TEST REPORT

Application No.:	SHEM2003001808CR
FCC ID:	2AVYF-M1
IC:	25954-M1
Applicant:	Hangzhou Huacheng Network Technology Co.,Ltd.
Address of Applicant:	No.2930, Nanhuan Road, Binjiang District, Hangzhou, China.
Manufacturer:	Hangzhou Huacheng Network Technology Co.,Ltd.
Address of Manufacturer:	No.2930, Nanhuan Road, Binjiang District, Hangzhou, China.
Equipment Under Test (EUT):	
EUT Name:	Smart Home Center
Model No.:	M1, L1, M1S, L1S ¤
¤	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standard(s) :	47 CFR Part 15, Subpart C 15.247
	RSS-247 Issue 2, February 2017
	RSS-Gen Issue 5, March 2019 Amendment 1
Date of Receipt:	2020-03-19
Date of Test:	2020-03-23 to 2020-04-10
Date of Issue:	2020-05-12
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan
E&E Section Manager

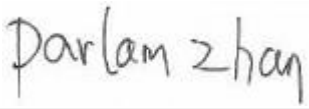
The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

Note：

For FCC Mode No：M1, L1, M1S, L1S

For IC Mode No:M1

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2020-05-12	/

Authorized for issue by:				
				
		Micheal Niu / Project Engineer		
				
		Parlam Zhan / Reviewer		

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**FCC Requirement**	**IC Requirement**	**Method**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	RSS-Gen Clause 6.8	N/A	Customer Declaration
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence	47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)	RSS-247 Section 5.1(a)	N/A	Pass

N/A: Not applicable

Radio Spectrum Matter Part				
Item	**FCC Requirement**	**IC Requirement**	**Method**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.207	RSS-Gen Section 8.8	ANSI C63.10 (2013) Section 6.2	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247(b)(1)	RSS-247 Section 5.4(b)	ANSI C63.10 (2013) Section 7.8.5	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247(a)(1)	RSS-247 Section 5.1(a)	ANSI C63.10 (2013) Section 7.8.7	Pass
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247a(1)	RSS-247 Section 5.1(b)	ANSI C63.10 (2013) Section 7.8.2	Pass
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247a(1)(iii)	RSS-247 Section 5.1(d)	ANSI C63.10 (2013) Section 7.8.3	Pass
Dwell Time	47 CFR Part 15, Subpart C 15.247a(1)(iii)	RSS-247 Section 5.1(d)	ANSI C63.10 (2013) Section 7.8.4	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Section 5.5	ANSI C63.10 (2013) Section 7.8.6	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Section 5.5	ANSI C63.10 (2013) Section 7.8.8	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.205 & 15.209	Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.10.5	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.205 & 15.209	Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.4,6.5,6.6	Pass
99% Bandwidth	-	RSS-Gen Section 6.6	ANSI C63.10 Section 6.9.3	Pass
Frequency Stability	-	RSS-Gen Section 8.11	RSS-Gen Section 6.11	Note1

Note1: Frequency stability requested in RSS GEN S8.11 has been complied since the result of band edge can demonstrate.

Declaration of EUT Family Grouping:

Note2: There are series models mentioned in this report, and they are the identical in electrical and electronic characters. Only the model M1 was tested since their differences were the model number, trade name and appearance.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	DC12V by Adapter Adapter1: Model: ADS-26FSG-12 12024EPCU INPUT: 100~240V 50/60Hz OUTPUT: DC 12V/2.0A Adapter2: Model: ESUA+24120-2000 INPUT: 100~240V 50/60Hz OUTPUT: DC 12V/2.0A
Test voltage:	AC 120V/60Hz
Serial Number:	6D01EC0PAG00001
Firmware Version:	1.000.0000002.5
Antenna Gain:	Antenna 1: 2.68dBi
Antenna Type:	Antenna 1: Dipole Antenna
Bluetooth Version:	V5.0 Dual mode
Channel Spacing:	1MHz
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channels:	79
Operation Frequency:	2402MHz to 2480MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	ThinkPad X100e	/

4.3 Power level setting using in test:

Channel	DH5	2DH5	3DH5
0	2	2	2
39	2	2	2
78	2	2	2

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	±8.4 x 10^{-8}
2	Timeout	±2s
3	Duty cycle	±0.37%
4	Occupied Bandwidth	±3%
5	RF conducted power	±0.6dB
6	RF power density	±2.84dB
7	Conducted Spurious emissions	±0.75dB
8	RF Radiated power	±4.6dB (Below 1GHz)
		±4.1dB (Above 1GHz)
9	Radiated Spurious emission test	±4.2dB (Below 30MHz)
		±4.4dB (30MHz-1GHz)
		±4.8dB (1GHz-18GHz)
		±5.2dB (Above 18GHz)
10	Temperature test	±1°C
11	Humidity test	±3%
12	Supply voltages	±1.5%
13	Time	±3%

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

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shanghai Branch

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS (No. CNAS L0599)

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• NVLAP (LAB CODE: 201034-0)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

• FCC (Designation Number: CN5033)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• ISED (CAB Identifier: CN0020)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

• VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Conducted Emission at Mains Terminals (150kHz-30MHz)					
EMI test receiver	R&S	ESR7	SHEM162-1	2019-12-20	2020-12-19
LISN	Schwarzbeck	NSLK8127	SHEM061-1	2019-12-20	2020-12-19
LISN	EMCO	3816/2	SHEM019-1	2019-12-20	2020-12-19
Pulse limiter	R&S	ESH3-Z2	SHEM029-1	2019-12-20	2020-12-19
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2019-12-20	2020-12-19
CE test Cable	/	CE01	/	2019-12-20	2020-12-19
RF Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2019-12-20	2020-12-19
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2019-08-13	2020-08-12
Signal Generator	R&S	SMR20	SHEM006-1	2019-08-13	2020-08-12
Signal Generator	Agilent	N5182A	SHEM182-1	2019-08-13	2020-08-12
Communication Tester	R&S	CMW270	SHEM183-1	2019-08-13	2020-08-12
Switcher	Tonscend	JS0806	SHEM184-1	2019-08-13	2020-08-12
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2019-08-13	2020-08-12
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2017-09-25	2020-09-24
AC Power Stabilizer	APC	KDF-31020T-V0-F0	SHEM216-1	2019-12-20	2020-12-19
DC Power Supply	MCH	MCH-303A	SHEM210-1	2019-12-20	2020-12-19
Conducted test Cable	/	RF01~RF04	/	2019-12-20	2020-12-19
RF Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2019-12-20	2020-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2019-12-20	2020-12-19
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2019-12-20	2020-12-19
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2019-10-14	2021-10-13
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2019-04-30	2021-04-29
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2017-10-24	2020-10-23
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2019-10-14	2021-10-13
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2017-10-31	2020-10-30
Pre-amplifier (9KHz-2GHz)	CLAVIIO	BDLNA-0001	SHEM164-1	2019-08-13	2020-08-12
Pre-amplifier (1-18GHz)	CLAVIIO	BDLNA-0118	SHEM050-2	2019-08-13	2020-08-12
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2018-12-20	2019-12-19
Signal Generator	R&S	SMR40	SHEM058-1	2019-08-13	2020-08-12
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2017-07-22	2020-07-21
RE test Cable	/	RE01, RE02, RE06	/	2019-12-20	2020-12-19

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

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

EUT Antenna:

The antenna is dipole antenna and no consideration of replacement. The best case gain of the antenna 1: 2.68dBi.

Antenna location: Refer to Appendix(External Photos)

6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

6.2.2 Conclusion

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

> Number of shift register stages: 9

> Length of pseudo-random sequence: 29 -1 = 511 bits

> Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:

Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band s

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		

7.1.1 E.U.T. Operation

Operating Environment:

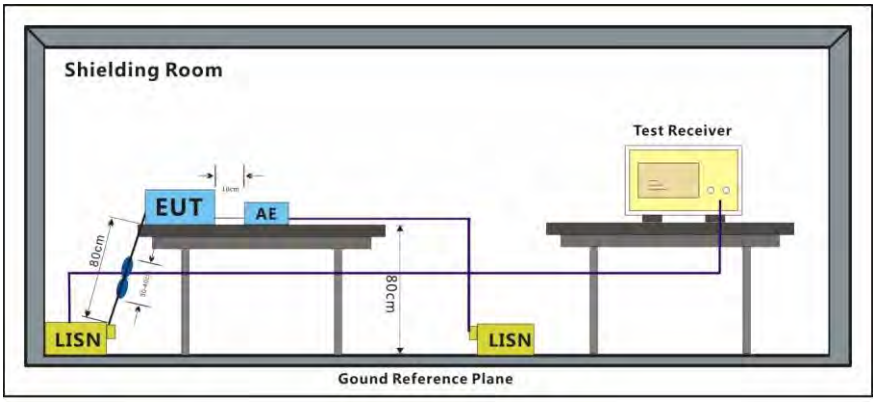
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Pretest these mode to find the worst case: b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.(Adapter 1)

C:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. (Adapter 2)

The worst case for final test: b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. (Adapter 1)

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

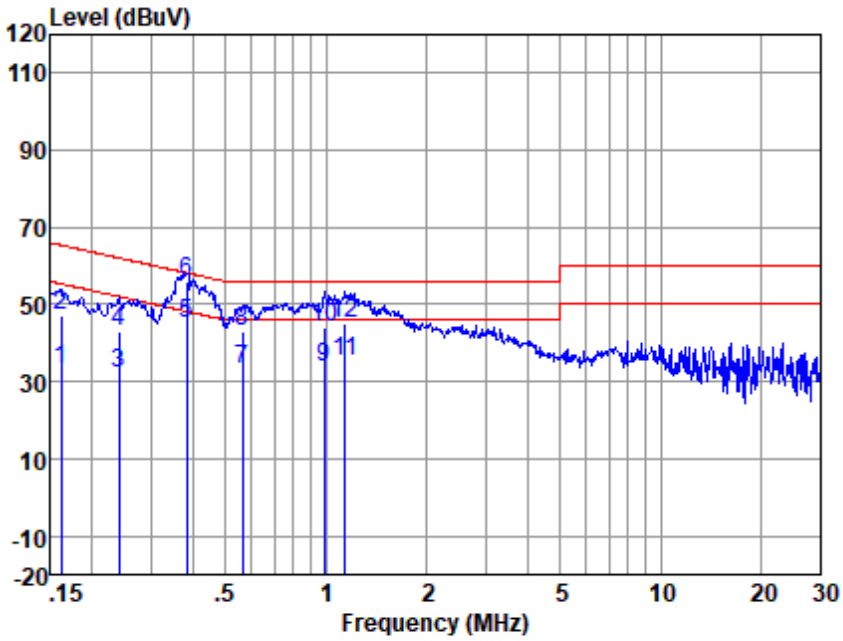
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

Mode:b; Line:Live Line

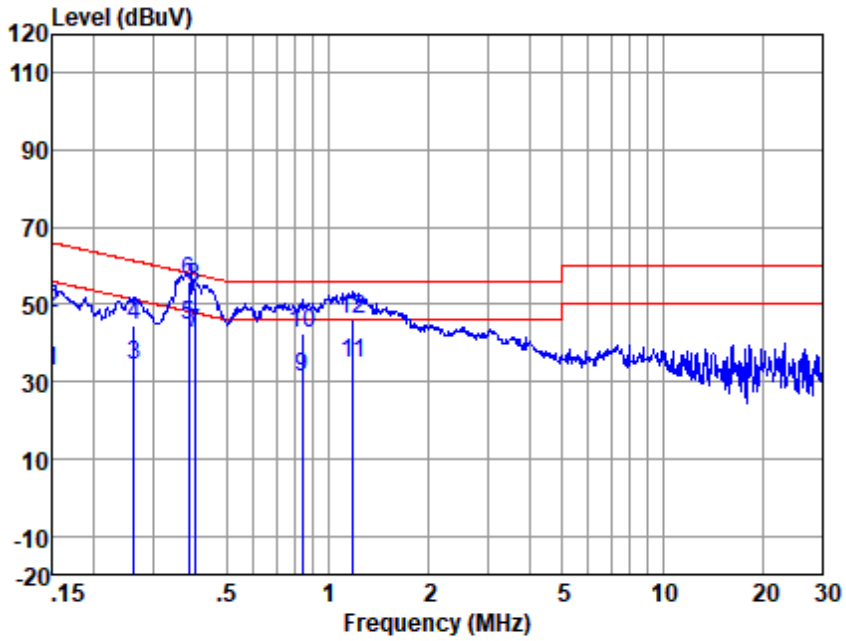


LISN : LINE
EUT/Project No : 01807CR
Test Mode : b

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.16	23.33	0.08	9.97	33.38	55.38	-22.00	Average
2	0.16	36.90	0.08	9.97	46.95	65.38	-18.43	QP
3	0.24	21.97	0.07	10.01	32.05	52.08	-20.03	Average
4	0.24	32.75	0.07	10.01	42.83	62.08	-19.25	QP
5	0.38	34.84	0.08	10.04	44.96	48.21	-3.25	Average
6	0.38	45.60	0.08	10.04	55.72	58.21	-2.49	QP
7	0.56	23.00	0.08	10.06	33.14	46.00	-12.86	Average
8	0.56	33.06	0.08	10.06	43.20	56.00	-12.80	QP
9	0.99	23.54	0.09	10.10	33.73	46.00	-12.27	Average
10	0.99	34.08	0.09	10.10	44.27	56.00	-11.73	QP
11	1.14	25.16	0.10	10.11	35.37	46.00	-10.63	Average
12	1.14	35.11	0.10	10.11	45.32	56.00	-10.68	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

Mode:b; Line:Neutral Line



LISN : NEUTRAL
EUT/Project No : 01807CR
Test Mode : b

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.15	22.65	0.07	9.97	32.69	56.00	-23.31	Average
2	0.15	37.77	0.07	9.97	47.81	66.00	-18.19	QP
3	0.26	24.13	0.06	10.01	34.20	51.34	-17.14	Average
4	0.26	34.41	0.06	10.01	44.48	61.34	-16.86	QP
5	0.38	34.58	0.06	10.04	44.68	48.21	-3.53	Average
6	0.38	45.82	0.06	10.04	55.92	58.21	-2.29	QP
7	0.40	32.34	0.06	10.04	42.44	47.86	-5.42	Average
8	0.40	44.07	0.06	10.04	54.17	57.86	-3.69	QP
9	0.83	21.07	0.07	10.09	31.23	46.00	-14.77	Average
10	0.83	32.23	0.07	10.09	42.39	56.00	-13.61	QP
11	1.19	24.79	0.08	10.11	34.98	46.00	-11.02	Average
12	1.19	36.02	0.08	10.11	46.21	56.00	-9.79	QP

Notes: Emission Level = Read Level +LISN Factor + Cable loss

7.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)

Test Method: ANSI C63.10 (2013) Section 7.8.5

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

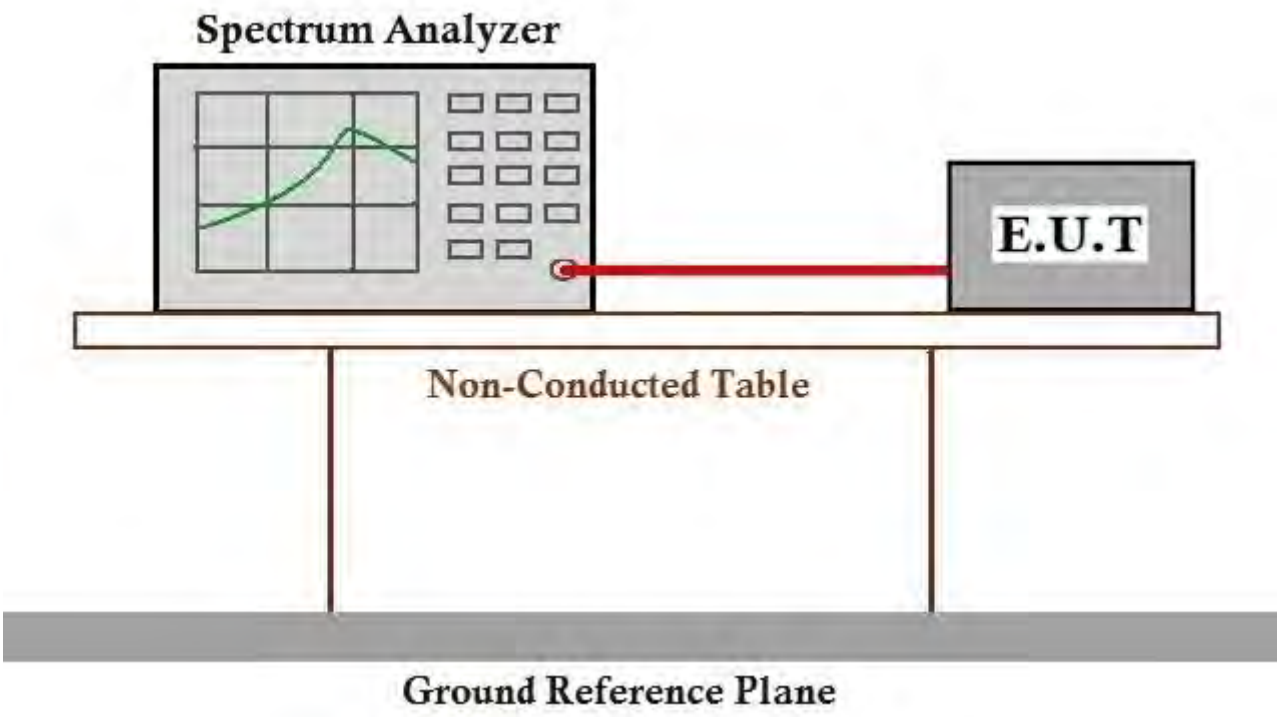
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHEM200300180801

7.3 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247(a)(1)

Test Method: ANSI C63.10 (2013) Section 7.8.7

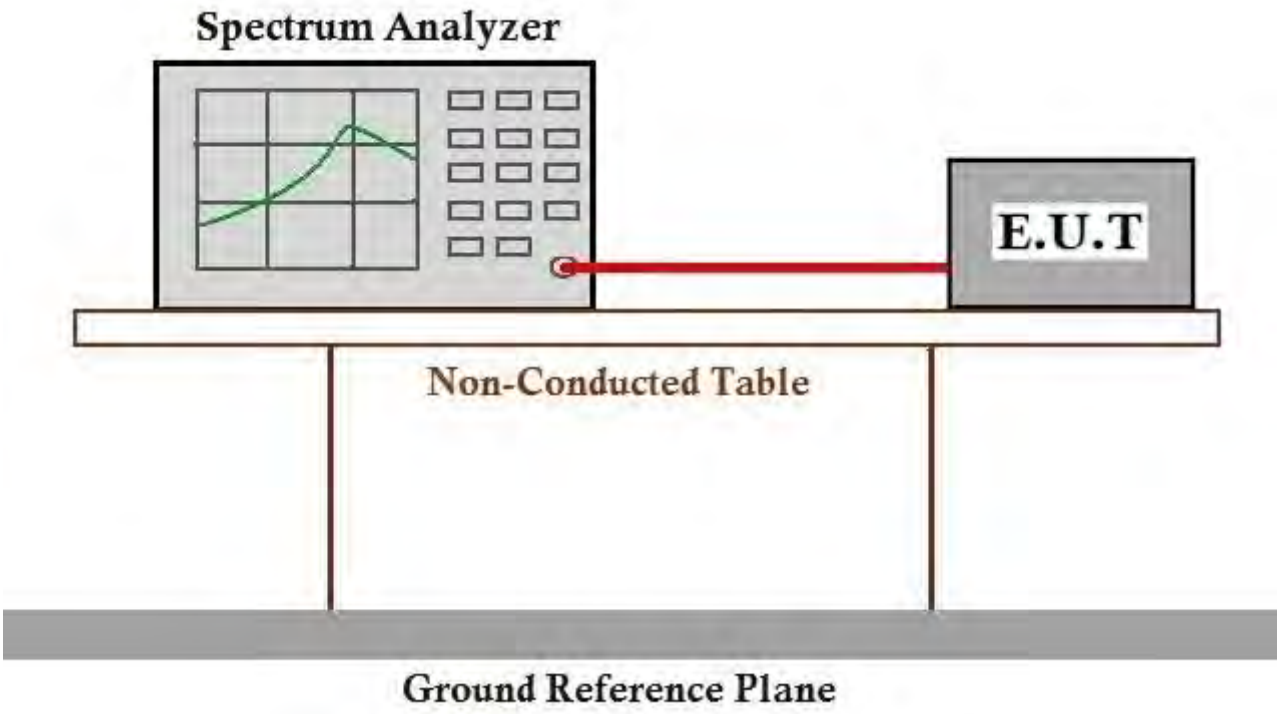
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHEM200300180801

7.4 Carrier Frequencies Separation

Test Requirement	47 CFR Part 15, Subpart C 15.247a(1)
Test Method:	ANSI C63.10 (2013) Section 7.8.2
Limit:	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W

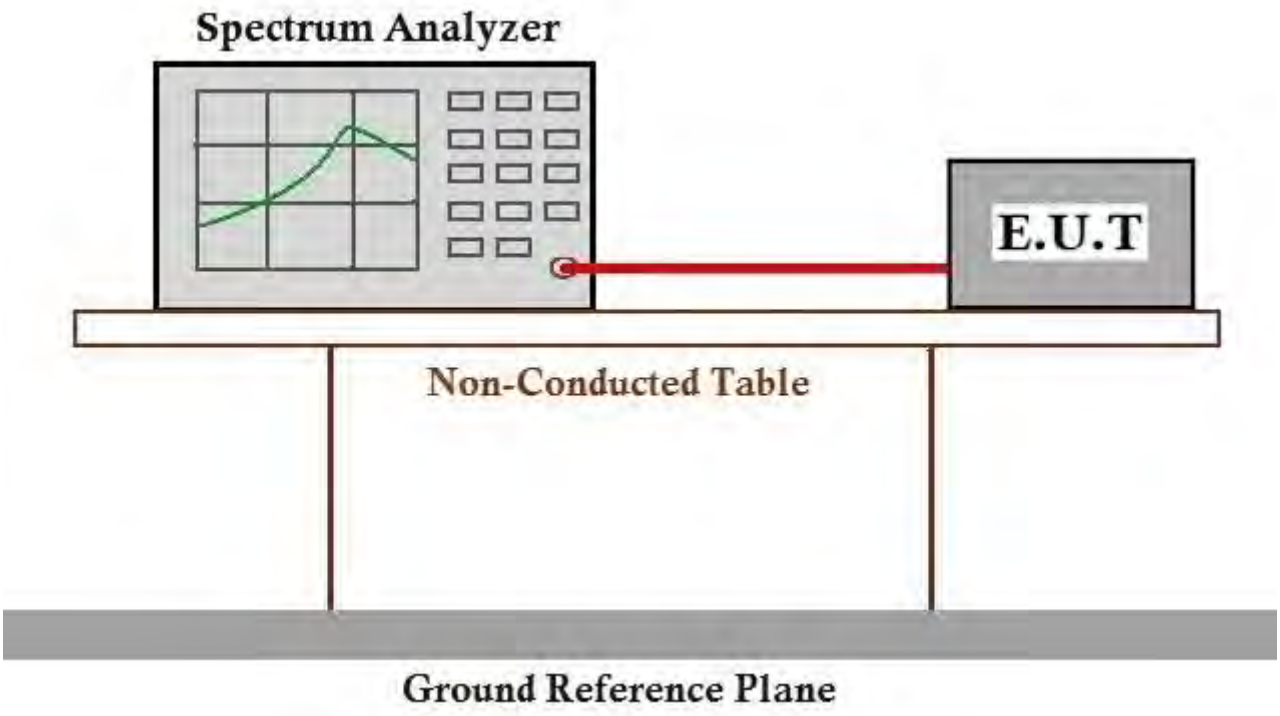
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode a:TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHEM200300180801

7.5 Hopping Channel Number

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)

Test Method: ANSI C63.10 (2013) Section 7.8.3

Limit:

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

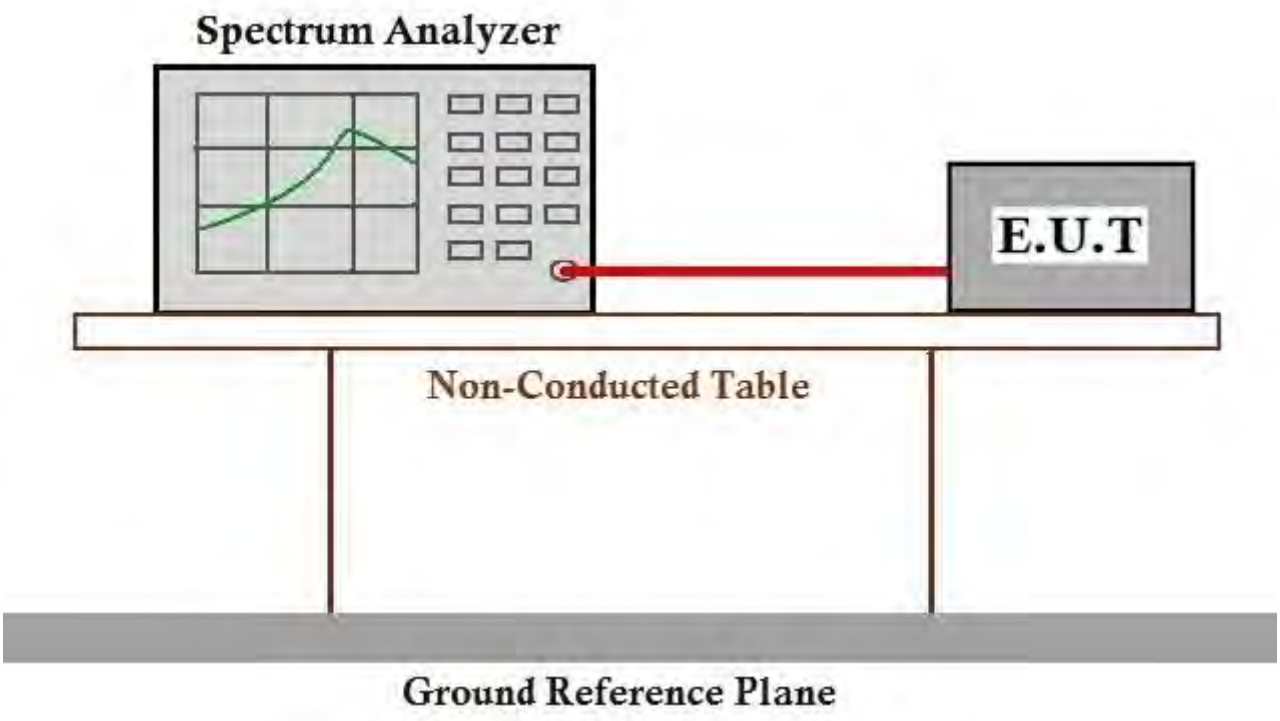
7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode a:TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHEM200300180801

7.6 Dwell Time

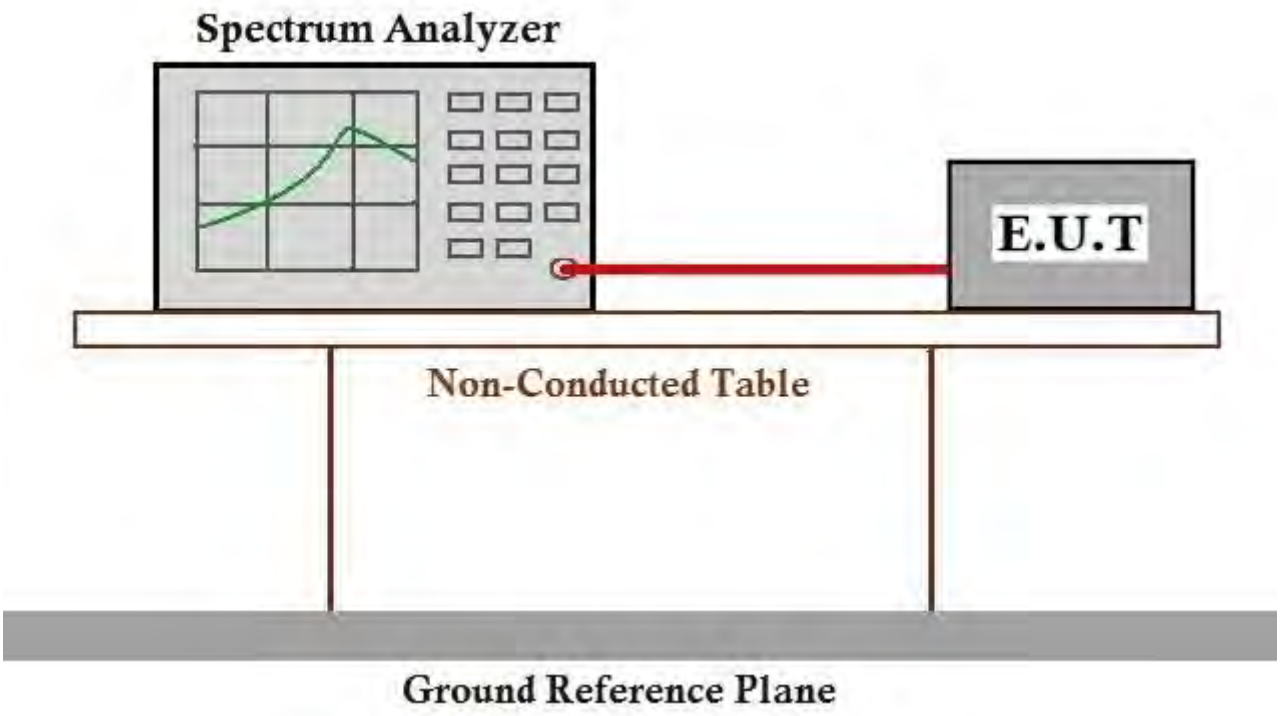
Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10 (2013) Section 7.8.4
Limit:

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4S multiplied by the number of hopping channels
5725-5850	0.4S within a 30S period

7.6.1 E.U.T. Operation

Operating Environment:
Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar
Test mode a:TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.6.2 Test Setup Diagram



7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHEM200300180801

7.7 Conducted Band Edges Measurement

Test Requirement: 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 7.8.6

Limit: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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 §15.205(c)

7.7.1 E.U.T. Operation

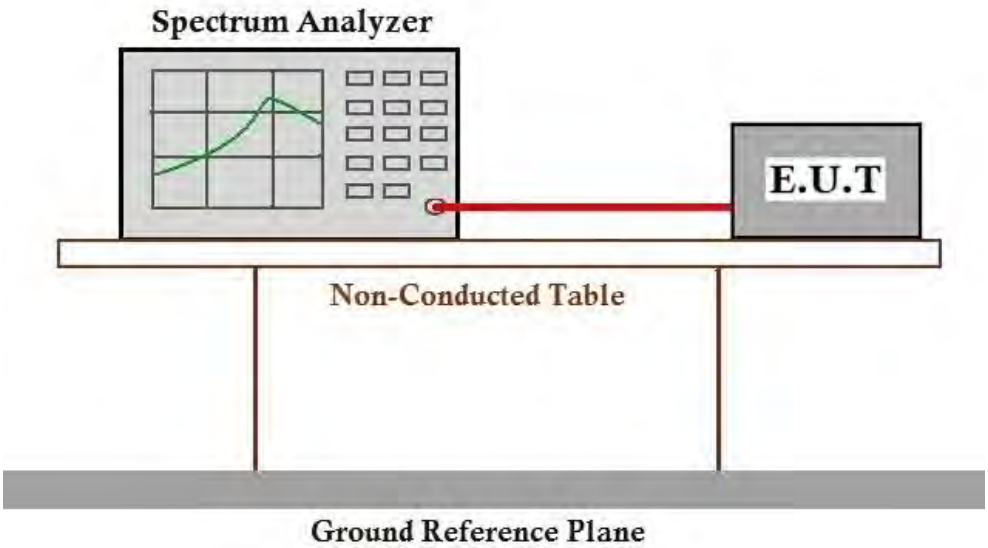
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode: a:TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.7.2 Test Setup Diagram



7.7.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHEM200300180801

7.8 Conducted Spurious Emissions

Test Requirement: 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 7.8.8

Limit: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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 §15.205(c)

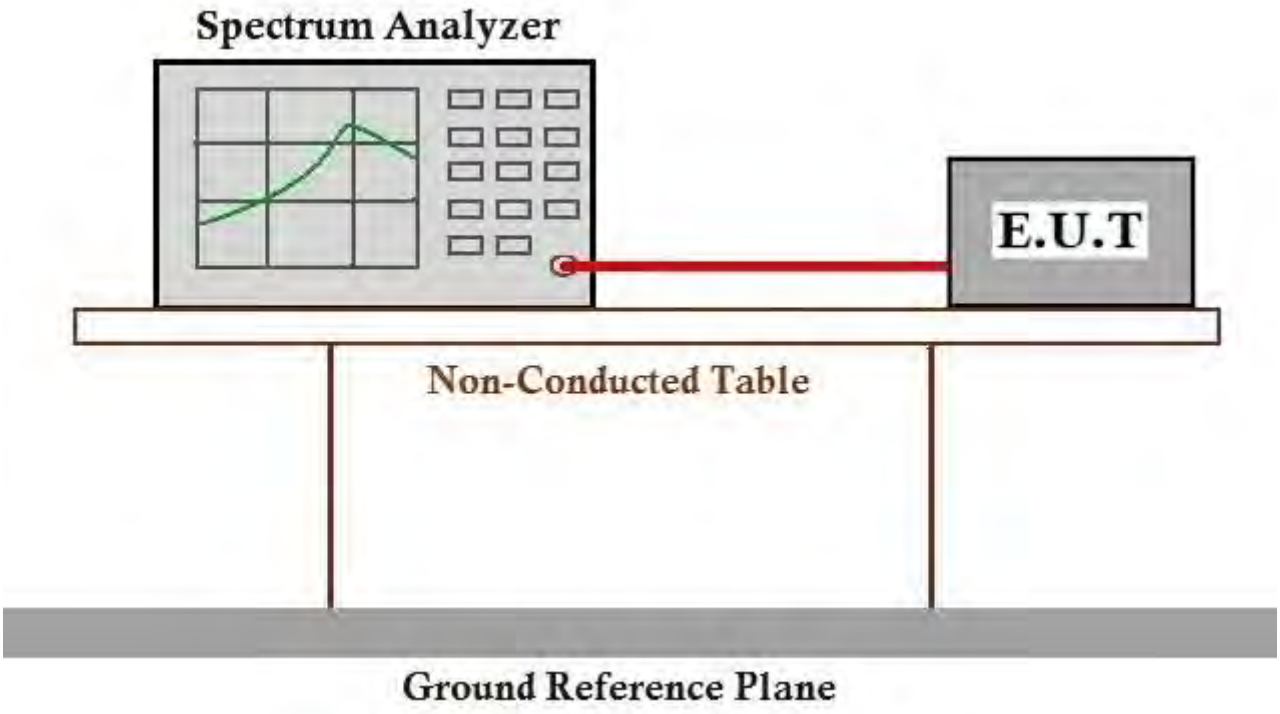
7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode: b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.8.2 Test Setup Diagram



7.8.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHEM200300180801

7.9 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

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
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.9.1 E.U.T. Operation

Operating Environment:

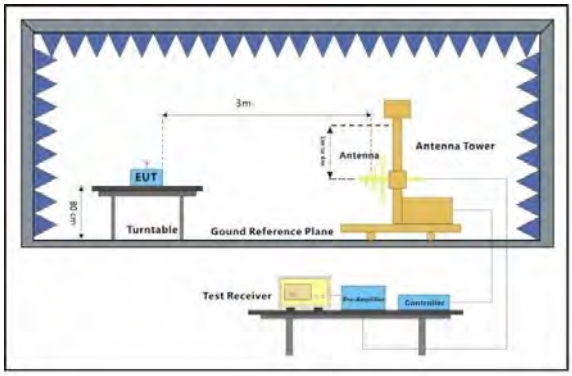
Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

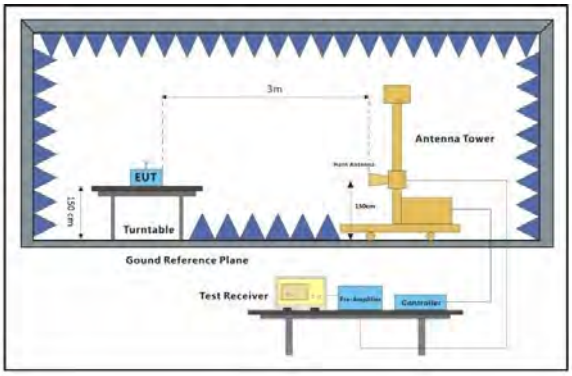
Test mode

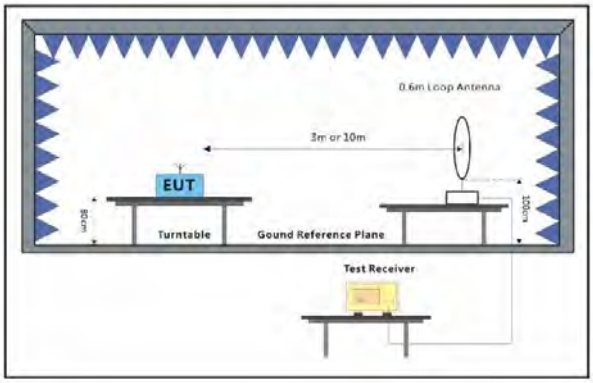
b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.(Adapter 1)

C:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. (Adapter 2)

7.9.2 Test Setup Diagram







7.9.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna 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.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

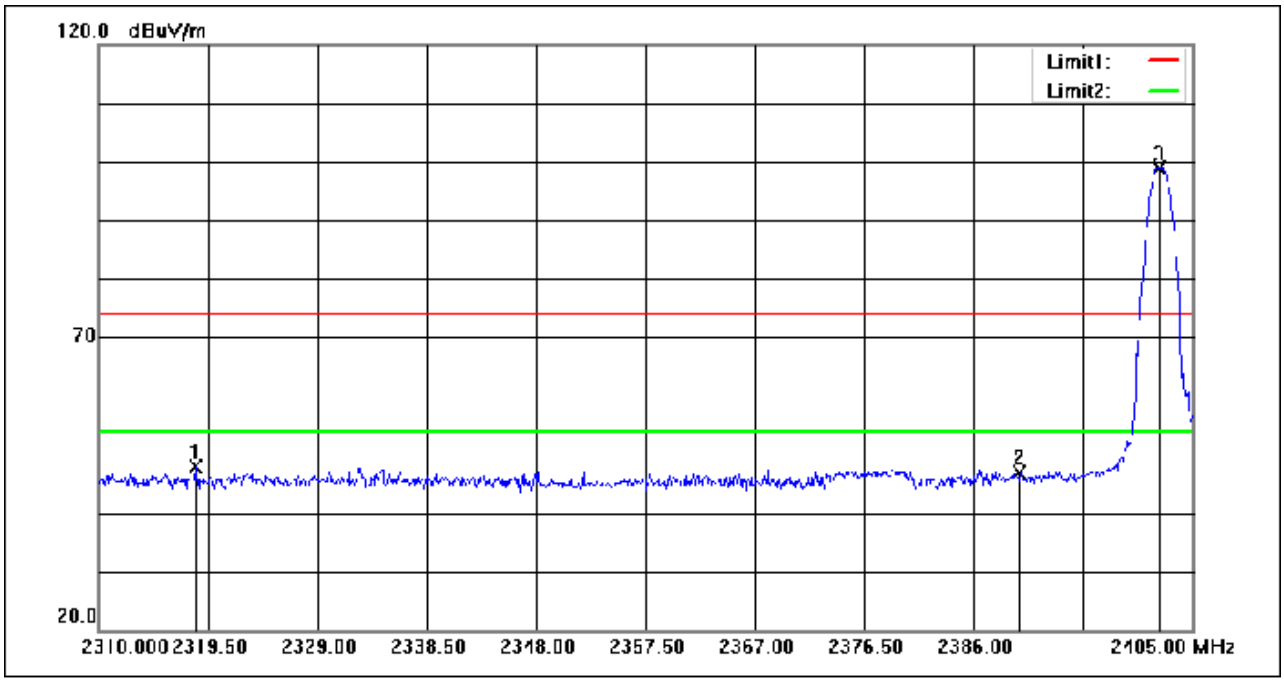
j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

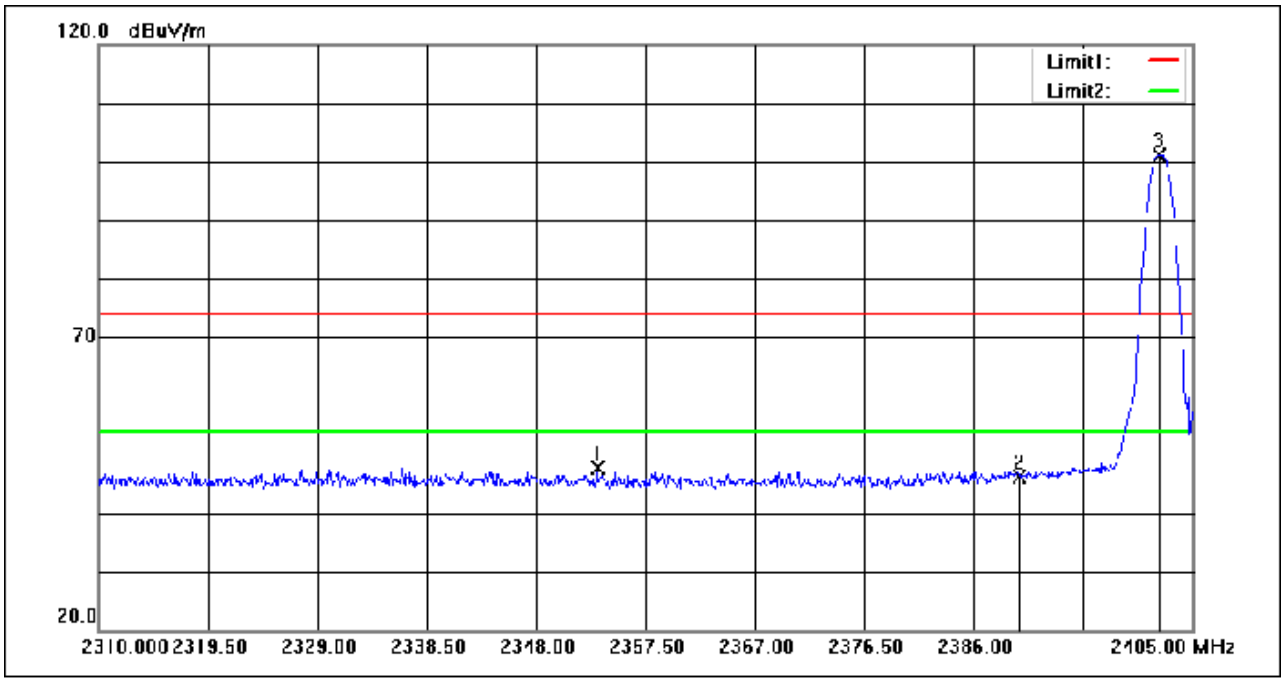
Adapter1

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



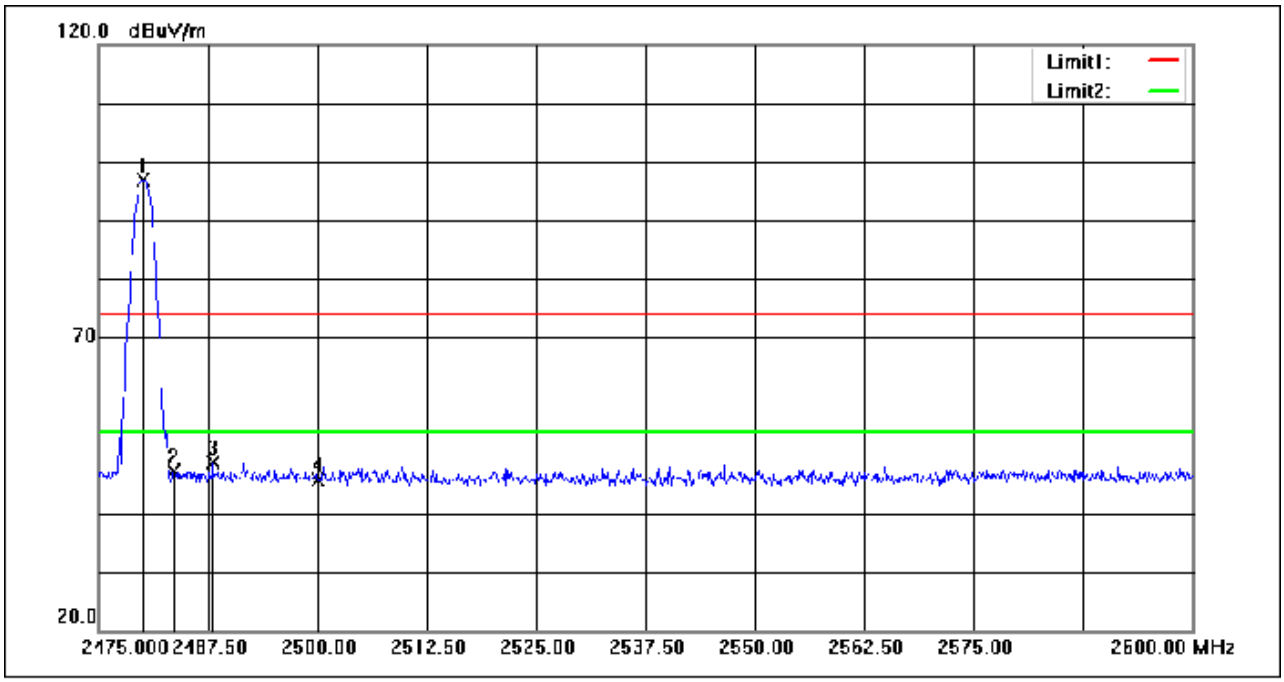
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2318.360	52.30	-4.43	47.87	74.00	-26.13	peak
2	2390.000	51.08	-4.24	46.84	74.00	-27.16	peak
3	2402.150	103.20	-4.21	98.99	74.00	24.99	peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



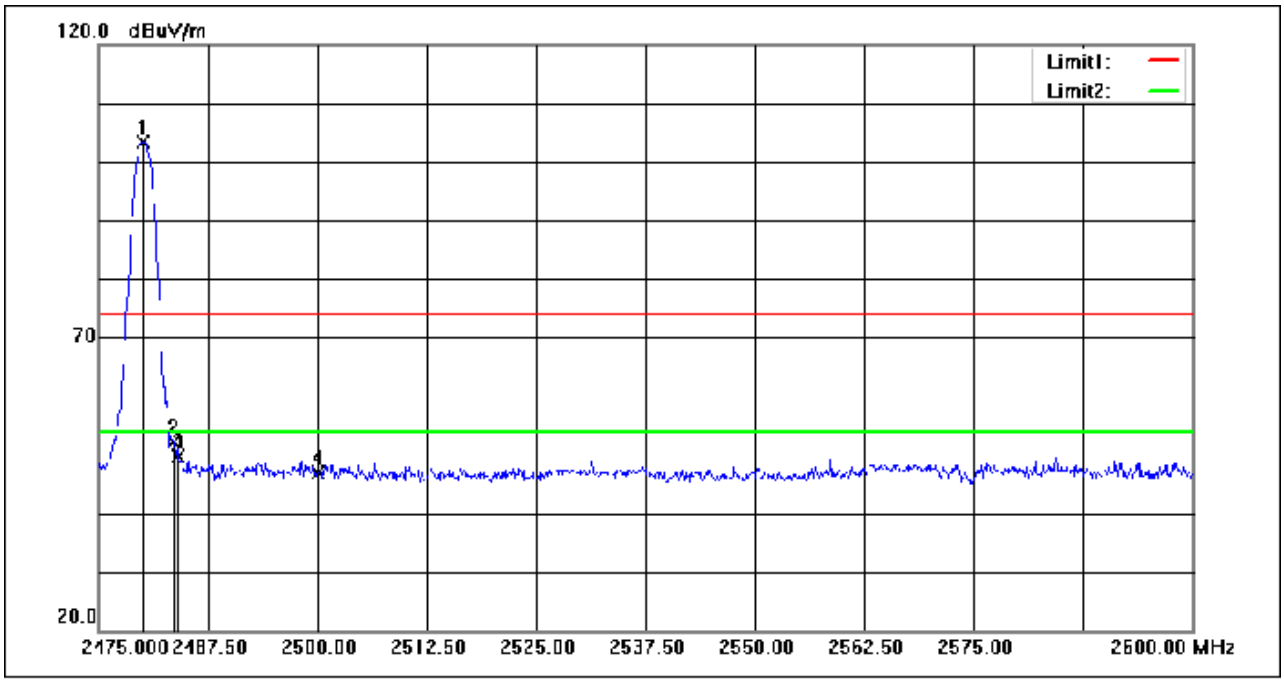
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2353.320	52.09	-4.34	47.75	74.00	-26.25	peak
2	2390.000	50.30	-4.24	46.06	74.00	-27.94	peak
3	2402.150	105.44	-4.21	101.23	74.00	27.23	peak

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



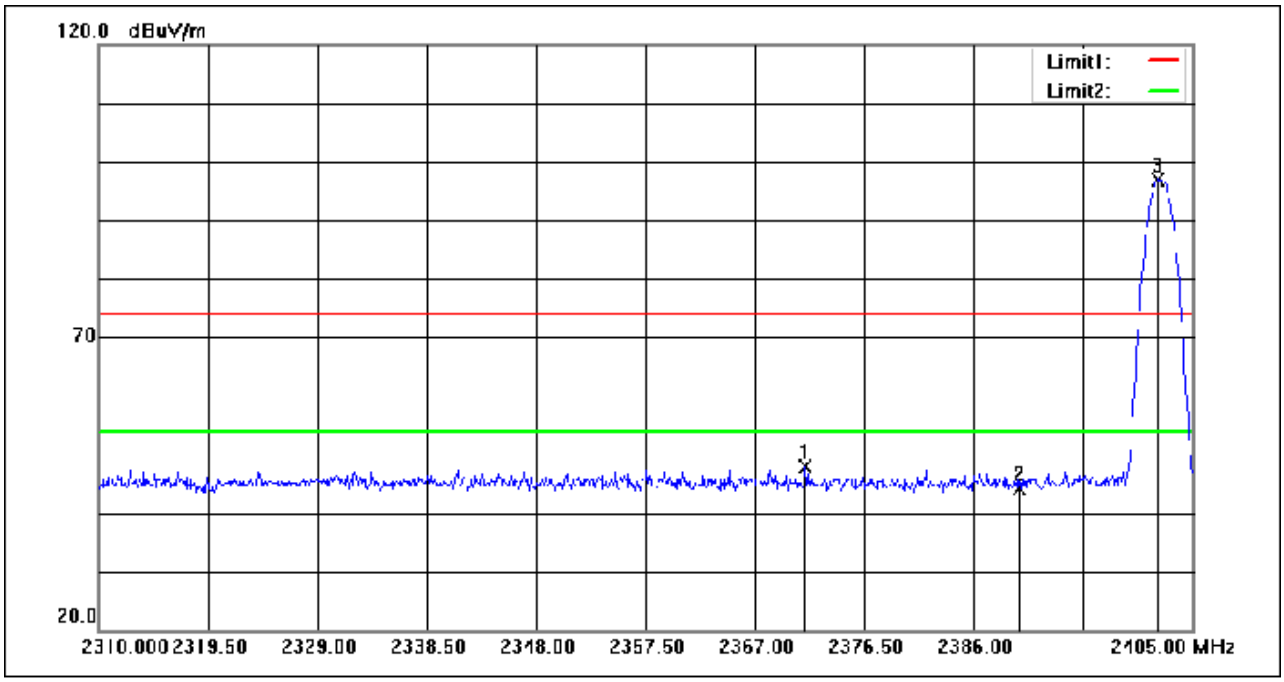
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	100.88	-4.01	96.87	74.00	22.87	peak
2	2483.500	51.02	-4.00	47.02	74.00	-26.98	peak
3	2488.000	52.60	-3.99	48.61	74.00	-25.39	peak
4	2500.000	49.59	-3.96	45.63	74.00	-28.37	peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High



