

	  
<p>MOTOROLA PENANG ADV. COMM. LABORATORY Motorola Solutions Malaysia Sdn. Bhd. Plot 2A Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia.</p>	<p>FCC / ISED TEST REPORT Report Revision : Rev.C</p>
<p>Date/s Tested : 15-Jan-2025 - 09-April-2025 Report Issue Date : 21-Apr-2025 Manufacturer/Location : Motorola Solutions Malaysia Sdn Bhd Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia Requestor : Yeap Tee Khoon Product Type : Body Worn Camera Product Marketing Name (PMN) : SVX Hardware Version Identification Number (HVIN) : VX650 Frequency Band : 2.402 - 2.480 GHz Max RF Output Power : GFSK - 39.81mW PI/4 DPSK & 8DPSK - 5.62mW Applicant Name : Motorola Solutions Inc Applicant Address : Plot 2A, Medan bayan Lepas, Mukim 12 S.W.D.11900 Bayan Lepas, Penang, Malaysia FCC Registrations : 461337 IC Registrations : MY0001 Firmware Version Identification Number (FVIN) : BL: D01.00.10 ; HOST: D01.00.54</p> <p>The equipment was tested accordance to the requirement listed below:</p> <p>(2.4GHz BT) PASS FCC 47CFR Part 15C ISED RSS 247 Issue 3 August 2023</p>	
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REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	25-Feb-2025	NUR ALIEYA
Rev. B	Update Antenna Type	12-Mar-2025	NUR ALIEYA
Rev. C	Change Product Marketing Name (PMN) from "VX650" to "SVX"	14-Apr-2025	NUR ALIEYA

1.0. General Information

EUT Description:

Technologies	2.4GHz BT
TX Frequency range	2402MHz – 2480MHz
Modulation Type	GFSK, Pi/4 DQPSK,8DPSK
Connector type	PROGRAMMING, TEST & ALIGNMENT CABLE
Antenna type	PIFA

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
BATTERY PACK,BATT LIION UL DIV2 IP68 4300T	MOTOROLA	PMNN4893A

Channel number and frequency information:

79 channels are provided to this EUT:

Channel	Freq. (MHz)						
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479

18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

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 (b)(1)	RSS-247 5.4(b)	Conducted RF Output Power (Peak)	Pass	Highest output power: 15.090 (32.285 mW)	9903EBA0063	Alieya
15.247 (a)(1)	RSS-247 5.1(a) RSS-247 5.1(b)	(1) 20dB Channel Bandwidth (2) Channel Separation	Pass	GFSK – 888KF1D Pi/4 DQPSK – 1M17G1D 8DPSK - 1M18G1D	9903EBA0063	Alieya
15.247(a)(1)(iii)	RSS-247 5.1(d)	Number of hopping Frequency used	Pass	Meet the limit requirement.	9903EBA0063	Alieya
15.247(a)(1)(iii)	RSS-247 5.1(d)	Dwell time on each channel	Pass	Meet the limit requirement.	9903EBA0063	Alieya
15.247 (d)	RSS-247 5.5	Band Edge Conducted Spurious Emission	Pass	Worst case emission: -42.62 dB	9903EBA0063	Alieya
15.247 (d)	RSS-247 5.5	Conducted Spurious Emission	Pass	Worst case emission: -50.784 dBm	9903EBA0063	Alieya
15.205, 15.209, 15.247 (d)	RSS-247 5.5	Radiated Emission within Restricted Bands	Pass	Worst case emission: RBE: 46.2162dBuV/m (margin: 7.7838dB) RSE: 25.8796dBuV/m (margin: 20.1204dB)	9903EBA0048	Aiman
15.207	RSS-Gen 8.8	AC Powerline Conducted Emission	Pass	Meet the limit requirement.	9903EBA0048	Shidee
15.203	-	Antenna Requirement	NA	Internal antenna is not accessible to the end-user	NA	NA

3.0. Measurement Uncertainty

The measurement uncertainties below were calculated using approach describe in ETSI TR 100 028, ETSI TR 100 028-2 (using a coverage factor of $k = 1.96$) & CISPR 16-4-2 (using a coverage factor of $k=2$), which gives a level of confidence of approximately 95%.

According to CISPR 16-4-2, the levels were found to be below levels of U_{CISPR} and therefore no adjustment of the data for measurement uncertainty is required.

ETSI TR 100 028 & ETSI TR 100 028-2:

MEASUREMENT TYPE	FREQUENCY RANGE	EXPANDED UNCERTAINTY
Conducted Spurious Output Power	9kHz-12750MHz	± 2.82 dB

CISPR 16-4-2:

MEASUREMENT TYPE	FREQUENCY RANGE	EXPANDED UNCERTAINTY
AC Power-line Conducted Emissions	150kHz-30MHz	± 3.44 dB
Radiated Emissions	30MHz-1000MHz	± 6.00 dB
Radiated Emissions	1000MHz-18000MHz	± 5.14 dB
Radiated Emissions	18000MHz-40000MHz	± 5.36 dB

4.0. Equipment List

Bluetooth ATE # 1 (SW Version: Ate Main_3.1.12_R1)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
SPECTRUM ANALYZER	E4440A	MY46186938	29-Oct-24	29-Oct-25
POWER SUPPLY	6652A	3541A02371	11-Sep-24	11-Sep-25
CHAMBER	SH-641	92003820	04-Jul-24	04-Jul-25

Radiated Emission Station (SW Version: EMC FCC RE v1.6.5)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMI TEST RECEIVER	ESIB40	100307	23-Oct-24	23-Oct-25
3m SEMI-ANECHOIC CHAMBER	NA	888032	Not Required	Not Required
TURNTABLE FLUSH MOUNT 2M	T-200-S	NA	Not Required	Not Required
PROGRAMMING CONTROLLER	MF-7802BS	NA	Not Required	Not Required
POWER SUPPLY	6674A	3126A00133	13-Mar-24	13-Mar-25
SIGNAL ANALYZER	FSV40	101432	09-Aug-24	08-Aug-25
DATA LOGGER	SDL500	A.016800	26-Jun-24	26-Jun-25
BILOG ANTENNA	CBL6112D	55546	05-Jun-24	05-Jun-25
BILOG ANTENNA	CBL 6112B	2964	08-Oct-24	08-Oct-25
DRG HORN FREQ.	SAS-571	1027	01-Jul-24	01-Jul-25
DRG HORN FREQ.	SAS-571	720	18-Apr-23	18-Apr-25
PREAMPLIFIER	PAM-0118	427	15-Nov-24	15-Nov-25
SIGNAL GENERATOR	SMB100A	181117	06-Dec-21	06-May-25
LOOP ANTENNA	6502	00203479	06-Mac-24	06-Mac-25
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170255	13-Mar-24	13-Mar-25

AC Powerline Station (SW Version: EMC32 Ver.10.60.10)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
DATA LOGGER	DSB	16344143	5-Jul-24	5-Jul-25
V-NETWORK 2-LINE	ENV216V	101268	12-Jun-24	12-Jun-25
EMI TEST RECEIVER	ESCI	100225	8-May-24	8-May-25
PROGRAMMABLE AC SOURCE	61604	ABR000000926	5-Aug-24	5-Aug-25

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 Technology	Modulation Type	Environmental Conditions
Test Mode	0 to 78	0,39,78	FHSS	GFSK, Pi/4 DQPSK,8DPSK	22.8°C, 70.1%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 Technology	Modulation Type	Environmental Conditions
Test Mode	0 to 78	0,39,78	FHSS	GFSK, Pi/4 DQPSK,8DPSK	22.8°C, 70.1%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.

NAEUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Environmental Conditions
Application Mode	0 to 78	AUTO	FHSS	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).

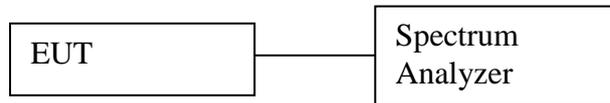
Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Environmental Conditions
Test Mode	0 to 78	0,39,78	FHSS	GFSK, Pi/4 DQPSK,8DPSK	25°C, 54.8%RH

6.0. Transmitter Test Parameters

6.1. Conducted RF Output Power (Peak)

6.1.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the EUT and set EUT to transmit maximum data rate with hopping disable.
- c) Connect EUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
 - a. RBW = > 20 dB bandwidth
 - b. VBW = RBW
 - c. Detector mode = Peak
 - d. AMPLITUDE → Scale/Div = 10 dB
 - e. Trace = Max hold
 - f. Sweep = auto
- e) Measure the captured power within the band and recording the plot.
- f) Repeat above procedure with other different mode of operation.

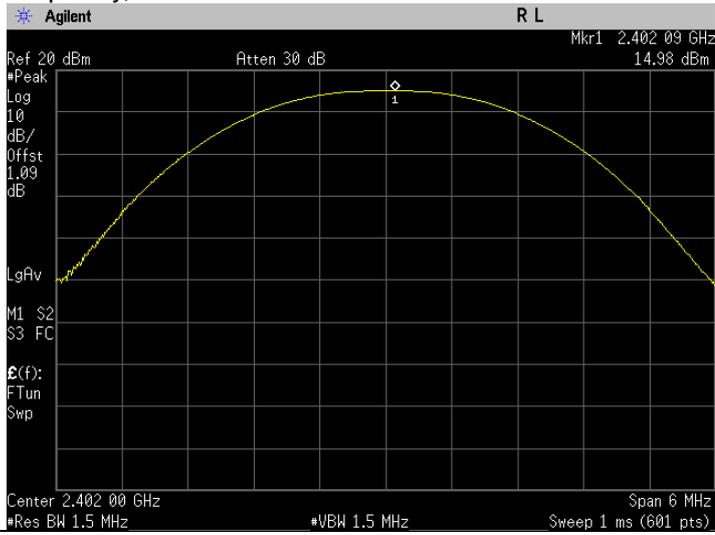
6.1.2. Test Limits:

Normal Condition (25 ° C)
≤ 125mW (or 20.9dBm)

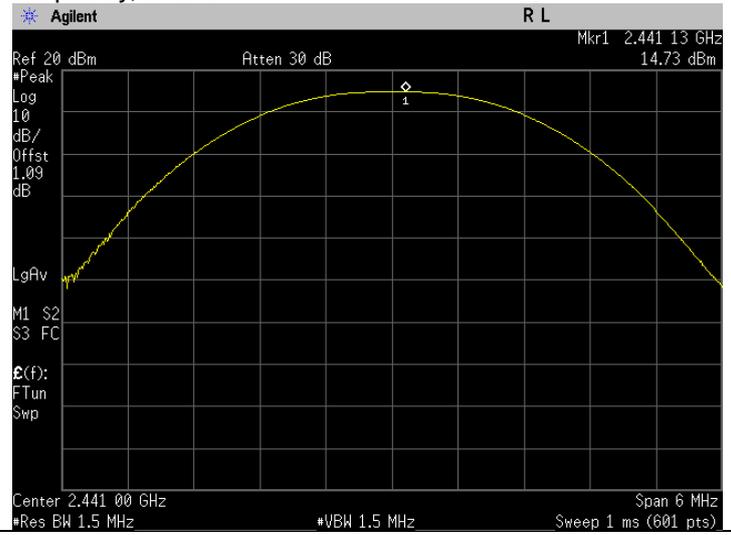
6.1.3. Test Data:

Test Conditions			Results	
Modulation	Voltage(V)	Test Frequency(GHz)	dBm	Status
GFSK	3.80	2.4020	14.977	Pass
		2.4410	14.731	Pass
		2.4800	15.090	Pass
Pi/4 DQPSK	3.80	2.4020	6.398	Pass
		2.4410	6.341	Pass
		2.4800	6.438	Pass
8DPSK	3.80	2.4020	6.635	Pass
		2.4410	6.549	Pass
		2.4800	6.661	Pass

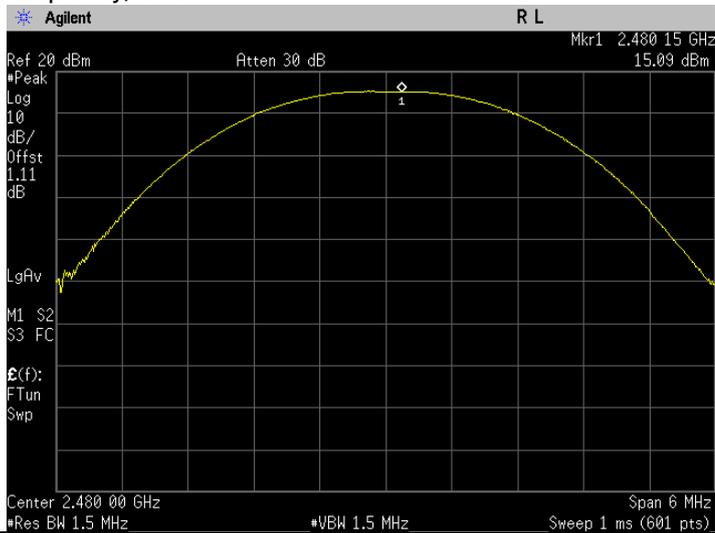
The Conducted RF Output Power test with result at low frequency, GFSK.



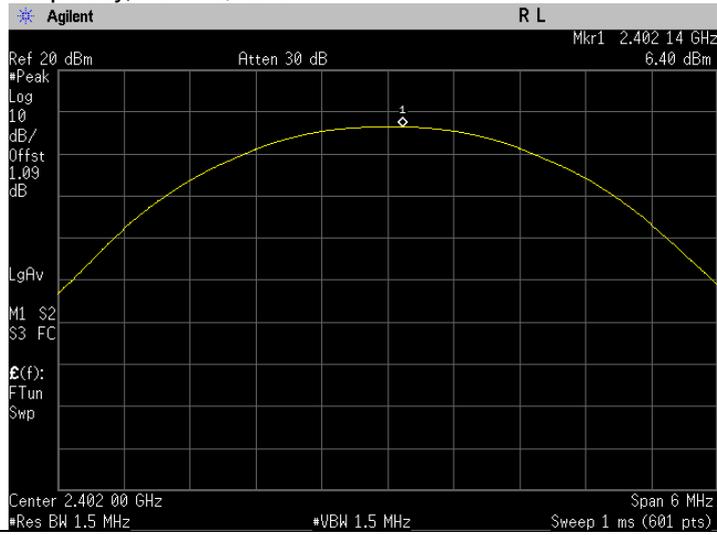
The Conducted RF Output Power test with result at mid frequency, GFSK.



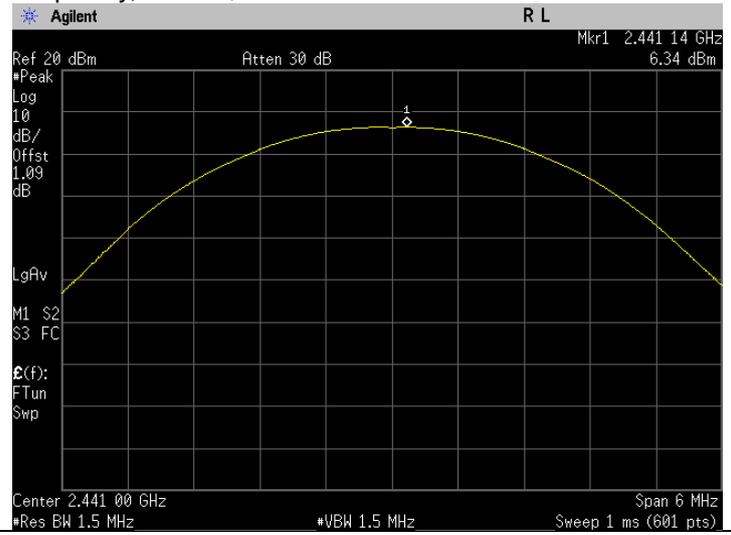
The Conducted RF Output Power test with result at high frequency, GFSK.



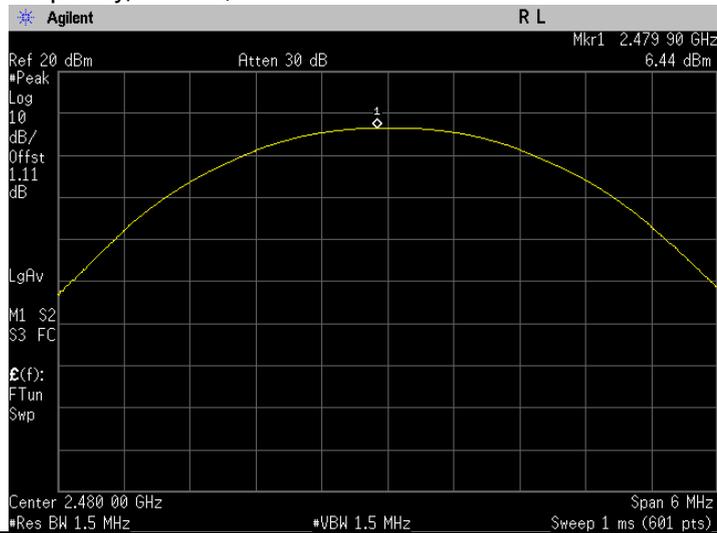
The Conducted RF Output Power test with result at low frequency, Pi/4 DQPSK.



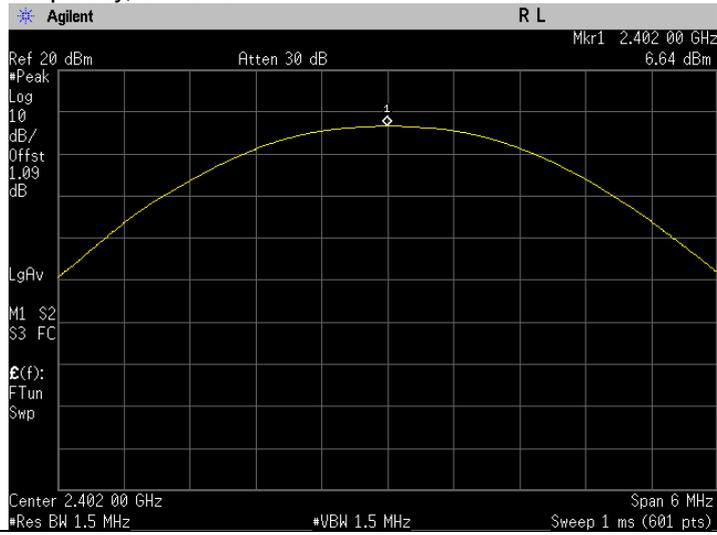
The Conducted RF Output Power test with result at mid frequency, Pi/4 DQPSK.



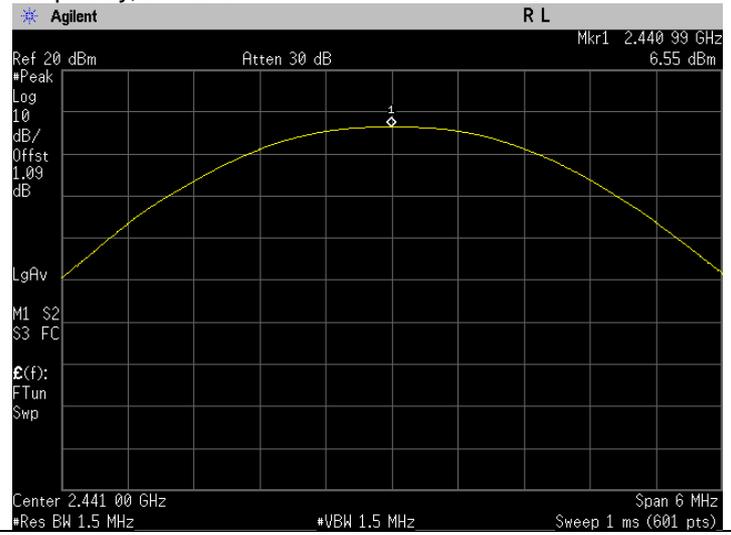
The Conducted RF Output Power test with result at high frequency, Pi/4 DQPSK.



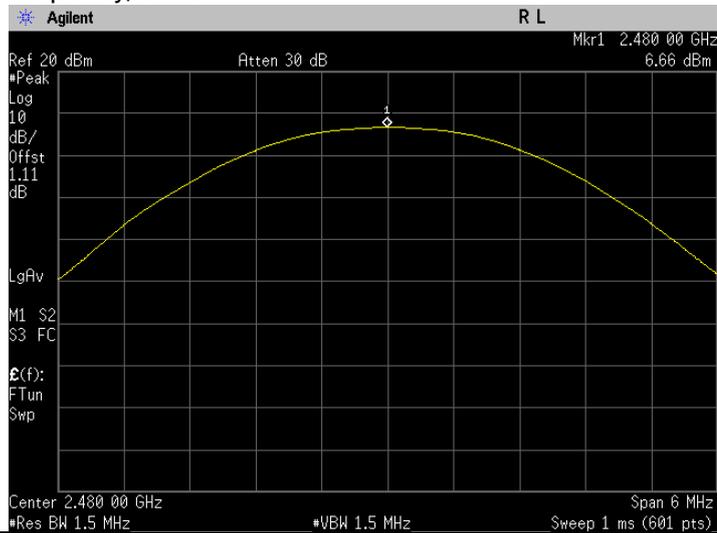
The Conducted RF Output Power test with result at low frequency, 8DPSK.



The Conducted RF Output Power test with result at mid frequency, 8DPSK.

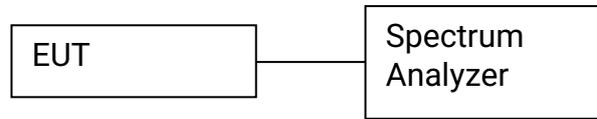


The Conducted RF Output Power test with result at high frequency, 8DPSK.



6.2. 20dB Channel Bandwidth

6.2.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the EUT and set EUT to transmit maximum data rate with hopping disable.
- c) Connect EUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
 - a. RBW = 30 kHz
 - b. VBW = 100 kHz
 - c. SPAN = 3 MHz, center on test frequency
 - d. AMPLITUDE → Scale/Div = 10 dB
 - e. Detector mode = Peak
 - f. Trace = Max hold
 - g. Sweep = auto
- e) Measure the freq different of two frequencies that were attenuated 20dB from peak of the emission & record the frequency difference as the emission bandwidth.
- f) Save the plot result from spectrum analyzer screen.
- g) Repeat above procedure with other different mode of operation.

6.2.2. Test Limits:

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

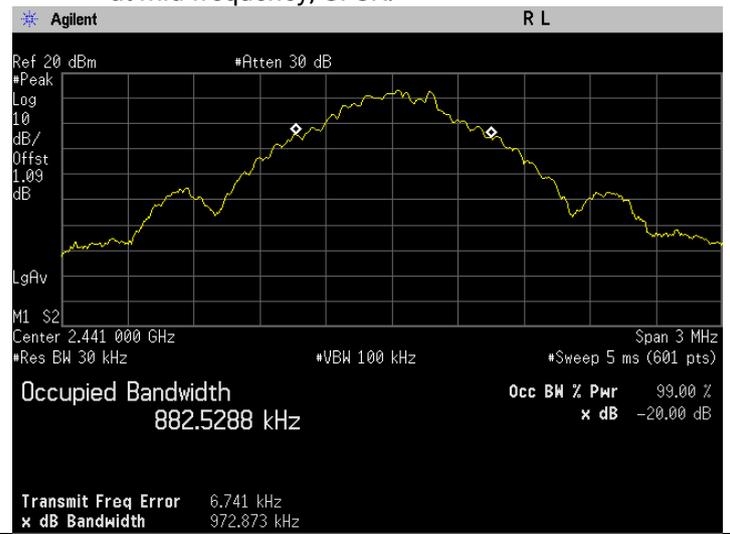
6.2.3. Test Data:

Test Conditions		Test Frequency	Results		
Modulation Type	Voltage(V)	TX (GHz)	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Status
GFSK	3.80	2.4020	0.982	0.888	Pass
		2.4410	0.973	0.883	Pass
		2.4800	0.971	0.881	Pass
Pi/4 DQPSK	3.80	2.4020	1.283	1.173	Pass
		2.4410	1.285	1.174	Pass
		2.4800	1.283	1.173	Pass
8DPSK	3.80	2.4020	1.298	1.180	Pass
		2.4410	1.296	1.180	Pass
		2.4800	1.292	1.175	Pass

i. The 20 dB BW & occupied bandwidth test with result at low frequency, GFSK.



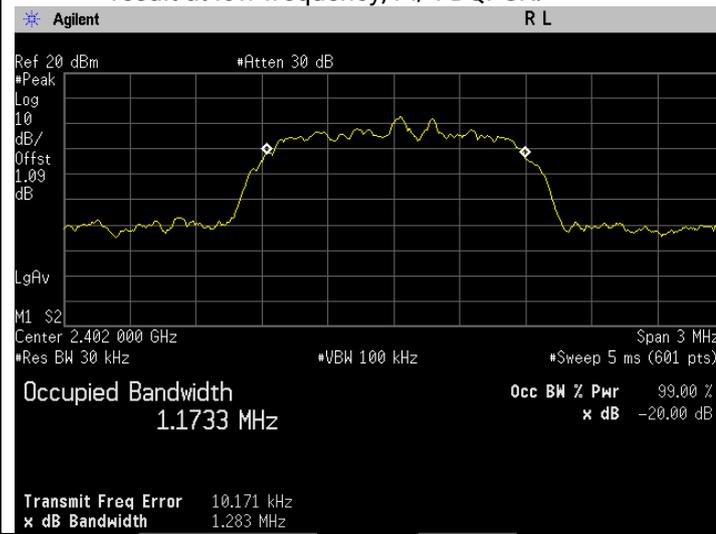
ii. The 20 dB BW & occupied bandwidth test with result at mid frequency, GFSK.



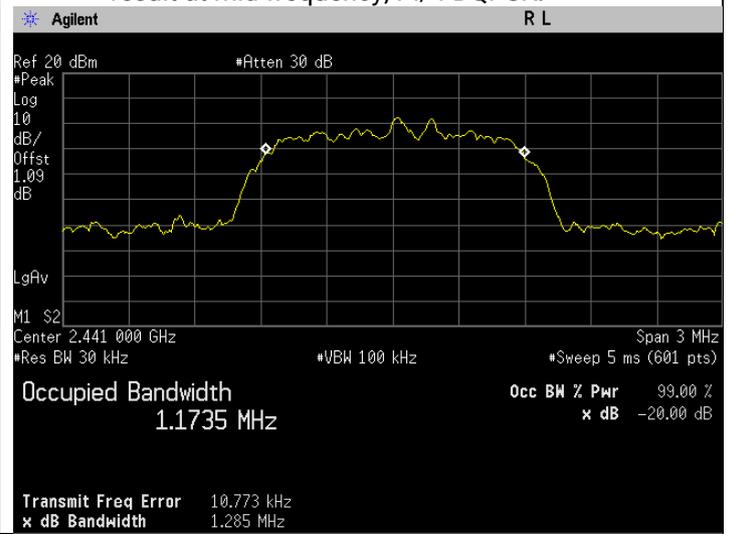
iii. The 20 dB BW & occupied bandwidth test with result at high frequency, GFSK.



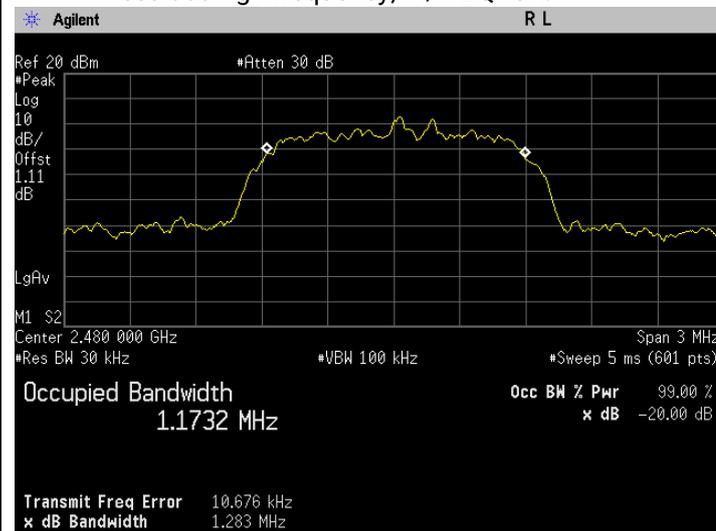
i. The 20 dB BW & occupied bandwidth test with result at low frequency, Pi/4 DQPSK.



ii. The 20 dB BW & occupied bandwidth test with result at mid frequency, Pi/4 DQPSK.



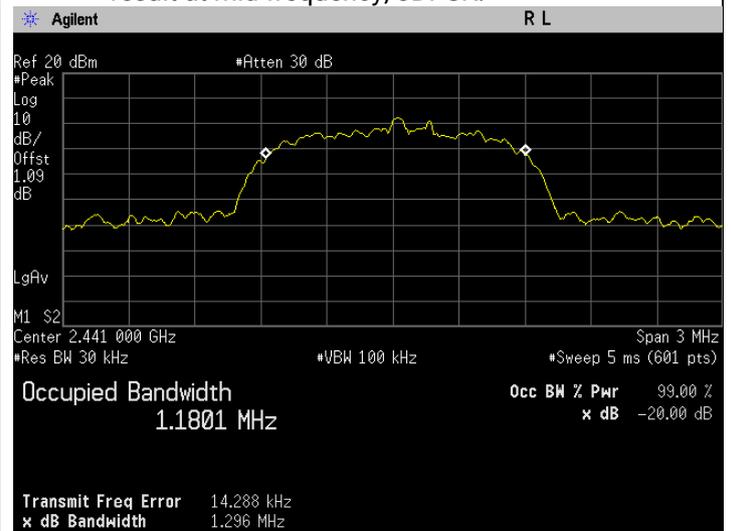
iii. The 20 dB BW & occupied bandwidth test with result at high frequency, Pi/4 DQPSK.



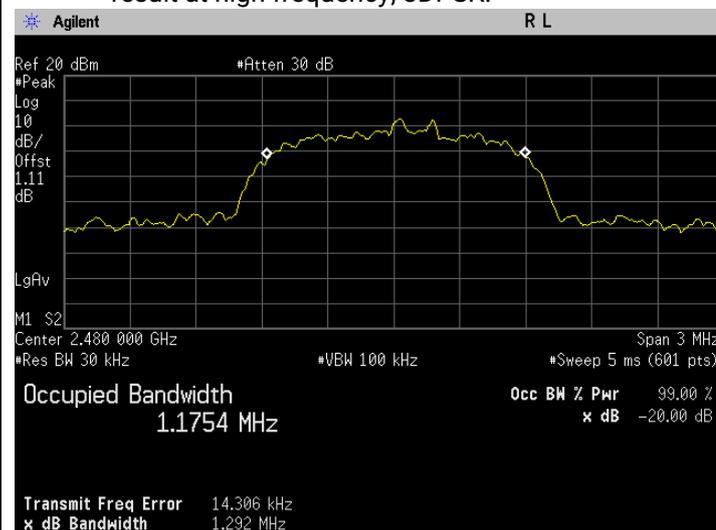
i. The 20 dB BW & occupied bandwidth test with result at low frequency, 8DPSK.



ii. The 20 dB BW & occupied bandwidth test with result at mid frequency, 8DPSK.

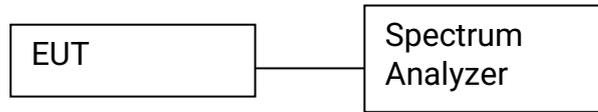


iii. The 20 dB BW & occupied bandwidth test with result at high frequency, 8DPSK.



6.3. Band-edge Conducted Spurious Emission

6.3.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the EUT and keep the EUT in hopping mode.
- c) Connect EUT'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. SPAN = 4 MHz (Low channel) or 6MHz(High Channel)
 - d. Detector mode = Peak
 - e. AMPLITUDE → Scale/Div = 10 dB
 - f. Trace = Max hold
 - g. Sweep = auto
- e) Measure the captured band edge emission result and recording the plot.
- f) Repeat above on EUT with hopping disable.
- g) Repeat above procedure with other different test frequency.

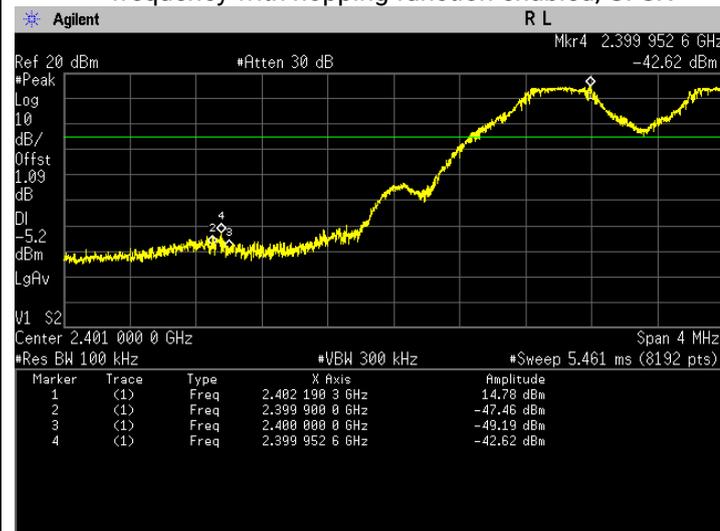
6.3.2. Test Limits

Normal Condition (25 ° C)
Shall be at least 20 dB below the peak power.

