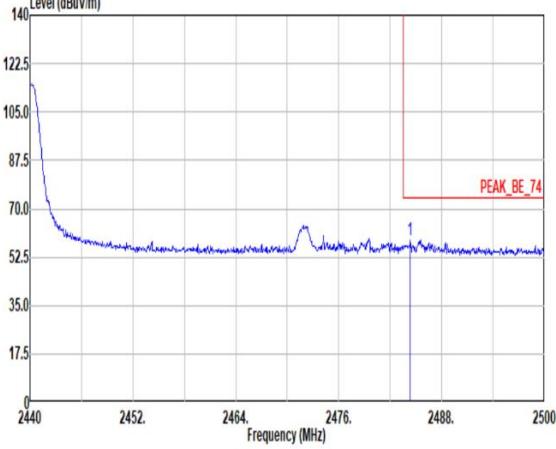


Mode	10	
	Band Edge - R	
	2400-2483.5_Bluetooth-LE_GFSK_CH19_2440MHz	
ANT	1	
Pol.	Horizontal	Fundamental
Peak	 <p>Site : 03CH02-CA Condition: PEAK_BE_74 3m HORN 02115_240806 HORIZONTAL : RBW:1000.000kHz VSW:3000.000kHz SWT:Auto</p>	Blank

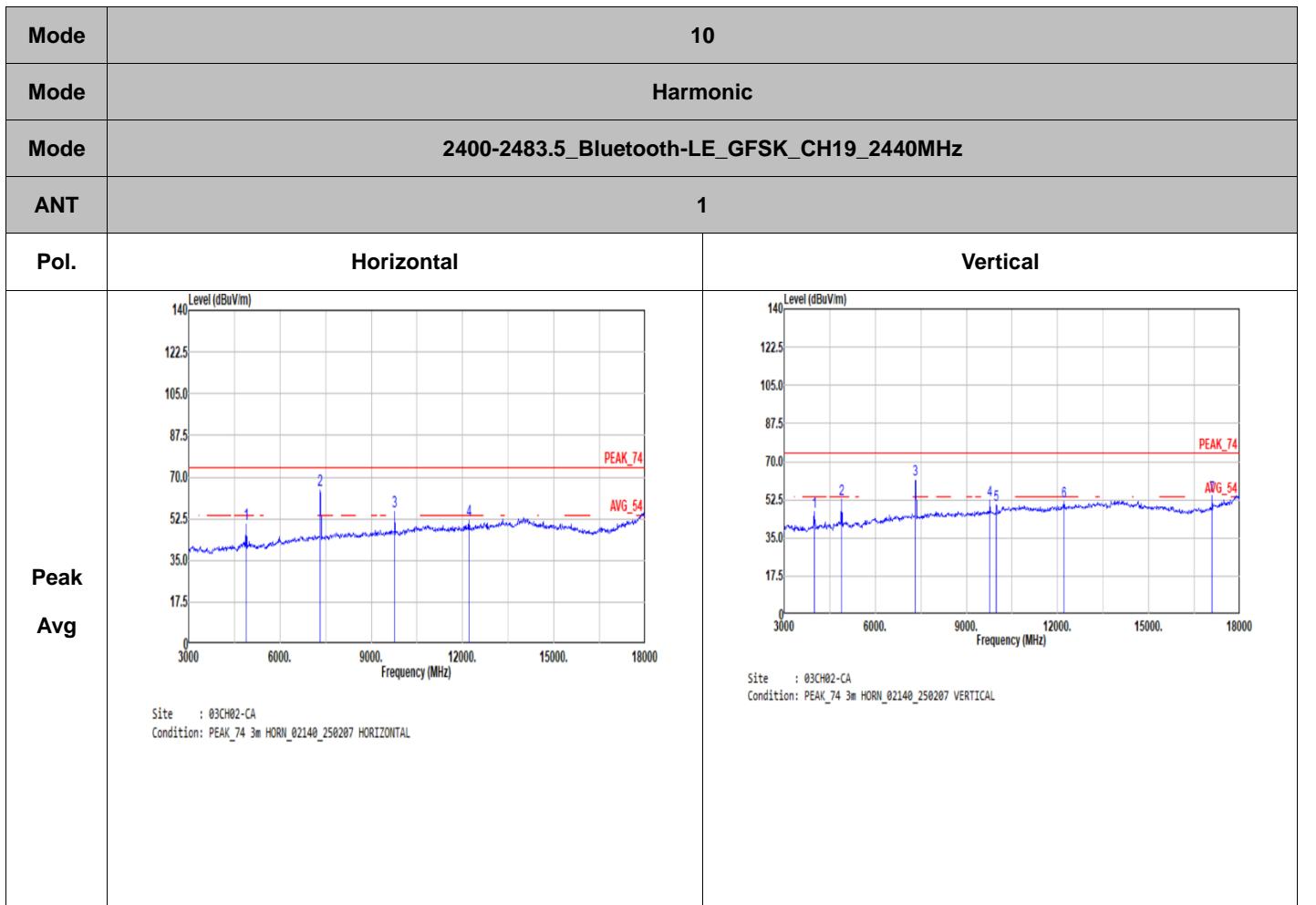


Mode	10	
	Band Edge - L	
	2400-2483.5_Bluetooth-LE_GFSK_CH19_2440MHz	
ANT	1	
Pol.	Vertical	Fundamental
Peak	 <p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Site : 03CH02-CA Condition: PEAK_BE_74 3m HORN_02115_240806 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SNT:Auto</p>	 <p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Site : 03CH02-CA Condition: PEAK_74 3m HORN_02115_240806 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SNT:Auto</p>

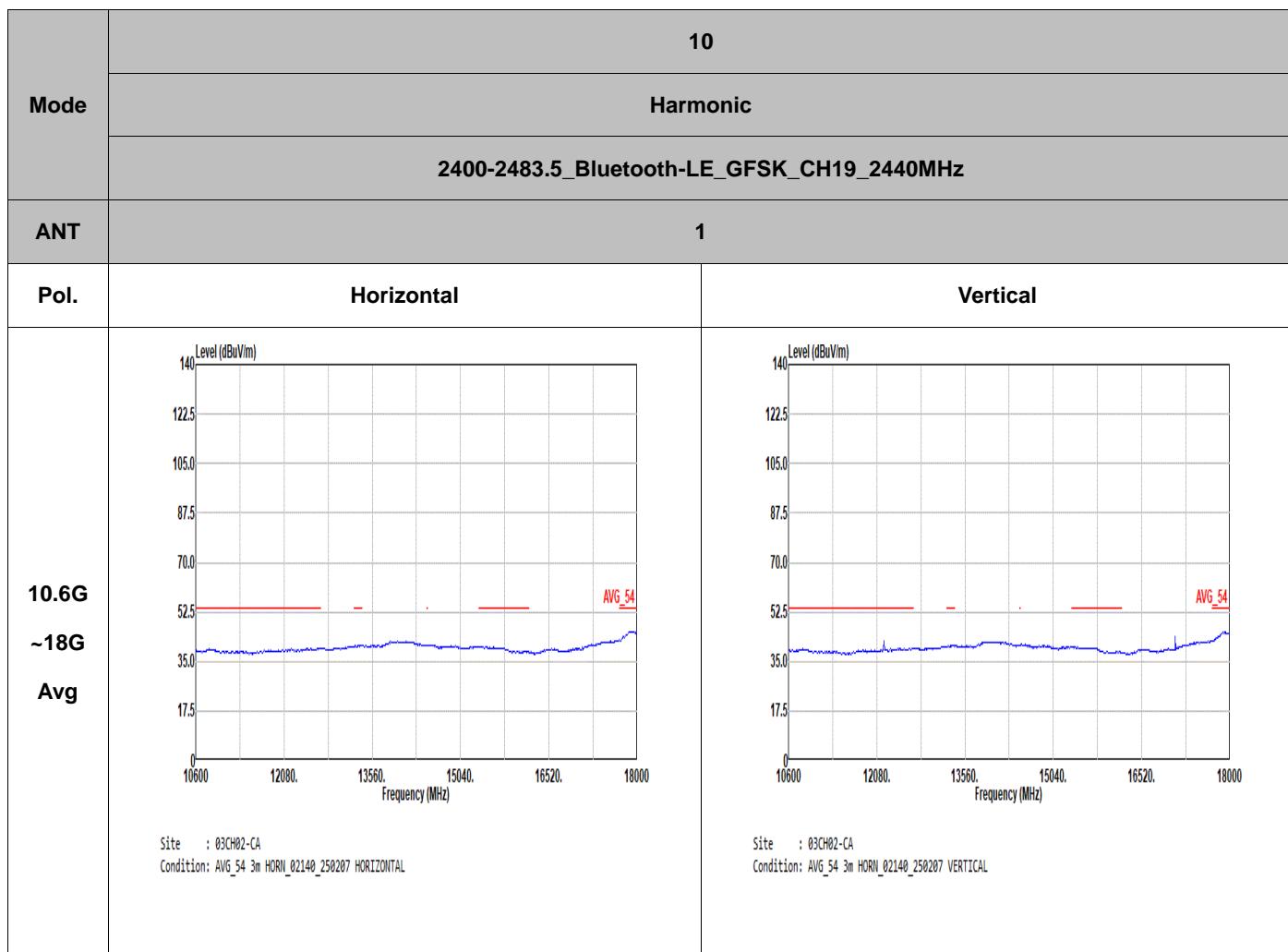


Mode	10	
Mode	Band Edge - R	
Mode	2400-2483.5_Bluetooth-LE_GFSK_CH19_2440MHz	
ANT	1	
Pol.	Vertical	Fundamental
Peak	 <p>Site : 03CH02-CA Condition: PEAK_BE_74 3m HORN_02115_240806 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	Blank

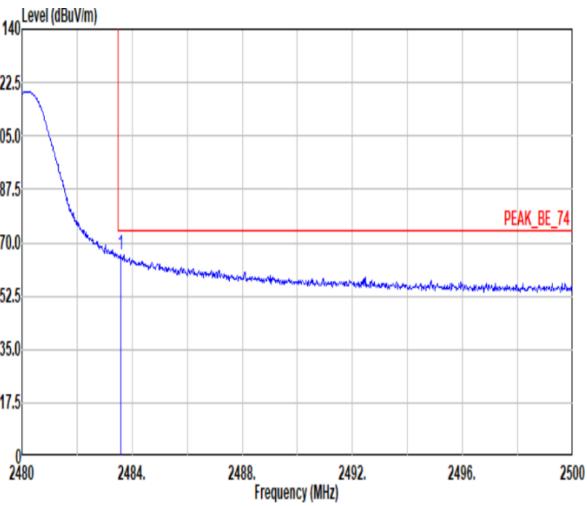
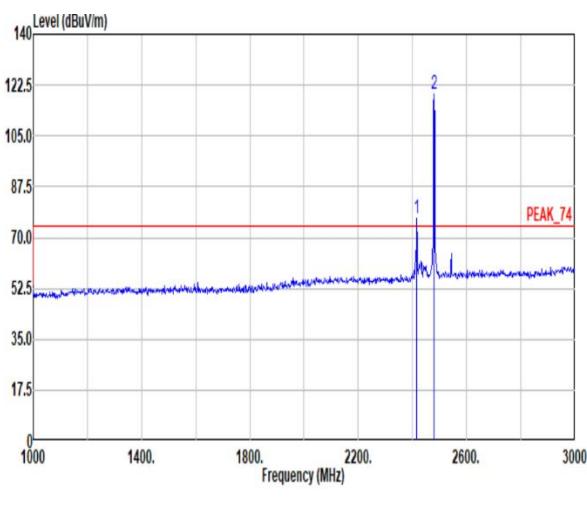
BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 19 2440MHz		2382.28	56.03	-17.97	74	41.55	27.42	18.15	31.09	119	48	P	H
		2382.28	42.08	-11.92	54	-	-	-	-	119	48	A	H
	*	2440.00	118.30	-	-	103.43	27.71	18.24	31.08	119	48	P	H
	*	2440.00	104.35	-	-	-	-	-	-	119	48	A	H
		2485.60	61.74	-12.26	74	46.51	27.97	18.32	31.06	119	48	P	H
		2485.60	-6.21		54	-	-	-	-	119	48	A	H
		2339.25	55.25	-18.75	74	40.97	27.34	18.07	31.13	372	171	P	V
		2339.25	41.30	-12.70	54	-	-	-	-	372	171	A	V
	*	2440.00	114.98	-	-	100.27	27.55	18.24	31.08	372	171	P	V
	*	2440.00	101.03	-	-	-	-	-	-	372	171	A	V
		2484.34	58.55	-15.45	74	43.48	27.82	18.31	31.06	372	171	P	V
		2484.34	44.60	-9.40	54	-	-	-	-	372	171	A	V