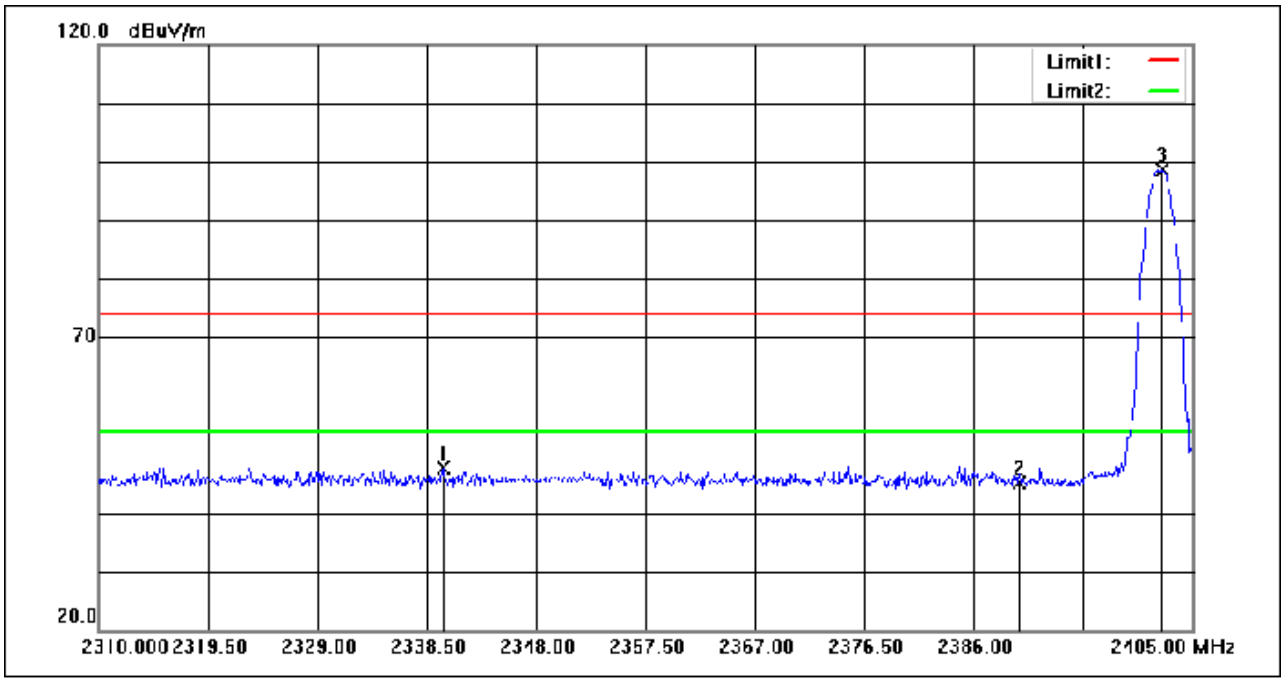
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	107.43	-4.01	103.42	74.00	29.42	peak
2	2483.500	56.25	-4.00	52.25	74.00	-21.75	peak
3	2484.125	53.53	-4.00	49.53	74.00	-24.47	peak
4	2500.000	50.82	-3.96	46.86	74.00	-27.14	peak

Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:Low



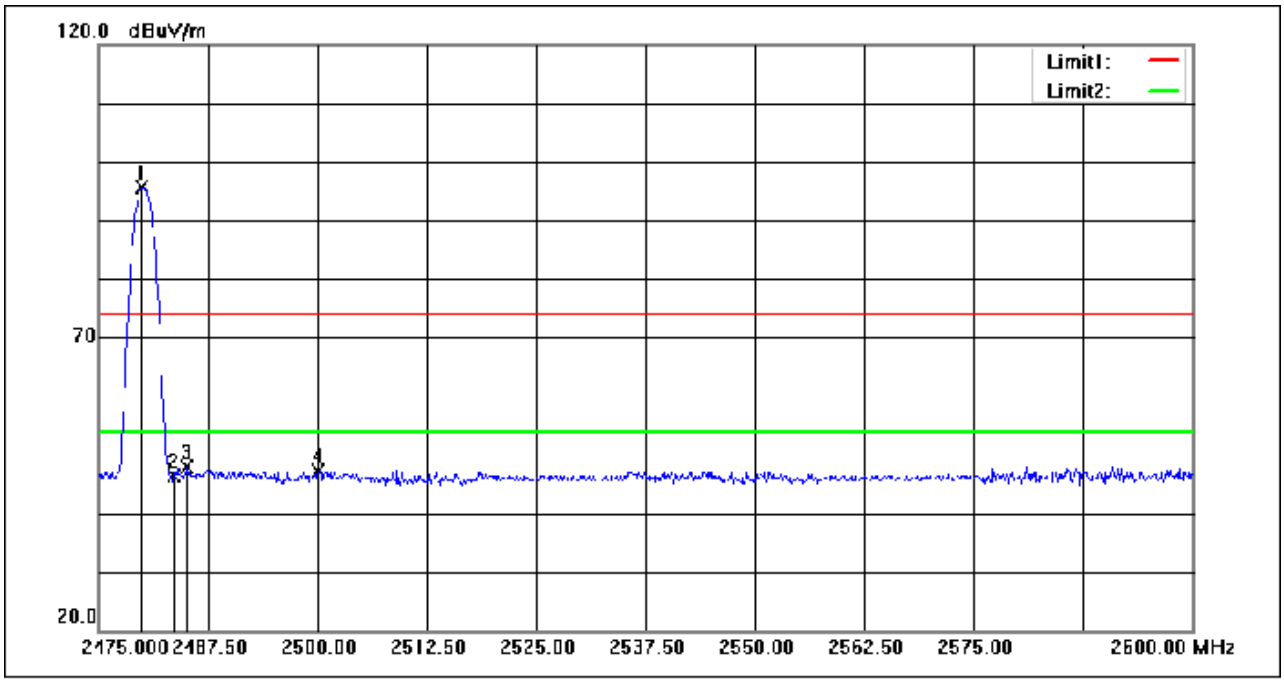
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2371.370	52.08	-4.29	47.79	74.00	-26.21	peak
2	2390.000	48.29	-4.24	44.05	74.00	-29.95	peak
3	2402.055	101.21	-4.21	97.00	74.00	23.00	peak

Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:Low



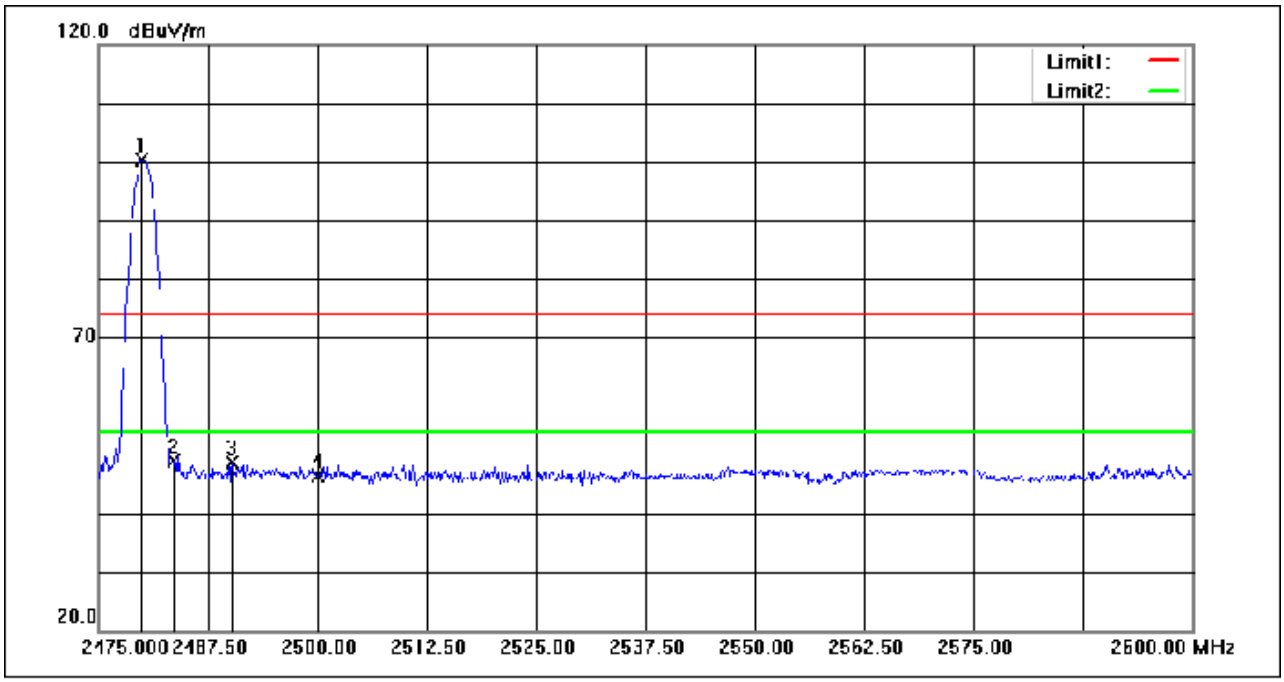
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2339.925	52.05	-4.37	47.68	74.00	-26.32	peak
2	2390.000	49.40	-4.24	45.16	74.00	-28.84	peak
3	2402.340	102.78	-4.21	98.57	74.00	24.57	peak

Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:High



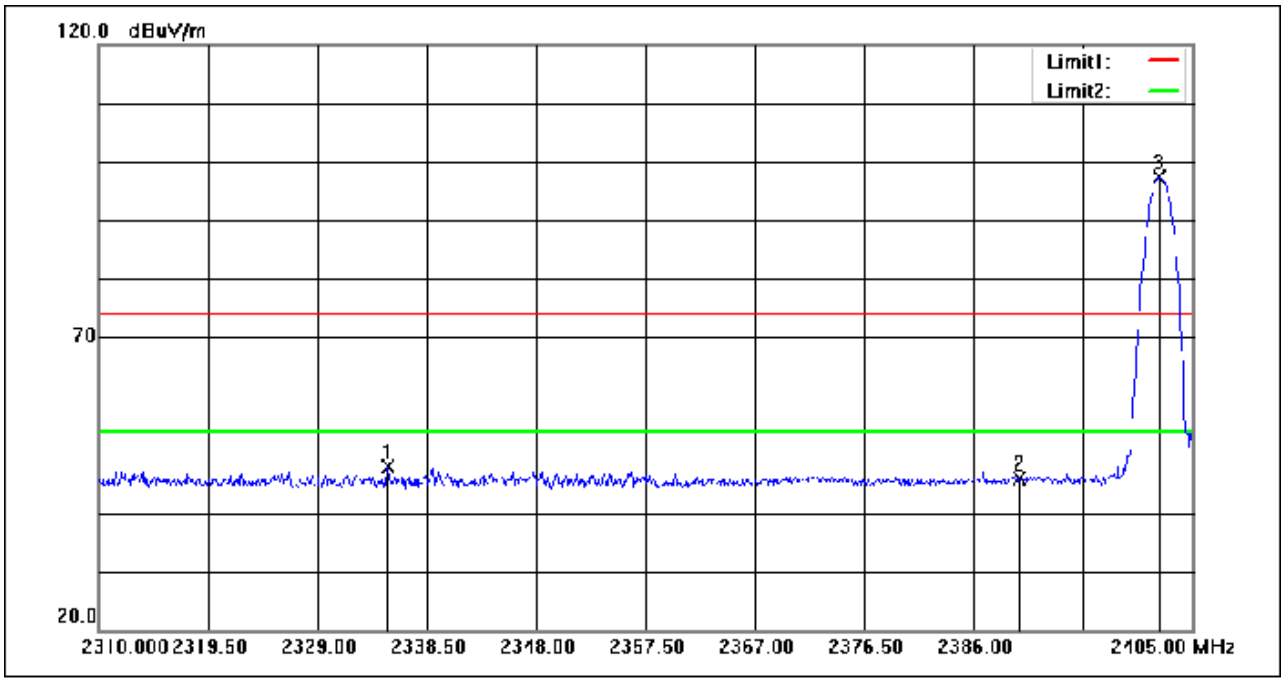
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2479.875	99.64	-4.01	95.63	74.00	21.63	peak
2	2483.500	50.42	-4.00	46.42	74.00	-27.58	peak
3	2485.125	51.80	-4.00	47.80	74.00	-26.20	peak
4	2500.000	51.18	-3.96	47.22	74.00	-26.78	peak

Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:High



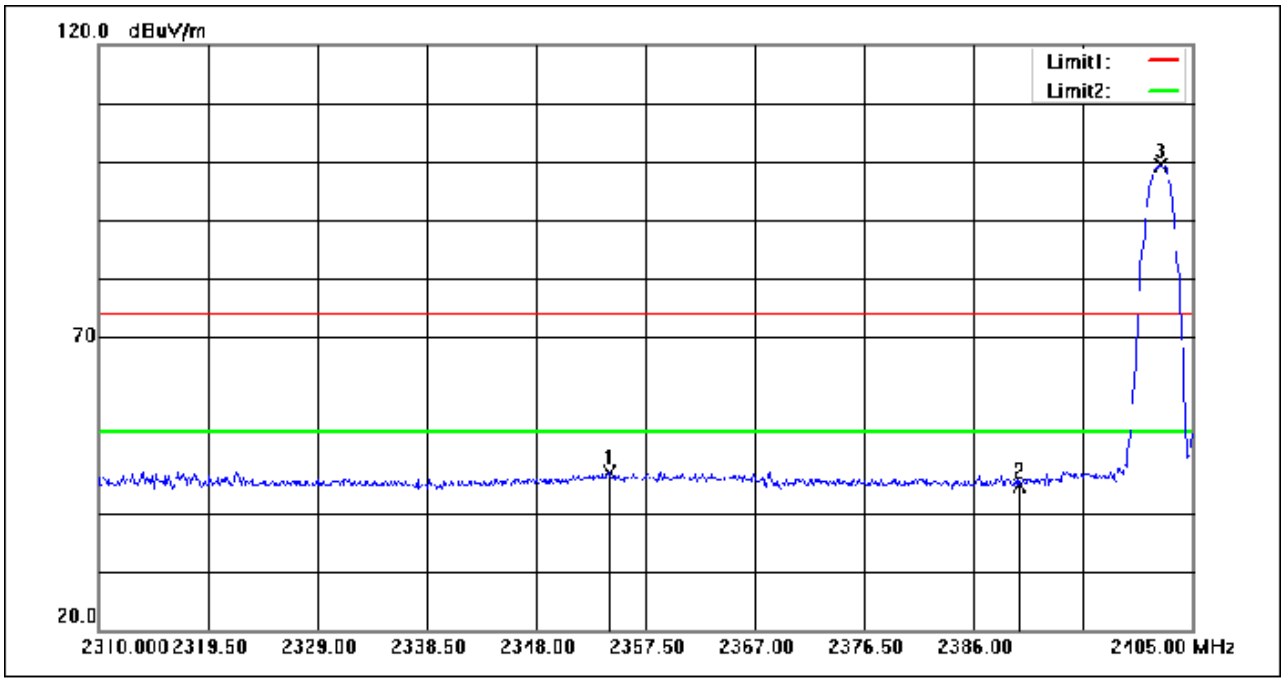
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2479.875	104.39	-4.01	100.38	74.00	26.38	peak
2	2483.500	52.76	-4.00	48.76	74.00	-25.24	peak
3	2490.250	52.69	-3.99	48.70	74.00	-25.30	peak
4	2500.000	50.45	-3.96	46.49	74.00	-27.51	peak

Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:Low



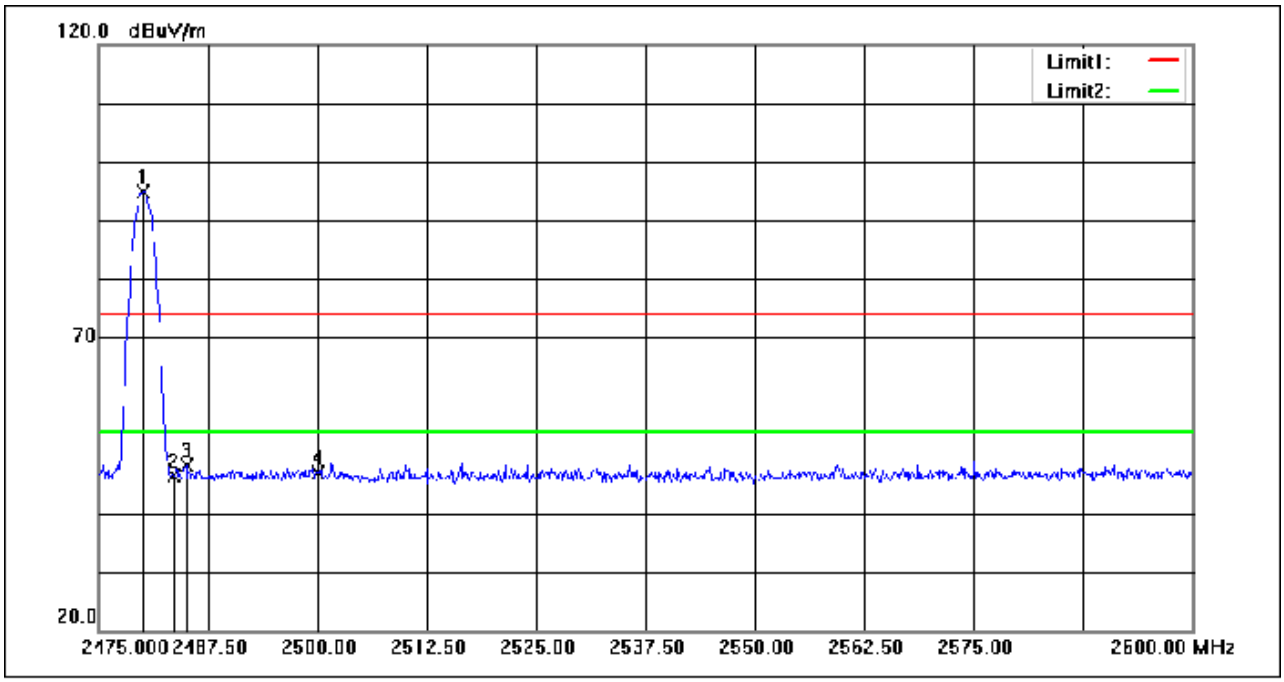
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2335.080	52.26	-4.39	47.87	74.00	-26.13	peak
2	2390.000	50.04	-4.24	45.80	74.00	-28.20	peak
3	2402.150	101.54	-4.21	97.33	74.00	23.33	peak

Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:Low



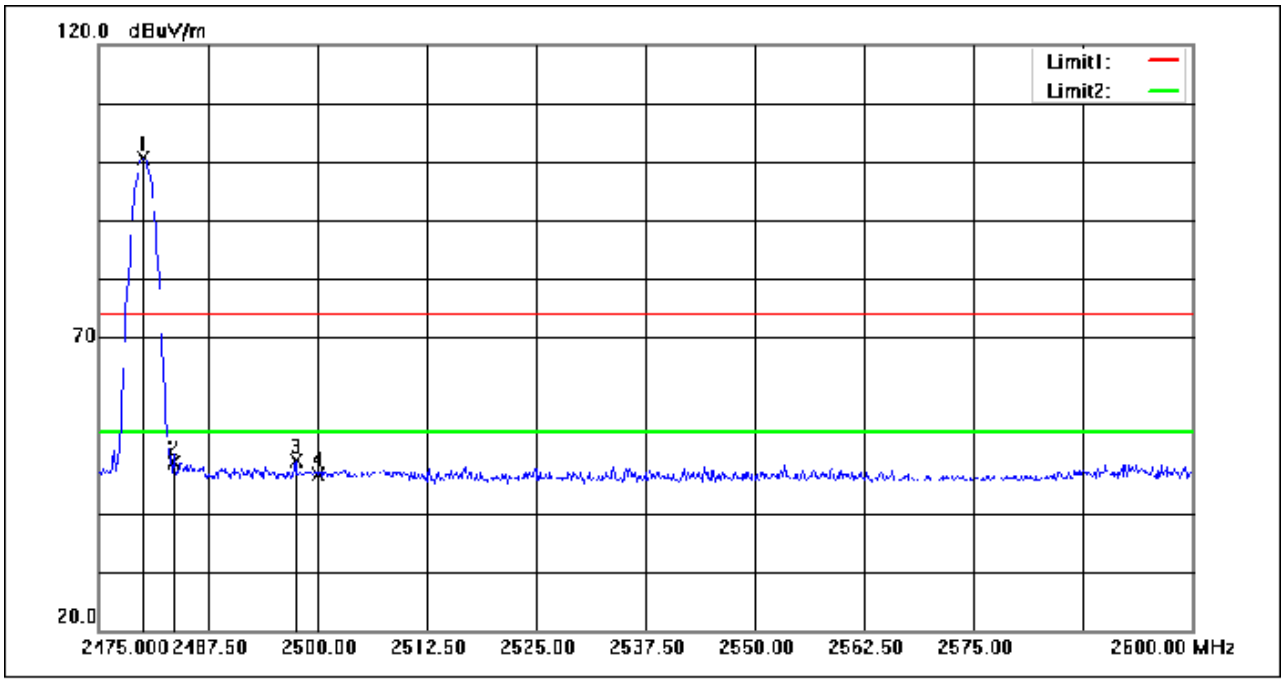
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2354.365	51.17	-4.34	46.83	74.00	-27.17	peak
2	2390.000	48.91	-4.24	44.67	74.00	-29.33	peak
3	2402.245	103.68	-4.21	99.47	74.00	25.47	peak

Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	98.98	-4.01	94.97	74.00	20.97	peak
2	2483.500	50.27	-4.00	46.27	74.00	-27.73	peak
3	2485.000	52.13	-4.00	48.13	74.00	-25.87	peak
4	2500.000	50.96	-3.96	47.00	74.00	-27.00	peak

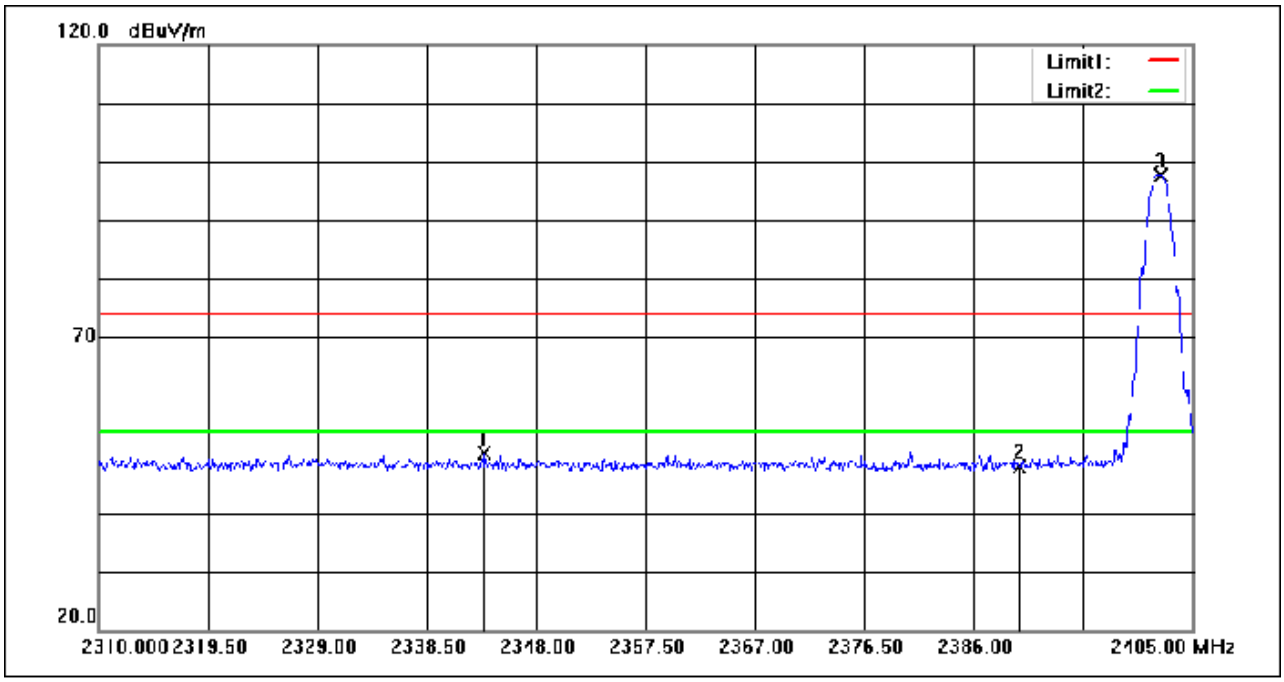
Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.125	104.65	-4.01	100.64	74.00	26.64	peak
2	2483.500	52.55	-4.00	48.55	74.00	-25.45	peak
3	2497.500	52.77	-3.97	48.80	74.00	-25.20	peak
4	2500.000	50.55	-3.96	46.59	74.00	-27.41	peak

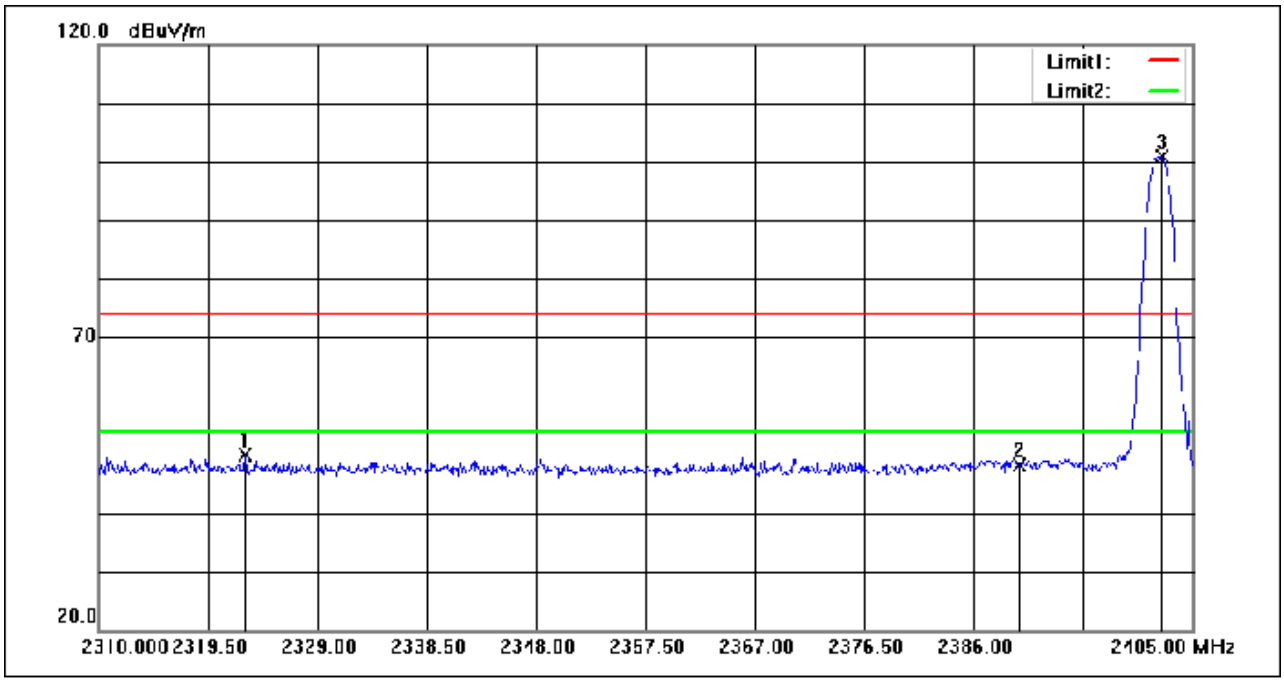
Adapter2

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



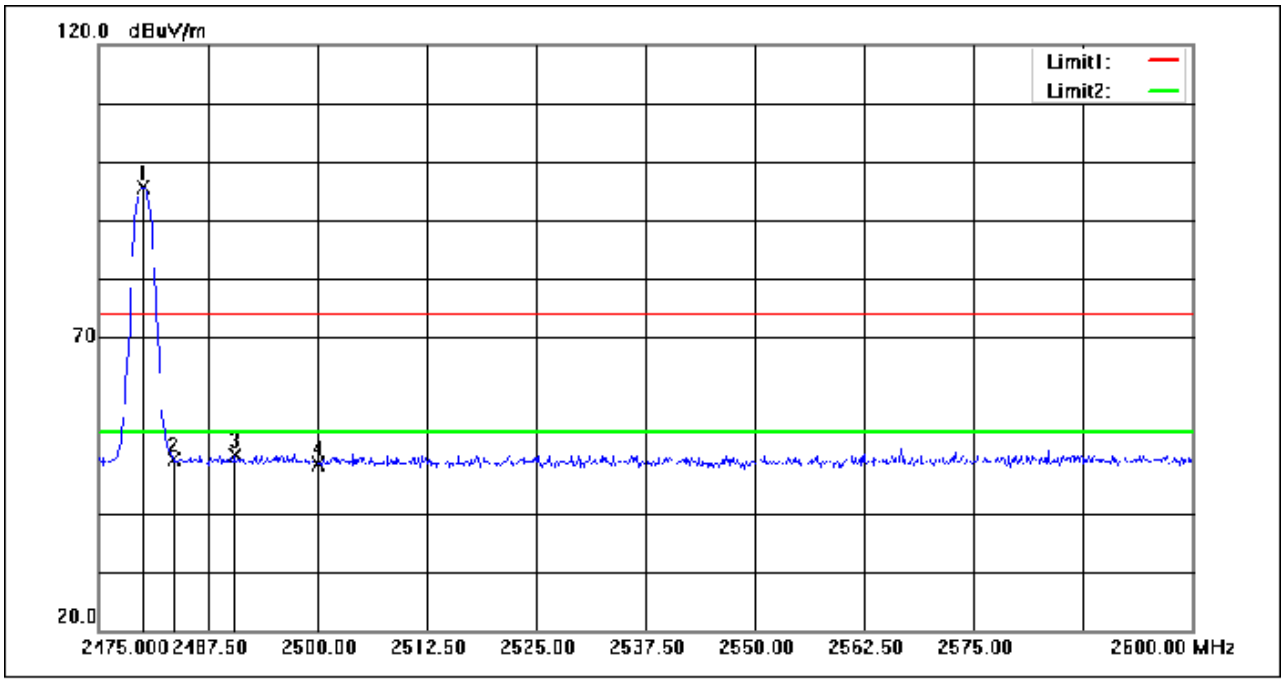
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2343.535	54.42	-4.36	50.06	74.00	-23.94	peak
2	2390.000	52.13	-4.24	47.89	74.00	-26.11	peak
3	2402.245	101.95	-4.21	97.74	74.00	23.74	peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



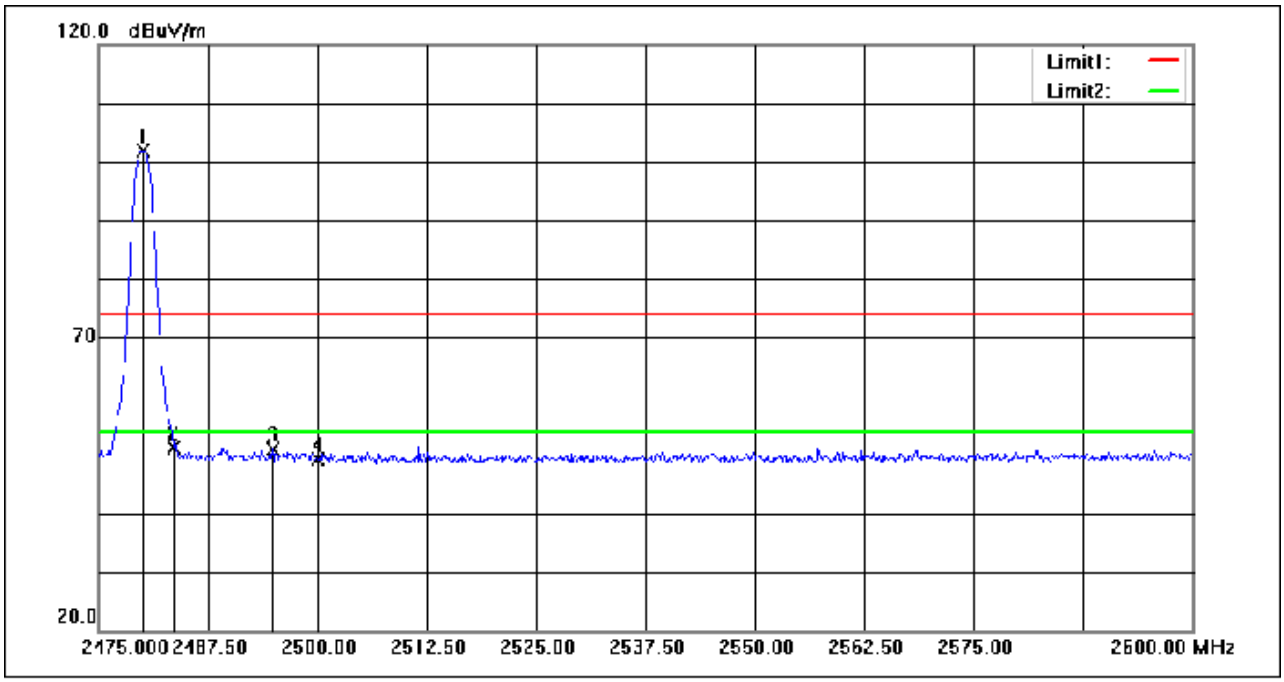
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2322.730	54.25	-4.42	49.83	74.00	-24.17	peak
2	2390.000	52.38	-4.24	48.14	74.00	-25.86	peak
3	2402.340	105.13	-4.21	100.92	74.00	26.92	peak

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



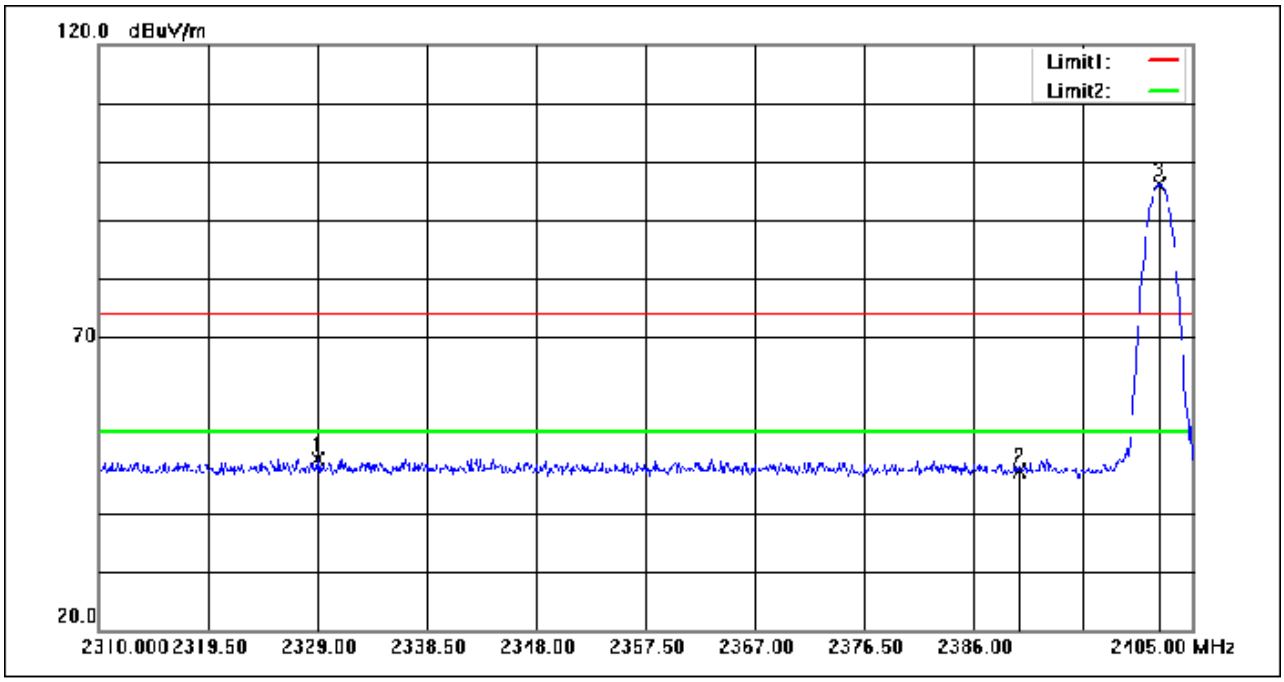
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.125	99.60	-4.01	95.59	74.00	21.59	peak
2	2483.500	53.13	-4.00	49.13	74.00	-24.87	peak
3	2490.500	53.89	-3.98	49.91	74.00	-24.09	peak
4	2500.000	52.22	-3.96	48.26	74.00	-25.74	peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:High



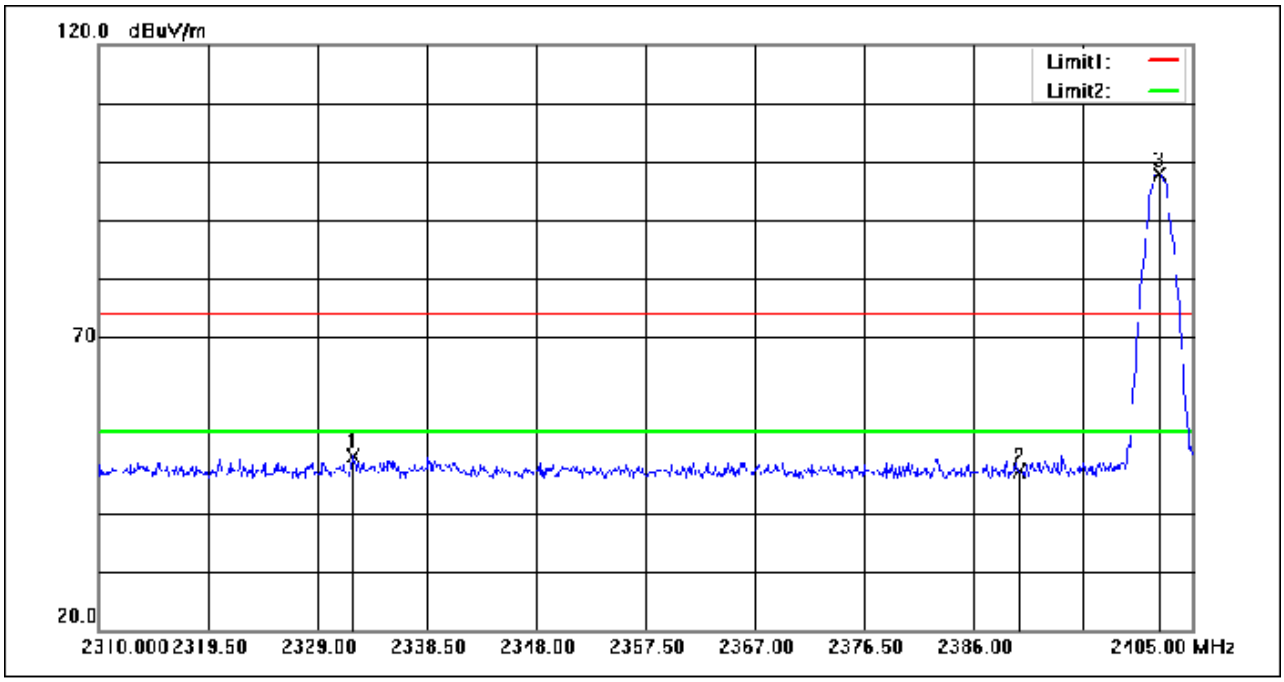
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.125	105.96	-4.01	101.95	74.00	27.95	peak
2	2483.500	55.14	-4.00	51.14	74.00	-22.86	peak
3	2494.875	54.92	-3.97	50.95	74.00	-23.05	peak
4	2500.000	53.12	-3.96	49.16	74.00	-24.84	peak

Mode:c; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:Low



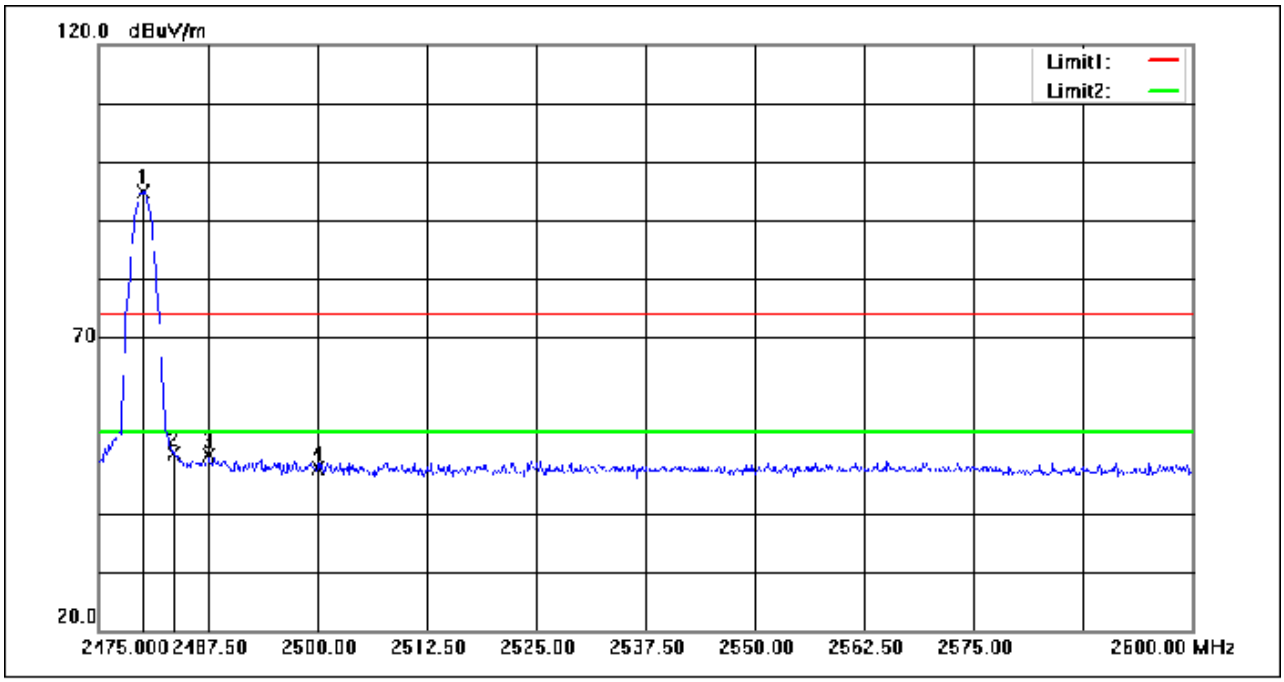
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2329.095	53.63	-4.40	49.23	74.00	-24.77	peak
2	2390.000	51.33	-4.24	47.09	74.00	-26.91	peak
3	2402.150	100.37	-4.21	96.16	74.00	22.16	peak

Mode:c; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:Low



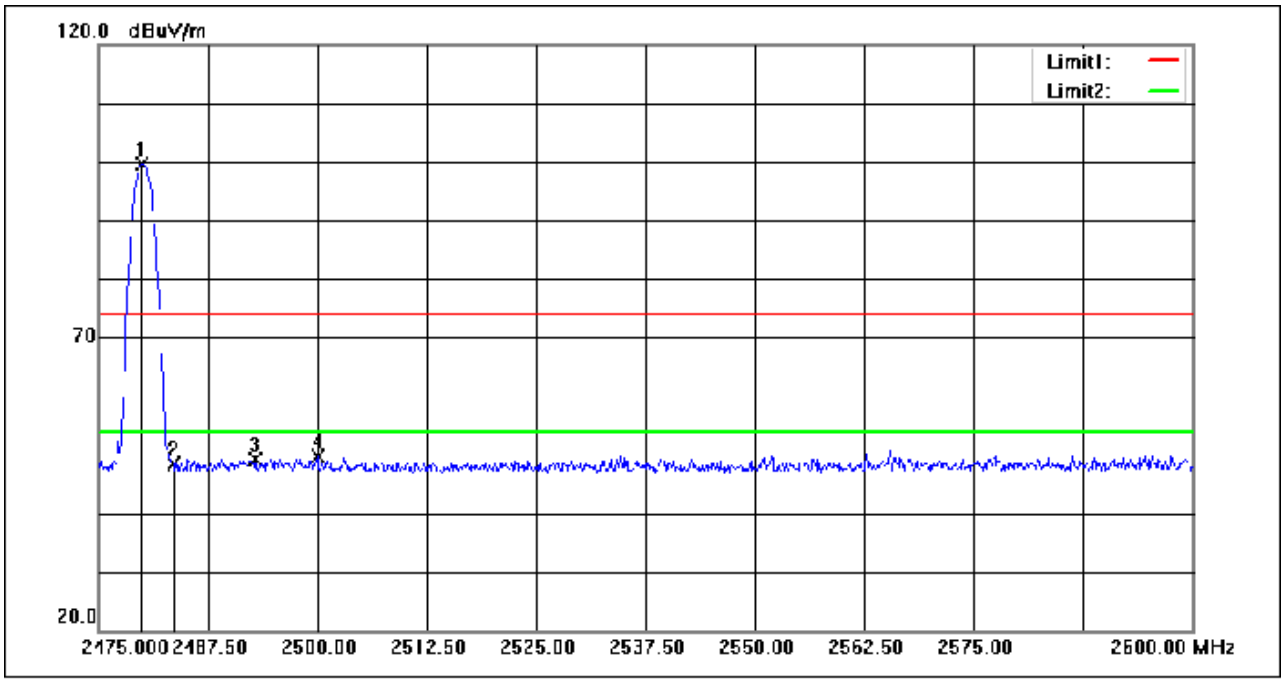
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2332.040	54.01	-4.39	49.62	74.00	-24.38	peak
2	2390.000	51.25	-4.24	47.01	74.00	-26.99	peak
3	2402.150	102.14	-4.21	97.93	74.00	23.93	peak

Mode:c; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:High



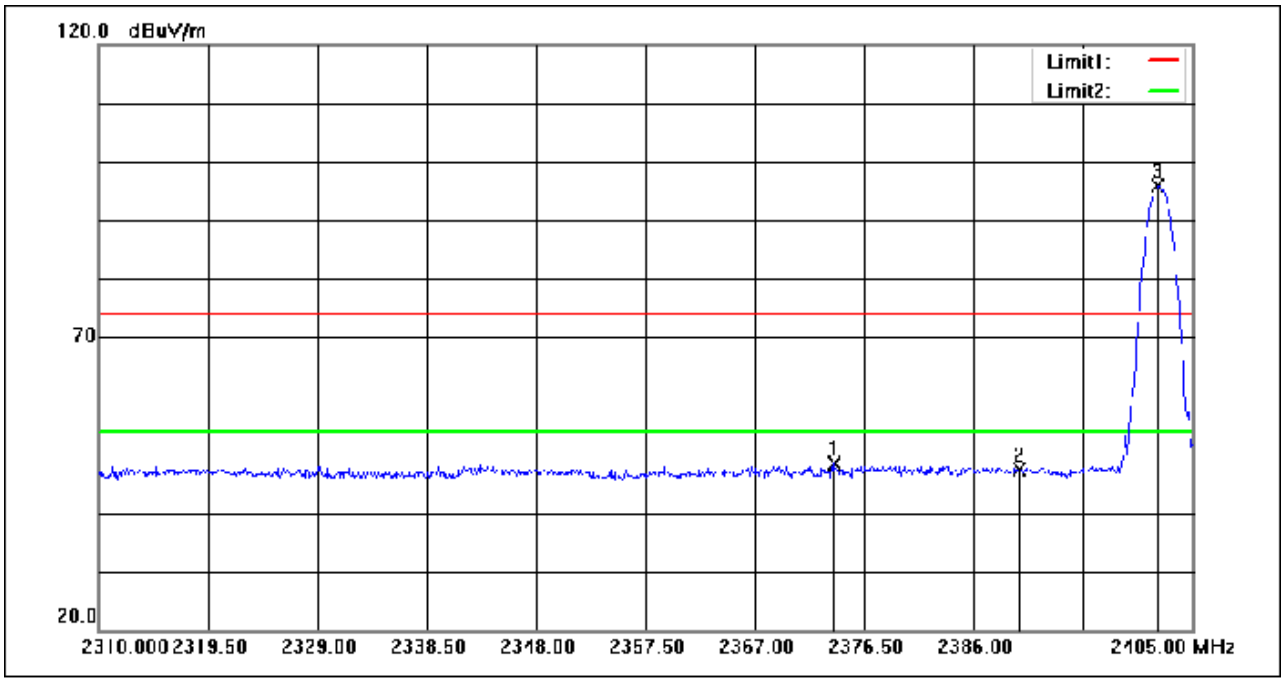
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.125	98.87	-4.01	94.86	74.00	20.86	peak
2	2483.500	54.07	-4.00	50.07	74.00	-23.93	peak
3	2487.625	53.77	-3.99	49.78	74.00	-24.22	peak
4	2500.000	51.66	-3.96	47.70	74.00	-26.30	peak

