



FCC Part 15 Subpart C

TEST REPORT

FOR

Product Name: Locomotive driving recorder

Model : S3

Series : S3PRO, S3PLUS

Trade Name: Global Eagle

Issued to

NAVSTAR ELECTRONICS CO., LTD.

5F.,-5 No.16, LN.609, SEC.5, CHONGXIN Rd., SANCHONG Dist., NEW Taipei City
241, Taiwan

Issued by

Global Certification Corp.

No.146, Sec. 2, Xiangzhang Rd., Xizhi Dist.,New Taipei City 221,
Taiwan (R.O.C.)



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Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
1.	3N2105	FR2-3N2105	Apr.01, 2025	Original Report	Judy



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1. GENERAL INFORMATION

Applicant : NAVSTAR ELECTRONICS CO., LTD.

Address : 5F.,-5 No.16, LN.609, SEC.5, CHONGXIN Rd., SANCHONG Dist.,
NEW Taipei City 241, Taiwan

Manufacturer : NAVSTAR ELECTRONICS CO., LTD.

Address : 5F.,-5 No.16, LN.609, SEC.5, CHONGXIN Rd., SANCHONG Dist.,
NEW Taipei City 241, Taiwan

EUT : Locomotive driving recorder

Model No. : S3

Series No. : S3PRO, S3PLUS

Trade Name : Global Eagle

Model Differences : The major electrical and mechanical constructions of series models are identical to the basic model, except different marketing purpose. The model, S3 is the testing sample, and the final test data are shown on this test report.

Is here with confirmed to comply with the requirements set out in the FCC Rules and Regulations Part 15 Subpart C and the measurement procedures were according to ANSI C63.10-2013. The said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

FCC Part 15 Subpart C 15.247

Tested By:

Approved by:

Jan.15, 2024
Date



Alex Huang, Engineer

Apr.01, 2025
Date



Adam Chou, Manager

Designation Number: TW1640



1.1 DESCRIPTION OF THE TESTED SAMPLES

EUT Name : Locomotive driving recorder
Model Number : S3
FCC ID : 2BMUNS3
Power From ☒Inside ☒Outside
☒Adaptor ☒Battery ☐DC Power Source ☐Support Unit PC
Power Rating(Battery) : 5 Vdc
Power Rating(Adapter) : 12Vdc to 5Vdc
Operate Frequency : Refer to the channel list as described below
Basic Spec : ☐Bluetooth ☐Bluetooth LE ☒802.11b ☒802.11g ☒802.11n HT20/HT40
Operate Frequency : 2412 MHz ~ 2462 MHz
Number of Channels : 11
Step of Channel : ☒N/A ☐_____MHz
Modulation Type : ☐GFSK ☐FHSS ☒DSSS ☐CCK ☒OFDM
Antenna Quantity : 1Tx/1Rx
Antenna Type : FPC
Antenna gain : -0.92 dBi
EUT Received Date : Nov. 07, 2023
EUT Test Completed Date : Nov. 24, 2023



1.3 LIST OF MEASUREMENTS AND EXAMINATIONS

FCC Rule	Description of Test	Result
15.203	Antenna Requirement	Pass
15.207	Conducted Emission	---
15.209	Radiated Spurious Emission Radiated Band Edge Measurement	Pass
15.247(a)(2)	6dB Bandwidth Measurement	Pass
15.247(b)(3)	Peak Output Power Measurement Data	Pass
15.247(d)	Conducted Spurious Emission	Pass
15.247(e)	Power Spectral Density	Pass

2. TEST METHODOLOGY

All testing as described bellowed were performed in accordance with ANSI C63.10:2013 and FCC CFR 47 Part 15 Subpart C.

2.1 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on a wood table, which is at 0.8 m above ground plane according to clause 15.207 and requirements of ANSI C63.10:2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz are using CISPR Quasi-Peak / Average detectors.

Radiated Emissions

The EUT is placed on a turn table, which is 1.5 m above ground plane. The turntable was rotated through 360 degrees to determine the position of maximum emission level. The EUT is placed at 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.



2.2 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
10.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



2.3 DESCRIPTION OF TEST MODES

The EUT was tested under following modes:

Modes:

1. TX mode (Continuous transmitting)

Channels:

Channel \ Wifi type	802.11b 、 802.11g 、 802.11 n20	802.11 n40
Low CH	2412MHz	2422MHz
Mid CH	2437MHz	2437MHz
High CH	3462MHz	2452MHz

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

Test Software Version	REALTEK 11n 8188F
Power Set	22

The EUT have been set in Continuous transmitting by the software above.

2.4 DESCRIPTION OF THE SUPPORT EQUIPMENTS

Setup Diagram

See test photographs attached in appendix 1 for the actual connections between EUT and support equipment.

Support Equipment

Peripherals Devices:

OUTSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
1.	NB	TPN-1130	--	DOC	HP	--	--
2	USB-C Cable	FD-1	--	--	SC	Unshielded 0.3m	

Note: All the above equipment /cable were placed in worse case position to maximize emission signals during emission test

Grounding: Grounding was in accordance with the manufacturer's requirement and conditions for the intended use.



3. TEST AND MEASUREMENT EQUIPMENT

3.1 CALIBRATION

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

3.2 EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and. Other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.

TABLE 1 LIST OF TEST AND MEASUREMENT EQUIPMENT

Conducted Emission Measurement (Test Site ID: GCC_CE_01)					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
LISN #1	SCHWARZBECK	NNLK8121	550213	Jan. 30, 2024	
LISN #2	SCHAFFNER	NNB41	03/10026	--	For Support Unit
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100438	Jan. 18, 2024	
1W 20db Attenuator & Pulse Limiter with Cable	AFJ	PAT20M and RG59U	PA2005130030	Jan. 17, 2024	
Digital thermometer and hygrometer	DRTEC	Q-226 WT	DEAC3E-A80408 213-000	Nov. 12, 2024	
AC POWER SOURCE	APC	AFC-3KB	870311	--	
Test Software	AUDIX	E3	6.2008-10-2C	--	

966_3m EMC Chamber Radiated Emission Measurement (Test Site ID: GCC_RE_01)					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
EMC Test Receiver	R&S	ESP17	101404	Sep. 26, 2024	
Spectrum Analyzer	R&S	FSV40	101088	May 06, 2024	
Magnetic Loop Antenna	TeseQ	HLA6120	26349	Oct. 04, 2024	
Bilog Antenna	SUNOL	JB1	A052204	Oct. 02, 2024	
Pre-Amplifier	WIRELESS	FPA-6592G	060028	Sep. 26, 2024	
RF Cable	HUBER + UHNER	RG213/U	Cable-004	Dec. 05, 2024	



Double Ridged Guide HORN ANTENNA	EST.LINDGREN	3117	00119028	May 10, 2024	
SMA_Cable	HUBER SUHNER	EMC104-SM-SM-1 000	170238	Mar. 28, 2024	
RF Cable	Huber Suhner	SUCOFLEX 104	293864/4	May 07, 2024	
Microwave Preamplifier	EMCINSTRUMENT	EMC051845	980059	May 09, 2024	
TEST SOFTWARE	AUDIX	E3	6.101222	--	
Digital thermometer and hygrometer	COMET	HTC-2	DEAC3E-A9009 QV8G-000	Jan. 29, 2024	
AC POWER SOURCE	Turn Power	APW-120N	S007	--	

Conducted Measurement (Test Site ID: GCC_RE_01)					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
Spectrum Analyzer	R&S	FSV40	101088	May 06, 2024	
20db Attenuator	Marvelous	6620_SMA-50-1	--	Nov. 08, 2024	
DC Block	Marvelous	MVE6411	--	--	
Digital thermometer and hygrometer	COMET	HTC-2	DEAC3E-A9009 QV8G-000	Jan. 29, 2024	

✂ Calibration interval of instruments listed above is one year



4. ANTENNA REQUIREMENTS

4.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247(b), if transmitting antennas of direction gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

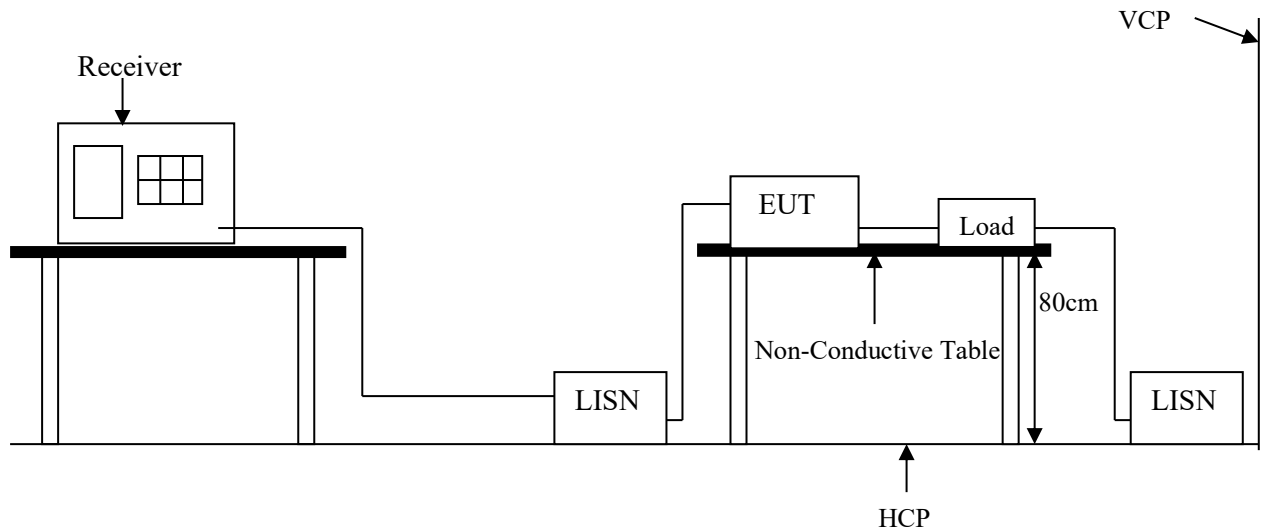
4.2 ANTENNA CONSTRUCTION AND DIRECTIONAL GAIN

Antenna type: FPC

Antenna Gain: -0.92 dBi

5. CONDUCTED EMISSIONS

5.1 TEST SETUP



5.2 LIMIT

Frequency range (MHz)	CLASS A		CLASS B	
	QP dB(uV)	Average dB(uV)	QP dB(uV)	Average dB(uV)
0.15-0.5	79 dBuV	66 dBuV	66 - 56 dBuV	56 - 46 dBuV
0.5-5.0	73 dBuV	60 dBuV	56 dBuV	46 dBuV
5.0-30.0	73 dBuV	60 dBuV	60 dBuV	50 dBuV

Remark: In the above table, the tighter limit applies at the band edges.

5.3 TEST PROCEDURE

The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). It provides a 50 ohm / 50 μ H coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm / 50 μ H coupling impedance with 50 ohm termination. (Please refer to the block diagram of the test setup and photograph.)

Both sides of AC line are checked for the maximum conducted emission interference. In order to find the maximum emissions, the relating positions of equipment and all of the interference cables must be changed according to EN 55022 regulations: The measurement procedure on conducted emission interference.

The resolution bandwidth of the field strength meter is set at 9 KHz.



5.4 TEST RESULT

Not applicable, because the EUT is powered by battery.

5.5 TEST DATA:

NA



6. PEAK OUTPUT POWER

6.1 TEST SETUP



6.2 LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to § 15.247(b)(3) , for systems using digital modulation in the bands of 902 – 928 MHz , 2400 – 2483.5 MHz: 1 Watt.
2. According to § 15.247(b)(4) , the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used , the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) , (b)(2) , and (b)(3) of this section , as appropriate , by the amount in dB that directional gain of the antenna exceeds 6 dBi.

6.3 TEST PROCEDURE

1. Peak power is measured using the wideband Spectrum Analyzer.
2. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

6.4 TEST RESULT

PASS



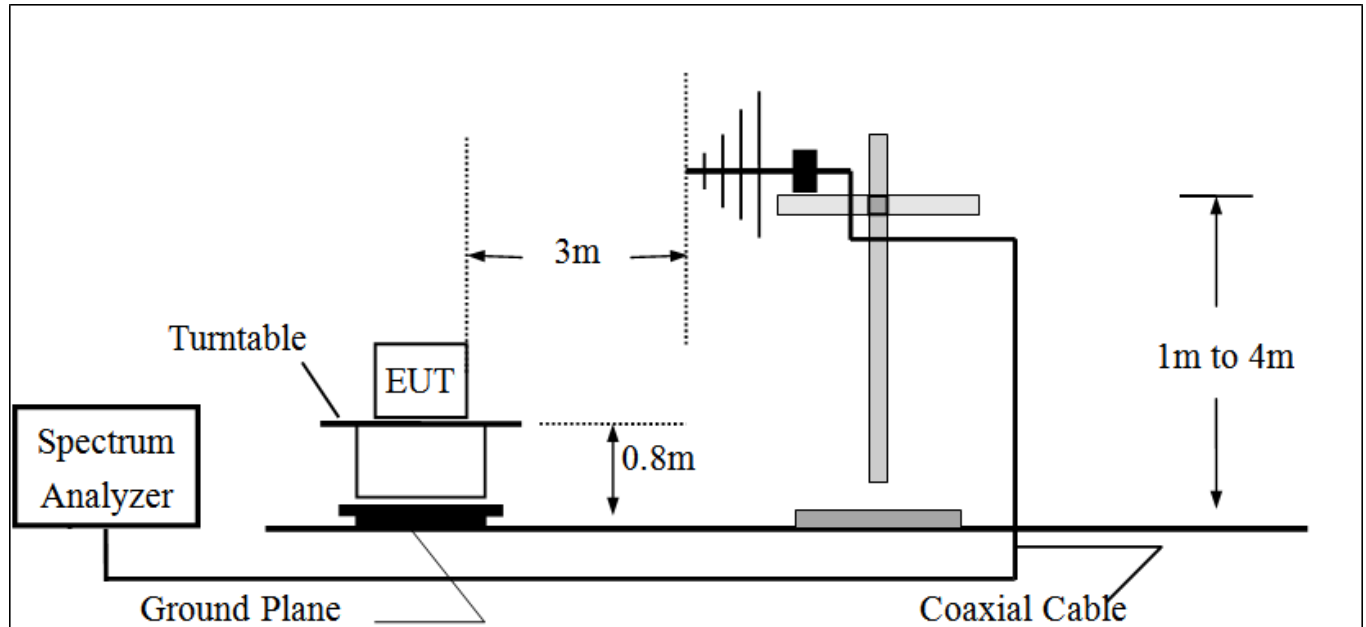
6.5 TEST DATA:

Wifi type	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit(dBm)	Max. Limit(W)
11b	2412 MHz	8.80	0.00758578	30.00	1.00
	2437 MHz	7.72	0.00591562	30.00	1.00
	2462 MHz	5.98	0.00396278	30.00	1.00
11g	2412 MHz	7.93	0.00620869	30.00	1.00
	2437 MHz	6.39	0.00435512	30.00	1.00
	2462 MHz	5.05	0.00319890	30.00	1.00
11 n20	2412 MHz	8.12	0.00648634	30.00	1.00
	2437 MHz	6.75	0.00473151	30.00	1.00
	2462 MHz	5.26	0.00335738	30.00	1.00
11 n40	2422 MHz	8.22	0.00663743	30.00	1.00
	2437 MHz	7.34	0.00542001	30.00	1.00
	2452 MHz	6.39	0.00435512	30.00	1.00

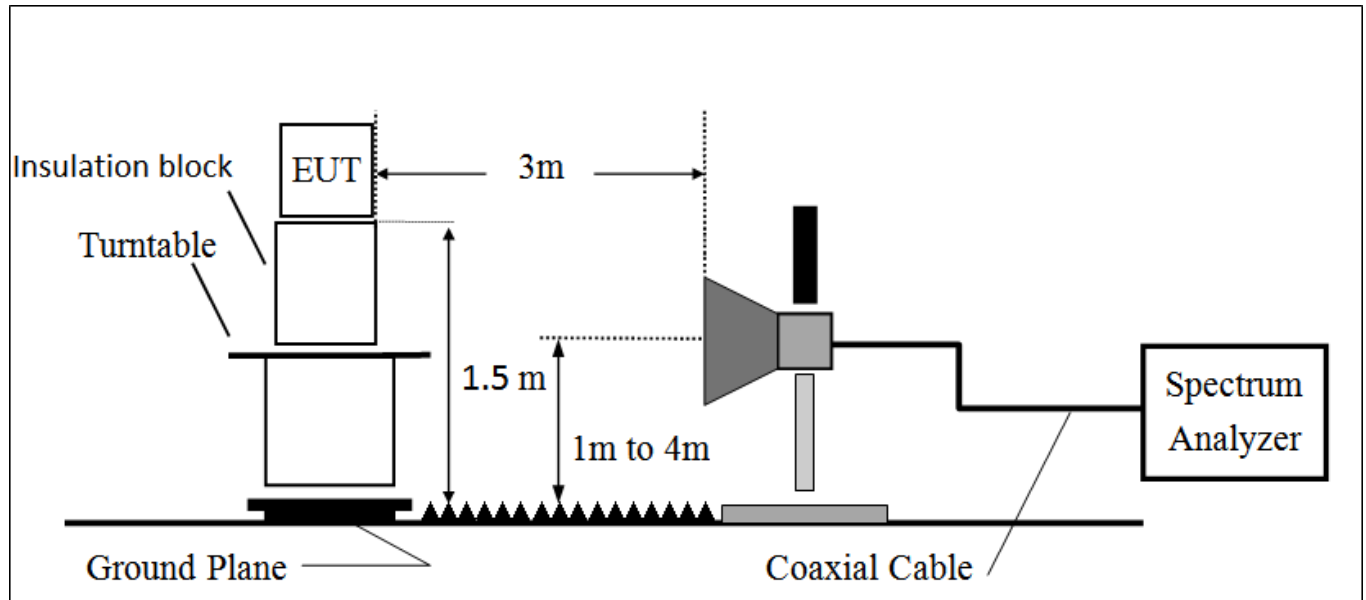
7. RADIATED BAND EDGE

7.1 TEST SETUP

30MHz to 1GHz



Above 1GHz





7.2 LIMIT

Restricted Bands:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

Operation within the bands:

902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

Frequency (Hz)	Field Strength ($\mu\text{V}/\text{m}$ at 3-meter)	Field Strength (dB $\mu\text{V}/\text{m}$ at 3-meter)
1.705-30	30 (at 30-meter)	69.54
30-88	100	40
88-216	150	43
216-960	200	46
Above 960	500	54

7.3 TEST RESULT

PASS



7.4 TEST DATA:

Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

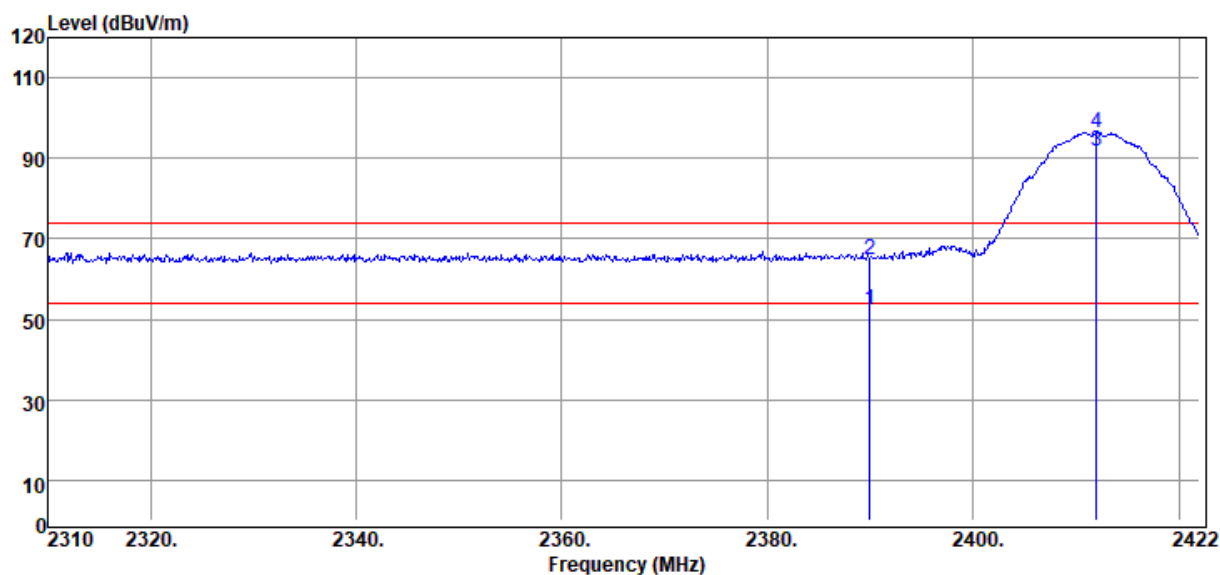
Model : Refer page 1 of the report

Mode : TX Mode 802.11b Low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2389.97	14.01	38.16	5.96	32.20	0.00	52.17	54.00	-1.83	Average
2	2389.97	26.42	38.16	5.96	32.20	0.00	64.58	74.00	-9.42	Peak
3	2412.00	53.51	38.29	5.99	32.30	0.00	91.80			Average
4	2412.00	58.17	38.29	5.99	32.30	0.00	96.46			Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

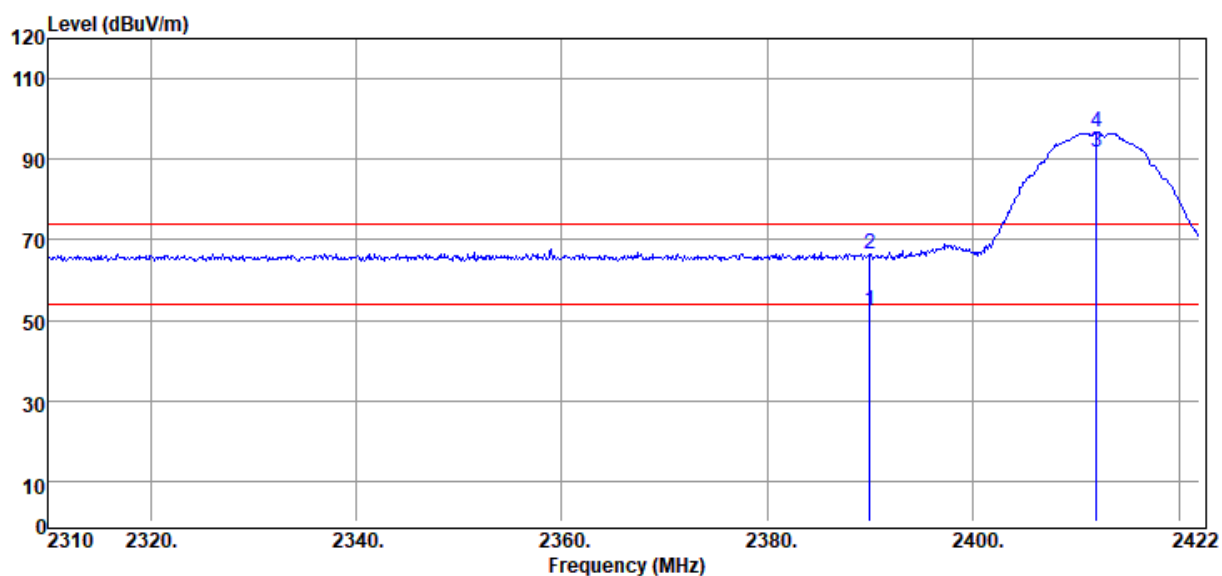
Mode : TX Mode 802.11b Low CH

Voltage : DC 5V(USB)

Model : Refer page 1 of the report

Temp/Humidity : 26°C / 59%

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2389.97	14.00	38.16	5.96	32.20	0.00	52.16	54.00	-1.84	Average
2	2389.97	28.36	38.16	5.96	32.20	0.00	66.52	74.00	-7.48	Peak
3	2412.00	53.36	38.29	5.99	32.30	0.00	91.65			Average
4	2412.00	58.39	38.29	5.99	32.30	0.00	96.68			Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

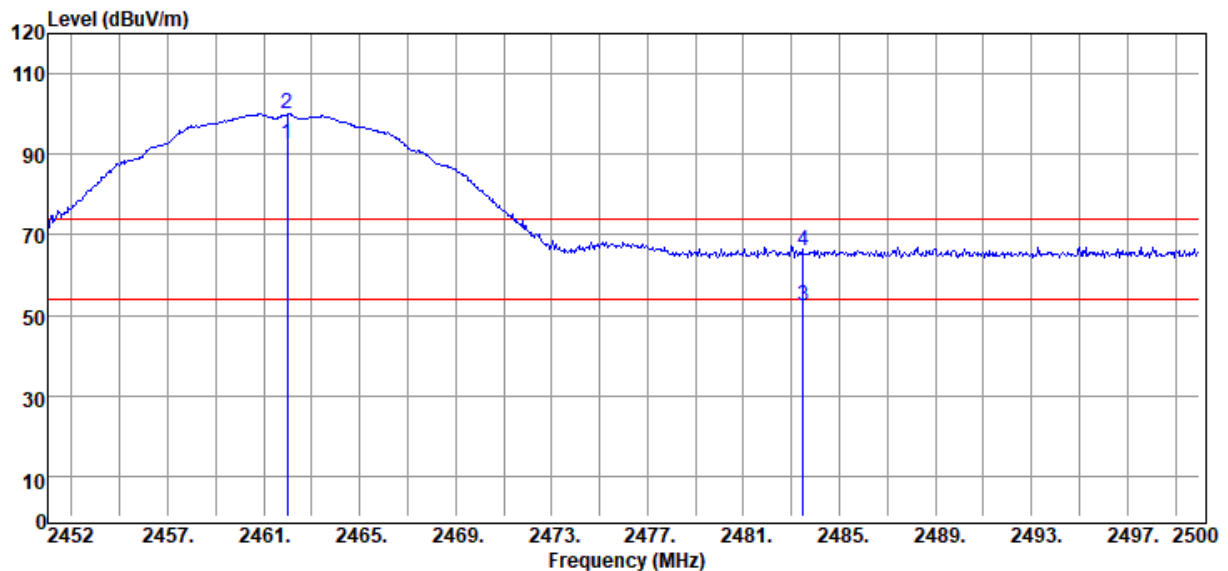
Model : Refer page 1 of the report

Mode : TX Mode 802.11b High CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



Freq	Meter Level	System Factor	Cable Loss	Antenna Factor	Preamp Gain	Real Level	Limit Line	Margin	Remark
------	-------------	---------------	------------	----------------	-------------	------------	------------	--------	--------

	MHz	dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2462.00	54.53	38.14	6.06	32.08	0.00	92.67			Average
2	2462.00	62.07	38.14	6.06	32.08	0.00	100.21			Peak
3	2483.50	14.05	38.09	6.09	32.00	0.00	52.14	54.00	-1.86	Average
4	2483.50	28.02	38.09	6.09	32.00	0.00	66.11	74.00	-7.89	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

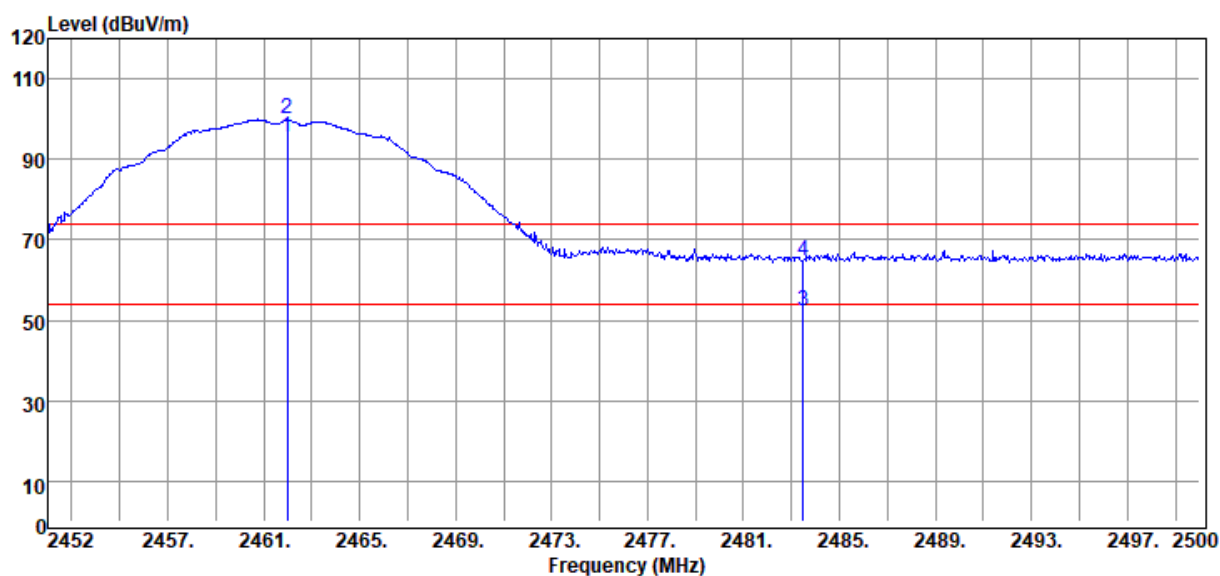
Model : Refer page 1 of the report

Mode : TX Mode 802.11b High CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2462.00	57.44	38.14	6.06	32.08	0.00	95.58			Average
2	2462.00	61.75	38.14	6.06	32.08	0.00	99.89			Peak
3	2483.50	14.10	38.09	6.09	32.00	0.00	52.19	54.00	-1.81	Average
4	2483.50	26.87	38.09	6.09	32.00	0.00	64.96	74.00	-9.04	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

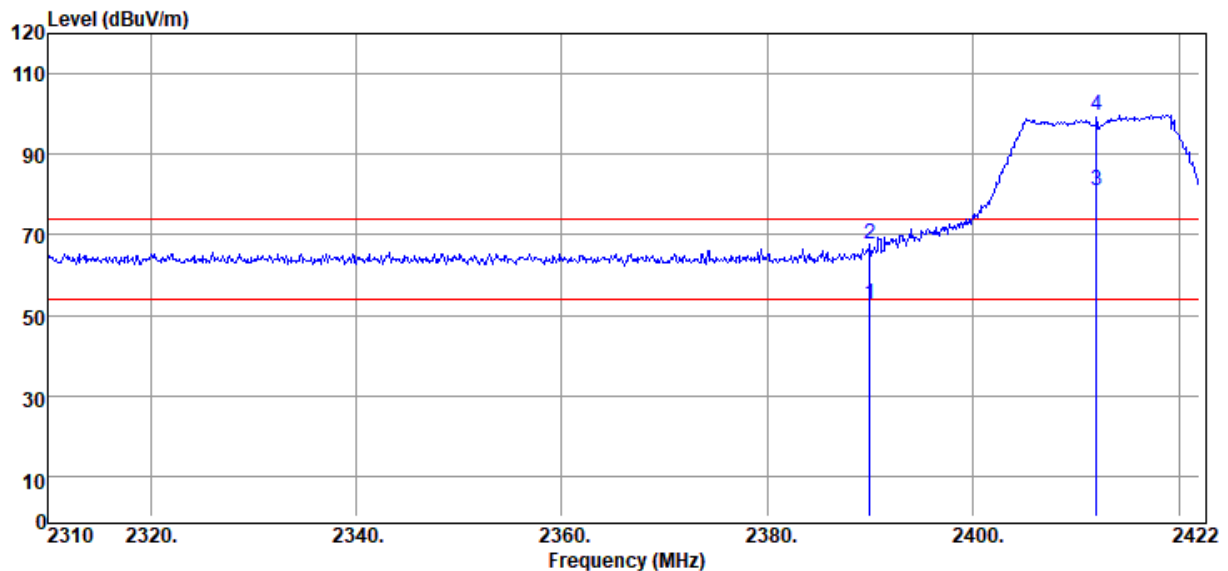
Model : Refer page 1 of the report

Mode : TX Mode 802.11g Low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2389.97	14.49	38.16	5.96	32.20	0.00	52.65	54.00	-1.35	Average
2	2389.97	29.42	38.16	5.96	32.20	0.00	67.58	74.00	-6.42	Peak
3	2412.00	42.80	38.29	5.99	32.30	0.00	81.09			Average
4	2412.00	61.39	38.29	5.99	32.30	0.00	99.68			Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

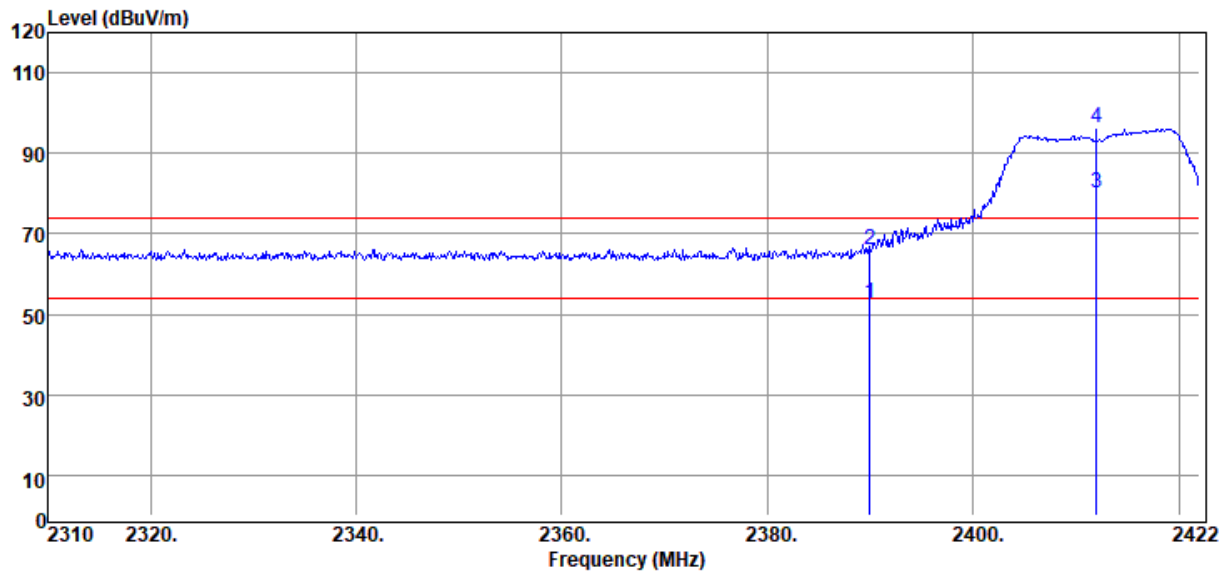
Model : Refer page 1 of the report

Mode : TX Mode 802.11g Low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2389.97	14.44	38.16	5.96	32.20	0.00	52.60	54.00	-1.40	Average
2	2389.97	28.02	38.16	5.96	32.20	0.00	66.18	74.00	-7.82	Peak
3	2412.00	42.02	38.29	5.99	32.30	0.00	80.31			Average
4	2412.00	57.91	38.29	5.99	32.30	0.00	96.20			Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

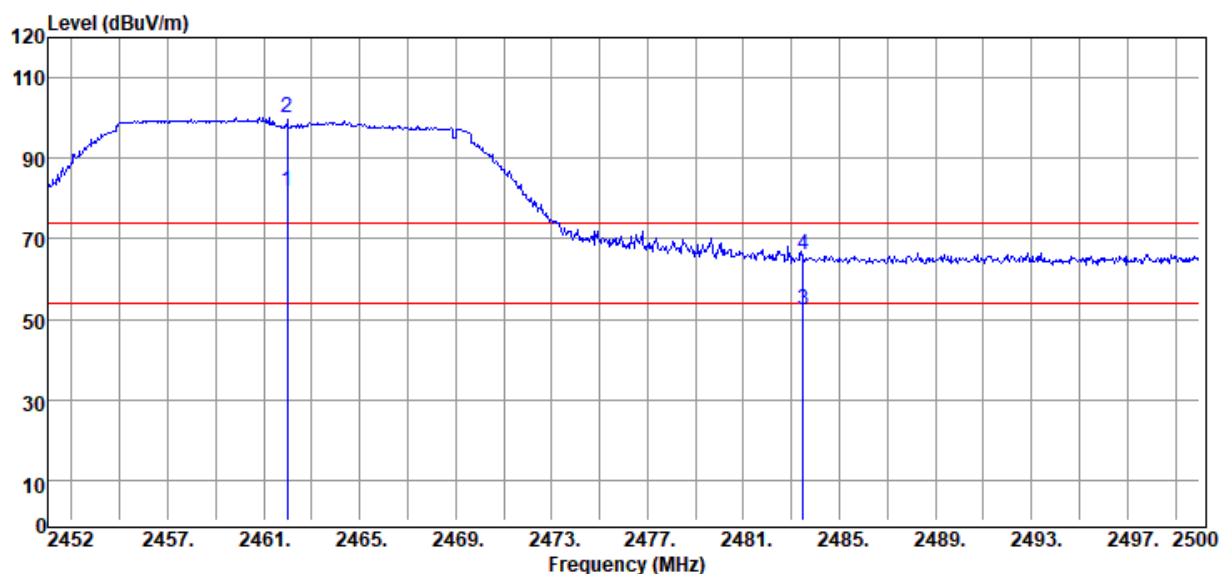
Model : Refer page 1 of the report

Mode : TX Mode 802.11g High CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2462.00	43.74	38.14	6.06	32.08	0.00	81.88			Average
2	2462.00	62.06	38.14	6.06	32.08	0.00	100.20			Peak
3	2483.50	14.21	38.09	6.09	32.00	0.00	52.30	54.00	-1.70	Average
4	2483.50	28.12	38.09	6.09	32.00	0.00	66.21	74.00	-7.79	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

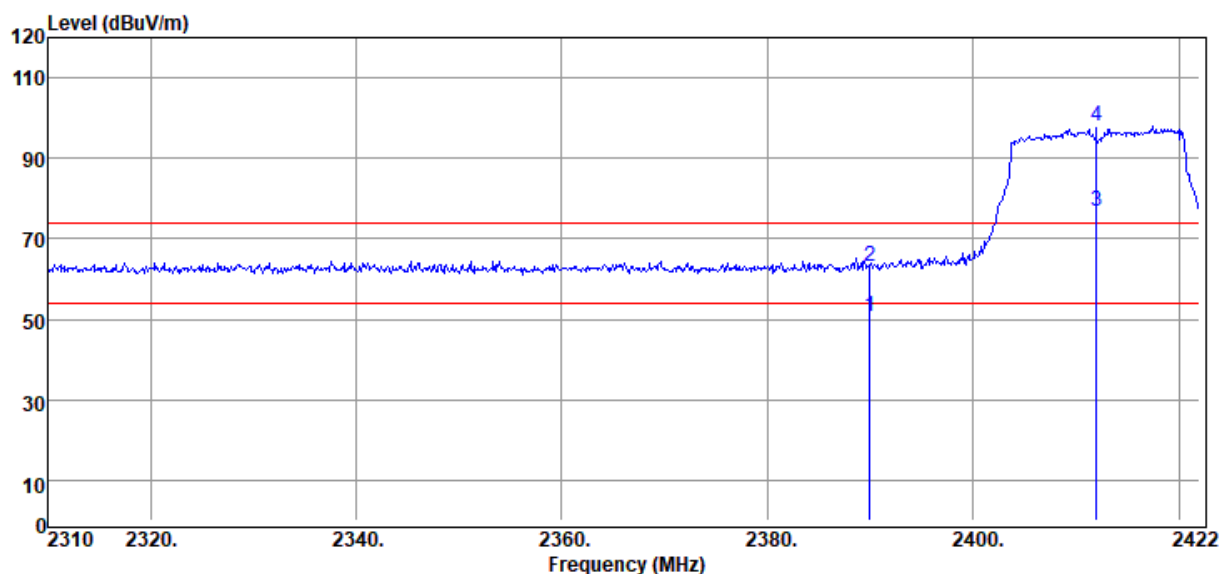
Model : Refer page 1 of the report

Mode : TX Mode 802.11n20 Low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2389.97	12.69	38.16	5.96	32.20	0.00	50.85	54.00	-3.15	Average
2	2389.97	24.85	38.16	5.96	32.20	0.00	63.01	74.00	-10.99	Peak
3	2412.00	38.67	38.29	5.99	32.30	0.00	76.96			Average
4	2412.00	59.58	38.29	5.99	32.30	0.00	97.87			Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