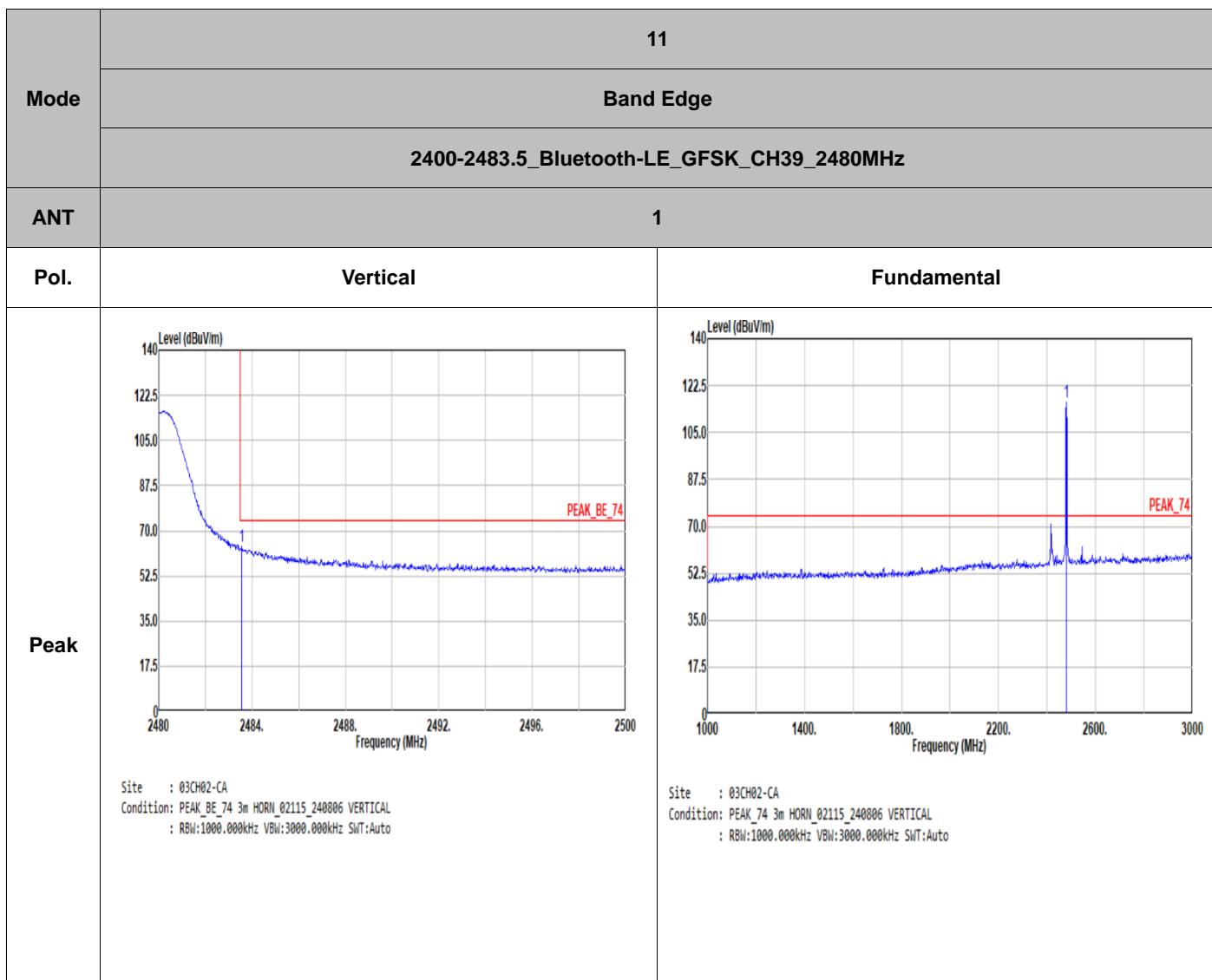


BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Pos	Peak Avg.	Pol.
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
BLE CH 19 2440MHz		4880.00	50.34	-23.66	74	72.70	32.76	12.27	67.47	-	-	P	H	
		7320.00	64.45	-9.55	74	79.71	36.84	14.80	66.90	100	126	P	H	
		7320.00	50.50	-3.50	54	-	-	-	-	100	126	A	H	
		9760.00	55.21	-18.79	74	67.90	38.19	17.38	68.26	-	-	P	H	
		12200.00	51.96	-22.04	74	60.06	38.93	19.69	66.72	-	-	P	H	
		3990.00	47.16	-26.84	74	72.45	30.89	11.33	67.51	-	-	P	V	
		4880.00	52.74	-21.26	74	75.06	32.88	12.27	67.47	-	-	P	V	
		7320.00	61.58	-12.42	74	76.78	36.90	14.80	66.90	109	91	P	V	
		7320.00	47.63	-6.37	54	-	-	-	-	109	91	A	V	
		9760.00	52.32	-21.68	74	64.85	38.35	17.38	64.85	-	-	P	V	
		9990.00	50.22	-23.78	74	62.79	38.61	17.64	68.82	-	-	P	V	
		12200.00	51.91	-22.09	74	59.94	39.00	19.69	66.72	-	-	P	V	
		17080.00	54.39	-19.61	74	60.23	38.58	23.33	67.75	-	-	P	V	

