



FCC TEST REPORT

FCC ID: Y44-S580

On Behalf of

Stonex Srl

GNSS Receiver

Model No.: S580

Prepared for : Stonex Srl
Address : Viale dell'Industria, 53 | 20037 - Paderno Dugnano (MI) | Italy

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

Report Number : A2105079-C06-R04
Date of Receipt : May 25, 2021
Date of Test : May 25, 2021 – June 09, 2021
Date of Report : June 10, 2021
Version Number : V0

TABLE OF CONTENTS

Description	Page
1. Summary Of Standards And Results -----	6
1.1. Description of Standards and Results -----	6
2. General Information -----	7
2.1. Description of Device (EUT)-----	7
2.2. Accessories of Device (EUT) -----	8
2.3. Tested Supporting System Details-----	8
2.4. Block Diagram of connection between EUT and simulators -----	8
2.5. Test Mode Description -----	8
2.6. Test Conditions-----	9
2.7. Test Facility -----	9
2.8. Measurement Uncertainty -----	9
2.9. Test Equipment List -----	10
3. Spurious Emission -----	11
3.1. Test Limits -----	11
3.2. Test Procedure -----	12
3.3. Test Setup -----	12
3.4. Test Results -----	13
4. Power line Conducted Emission -----	19
4.1. Test Limits -----	19
4.2. Test Procedure -----	19
4.3. Test Setup -----	19
4.4. Test Results -----	19
5. Conducted Maximum Output Power -----	21
5.1. Test limits -----	21
5.2. Test Procedure -----	21
5.3. Test Setup -----	21
5.4. Test Results -----	21
6. Peak Power Spectral Density -----	23
6.1. Test limits -----	23
6.2. Test Procedure -----	23
6.3. Test Setup -----	23
6.4. Test Results -----	24
7. Bandwidth -----	29
7.1. Test limits -----	29
7.2. Test Procedure -----	29
7.3. Test Setup -----	29
7.4. Test Results -----	29
8. Band Edge Check -----	42
8.1. Test limits -----	42
8.2. Test Procedure -----	42
8.3. Test Setup -----	42
8.4. Test Results -----	42
9. Antenna Requirement -----	55
9.1. Standard Requirement -----	55
9.2. Antenna Connected Construction-----	55
9.3. Results -----	55
10. Test setup photo -----	56

10.1. Photos of Radiated emission-----	56
10.2. Photos of Power Line Conducted Emission Test -----	57
11. Photos of EUT -----	58

TEST REPORT DECLARATION

Applicant : Stonex Srl
Address : Viale dell'Industria, 53 | 20037 - Paderno Dugnano (MI) | Italy
Manufacturer : Stonex Srl
Address : Viale dell'Industria, 53 | 20037 - Paderno Dugnano (MI) | Italy
EUT Description : GNSS Receiver
(A) Model No. : S580
(B) Trademark : STONEX

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247

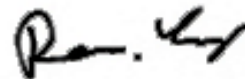
ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Reak Yang
Project Engineer



Approved by (name + signature).....: Simple Guan
Project Manager



Date of issue.....: June 10, 2021

Revision History

Revision	Issue Date	Revisions	Revised By
V0	June 10, 2021	Initial released Issue	Lucas Pang

1. Summary Of Standards And Results

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Standards Paragraph	Result
Conducted Emission	FCC Part 15: 15.207 ANSI C63.10 :2013	P
6dB Bandwidth	FCC PART 15:15.247(a)(2) ANSI C63.10 :2013	P
Output Power	FCC Part 15: 15.247(b)(3) ANSI C63.10 :2013	P
Radiated Spurious Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Conducted Spurious & Band Edge Emission	FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Power Spectral Density	FCC PART 15:15.247(e) ANSI C63.10 :2013	P
Radiated Band Edge Emission	FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Antenna Requirement	FCC Part 15: 15.203	P
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable.		

2. General Information

2.1. Description of Device (EUT)

EUT Name : GNSS Receiver
Trademark : STONEX
Model No. : S580
DIFF. : /
Power supply : DC 3.85V From Battery, DC 5V From USB Port

2.4G WIFI :

Operation frequency : 2412MHz-2462MHz for IEEE 802.11 b, g, n/HT20
2422MHz~2452MHz for IEEE802.11n/HT40
Channel No. : 802.11b/802.11g /802.11n(HT20): 11CH
802.11(HT40): 7CH
Modulation type : IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK)
IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)
IEEE 802.11n :OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Type : Internal antenna, Maximum Gain is 1dBi
Software version : V1.0
Hardware version : V1.0

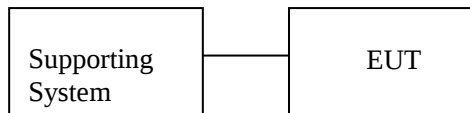
2.2.Accessories of Device (EUT)

Accessories1	:	/
Manufacturer	:	/
Model	:	/
Input	:	/

2.3.Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1	Notebook PC	DELL	Latitude 3490	--	SDOC

2.4.Block Diagram of connection between EUT and simulators



2.5.Test Mode Description

Duty cycle :100%Keeping TX			
Mode	data rate (Mbps)(see Note)	Channel	Frequency (MHz)
IEEE 802.11b	1	Low :CH1	2412
	1	Middle: CH6	2437
	1	High: CH11	2462
IEEE 802.11g	6	Low :CH1	2412
	6	Middle: CH6	2437
	6	High: CH11	2462
IEEE 802.11 n/HT20	6.5	Low :CH1	2412
	6.5	Middle: CH6	2437
	6.5	High: CH11	2462
IEEE 802.11 n/HT40	13	Low :CH3	2422
	13	Middle: CH6	2437
	13	High: CH9	2452
Note: According exploratory test, EUT will have maximum output power in those data rate. So those data rate were used for all test.			

Setting output power (Max)			
802.11b	802.11g	802.11n(HT20)	802.11n(HT40)
12 ±1dBm	12 ±1dBm	12 ±1dBm	12 ±1dBm

2.6.Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	24℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7.Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission

Registration Number: 293961

Designation Number: CN1236

July 15, 2019 Certificated by IC

Registration Number: CN0085

2.8.Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.13dB(Polarize: H)
	4.16dB(Polarize: V)
Uncertainty for radio frequency	5.4×10^{-8}
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.9.Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2020.09.02	1 Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	102137	2020.09.02	1 Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2020.09.02	1 Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-10208 2-Wa	2020.09.02	1 Year
Receiver	R&S	ESCI	101165	2020.09.02	1 Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2020.04.12	2 Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2 Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2019.09.07	2 Year
Cable	Resenberger	N/A	No.1	2020.09.02	1 Year
Cable	Resenberger	N/A	No.2	2020.09.02	1 Year
Cable	Resenberger	N/A	No.3	2020.09.02	1 Year
Pre-amplifier	HP	HP8347A	2834A00455	2020.09.02	1 Year
Pre-amplifier	Agilent	8449B	3008A02664	2020.09.02	1 Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2020.09.02	1 Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2020.09.02	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2020.09.02	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	00946	2019.09.07	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2020.09.02	1 Year
Power Meter	Agilent	E9300A	MY41496625	2020.09.02	1 Year
Temp. & Humid. Chamber	Wei Huang	WHTH-1000-40-8 80	100631	2020.09.02	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2020.09.02	1 Year

3. Spurious Emission

3.1. Test Limits

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

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

15.209 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	
Note 1: The peak limit is 20 dB higher than the average limit			

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

3.2. Test Procedure

The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz. The EUT was placed on a rotating 0.8 m high above ground for below 1GHz and 1.5m high for above 1GHz testing, the table was rotated 360 degrees to determine the position of the highest radiation

The Test antenna shall vary between 1m and 4m, both Horizontal and Vertical antenna are set of make measurement.

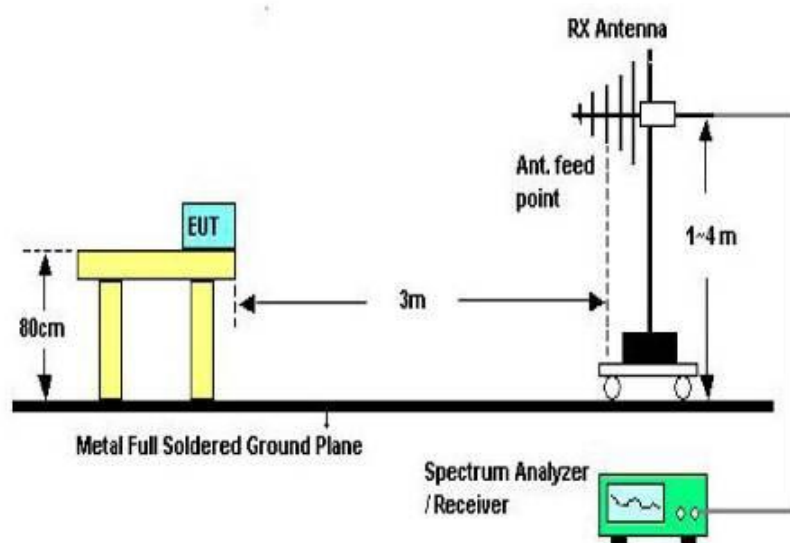
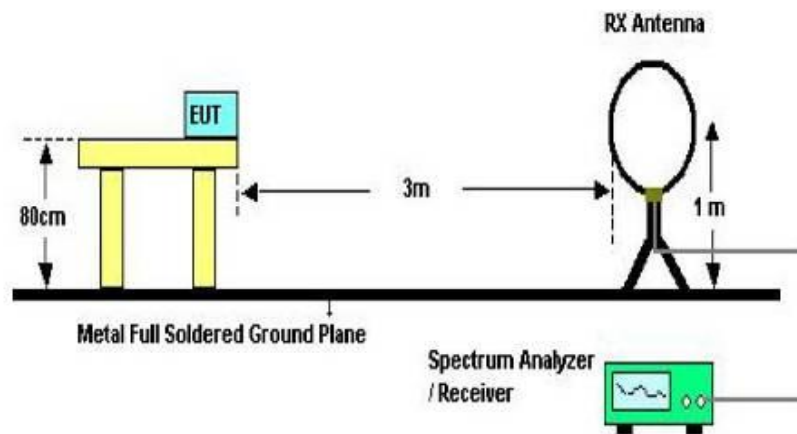
The initial step in collecting radiated emission data is a spectrum analyzer Peak detector mode pre-scanning the measurement frequency range. Significant Peaks are then marked. and then Quasi Peak Detector mode premeasured

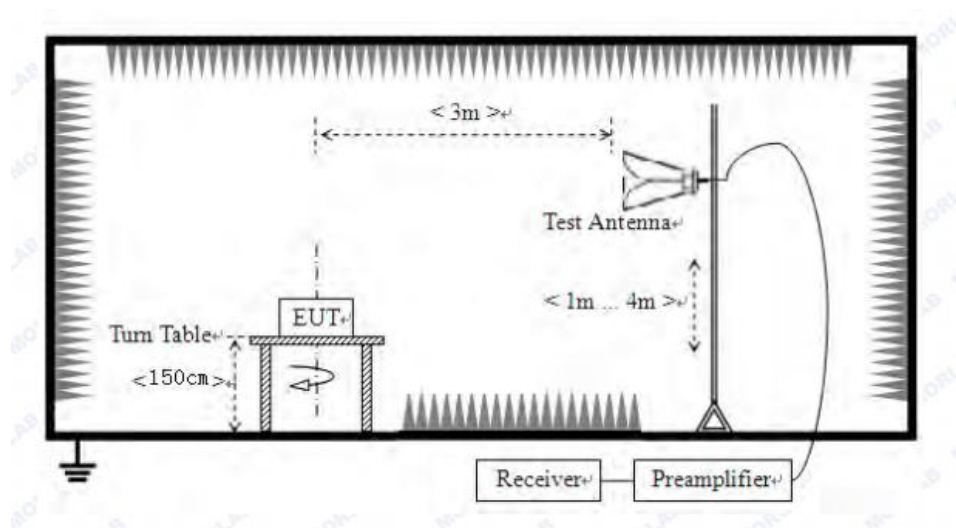
If Peak value comply with QP limit below 1GHz, the EUT deemed to comply with QP limit.

But the Peak value and average value both need to comply with applicable limit above 1GHz.

For the actual test configuration, please see the test setup photo.

3.3. Test Setup





Above 1GHz Test Setup

3.4. Test Results

Test Condition

Continual Transmitting in maximum power.

9KHz~150KHz	RBW200Hz	VBW1KHz
150KHz~30MHz	RBW9KHz	VBW 30KHz
30MHz~1GHz	RBW120KHz	VBW 300KHz
Above1GHz	RBW1MHz	VBW 3MHz

We have scanned the EUT from 9kHz up to the 10th harmonic of the fundamental.

Detailed information please see the following page.

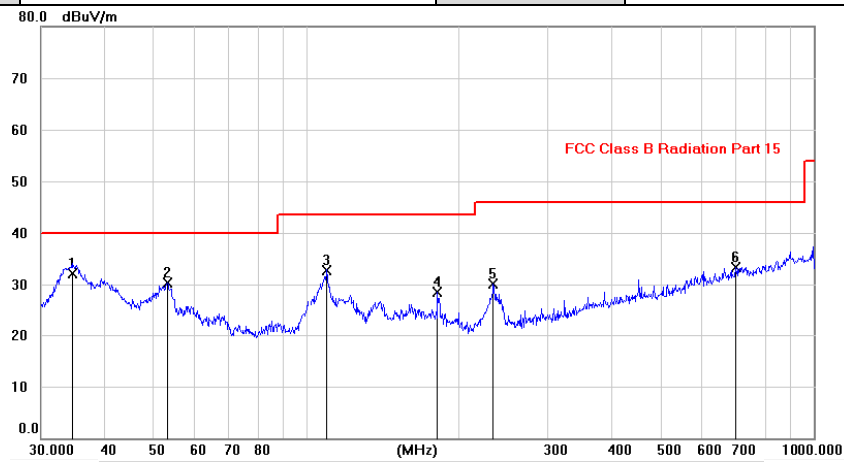
From 9KHz to 30MHz: Conclusion: PASS

Note:1.The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

2.Only show the test data of the worst Channel in this report.

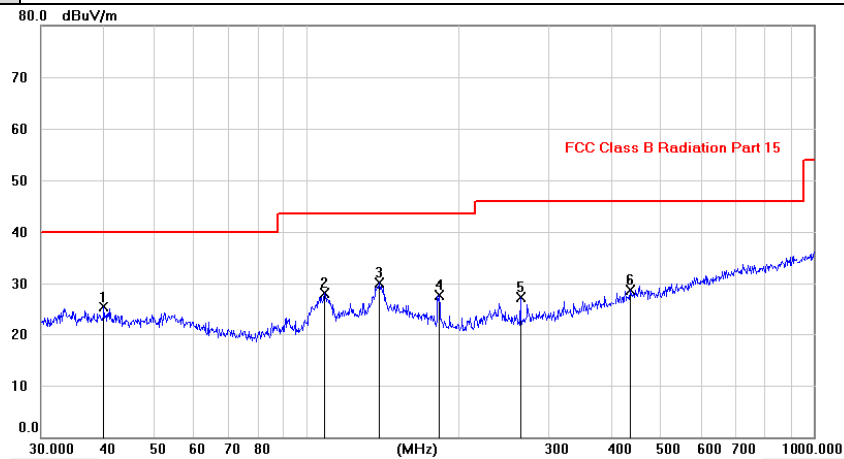
From 30MHz to 1000MHz: Conclusion: PASS

EUT Description	GNSS Receiver	Temperature	24℃
Model No.	S580	Humidity	56%
Pol	Vertical	Test mode	802.11b 2412MHz
Test Voltage	DC 5V		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	34.5294	18.47	13.71	32.18	40.00	-7.82	QP
2		53.1810	16.64	13.72	30.36	40.00	-9.64	peak
3		109.7831	20.99	11.81	32.80	43.50	-10.70	peak
4		181.4530	15.98	12.50	28.48	43.50	-15.02	peak
5		233.7035	17.68	12.40	30.08	46.00	-15.92	peak
6		701.2690	11.46	21.76	33.22	46.00	-12.78	peak

Pol	Horizontal
------------	------------



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		39.8542	10.86	14.47	25.33	40.00	-14.67	peak
2		108.5455	16.36	11.69	28.05	43.50	-15.45	peak
3	*	139.5569	15.73	14.28	30.01	43.50	-13.49	peak
4		183.0507	15.45	12.31	27.76	43.50	-15.74	peak
5		264.0041	14.15	13.10	27.25	46.00	-18.75	peak
6		434.9793	11.46	17.20	28.66	46.00	-17.34	peak

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Remark: All modes have been tested, and only worst data was listed in this report.

