

FCC - TEST REPORT

Report Number : **60.792.18.014.02R01** Date of Issue : December 6, 2018Model : HG04126A-USProduct Type : Bluetooth speaker outdoorApplicant : Lidl US LLC.Address : 3500 South Clark Street, Arlington, VA 22202Production Facility : Rifen International Ltd.Address : No.7, Dayuling Road, Wentang Street, Dongcheng district, Dongguan City, Guangdong. Province , China.Test Result : ☒Positive ☐NegativeTotal pages
including
Appendices : 53

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2 Description of Equipment Under Test

Description of the Equipment Under Test

Product: Bluetooth speaker outdoor

Model no.: HG04126A-US

FCC ID: 2AJ9O-HG4126

Rating: 1) 3.6 VDC (1 x 3.6 VDC rechargeable battery)
2) 5.0 VDC (USB charging port)

Frequency: 2402MHz-2480MHz

Antenna gain: 0 dBi

Number of operated channel: 79

Modulation: GFSK, $\pi/4$ DQPSK and 8DPSK

Auxiliary Equipment and Software Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Adapter	Apple	A1357	---
Computer	Lenovo	X220	0A72168

Auxiliary Software Used during Test:

DESCRIPTION	SOFTWARE NAME	VERSION	REMARK
RF Test Mode Software	RDA Toolkit	8.03.03	Provided by applicant

3 Summary of Test Standards

Test Standards
FCC Part 15 Subpart C 10-1-17 Edition Federal Communications Commission, PART 15 — Radio Frequency Devices, Subpart C — Unintentional Radiators

All the tests were performed using the procedures from ANSI C63.4(2014) and ANSI C63.10 (2013).

4 Details about the Test Laboratory

Site 1

Company name: TÜV SÜD Hong Kong Ltd.
3/F, West Wing, Lakeside 2,
10 Science Park West Avenue,
Science Park, Shatin, Hong Kong

Site 2

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13 Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2,
Shenzhen 518052, P.R.China
FCC Registration Number: 502708

Emission Tests	
Test Item	Test Site
FCC Part 15 Subpart C	
FCC Title 47 Part 15.205, 15.209 & 15.247(d) Spurious Radiated Emission	Site 2
FCC Title 47 Part 15.207(a) AC Line Conducted Emission	Site 2
FCC Title 47 Part 15.247(a)(1) 20dB & 99% Bandwidth	Site 2
FCC Title 47 Part 15.247(b) Peak Output Power	Site 2
FCC Title 47 Part 2.1051 & 15.247(d) Spurious Emissions at Antenna Terminals	Site 2
FCC Title 47 Part 15.247(d) 100kHz Bandwidth of band edges	Site 2
FCC Title 47 Part 15.247(a)(1) Minimum Number of Hopping Frequencies	Site 2
FCC Title 47 Part 15.247(a)(1) Minimum Hopping Channel Carrier Frequency Separation	Site 2
FCC Title 47 Part 15.247(a)(1) Average Time of Occupancy	Site 2
FCC Title 47 Part 15.203 & 15.247(b) Antenna Requirement	Site 2

4.1 Test Equipment Site List

Radiated emission Test – Site 2

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2019-7-6
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100398	2019-7-6
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2019-6-28
Horn Antenna	Rohde & Schwarz	HF907	102294	2019-6-28
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2019-7-12
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2019-7-6
Signal Generator	Rohde & Schwarz	SMY01	839369/005	2019-7-6
Attenuator	Agilent	8491A	MY39264334	2019-7-6
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

Conducted Emission Test – Site 2

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2019-7-6
LISN	Rohde & Schwarz	ENV4200	100249	2019-7-6
LISN	Rohde & Schwarz	ENV432	101318	2019-7-6
LISN	Rohde & Schwarz	ENV216	100326	2019-7-6
ISN	Rohde & Schwarz	ENY81	100177	2019-7-6
ISN	Rohde & Schwarz	ENY81-CA6	101664	2019-7-6
High Voltage Probe	Rohde & Schwarz	TK9420(VT94 20)	9420-584	2019-6-30
RF Current Probe	Rohde & Schwarz	EZ-17	100816	2019-6-30
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2019-7-6
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

20dB & 99% Bandwidth, Peak Output Power, Spurious Emissions at Antenna Terminals, 100kHz Bandwidth of band edges, Power Spectral Density – Site 2

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	108272	2019-7-6
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2019-7-6
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2019-7-6
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2019-7-6

4.2 Measurement System Uncertainty

Measurement System Uncertainty Emissions

System Measurement Uncertainty	
Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.54dB
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.83dB; Vertical: 4.91dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-25000MHz	Horizontal: 4.89dB; Vertical: 4.88dB;
Uncertainty for Conducted Emission at AC Power Line 150kHz-30MHz	3.21dB
Uncertainty for frequency test	0.6×10^{-7}

5 Summary of Test Results

Emission Tests				
FCC Part 15 Subpart C				
Test Condition	Pages	Test Result		
		Pas s	Fail	N/A
FCC Title 47 Part 15.207(a) AC Line Conducted Emission	10-11	☒	☐	☐
FCC Title 47 Part 15.205, 15.209 & 15.247(d) Spurious Radiated Emission	12-15	☒	☐	☐
FCC Title 47 Part 15.247(a)(2) 20dB & 99% Bandwidth	16-24	☒	☐	☐
FCC Title 47 Part 15.247(b) Peak Output Power	25-33	☒	☐	☐
FCC Title 47 Part 2.1051 & 15.247(d) Spurious Emissions at Antenna Terminals	34-39	☒	☐	☐
FCC Title 47 Part 15.247(d) 100kHz Bandwidth of band edges	40-42	☒	☐	☐
FCC Title 47 Part 15.247(a)(1) Min. No. of Hopping Frequencies	43-45	☒	☐	☐
FCC Title 47 Part 15.247(a)(1) Min. of Hopping Channel Carrier Frequency Separation	46-48	☒	☐	☐
FCC Title 47 Part 15.247(a)(1) Average Time of Occupancy	49-51	☒	☐	☐
FCC Title 47 Part 15.203 & 15.247(b) Antenna Requirement	52	☒	☐	☐

6 General Remarks

Remarks

EMC tests were performed on model: **HG04126A-US**.

This submittal(s) (test report) is intended for **FCC ID: 2AJ90-HG4126**, complies with Section 15.203, 15.205, 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules for the DTS grant

The TX and RX range is 2402MHz-2480MHz

SUMMARY:

- All tests according to the regulations cited on page 5 were

☒ - Performed

☐ - **Not** Performed

- The Equipment Under Test

☒ - **Fulfills** the general approval requirements.

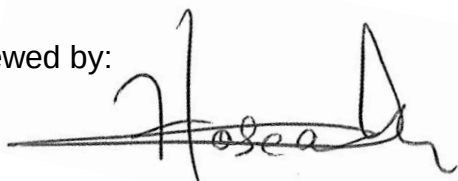
☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: September 17, 2018

Testing Start Date: September 18, 2018

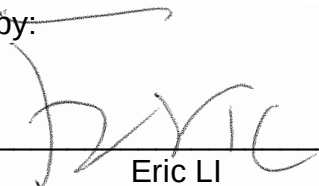
Testing End Date: November 8, 2018

Reviewed by:



Hosea CHAN
EMC Project Engineer

Prepared by:



Eric LI
EMC Senior Project Engineer

7 Emission Test Results

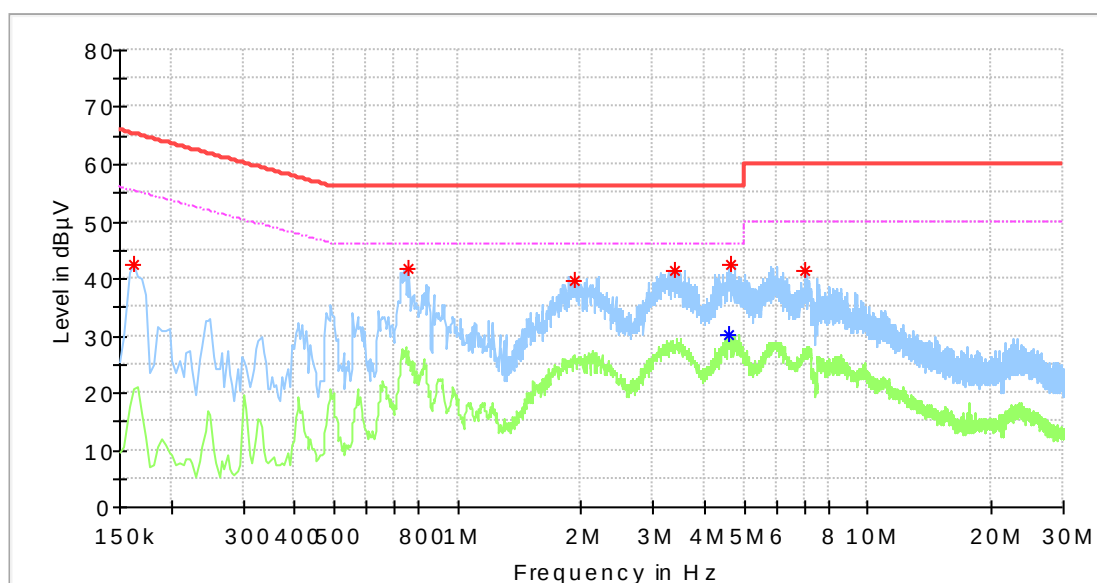
7.1 Conducted Emission

EUT: HG04126A-US
 Op Condition: Operated, Charging Mode
 Test Specification: FCC15.207, AC Mains, L Line
 Comment: 120VAC, 60Hz

Test Result

☒ Passed

☐ Not Passed



Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)
0.162000	42.57	---	65.36	-22.79
0.762000	41.92	---	56.00	-14.08
1.934000	39.70	---	56.00	-16.30
3.390000	41.46	---	56.00	-14.54
4.594000	---	30.14	46.00	-15.86
4.658000	42.54	---	56.00	-13.46
7.058000	41.57	---	60.00	-18.43

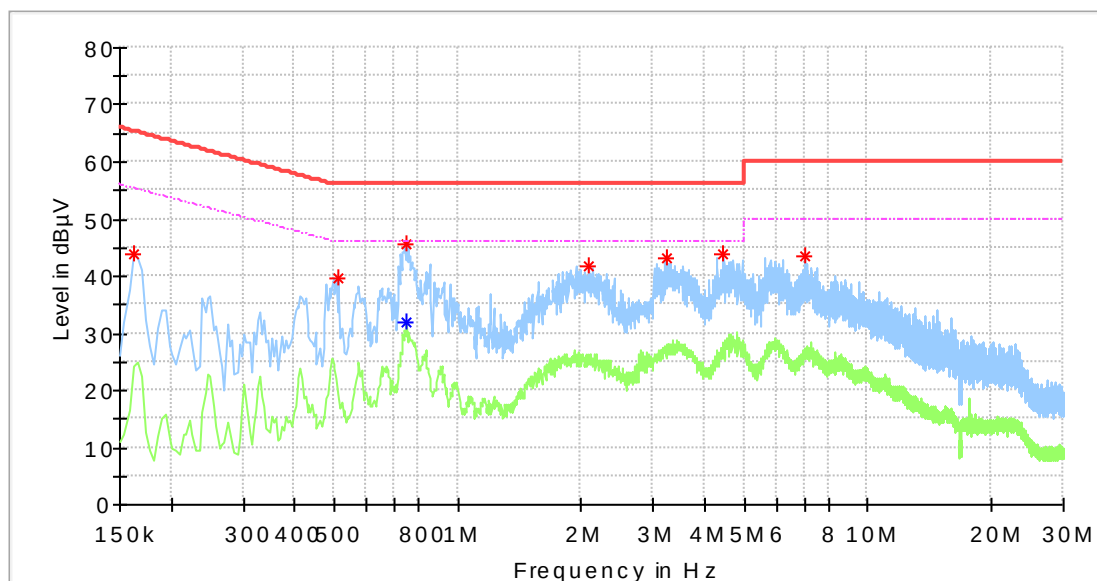
Conducted Emission

EUT: HG04126A-US
 Op Condition: Operated, Charging Mode
 Test Specification: FCC15.207, AC Mains, N Line
 Comment: 120VAC, 60Hz