Mode:c; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:High



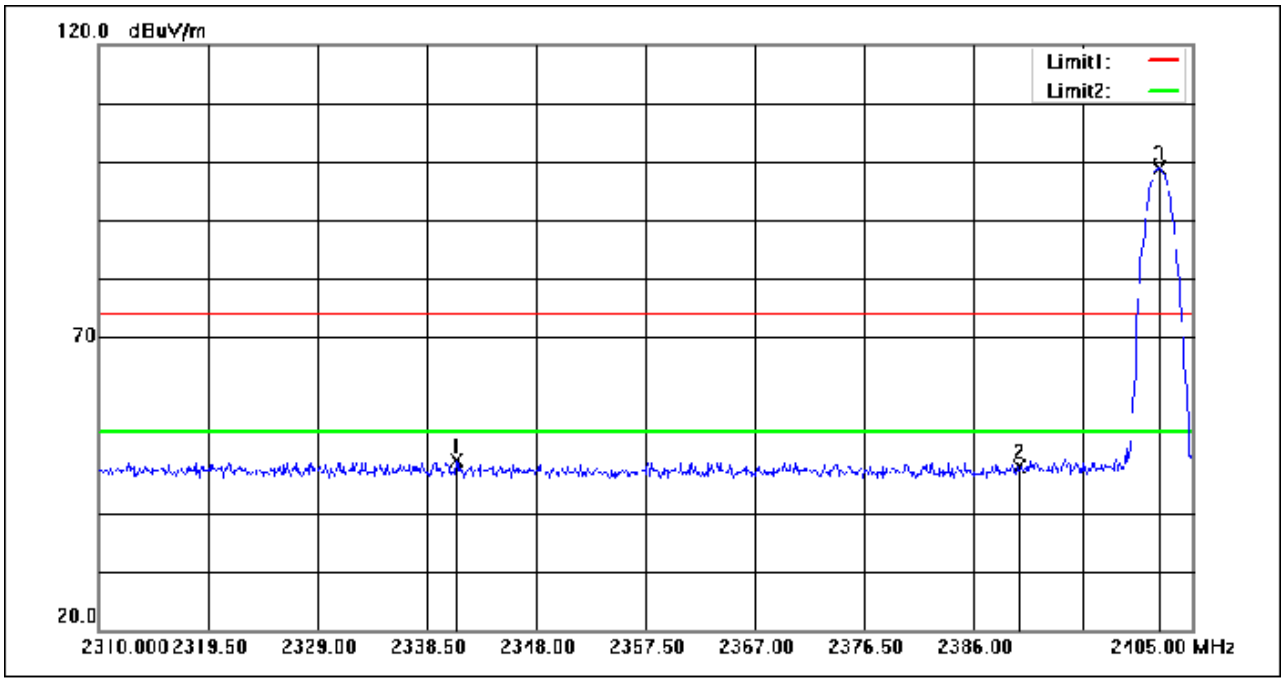
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2479.875	103.72	-4.01	99.71	74.00	25.71	peak
2	2483.500	52.31	-4.00	48.31	74.00	-25.69	peak
3	2492.875	53.11	-3.98	49.13	74.00	-24.87	peak
4	2500.000	53.48	-3.96	49.52	74.00	-24.48	peak

Mode:c; Polarization:Horizontal; Modulation:8DPSK; ; Channel:Low



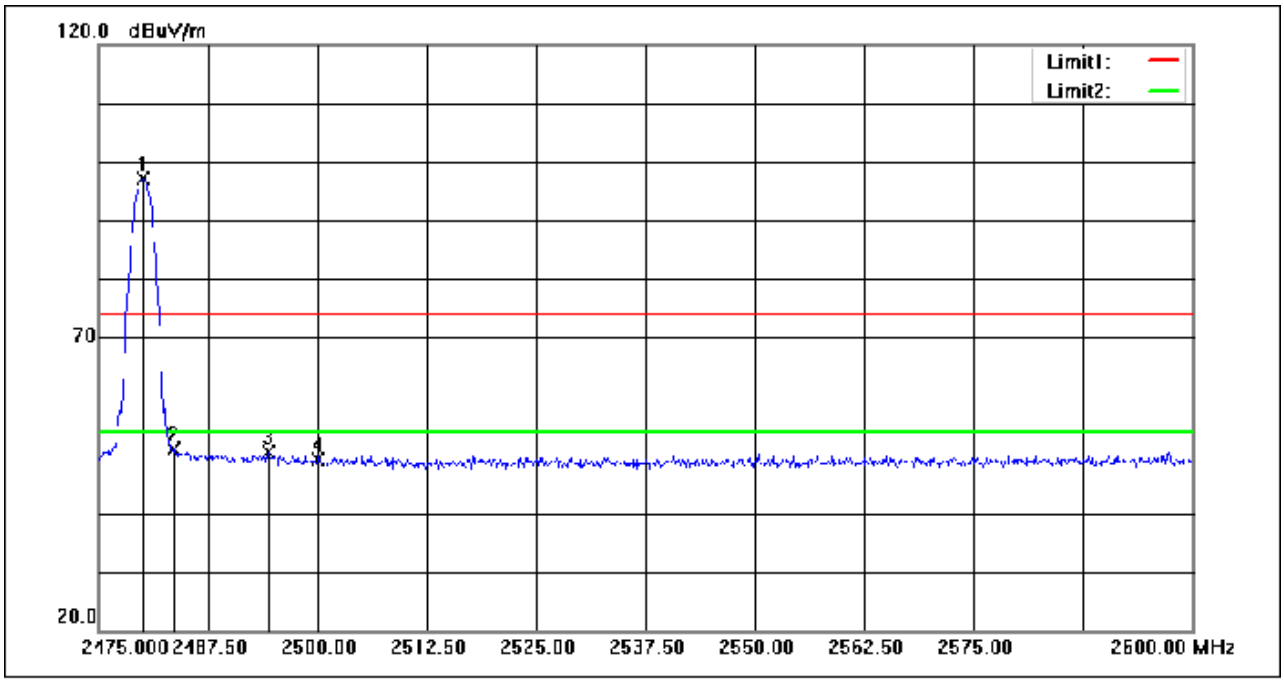
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2373.840	52.57	-4.29	48.28	74.00	-25.72	peak
2	2390.000	51.52	-4.24	47.28	74.00	-26.72	peak
3	2402.055	100.05	-4.21	95.84	74.00	21.84	peak

Mode:c; Polarization:Vertical; Modulation:8DPSK; ; Channel:Low



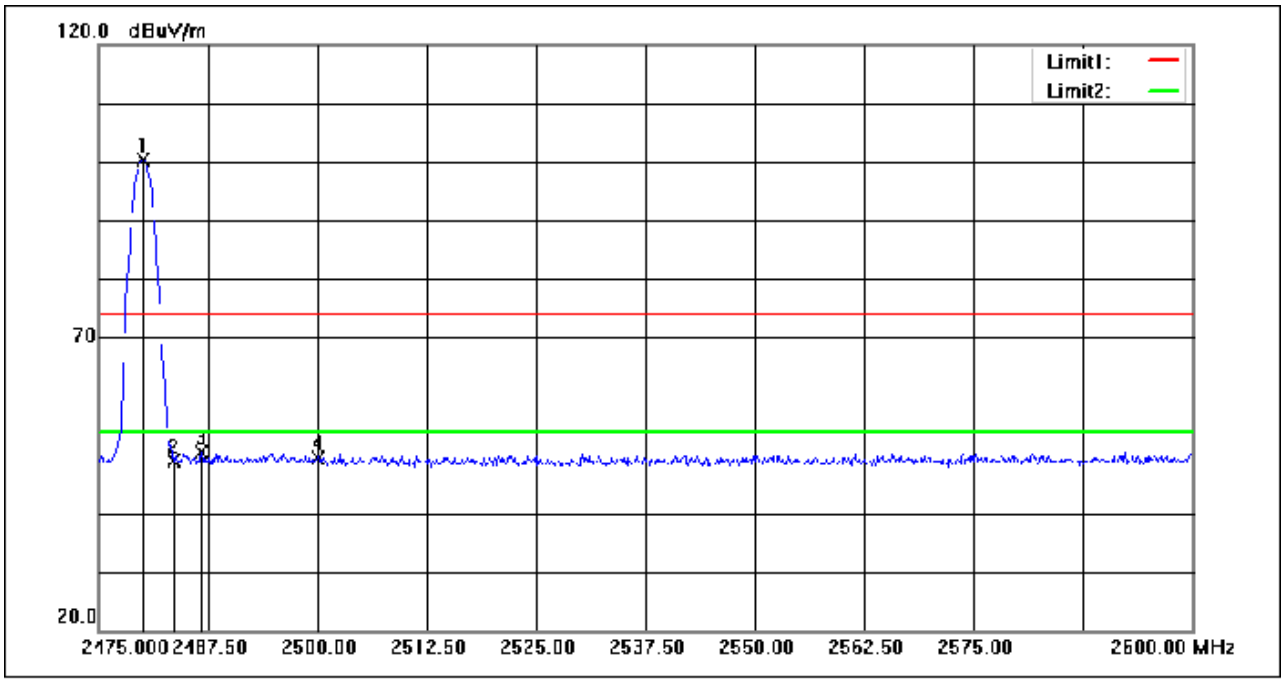
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2341.065	53.28	-4.37	48.91	74.00	-25.09	peak
2	2390.000	52.09	-4.24	47.85	74.00	-26.15	peak
3	2402.150	103.08	-4.21	98.87	74.00	24.87	peak

Mode:c; Polarization:Horizontal; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	101.04	-4.01	97.03	74.00	23.03	peak
2	2483.500	54.98	-4.00	50.98	74.00	-23.02	peak
3	2494.375	54.38	-3.97	50.41	74.00	-23.59	peak
4	2500.000	53.06	-3.96	49.10	74.00	-24.90	peak

Mode:c; Polarization:Vertical; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	104.34	-4.01	100.33	74.00	26.33	peak
2	2483.500	52.87	-4.00	48.87	74.00	-25.13	peak
3	2486.750	54.30	-3.99	50.31	74.00	-23.69	peak
4	2500.000	53.35	-3.96	49.39	74.00	-24.61	peak

7.10 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Limit:

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
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.10.1 E.U.T. Operation

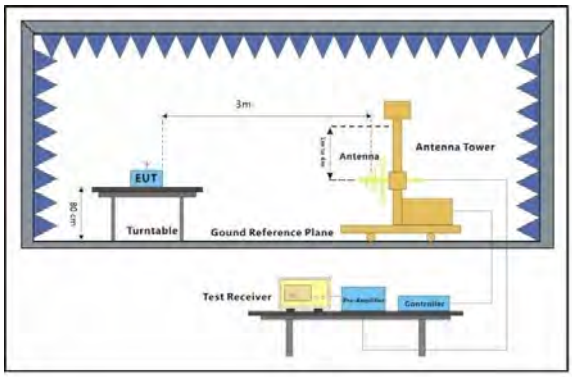
Operating Environment:

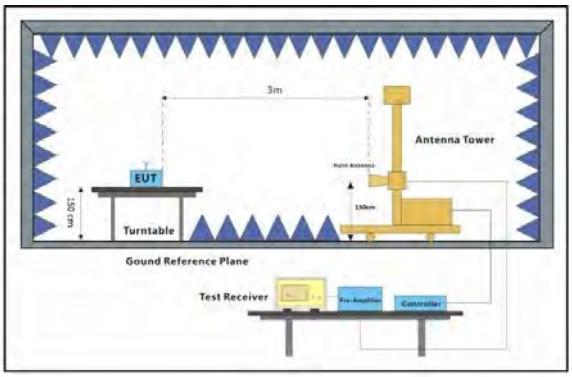
Temperature: 20 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

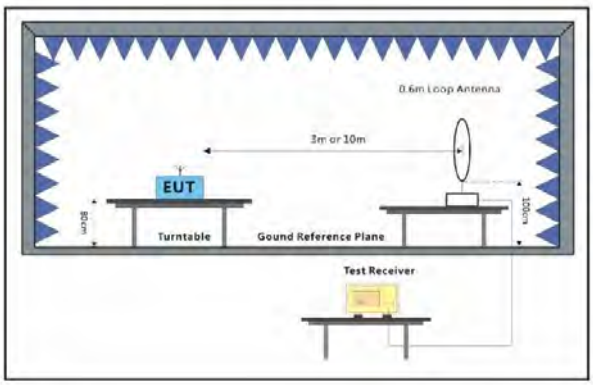
Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.(Adapter 1)

C:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report. (Adapter 2)

7.10.2 Test Setup Diagram







7.10.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna 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.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark:

1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

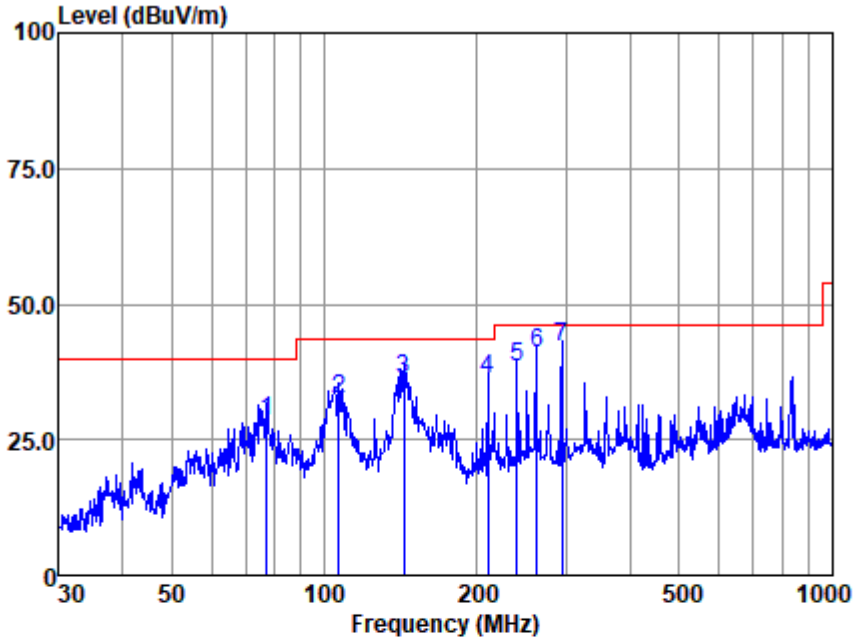
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown

Remark：For frequencies below 1GHz，pre-test two adapters and only record the worst data of adapter 1 data in test report

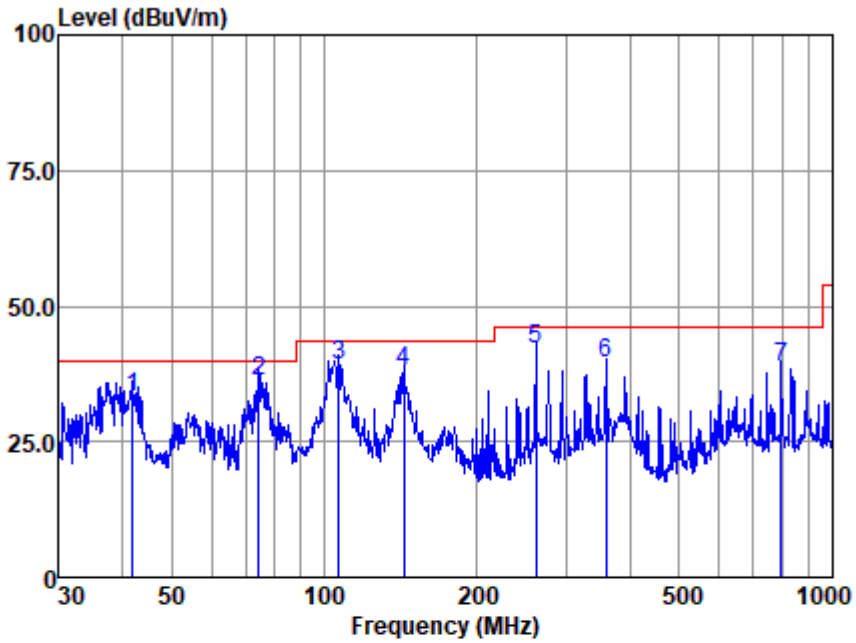
Adapter1
Below 1GHz:



Antenna Polarity :HORIZONTAL
EUT/Project :1807CR
Test mode :b

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	77.051	59.69	9.92	1.21	42.27	28.55	40.00	-11.45	QP
2	106.759	63.70	9.65	1.38	42.31	32.42	43.50	-11.08	QP
3	143.326	64.17	12.64	1.67	42.24	36.24	43.50	-7.26	QP
4	210.048	66.64	9.78	2.04	42.16	36.30	43.50	-7.20	QP
5	239.987	67.54	10.86	2.16	42.12	38.44	46.00	-7.56	QP
6	261.975	68.65	12.18	2.25	42.11	40.97	46.00	-5.03	QP
7	294.114	68.64	13.16	2.37	42.12	42.05	46.00	-3.95	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



Antenna Polarity :VERTICAL
EUT/Project :1807CR
Test mode :b

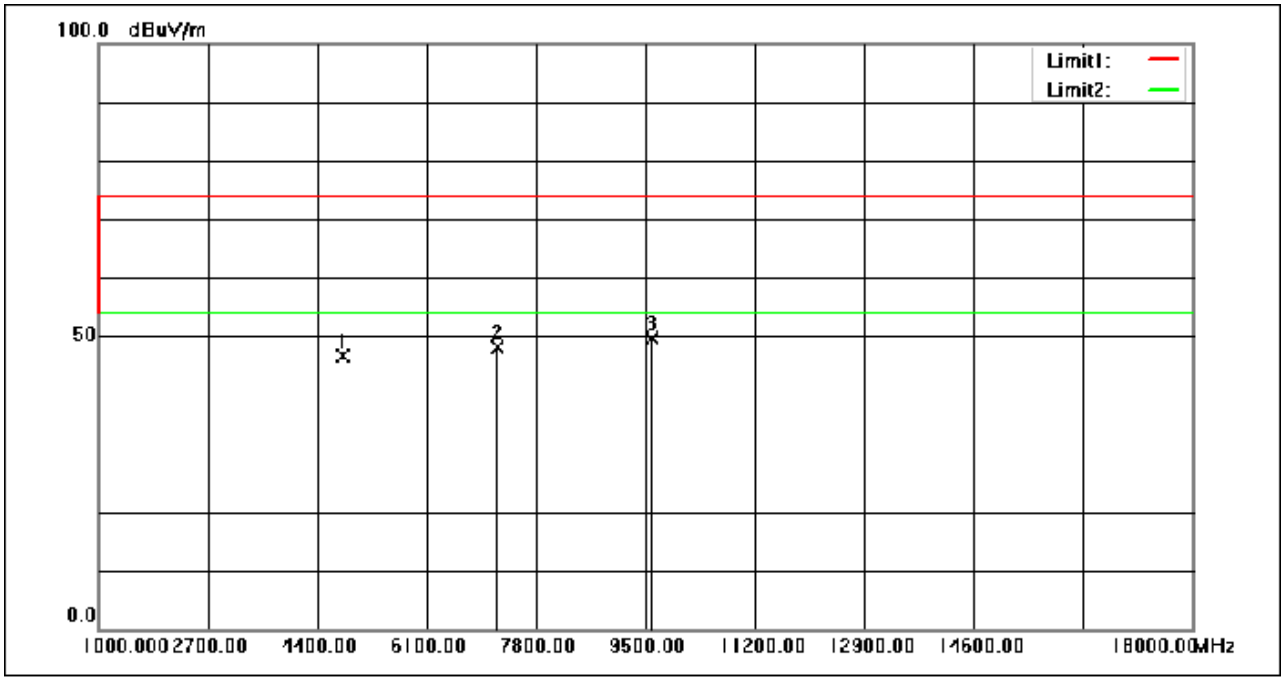
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	42.007	61.10	13.32	0.97	42.33	33.06	40.00	-6.94	QP
2	74.396	66.68	10.58	1.20	42.26	36.20	40.00	-3.80	QP
3	106.759	70.33	9.65	1.38	42.31	39.05	43.50	-4.45	QP
4	143.326	65.90	12.64	1.67	42.24	37.97	43.50	-5.53	QP
5	261.058	69.78	12.14	2.25	42.10	42.07	46.00	-3.93	QP
6	359.186	64.16	14.56	2.57	41.94	39.35	46.00	-6.65	QP
7	793.396	54.93	22.28	3.69	41.99	38.91	46.00	-7.09	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Adapter1

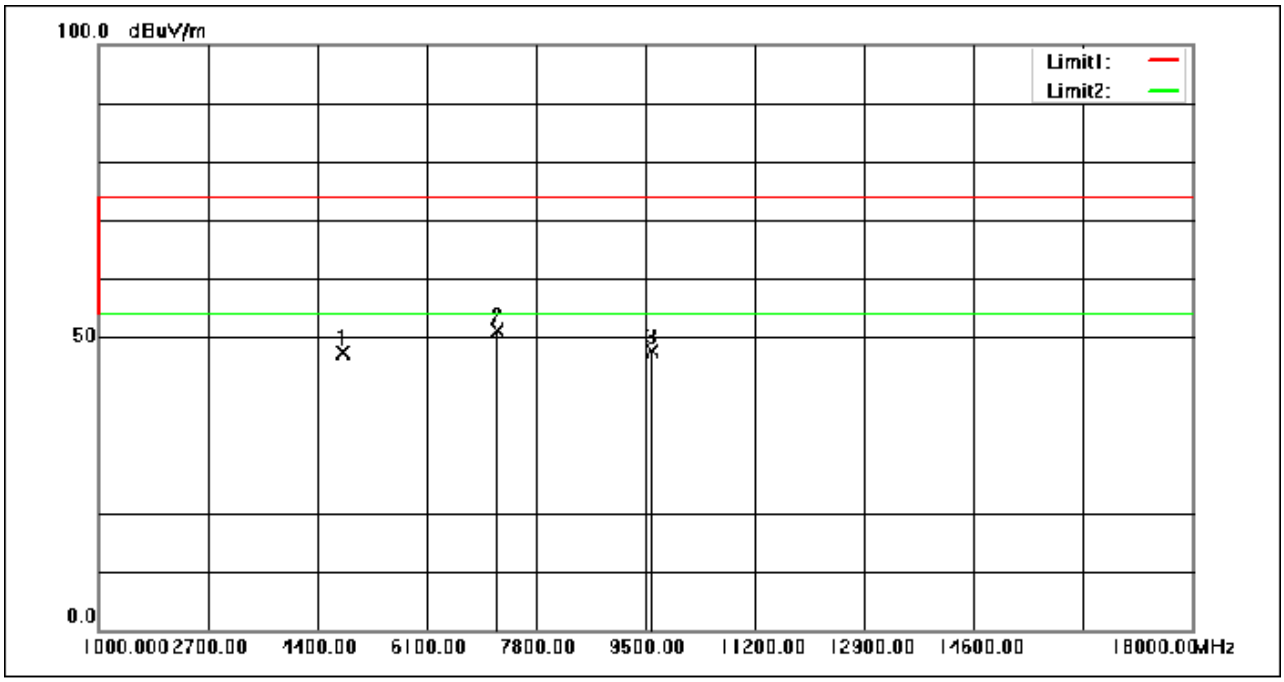
Above 1GHz

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



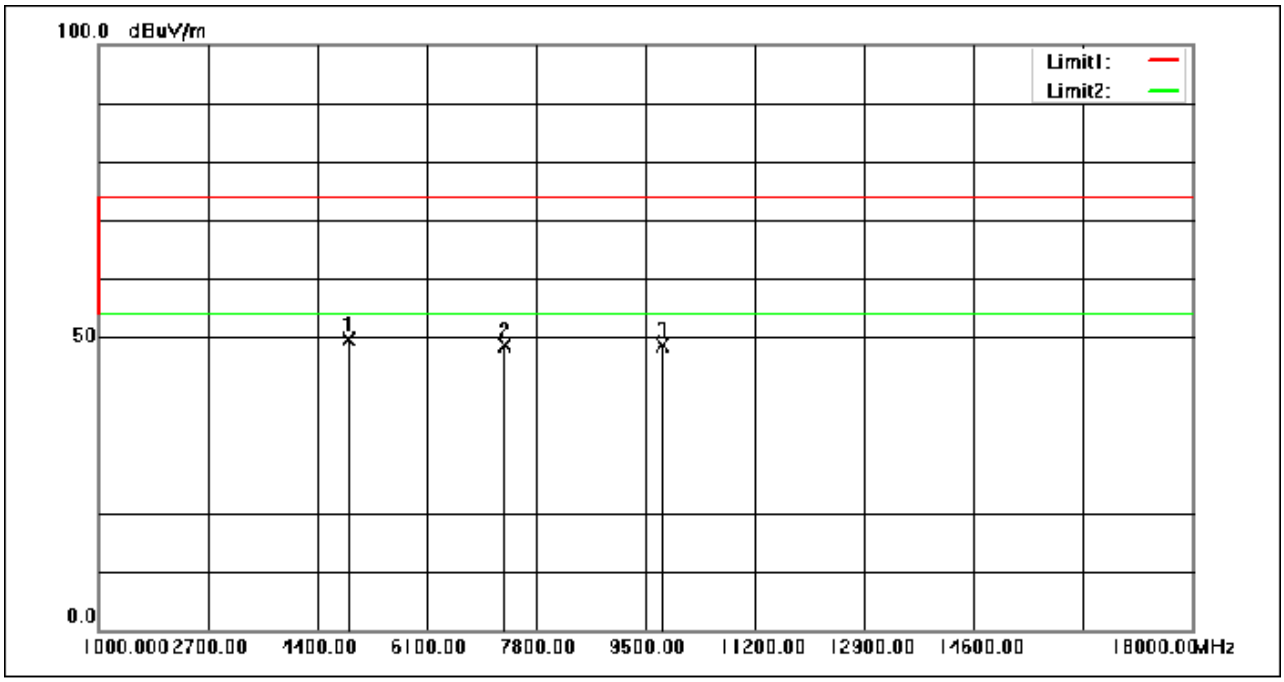
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	56.98	-10.28	46.70	74.00	-27.30	peak
2	7206.000	55.11	-7.10	48.01	74.00	-25.99	peak
3	9608.000	54.56	-4.96	49.60	74.00	-24.40	peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



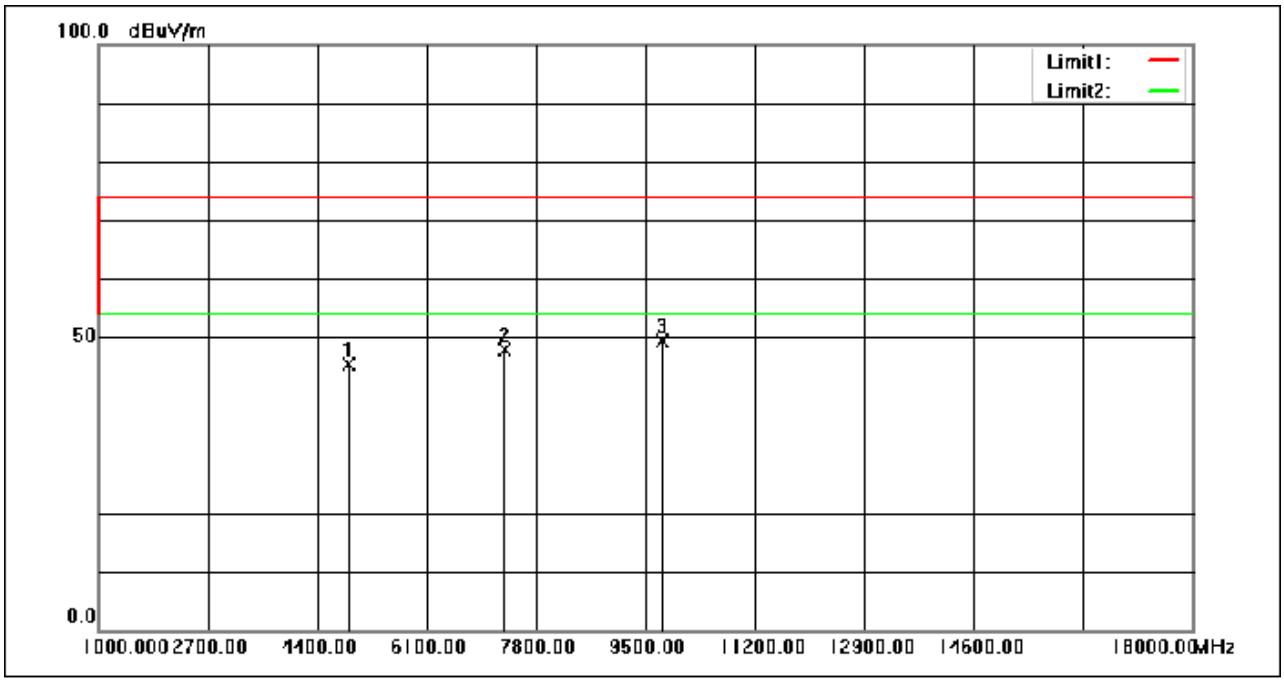
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	57.61	-10.28	47.33	74.00	-26.67	peak
2	7206.000	58.31	-7.10	51.21	74.00	-22.79	peak
3	9608.000	52.50	-4.96	47.54	74.00	-26.46	peak

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



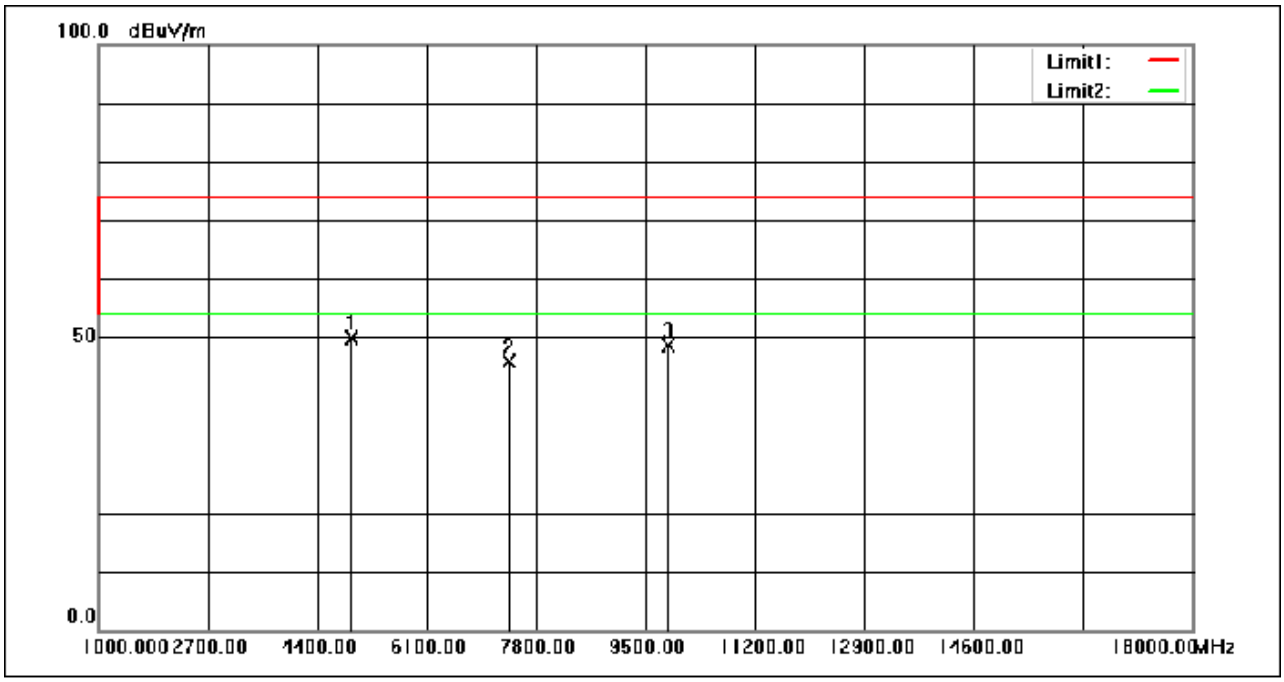
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	59.67	-9.98	49.69	74.00	-24.31	peak
2	7323.000	55.52	-6.91	48.61	74.00	-25.39	peak
3	9764.000	52.83	-4.23	48.60	74.00	-25.40	peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



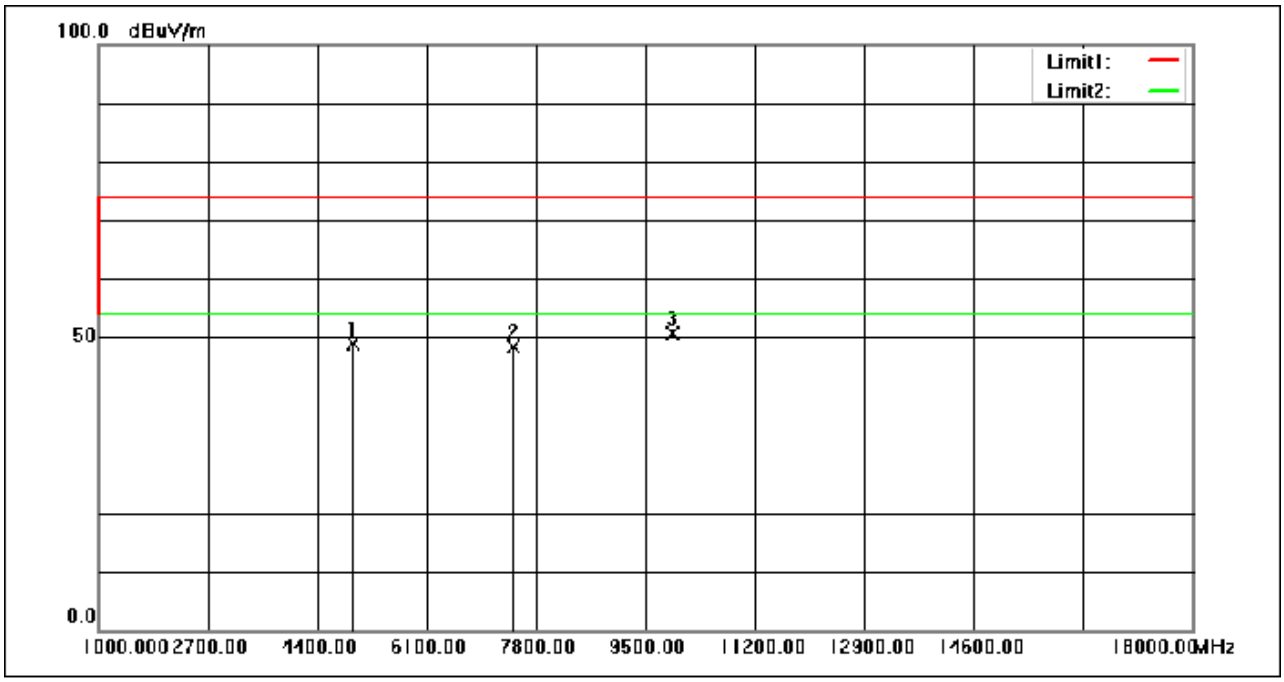
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	55.39	-9.98	45.41	74.00	-28.59	peak
2	7323.000	54.68	-6.91	47.77	74.00	-26.23	peak
3	9764.000	53.57	-4.23	49.34	74.00	-24.66	peak

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



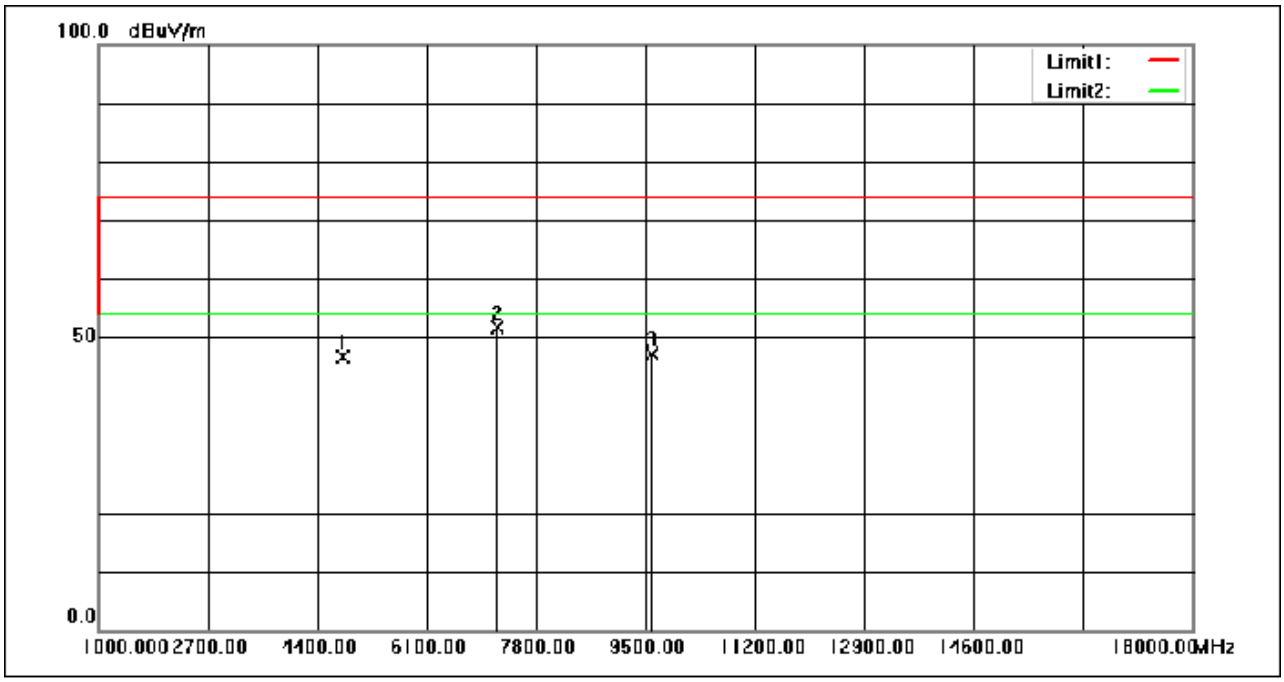
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	59.58	-9.82	49.76	74.00	-24.24	peak
2	7386.000	52.61	-6.80	45.81	74.00	-28.19	peak
3	9848.000	52.38	-3.84	48.54	74.00	-25.46	peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High



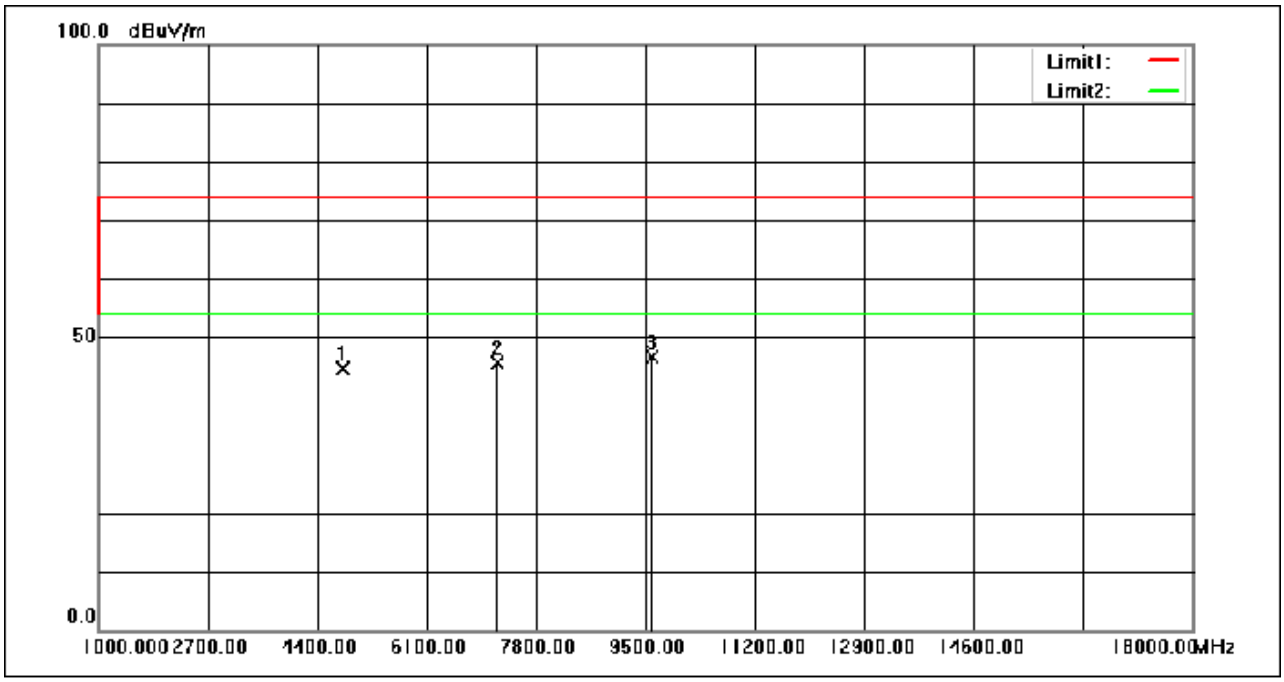
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	58.59	-9.68	48.91	74.00	-25.09	peak
2	7440.000	55.01	-6.72	48.29	74.00	-25.71	peak
3	9920.000	54.16	-3.50	50.66	74.00	-23.34	peak

Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:Low



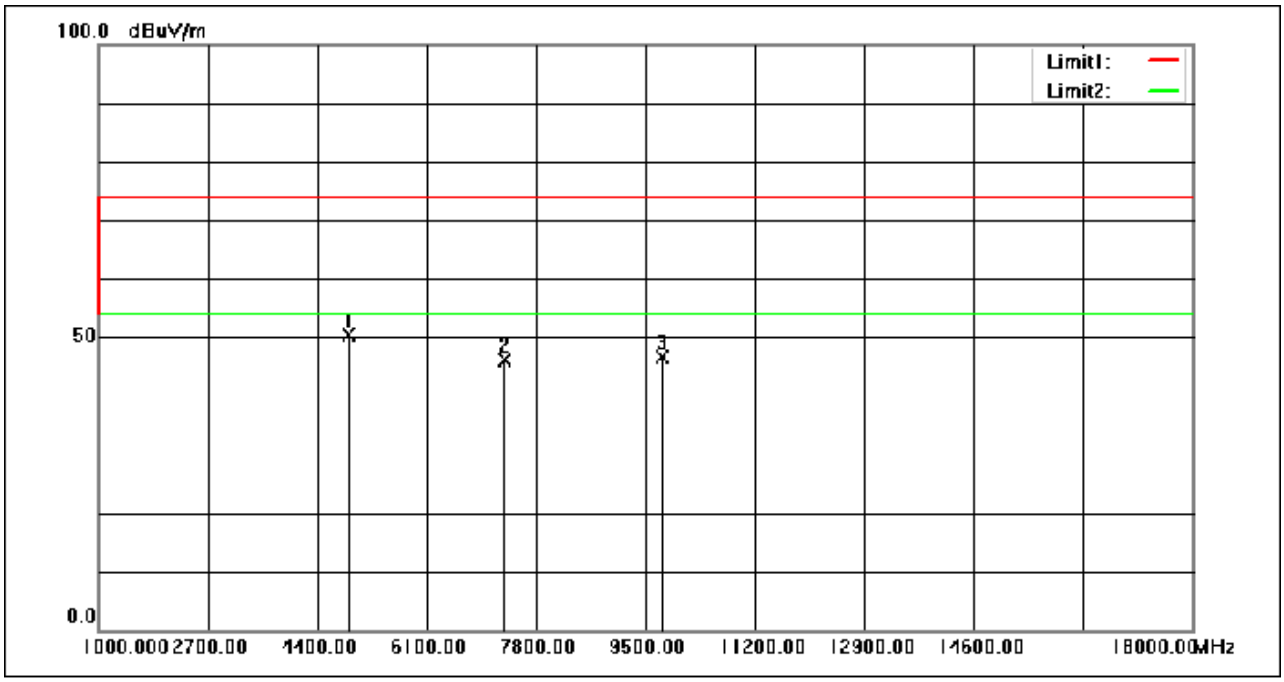
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	57.00	-10.28	46.72	74.00	-27.28	peak
2	7206.000	58.74	-7.10	51.64	74.00	-22.36	peak
3	9608.000	52.02	-4.96	47.06	74.00	-26.94	peak

Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:Low



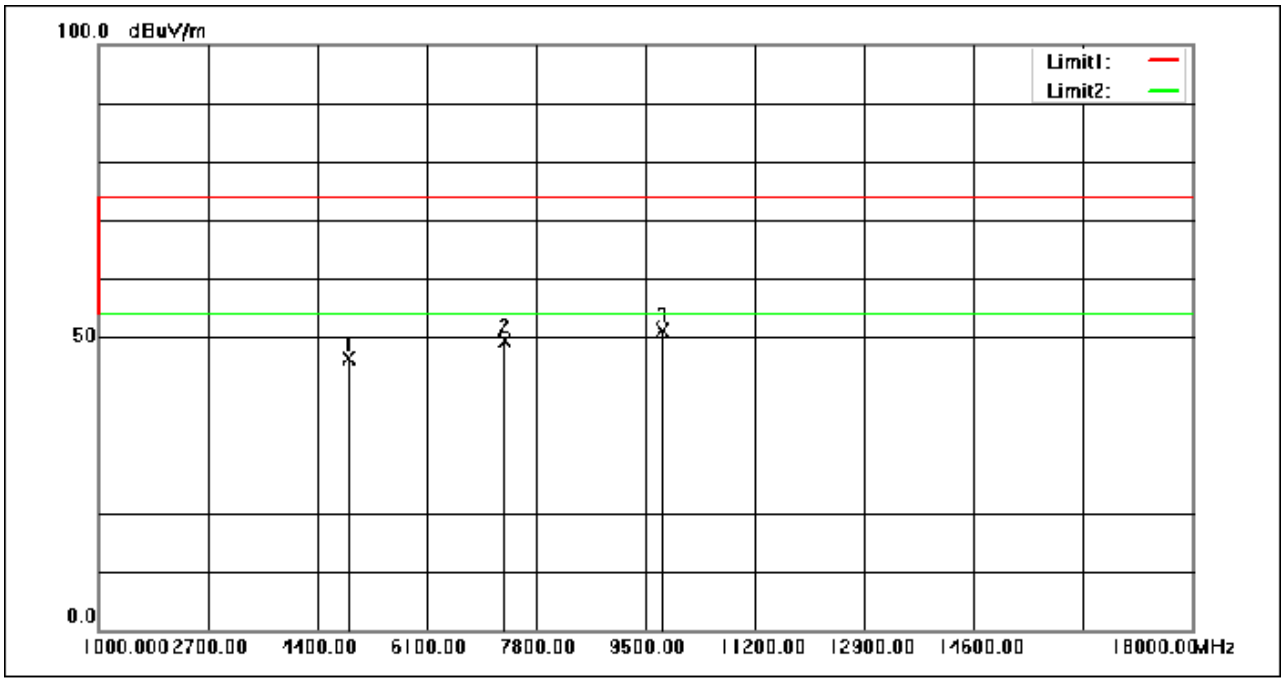
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	54.83	-10.28	44.55	74.00	-29.45	peak
2	7206.000	52.67	-7.10	45.57	74.00	-28.43	peak
3	9608.000	51.52	-4.96	46.56	74.00	-27.44	peak

Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:middle



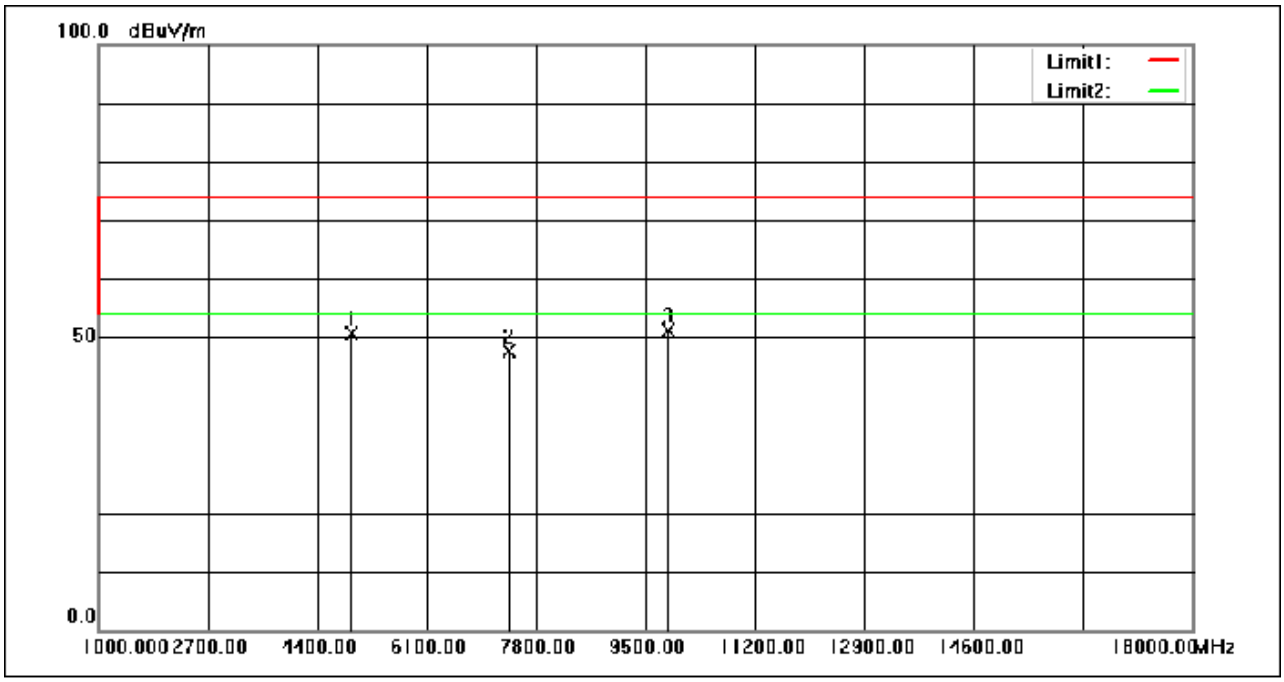
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	60.46	-9.98	50.48	74.00	-23.52	peak
2	7323.000	52.95	-6.91	46.04	74.00	-27.96	peak
3	9764.000	50.86	-4.23	46.63	74.00	-27.37	peak

Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:middle



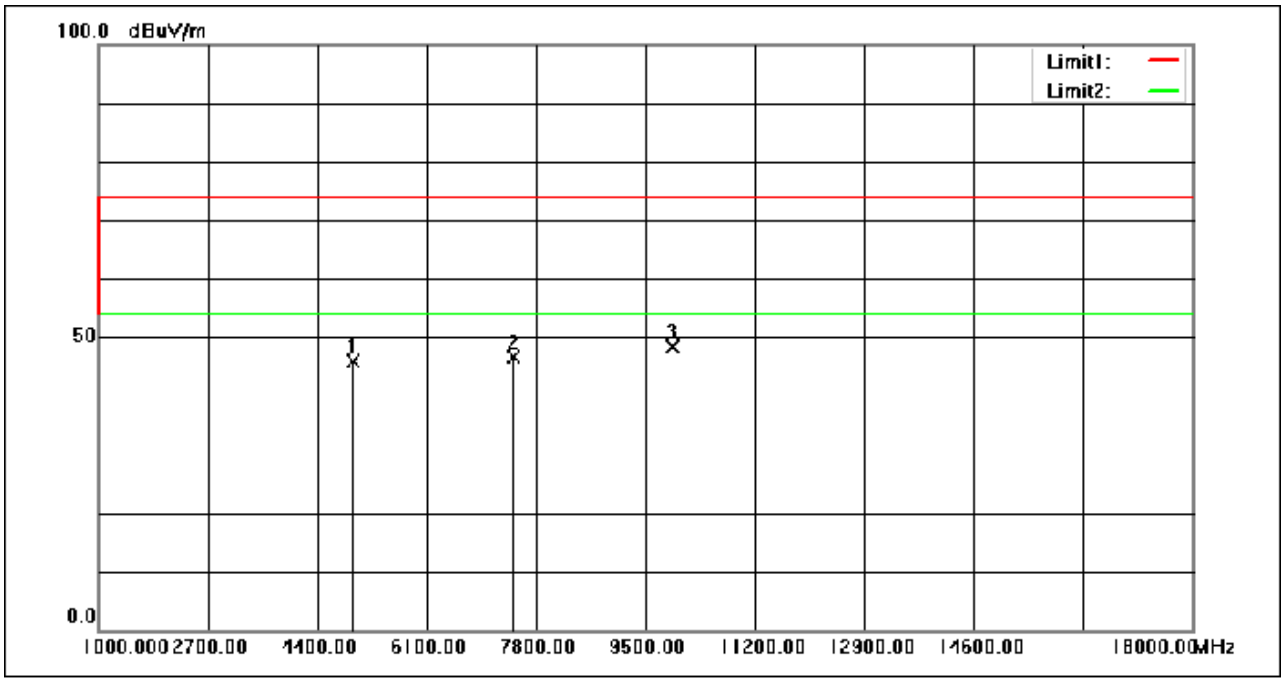
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	56.37	-9.98	46.39	74.00	-27.61	peak
2	7323.000	56.24	-6.91	49.33	74.00	-24.67	peak
3	9764.000	55.40	-4.23	51.17	74.00	-22.83	peak

Mode:b; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:High



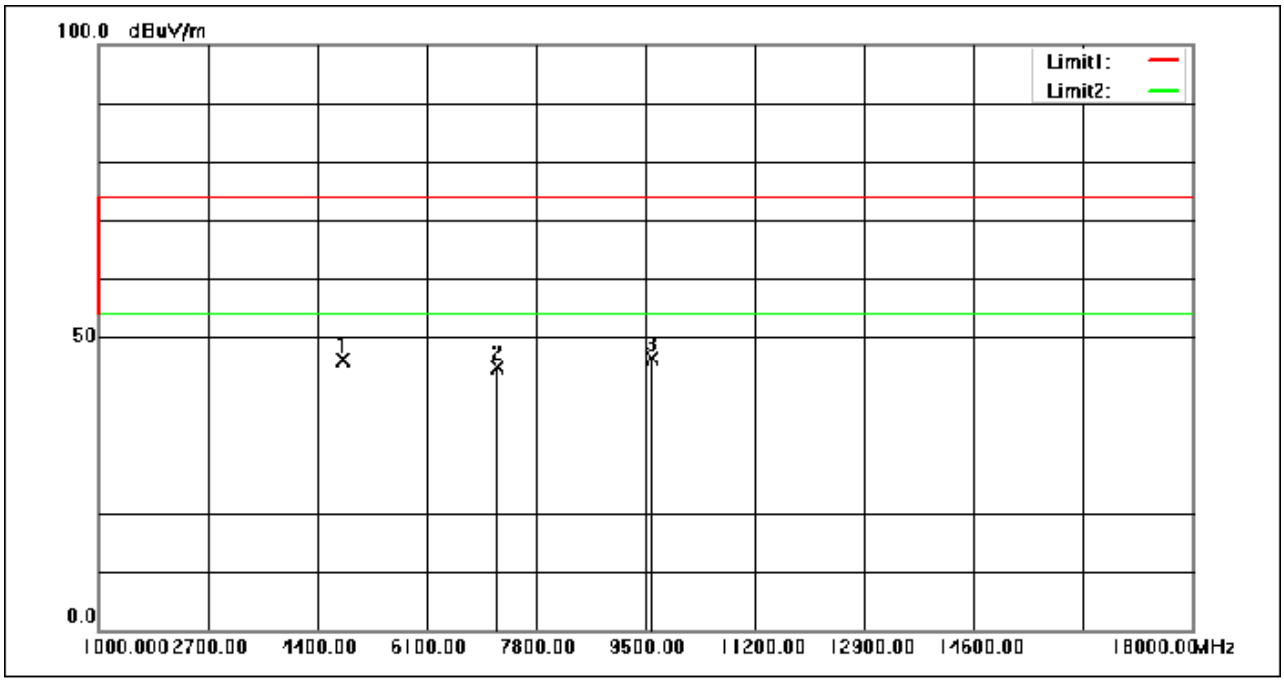
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	60.37	-9.82	50.55	74.00	-23.45	peak
2	7386.000	54.31	-6.80	47.51	74.00	-26.49	peak
3	9848.000	54.94	-3.84	51.10	74.00	-22.90	peak

Mode:b; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:High



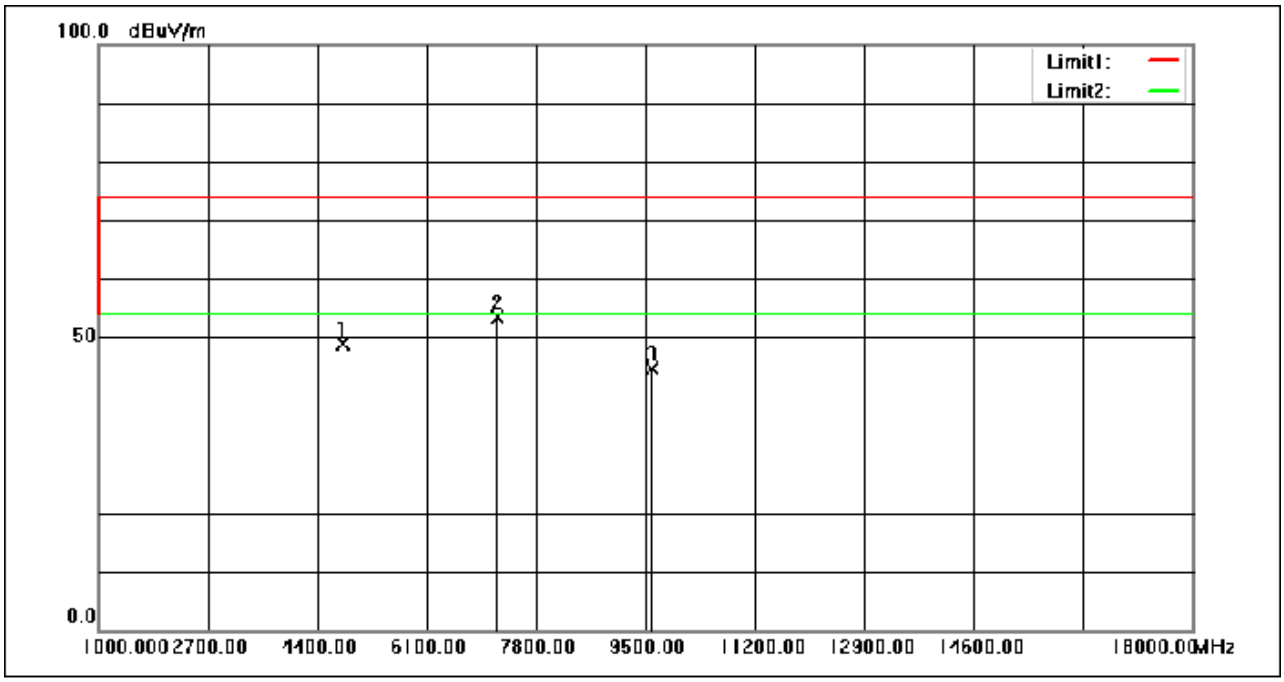
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	55.59	-9.68	45.91	74.00	-28.09	peak
2	7440.000	53.47	-6.72	46.75	74.00	-27.25	peak
3	9920.000	51.81	-3.50	48.31	74.00	-25.69	peak

Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:Low



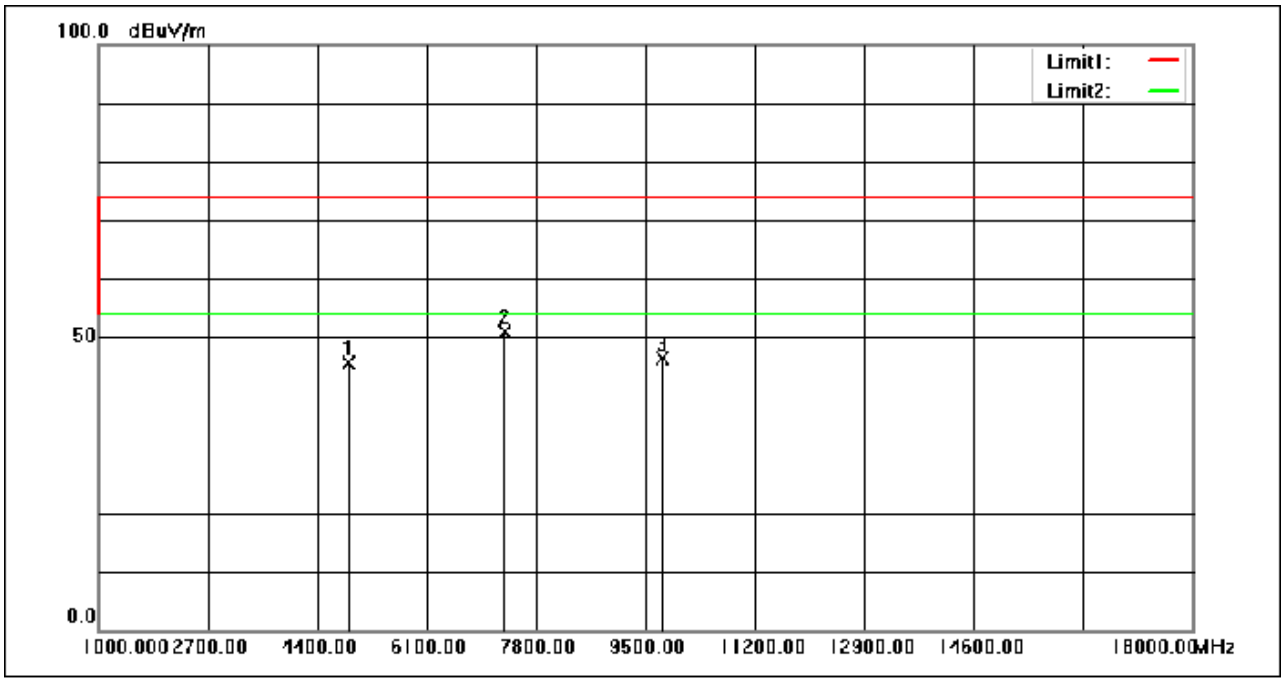
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	56.51	-10.28	46.23	74.00	-27.77	peak
2	7206.000	51.87	-7.10	44.77	74.00	-29.23	peak
3	9608.000	51.46	-4.96	46.50	74.00	-27.50	peak

Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:Low



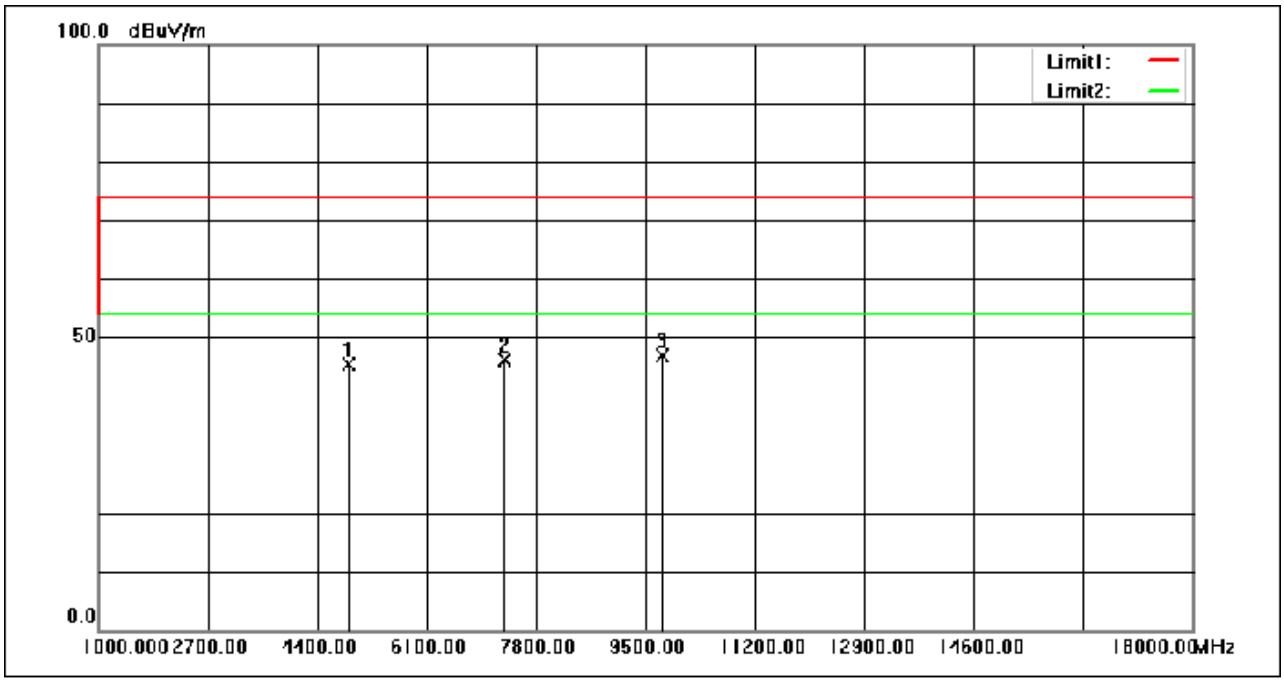
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	59.23	-10.28	48.95	74.00	-25.05	peak
2	7206.000	60.41	-7.10	53.31	74.00	-20.69	peak
3	9608.000	49.66	-4.96	44.70	74.00	-29.30	peak

Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:middle



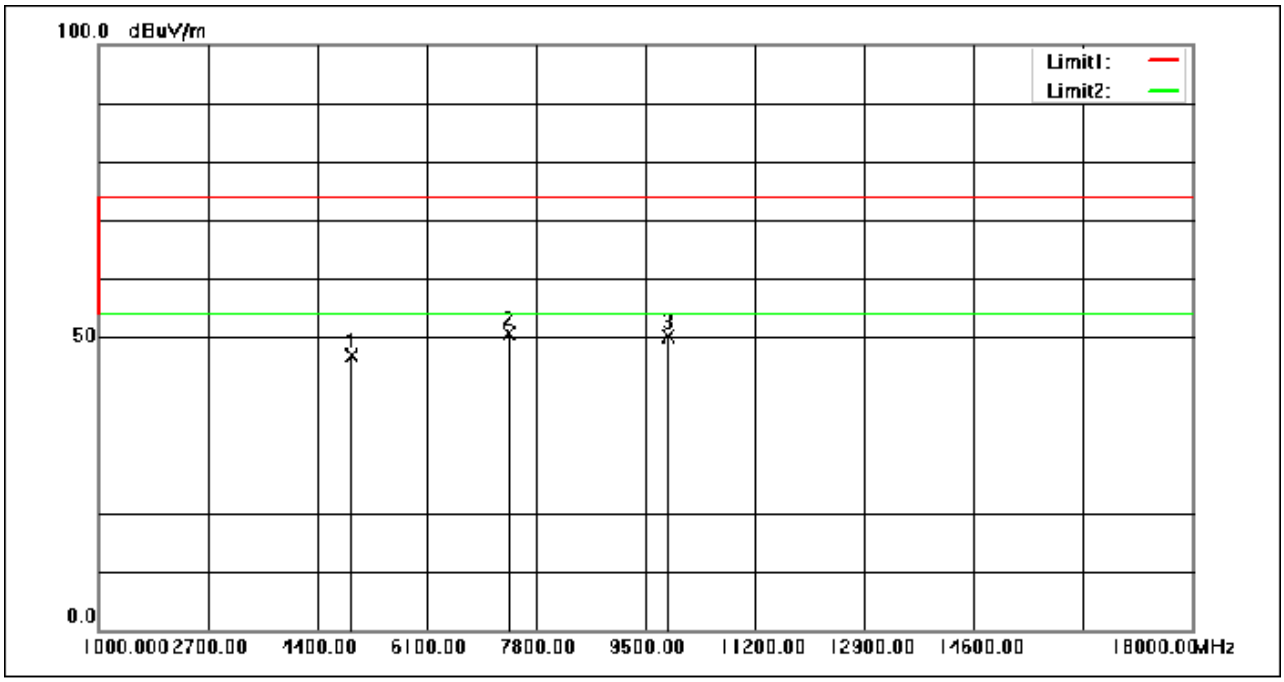
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	55.65	-9.98	45.67	74.00	-28.33	peak
2	7323.000	57.88	-6.91	50.97	74.00	-23.03	peak
3	9764.000	50.71	-4.23	46.48	74.00	-27.52	peak

Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:middle



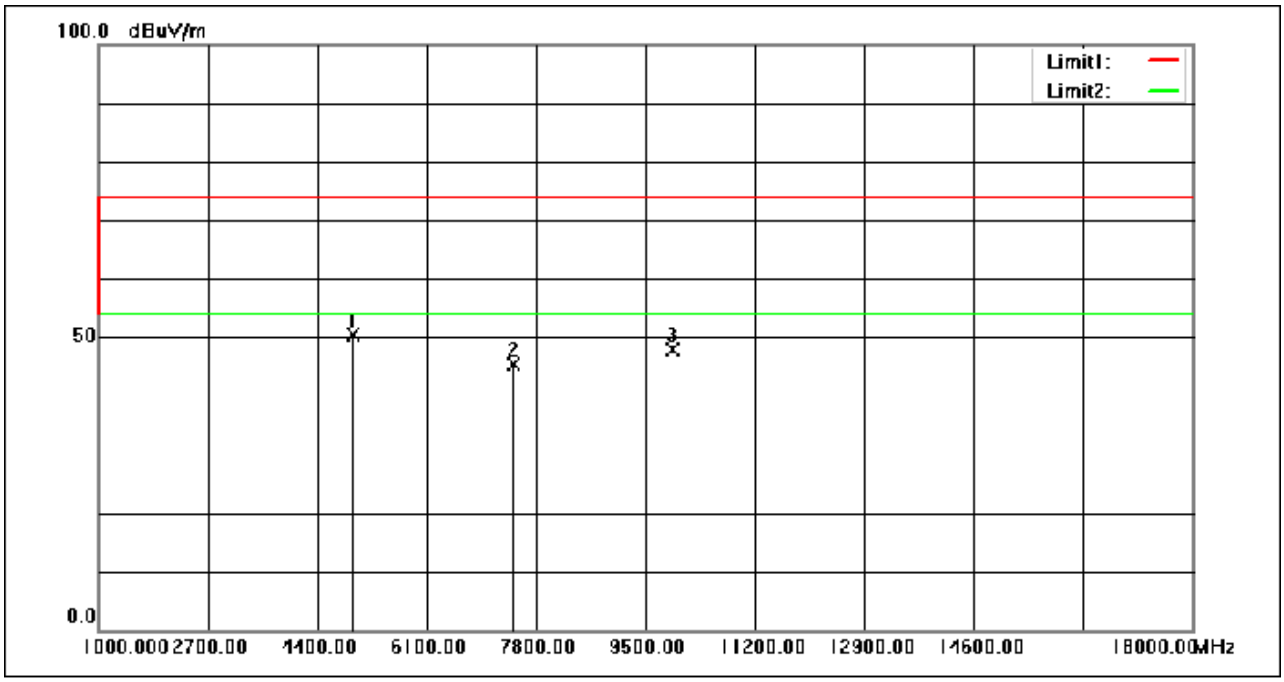
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	55.27	-9.98	45.29	74.00	-28.71	peak
2	7323.000	52.93	-6.91	46.02	74.00	-27.98	peak
3	9764.000	51.04	-4.23	46.81	74.00	-27.19	peak

Mode:b; Polarization:Horizontal; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	56.62	-9.82	46.80	74.00	-27.20	peak
2	7386.000	57.48	-6.80	50.68	74.00	-23.32	peak
3	9848.000	54.03	-3.84	50.19	74.00	-23.81	peak

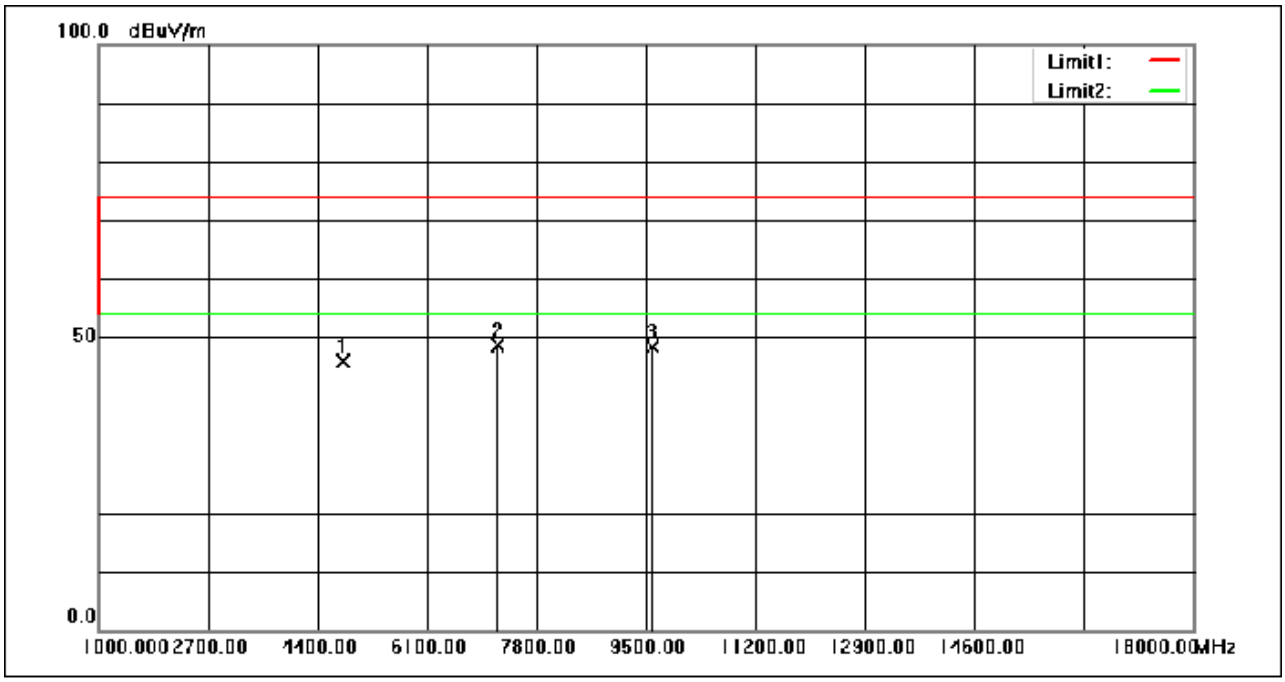
Mode:b; Polarization:Vertical; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	60.01	-9.68	50.33	74.00	-23.67	peak
2	7440.000	52.22	-6.72	45.50	74.00	-28.50	peak
3	9920.000	51.35	-3.50	47.85	74.00	-26.15	peak

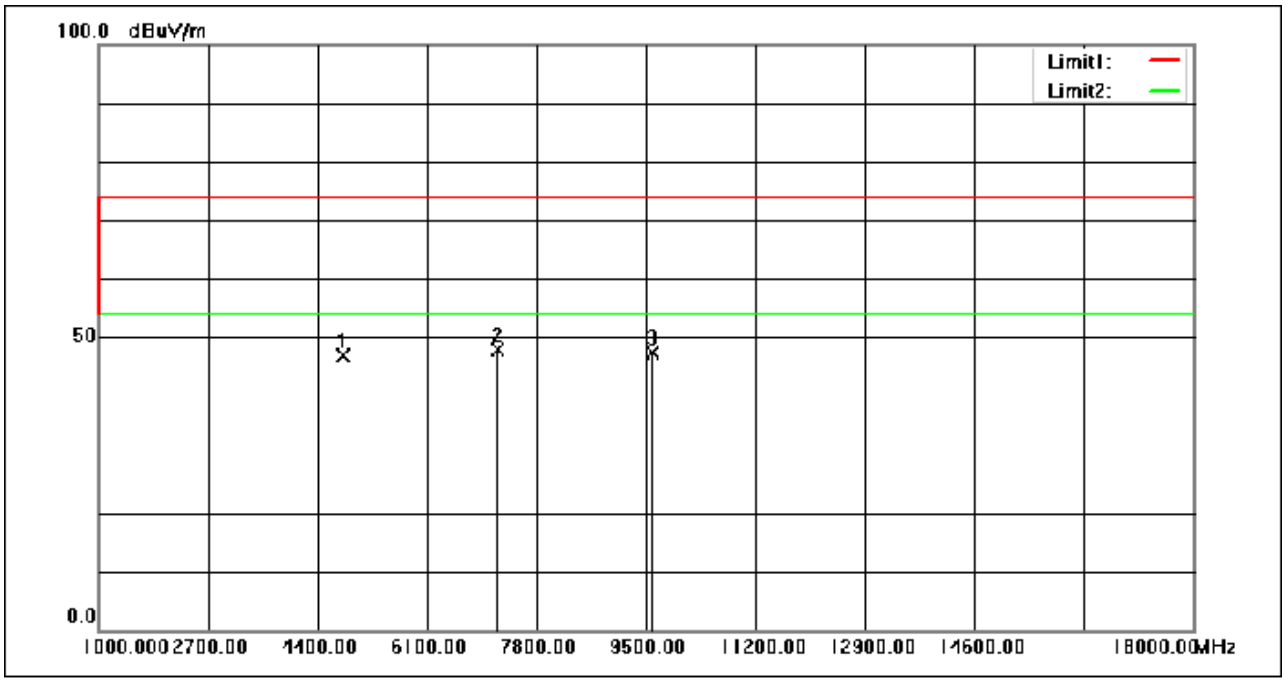
Adapter2

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



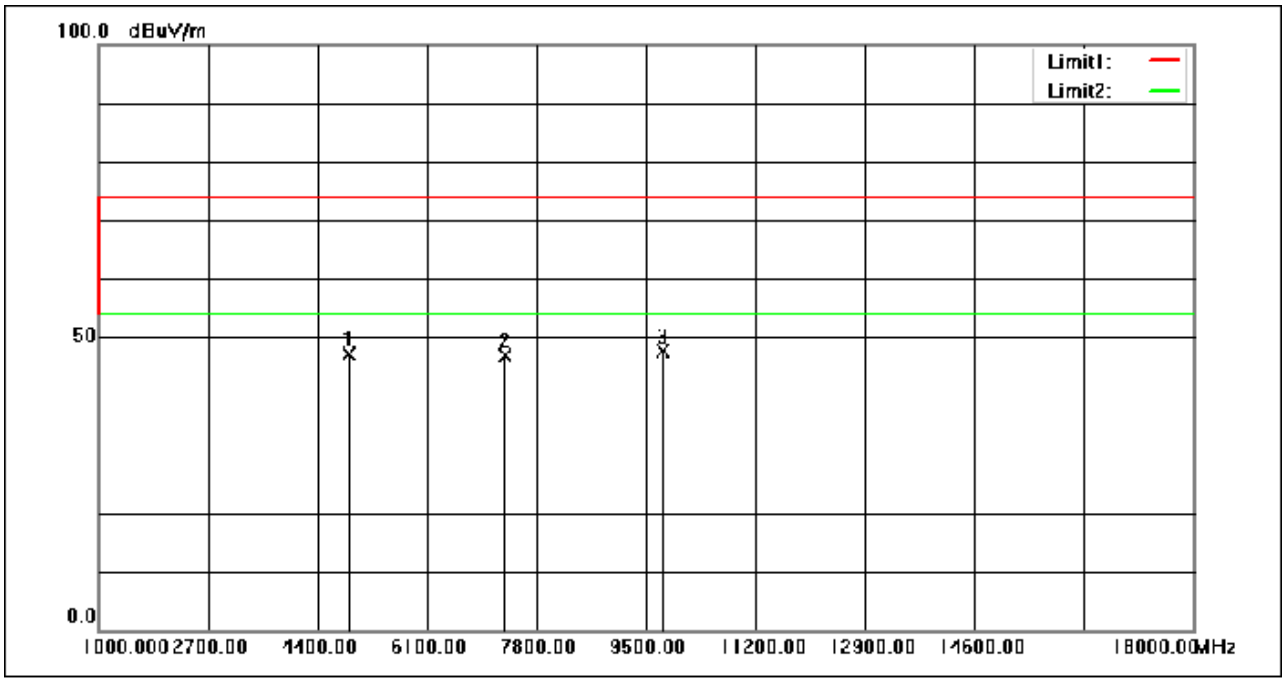
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	56.21	-10.28	45.93	74.00	-28.07	peak
2	7206.000	55.82	-7.10	48.72	74.00	-25.28	peak
3	9608.000	53.25	-4.96	48.29	74.00	-25.71	peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



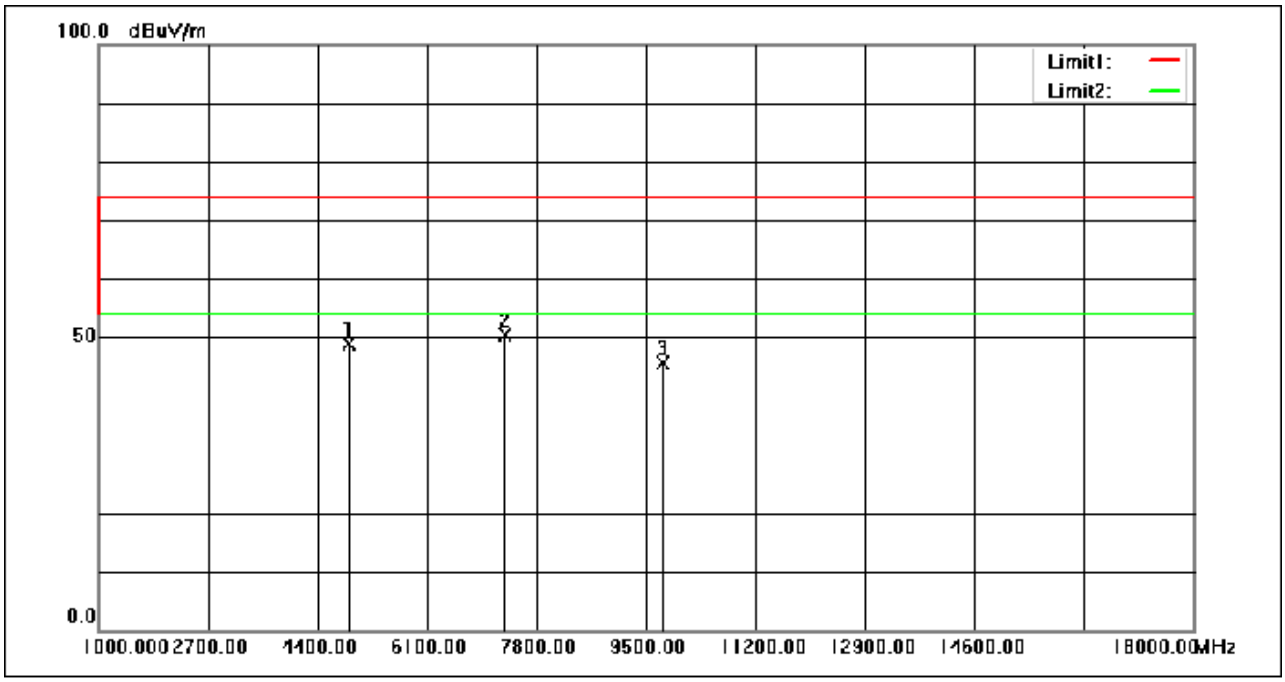
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	57.18	-10.28	46.90	74.00	-27.10	peak
2	7206.000	55.07	-7.10	47.97	74.00	-26.03	peak
3	9608.000	52.42	-4.96	47.46	74.00	-26.54	peak

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



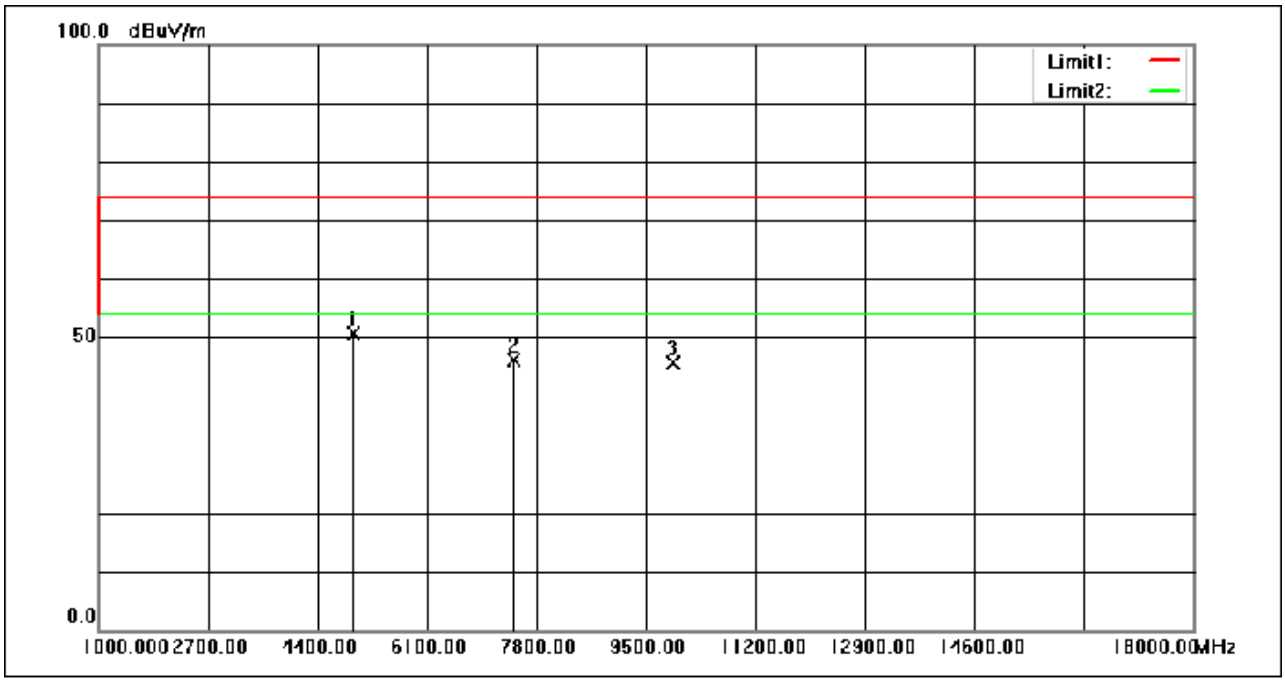
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	57.04	-9.98	47.06	74.00	-26.94	peak
2	7323.000	53.89	-6.91	46.98	74.00	-27.02	peak
3	9764.000	51.76	-4.23	47.53	74.00	-26.47	peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



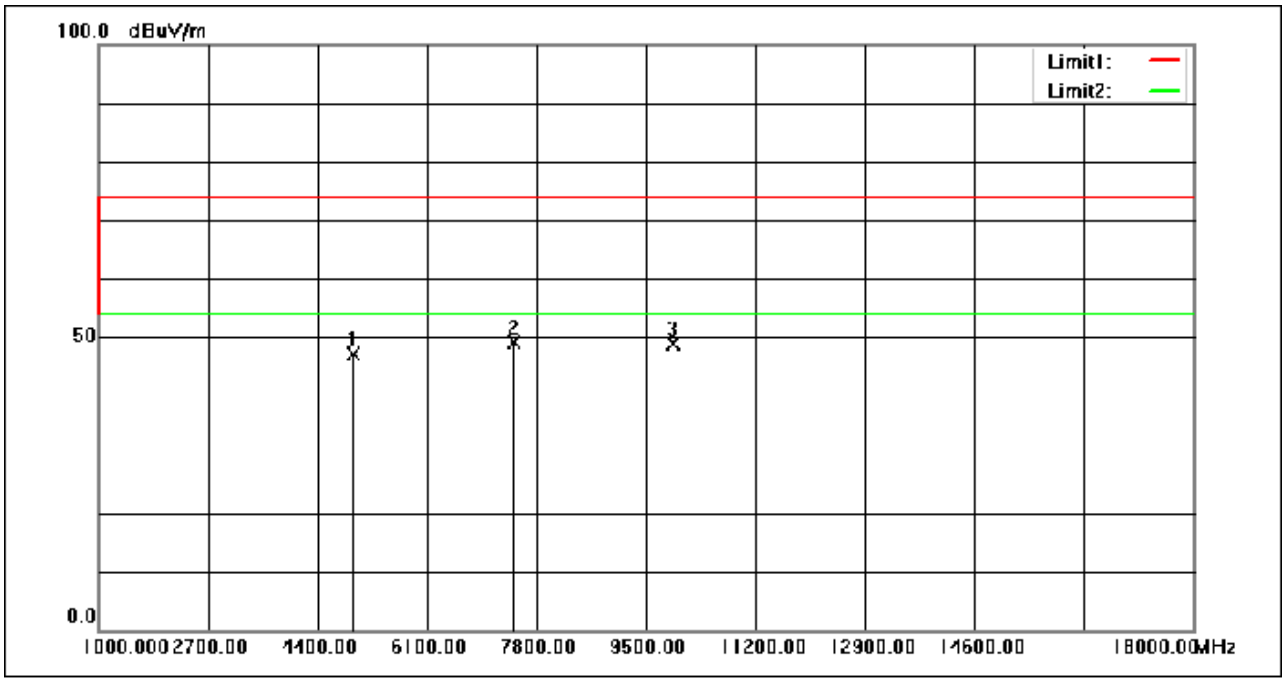
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	58.93	-9.98	48.95	74.00	-25.05	peak
2	7323.000	57.33	-6.91	50.42	74.00	-23.58	peak
3	9764.000	49.83	-4.23	45.60	74.00	-28.40	peak

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



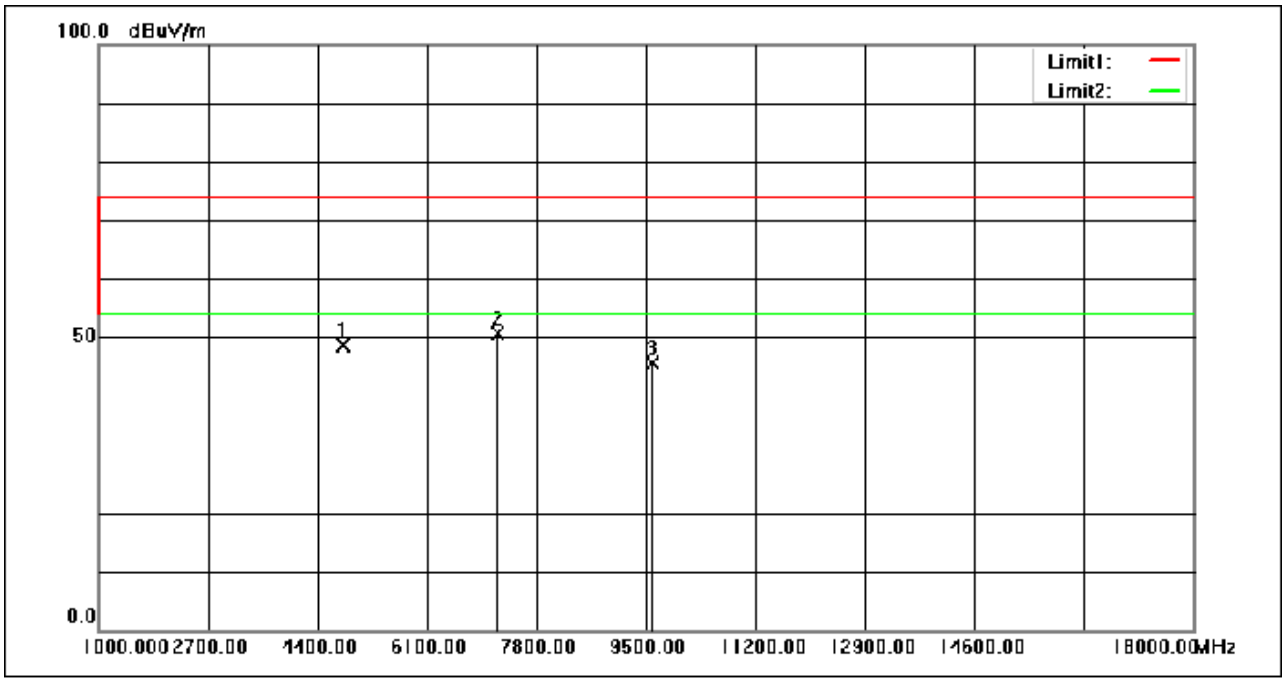
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	60.39	-9.68	50.71	74.00	-23.29	peak
2	7440.000	52.90	-6.72	46.18	74.00	-27.82	peak
3	9920.000	49.06	-3.50	45.56	74.00	-28.44	peak

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:High



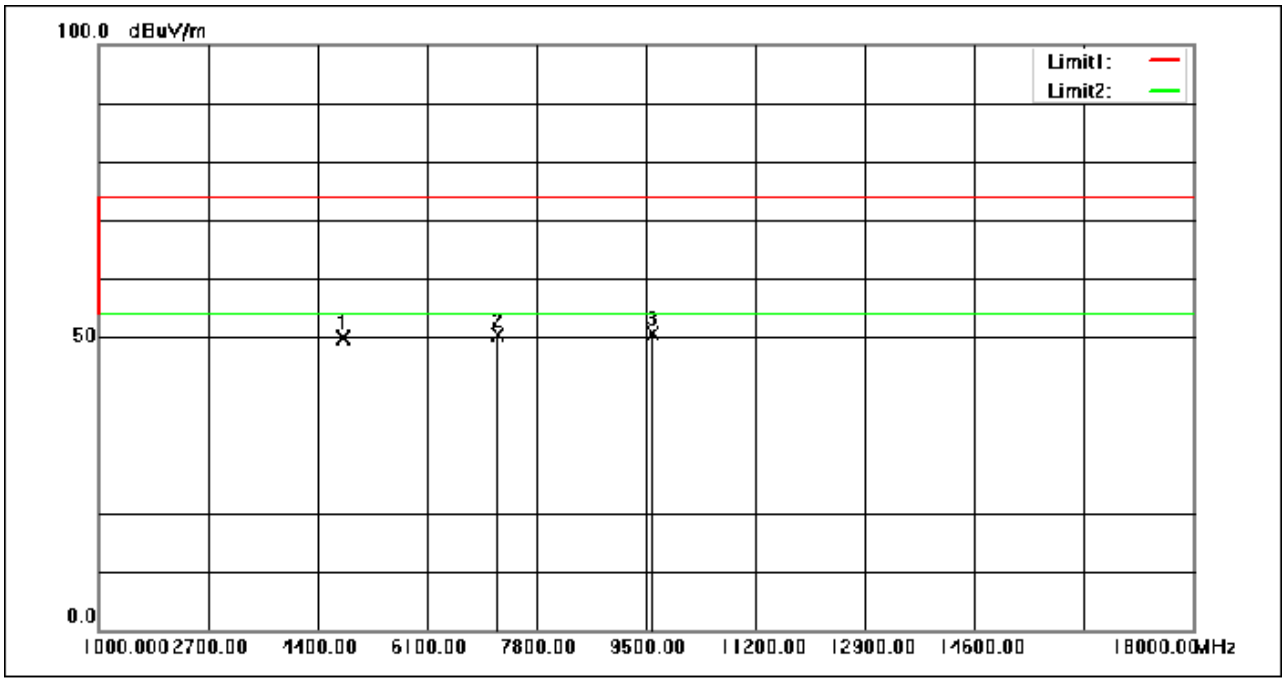
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	56.76	-9.68	47.08	74.00	-26.92	peak
2	7440.000	55.73	-6.72	49.01	74.00	-24.99	peak
3	9920.000	52.41	-3.50	48.91	74.00	-25.09	peak

Mode:c; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:Low



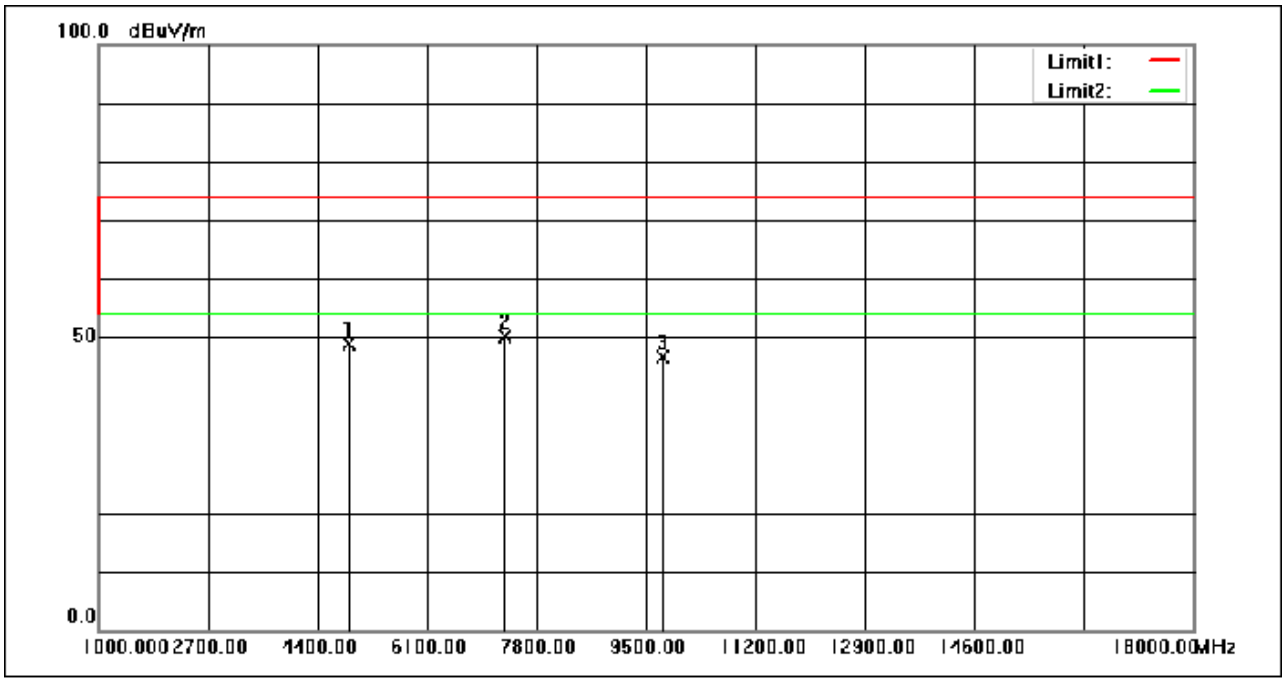
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	58.83	-10.28	48.55	74.00	-25.45	peak
2	7206.000	57.80	-7.10	50.70	74.00	-23.30	peak
3	9608.000	50.64	-4.96	45.68	74.00	-28.32	peak

Mode:c; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:Low



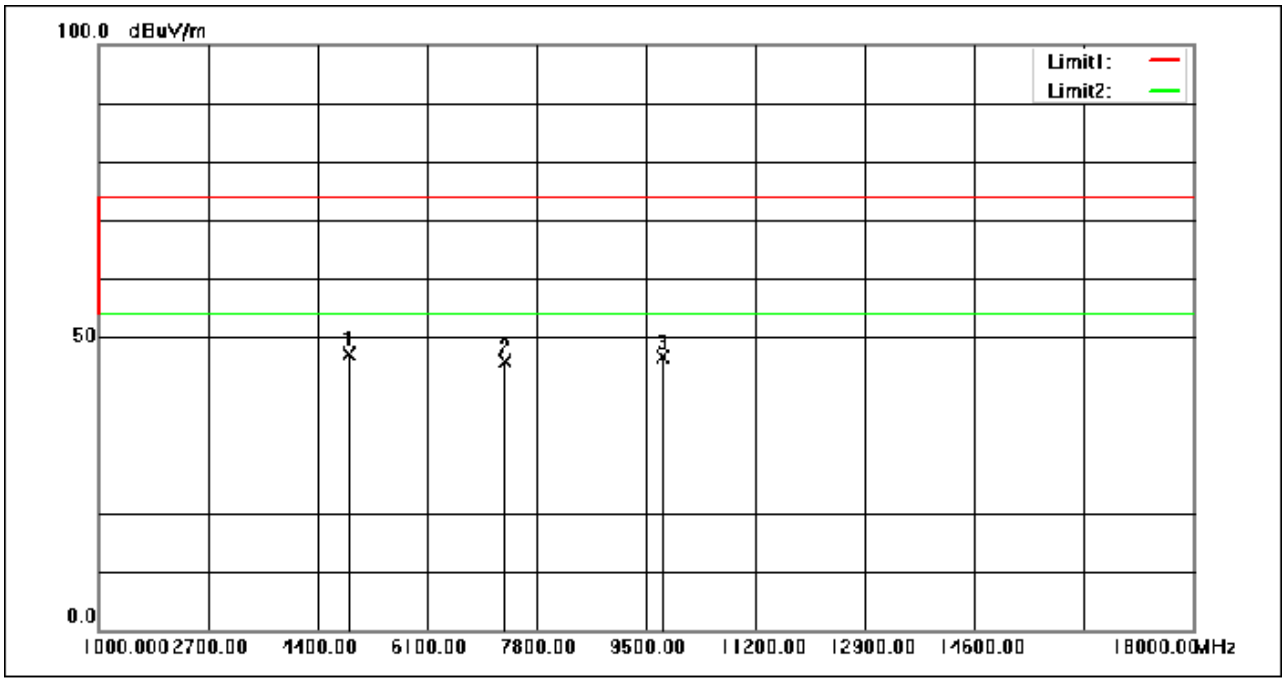
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	60.14	-10.28	49.86	74.00	-24.14	peak
2	7206.000	57.56	-7.10	50.46	74.00	-23.54	peak
3	9608.000	55.71	-4.96	50.75	74.00	-23.25	peak