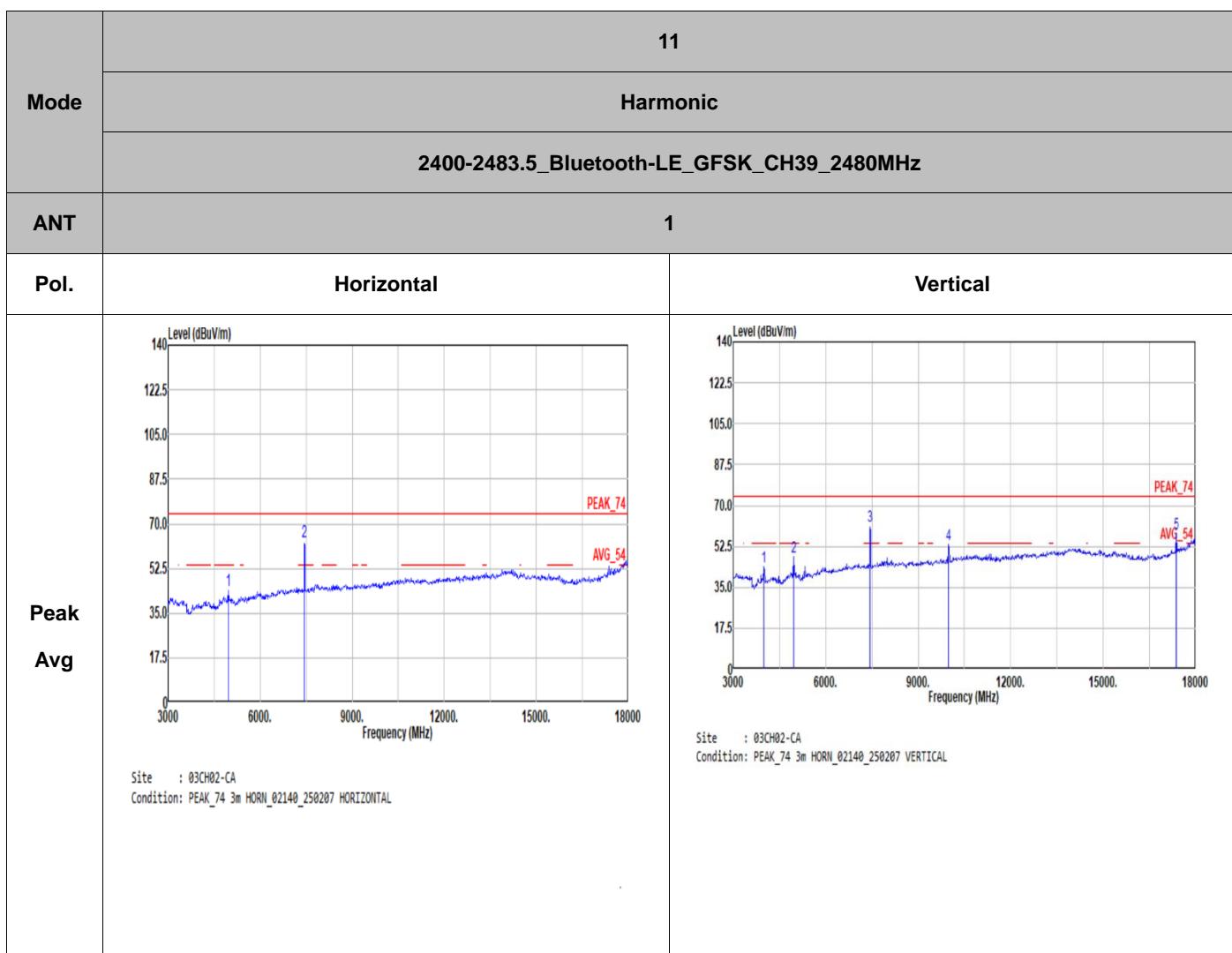




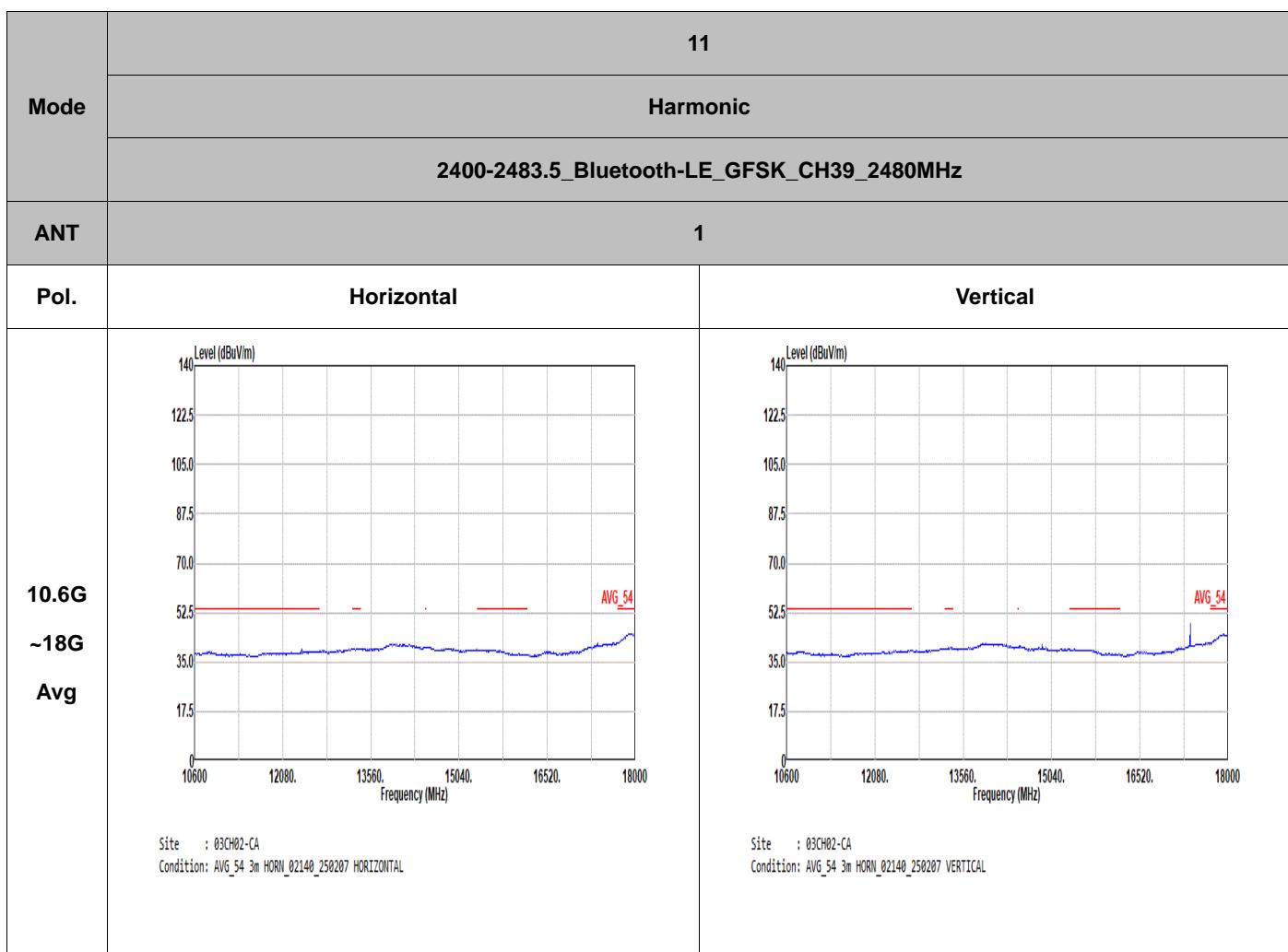
Mode	11	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK_CH39_2480MHz	
ANT	1	
Pol.	Horizontal	Fundamental
Peak	 <p>Site : 03CH02-CA Condition: PEAK_BE_74 3m HORN 02115_240806 HORIZONTAL : RBW:1000.000kHz VSW:3000.000kHz SWT:Auto</p>	 <p>Site : 03CH02-CA Condition: PEAK_74 3m HORN 02115_240806 HORIZONTAL : RBW:1000.000kHz VSW:3000.000kHz SWT:Auto</p>



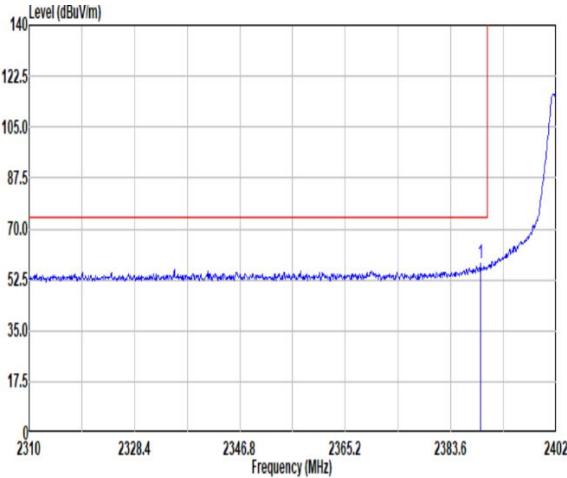
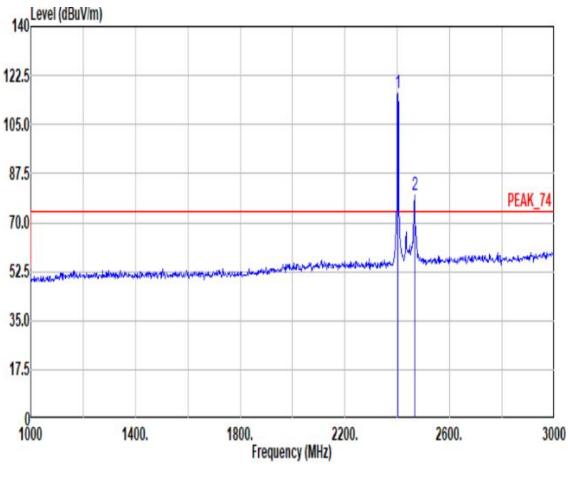
BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 39 2480MHz		2483.58	65.89	-8.11	74	50.68	27.96	18.31	31.06	118	48	P	H
		2483.58	51.94	-2.06	54	-	-	-	-	118	48	A	H
	*	2416.00	76.65	-	-	61.93	27.59	18.21	31.08	118	48	P	H
	*	2480.00	119.34	-	-	104.14	27.95	18.31	31.06	118	48	P	H
	*	2480.00	105.39	-	-	-	-	-	-	118	48	A	H
		2483.56	64.00	-10.00	74	48.93	27.82	18.31	31.06	365	183	P	V
		2483.56	50.05	-3.95	54	-	-	-	-	365	183	A	V
	*	2480.00	116.02	-	-	100.98	27.79	18.31	31.06	365	183	P	V
	*	2480.00	102.07	-	-	-	-	-	-	365	183	A	V

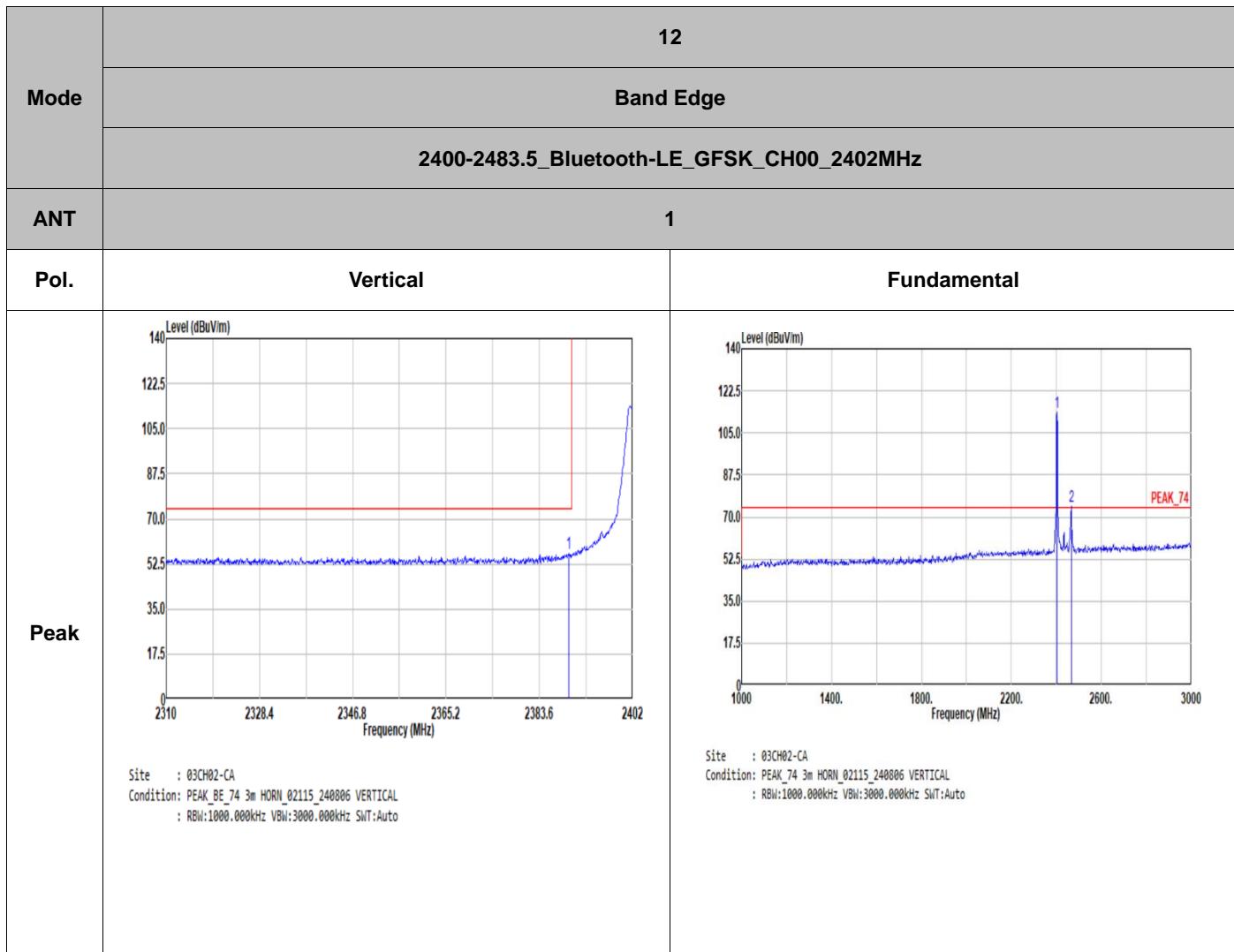


BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 39 2480MHz		4960.00	44.06	-29.94	74	66.39	33.00	12.21	67.54	-	-	P	H
		7440.00	62.96	-11.04	74	78.36	36.56	14.97	66.93	100	135	P	H
		7440.00	49.01	-4.99	54	-	-	-	-	100	135	A	H
		4005.00	43.60	-30.40	74	68.88	30.90	11.37	67.55	-	-	P	V
		4960.00	47.91	-26.09	74	70.16	33.08	12.21	67.54	-	-	P	V
		7440.00	61.34	-12.66	74	62.73	36.61	14.97	66.93	100	331	P	V
		7440.00	47.39	-6.61	54	-	-	-	-	100	331	A	V
		9990.00	53.11	-20.89	74	65.68	38.61	17.64	68.82	-	-	P	V
		17360.00	58.22	-15.78	74	63.07	39.48	23.60	67.93	-	-	P	V