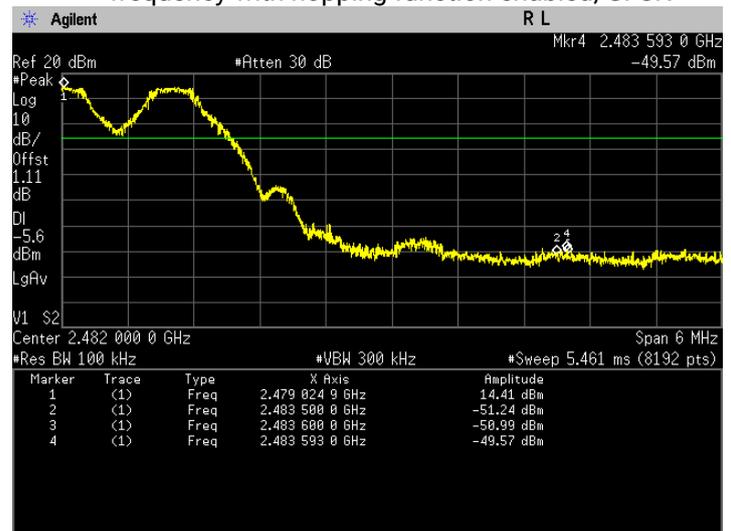
6.3.3. Test Result

Test Conditions				Results	
Modulation	Voltage(V)	Hopping Method	Test Frequency(GHz)	dB	Status
GFSK	3.80	Enabled (continuously)	2.402	-42.62	Pass
			2.480	-49.57	Pass
		Disabled (constantly)	2.402	-43.52	Pass
			2.480	-50.77	Pass
Pi/4 DQPSK	3.80	Enabled (continuously)	2.402	-50.43	Pass
			2.480	-56.24	Pass
		Disabled (constantly)	2.402	-48.64	Pass
			2.480	-56.74	Pass
8 DPSK	3.80	Enabled (continuously)	2.402	-45.34	Pass
			2.480	-52.98	Pass
		Disabled (constantly)	2.402	-44.97	Pass
			2.480	-53.24	Pass

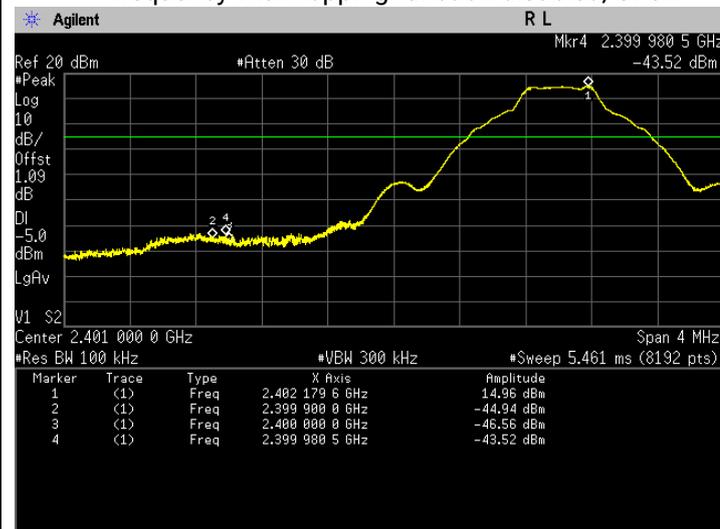
i. The highest band edge emission at low carrier frequency with hopping function enabled, GFSK



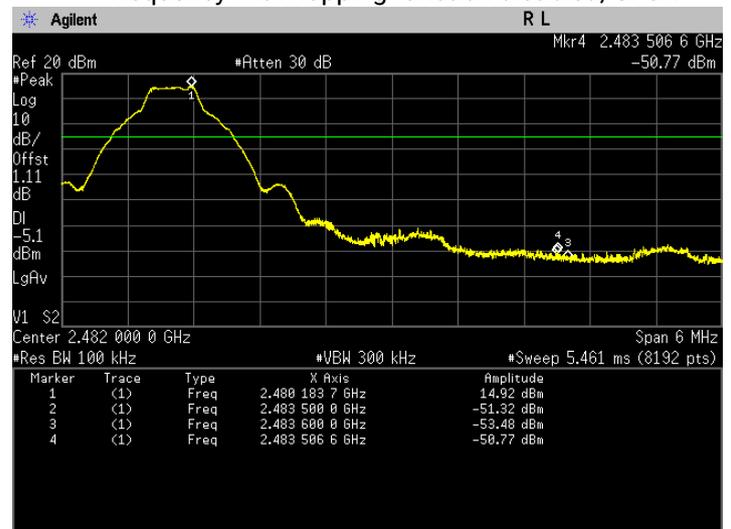
ii. The highest band edge emission at high carrier frequency with hopping function enabled, GFSK



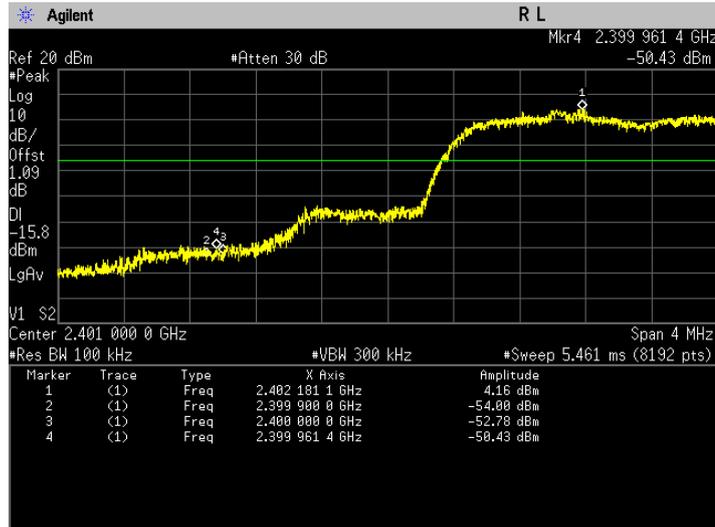
iii. The highest band edge emission at low carrier frequency with hopping function disabled, GFSK



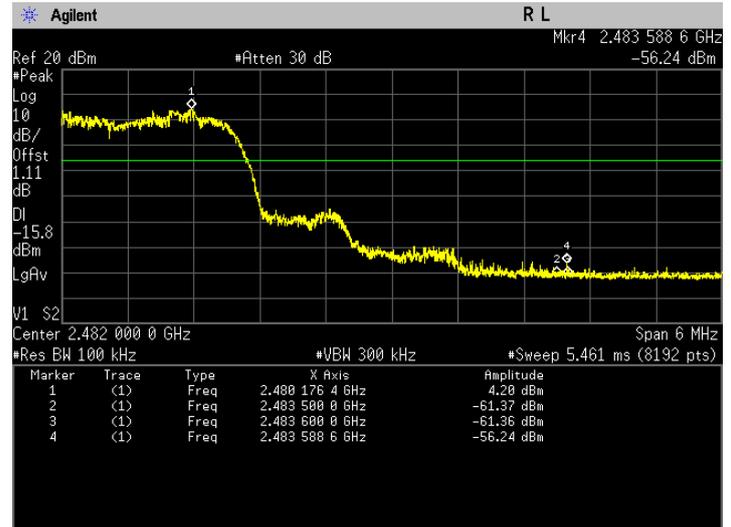
iv. The highest band edge emission at high carrier frequency with hopping function disabled, GFSK



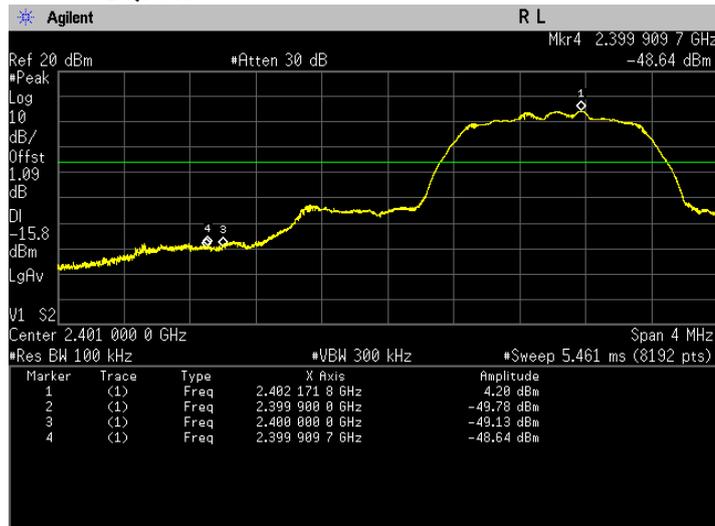
i. The highest band edge emission at low carrier frequency with hopping function enabled, Pi/4 DQPSK



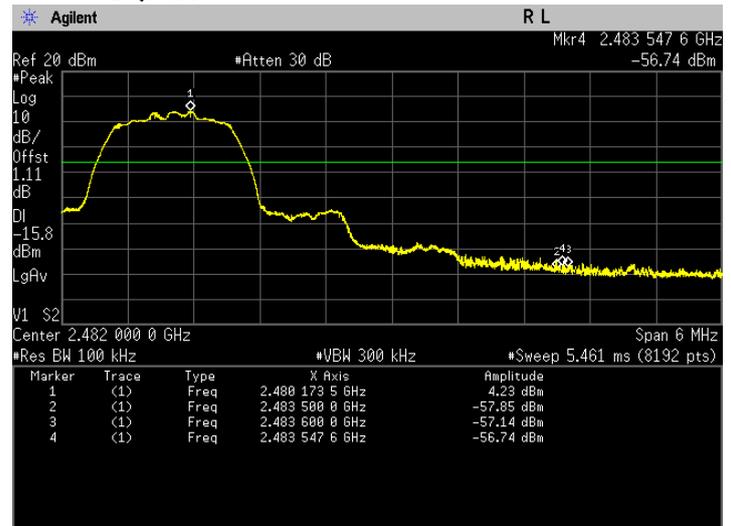
ii. The highest band edge emission at high carrier frequency with hopping function enabled, Pi/4 DQPSK



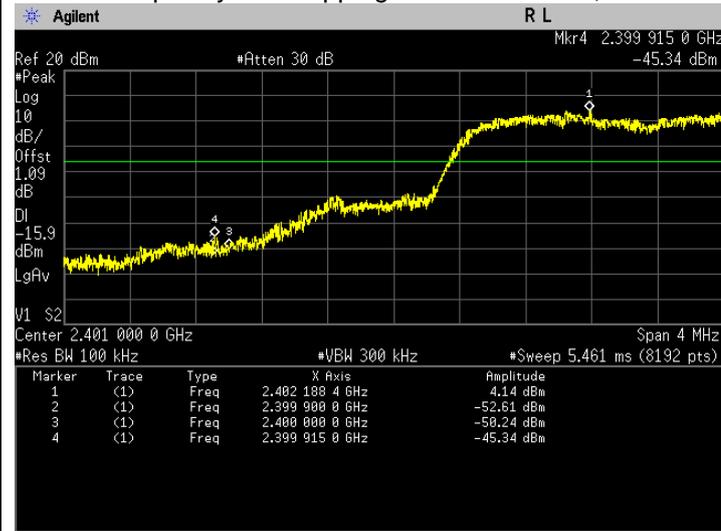
iii. The highest band edge emission at low carrier frequency with hopping function disabled, Pi/4 DQPSK



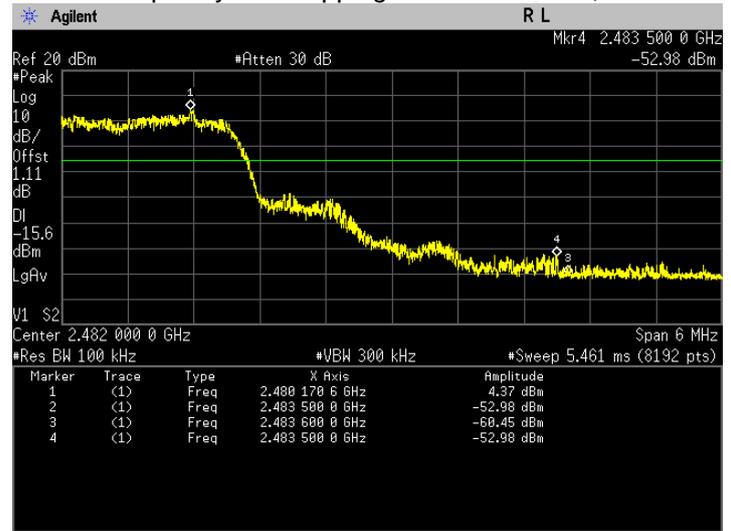
iv. The highest band edge emission at high carrier frequency with hopping function disabled, Pi/4 DQPSK



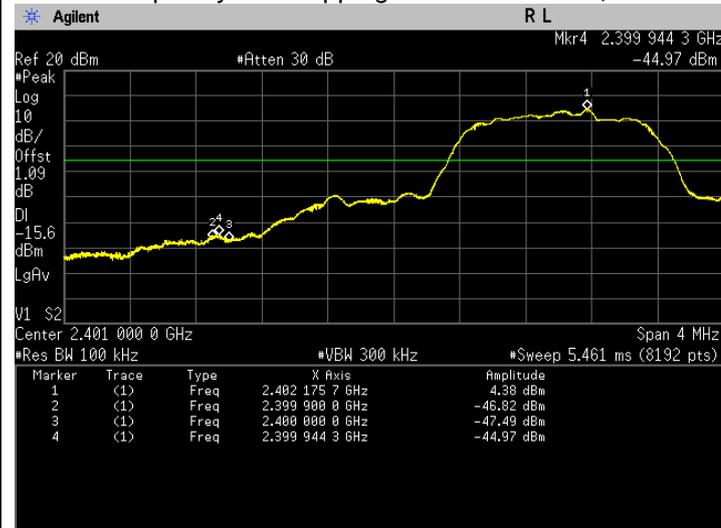
i. The highest band edge emission at low carrier frequency with hopping function enabled, 8DPSK



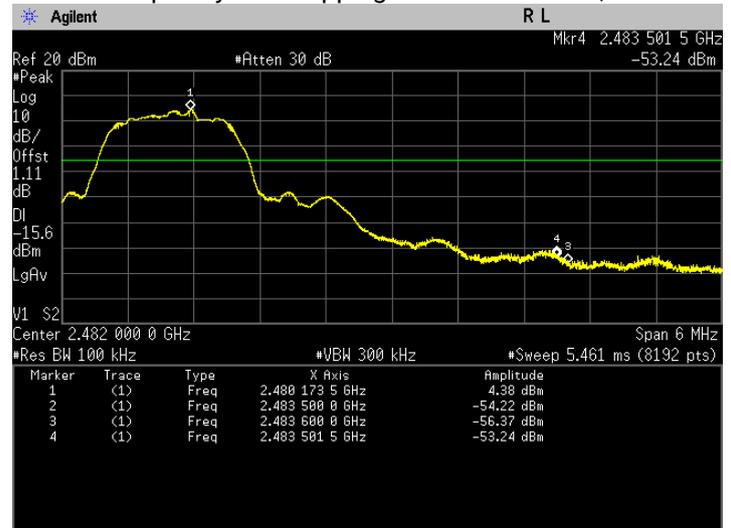
ii. The highest band edge emission at high carrier frequency with hopping function enabled, 8DPSK



iii. The highest band edge emission at low carrier frequency with hopping function disabled, 8DPSK

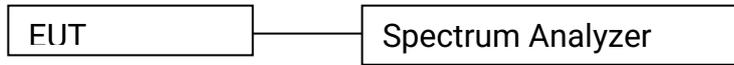


iv. The highest band edge emission at high carrier frequency with hopping function disabled, 8DPSK



6.4. Dwell time on each channel

6.4.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the EUT and keep the EUT in hopping mode.
- c) Connect EUT'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. SPAN = Zero SPAN, center on hopping frequency
 - d. Detector mode = Peak
 - e. Trace = Max hold
 - f. Sweep time = 5second
 - g. Sweep = Single
- e) Measure total numbers of transmissions occur in 5 second and save the plot.
- f) Change the setting of spectrum analyzer :
 - a. RBW = 100 kHz
 - b. VBW = 300 kHz
 - c. Sweep time = sufficient to capture dwell time for 1 transmission
 - d. Sweep = Single
- g) Measure dwell time for 1 transmission and save the plot.
- h) Calculate accumulate dwell time in a given period equal to number of hopping frequencies x 0.4
- i) Repeat above procedure with other different mode of operation.

6.4.2. Test Limits:

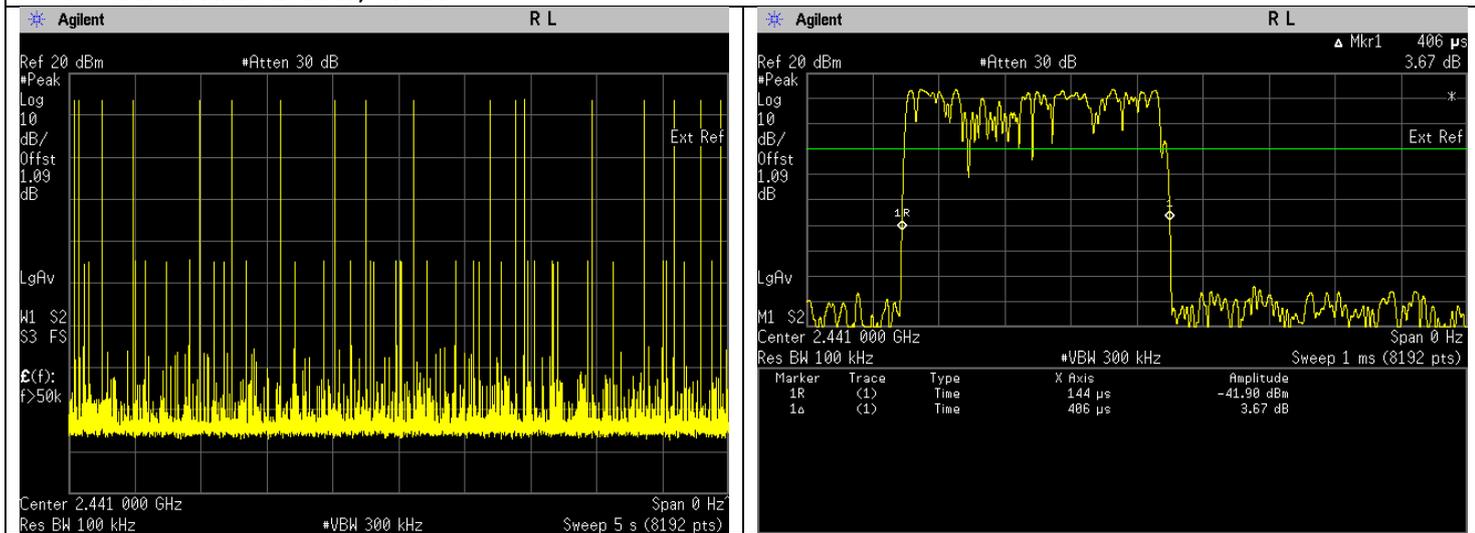
Normal Condition (25 ° C)
≤ 400ms

6.4.3. Test Result

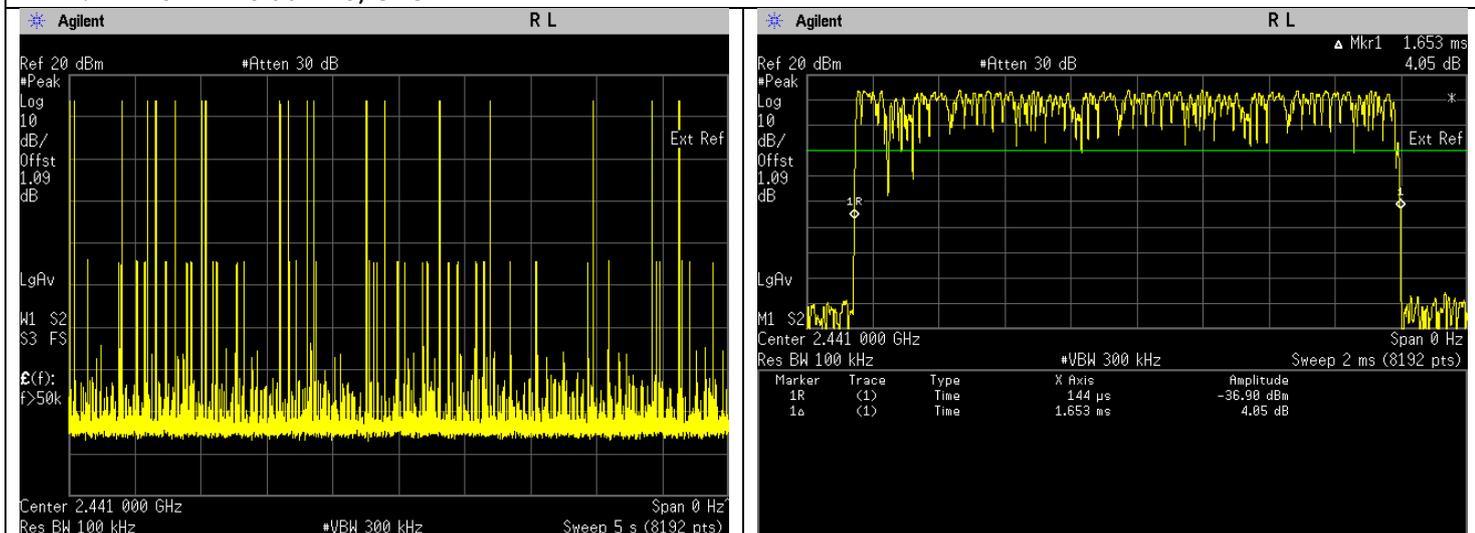
Test Conditions				Results			
Modulation	Voltage (V)	TX Frequency (MHz)	Data Package	No. of transmission in 5s (a)	Dwell time in one transmission (b)	Total accumulate dwell time in 31.6s. (c)	Status
GFSK	3.80	2441	DH1	18	0.406	46.186560	Pass
			DH3	19	1.653	198.492240	Pass
			DH5	15	2.901	275.014800	Pass
Pi/4 DQPSK	3.80	2441	DH1	13	0.400	32.864000	Pass
			DH3	18	1.651	187.817760	Pass
			DH5	21	2.900	384.888000	Pass
8 DPSK	3.80	2441	DH1	21	0.399	52.955280	Pass
			DH3	17	1.650	177.276000	Pass
			DH5	20	2.900	366.560000	Pass

****Note:** Total dwell time 31.6s (79Hopping*0.4), (c) = (a) x 6.32 x (b)

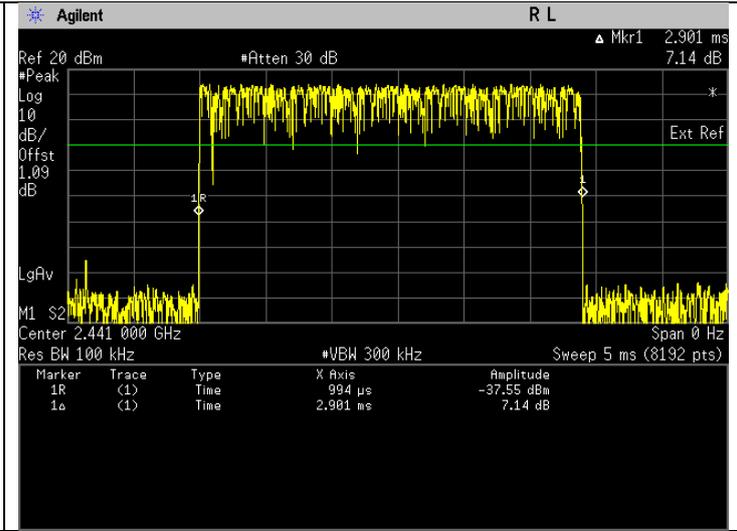
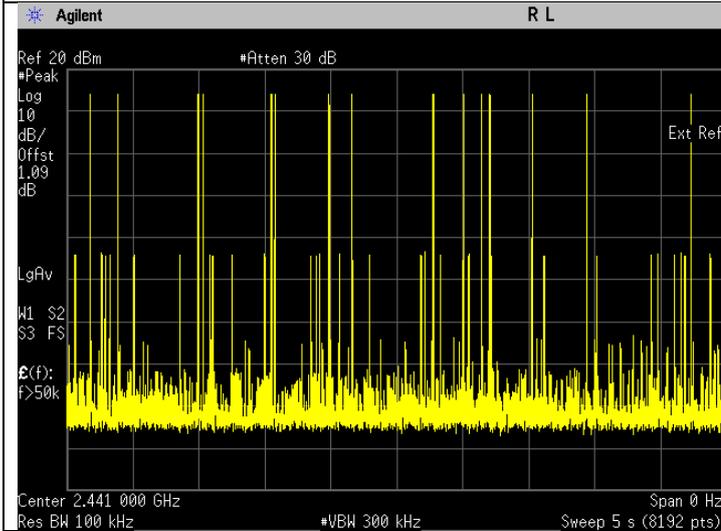
i. Dwell Time at DH1, GFSK



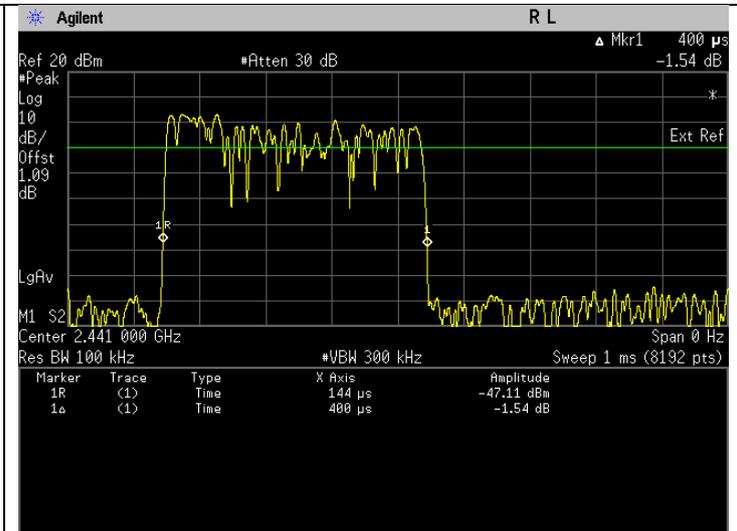
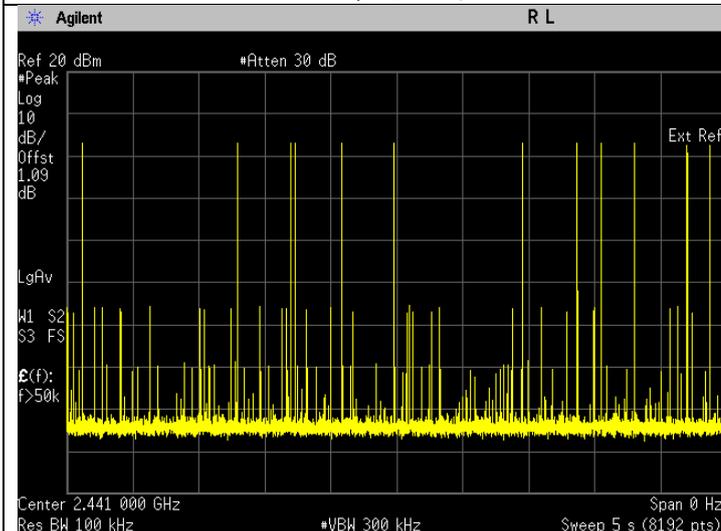
ii. Dwell Time at DH3, GFSK



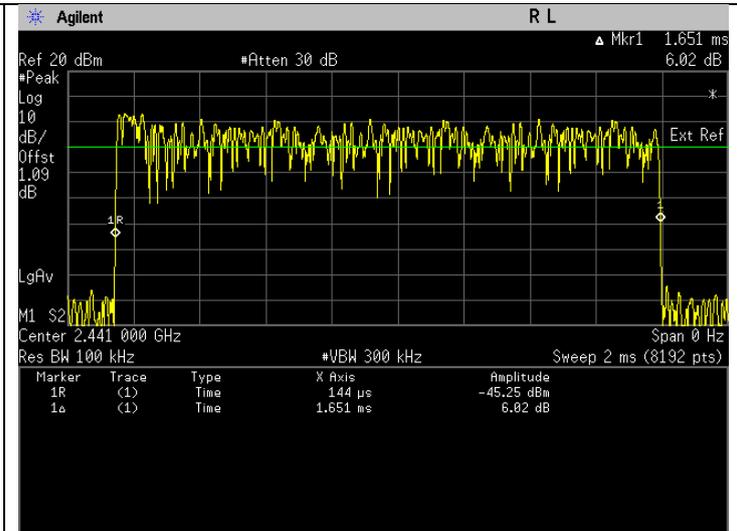
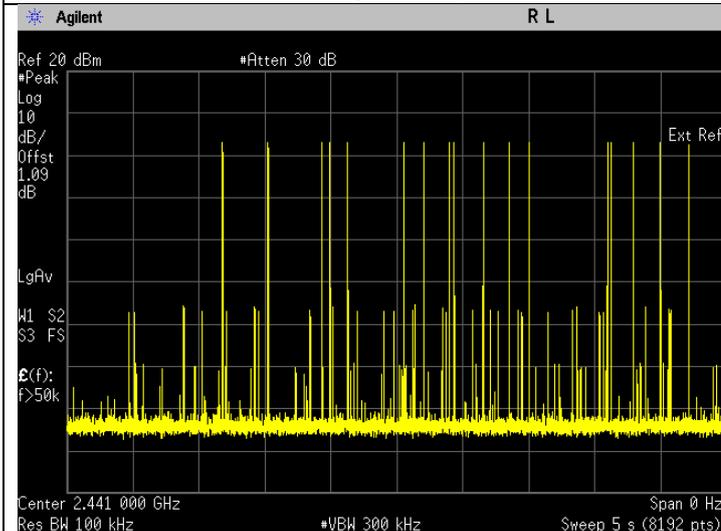
iii. Dwell Time at DH5, GFSK



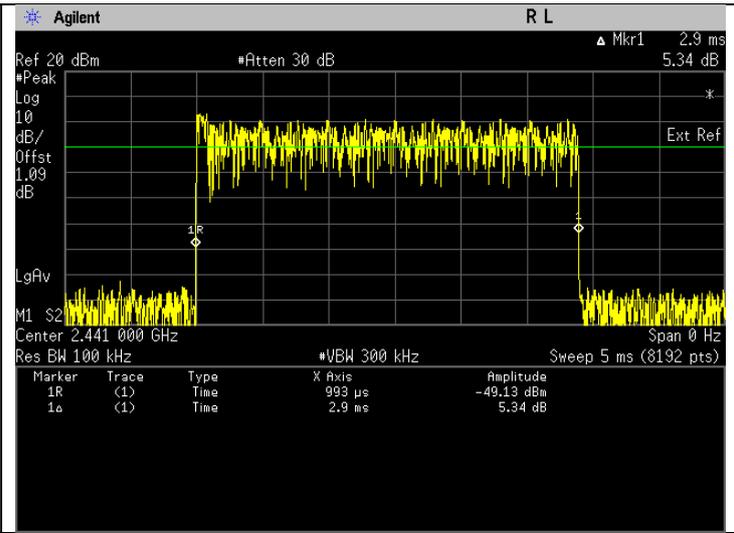
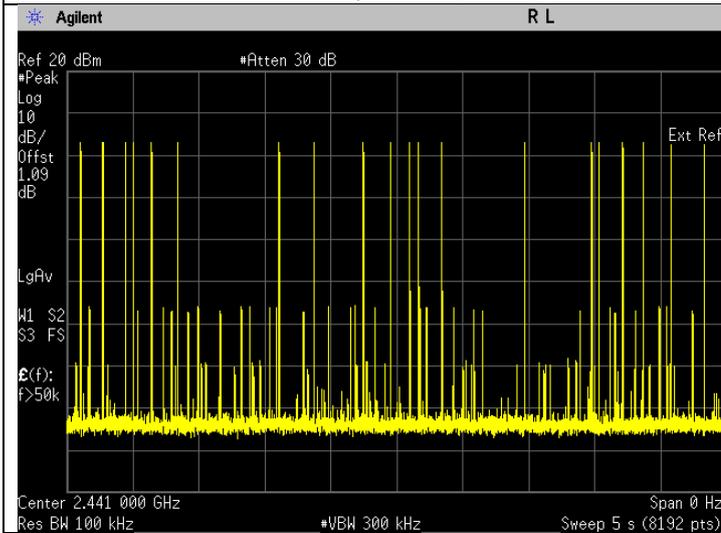
iv. Dwell Time at DH1, PI/4DQPSK



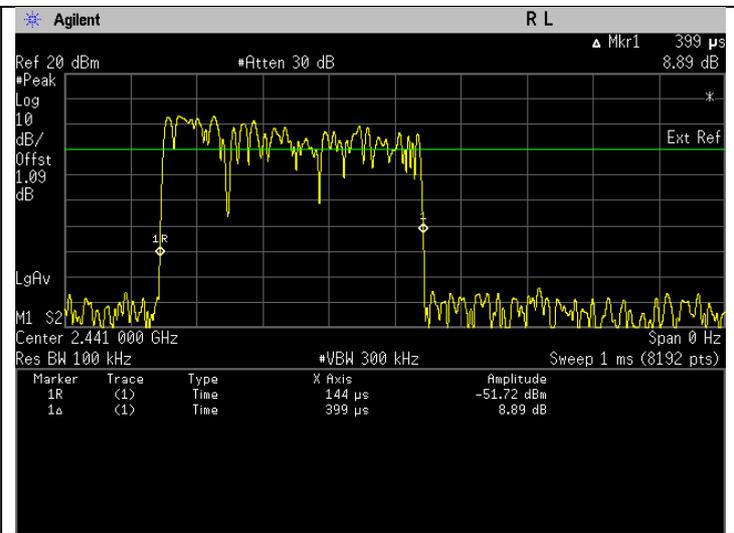
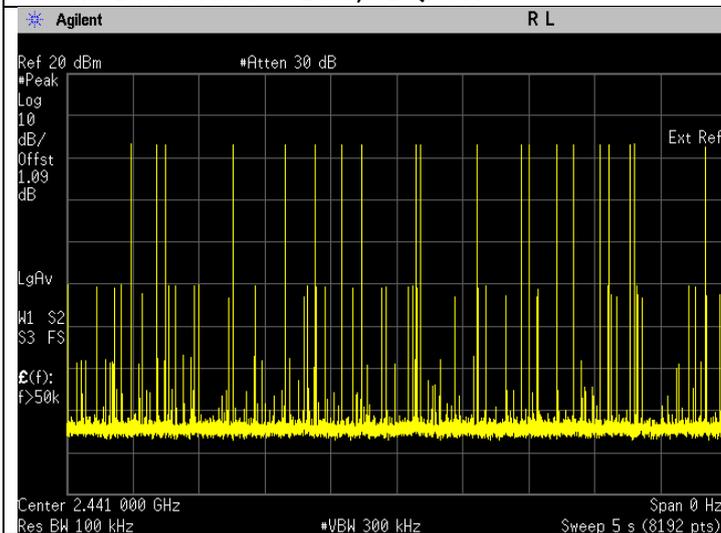
v. Dwell Time at DH3, PI/4DQPSK