Mode:c; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:middle



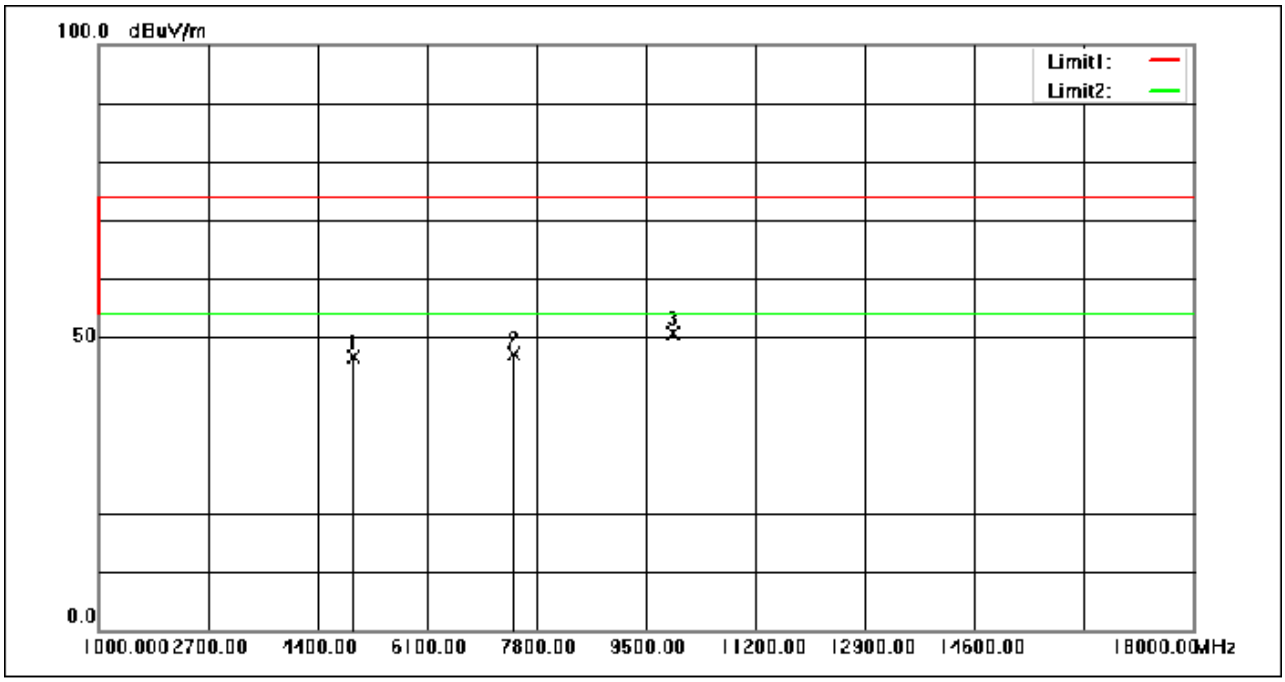
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	58.90	-9.98	48.92	74.00	-25.08	peak
2	7323.000	57.10	-6.91	50.19	74.00	-23.81	peak
3	9764.000	50.93	-4.23	46.70	74.00	-27.30	peak

Mode:c; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:middle



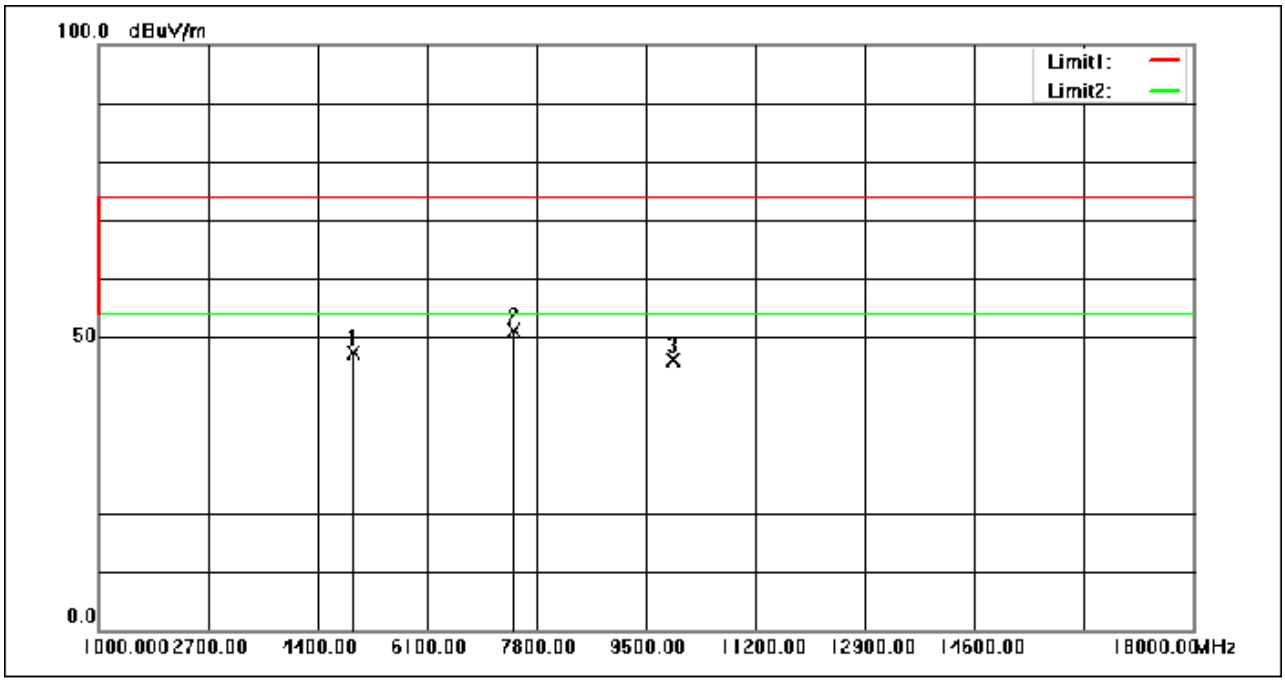
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	57.16	-9.98	47.18	74.00	-26.82	peak
2	7323.000	52.89	-6.91	45.98	74.00	-28.02	peak
3	9764.000	50.96	-4.23	46.73	74.00	-27.27	peak

Mode:c; Polarization:Horizontal; Modulation:π/4 DQPSK; ; Channel:High



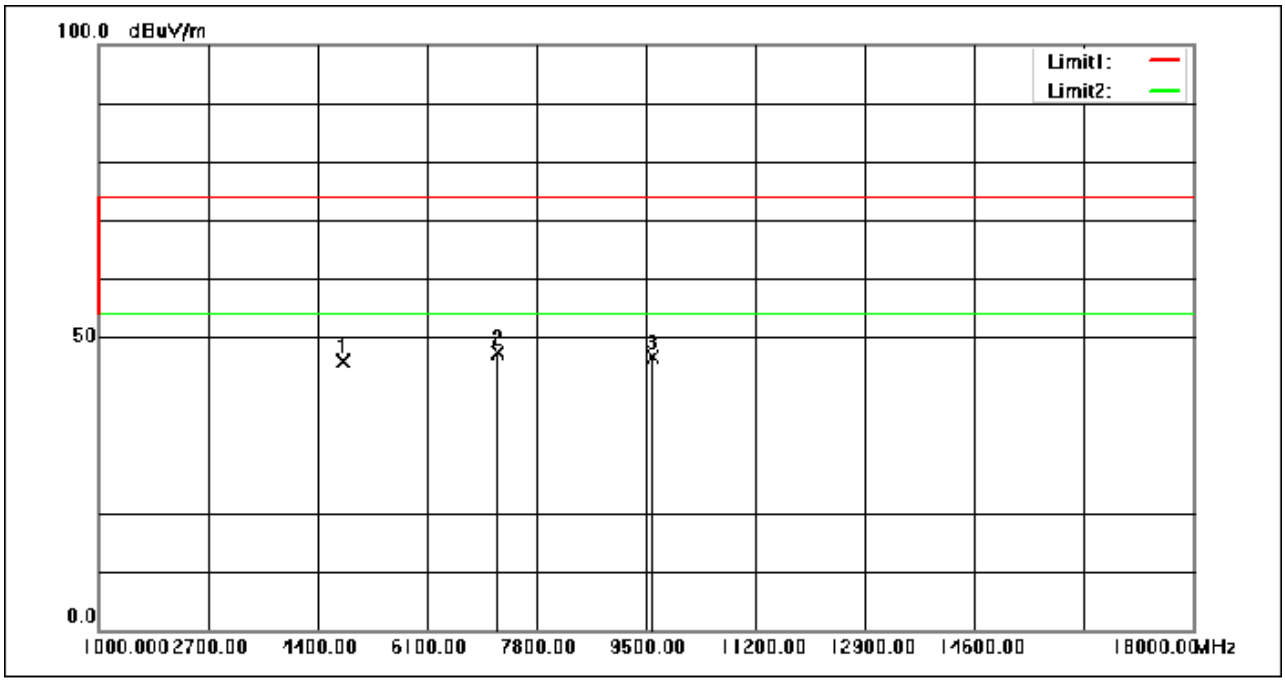
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	56.31	-9.68	46.63	74.00	-27.37	peak
2	7440.000	53.75	-6.72	47.03	74.00	-26.97	peak
3	9920.000	54.03	-3.50	50.53	74.00	-23.47	peak

Mode:c; Polarization:Vertical; Modulation:π/4 DQPSK; ; Channel:High



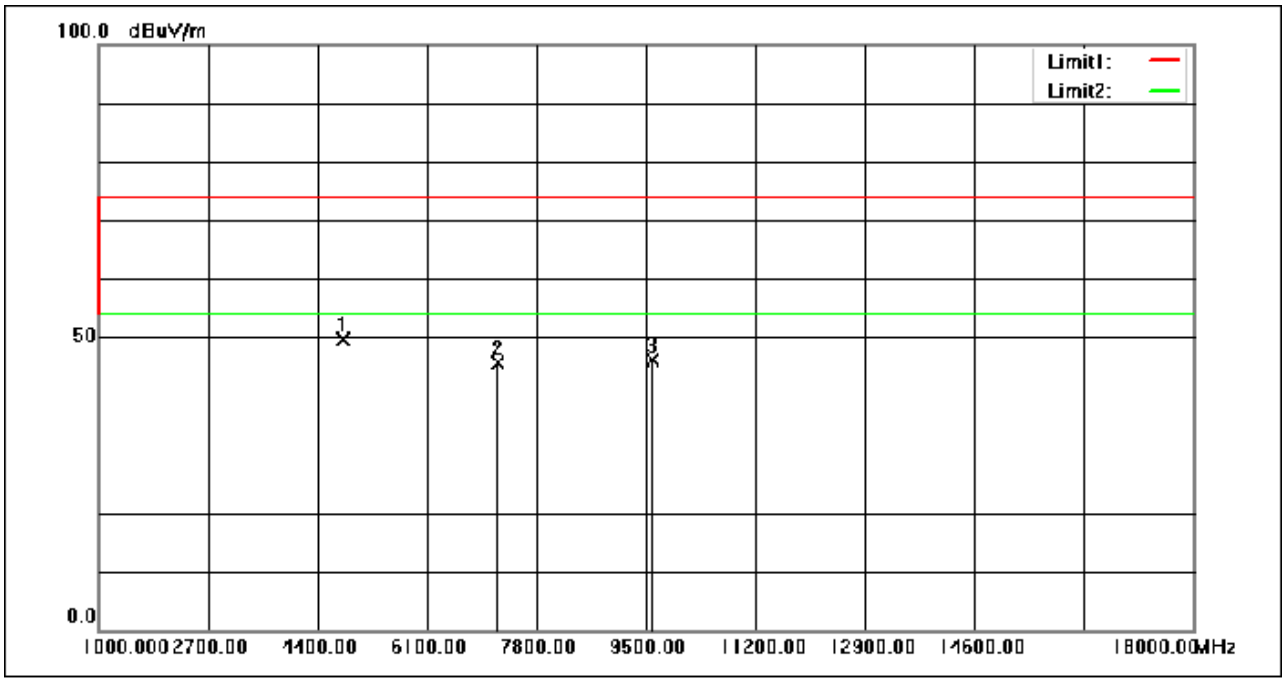
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	57.07	-9.68	47.39	74.00	-26.61	peak
2	7440.000	57.75	-6.72	51.03	74.00	-22.97	peak
3	9920.000	49.75	-3.50	46.25	74.00	-27.75	peak

Mode:c; Polarization:Horizontal; Modulation:8DPSK; ; Channel:Low



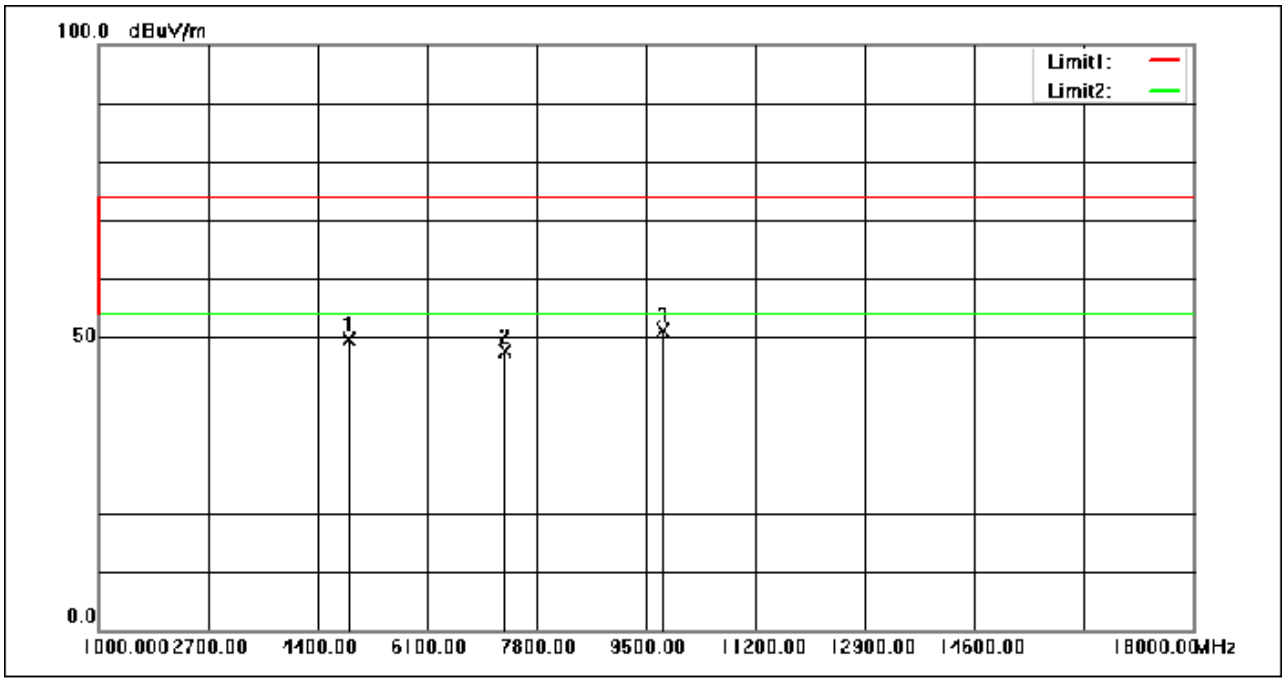
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	56.18	-10.28	45.90	74.00	-28.10	peak
2	7206.000	54.53	-7.10	47.43	74.00	-26.57	peak
3	9608.000	51.71	-4.96	46.75	74.00	-27.25	peak

Mode:c; Polarization:Vertical; Modulation:8DPSK; ; Channel:Low



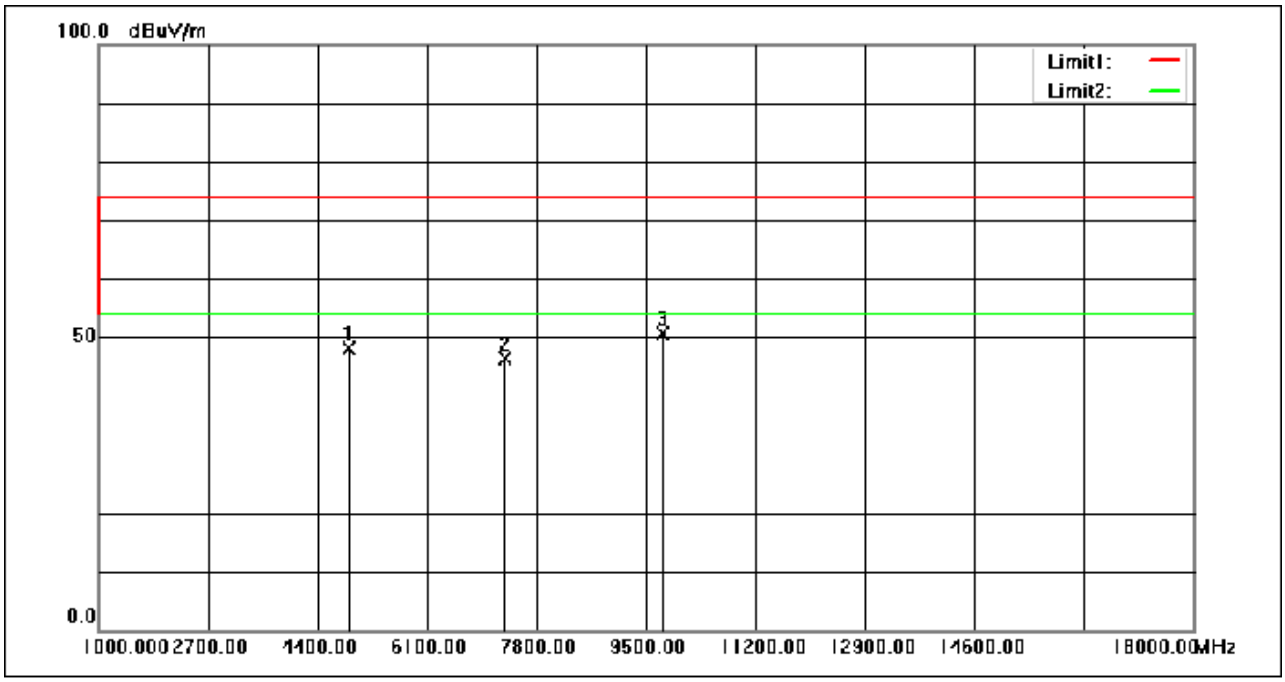
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	60.02	-10.28	49.74	74.00	-24.26	peak
2	7206.000	52.64	-7.10	45.54	74.00	-28.46	peak
3	9608.000	51.16	-4.96	46.20	74.00	-27.80	peak

Mode:c; Polarization:Horizontal; Modulation:8DPSK; ; Channel:middle



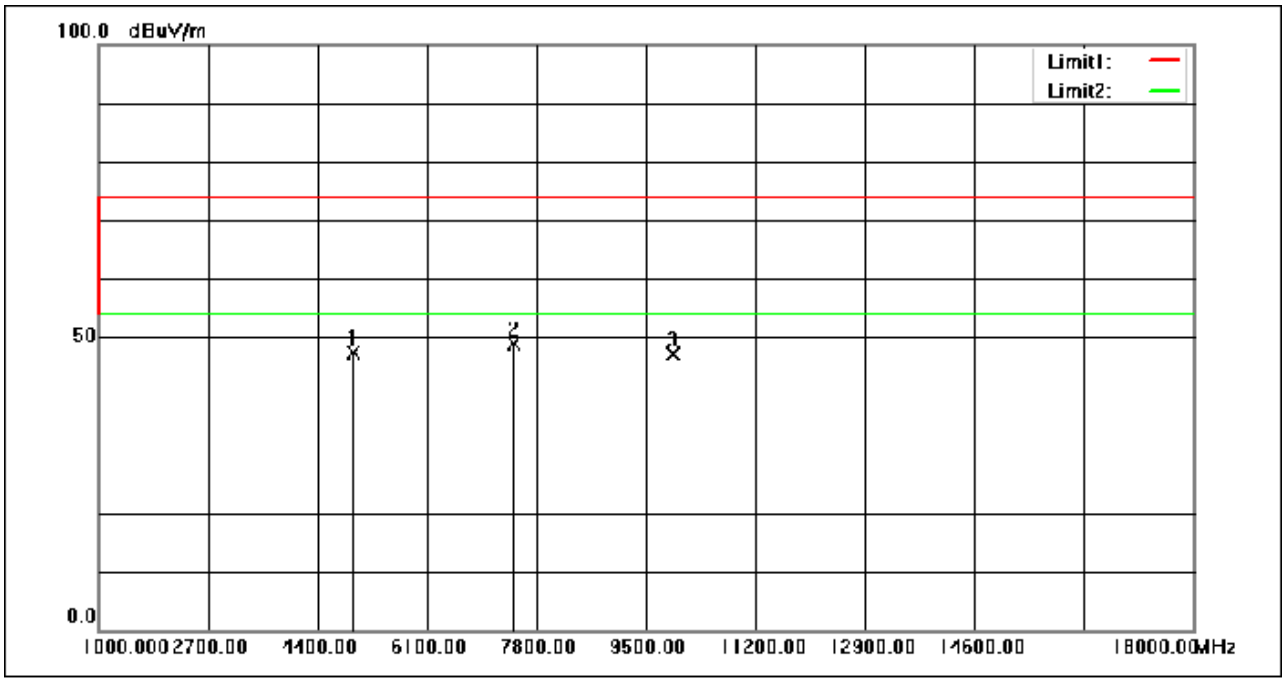
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	59.61	-9.98	49.63	74.00	-24.37	peak
2	7323.000	54.66	-6.91	47.75	74.00	-26.25	peak
3	9764.000	55.41	-4.23	51.18	74.00	-22.82	peak

Mode:c; Polarization:Vertical; Modulation:8DPSK; ; Channel:middle



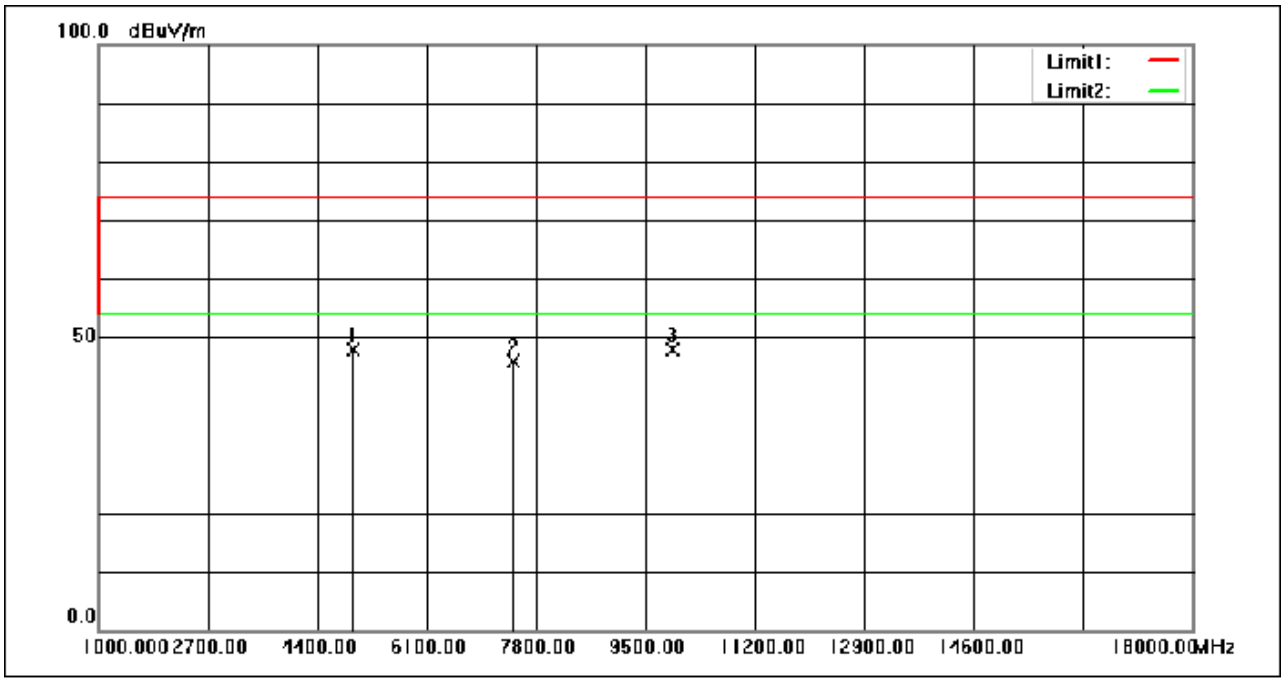
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	58.11	-9.98	48.13	74.00	-25.87	peak
2	7323.000	53.35	-6.91	46.44	74.00	-27.56	peak
3	9764.000	54.89	-4.23	50.66	74.00	-23.34	peak

Mode:c; Polarization:Horizontal; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	57.15	-9.68	47.47	74.00	-26.53	peak
2	7440.000	55.69	-6.72	48.97	74.00	-25.03	peak
3	9920.000	50.66	-3.50	47.16	74.00	-26.84	peak

Mode:c; Polarization:Vertical; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	57.53	-9.68	47.85	74.00	-26.15	peak
2	7440.000	52.58	-6.72	45.86	74.00	-28.14	peak
3	9920.000	51.45	-3.50	47.95	74.00	-26.05	peak

7.11 99% Bandwidth

Test Requirement RSS-Gen Section 6.7

Test Method: ANSI C63.10 Section 6.9.3

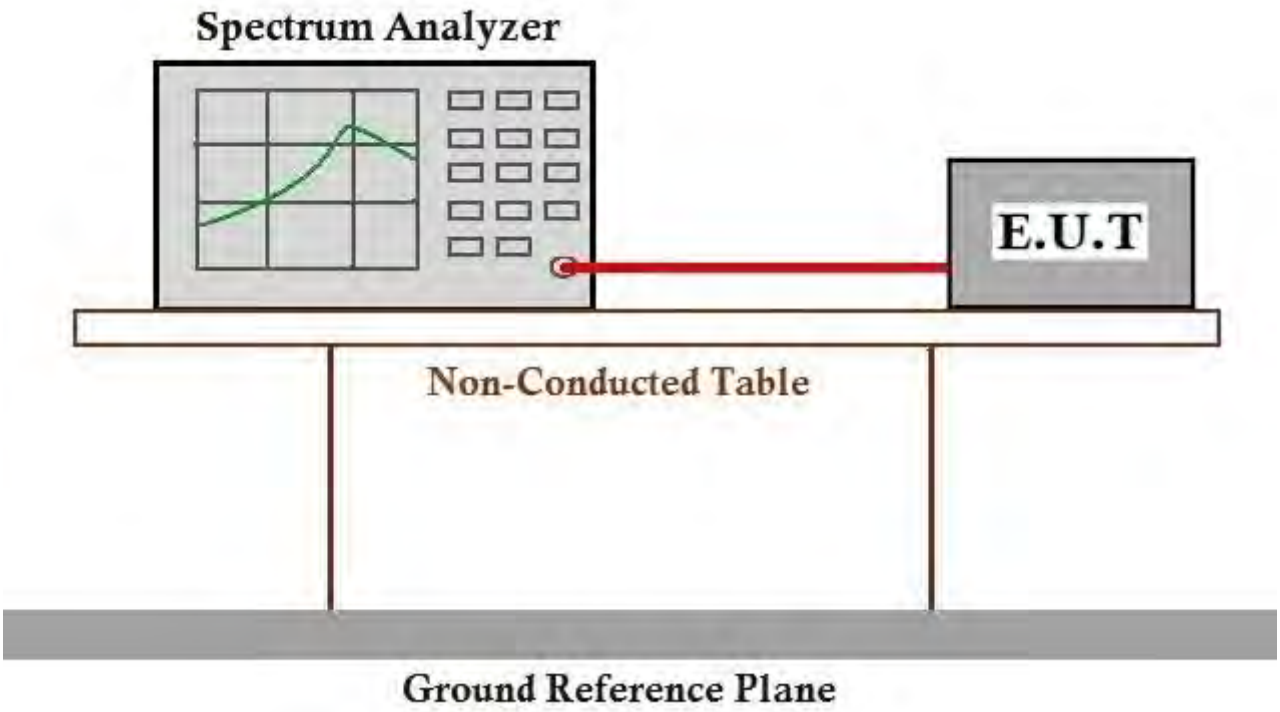
7.11.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, π/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.11.2 Test Setup Diagram



7.11.3 Measurement Procedure and Data

The detailed test data see: Appendix A for SHEM200300180801

8 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

9 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

Appendix A for SHEM200300180801

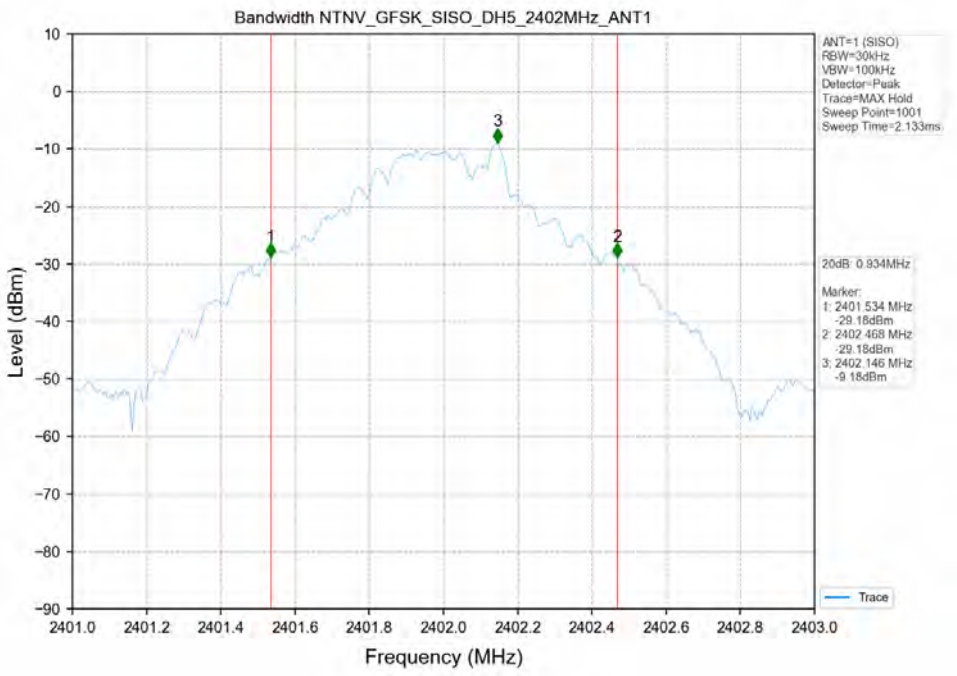
1. Bandwidth

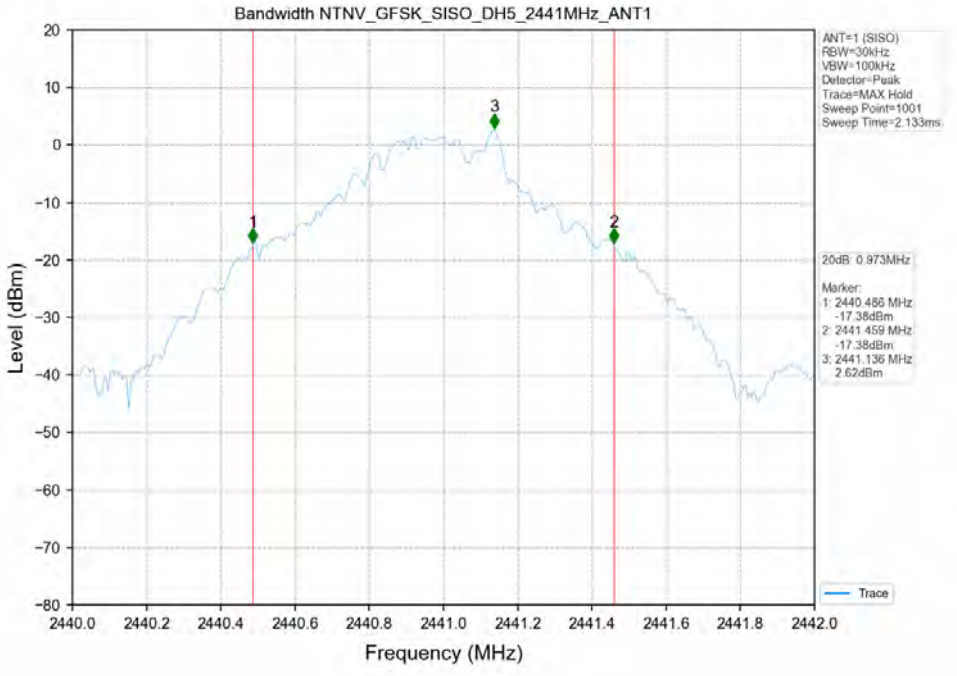
1.1 Test Result

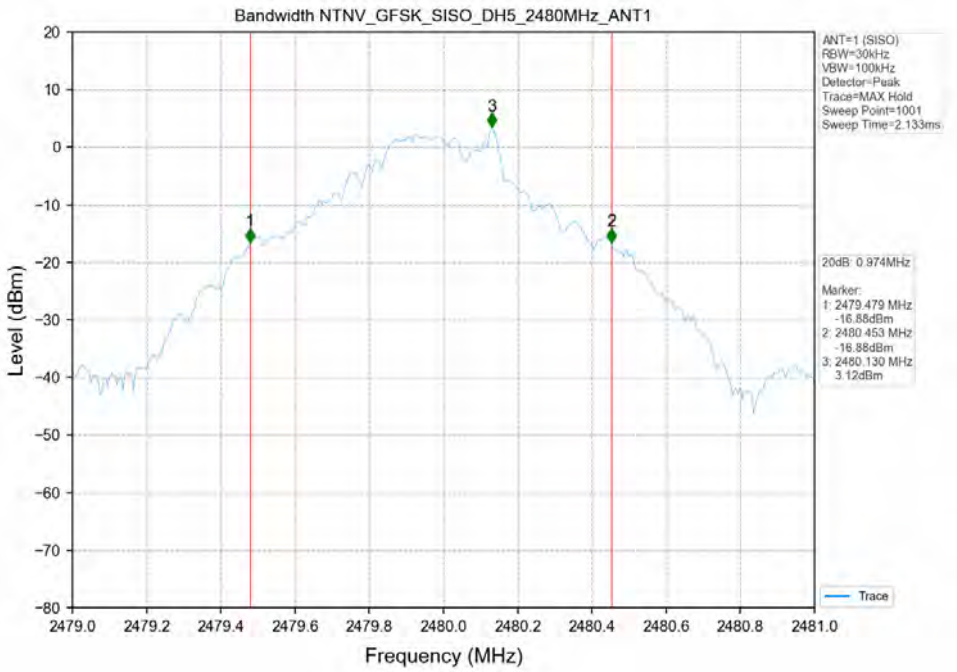
Test Mode	Frequency (MHz)	TX Type	ANT No.	20dB Bandwidth Test Result (MHz)	Verdict
GFSK	2402	SISO	1	0.934	PASS
	2441	SISO	1	0.973	PASS
	2480	SISO	1	0.974	PASS
Pi/4DQPSK	2402	SISO	1	1.342	PASS
	2441	SISO	1	1.349	PASS
	2480	SISO	1	1.350	PASS
8DPSK	2402	SISO	1	1.308	PASS
	2441	SISO	1	1.304	PASS
	2480	SISO	1	1.302	PASS

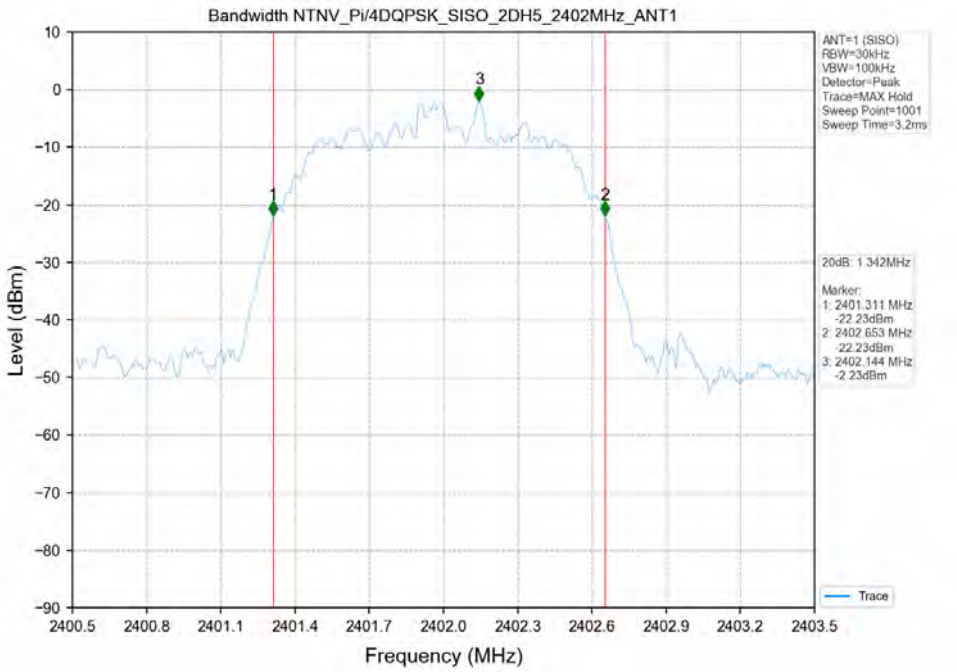
Test Mode	Frequency (MHz)	TX Type	ANT No.	99% Occupied Bandwidth Test Result (MHz)	
GFSK	2402	SISO	1	0.886	Only for Report Use
	2441	SISO	1	0.885	Only for Report Use
	2480	SISO	1	0.891	Only for Report Use
Pi/4DQPSK	2402	SISO	1	1.192	Only for Report Use
	2441	SISO	1	1.197	Only for Report Use
	2480	SISO	1	1.203	Only for Report Use
8DPSK	2402	SISO	1	1.199	Only for Report Use
	2441	SISO	1	1.198	Only for Report Use
	2480	SISO	1	1.216	Only for Report Use

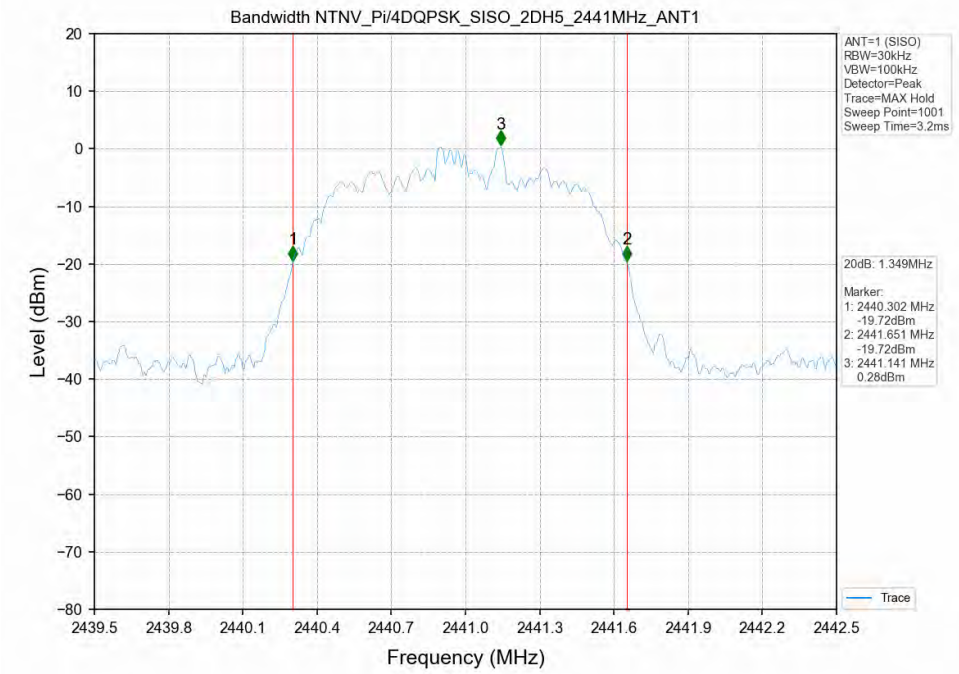
1.2 Test Graph - 20dB Bandwidth

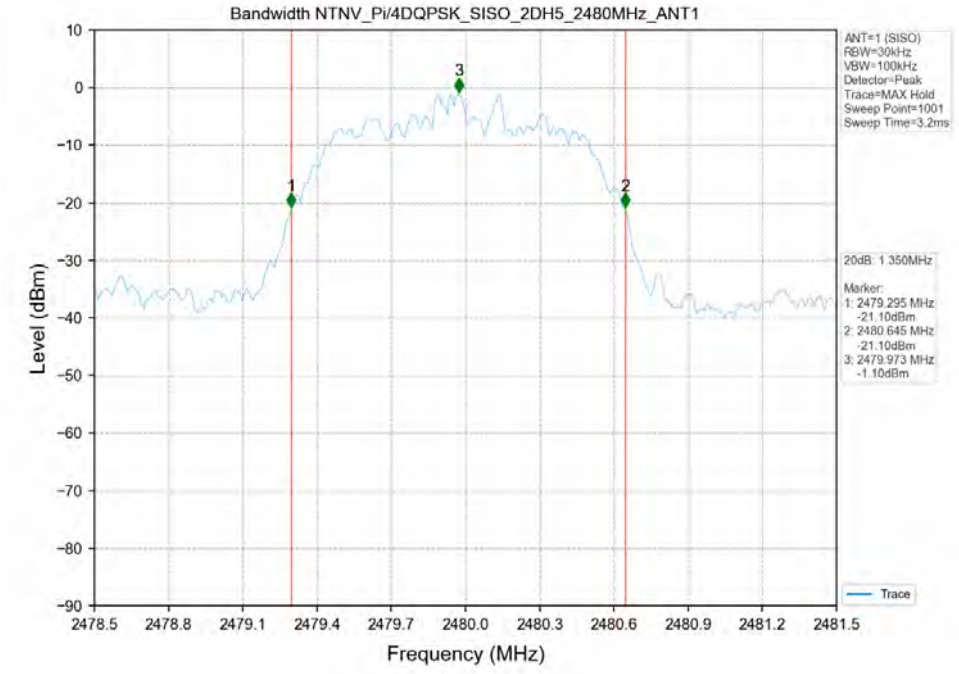


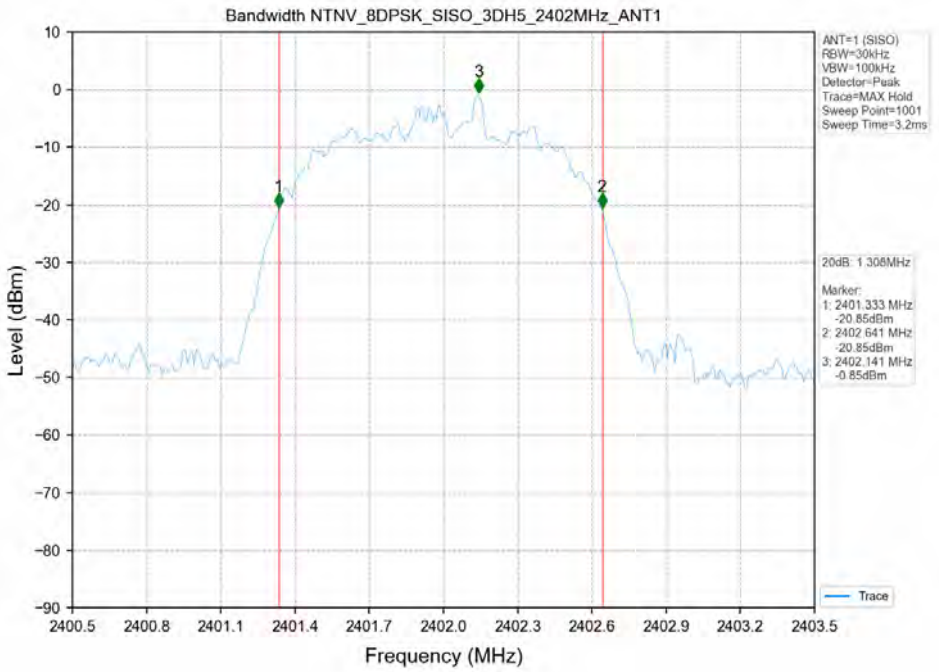


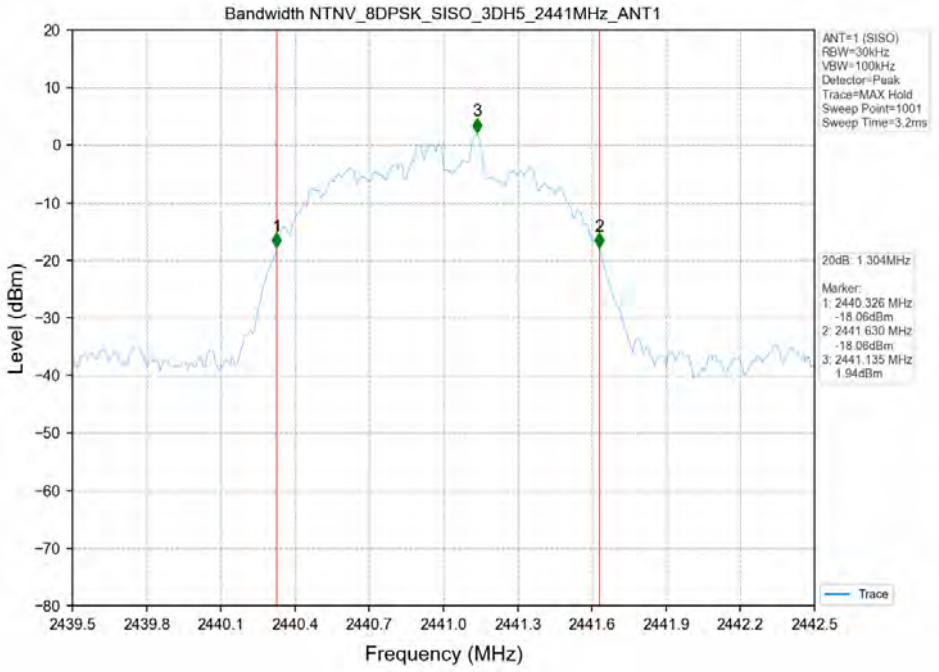

Bandwidth NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.133ms
20dB: 0.974MHz
Marker:
1: 2479.479 MHz
-16.88dBm
2: 2480.453 MHz
-16.88dBm
3: 2480.130 MHz
3.12dBm
Trace
Level (dBm)
Frequency (MHz)

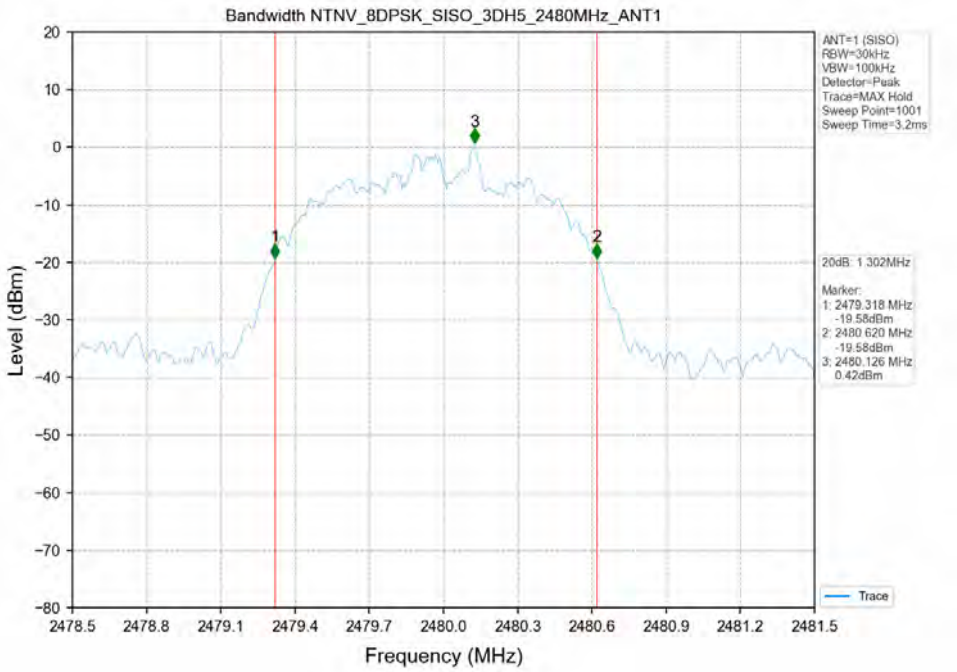

Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
20dB: 1.342MHz
Marker:
1: 2401.311 MHz
-22.23dBm
2: 2402.653 MHz
-22.23dBm
3: 2402.144 MHz
-2.23dBm
Trace
Level (dBm)
Frequency (MHz)


Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
20dB: 1.349MHz
Marker:
1: 2440.302 MHz
-19.72dBm
2: 2441.651 MHz
-19.72dBm
3: 2441.141 MHz
0.28dBm
Trace
Level (dBm)
Frequency (MHz)

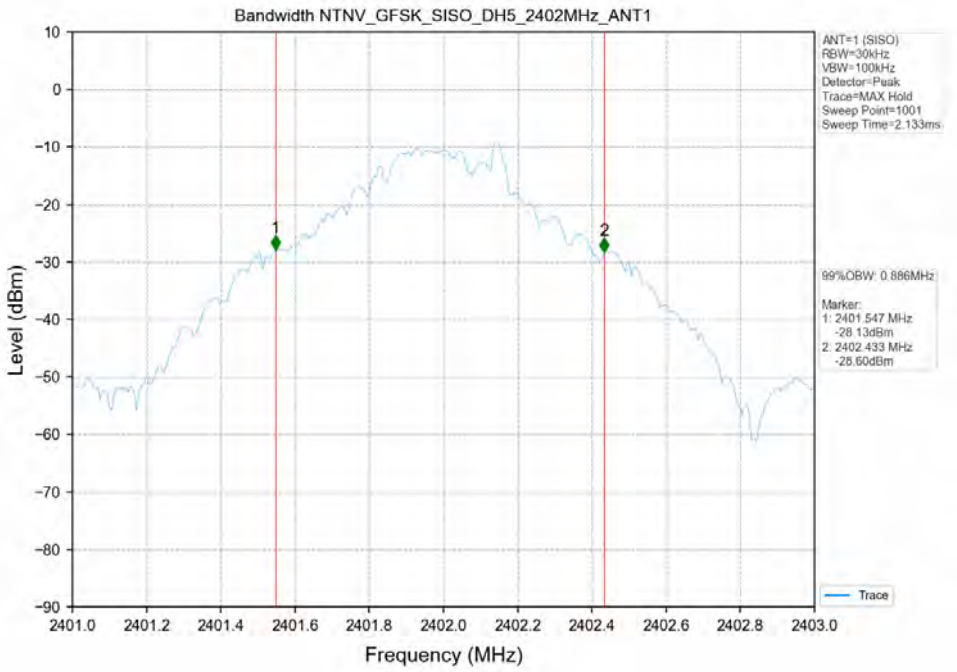

Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
20dB: 1.350MHz
Marker:
1: 2479.295 MHz
-21.10dBm
2: 2480.645 MHz
-21.10dBm
3: 2479.973 MHz
-1.10dBm
Trace
Level (dBm)
Frequency (MHz)