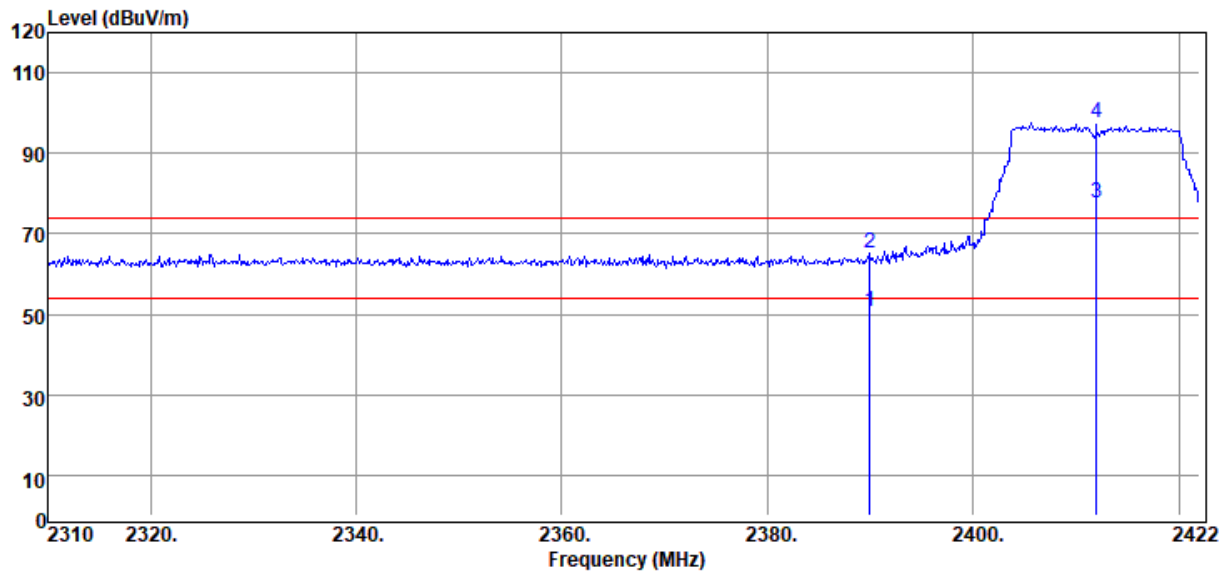
Model : Refer page 1 of the report

Mode : TX Mode 802.11n20 Low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
		Level	Factor	Loss	Factor	Gain	Level	Line		
	MHz	dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2389.97	12.59	38.16	5.96	32.20	0.00	50.75	54.00	-3.25	Average
2	2389.97	26.93	38.16	5.96	32.20	0.00	65.09	74.00	-8.91	Peak
3	2412.00	39.27	38.29	5.99	32.30	0.00	77.56			Average
4	2412.00	59.10	38.29	5.99	32.30	0.00	97.39			Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

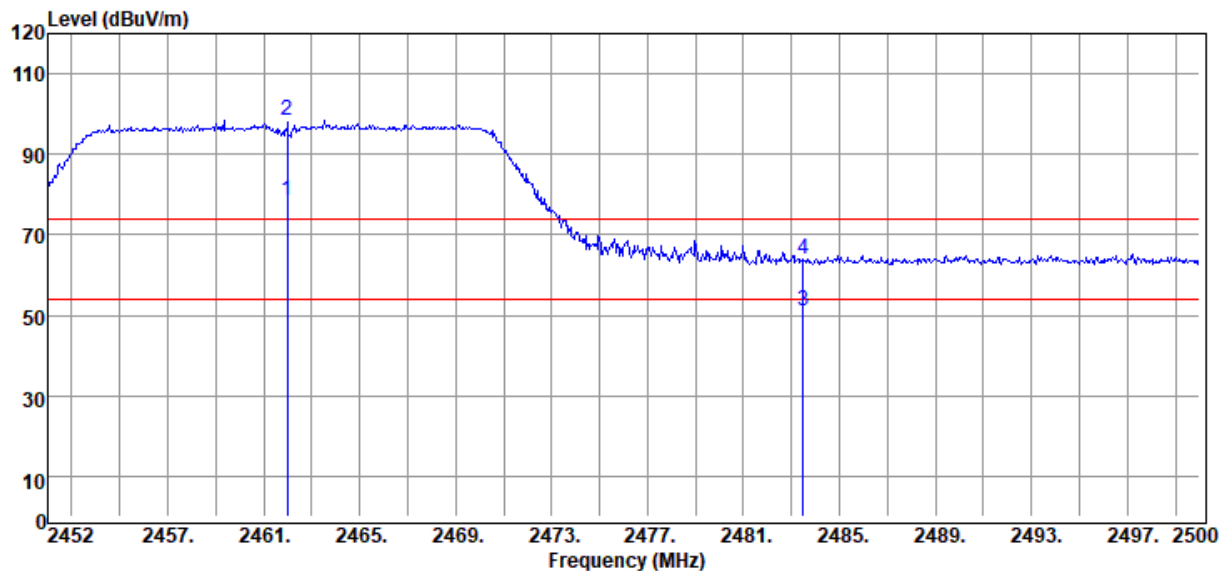
Model : Refer page 1 of the report

Mode : TX Mode 802.11n20 High CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2462.00	40.19	38.14	6.06	32.08	0.00	78.33			Average
2	2462.00	60.16	38.14	6.06	32.08	0.00	98.30			Peak
3	2483.50	13.10	38.09	6.09	32.00	0.00	51.19	54.00	-2.81	Average
4	2483.50	25.86	38.09	6.09	32.00	0.00	63.95	74.00	-10.05	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

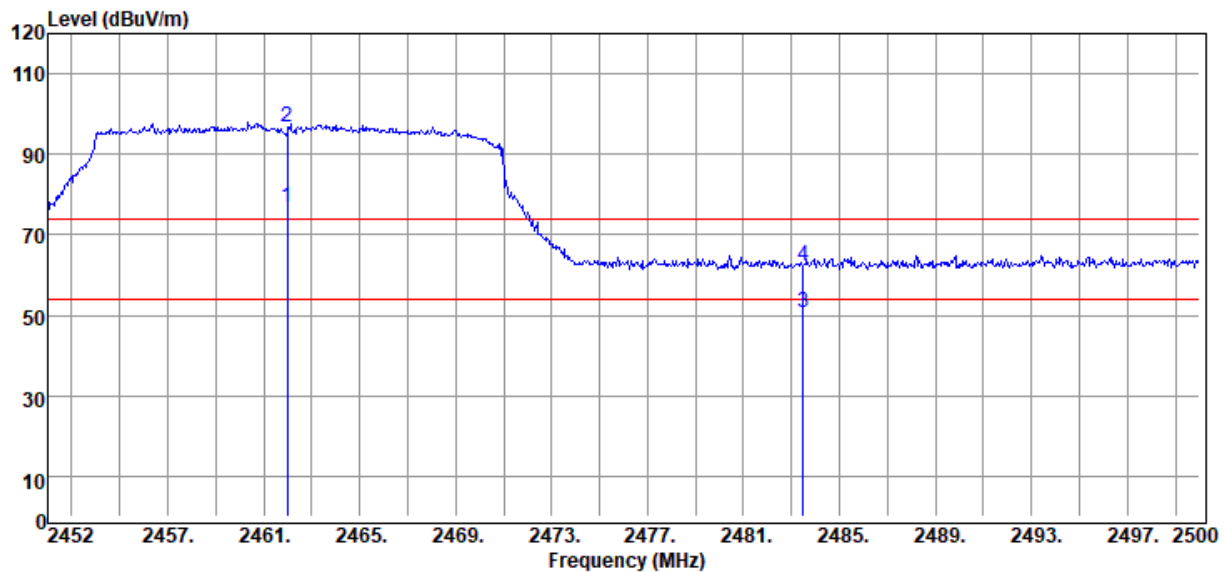
Model : Refer page 1 of the report

Mode : TX Mode 802.11n20 High CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2462.00	38.55	38.14	6.06	32.08	0.00	76.69			Average
2	2462.00	58.46	38.14	6.06	32.08	0.00	96.60			Peak
3	2483.50	12.77	38.09	6.09	32.00	0.00	50.86	54.00	-3.14	Average
4	2483.50	24.26	38.09	6.09	32.00	0.00	62.35	74.00	-11.65	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

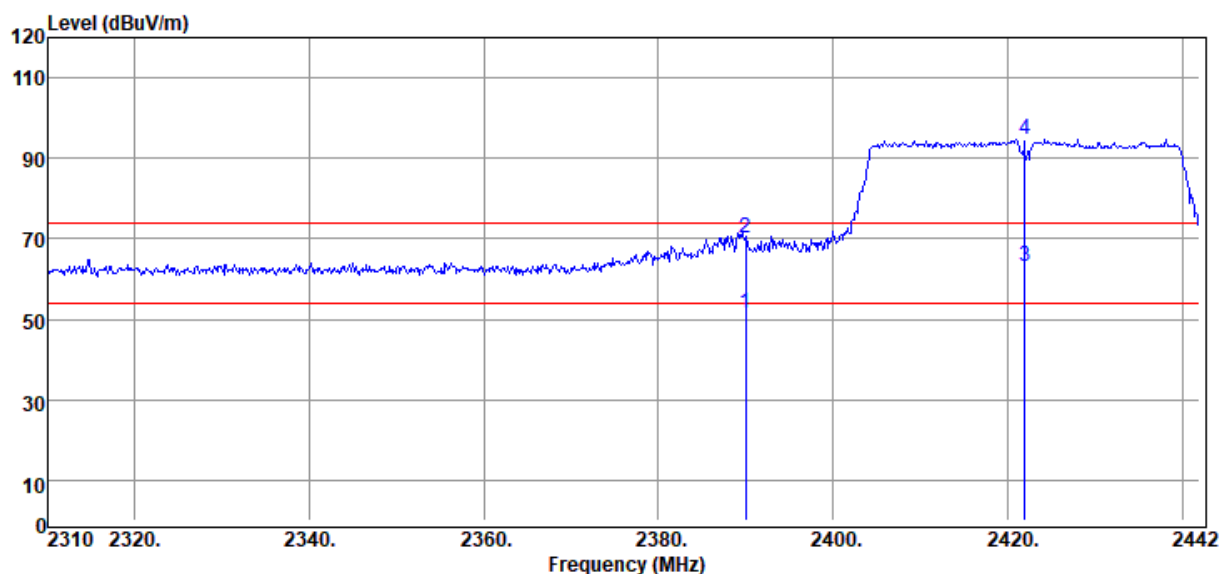
Model : Refer page 1 of the report

Mode : TX Mode 802.11n40 Low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2389.99	13.15	38.16	5.96	32.20	0.00	51.31	54.00	-2.69	Average
2	2389.99	32.07	38.16	5.96	32.20	0.00	70.23	74.00	-3.77	Peak
3	2422.00	24.76	38.28	6.00	32.28	0.00	63.04			Average
4	2422.00	56.57	38.28	6.00	32.28	0.00	94.85			Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

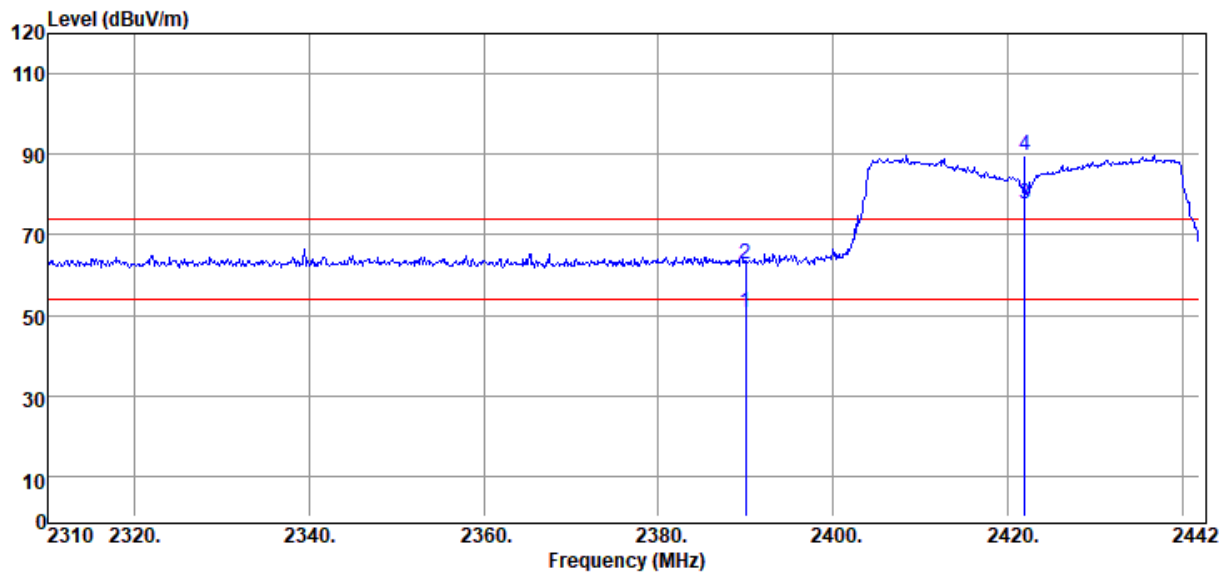
Model : Refer page 1 of the report

Mode : TX Mode 802.11n40 Low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2389.99	12.67	38.16	5.96	32.20	0.00	50.83	54.00	-3.17	Average
2	2389.99	24.71	38.16	5.96	32.20	0.00	62.87	74.00	-11.13	Peak
3	2422.00	39.43	38.28	6.00	32.28	0.00	77.71			Average
4	2422.00	51.28	38.28	6.00	32.28	0.00	89.56			Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

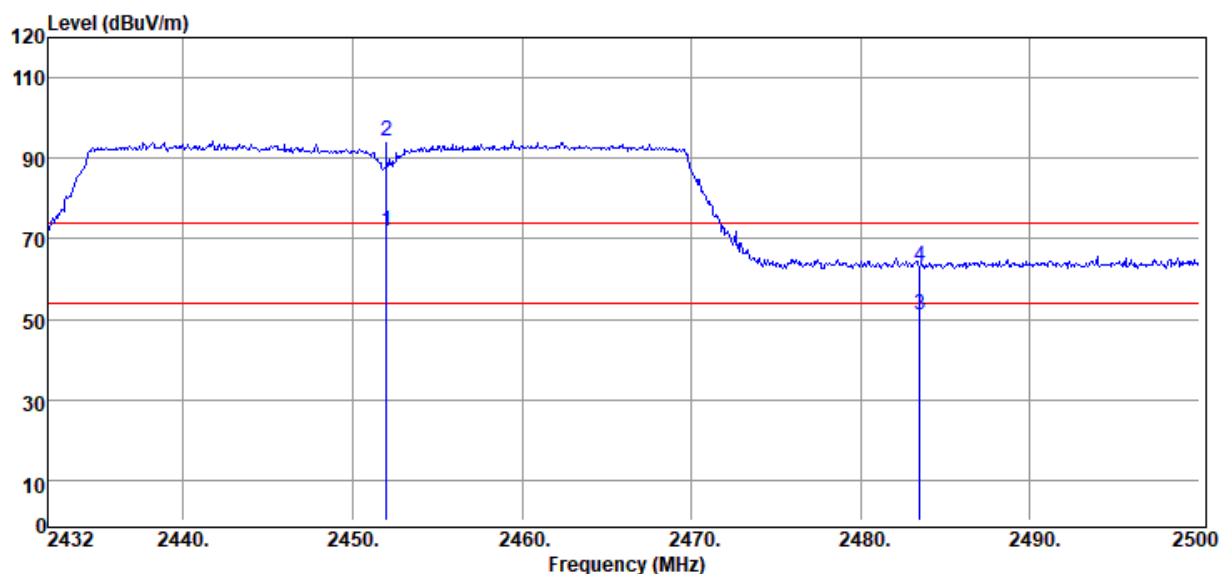
Model : Refer page 1 of the report

Mode : TX Mode 802.11n40 High CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2452.00	33.71	38.14	6.04	32.10	0.00	71.85			Average
2	2452.00	56.26	38.14	6.04	32.10	0.00	94.40			Peak
3	2483.50	12.83	38.09	6.09	32.00	0.00	50.92	54.00	-3.08	Average
4	2483.50	25.08	38.09	6.09	32.00	0.00	63.17	74.00	-10.83	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

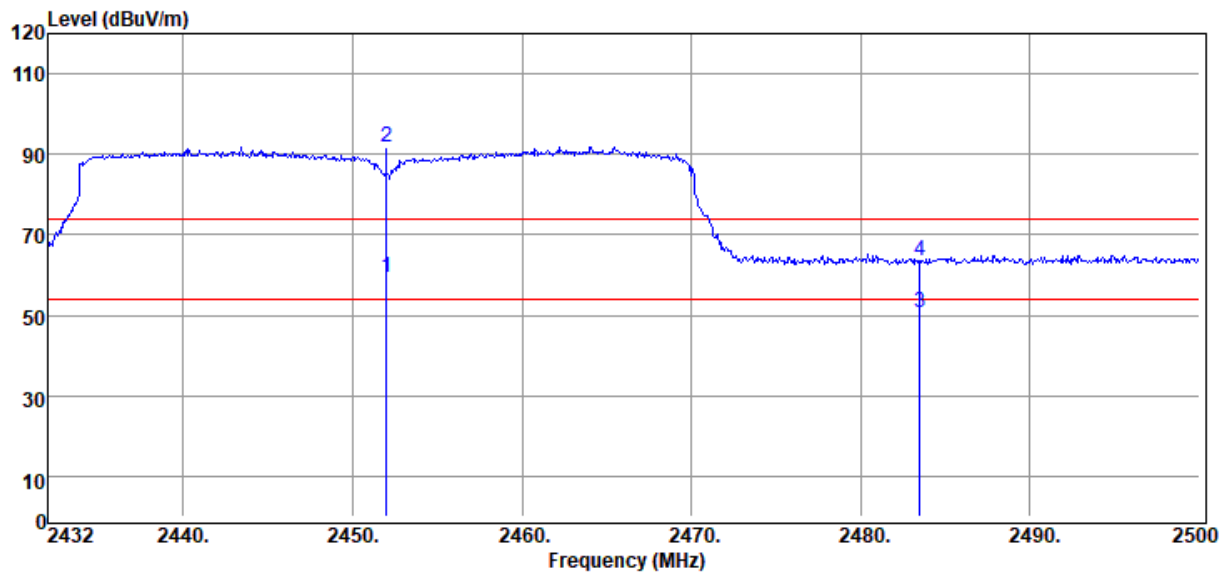
Model : Refer page 1 of the report

Mode : TX Mode 802.11n40 High CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	2452.00	21.09	38.14	6.04	32.10	0.00	59.23			Average
2	2452.00	53.74	38.14	6.04	32.10	0.00	91.88			Peak
3	2483.50	12.74	38.09	6.09	32.00	0.00	50.83	54.00	-3.17	Average
4	2483.50	25.36	38.09	6.09	32.00	0.00	63.45	74.00	-10.55	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



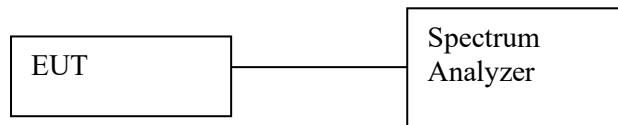
Note:

1. Emission level = Reading level + Correction factor
2. Correction factor : Antenna factor, Cable loss, PreAmp, etc.
3. All emissions as described above were determining by rotating the EUT through three orthogonal axes to maximizing the emissions if the EUT belongs to hand-held or body-worn devices.
4. Measurements above 1000 MHz, Peak detector setting: 1MHz RBW, with 3 MHz VBW.
5. Measurements above 1000 MHz, Average detector setting: 1MHz RBW with 10 Hz VBW.
6. Peak detector measurement data will represent the worst case results.



8. 6DB BANDWIDTH

8.1 TEST SETUP



8.2 LIMIT

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

8.3 TEST PROCEDURE

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW of spectrum analyzer to 30 KHz and VBW to 100KHz.
- c. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

8.4 TEST RESULT

PASS



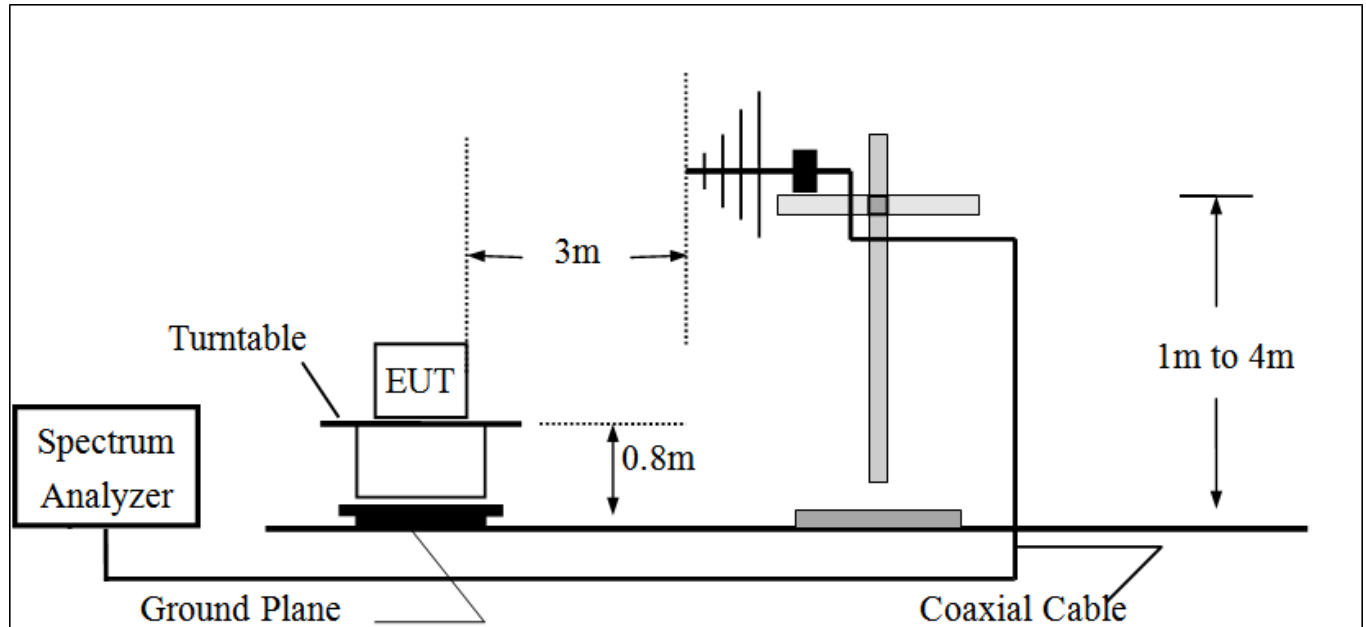
8.5 TEST DATA:

Wifi Type	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	6db Bandwidth limit(KHz)
11b	1	2412	9.042	≥ 500
	6	2437	9.042	≥ 500
	11	2462	8.556	≥ 500
11g	1	2412	16.350	≥ 500
	6	2437	16.362	≥ 500
	11	2462	16.332	≥ 500
11 n20	1	2412	17.568	≥ 500
	6	2437	17.304	≥ 500
	11	2462	17.562	≥ 500
11n40	3	2422	35.880	≥ 500
	6	2437	35.660	≥ 500
	9	2452	35.920	≥ 500

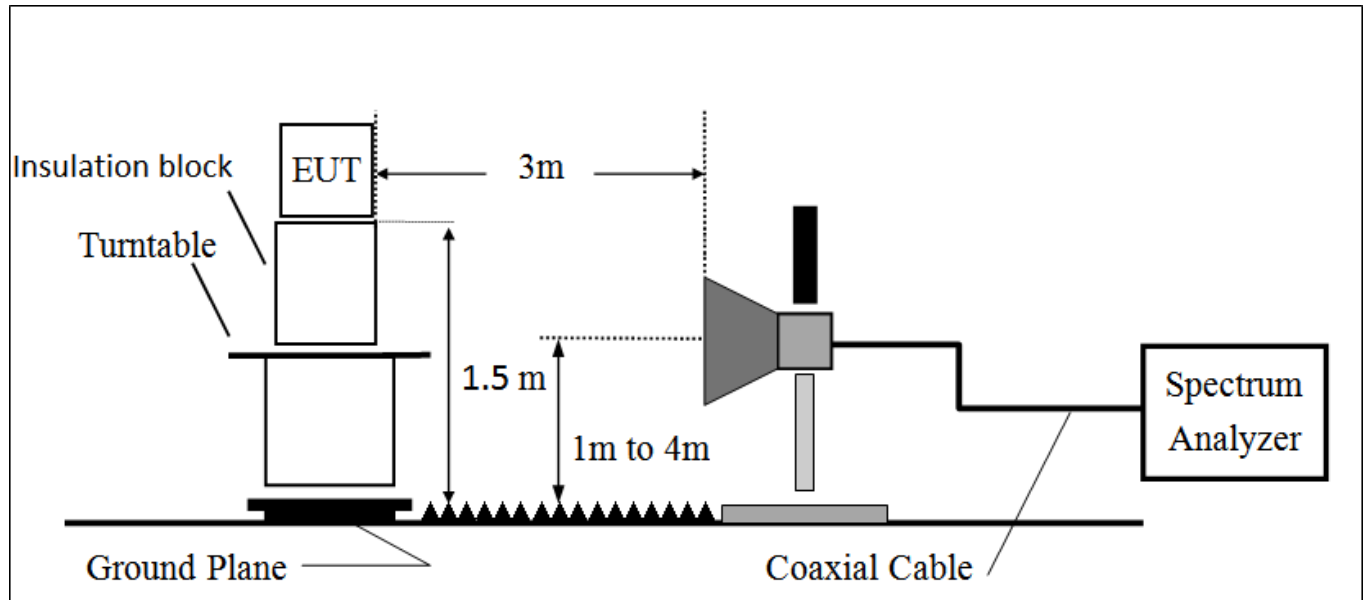
9. RADIATED SPURIOUS EMISSIONS

9.1 TEST SETUP

30MHz to 1GHz



Above 1GHz





9.2 LIMIT

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209 as below.

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500*	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

In the above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength ($\mu\text{V/m}$)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
0.009-0.490	2400/F(kHz) at 300-meter	--
0.490-1.705	24000/F(kHz) at 30-meter	--
1.705-30	30 at 30-meter	69.54
30-88	100	40
88-216	150	43
216-960	200	46
Above 960	500	54



9.3 TEST PROCEDURE

1. The EUT was placed on a turntable, which was 0.8m above ground plane.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT was set at 3m away from the receiving antenna, which was varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was maximized by changing the polarization of receiving antenna, both horizontal and vertical.
6. Repeated above procedures until the measurements for all frequencies are completed.

9.4 TEST RESULT

PASS

9.5 TEST DATA:

All frequencies not described in this test report and within the range of the general radiated emission limits are not detectable significantly. The table as below is representing worst emissions found.



30MHz ~ 1GMz

Site : GCC_RE_01

RBW : 100 KHz VBW : 300 KHz SWT:Auto

EUT : Refer page 1 of the report

Mode : TX Mode

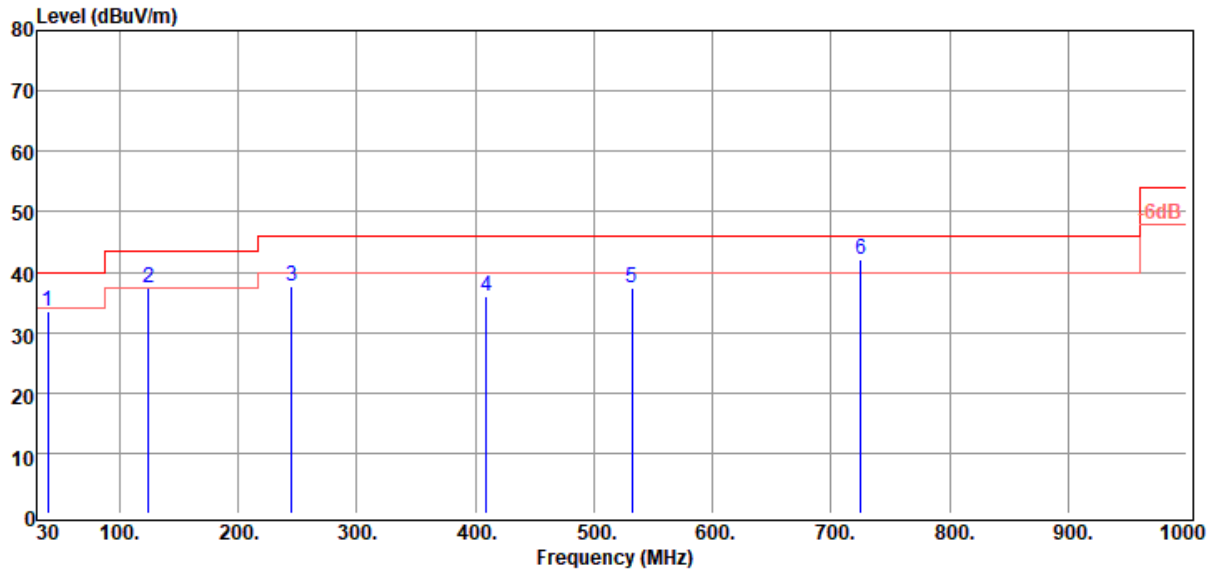
Voltage : DC 5V(USB)

Polarity : HORIZONTAL

Model : Refer page 1 of the report

Temp/Humidity : 26°C / 59%

Memo : 3N2105



	Freq MHz	Meter Level dBuV	System Factor dB/m	Cable Loss dB	Antenna Factor dB/m	Preamp Gain dB	Real Level dBuV/m	Limit Line dBuV/m	Margin dB	Remark
1	39.70	41.28	-7.82	0.60	20.82	29.24	33.46	40.00	-6.54	Peak
2	124.09	44.98	-7.53	1.14	20.22	28.89	37.45	43.50	-6.05	Peak
3	245.34	46.51	-8.83	1.95	18.20	28.98	37.68	46.00	-8.32	QP
4	409.27	39.30	-3.26	2.76	22.57	28.59	36.04	46.00	-9.96	Peak
5	532.46	37.61	-0.16	3.06	24.75	27.97	37.45	46.00	-8.55	Peak
6	725.49	38.27	3.77	3.37	27.27	26.87	42.04	46.00	-3.96	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 100 KHz VBW : 300 KHz SWT:Auto Polarity : VERTICAL

EUT : Refer page 1 of the report

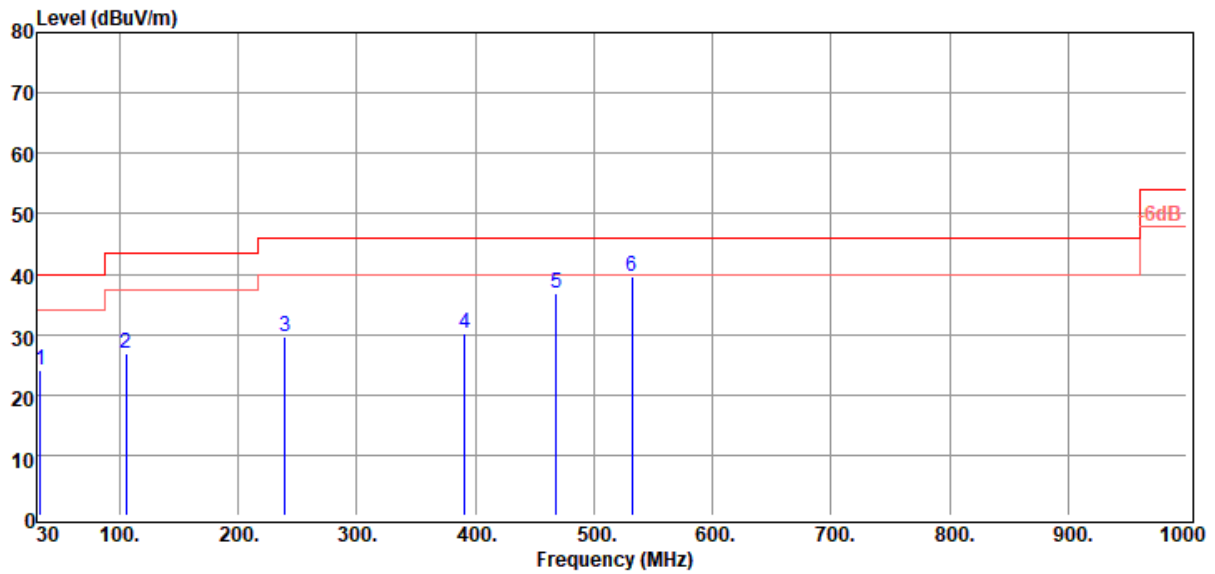
Model : Refer page 1 of the report

Mode : TX Mode

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line	dB	
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m		
1	32.91	26.97	-3.01	0.52	25.72	29.25	23.96	40.00	-16.04	Peak
2	105.66	36.66	-9.71	1.03	18.10	28.84	26.95	43.50	-16.55	Peak
3	239.52	38.57	-8.94	1.88	18.18	29.00	29.63	46.00	-16.37	Peak
4	390.84	34.01	-3.90	2.73	22.03	28.66	30.11	46.00	-15.89	Peak
5	468.44	38.59	-1.86	2.89	23.54	28.29	36.73	46.00	-9.27	Peak
6	532.46	39.88	-0.16	3.06	24.75	27.97	39.72	46.00	-6.28	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



1GHz ~26.5GHz

Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

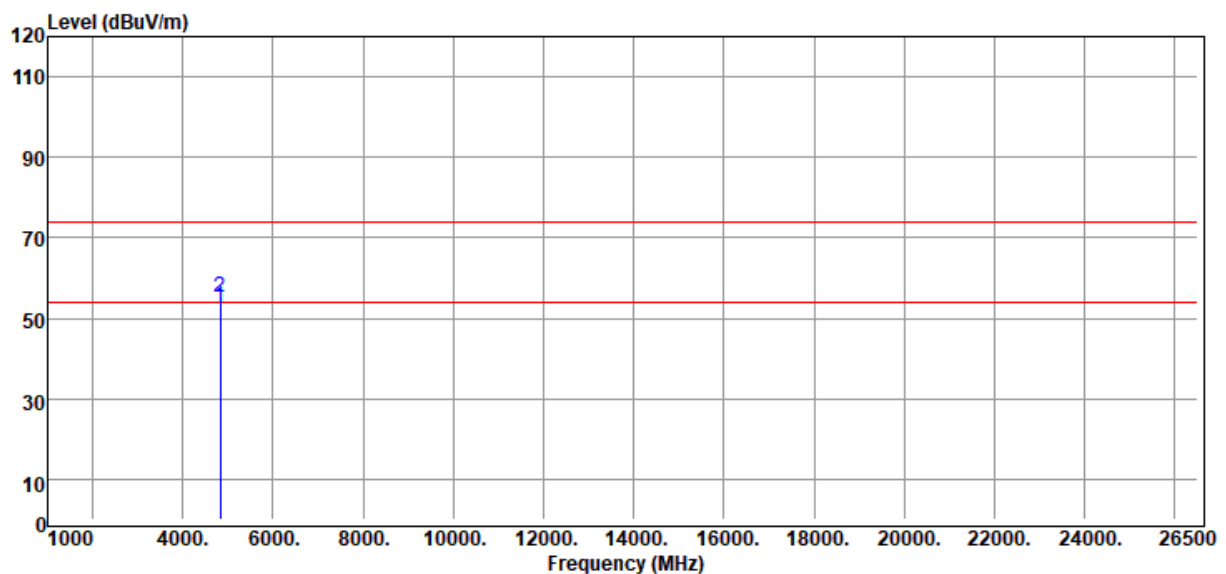
Model : Refer page 1 of the report

Mode : TX mode 802.11b low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4824.00	60.29	-7.63	8.86	33.95	50.44	52.66	54.00	-1.34	Average
2	4824.00	62.92	-7.63	8.86	33.95	50.44	55.29	74.00	-18.71	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

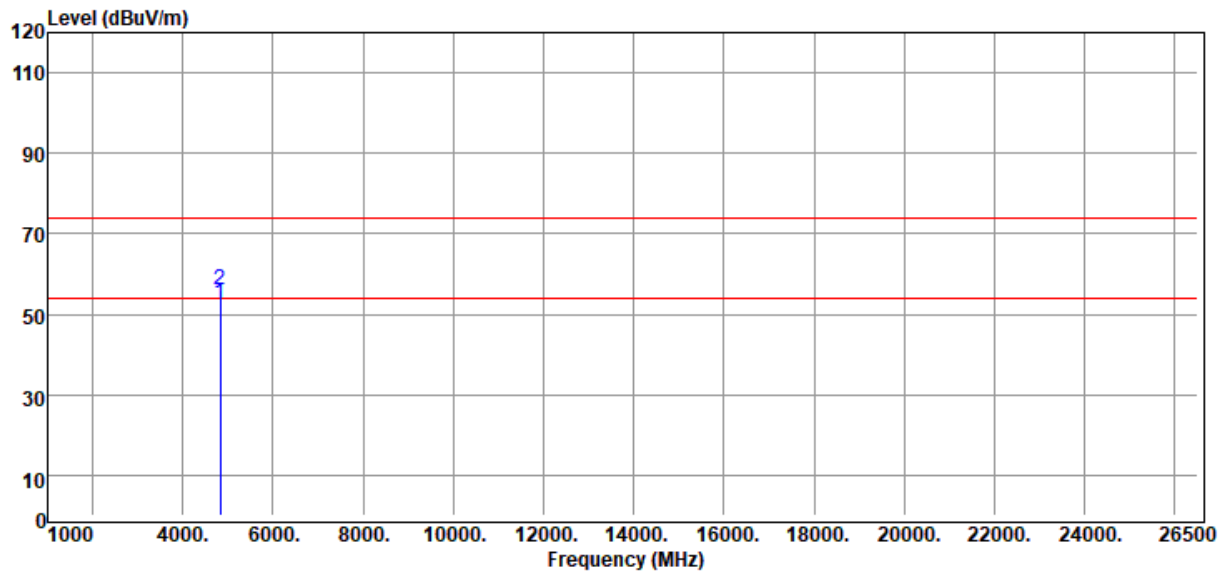
Model : Refer page 1 of the report

Mode : TX mode 802.11b low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line	dB	
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m		
1	4824.00	60.41	-7.63	8.86	33.95	50.44	52.78	54.00	-1.22	Average
2	4824.00	63.76	-7.63	8.86	33.95	50.44	56.13	74.00	-17.87	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

