
 <p>CERTIFICATE 2518.08</p> <p>MS ISO/IEC 17025          TESTING          SAMM NO. 0825</p>
<p><b>MOTOROLA PENANG ADV. COMM. LABORATORY</b>  <b>Motorola Solutions Malaysia Sdn. Bhd.</b>  <b>Plot 2A Medan Bayan Lepas,</b>  <b>Mukim 12, S.W.D. 11900 Bayan Lepas,</b>  <b>Penang, Malaysia.</b></p>	<p><b>FCC / ISED TEST REPORT</b>  <b>Report Revision : Rev.D</b></p>
<p><b>Date/s Tested</b> : 31-Oct-2021 - 24-Dec-2021  <b>Report Issue Date</b> : 2-Feb-2023  <b>Manufacturer/Location</b> : Motorola Solutions Malaysia Sdn Bhd          Plot 2A, Medan Bayan Lepas, Mukim 12 SWD,          11900 Bayan Lepas, Penang, Malaysia  <b>Requestor</b> : LEE SZU SEE  <b>Product Type</b> : Hand-held  <b>Product Version (PMN)</b> : MXP600  <b>Model Number (HVIN)</b> : AZH77PCN6TZ5AN  <b>Frequency Band</b> : 2.402 - 2.480 GHz  <b>Max RF Output Power</b> : 2.5 mWatts  <b>Applicant Name</b> : Motorola Solutions Inc  <b>Applicant Address</b> : 8000 West Sunrise Boulevard,          Fort Lauderdale, Florida 33322  <b>FCC Registrations</b> : 461337  <b>ISED Registrations</b> : MY0001  <b>Firmware Version (FVIN)</b> : D55.000.9681</p> <p><b>The equipment was tested accordance to the requirement listed below:</b></p> <p><b>(2.4GHz BT LE )</b> <span style="float: right;"><b>PASS</b></span>  <b>47 CFR Part 15C</b>  <b>ISED RSS 247 Issue 2</b>  <b>February 2017</b></p>	
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<p>Prepared By:</p>  <hr/> <p><b>GAN BOON TEONG</b>  <b>Test Personnel</b></p>	<p>Approved Signatory:</p> <hr/> <p><b>VINCENT FOONG CHUEN KIT</b>  <b>Responsible Engineer</b></p>

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## REVISION HISTORY

<b>Revision History</b>	<b>Description</b>	<b>Date</b>	<b>Originator</b>
Rev. A	Initial Report	<b>7-Jan-2022</b>	<b>Gan Boon Teong</b>
Rev. B	Updated summary table	<b>27-Sep-2022</b>	<b>Gan Boon Teong</b>
Rev. C	Update Report Issue Date	<b>2-Feb-2023</b>	<b>Gan Boon Teong</b>
Rev. D	Amend summary table for power detector	<b>27-Mar-2023</b>	<b>Vincent Foong</b>

**1.0 General Information**

**EUT Description:**

<b>Technologies</b>	2.4GHz BT LE
<b>TX Frequency range</b>	2402MHz – 2480MHz
<b>Modulation Type</b>	GFSK
<b>Connector type</b>	PROGRAMMING, TEST & ALIGNMENT CABLE
<b>Antenna type</b>	Ceramic

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
BELIZE TIA4950 IMPRES HIGH CAP LI ION BATTERY 2850M2900T	MOTOROLA	PMNN4802A
BOTTOM CONNECTOR SERIAL DATA CABLE	MOTOROLA	PMKN4127A
AC Charger	MOTOROLA	PS000227A31-CF1

Channel number and frequency information:

40 channels are provided to this EUT:

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

**General Description of Applied Standards**

The EUT is a RF Product. According to the specifications of the manufacturer, the EUT is to comply with the requirements of the following standards:

**FCC 47 CFR Part 15 Subpart C**  
**KDB 558074 D01 15.247 Meas Guidance v05**  
**ANSI C63.10-2013**

**Deviation from standard**

Not applicable as no deviation from standard test method

**Modifications to EUT**

For RF conducted measurements a pigtail was soldered out of the board while for radiated measurements there were no modifications to the device

## 2.0 Summary of Test Results

FCC Clause	ISED Clause	Test Item	Result	Remark	Serial number tested	Tested by
15.247 (a)(2)	RSS 247 5.2 (a)	DTS & 99% Channel Bandwidth	Pass	Highest 99% OCB: BTLE 1M: 1.050 MHz (1M05F1D) BTLE 2M: 2.068 MHz (2M07F1D)	767TXV0817	Gan
15.247 (b)(3)	RSS 247 5.4 (d)	Conducted RF Output Power (Peak)	Pass	Highest output power: BTLE 1M: 2.930 dBm (1.96 mW) BTLE 2M: 2.997 dBm (1.99 mW)	767TXV0817	Gan
15.247(e)	RSS 247 5.2 (b)	Maximum Peak Power Spectral Density	Pass	Meet the limit requirement.	767TXV0817	Gan
15.247 (d)	RSS-247 5.5	Band-Edge Conducted Spurious Emission	Pass	Worst case emission: BTLE 1M:-55.28 dBm BTLE 2M:-29.69 dBm	767TXV0817	Gan
15.247 (b)	RSS-247 5.5	Conducted Spurious Emission	Pass	Worst case emission: BTLE 1M:-40.60 dBm BTLE 1M:-39.60 dBm	767TXV0817	Gan
15.205, 15.209, 15.247 (d)	RSS247 5.5	Radiated Emission within Restricted Bands	Pass	Worst case emission: RE: BT LE 1M: spur: 50.6877dBuV/m, margin: 3.3123dB (NF) BT LE 2M: spur: 51.3908dBuV/m, margin: 2.6092dB (NF) RBE: BT LE 1M: spur:41.5093dBuV/m, margin: 12.4907dB BT LE 2M: spur: 42.5180dBuV/m, margin:11.4820dB)	767TXV0821 767TXV0826	Nazirul&Abid
15.207	RSS-Gen 8.8	AC Power Line Conducted Spurious Emission	NA	Testing is not required, radio shall turn off during charging mode	NA	NA
15.203	-	Antenna Requirement	NA	Internal antenna is not accessible to the end-user	NA	NA

## 3.0. Measurement Uncertainty

Measurement	Frequency	Expended Uncertainty (k=1.96) (±dB)
AC Power Line Conducted Spurious Emission	150KHz ~ 30MHz	3.43
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	5.01
	200MHz ~ 1000MHz	5.01
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.01
	18GHz ~ 25GHz	5.01
Conducted Spurious Emissions	9kHz ~ 12.75GHz	2.82

#### 4.0 Equipment List

##### Bluetooth ATE # 1 (SW Version: Ate Main\_3.1.11)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
POWER SUPPLY	6652A	3640A02941	22-Jan-21	22-Jan-22
ANALYZER SPECTRUM	E4440A	US45303111	14-Jul-21	14-Jul-22
CHAMBER	SH-641	92003820	14-Jul-21	14-Jul-22
N to N RF Cable # 1	SF126/11N/11N	NA	NA	NA

##### Radiated Emission Station (SW Version: EMC FCC RE v1.6.3)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMI TEST RECEIVER	ESIB40	100307	08-Jan-21	08-Jan-22
3m Semi-anechoic Chamber	NA	888032	Not Required	Not Required
TURNTABLE FLUSH MOUNT 2M	T-200-S	N/A	Not Required	Not Required
Bore sight Antenna mast	MBS-500	N/A	Not Required	Not Required
PROGRAMMING CONTROLLER	MF-7802BS	N/A	Not Required	Not Required
POWER SUPPLY (0-60V/0-50A, 1000W)	6032A	41001736	28-Jun-21	28-Jun-22
EMI TEST RECEIVER	ESW44	101731	23-Mar-21	23-Mar-22
DATA LOGGER	SDL500	A.016776	17-Jun-21	17-Jun-22
BILOG ANTENNA	CBL6112D	55546	16-Jun-21	16-Jun-22
BILOG ANTENNA	CBL6112B	2964	4-May-21	4-May-22
DRG HORN FREQ.	SAS-571	1143	24-Feb-21	24-Feb-23
DRG HORN FREQ.	SAS-571	719	13-Sep-21	13-Sep-22
PREAMPLIFIER	PAM-0118	427	13-May-20	13-May-23
SIGNAL GENERATOR	SMB100A	180683	13-Apr-21	13-Apr-24
LOOP ANTENNA	6502	00203479	05-Feb-21	05-Feb-22
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170255	04-Feb-21	04-Feb-22

### 5.0 Test Mode Applicability and Test Channel Detail

#### Radiated Emission Test (Above 1GHz)

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Environmental Conditions
Test Mode	0 to 39	0,19,39	GFSK	22.3°C, 70.2%RH

#### Radiated Emission Test (Below 1GHz)

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Environmental Conditions
Test Mode	0 to 39	0,19,39	GFSK	22.3°C, 70.2%RH

#### Power Line Conducted Emission Test

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Environmental Conditions
Application Mode	0 to 39	AUTO	AUTO	NA

#### Antenna Port Conducted Measurement:

This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

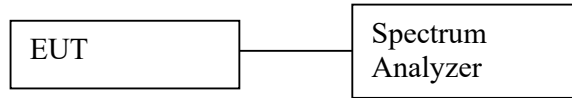
Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Environmental Conditions
Test Mode	0 to 39	0,19,39	GFSK	25°C, 54.6%RH

## 6.0 Transmitter Test Parameters

### 6.1 6dB Channel Bandwidth

#### 6.1.1 Test Setup



- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
  - a. RBW = 100 kHz
  - b. VBW = 300 kHz
  - c. Detector mode = Peak
  - d. Trace = Max hold
  - e. Sweep = auto
- 5) Measure the freq different of two frequencies that were attenuated 6dB from peak of the emission & record the frequency difference as the emission bandwidth.

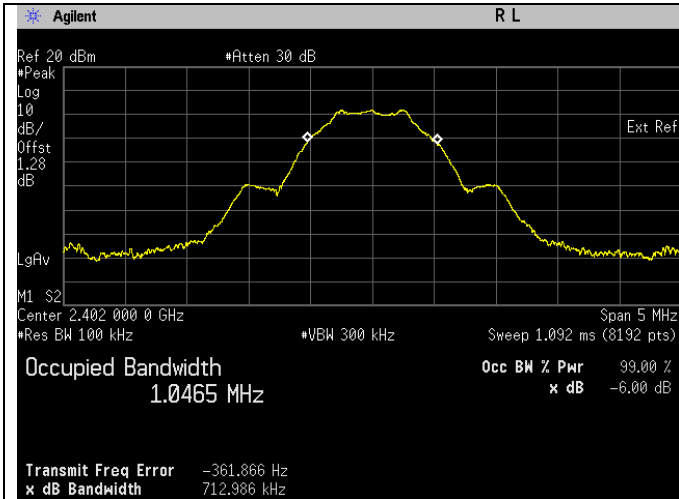
#### 6.1.2 Test Limits:

<b>Normal Condition (25 ° C)</b>
<b>≥500 kHz</b>

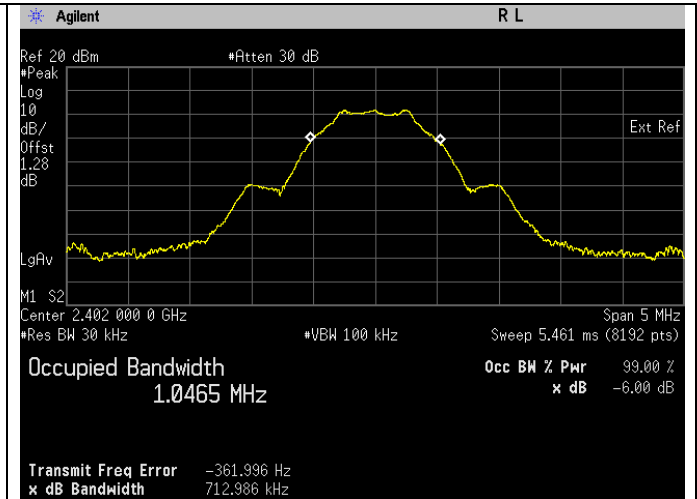
#### 6.1.3 Test Data:

##### BTLE 1M

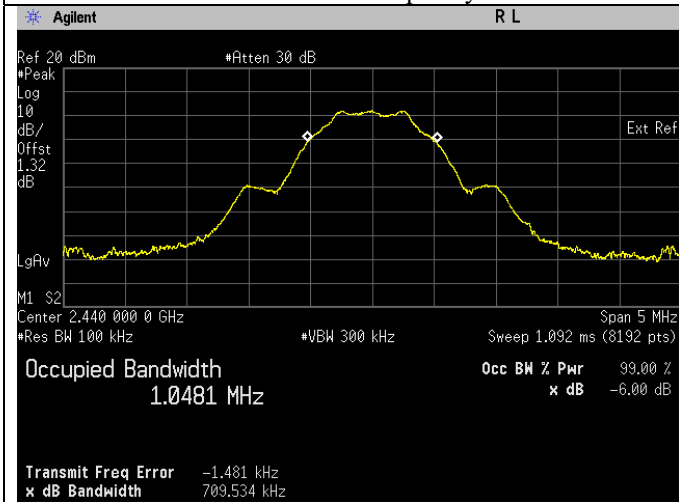
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
Bluetooth L.E	GFSK	2402	0.713	1.047	Pass
Bluetooth L.E	GFSK	2440	0.710	1.048	Pass
Bluetooth L.E	GFSK	2480	0.710	1.050	Pass



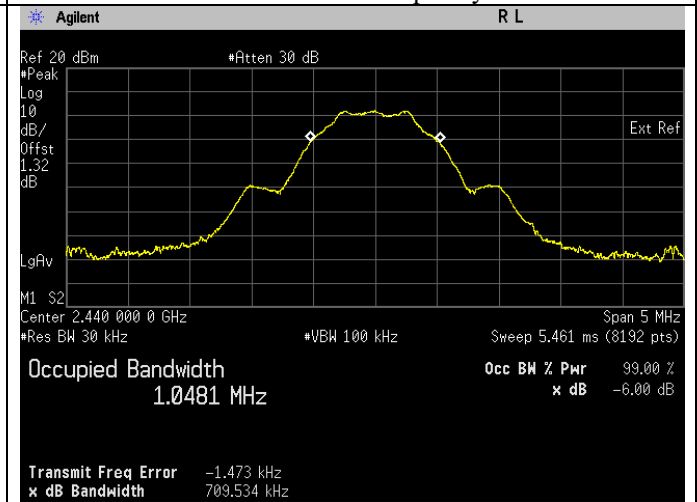
6dB Bandwidth. Bluetooth LE Frequency 2402 MHz



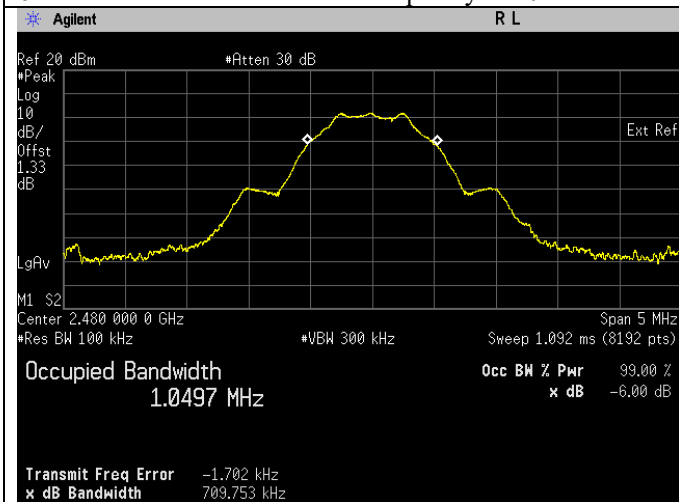
99% Bandwidth. Bluetooth LE Frequency 2402 MHz



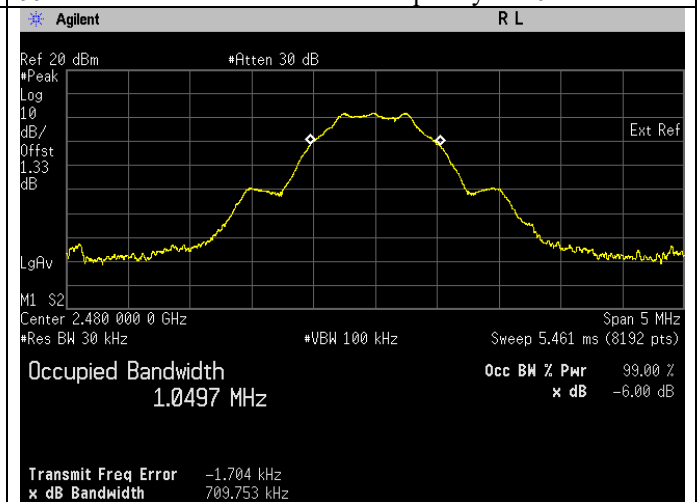
6dB Bandwidth. Bluetooth LE Frequency 2440 MHz



99% Bandwidth. Bluetooth LE Frequency 2440 MHz



6dB Bandwidth. Bluetooth LE Frequency 2480 MHz



99% Bandwidth. Bluetooth LE Frequency 2480 MHz

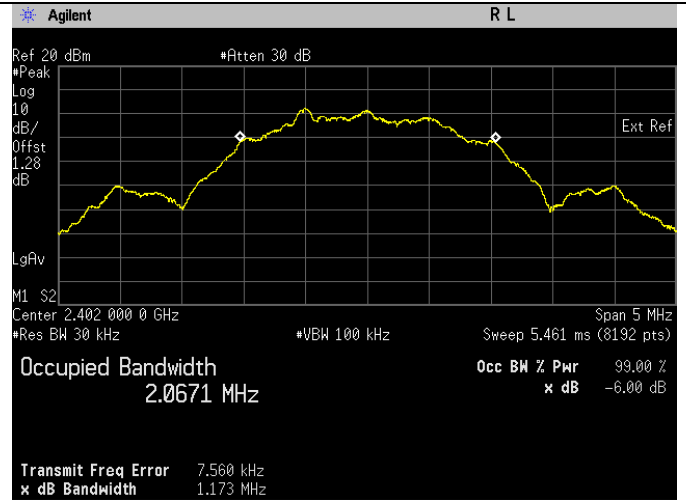


**BTLE 2M**

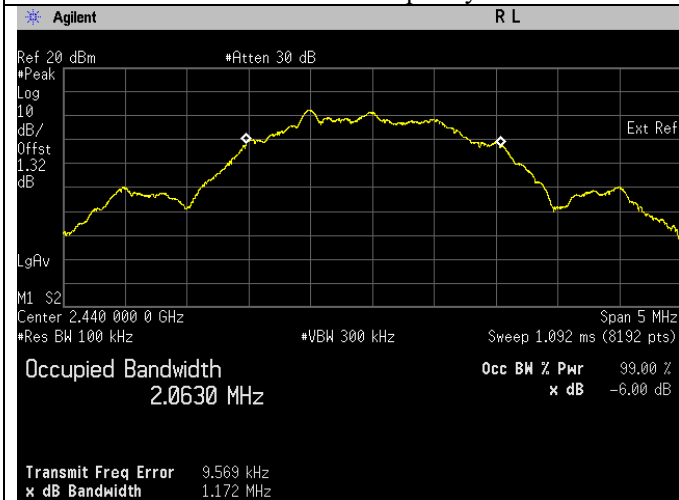
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Status
Bluetooth L.E	GFSK	2402	1.173	2.067	Pass
Bluetooth L.E	GFSK	2440	1.172	2.063	Pass
Bluetooth L.E	GFSK	2480	1.163	2.068	Pass



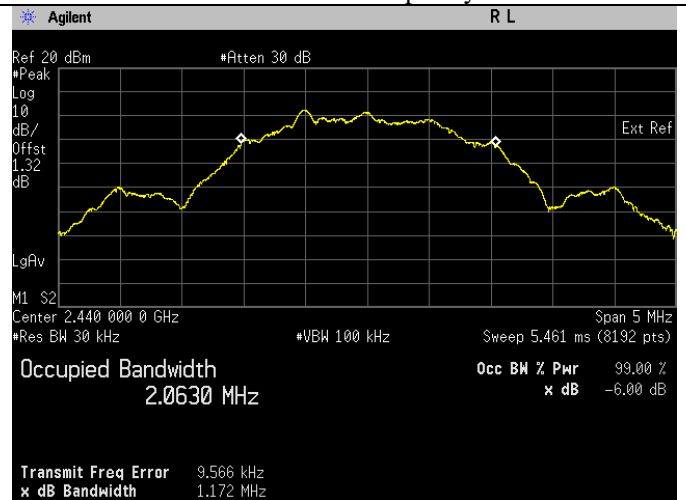
6dB Bandwidth. Bluetooth LE Frequency 2402 MHz



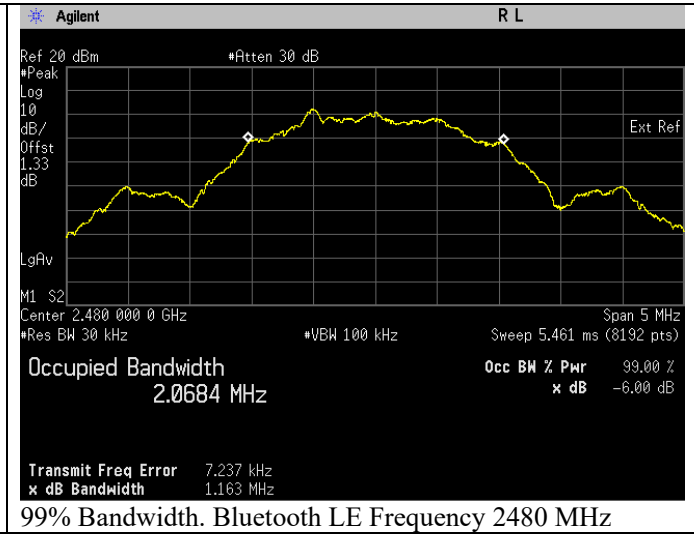
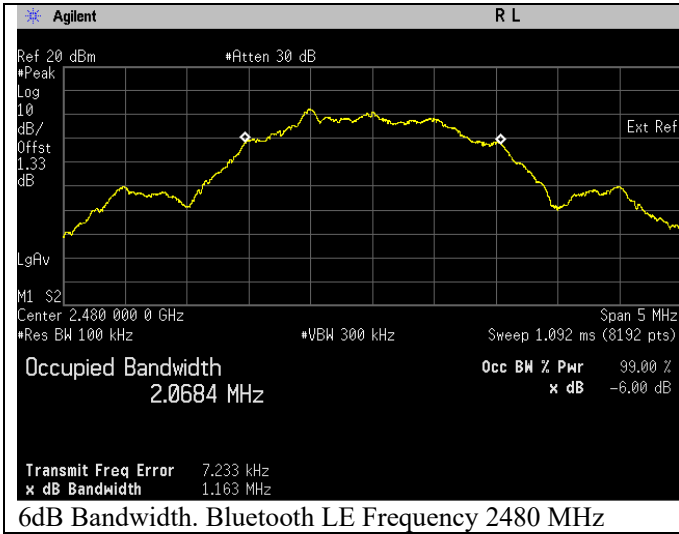
99% Bandwidth. Bluetooth LE Frequency 2402 MHz



6dB Bandwidth. Bluetooth LE Frequency 2440 MHz

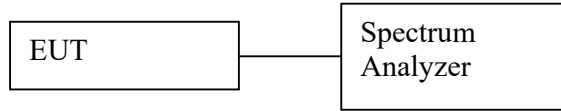


99% Bandwidth. Bluetooth LE Frequency 2440 MHz



## 6.2 Conducted RF Output Power

### 6.2.1 Test Setup



- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Measure the duty cycle of transmitter output signal.
- 4) Setting of Spectrum analyzer :
  - a. Set the RBW = 30 kHz.
  - b. Set the VBW  $\geq [3 \times \text{RBW}]$ .
  - c. Set the span  $\geq [1.5 \times \text{OBW bandwidth}]$ .
  - d. Detector = Peak.
  - e. Sweep time = auto couple.
  - f. Trace mode = max hold.
  - g. Allow trace to fully stabilize.