Test Mode: IEEE 802.11b TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824	43.67	V	33.95	10.18	34.26	53.54	74	-20.46	PK
4824	33.95	V	33.95	10.18	34.26	43.82	54	-10.18	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	42.56	H	33.95	10.18	34.26	52.43	74	-21.57	PK
4824	31.33	H	33.95	10.18	34.26	41.20	54	-12.80	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11b TX Mid									
4874	41.38	V	33.93	10.2	34.29	51.22	74	-22.78	PK
4874	33.46	V	33.93	10.2	34.29	43.30	54	-10.70	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	42.61	H	33.93	10.2	34.29	52.45	74	-21.55	PK
4874	32.88	H	33.93	10.2	34.29	42.72	54	-11.28	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11b TX High									
4924	42.21	V	33.98	10.22	34.25	52.16	74	-21.84	PK
4924	31.53	V	33.98	10.22	34.25	41.48	54	-12.52	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	42.21	H	33.98	10.22	34.25	52.16	74	-21.84	PK
4924	31.60	H	33.98	10.22	34.25	41.55	54	-12.45	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/

Note:

1, Result = Read level + Antenna factor + cable loss-Amp factor

2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Test Mode: IEEE 802.11g TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824	43.02	V	33.95	10.18	34.26	52.89	74	-21.11	PK
4824	31.66	V	33.95	10.18	34.26	41.53	54	-12.47	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	42.97	H	33.95	10.18	34.26	52.84	74	-21.16	PK
4824	34.41	H	33.95	10.18	34.26	44.28	54	-9.72	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11g TX Mid									
4874	40.82	V	33.93	10.2	34.29	50.66	74	-23.34	PK
4874	32.53	V	33.93	10.2	34.29	42.37	54	-11.63	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	41.42	H	33.93	10.2	34.29	51.26	74	-22.74	PK
4874	32.38	H	33.93	10.2	34.29	42.22	54	-11.78	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11g TX High									
4924	42.49	V	33.98	10.22	34.25	52.44	74	-21.56	PK
4924	33.26	V	33.98	10.22	34.25	43.21	54	-10.79	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	42.22	H	33.98	10.22	34.25	52.17	74	-21.83	PK
4924	32.43	H	33.98	10.22	34.25	42.38	54	-11.62	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
Note: 1, Result = Read level + Antenna factor + cable loss-Amp factor 2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

Test ModeIEEE 802.11n HT20 TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4824	44.76	V	33.95	10.18	34.26	54.63	74	-19.37	PK
4824	31.40	V	33.95	10.18	34.26	41.27	54	-12.73	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	42.83	H	33.95	10.18	34.26	52.70	74	-21.30	PK
4824	32.62	H	33.95	10.18	34.26	42.49	54	-11.51	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode:IEEE 802.11n HT20 TX Mid									
4874	41.36	V	33.93	10.2	34.29	51.20	74	-22.80	PK
4874	32.36	V	33.93	10.2	34.29	42.20	54	-11.80	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	41.23	H	33.93	10.2	34.29	51.07	74	-22.93	PK
4874	32.28	H	33.93	10.2	34.29	42.12	54	-11.88	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode:IEEE 802.11n HT20 TX High									
4924	41.20	V	33.98	10.22	34.25	51.15	74	-22.85	PK
4924	31.57	V	33.98	10.22	34.25	41.52	54	-12.48	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	41.39	H	33.98	10.22	34.25	51.34	74	-22.66	PK
4924	31.74	H	33.98	10.22	34.25	41.69	54	-12.31	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/

Note:

1, Result = Read level + Antenna factor + cable loss-Amp factor

2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Note: 1, Result = Read level + Antenna factor + cable loss-Amp factor 2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.
--

4. Power line Conducted Emission

4.1. Test Limits

Frequency MHz	Limits dB(μ V)	
	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

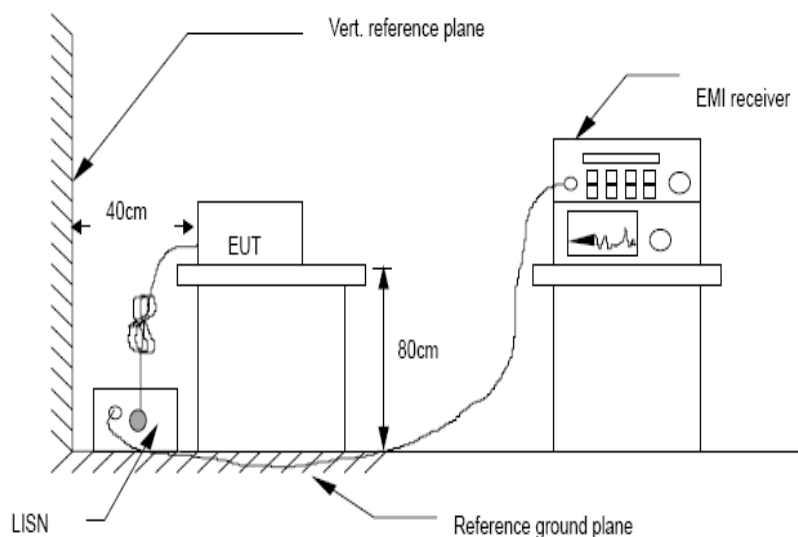
3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10:2013 on Conducted Emission Measurement.

The bandwidth of test receiver is set at 9 kHz.

4.3. Test Setup

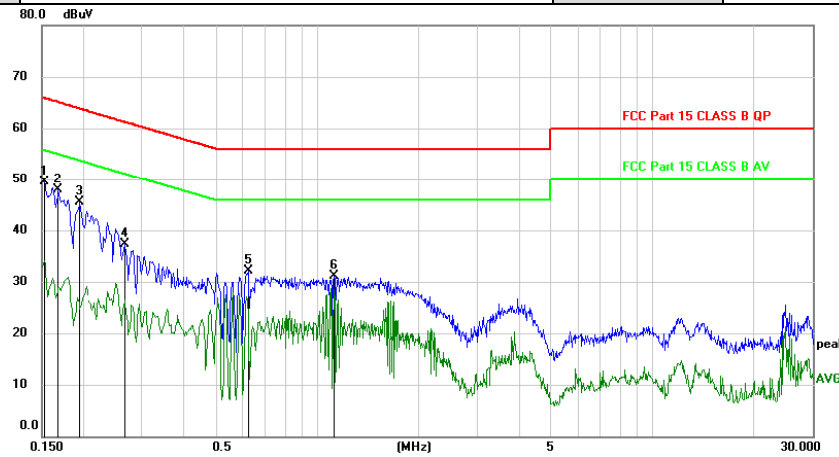


4.4. Test Results

PASS. (See below detailed test data)

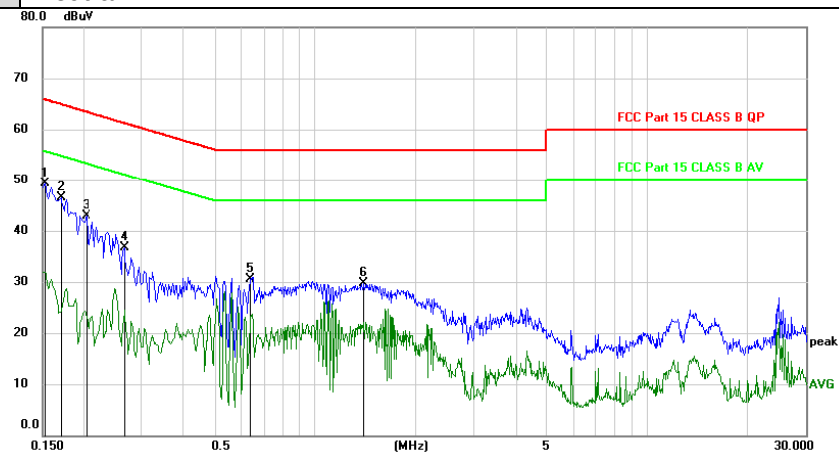
Note: If peak Result comply with AV limit, QP and AV Result is deemed to comply with AV limit

EUT Description	GNSS Receiver	Model No.	S580
Temperature	24°C	Humidity	56%
Pol	Line	Test mode	802.11b 2412MHz
Test Voltage	AC 120V/60Hz		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1530	39.63	9.94	49.57	65.84	-16.27	peak
2		0.1680	37.97	9.93	47.90	65.06	-17.16	peak
3		0.1949	35.59	9.92	45.51	63.83	-18.32	peak
4		0.2670	27.41	9.95	37.36	61.21	-23.85	peak
5		0.6210	22.22	9.92	32.14	56.00	-23.86	peak
6		1.1220	21.14	9.90	31.04	56.00	-24.96	peak

Pol	Neutral
------------	---------



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1530	39.29	9.94	49.23	65.84	-16.61	peak
2		0.1710	36.53	9.93	46.46	64.91	-18.45	peak
3		0.2040	32.94	9.92	42.86	63.45	-20.59	peak
4		0.2670	26.74	9.95	36.69	61.21	-24.52	peak
5		0.6360	20.56	9.92	30.48	56.00	-25.52	peak
6		1.4010	19.75	9.90	29.65	56.00	-26.35	peak

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Remark: All modes have been tested, and only worst data was listed in this report.

5. Conducted Maximum Output Power

5.1. Test limits

Please refer FCC PART 15: 15.247.

Regulation 15.247(b) The limit of Maximum Peak Output Power Measurement is 1 W(30dBm)

5.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

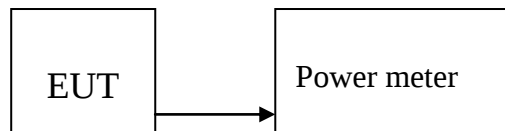
5.2.1 Place the EUT on the table and set it in transmitting mode.

5.2.2 Connected the EUT's antenna port to peak power meter by 20dB attenuator.

5.2.3 Measure out each mode and each bands peak output power of EUT.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

5.3. Test Setup



5.4. Test Results

PASS

Detailed information please see the following page.

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	7.341	0	7.341	30	Pass
NVNT	b	2437	Ant1	7.45	0	7.45	30	Pass
NVNT	b	2462	Ant1	7.151	0	7.151	30	Pass
NVNT	g	2412	Ant1	6.99	0	6.99	30	Pass
NVNT	g	2437	Ant1	7.4	0	7.4	30	Pass
NVNT	g	2462	Ant1	7.578	0	7.578	30	Pass
NVNT	n20	2412	Ant1	7.297	0	7.297	30	Pass
NVNT	n20	2437	Ant1	7.626	0	7.626	30	Pass
NVNT	n20	2462	Ant1	7.688	0	7.688	30	Pass
NVNT	n40	2422	Ant1	7.64	0	7.64	30	Pass
NVNT	n40	2437	Ant1	7.831	0	7.831	30	Pass
NVNT	n40	2452	Ant1	7.914	0	7.914	30	Pass

6. Peak Power Spectral Density

6.1. Test limits

6.1.1 Please refer FCC PART 15: 15.247.

6.1.2 For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

6.1.3 The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

6.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

6.2.1 Place the EUT on the table and set it in transmitting mode.

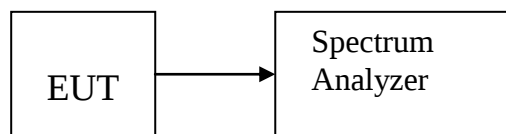
6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3 Set the spectrum analyzer as $RBW = 3\text{kHz}$ (Set the RBW to: $3\text{ kHz} \leq RBW \leq 100\text{ kHz}$.), $VBW = 10\text{kHz}$ (Set the $VBW \geq 3 \times RBW$), $\text{span} \geq 1.5 \times \text{DTS bandwidth}$., detail see the test plot.

6.2.4 Record the max reading.

6.2.5 Repeat the above procedure until the measurements for all frequencies are completed.

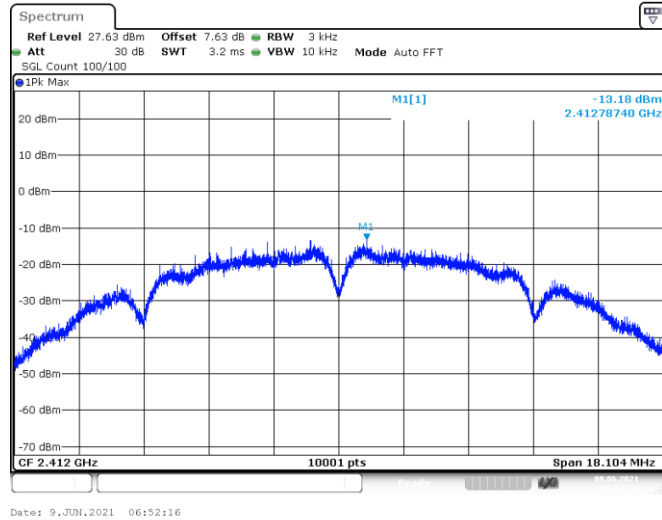
6.3. Test Setup



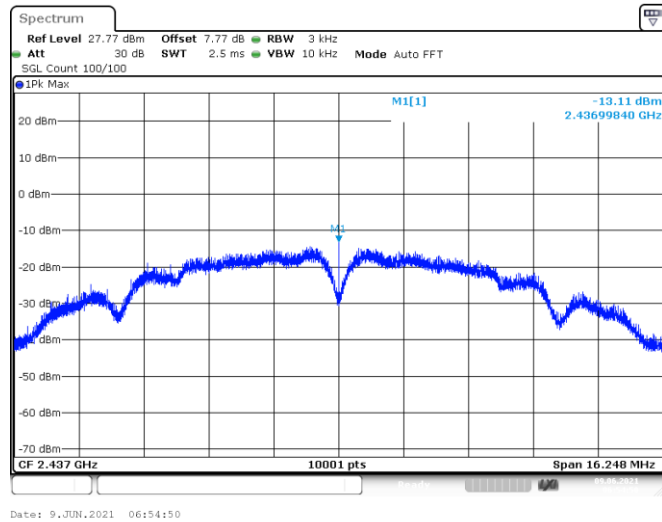
6.4. Test Results

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	-13.177	8	Pass
NVNT	b	2437	Ant1	-13.109	8	Pass
NVNT	b	2462	Ant1	-13.738	8	Pass
NVNT	g	2412	Ant1	-21.057	8	Pass
NVNT	g	2437	Ant1	-21.68	8	Pass
NVNT	g	2462	Ant1	-19.725	8	Pass
NVNT	n20	2412	Ant1	-17.772	8	Pass
NVNT	n20	2437	Ant1	-21.234	8	Pass
NVNT	n20	2462	Ant1	-20.03	8	Pass
NVNT	n40	2422	Ant1	-22.124	8	Pass
NVNT	n40	2437	Ant1	-23.659	8	Pass
NVNT	n40	2452	Ant1	-23.143	8	Pass