Test Result

☒ Passed

☐ Not Passed



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)
0.162000	43.74	---	65.36	-21.62
0.514000	39.50	---	56.00	-16.50
0.750000	45.58	---	56.00	-10.42
0.750000	---	31.90	46.00	-14.10
2.094000	41.60	---	56.00	-14.40
3.218000	43.30	---	56.00	-12.70
4.454000	43.89	---	56.00	-12.11
7.042000	43.66	---	60.00	-16.34

7.2 Spurious Radiated Emission

EUT: HG04126A-US
 Op Condition: Operated, TX Mode(3DH5)
 (Low channel is the worst case)
 Test Specification: FCC15.205, 15.209 & 15.247(d)
 Comment: 3.6 VDC
 Remark: 9kHz to 1GHz

Test Result

☒ Passed

☐ Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector PK/QP/AV	Ant. Polarity H/V	Corr. (dB)
51.218750	18.34	40.00	-21.66	Peak	H	17.9
147.491250	30.30	43.50	-13.20	Peak	H	13.3
283.109375	22.85	46.00	-23.15	Peak	H	19.5
482.262500	26.96	46.00	-19.04	Peak	H	23.6
719.124375	31.92	46.00	-14.08	Peak	H	27.6
885.055000	33.12	46.00	-12.88	Peak	H	29.8
30.242500	23.08	40.00	-16.92	Peak	V	13.8
41.700625	21.61	40.00	-18.39	Peak	V	16.5
45.883750	21.57	40.00	-18.43	Peak	V	17.4
52.613125	21.47	40.00	-18.53	Peak	V	17.6
147.430625	32.54	43.50	-10.96	Peak	V	13.3
720.155000	32.09	46.00	-13.91	Peak	V	27.6

Remark:

- As the measured peak value not exceeded the Quasi peak limit, Quasi peak value no need to be measured.

Spurious Radiated Emission

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402MHz, 3DH5)
 Test Specification: FCC15.205, 15.209 & 15.247(d)
 Comment: 3.6 VDC
 Remark: 1GHz to 25GHz

Test Result	
☒	Passed
☐	Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector PK/QP/AV	Ant. Polarity H/V	Corr. (dB)
1241.250000	33.65	54.00	-20.35	Peak	H	-12.0
1428.125000	31.06	54.00	-22.94	Peak	H	-11.3
4803.750000	43.02	54.00	-10.98	Peak	H	3.7
7605.468750	41.48	54.00	-12.52	Peak	H	9.9
10699.218750	40.53	54.00	-13.47	Peak	H	10.4
1260.875000	30.55	54.00	-23.45	Peak	V	-11.6
1778.250000	30.43	54.00	-23.57	Peak	V	-9.8
4803.750000	40.23	54.00	-13.77	Peak	V	3.7
7608.281250	41.39	54.00	-12.61	Peak	V	9.9
10692.656250	41.47	54.00	-12.53	Peak	V	10.4

Remark:

1.As the measured peak value not exceeded the average limit, average value no need to be measured.

Spurious Radiated Emission

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, 3DH5)
 Test Specification: FCC15.205, 15.209 & 15.247(d)
 Comment: 3.6 VDC
 Remark: 1GHz to 25GHz

Test Result	
☒	Passed
☐	Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector PK/QP/AV	Ant. Polarity H/V	Corr. (dB)
1250.250000	35.85	54.00	-18.15	Peak	H	-11.9
1787.812500	30.87	54.00	-23.13	Peak	H	-9.8
4882.031250	39.31	54.00	-14.69	Peak	H	3.8
7642.031250	41.59	54.00	-12.41	Peak	H	9.6
10727.812500	41.53	54.00	-12.47	Peak	H	10.4
1356.125000	29.36	54.00	-24.64	Peak	V	-11.5
1776.687500	29.00	54.00	-25.00	Peak	V	-9.9
4882.031250	41.93	54.00	-12.07	Peak	V	3.8
8749.687500	40.59	54.00	-13.41	Peak	V	8.8
10721.250000	41.71	54.00	-12.29	Peak	V	10.4

Remark:

1.As the measured peak value not exceeded the average limit, average value no need to be measured.

Spurious Radiated Emission

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2480MHz, 3DH5)
 Test Specification: FCC15.205, 15.209 & 15.247(d)
 Comment: 3.6 VDC
 Remark: 1GHz to 25GHz

Test Result

☒ Passed

☐ Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector PK/QP/AV	Ant. Polarity H/V	Corr. (dB)
1020.062500	37.59	54.00	-16.41	Peak	H	-12.8
1245.500000	33.68	54.00	-20.32	Peak	H	-12.0
4959.843750	42.06	54.00	-11.94	Peak	H	4.3
7614.375000	40.94	54.00	-13.06	Peak	H	9.8
11551.875000	40.80	54.00	-13.20	Peak	H	9.7
1272.125000	30.46	54.00	-23.54	Peak	V	-11.7
1452.125000	29.84	54.00	-24.16	Peak	V	-11.1
4959.843750	39.85	54.00	-14.15	Peak	V	4.3
7618.593750	41.42	54.00	-12.58	Peak	V	9.8
10222.031250	41.73	54.00	-12.27	Peak	V	9.3

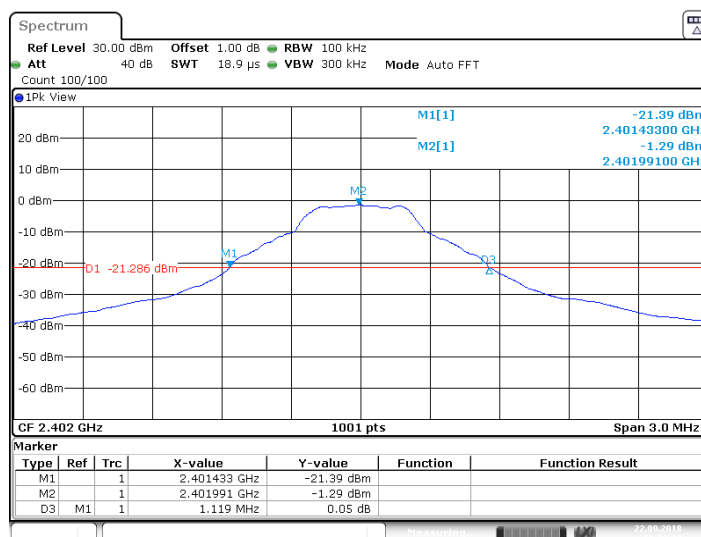
Remark:

1.As the measured peak value not exceeded the average limit, average value no need to be measured.

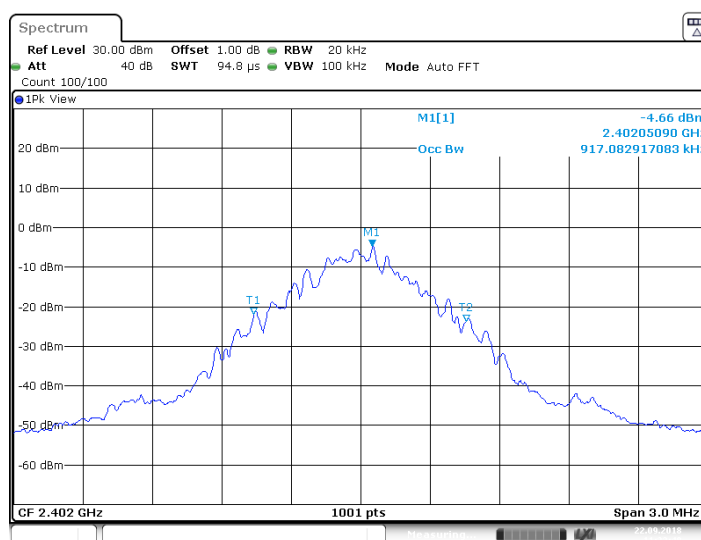
7.3 20dB & 99% Bandwidth

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402MHz, DH5)
 Test Specification: FCC15.247(a)(2), 20dB Bandwidth & 99% Bandwidth
 Comment: 3.6 VDC

Test Result

☒ Passed☐ Not Passed

Date: 22 SEP 2018 11:22:36



Date: 22 SEP 2018 11:22:48

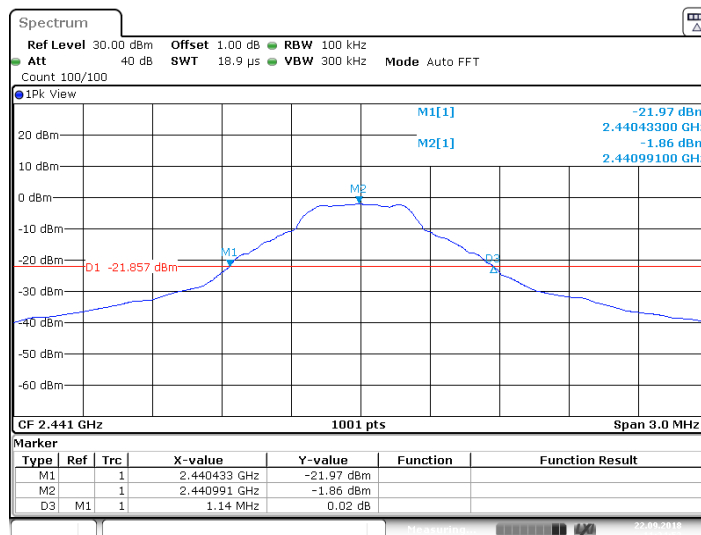
20dB bandwidth	99% bandwidth
1.119 MHz	0.917 MHz

20dB & 99% Bandwidth

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, DH5)
 Test Specification: FCC15.247(a)(2), 20dB Bandwidth & 99% Bandwidth
 Comment: 3.6 VDC

Test Result

☒ Passed
☐ Not Passed



Date: 22 SEP 2018 11:24:54



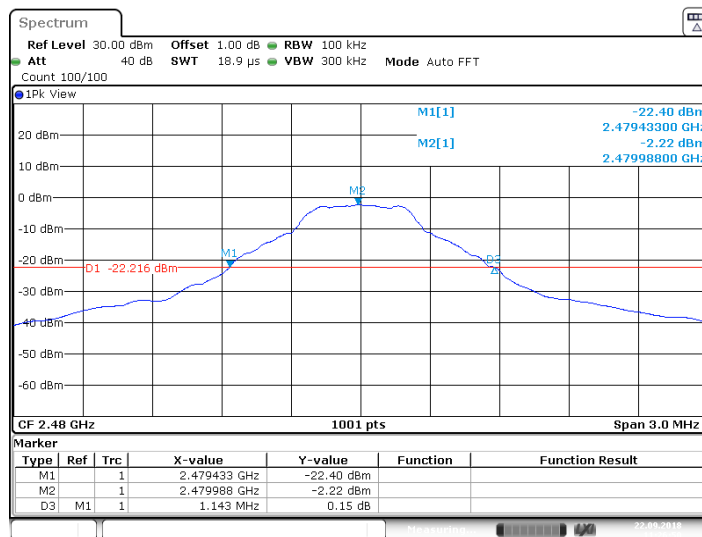
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20dB bandwidth	99% bandwidth
1.140 MHz	0.917 MHz