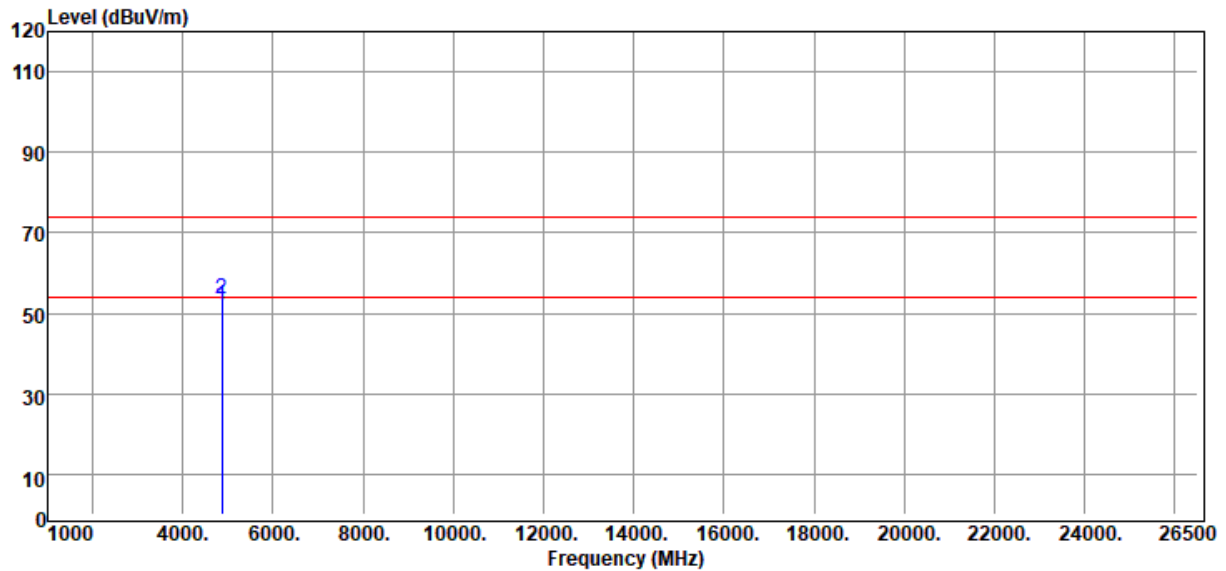
Model : Refer page 1 of the report

Mode : TX mode 802.11b mid CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4874.00	59.65	-7.56	8.92	33.95	50.43	52.09	54.00	-1.91	Average
2	4874.00	61.25	-7.56	8.92	33.95	50.43	53.69	74.00	-20.31	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

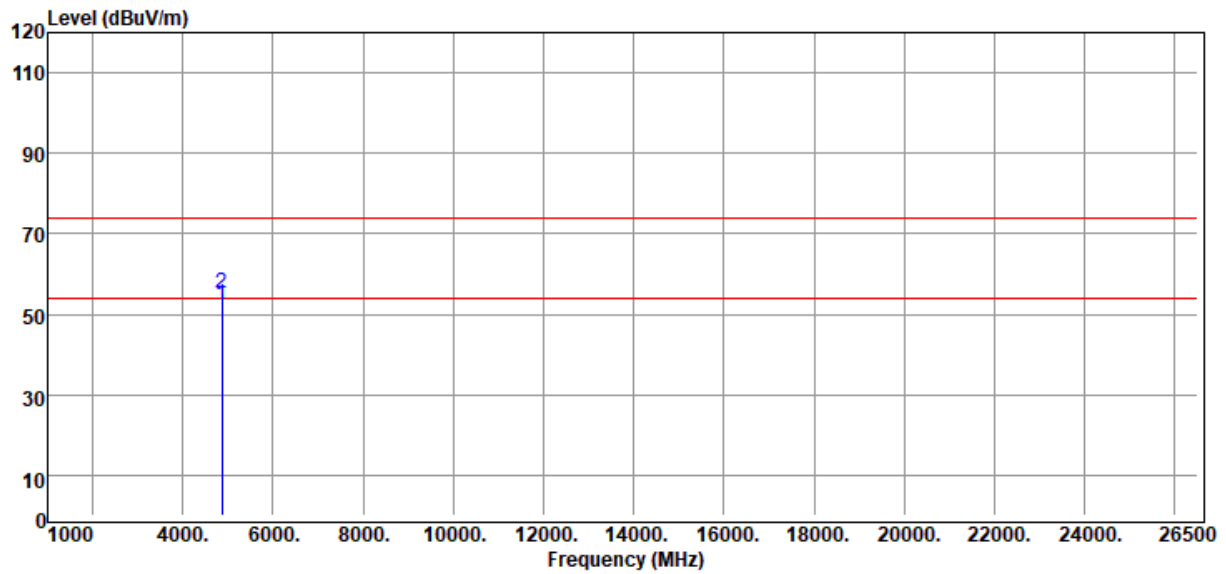
Model : Refer page 1 of the report

Mode : TX mode 802.11b mid CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4874.00	60.00	-7.56	8.92	33.95	50.43	52.44	54.00	-1.56	Average
2	4874.00	62.89	-7.56	8.92	33.95	50.43	55.33	74.00	-18.67	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

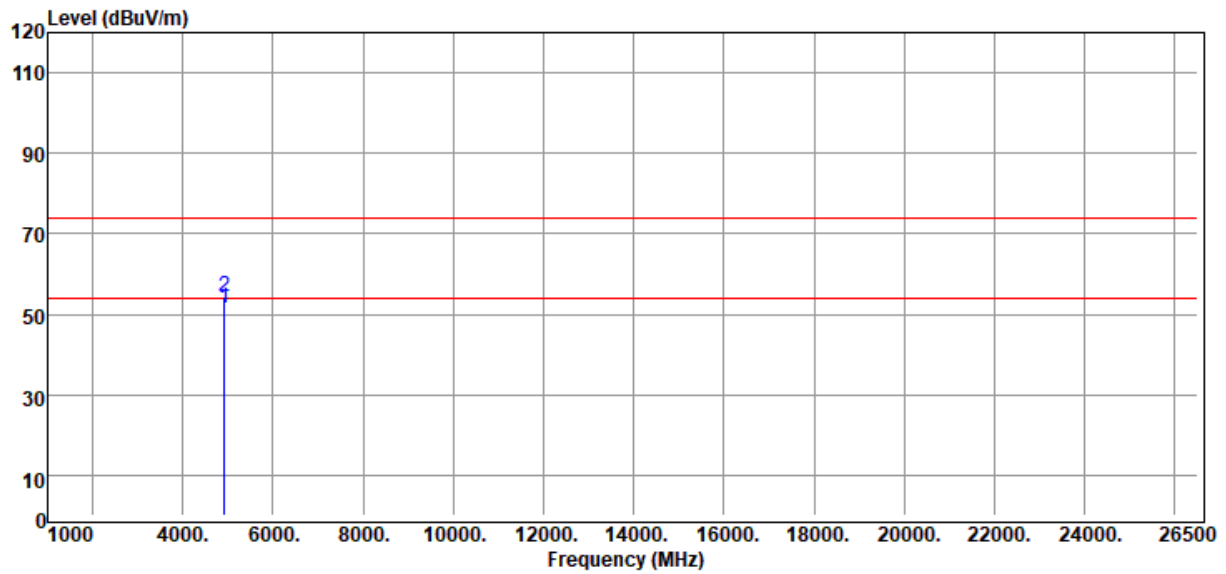
Model : Refer page 1 of the report

Mode : TX mode 802.11b high CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line	dB	
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m		
1	4924.00	58.89	-7.45	8.97	34.00	50.42	51.44	54.00	-2.56	Average
2	4924.00	61.67	-7.45	8.97	34.00	50.42	54.22	74.00	-19.78	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

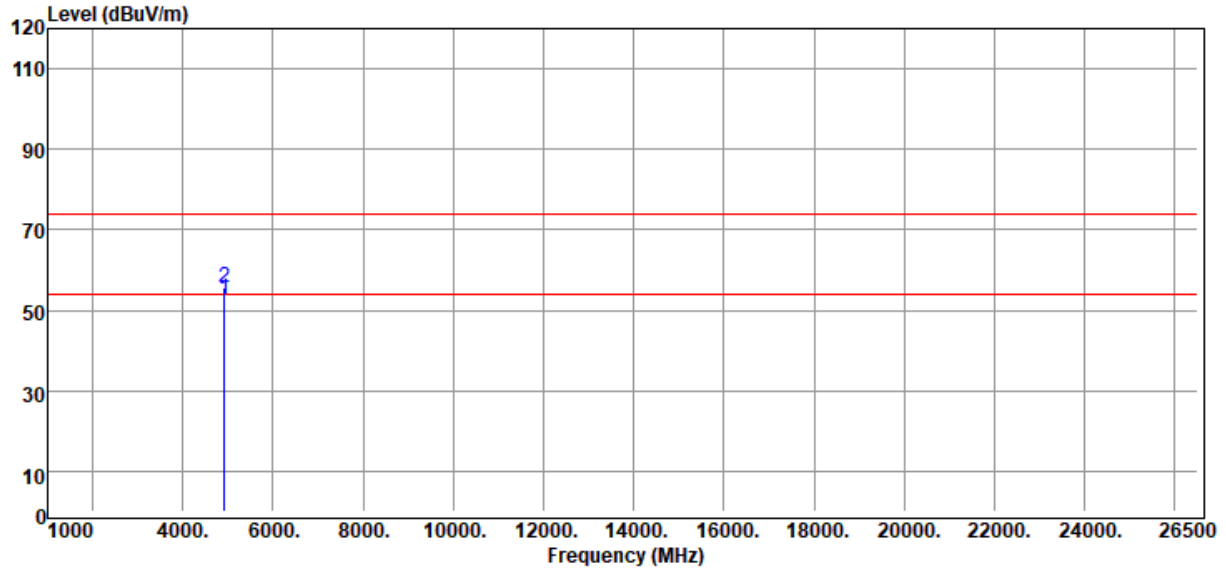
Model : Refer page 1 of the report

Mode : TX mode 802.11b high CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line	dB	
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m		
1	4924.00	60.04	-7.45	8.97	34.00	50.42	52.59	54.00	-1.41	Average
2	4924.00	62.99	-7.45	8.97	34.00	50.42	55.54	74.00	-18.46	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

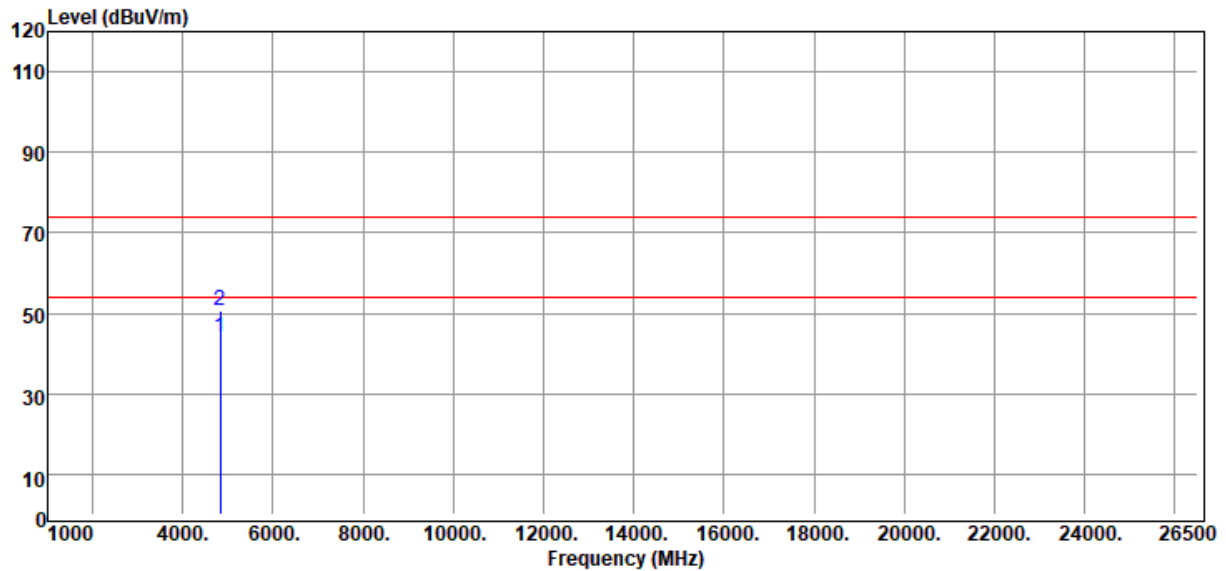
Model : Refer page 1 of the report

Mode : TX mode 802.11g low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4824.00	51.78	-7.63	8.86	33.95	50.44	44.15	54.00	-9.85	Average
2	4824.00	58.30	-7.63	8.86	33.95	50.44	50.67	74.00	-23.33	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

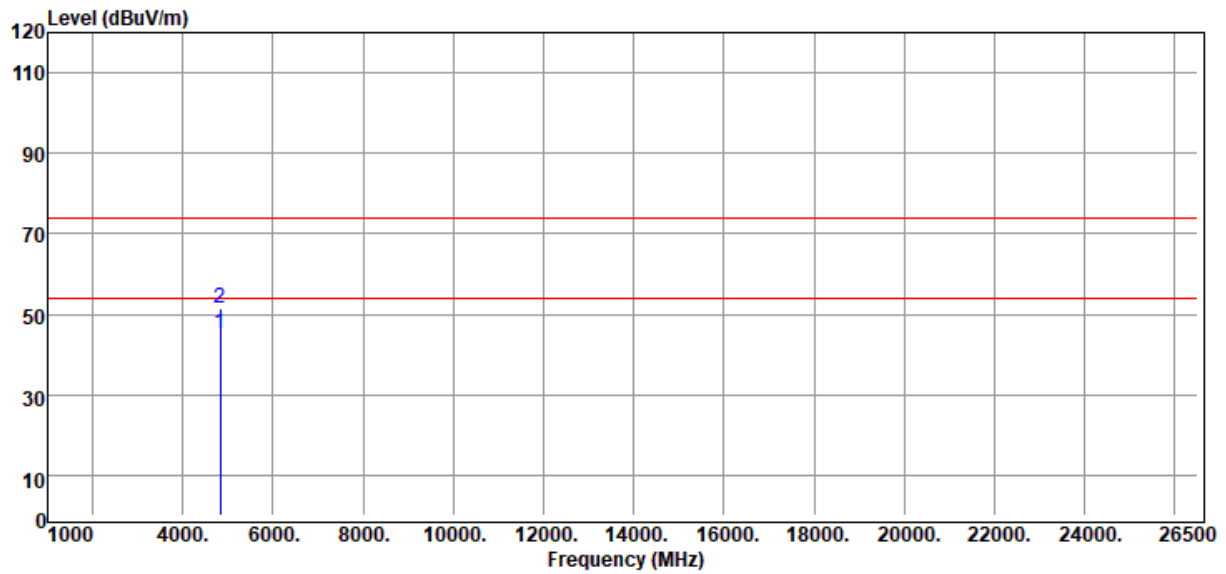
Model : Refer page 1 of the report

Mode : TX mode 802.11g low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line	dB	
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m		
1	4824.00	52.96	-7.63	8.86	33.95	50.44	45.33	54.00	-8.67	Average
2	4824.00	58.99	-7.63	8.86	33.95	50.44	51.36	74.00	-22.64	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

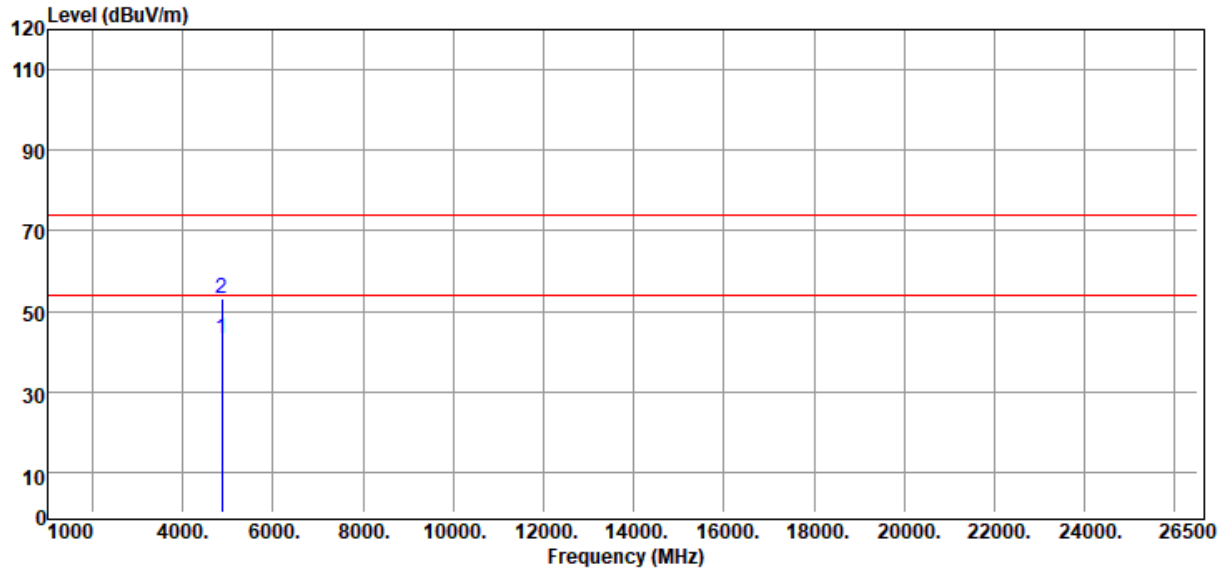
Model : Refer page 1 of the report

Mode : TX mode 802.11g mid CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4874.00	50.77	-7.56	8.92	33.95	50.43	43.21	54.00	-10.79	Average
2	4874.00	60.81	-7.56	8.92	33.95	50.43	53.25	74.00	-20.75	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

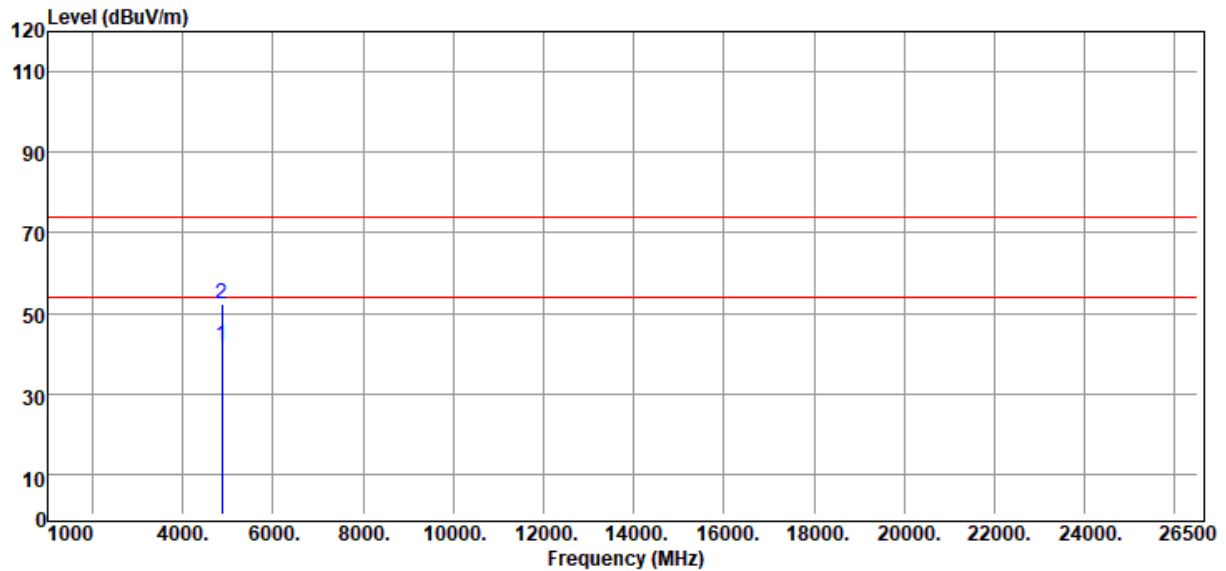
Model : Refer page 1 of the report

Mode : TX mode 802.11g mid CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4874.00	49.54	-7.56	8.92	33.95	50.43	41.98	54.00	-12.02	Average
2	4874.00	59.91	-7.56	8.92	33.95	50.43	52.35	74.00	-21.65	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

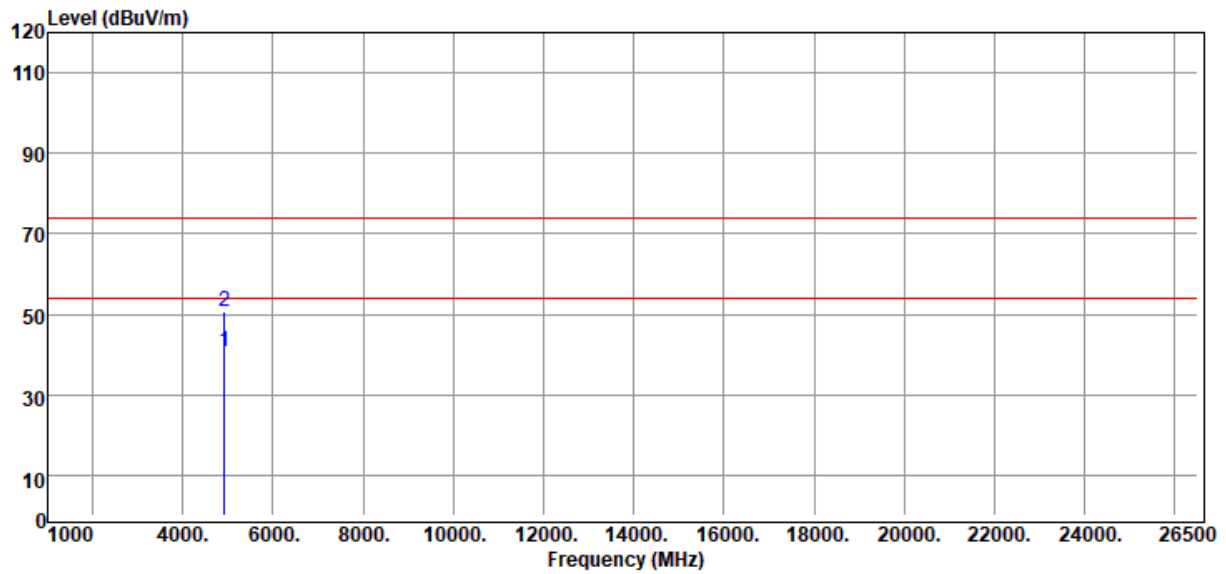
Model : Refer page 1 of the report

Mode : TX mode 802.11g high CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4924.00	48.31	-7.45	8.97	34.00	50.42	40.86	54.00	-13.14	Average
2	4924.00	58.24	-7.45	8.97	34.00	50.42	50.79	74.00	-23.21	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

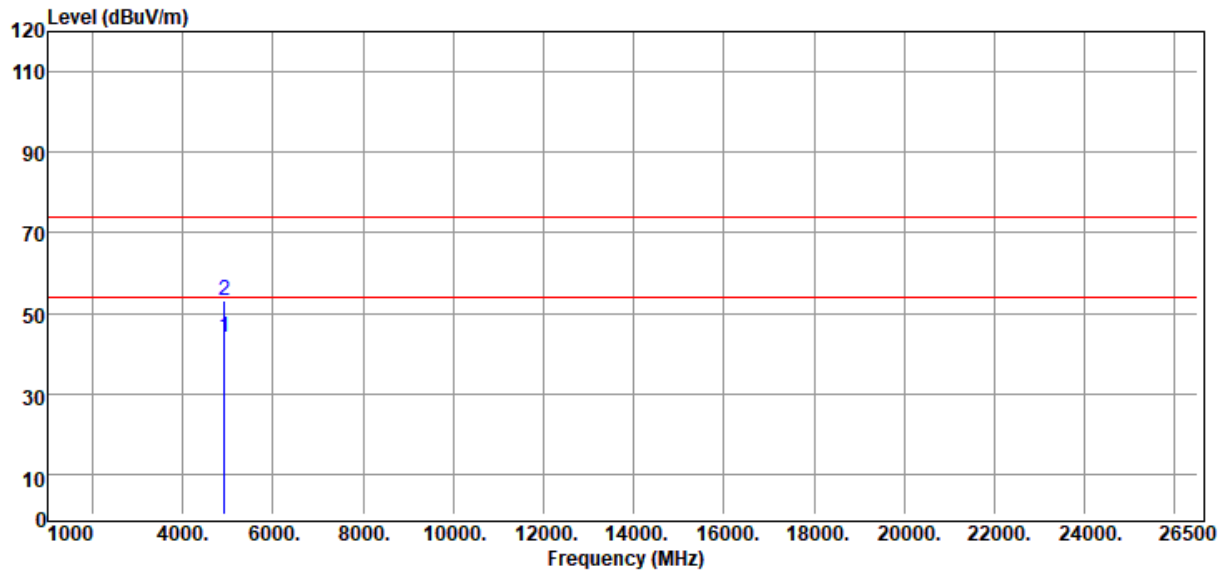
Model : Refer page 1 of the report

Mode : TX mode 802.11g high CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
		Level	Factor	Loss	Factor	Gain	Level	Line		
	MHz	dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4924.00	51.41	-7.45	8.97	34.00	50.42	43.96	54.00	-10.04	Average
2	4924.00	60.74	-7.45	8.97	34.00	50.42	53.29	74.00	-20.71	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

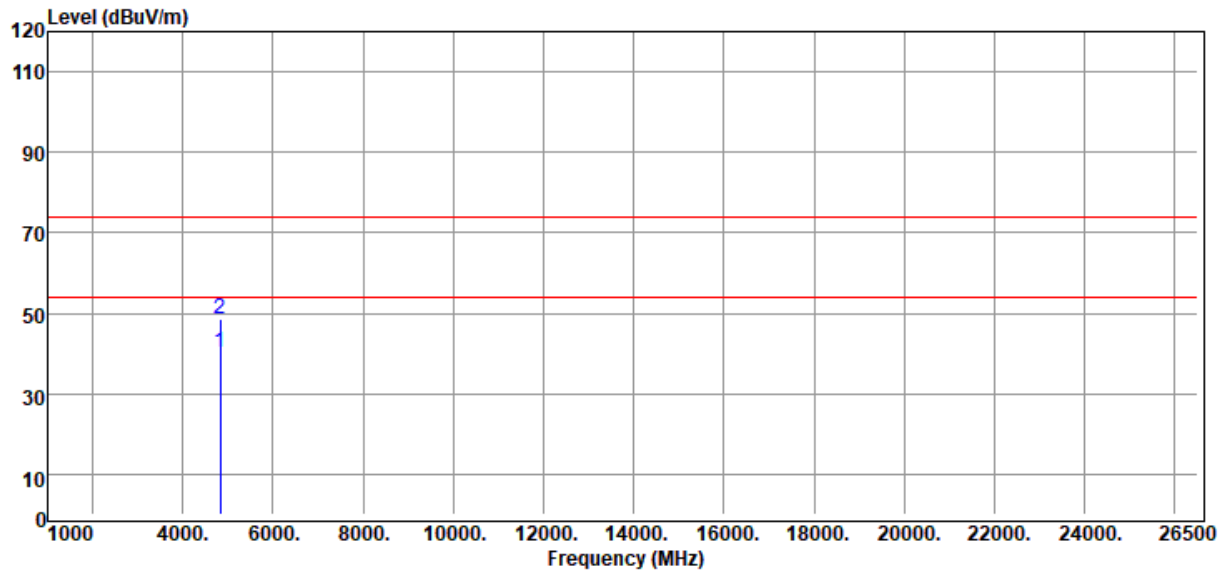
Model : Refer page 1 of the report

Mode : TX mode 802.11n20 low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4824.00	47.89	-7.63	8.86	33.95	50.44	40.26	54.00	-13.74	Average
2	4824.00	56.40	-7.63	8.86	33.95	50.44	48.77	74.00	-25.23	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

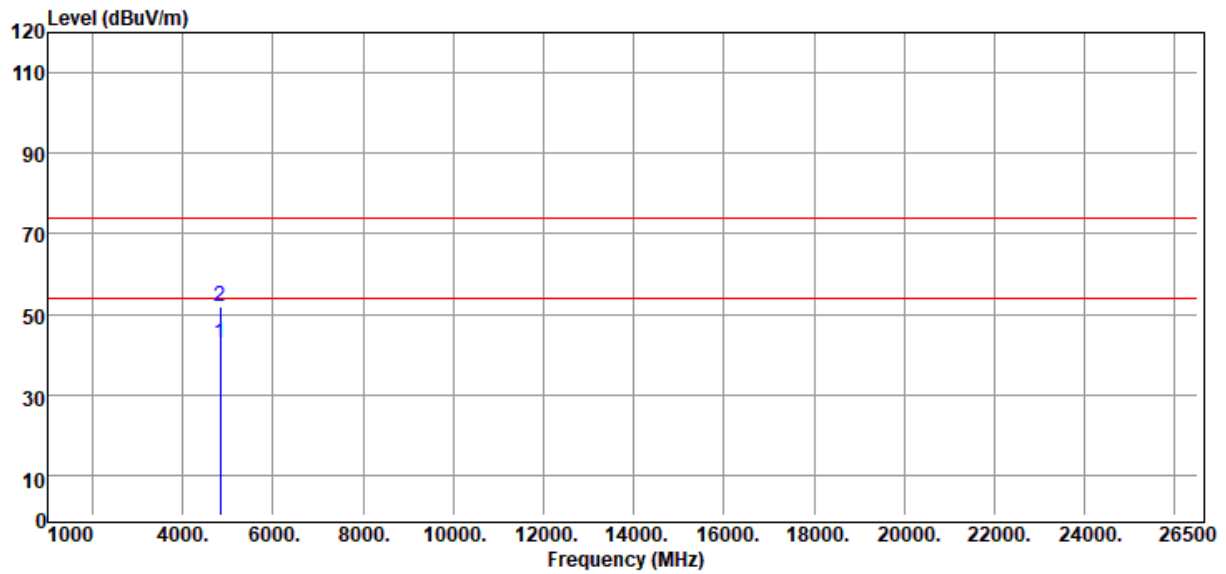
Model : Refer page 1 of the report

Mode : TX mode 802.11n20 low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4824.00	50.41	-7.63	8.86	33.95	50.44	42.78	54.00	-11.22	Average
2	4824.00	59.56	-7.63	8.86	33.95	50.44	51.93	74.00	-22.07	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

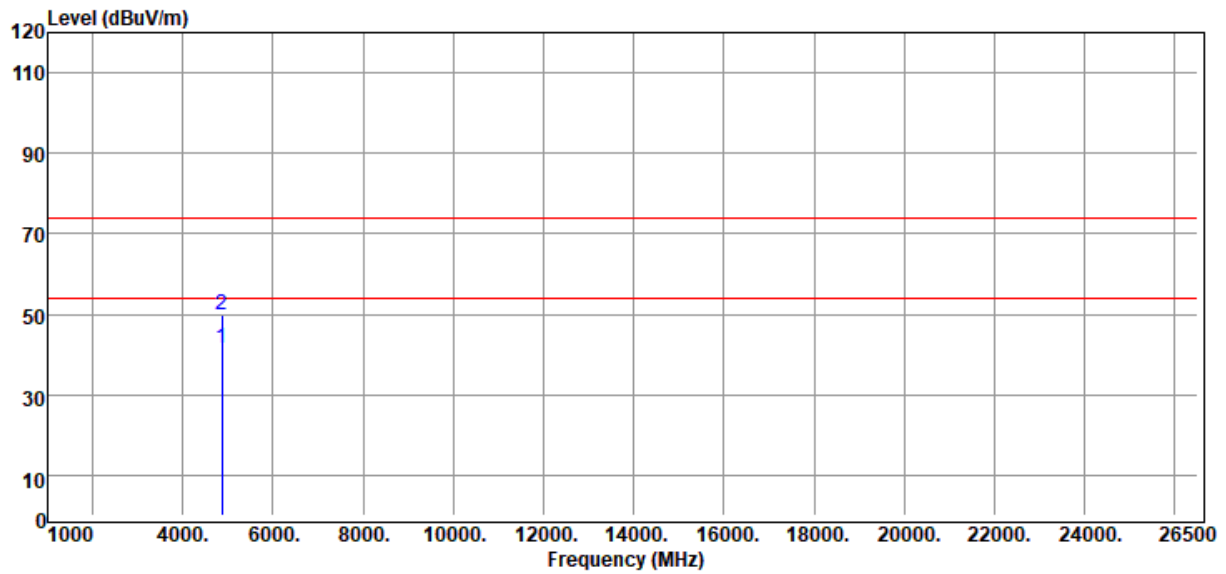
Model : Refer page 1 of the report

Mode : TX mode 802.11n20 mid CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4874.00	48.97	-7.56	8.92	33.95	50.43	41.41	54.00	-12.59	Average
2	4874.00	57.35	-7.56	8.92	33.95	50.43	49.79	74.00	-24.21	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

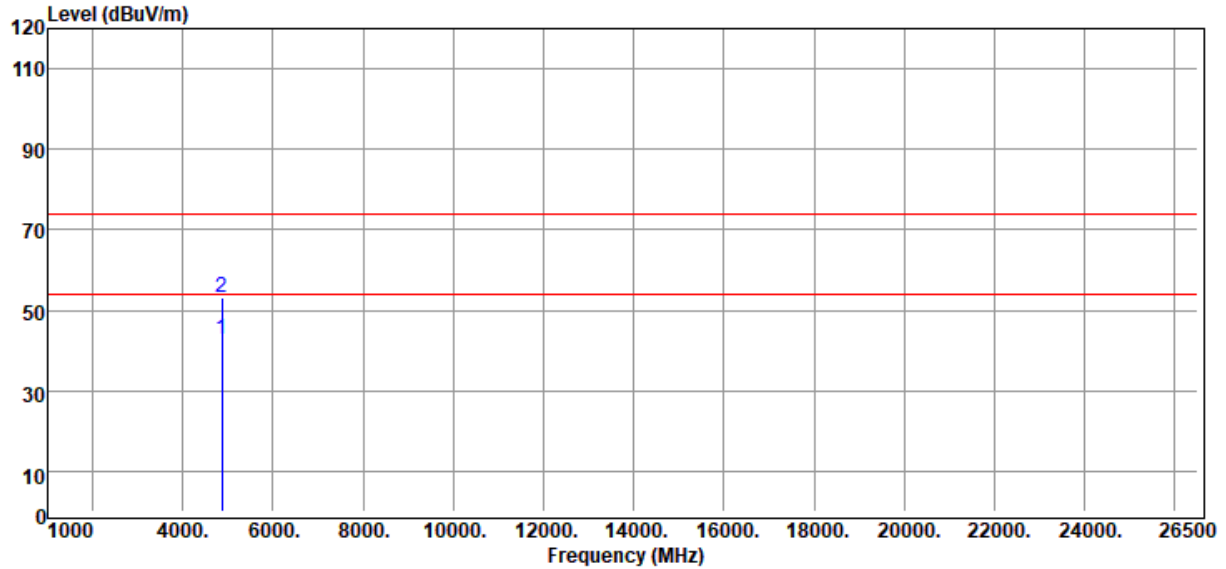
Model : Refer page 1 of the report

Mode : TX mode 802.11n20 mid CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line	dB	
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m		
1	4874.00	50.53	-7.56	8.92	33.95	50.43	42.97	54.00	-11.03	Average
2	4874.00	60.51	-7.56	8.92	33.95	50.43	52.95	74.00	-21.05	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

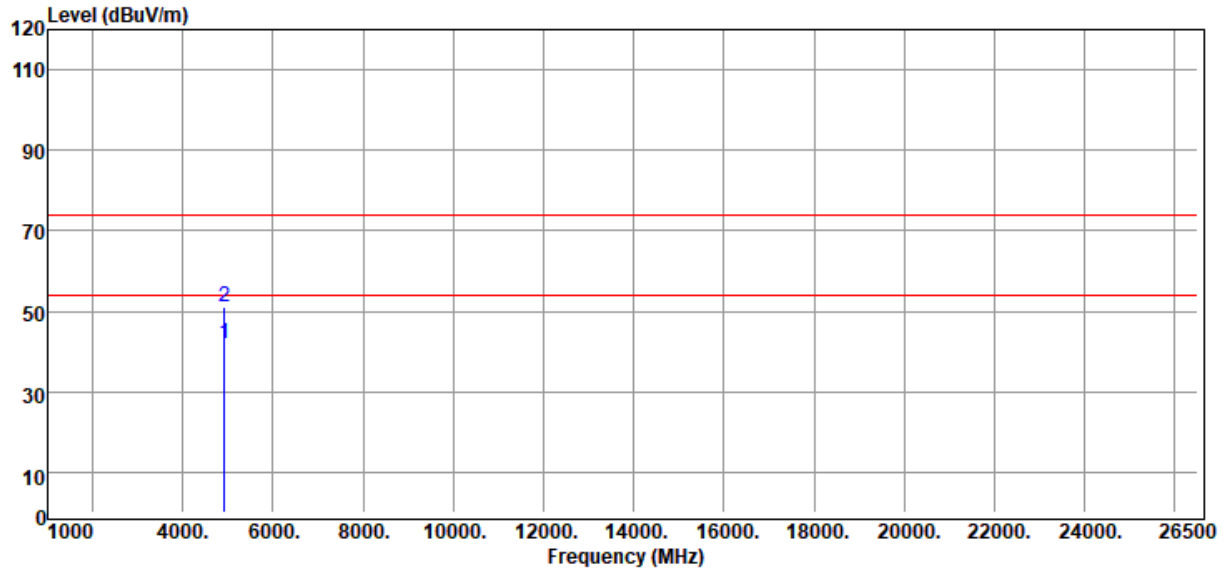
Model : Refer page 1 of the report

Mode : TX mode 802.11n20 high CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4924.00	49.23	-7.45	8.97	34.00	50.42	41.78	54.00	-12.22	Average
2	4924.00	58.35	-7.45	8.97	34.00	50.42	50.90	74.00	-23.10	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

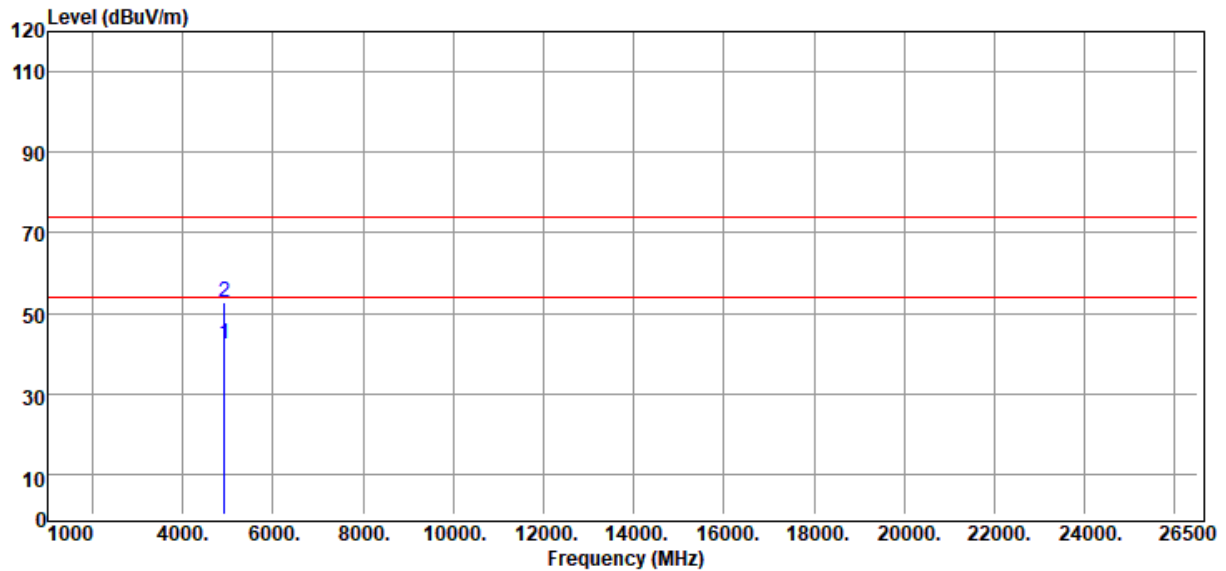
Model : Refer page 1 of the report

Mode : TX mode 802.11n20 high CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4924.00	49.63	-7.45	8.97	34.00	50.42	42.18	54.00	-11.82	Average
2	4924.00	60.24	-7.45	8.97	34.00	50.42	52.79	74.00	-21.21	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