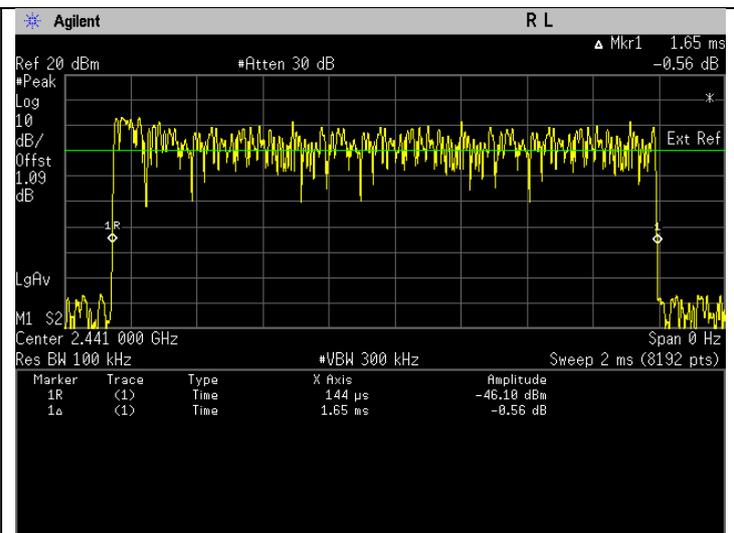
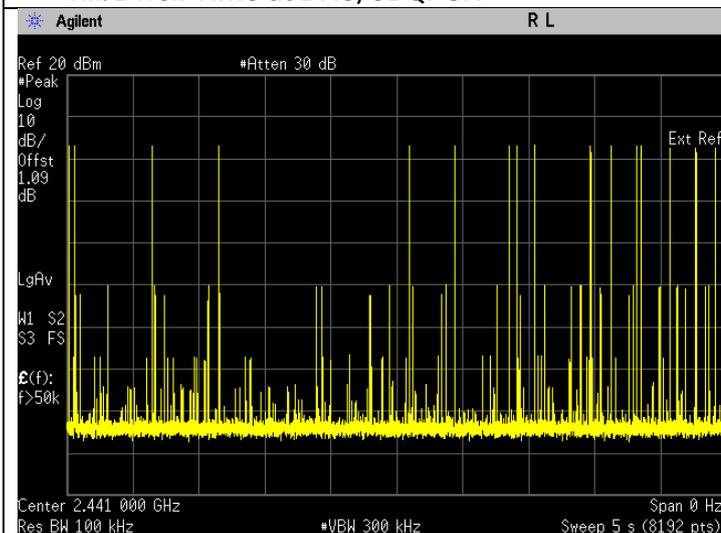
vi. Dwell Time at DH5, PI/4QPSK



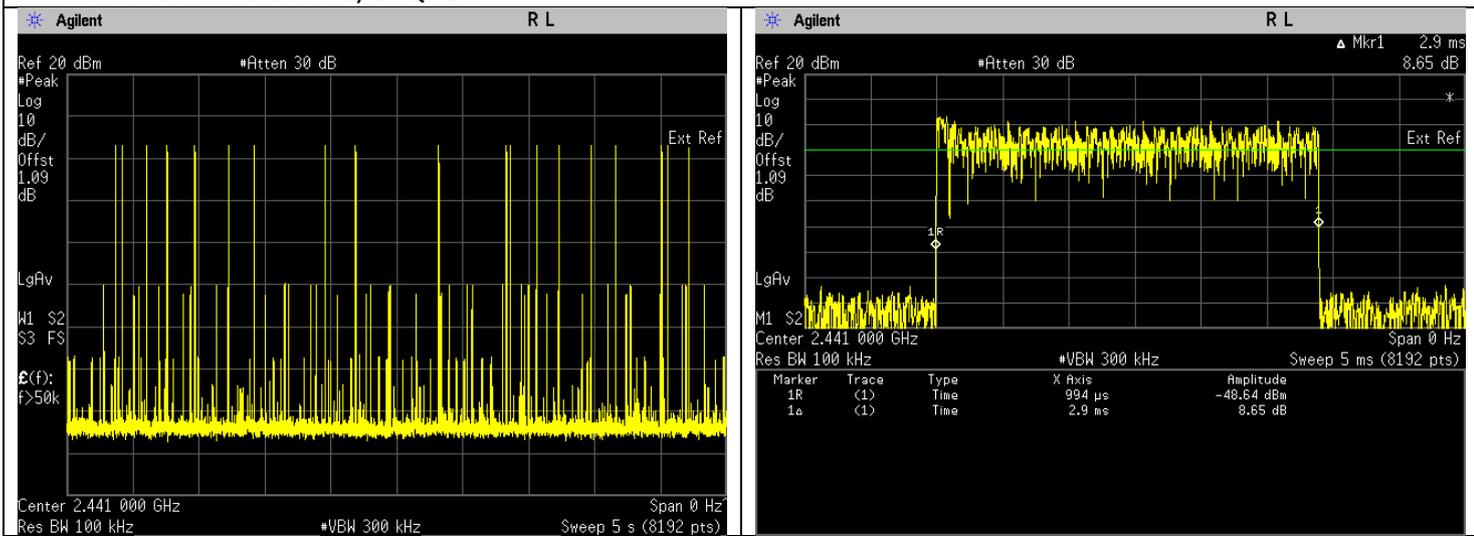
vii. Dwell Time at DH1, 8DQPSK



viii. Dwell Time at DH3, 8DQPSK

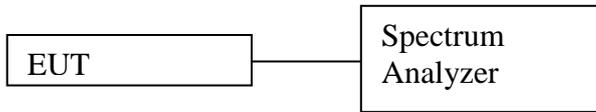


ix. Dwell Time at DH5, 8DQPSK



6.5. Number of hopping Frequency

6.5.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the EUT and keep the EUT in hopping mode.
- c) Connect EUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
 - a. RBW = 300 kHz
 - b. VBW = 300 kHz
 - c. Detector mode = Peak
 - d. Trace = Max hold
- e) Allow the trace to stabilized & save the plot result from spectrum analyzer screen.
- f) Count number of channel frequency in the operating.
- g) Repeat above procedure for other test frequency.

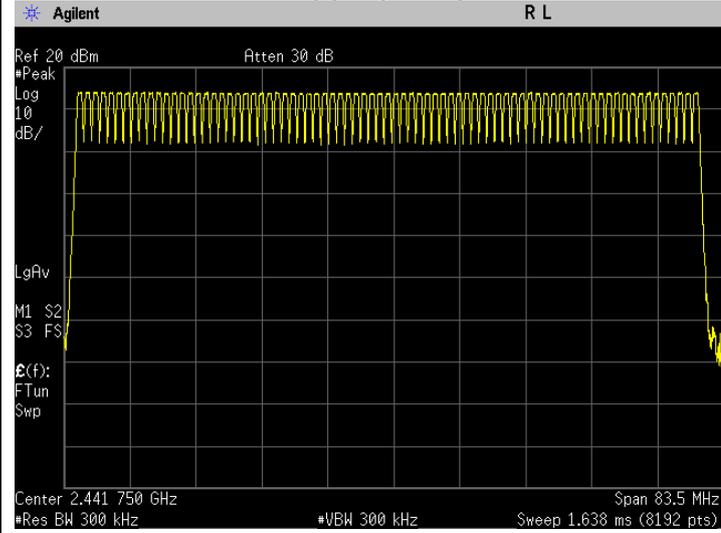
6.5.2. Test Limits:

Normal Condition (25 ° C)
≥ 15

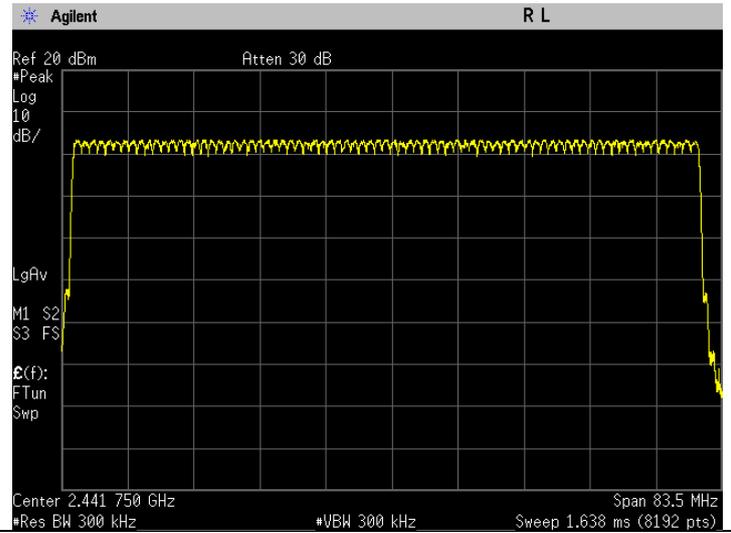
6.5.3. Test Result

Test Conditions			Results	
Modulation	Voltage(V)	Test Frequency (GHz)	No. of Hopping Frequencies	Status
GFSK	3.80	2.4020-2.4835	79	Pass
Pi/4DQPSK	3.80	2.4020-2.4835	79	Pass
8DPSK	3.80	2.4020-2.4835	79	Pass

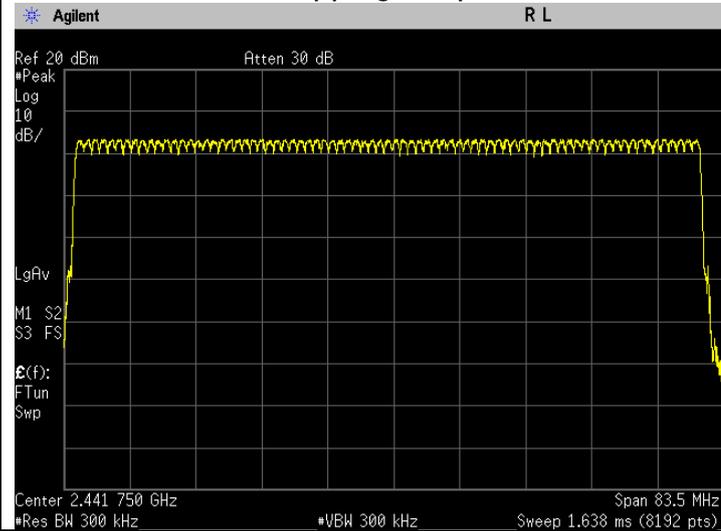
i. Number of Hopping Frequencies, GFSK



ii. Number of Hopping Frequencies, Pi/4 DQPSK

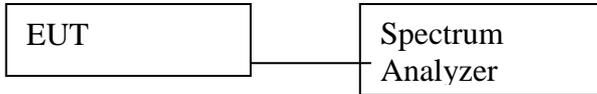


iii. Number of Hopping Frequencies, 8DPSK



6.6. Channel Separation

6.6.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the EUT and keep the EUT in hopping mode.
- c) Connect EUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
 - a. RBW = 300 kHz
 - b. VBW = 300 kHz
 - c. SPAN = 3 MHz, center on test frequency
 - d. AMPLITUDE → Scale/Div = 5 dB
 - e. Detector mode = Peak
 - f. Trace = Max hold
 - g. Sweep = auto
- e) Measure the frequency different of these two adjacent channels with marker delta function & record the measurement results.
- f) Repeat above procedure with other different mode of operation.

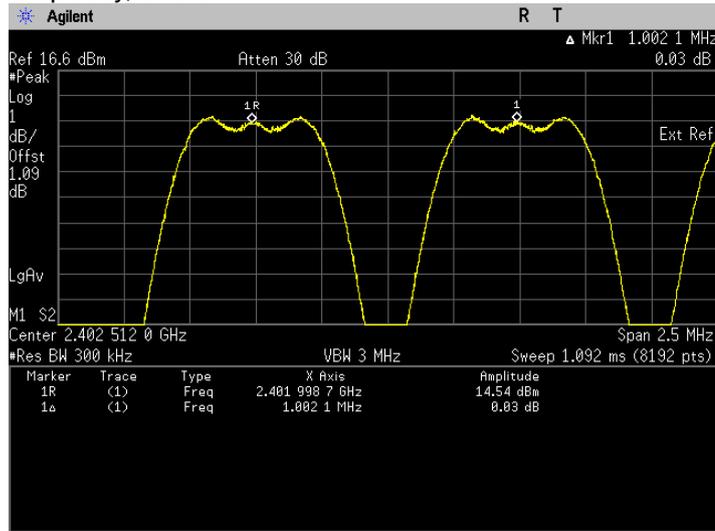
6.6.2. Test Limits:

Normal Condition (25 ° C)
≥ 2/3 of 20dB Bandwidth

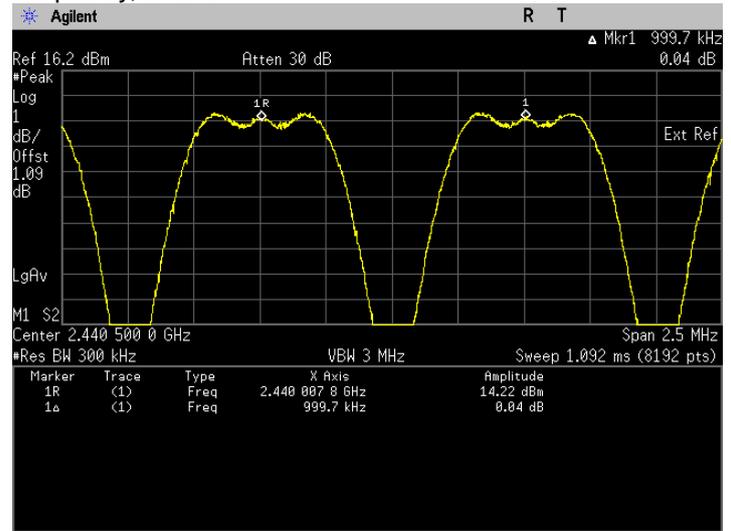
6.6.3. Test Result

Test Conditions			Results			
Modulation	Voltage(V)	Test Frequency (GHz)	Adjacent Channel Separation (MHz)	20dB Bandwidth (MHz)	2/3 of 20dB Bandwidth (kHz)	Status
GFSK	3.80	2.4020	1.002	0.982	654.667	Pass
		2.4410	1.000	0.973	648.667	Pass
		2.4800	0.999	0.971	647.333	Pass
Pi/4DQPSK	3.80	2.4020	1.007	1.283	855.333	Pass
		2.4410	0.995	1.285	856.667	Pass
		2.4800	0.992	1.283	855.333	Pass
8DPSK	3.80	2.4020	1.004	1.298	865.333	Pass
		2.4410	1.000	1.296	864.000	Pass
		2.4800	1.006	1.292	861.333	Pass

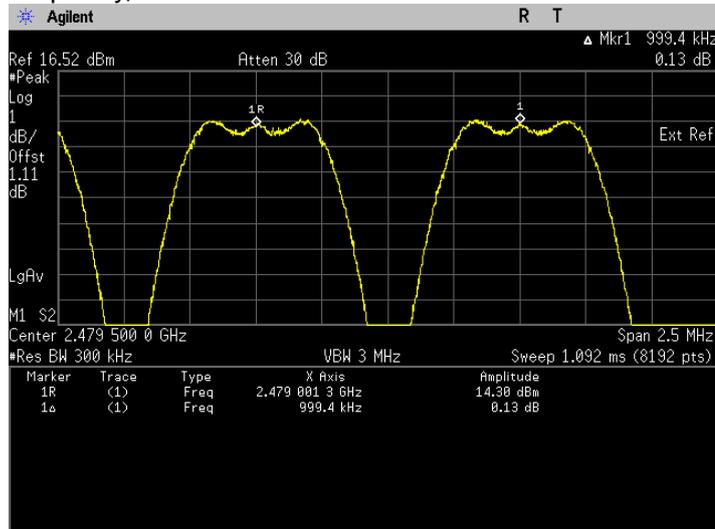
The Conducted RF Output Power test with result at low frequency, GFSK.



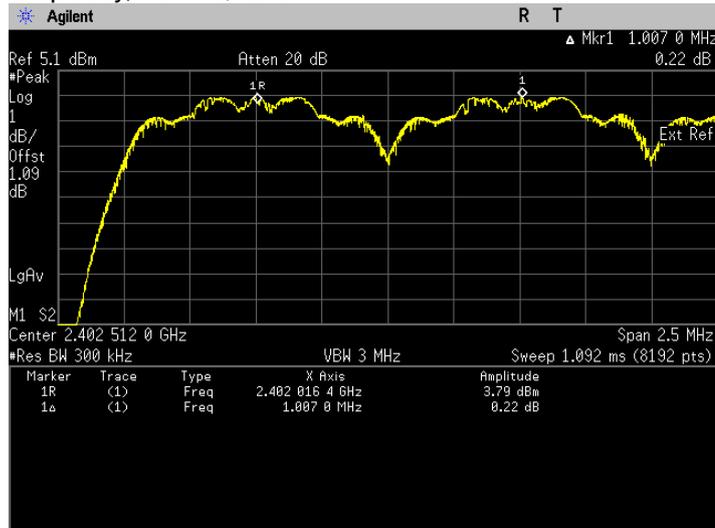
The Conducted RF Output Power test with result at mid frequency, GFSK.



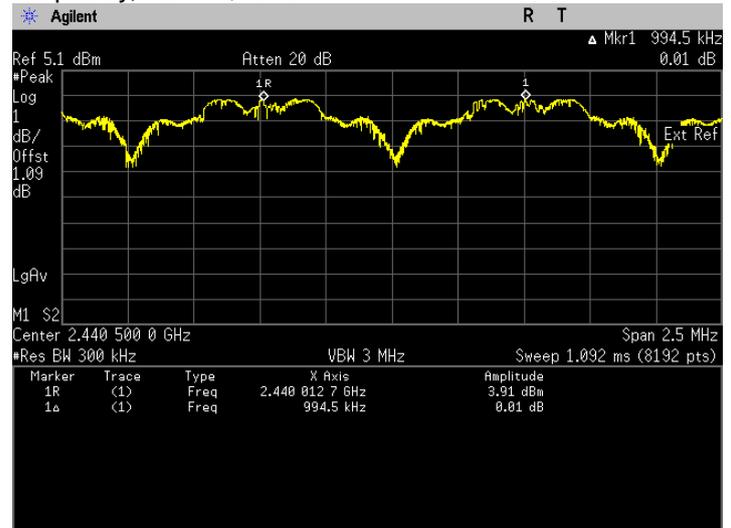
The Conducted RF Output Power test with result at high frequency, GFSK.



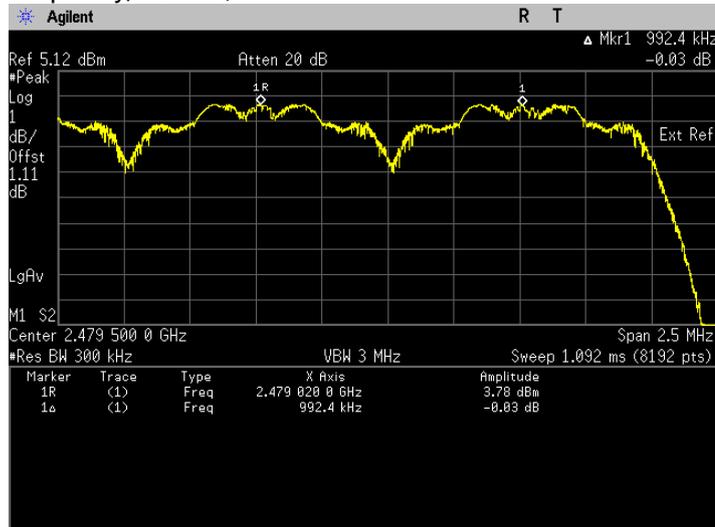
The Conducted RF Output Power test with result at low frequency, Pi/4 DQPSK.



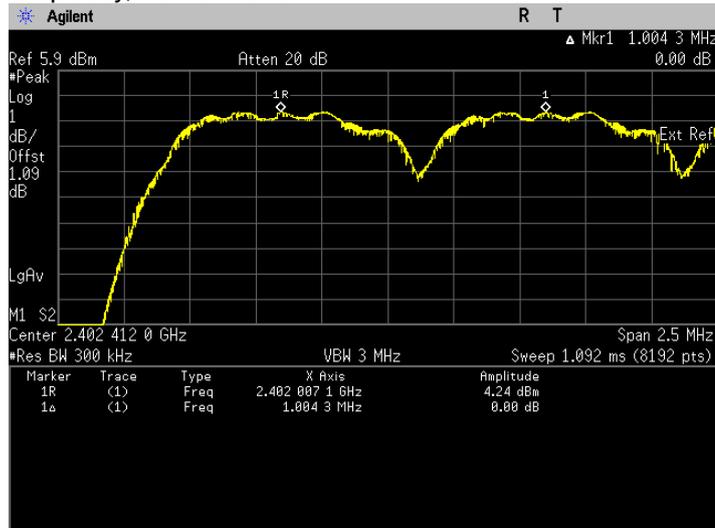
The Conducted RF Output Power test with result at mid frequency, Pi/4 DQPSK.



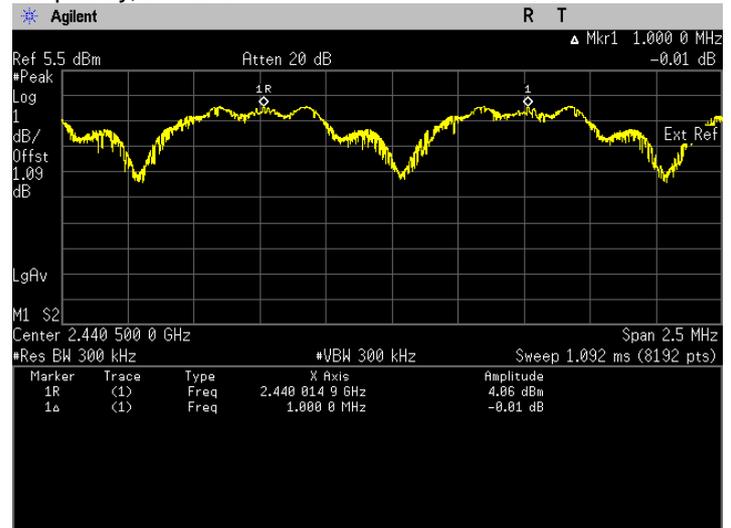
The Conducted RF Output Power test with result at high frequency, Pi/4 DQPSK.



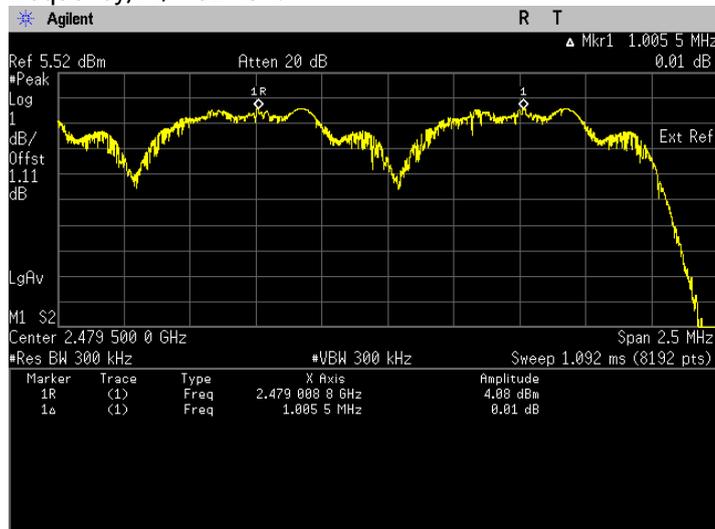
The Conducted RF Output Power test with result at low frequency, Pi/4 8DPSK.



The Conducted RF Output Power test with result at mid frequency, 8DPSK.

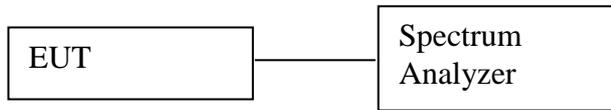


The Conducted RF Output Power test with result at high frequency, Pi/4 8DPSK.



6.7. Conducted Spurious Emission

6.7.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the EUT and set EUT to transmit maximum data rate with hopping disable.
- c) Connect EUT'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. SPAN = Cover until 10th harmonic
 - d. Detector mode = Peak
 - e. AMPLITUDE → Scale/Div = 10 dB
 - f. Trace = Max hold
 - g. Sweep = auto
- e) Measure the captured spurious emission result and recording the plot.
- f) Repeat above procedure with other different mode of operation.

6.7.2. Test Limits:

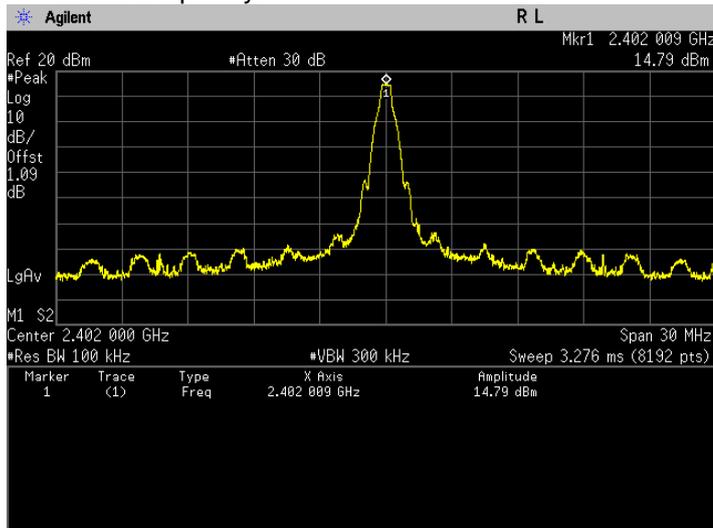
Normal Condition (25 ° C)
Shall be at least 20 dB below for peak power.

6.7.3. Test Data:

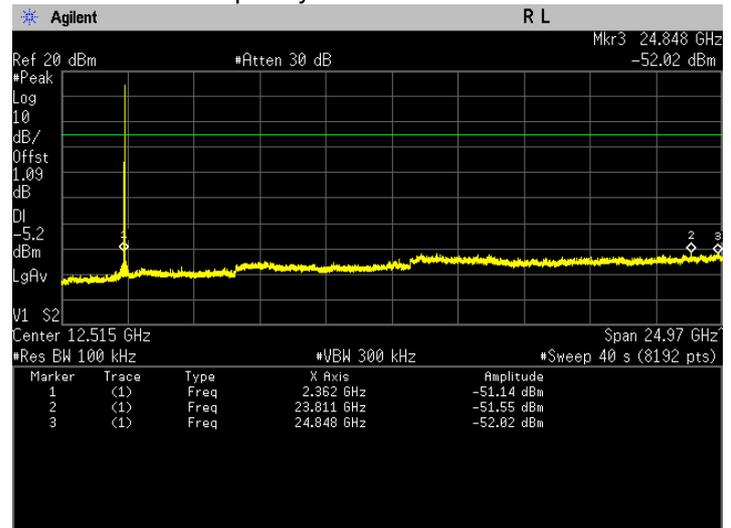
Test Conditions			Results		
Modulation	Voltage(V)	Test Frequency (GHz)	Spurs (MHz)	Level (dBm)	Status
GFSK	3.80	2.4020	2362.000	-51.139	Pass
		2.4410	3408.000	-51.116	Pass
		2.4800	24204.000	-50.784	Pass
Pi/4 DQPSK	3.80	2.4020	24146.000	-50.808	Pass
		2.4410	24860.000	-51.687	Pass
		2.4800	24564.000	-51.777	Pass
8DPSK	3.80	2.4020	24845.000	-51.686	Pass
		2.4410	24805.000	-51.557	Pass
		2.4800	24787.000	-50.818	Pass

GFSK Modulation:

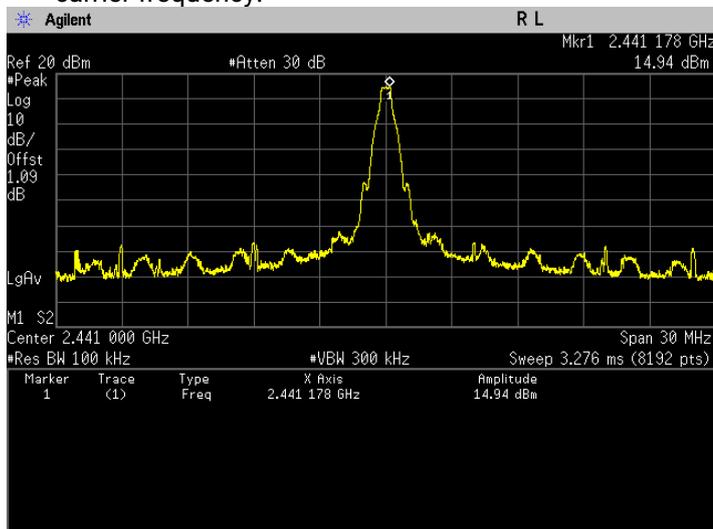
- The high emission level within the assigned band at low carrier frequency.



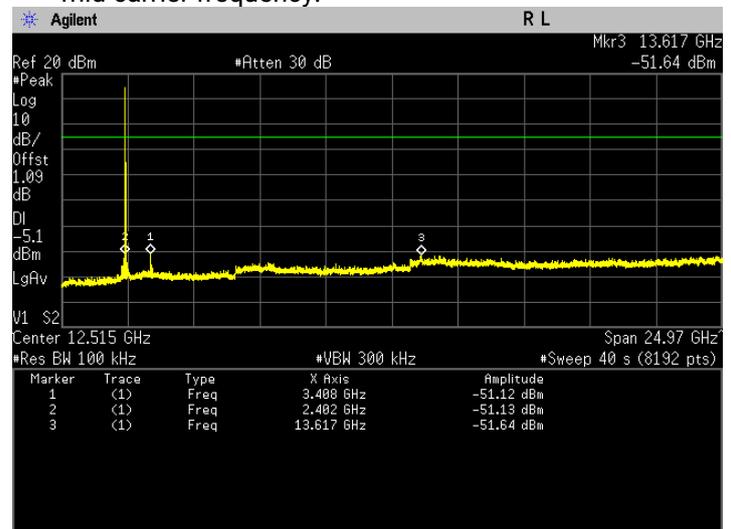
- Spurious emission measurement in 30MHz – 25GHz at low carrier frequency.



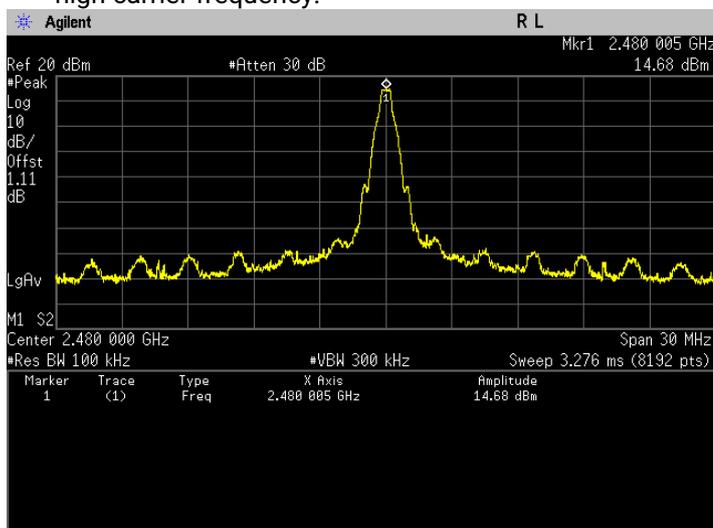
- The high emission level within the assigned band at mid carrier frequency.



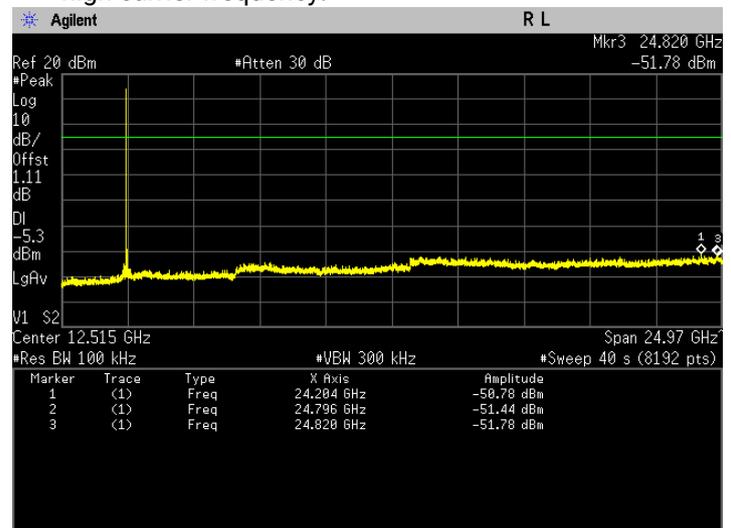
- Spurious emission measurement in 30MHz – 25GHz at mid carrier frequency.