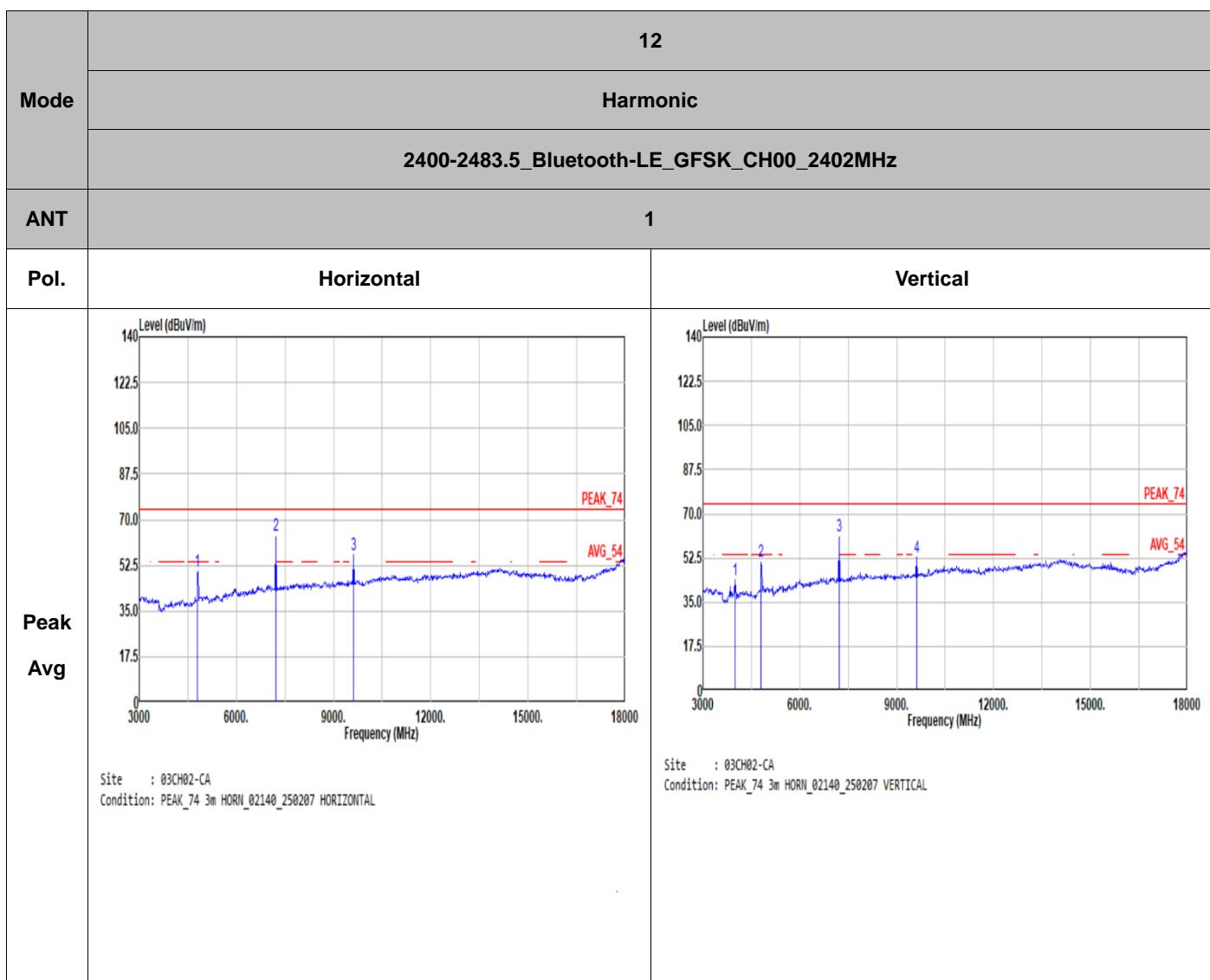




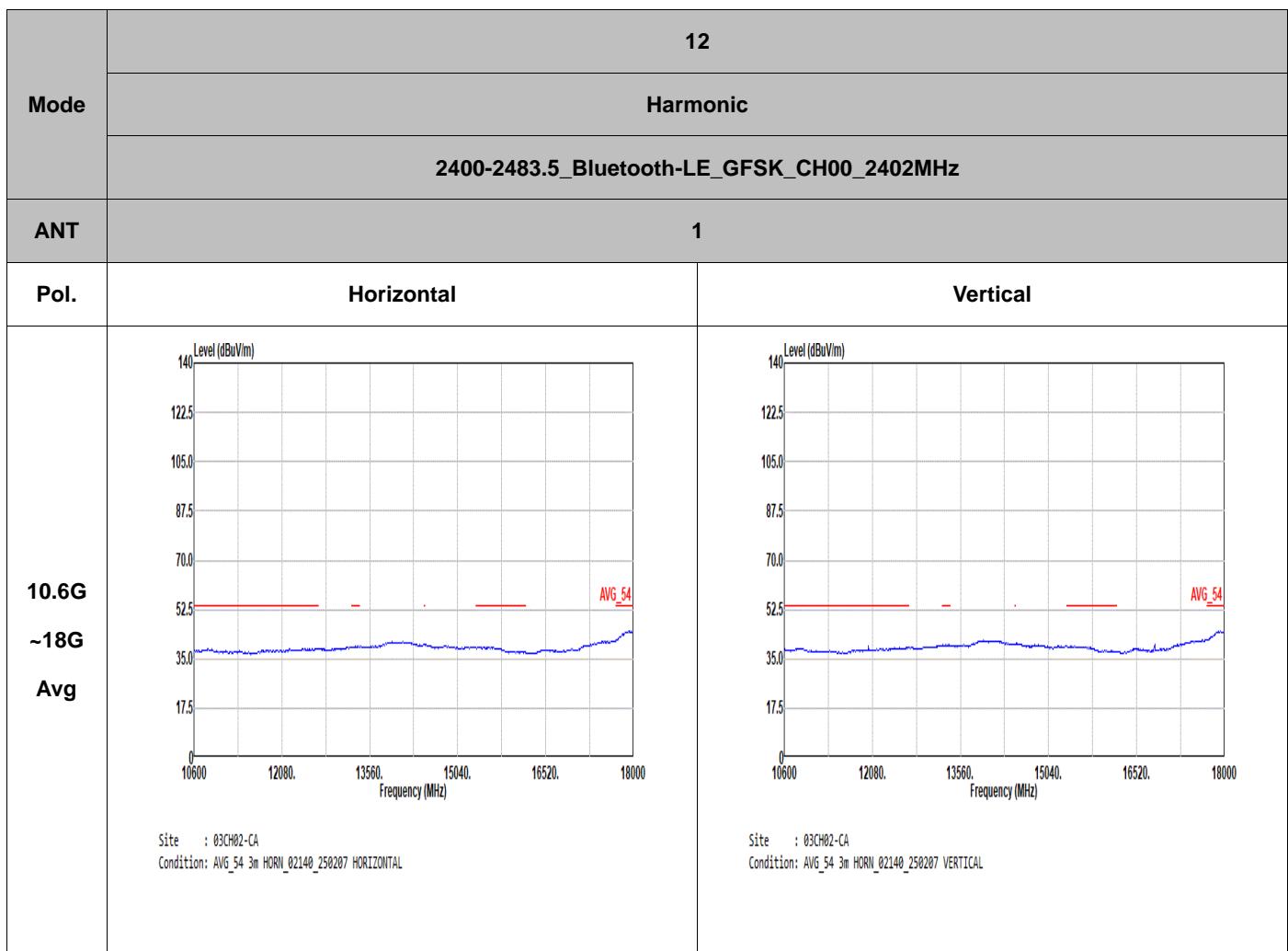
Mode	12	
	Band Edge	
	2400-2483.5_Bluetooth-LE_GFSK_CH00_2402MHz	
ANT	1	
Pol.	Horizontal	Fundamental
Peak	 <p>Site : 03CH02-CA Condition: PEAK_74 3m HORN_02115_240806 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SIT:Auto</p>	 <p>Site : 03CH02-CA Condition: PEAK_74 3m HORN_02115_240806 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SIT:Auto</p>



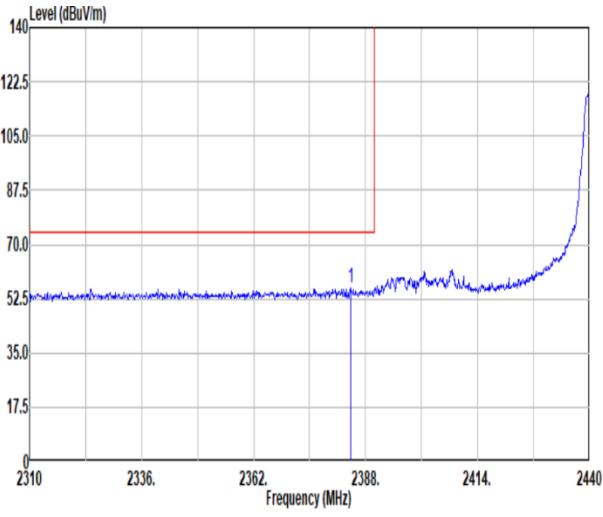
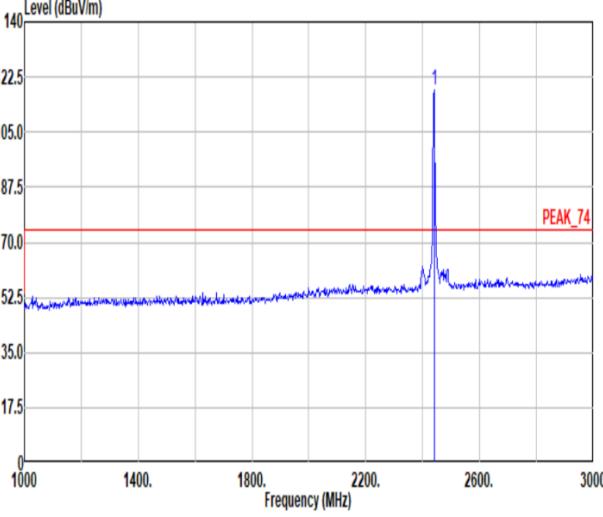
BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)
BLE CH 00 2402MHz		2388.84	58.00	-16.00	74	43.48	27.45	18.16	31.09	117	37	P	H
		2388.84	44.05	-9.95	54	-	-	-	-	117	37	A	H
	*	2402.00	116.34	-	-	101.72	27.52	18.18	31.08	117	37	P	H
	*	2402.00	102.39	-	-	-	-	-	-	117	37	A	H
	*	2466.00	79.62	-	-	64.54	27.86	18.29	31.07	117	37	P	H
		2389.40	56.40	-17.60	74	41.92	27.41	18.16	31.09	385	181	P	V
		2389.40	42.45	-11.55	54	-	-	-	-	385	181	A	V
	*	2402.00	113.50	-	-	98.95	24.45	18.18	31.08	385	181	P	V
	*	2402.00	99.55	-	-	-	-	-	-	385	181	A	V
	*	2466.00	74.57	-	-	59.69	27.66	18.29	31.07	385	181	P	V



BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 00 2402MHz		4804.00	49.94	-24.06	74	72.48	32.49	12.32	67.35	-	-	P	H
		7206.00	63.95	-10.05	74	78.44	36.82	14.67	65.98	400	8	P	H
		7206.00	50.00	-4.00	54	-	-	-	-	400	8	A	H
		9608.00	56.50	-17.50	74	69.35	38.22	16.74	68.28	-	-	P	H
		4005.00	43.89	-30.11	74	69.17	30.90	11.37	67.55	-	-	P	V
		4804.00	51.83	-22.97	74	73.44	32.62	12.32	67.35	-	-	P	V
		7206.00	61.42	-12.58	74	75.81	36.92	14.67	65.98	400	292	P	V
		7206.00	47.47	-6.53	54	-	-	-	-	400	292	A	V
		9608.00	52.97	-21.03	74	65.78	38.26	17.21	68.28	-	-	P	V