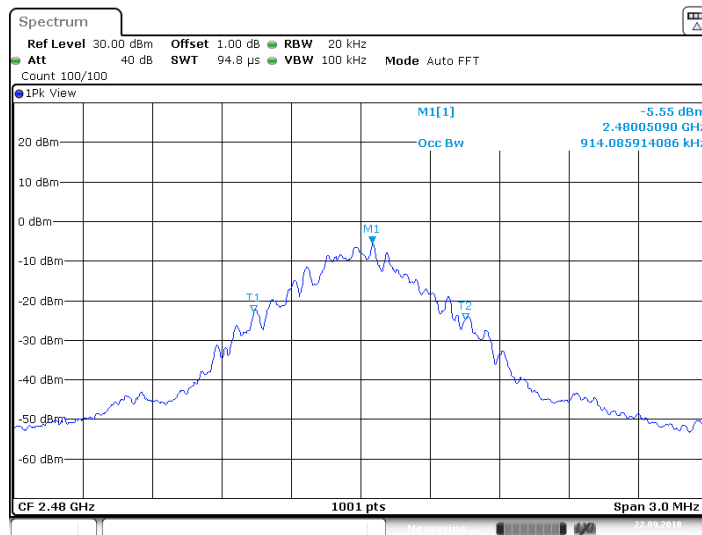
20dB & 99% Bandwidth

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2480MHz, DH5)
 Test Specification: FCC15.247(a)(2), 20dB Bandwidth & 99% Bandwidth
 Comment: 3.6 VDC

Test Result
☒ Passed
☐ Not Passed



Date: 22 SEP 2018 11:26:51



Date: 22 SEP 2018 11:27:02

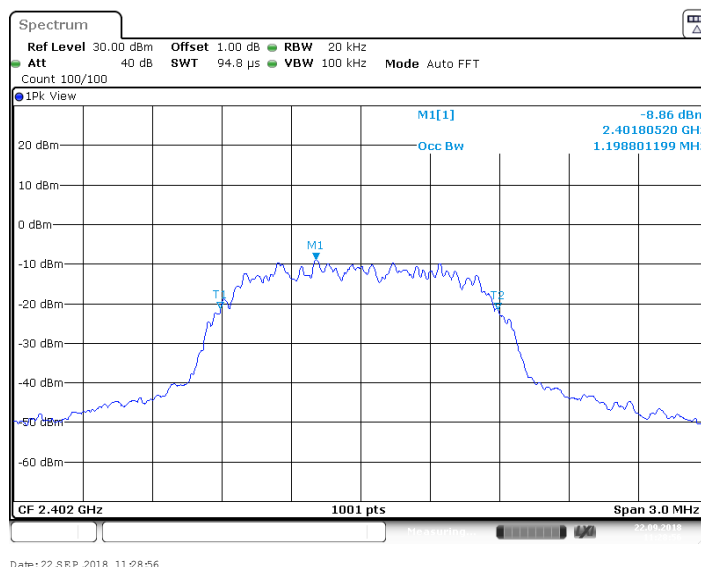
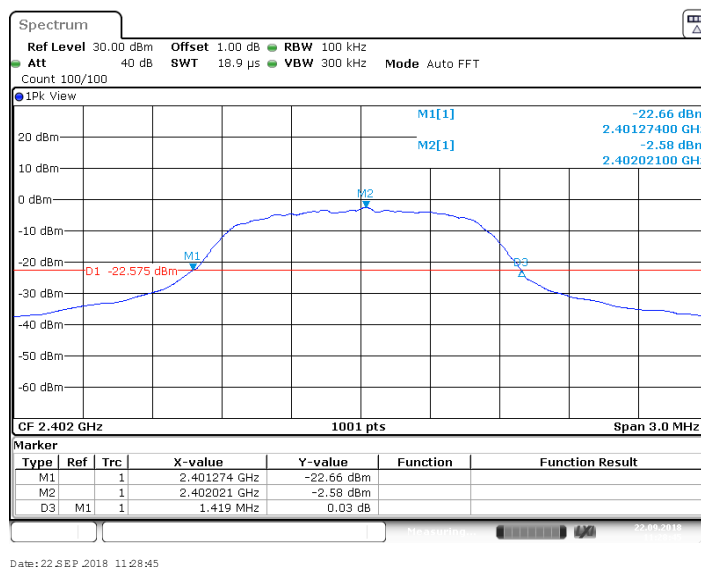
20dB bandwidth	99% bandwidth
1.143 MHz	0.914 MHz

20dB & 99% Bandwidth

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402MHz, 2DH5)
 Test Specification: FCC15.247(a)(2), 20dB Bandwidth & 99% Bandwidth
 Comment: 3.6 VDC

Test Result

☒ Passed
☐ Not Passed

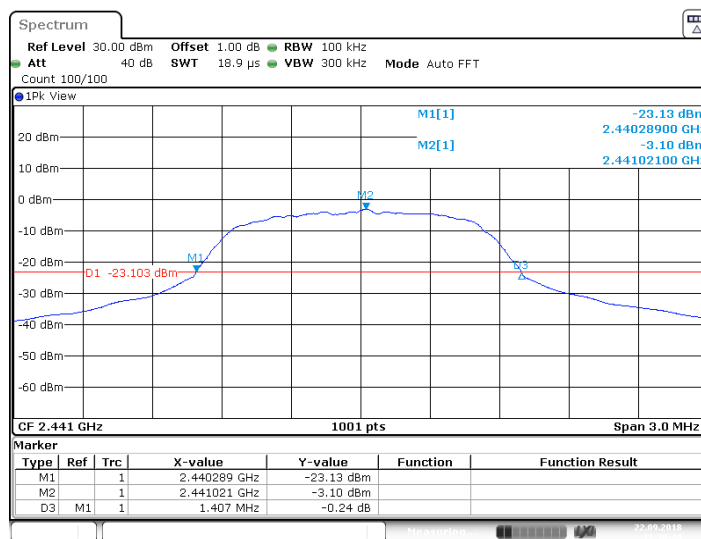


20dB bandwidth	99% bandwidth
1.419 MHz	1.199 MHz

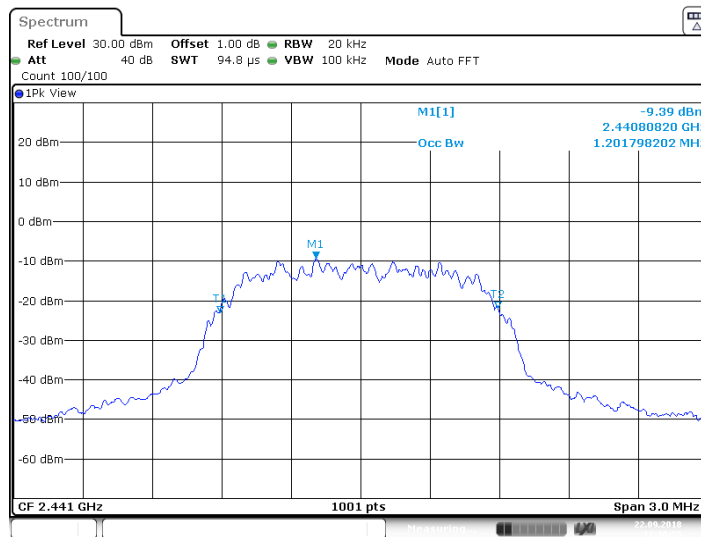
20dB & 99% Bandwidth

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, 2DH5)
 Test Specification: FCC15.247(a)(2), 20dB Bandwidth & 99% Bandwidth
 Comment: 3.6 VDC

Test Result

☒ Passed☐ Not Passed

Date: 22 SEP 2018 11:30:44



Date: 22 SEP 2018 11:30:56

20dB bandwidth	99% bandwidth
1.407 MHz	1.202 MHz

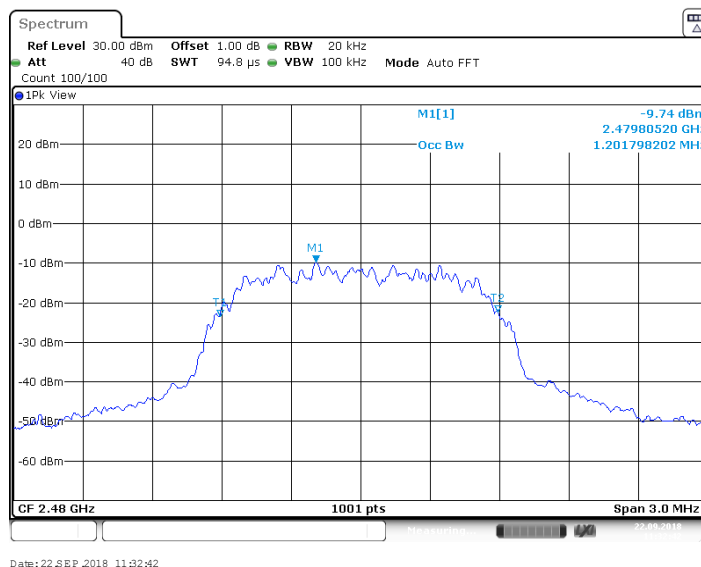
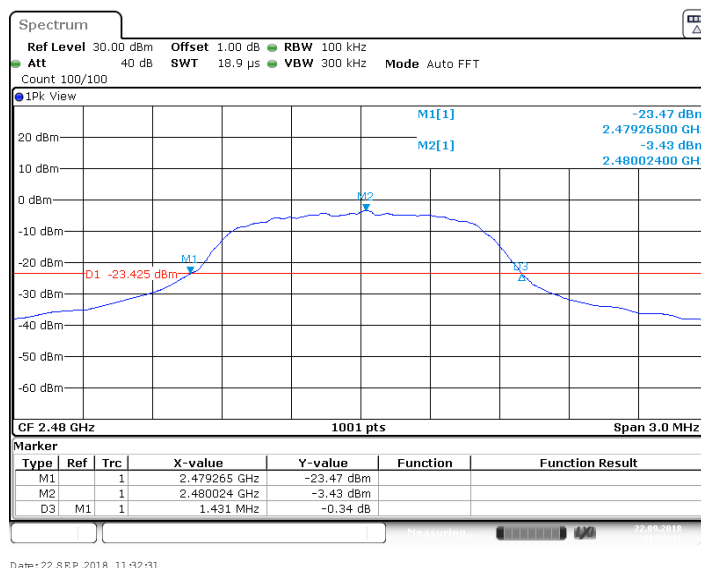
20dB & 99% Bandwidth

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2480MHz, 2DH5)
 Test Specification: FCC15.247(a)(2), 20dB Bandwidth & 99% Bandwidth
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed

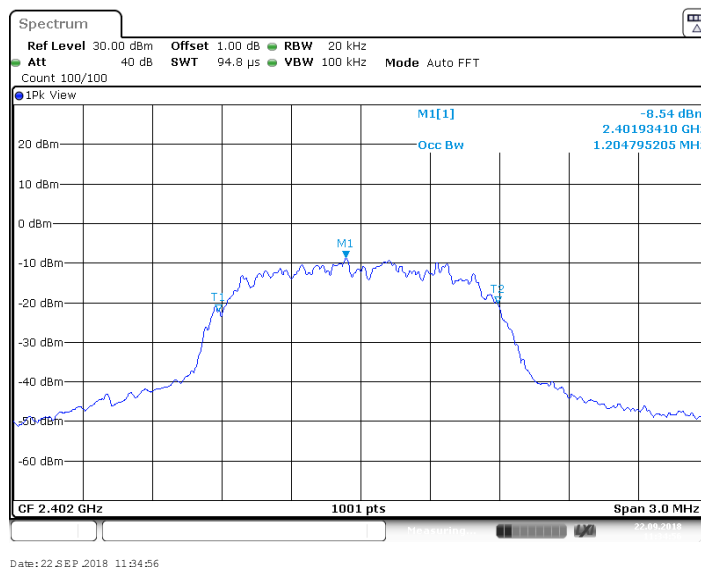
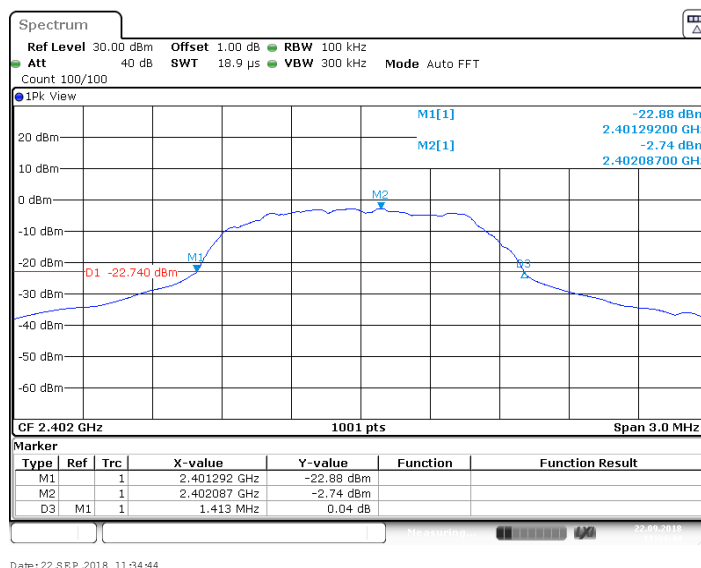