- The high emission level within the assigned band at high carrier frequency.

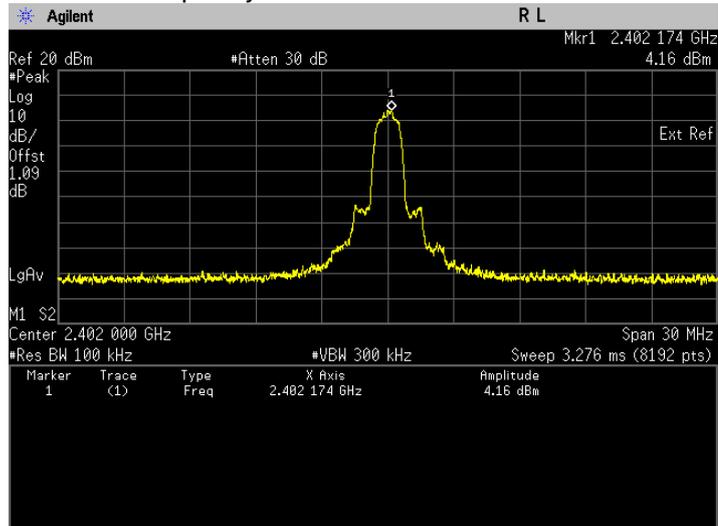


- Spurious emission measurement in 30MHz – 25GHz at high carrier frequency.

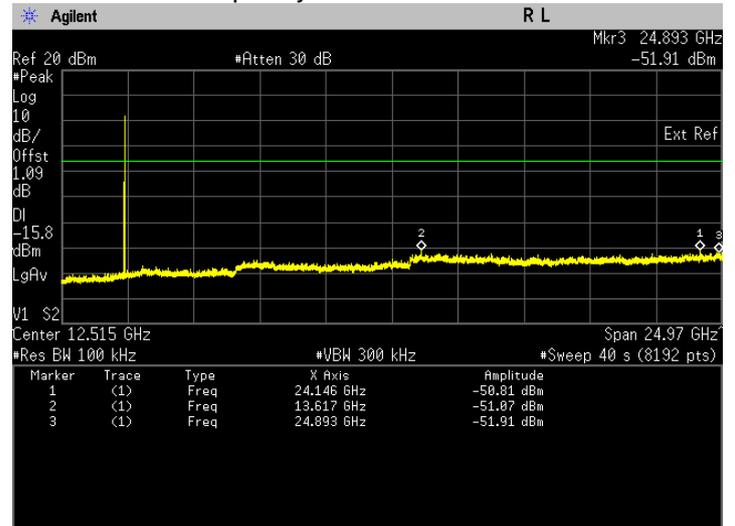


Pi/4 DQPSK Modulation:

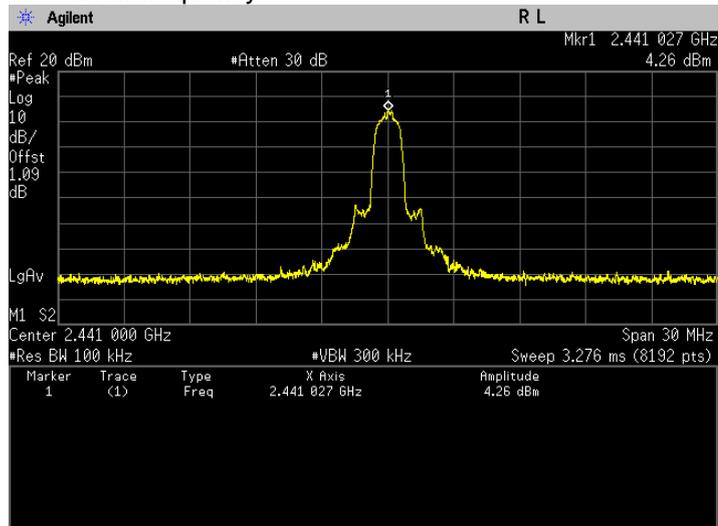
i. The high emission level within the assigned band at low carrier frequency.



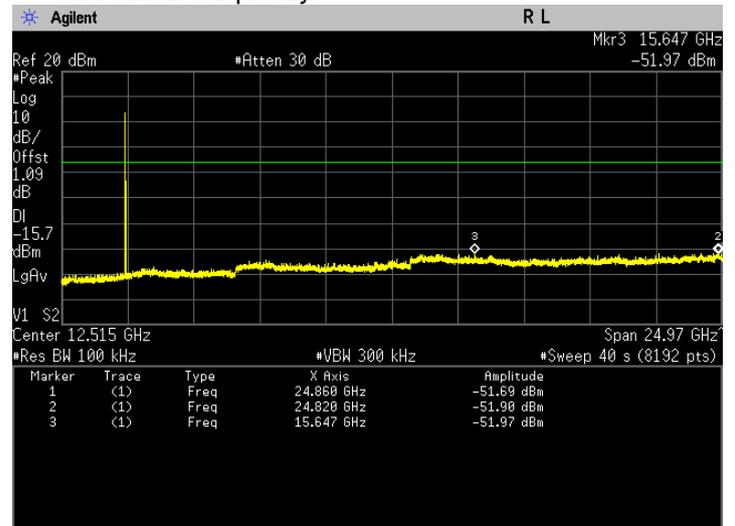
ii. Spurious emission measurement in 30MHz – 25GHz at low carrier frequency.



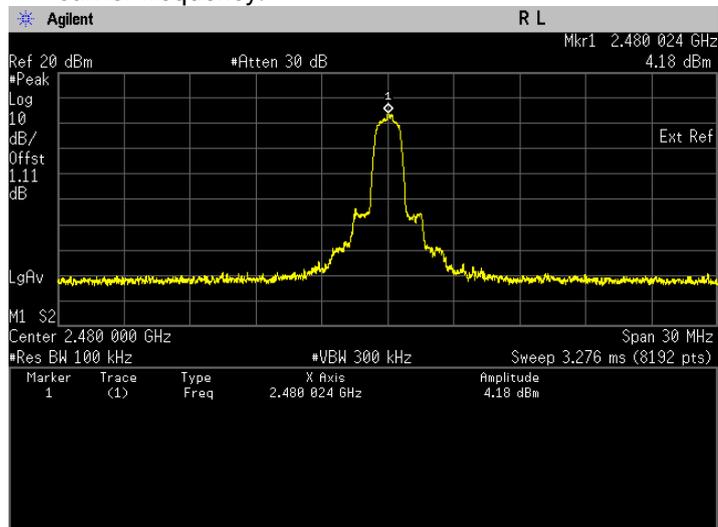
iii. The high emission level within the assigned band at mid carrier frequency.



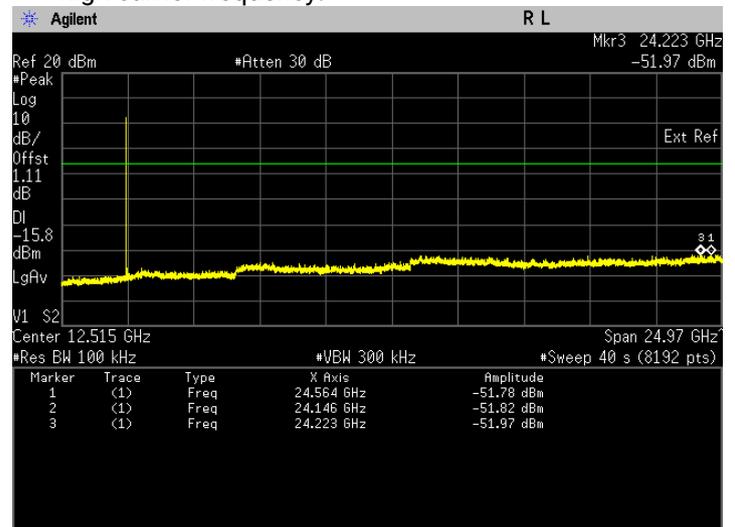
iv. Spurious emission measurement in 30MHz – 25GHz at mid carrier frequency.



v. The high emission level within the assigned band at high carrier frequency.

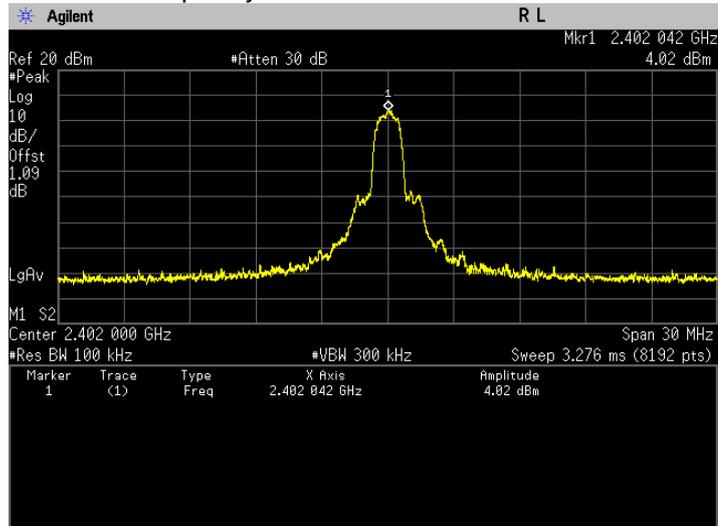


vi. Spurious emission measurement in 30MHz – 25GHz at high carrier frequency.

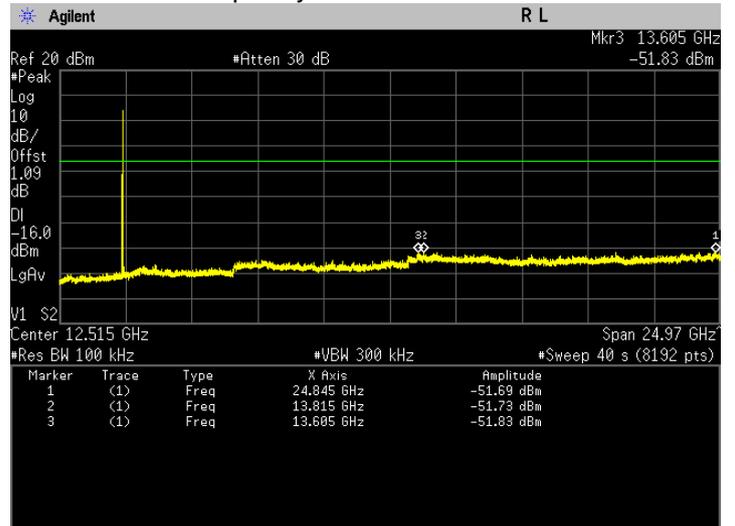


8DPSK Modulation:

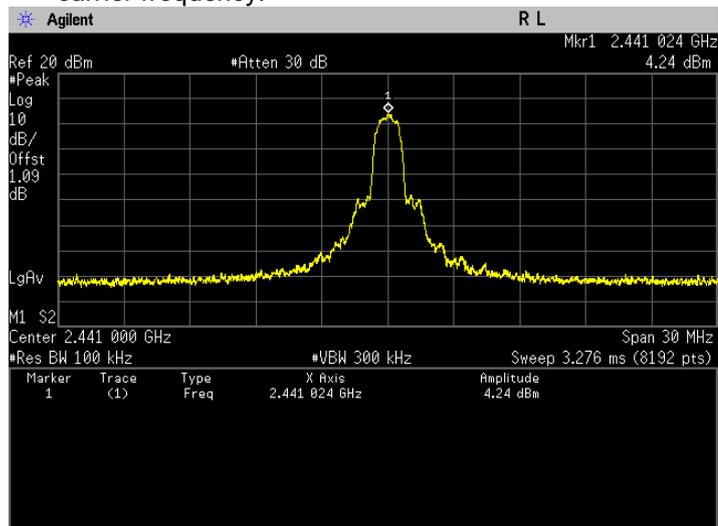
i. The high emission level within the assigned band at low carrier frequency.



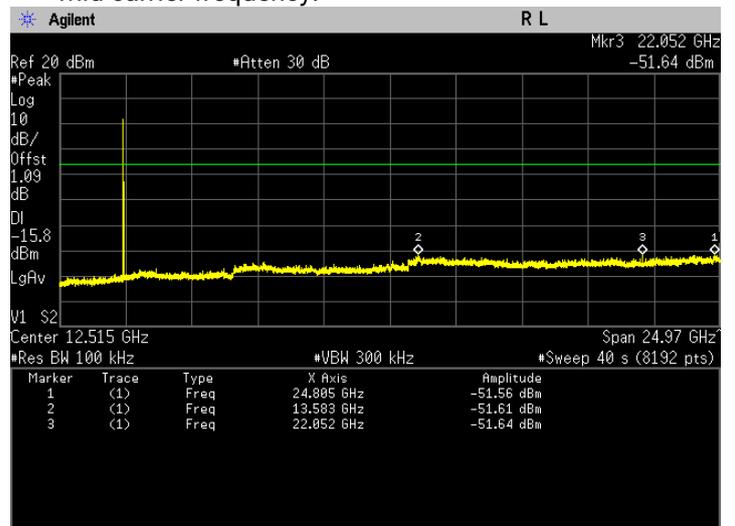
ii. Spurious emission measurement in 30MHz – 25GHz at low carrier frequency.



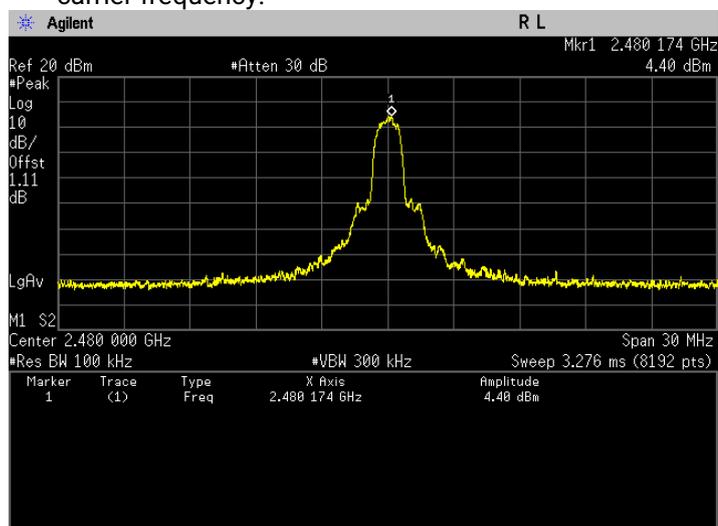
iii. The high emission level within the assigned band at mid carrier frequency.



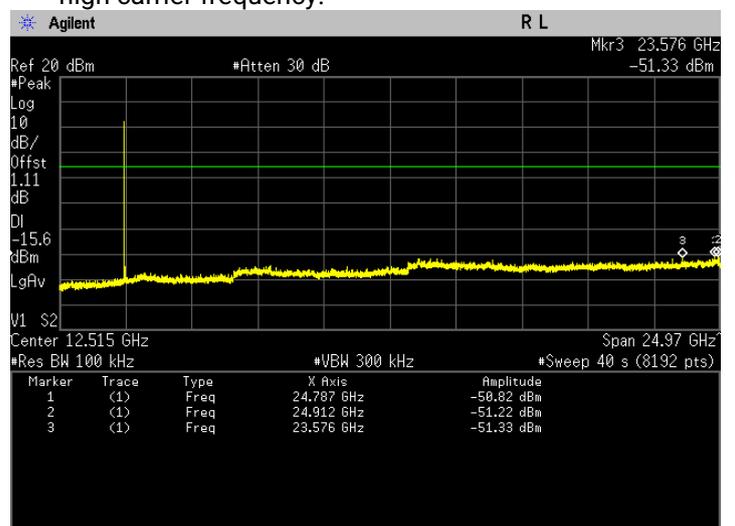
iv. Spurious emission measurement in 30MHz – 25GHz at mid carrier frequency.



v. The high emission level within the assigned band at high carrier frequency.

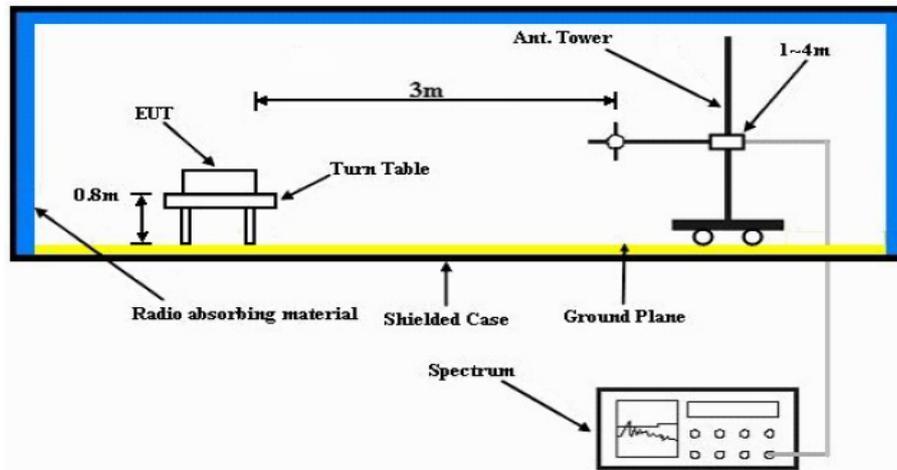


vi. Spurious emission measurement in 30MHz – 25GHz at high carrier frequency.



6.8. Radiated Emission within restricted Bands

6.8.1. 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.

6.8.2. Test Limits:

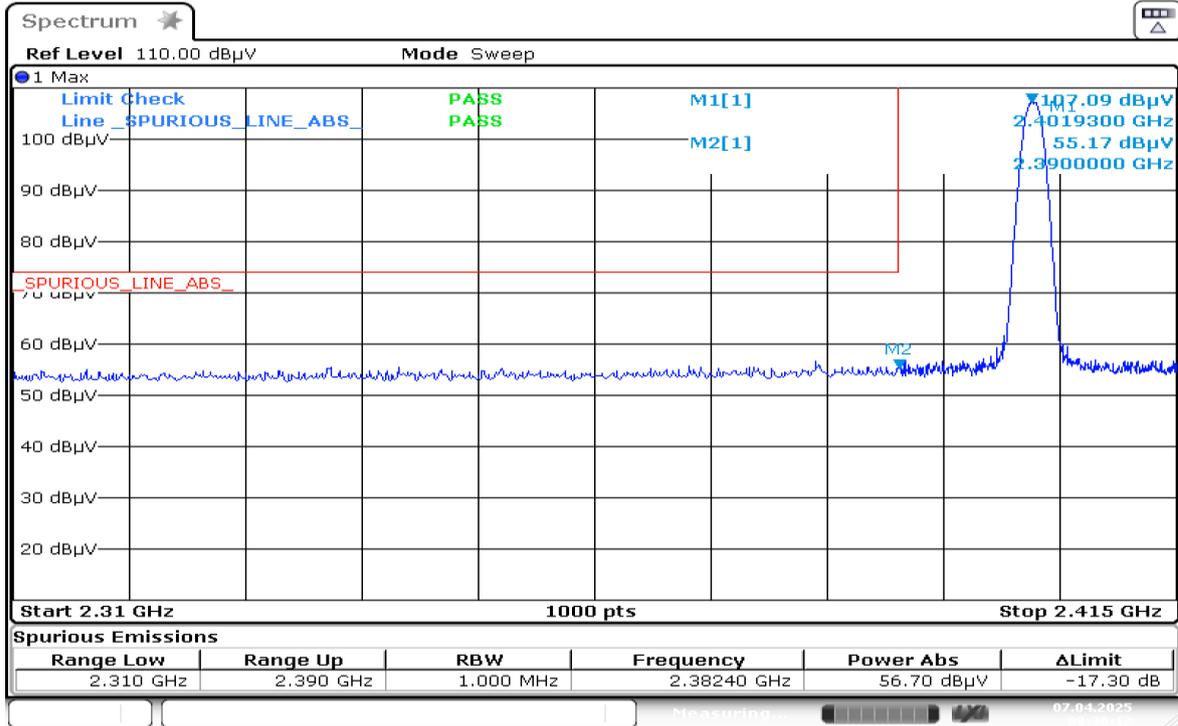
Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power.

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

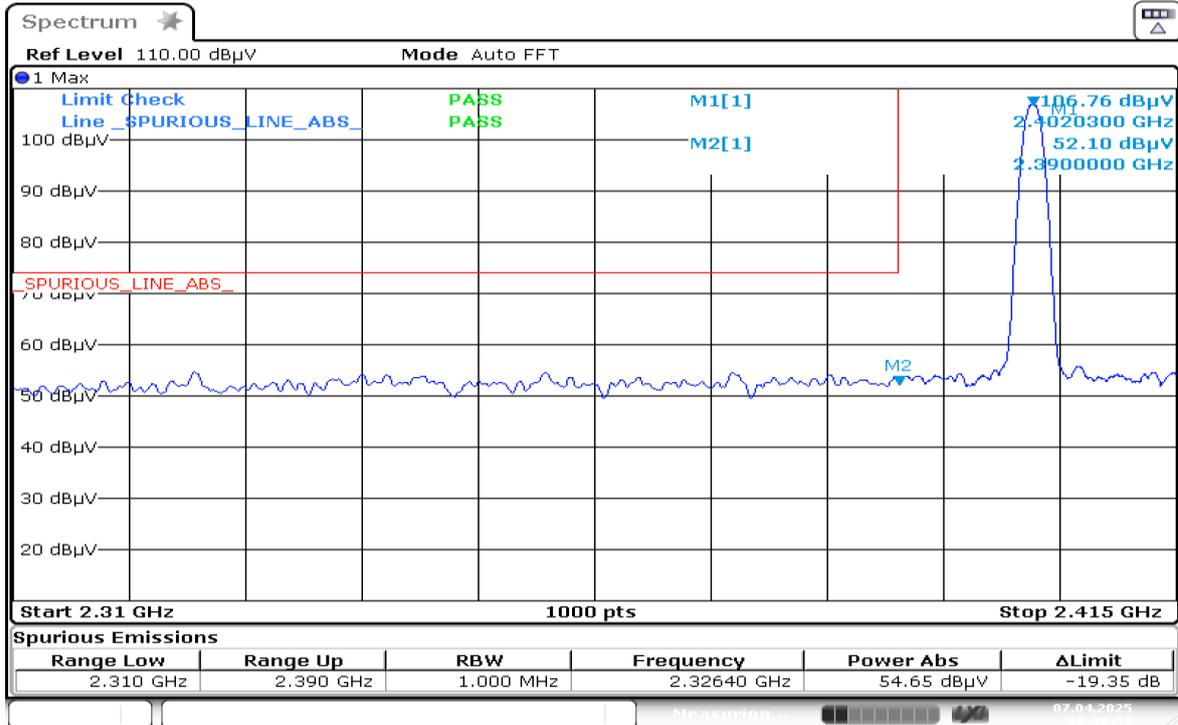
NOTE:

- a. The lower limit shall apply at the transition frequencies.
- b. Emission level (dBuV/m) = 20 log Emission level (uV/m).
- c. 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.

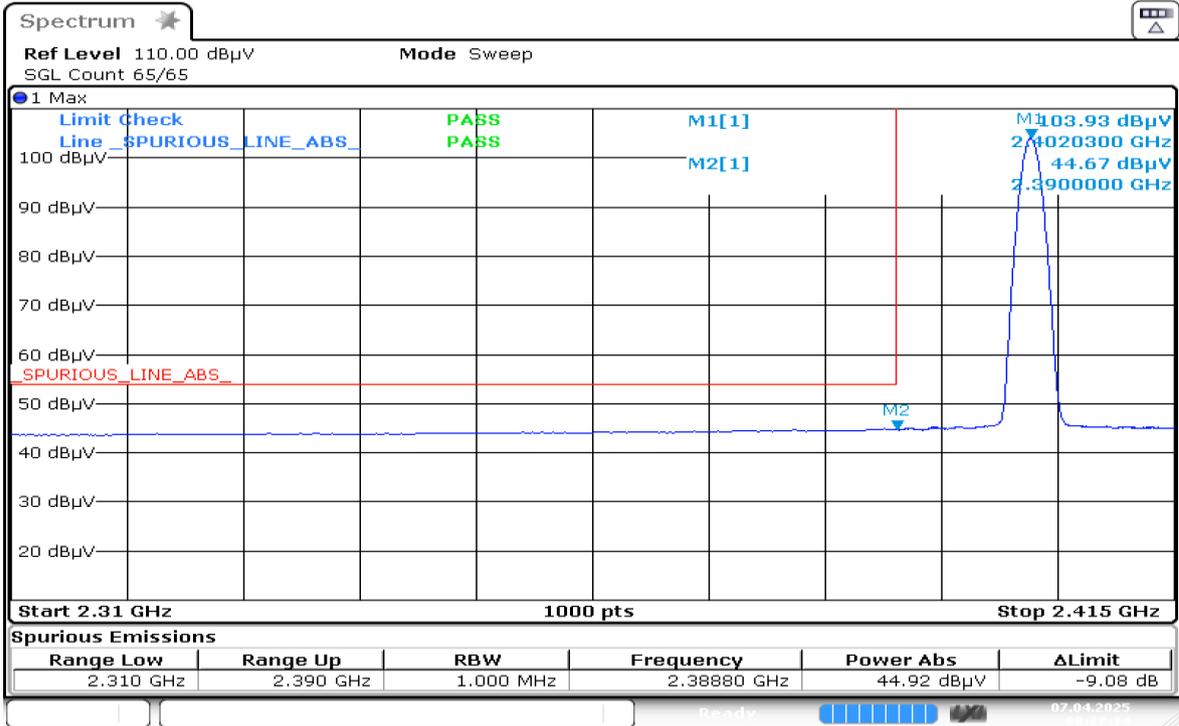
Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



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

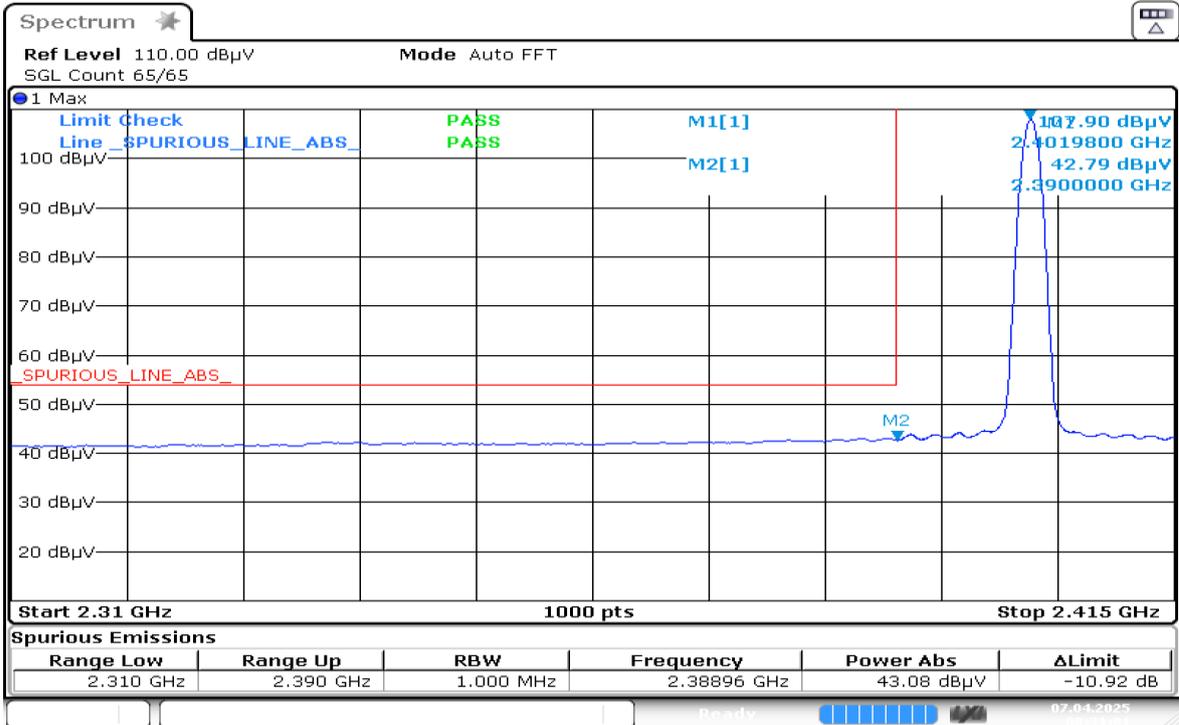


Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



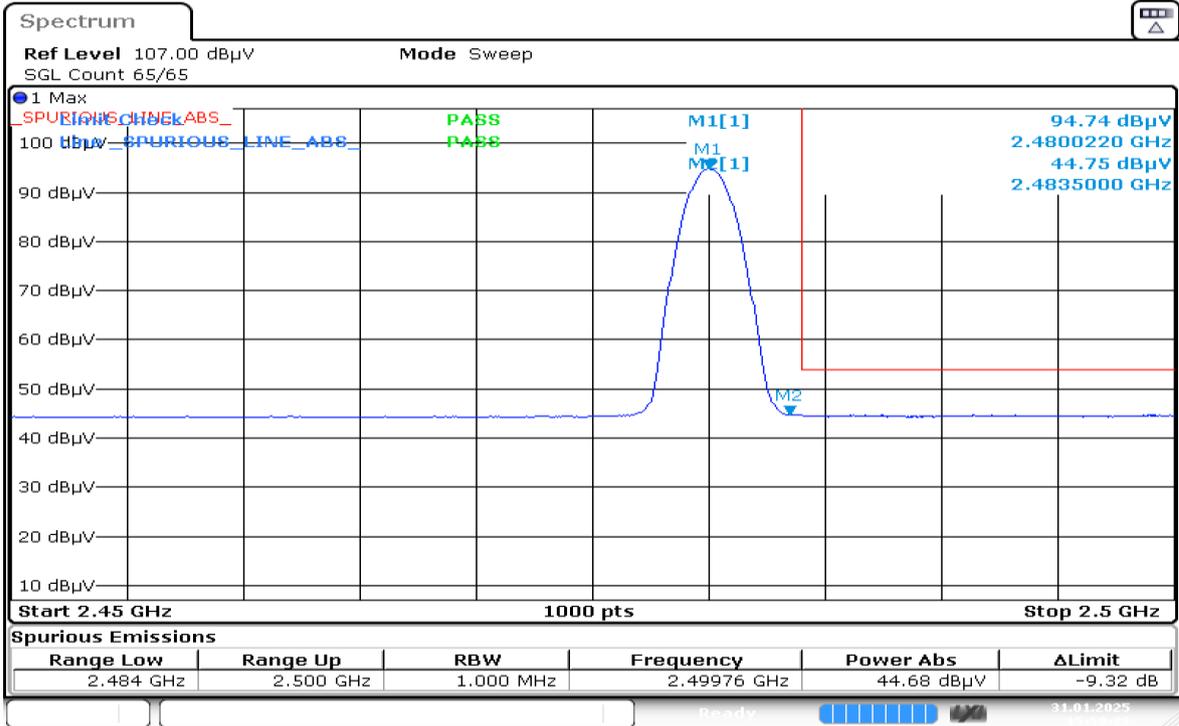
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Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot



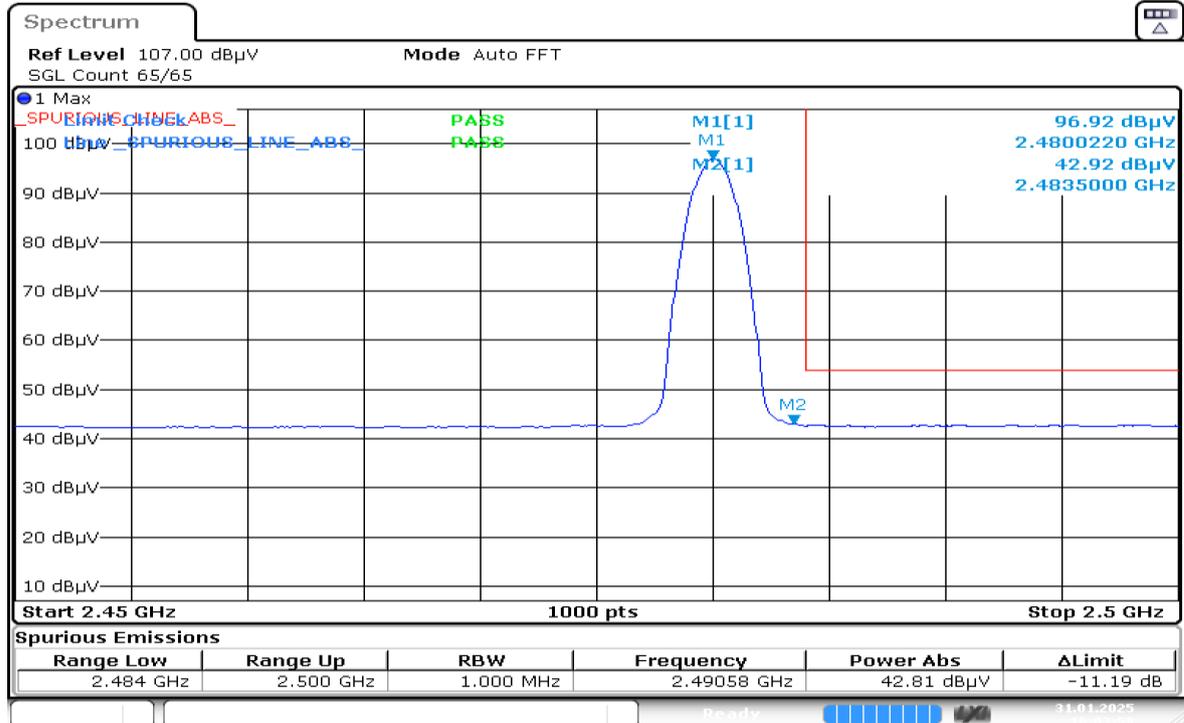
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Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