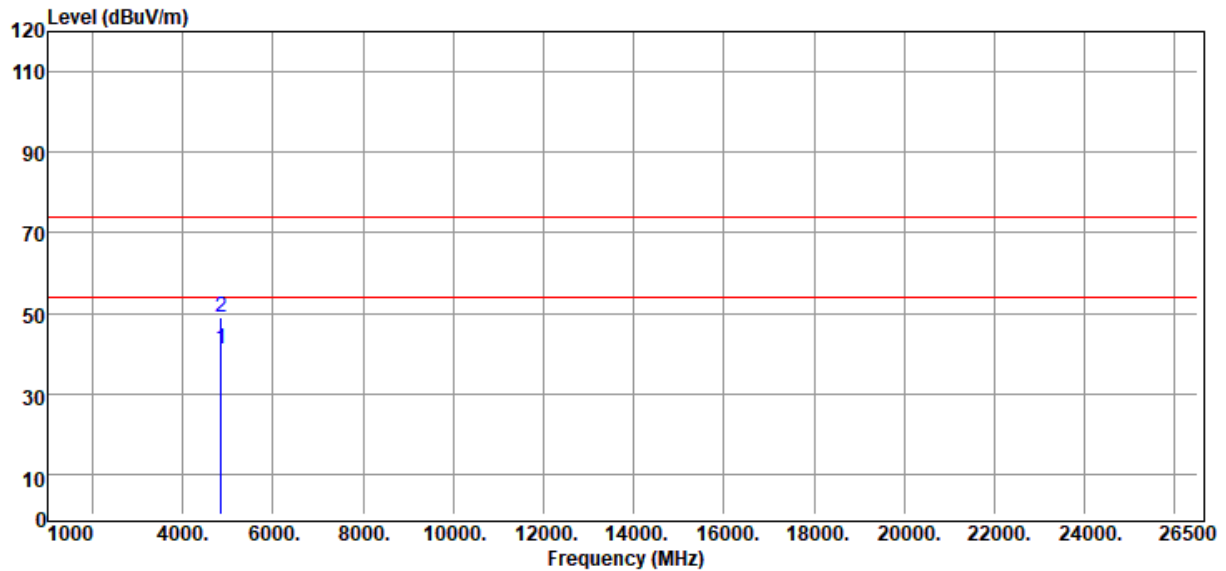
Model : Refer page 1 of the report

Mode : TX mode 802.11n40 low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4844.00	48.55	-7.56	8.88	33.99	50.43	40.99	54.00	-13.01	Average
2	4844.00	56.40	-7.56	8.88	33.99	50.43	48.84	74.00	-25.16	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

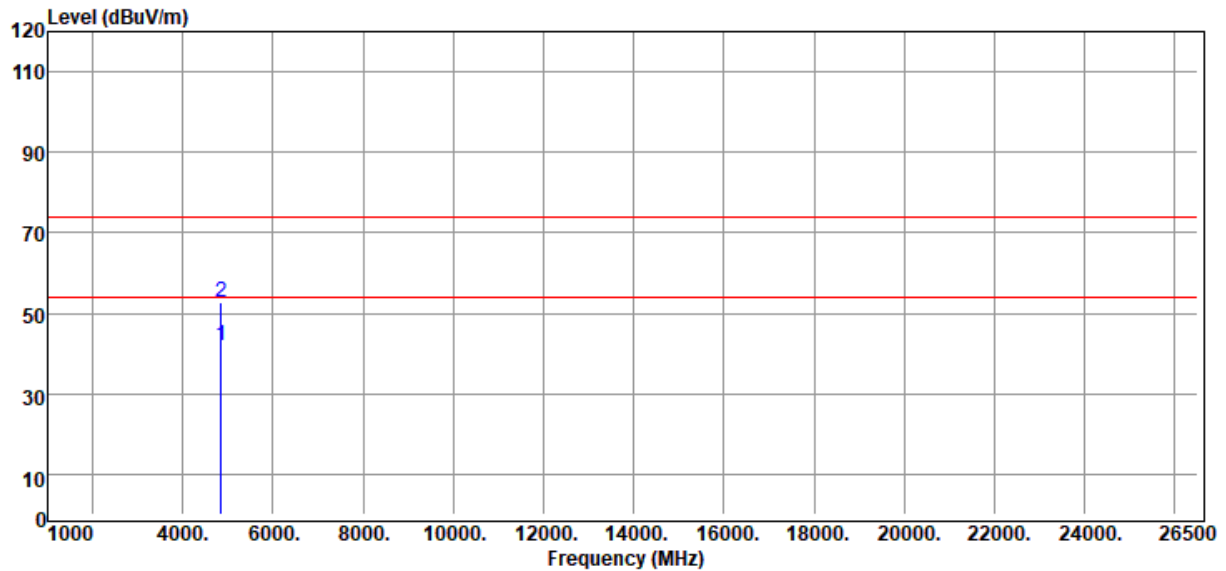
Model : Refer page 1 of the report

Mode : TX mode 802.11n40 low CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4844.00	49.32	-7.56	8.88	33.99	50.43	41.76	54.00	-12.24	Average
2	4844.00	60.49	-7.56	8.88	33.99	50.43	52.93	74.00	-21.07	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line

Site : GCC RE 01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

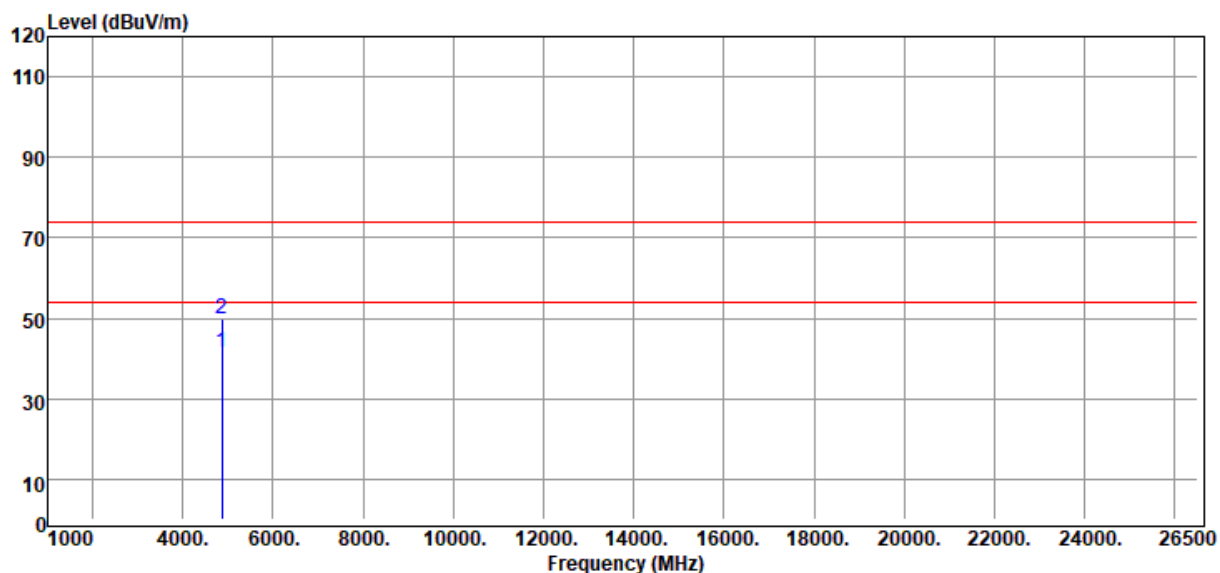
Model : Refer page 1 of the report

Mode : TX mode 802.11n40 mid CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4874.00	48.90	-7.56	8.92	33.95	50.43	41.34	54.00	-12.66	Average
2	4874.00	57.53	-7.56	8.92	33.95	50.43	49.97	74.00	-24.03	Peak

$$\text{System Factor} = \text{Cable Loss} + \text{Antenna Factor} - \text{Preamplifier Gain}$$
$$\text{Real Level} = \text{Meter Level} + \text{System Factor}$$
$$\text{Margin} = \text{Real Level} - \text{Limit Line}$$



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

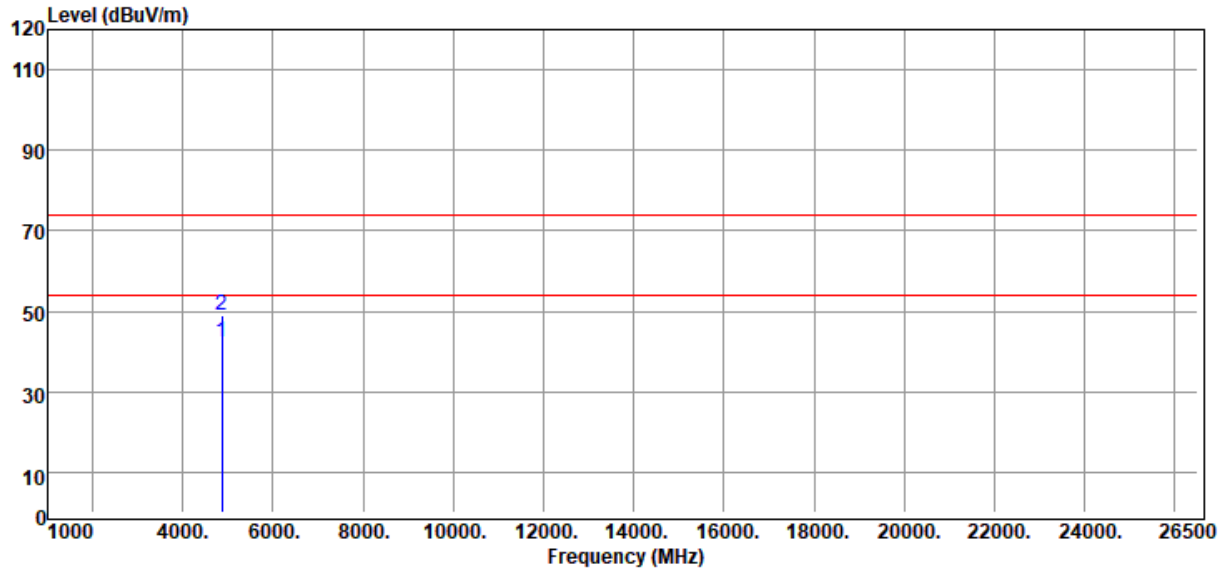
Model : Refer page 1 of the report

Mode : TX mode 802.11n40 mid CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4874.00	50.11	-7.56	8.92	33.95	50.43	42.55	54.00	-11.45	Average
2	4874.00	56.73	-7.56	8.92	33.95	50.43	49.17	74.00	-24.83	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : HORIZONTAL

SWT:Auto

EUT : Refer page 1 of the report

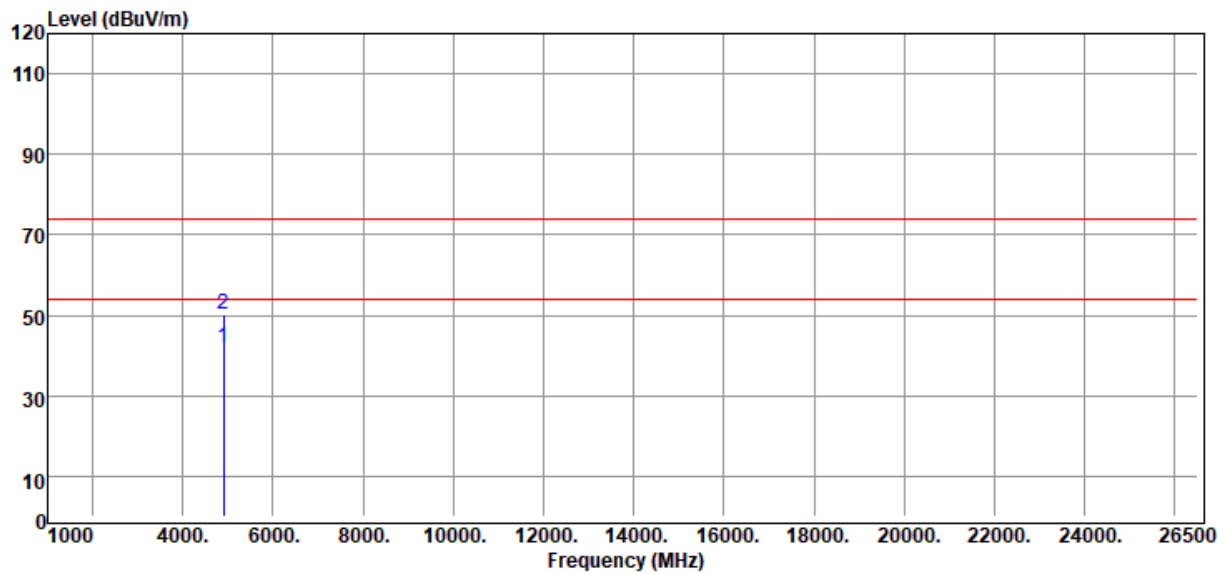
Model : Refer page 1 of the report

Mode : TX mode 802.11n40 high CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4904.00	49.69	-7.55	8.95	33.92	50.42	42.14	54.00	-11.86	Average
2	4904.00	57.61	-7.55	8.95	33.92	50.42	50.06	74.00	-23.94	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Site : GCC_RE_01

RBW : 1000 KHz VBW : 3000 KHz Polarity : VERTICAL

SWT:Auto

EUT : Refer page 1 of the report

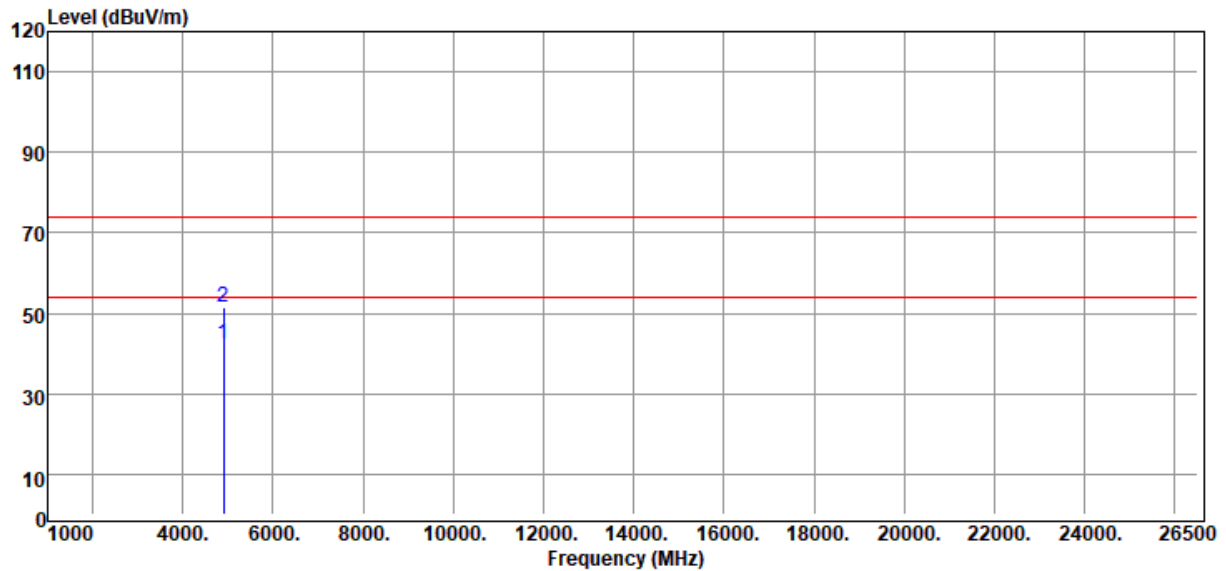
Model : Refer page 1 of the report

Mode : TX mode 802.11n40 high CH

Temp/Humidity : 26°C / 59%

Voltage : DC 5V(USB)

Memo : 3N2105(Power set:22)



	Freq	Meter	System	Cable	Antenna	Preamp	Real	Limit	Margin	Remark
	MHz	Level	Factor	Loss	Factor	Gain	Level	Line		
		dBuV	dB/m	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	4904.00	49.83	-7.55	8.95	33.92	50.42	42.28	54.00	-11.72	Average
2	4904.00	59.02	-7.55	8.95	33.92	50.42	51.47	74.00	-22.53	Peak

System Factor = Cable Loss + Antenna Factor - Preamp Gain

Real Level = Meter Level + System Factor

Margin = Real Level - Limit Line



Note:

1. Emission level = Reading level + Correction factor
2. Correction factor : Antenna factor, Cable loss, PreAmp, etc.
3. All emissions as described above were determining by rotating the EUT through three orthogonal axes to maximizing the emissions if the EUT belongs to hand-held or body-worn devices.
4. Measurements from 9 kHz to 150 kHz, Peak detector setting: 100 Hz RBW
5. Measurements from 150 kHz to 30MHz, Peak detector setting: 10 kHz RBW
6. Measurements from 30 MHz to 1000 MHz, Peak detector setting: 100 kHz RBW
7. Measurements from 9 kHz to 150 kHz, CISPR Quasi-Peak detector: 200 Hz RBW
8. Measurements from 150 kHz to 30MHz, CISPR Quasi-Peak detector: 9 kHz RBW
9. Measurements from 30 MHz to 1000 MHz, CISPR Quasi-Peak detector: 120 kHz RBW
10. Peak detector measurement data will represent the worst case results.



10. CONDUCTED SPURIOUS EMISSIONS

10.1 TEST SETUP



10.2 LIMIT

According to § 15.247(d) , in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intention radiator in operating , the radio radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power , based on either an RF conducted or a radiated measurement , provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands , as defined in § 15.205(a) , must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

10.3 TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

10.4 TEST RESULTS

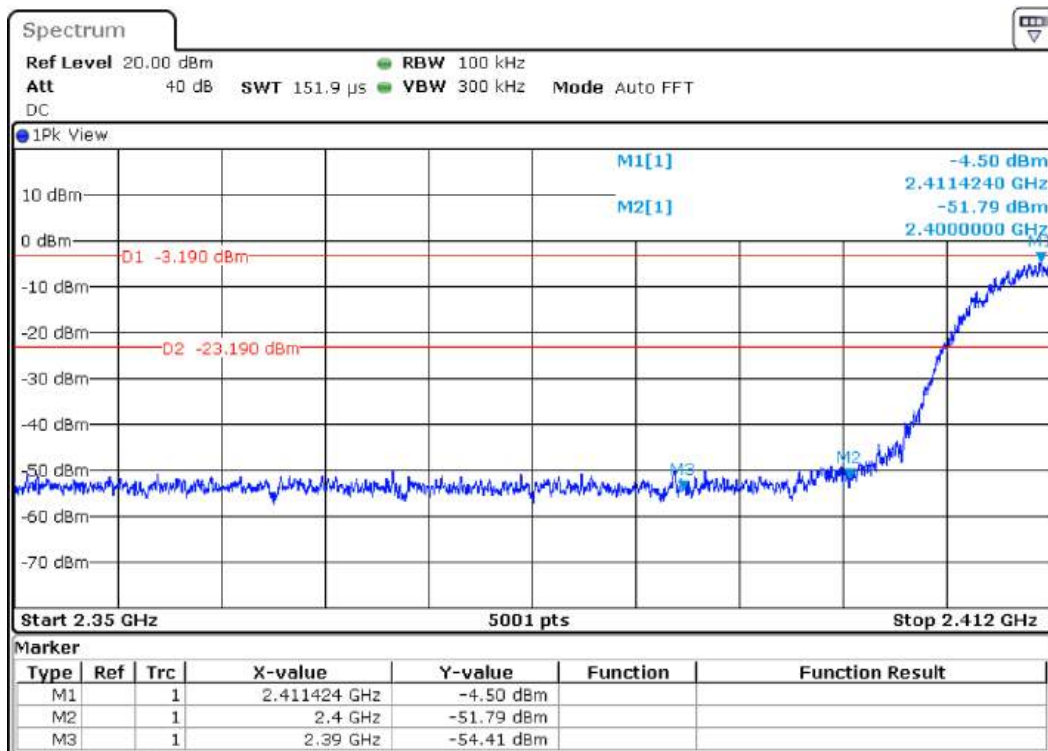
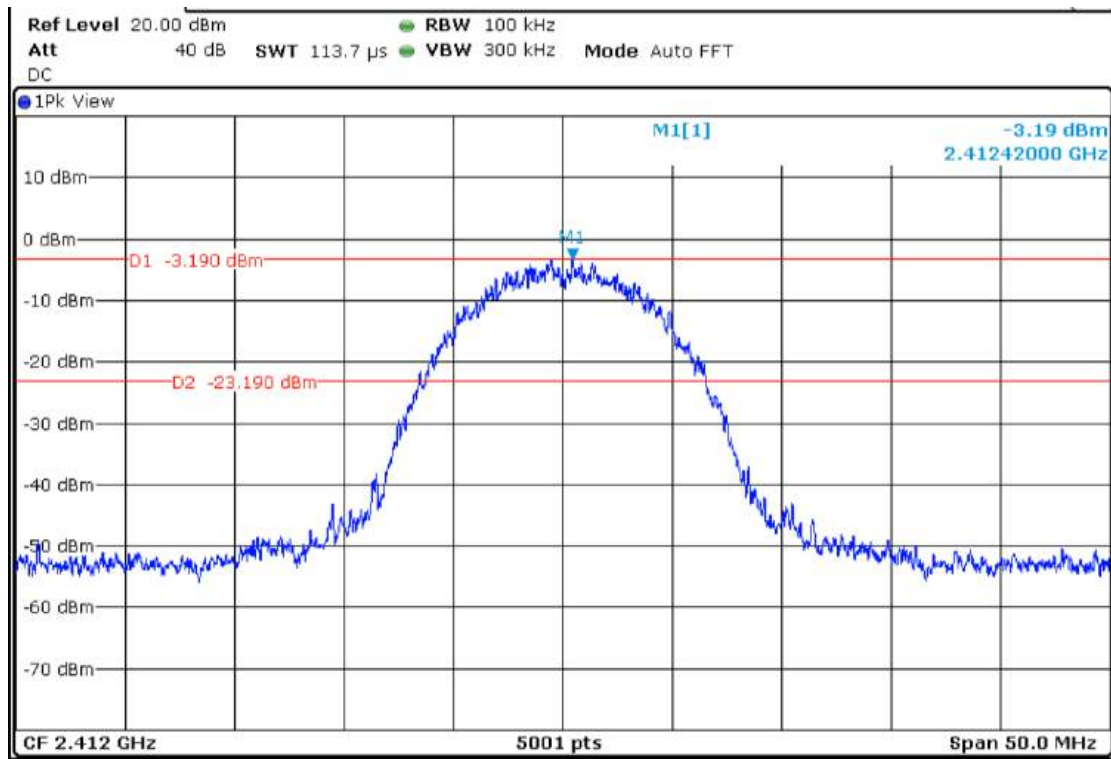
PASS

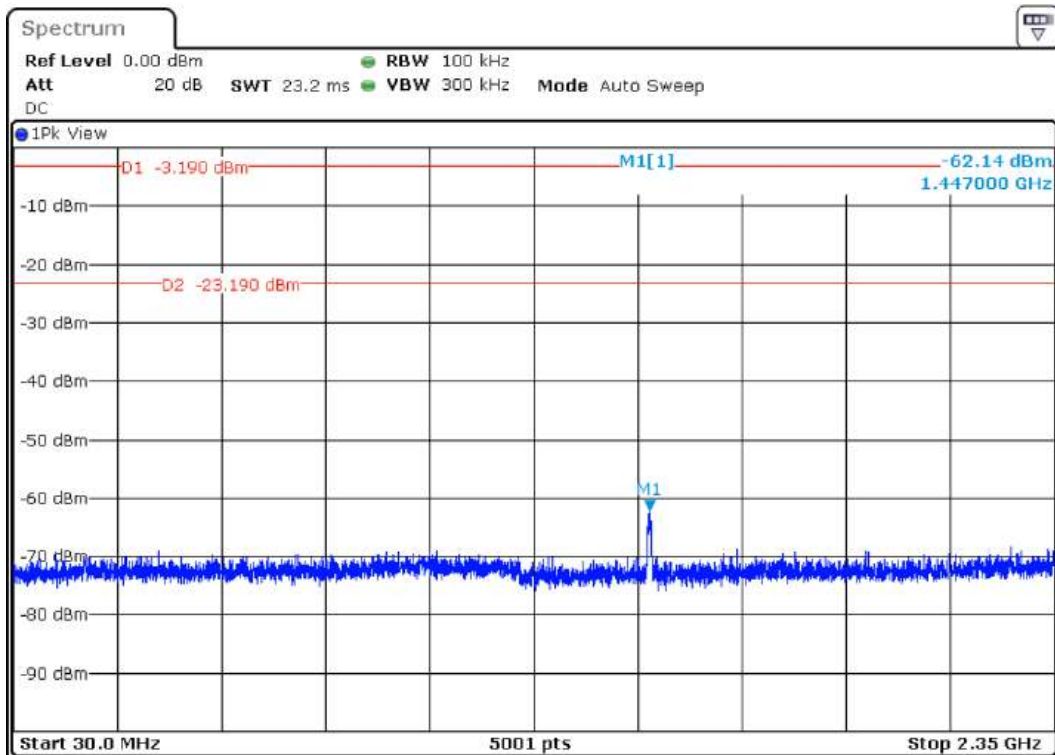
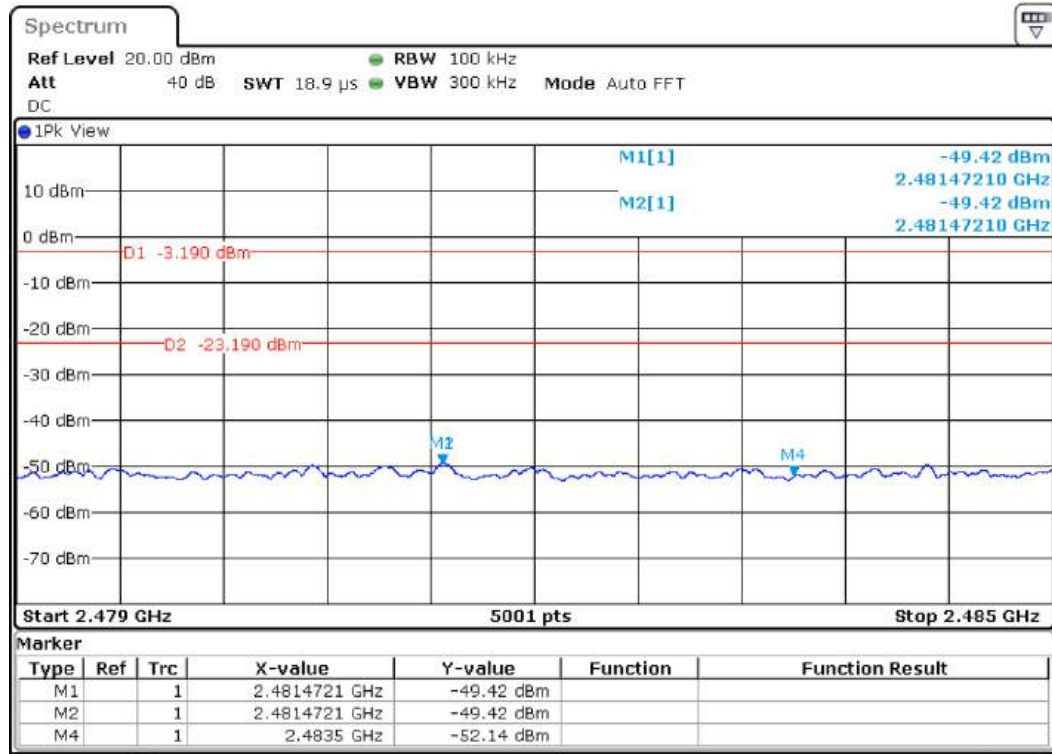


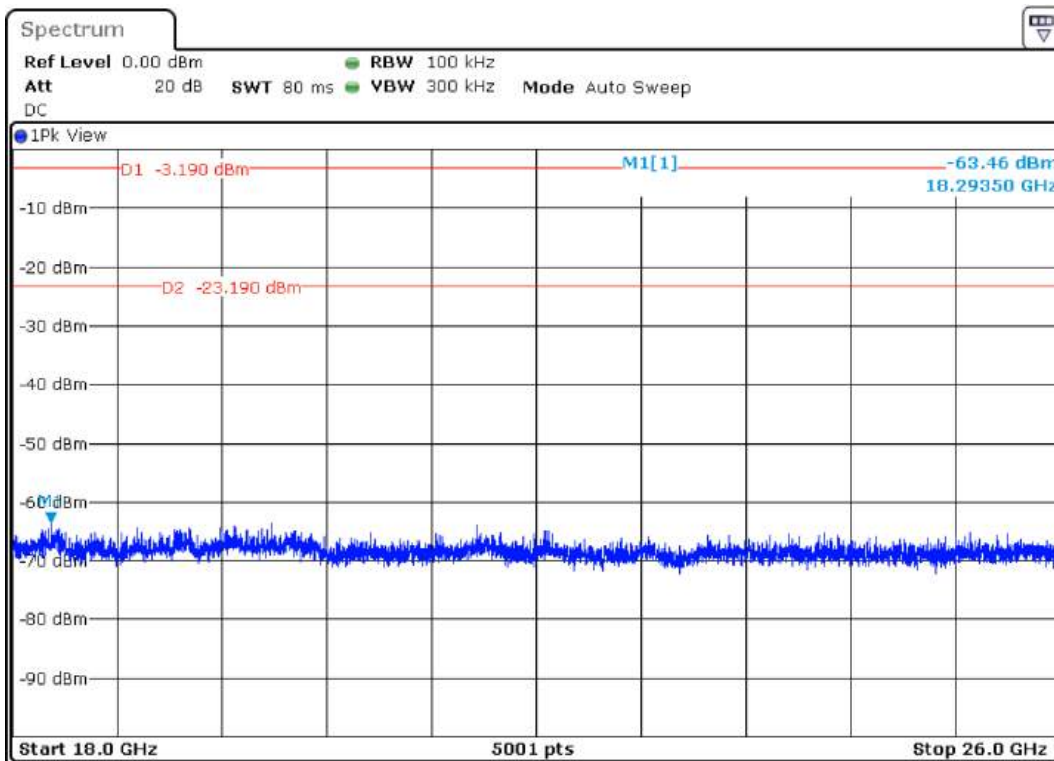
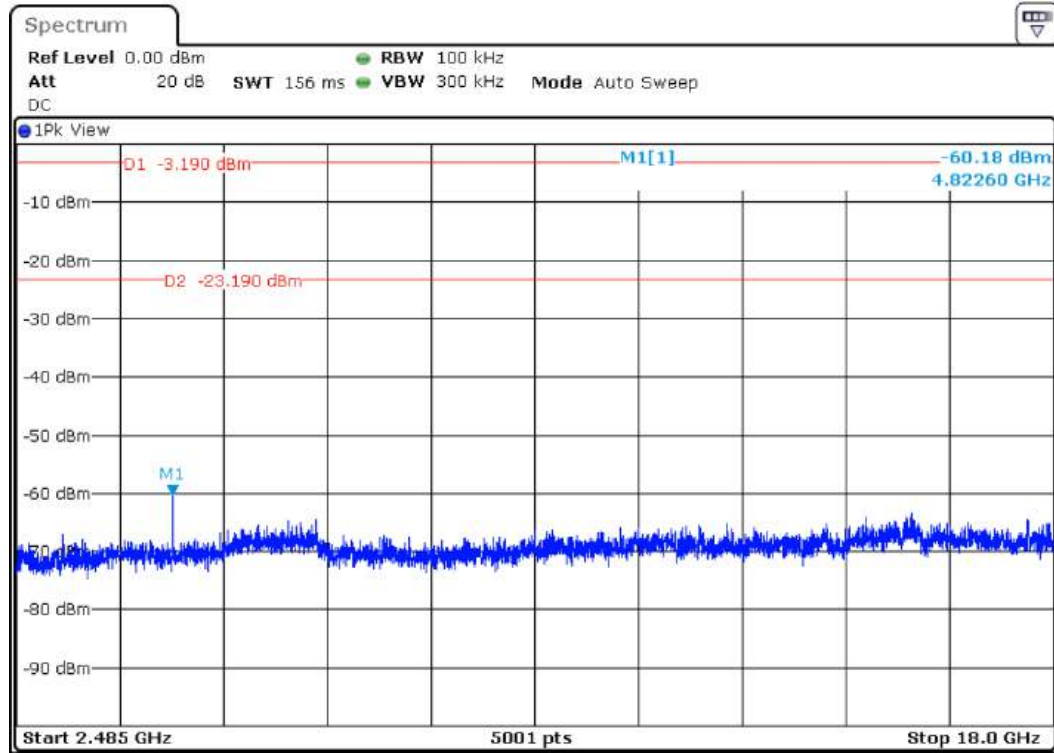
10.5 TEST DATA:

802.11b

Low Channel

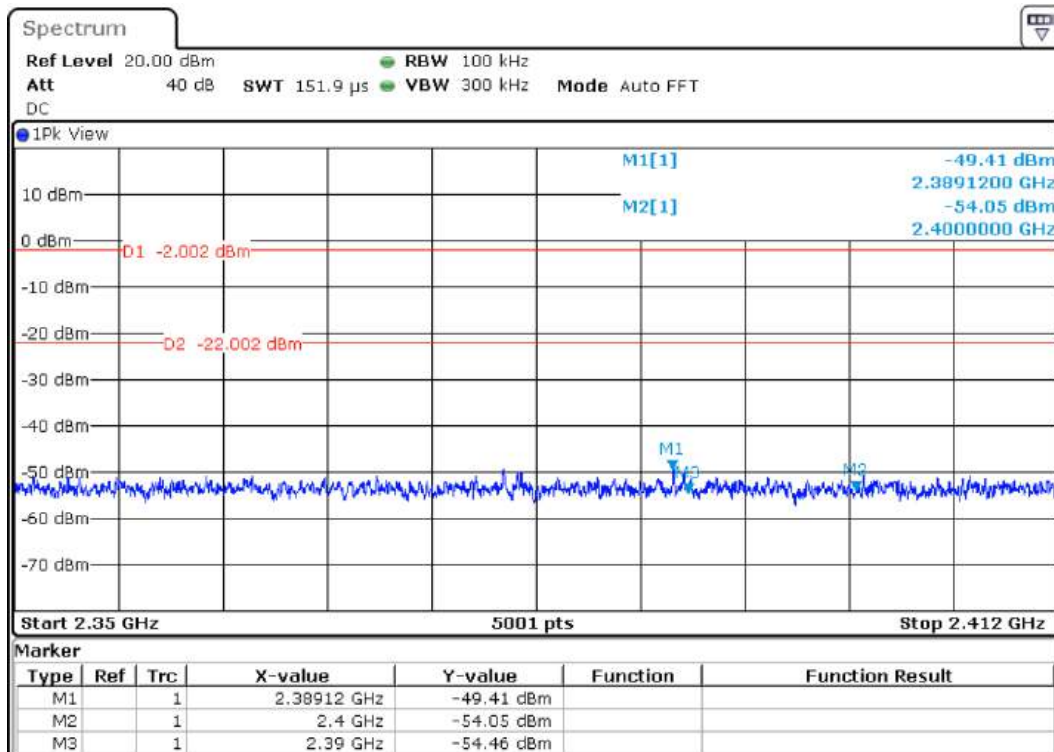
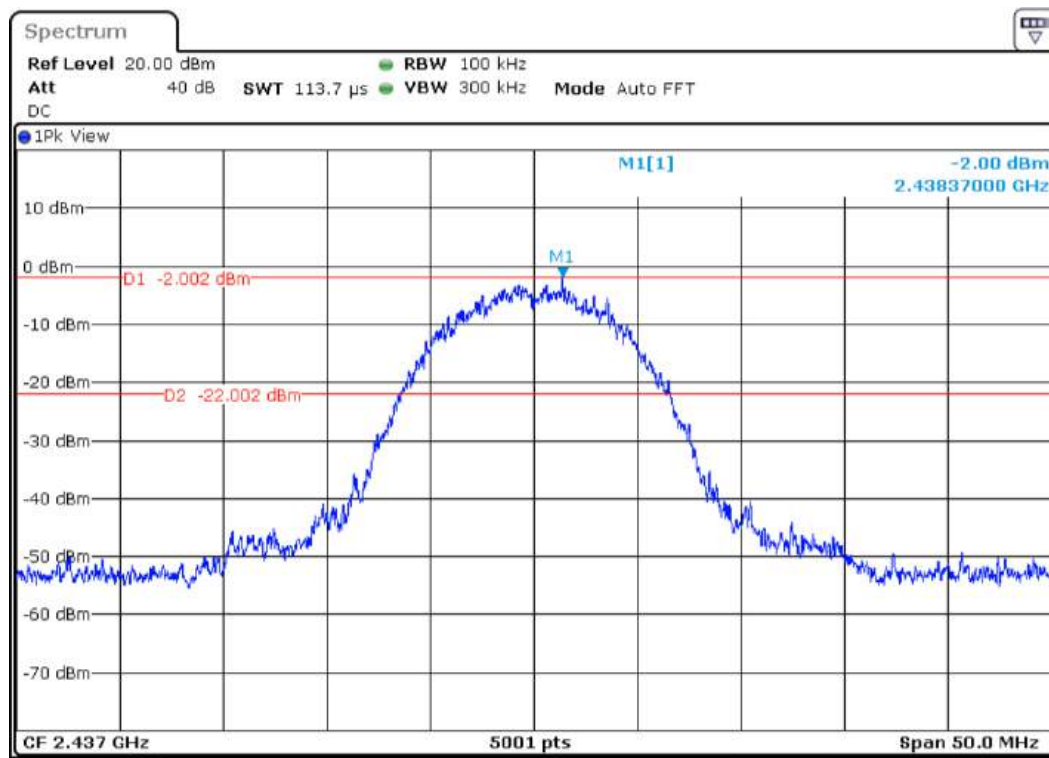