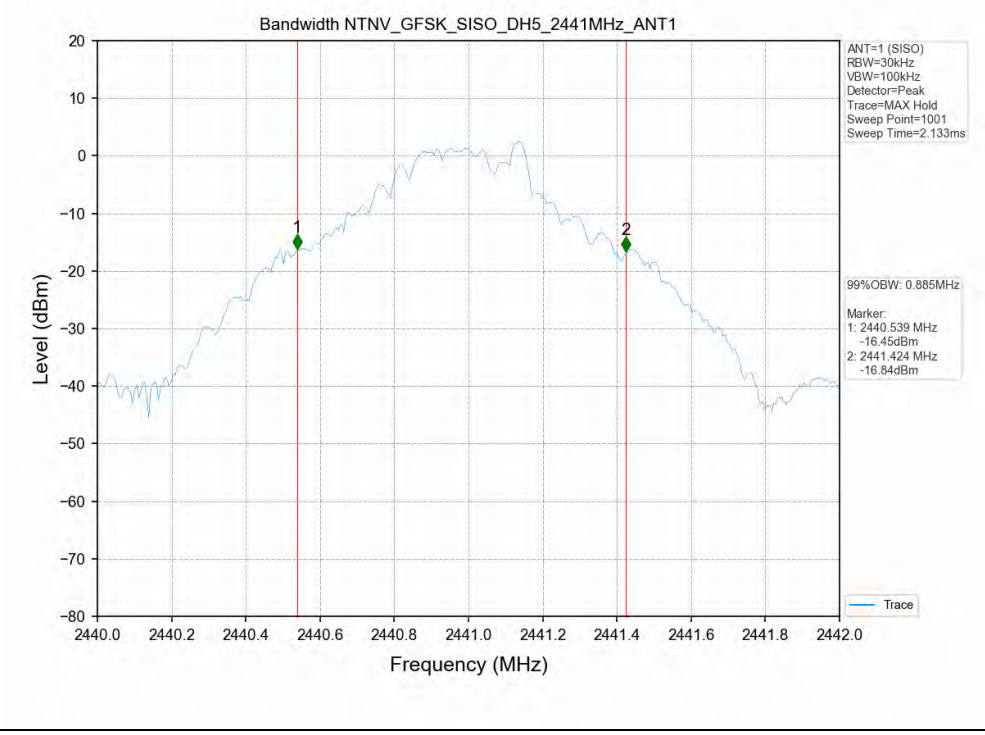

Bandwidth NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
20dB: 1.308MHz
Marker:
1: 2401.333 MHz
-20.85dBm
2: 2402.641 MHz
-20.85dBm
3: 2402.141 MHz
-0.85dBm
Trace
Level (dBm)
Frequency (MHz)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
2400.5
2400.8
2401.1
2401.4
2401.7
2402.0
2402.3
2402.6
2402.9
2403.2
2403.5

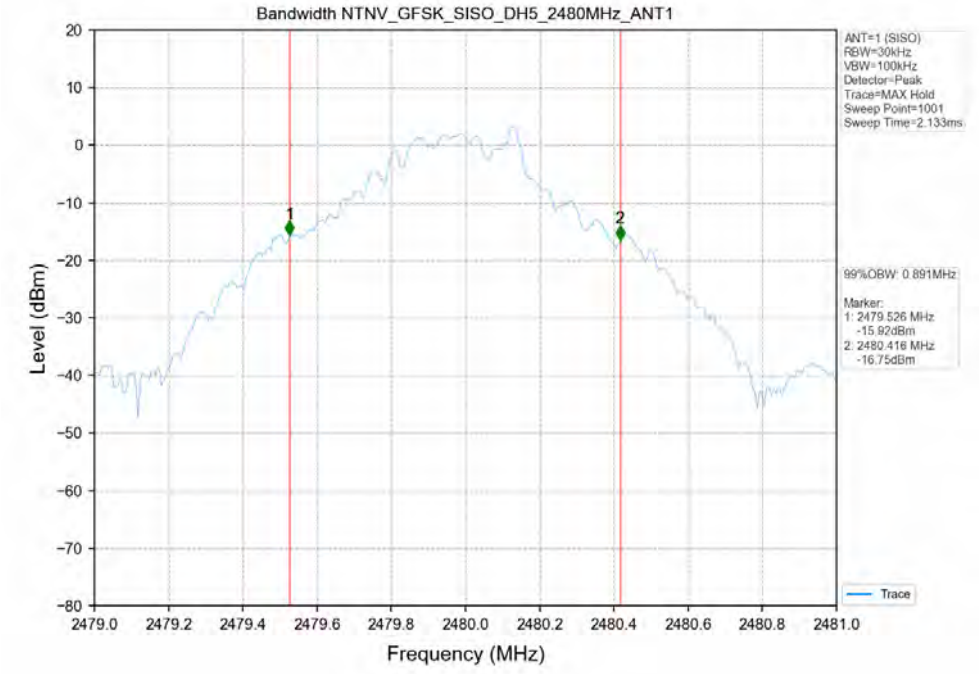

Bandwidth NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
20dB: 1.304MHz
Marker:
1: 2440.326 MHz
-18.06dBm
2: 2441.630 MHz
-18.06dBm
3: 2441.135 MHz
1.94dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2439.5
2439.8
2440.1
2440.4
2440.7
2441.0
2441.3
2441.6
2441.9
2442.2
2442.5

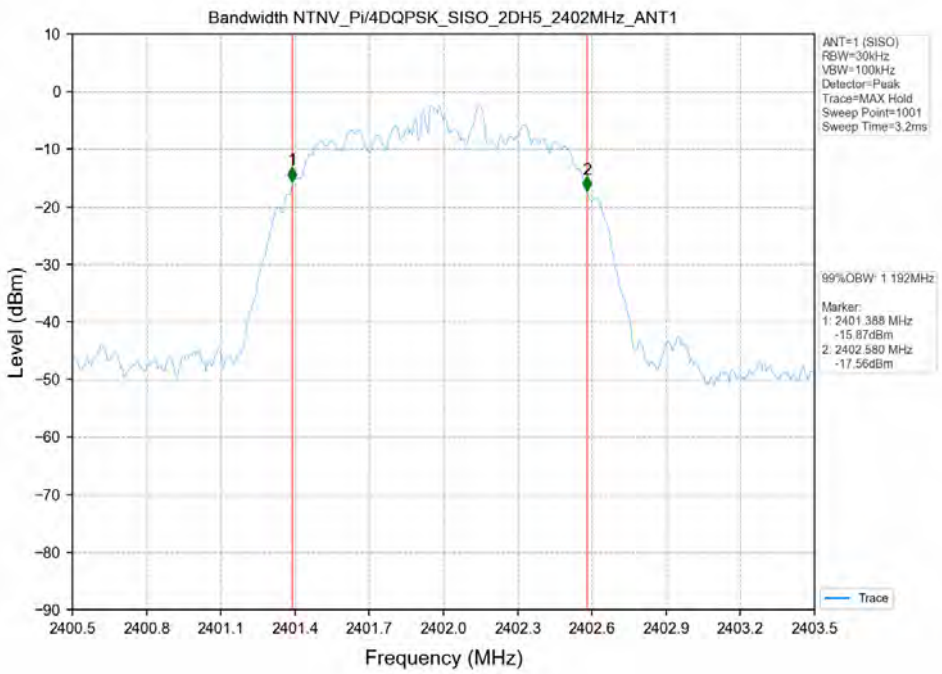


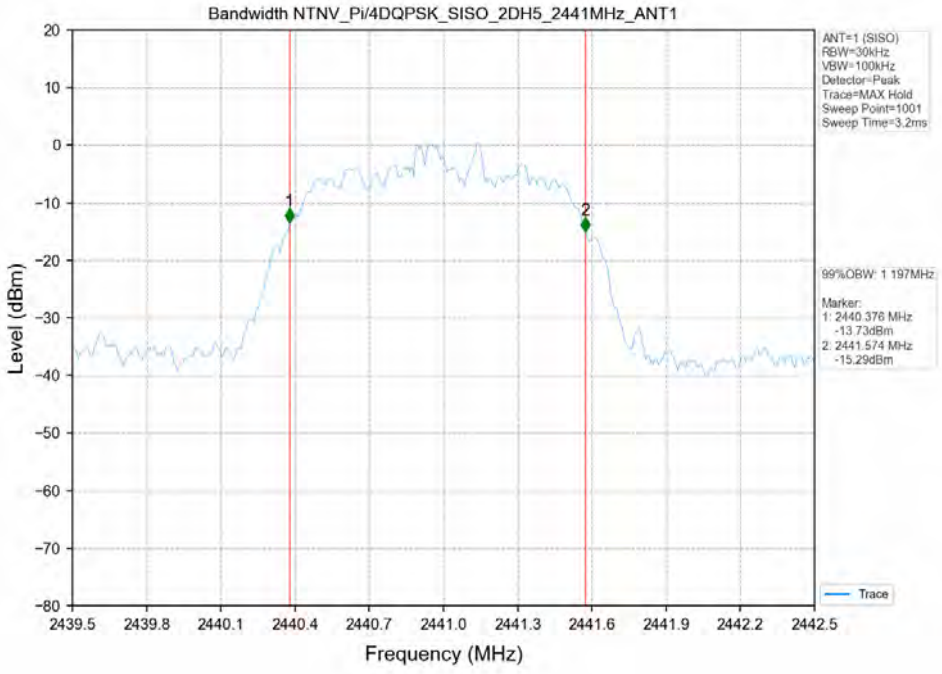
1.3 Test Graph - 99% Occupied Bandwidth

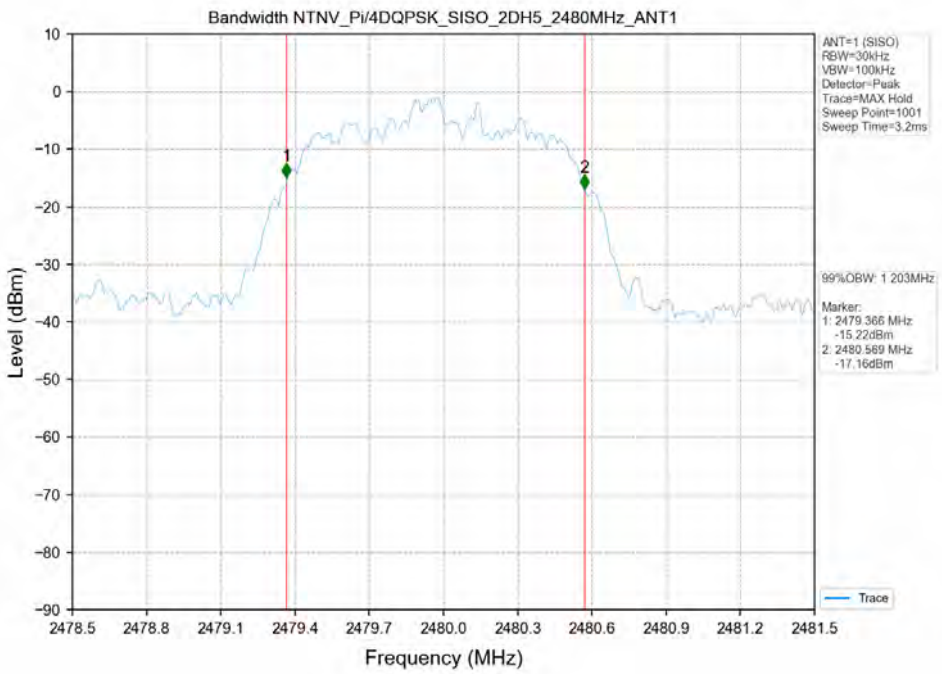


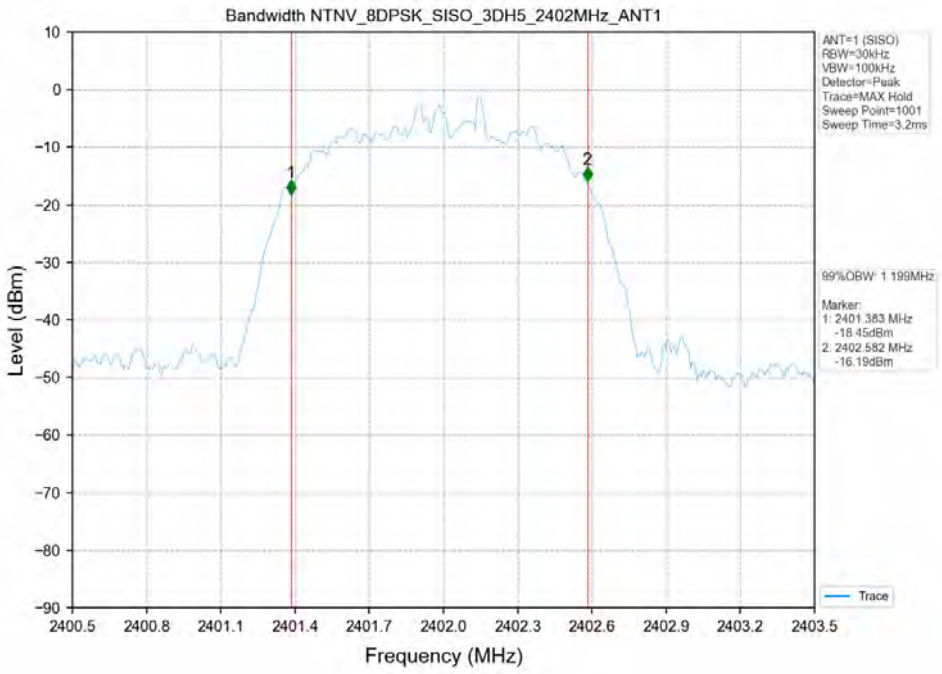

Bandwidth NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.133ms
99%OBW: 0.885MHz
Marker:
1: 2440.539 MHz
-16.45dBm
2: 2441.424 MHz
-16.84dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2440.0
2440.2
2440.4
2440.6
2440.8
2441.0
2441.2
2441.4
2441.6
2441.8
2442.0

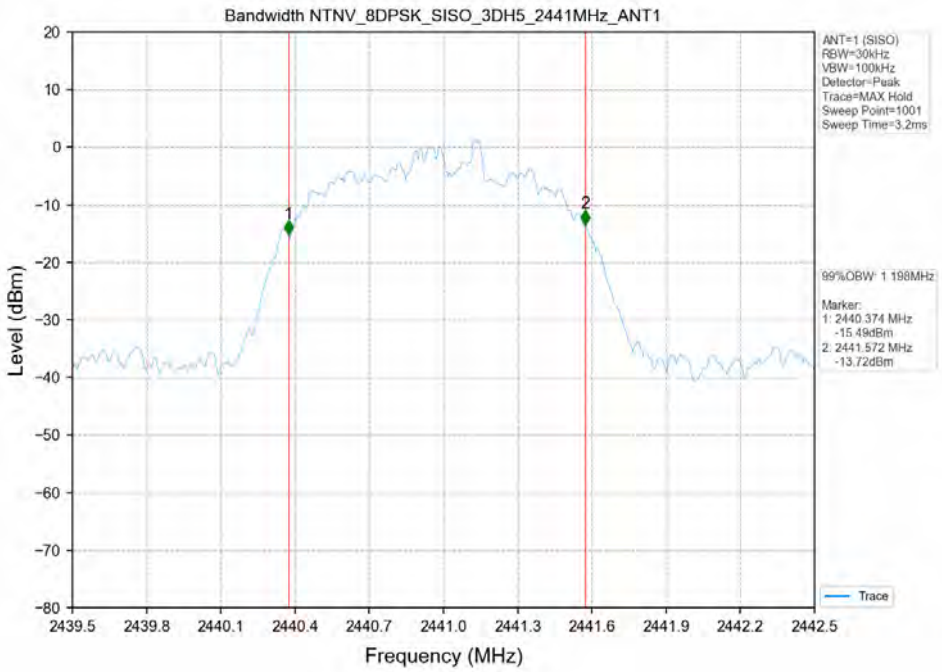

Bandwidth NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.133ms
99%OBW: 0.891MHz
Marker:
1: 2479.526 MHz
-15.92dBm
2: 2480.416 MHz
-16.75dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2479.0
2479.2
2479.4
2479.6
2479.8
2480.0
2480.2
2480.4
2480.6
2480.8
2481.0

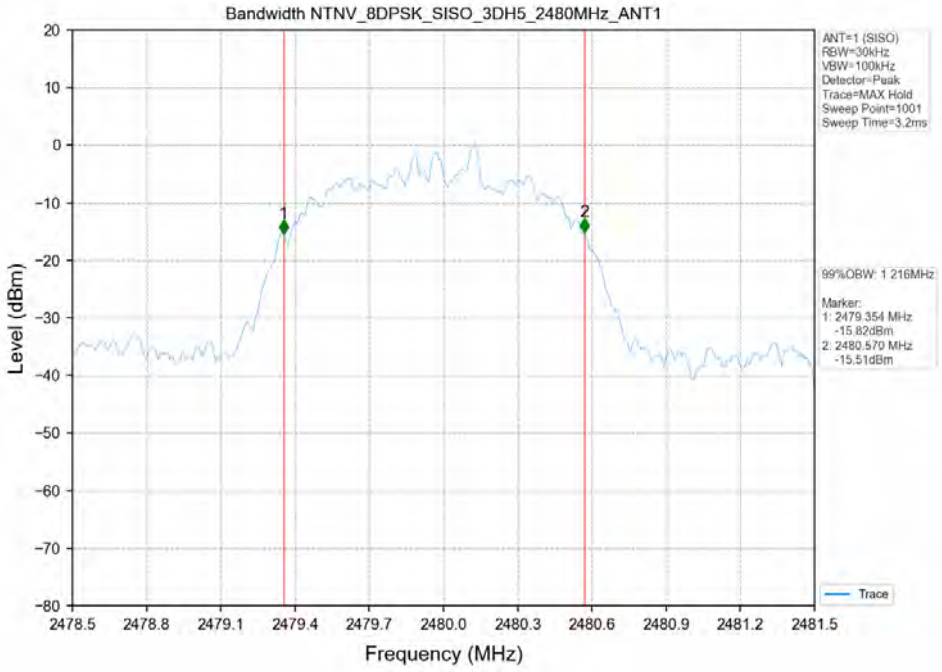

Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.192MHz
Marker:
1: 2401.388 MHz
-15.87dBm
2: 2402.580 MHz
-17.56dBm
Trace
Level (dBm)
Frequency (MHz)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
2400.5
2400.8
2401.1
2401.4
2401.7
2402.0
2402.3
2402.6
2402.9
2403.2
2403.5


Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.197MHz
Marker:
1: 2440.376 MHz
-13.73dBm
2: 2441.574 MHz
-15.29dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2439.5
2439.8
2440.1
2440.4
2440.7
2441.0
2441.3
2441.6
2441.9
2442.2
2442.5


Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.203MHz
Marker:
1: 2479.366 MHz
-15.22dBm
2: 2480.569 MHz
-17.16dBm
Trace
Level (dBm)
Frequency (MHz)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
2478.5
2478.8
2479.1
2479.4
2479.7
2480.0
2480.3
2480.6
2480.9
2481.2
2481.5


Bandwidth NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.199MHz
Marker:
1: 2401.383 MHz
-18.45dBm
2: 2402.582 MHz
-16.19dBm
Trace
Level (dBm)
Frequency (MHz)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
2400.5
2400.8
2401.1
2401.4
2401.7
2402.0
2402.3
2402.6
2402.9
2403.2
2403.5


Bandwidth NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.198MHz
Marker:
1: 2440.374 MHz
-15.49dBm
2: 2441.572 MHz
-13.72dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2439.5
2439.8
2440.1
2440.4
2440.7
2441.0
2441.3
2441.6
2441.9
2442.2
2442.5

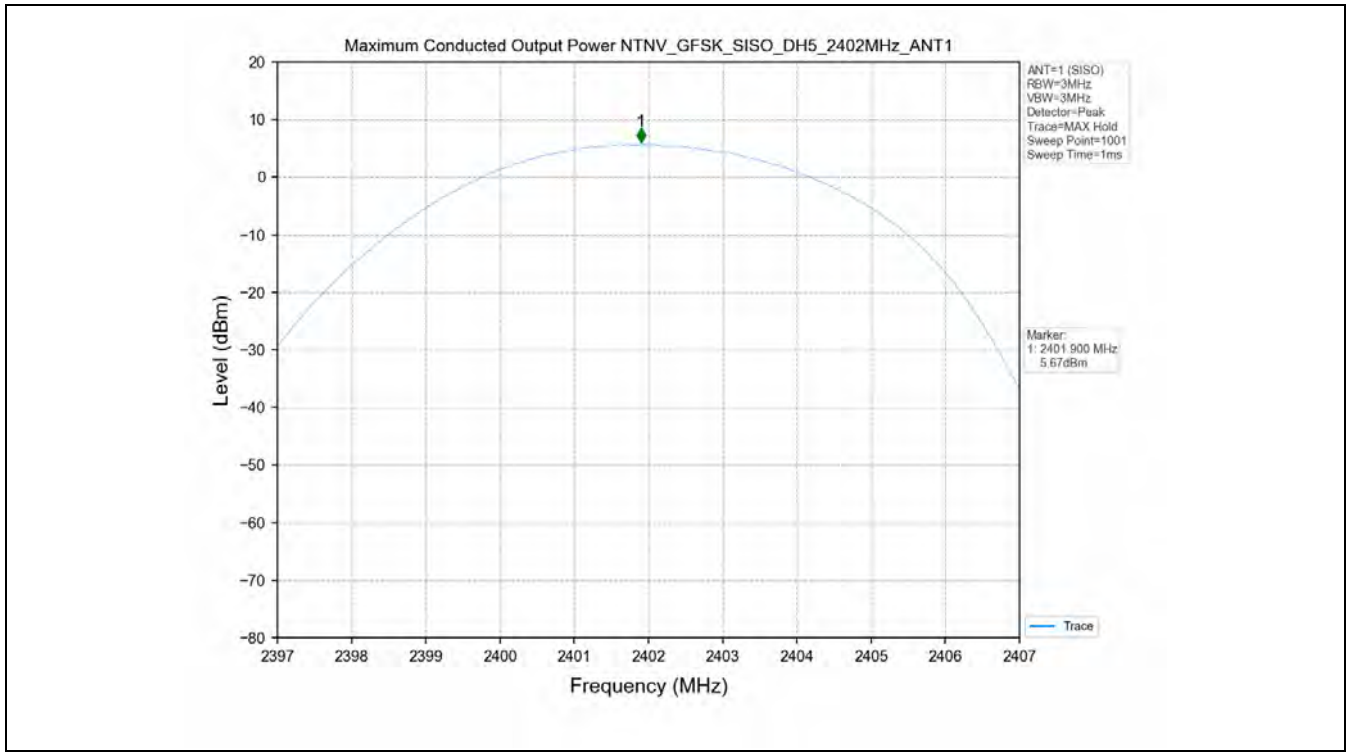

Bandwidth NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.216MHz
Marker:
1: 2479.354 MHz
-15.82dBm
2: 2480.570 MHz
-15.51dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2478.5
2478.8
2479.1
2479.4
2479.7
2480.0
2480.3
2480.6
2480.9
2481.2
2481.5

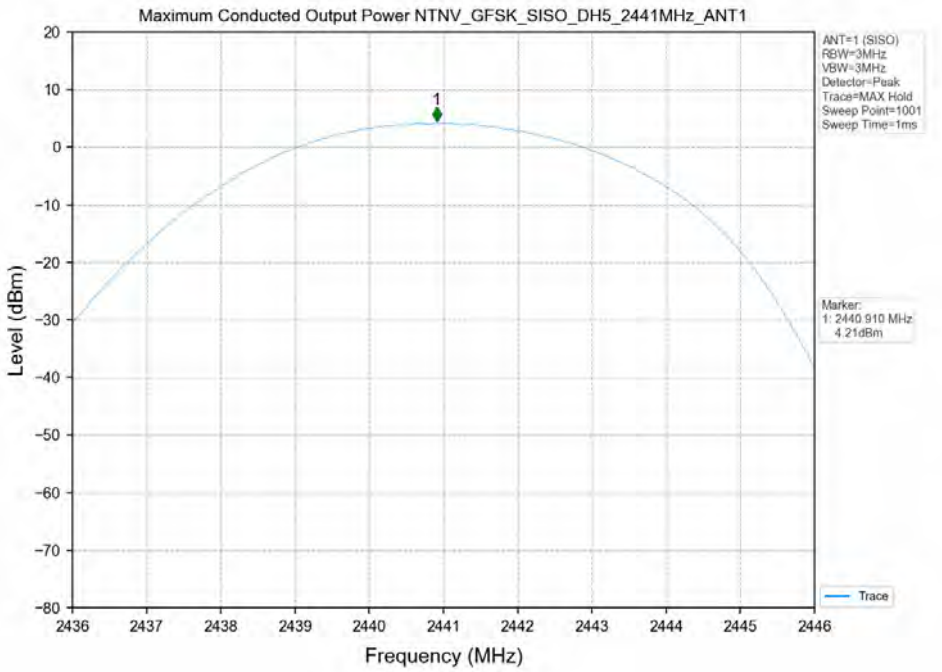
2. Maximum Conducted Output Power

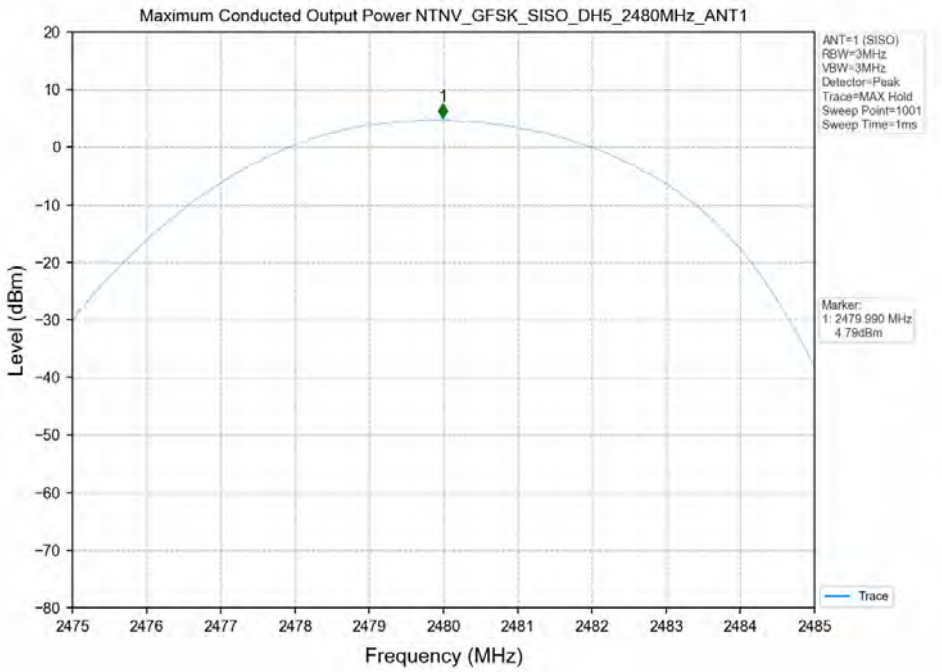
2.1 Test Result

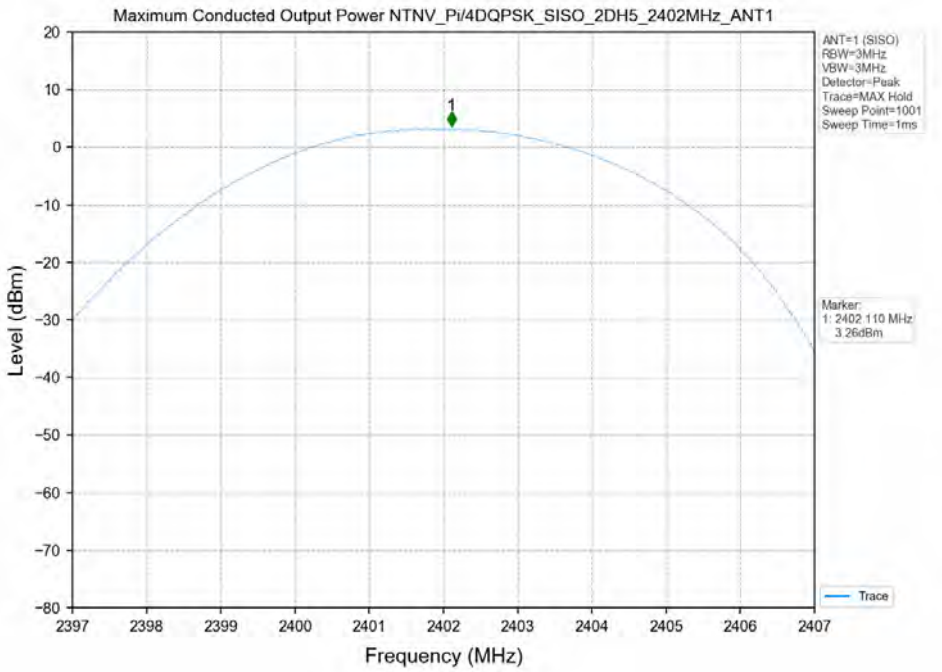
Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1		
GFSK	2402	SISO	5.67	30	PASS
	2441	SISO	4.21	30	PASS
	2480	SISO	4.79	30	PASS
π/4DQPSK	2402	SISO	3.26	20.97	PASS
	2441	SISO	5.80	20.97	PASS
	2480	SISO	4.29	20.97	PASS
8DPSK	2402	SISO	3.57	20.97	PASS
	2441	SISO	6.04	20.97	PASS
	2480	SISO	4.45	20.97	PASS

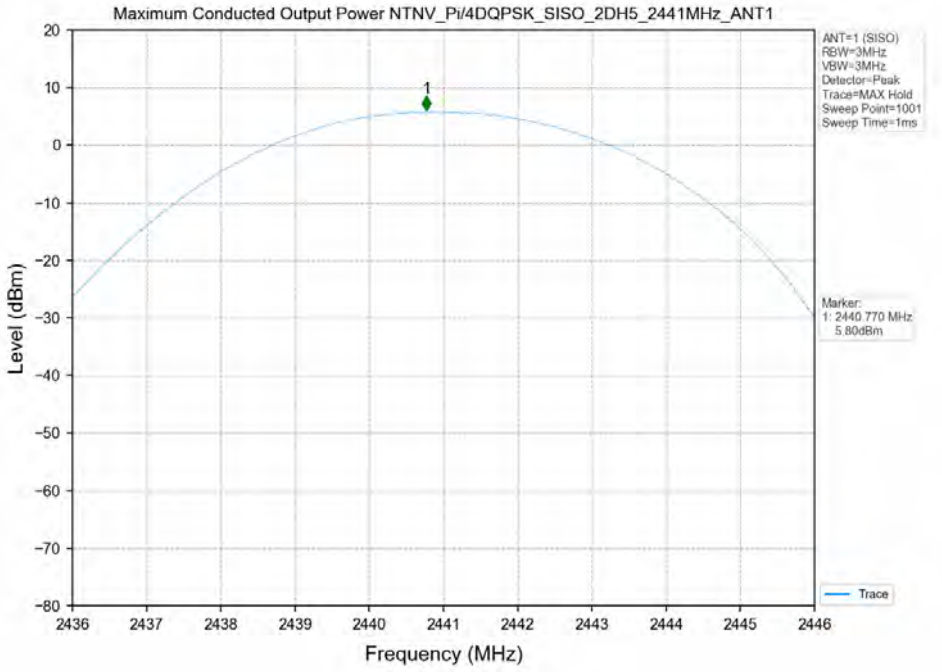
2.2 Test Graph

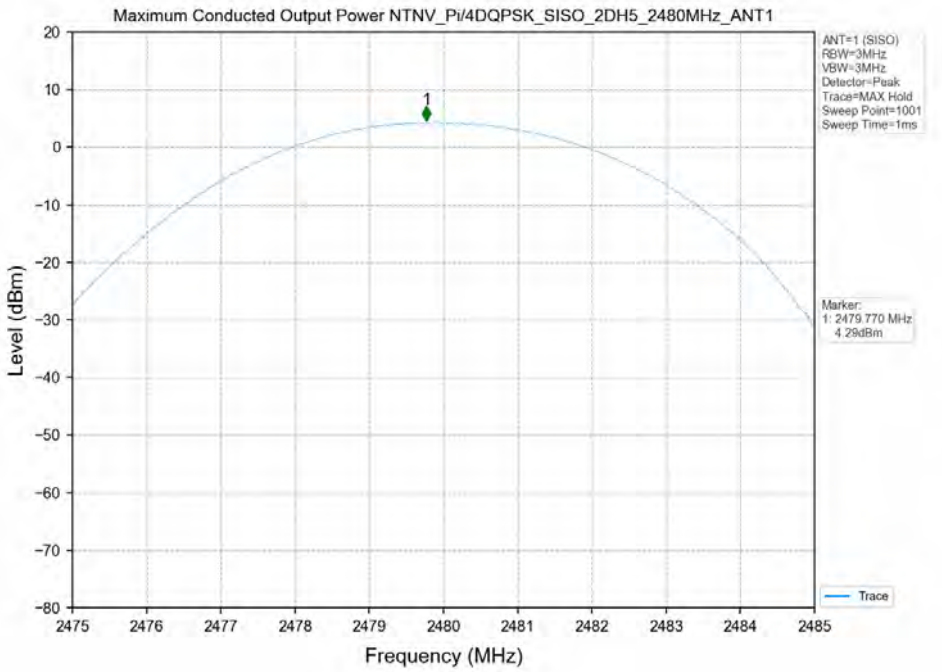


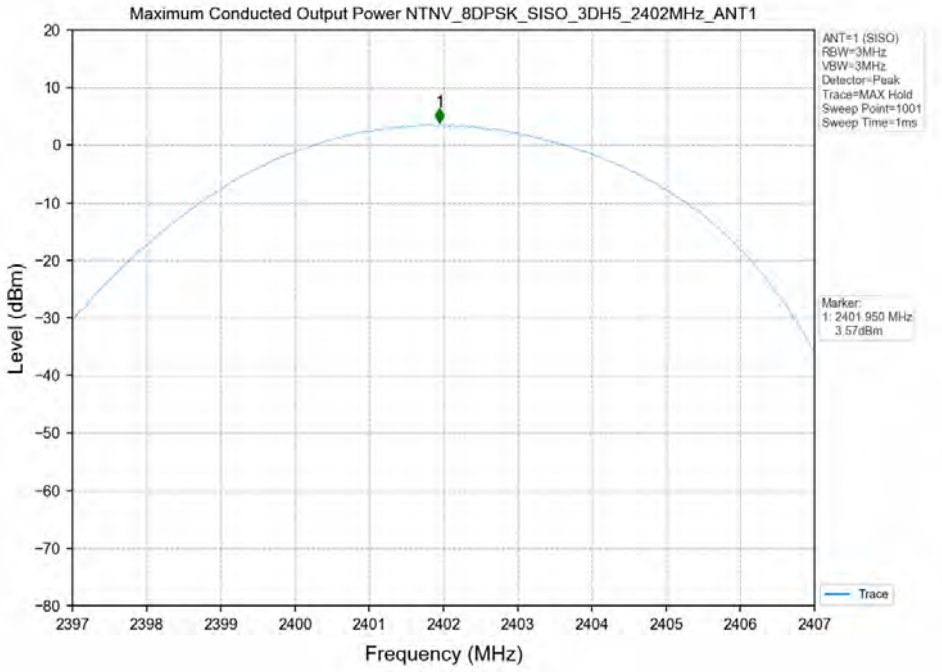

Maximum Conducted Output Power NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2440.910 MHz
4.21dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2436
2437
2438
2439
2440
2441
2442
2443
2444
2445
2446

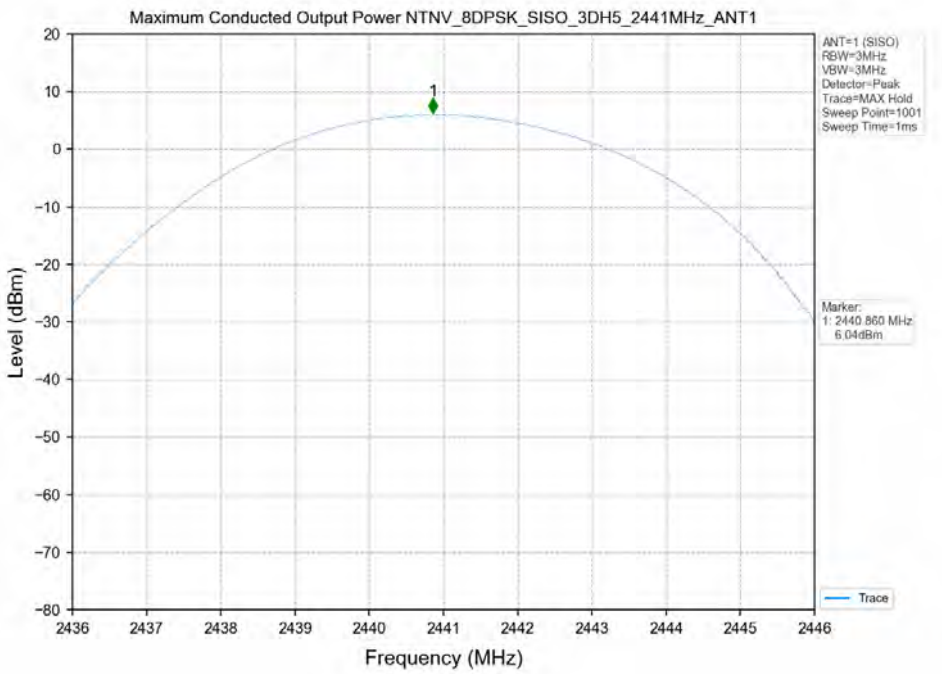

Maximum Conducted Output Power NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2479.990 MHz
4.79dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2475
2476
2477
2478
2479
2480
2481
2482
2483
2484
2485

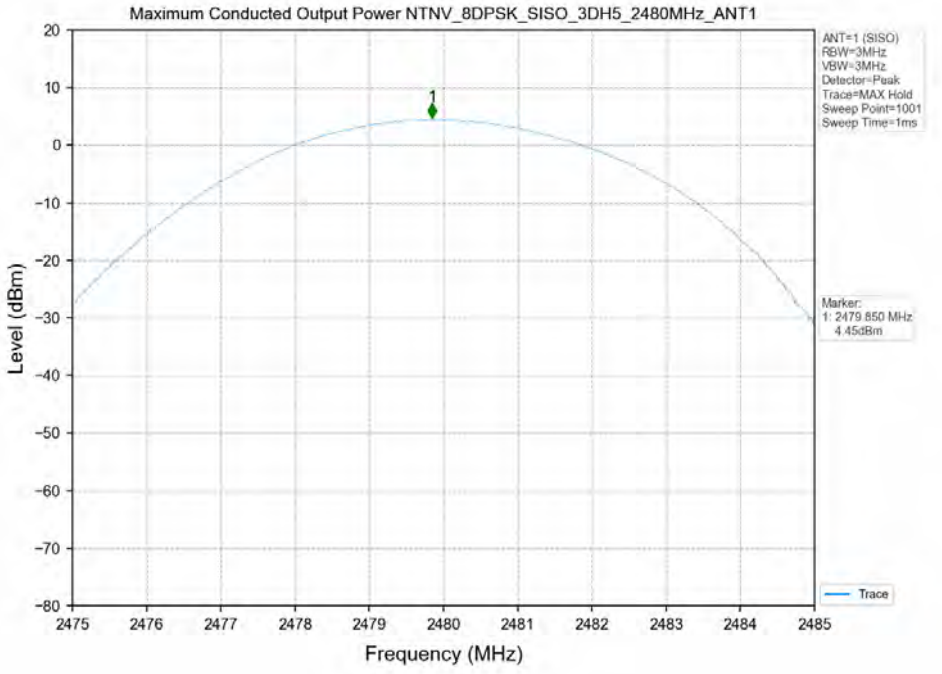

Maximum Conducted Output Power NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2402.110 MHz
3.26dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2397
2398
2399
2400
2401
2402
2403
2404
2405
2406
2407


Maximum Conducted Output Power NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2440.770 MHz
5.80dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2436
2437
2438
2439
2440
2441
2442
2443
2444
2445
2446


Maximum Conducted Output Power NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2479.770 MHz
4.29dBm
Trace
Level (dBm)
Frequency (MHz)


Maximum Conducted Output Power NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2401.950 MHz
3.57dBm
Trace
Level (dBm)
Frequency (MHz)


Maximum Conducted Output Power NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2440.860 MHz
6.04dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2436
2437
2438
2439
2440
2441
2442
2443
2444
2445
2446

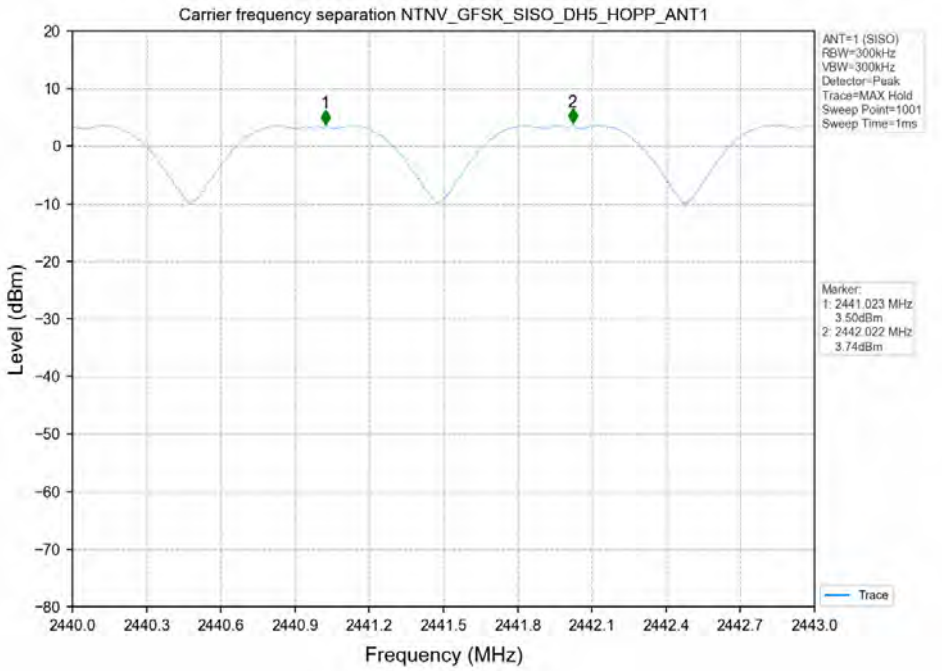

Maximum Conducted Output Power NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2479.850 MHz
4.45dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2475
2476
2477
2478
2479
2480
2481
2482
2483
2484
2485

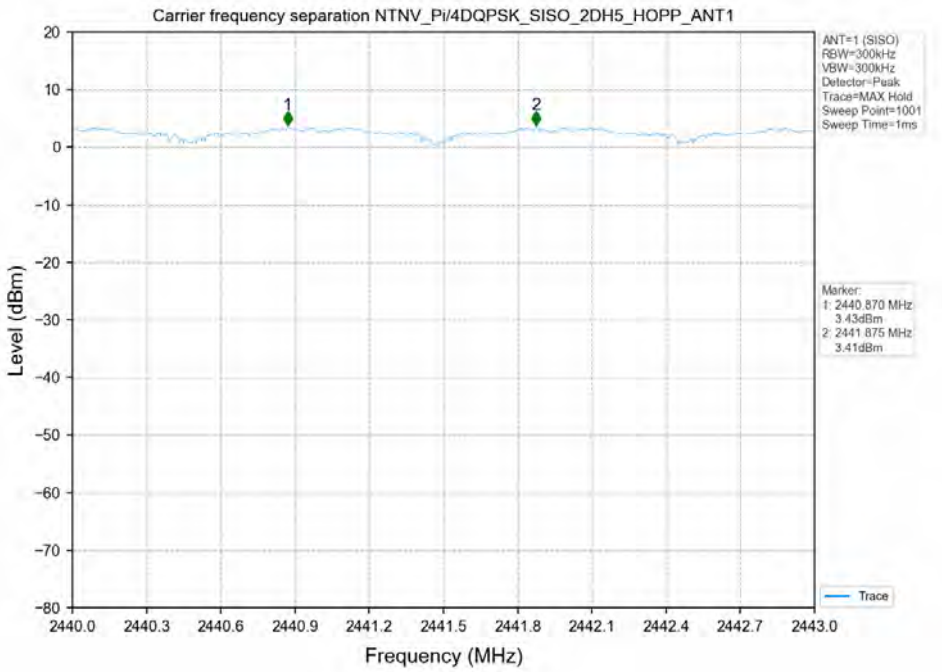
3. Carrier frequency separation

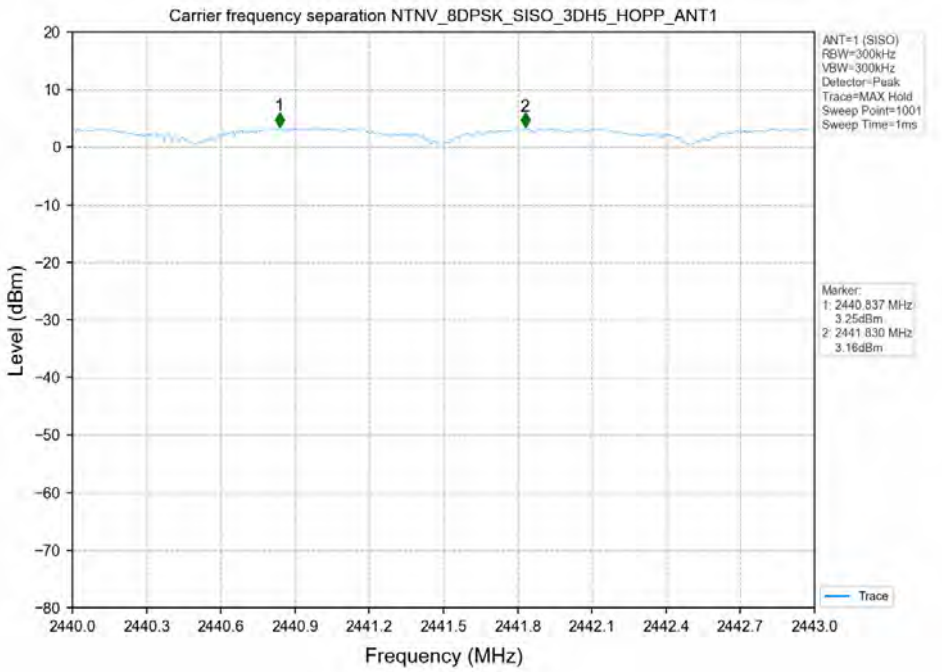
3.1 Test Result

Test Mode	TX Type	ANT No.	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limits (MHz)	Verdict
GFSK	SISO	1	0.999	0.974	≥0.974	PASS
Pi/4DQPSK	SISO	1	1.005	1.350	≥0.900	PASS
8DPSK	SISO	1	0.993	1.308	≥0.872	PASS

3.2 Test Graph




Carrier frequency separation NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
ANT=1 (SISO)
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2440.870 MHz
3.43dBm
2: 2441.875 MHz
3.41dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2440.0
2440.3
2440.6
2440.9
2441.2
2441.5
2441.8
2442.1
2442.4
2442.7
2443.0

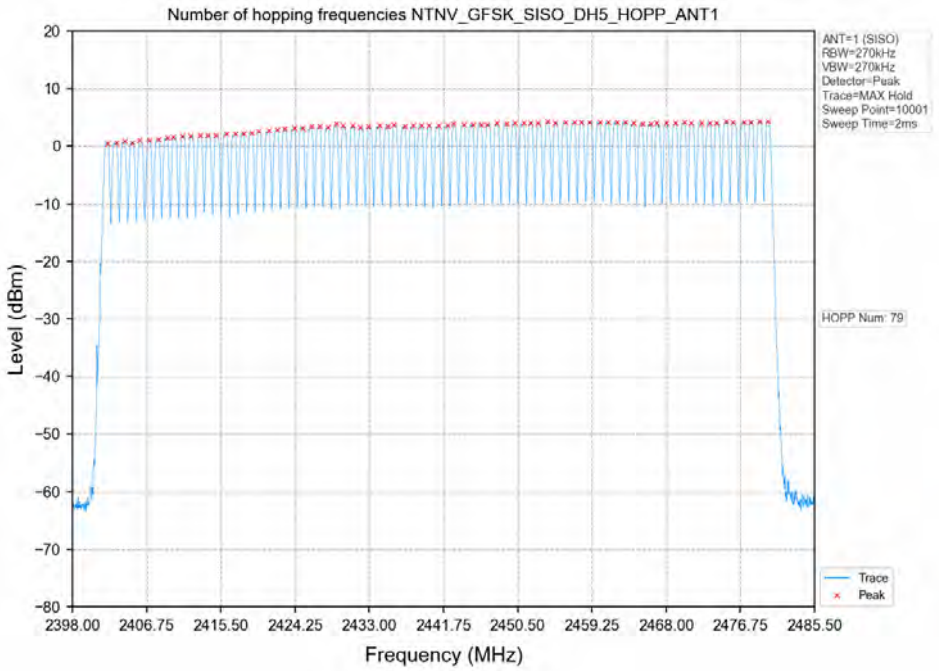

Carrier frequency separation NTNV_8DPSK_SISO_3DH5_HOPP_ANT1
ANT=1 (SISO)
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2440.837 MHz
3.25dBm
2: 2441.830 MHz
3.16dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2440.0
2440.3
2440.6
2440.9
2441.2
2441.5
2441.8
2442.1
2442.4
2442.7
2443.0