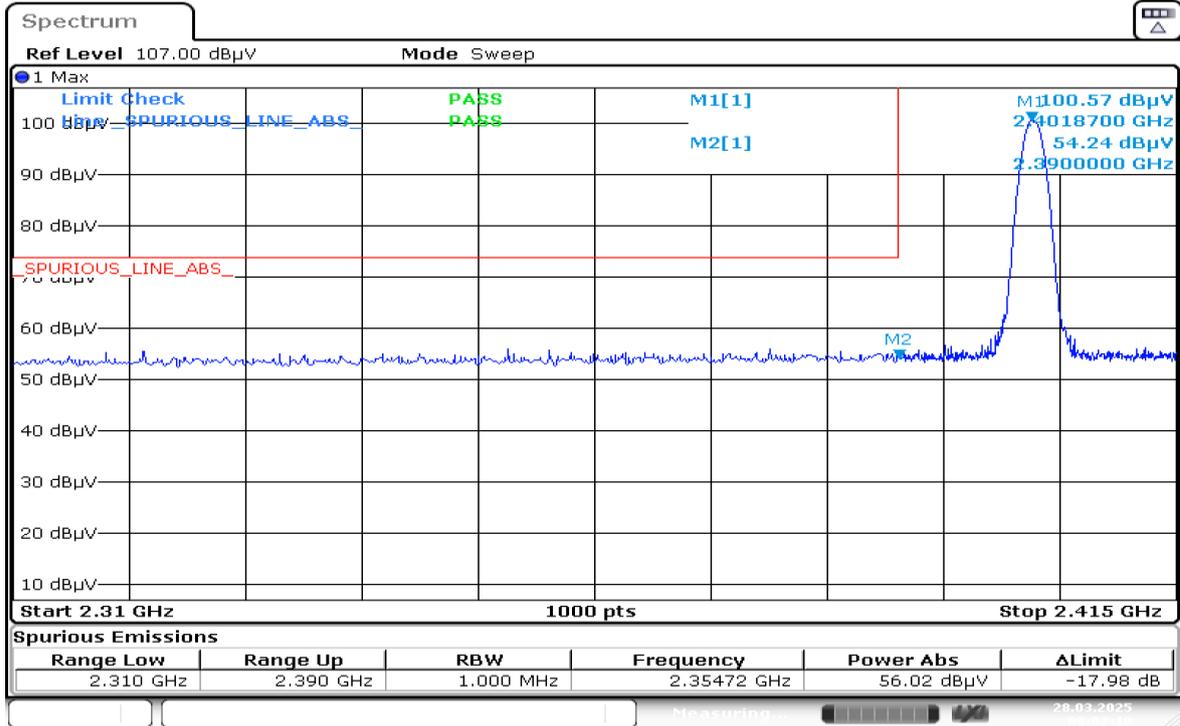
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Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot



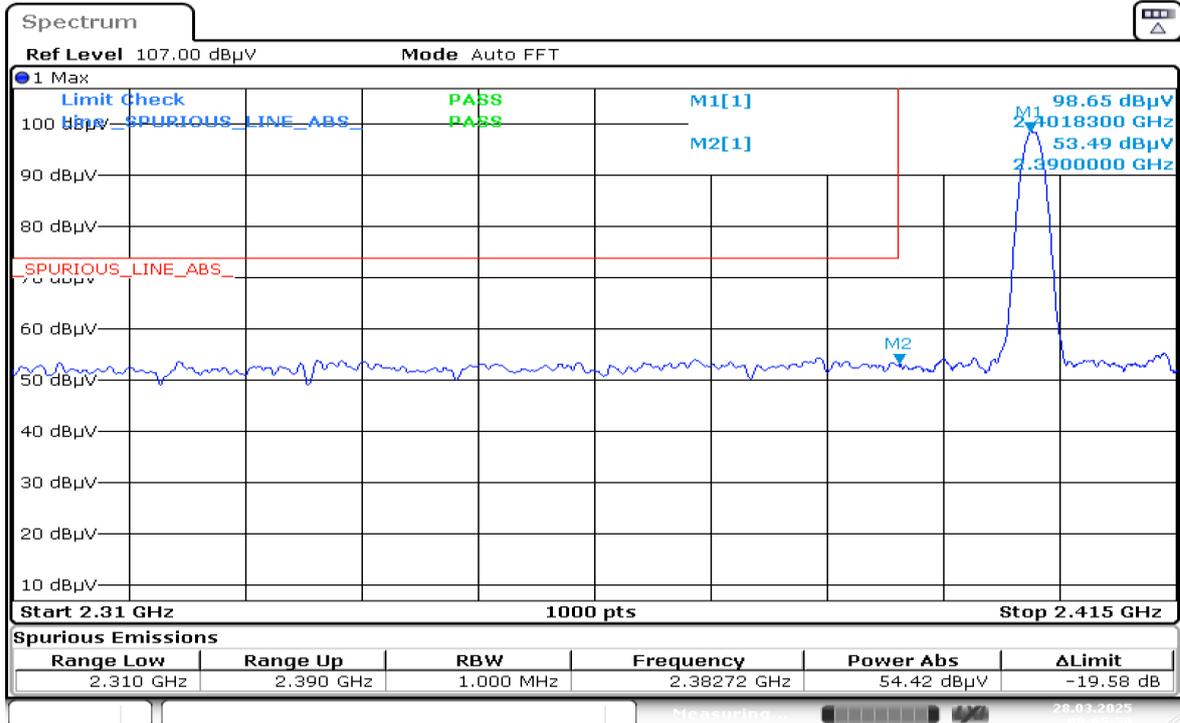
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Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



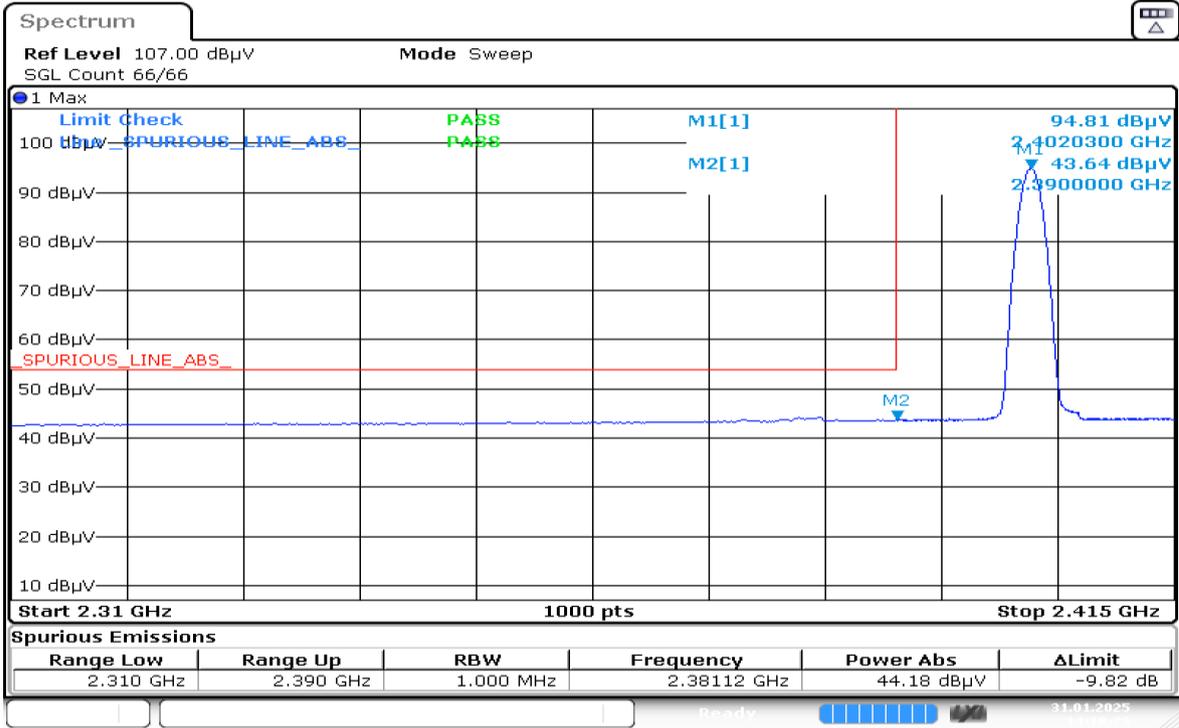
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Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



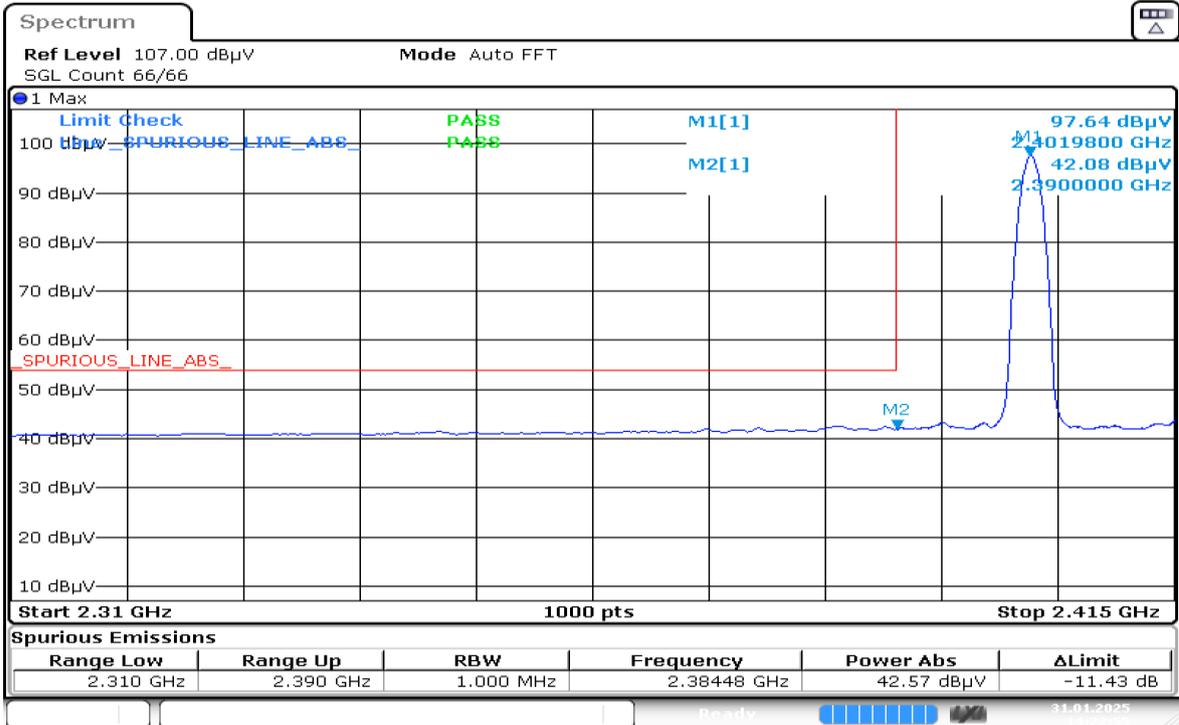
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Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



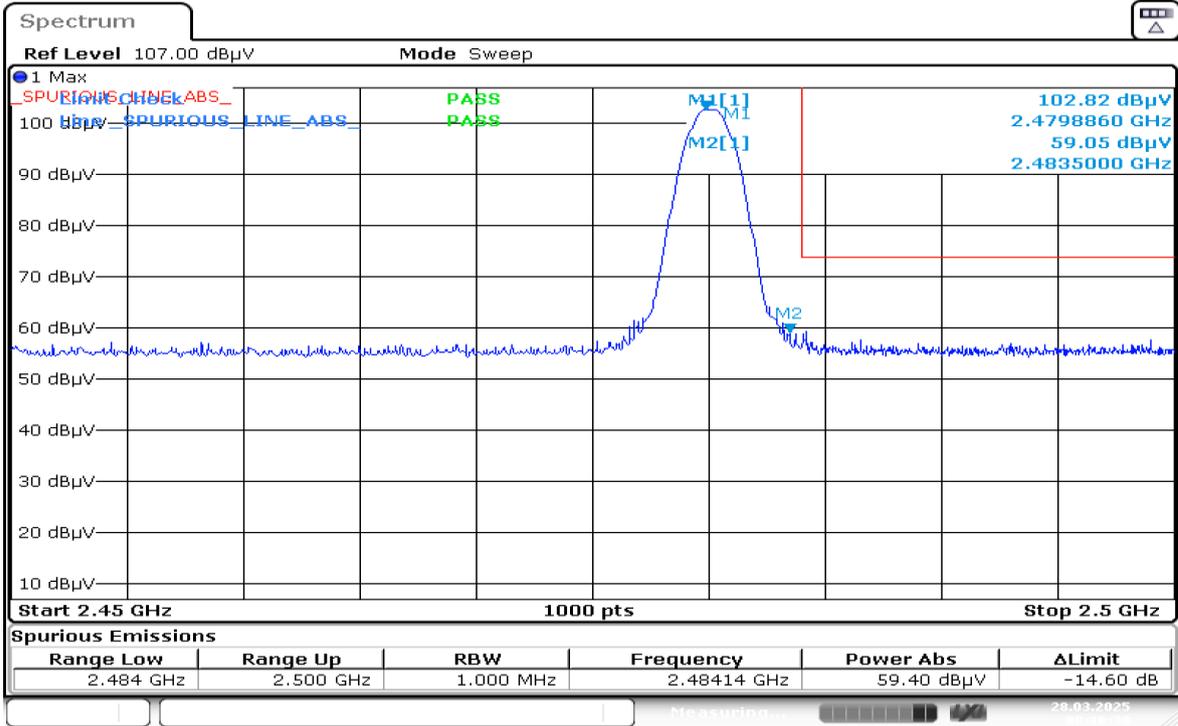
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Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot



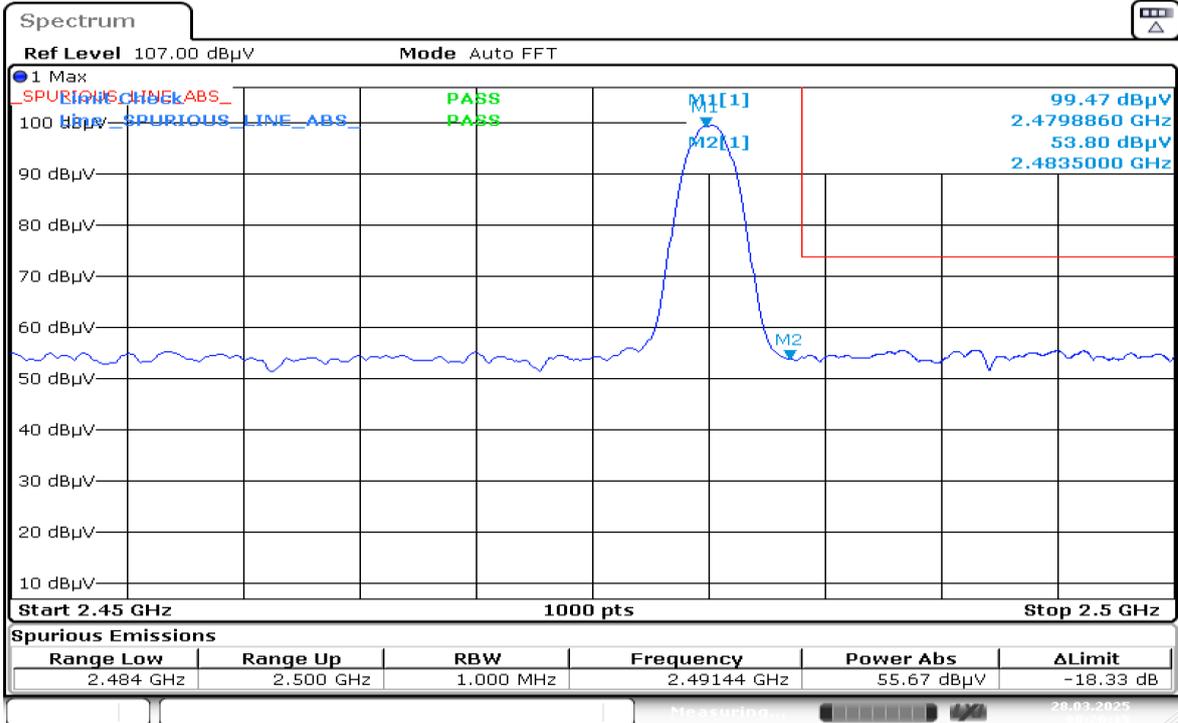
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Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



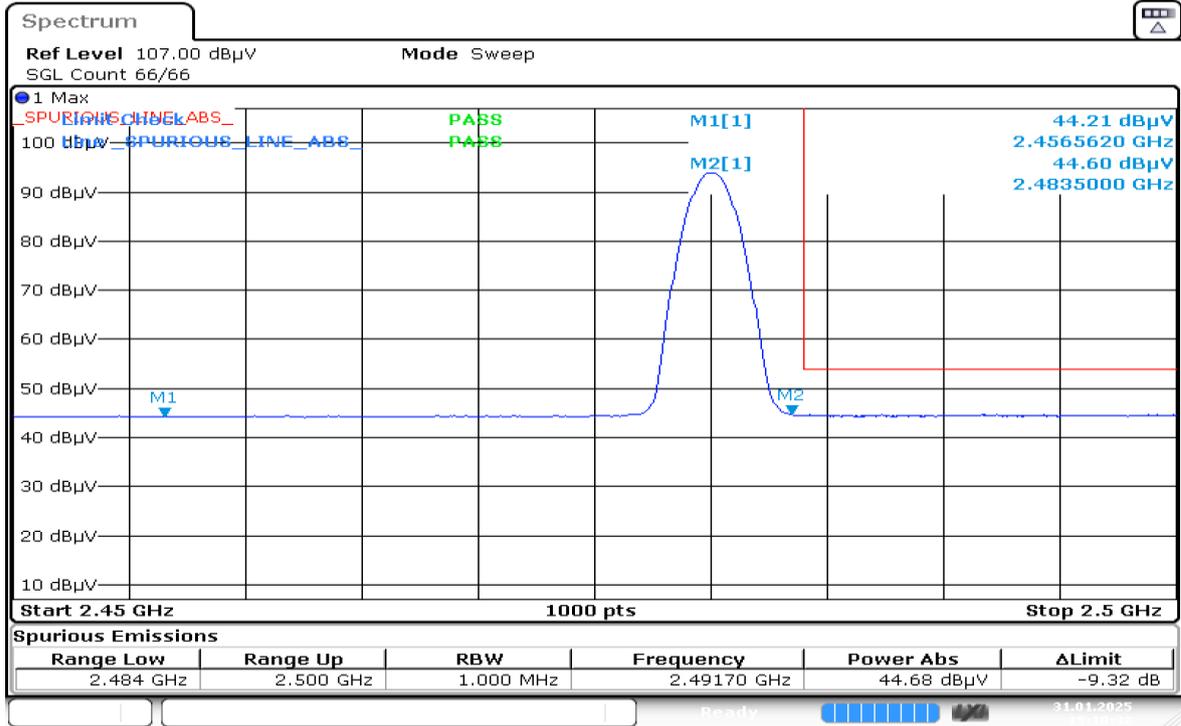
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Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



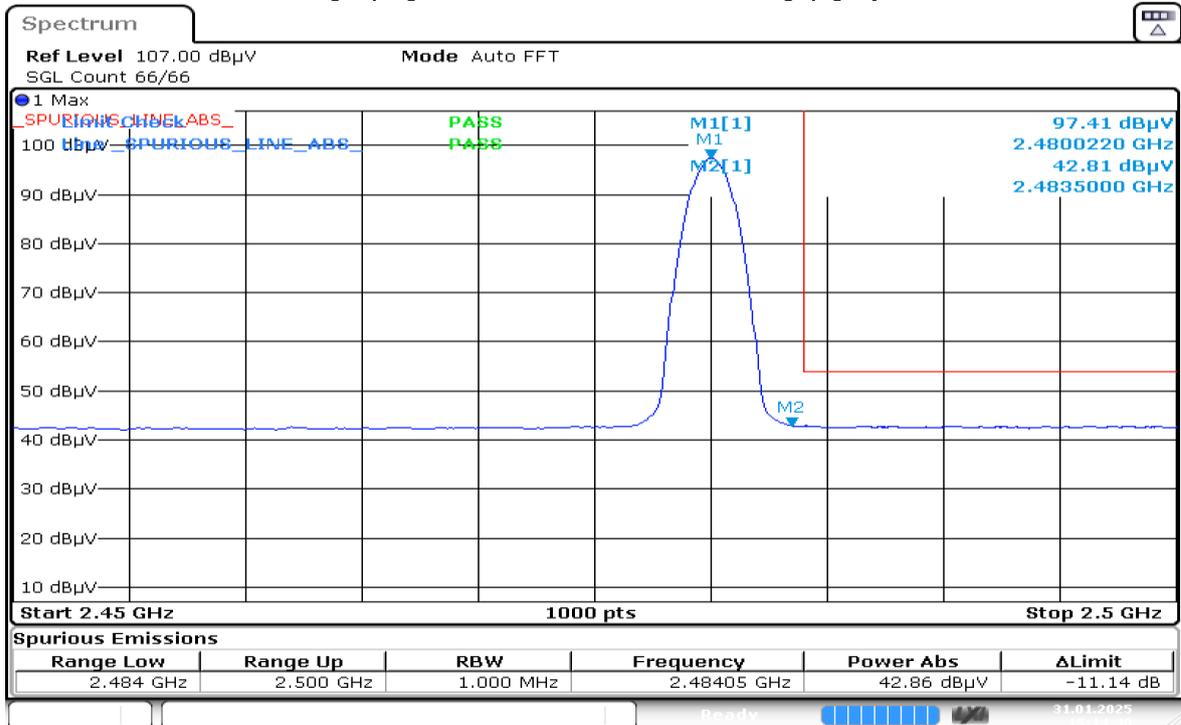
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Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



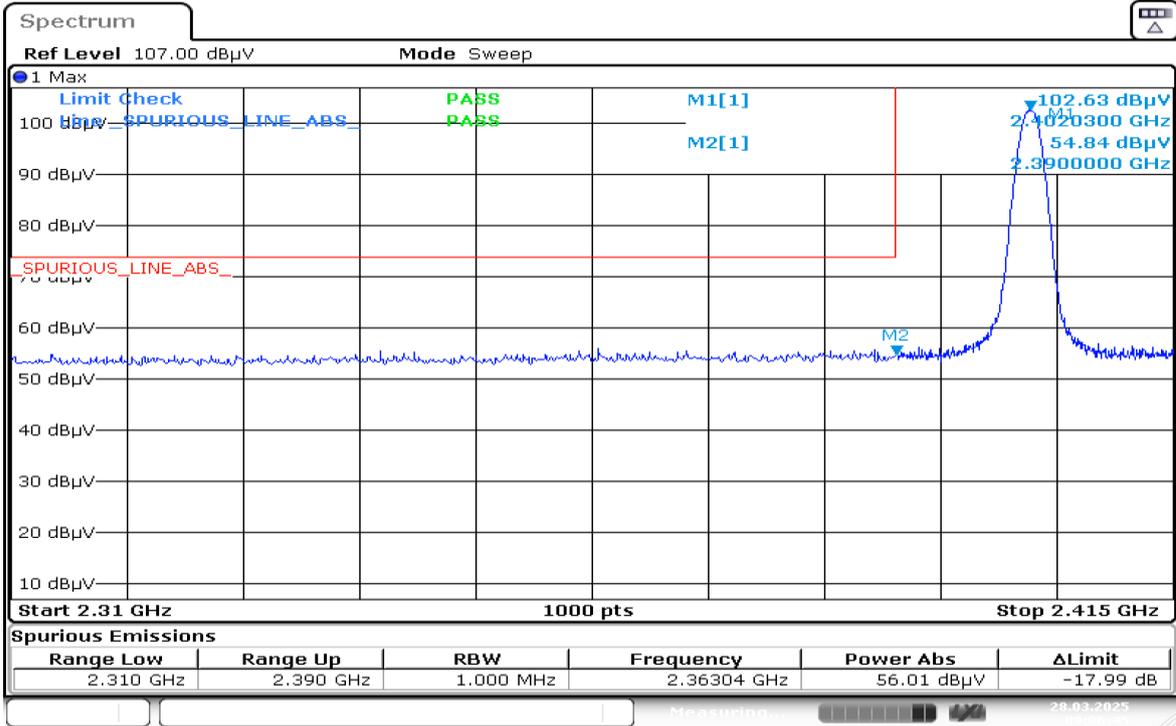
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Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot



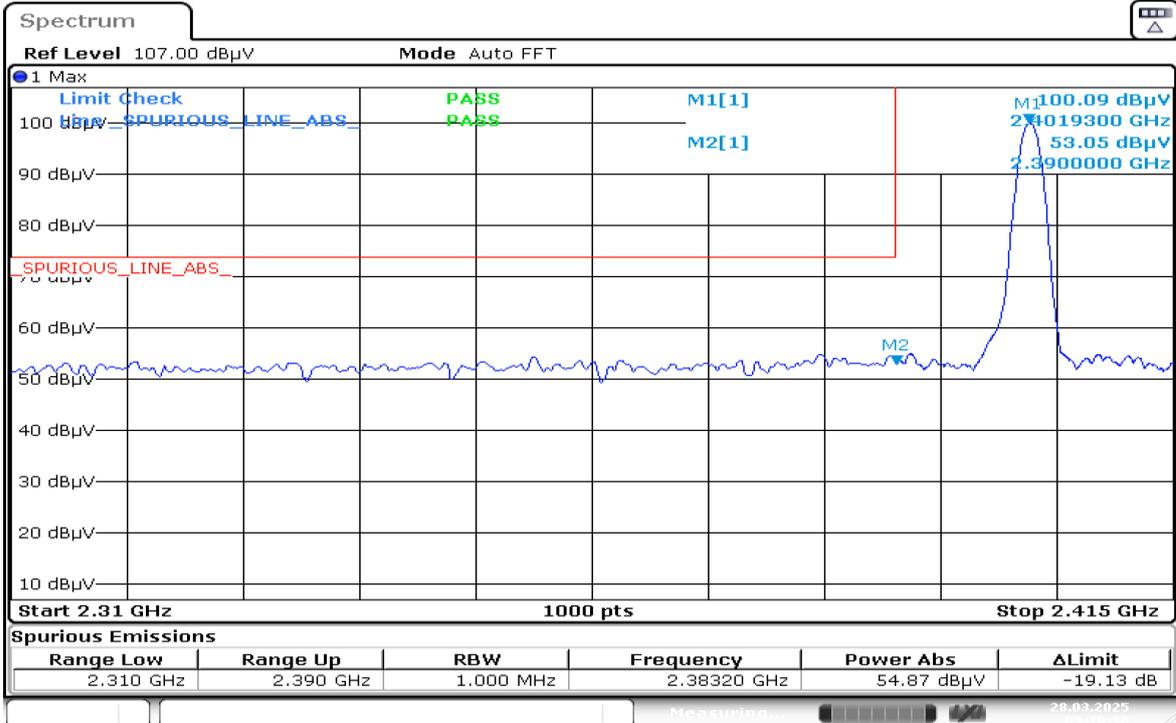
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Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



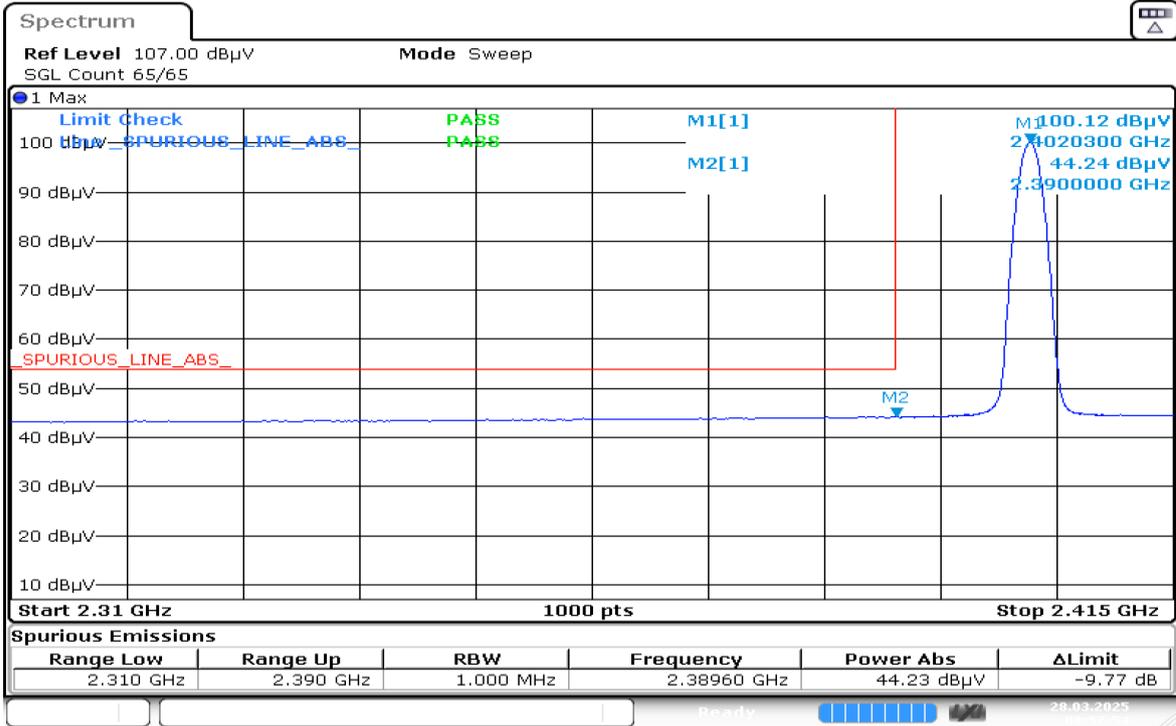
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Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



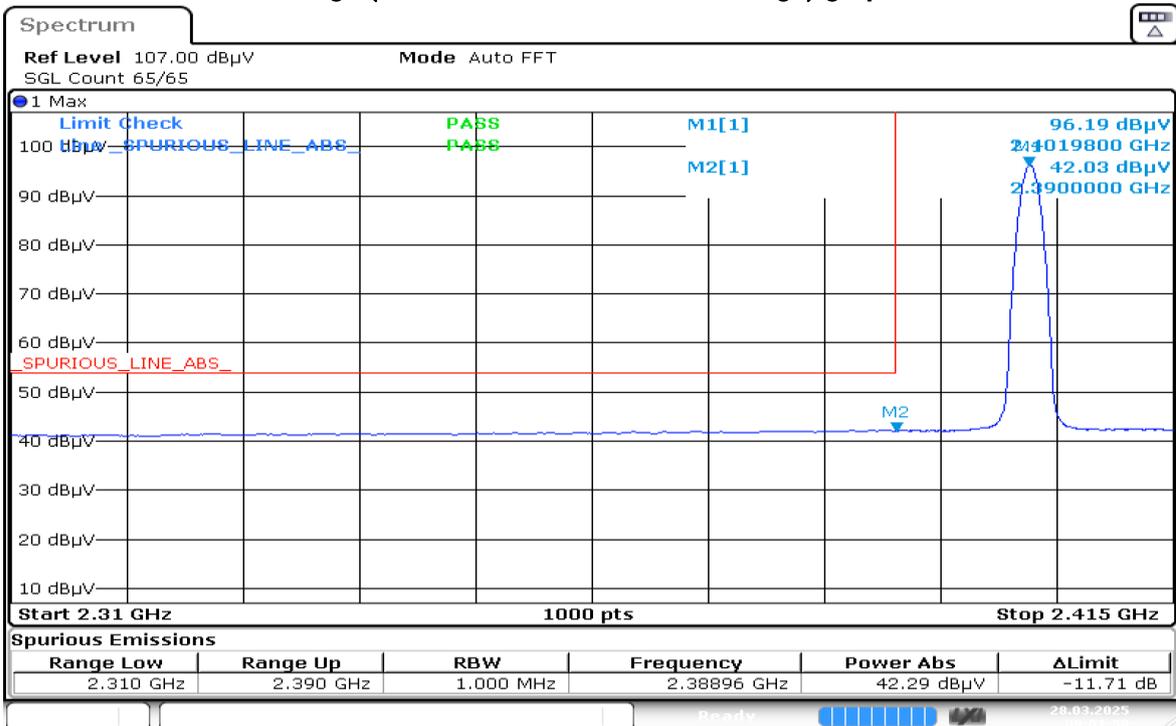
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Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