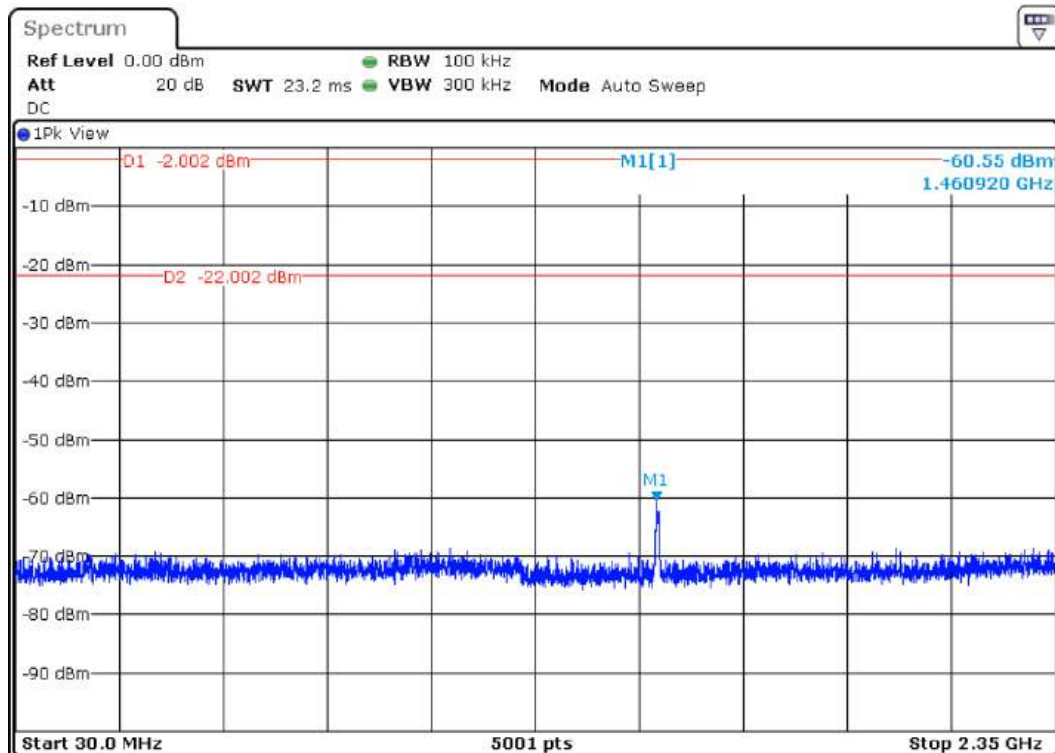
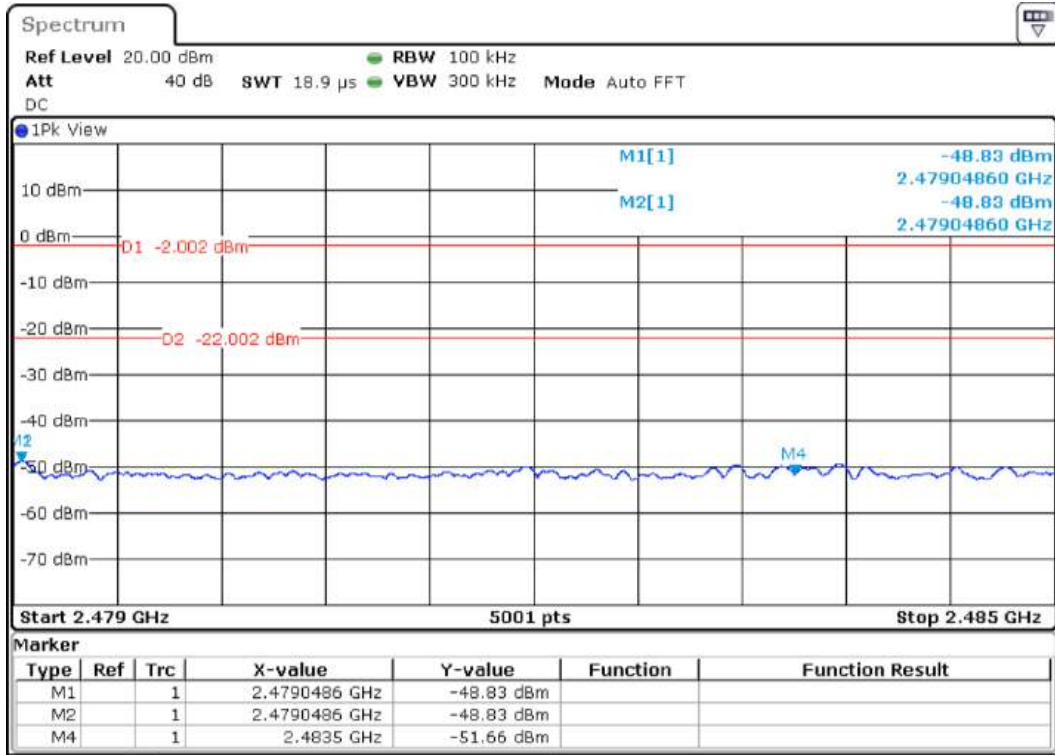


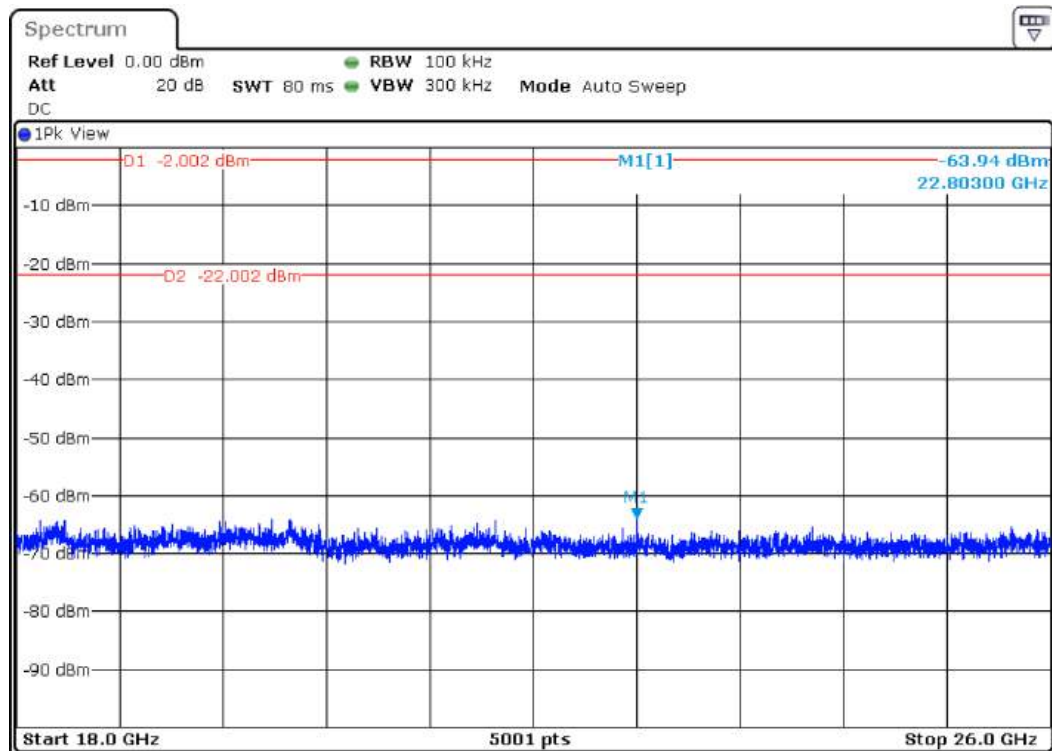
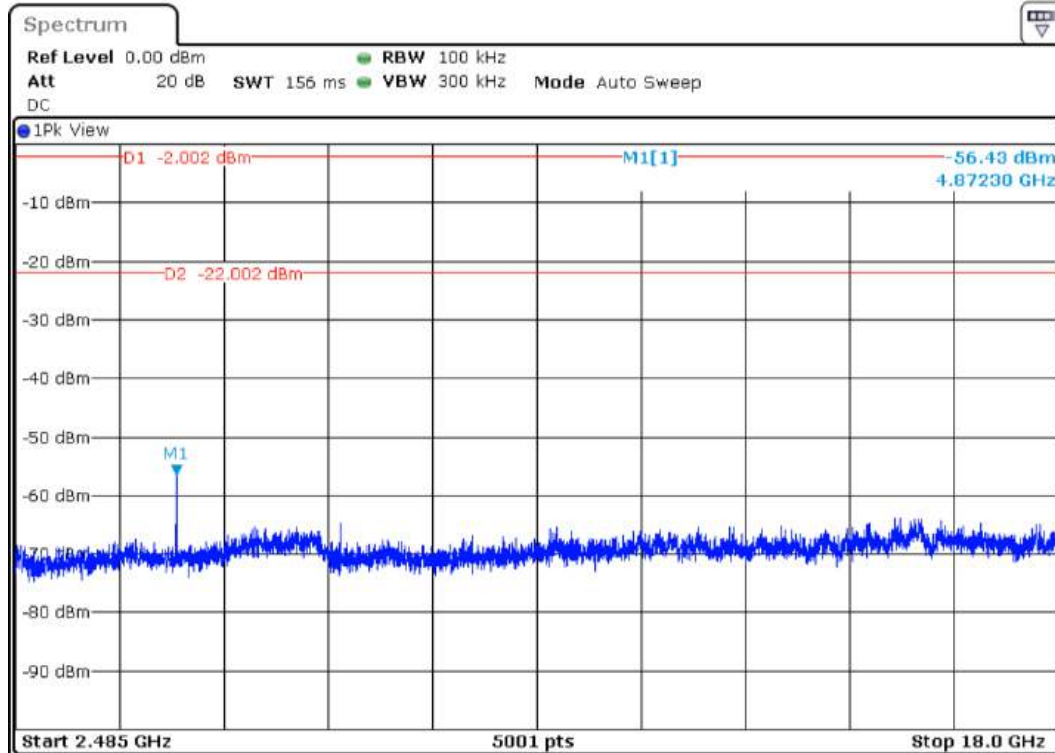




Mid Channel

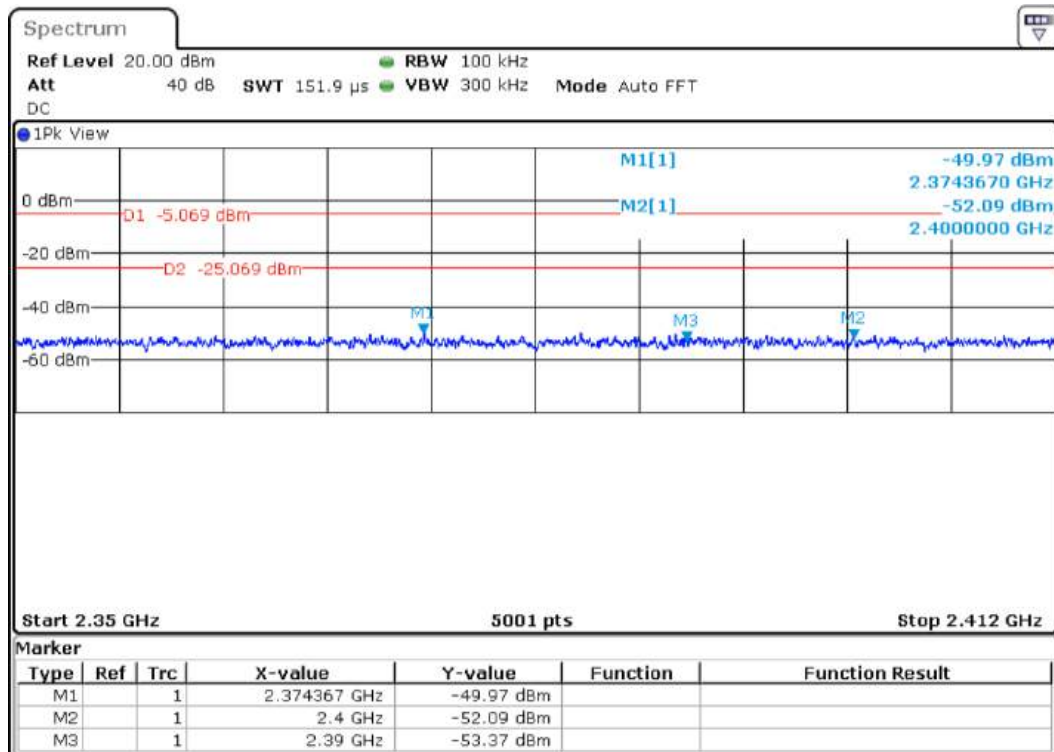
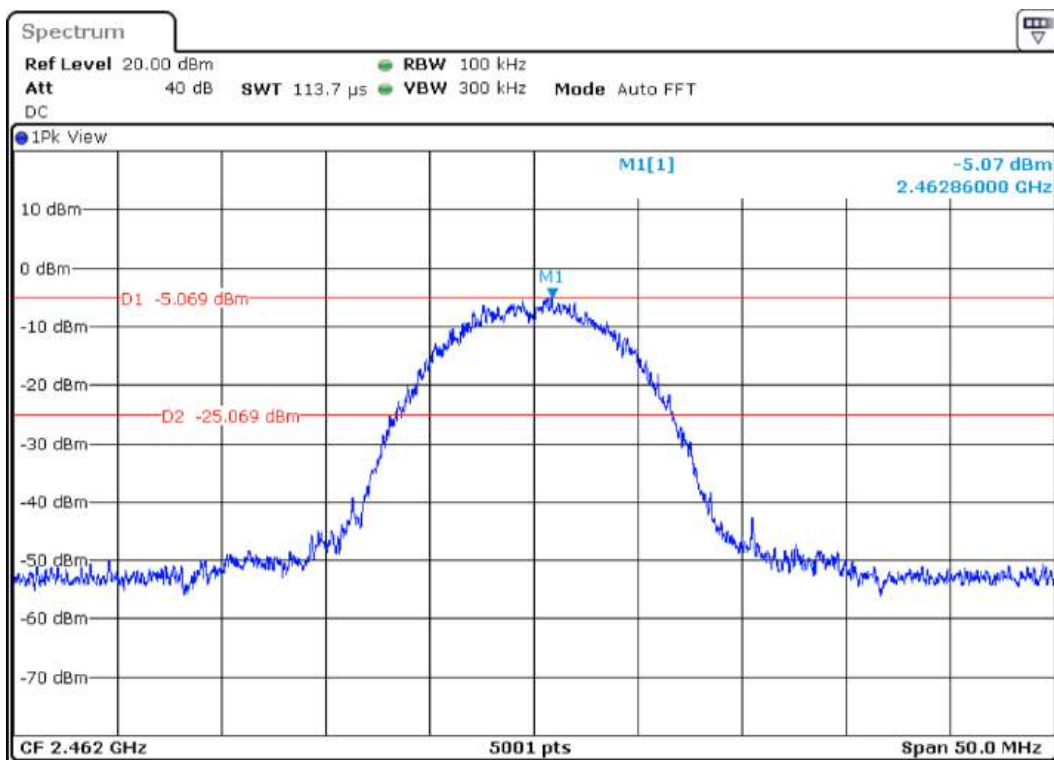


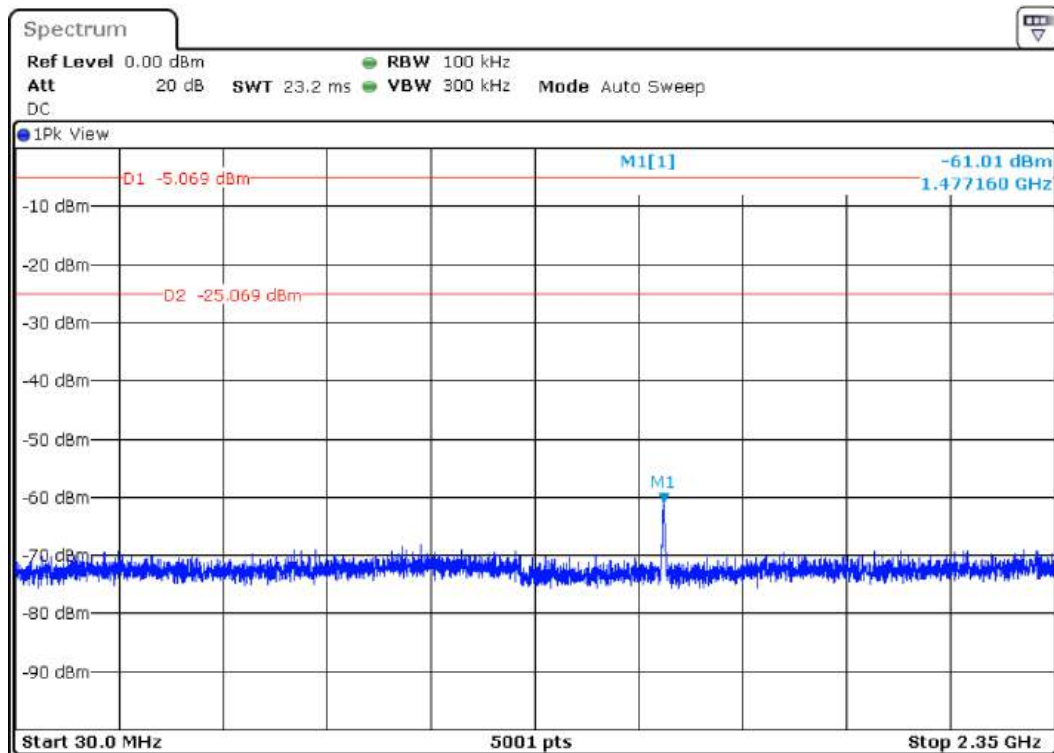
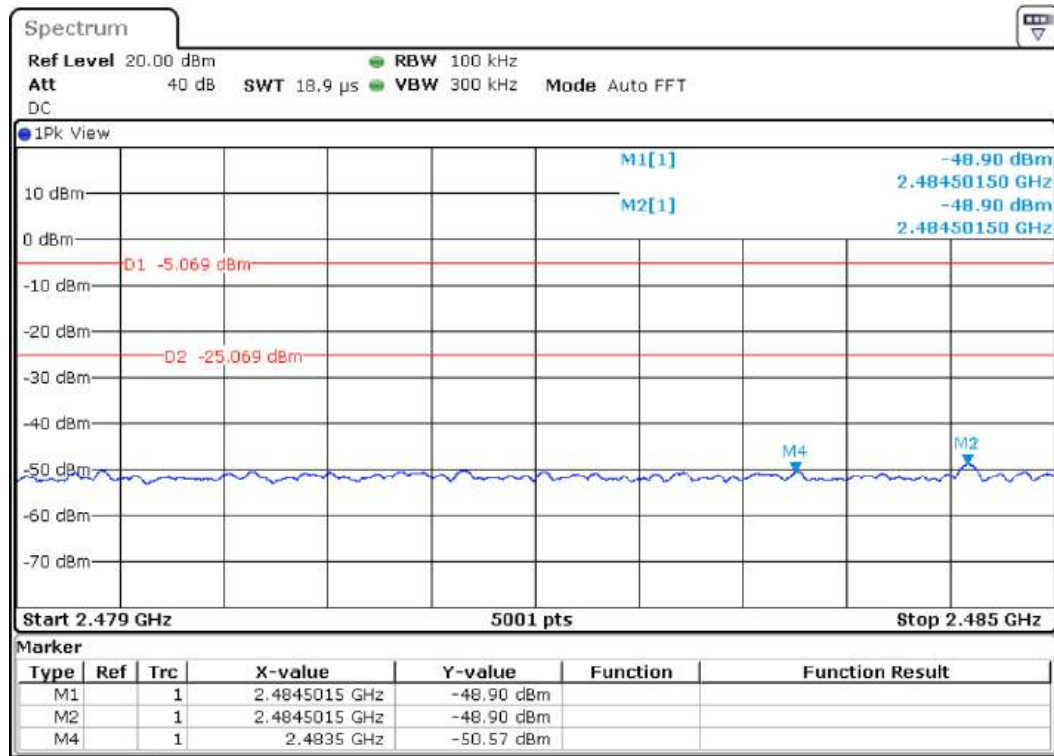


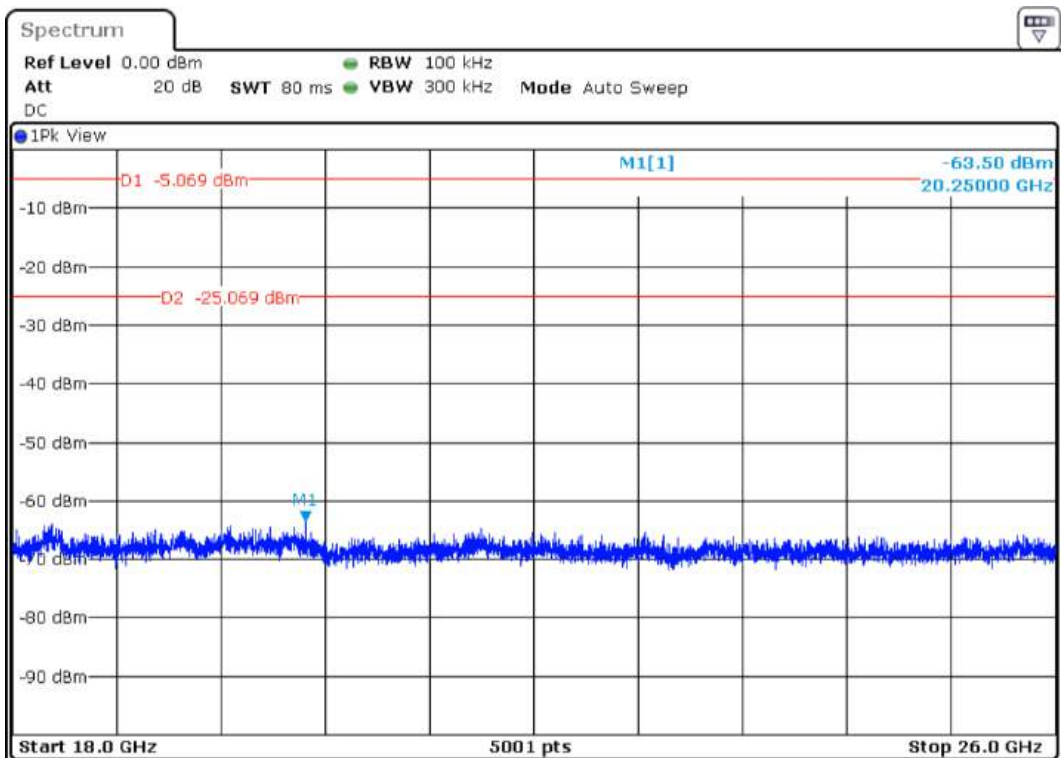
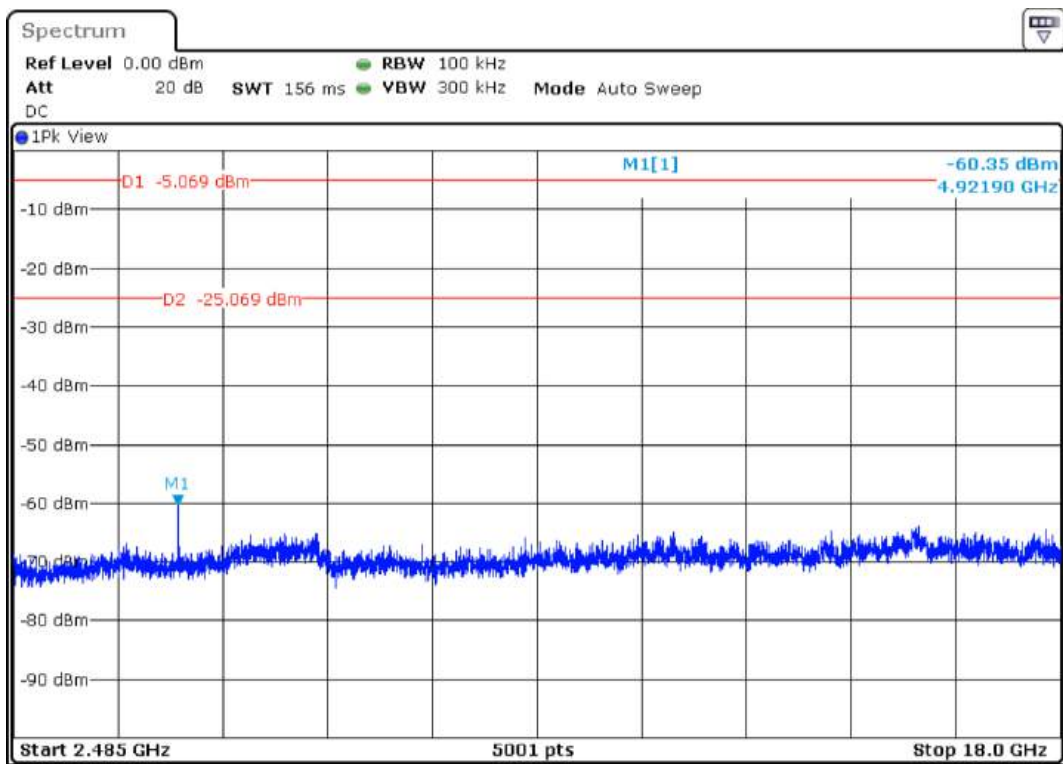




High Channel



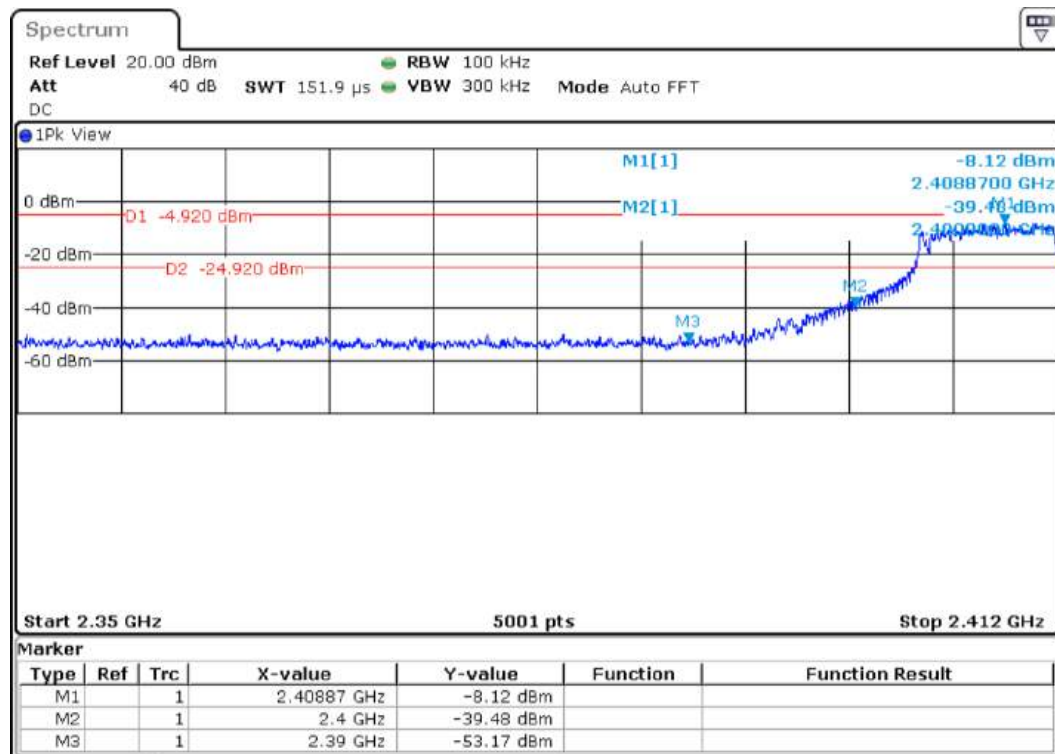
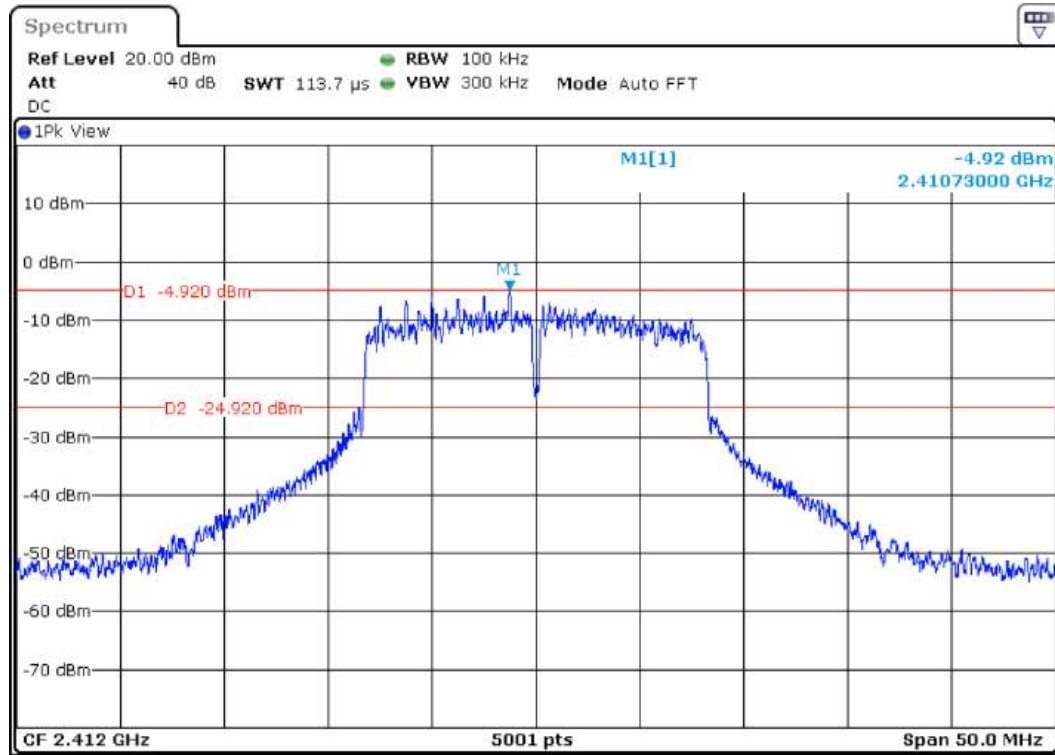


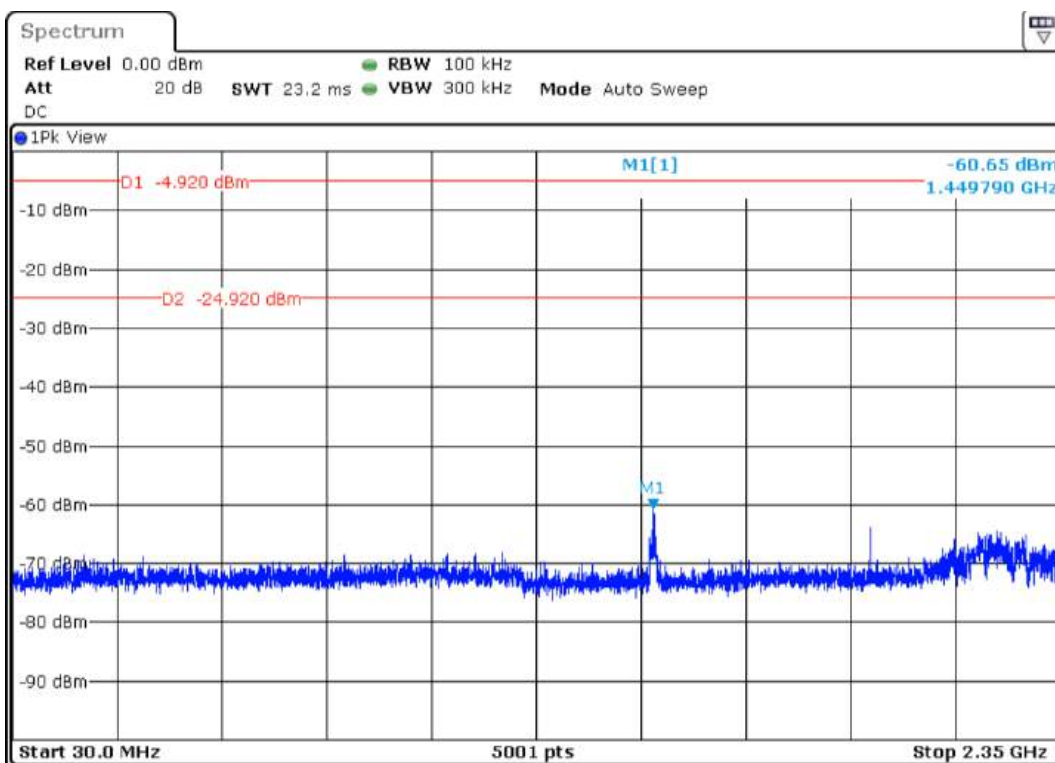
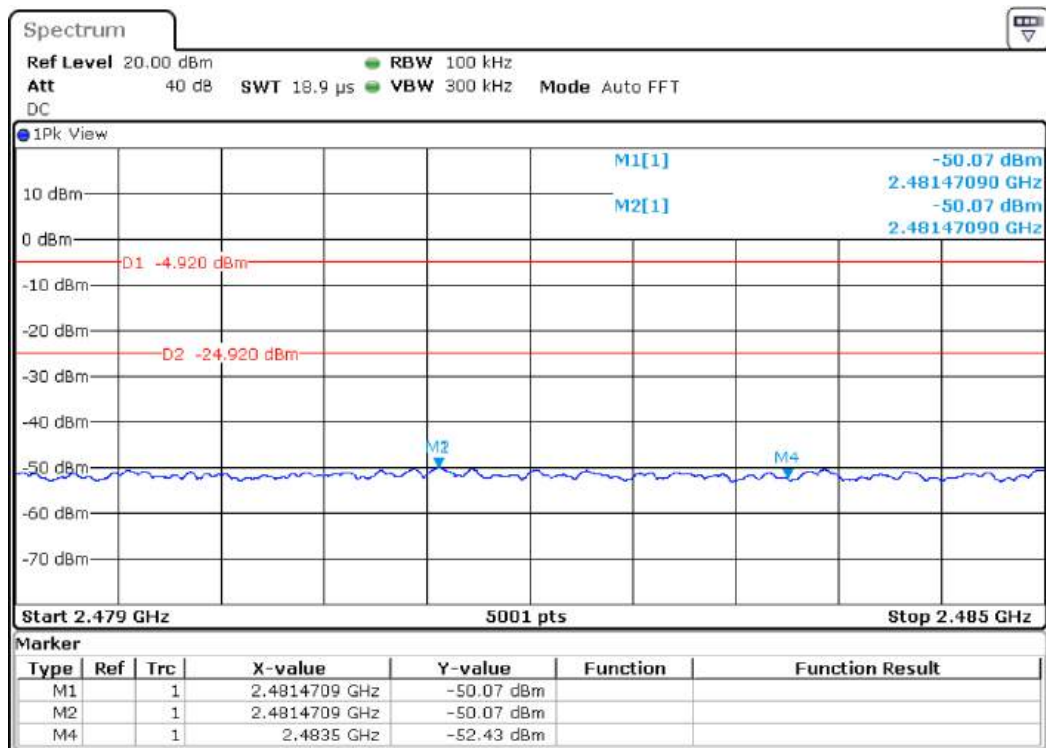


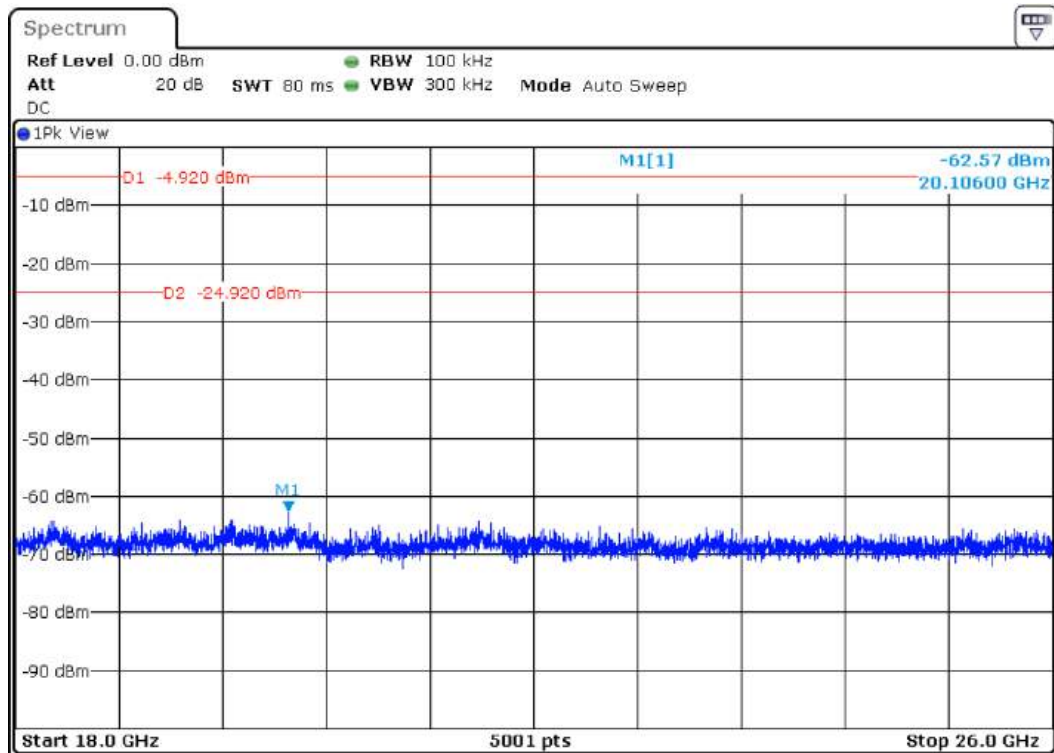
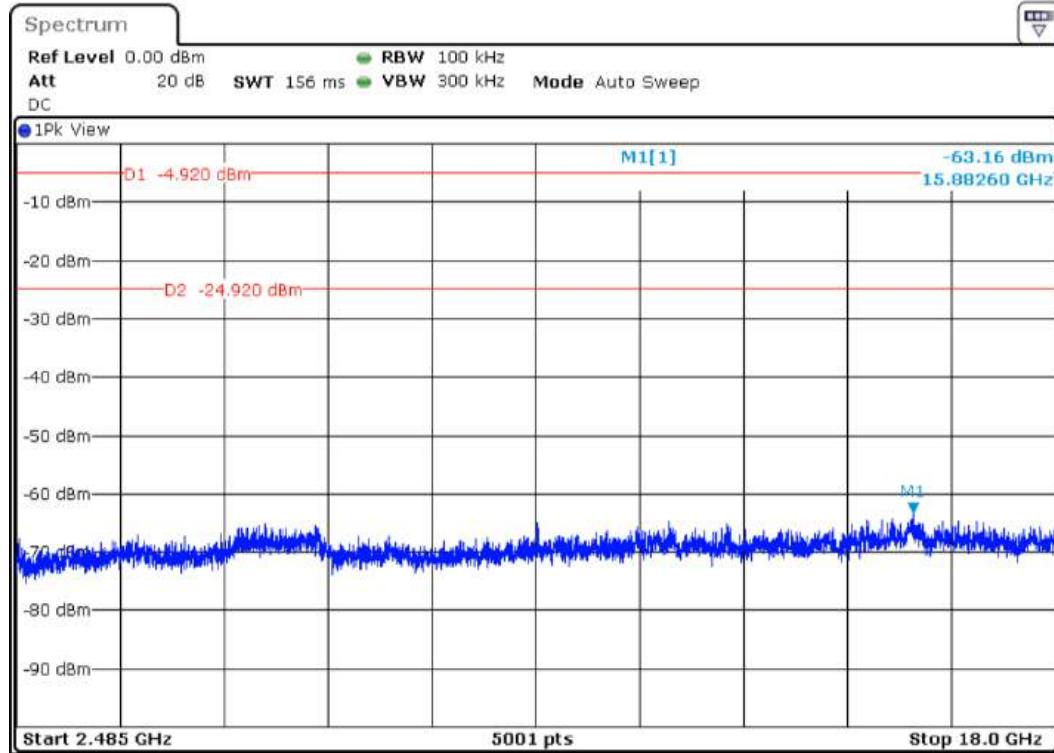