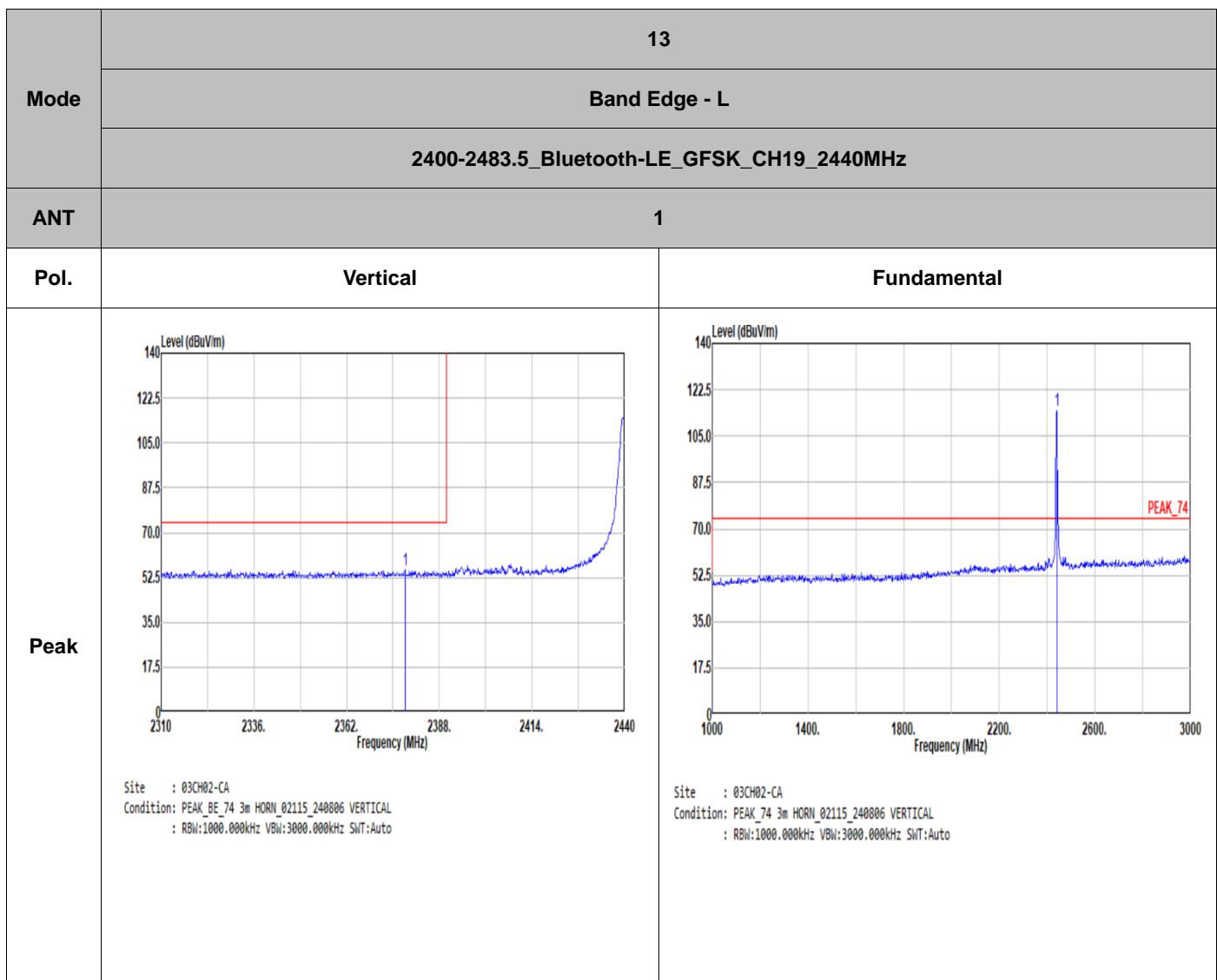




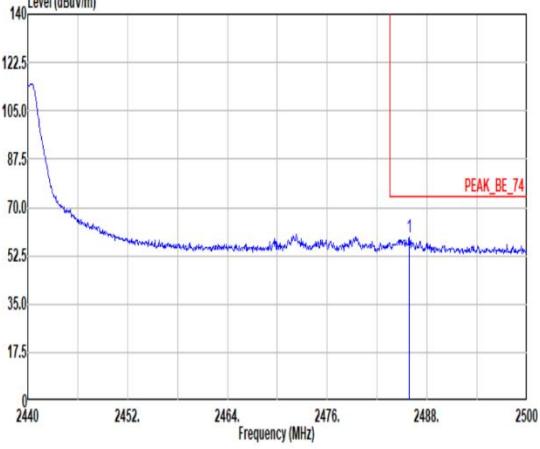
Mode	13	
	Band Edge - L	
	2400-2483.5_Bluetooth-LE_GFSK_CH19_2440MHz	
ANT	1	
Pol.	Horizontal	
Peak	 <p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Site : 03CH02-CA Condition: PEAK_BE_74 3m HORN_02115_240806 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	 <p>Level (dBuV/m)</p> <p>Frequency (MHz)</p> <p>Site : 03CH02-CA Condition: PEAK_74 3m HORN_02115_240806 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>



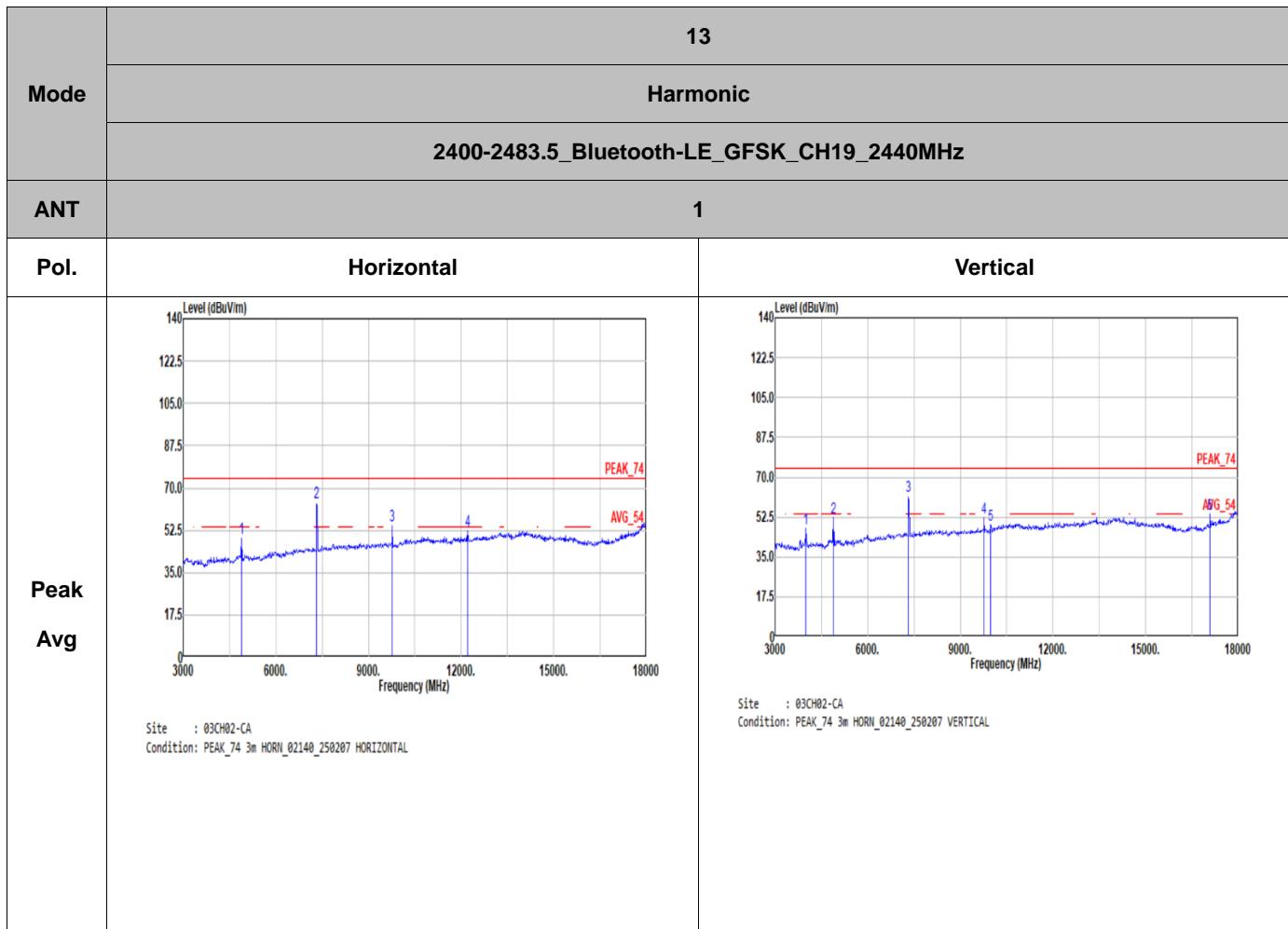
Mode	13	
	Band Edge - R	
	2400-2483.5_Bluetooth-LE_GFSK_CH19_2440MHz	
ANT	1	
Pol.	Horizontal	Fundamental
Peak	<p>Site : 03CH02-CA Condition: PEAK_BE_74 3m HORN_02115_240806 HORIZONTAL : RBW:1000.000kHz VSW:3000.000kHz SWT:Auto</p>	Blank