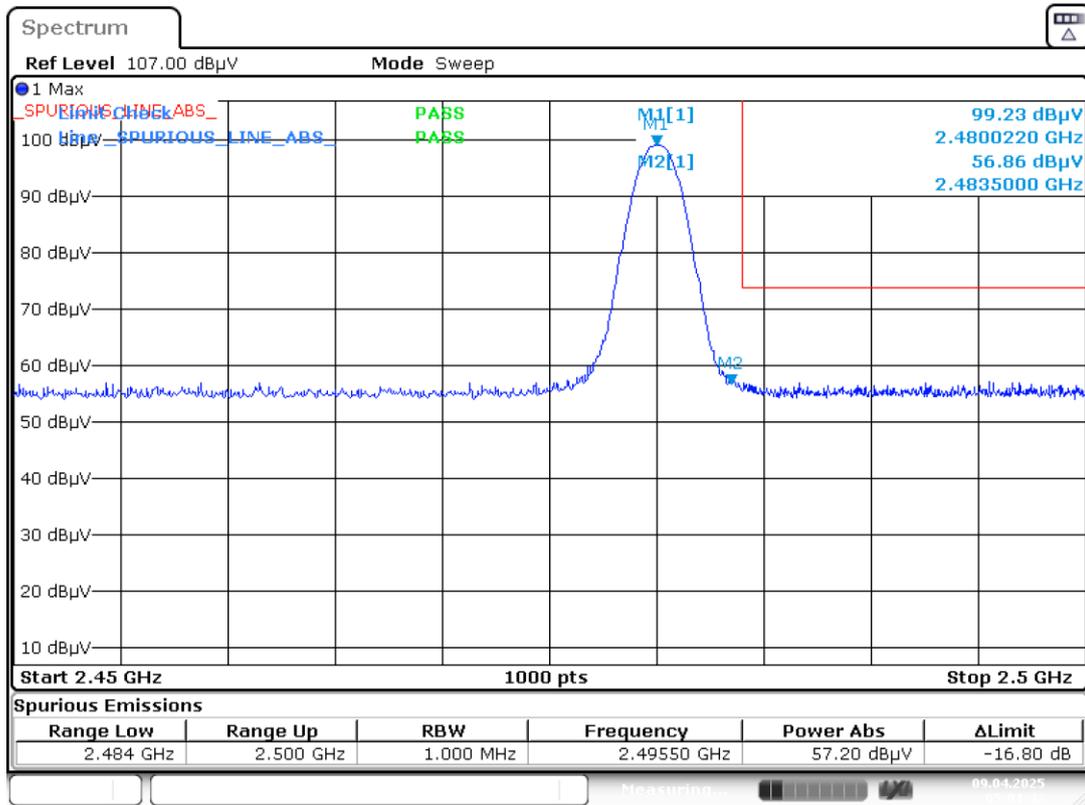
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Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot



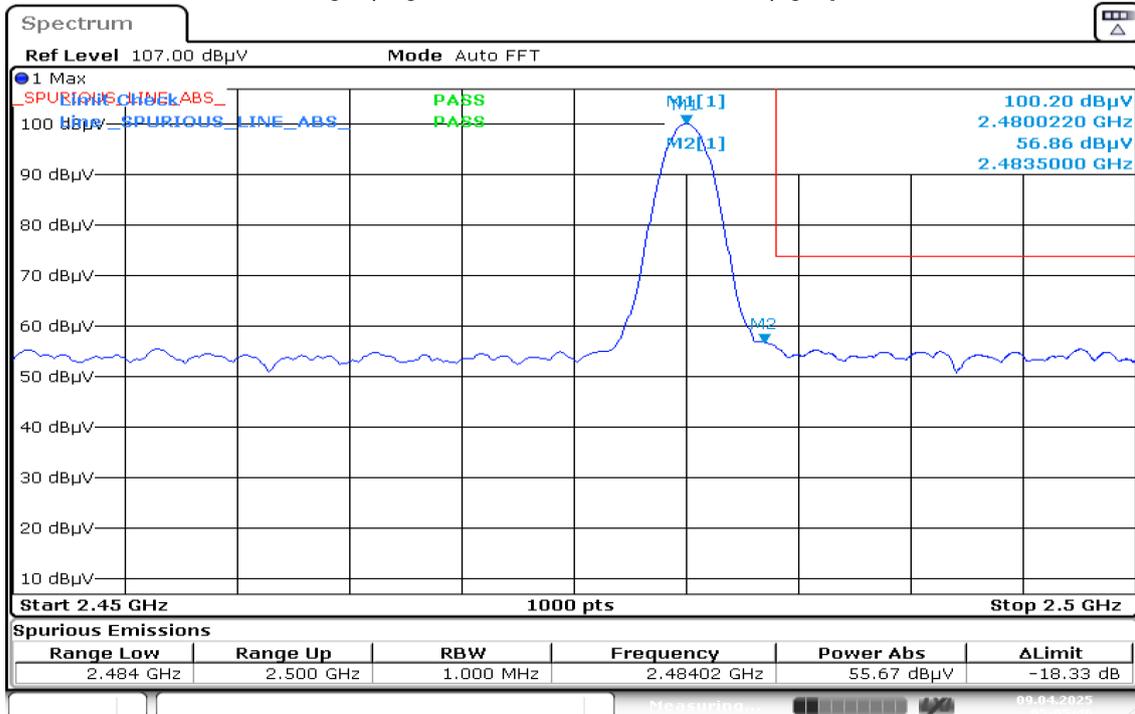
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Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



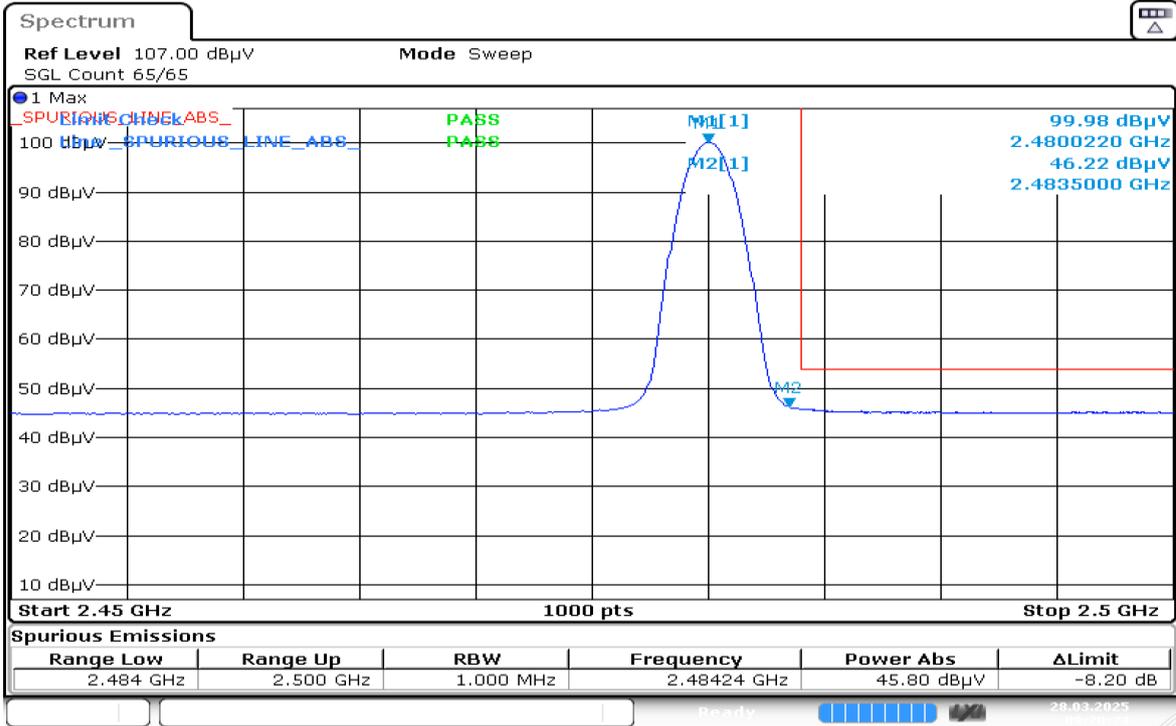
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Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



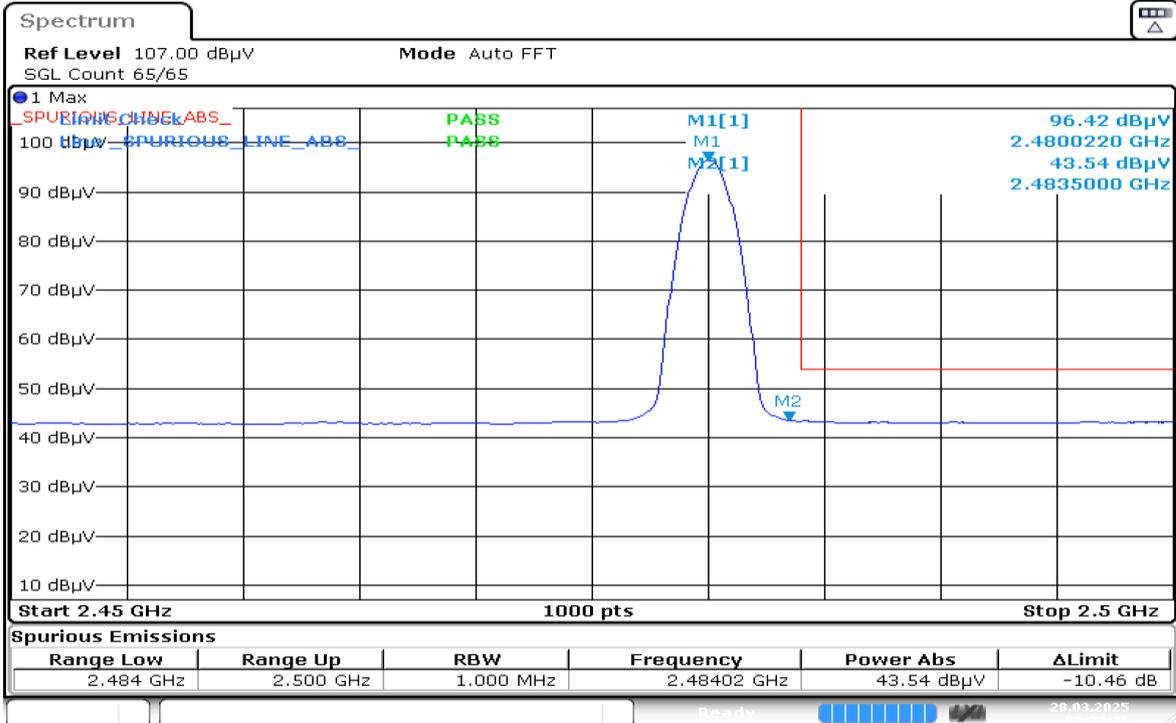
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Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



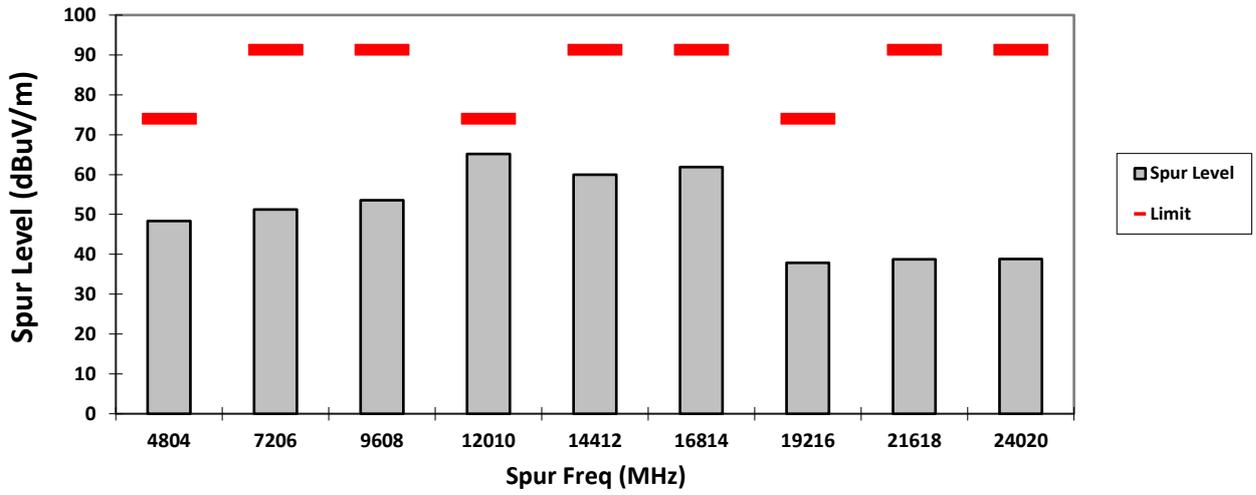
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Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot

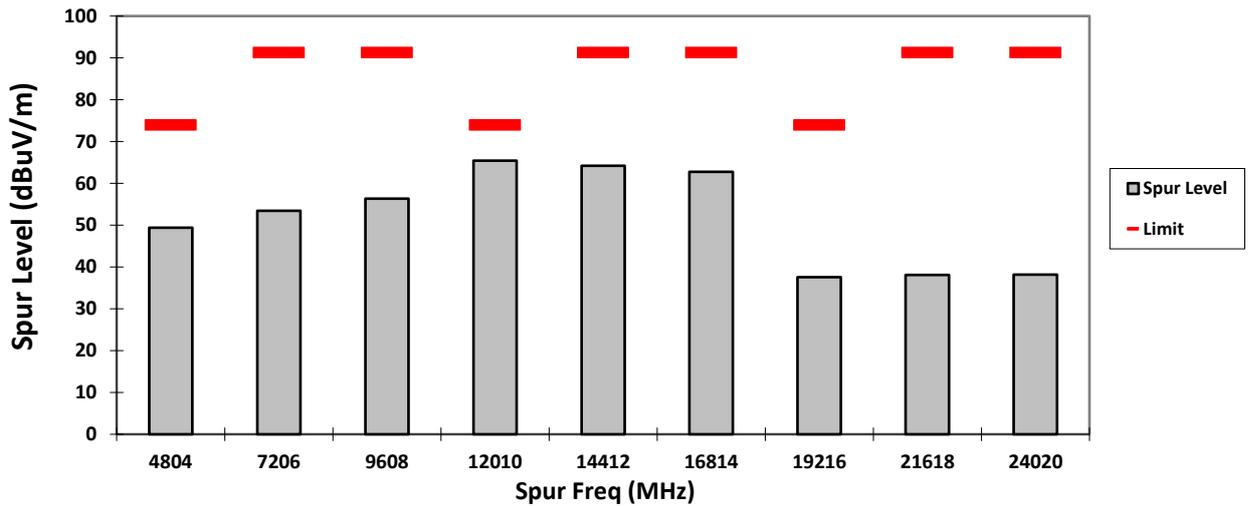


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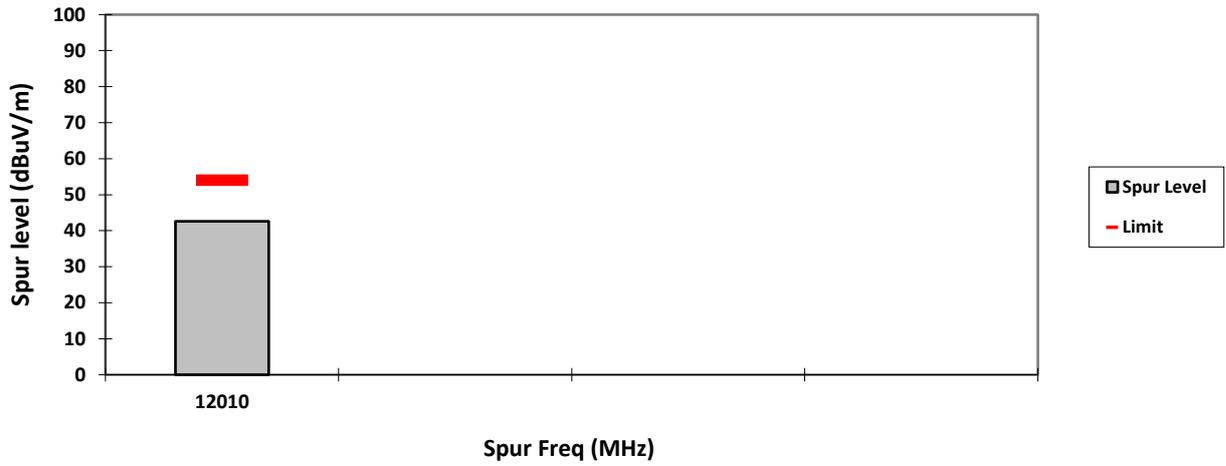
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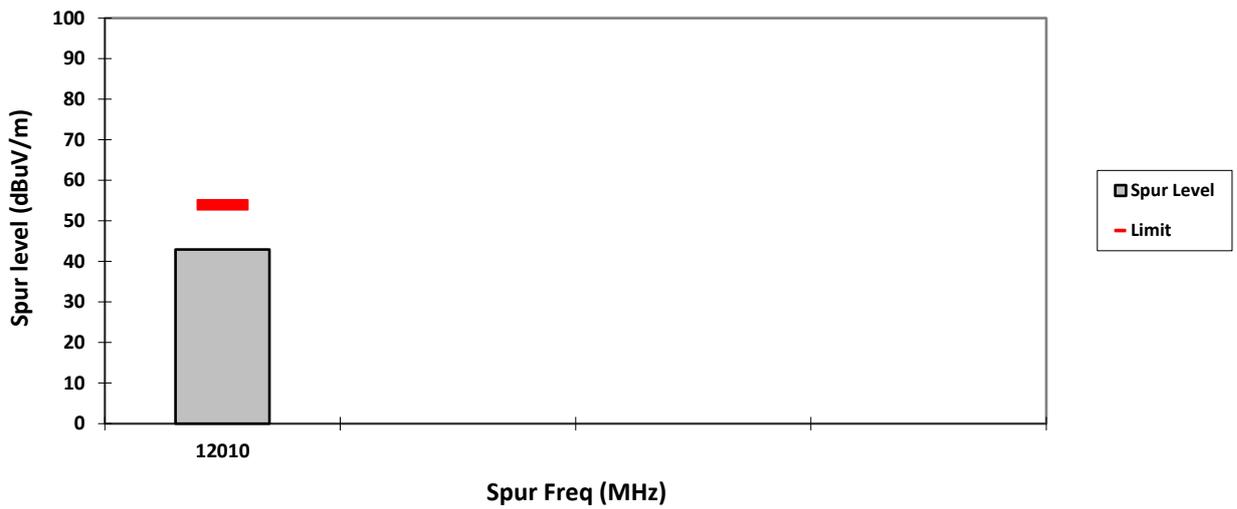
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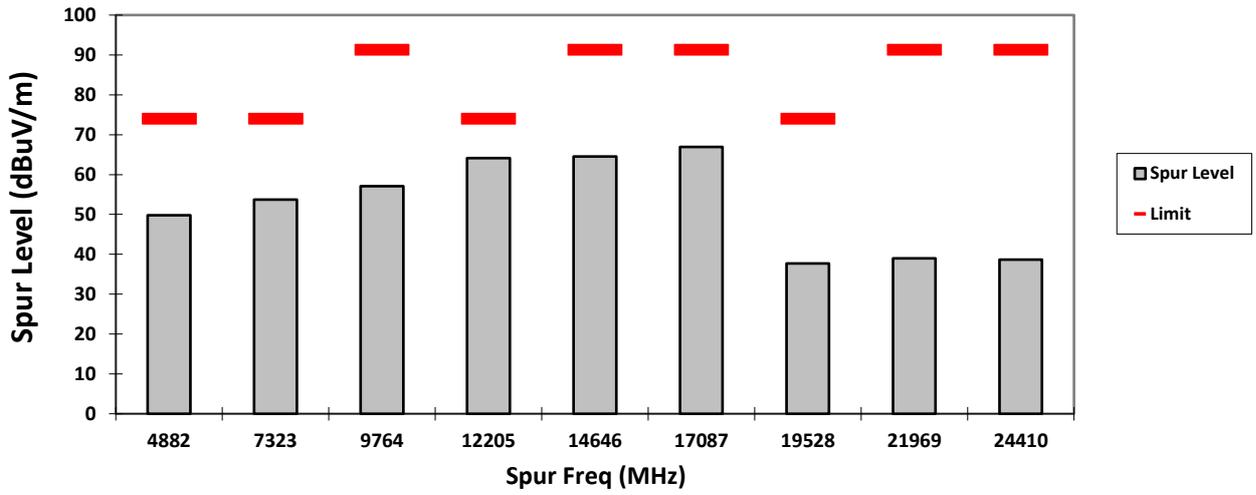
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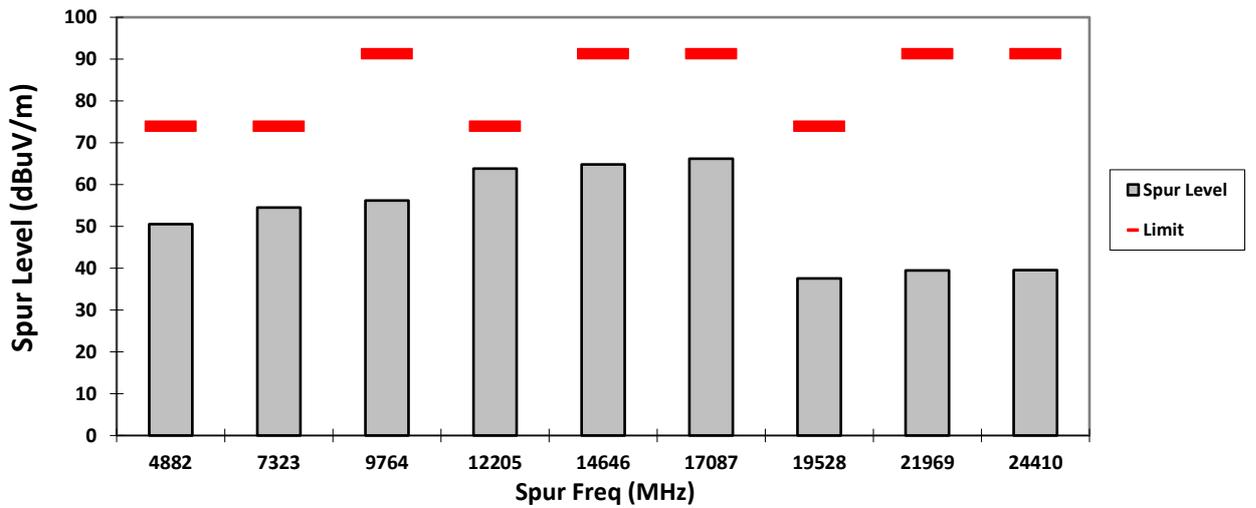
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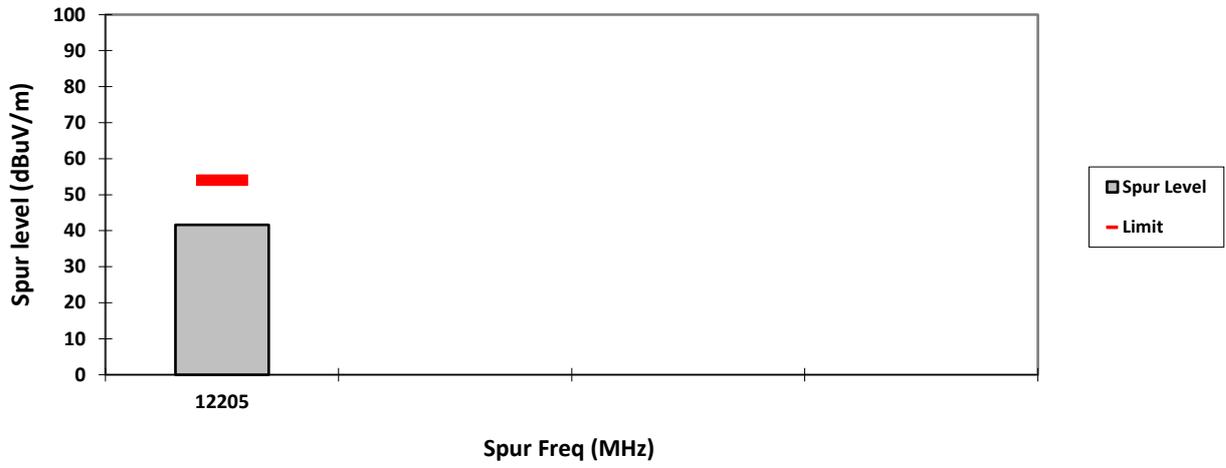
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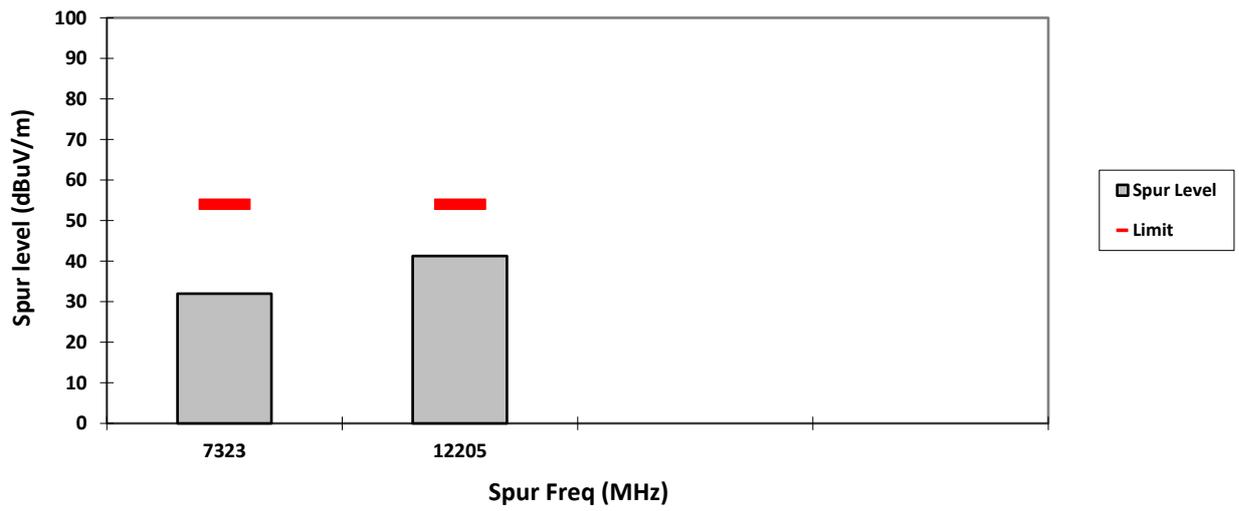
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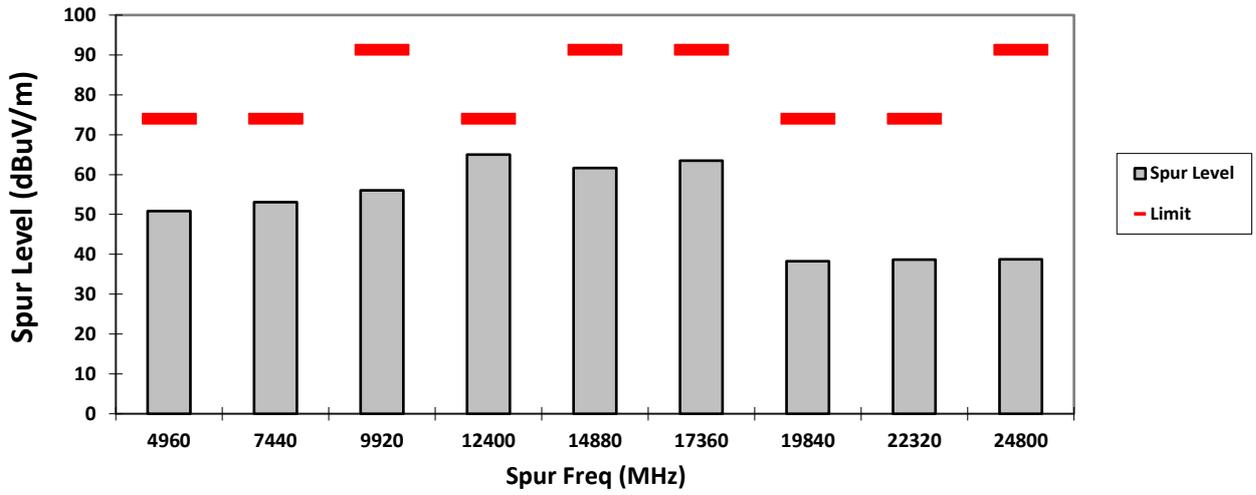
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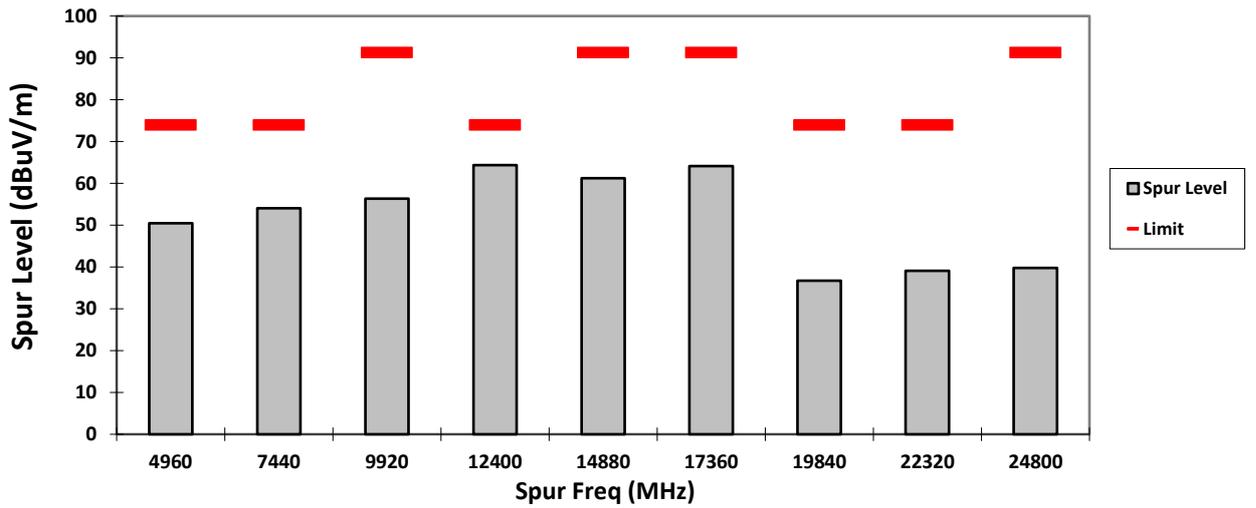
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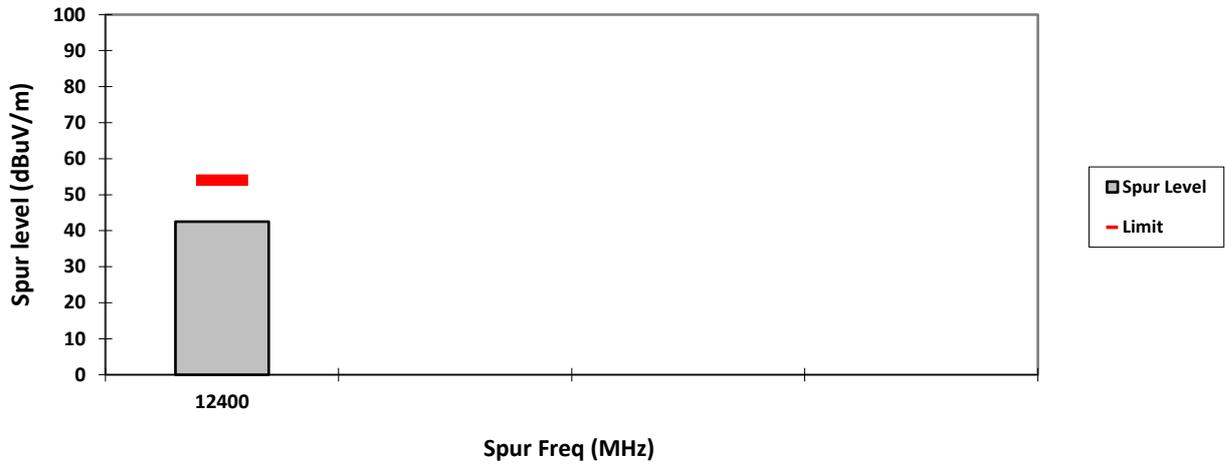
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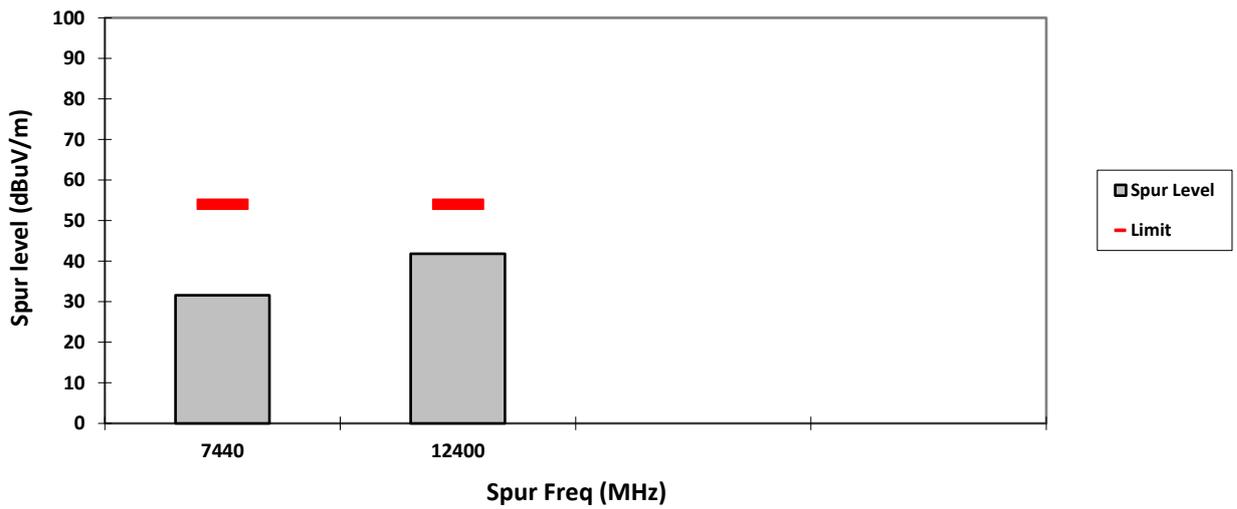
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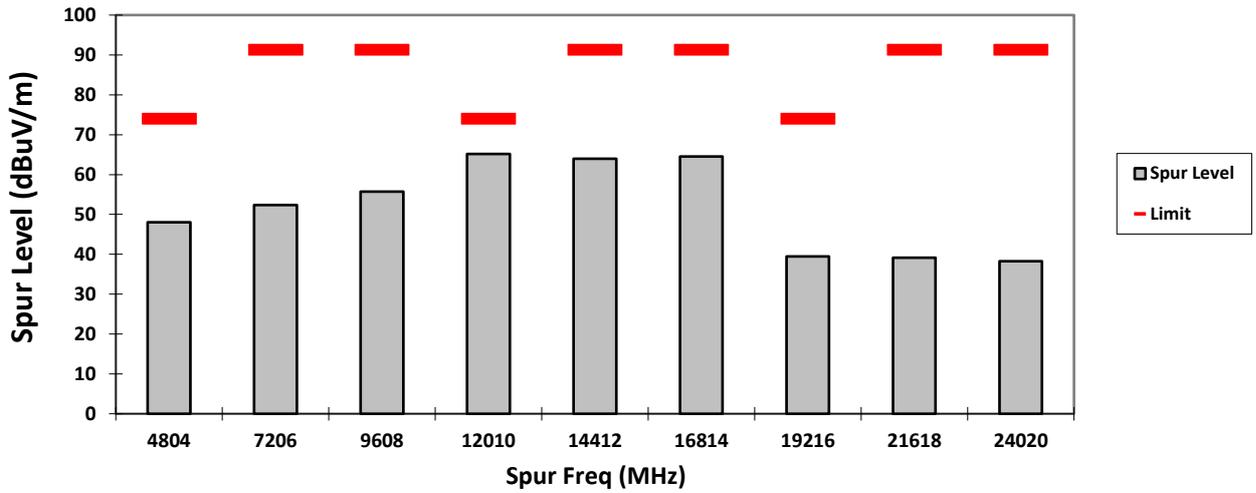
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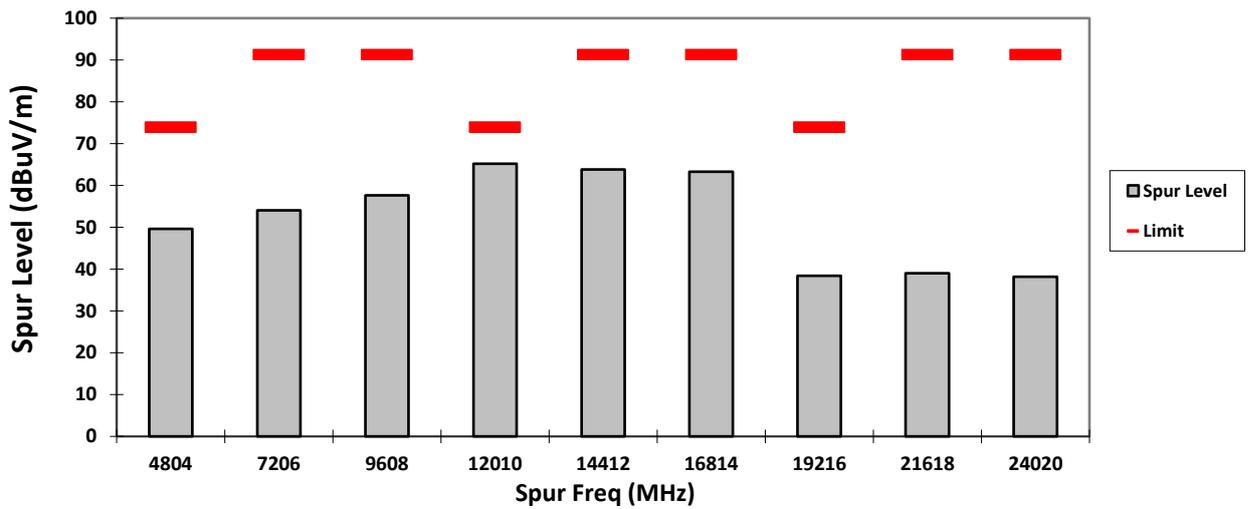
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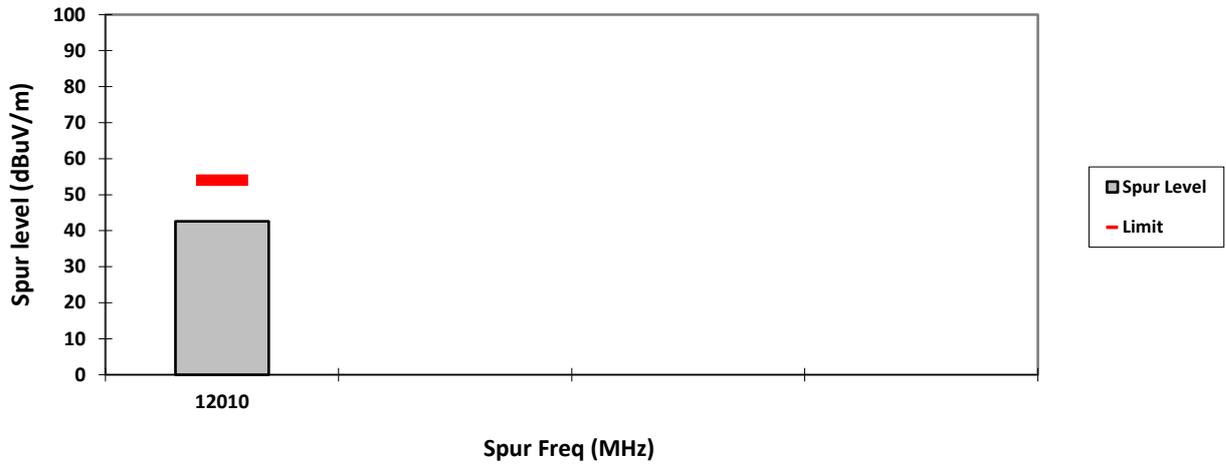
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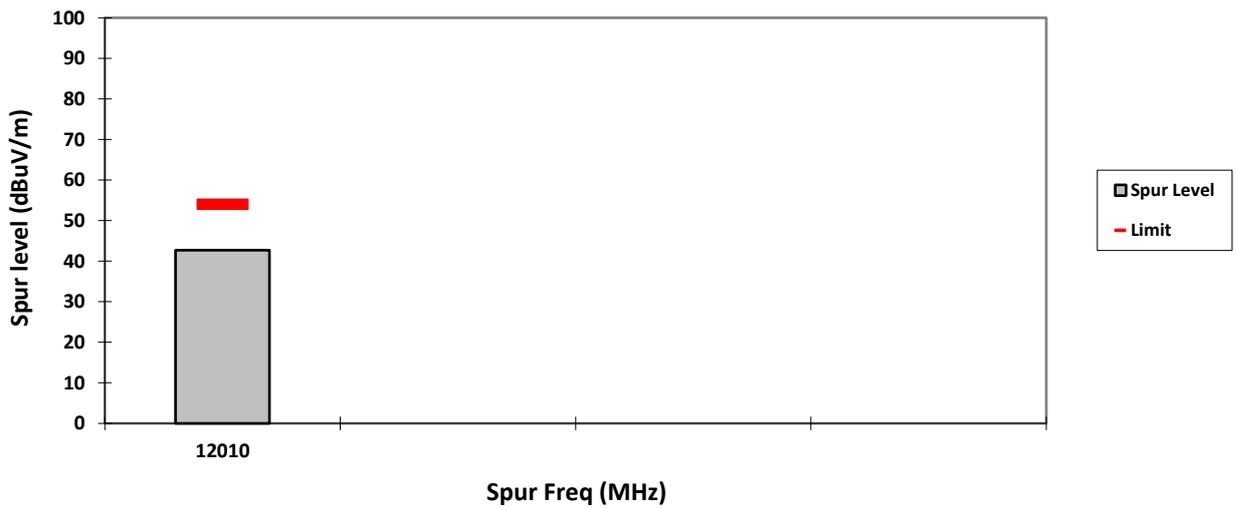
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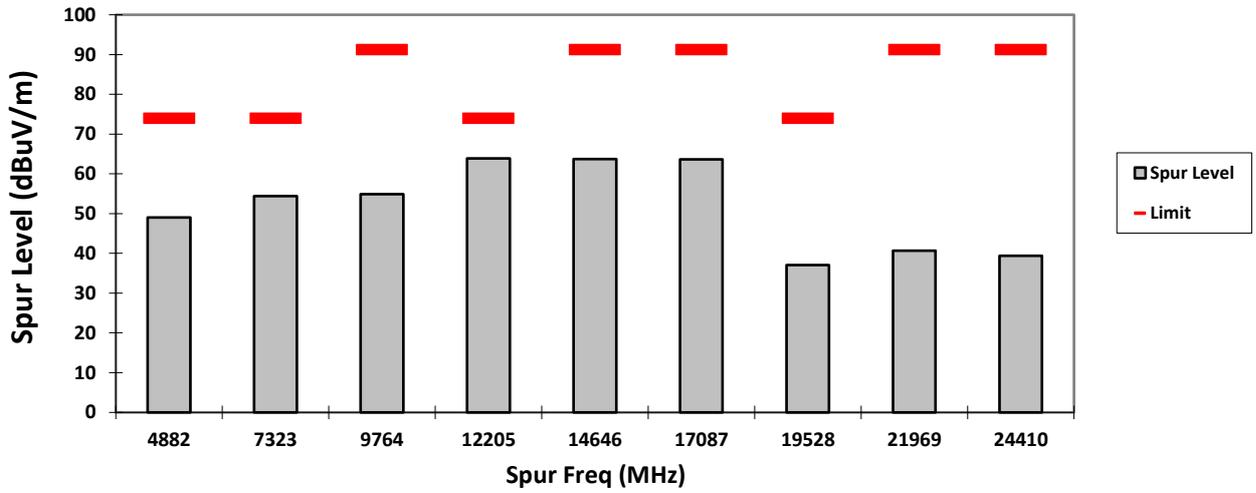
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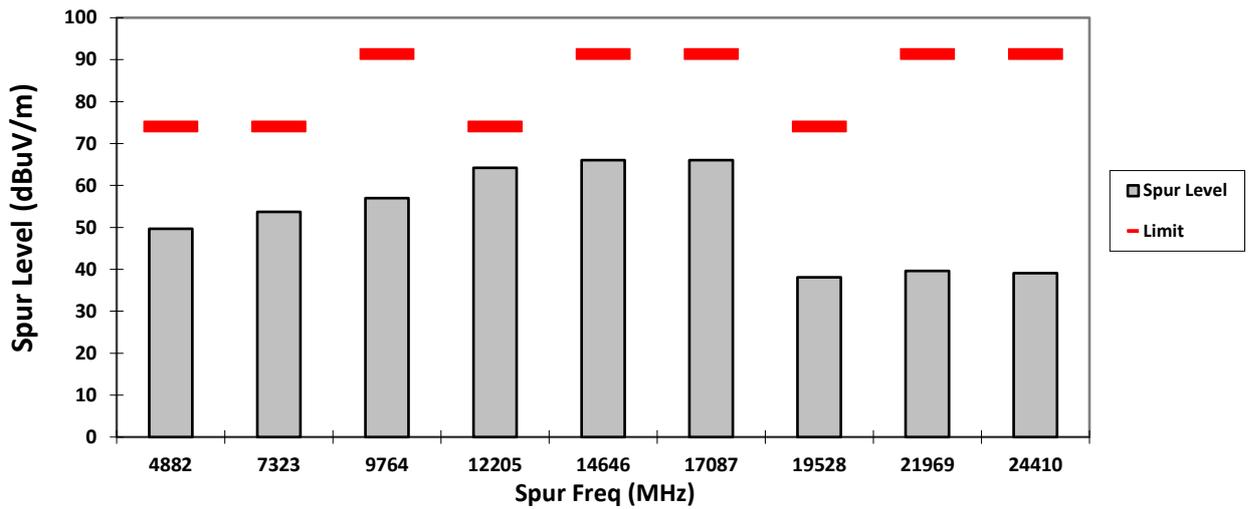
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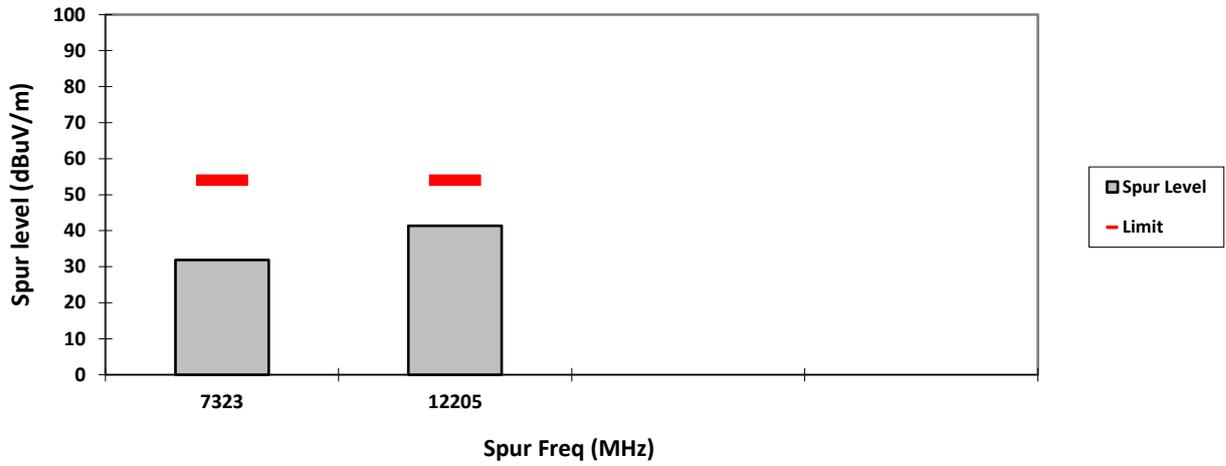
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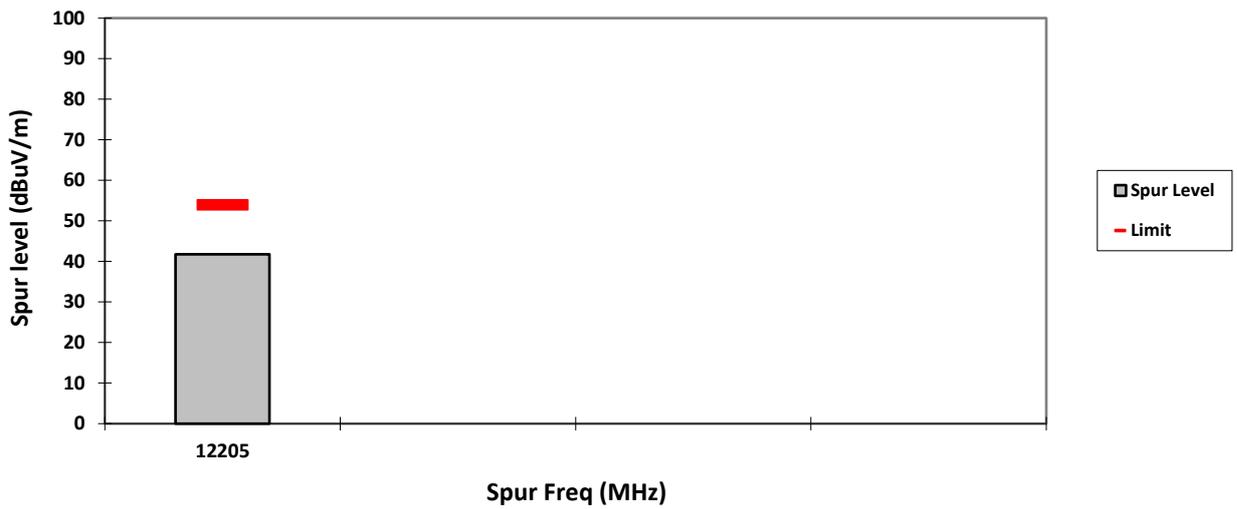
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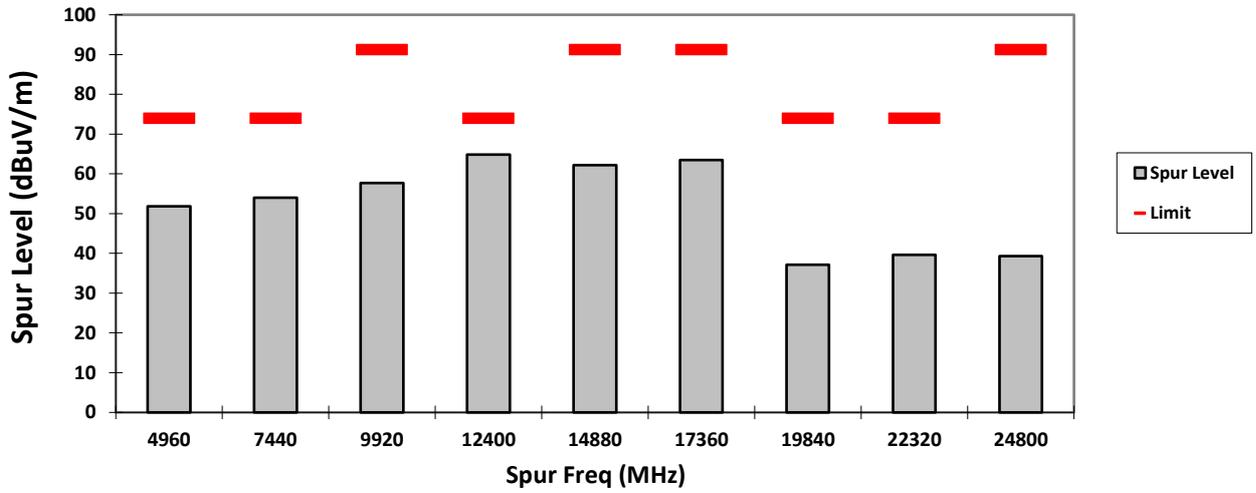
VERTICAL, AV