802.11g

Low Channel

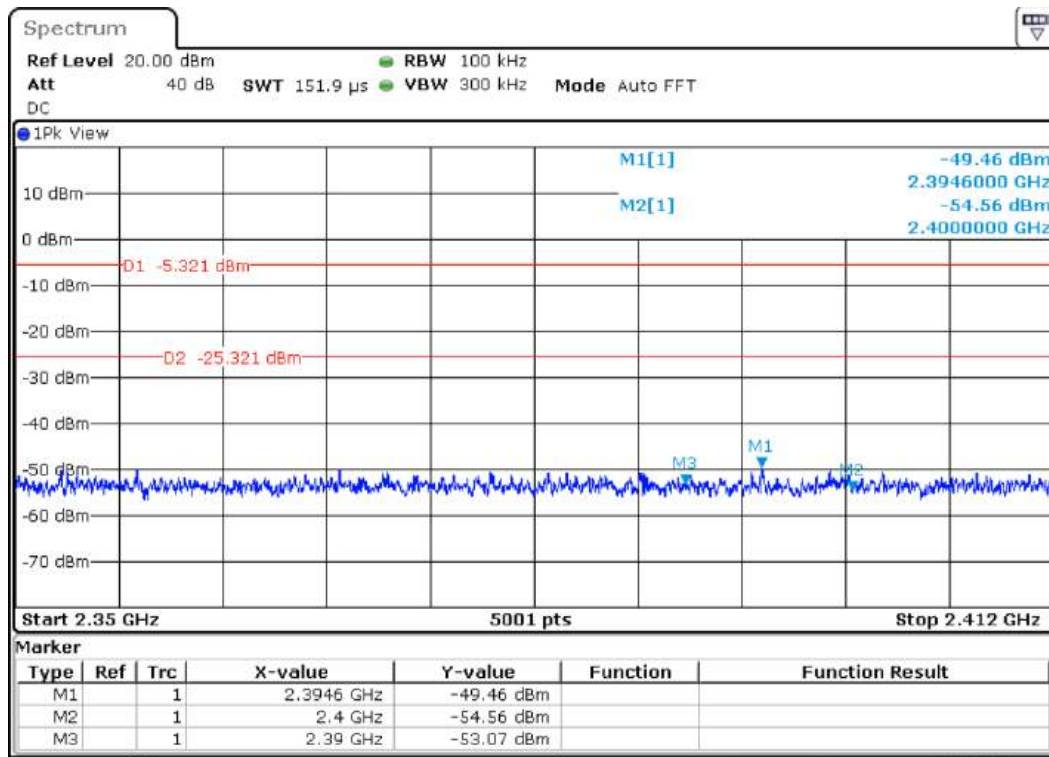
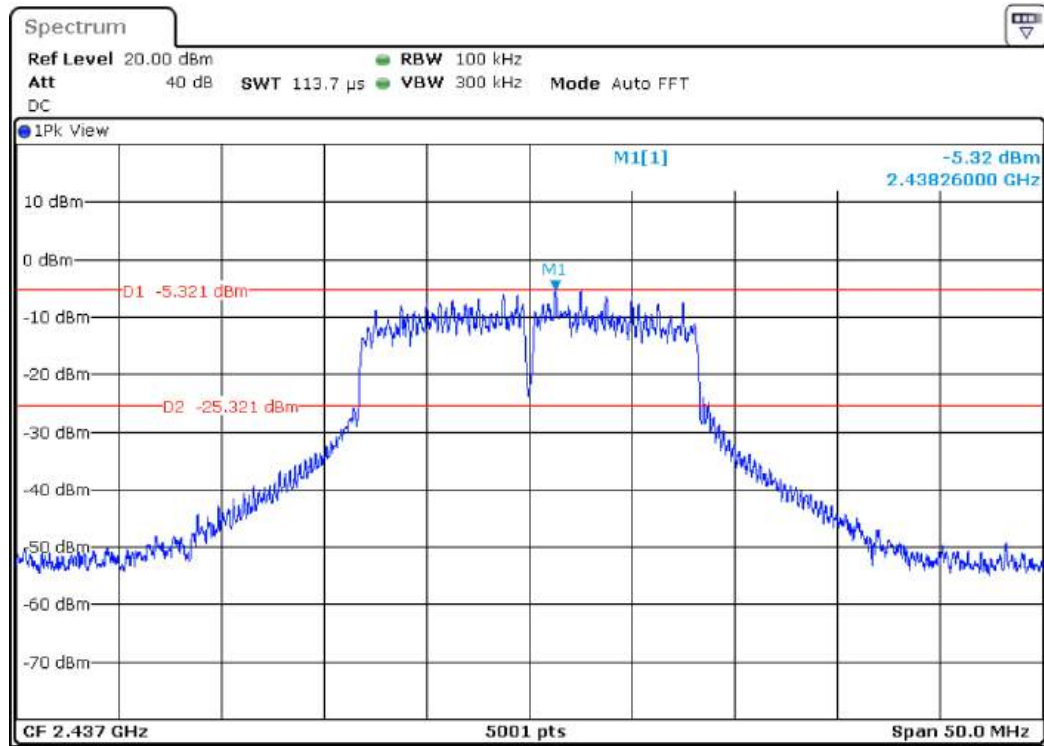


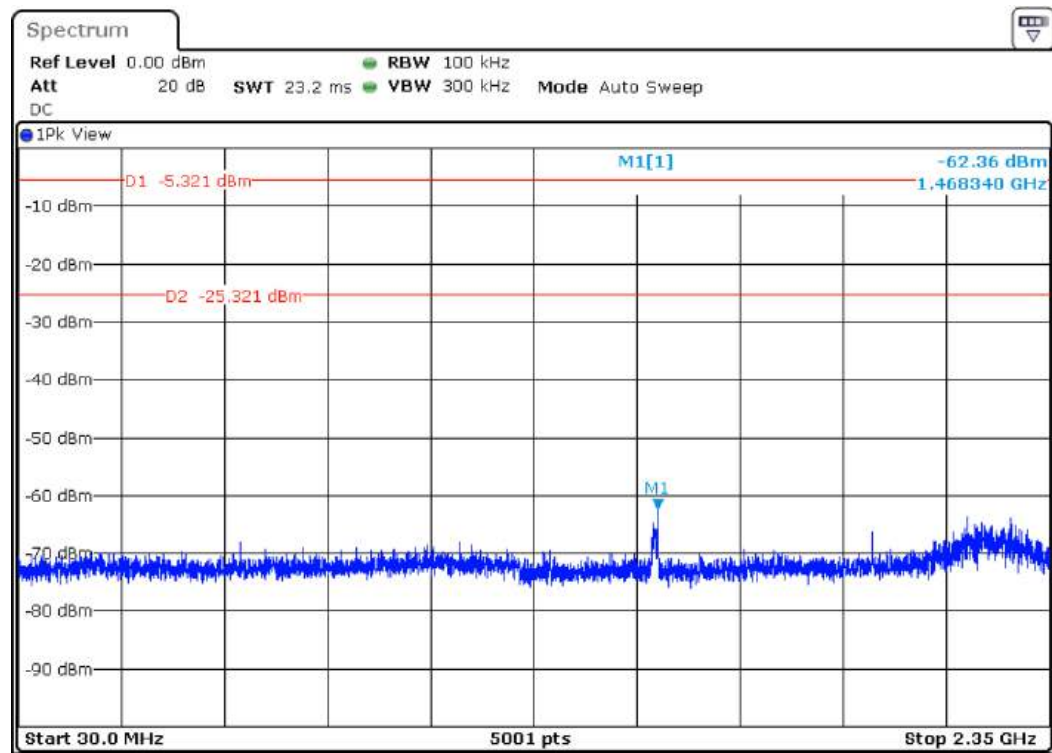
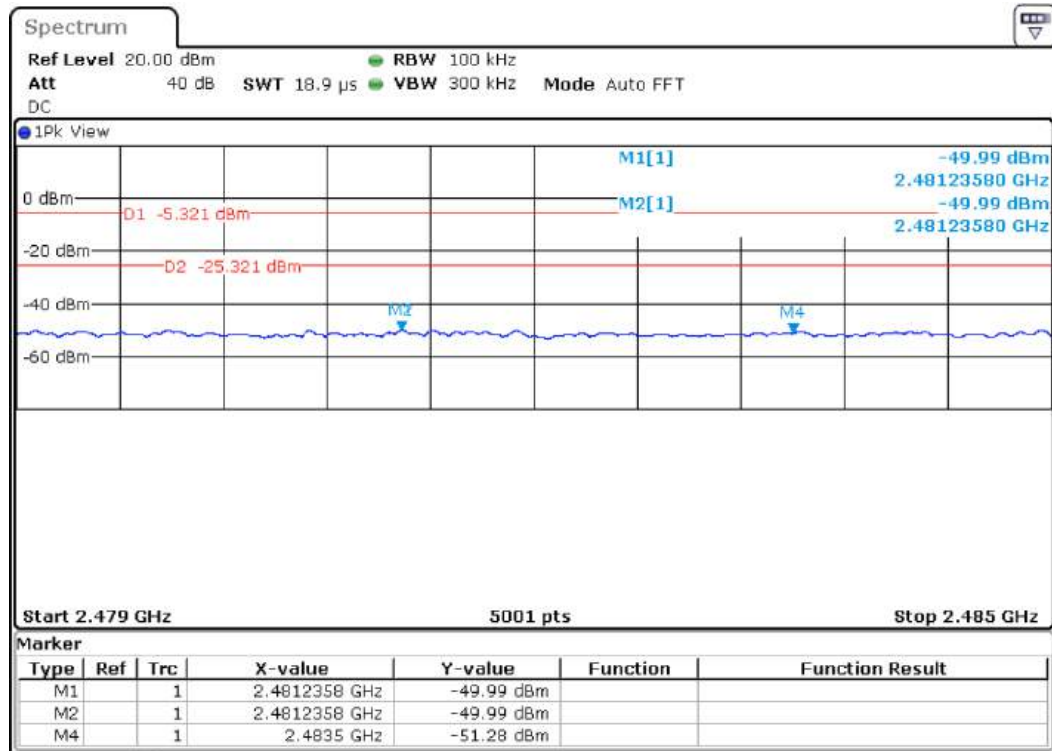


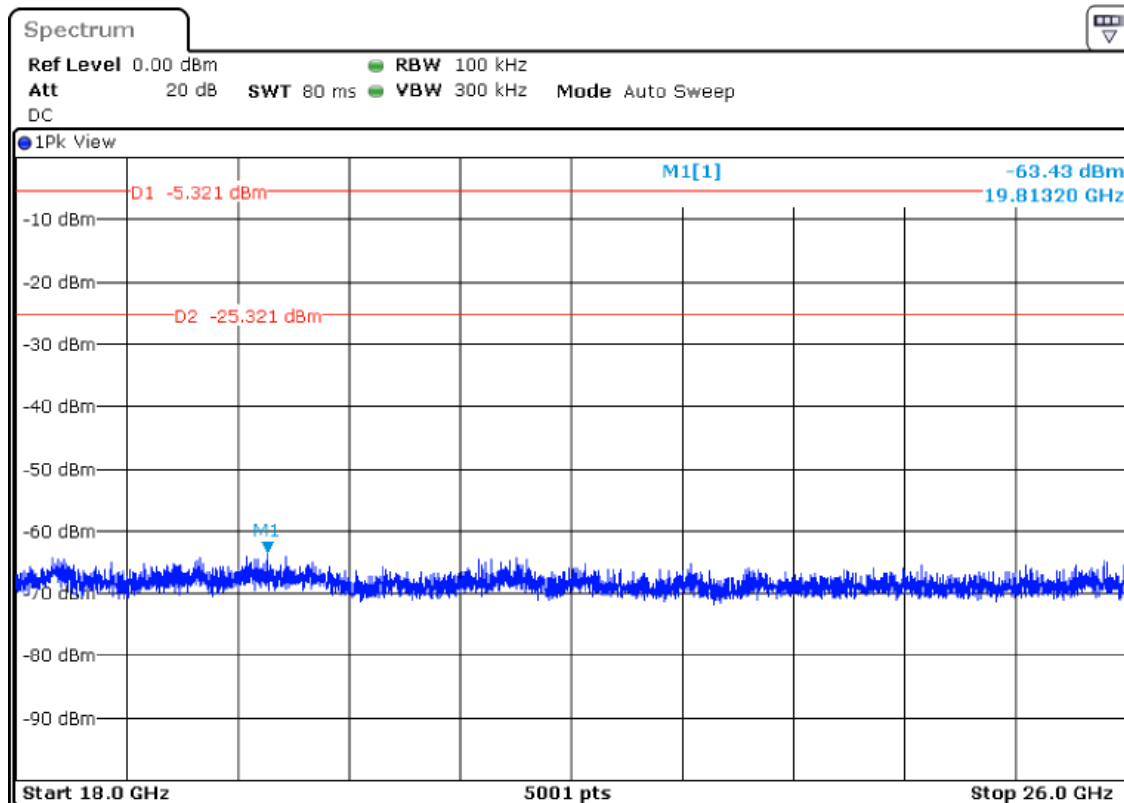
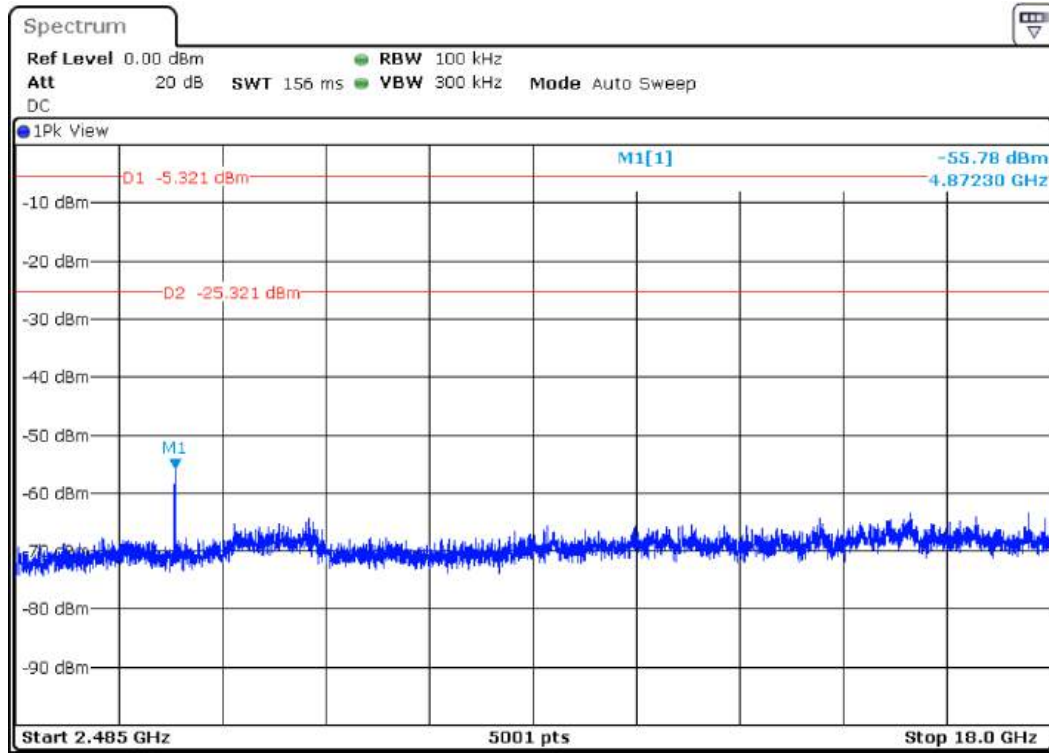




Mid Channel

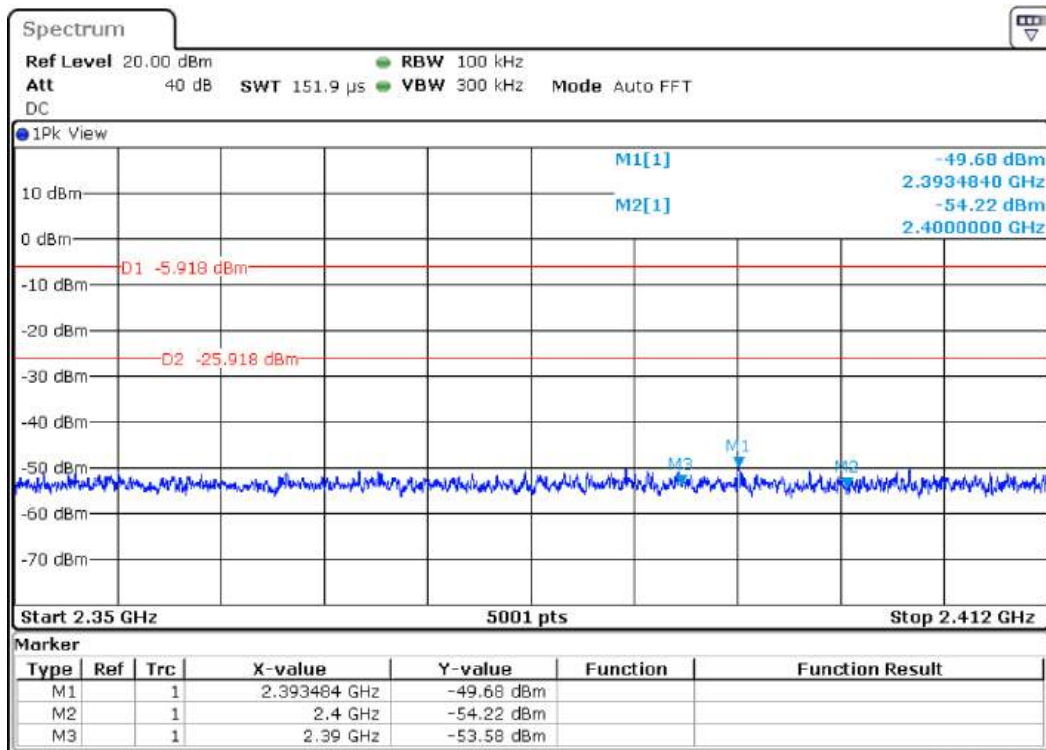
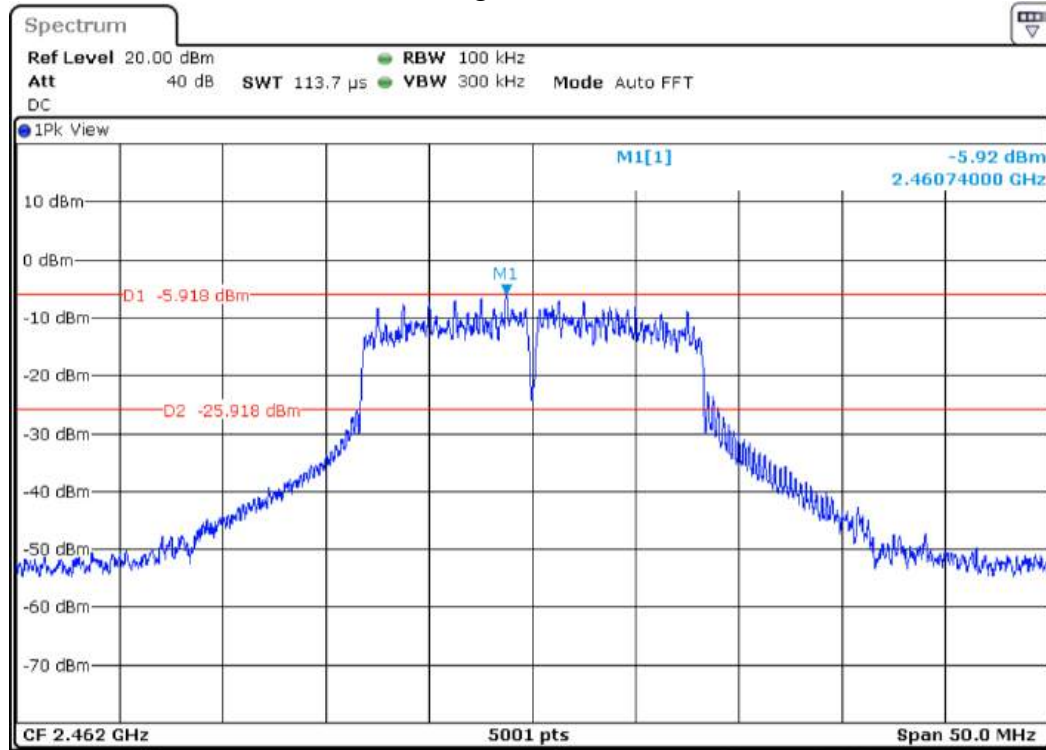


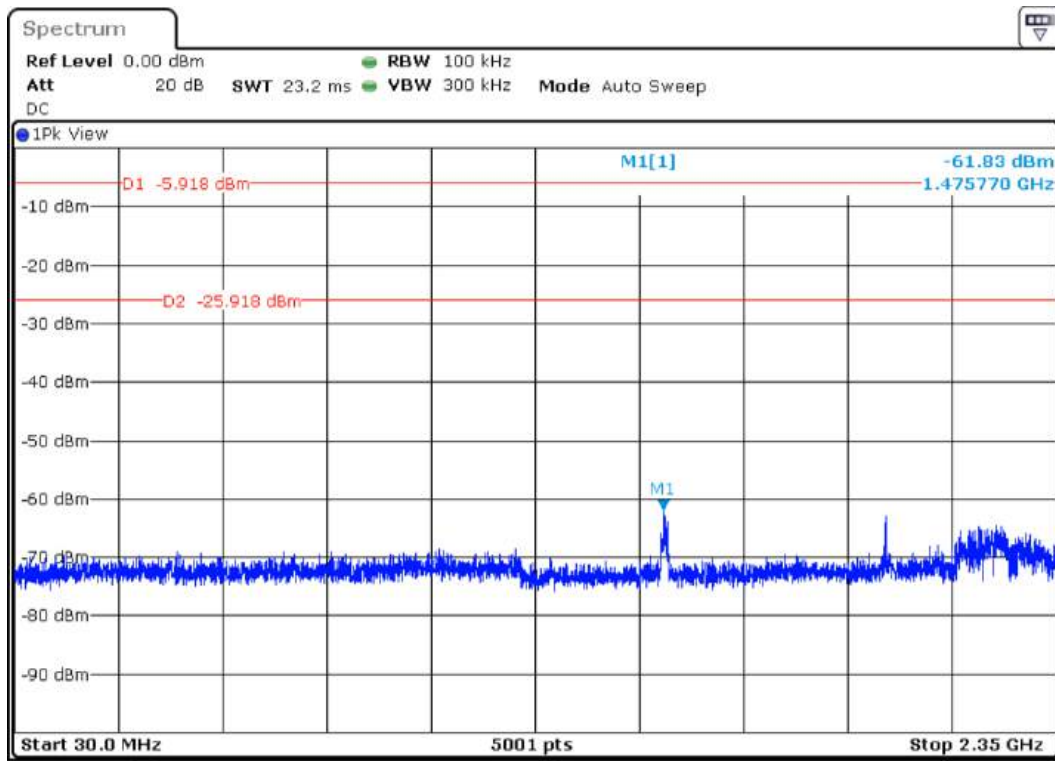
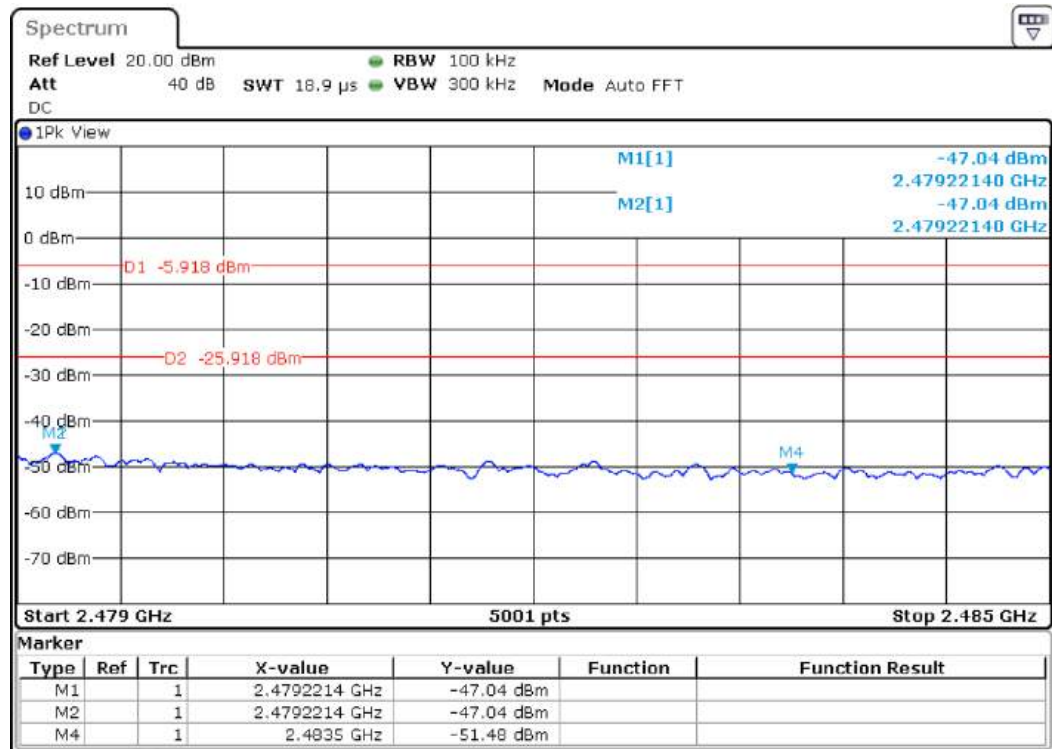


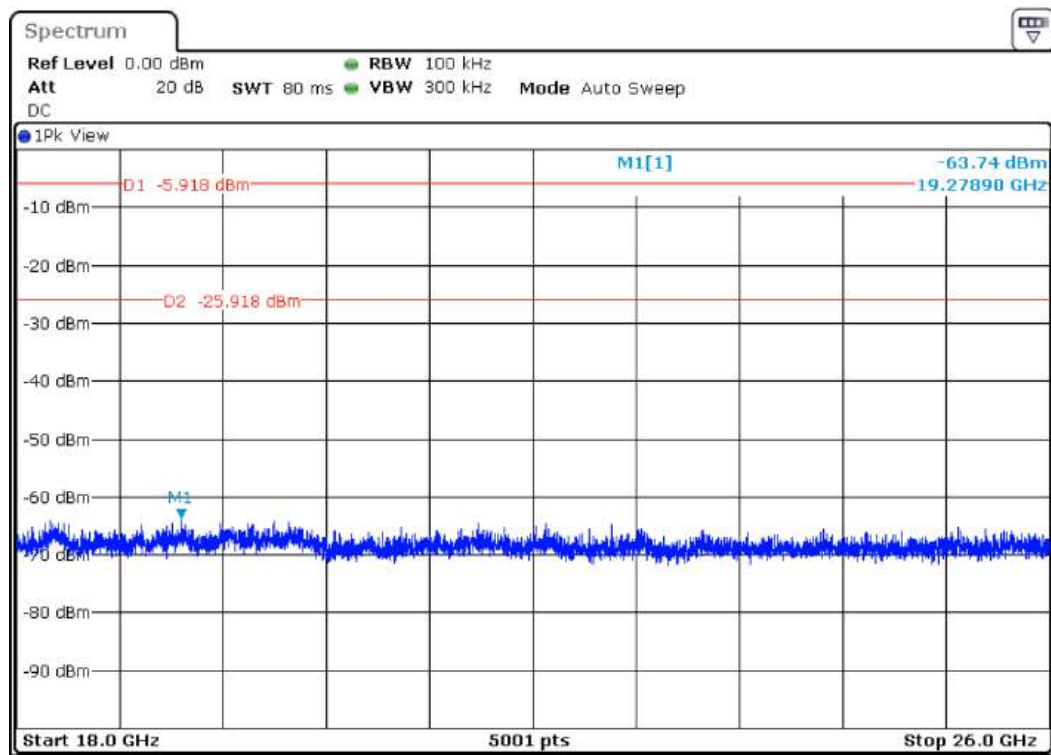
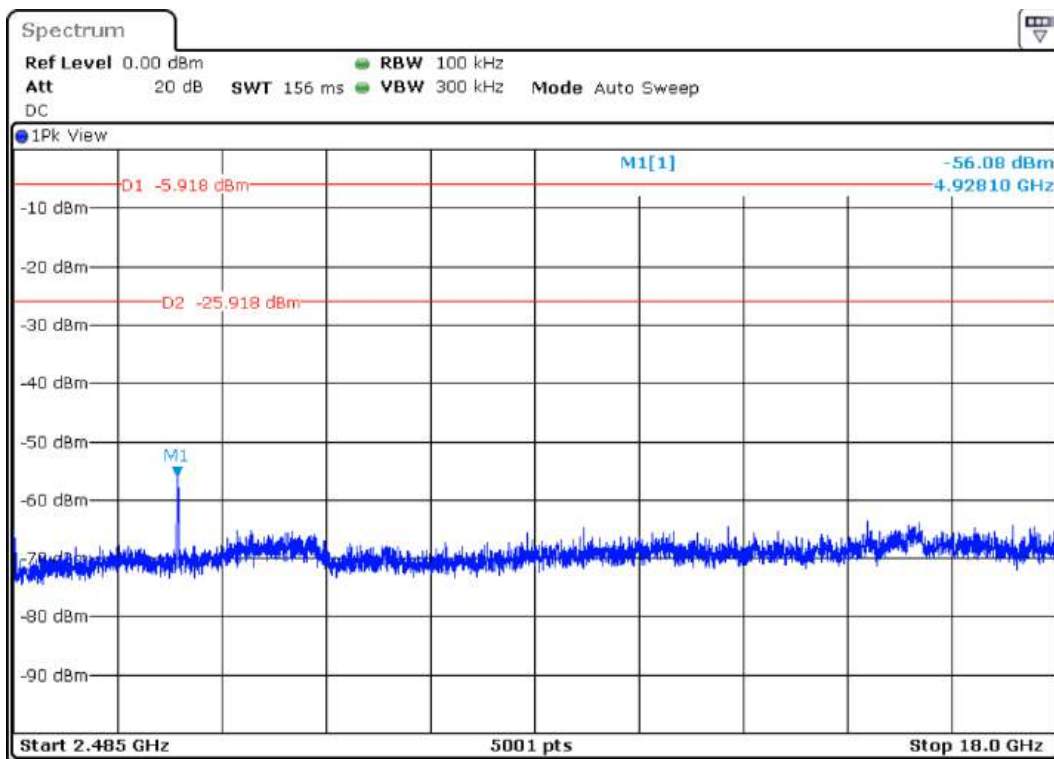




High Channel



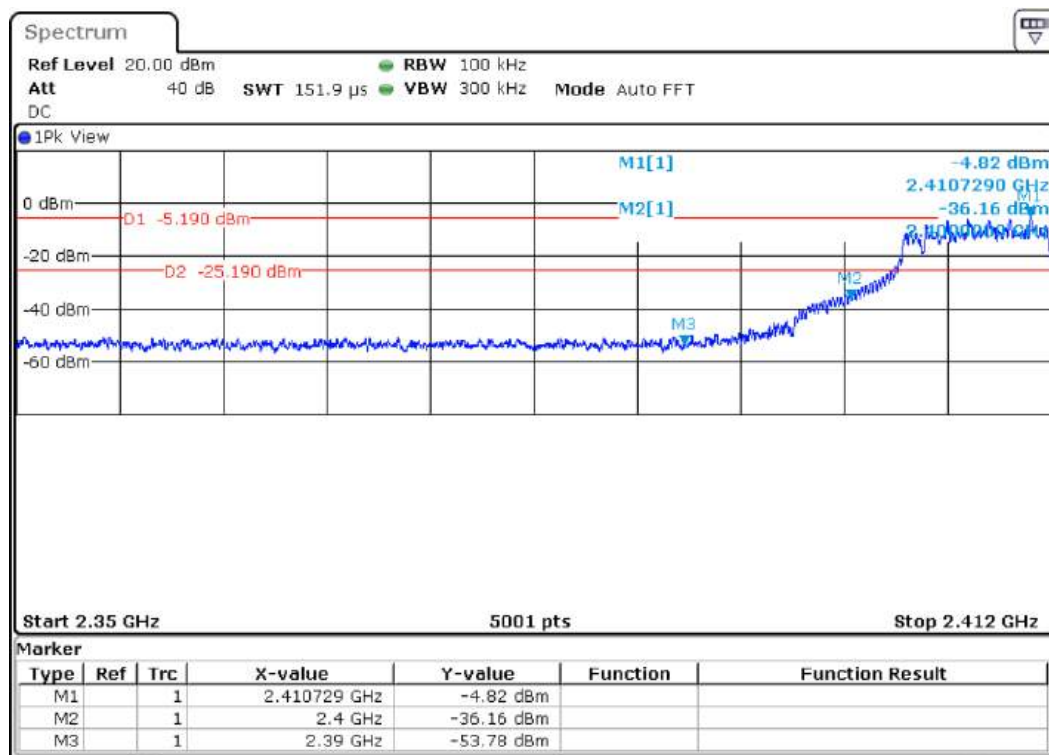
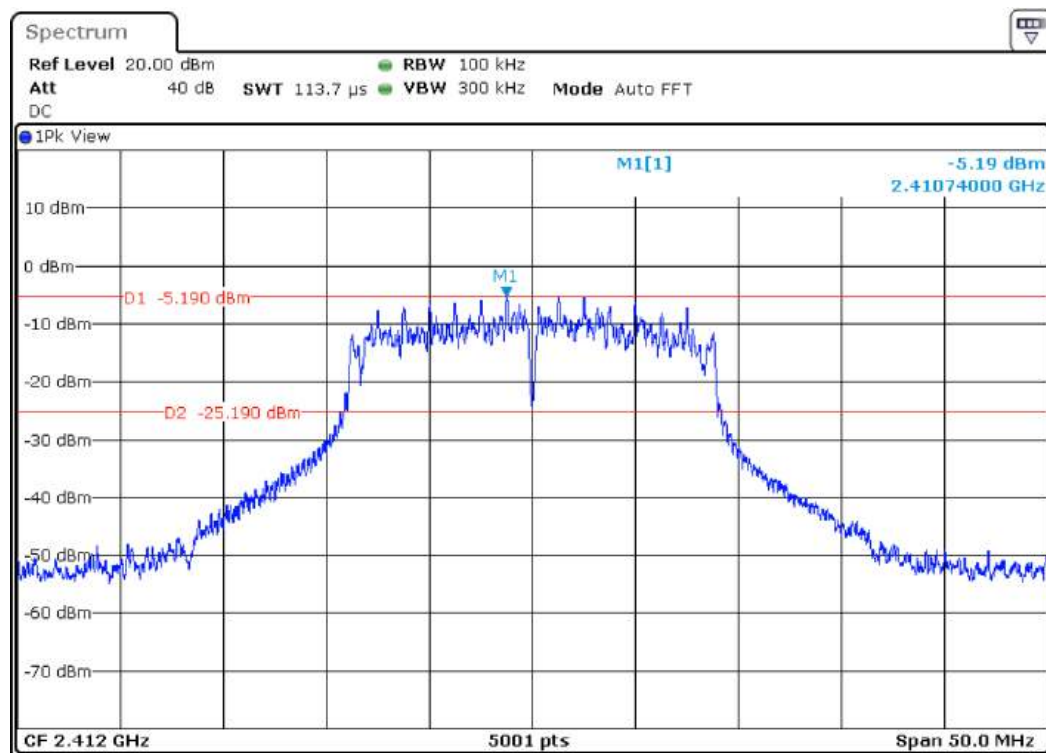


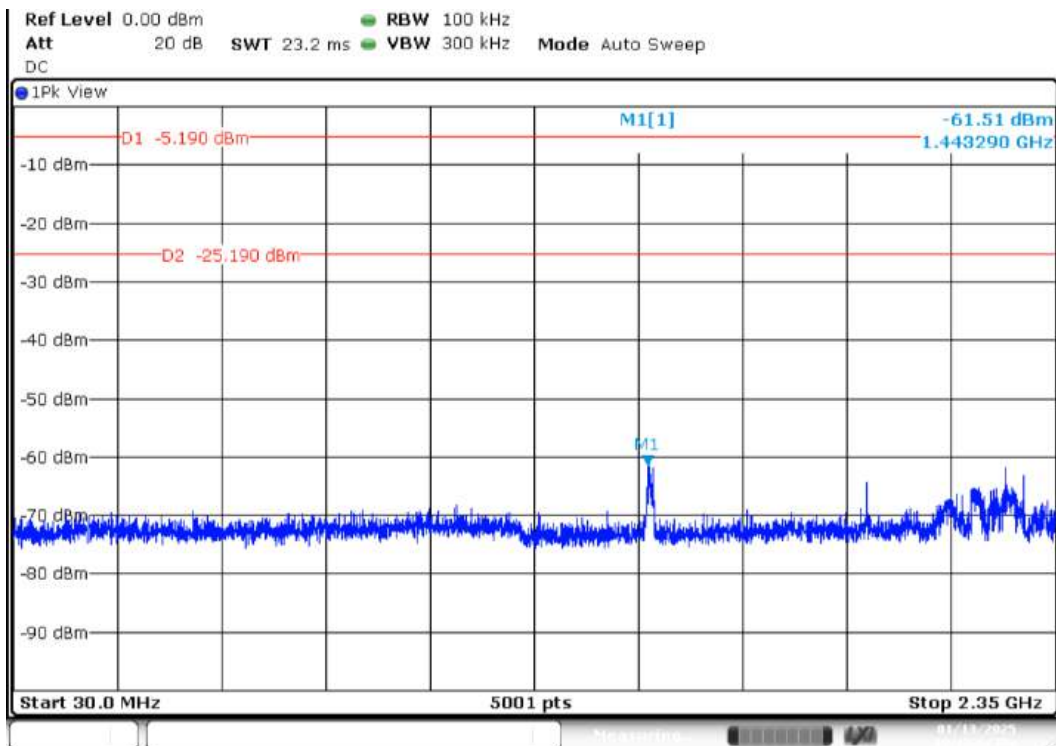
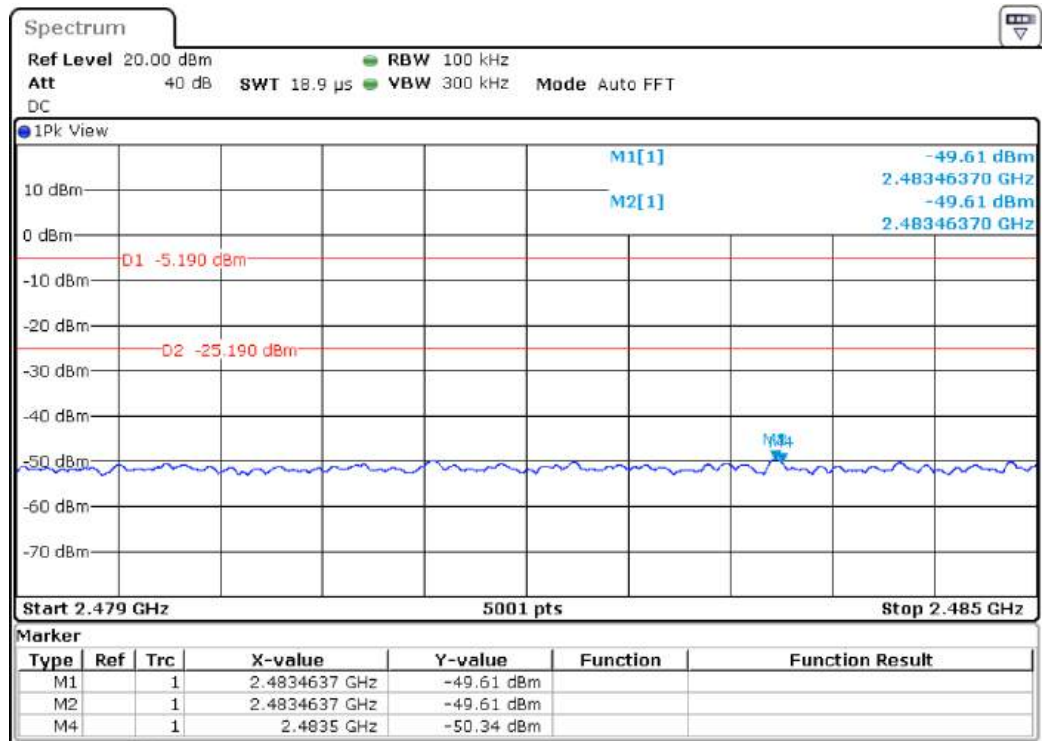