20dB bandwidth	99% bandwidth
1.431 MHz	1.202 MHz

20dB & 99% Bandwidth

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402MHz, 3DH5)
 Test Specification: FCC15.247(a)(2), 20dB Bandwidth & 99% Bandwidth
 Comment: 3.6 VDC

Test Result

☒ Passed☐ Not Passed

20dB bandwidth	99% bandwidth
1.413 MHz	1.205 MHz

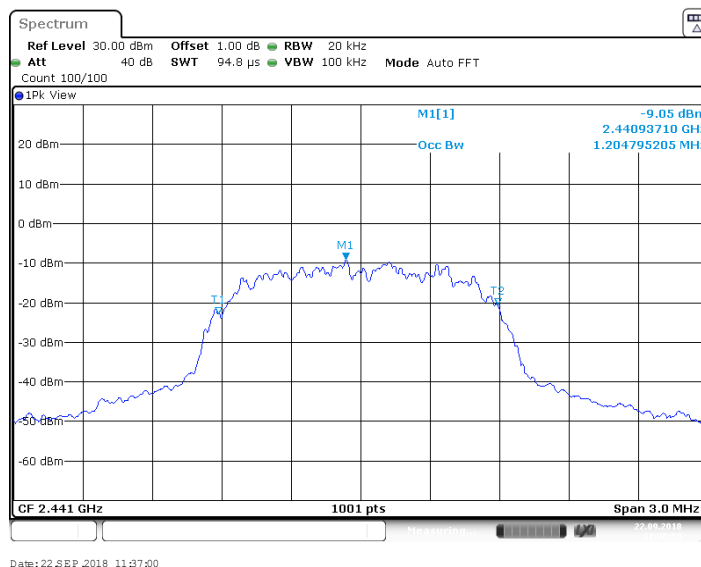
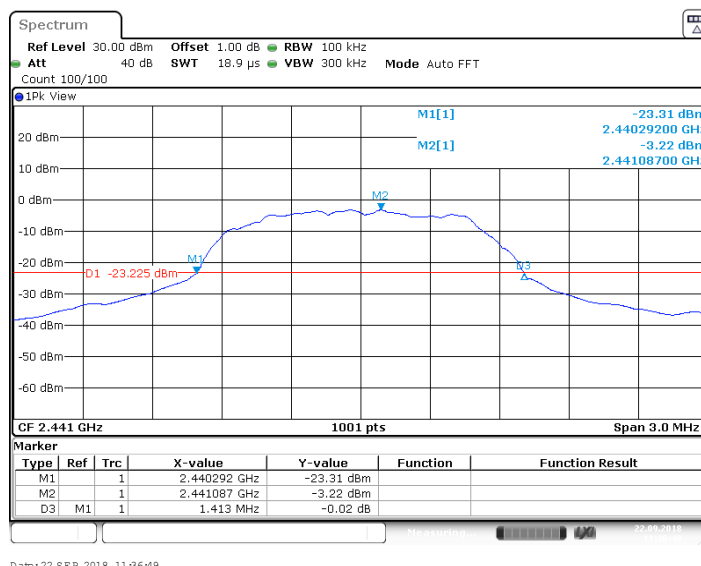
20dB & 99% Bandwidth

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, 3DH5)
 Test Specification: FCC15.247(a)(2), 20dB Bandwidth & 99% Bandwidth
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



20dB bandwidth	99% bandwidth
1.413 MHz	1.205 MHz

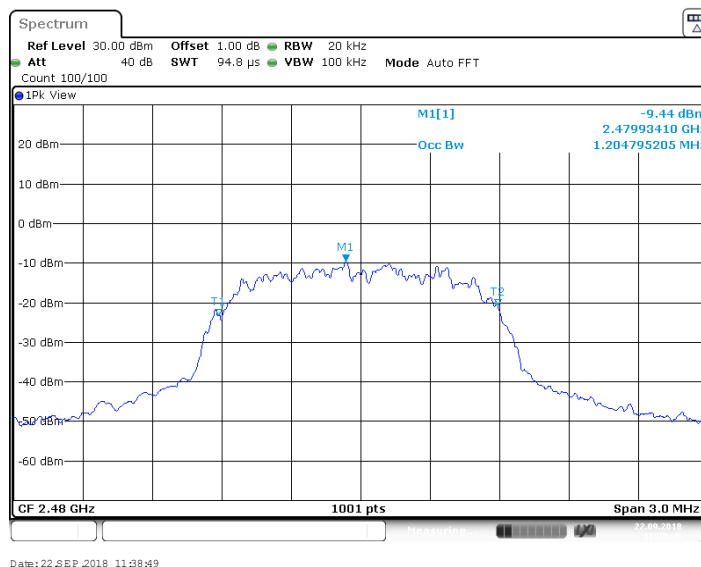
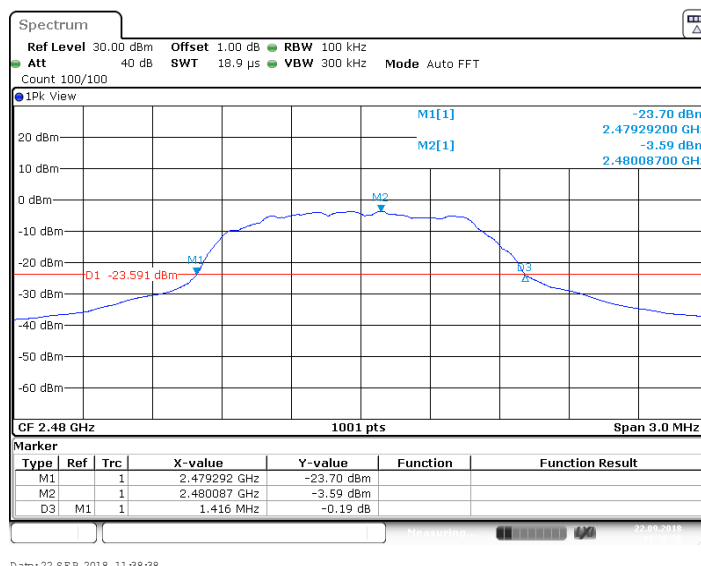
20dB & 99% Bandwidth

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2480MHz, 3DH5)
 Test Specification: FCC15.247(a)(2), 20dB Bandwidth & 99% Bandwidth
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



20dB bandwidth	99% bandwidth
1.416 MHz	1.205 MHz

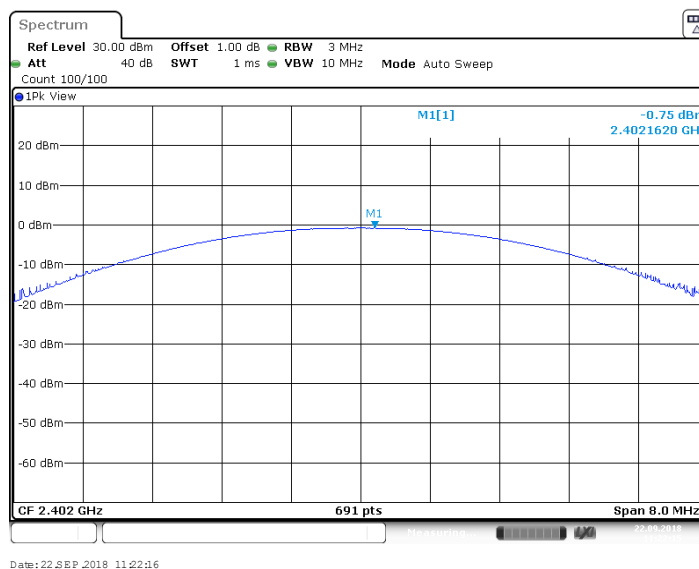
7.4 Peak Output Power

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402MHz, DH5)
 Test Specification: FCC15.247(b)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed

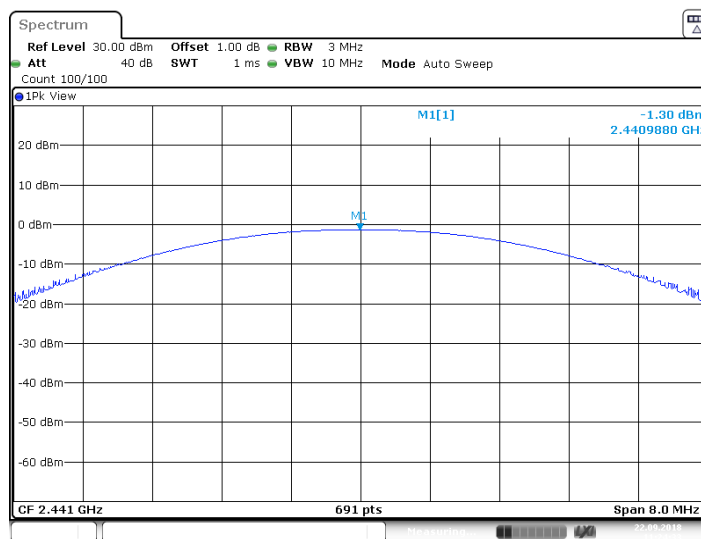


Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
-0.75	0.84	125.0

Peak Output Power

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, DH5)
 Test Specification: FCC15.247(b)
 Comment: 3.6 VDC

Test Result

☒ Passed☐ Not Passed

Date: 22 SEP 2018 11:24:33

Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
-1.30	0.74	125.0

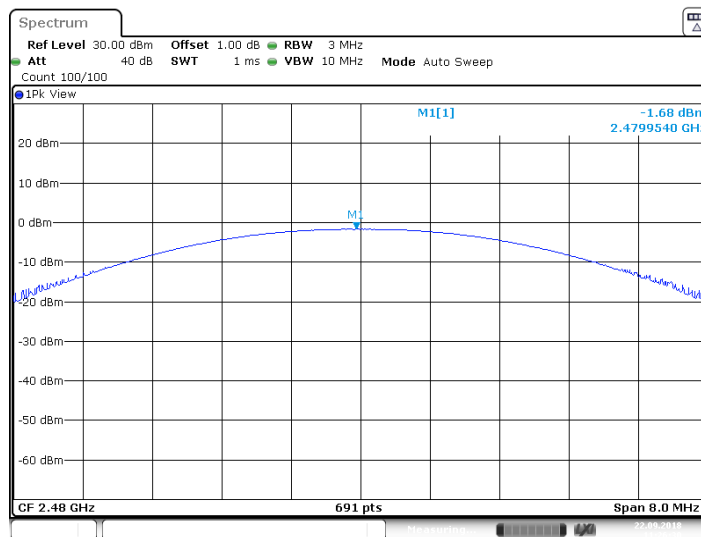
Peak Output Power

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2480MHz, DH5)
 Test Specification: FCC15.247(b)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



Date: 22 SEP 2018 11:26:30

Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
-1.68	0.68	125.0

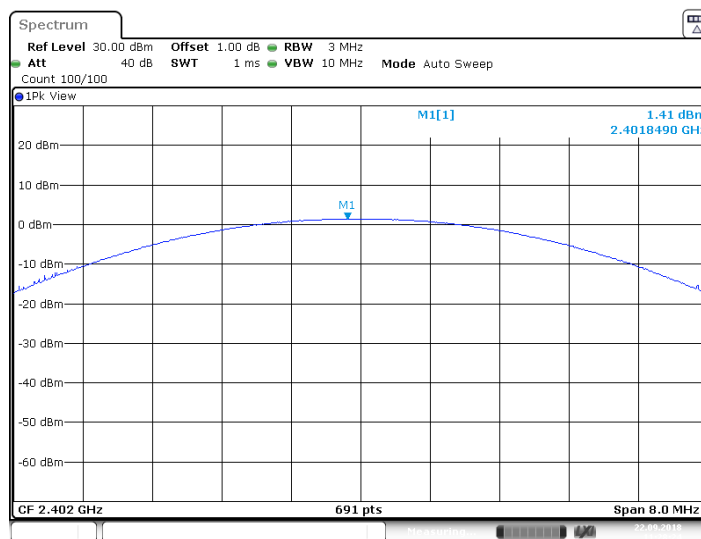
Peak Output Power

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402MHz, 2DH5)
 Test Specification: FCC15.247(b)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