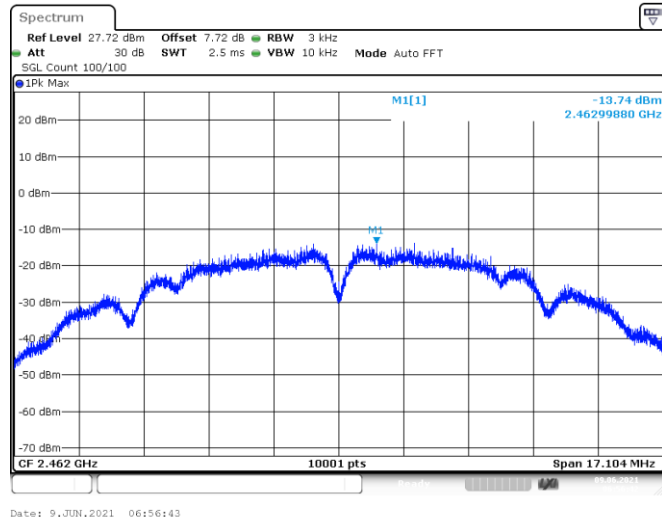
PSD NVNT 802.11b 2412MHz Ant1



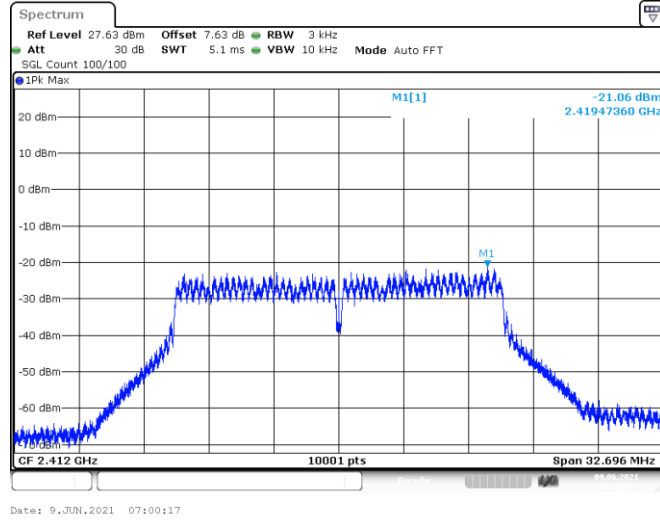
PSD NVNT 802.11b 2437MHz Ant1



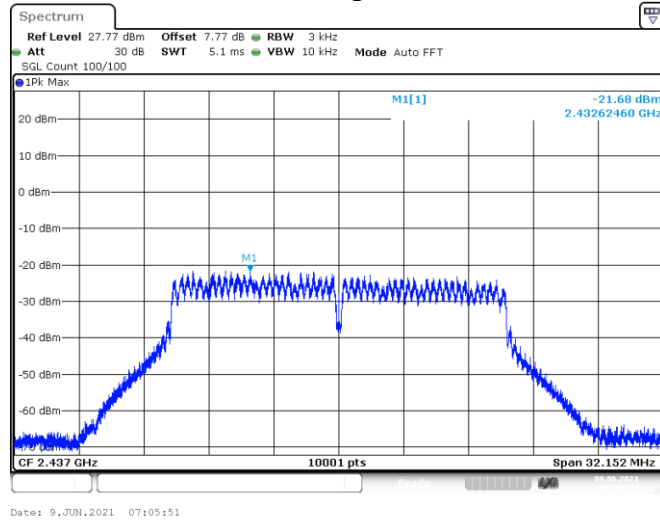
PSD NVNT 802.11b 2462MHz Ant1



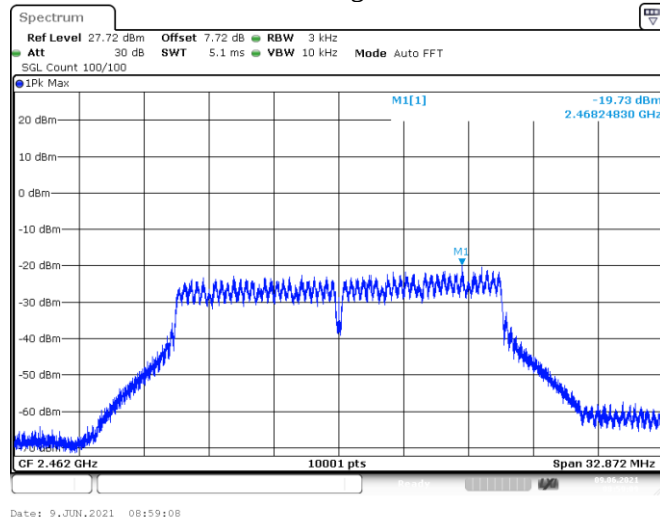
PSD NVNT 802.11g 2412MHz Ant1



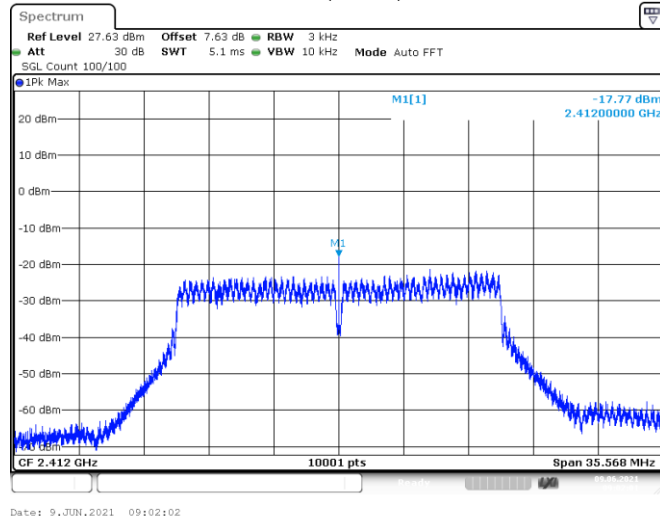
PSD NVNT 802.11g 2437MHz Ant1



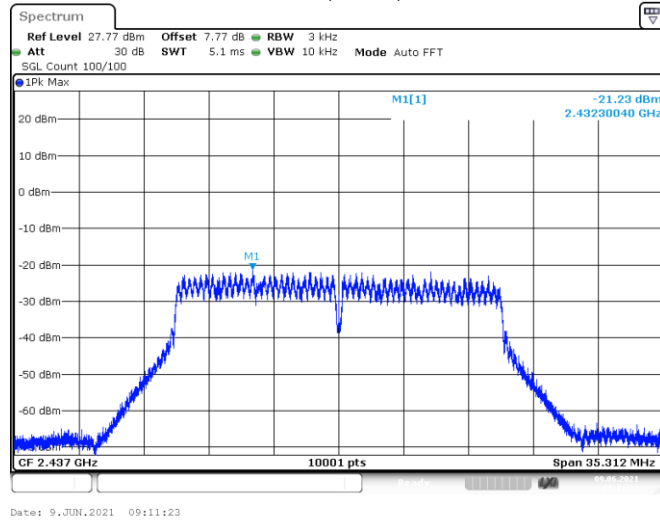
PSD NVNT 802.11g 2462MHz Ant1



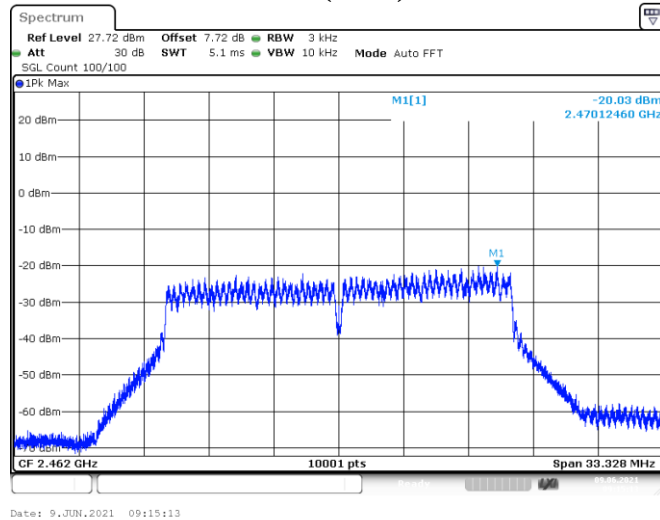
PSD NVNT 802.11n(HT20) 2412MHz Ant1



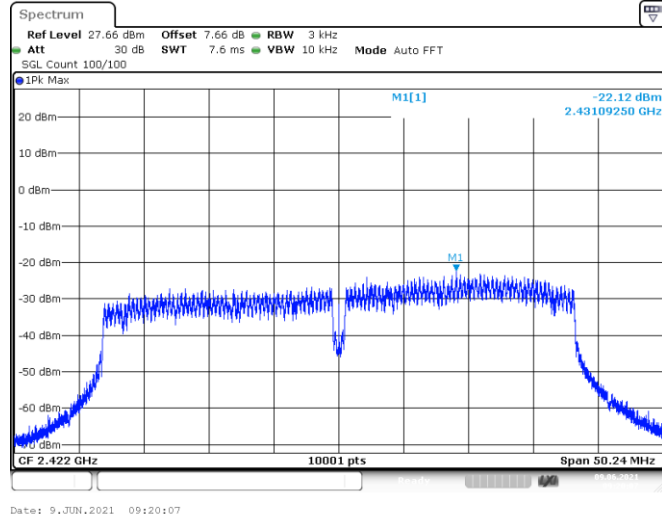
PSD NVNT 802.11n(HT20) 2437MHz Ant1



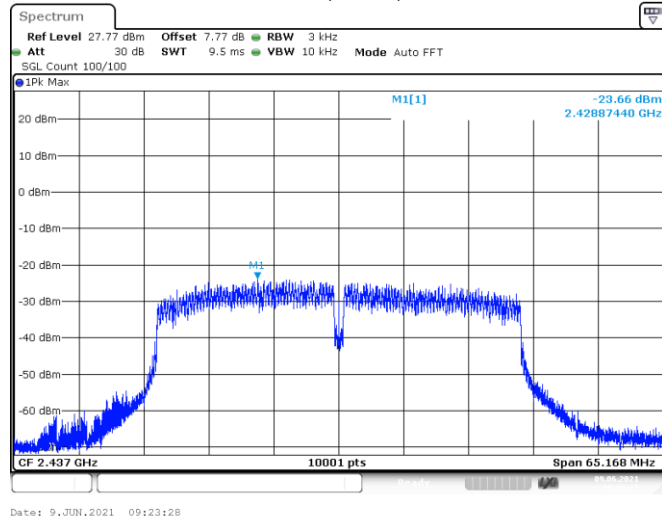
PSD NVNT 802.11n(HT20) 2462MHz Ant1



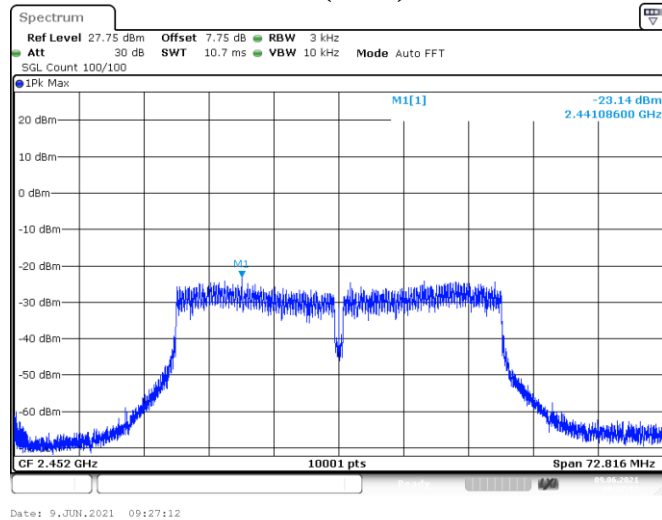
PSD NVNT 802.11n(HT40) 2422MHz Ant1



PSD NVNT 802.11n(HT40) 2437MHz Ant1



PSD NVNT 802.11n(HT40) 2452MHz Ant1



7. Bandwidth

7.1. Test limits

Please refer FCC PART 15: 15.247

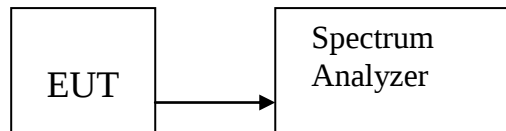
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

7.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

- a) The bandwidth is measured at an amplitude level reduced 6dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.
- b) The test receiver set RBW = 100kHz, VBW $\geq 3 \times$ RBW = 300kHz,, Peak Detector, Sweep time set auto, detail see the test plot.

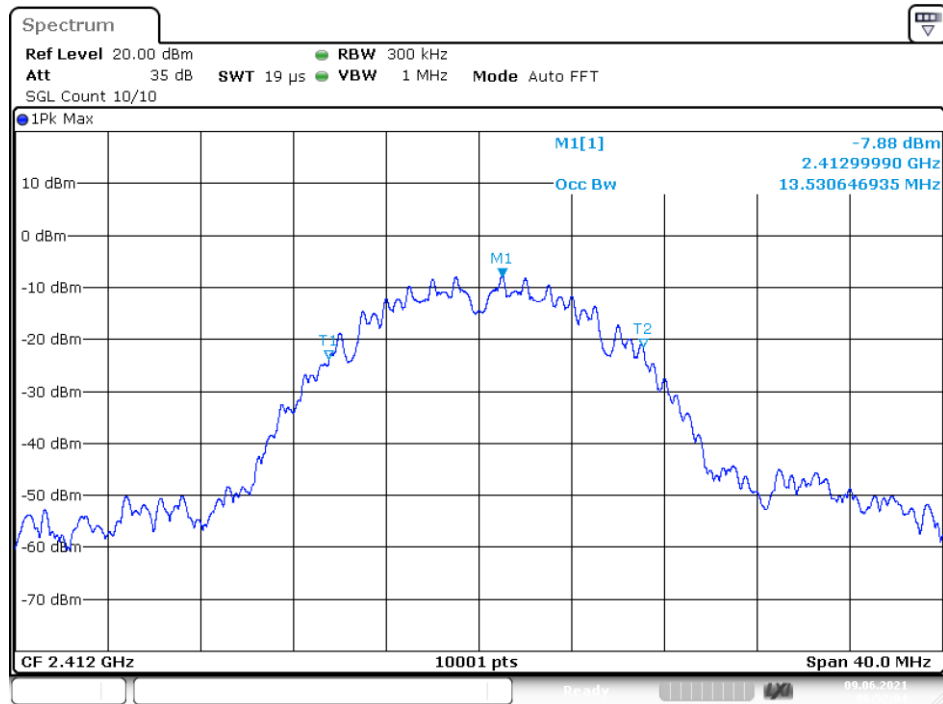
7.3. Test Setup



7.4. Test Results

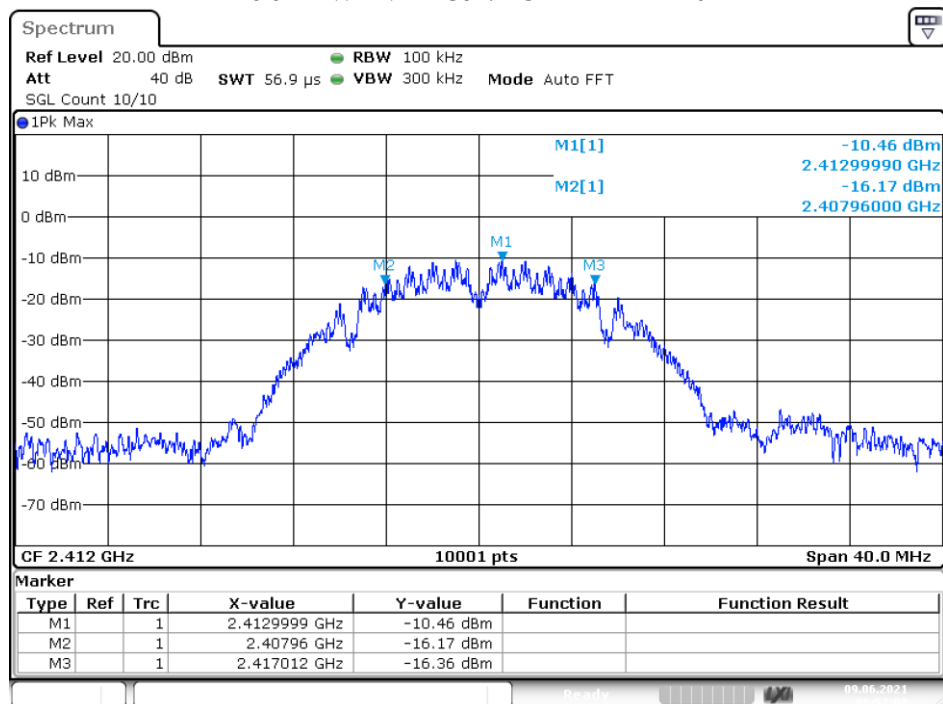
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	802.11b	2412	Ant 1	13.5306	9.052	0.5	Pass
NVNT	802.11b	2437	Ant 1	12.8707	8.124	0.5	Pass
NVNT	802.11b	2462	Ant 1	13.2027	8.552	0.5	Pass
NVNT	802.11g	2412	Ant 1	17.1863	16.348	0.5	Pass
NVNT	802.11g	2437	Ant 1	17.0263	16.076	0.5	Pass
NVNT	802.11g	2462	Ant 1	16.5343	16.436	0.5	Pass
NVNT	802.11n(HT20)	2412	Ant 1	17.9462	17.784	0.5	Pass
NVNT	802.11n(HT20)	2437	Ant 1	17.6782	17.656	0.5	Pass
NVNT	802.11n(HT20)	2462	Ant 1	18.1582	16.664	0.5	Pass
NVNT	802.11n(HT40)	2422	Ant 1	35.9724	35.12	0.5	Pass
NVNT	802.11n(HT40)	2437	Ant 1	35.8764	32.584	0.5	Pass
NVNT	802.11n(HT40)	2452	Ant 1	37.1723	36.408	0.5	Pass