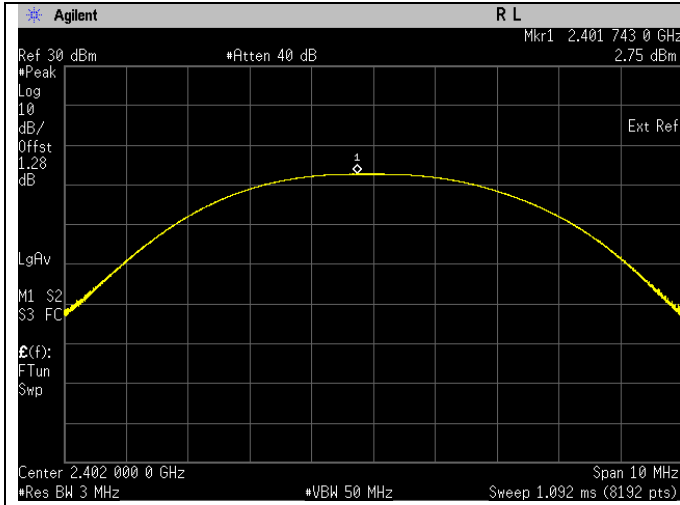
### 6.2.2 Test Limits:

<b>Normal Condition (25 ° C)</b>
<b><math>\leq 1</math> Watt(30 dBm)</b>

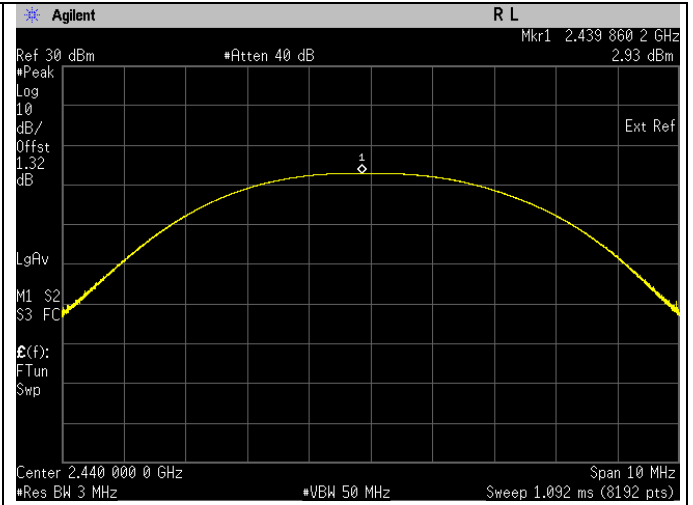
**6.2.3 Test Data:**

**BTLE 1M**

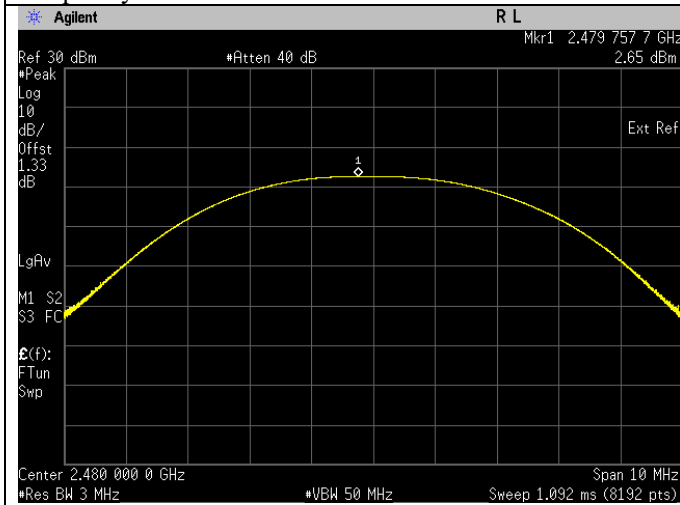
Test Conditions			Test Frequency	Results
Standard	Modulation Type	Tx (MHz)	Output Power (dBm)	Status
Bluetooth L.E	GFSK	2402	2.750	Pass
Bluetooth L.E	GFSK	2440	2.930	Pass
Bluetooth L.E	GFSK	2480	2.650	Pass



Frequency 2402 MHz



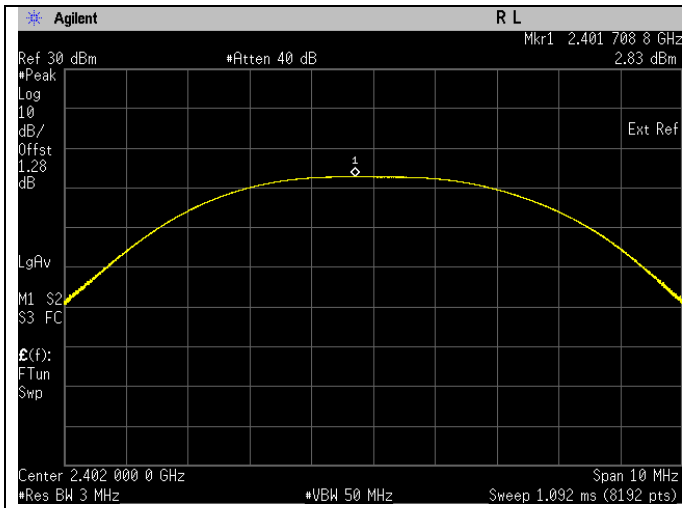
Frequency 2440 MHz



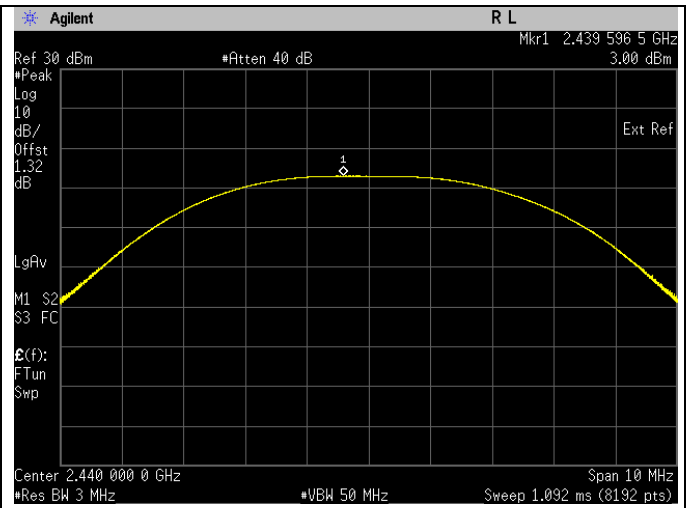
Frequency 2480 MHz

**BTLE 2M**

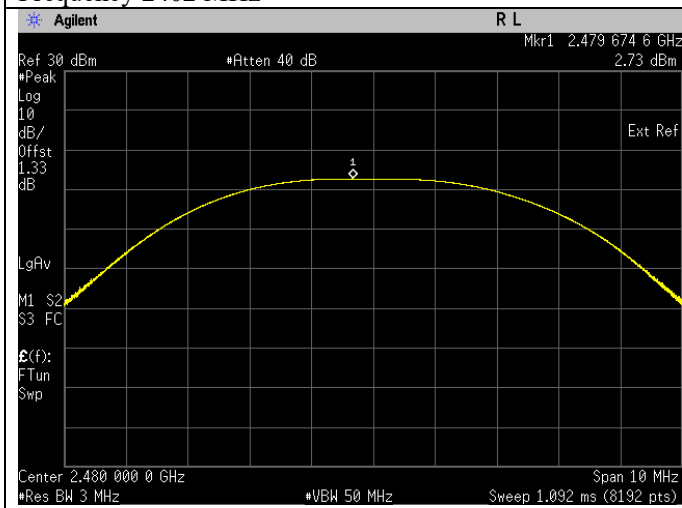
Test Conditions			Test Frequency	Results
Standard	Modulation Type	Tx (MHz)	Output Power (dBm)	Status
Bluetooth L.E	GFSK	2402	2.833	Pass
Bluetooth L.E	GFSK	2440	2.997	Pass
Bluetooth L.E	GFSK	2480	2.728	Pass



Frequency 2402 MHz



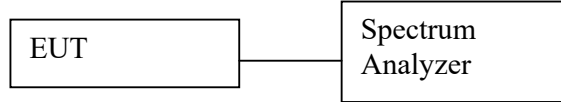
Frequency 2440 MHz



Frequency 2480 MHz

### 6.3 Maximum Peak Power Spectral Density

#### 6.3.1 Test Setup



##### Maximum Peak

- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
  - a. Set analyzer center frequency to DTS channel center frequency.
  - b. Set the span to 1.5 times the DTS bandwidth.
  - c. Set the RBW to 3 kHz.
  - d. Set the VBW  $\geq [3 \times \text{RBW}]$ .
  - e. Detector = peak.
  - f. Sweep time = auto couple.
  - g. Trace mode = max hold.
  - h. Allow trace to fully stabilize.
  - i. Use the peak marker function to determine the maximum amplitude level within the RBW.
  - j. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

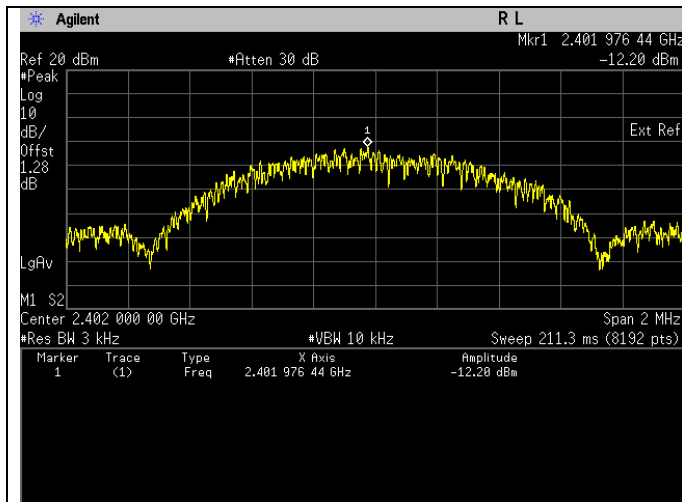
#### 6.3.2 Test Limits:

<b>Normal Condition (25 ° C)</b>
<b><math>\leq 8 \text{ dBm/3kHz}</math></b>

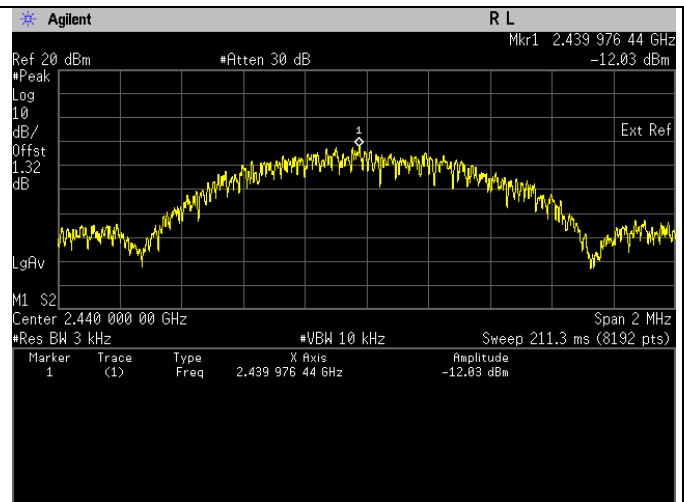
### 6.3.3 Test Result

#### BTLE 1M

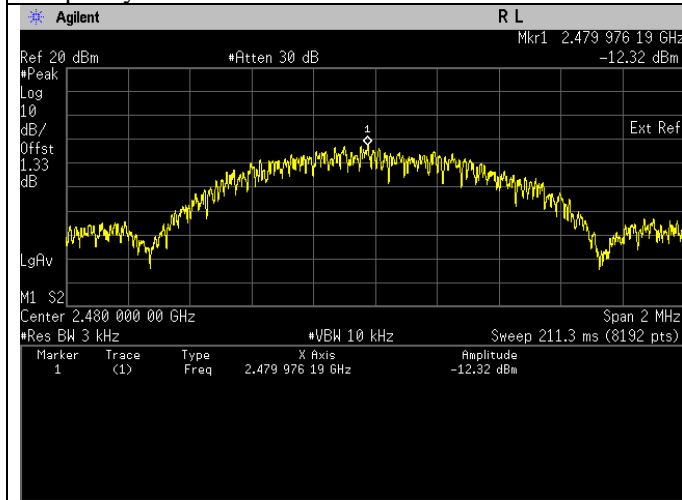
Test Conditions		Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Power (dBm/3kHz)	Status
Bluetooth L.E.	GFSK	2402	-12.20	Pass
Bluetooth L.E.	GFSK	2440	-12.03	Pass
Bluetooth L.E.	GFSK	2480	-12.32	Pass



Maximum Power Spectral Density. Bluetooth LE  
 Frequency 2402 MHz



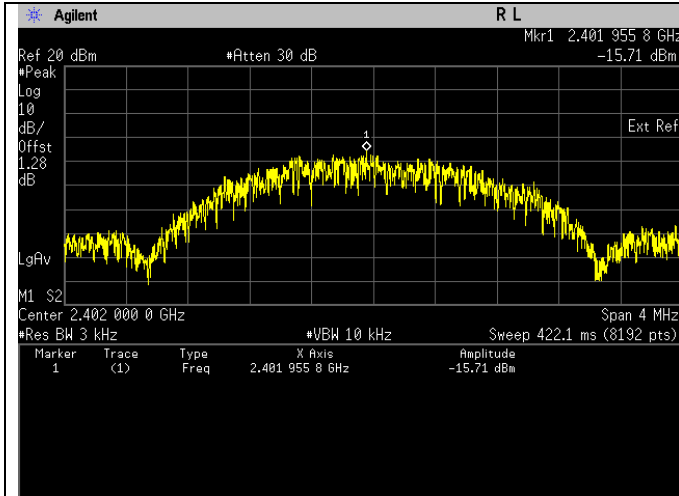
Maximum Power Spectral Density. Bluetooth LE  
 Frequency 2440 MHz



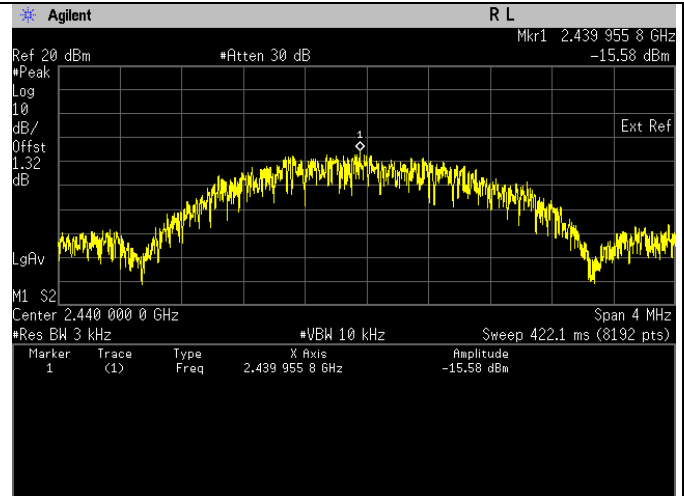
Maximum Power Spectral Density. Bluetooth LE  
 Frequency 2480 MHz

**BTLE 2M**

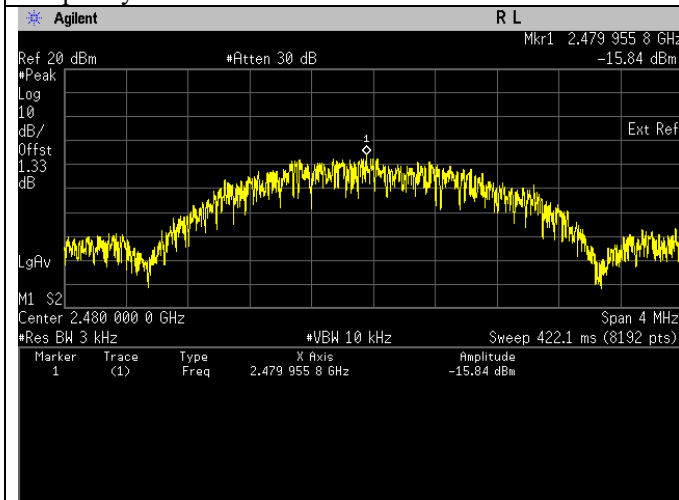
Test Conditions		Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Power (dBm/3kHz)	Status
Bluetooth L.E.	GFSK	2402	-15.71	Pass
Bluetooth L.E.	GFSK	2440	-15.58	Pass
Bluetooth L.E.	GFSK	2480	-15.84	Pass



Maximum Power Spectral Density. Bluetooth LE Frequency 2402 MHz



Maximum Power Spectral Density. Bluetooth LE Frequency 2440 MHz

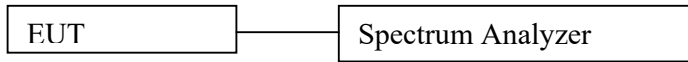


Maximum Power Spectral Density. Bluetooth LE Frequency 2480 MHz



## 6.4 Conducted Spurious Emission

### 6.4.1 Test Setup



- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
  - a. RBW = 100 kHz
  - b. VBW = 300 kHz
  - c. Detector mode = Peak
  - d. Trace = Max Hold
  - e. Sweep = auto
- 5) Use the peak marker function to measure highest emission and scan up to 10<sup>th</sup> harmonic.

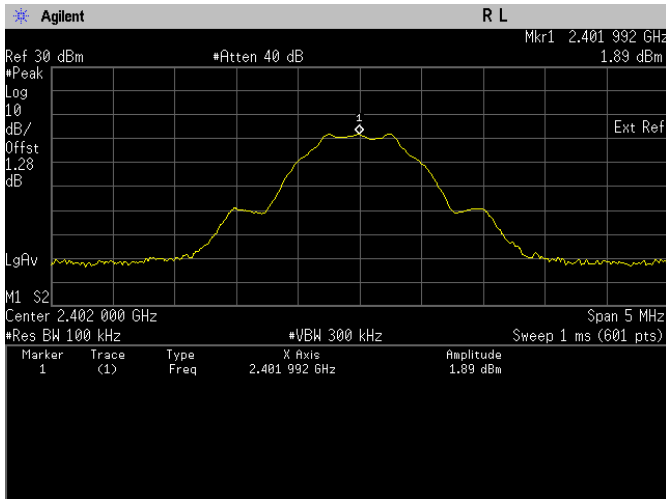
### 6.4.2 Test Limits:

<b>Normal Condition (25 ° C)</b>
<b>Shall be at least 20 dB below peak (max) power.</b>

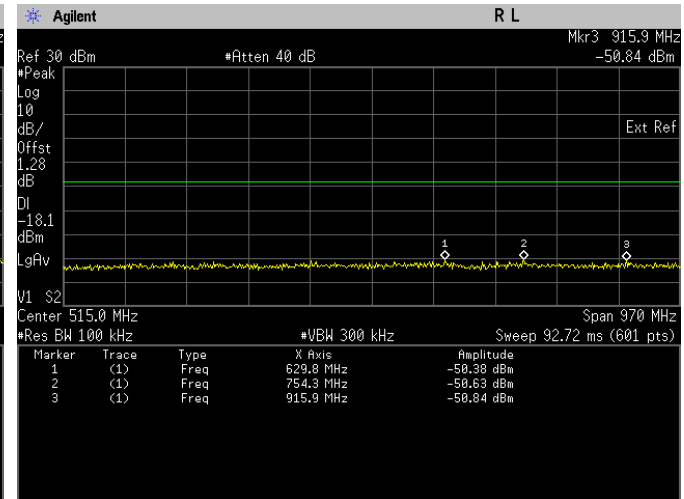
### 6.4.3 Test Result

#### BTLE 1M

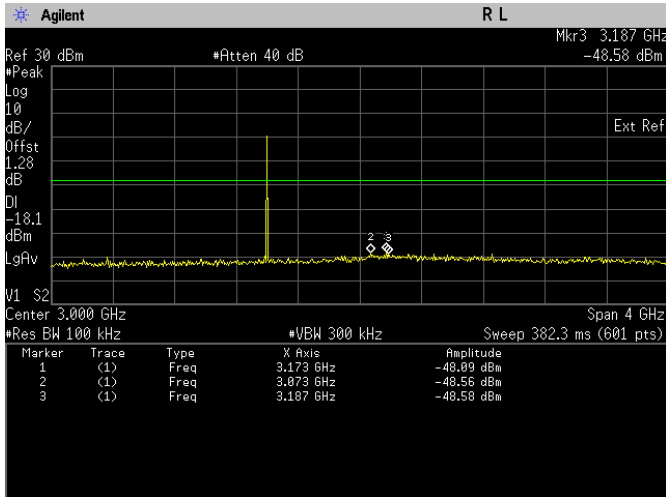
Test Conditions			Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
Bluetooth L.E.	GFSK	2402	24217.00	-41.01	Pass
			24942.00	-41.15	Pass
			24825.00	-41.26	Pass
Bluetooth L.E.	GFSK	2440	24825.00	-40.60	Pass
			24908.00	-40.83	Pass
			24250.00	-41.20	Pass
Bluetooth L.E.	GFSK	2480	24600.00	-40.79	Pass
			24925.00	-41.01	Pass
			24850.00	-41.09	Pass



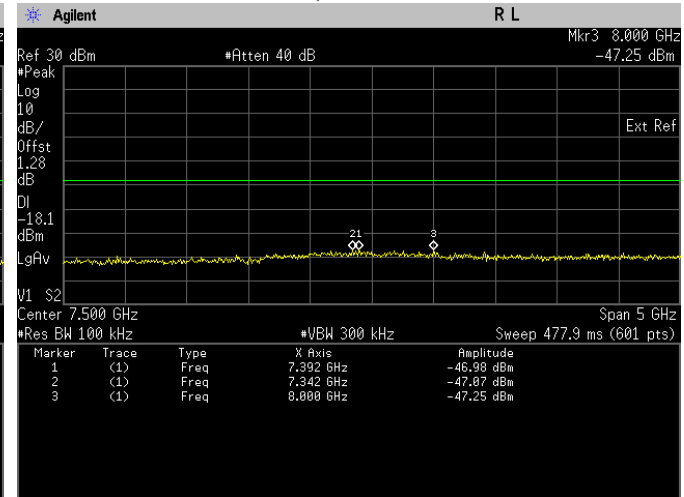
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Reference Level



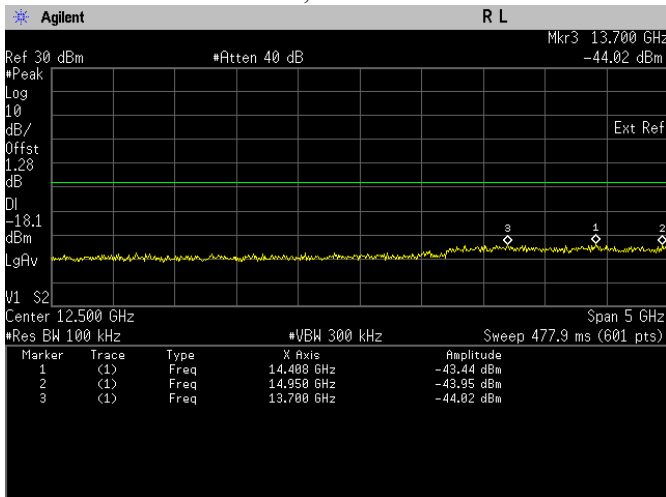
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 30 MHz -> 1 GHz



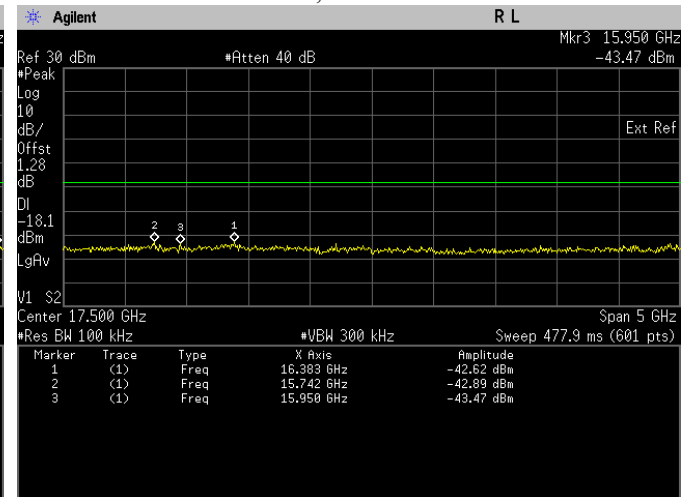
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 1 GHz -> 5 GHz



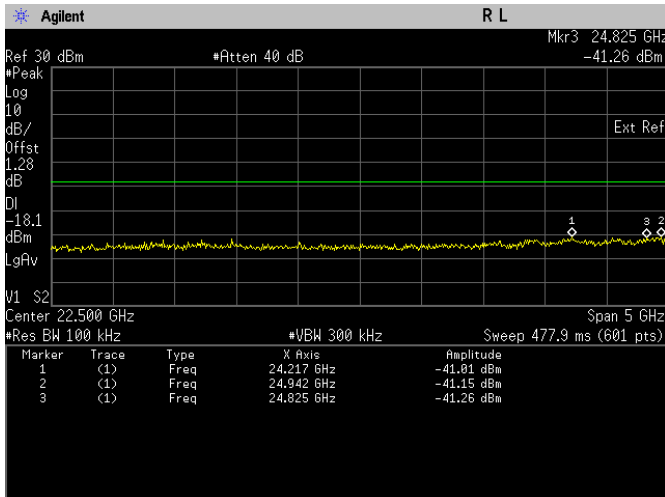
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 5 GHz -> 10 GHz



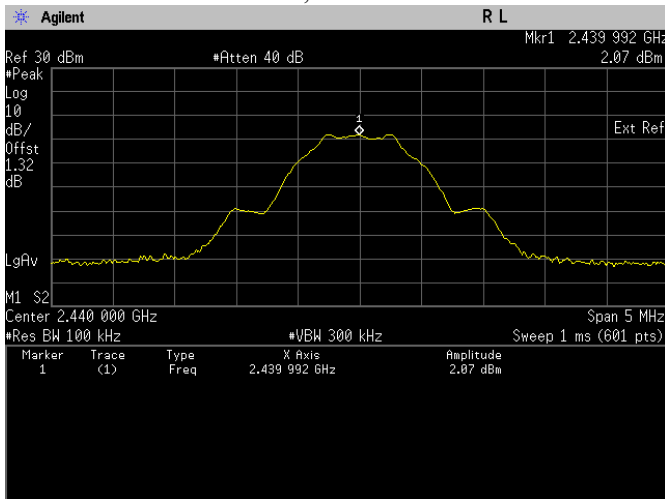
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 Emission Level, 10 GHz -> 15 GHz



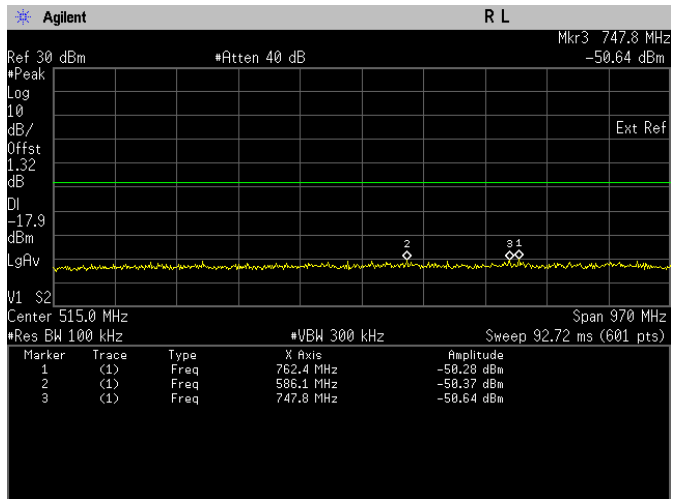
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 15 GHz -> 20 GHz



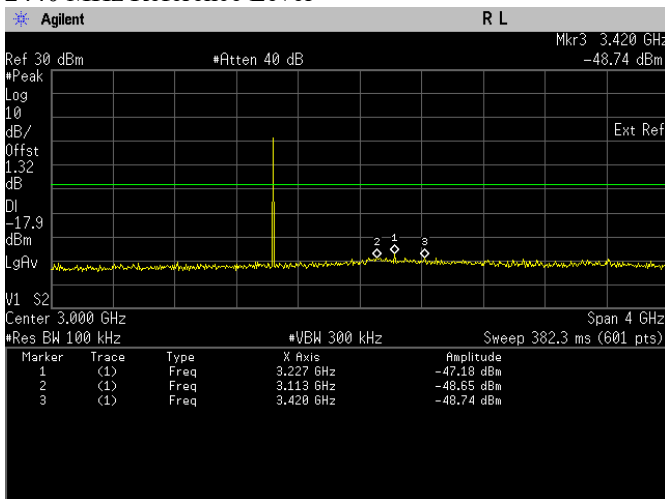
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 20 GHz -> 25 GHz



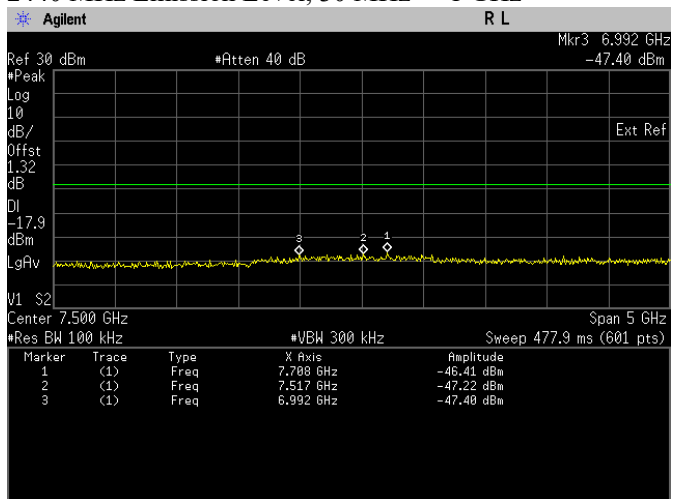
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Reference Level



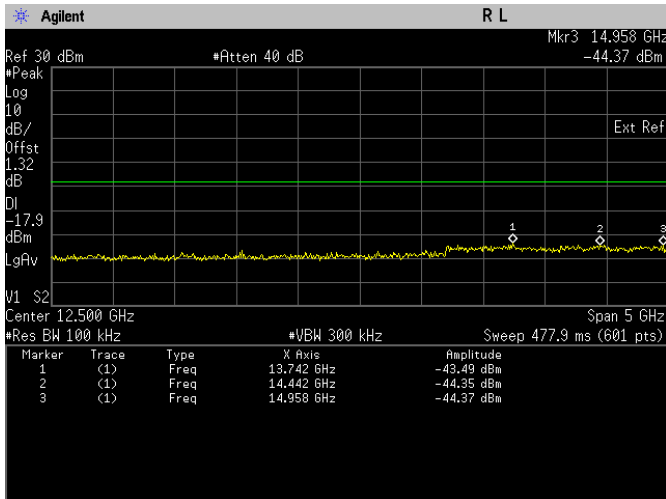
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 30 MHz -> 1 GHz