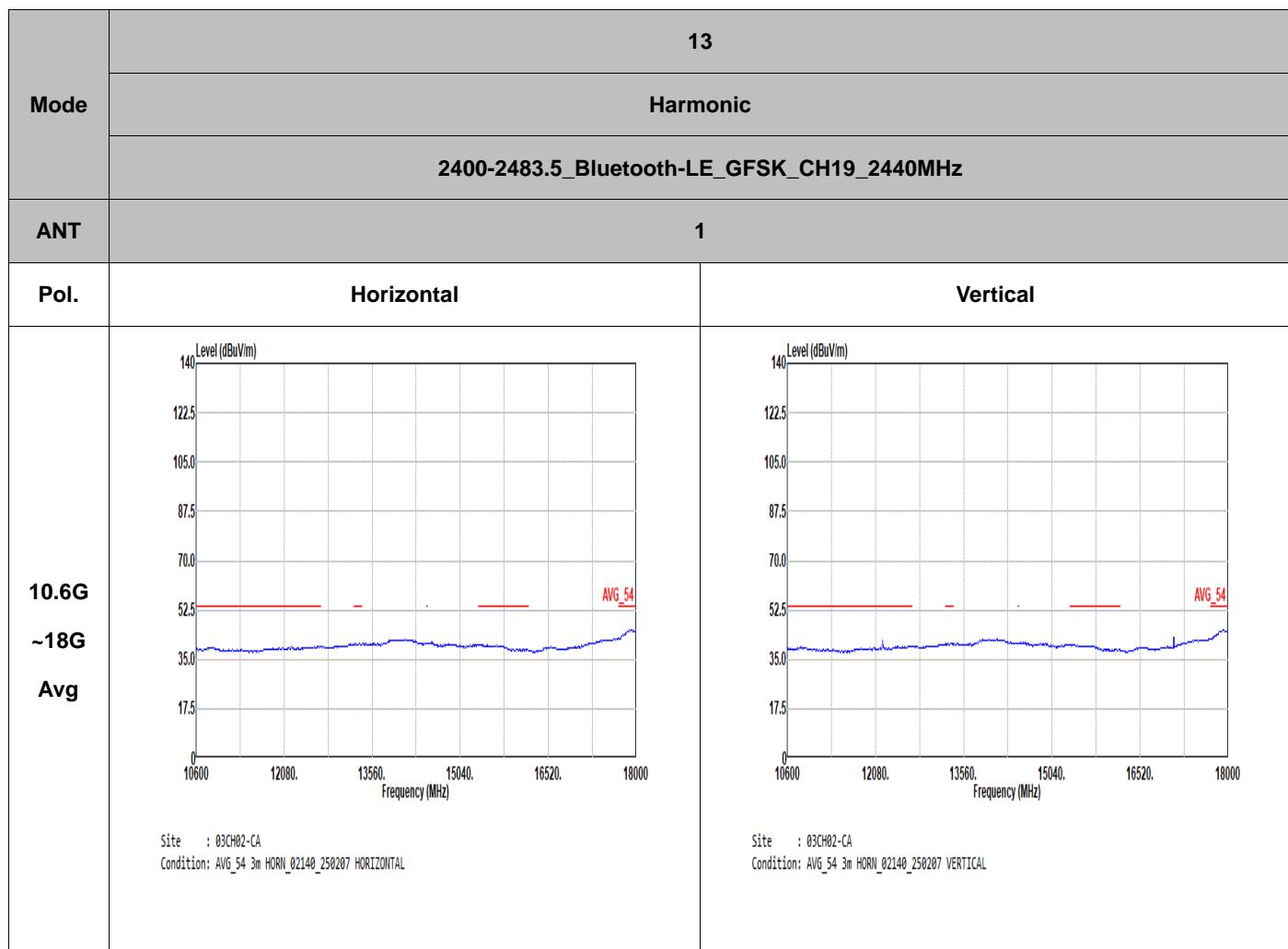


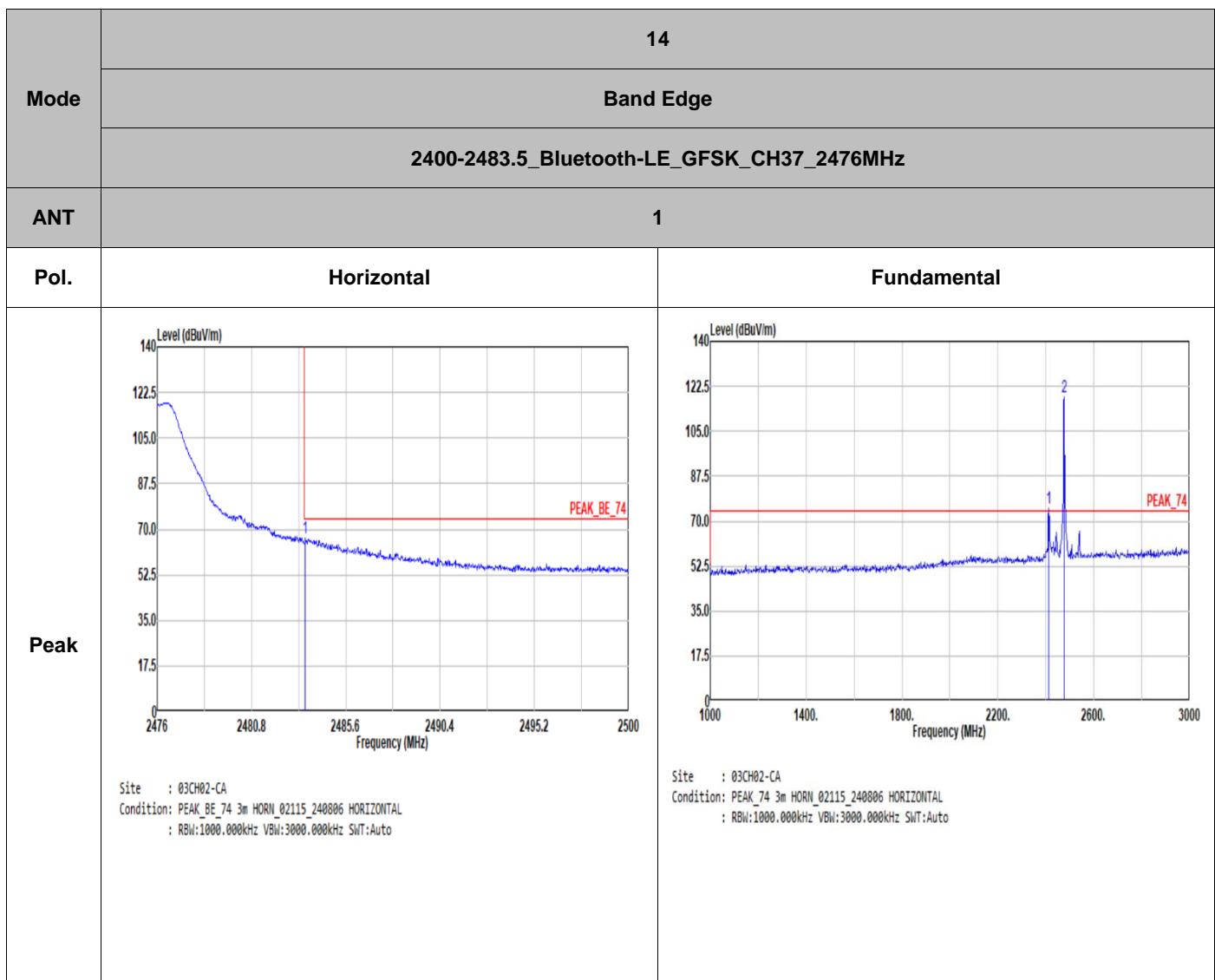
Mode	13												
	Band Edge - R												
	2400-2483.5_Bluetooth-LE_GFSK_CH19_2440MHz												
ANT	1												
Pol.	Vertical						Fundamental						
Peak	 <p>Site : 03CH02-CA Condition: PEAK_BE_74 3m HORN_02115_248806 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>						Blank						

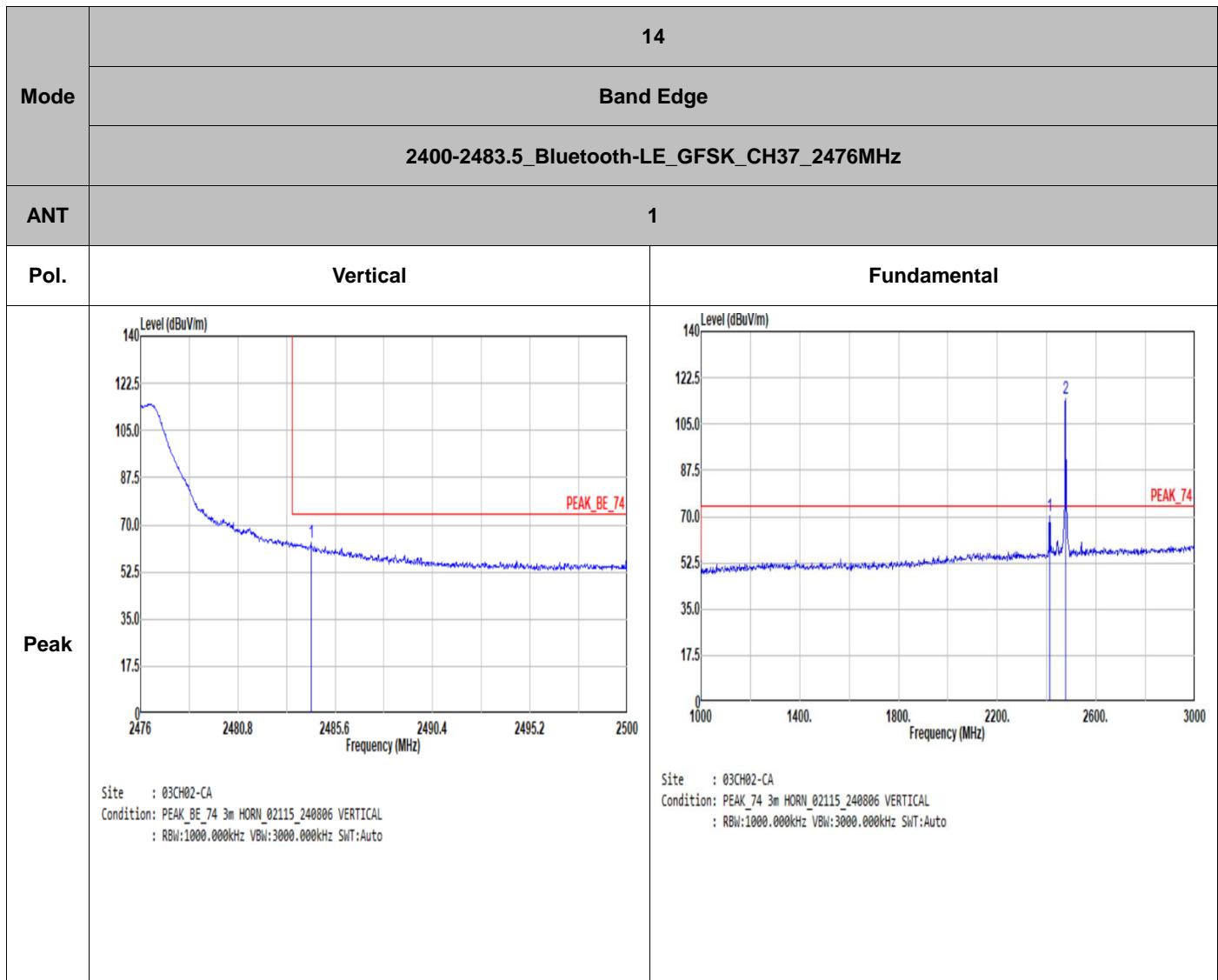
BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 19 2440MHz		2384.49	56.15	-17.85	74	41.66	27.43	18.15	31.09	115	50	P	H
		2384.49	42.20	-11.80	54	-	-	-	-	115	50	A	H
	*	2440.00	118.11	-	-	103.24	24.71	18.24	31.08	115	50	P	H
	*	2440.00	104.16	-	-	-	-	-	-	115	50	A	H
		2484.70	61.49	-12.51	74	46.27	27.96	18.32	31.06	115	50	P	H
		2484.70	47.54	-6.46	54	-	-	-	-	115	50	A	H
		2378.38	55.72	-18.28	74	41.29	27.39	18.14	31.10	372	169	P	V
		2378.38	41.77	-12.23	54	-	-	-	-	372	169	A	V
	*	2440.00	114.77	-	-	100.06	27.55	18.24	31.08	372	169	P	V
	*	2440.00	100.82	-	-	-	-	-	-	372	169	A	V
		2485.84	58.99	-15.01	74	43.89	27.84	18.32	31.06	372	169	P	V
		2485.84	45.04	-8.96	54	-	-	-	-	372	169	A	V