OBW NVNT 802.11b 2412MHz Ant1



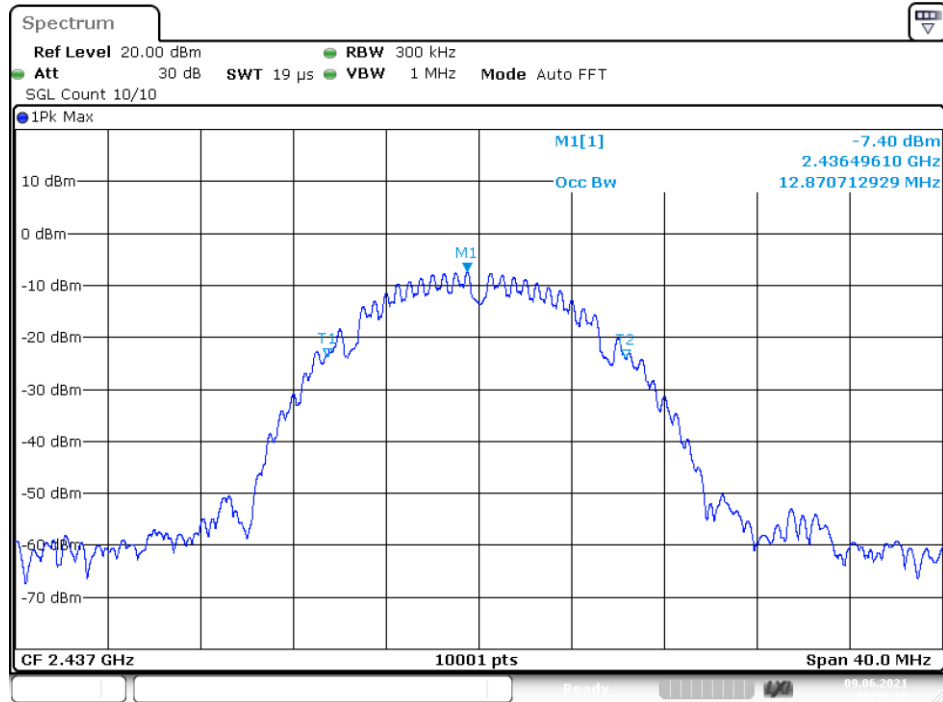
Date: 9.JUN.2021 06:52:04

-6 dB BW NVNT 802.11b 2412MHz Ant1



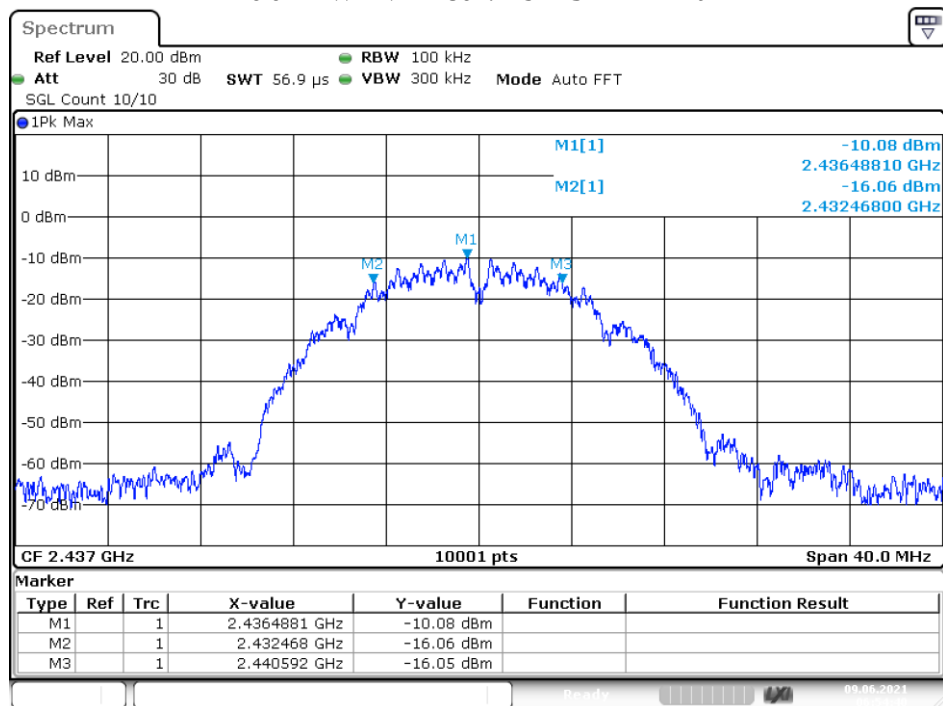
Date: 9.JUN.2021 06:52:07

OBW NVNT 802.11b 2437MHz Ant1



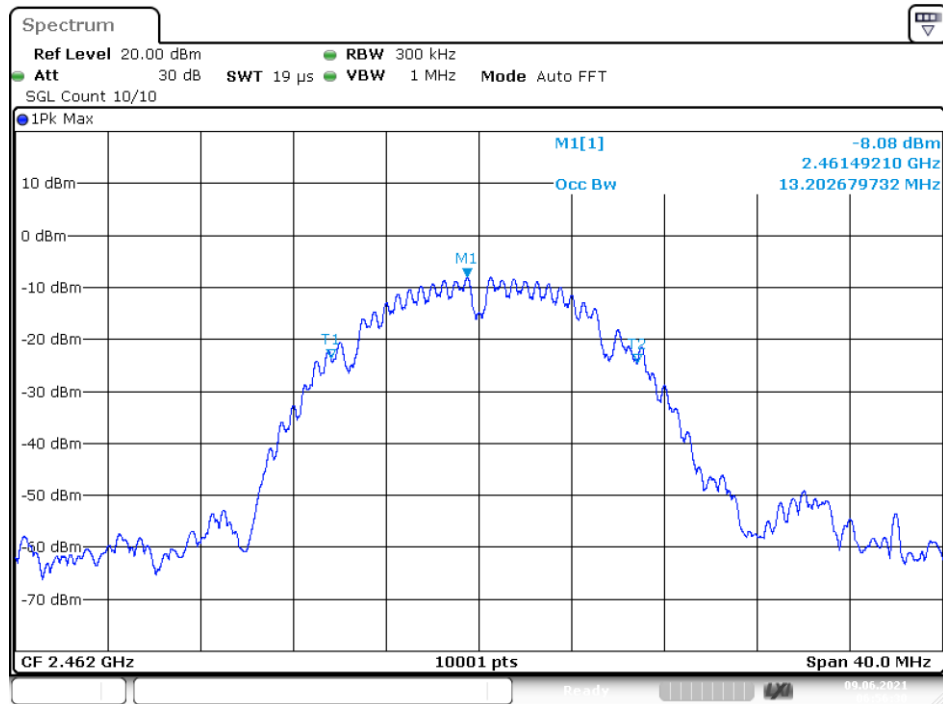
Date: 9.JUN.2021 06:54:38

-6 dB BW NVNT 802.11b 2437MHz Ant1



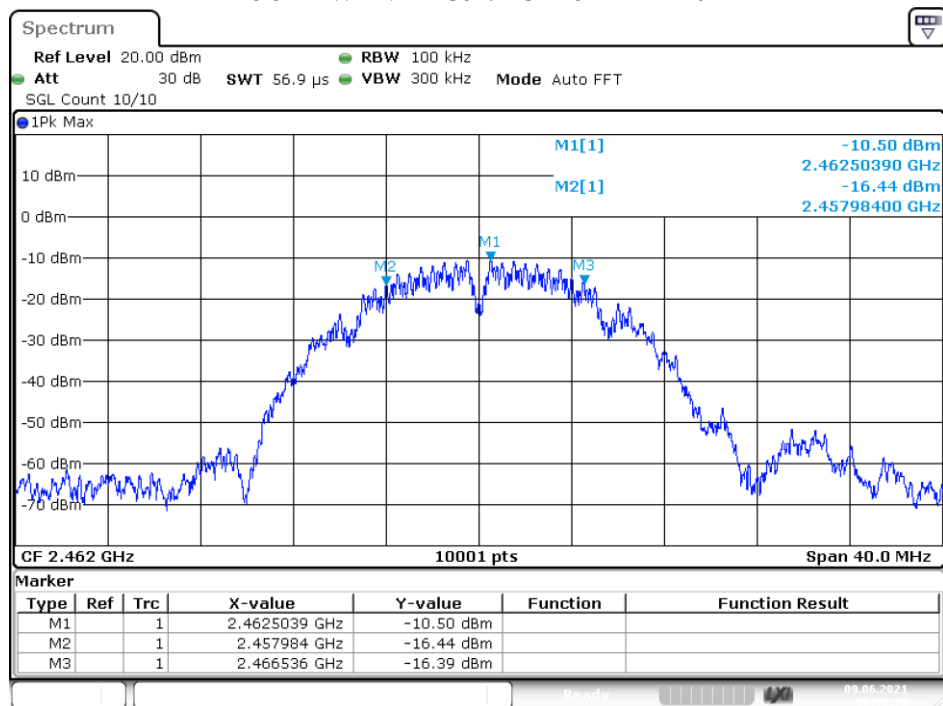
Date: 9.JUN.2021 06:54:40

OBW NVNT 802.11b 2462MHz Ant1



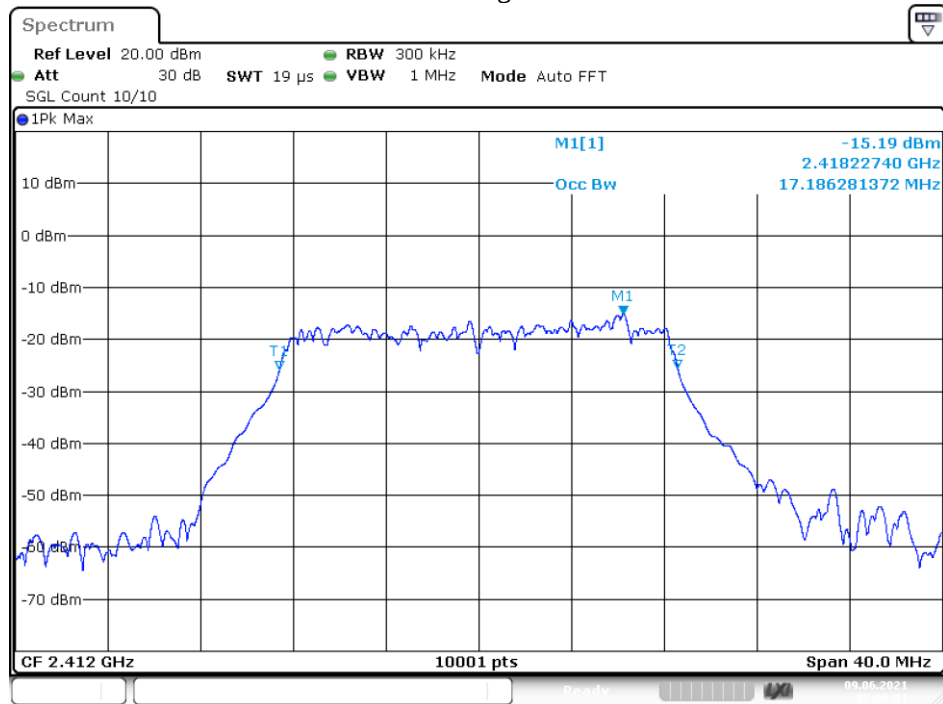
Date: 9.JUN.2021 06:56:30

-6 dB BW NVNT 802.11b 2462MHz Ant1



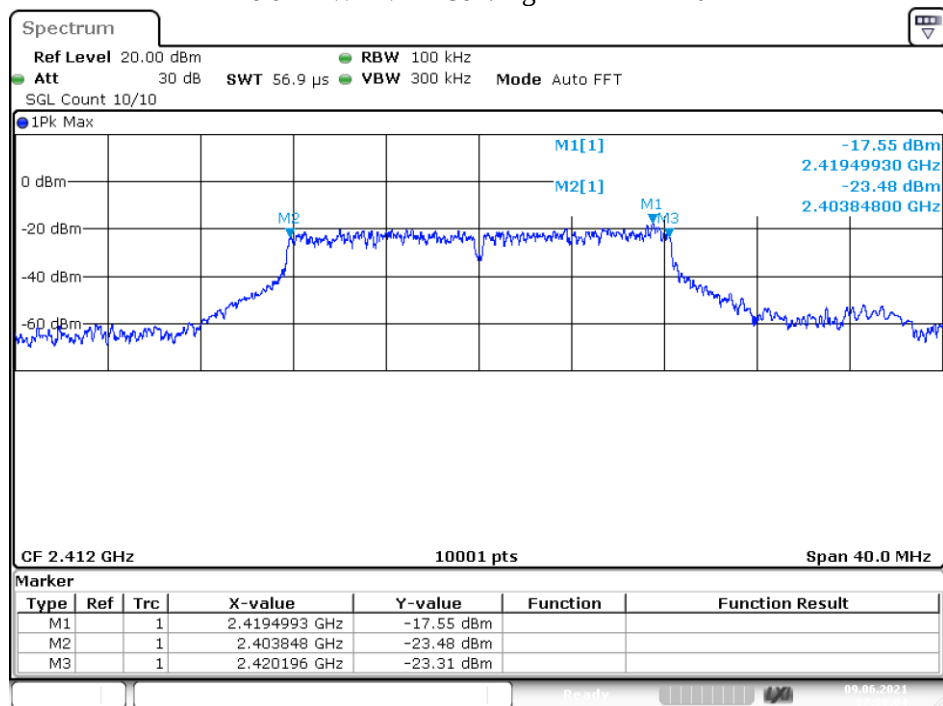
Date: 9.JUN.2021 06:56:32

OBW NVNT 802.11g 2412MHz Ant1



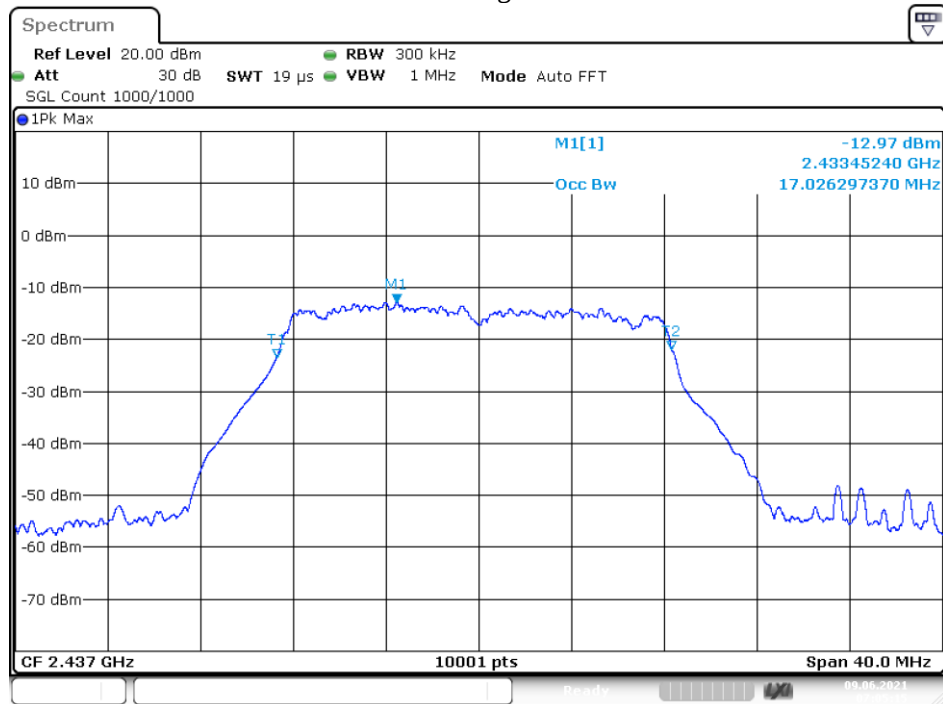
Date: 9.JUN.2021 07:00:02

-6 dB BW NVNT 802.11g 2412MHz Ant1



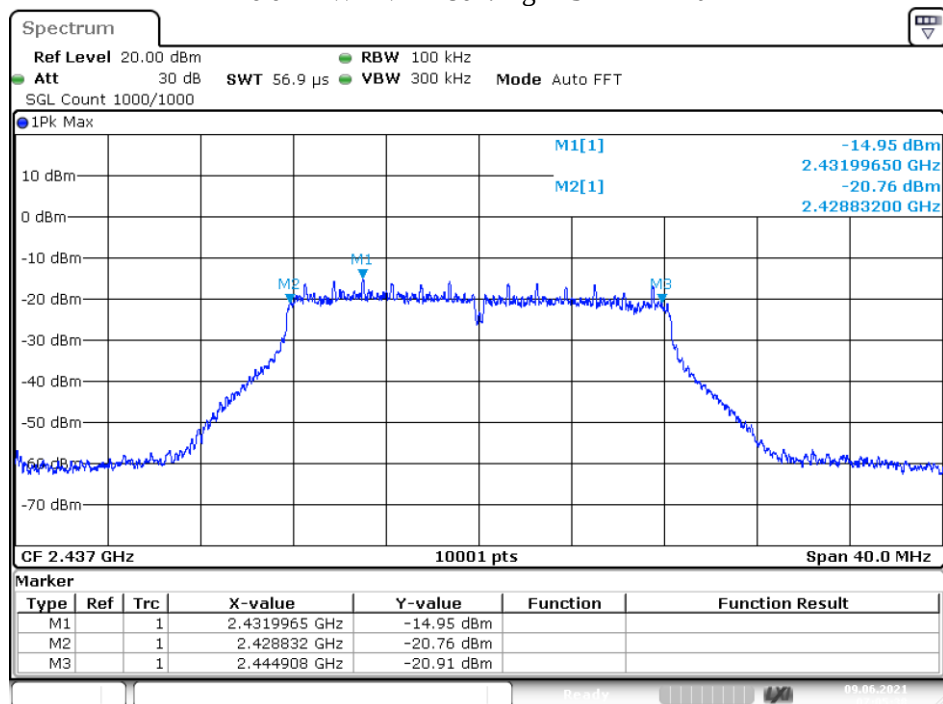
Date: 9.JUN.2021 07:00:04

OBW NVNT 802.11g 2437MHz Ant1



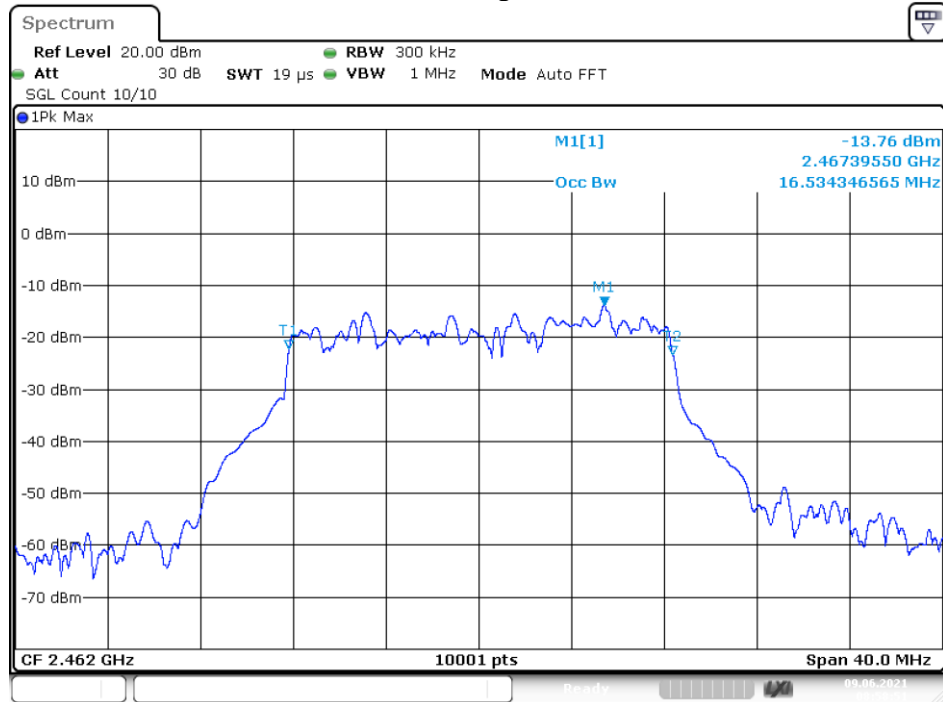
Date: 9.JUN.2021 07:05:15

-6 dB BW NVNT 802.11g 2437MHz Ant1



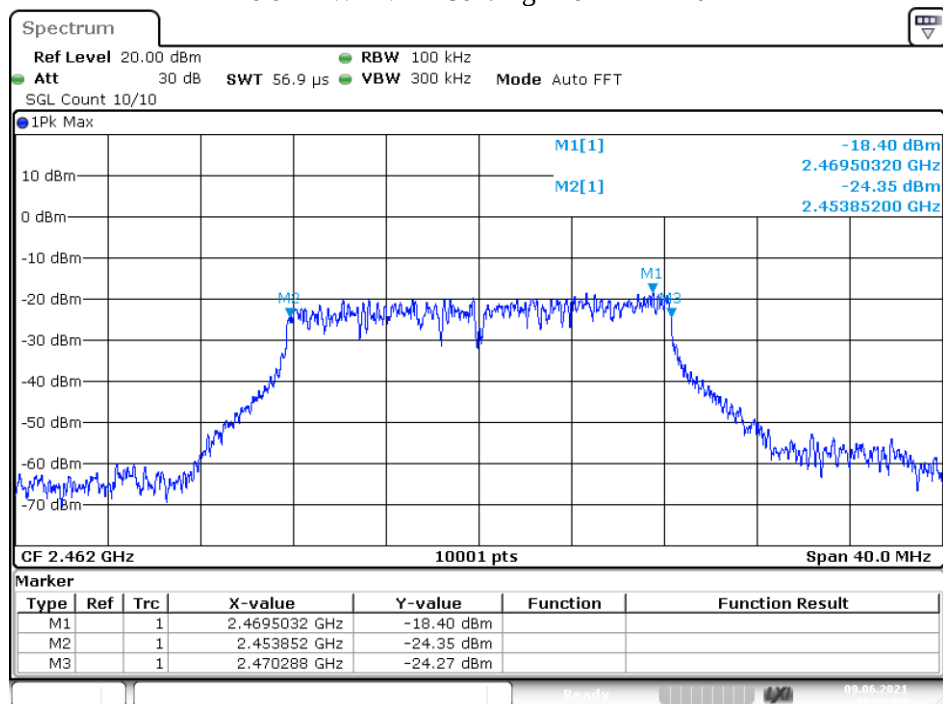