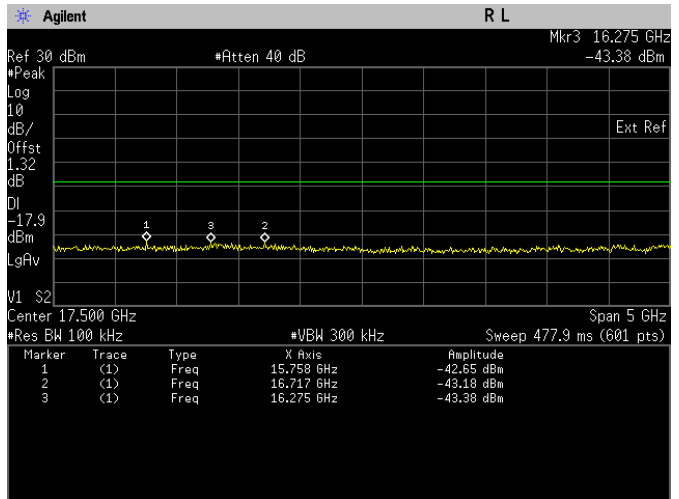
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 1 GHz -> 5 GHz



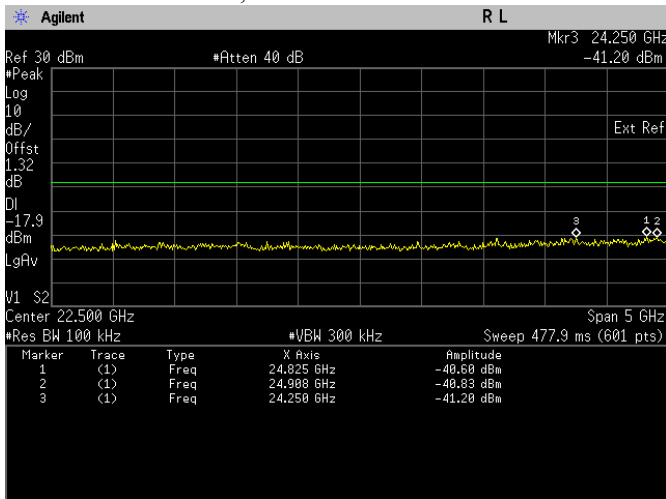
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 5 GHz -> 10 GHz



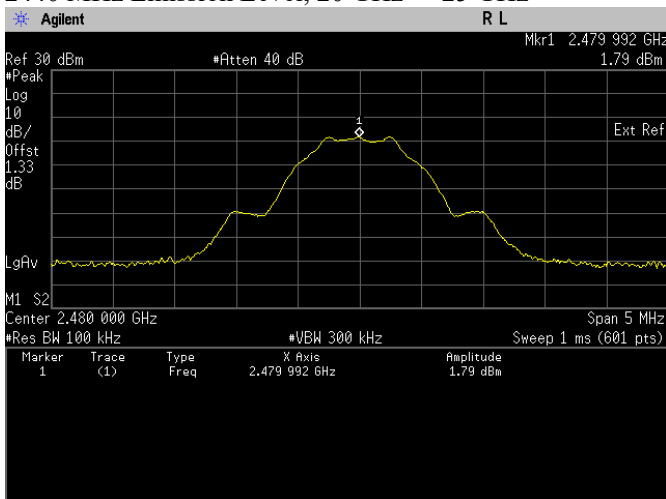
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 Emission Level, 10 GHz -> 15 GHz



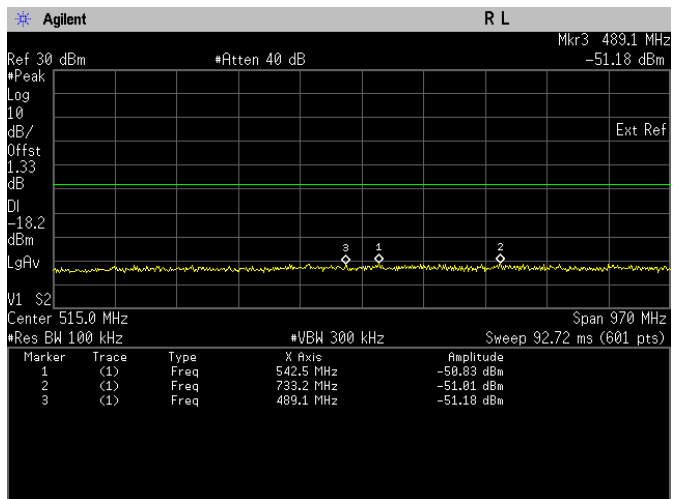
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 15 GHz -> 20 GHz



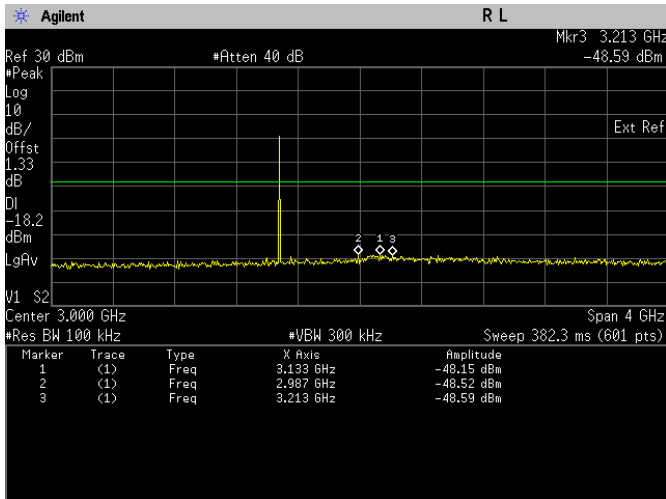
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 20 GHz -> 25 GHz



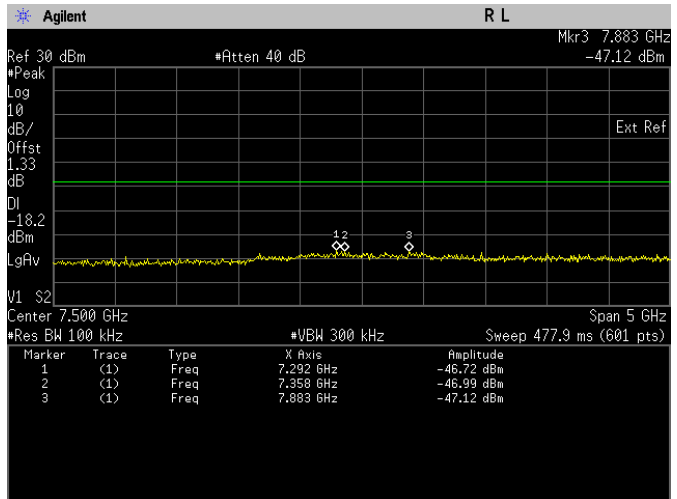
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Reference Level



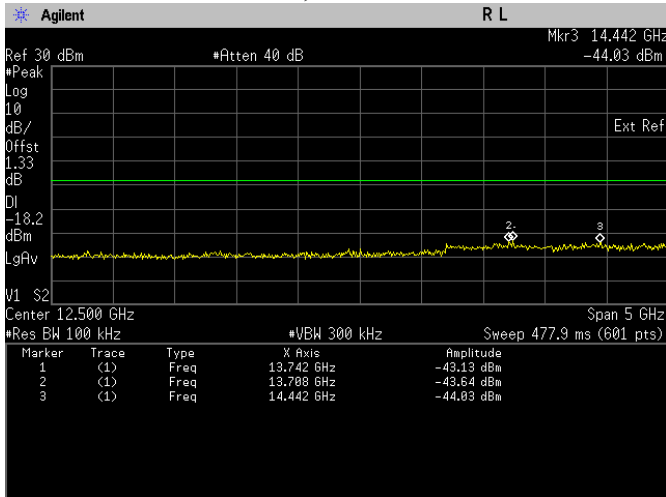
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 30 MHz -> 1 GHz



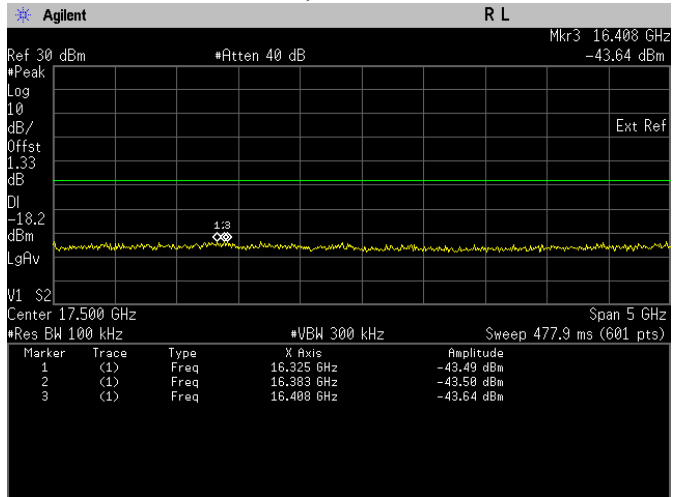
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 1 GHz -> 5 GHz



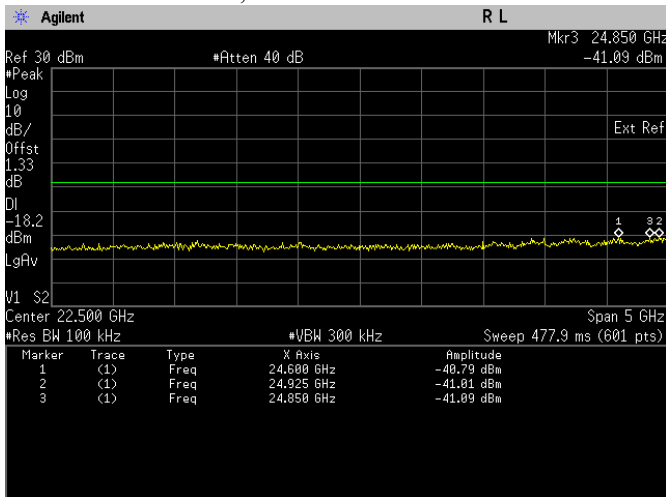
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 5 GHz -> 10 GHz



Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 10 GHz -> 15 GHz



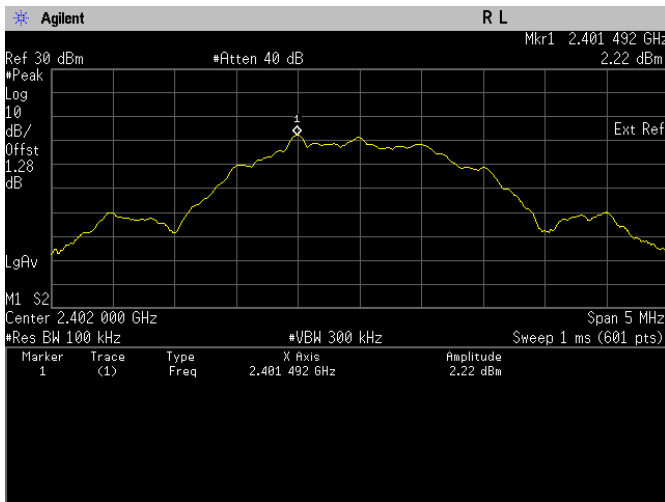
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 15 GHz -> 20 GHz



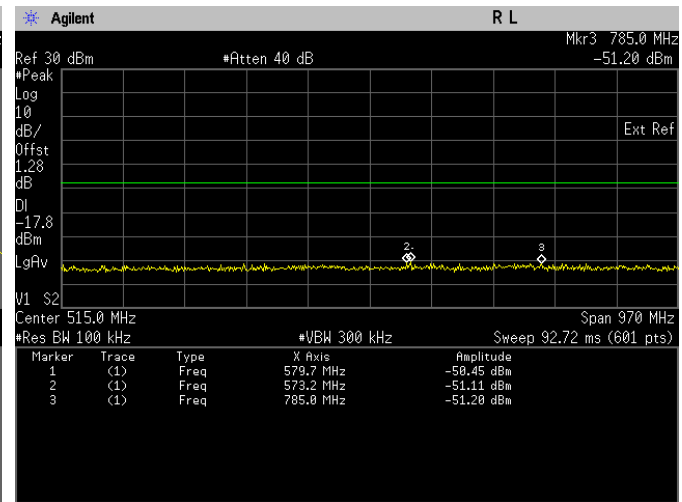
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 20 GHz -> 25 GHz

**BTLE 2M**

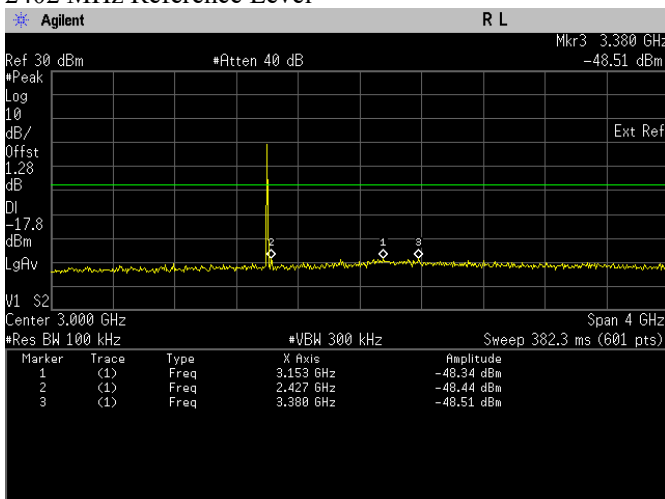
Test Conditions			Test Frequency	Results	
Standard	Modulation Type	Tx (MHz)	Spurs (MHz)	Level (dBm)	Status
Bluetooth L.E.	GFSK	2402	24542.00	-40.74	Pass
			24283.00	-41.01	Pass
			24917.00	-41.07	Pass
Bluetooth L.E.	GFSK	2440	24842.00	-40.49	Pass
			24917.00	-41.05	Pass
			24583.00	-41.11	Pass
Bluetooth L.E.	GFSK	2480	24942.00	-39.60	Pass
			24242.00	-40.63	Pass
			24892.00	-40.70	Pass



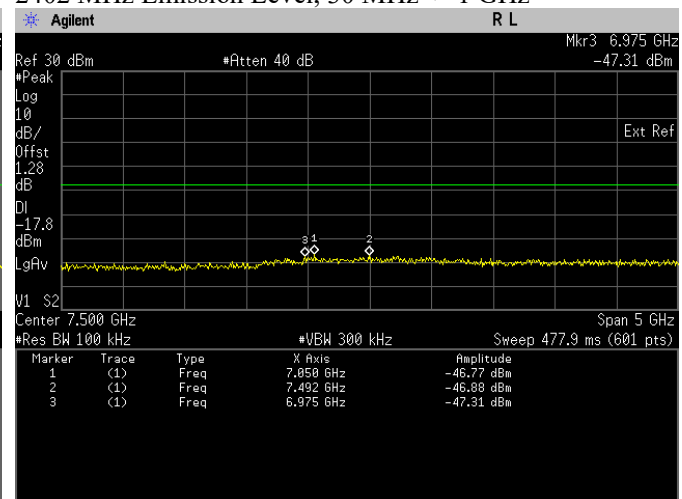
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Reference Level



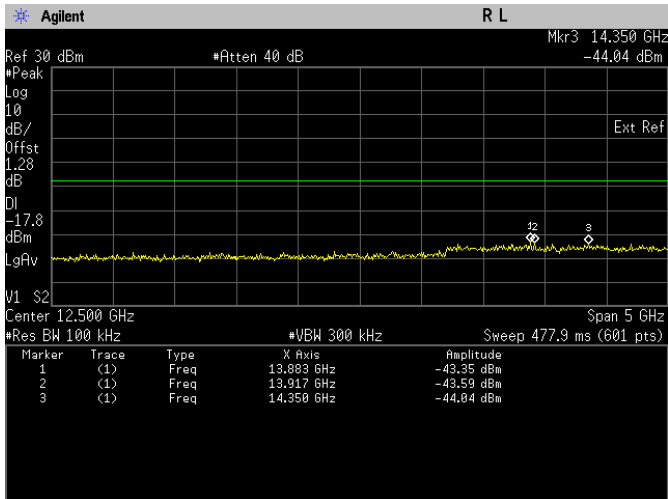
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 30 MHz -> 1 GHz



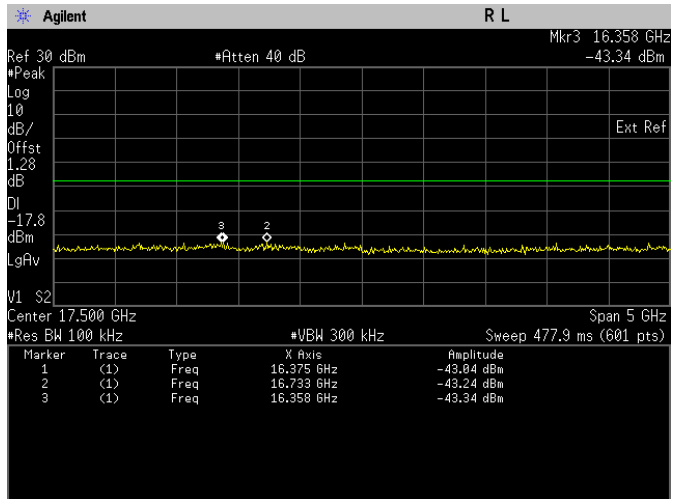
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 1 GHz -> 5 GHz



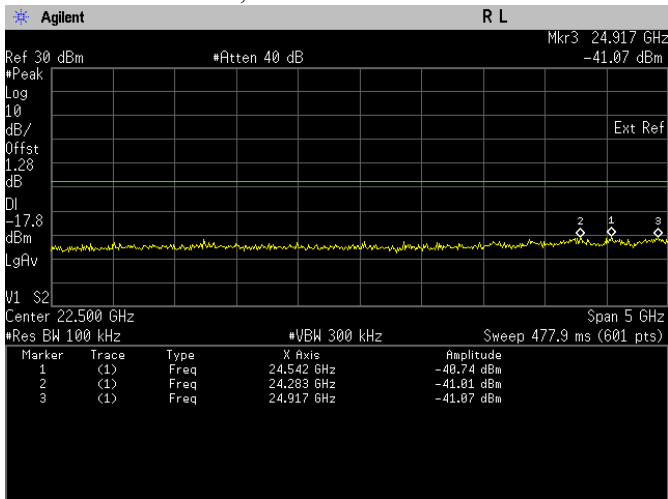
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 5 GHz -> 10 GHz



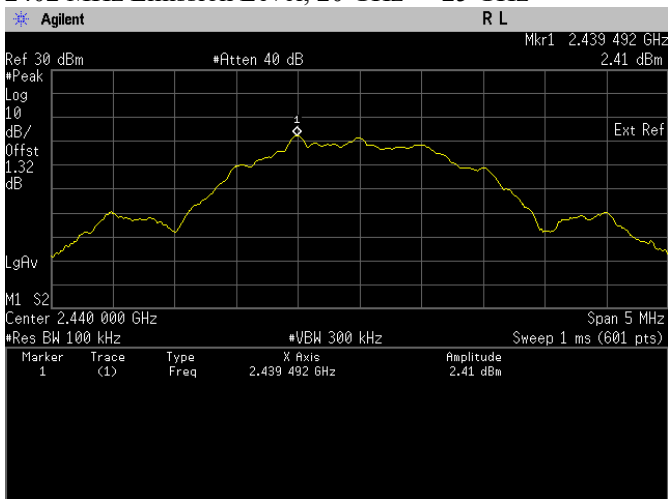
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 Emission Level, 10 GHz -> 15 GHz



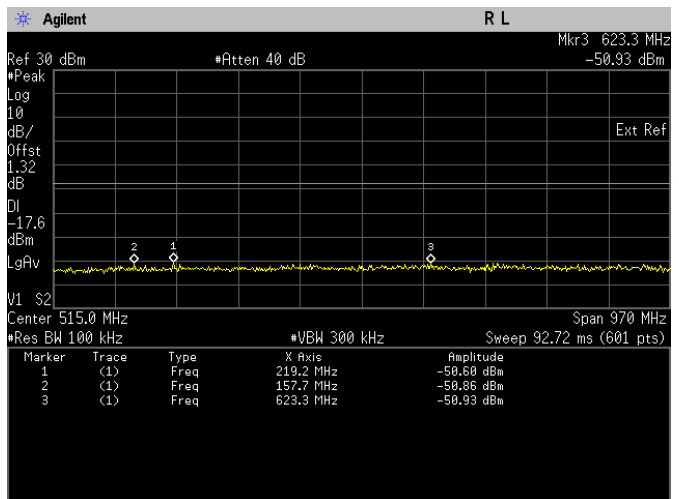
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 15 GHz -> 20 GHz



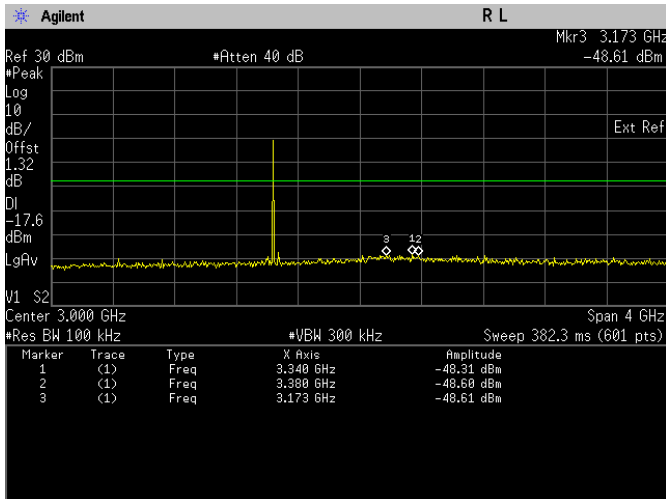
Conducted Emissions(Peak). Bluetooth LE, Frequency 2402 MHz Emission Level, 20 GHz -> 25 GHz



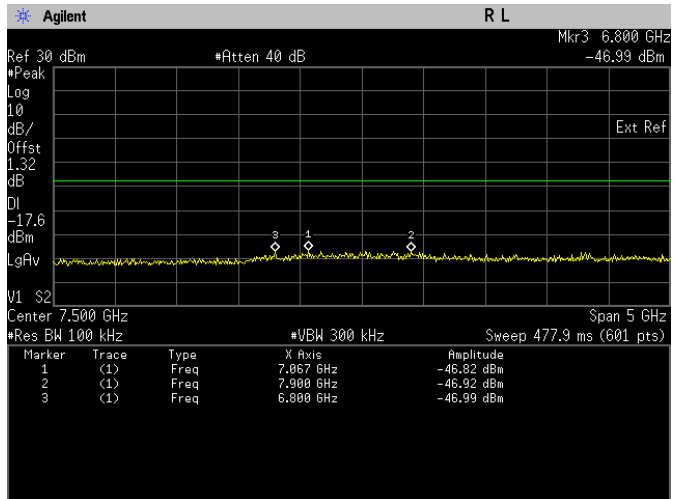
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Reference Level



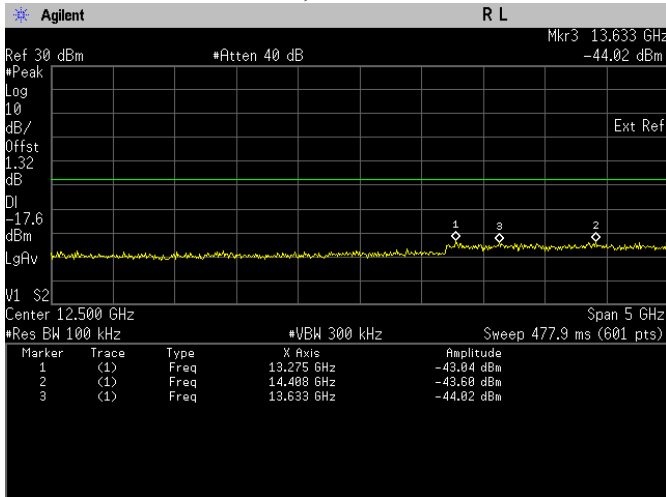
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 30 MHz -> 1 GHz



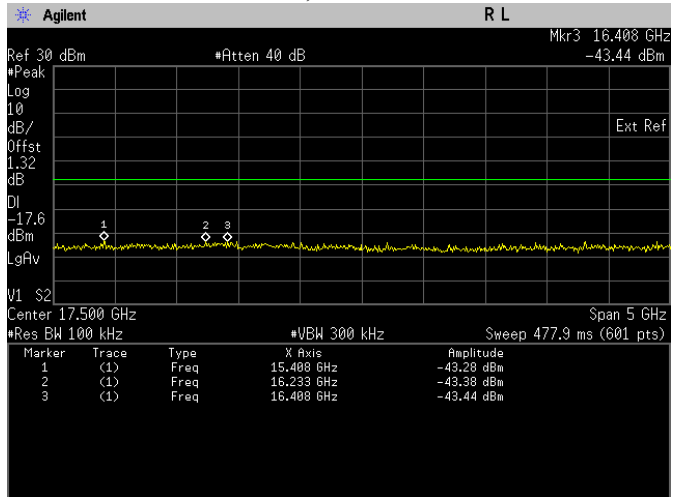
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 1 GHz -> 5 GHz



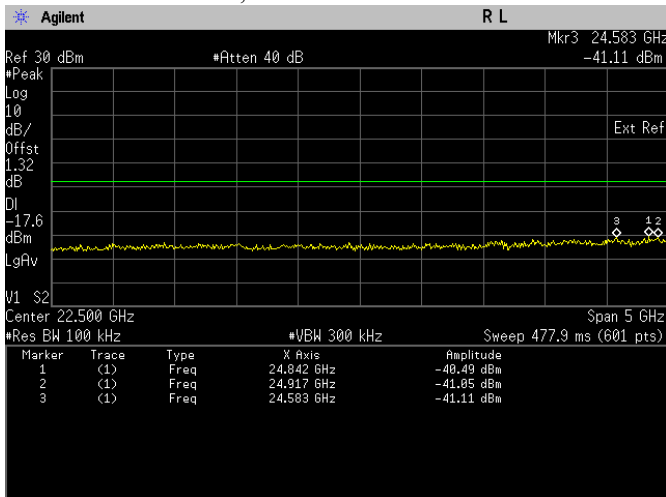
Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 5 GHz -> 10 GHz



Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 10 GHz -> 15 GHz

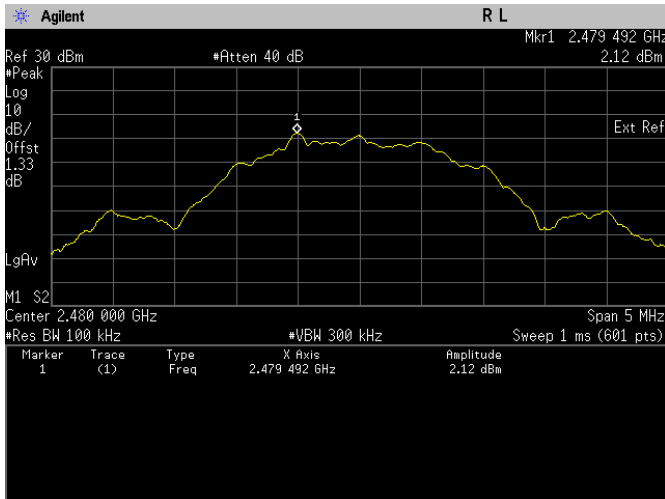


Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 15 GHz -> 20 GHz

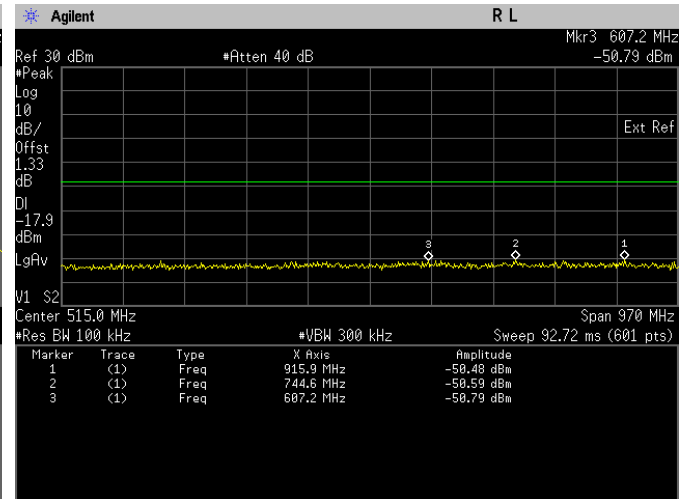


Conducted Emissions(Peak). Bluetooth LE, Frequency 2440 MHz Emission Level, 20 GHz -> 25 GHz

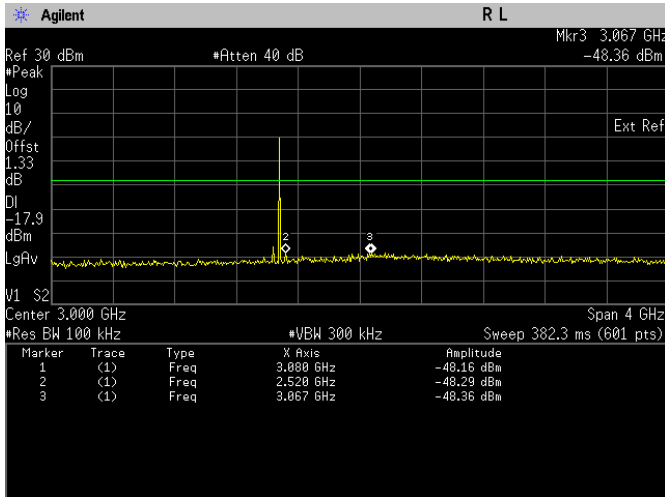




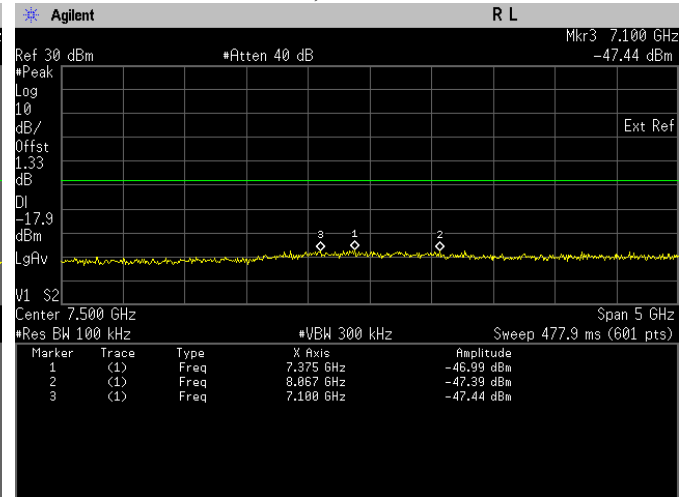
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Reference Level



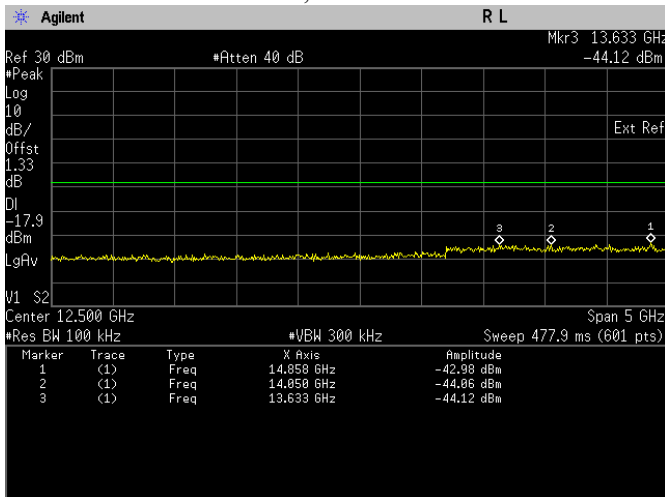
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 30 MHz -> 1 GHz



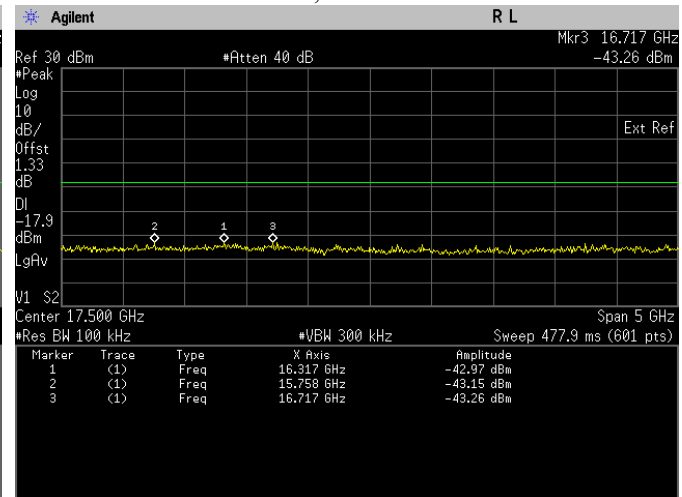
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 1 GHz -> 5 GHz



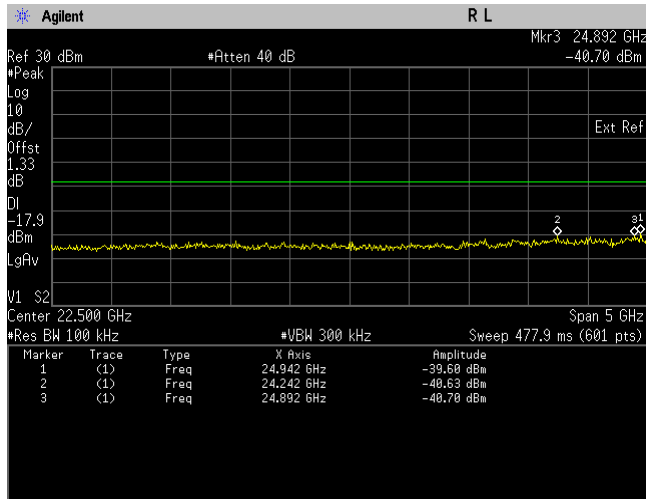
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 5 GHz -> 10 GHz



Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 10 GHz -> 15 GHz



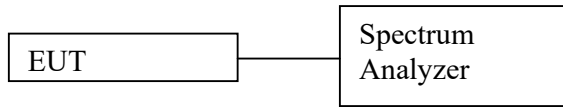
Conducted Emissions(Peak). Bluetooth LE, Frequency 2480 MHz Emission Level, 15 GHz -> 20 GHz



Conducted Emissions(Peak). Bluetooth LE, Frequency  
2480 MHz Emission Level, 20 GHz -> 25 GHz

## 6.5 Band edge Conducted Spurious Emission

### 6.5.1 Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
  - a. RBW = 100 kHz
  - b. VBW = 300 kHz
  - c. Detector mode = Peak
  - d. Trace = Max Hold
  - e. Sweep = auto
- e) Use the peak marker function to measure highest emission.

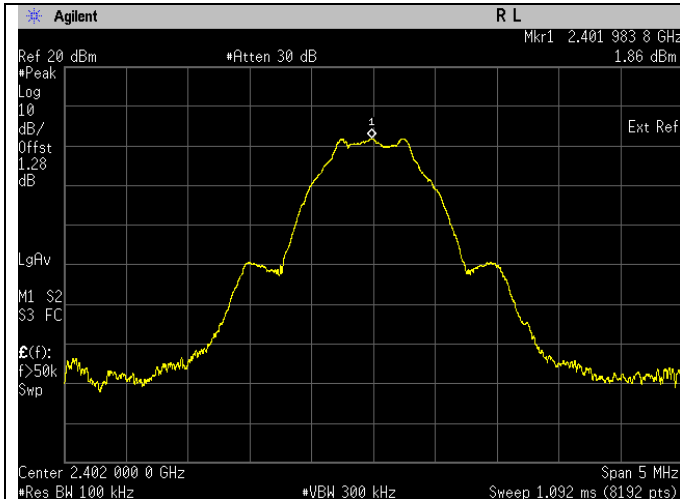
### 6.5.2 Test Limits:

<b>Normal Condition (25 ° C)</b>
<b>Shall be at least 20 dB below peak (max) power.</b>

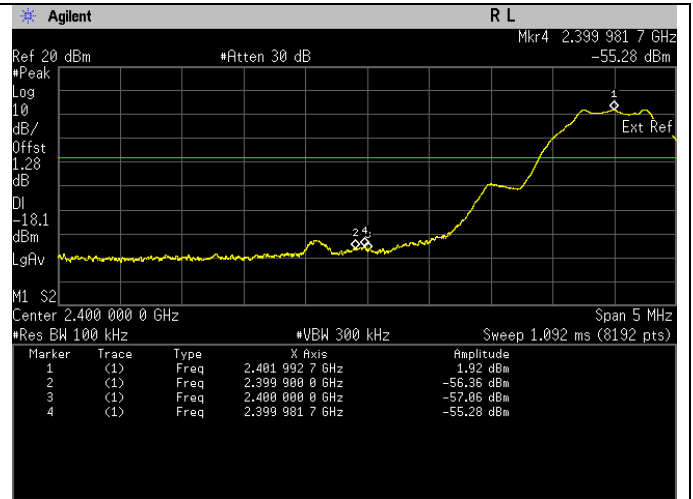
### 6.5.3 Test Result

#### BTLE 1M

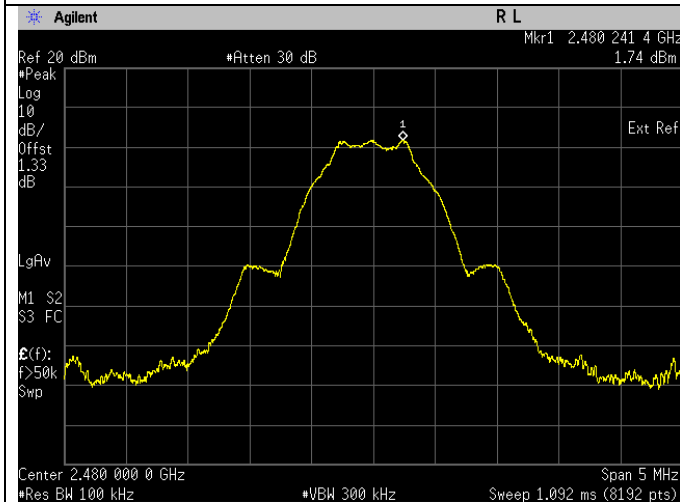
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
Bluetooth L.E	GFSK	2402	2399.98	-55.28	Pass
Bluetooth L.E	GFSK	2480	2483.54	-59.47	Pass



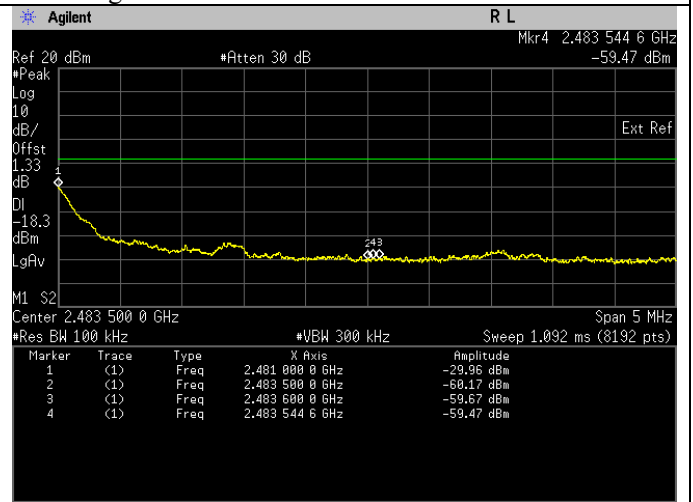
Band Edge(Peak). Bluetooth LE Frequency 2402 MHz  
 Reference Level



Band Edge(Peak). Bluetooth LE Frequency 2402 MHz  
 Band Edge



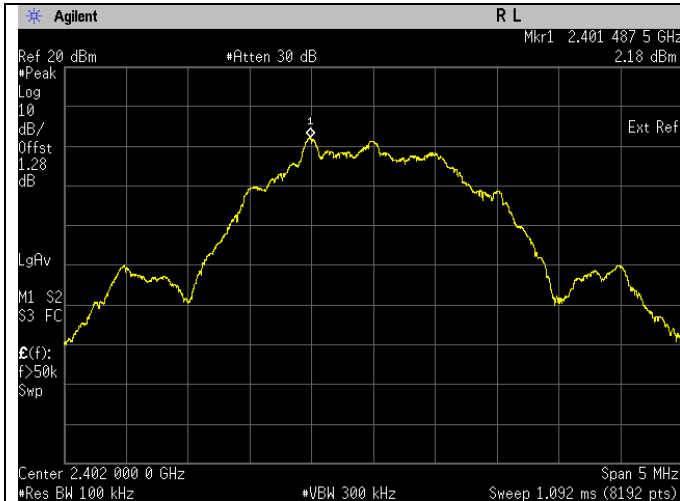
Band Edge(Peak). Bluetooth LE Frequency 2480 MHz  
 Reference Level



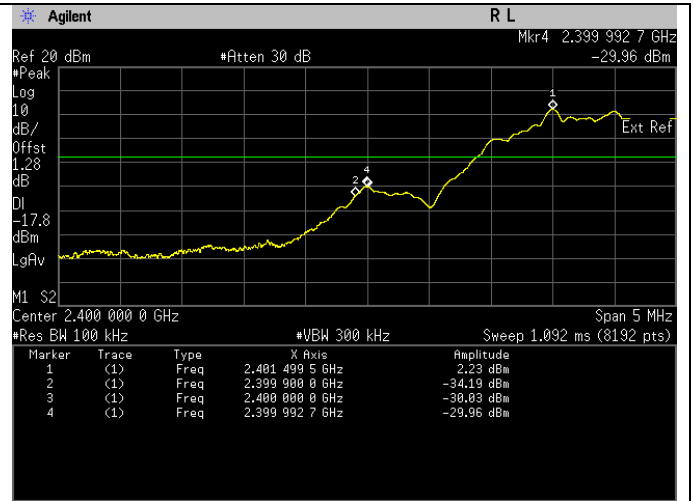
Band Edge(Peak). Bluetooth LE Frequency 2480 MHz  
 Band Edge

**BTLE 2M**

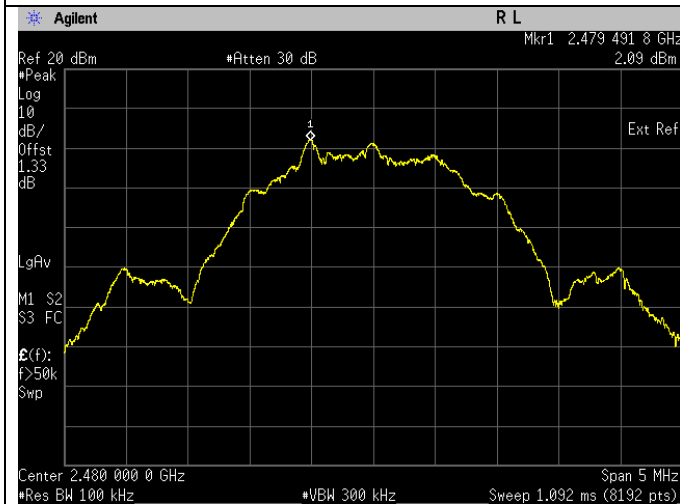
Test Conditions		Test Frequency	Results		
Standard	Modulation Type	Tx (MHz)	Frequencies (MHz)	Power (dBm)	Status
Bluetooth L.E	GFSK	2402	2399.99	-29.96	Pass
Bluetooth L.E	GFSK	2480	2483.50	-57.78	Pass



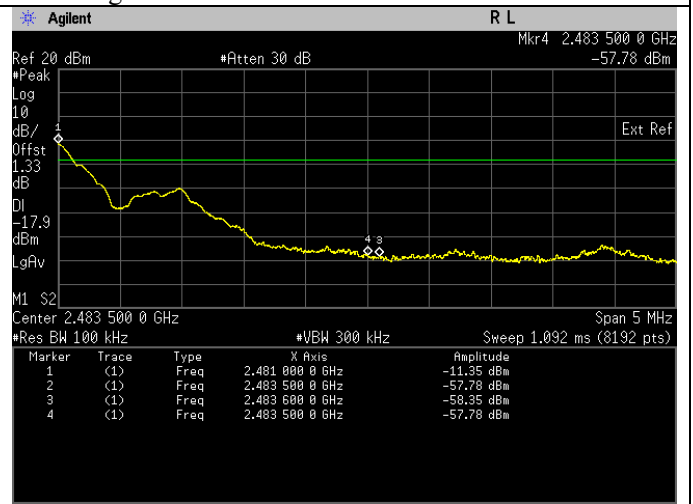
Band Edge(Peak). Bluetooth LE Frequency 2402 MHz  
 Reference Level



Band Edge(Peak). Bluetooth LE Frequency 2402 MHz  
 Band Edge



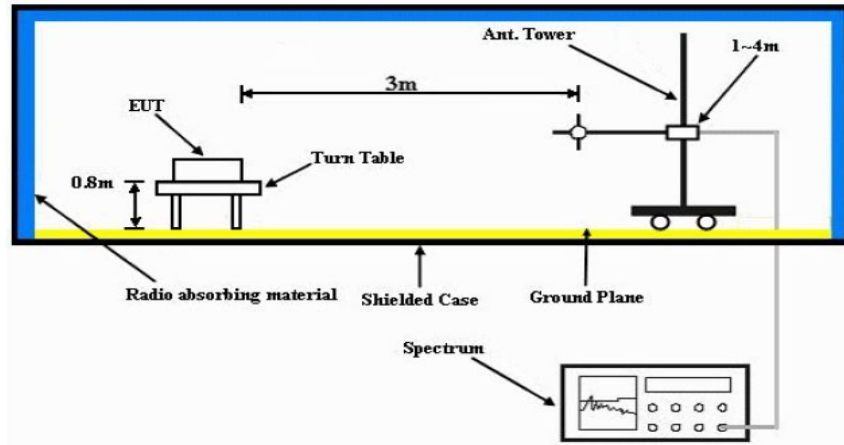
Band Edge(Peak). Bluetooth LE Frequency 2480 MHz  
 Reference Level



Band Edge(Peak). Bluetooth LE Frequency 2480 MHz  
 Band Edge

## 6.6 Radiated Emission within Restricted Bands

### 6.6.1 Test Setup



- The EUT is placed on the top of a rotating table 0.8m (<1GHz) or 1.5m (>1GHz) above the ground at a 3m semi-anechoic chamber. The table is rotated 360 degrees to determine the position of the highest radiation.
- The EUT is set 3m away from the interference-receiving antenna, which is mounted on the top of a variable-height antenna tower.
- The antenna is Bilog/Horn antenna depend on which frequency range uses, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT is arranged to its worst case and then the antenna is tuned to heights from 1m to 4m and the rotatable table is turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system is set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode is fall within the range of 10dB from the limit specified, the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. Otherwise, the testing could be stopped and the peak values of the EUT would be reported.

#### NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1 GHz.
- All modes of operation were investigated and the worst-case emissions are reported.

### 6.6.2 Test Limits:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power.

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

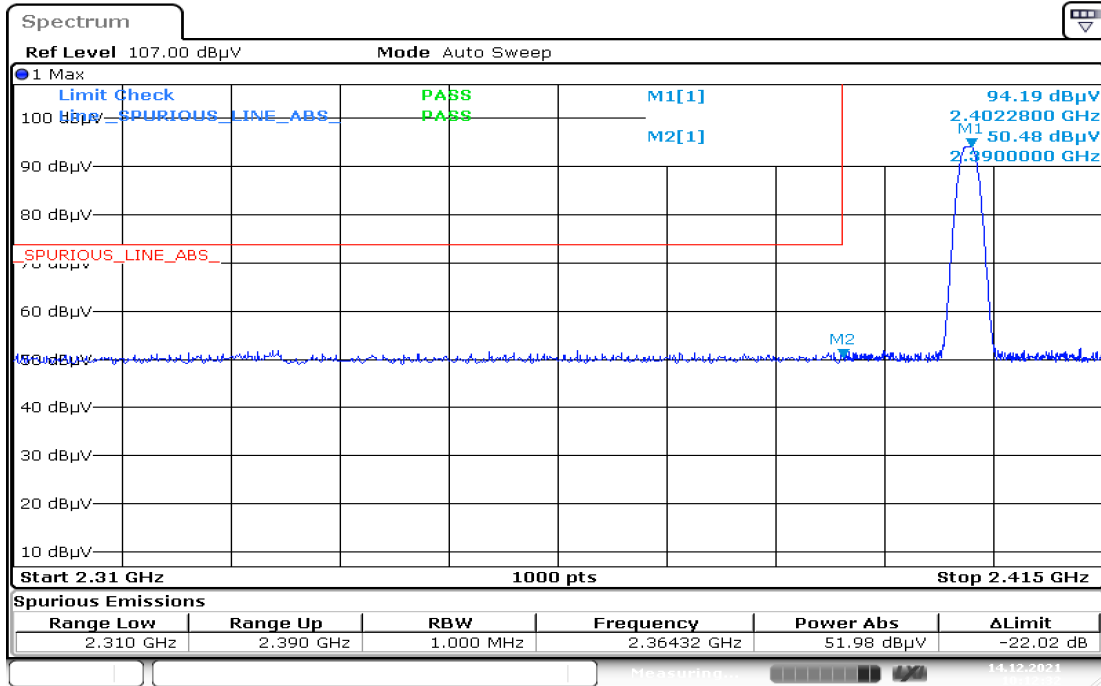
**NOTE:**

- 1) The lower limit shall apply at the transition frequencies.
- 2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3) For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