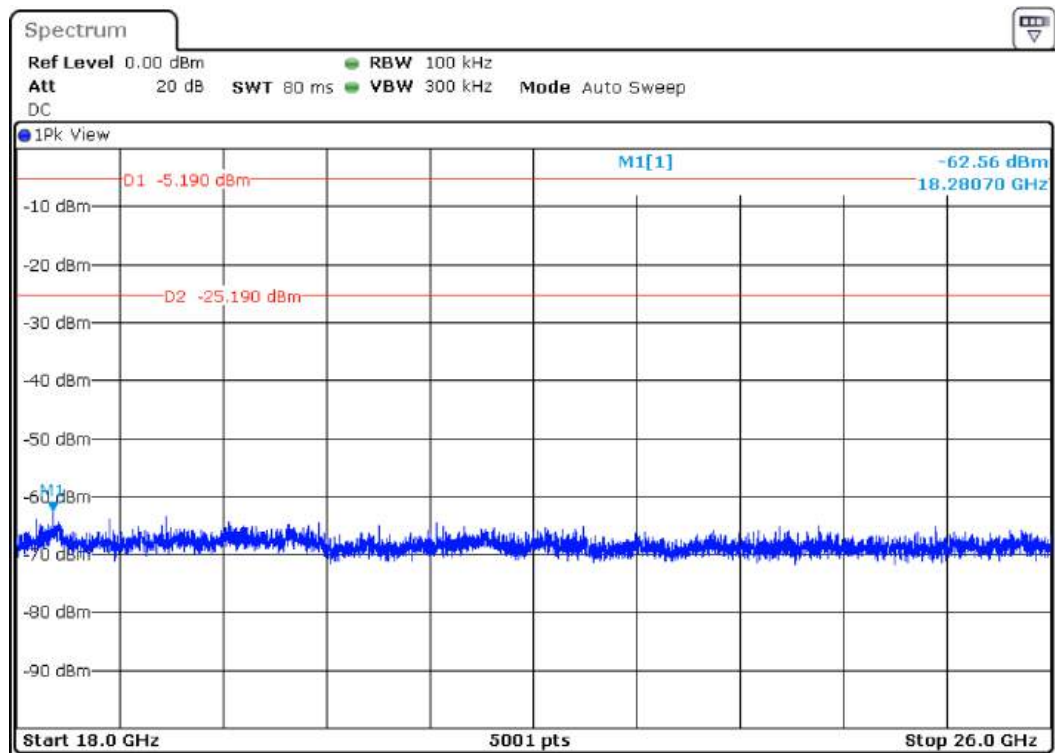
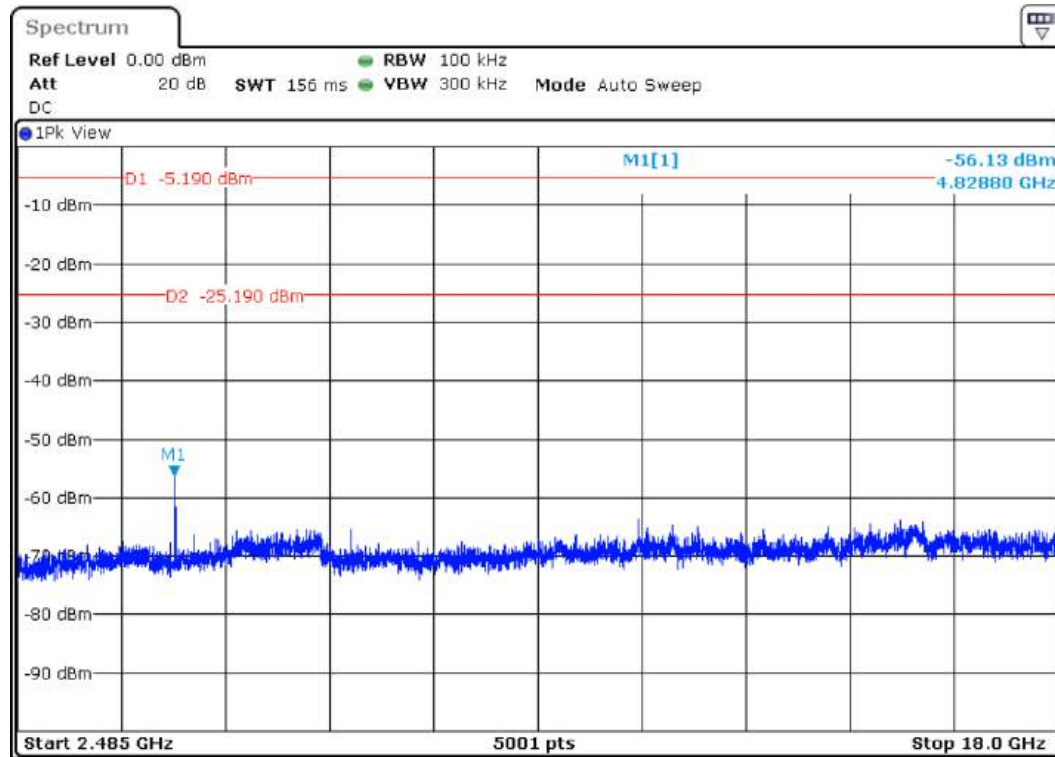


802.11 n20

Low Channel

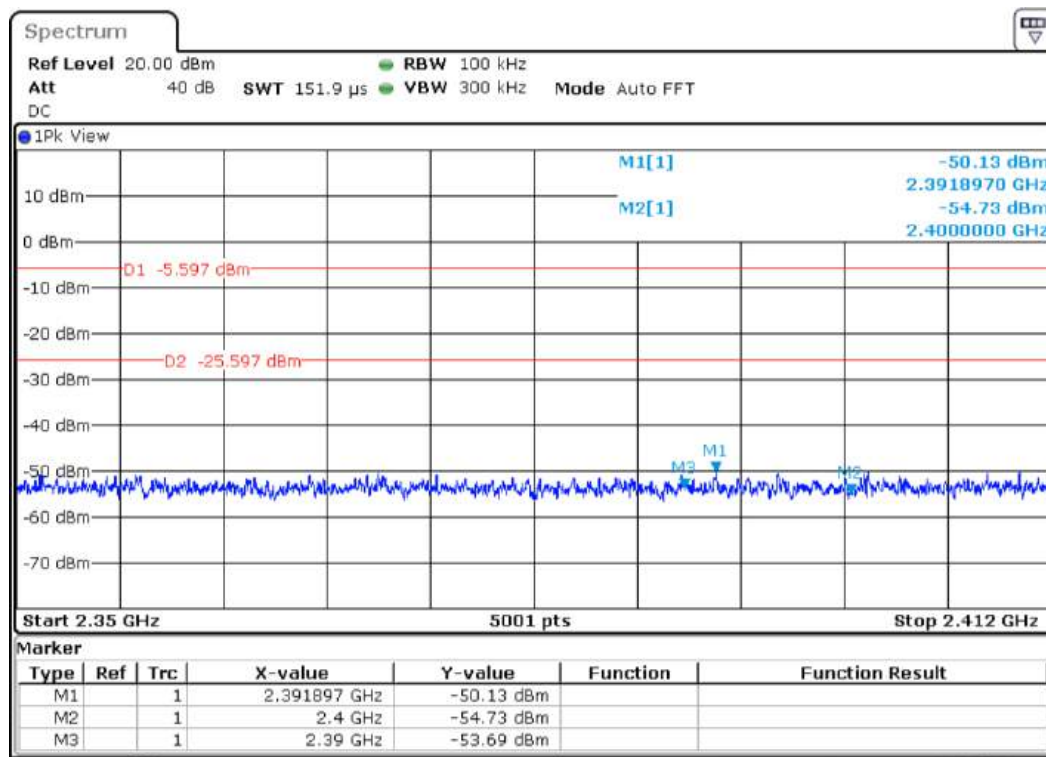
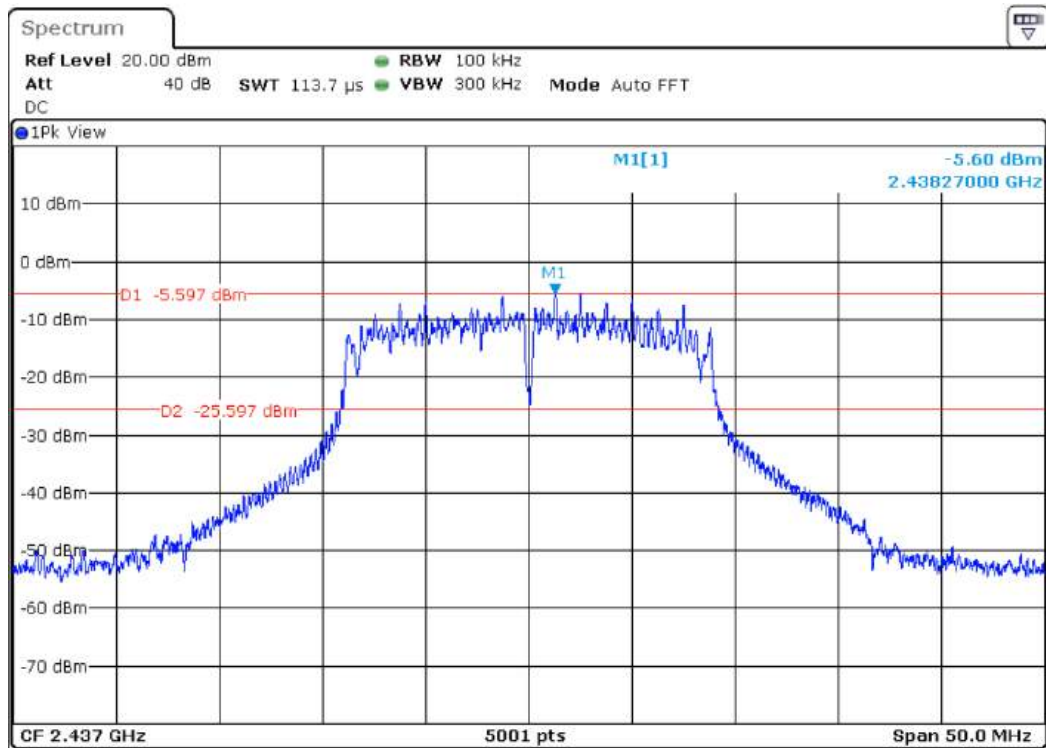


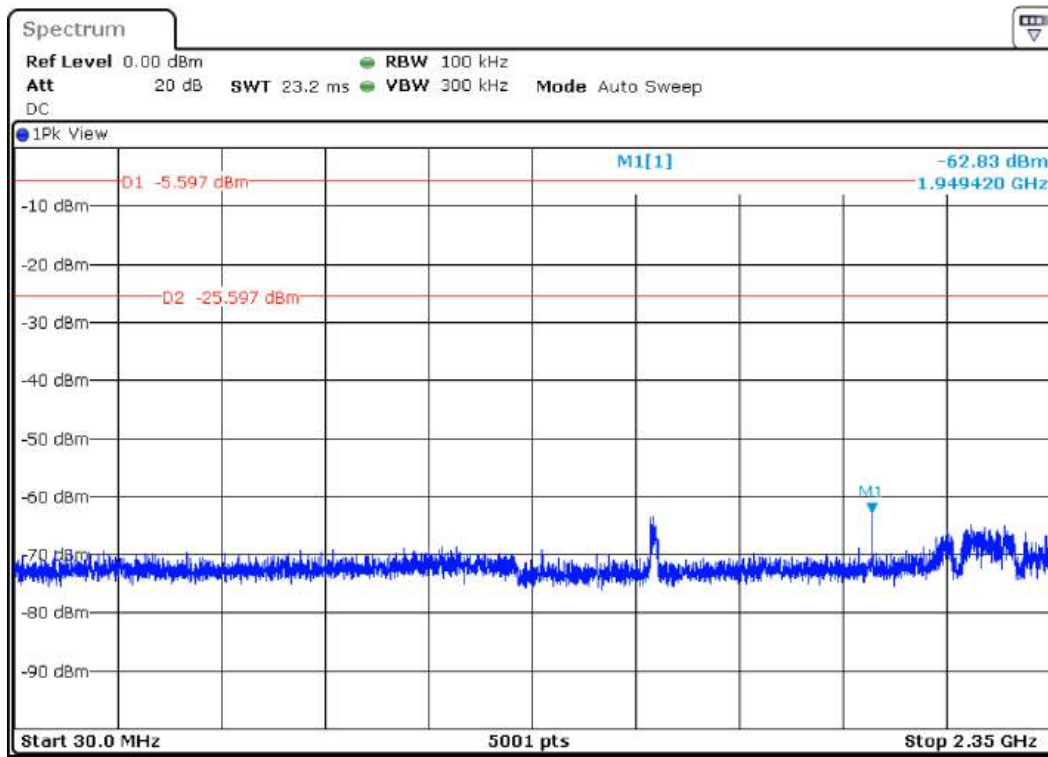
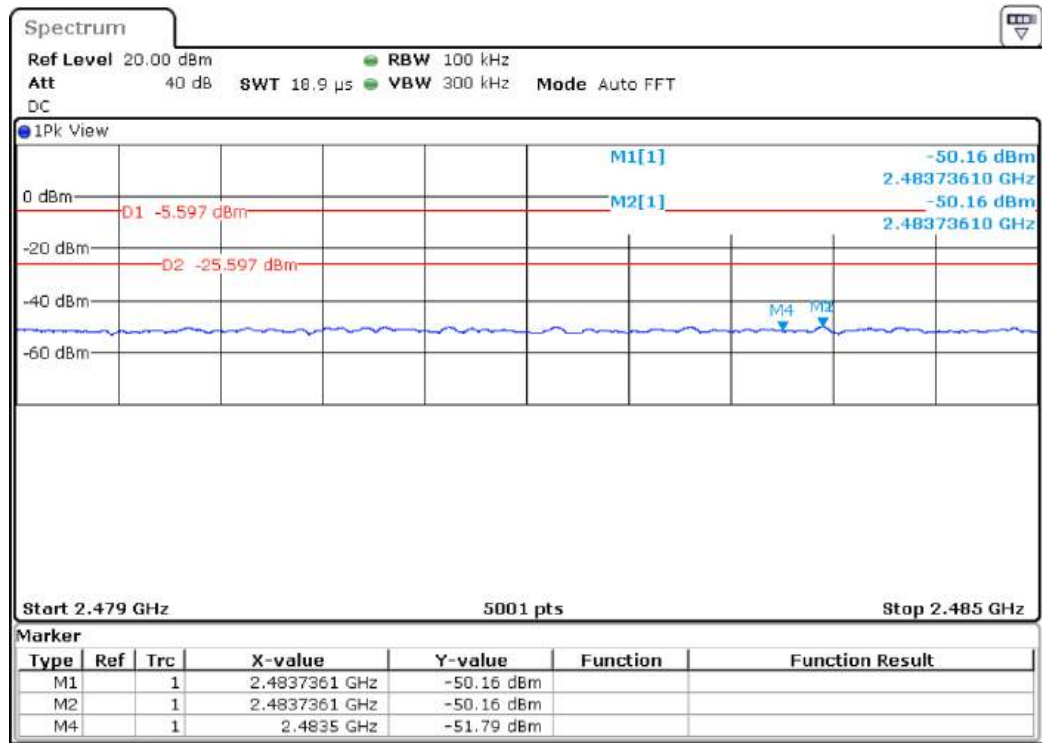


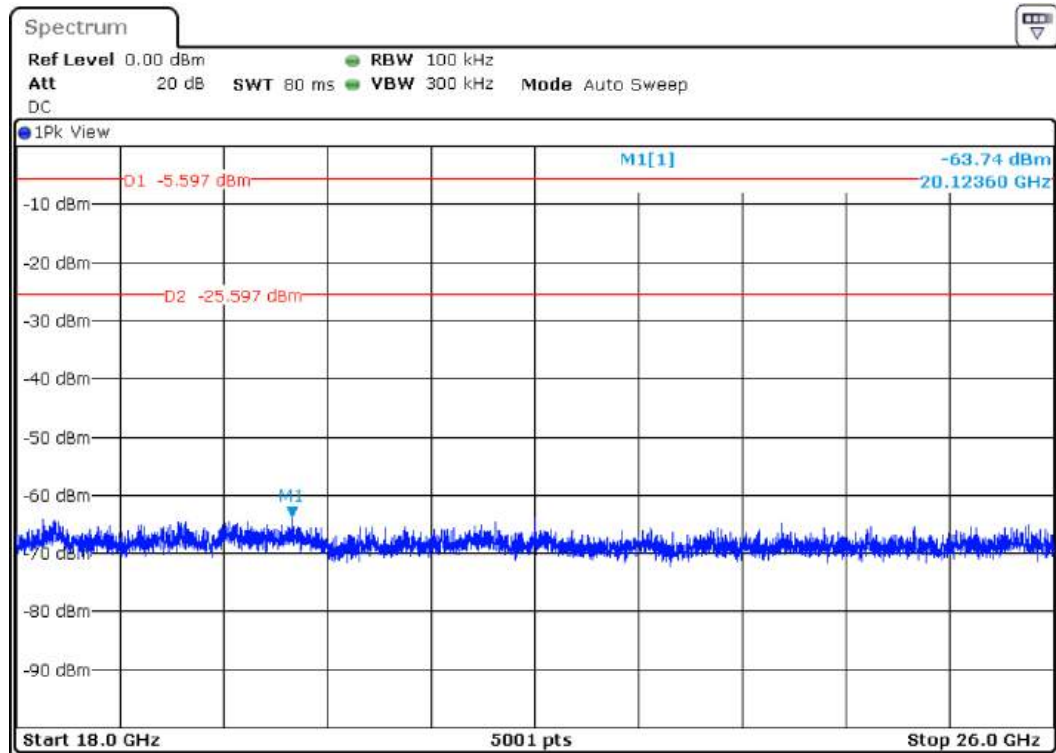
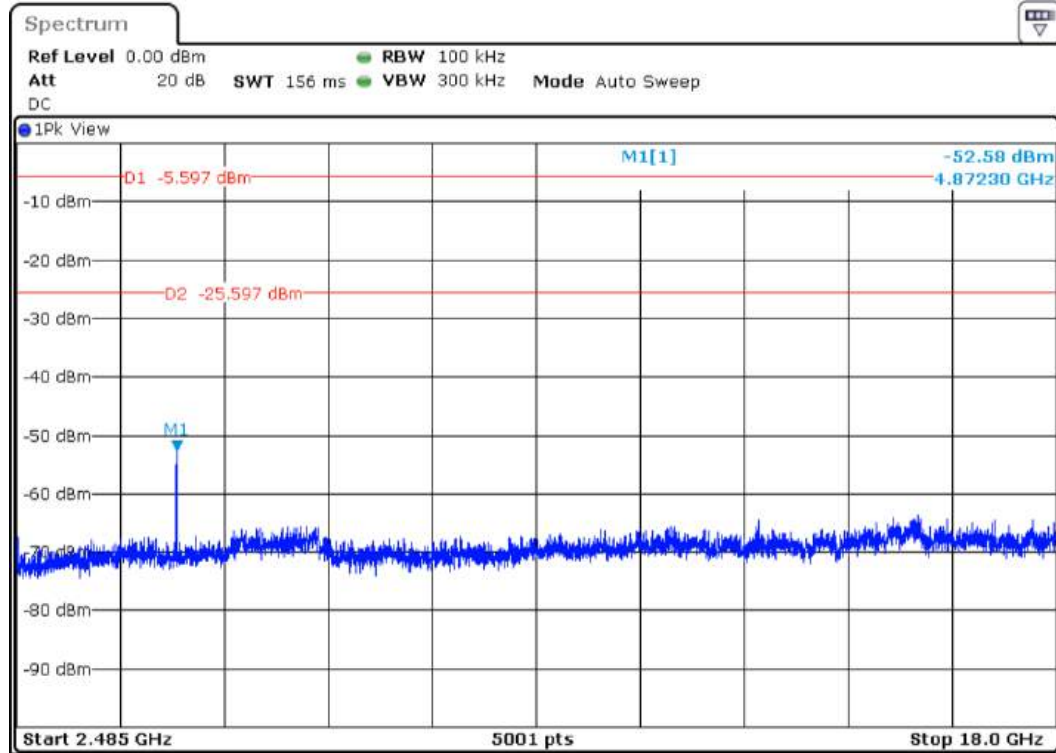




Mid Channel

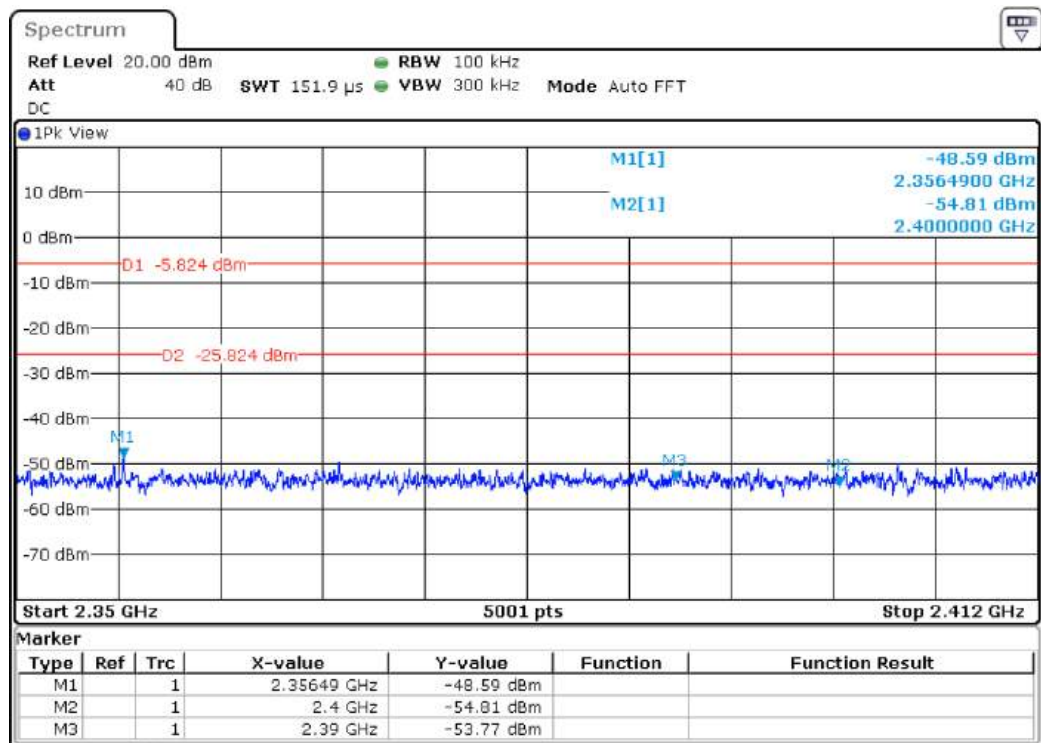
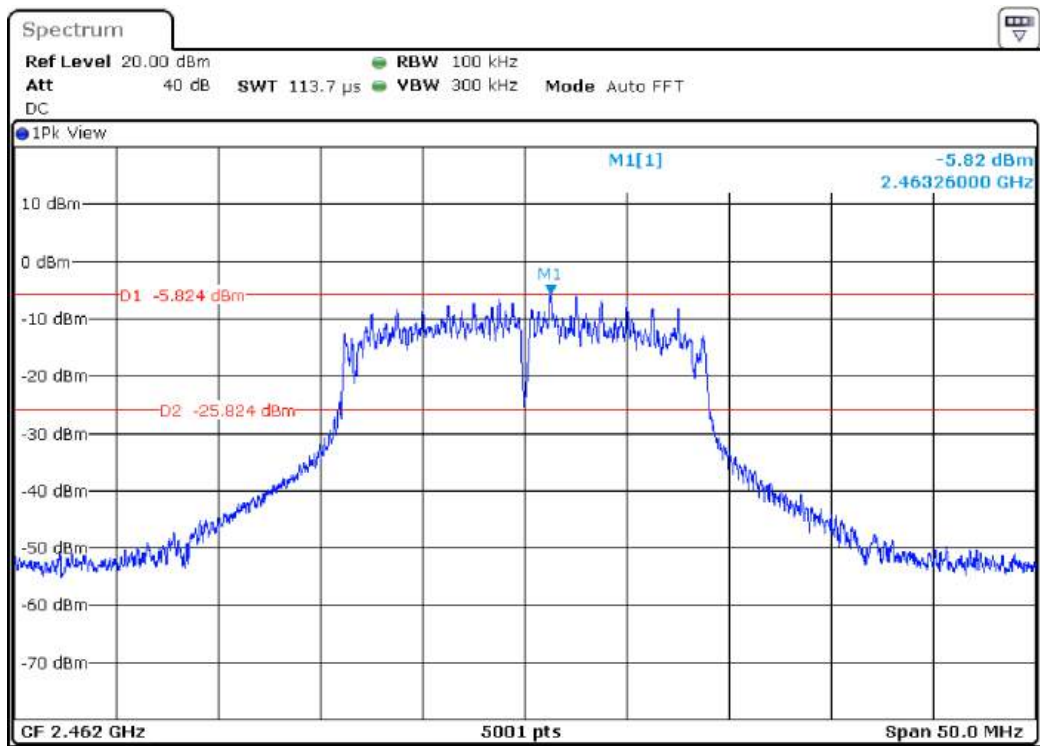


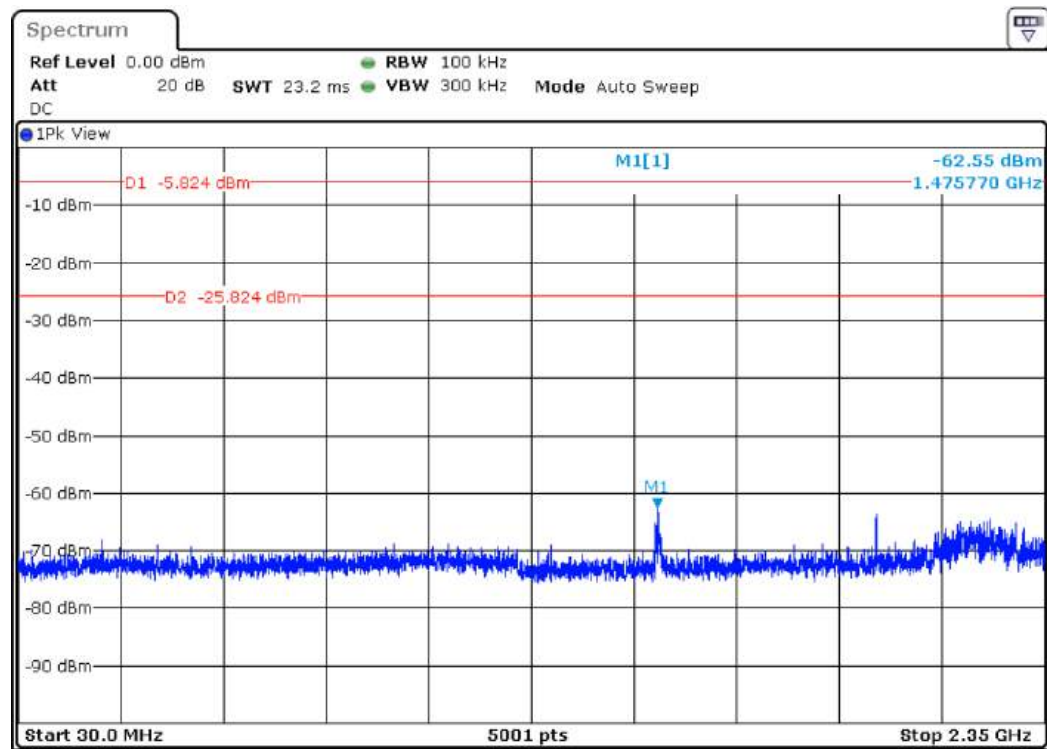
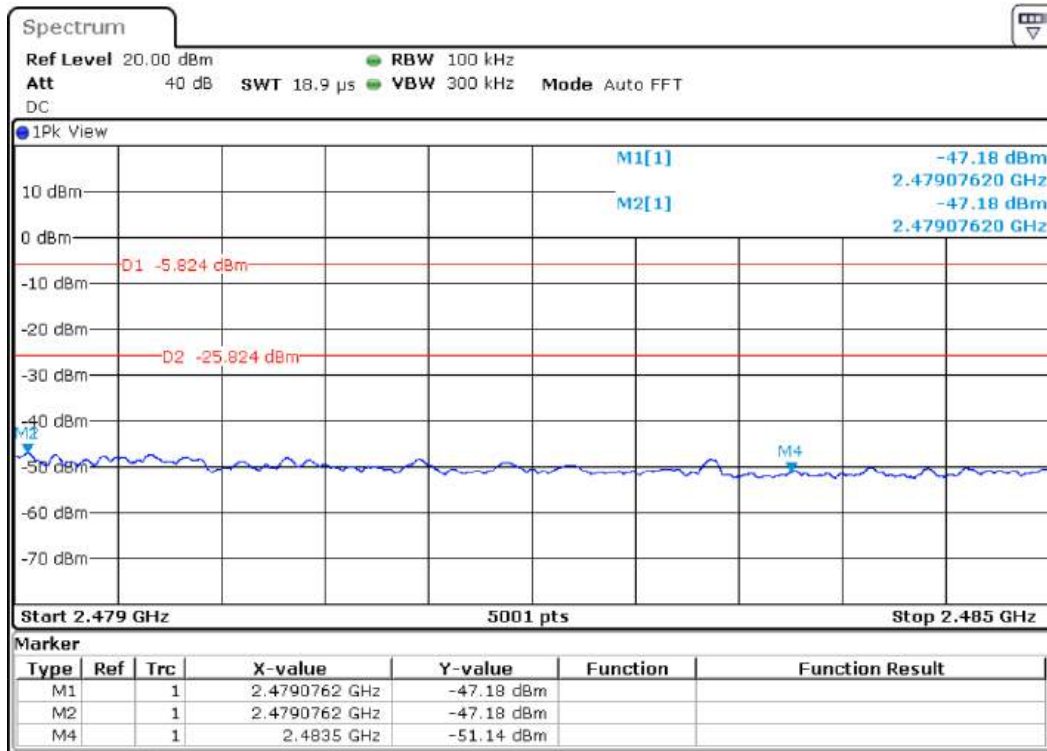


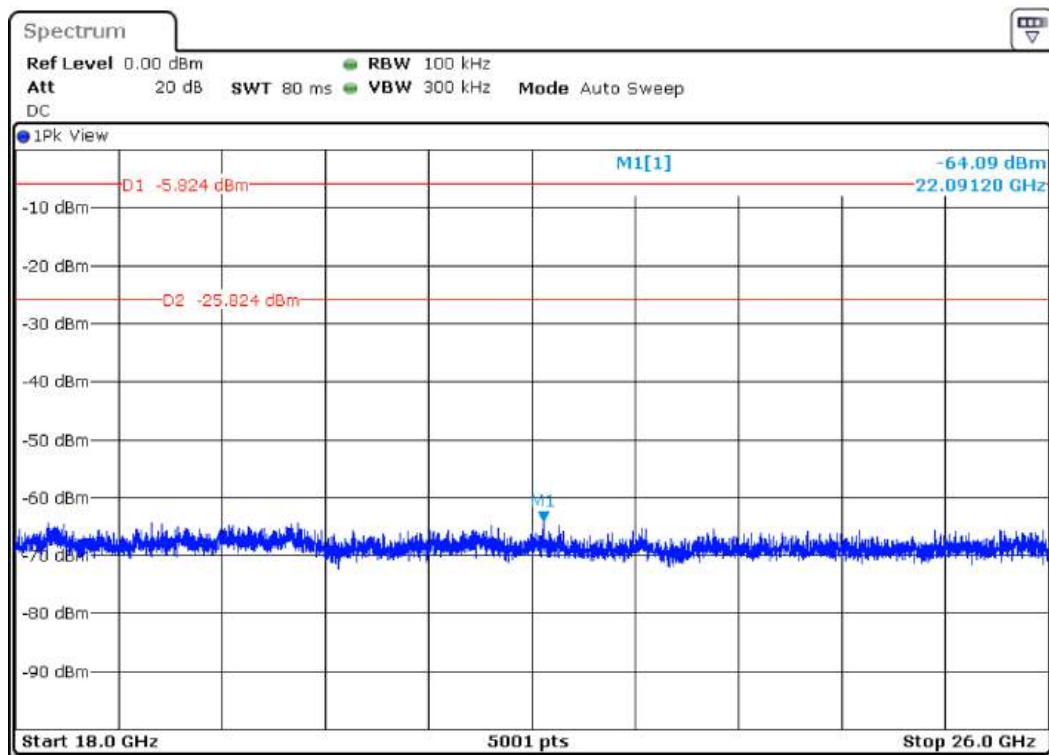
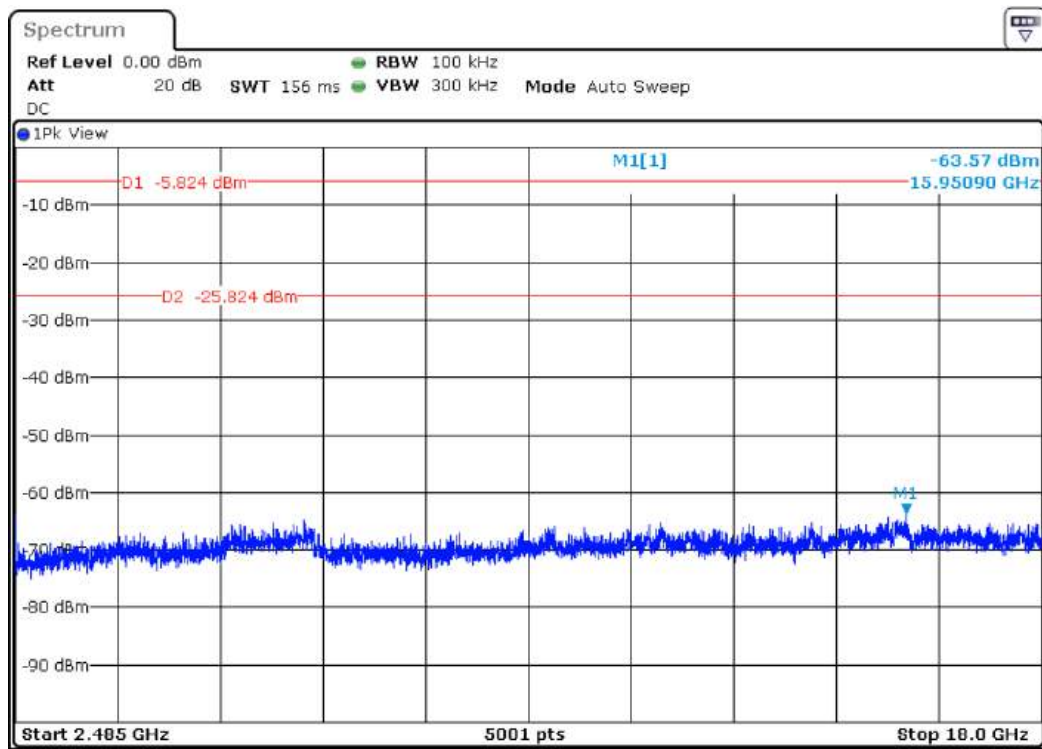




High Channel



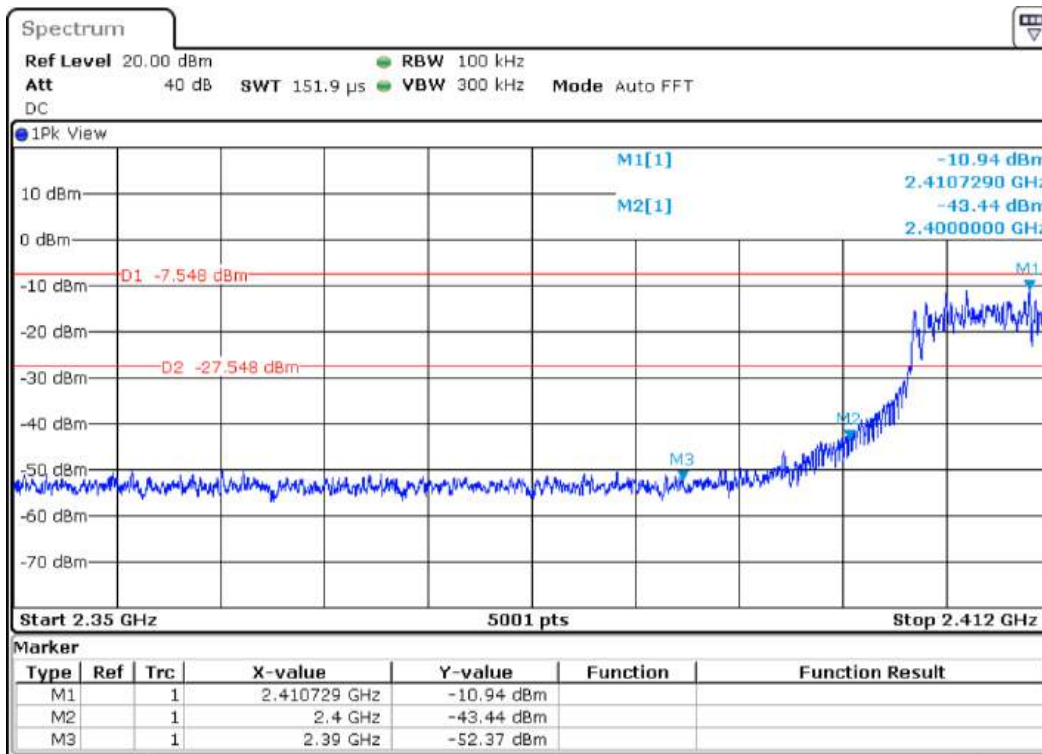
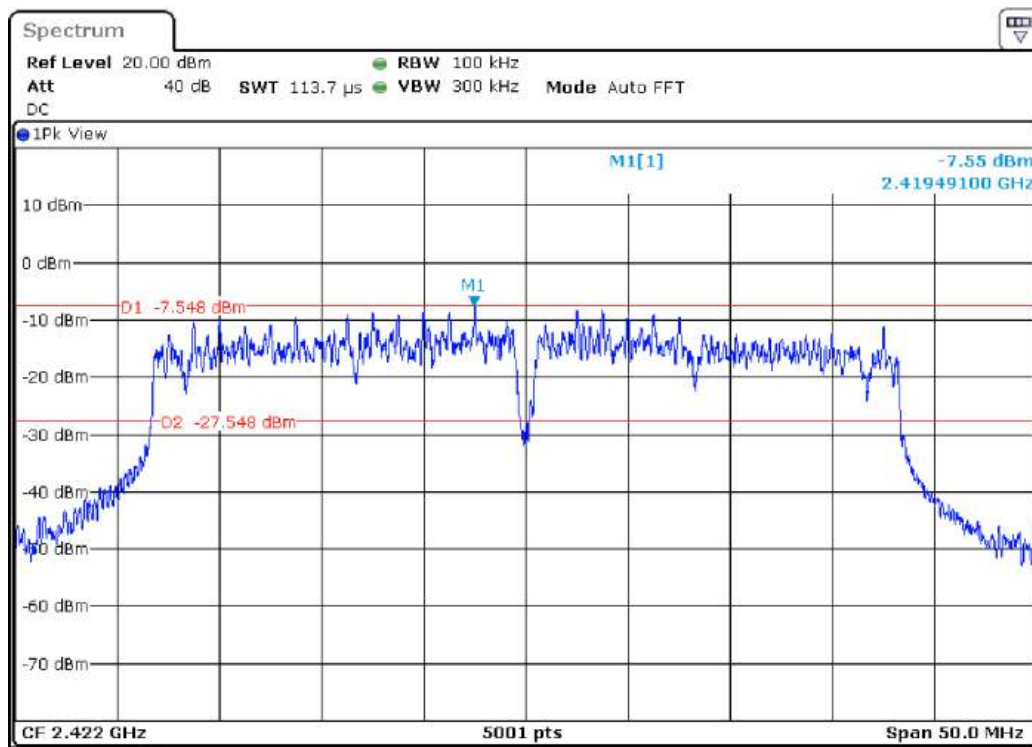