Date: 22 SEP 2018 11:28:25

Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
1.41	1.38	125.0

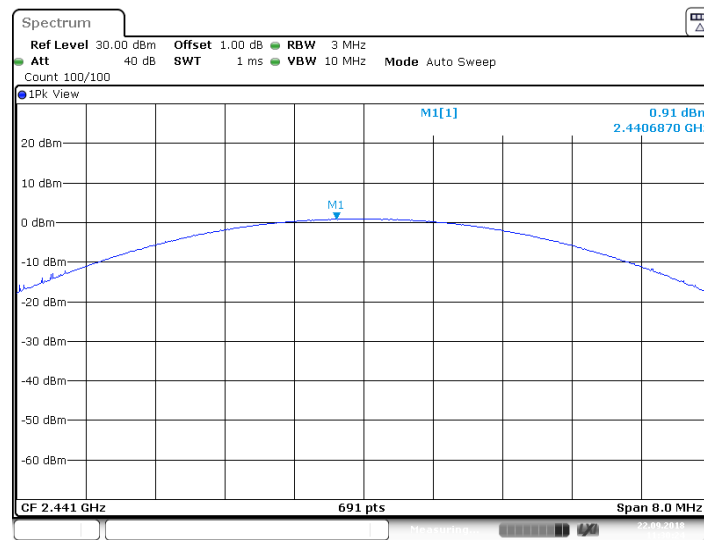
Peak Output Power

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, 2DH5)
 Test Specification: FCC15.247(b)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
0.91	1.23	125.0

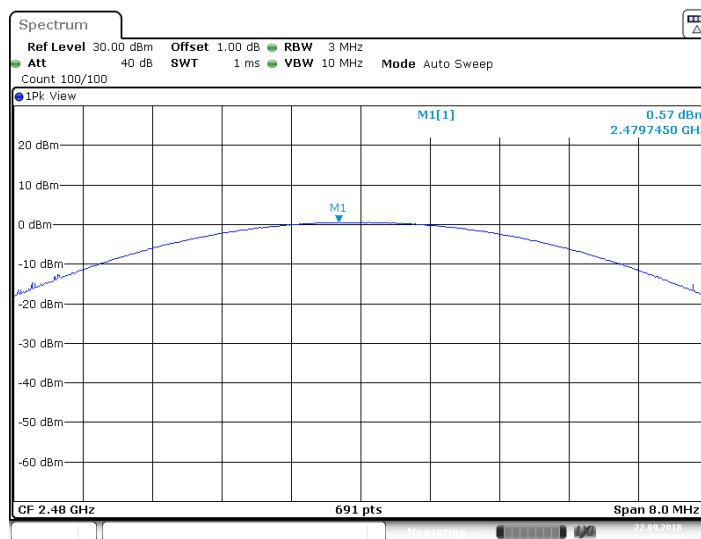
Peak Output Power

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2480MHz, 2DH5)
 Test Specification: FCC15.247(b)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



Date: 22 SEP 2018 11:32:10

Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
0.57	1.14	125.0

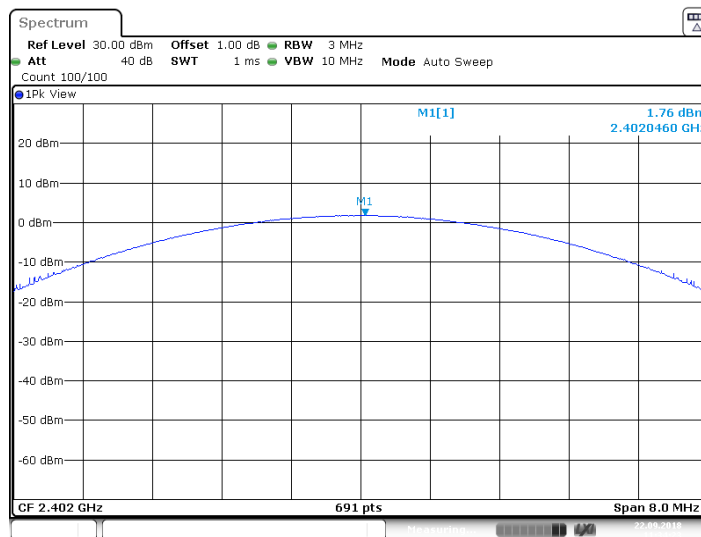
Peak Output Power

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402MHz, 3DH5)
 Test Specification: FCC15.247(b)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



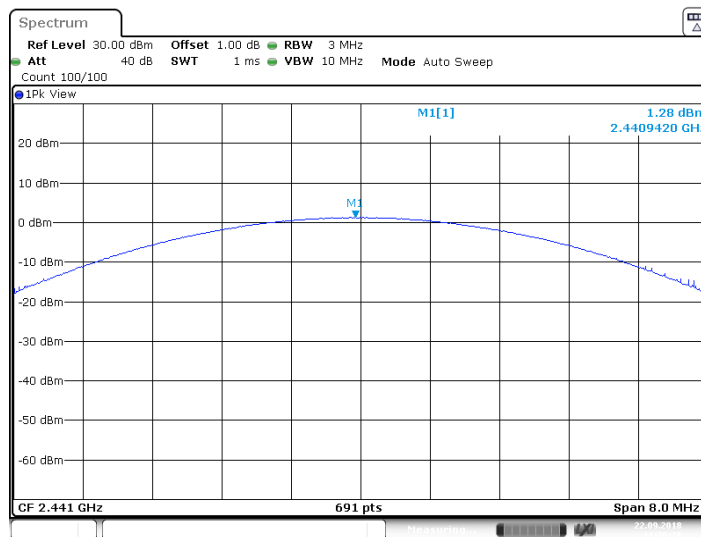
Date: 22 SEP 2018 11:34:24

Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
1.76	1.50	125.0

Peak Output Power

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, 3DH5)
 Test Specification: FCC15.247(b)
 Comment: 3.6 VDC

Test Result

☒ Passed☐ Not Passed

Date: 22 SEP 2018 11:36:28

Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
1.28	1.34	125.0

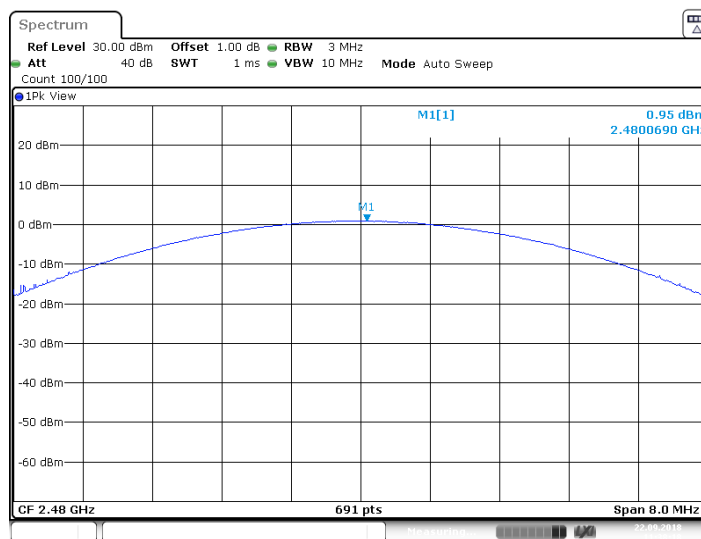
Peak Output Power

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2480MHz, 3DH5)
 Test Specification: FCC15.247(b)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



Date: 22 SEP 2018 11:38:17

Conducted Output Power (dBm)	Conducted Output Power (mW)	Limit (mW)
0.95	1.24	125.0

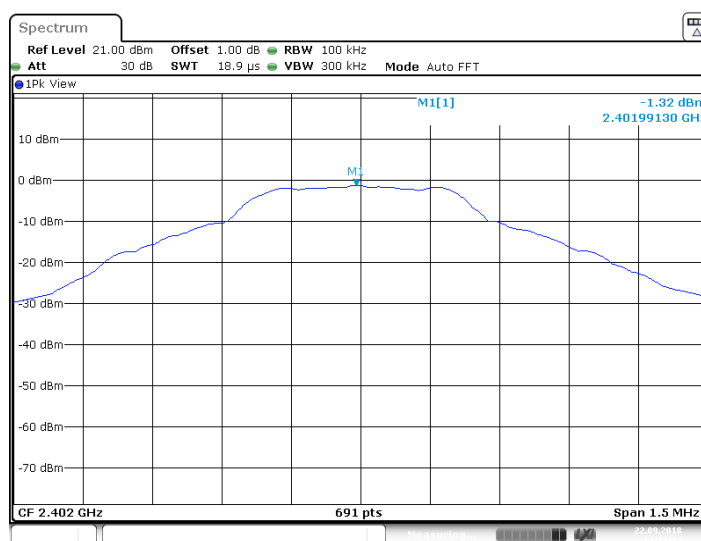
7.5 Spurious Emissions at Antenna Terminals

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402MHz, DH5)
 Test Specification: FCC2.1051 & 15.247(d)
 Comment: 3.6 VDC

Test Result

☒ Passed☐ Not Passed

Channel	FreqRange	RefLevel	Result	Limit	Verdict
2402	Reference	-1.32	---	---	PASS
2402	30~1000	-1.32	-62.2	-21.32	PASS
2402	1000~26500	-1.32	-45.7	-21.32	PASS

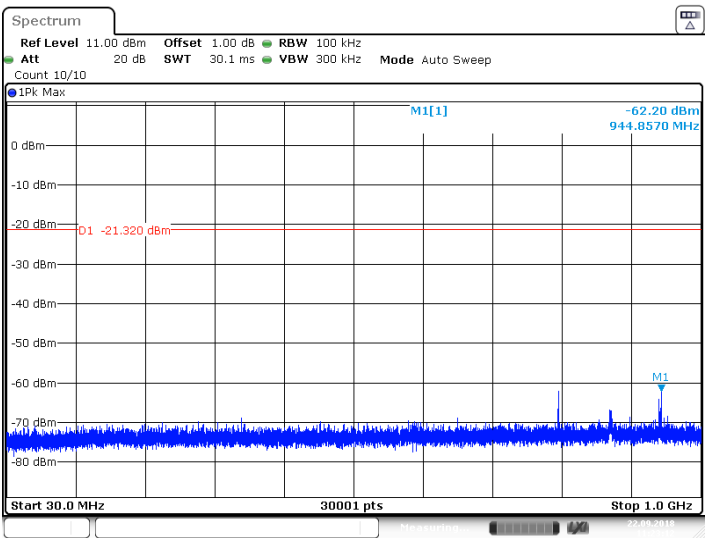


Date: 22 SEP 2018 11:23:04

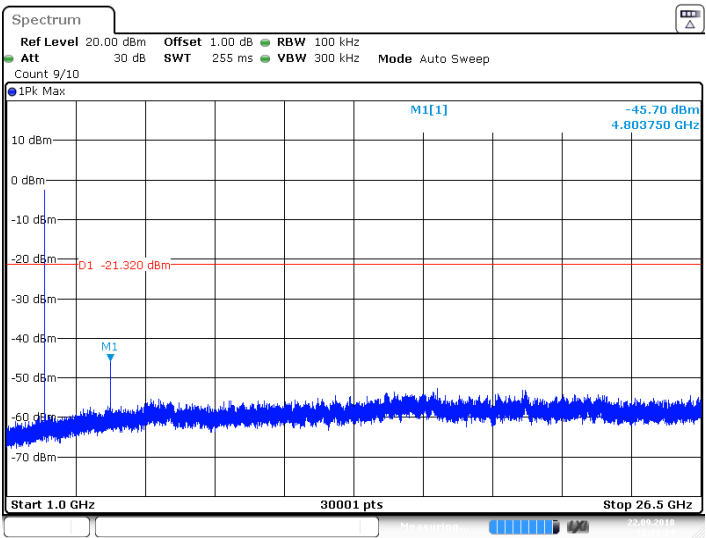
Spurious Emissions at Antenna Terminals

EUT: 165-00645
Op Condition: Operated, TX Mode (2402MHz, DH5)
Test Specification: FCC2.1051 & 15.247(d)
Comment: 3.6 VDC