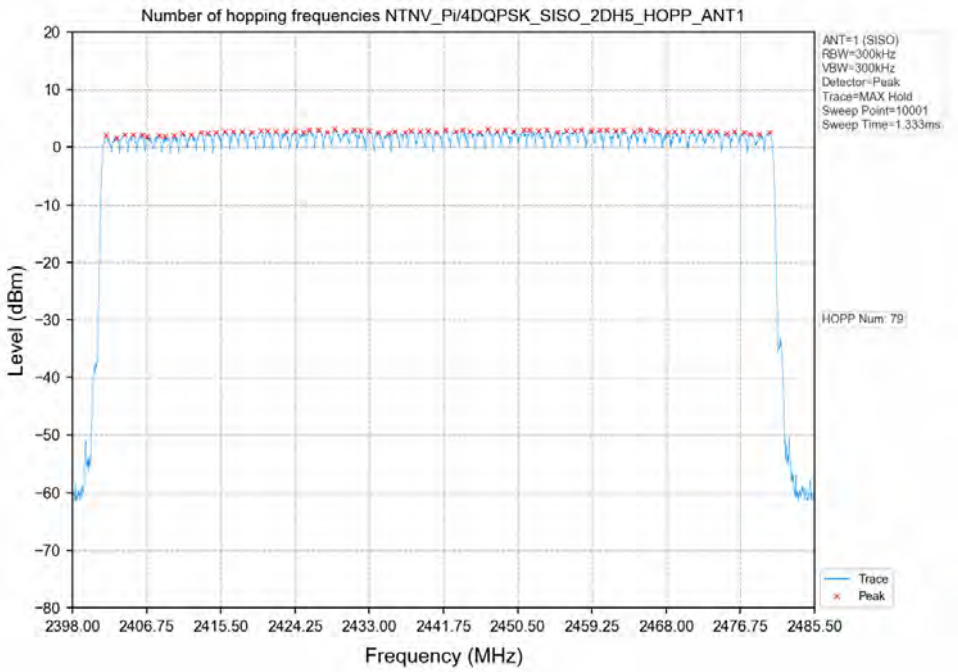
4. Number of hopping frequencies

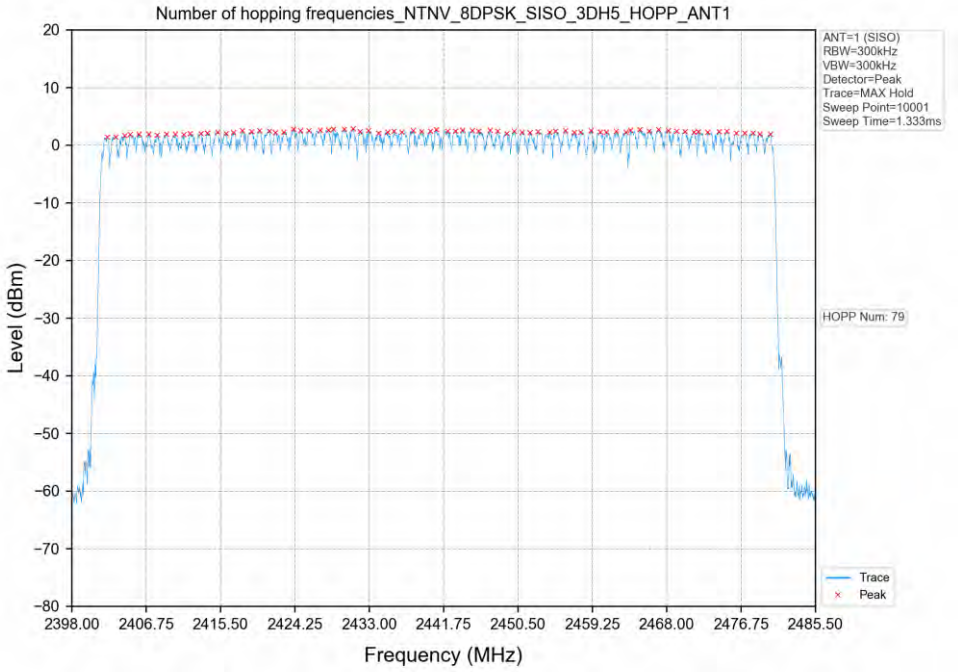
4.1 Test Result

Test Mode	TX Type	ANT No.	Num of Hopping Frequencies	Limits	Verdict
GFSK	SISO	1	79	≥15	PASS
Pi/4DQPSK	SISO	1	79	≥15	PASS
8DPSK	SISO	1	79	≥15	PASS

4.2 Test Graph




Number of hopping frequencies NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
ANT=1 (SISO)
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=1.333ms
HOPP Num: 79
Trace
Peak
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2398.00
2406.75
2415.50
2424.25
2433.00
2441.75
2450.50
2459.25
2468.00
2476.75
2485.50

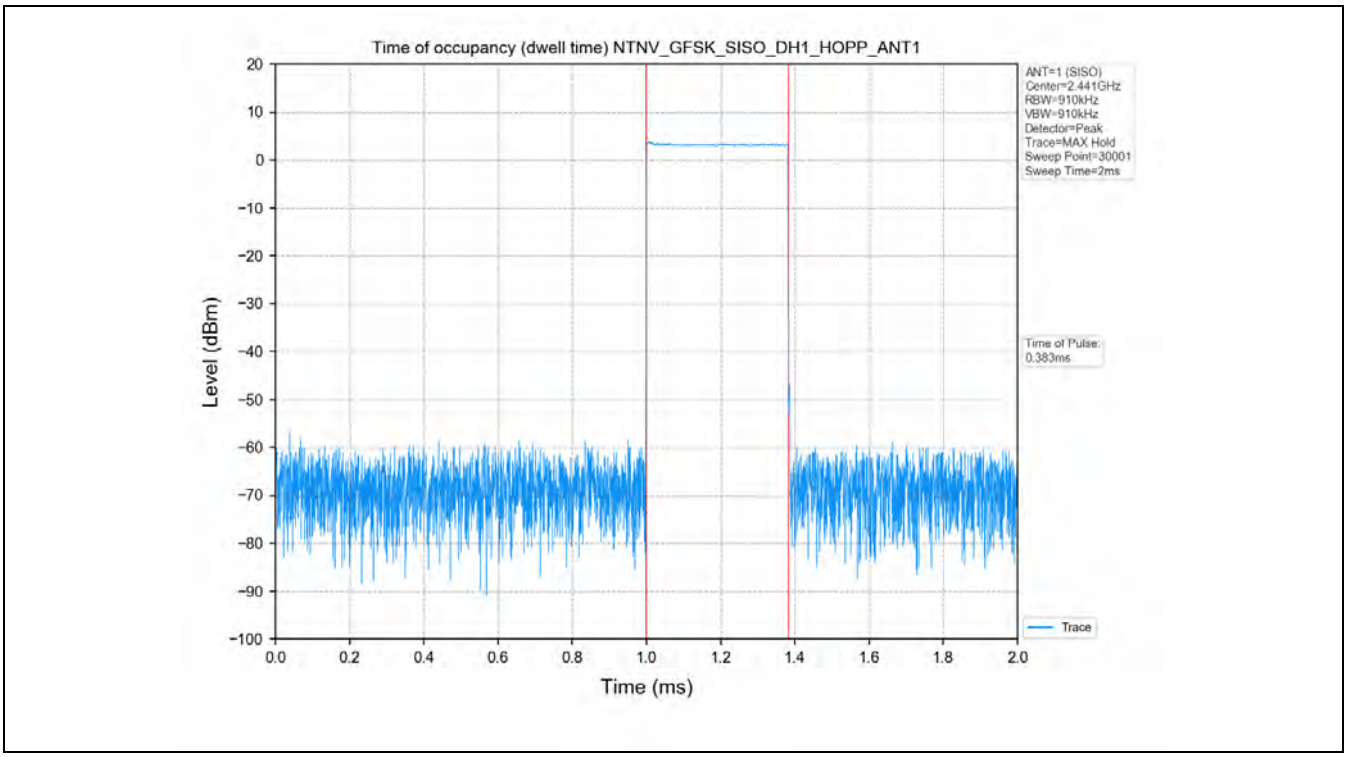

Number of hopping frequencies_NTNV_8DPSK_SISO_3DH5_HOPP_ANT1
ANT=1 (SISO)
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=1.333ms
HOPP Num: 79
Trace
Peak
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2398.00
2406.75
2415.50
2424.25
2433.00
2441.75
2450.50
2459.25
2468.00
2476.75
2485.50

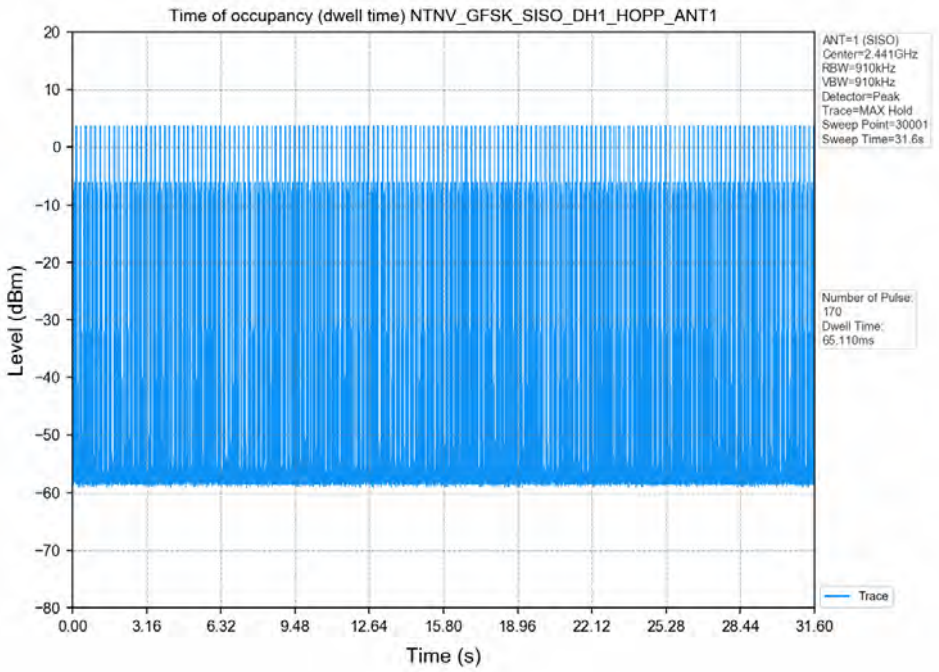
5. Time of occupancy (dwell time)

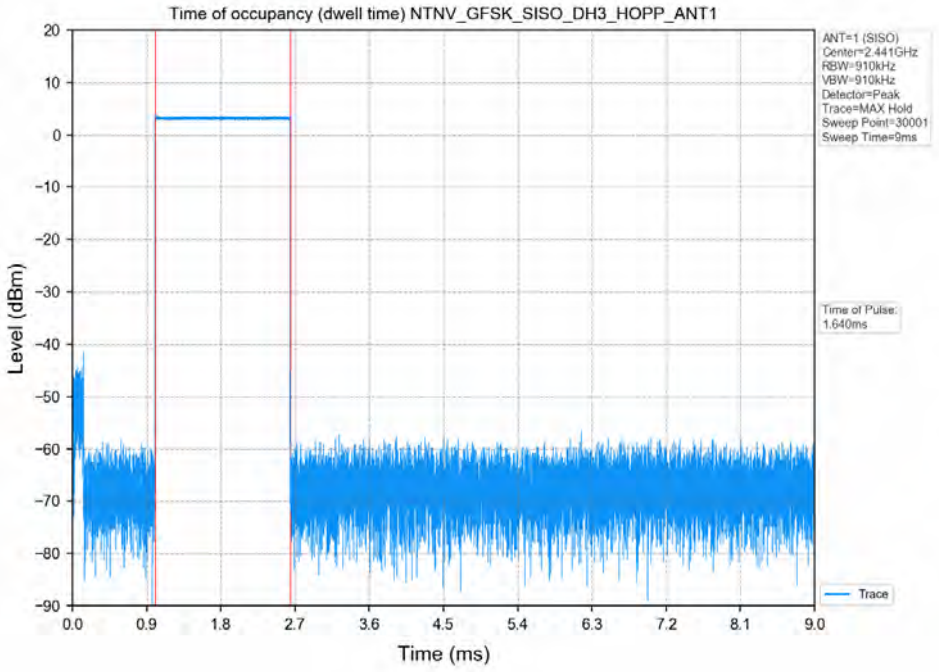
5.1 Test Result

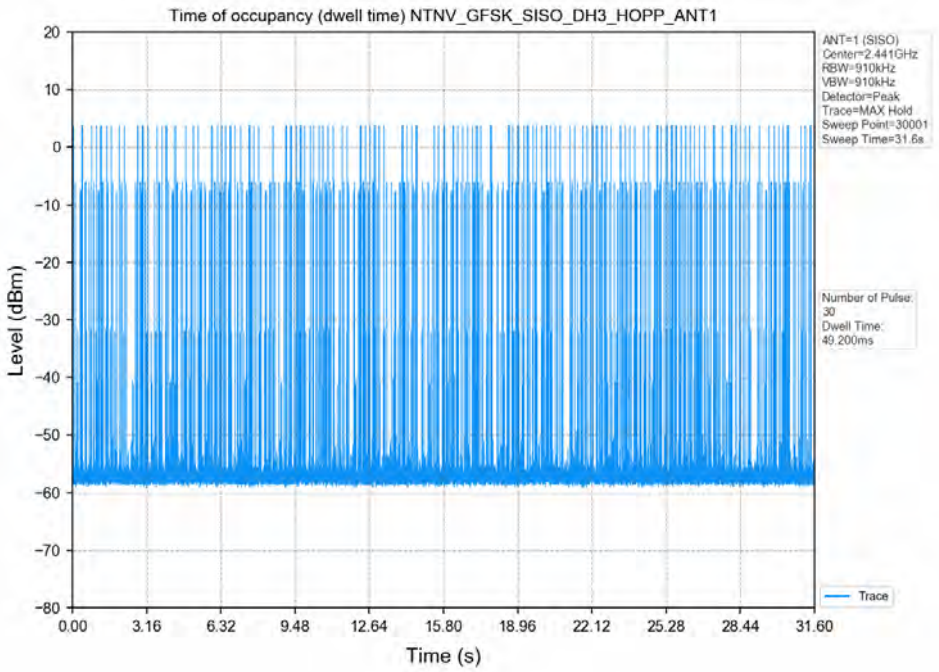
Test Mode	Packet Type	TX Type	ANT No.	Duration of Single Pulse (ms)	Obeservation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limits (ms)	Verdict
GFSK	DH1	SISO	1	0.383	31.6	170	65.110	≤400	PASS
	DH3	SISO	1	1.640	31.6	30	49.200	≤400	PASS
	DH5	SISO	1	2.888	31.6	33	95.304	≤400	PASS
Pi/4DQPSK	2DH1	SISO	1	0.383	31.6	153	58.599	≤400	PASS
	2DH3	SISO	1	1.635	31.6	159	259.965	≤400	PASS
	2DH5	SISO	1	2.883	31.6	81	233.523	≤400	PASS
8DPSK	3DH1	SISO	1	0.384	31.6	165	63.360	≤400	PASS
	3DH3	SISO	1	1.633	31.6	159	259.647	≤400	PASS
	3DH5	SISO	1	2.886	31.6	80	230.880	≤400	PASS

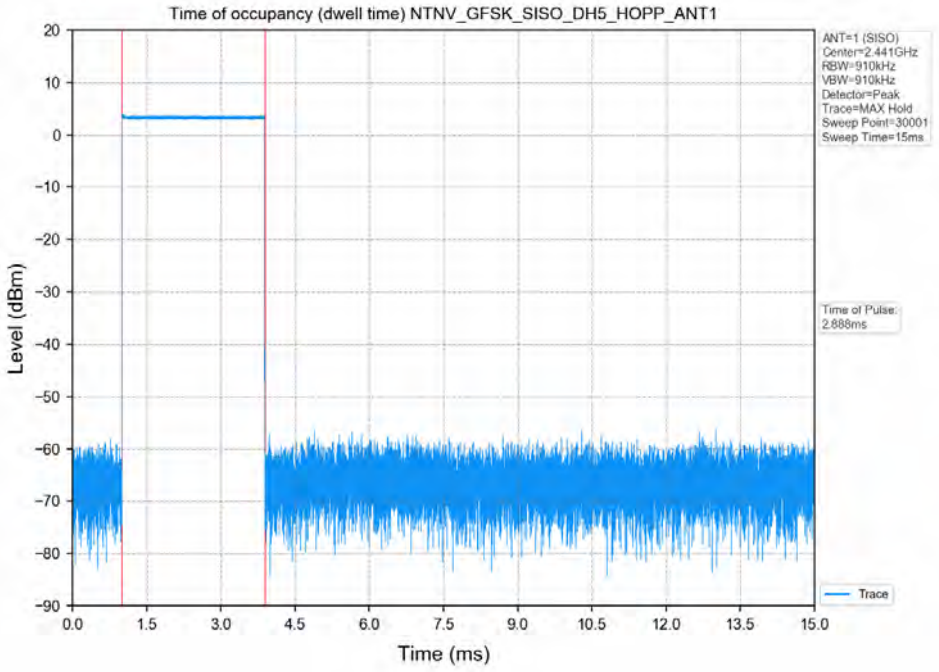
5.2 Test Graph

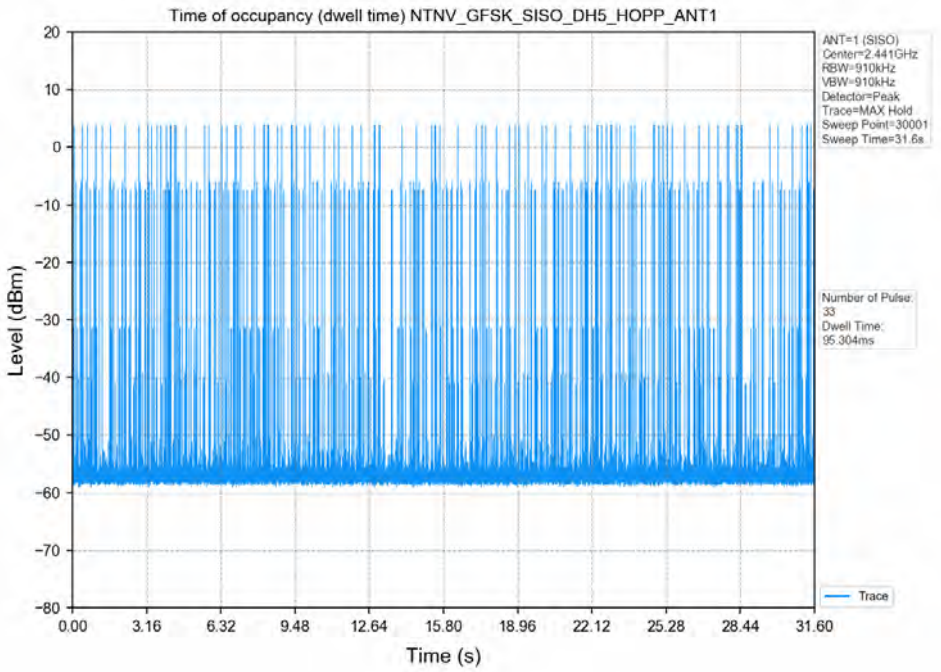


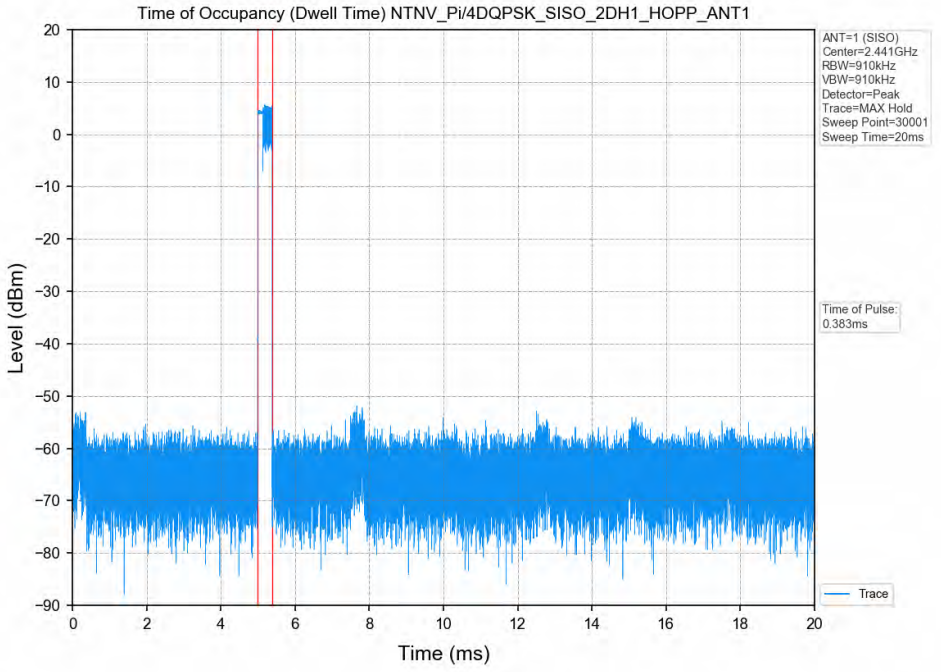

Time of occupancy (dwell time) NTNV_GFSK_SISO_DH1_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
170
Dwell Time:
65.110ms
Trace
Level (dBm)
Time (s)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
0.00
3.16
6.32
9.48
12.64
15.80
18.96
22.12
25.28
28.44
31.60

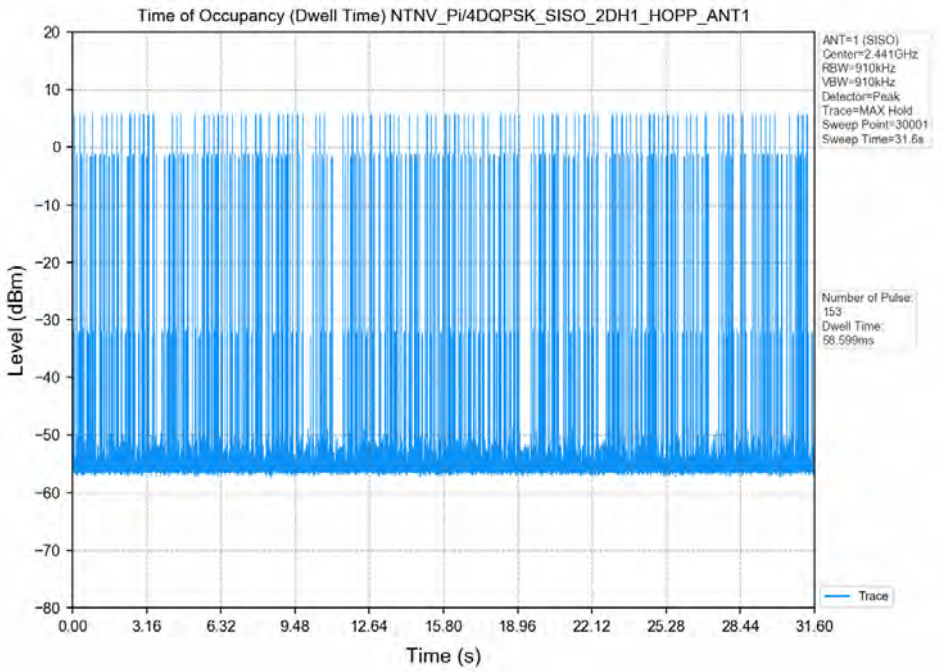

Time of occupancy (dwell time) NTNV_GFSK_SISO_DH3_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=9ms
Time of Pulse:
1.640ms
Trace
Level (dBm)
Time (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0.0
0.9
1.8
2.7
3.6
4.5
5.4
6.3
7.2
8.1
9.0

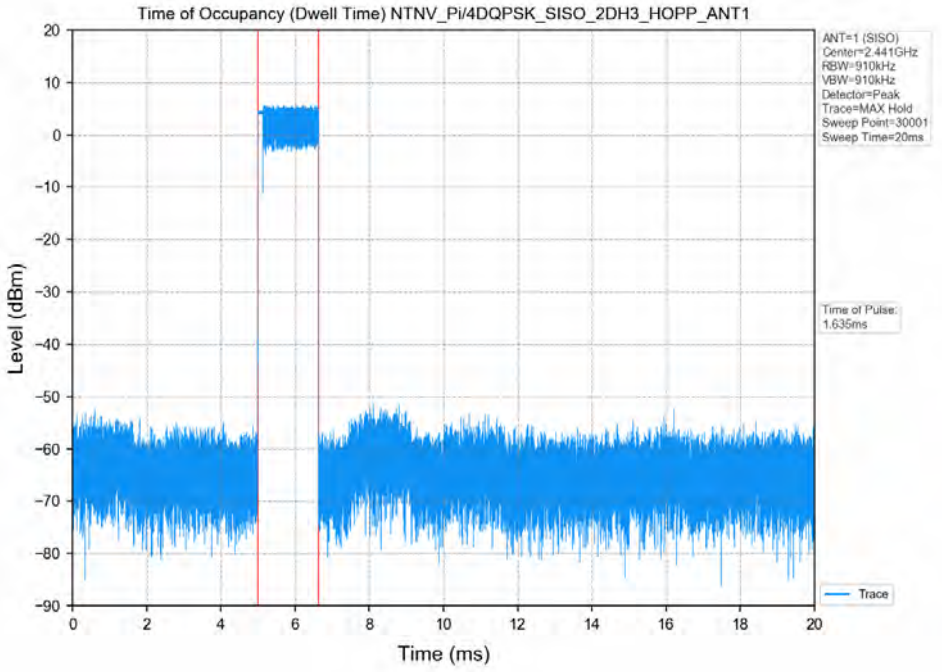

Time of occupancy (dwell time) NTNV_GFSK_SISO_DH3_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
30
Dwell Time:
49.200ms
Trace
Level (dBm)
Time (s)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
0.00
3.16
6.32
9.48
12.64
15.80
18.96
22.12
25.28
28.44
31.60

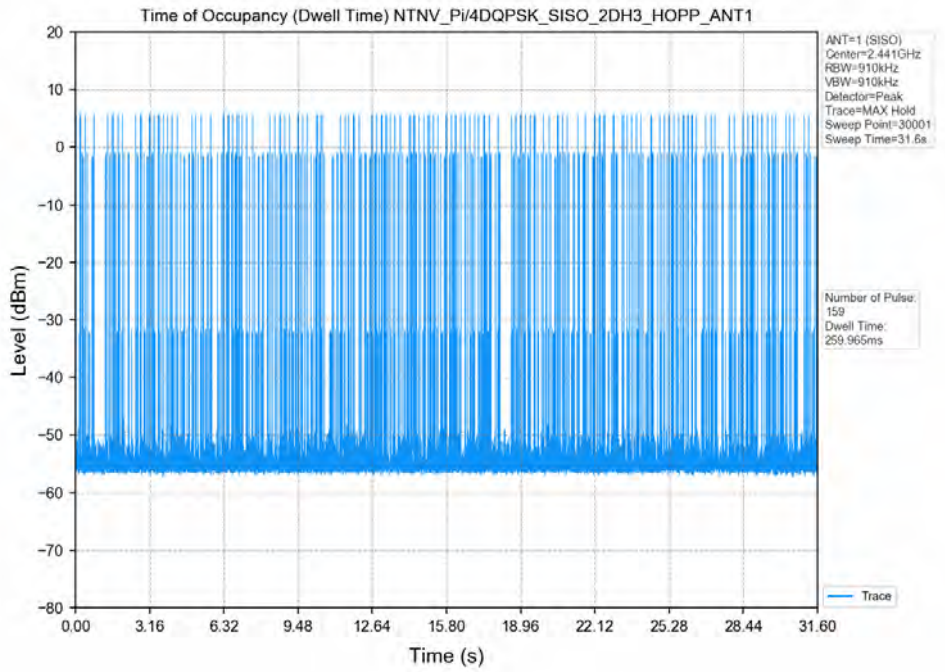

Time of occupancy (dwell time) NTNV_GFSK_SISO_DH5_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=15ms
Time of Pulse:
2.888ms
Trace
Level (dBm)
Time (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0.0
1.5
3.0
4.5
6.0
7.5
9.0
10.5
12.0
13.5
15.0

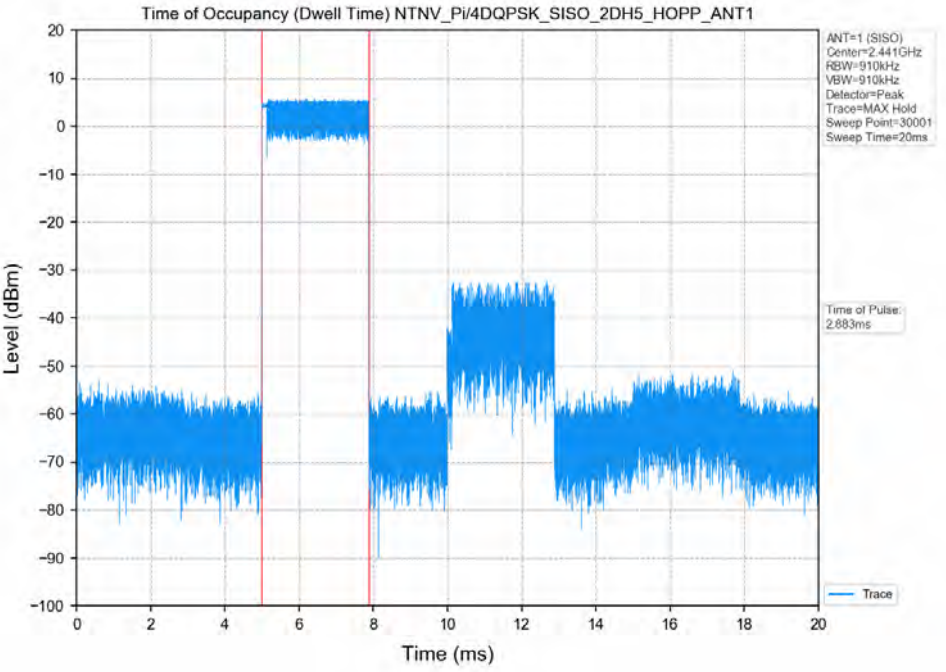

Time of occupancy (dwell time) NTNV_GFSK_SISO_DH5_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
33
Dwell Time:
95.304ms
Trace
Level (dBm)
Time (s)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
0.00
3.16
6.32
9.48
12.64
15.80
18.96
22.12
25.28
28.44
31.60

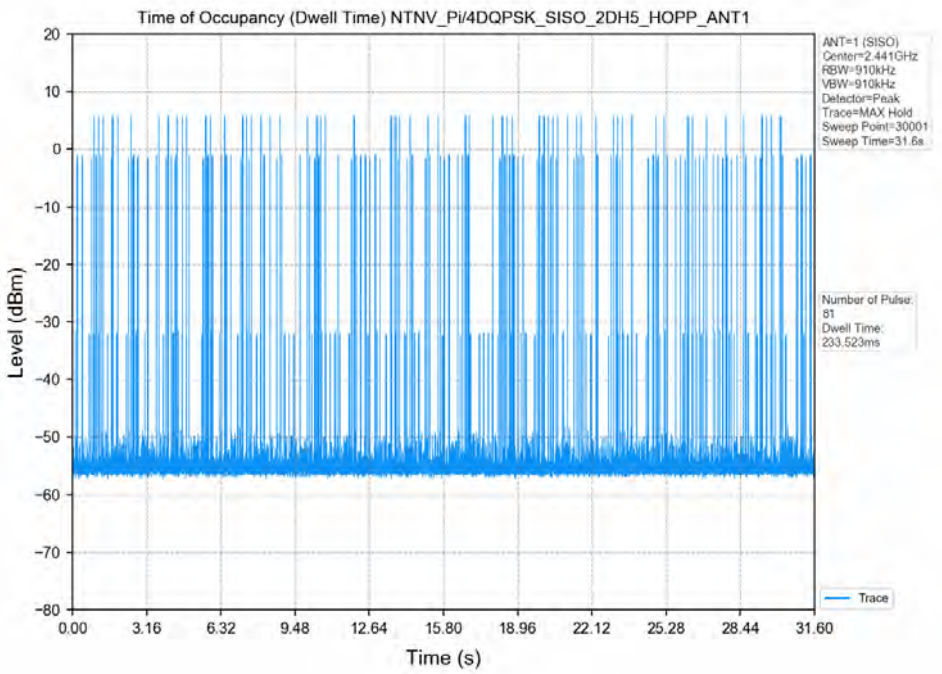

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH1_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
0.383ms
Trace
Level (dBm)
Time (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0
2
4
6
8
10
12
14
16
18
20

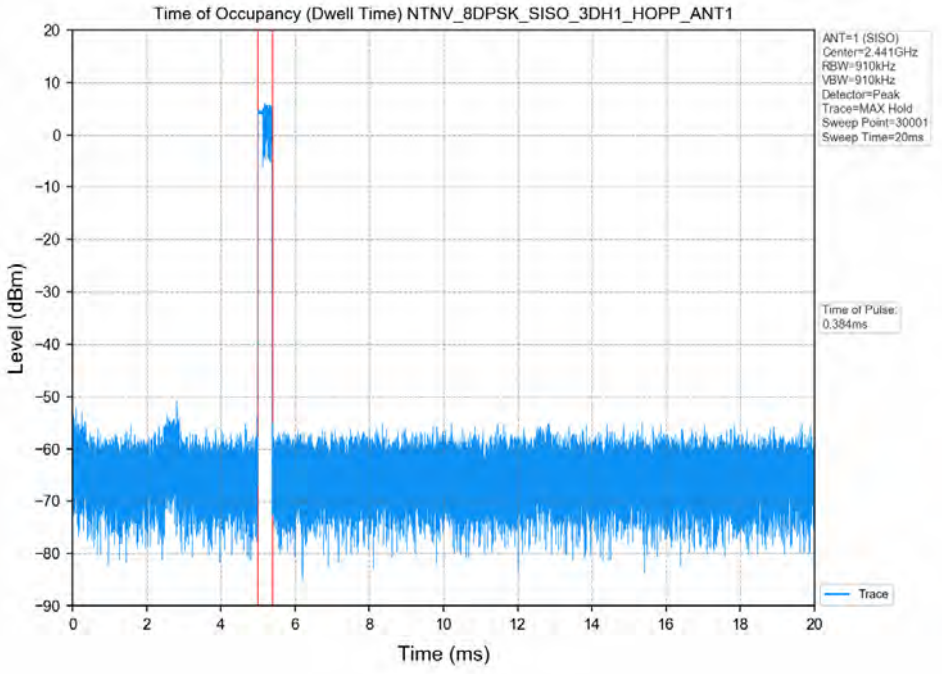

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH1_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
153
Dwell Time:
58.599ms
Trace
Level (dBm)
Time (s)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
0.00
3.16
6.32
9.48
12.64
15.80
18.96
22.12
25.28
28.44
31.60

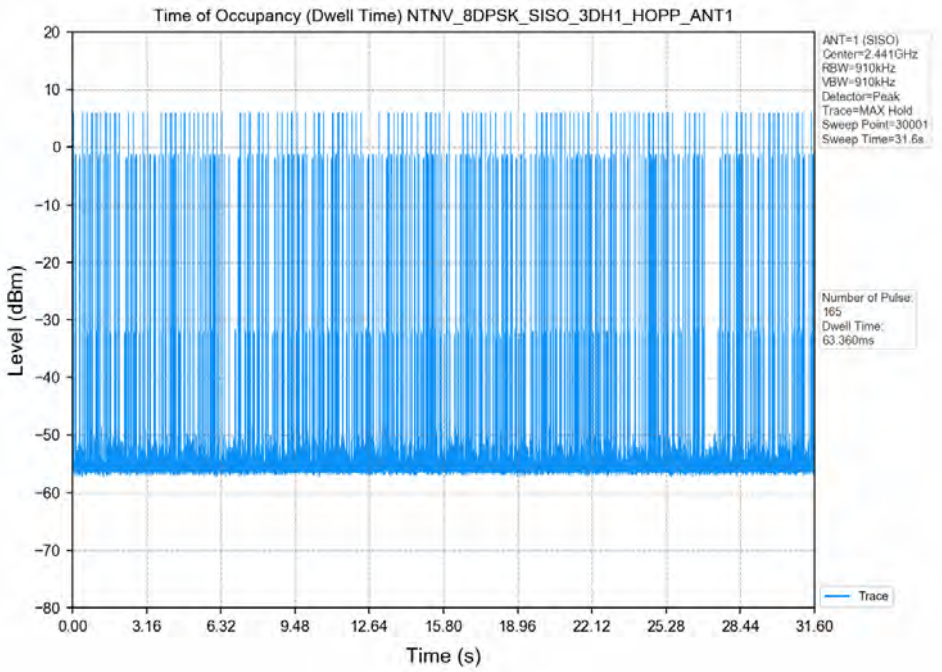

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH3_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
1.635ms
Trace
Level (dBm)
Time (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0
2
4
6
8
10
12
14
16
18
20

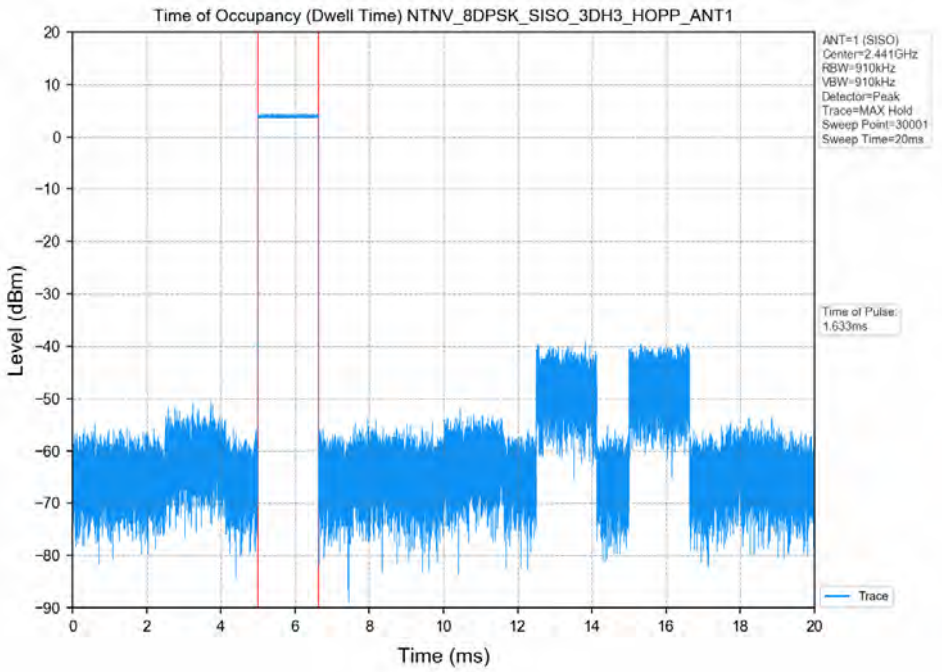

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH3_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
159
Dwell Time:
259.965ms
Trace
Level (dBm)
Time (s)

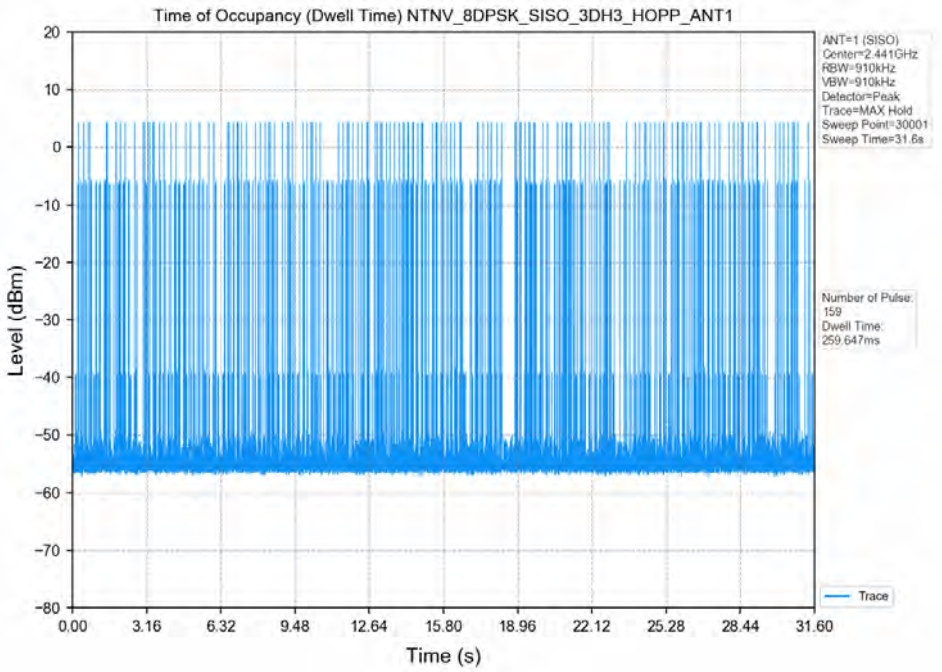

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
2.883ms
Trace
Level (dBm)
Time (ms)

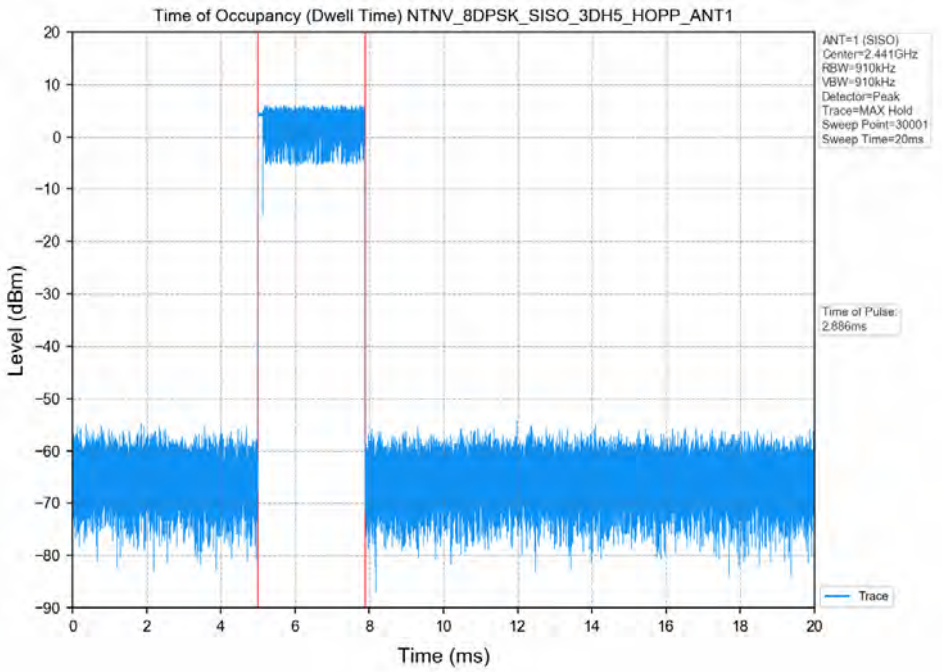

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
81
Dwell Time:
233.523ms
Trace
Level (dBm)
Time (s)

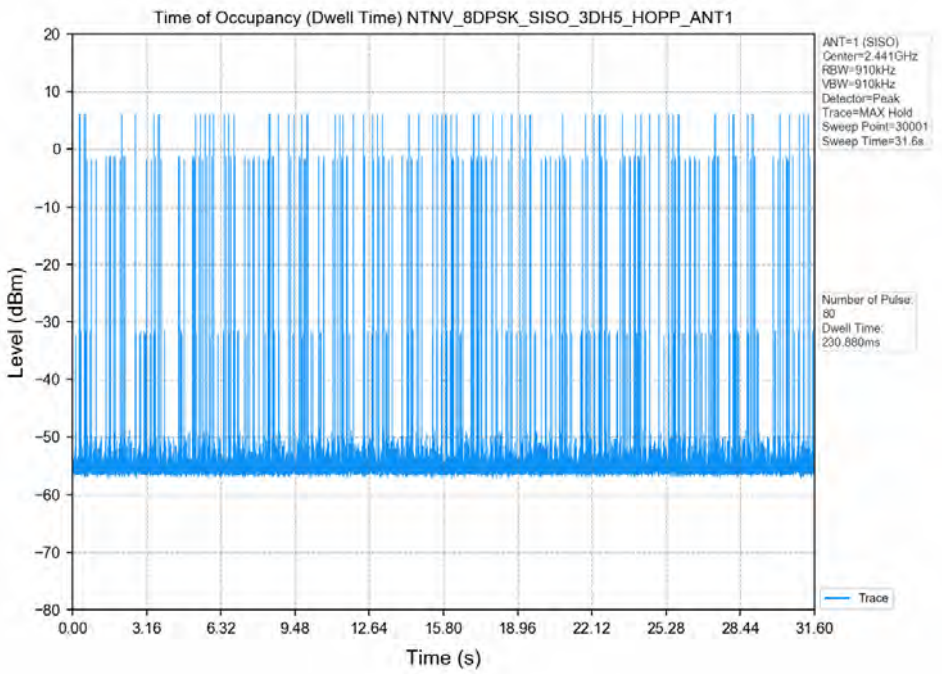

Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH1_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
0.384ms
Trace
Level (dBm)
Time (ms)


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH1_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
165
Dwell Time:
63.360ms
Trace
Level (dBm)
Time (s)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
0.00
3.16
6.32
9.48
12.64
15.80
18.96
22.12
25.28
28.44
31.60


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH3_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
1.633ms
Trace
Level (dBm)
Time (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0
2
4
6
8
10
12
14
16
18
20


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH3_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
159
Dwell Time:
259.647ms
Trace
Level (dBm)
Time (s)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
0.00
3.16
6.32
9.48
12.64
15.80
18.96
22.12
25.28
28.44
31.60


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH5_HOPP_ANT1
ANT=1 (SISO)
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
2.886ms
Trace
Level (dBm)
Time (ms)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0
2
4
6
8
10
12
14
16
18
20

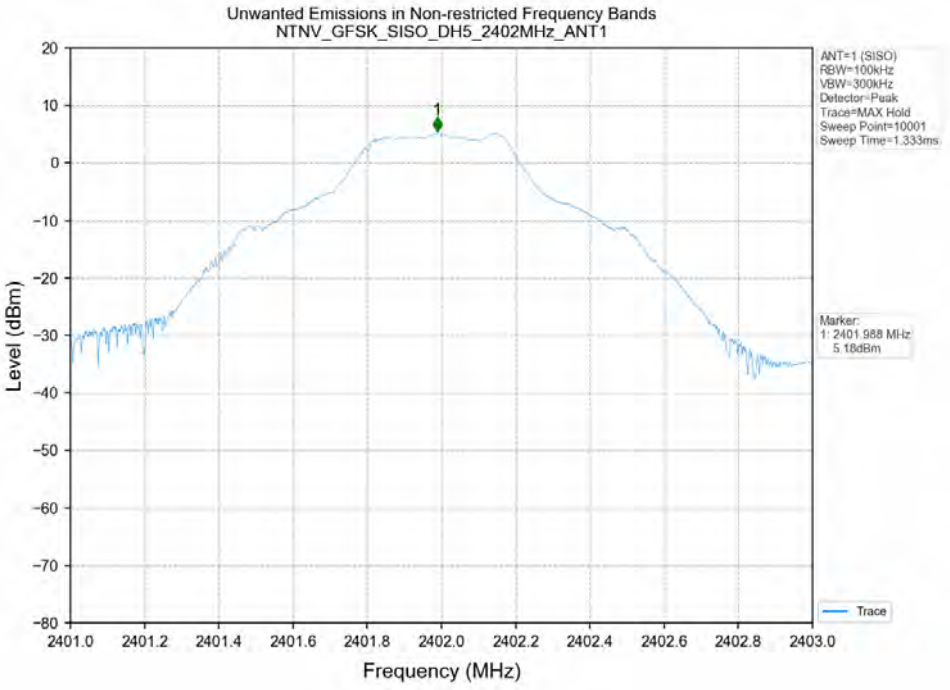


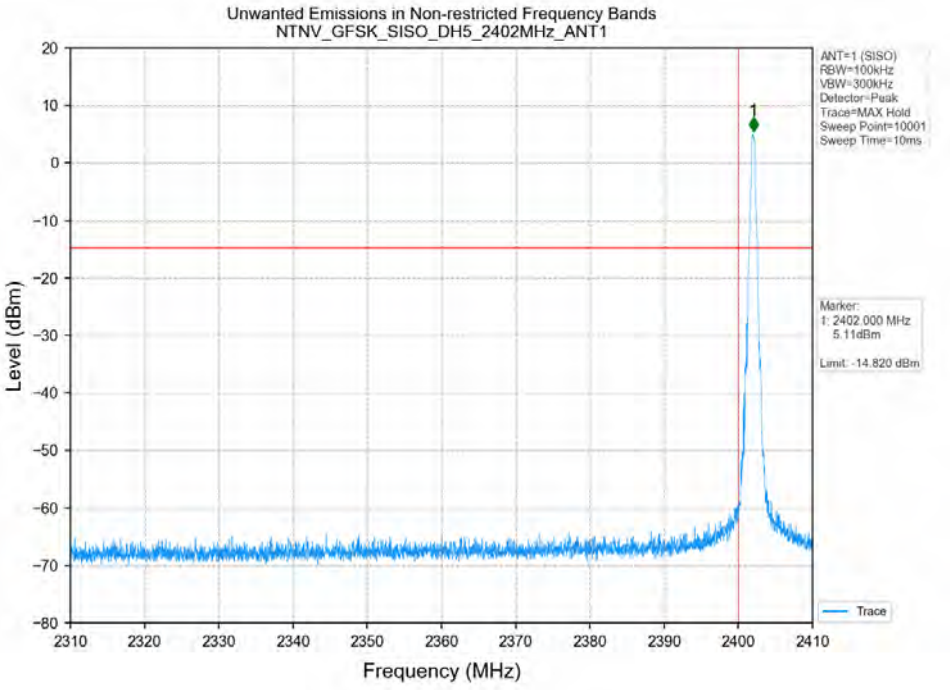
6. Unwanted Emissions in Non-restricted Frequency Bands