Date: 9.JUN.2021 07:05:37

OBW NVNT 802.11g 2462MHz Ant1



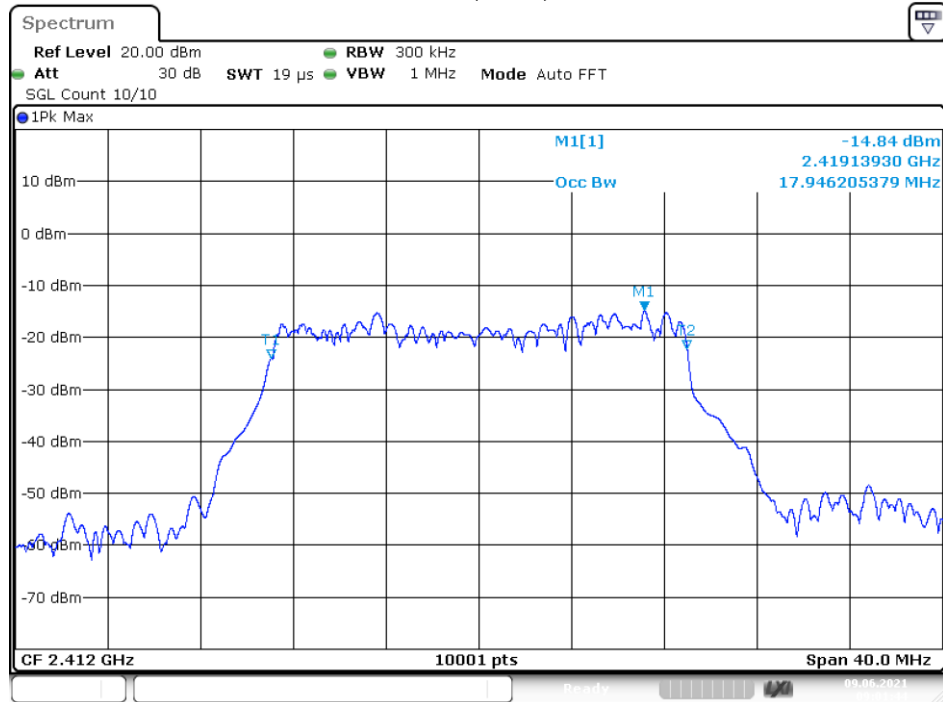
Date: 9.JUN.2021 08:58:51

-6 dB BW NVNT 802.11g 2462MHz Ant1



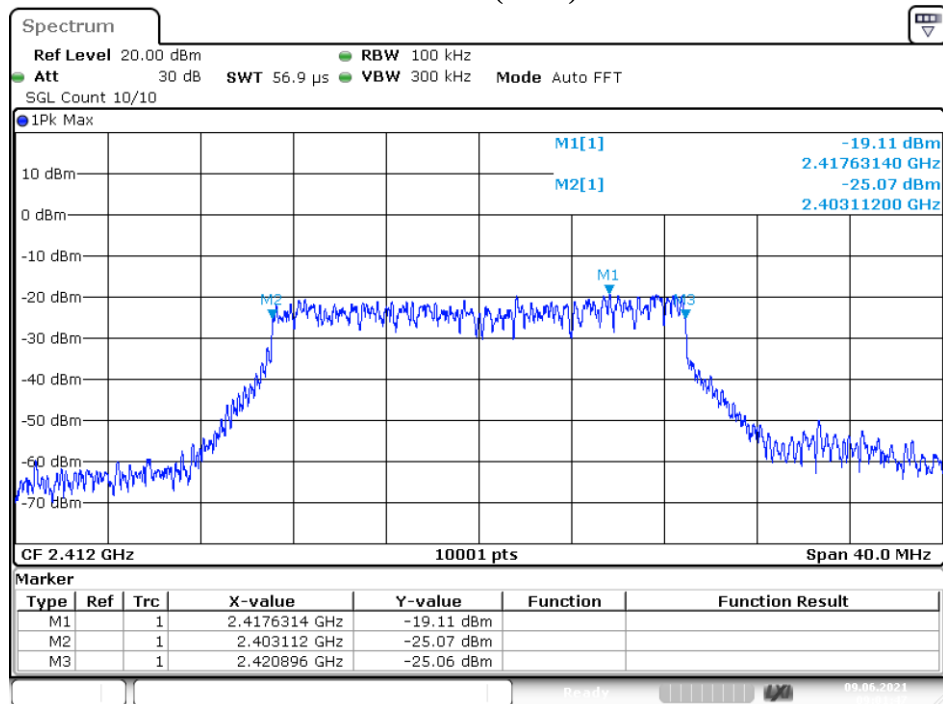
Date: 9.JUN.2021 08:58:54

OBW NVNT 802.11n(HT20) 2412MHz Ant1



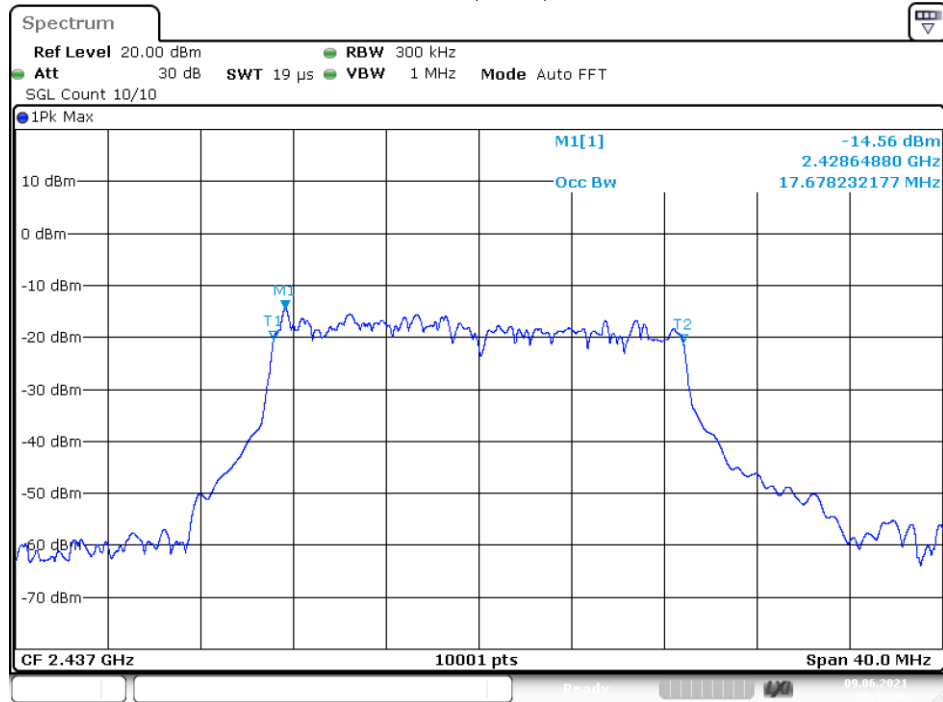
Date: 9.JUN.2021 09:01:45

-6 dB BW NVNT 802.11n(HT20) 2412MHz Ant1



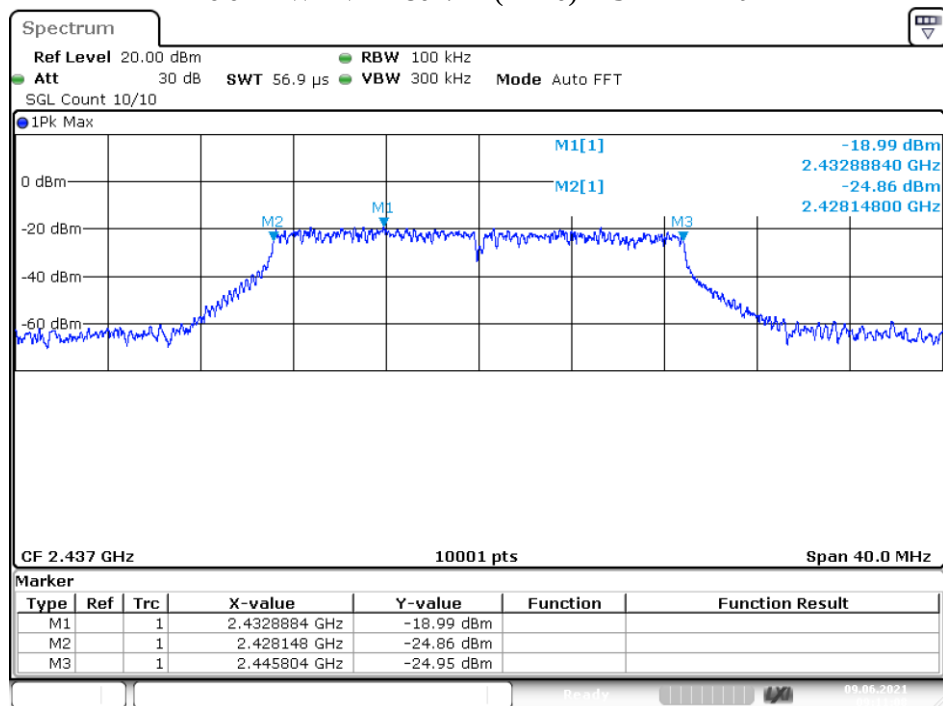
Date: 9.JUN.2021 09:01:47

OBW NVNT 802.11n(HT20) 2437MHz Ant1



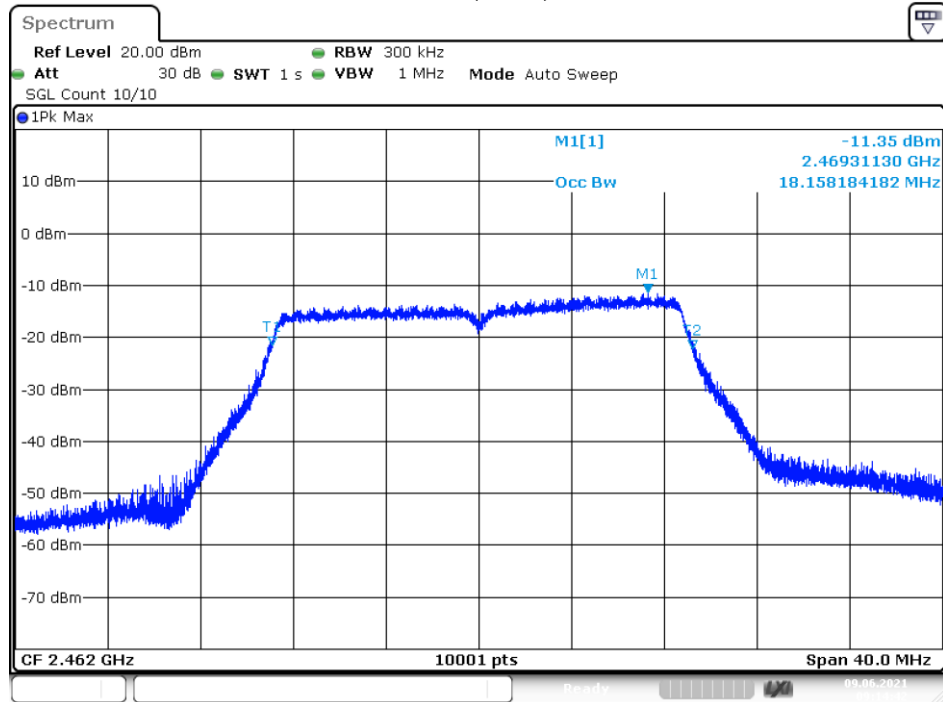
Date: 9.JUN.2021 09:11:05

-6 dB BW NVNT 802.11n(HT20) 2437MHz Ant1



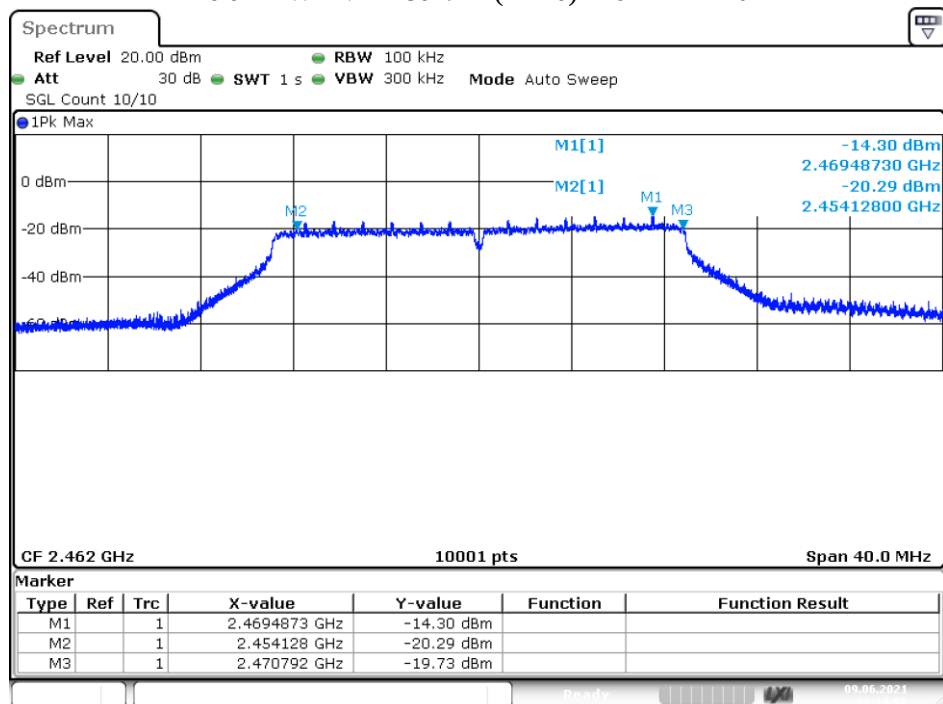
Date: 9.JUN.2021 09:11:08

OBW NVNT 802.11n(HT20) 2462MHz Ant1



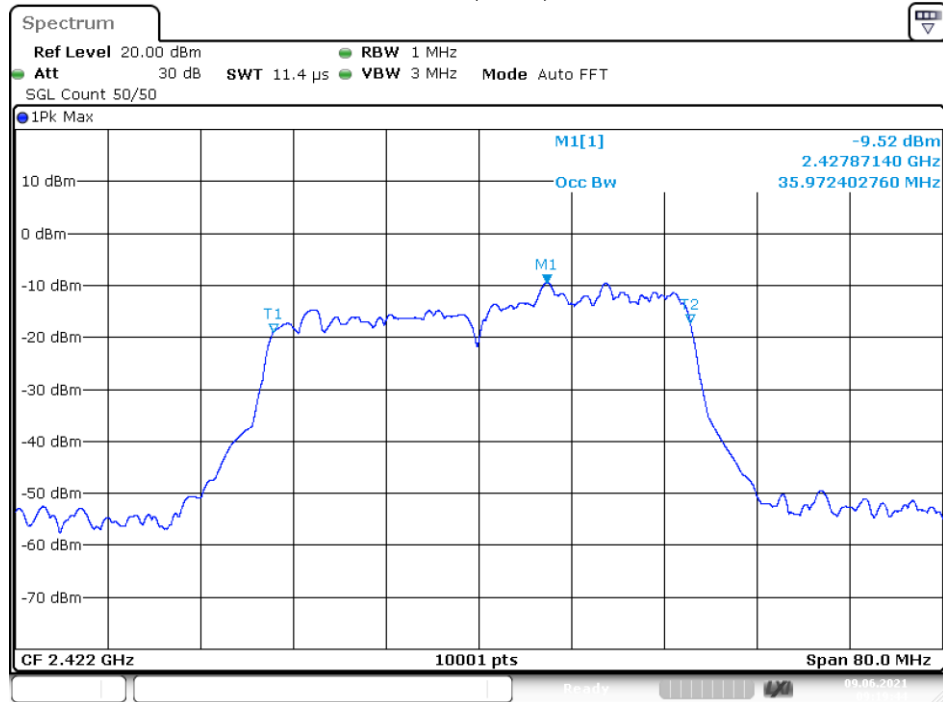
Date: 9.JUN.2021 09:14:42

-6 dB BW NVNT 802.11n(HT20) 2462MHz Ant1



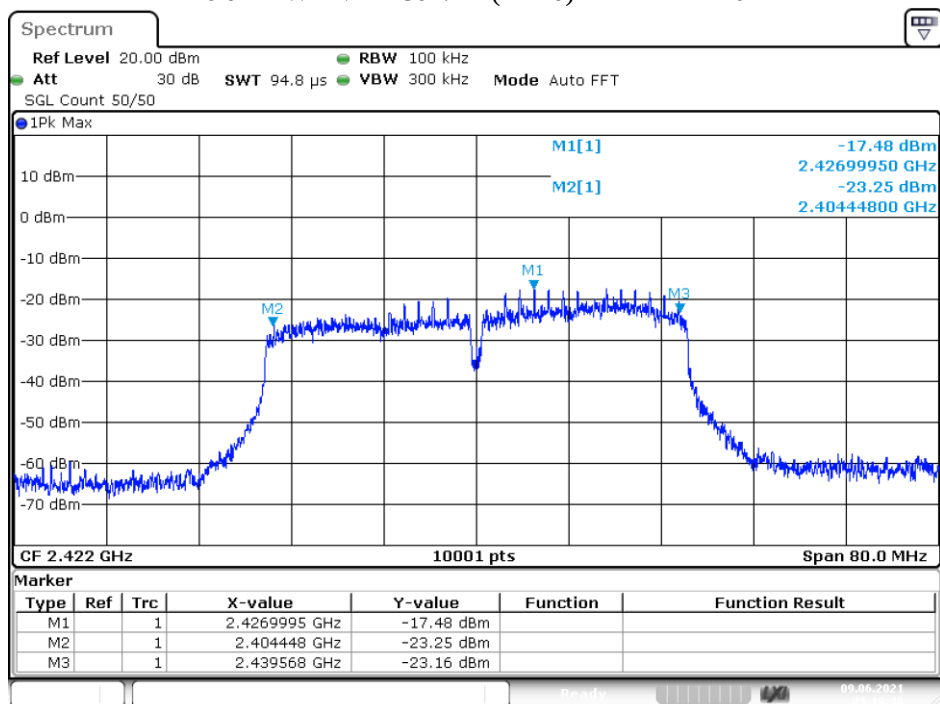
Date: 9.JUN.2021 09:14:56

OBW NVNT 802.11n(HT40) 2422MHz Ant1



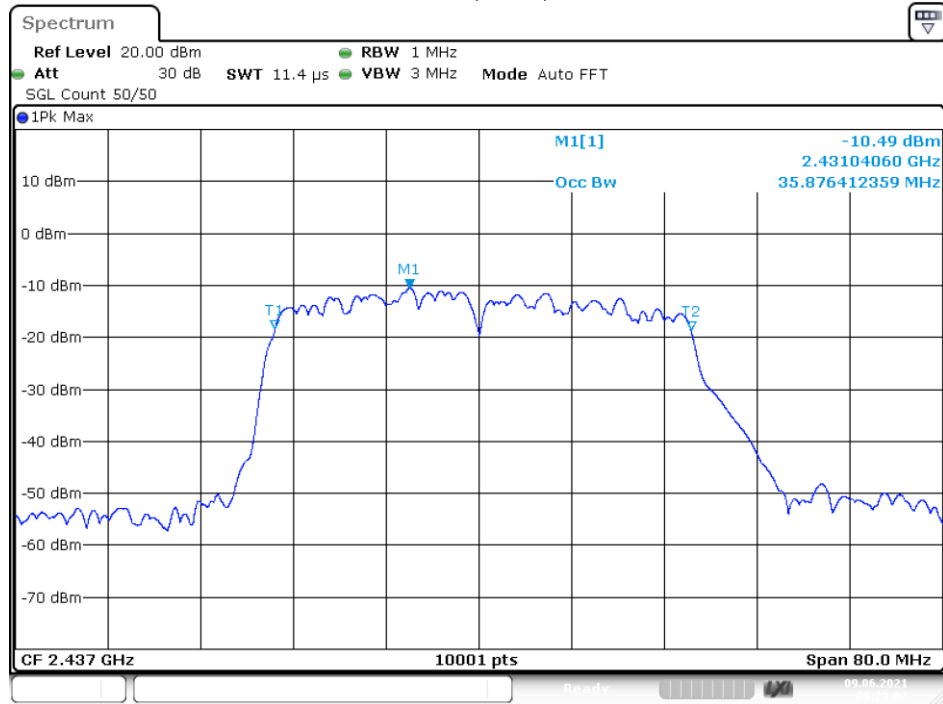