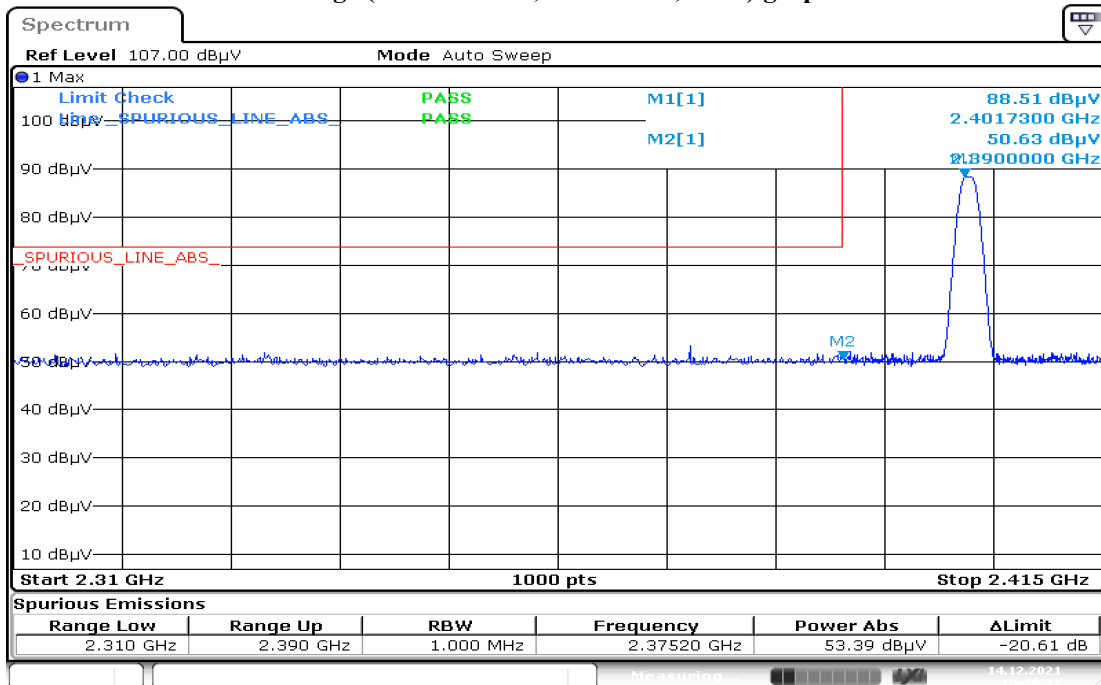


**Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot**



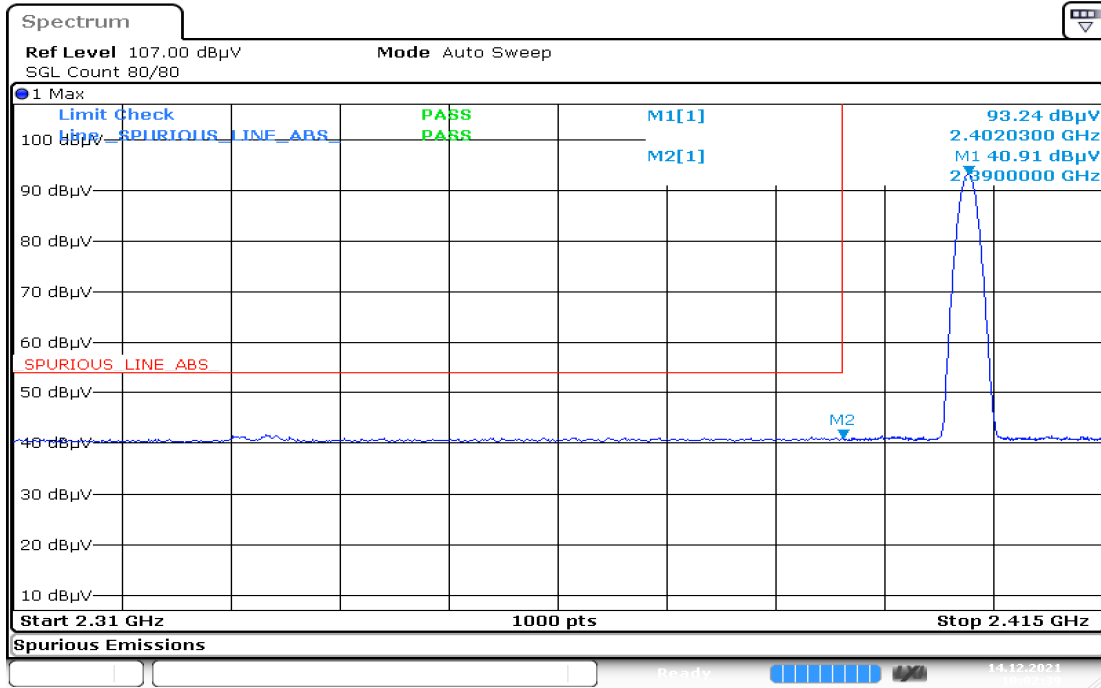
Date: 14.DEC.2021 10:12:32

**Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot**



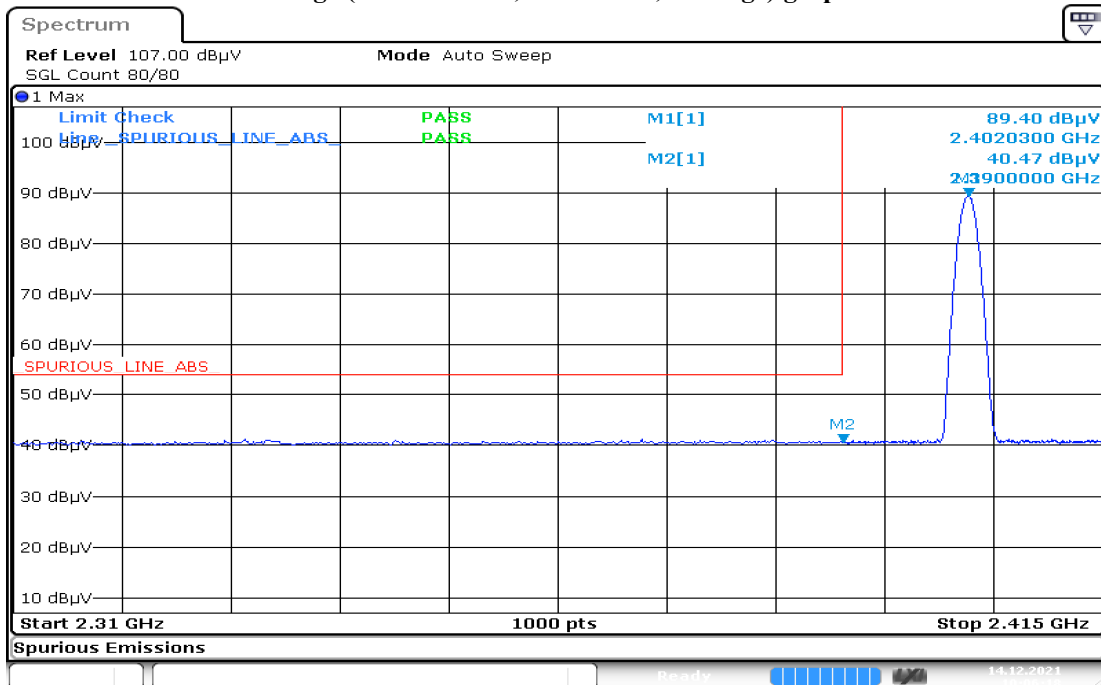
Date: 14.DEC.2021 10:16:32

**Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot**



Date: 14.DEC.2021 10:02:40

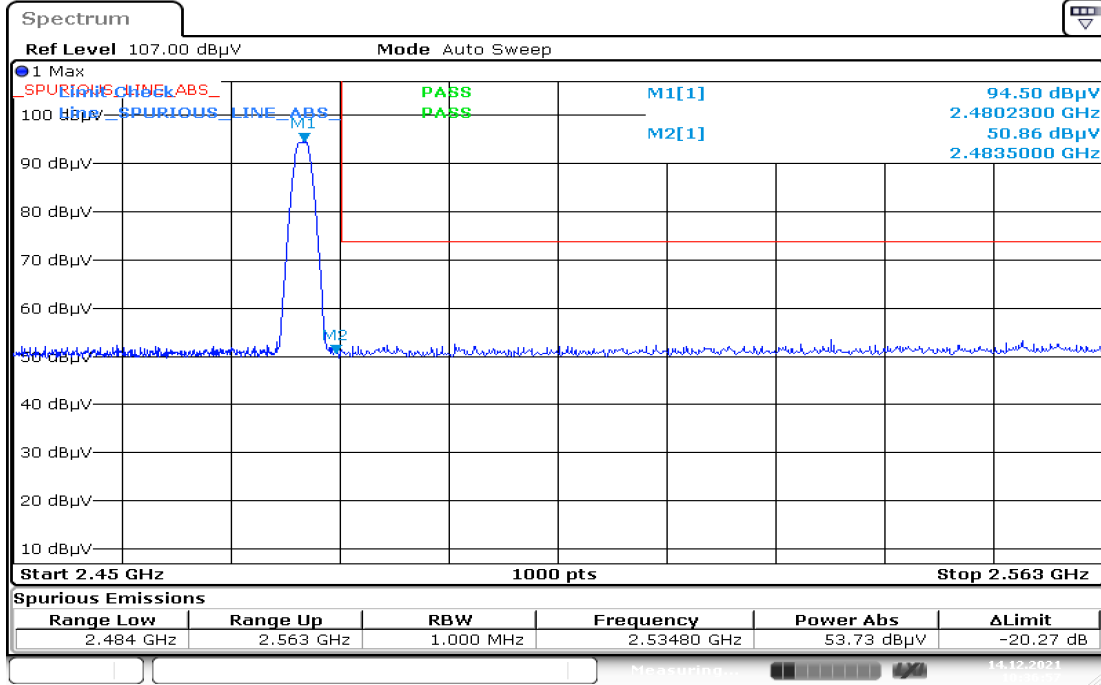
**Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot**



Date: 14.DEC.2021 10:06:19

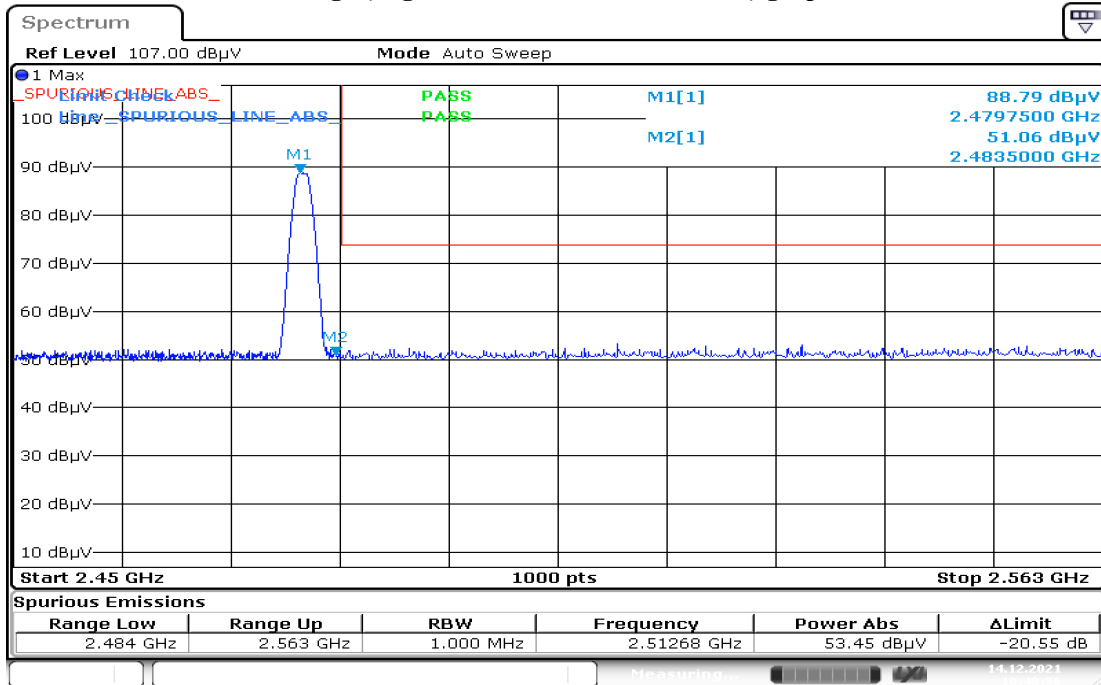


**Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot**



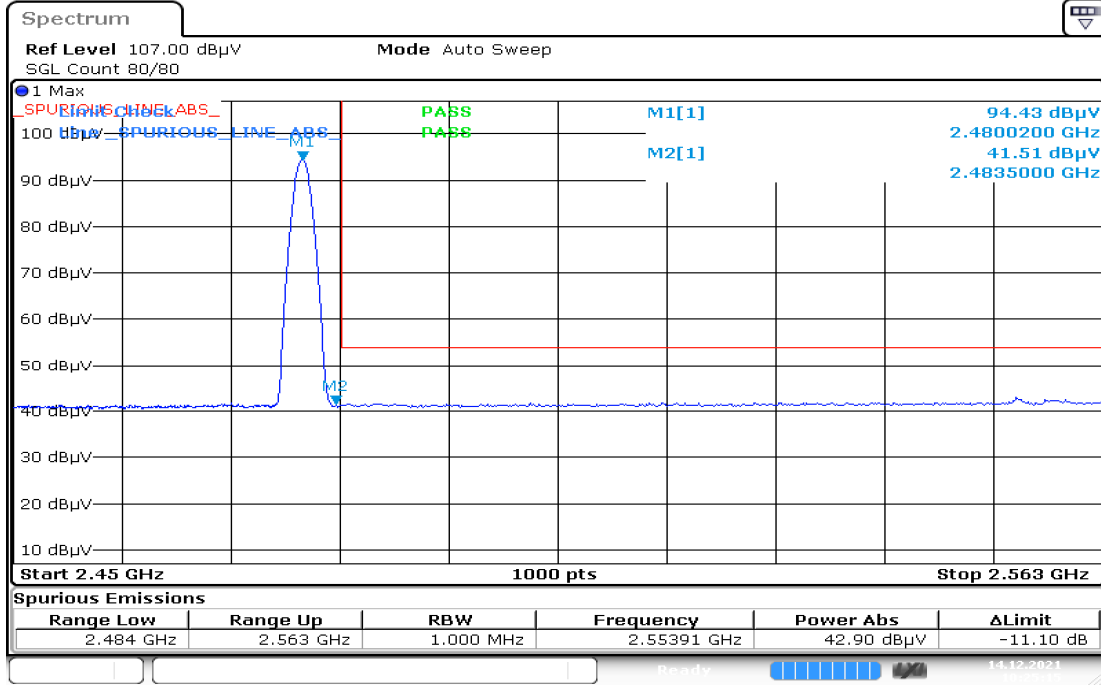
Date: 14.DEC.2021 10:36:57

**Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot**



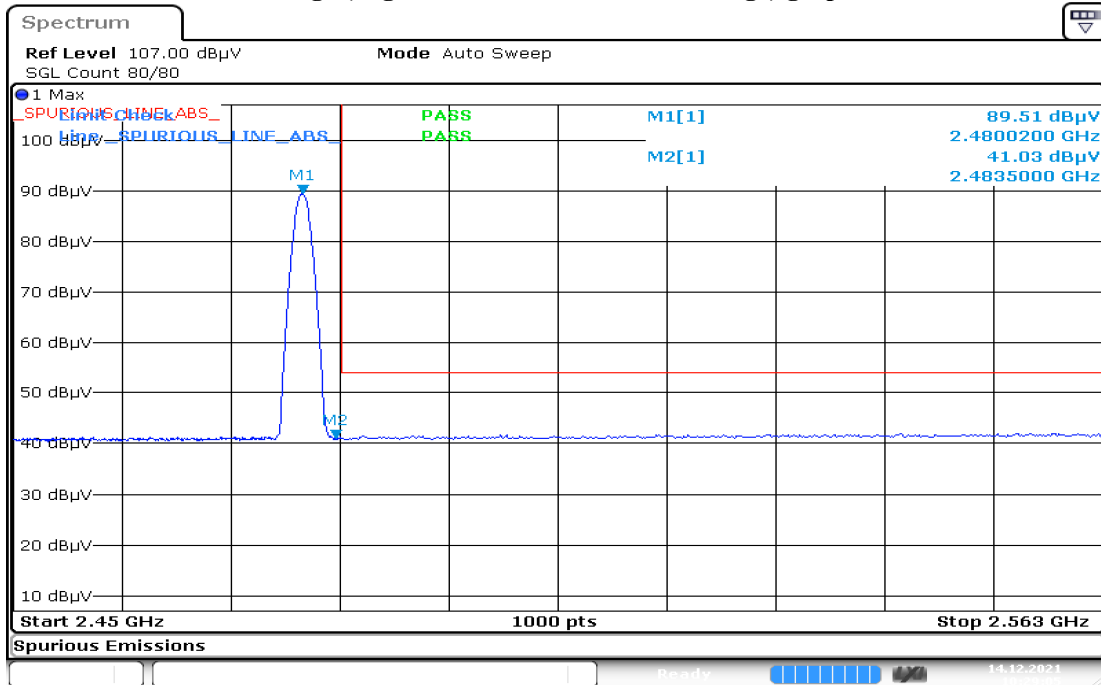
Date: 14.DEC.2021 10:40:56

**Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot**



Date: 14.DEC.2021 10:25:15

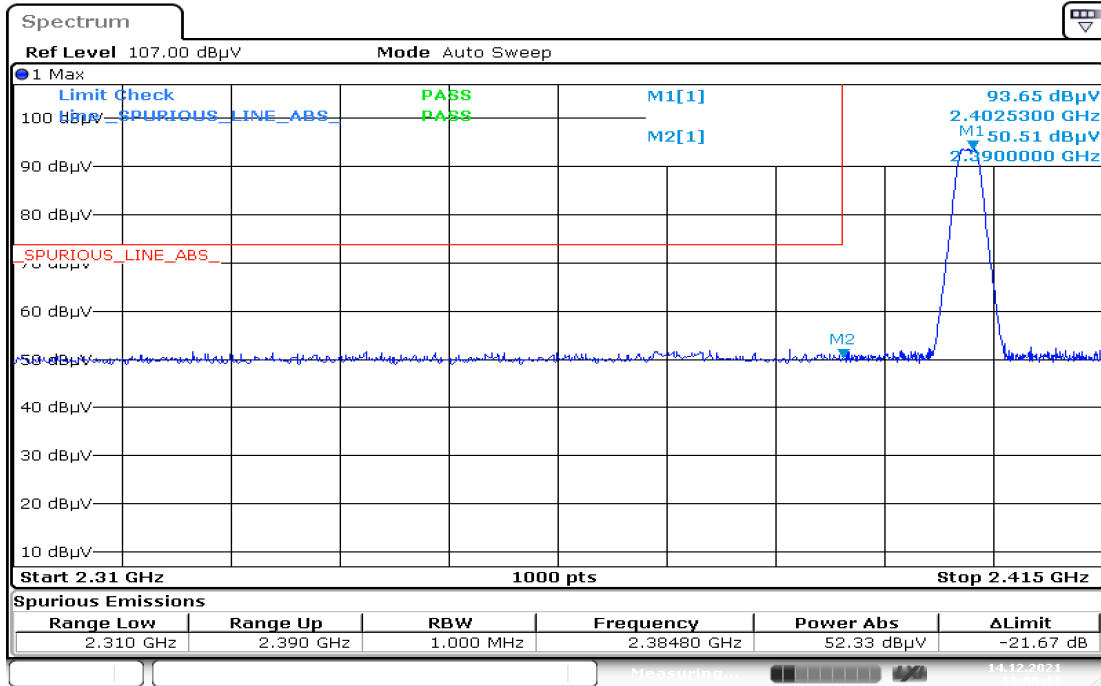
**Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot**



Date: 14.DEC.2021 10:29:05

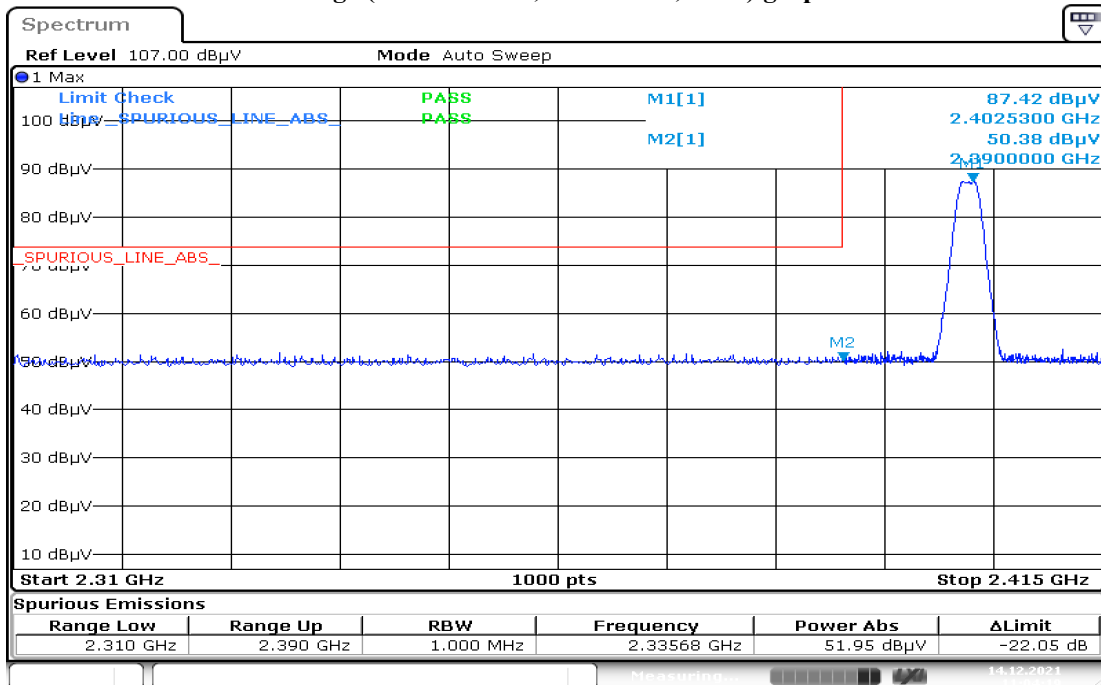


**Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot**



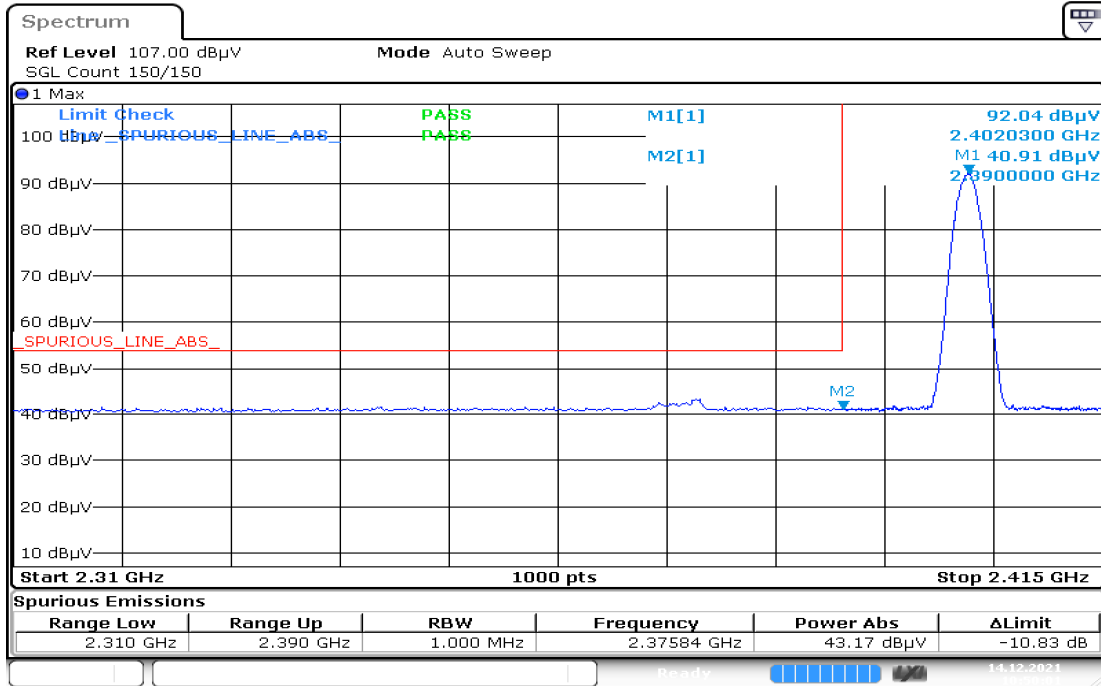
Date: 14.DEC.2021 11:00:12

**Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot**



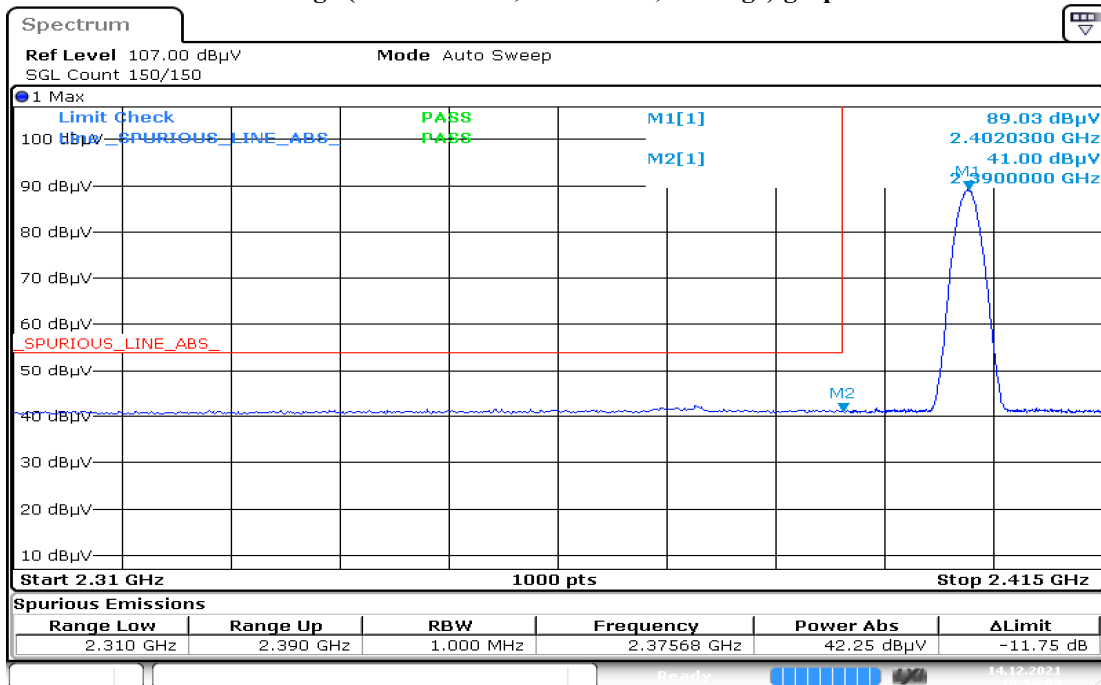
Date: 14.DEC.2021 11:04:19

**Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot**



Date: 14.DEC.2021 10:50:01

**Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot**

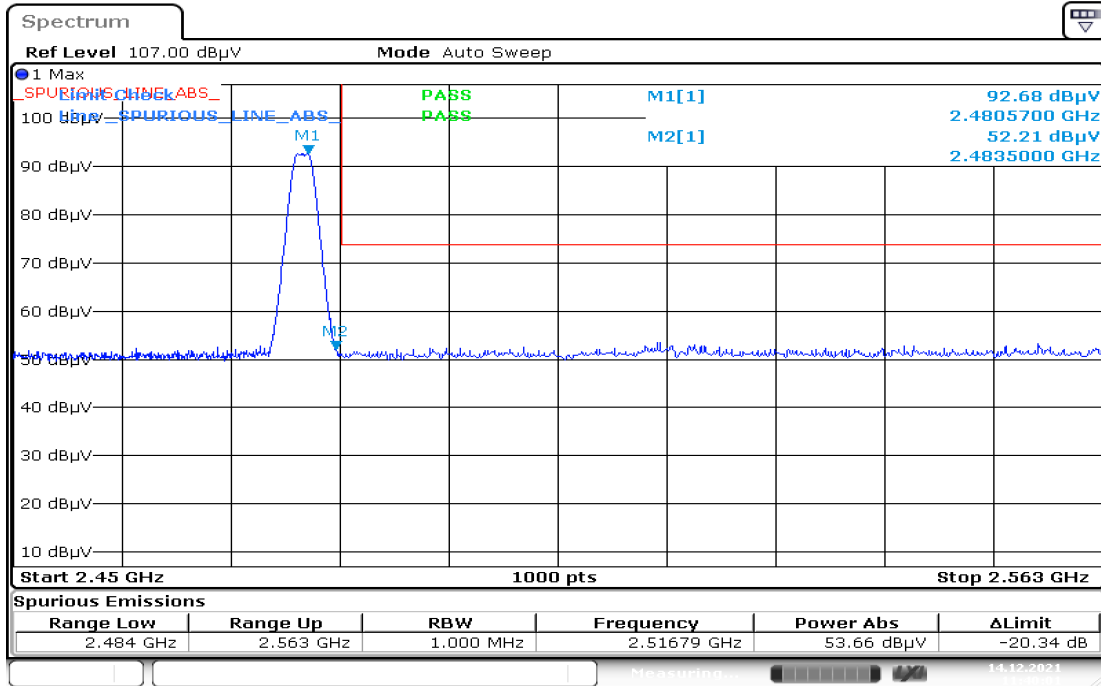


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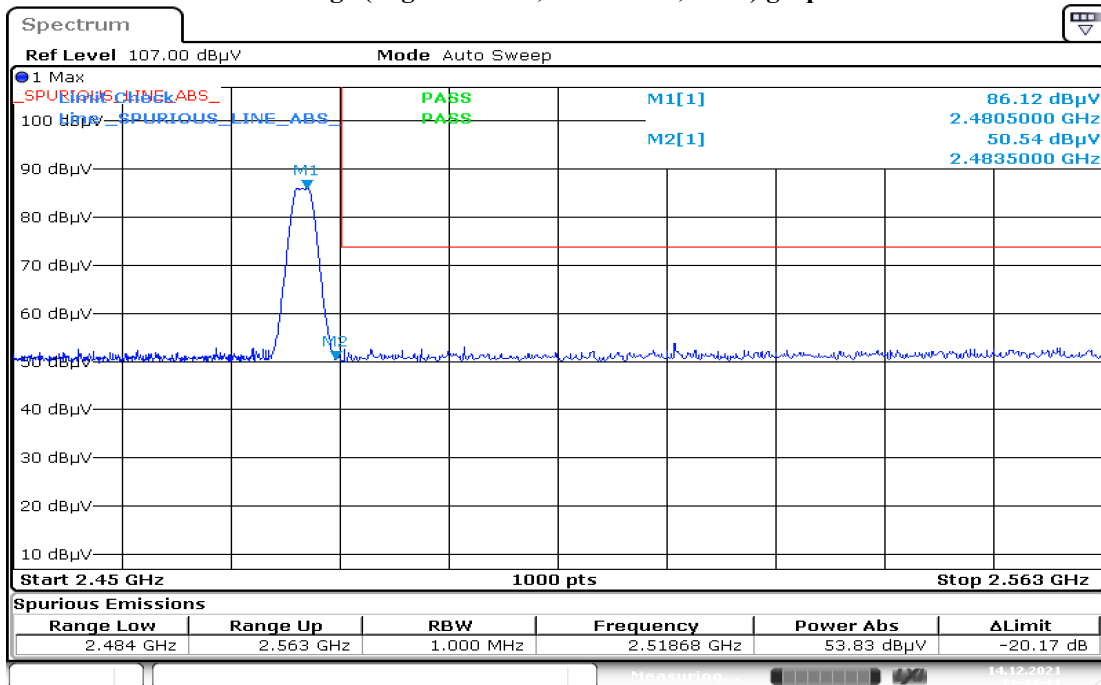


**Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot**



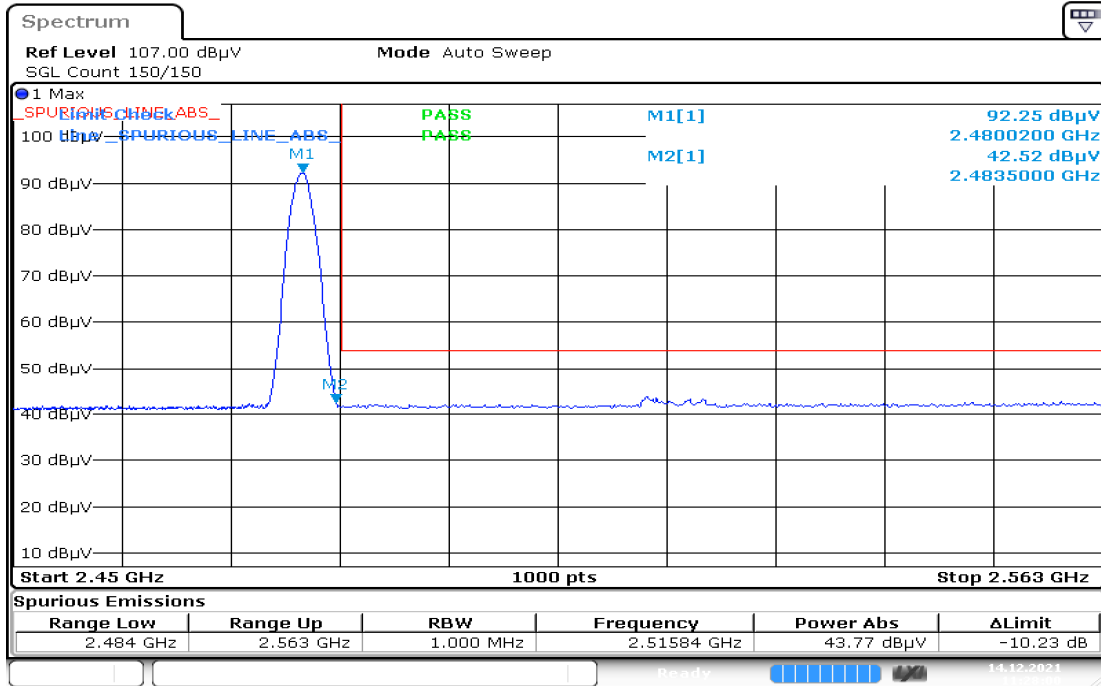
Date: 14.DEC.2021 11:40:01

**Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot**



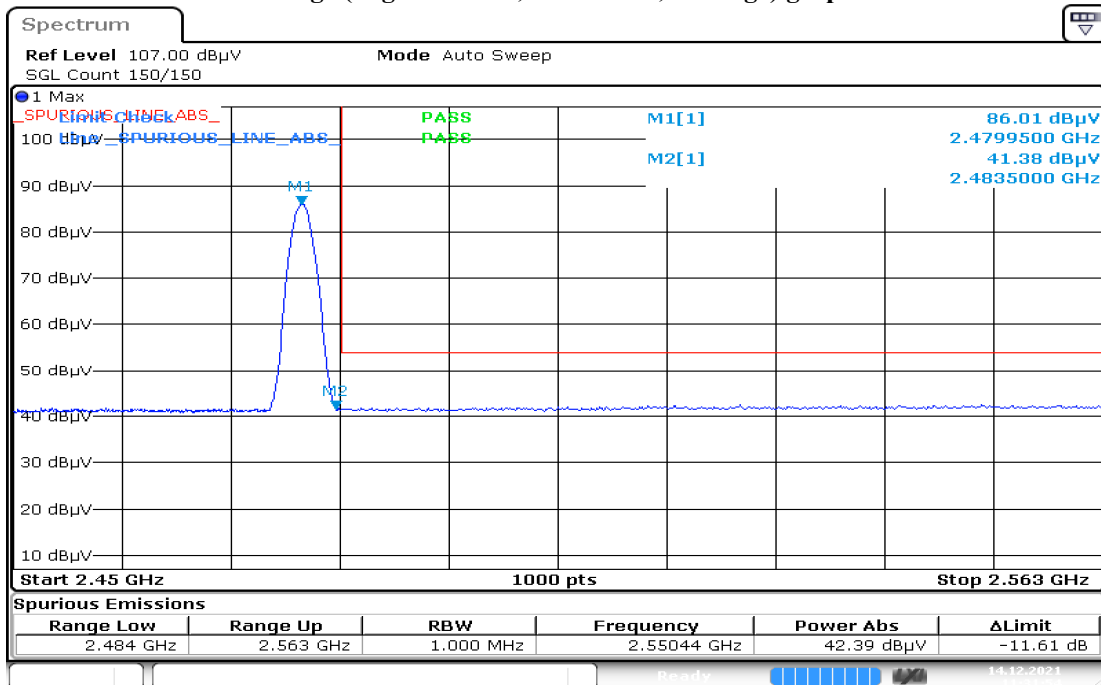
Date: 14.DEC.2021 11:44:11

**Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot**



Date: 14.DEC.2021 11:28:01

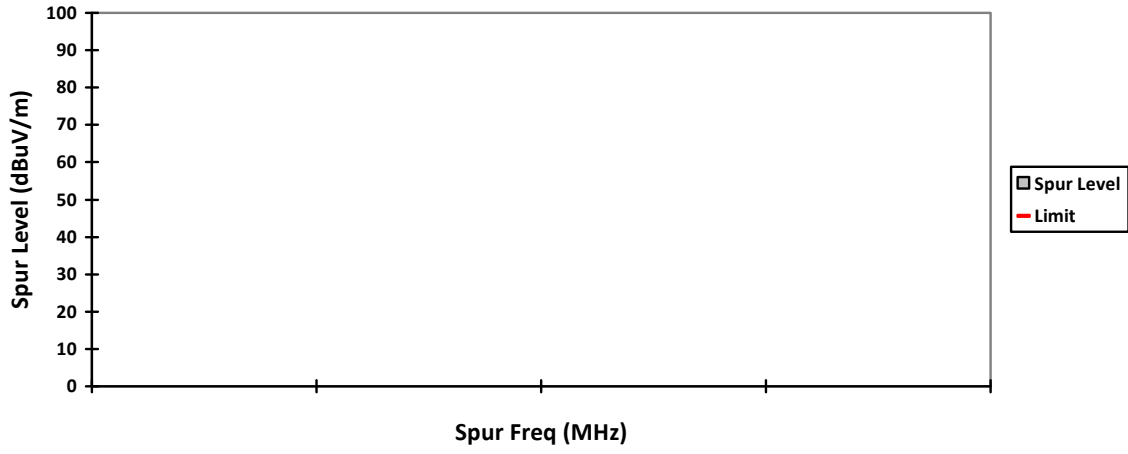
**Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot**



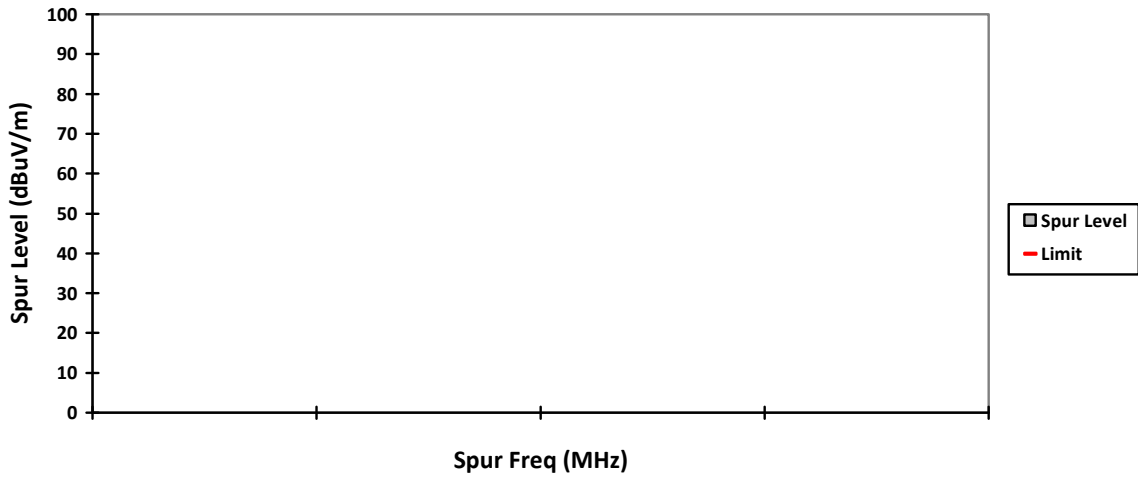
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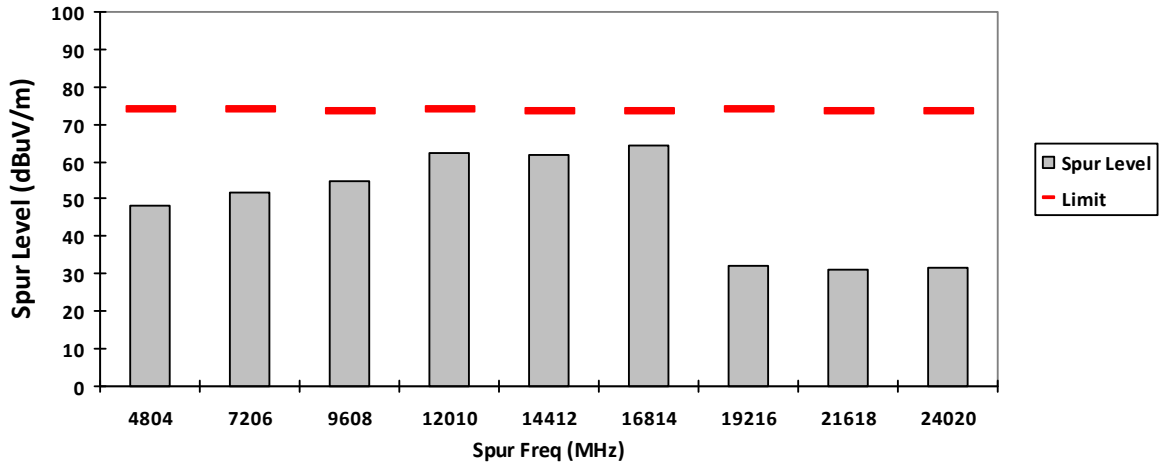
### VERTICAL, QPK



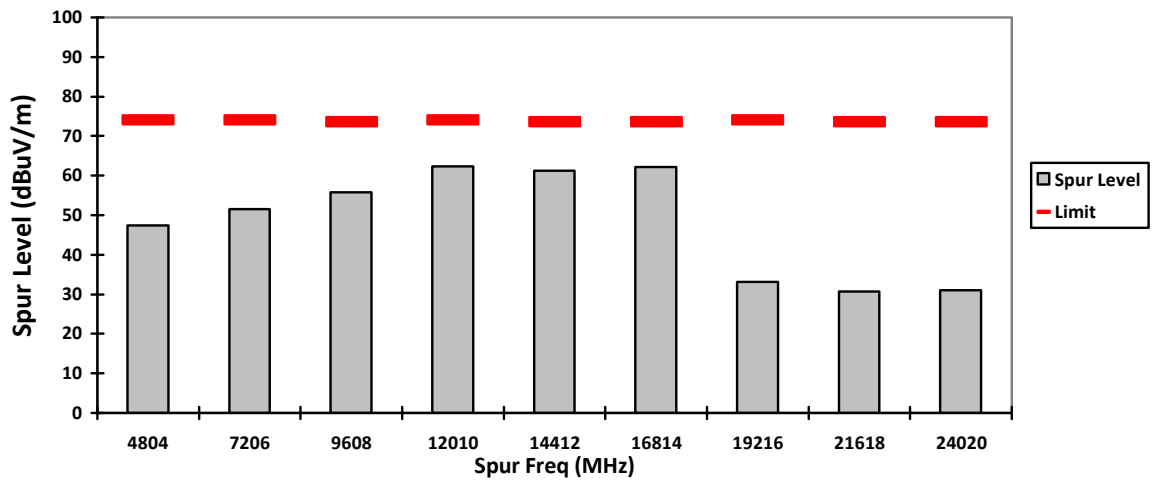
### HORIZONTAL, QPK



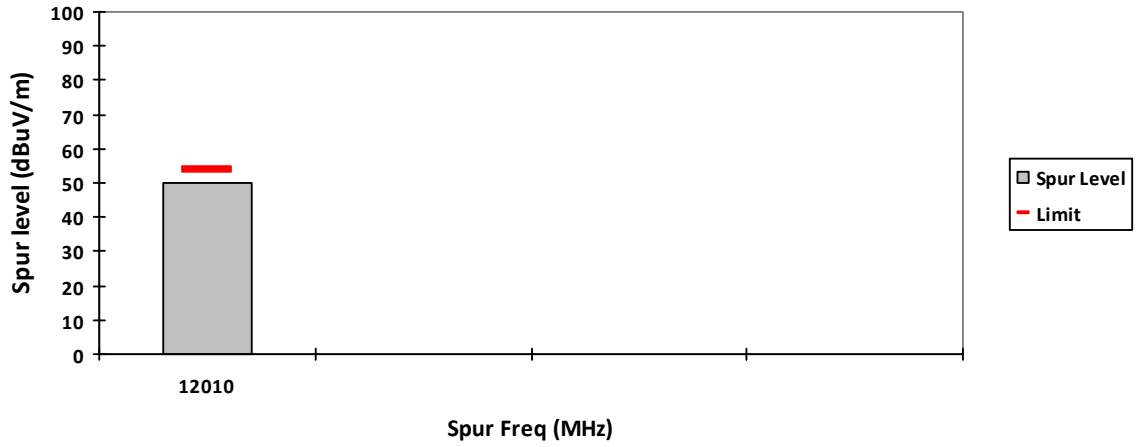
**VERTICAL, PK**



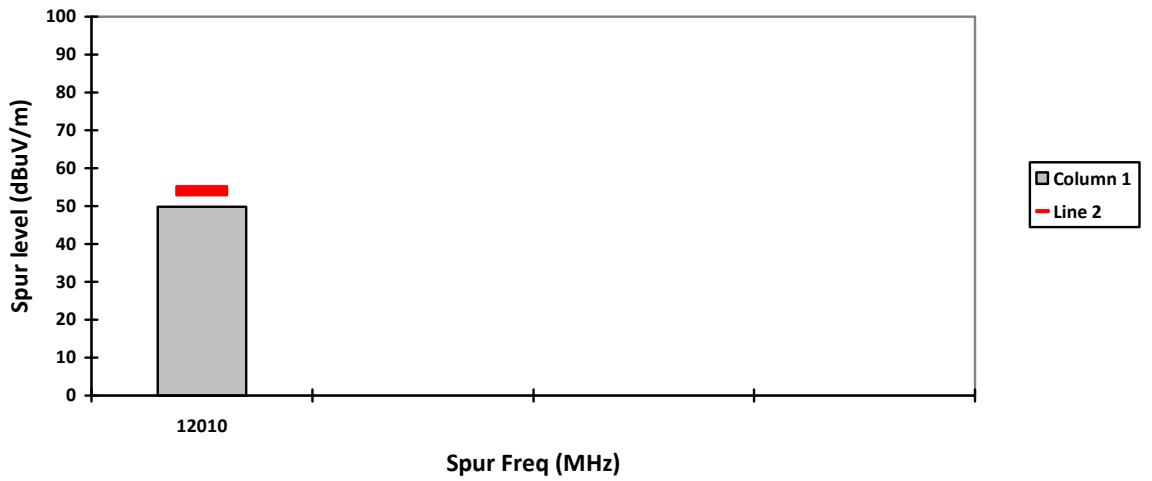
**HORIZONTAL, PK**



VERTICAL, AV



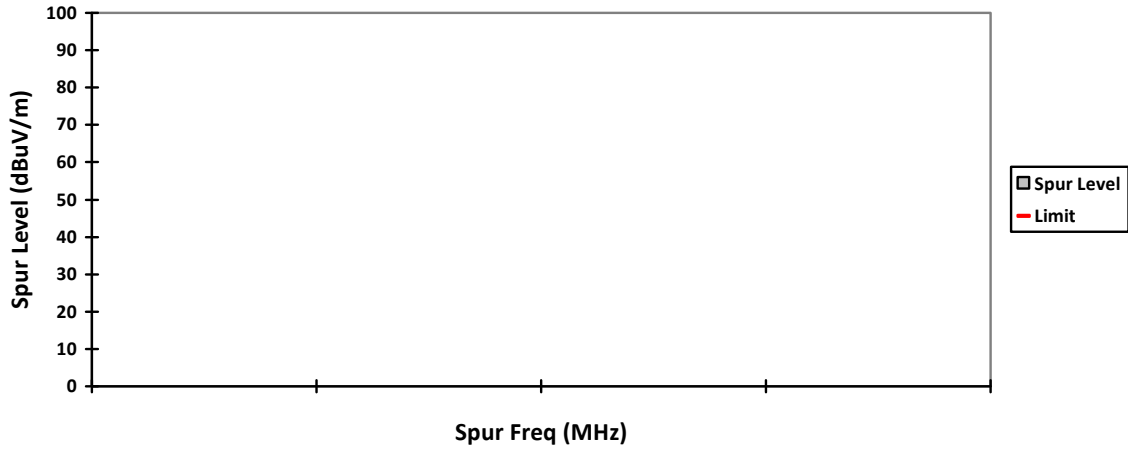
HORIZONTAL, AV



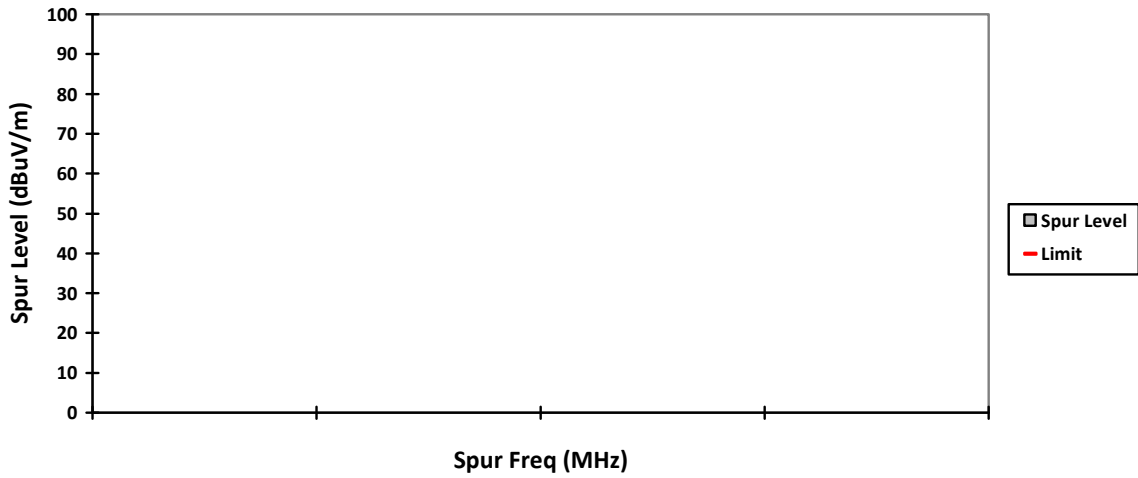




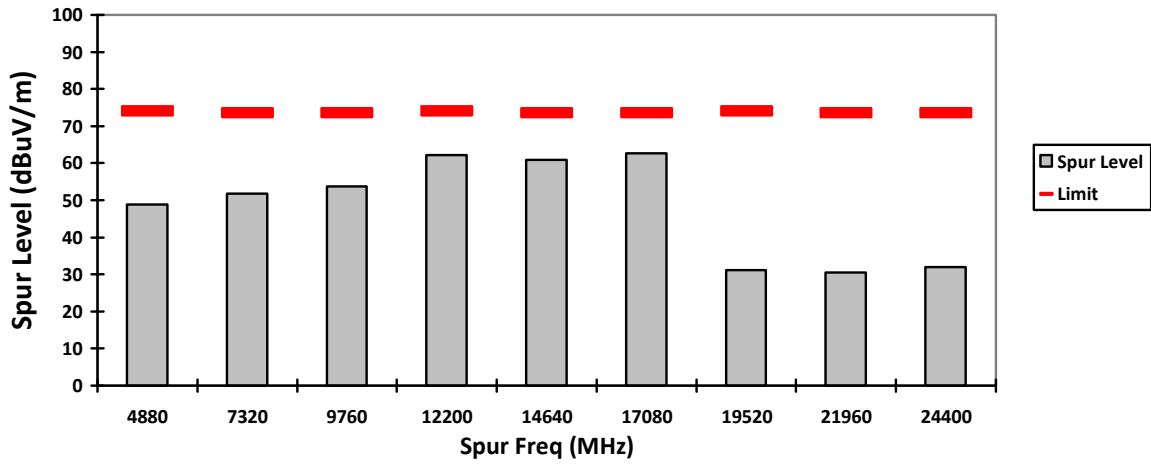
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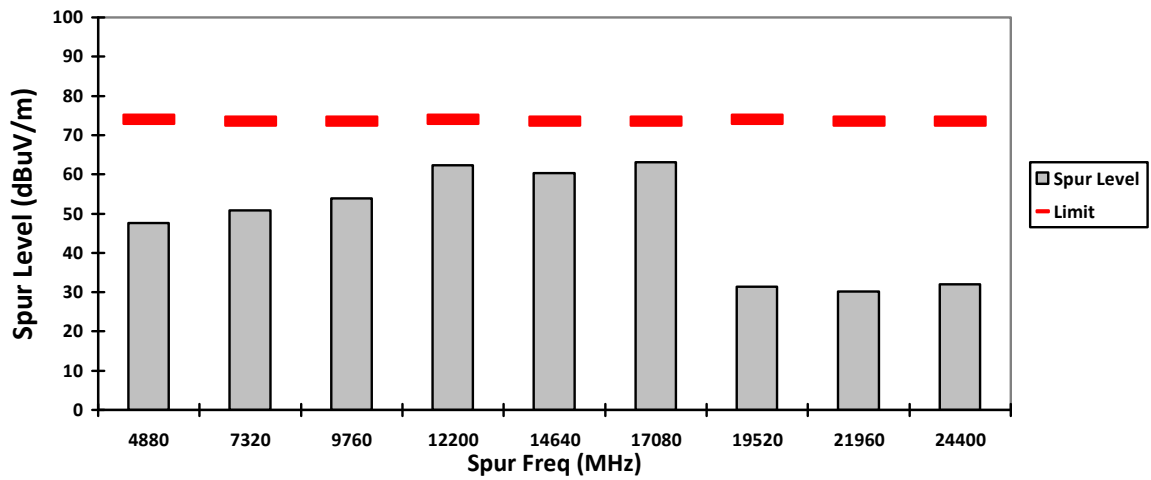
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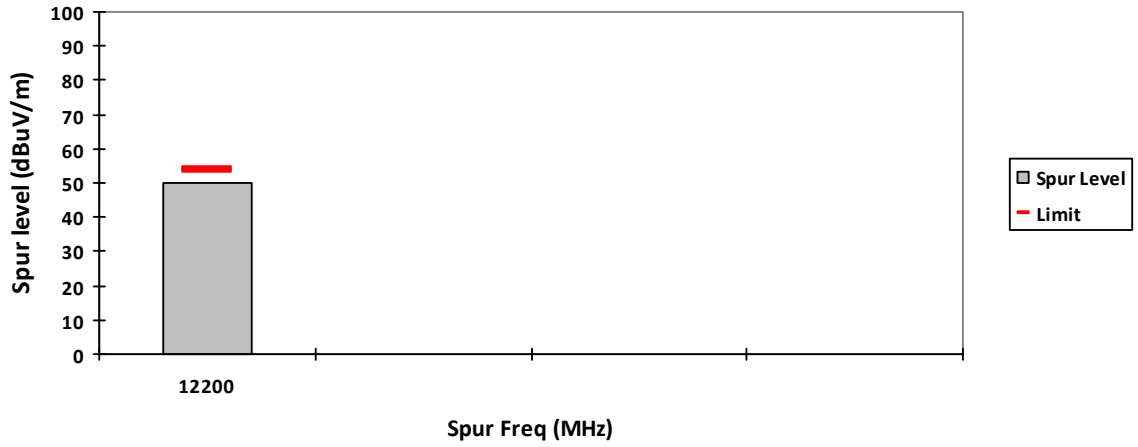
VERTICAL, PK