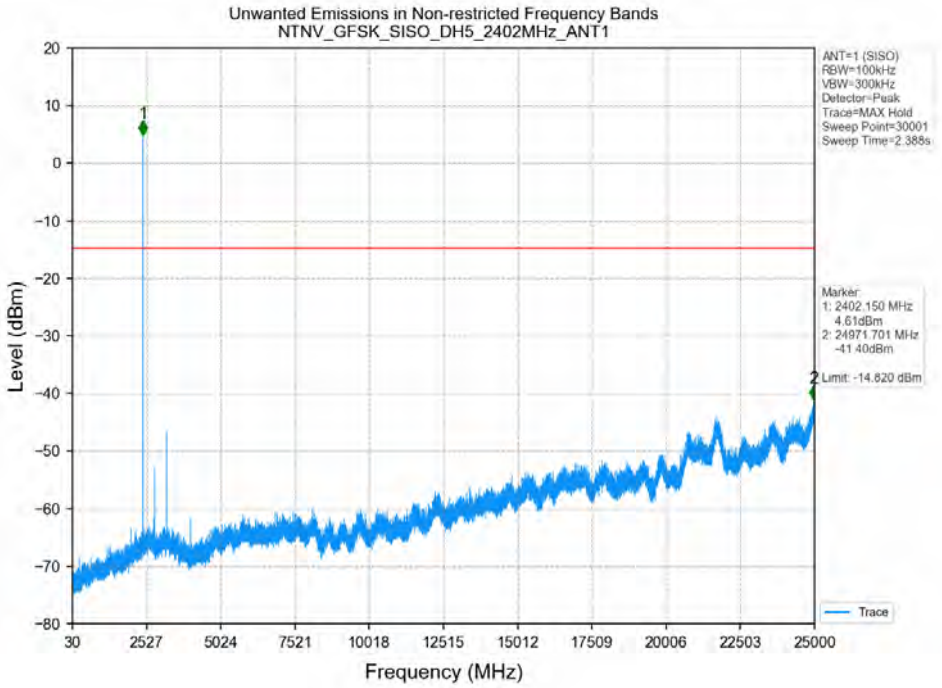
6.1 Test Result

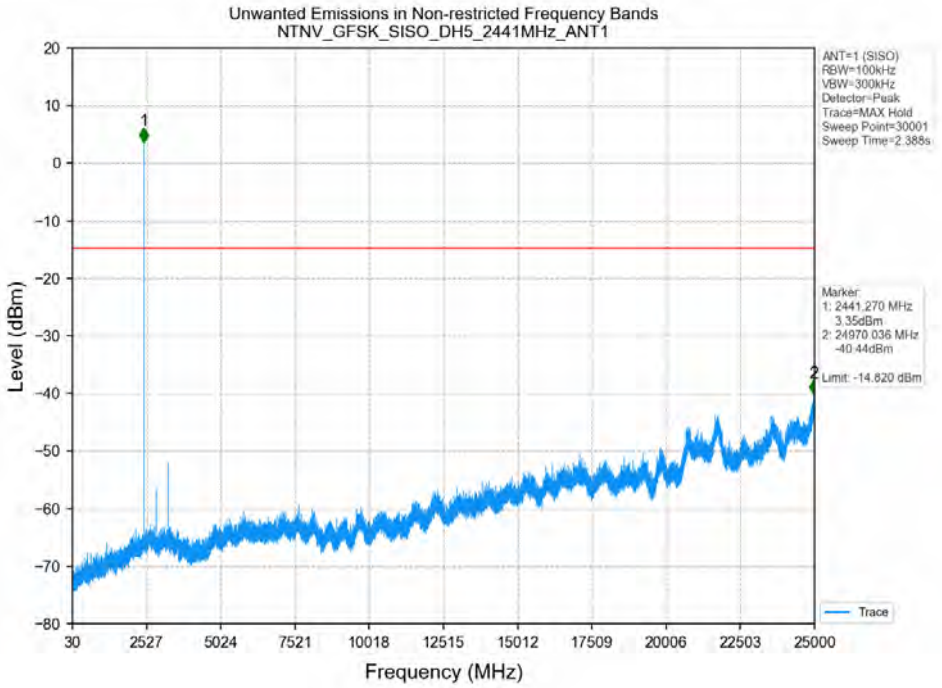
Test Mode	Frequency (MHz)	TX Type	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBc)	Verdict
GFSK	2402	SISO	1	Refer to test graph	-20	PASS
	2441	SISO	1	Refer to test graph	-20	PASS
	2480	SISO	1	Refer to test graph	-20	PASS
	Hopping	SISO	1	Refer to test graph	-20	PASS
Pi/4DQPSK	2402	SISO	1	Refer to test graph	-20	PASS
	2441	SISO	1	Refer to test graph	-20	PASS
	2480	SISO	1	Refer to test graph	-20	PASS
	Hopping	SISO	1	Refer to test graph	-20	PASS
8DPSK	2402	SISO	1	Refer to test graph	-20	PASS
	2441	SISO	1	Refer to test graph	-20	PASS
	2480	SISO	1	Refer to test graph	-20	PASS
	Hopping	SISO	1	Refer to test graph	-20	PASS

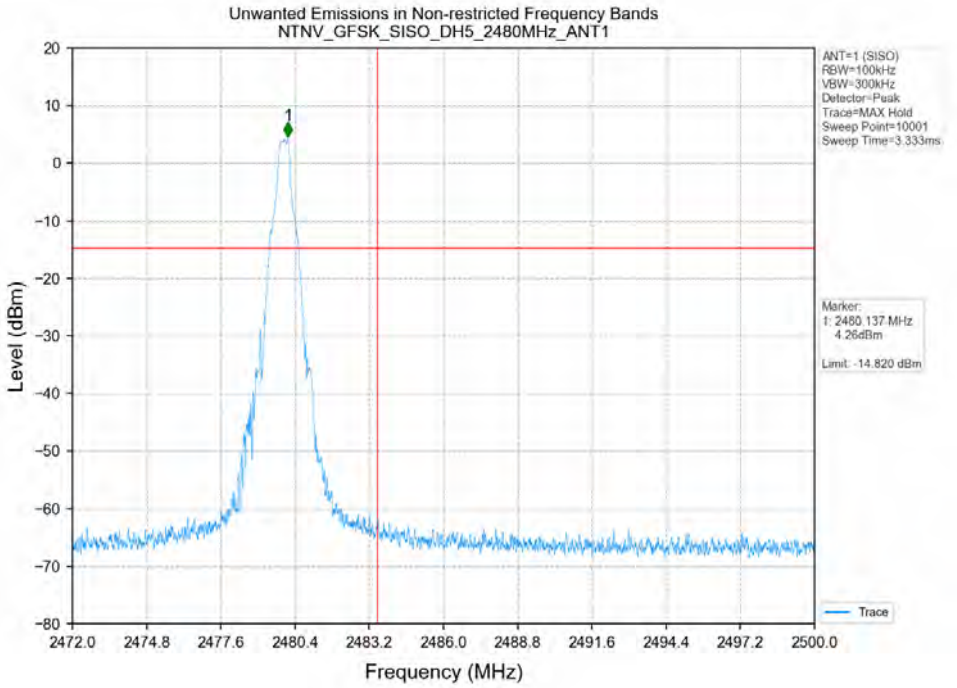
6.2 Test Graph

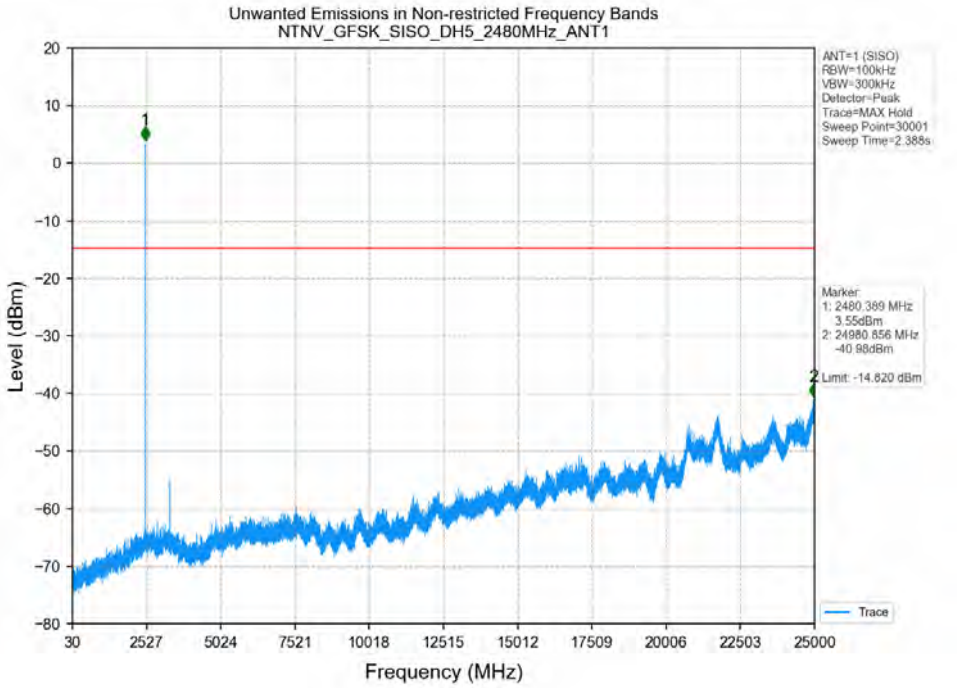


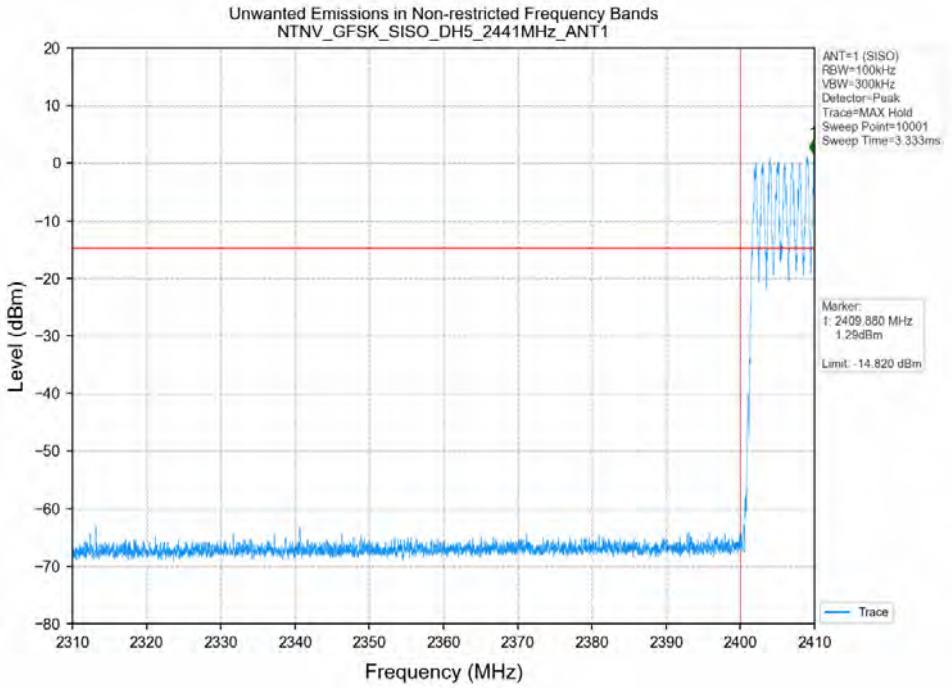


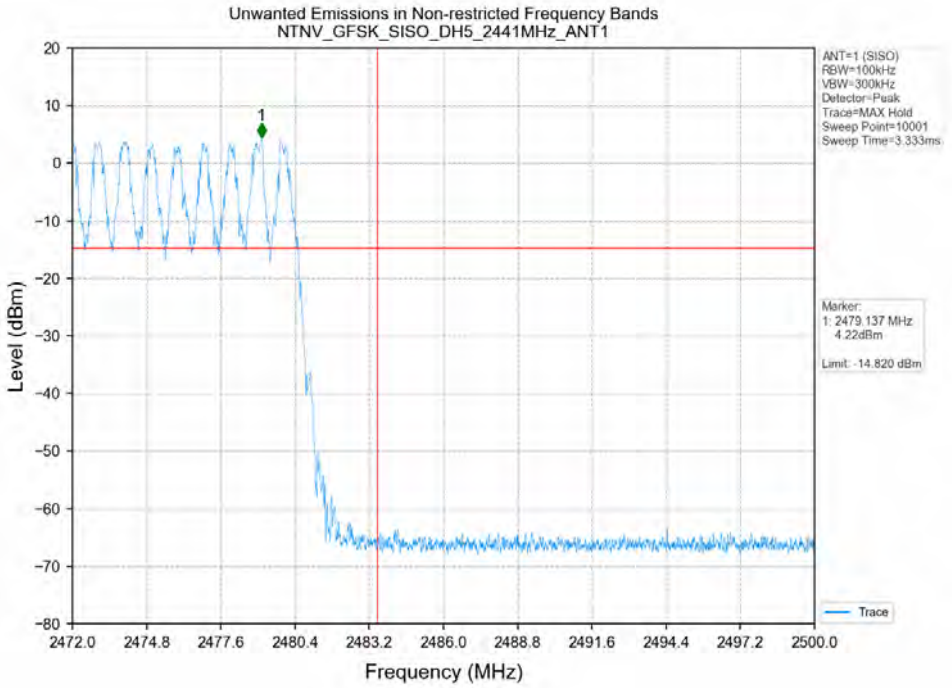

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=2.388s
Marker
1: 2402.150 MHz
4.61dBm
2: 24971.701 MHz
-41.40dBm
Limit: -14.620 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
30
2527
5024
7521
10018
12515
15012
17509
20006
22503
25000

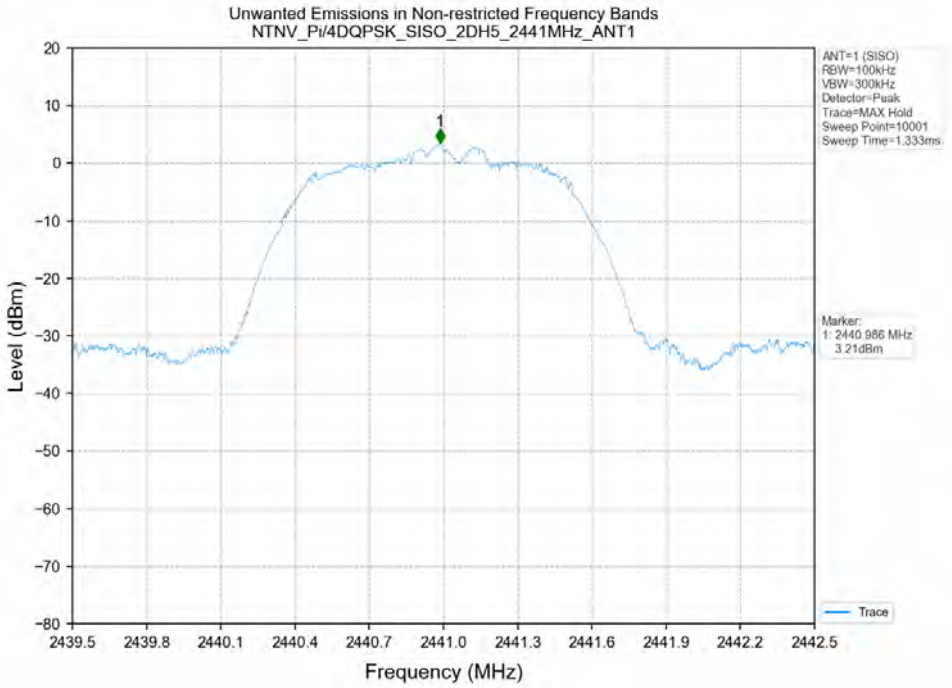

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=2.388s
Marker
1: 2441.270 MHz
3.35dBm
2: 24970.036 MHz
-40.44dBm
Limit: -14.620 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
30
2527
5024
7521
10018
12515
15012
17509
20006
22503
25000

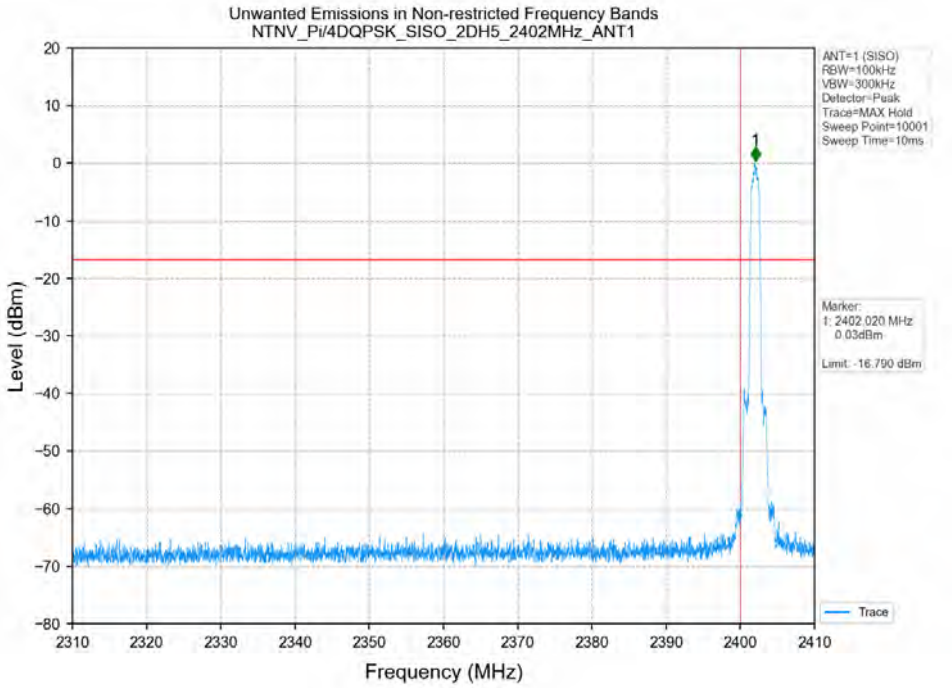

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=3.333ms
Marker:
1: 2480.137 MHz
4.26dBm
Limit: -14.820 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2472.0
2474.8
2477.6
2480.4
2483.2
2486.0
2488.8
2491.6
2494.4
2497.2
2500.0

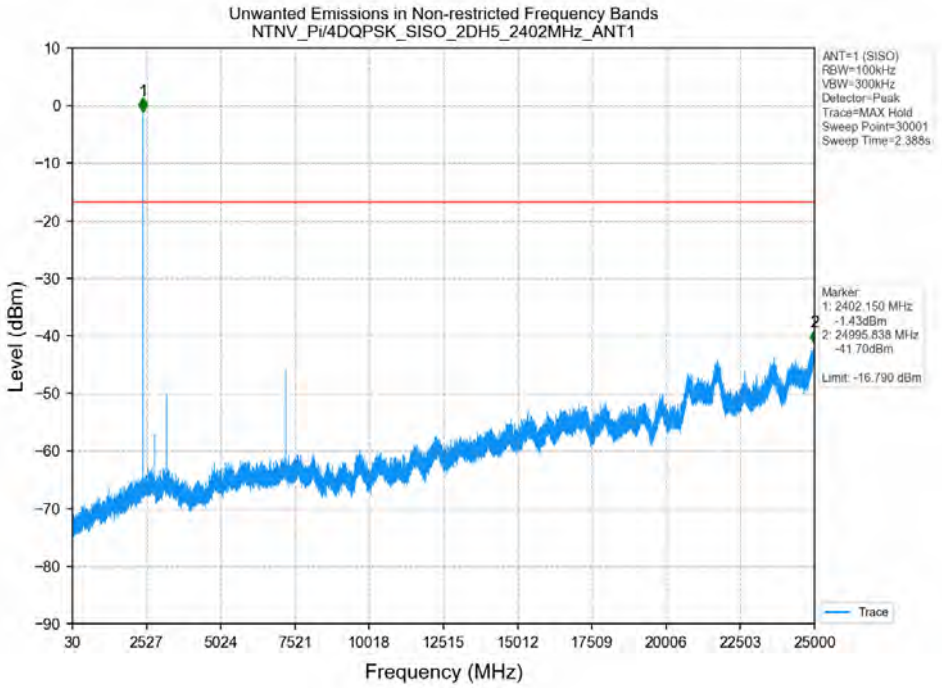

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=2.388s
Marker:
1: 2480.389 MHz
3.55dBm
2: 24980.856 MHz
-40.98dBm
Limit: -14.820 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
30
2527
5024
7521
10018
12515
15012
17509
20006
22503
25000

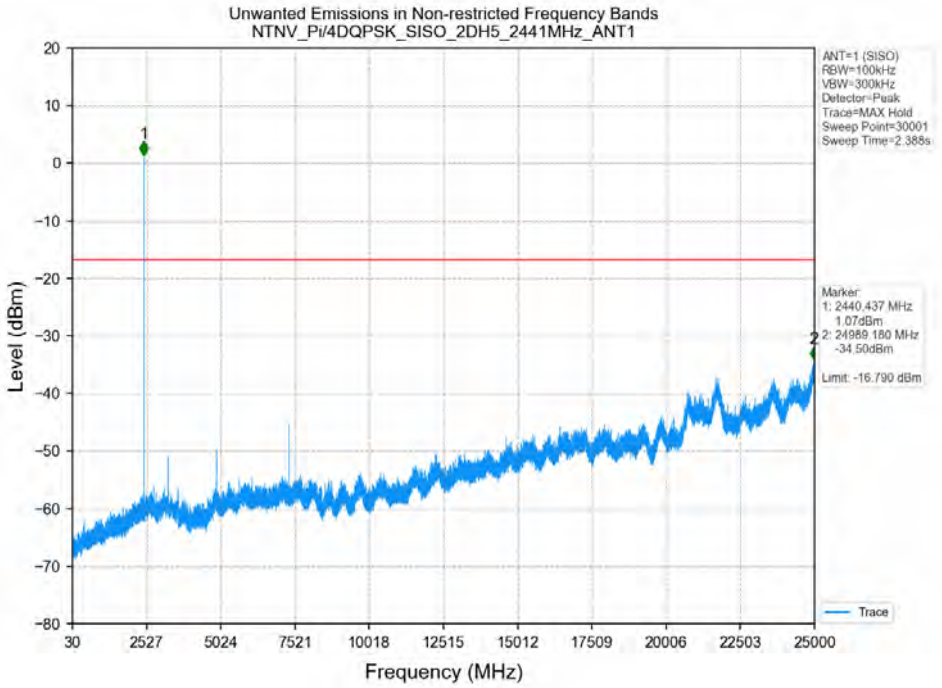

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=3.333ms
Marker:
1: 2409.880 MHz
1.29dBm
Limit: -14.820 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2310
2320
2330
2340
2350
2360
2370
2380
2390
2400
2410

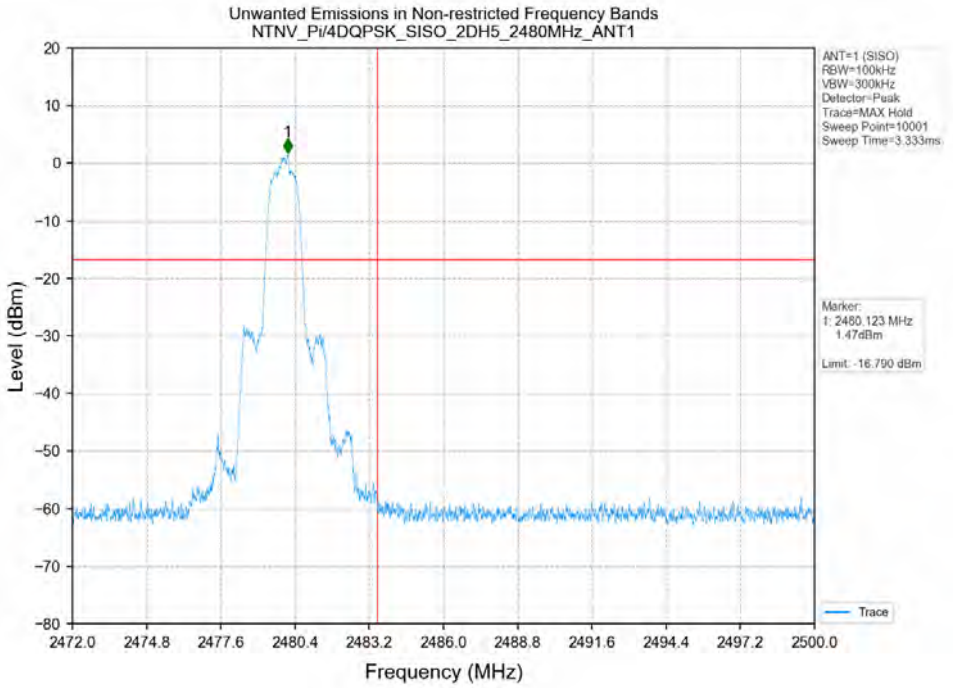

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=3.333ms
Marker:
1: 2479.137 MHz
4.22dBm
Limit: -14.820 dBm
Trace
Level (dBm)
Frequency (MHz)
1
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2472.0
2474.8
2477.6
2480.4
2483.2
2486.0
2488.8
2491.6
2494.4
2497.2
2500.0

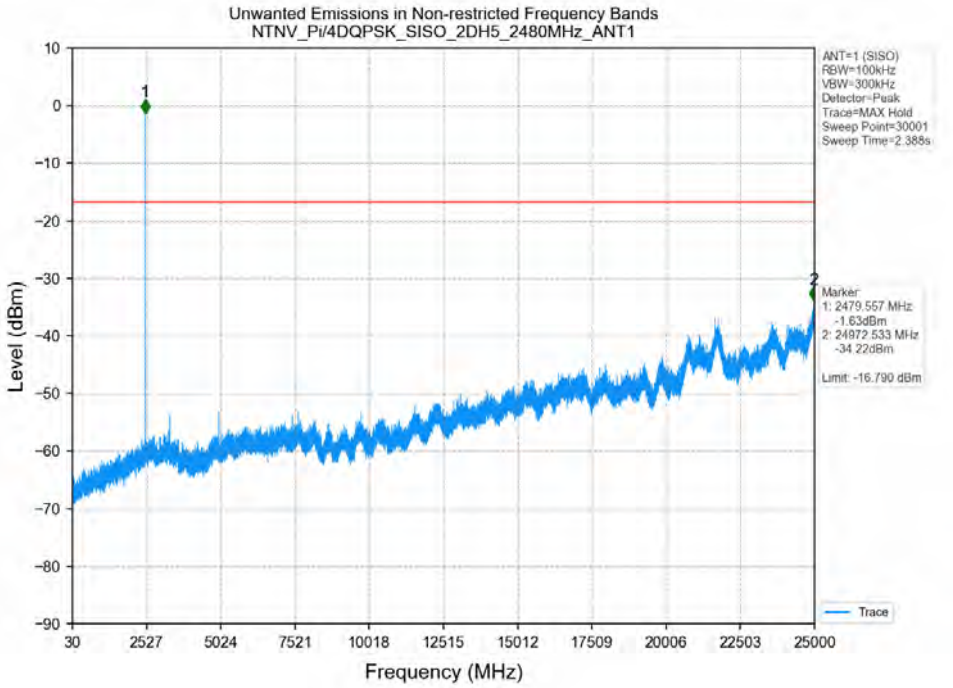

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=1.333ms
Marker:
1: 2440.986 MHz
3.21dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2439.5
2439.8
2440.1
2440.4
2440.7
2441.0
2441.3
2441.6
2441.9
2442.2
2442.5

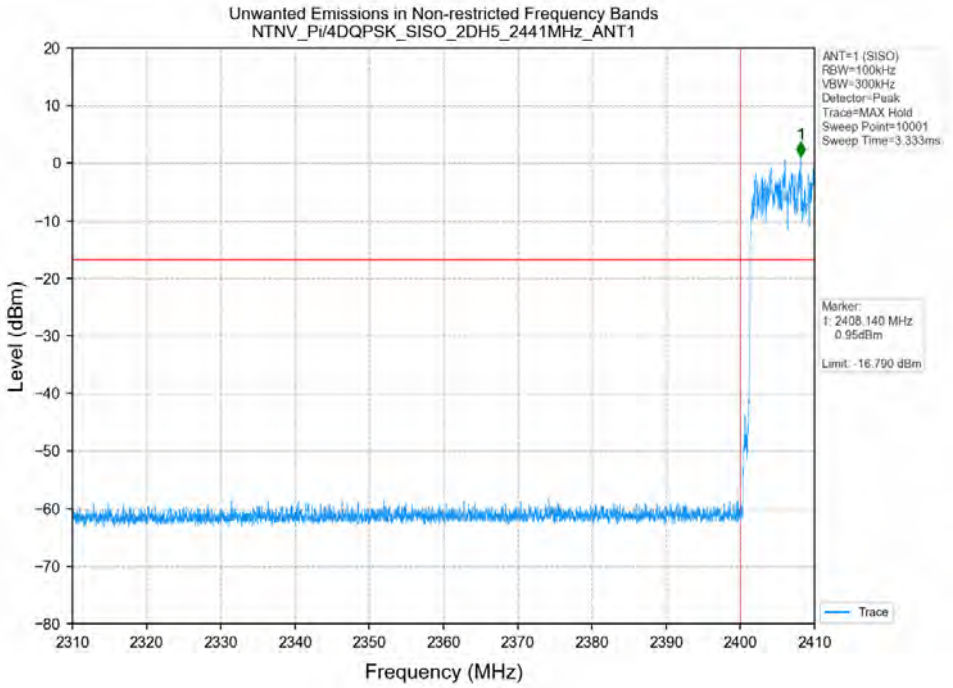

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=10ms
Marker:
1: 2402.020 MHz
0.03dBm
Limit: -16.790 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2310
2320
2330
2340
2350
2360
2370
2380
2390
2400
2410

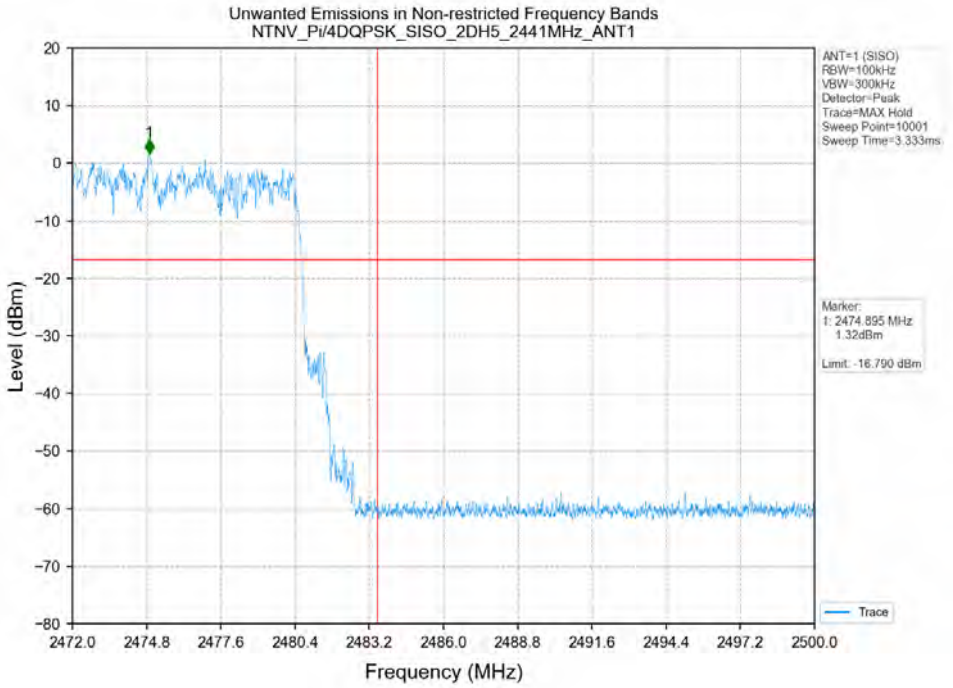

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=2.388s
Marker
1: 2402.150 MHz
-1.43dBm
2: 24995.838 MHz
-41.70dBm
Limit: -16.790 dBm
Trace
Level (dBm)
Frequency (MHz)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
30
2527
5024
7521
10018
12515
15012
17509
20006
22503
25000

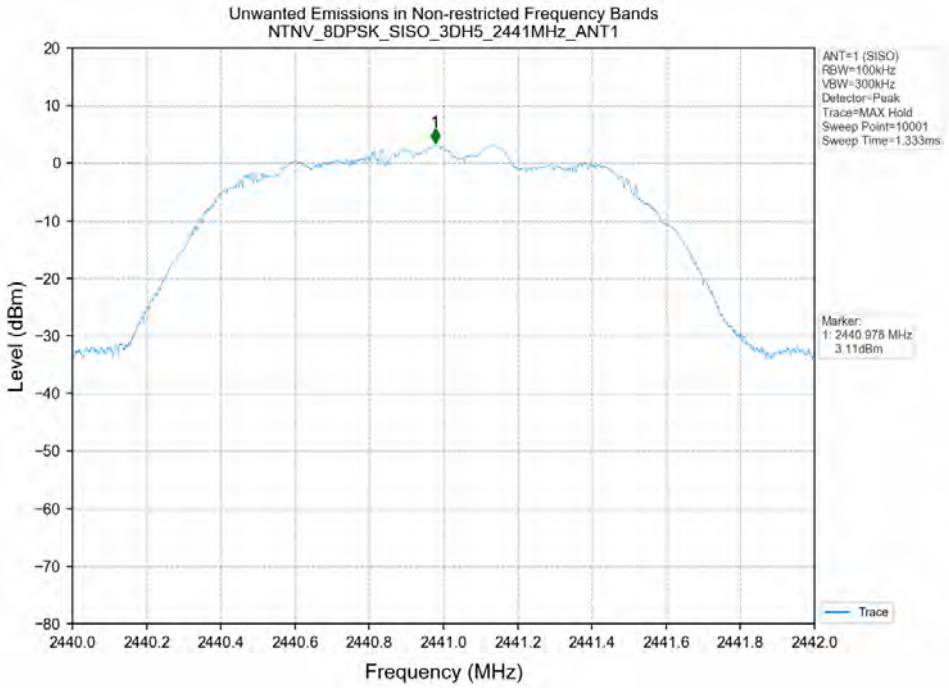

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=2.388s
Marker
1: 2440.437 MHz
1.07dBm
2: 24988.180 MHz
-34.50dBm
Limit: -16.790 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
30
2527
5024
7521
10018
12515
15012
17509
20006
22503
25000

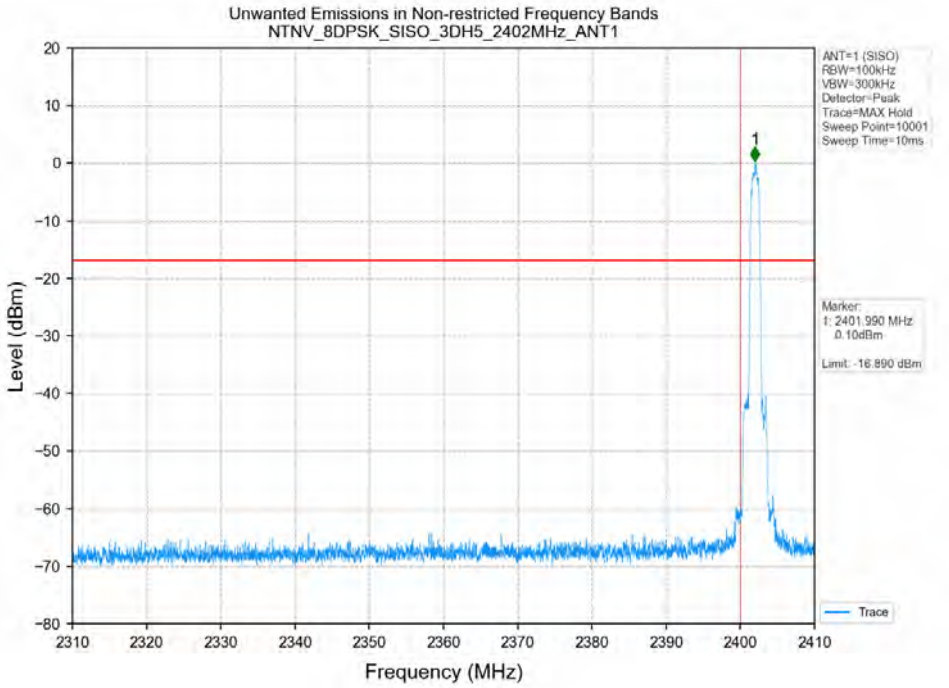

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=3.333ms
Marker:
1: 2480.123 MHz
1.47dBm
Limit: -16.790 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2472.0
2474.8
2477.6
2480.4
2483.2
2486.0
2488.8
2491.6
2494.4
2497.2
2500.0

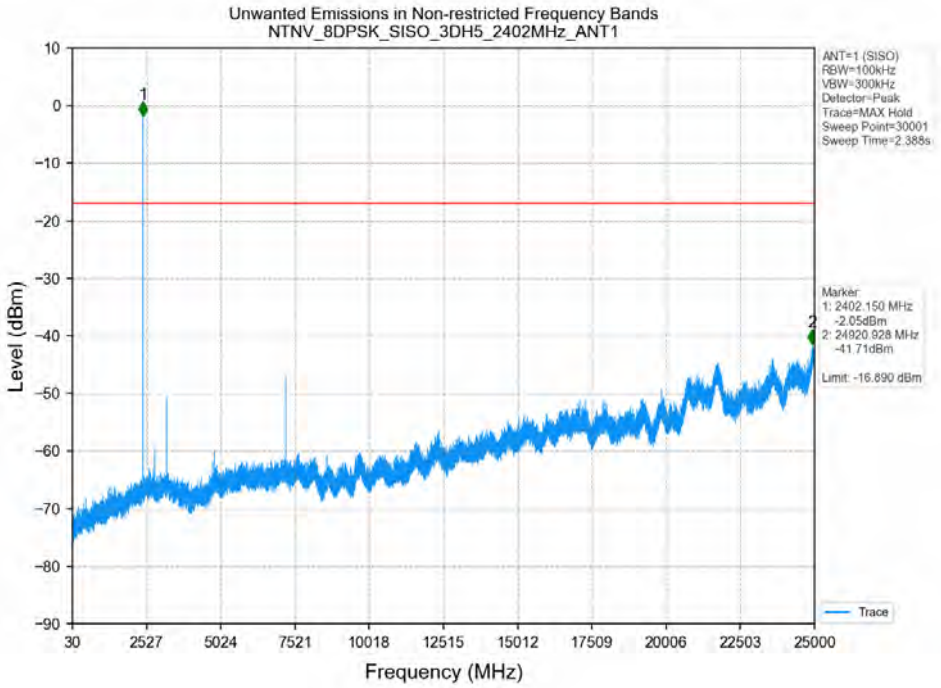

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=2.388s
Marker:
1: 2479.557 MHz
-1.63dBm
2: 24972.533 MHz
-34.22dBm
Limit: -16.790 dBm
Trace
Level (dBm)
Frequency (MHz)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
30
2527
5024
7521
10018
12515
15012
17509
20006
22503
25000

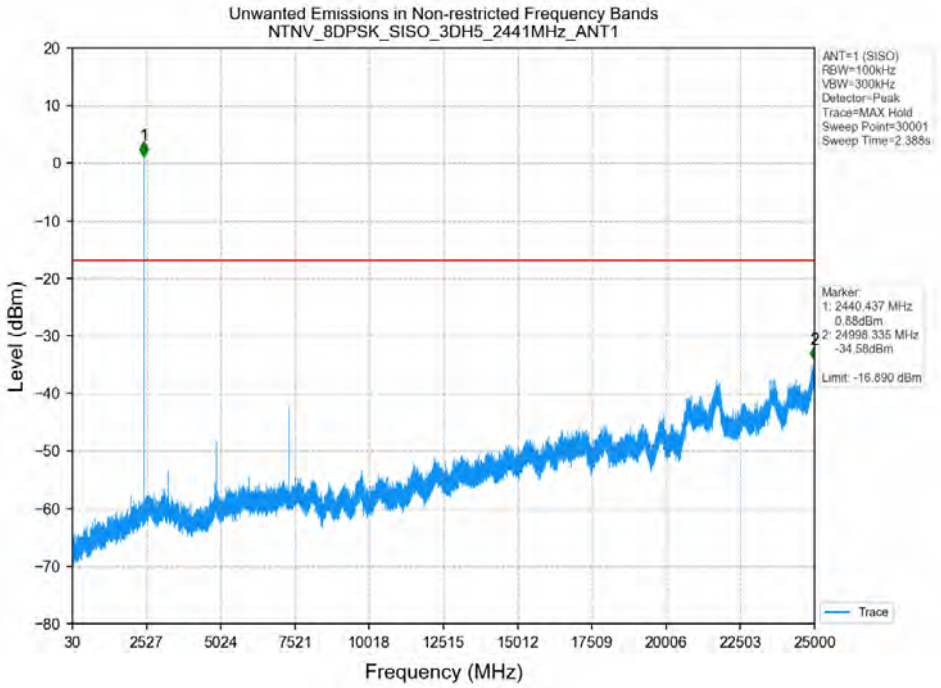

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=3.333ms
Marker:
1: 2408.140 MHz
0.95dBm
Limit: -16.790 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2310
2320
2330
2340
2350
2360
2370
2380
2390
2400
2410

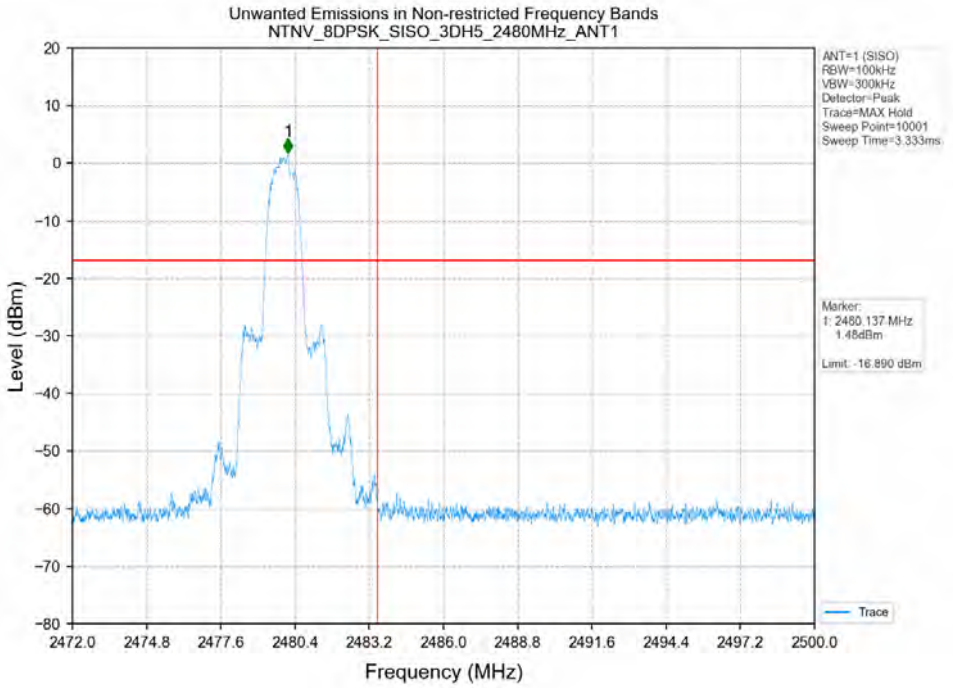

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=3.333ms
Marker:
1: 2474.895 MHz
1.32dBm
Limit: -16.790 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2472.0
2474.8
2477.6
2480.4
2483.2
2486.0
2488.8
2491.6
2494.4
2497.2
2500.0

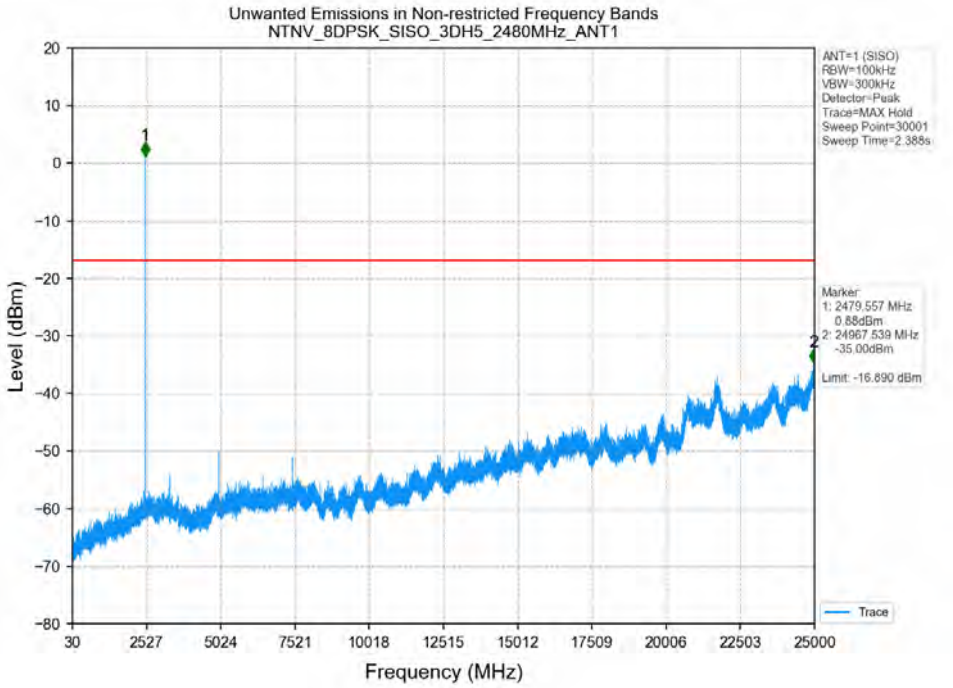

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=1.333ms
Marker:
1: 2440.978 MHz
3.11dBm
Trace
Level (dBm)
Frequency (MHz)

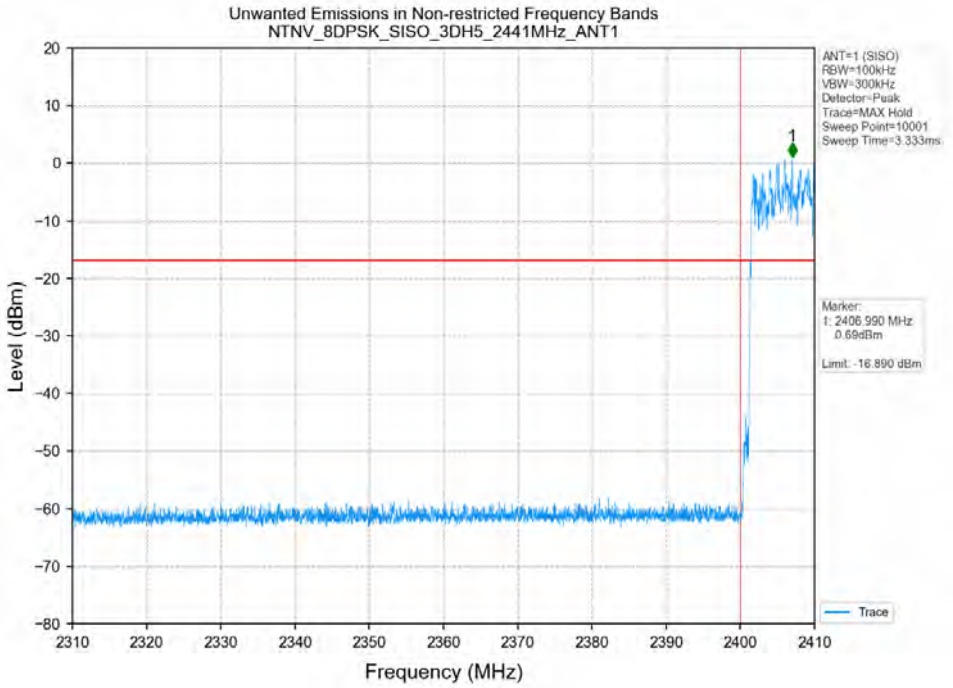

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=10ms
Marker:
1: 2401.990 MHz
0.10dBm
Limit: -16.890 dBm
Trace
Level (dBm)
Frequency (MHz)

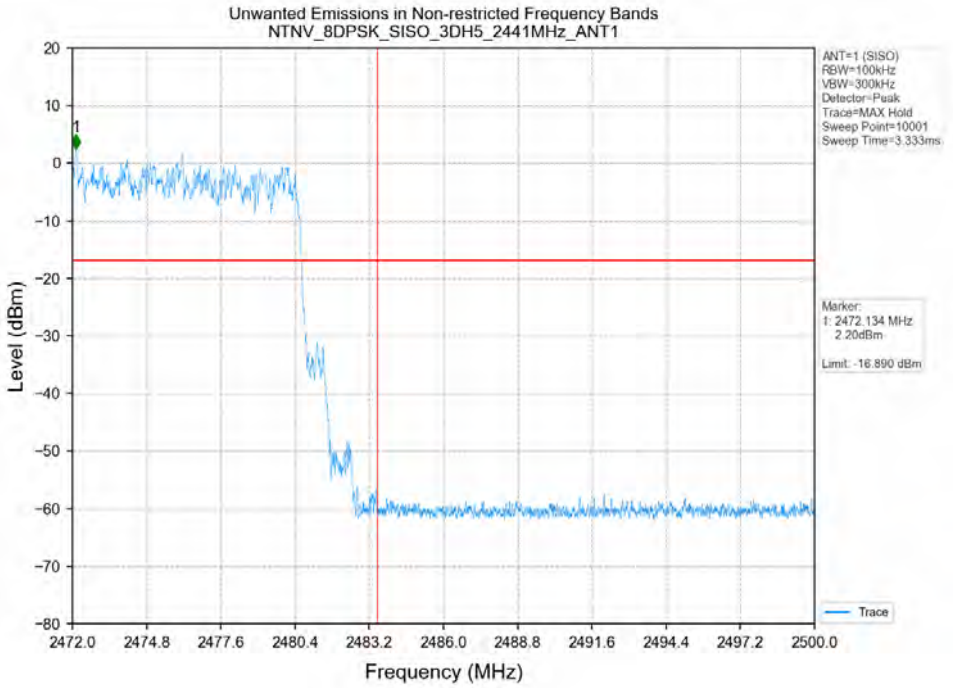

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=2.388s
Marker
1: 2402.150 MHz
-2.05dBm
2: 24920.928 MHz
-41.71dBm
Limit: -16.890 dBm
Trace
Level (dBm)
Frequency (MHz)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
30
2527
5024
7521
10018
12515
15012
17509
20006
22503
25000


Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=2.388s
Marker
1: 2440.437 MHz
0.88dBm
2: 24998.335 MHz
-34.58dBm
Limit: -16.890 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
30
2527
5024
7521
10018
12515
15012
17509
20006
22503
25000


Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=3.333ms
Marker:
1: 2480.137 MHz
1.48dBm
Limit: -16.890 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2472.0
2474.8
2477.6
2480.4
2483.2
2486.0
2488.8
2491.6
2494.4
2497.2
2500.0


Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=2.388s
Marker:
1: 2479.557 MHz
0.88dBm
2: 24967.539 MHz
-35.00dBm
Limit: -16.890 dBm
Trace
Level (dBm)
Frequency (MHz)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
30
2527
5024
7521
10018
12515
15012
17509
20006
22503
25000





- End of the Report -