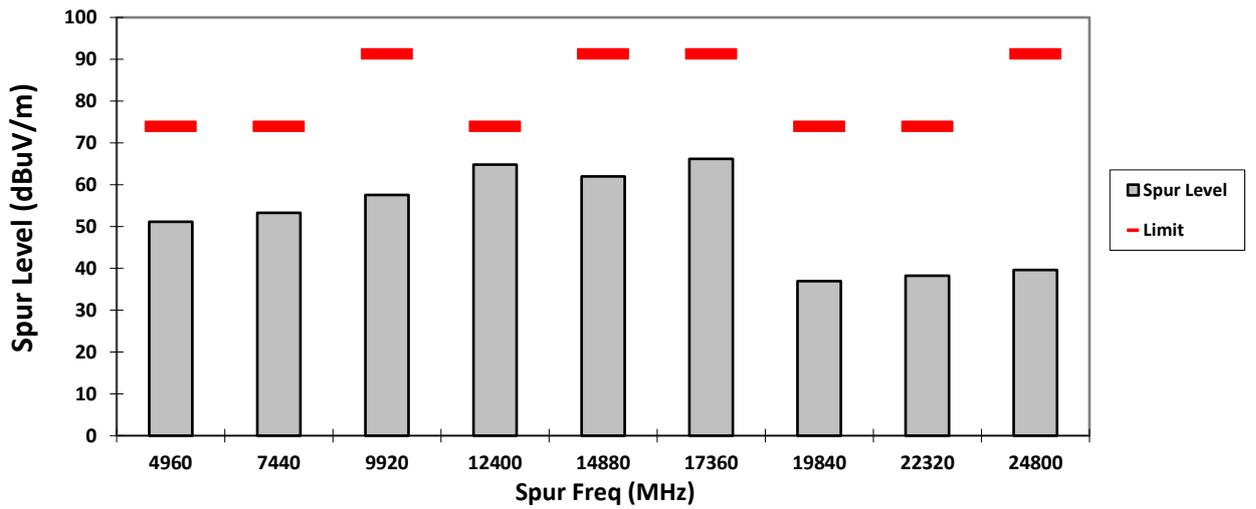
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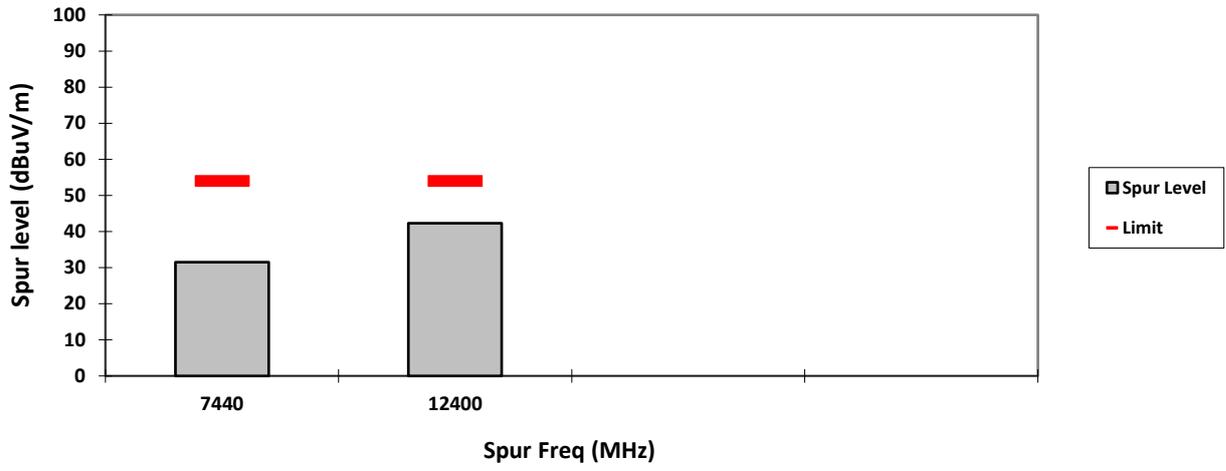
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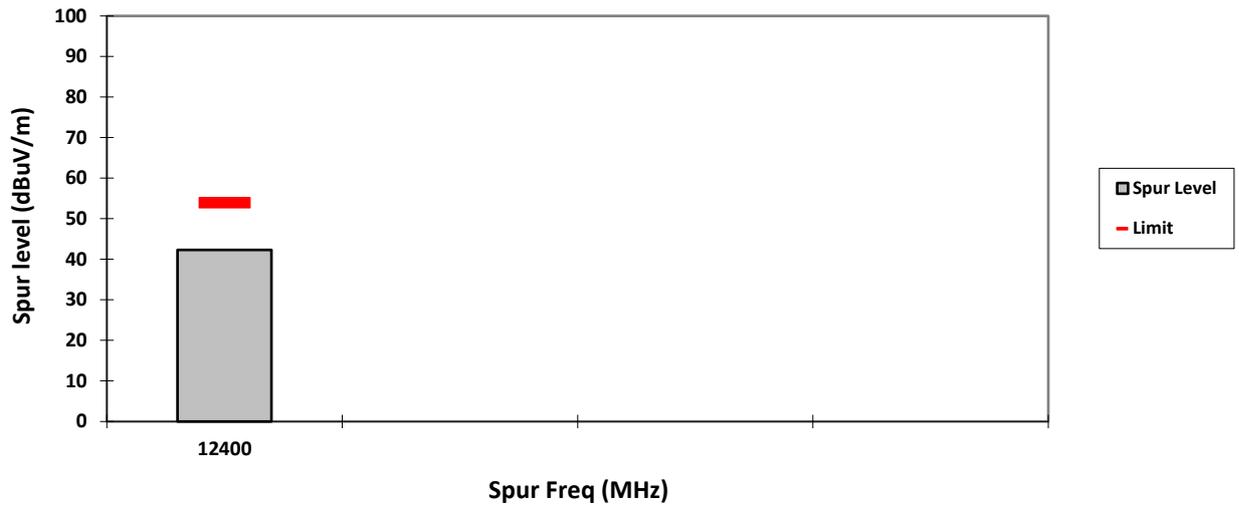
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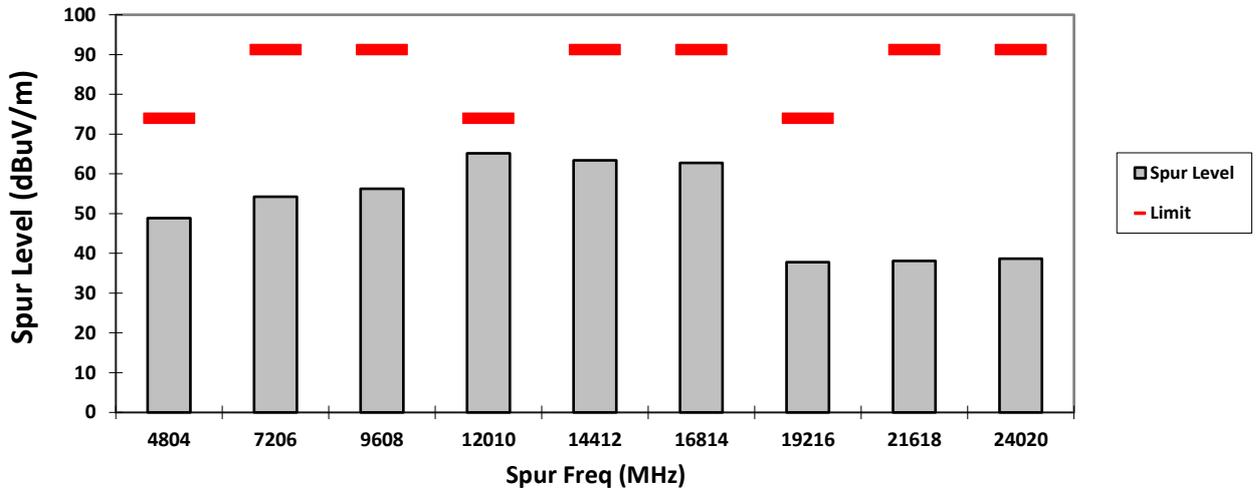
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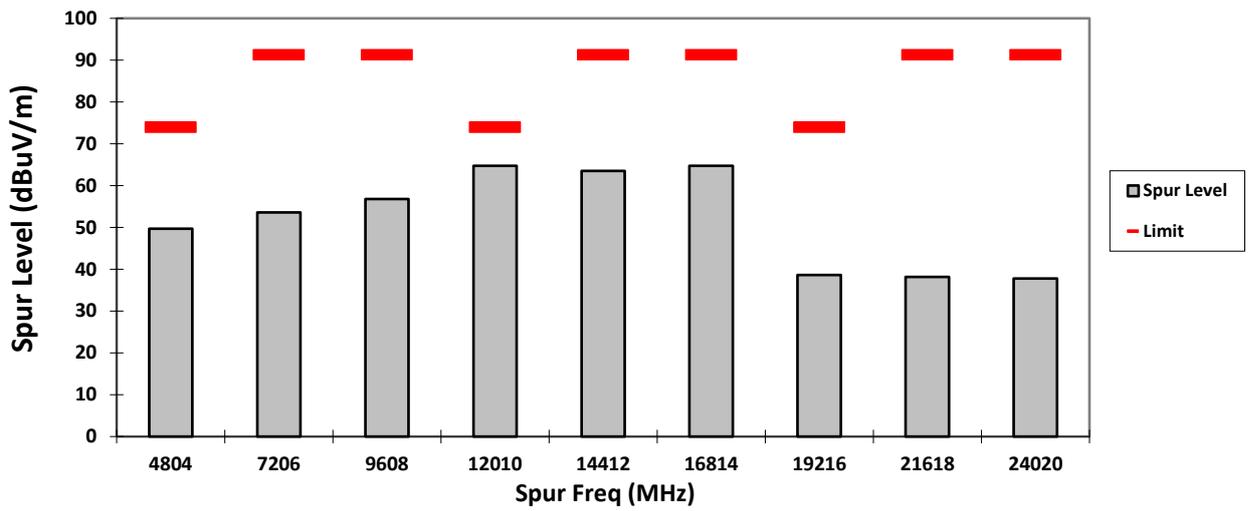
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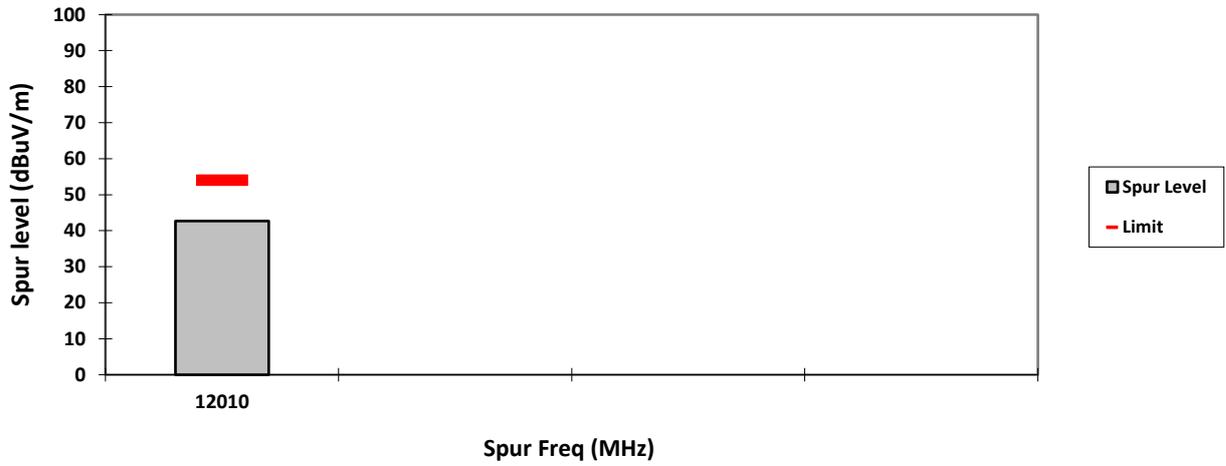
VERTICAL, PK