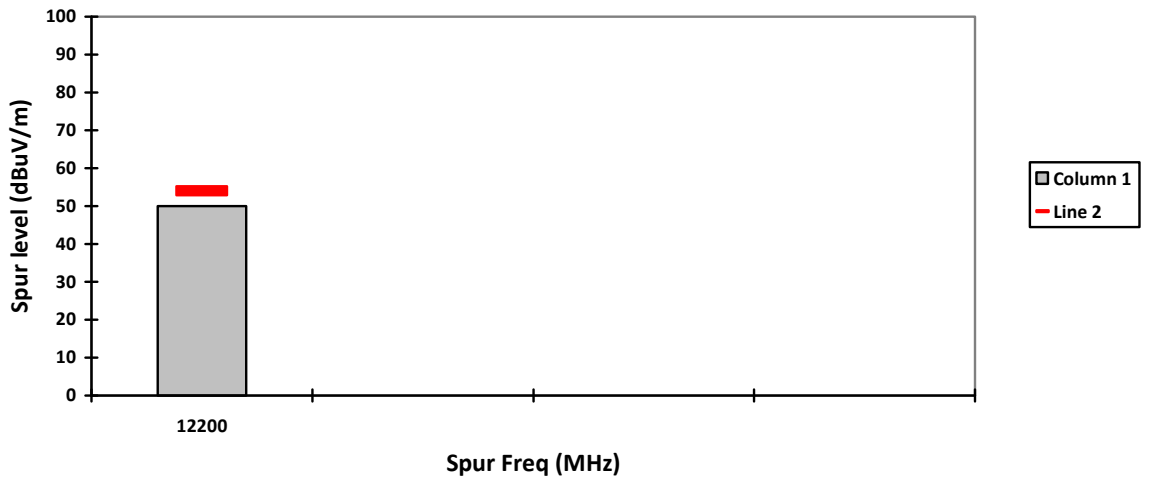
HORIZONTAL, PK



### VERTICAL, AV

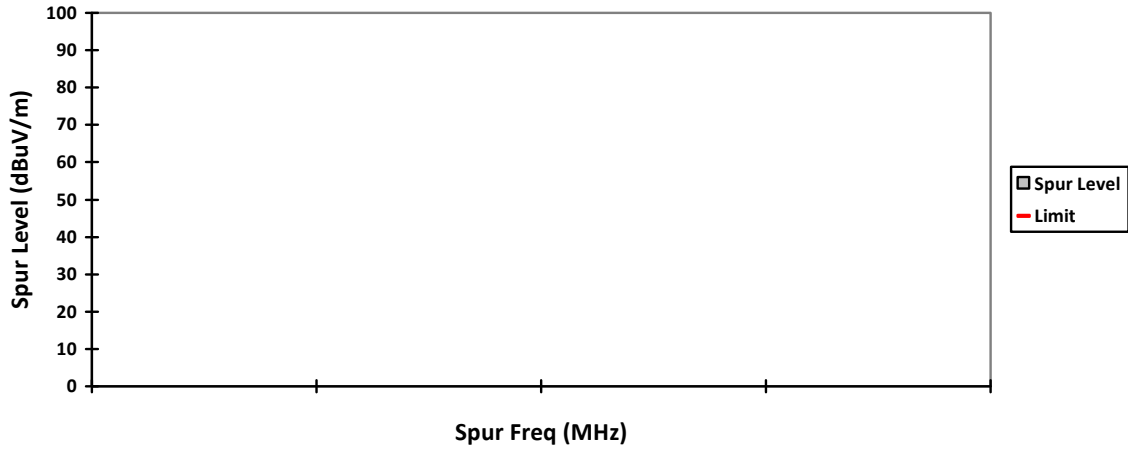


### HORIZONTAL, AV

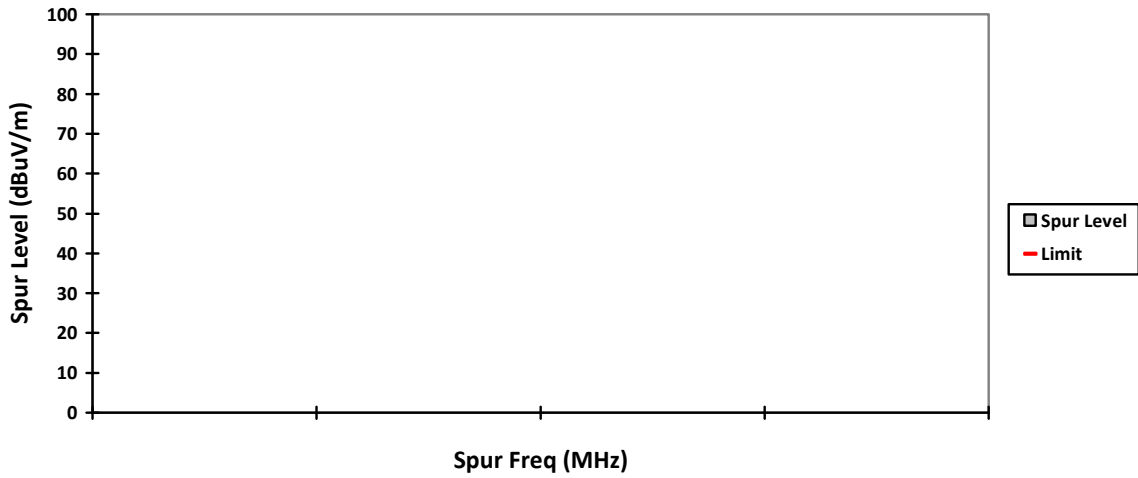




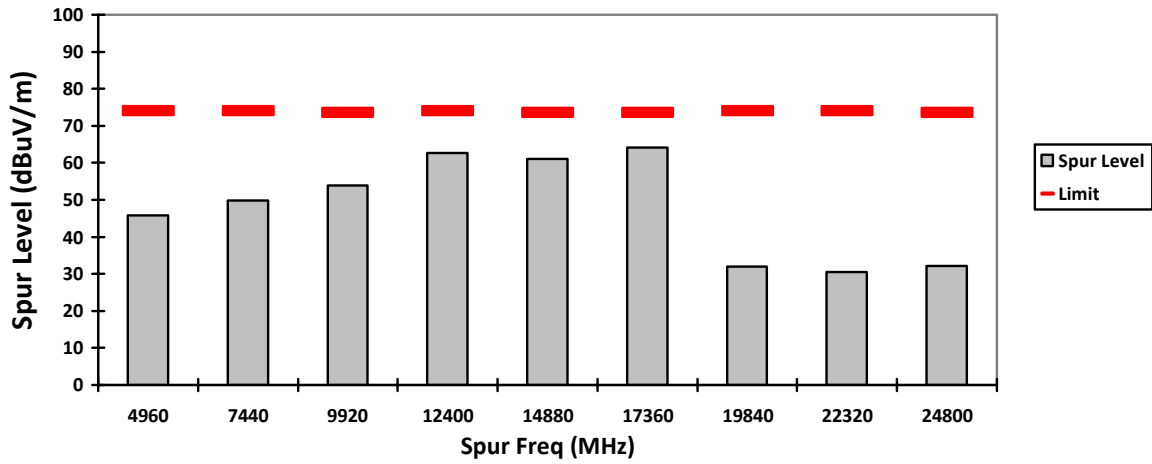
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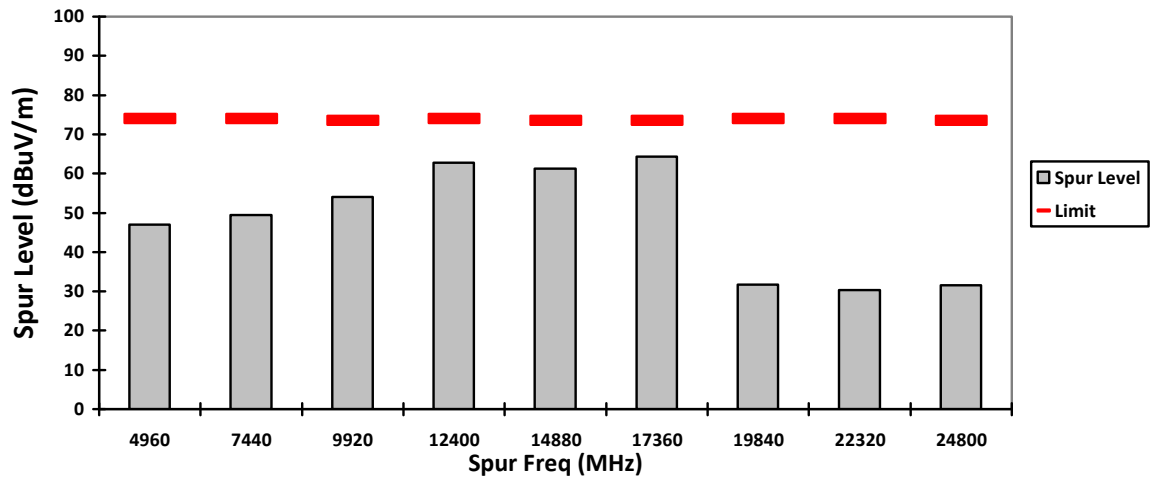
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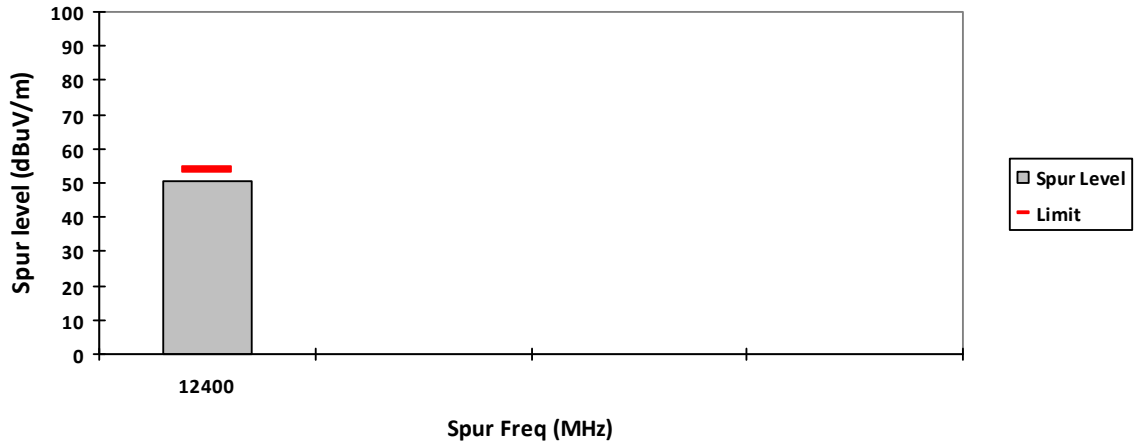
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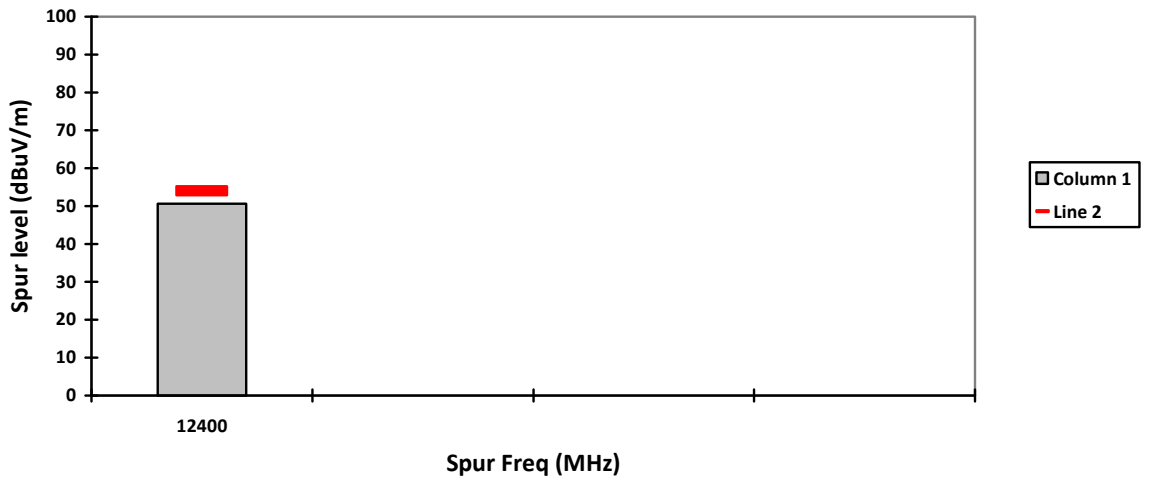
HORIZONTAL, PK



VERTICAL, AV



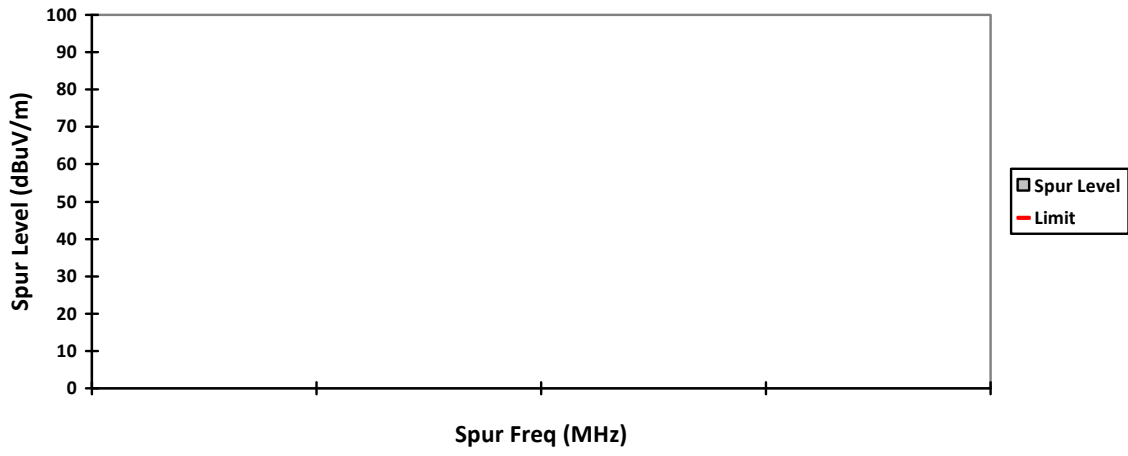
HORIZONTAL, AV



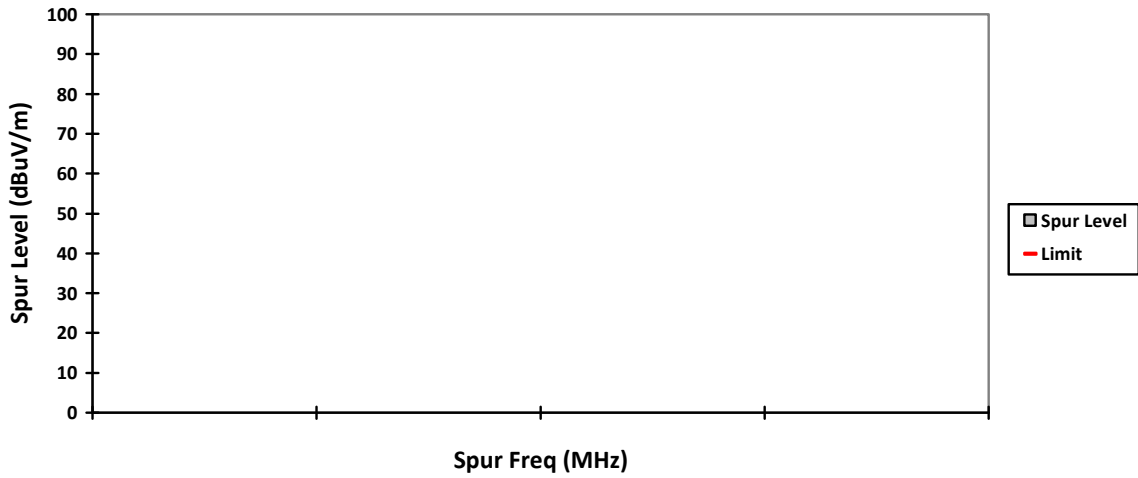




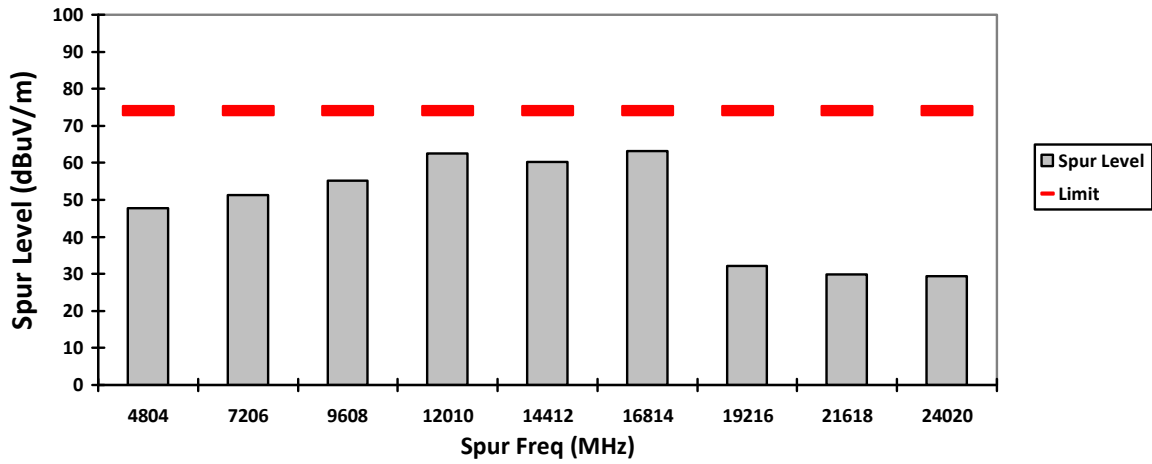
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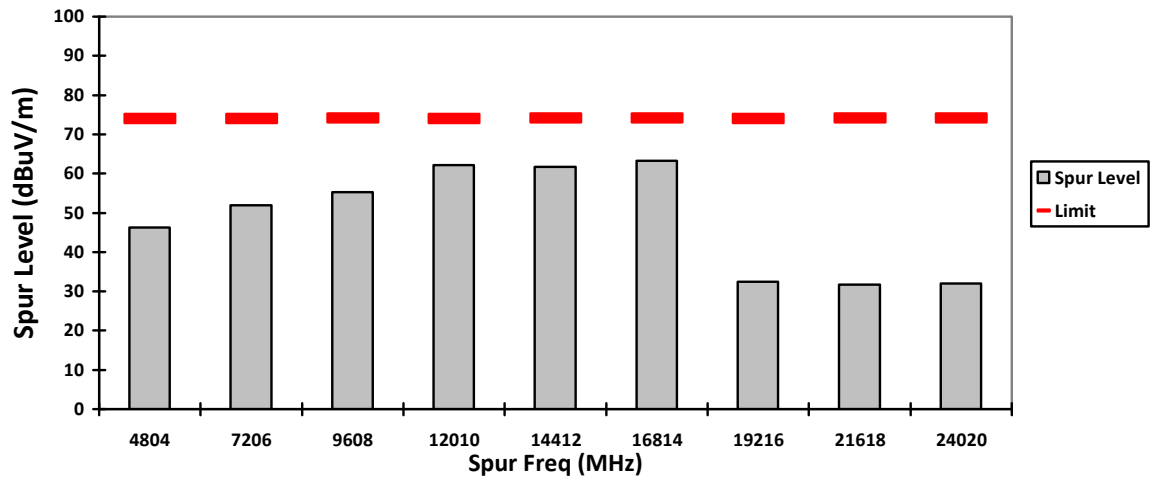
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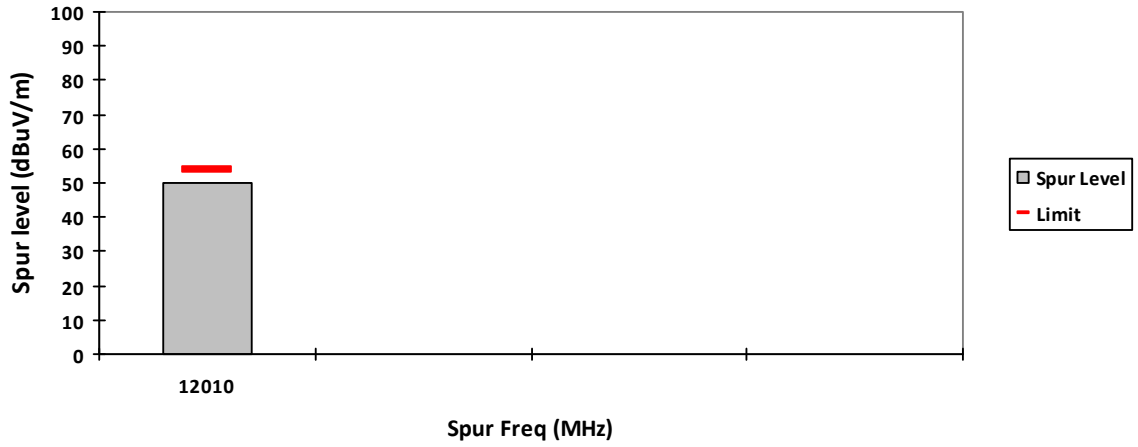
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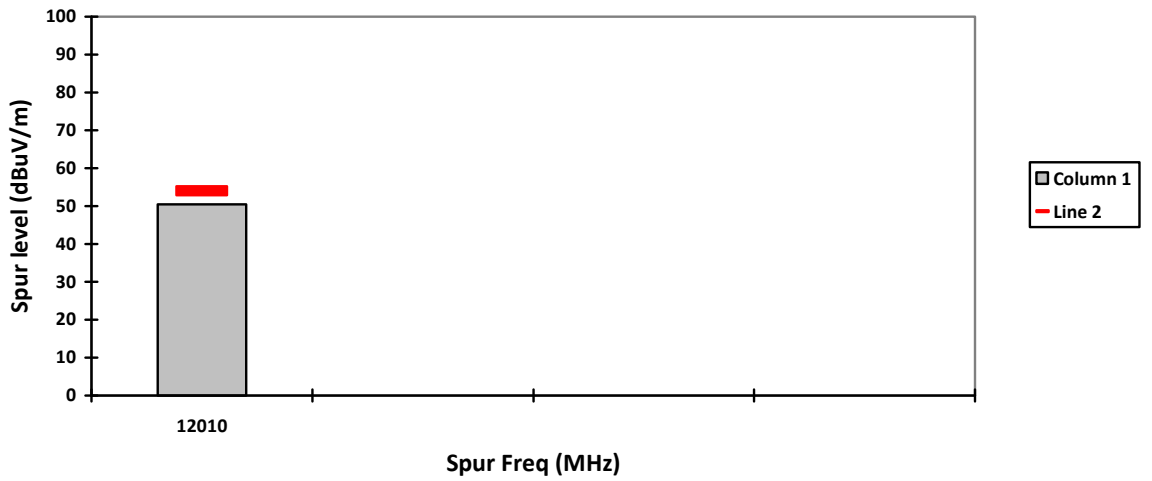
HORIZONTAL, PK



### VERTICAL, AV

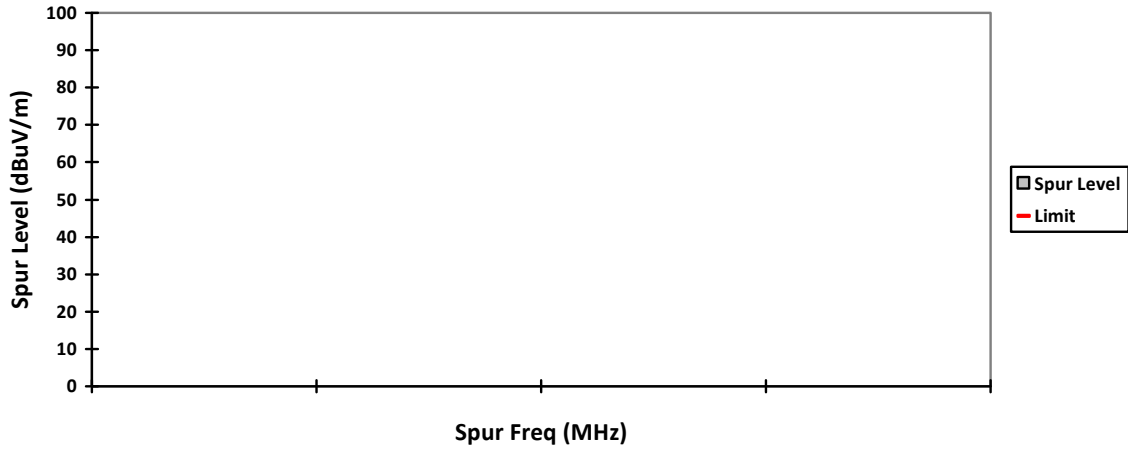


### HORIZONTAL, AV

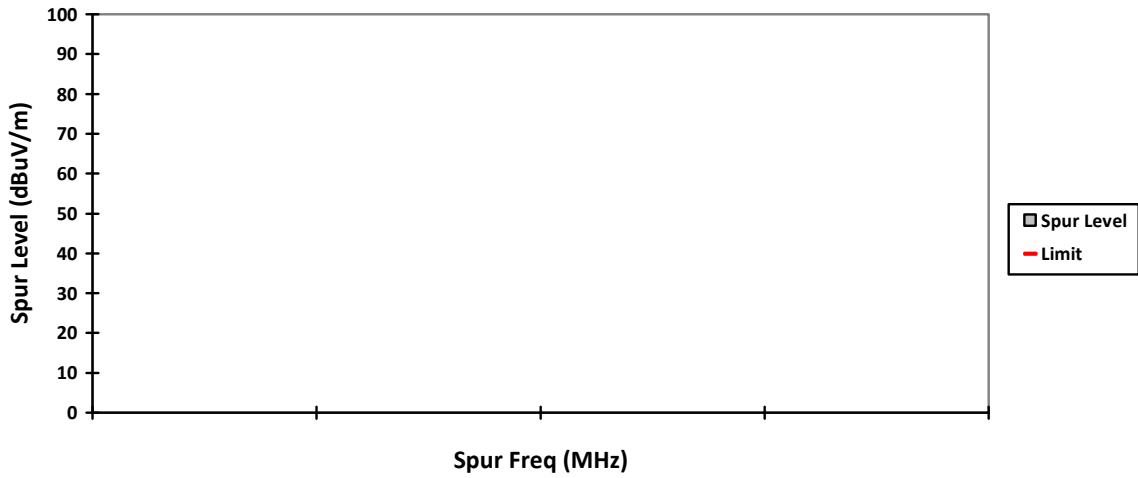




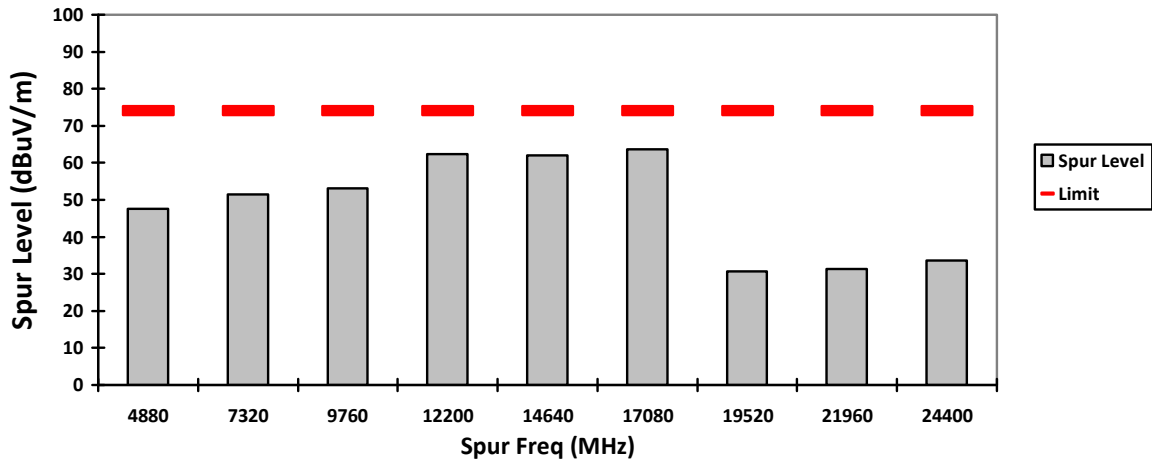
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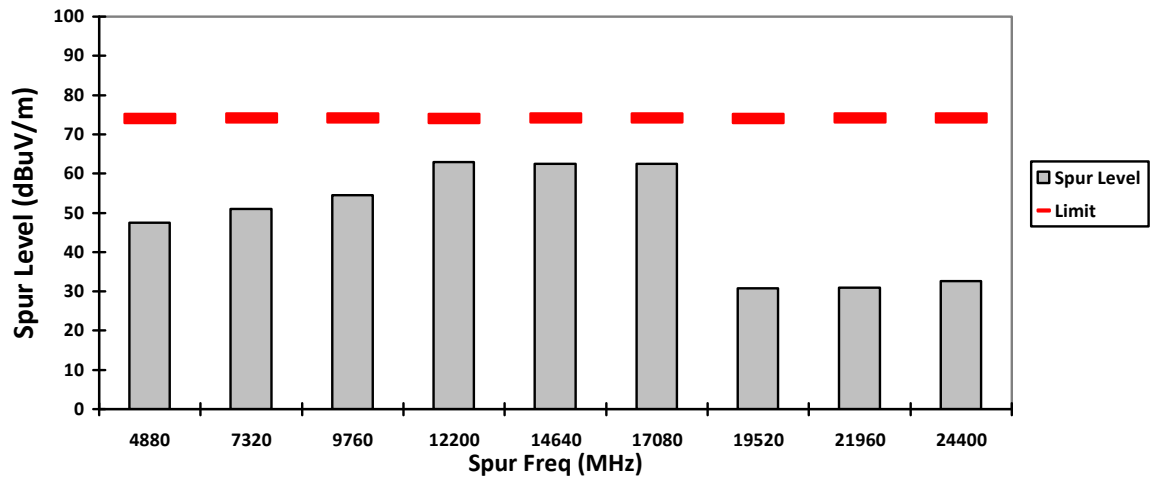
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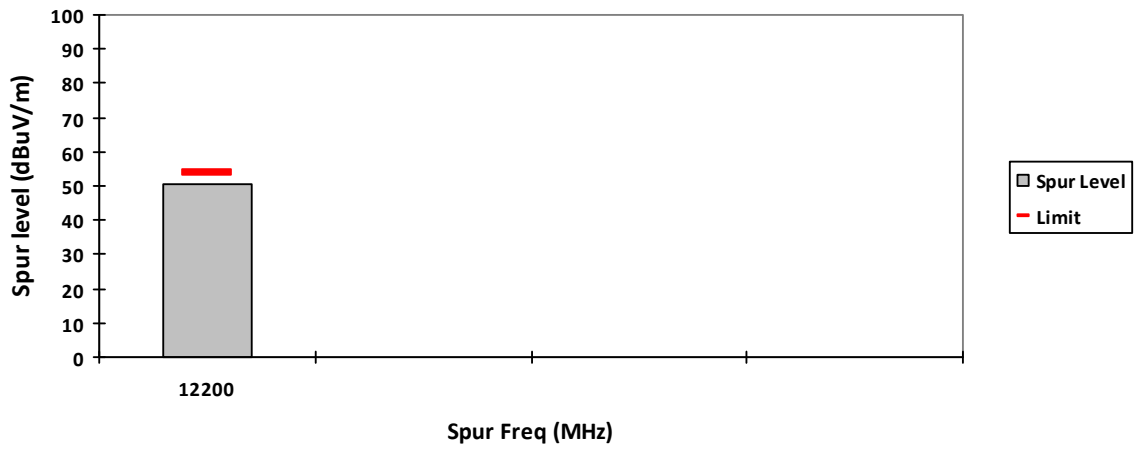
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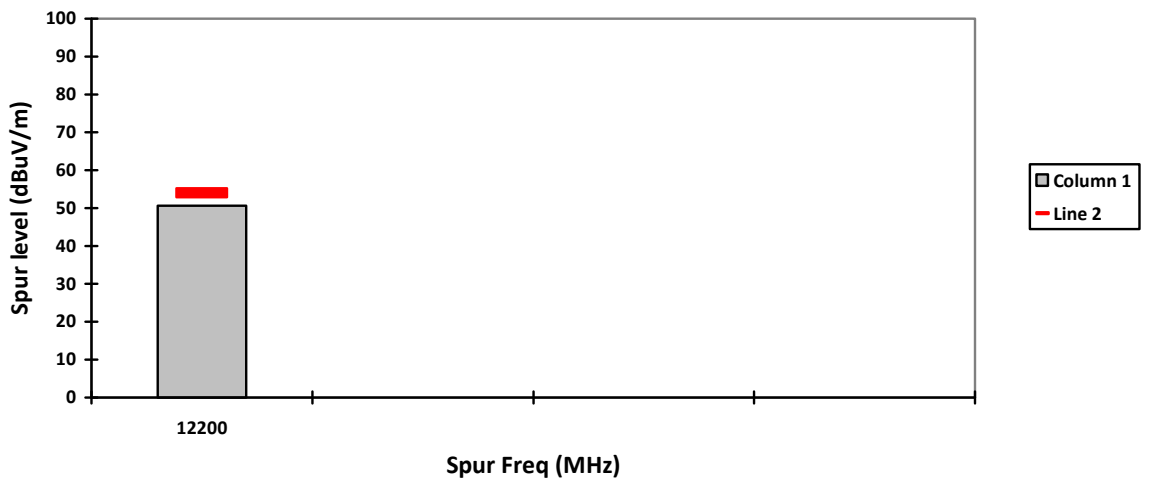
**HORIZONTAL, PK**