Date: 9.JUN.2021 09:19:45

-6 dB BW NVNT 802.11n(HT40) 2422MHz Ant1



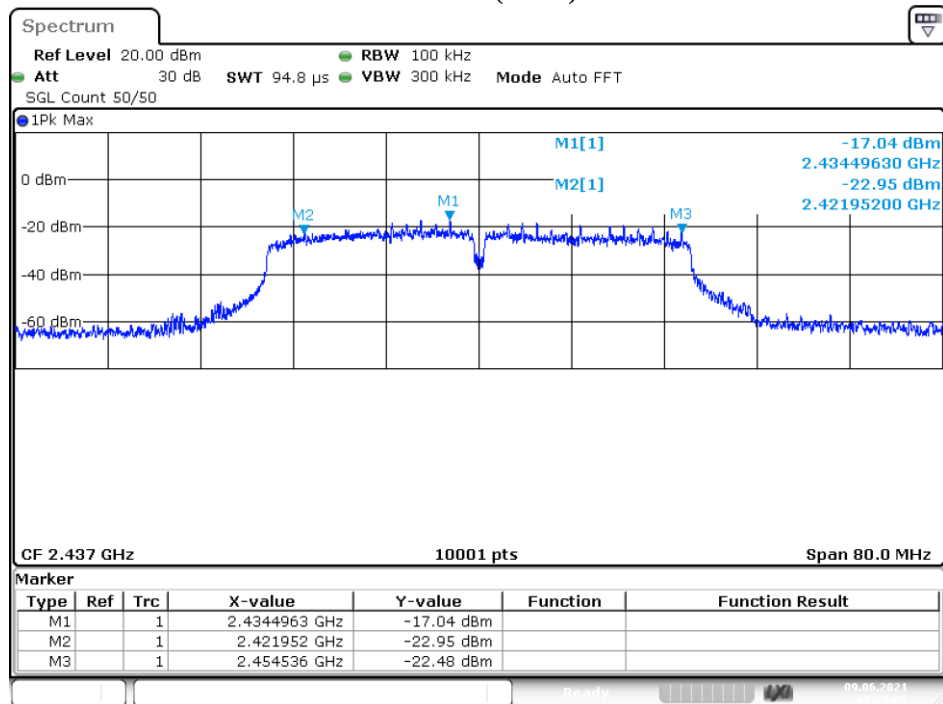
Date: 9.JUN.2021 09:19:49

OBW NVNT 802.11n(HT40) 2437MHz Ant1



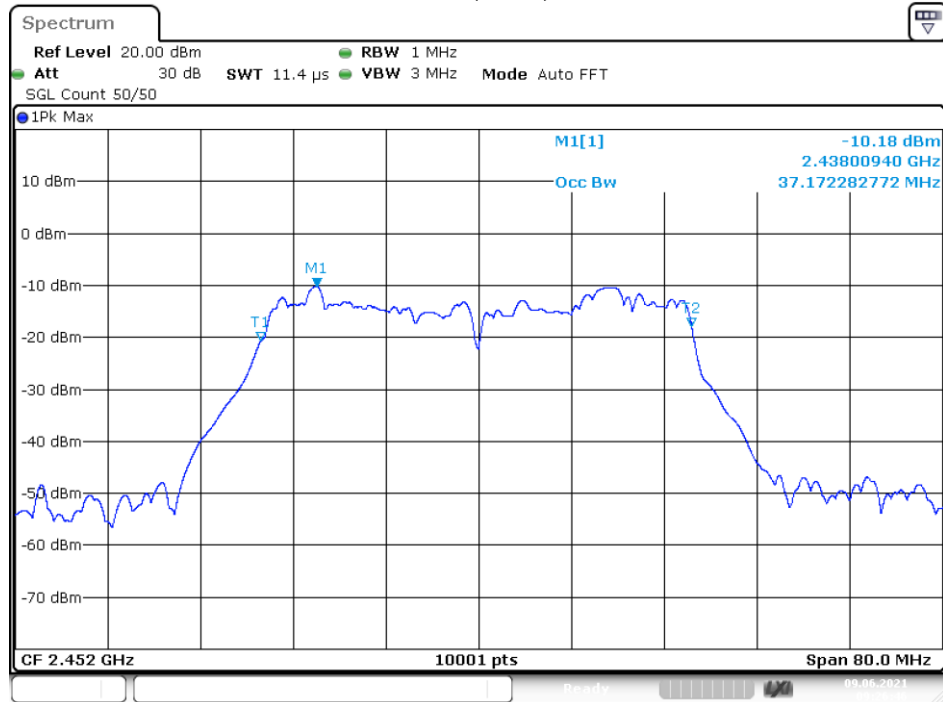
Date: 9.JUN.2021 09:23:02

-6 dB BW NVNT 802.11n(HT40) 2437MHz Ant1



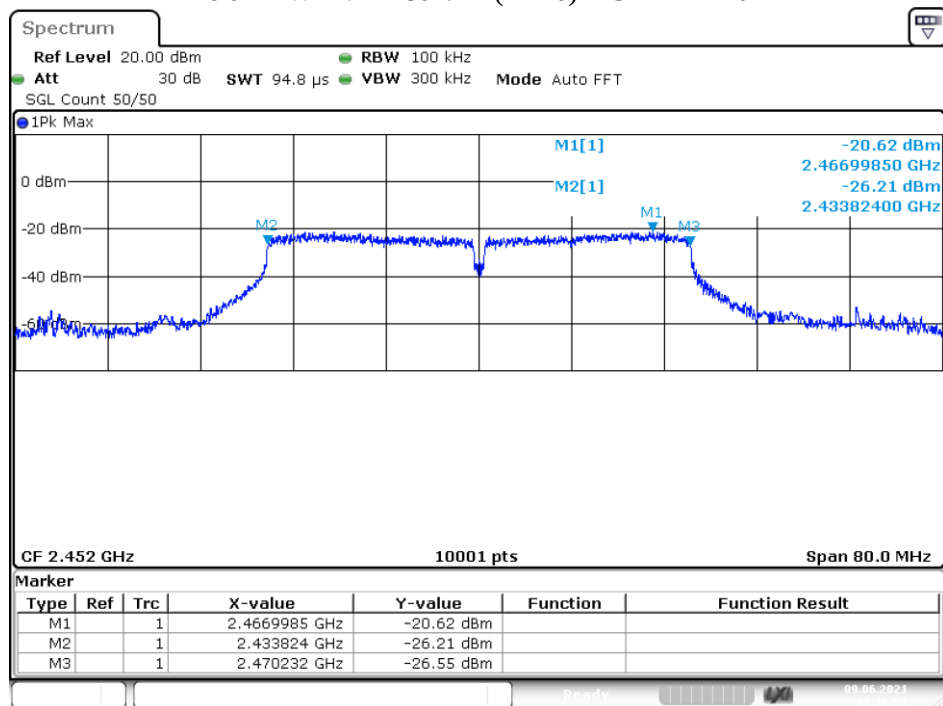
Date: 9.JUN.2021 09:23:06

OBW NVNT 802.11n(HT40) 2452MHz Ant1



Date: 9.JUN.2021 09:26:46

-6 dB BW NVNT 802.11n(HT40) 2452MHz Ant1



Date: 9.JUN.2021 09:26:49

8. Band Edge Check

8.1. Test limits

Please refer FCC PART 15: 15.247

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

8.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

8.2.1 Put the EUT on a 1.5m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission

8.2.2 Check the spurious emissions out of band.

8.2.3 RBW 1MHz, VBW 3MHz, peak detector for peak value , RBW 1MHz ,VBW 10Hz, RMS detector for AV value.

8.3. Test Setup

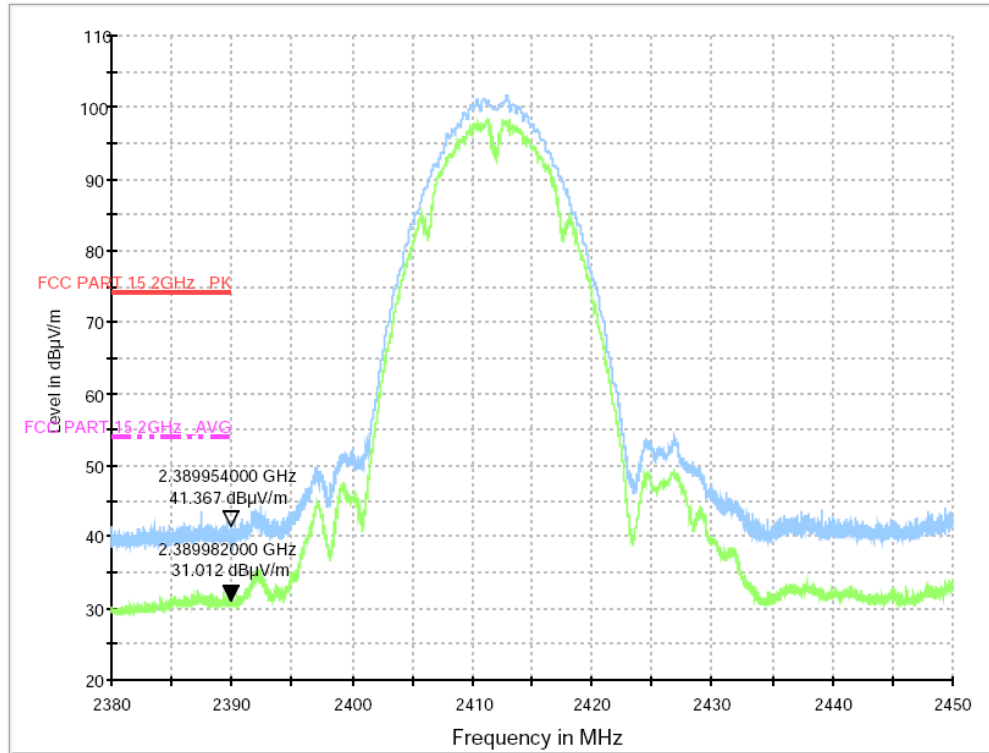
Same as 3.3.