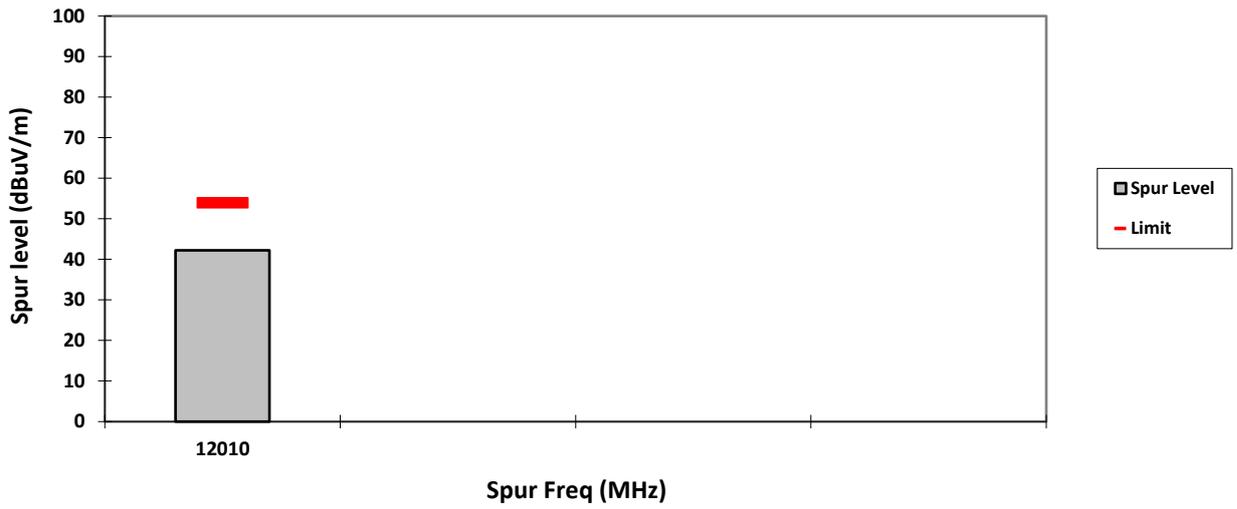
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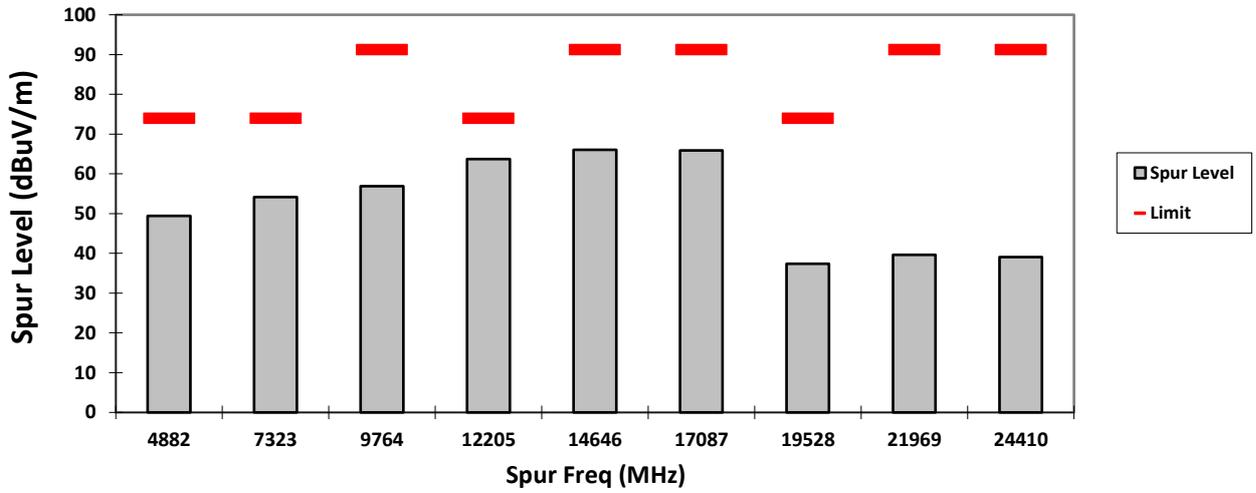
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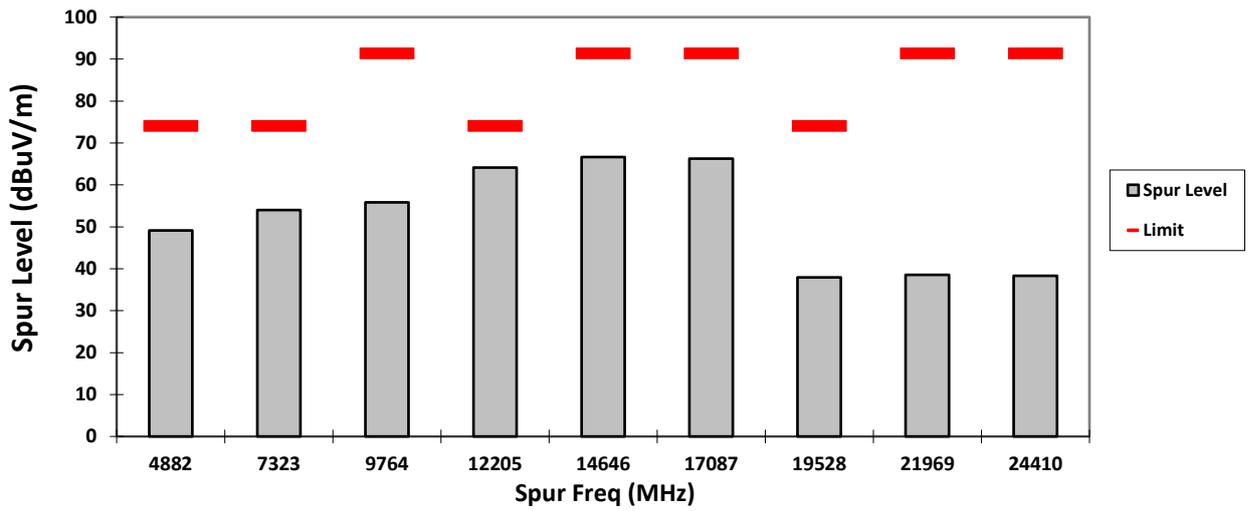
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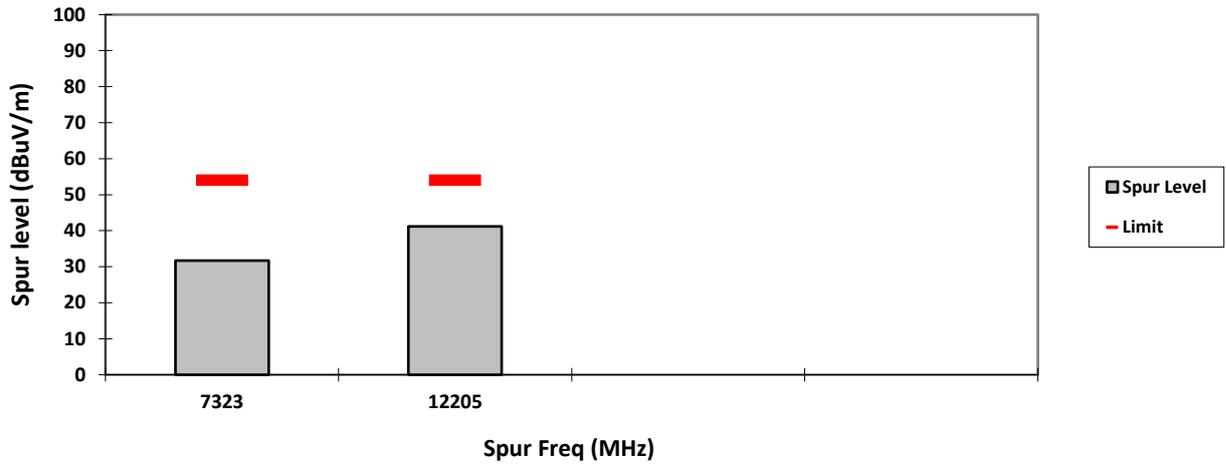
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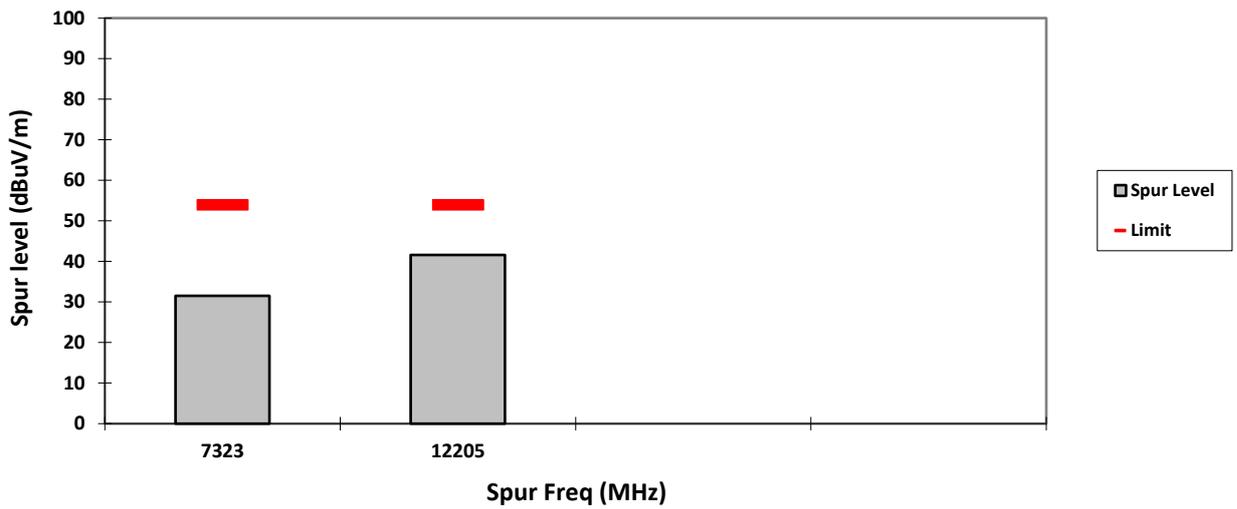
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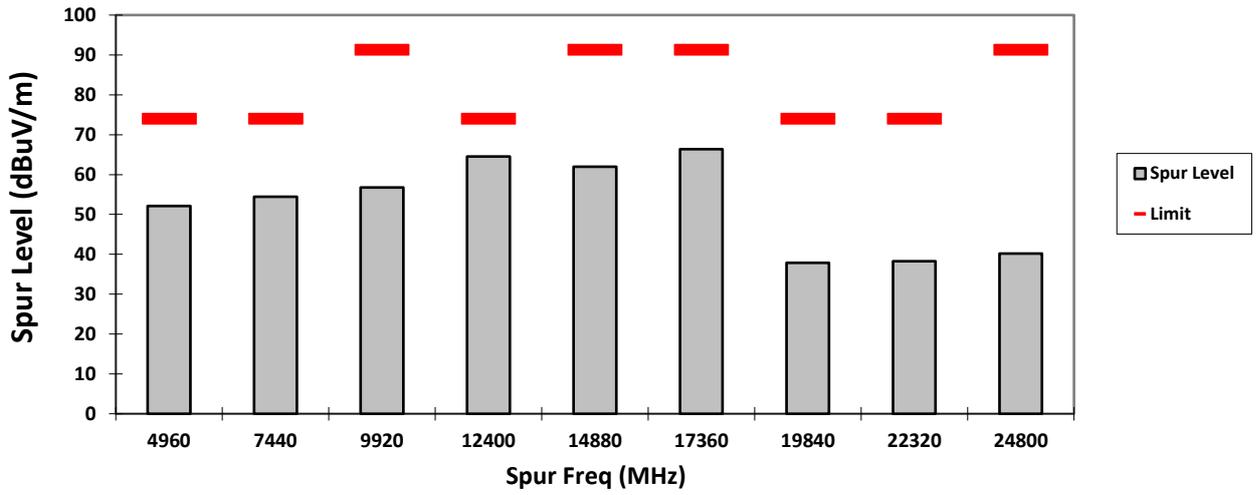
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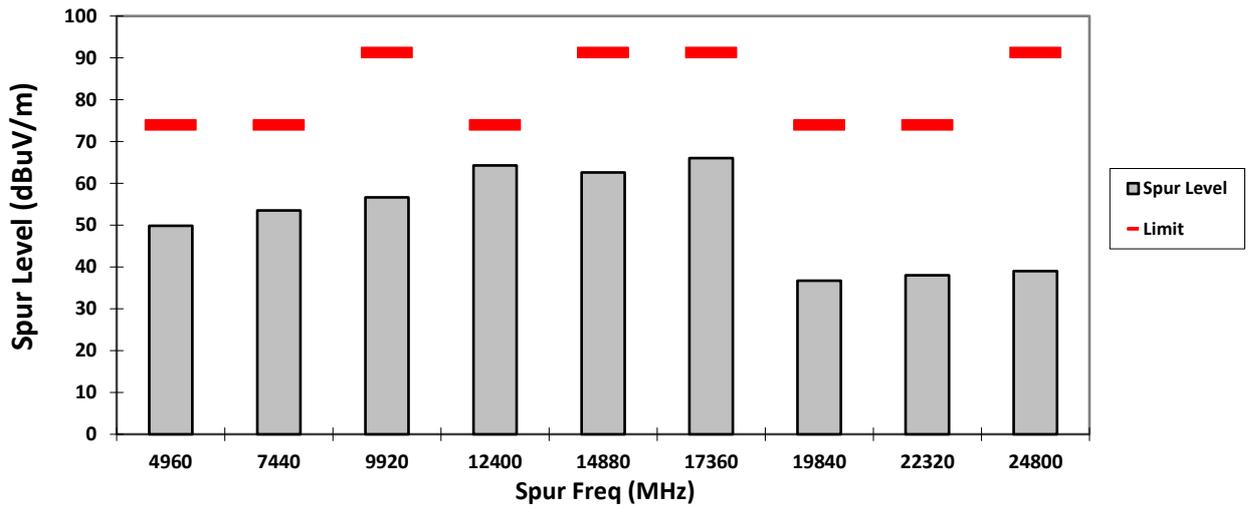
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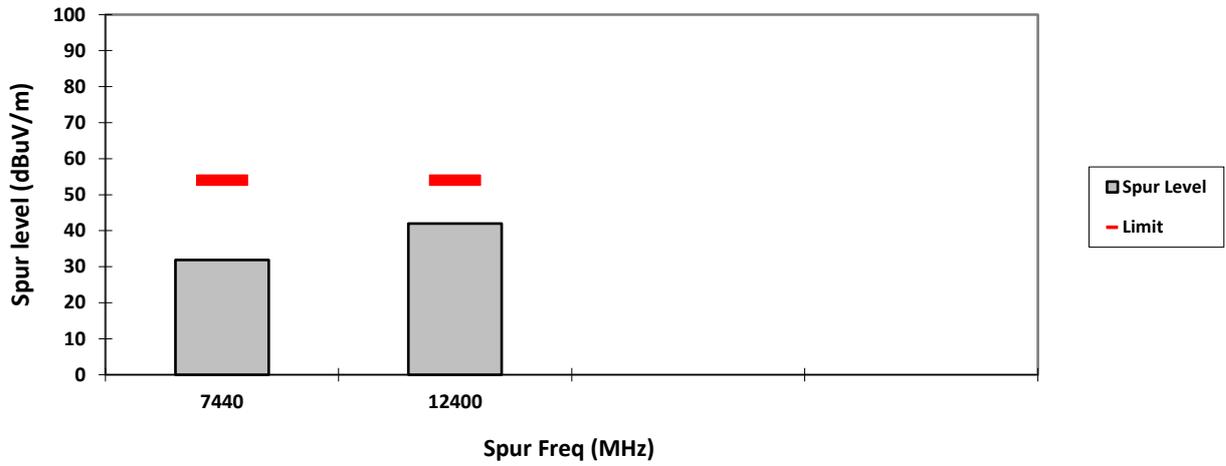
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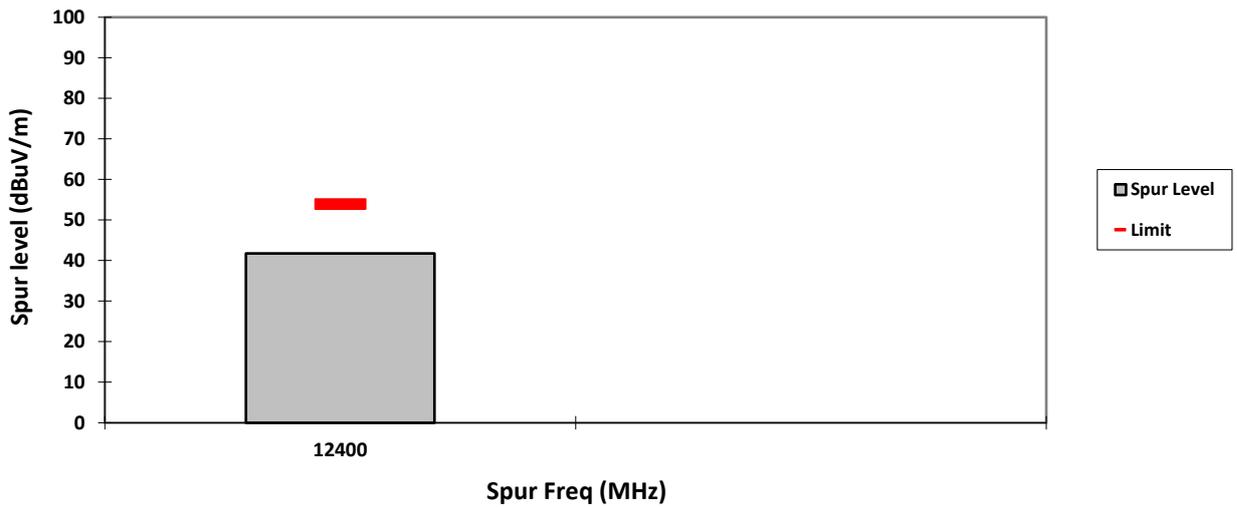
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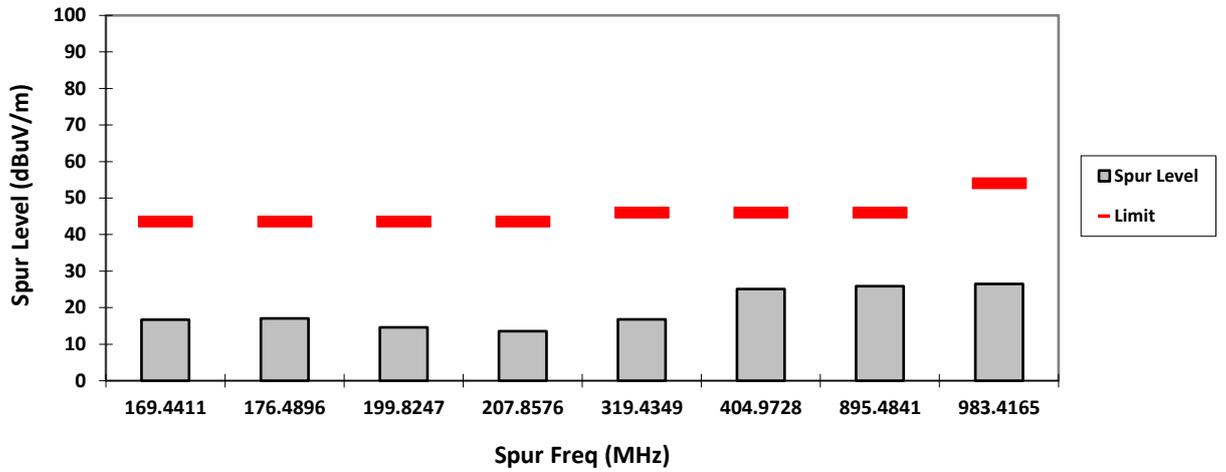
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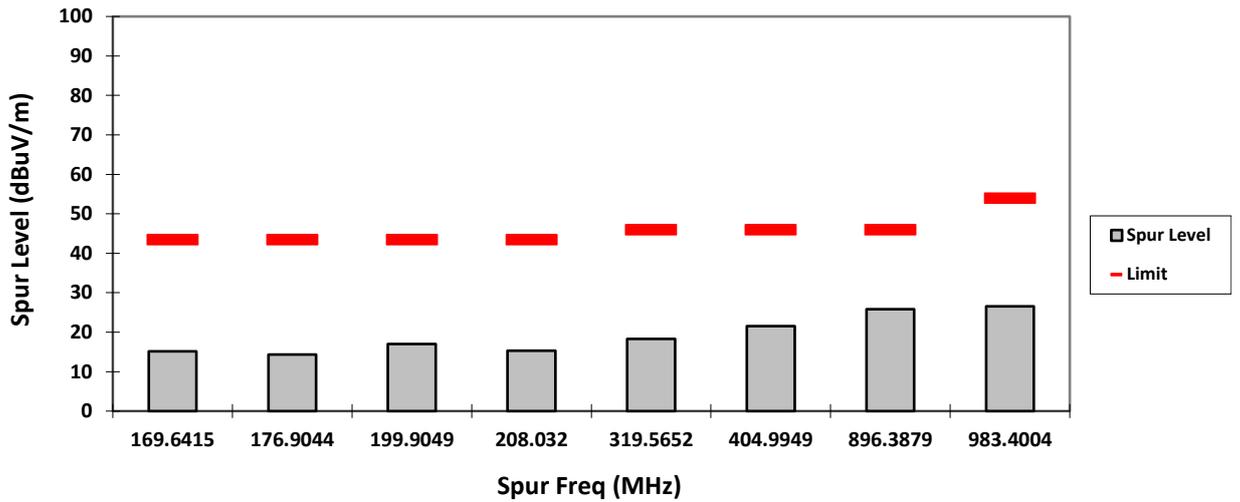
HORIZONTAL, AV



VERTICAL, QPK

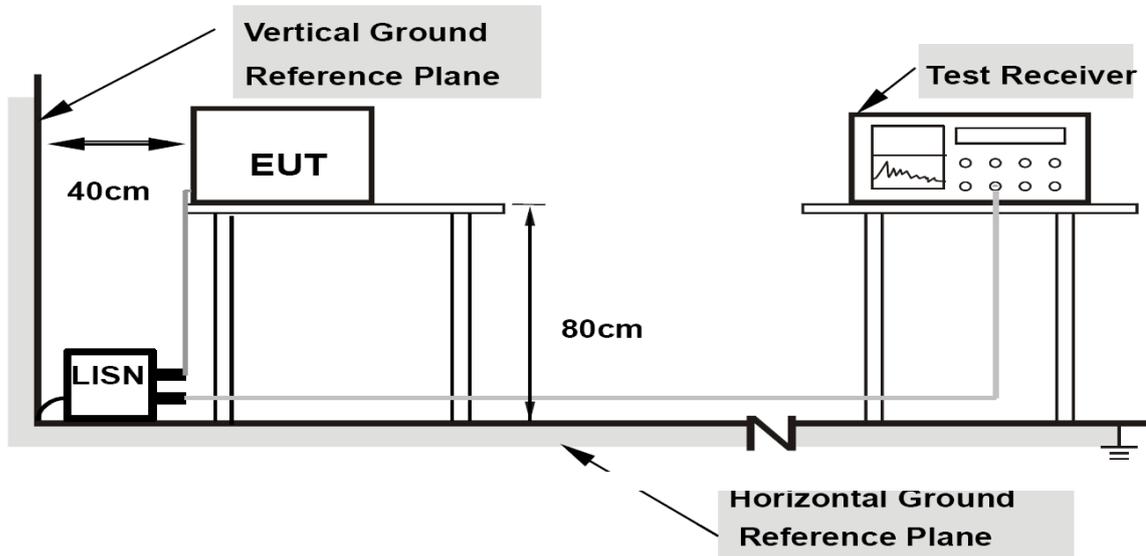


HORIZONTAL, QPK



6.9. AC Powerline Conducted Emission

6.9.1. 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.

6.9.2. 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(μV)	
	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(μV)	
	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.		

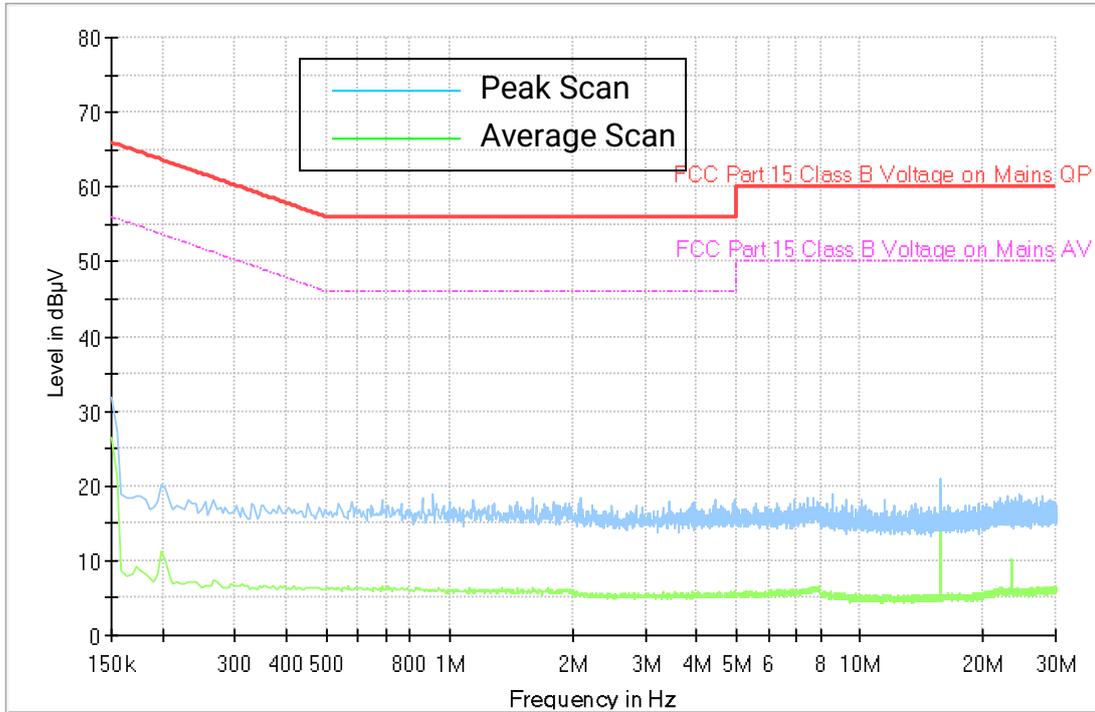
Table 2: Limits for Conducted Disturbance at the Mains Ports of Class B ITE

6.9.3. Test Result

Test Data
120 VAC, 60Hz

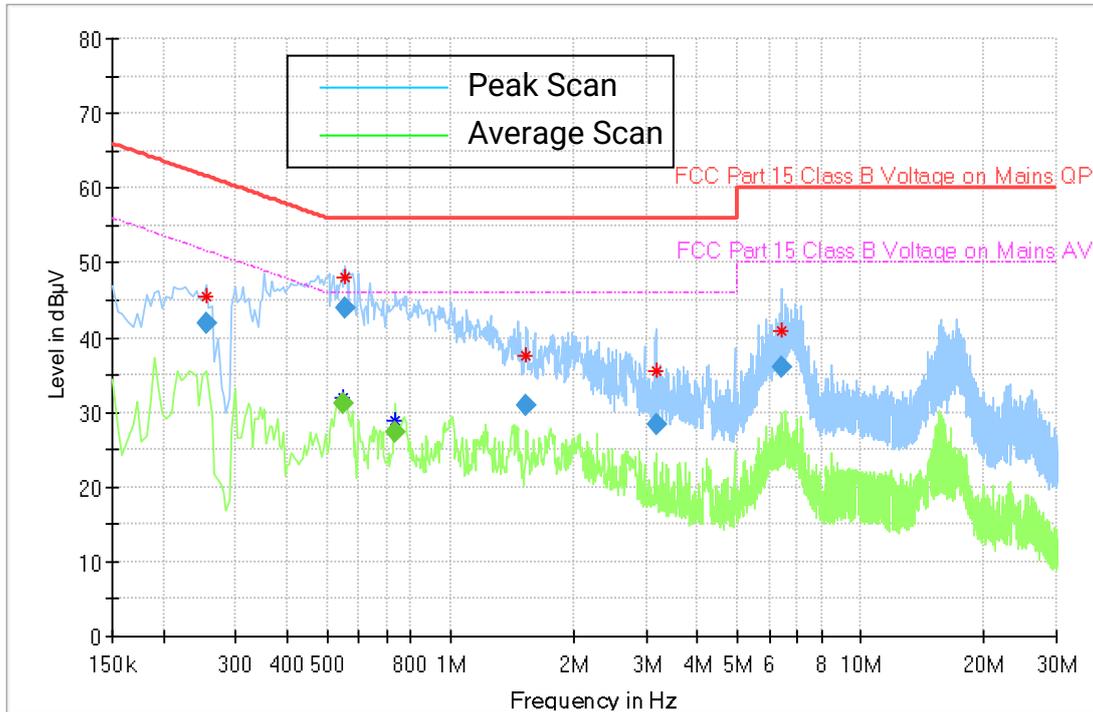
1) Ambient

Full Spectrum



2) Ambient Laptop

Full Spectrum

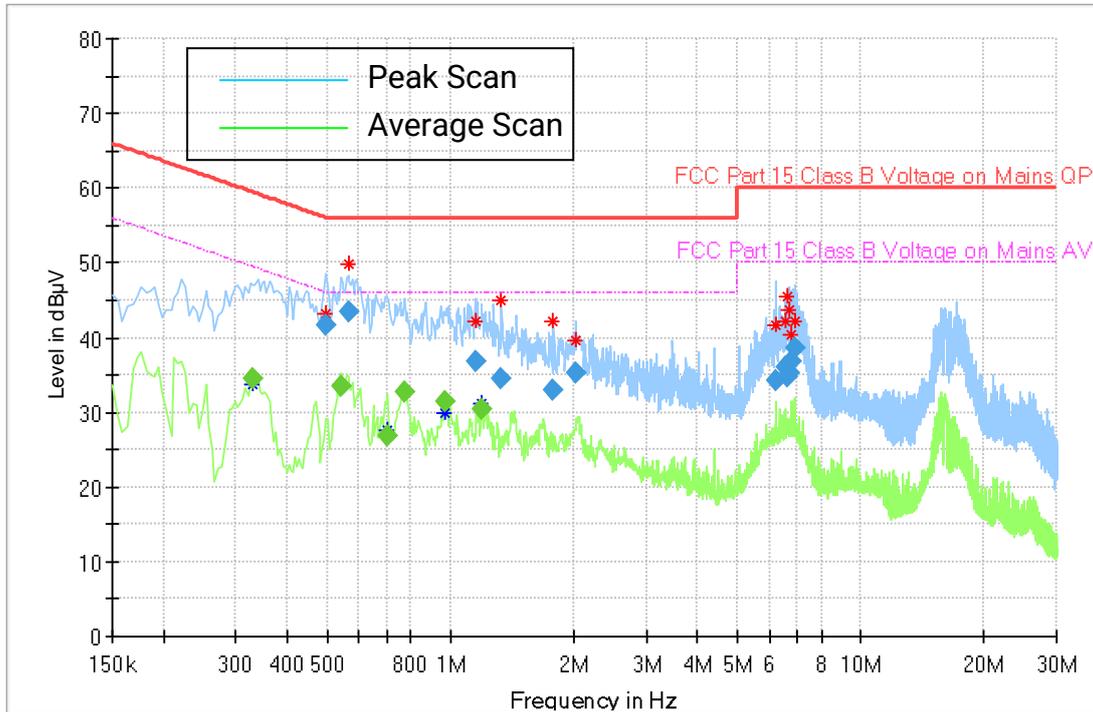


QuasiPeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.253500	42.01	—	61.64	19.63	N	ON	10.2
0.550500	—	31.27	46.00	14.73	N	ON	10.6
0.555000	44.04	—	56.00	11.96	N	ON	10.6
0.735000	—	27.45	46.00	18.55	N	ON	10.5
1.531500	30.99	—	56.00	25.01	L1	ON	10.3
3.165000	28.30	—	56.00	27.70	L1	ON	10.3
6.418500	35.99	—	60.00	24.01	N	ON	10.4

3) Laptop + VRSM Standby

Full Spectrum

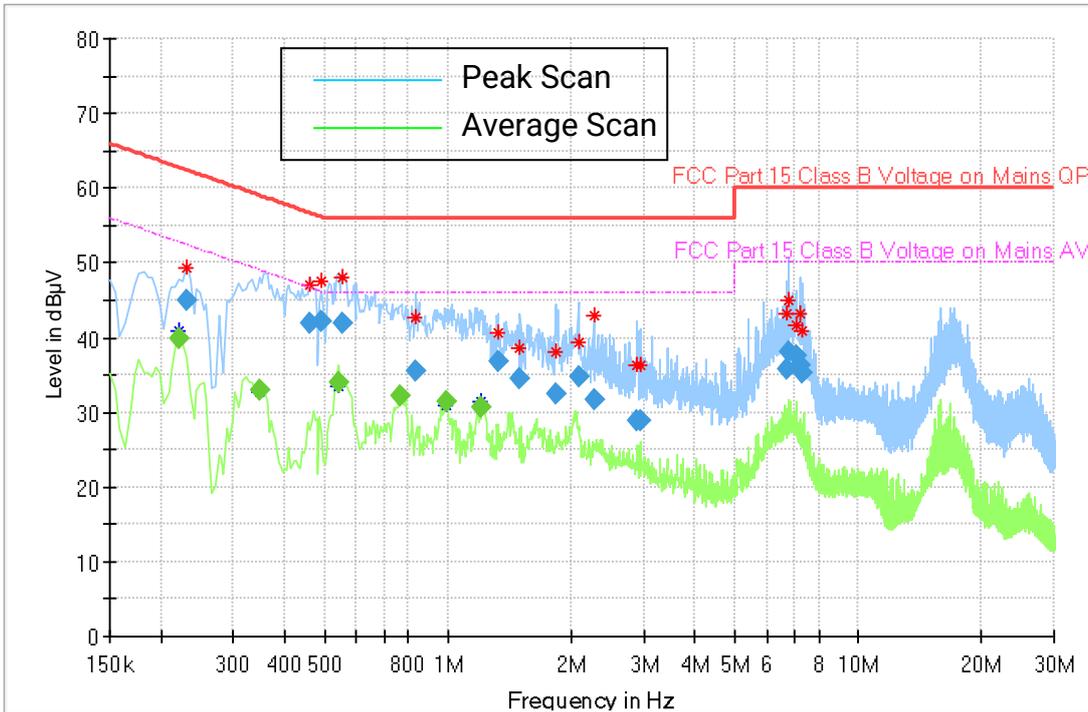


QuasiPeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.330000	—	34.44	49.45	15.01	N	ON	10.5
0.496500	41.59	—	56.06	14.46	N	ON	10.6
0.541500	—	33.55	46.00	12.45	L1	ON	10.6
0.564000	43.49	—	56.00	12.51	N	ON	10.6
0.703500	—	26.73	46.00	19.27	L1	ON	10.5
0.771000	—	32.80	46.00	13.20	N	ON	10.5
0.973500	—	31.47	46.00	14.53	N	ON	10.4
1.149000	36.86	—	56.00	19.14	N	ON	10.4
1.194000	—	30.31	46.00	15.69	L1	ON	10.4
1.333500	34.61	—	56.00	21.39	N	ON	10.3
1.783500	33.00	—	56.00	23.00	L1	ON	10.3
2.017500	35.15	—	56.00	20.85	L1	ON	10.3
6.180000	34.30	—	60.00	25.70	N	ON	10.4
6.571500	36.13	—	60.00	23.87	L1	ON	10.4
6.616500	34.87	—	60.00	25.13	N	ON	10.4
6.706500	35.31	—	60.00	24.69	N	ON	10.4
6.778500	36.85	—	60.00	23.15	L1	ON	10.4
6.882000	38.58	—	60.00	21.42	L1	ON	10.4

4) Laptop + VRSM TX BT GFSK

Full Spectrum



QuasiPeak and Average Measurement

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.222000	—	39.94	52.74	12.80	L1	ON	10.4
0.231000	45.07	—	62.41	17.34	N	ON	10.3
0.348000	—	33.02	49.01	15.99	L1	ON	10.5
0.460500	41.97	—	56.68	14.71	N	ON	10.6
0.492000	42.14	—	56.13	13.99	N	ON	10.6
0.541500	—	34.07	46.00	11.93	L1	ON	10.6
0.555000	41.82	—	56.00	14.18	L1	ON	10.6
0.762000	—	32.28	46.00	13.72	N	ON	10.5
0.838500	35.61	—	56.00	20.39	L1	ON	10.5
0.987000	—	31.51	46.00	14.49	L1	ON	10.4
1.207500	—	30.71	46.00	15.29	L1	ON	10.4
1.329000	36.68	—	56.00	19.32	N	ON	10.3
1.500000	34.38	—	56.00	21.62	L1	ON	10.3
1.828500	32.37	—	56.00	23.63	N	ON	10.3
2.080500	34.72	—	56.00	21.28	L1	ON	10.3
2.265000	31.71	—	56.00	24.29	N	ON	10.3
2.881500	28.97	—	56.00	27.03	N	ON	10.3
2.949000	28.76	—	56.00	27.24	N	ON	10.3
6.693000	35.81	—	60.00	24.19	N	ON	10.4
6.792000	38.14	—	60.00	21.86	L1	ON	10.4
7.093500	37.53	—	60.00	22.47	L1	ON	10.4
7.215000	36.29	—	60.00	23.71	L1	ON	10.4
7.305000	35.32	—	60.00	24.68	L1	ON	10.4

END OF TEST REPORT