Test Result
☒ Passed
☐ Not Passed



Date: 22 SEP 2018 11:23:13



Date: 22 SEP 2018 11:23:24

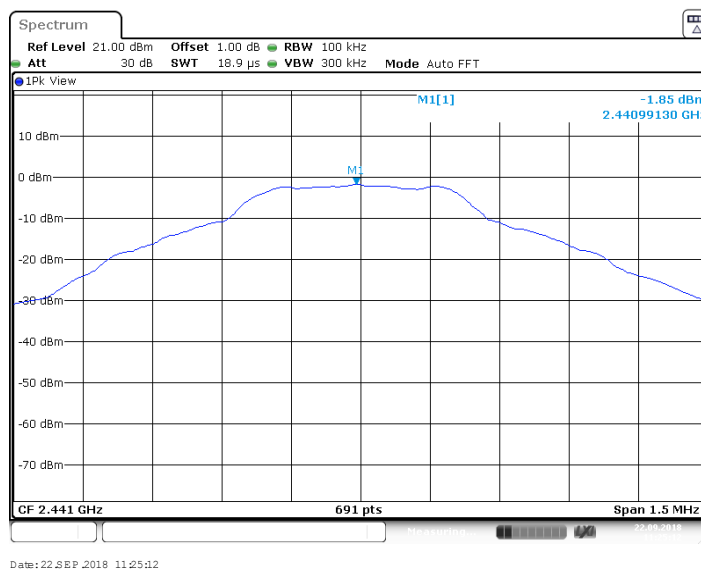
Spurious Emissions at Antenna Terminals

EUT: 165-00645
 Op Condition: Operated, TX Mode (2441MHz, DH5)
 Test Specification: FCC2.1051 & 15.247(d)
 Comment: 3.6 VDC

Test Result

☒ Passed☐ Not Passed

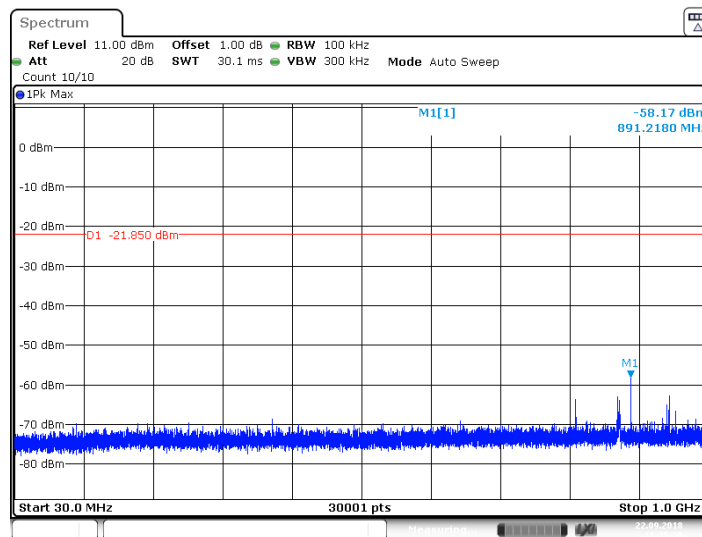
Channel	FreqRange	RefLevel	Result	Limit	Verdict
2441	Reference	-1.85	---	---	PASS
2441	30~1000	-1.85	-58.17	-21.85	PASS
2441	1000~26500	-1.85	-43.56	-21.85	PASS



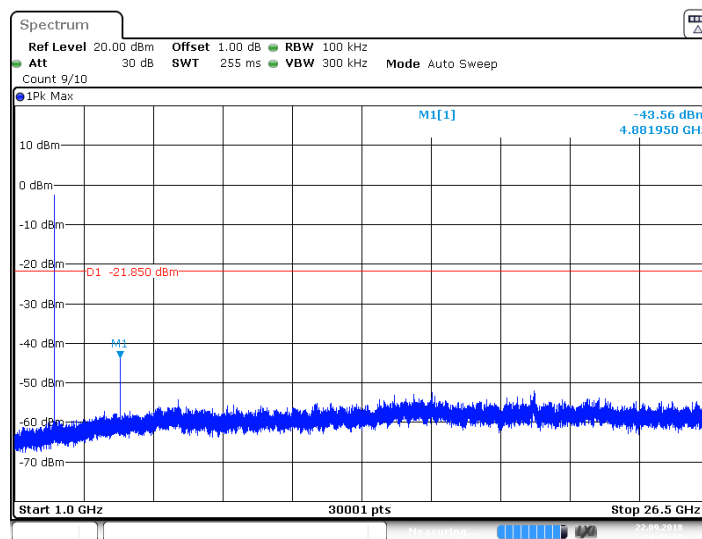
Spurious Emissions at Antenna Terminals

EUT: 165-00645
Op Condition: Operated, TX Mode (2441MHz, DH5)
Test Specification: FCC2.1051 & 15.247(d)
Comment: 3.6 VDC

Test Result
☒ Passed
☐ Not Passed



Date: 22 SEP 2018 11:25:20



Date: 22 SEP 2018 11:25:32

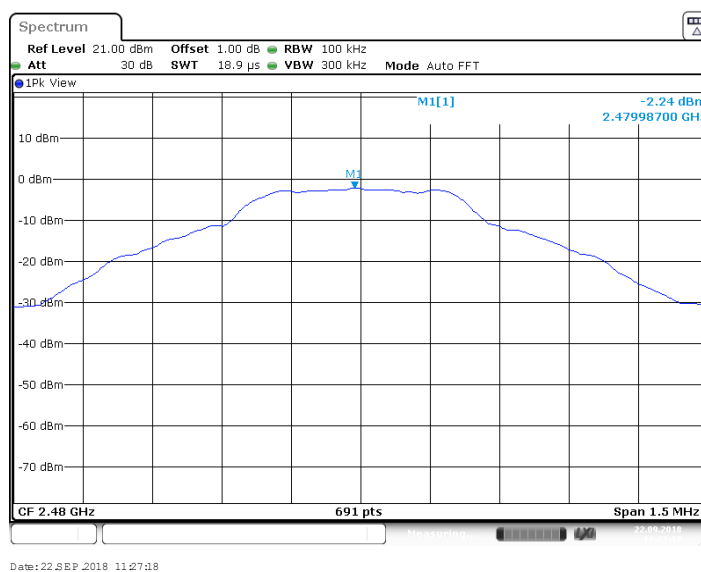
Spurious Emissions at Antenna Terminals

EUT: 165-00645
 Op Condition: Operated, TX Mode (2480MHz, DH5)
 Test Specification: FCC2.1051 & 15.247(d)
 Comment: 3.6 VDC

Test Result

☒ Passed
☐ Not Passed

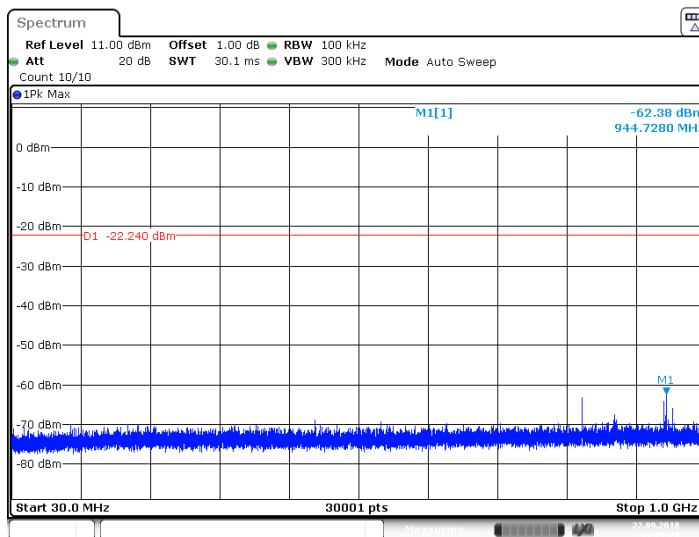
Channel	FreqRange	RefLevel	Result	Limit	Verdict
2480	Reference	-2.24	---	---	PASS
2480	30~1000	-2.24	-63.03	-22.24	PASS
2480	1000~26500	-2.24	-46.66	-22.24	PASS



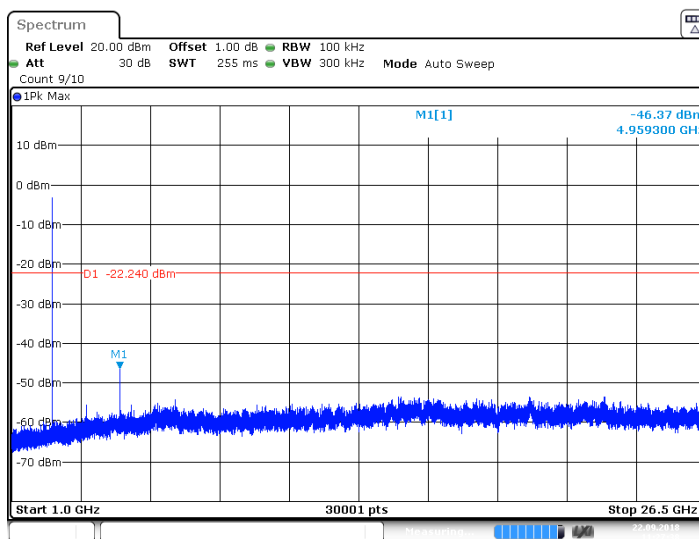
Spurious Emissions at Antenna Terminals

EUT: 165-00645
Op Condition: Operated, TX Mode (2480MHz, DH5)
Test Specification: FCC2.1051 & 15.247(d)
Comment: 3.6 VDC

Test Result

☒ Passed☐ Not Passed

Date: 22 SEP 2018 11:27:27

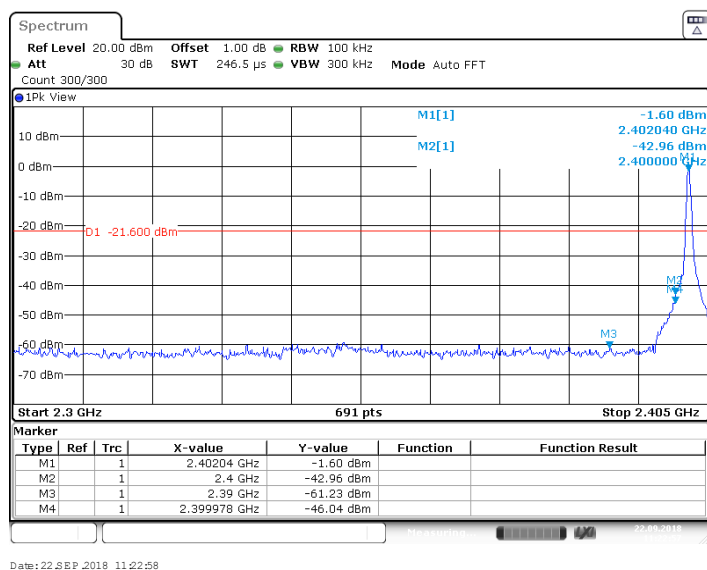


Date: 22 SEP 2018 11:27:38

7.6 100kHz Bandwidth of band edges

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402MHz, DH5)
 (Worst case)
 Test Specification: FCC15.247(d), Conducted
 Comment: 3.6 VDC