### VERTICAL, AV



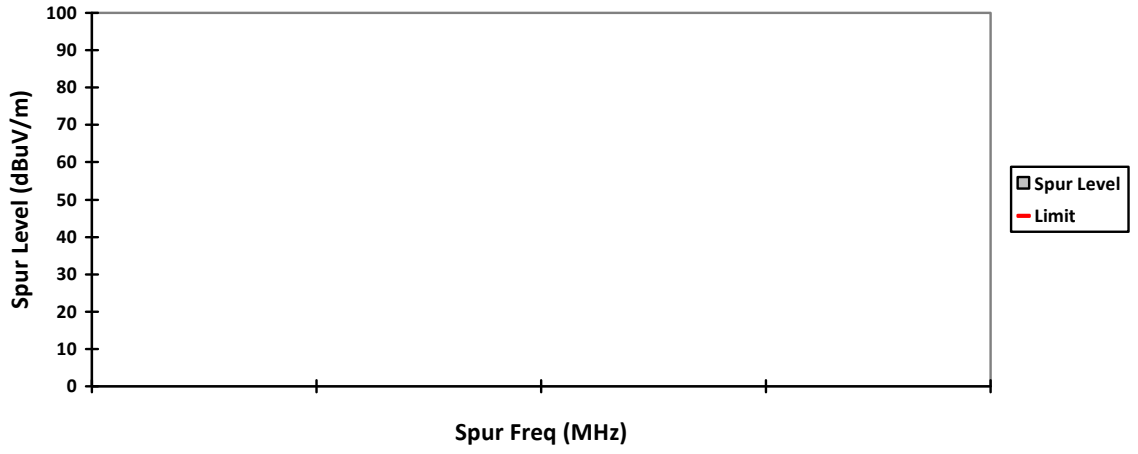
### HORIZONTAL, AV



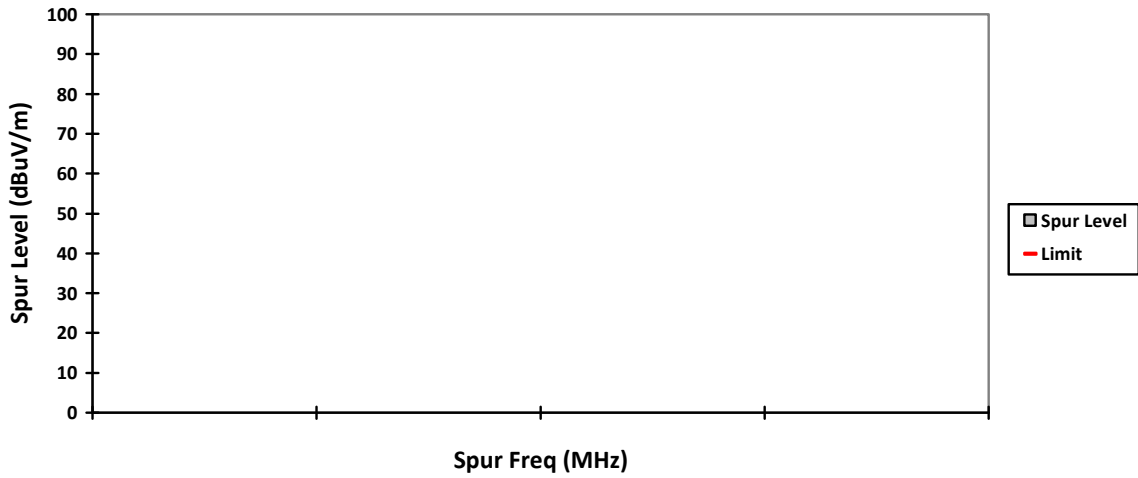




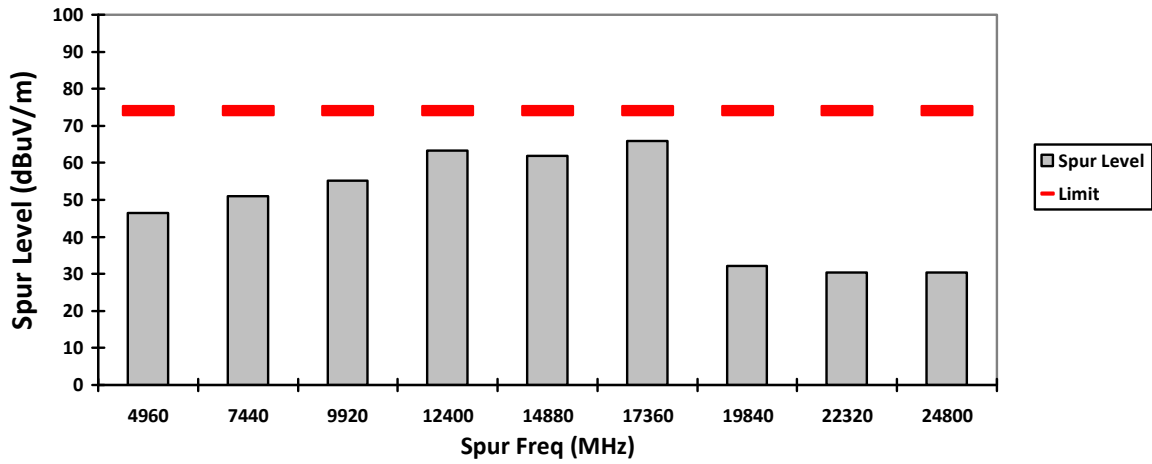
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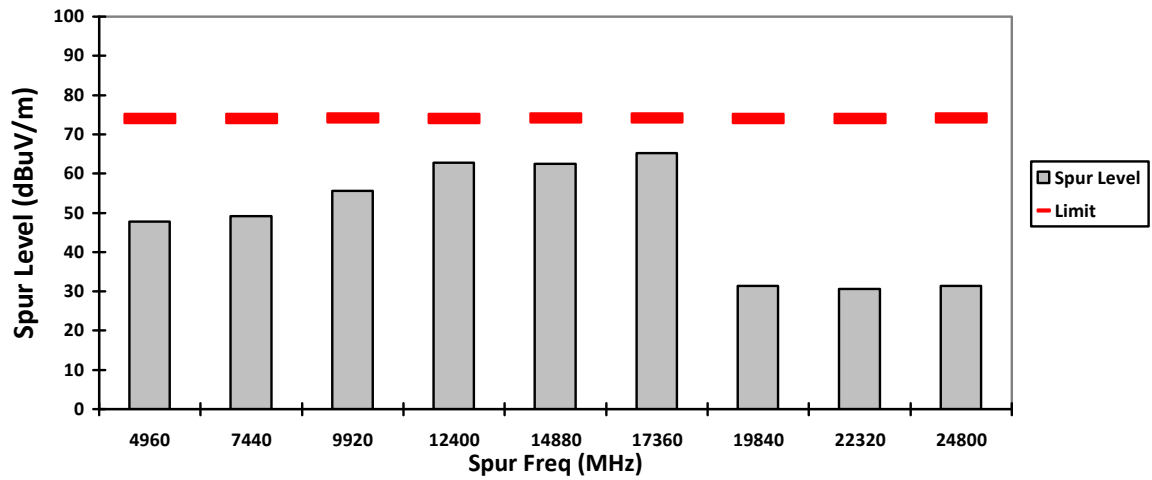
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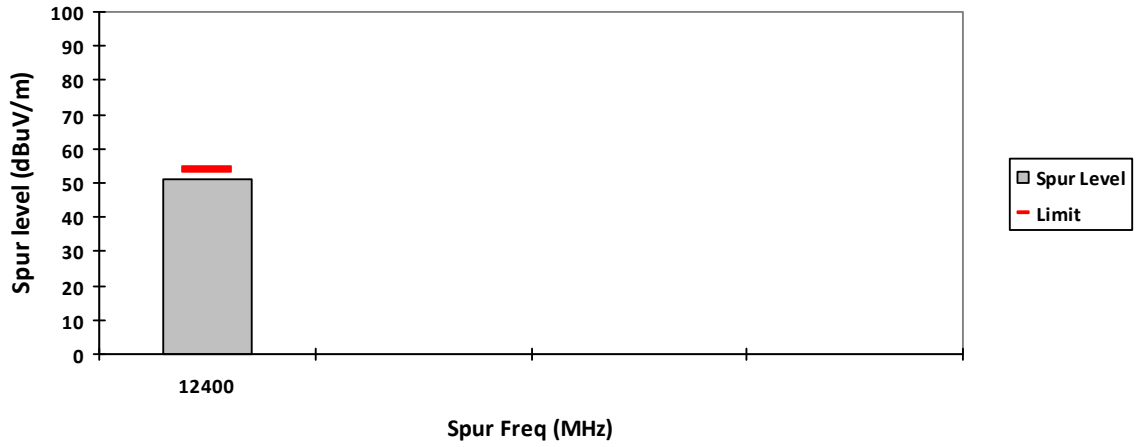
VERTICAL, PK



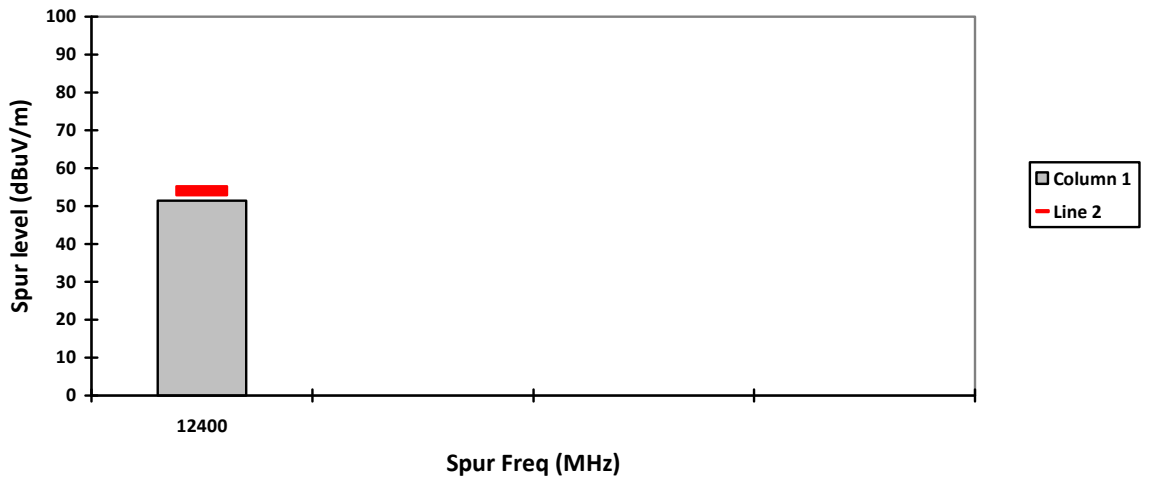
HORIZONTAL, PK



### VERTICAL, AV

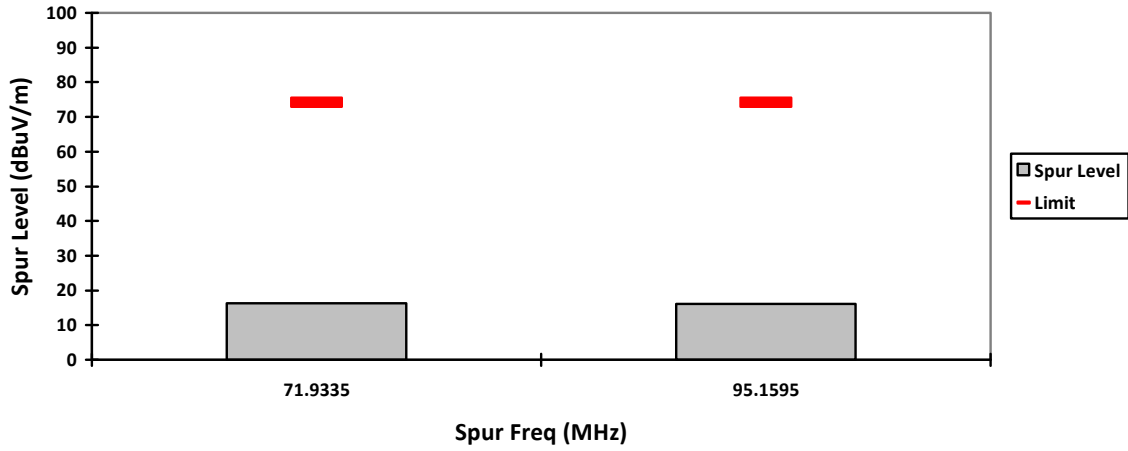


### HORIZONTAL, AV

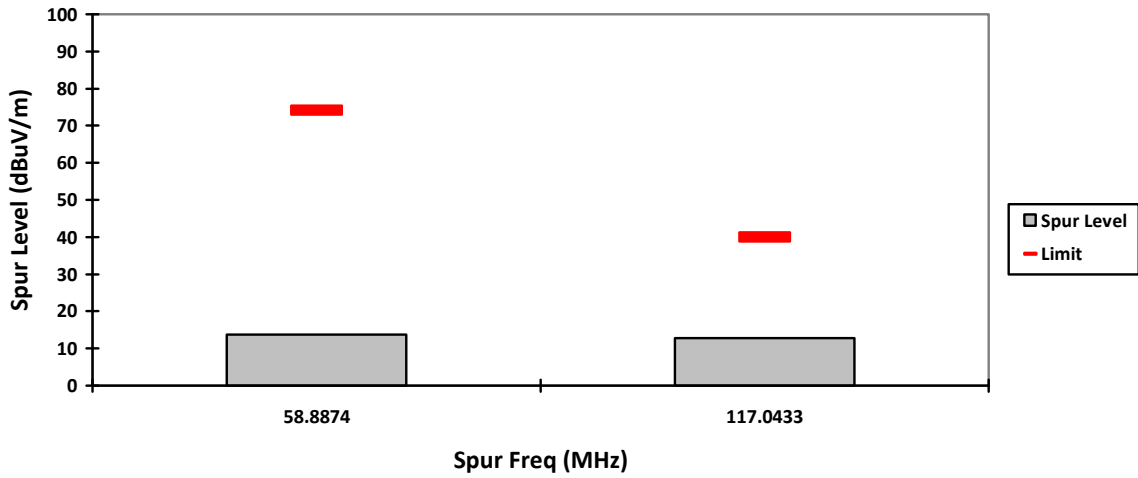




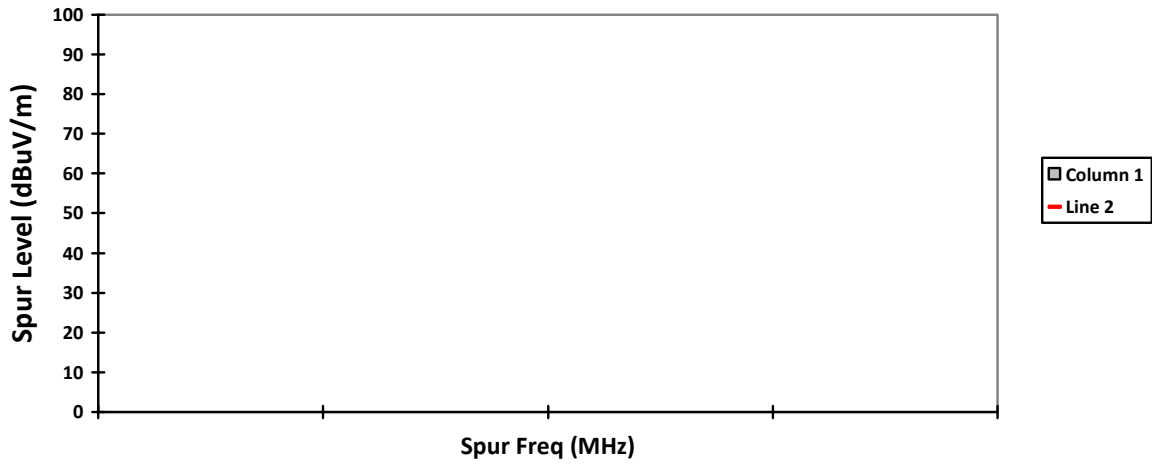
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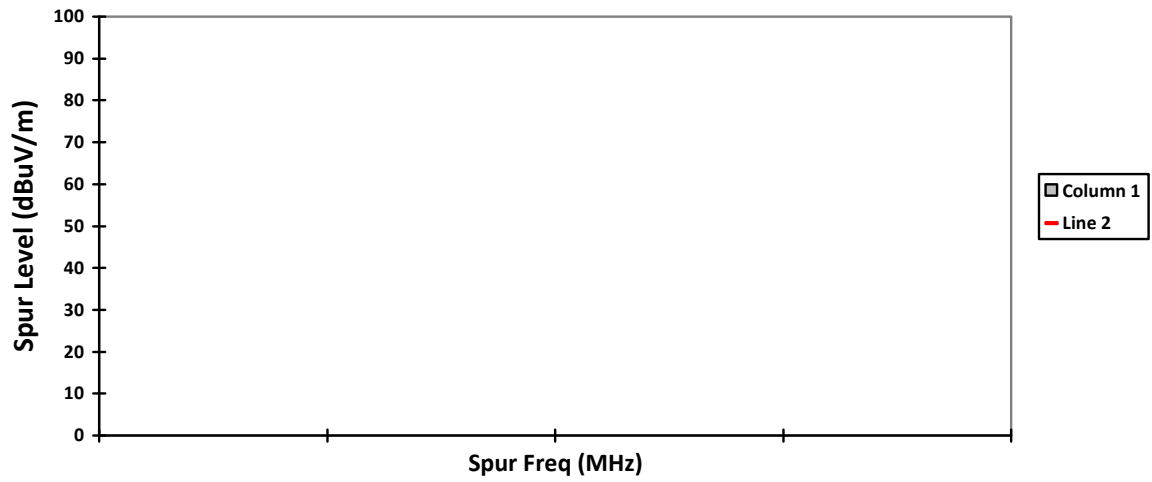
**HORIZONTAL, QPK**



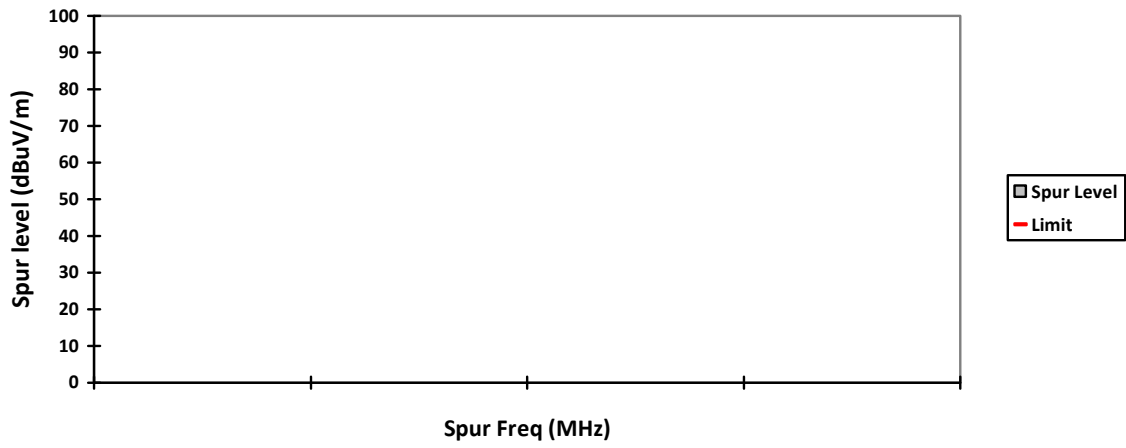
VERTICAL, PK



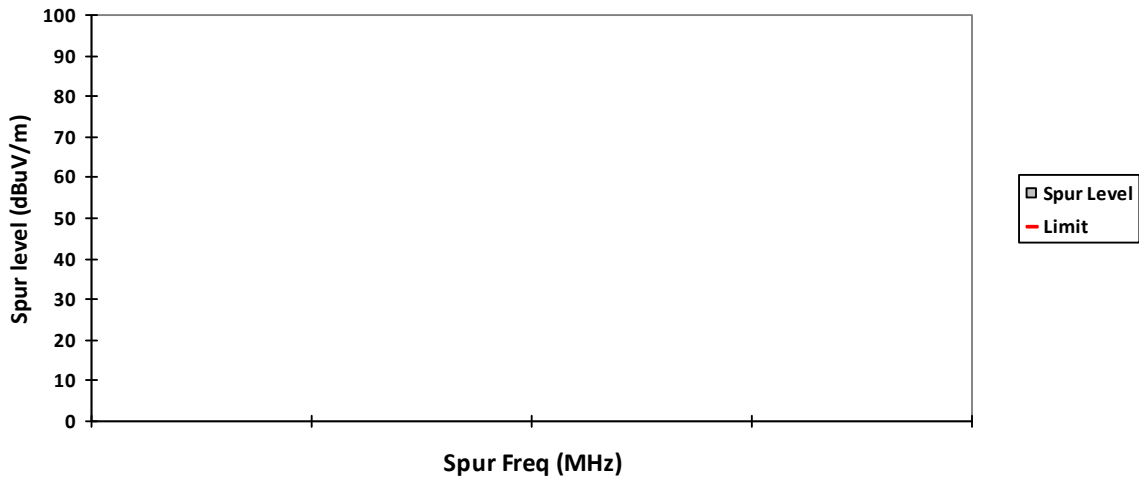
HORIZONTAL, PK



VERTICAL, AV

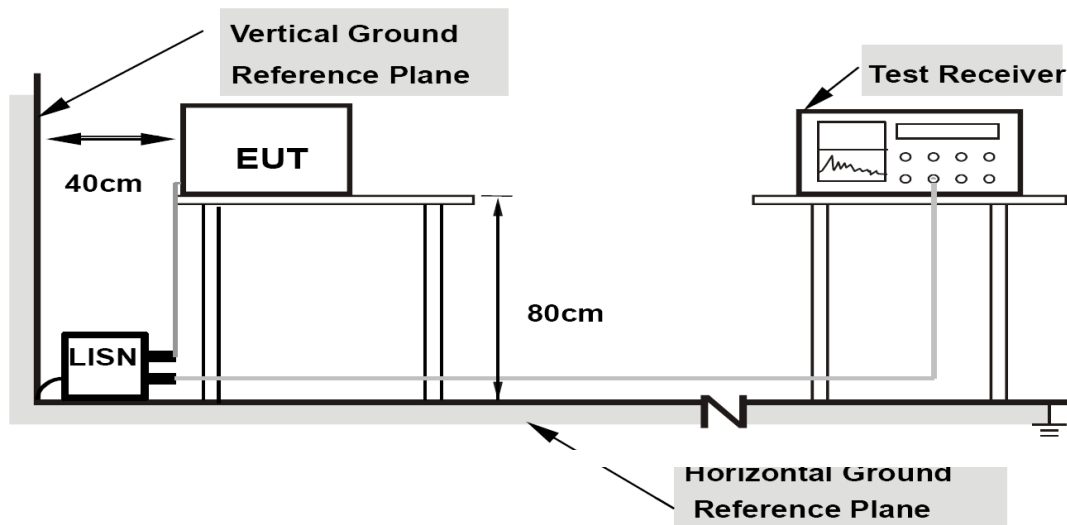


HORIZONTAL, AV



## 6.7 AC Powerline Conducted Emission

### 6.7.1 Test Setup



- 1) Tests were conducted for both Receive and Transmit Mode of the EUT.
- 2) The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50uH of coupling impedance for the measuring instrument.
- 3) Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 4) The frequency range from 150 kHz to 30MHz was measured.

### 6.7.2 Test Limits:

For AC Power Line Conducted Test Limit can be Class A or B depends on product classification.

Limits for conducted disturbance at the mains ports  
of class A ITE

Frequency range MHz	Limits dB( $\mu$ V)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60
NOTE The lower limit shall apply at the transition frequency.		

Table 1: Limits for Conducted Disturbance at the Mains Ports of Class A ITE.



**Limits for conducted disturbance at the mains ports  
of class B ITE**

Frequency range MHz	Limits dB( $\mu$ V)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

NOTE 1 The lower limit shall apply at the transition frequencies.  
NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

**Table 2: Limits for Conducted Disturbance at the Mains Ports of Class B ITE**

### 6.7.3 Test Result

Not Applicable. Testing is not required, radio shall turn off during charging mode.

**END OF TEST REPORT**