8.4. Test Results

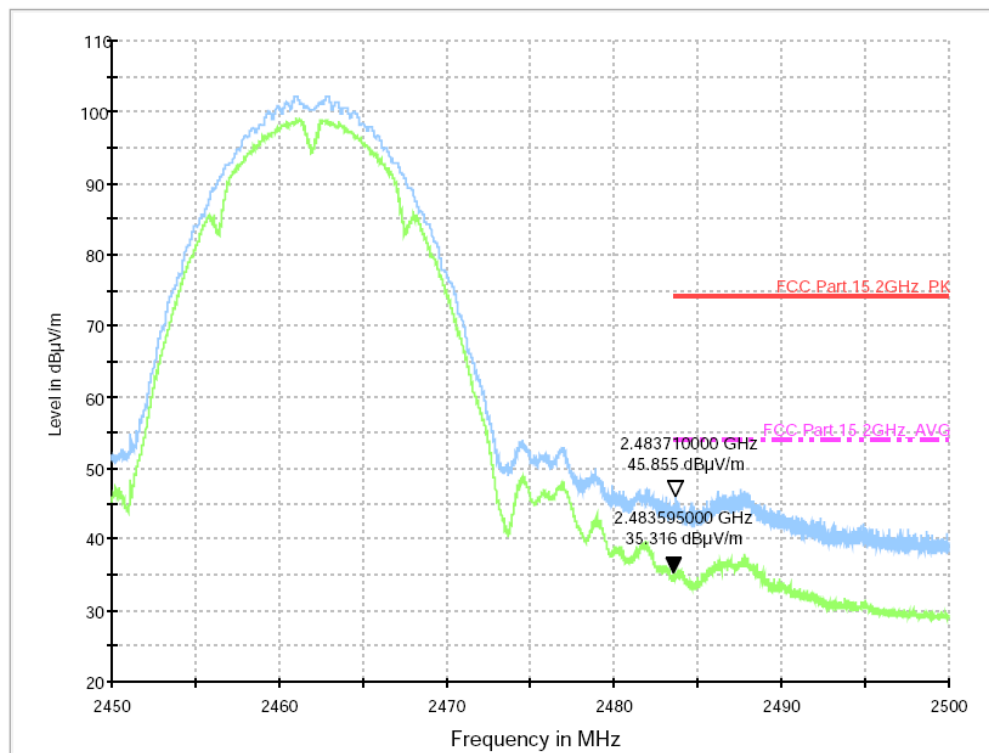
PASS.

Detailed information please see the following page.

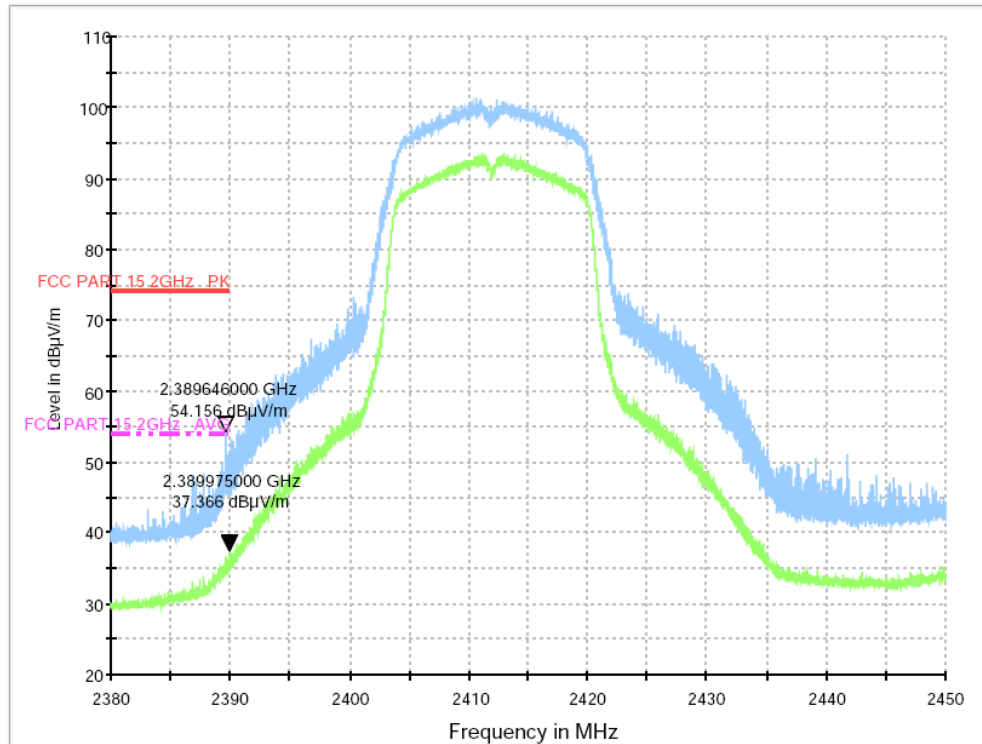
Test Mode: IEEE 802.11b-Low
Polarization: Vertical & Horizontal



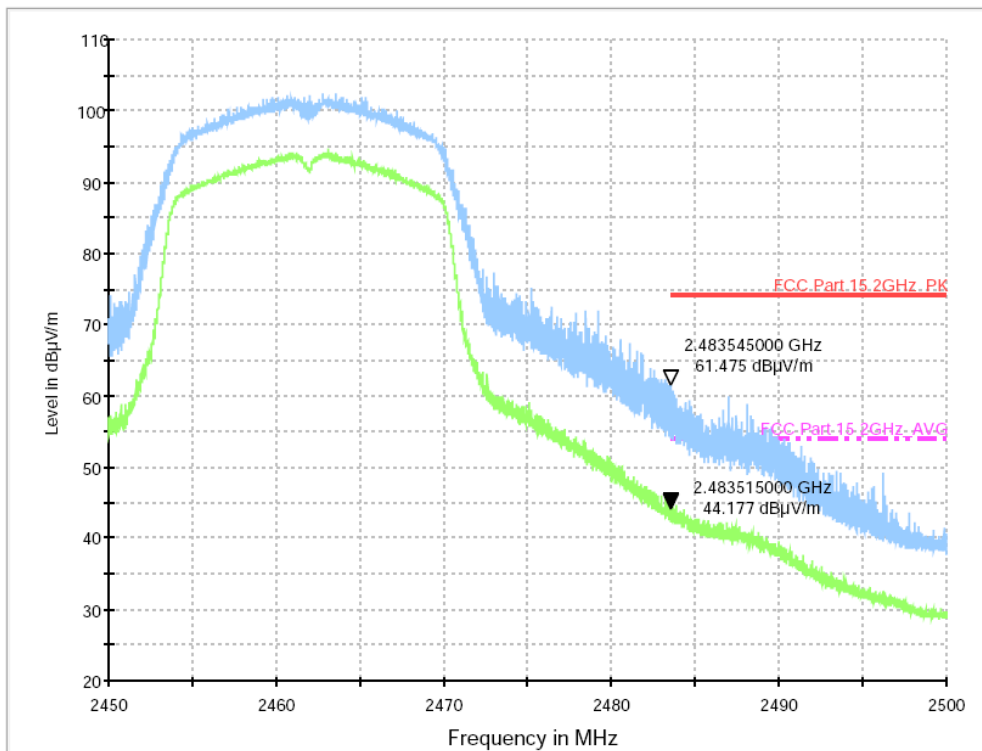
Test Mode: IEEE 802.11b-High
Polarization: Vertical & Horizontal



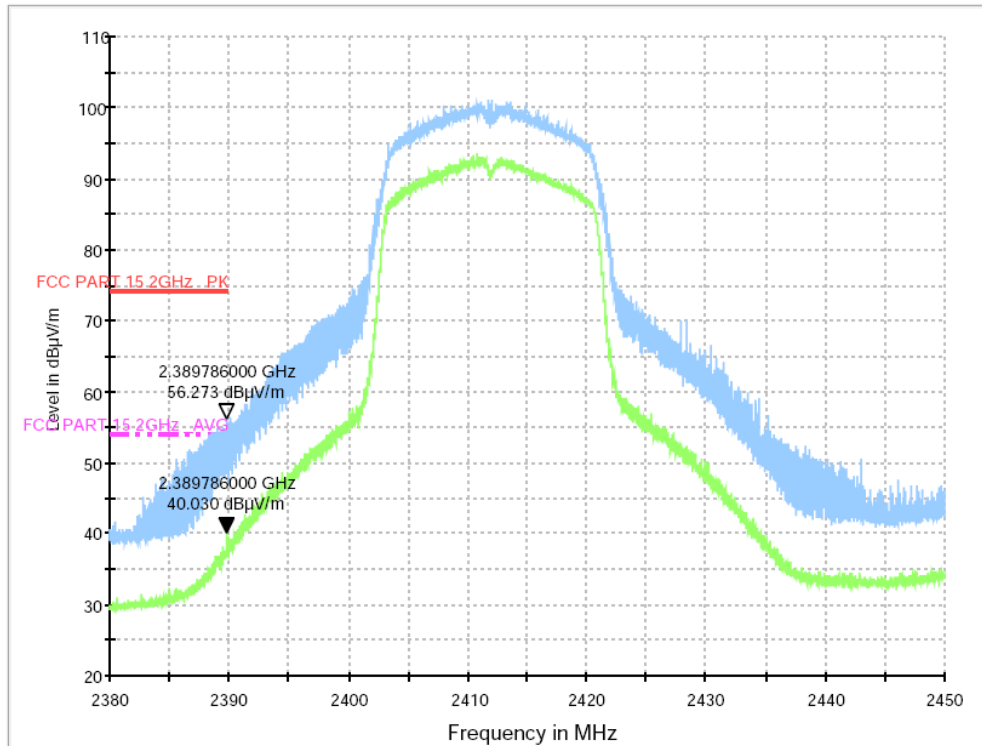
Test Mode: IEEE 802.11g-Low
Polarization: Vertical & Horizontal



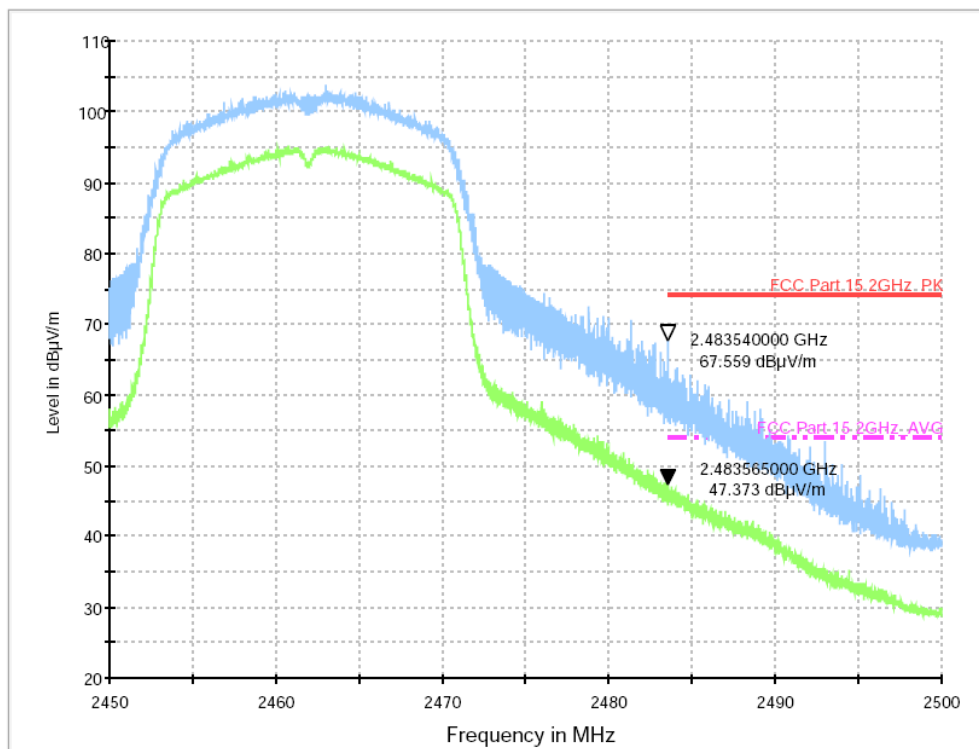
Test Mode: IEEE 802.11g-High
Polarization: Vertical & Horizontal



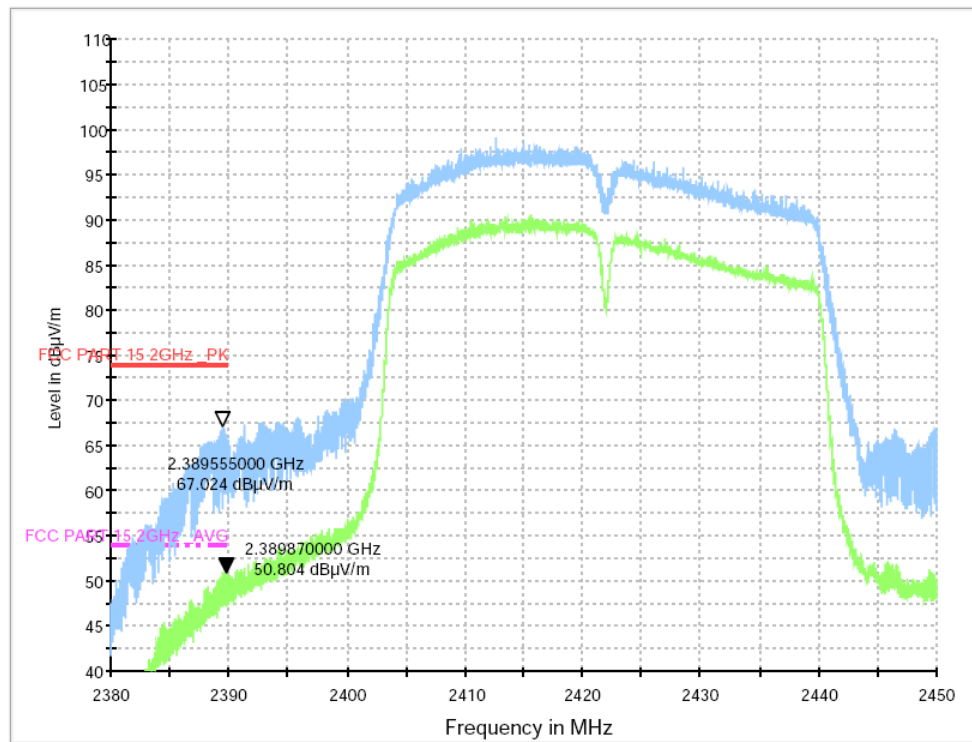
Test Mode: IEEE 802.11n20-Low
Polarization: Vertical & Horizontal