Test Result

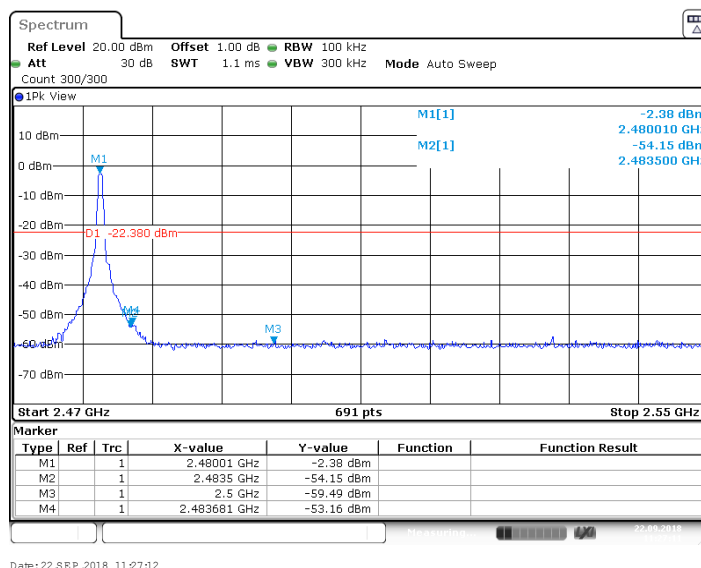
☒ Passed☐ Not Passed

Band edges	Limit
41.36 dB	> 20dB

100kHz Bandwidth of band edges

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2480MHz, DH5)
 (Worst case)
 Test Specification: FCC15.247(d), Conducted
 Comment: 3.6 VDC

Test Result

☒ Passed☐ Not Passed

Band edges	Limit
51.77 dB	> 20dB

100kHz Bandwidth of band edges

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2405MHz and 2480MHz, DH5) (Worst case)
 Test Specification: FCC15.247(d), Radiated
 Comment: 3.6 VDC

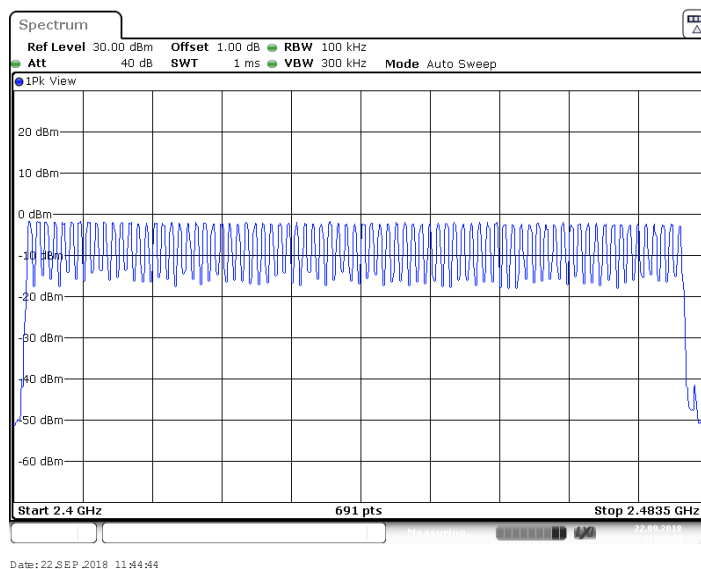
Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector PK /AV	Ant. Polarity H/V
2400.00	44.55	74.00	-29.45	Peak	H
2400.00	34.34	54.00	-19.66	Average	H
2400.00	42.56	74.00	-31.44	Peak	V
2400.00	32.94	54.00	-21.06	Average	V
2483.50	45.53	74.00	-28.47	Peak	H
2483.50	34.19	54.00	-19.81	Average	H
2483.50	43.62	74.00	-30.38	Peak	V
2483.50	33.88	54.00	-20.12	Average	V

7.7 Minimum. Number of Hopping Frequencies

EUT: HG04126A-US
Op Condition: Operated, TX Mode (2402-2480MHz, DH5)
Test Specification: FCC15.247(a)(1)
Comment: 3.6 VDC

Test Result	
☒	Passed
☐	Not Passed



Hopping Channels	Limit
79	≥ 15

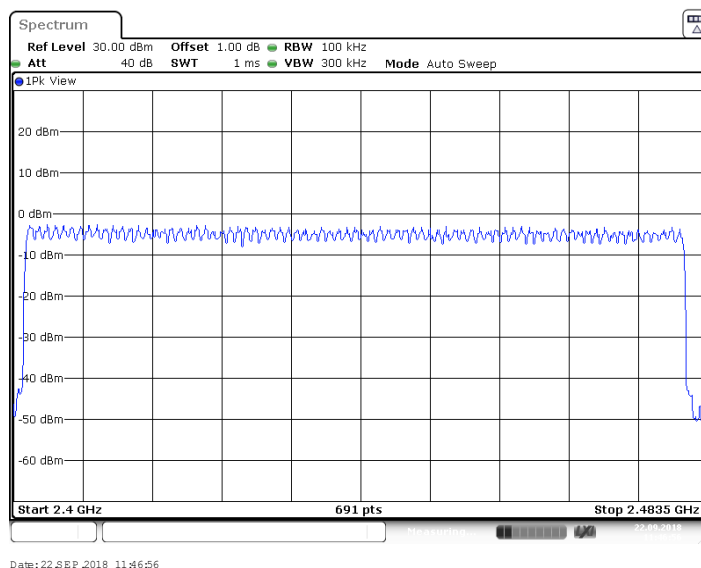
Minimum. Number of Hopping Frequencies

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402-2480MHz, 2DH5)
 Test Specification: FCC15.247(a)(1)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed

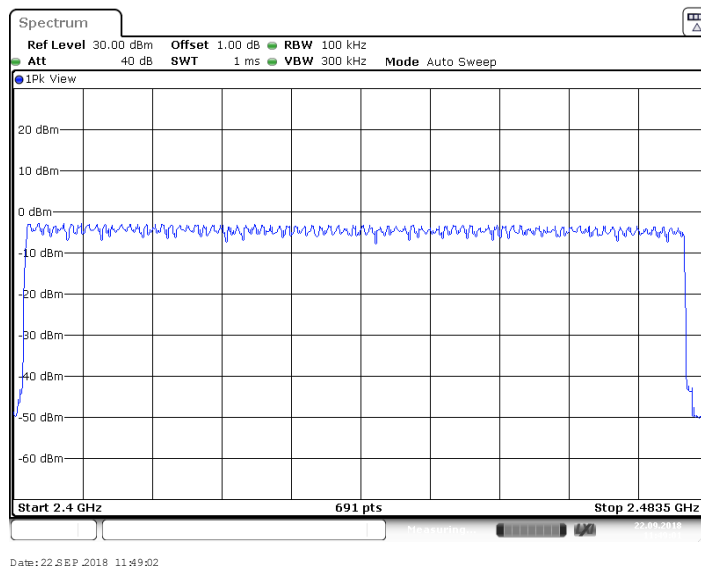


Hopping Channels	Limit
79	≥ 15

Minimum. Number of Hopping Frequencies

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2402-2480MHz, 3DH5)
 Test Specification: FCC15.247(a)(1)
 Comment: 3.6 VDC

Test Result
☒ Passed
☐ Not Passed



Hopping Channels	Limit
79	≥ 15

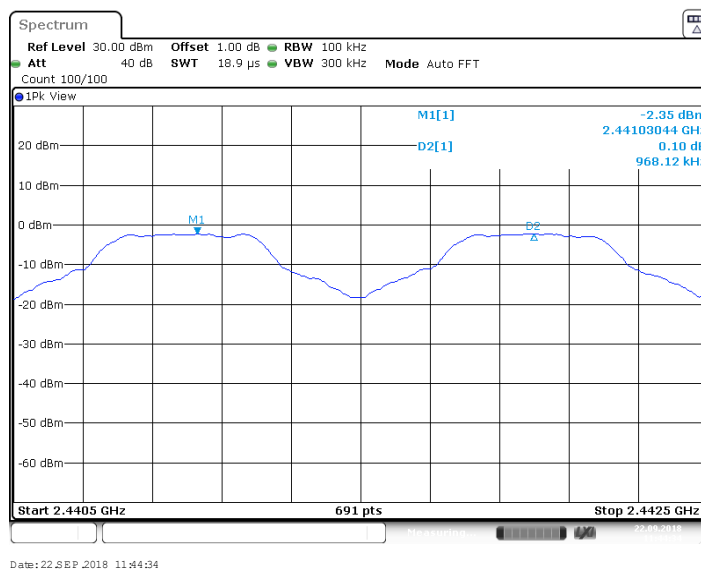
7.8 Minimum Hopping Channel Carrier Frequency Separation

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, DH5)
 Test Specification: FCC15.247(a)(1)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



Chanel Separation	Limit
968 kHz	760 kHz

Limit: 2/3 of 20dB bandwidth of hopping channel

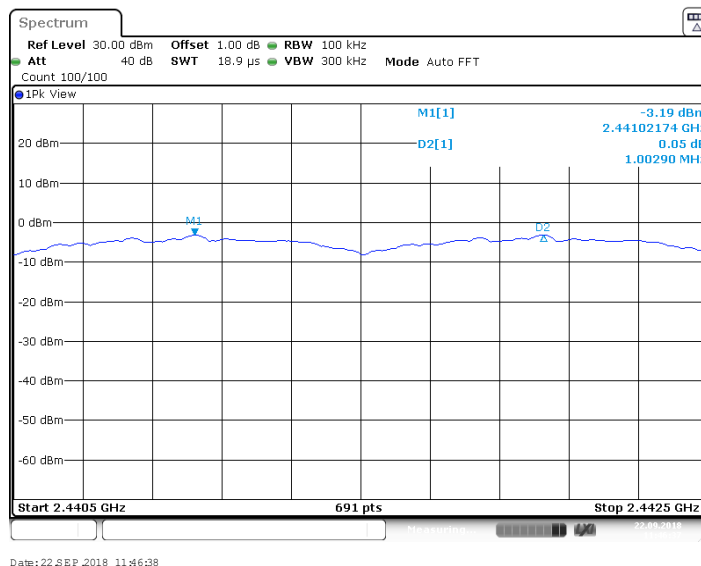
Minimum Hopping Channel Carrier Frequency Separation

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, 2DH5)
 Test Specification: FCC15.247(a)(1)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



Channel Separation	Limit
1003 kHz	938 kHz

Limit: 2/3 of 20dB bandwidth of hopping channel

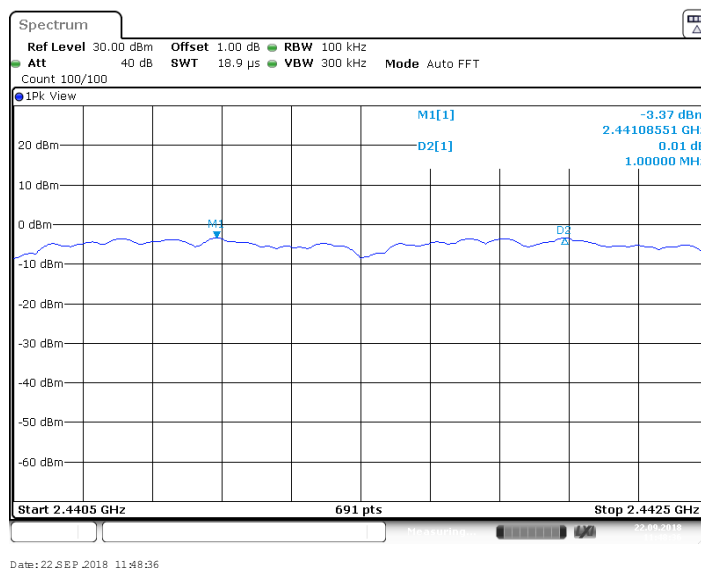
Minimum Hopping Channel Carrier Frequency Separation

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, 3DH5)
 Test Specification: FCC15.247(a)(1)
 Comment: 3.6 VDC