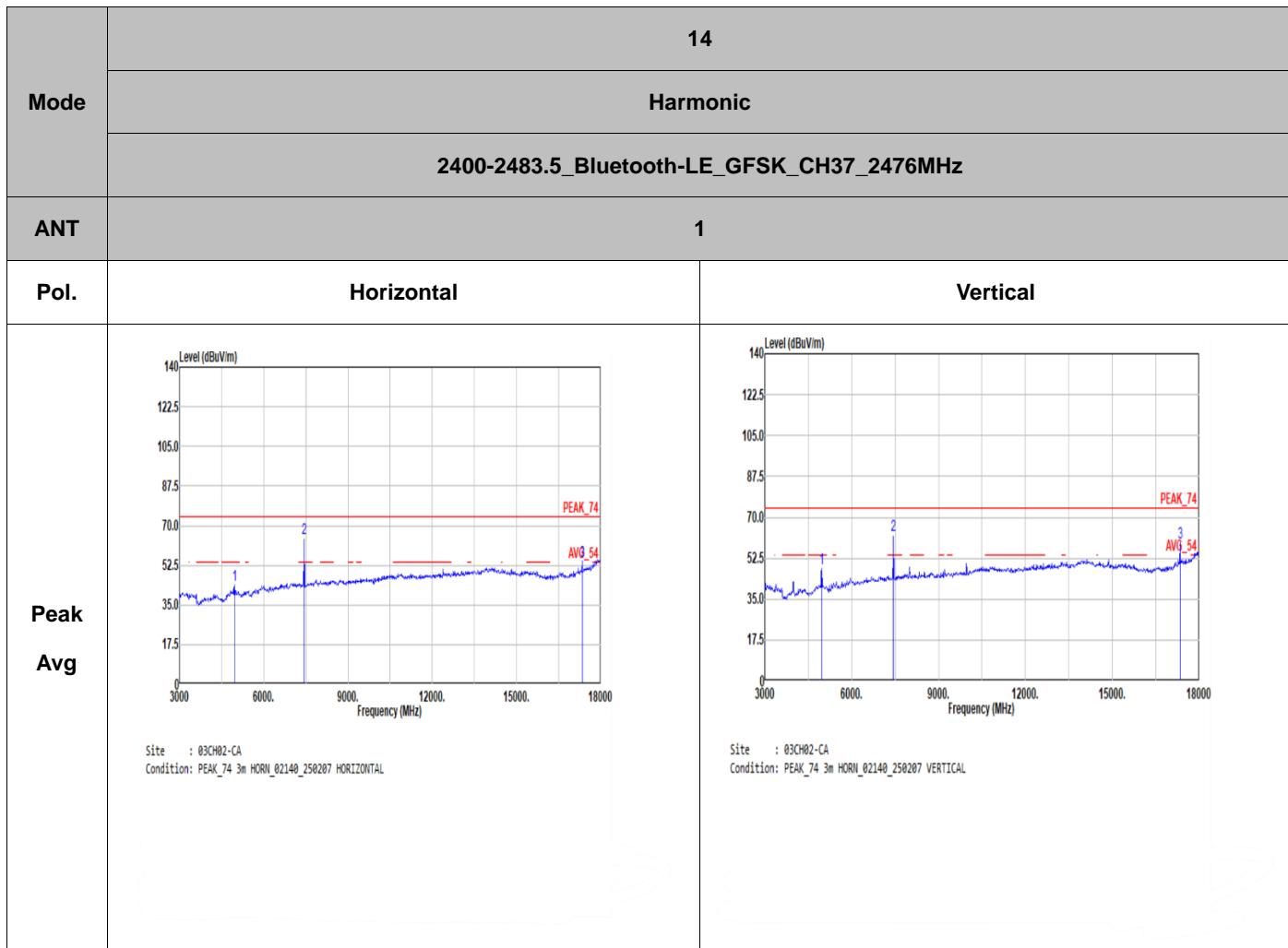
BLE	Note	Frequency ( MHz )	Level ( dB $\mu$ V/m )	Over Limit ( dB )	Limit Line ( dB $\mu$ V/m )	Read Level ( dB $\mu$ V )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
BLE CH 19 2440MHz		4880.00	49.03	-24.97	74	71.47	32.76	12.27	67.47	-	-	P	H
		7320.00	64.07	-9.93	74	79.33	36.84	14.80	66.90	100	124	P	H
		7320.00	50.12	-3.88	54	-	-	-	-	100	124	A	H
		9760.00	54.39	-19.61	74	67.08	38.19	17.38	68.26	-	-	P	H
		12200.00	52.11	-21.89	74	60.21	38.93	19.69	66.72	-	-	P	H
		4005.00	47.74	-26.26	74	73.02	30.90	11.37	67.55	-	-	P	V
		4880.00	52.38	-21.62	74	74.70	32.88	12.27	68.26	-	-	P	V
		7320.00	62.01	-11.99	74	77.21	35.90	14.80	66.90	100	91	P	V
		7320.00	48.06	-5.94	54	-	-	-	-	100	91	A	V
		9760.00	52.12	-12.88	74	64.65	38.35	14.38	68.26	-	-	P	V
		9990.00	49.32	-24.68	74	61.89	38.61	17.64	68.82	-	-	P	V
		17005.00	53.90	-20.10	74	59.74	38.58	23.33	67.75	-	-	P	V



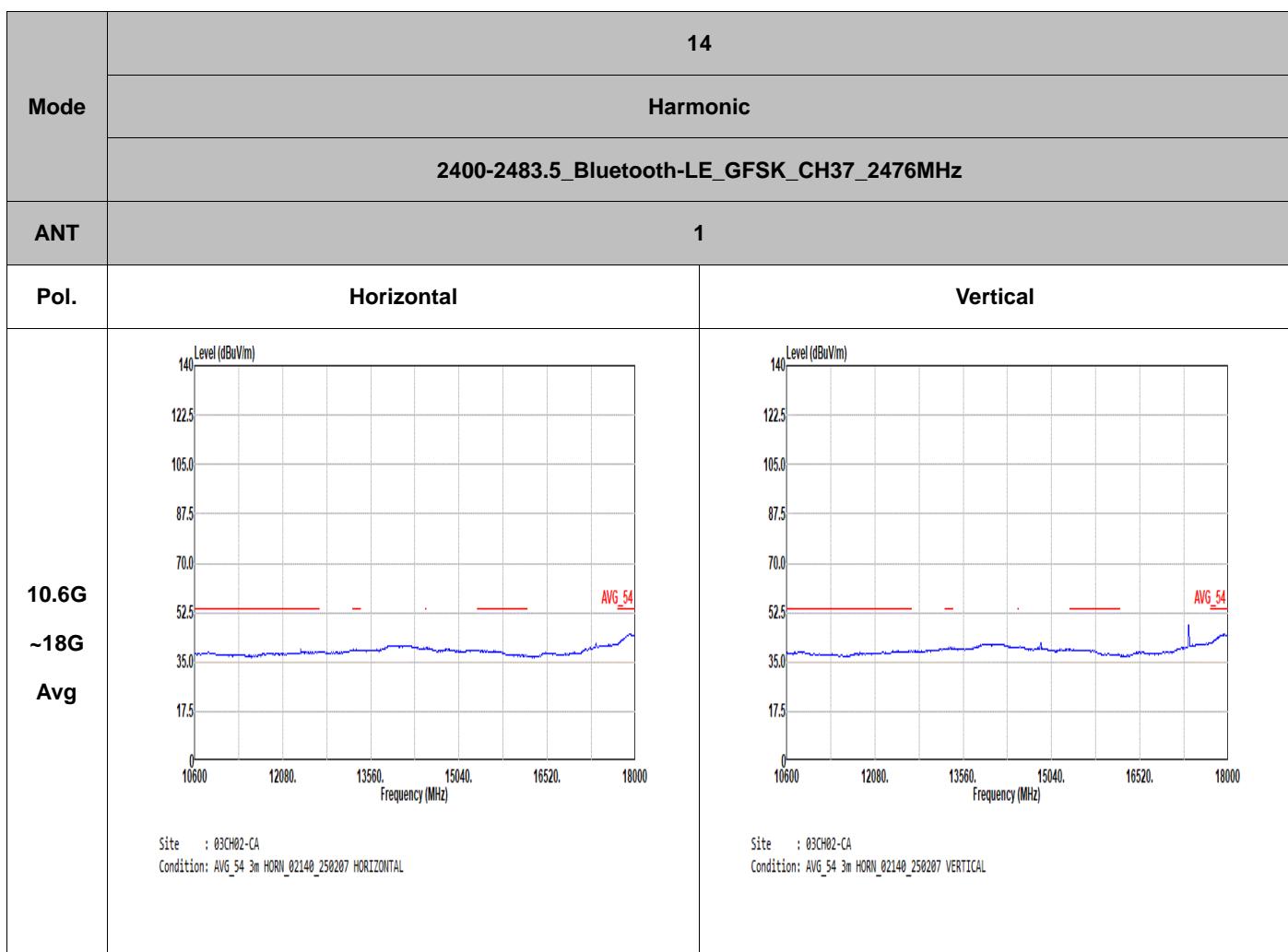


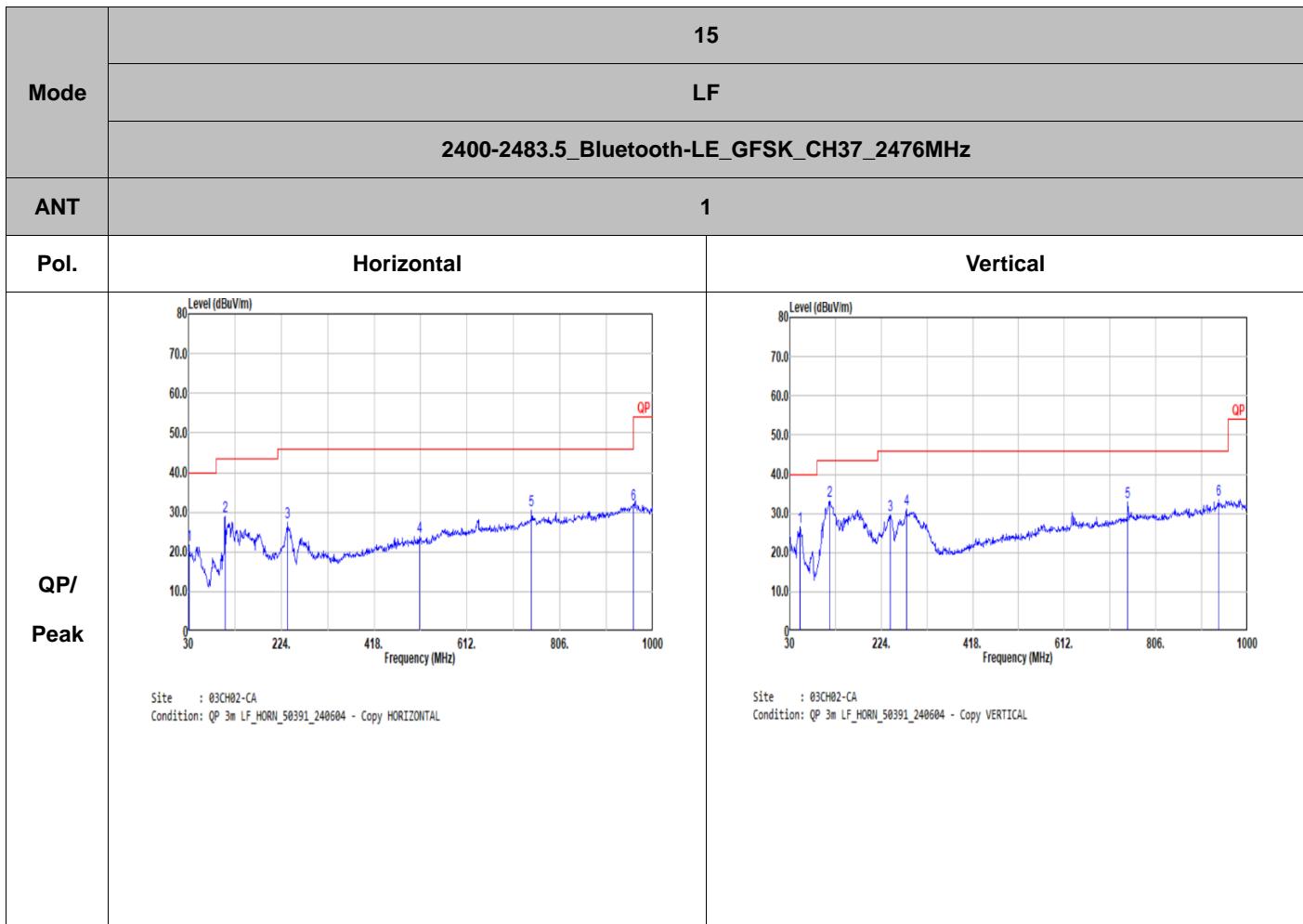


BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 37 2476MHz		2483.54	66.33	-7.67	74	51.12	27.96	18.31	31.06	114	47	P	H
		2483.54	52.38	-1.62	54	-	-	-	-	114	47	A	H
		2412.00	74.85	-	-	60.17	27.56	18.20	31.08	114	47	P	H
	*	2476.00	118.43	-	-	103.27	27.92	18.30	31.06	114	47	A	H
	*	2476.00	104.48	-	-	-	-	-	-	114	47	P	H
		2484.40	63.30	-10.70	74	48.21	27.83	18.32	31.06	366	168	P	V
		2484.40	49.35	-4.65	54	-	-	-	-	366	168	A	V
	*	2476.00	114.56	-	-	99.57	27.75	18.30	31.06	366	168	P	V
	*	2476.00	100.61	-	-	-	-	-	-	366	168	A	V