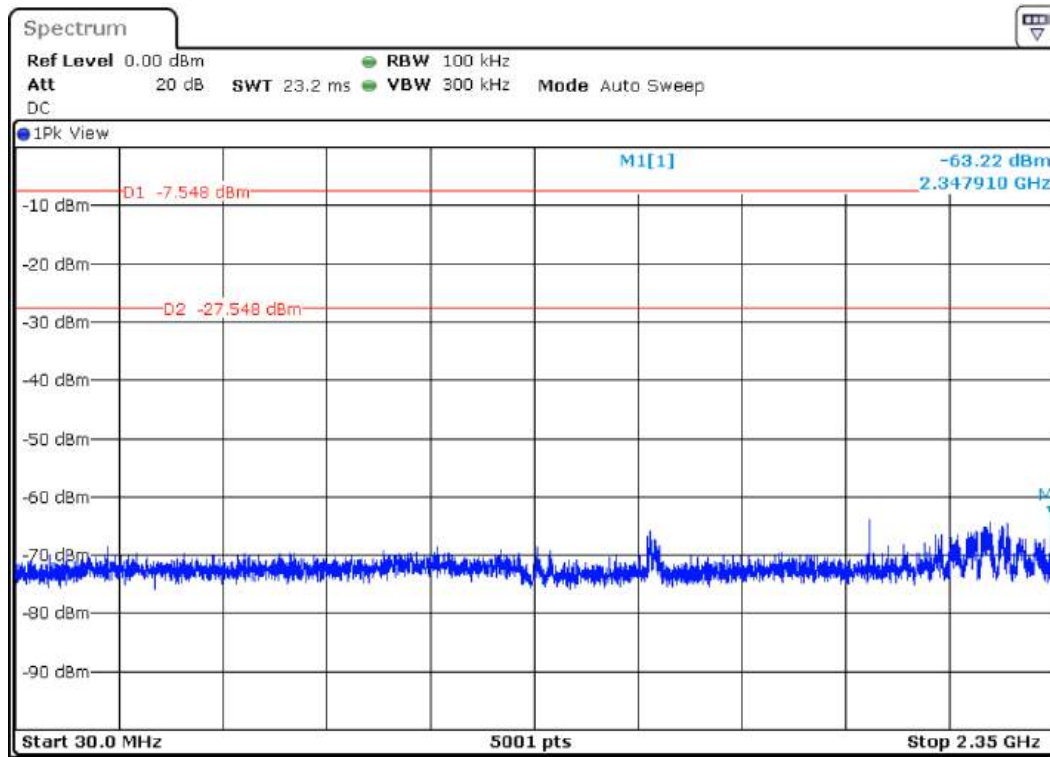
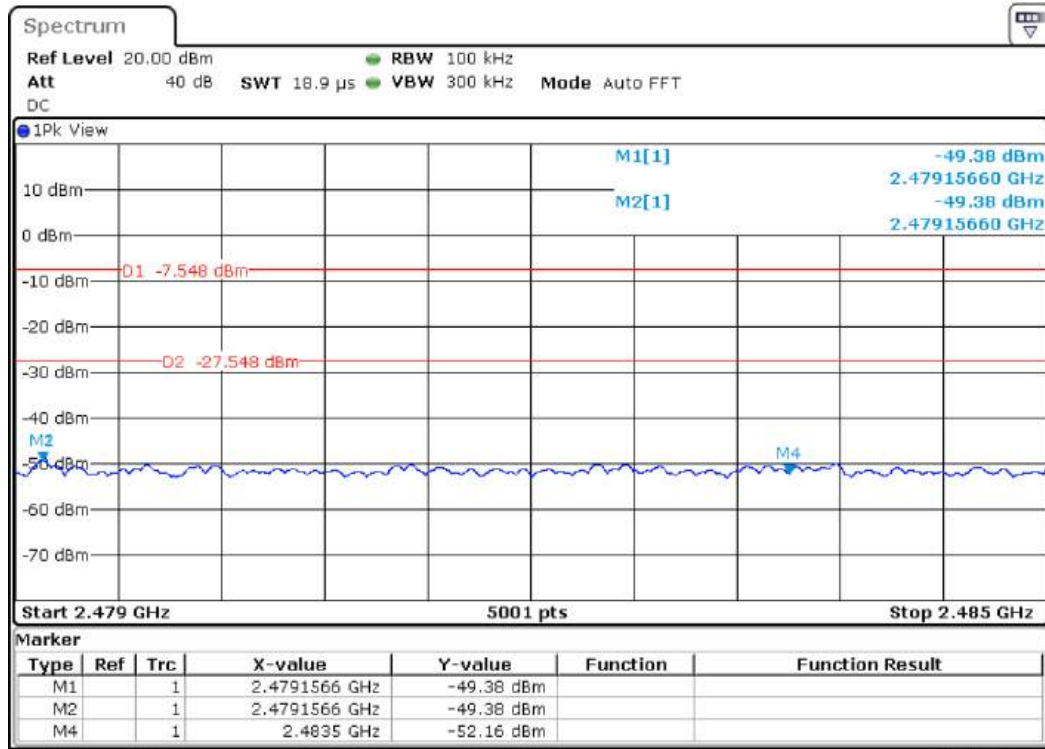


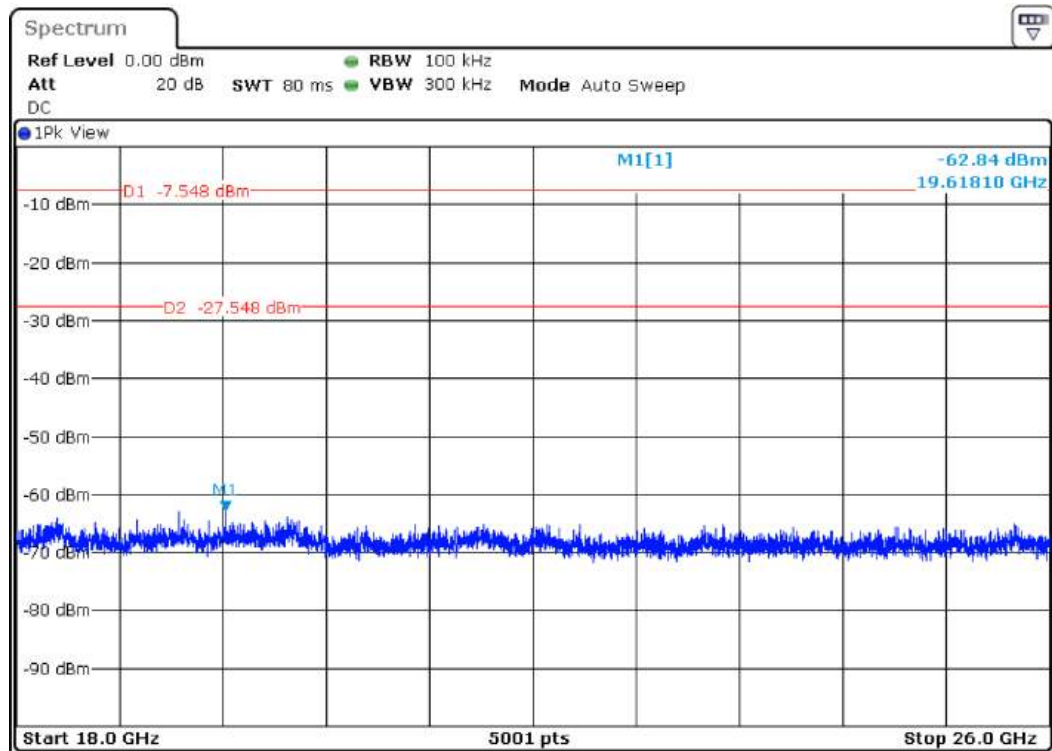
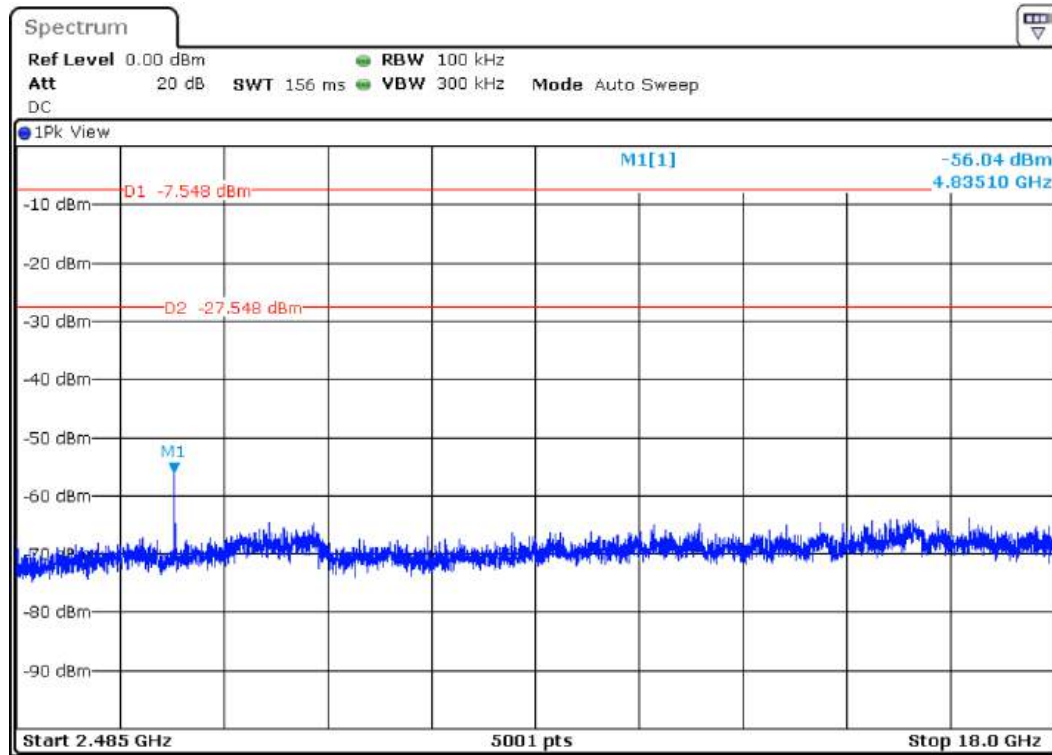


802.11 n40

Low Channel

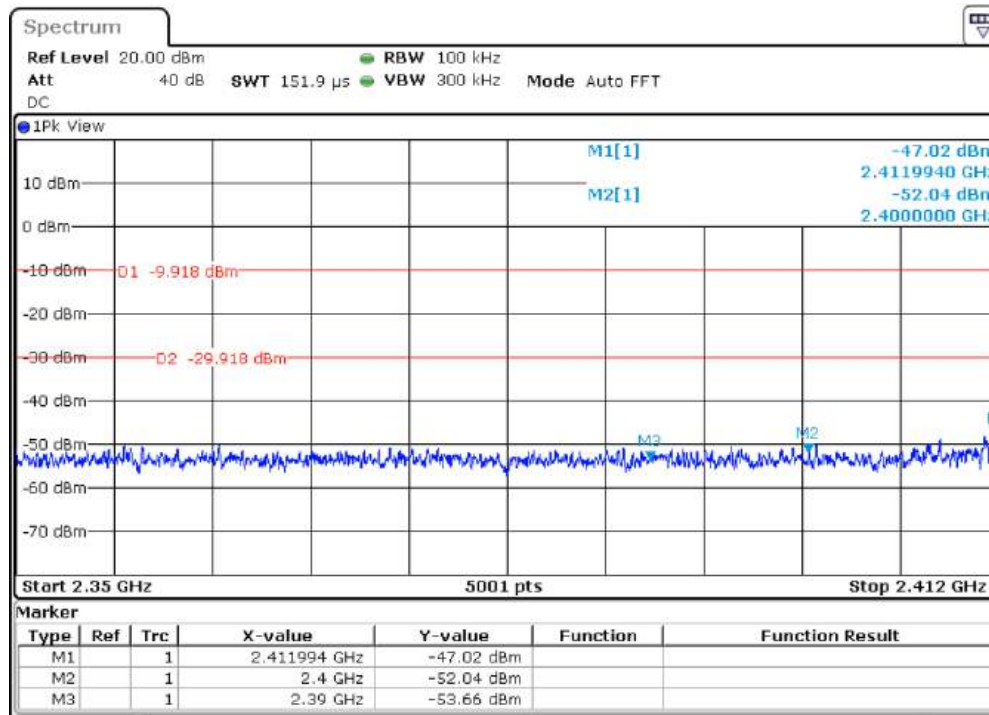
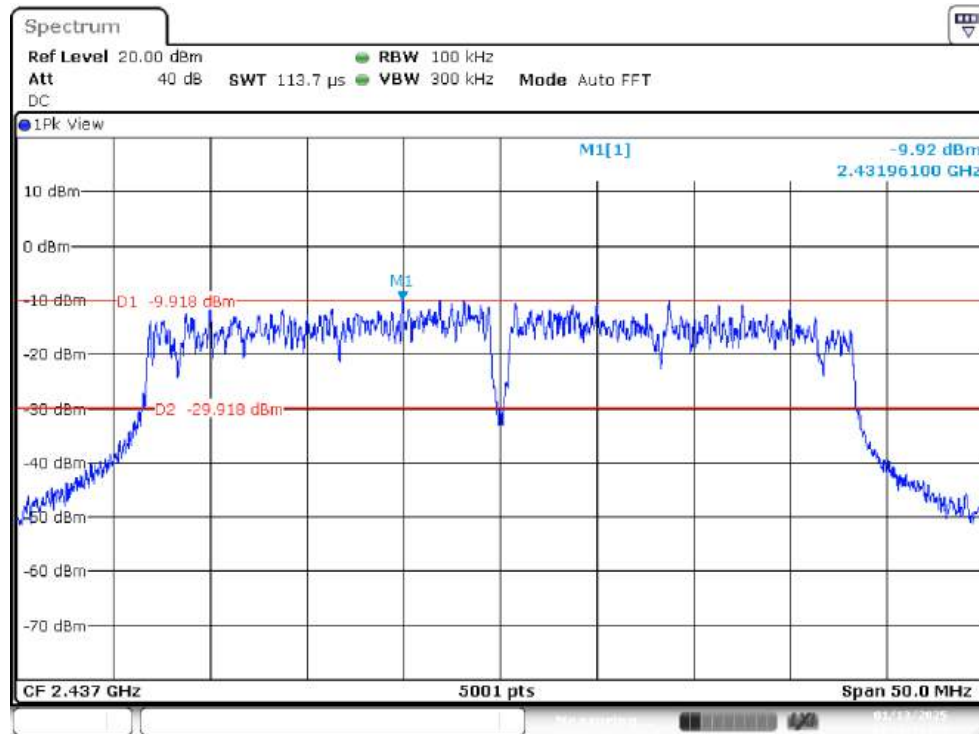


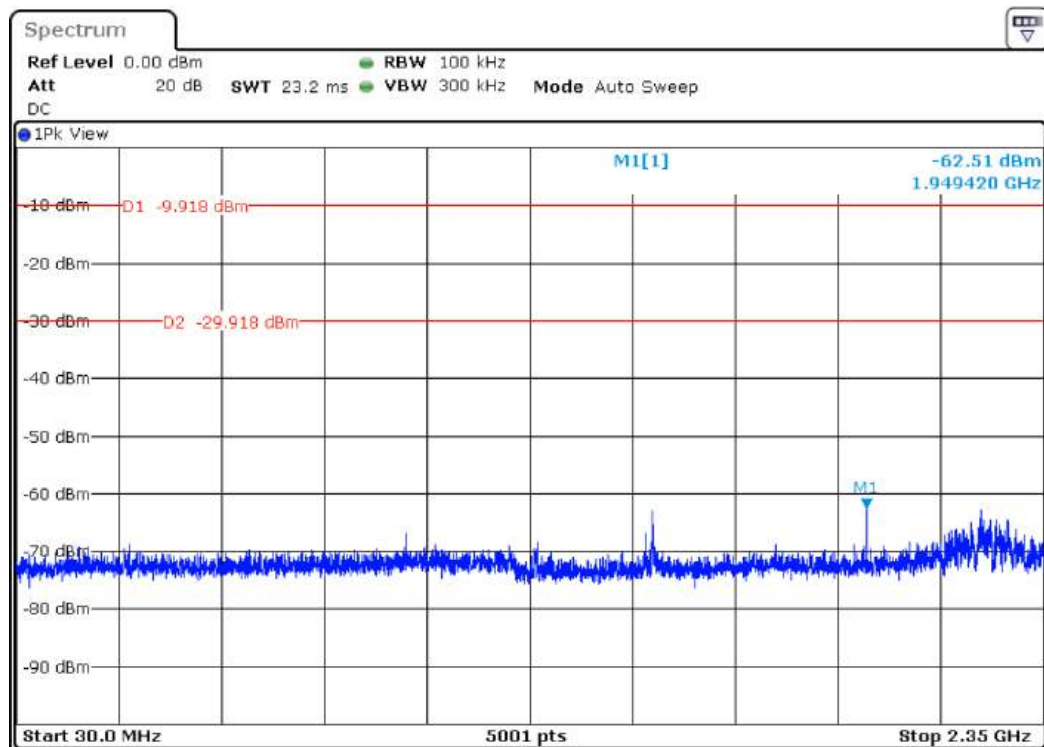
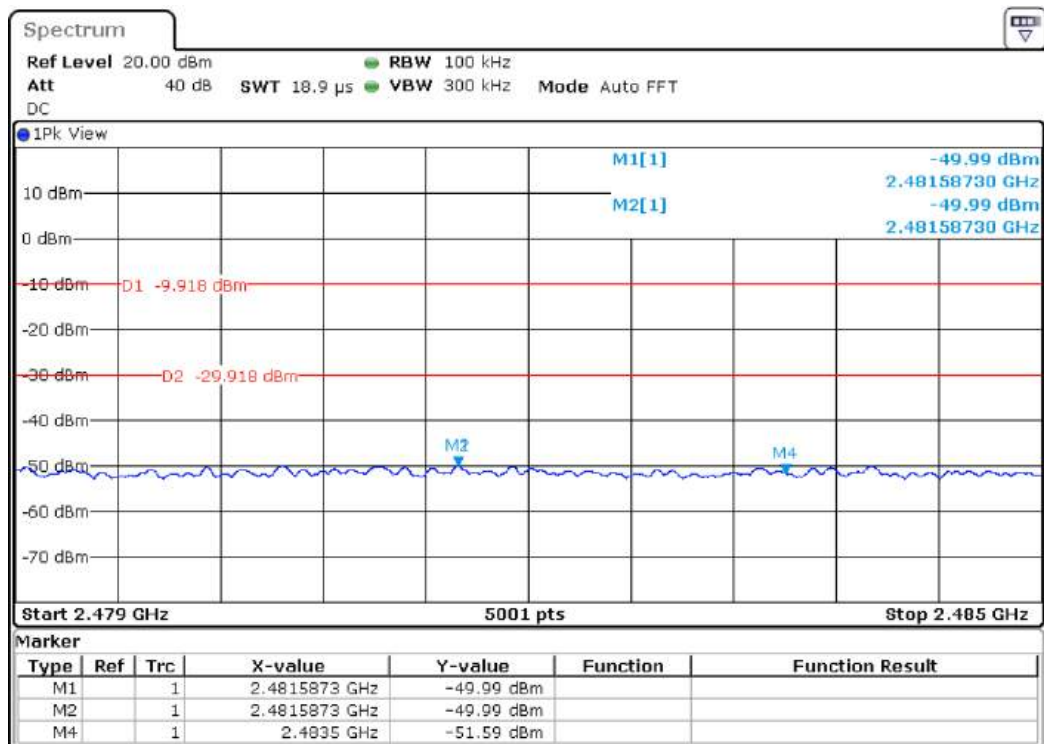


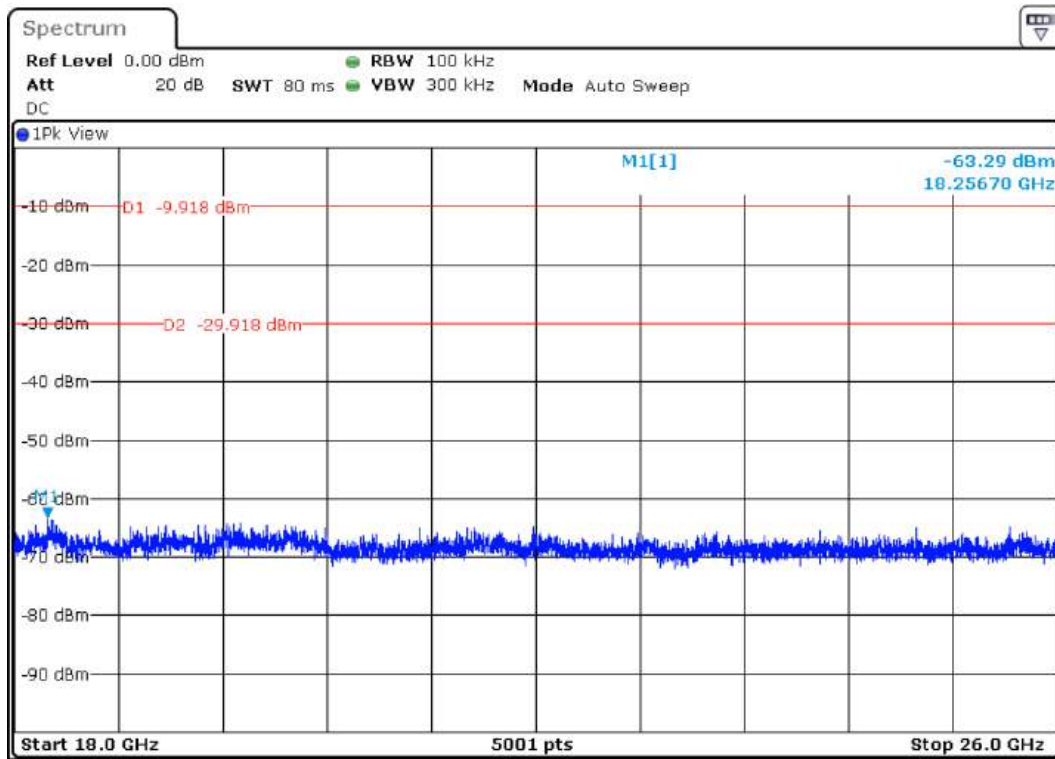
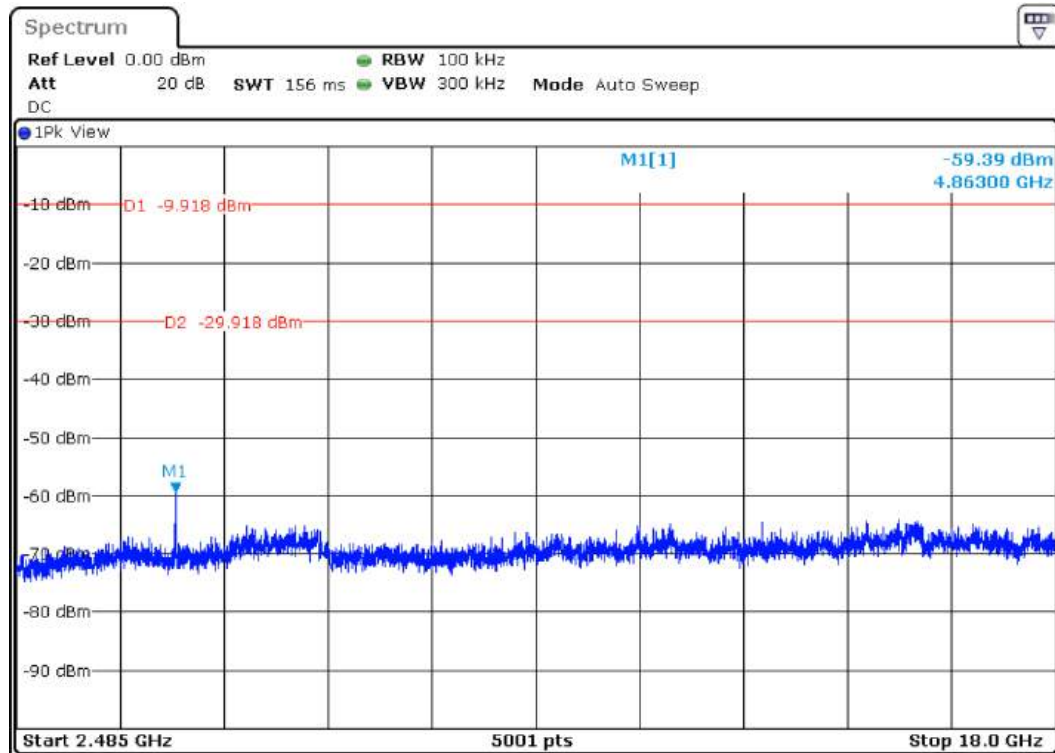




Mid Channel

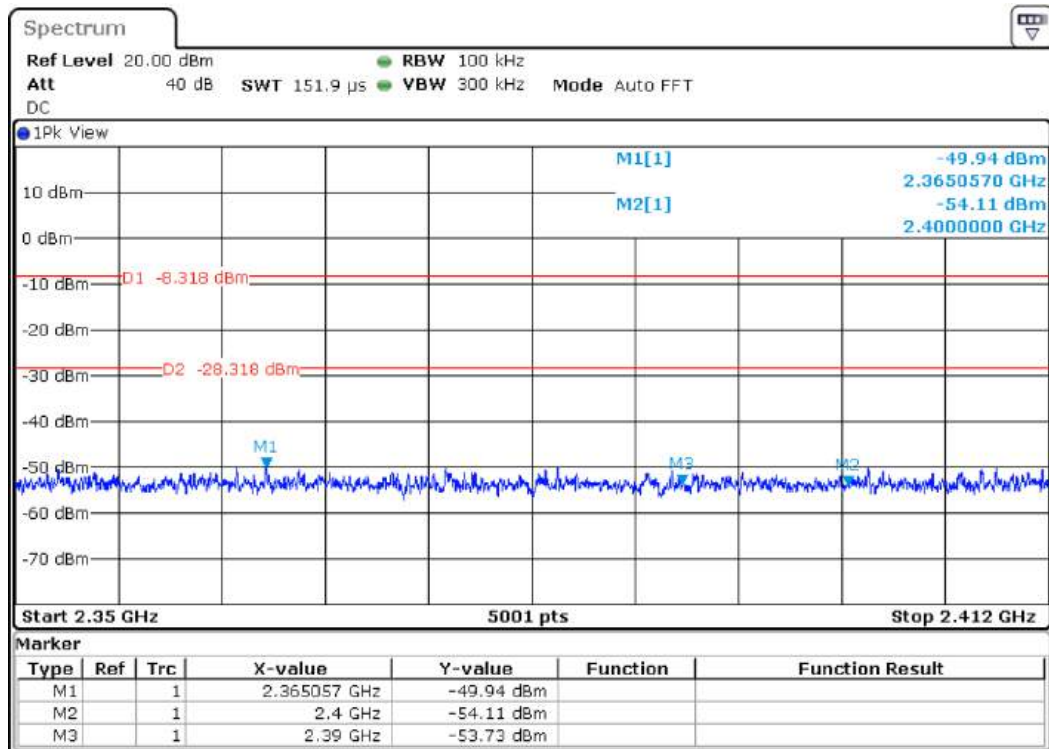
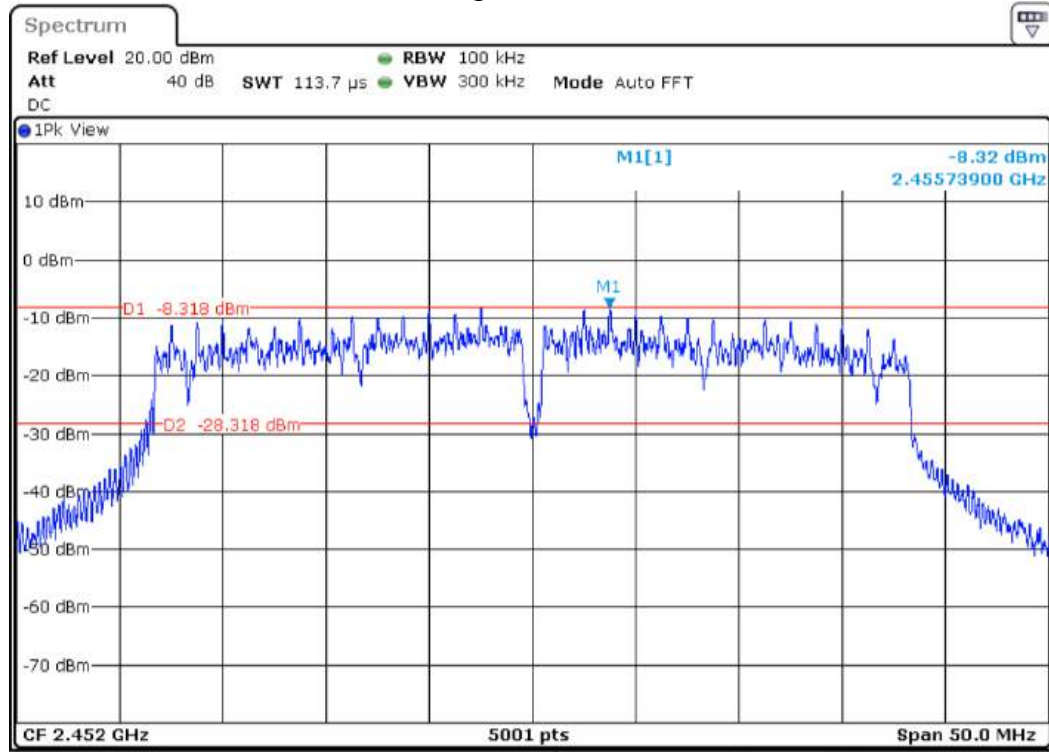


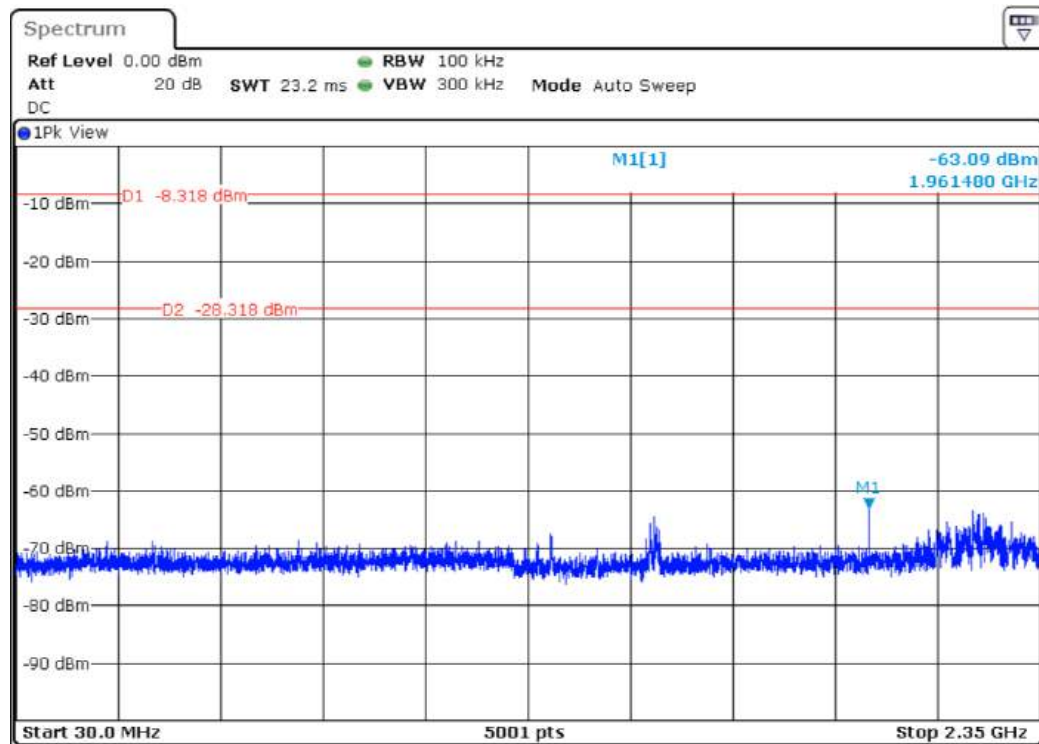
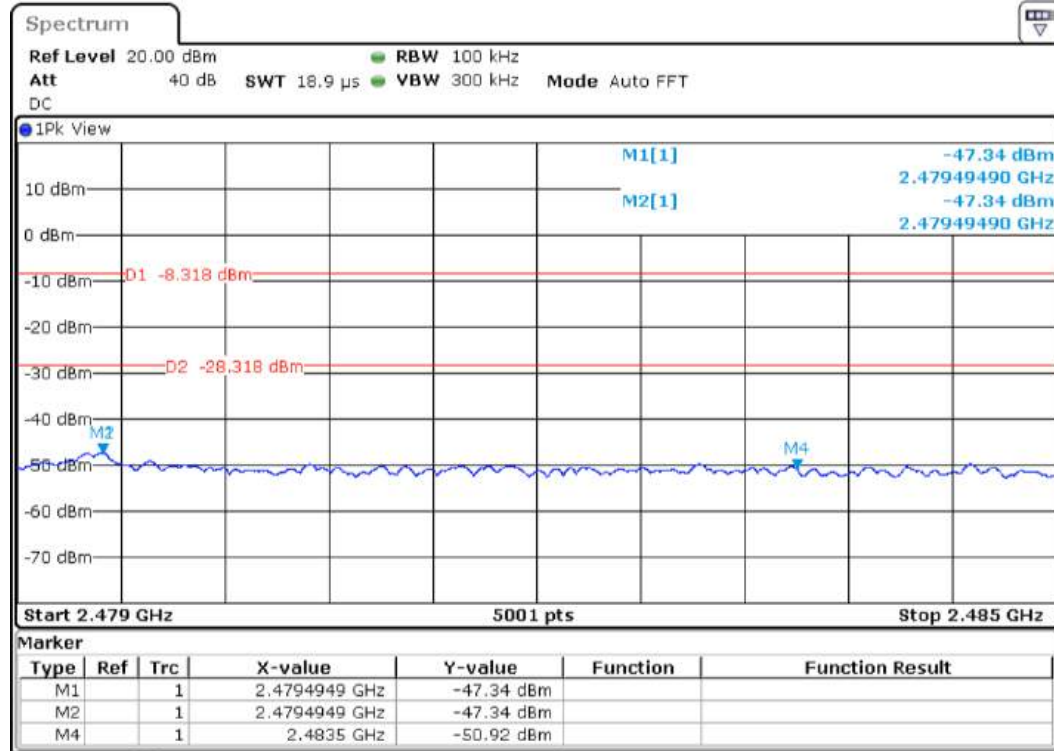


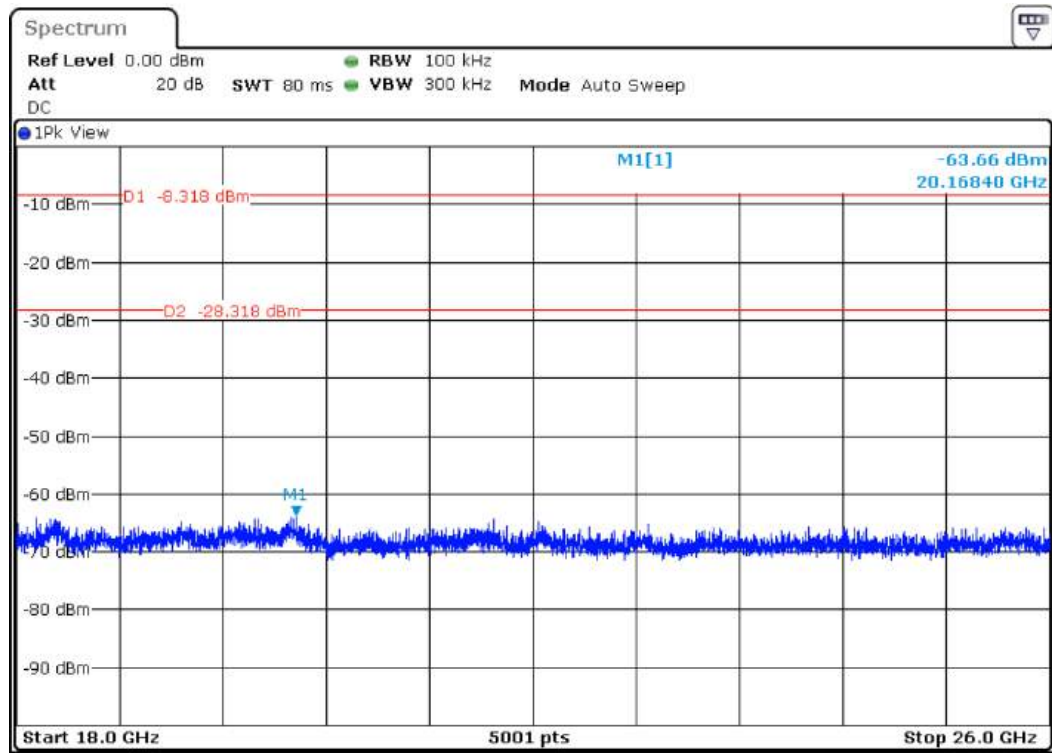
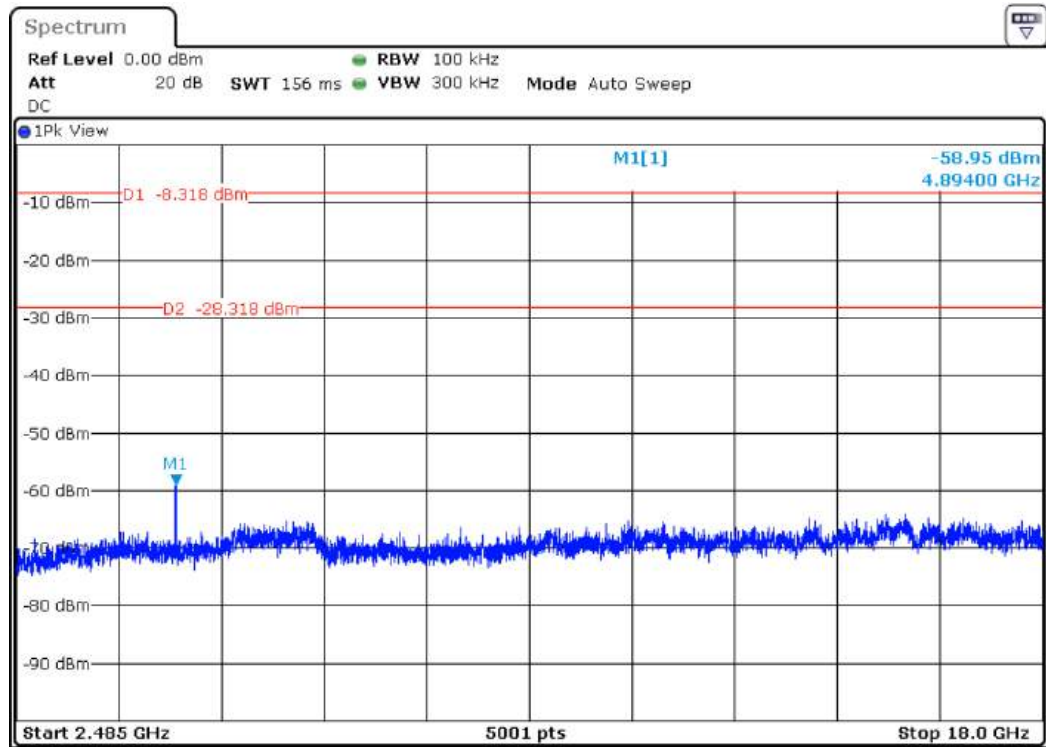




High Channel









11. POWER SPECTRAL DENSITY

11.1 TEST SETUP



11.2 LIMIT

According to § 15.247(e) , For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

11.3 TEST PROCEDURE

The EUT was connected to the spectrum analyzer through an external attenuator (if needed) and a known loss cable. RBW is set to 3 kHz and VBW is set to 10 kHz on spectrum analyzer. Set the span to at least 1.5 times the DTS channel bandwidth. Sweep time = auto couple. Trace mode = max hold. The peak power spectral density is recorded.

11.4 TEST RESULTS

PASS



11.5 TEST DATA:

Wifi Type	Frequency (MHz)	power spectral density	Max Limit
		(dBm)	(dBm)
802.11b	2412 MHz	-16.40	≤ 8
	2437 MHz	-18.46	≤ 8
	2462 MHz	-19.73	≤ 8
802.11b	2412 MHz	-22.83	≤ 8
	2437 MHz	-25.54	≤ 8
	2462 MHz	-27.09	≤ 8
802.11 n20	2412 MHz	-24.88	≤ 8
	2437 MHz	-27.00	≤ 8
	2462 MHz	-27.81	≤ 8
802.11 n40	2422 MHz	-27.11	≤ 8
	2437 MHz	-29.02	≤ 8
	2452 MHz	-29.54	≤ 8