Test Result

☒ Passed

☐ Not Passed



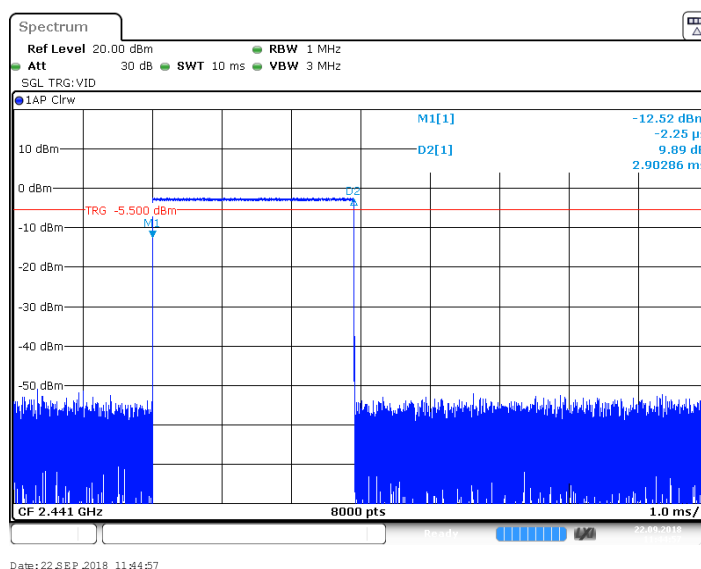
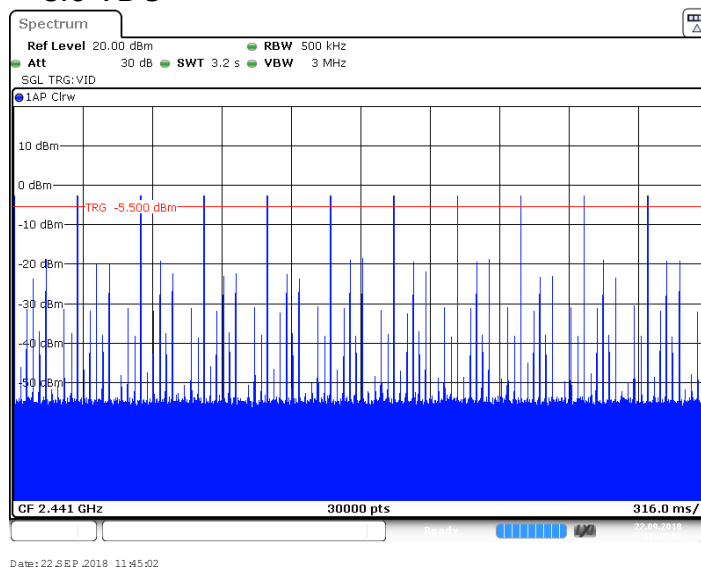
Channel Separation	Limit
1000 kHz	942 kHz

Limit: 2/3 of 20dB bandwidth of hopping channel

7.9 Average Channel Occupancy Time

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, DH5)
 Test Specification: FCC15.247(a)(1)
 Comment: 3.6 VDC

Test Result

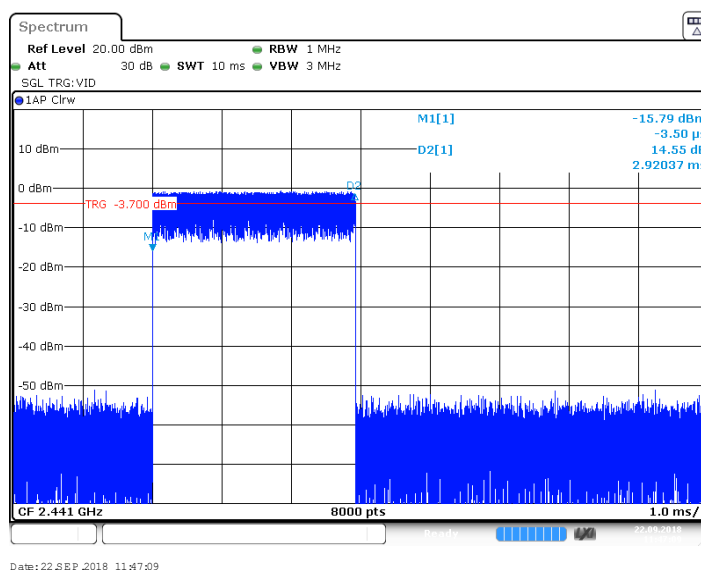
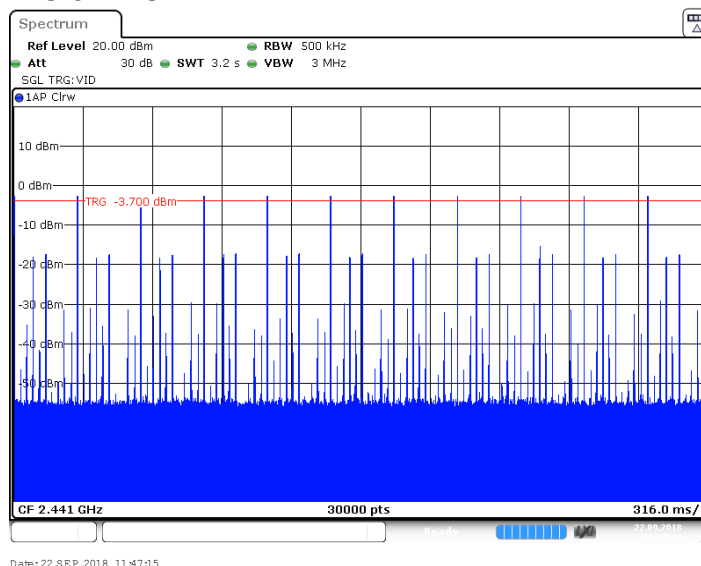
☒ Passed☐ Not Passed

Average time of occupancy	Limit
Number of hops in 3.16 sec.: 10 Period: 0.4 x 79 Ch. = 31.6 sec. Total number of hops in 31.6 sec.: 10*31.6/3.16=100 Time of single pulse: 2.903ms Average time of occupancy: 2.903 ms x 100 = 0.2903 sec.	0.4 Seconds

Average Channel Occupancy Time

EUT: HG04126A-US
Op Condition: Operated, TX Mode (2441MHz, 2DH5)
Test Specification: FCC15.247(a)(1)
Comment: 3.6 VDC

Test Result

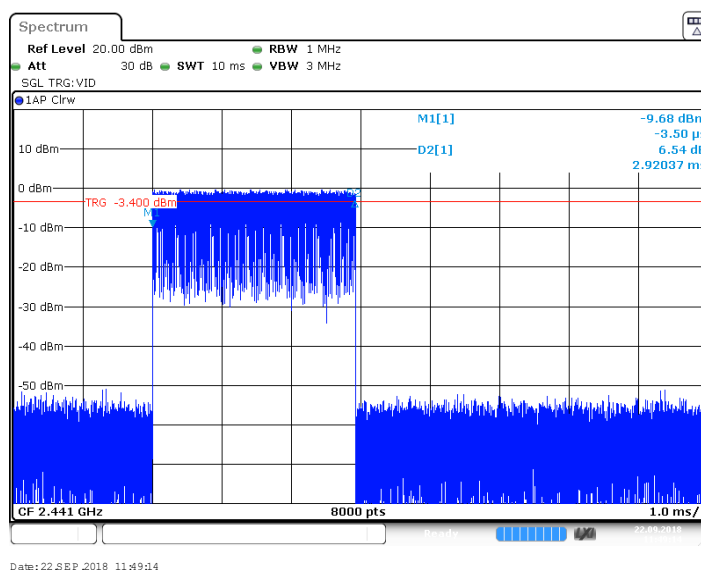
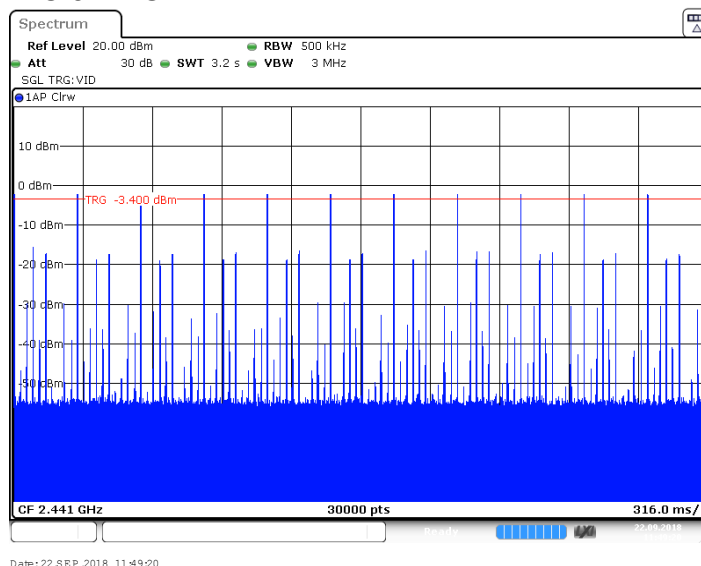
☒ Passed☐ Not Passed

Average time of occupancy	Limit
Number of hops in 3.16 sec.: 10 Period: 0.4 x 79 Ch. = 31.6 sec. Total number of hops in 31.6 sec.: $10 \times 31.6 / 3.16 = 100$ Time of single pulse: 2.920ms Average time of occupancy: $2.920 \text{ ms} \times 100 = 0.2920 \text{ sec.}$	0.4 Seconds

Average Channel Occupancy Time

EUT: HG04126A-US
 Op Condition: Operated, TX Mode (2441MHz, 3DH5)
 Test Specification: FCC15.247(a)(1)
 Comment: 3.6 VDC

Test Result
☒ Passed
☐ Not Passed



Average time of occupancy	Limit
Number of hops in 3.16 sec.: 10 Period: 0.4 x 79 Ch. = 31.6 sec. Total number of hops in 31.6 sec.: $10 \times 31.6 / 3.16 = 100$ Time of single pulse: 2.920ms Average time of occupancy: $2.920 \text{ ms} \times 100 = 0.2920 \text{ sec.}$	0.4 Seconds

7.10 Antenna Requirement

EUT: HG04126A-US
Op Condition: Operated, TX Mode
Test Specification: FCC15.203 & 15.247(b)
Comment: 3.6 VDC

Test Result	
☒	Passed
☐	Not Passed

Limit

For intentional device, according to FCC Title 47 Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC Title 47 Part 15.247(b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The antenna used in this product is PCB antenna, and the maximum gain of this antenna is 0 dBi.

8 Appendix C - General Product Information

Radiofrequency radiation exposure evaluation

According to KDB 447498 D01v06 section 4.3.1, For frequencies between 100 MHz to 6GHz and test separation distances ≤ 50 mm, the Numeric threshold is determined as

Step a)

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR

>> The fundamental frequency of the EUT is 2402-2480MHz,
the test separation distance is ≤ 50 mm.
(Manufacturer specified the separation distance is: 5 mm)

Step a)

>> Numeric threshold (2402MHz), $\text{mW} / 5\text{mm} \cdot \sqrt{2.402\text{GHz}} \leq 3.0$
Numeric threshold (2402MHz) $\leq 9.678\text{mW}$

>> Numeric threshold (2440MHz), $\text{mW} / 5\text{mm} \cdot \sqrt{2.441\text{GHz}} \leq 3.0$
Numeric threshold (2440MHz) $\leq 9.601\text{mW}$

>> Numeric threshold (2480MHz), $\text{mW} / 5\text{mm} \cdot \sqrt{2.480\text{GHz}} \leq 3.0$
Numeric threshold (2480MHz) $\leq 9.525\text{mW}$

>> The power of EUT measured (2402MHz) is: $-0.75\text{dBm} = 0.841\text{mW}$

The power of EUT measured (2440MHz) is: $1.41\text{dBm} = 1.384\text{mW}$

The power of EUT measured (2480MHz) is: $1.76\text{dBm} = 1.500\text{mW}$

Which is smaller than the Numeric threshold.

Therefore, the device is exempt from stand-alone SAR test requirements.