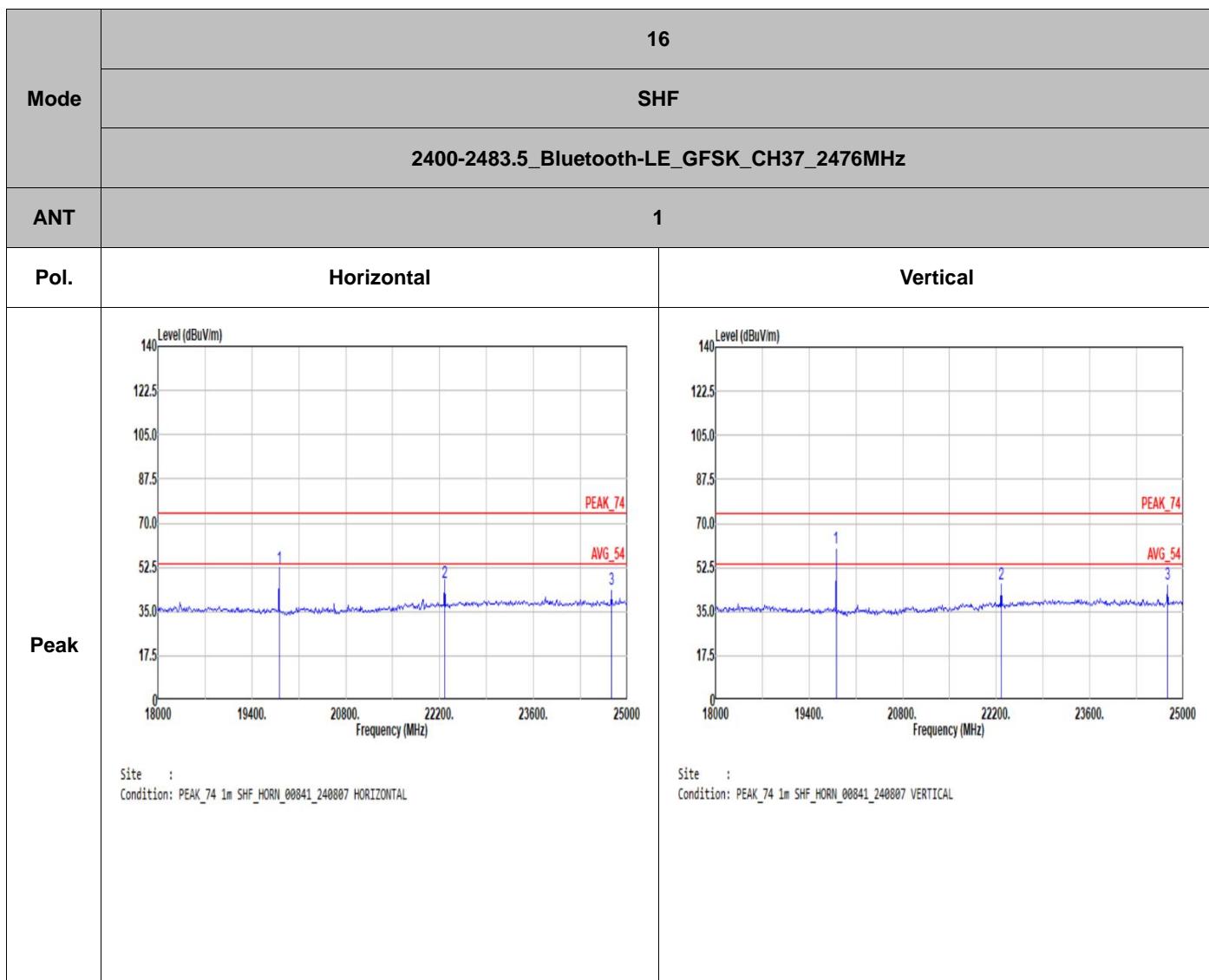


BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 37 2476MHz		4952.00	53.73	-20.27	74	76.06	33.00	12.21	67.54	-	-	P	H
		7428.00	63.44	-10.56	74	78.84	36.56	14.97	66.93	100	136	P	H
		7428.00	49.49	-4.51	54	-	-	-	-	100	136	A	H
		4952.00	49.53	-24.47	74	71.78	33.08	12.21	67.54	-	-	P	V
		7428.00	61.19	-12.81	74	76.54	36.61	14.97	66.93	100	315	P	V
		7428.00	47.24	-6.76	54	-	-	-	-	100	315	A	V
		9990.00	51.36	-22.64	74	63.93	38.61	17.64	68.82	-	-	P	V
		17332.00	58.72	-15.28	74	63.57	39.48	23.60	67.93	-	-	P	V





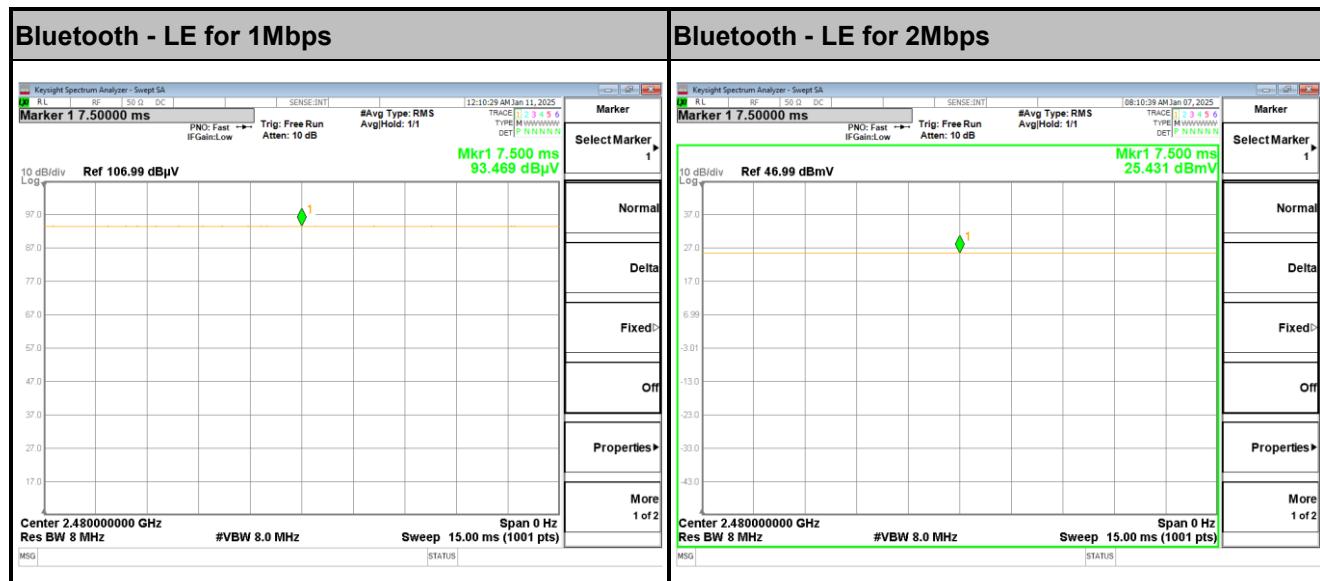
BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE CH 00 2402MHz		30.97	21.60	-18.40	40	28.65	24.39	1.02	32.46	-	-	P	H
		106.63	28.98	-14.52	43.5	42.82	16.78	1.82	32.44	-	-	P	H
		237.58	27.37	-18.63	46	40.10	17.03	2.67	32.43	-	-	P	H
		512.09	23.93	-22.07	46	28.69	23.90	3.96	32.62	-	-	P	H
		746.83	30.47	-15.53	46	30.15	28.03	4.74	32.45	-	-	P	H
		959.26	31.95	-14.05	46	26.51	31.11	5.51	31.18	-	-	P	H
		52.31	26.43	-13.57	40	44.27	13.36	1.27	32.47	-	-	P	V
		115.36	33.22	-10.28	43.5	46.41	17.41	1.84	32.44	-	-	P	V
		242.43	29.60	-16.40	46	41.74	17.58	2.73	32.43	-	-	P	V
		277.35	30.98	-15.02	46	41.76	18.78	2.90	32.45	-	-	P	V
		746.83	32.93	-13.07	46	32.61	28.03	4.74	32.45	-	-	P	V
		938.89	33.41	-12.59	46	28.93	30.40	5.43	31.35	-	-	P	V



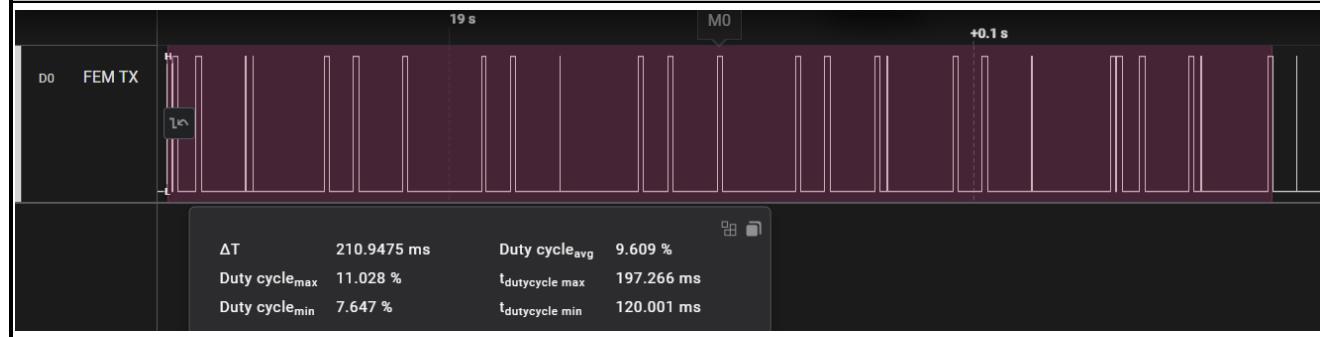
BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		( MHz )	( dB $\mu$ V/m )	( dB )	( dB $\mu$ V/m )	( dB $\mu$ V )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)
BLE CH 00 2402MHz		19808.00	52.19	-21.81	74	53.37	37.81	15.04	54.03	100	46	P	H
		22284.00	46.39	-27.61	74	43.37	38.34	17.04	52.36	-	-	P	H
		24760.00	43.82	-30.18	74	38.73	39.03	18.59	52.53	-	-	P	H
		19808.00	60.35	-13.65	74	61.67	37.67	15.04	54.03	200	360	P	V
		19808.00	46.40	-7.60	54	-	-	-	-	200	360	A	V
		22284.00	45.85	-28.15	74	42.82	38.35	17.04	52.36	-	-	P	V
		24760.00	46.12	-27.88	74	40.96	40.96	18.59	52.53	-	-	P	V

## Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
Bluetooth - LE for 1Mbps	100.00	-	-	10Hz
Bluetooth - LE for 2Mbps	100.00	-	-	10Hz



Bluetooth - LE in actual user scenario



Note, the plot was tested with the device in the scenario of 7 audio payloads, the maximum supported numbers limited by the firmware. The maximum observed TX duty cycle in any 100-msec window is 11.03 %, not exceeding the theoretical number of 20.06% by its design.

20.06% is used to determine the duty cycle correction factor (DCCF) in this report