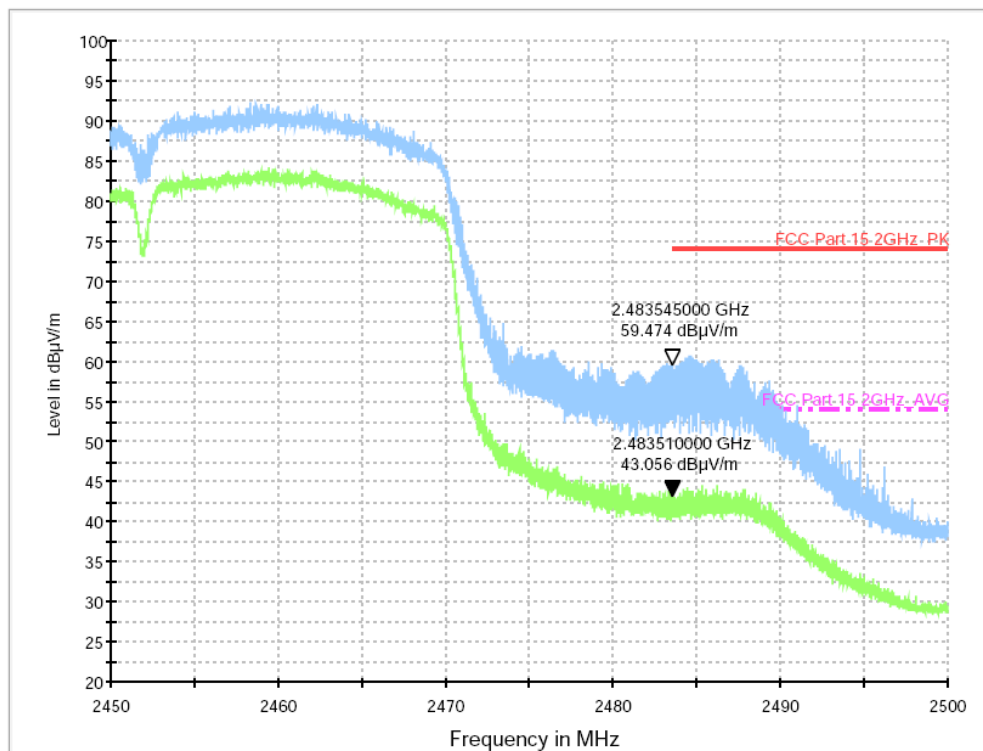
Test Mode: IEEE 802.11n20-High
Polarization: Vertical & Horizontal



Test Mode: IEEE 802.11n40-Low
Polarization: Vertical & Horizontal

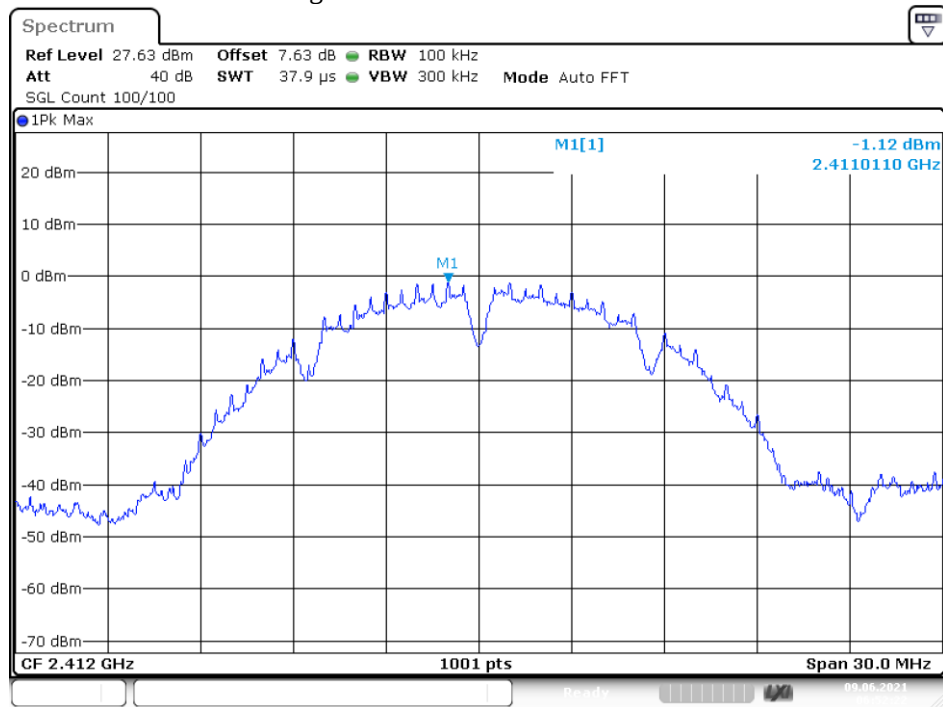


Test Mode: IEEE 802.11n40-High
Polarization: Vertical & Horizontal



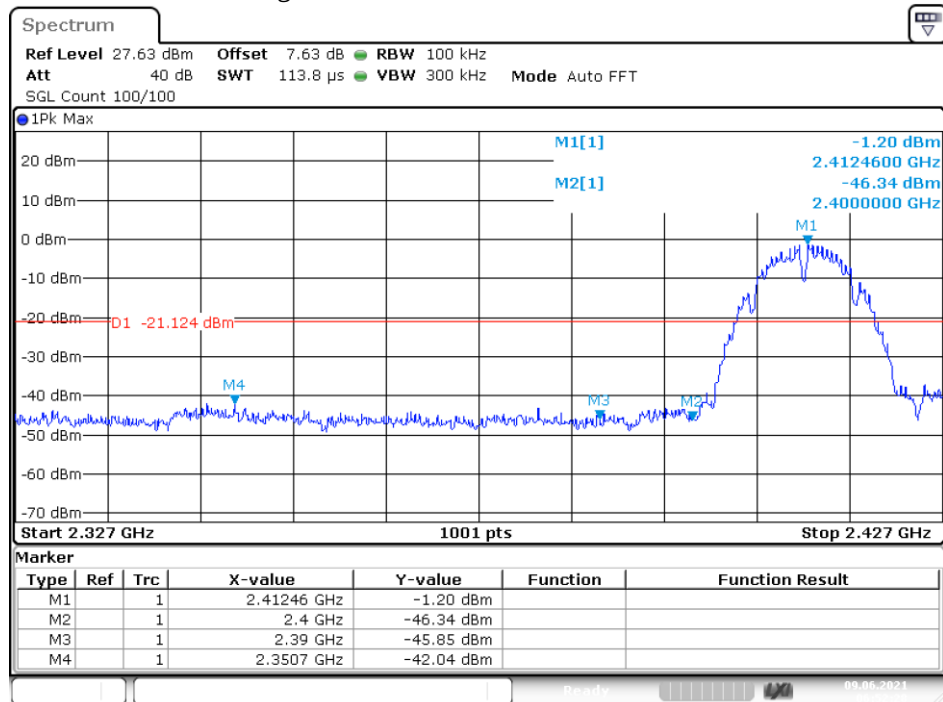
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level + Correct Factor; Correct Factor=Antenna Factor + Cable Loss.

Band Edge NVNT 802.11b 2412MHz Ant1 Ref



Date: 9.JUN.2021 06:52:22

Band Edge NVNT 802.11b 2412MHz Ant1 Emission



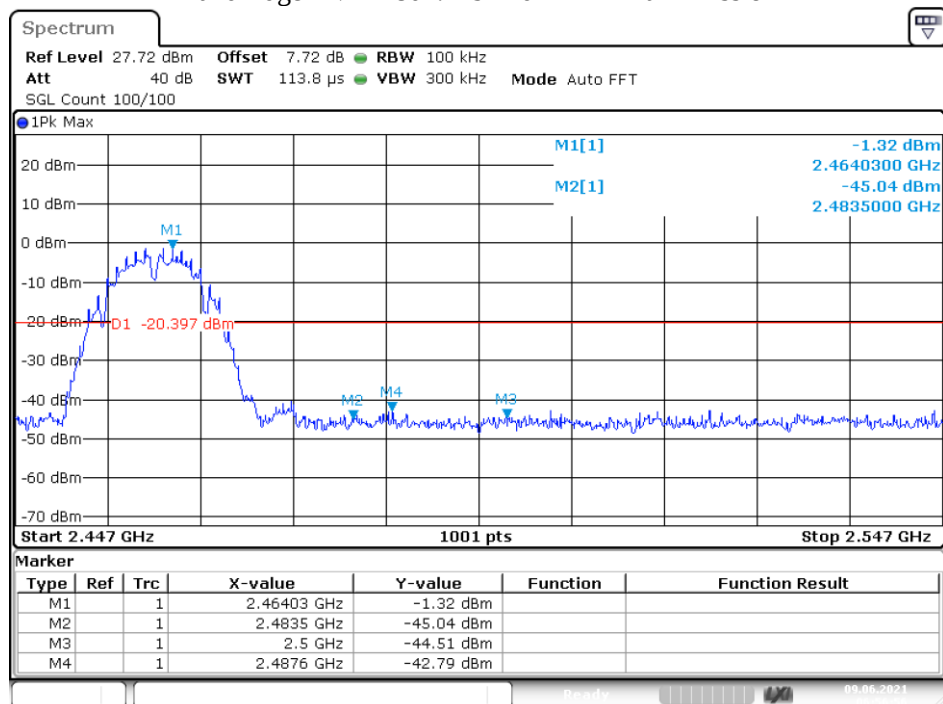
Date: 9.JUN.2021 06:52:27

Band Edge NVNT 802.11b 2462MHz Ant1 Ref



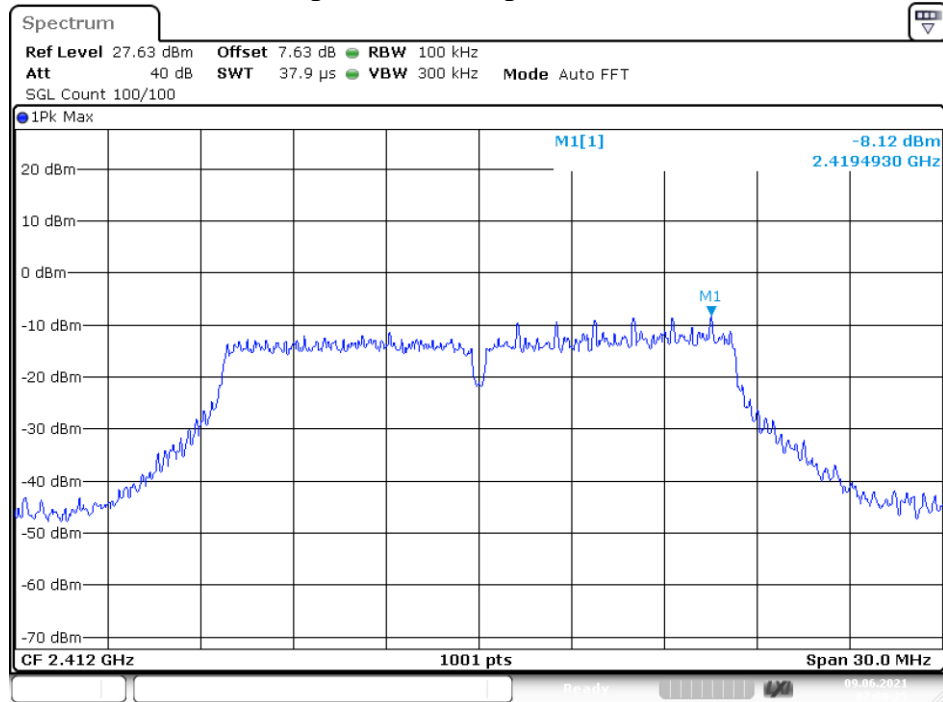
Date: 9.JUN.2021 06:56:50

Band Edge NVNT 802.11b 2462MHz Ant1 Emission



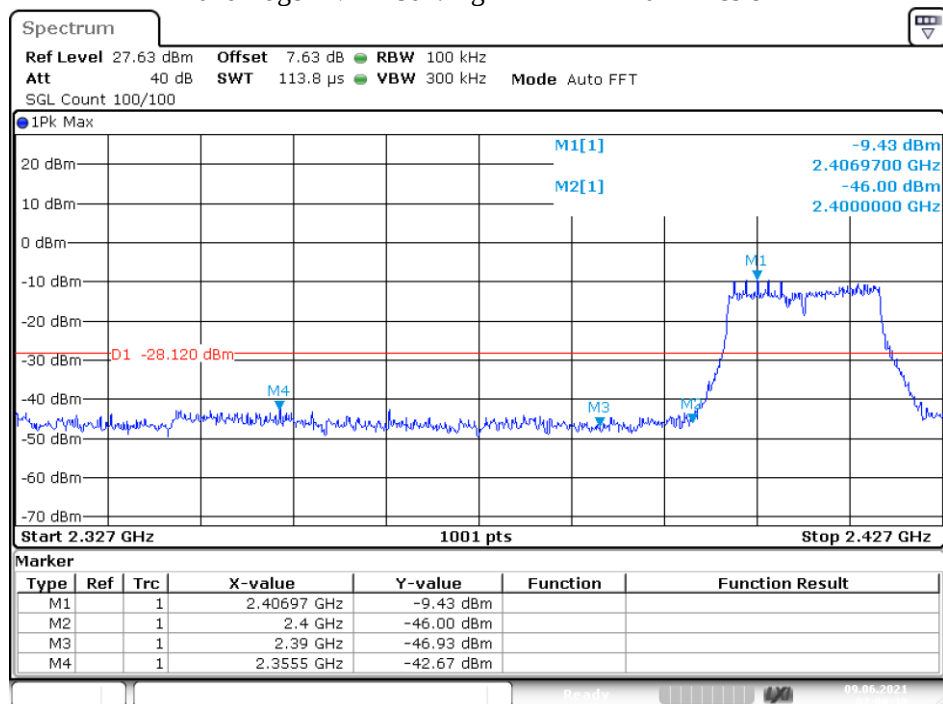
Date: 9.JUN.2021 06:56:56

Band Edge NVNT 802.11g 2412MHz Ant1 Ref



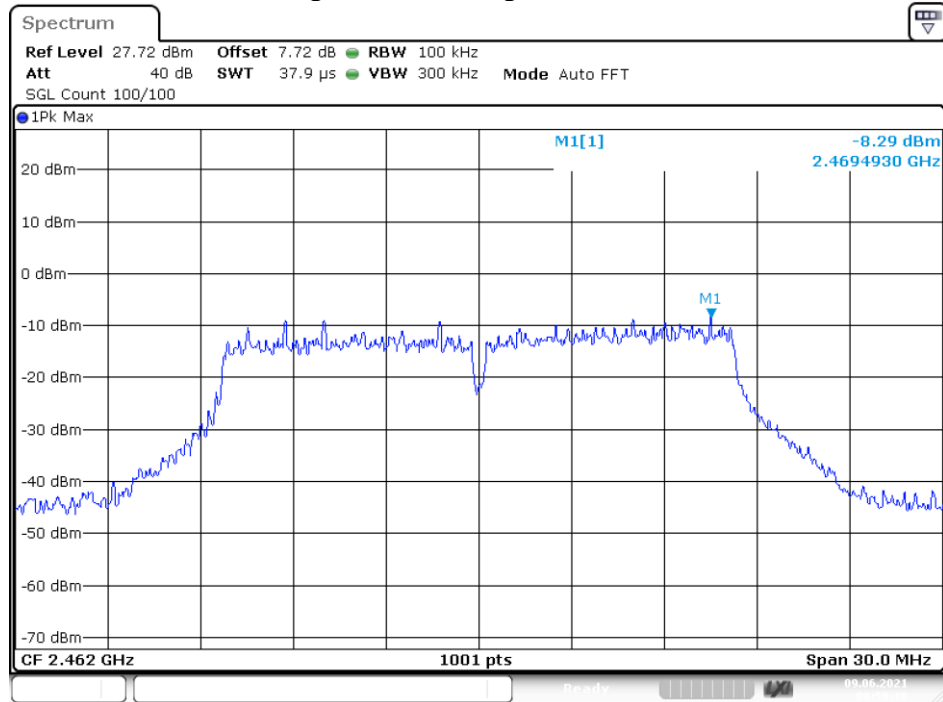
Date: 9.JUN.2021 07:00:25

Band Edge NVNT 802.11g 2412MHz Ant1 Emission



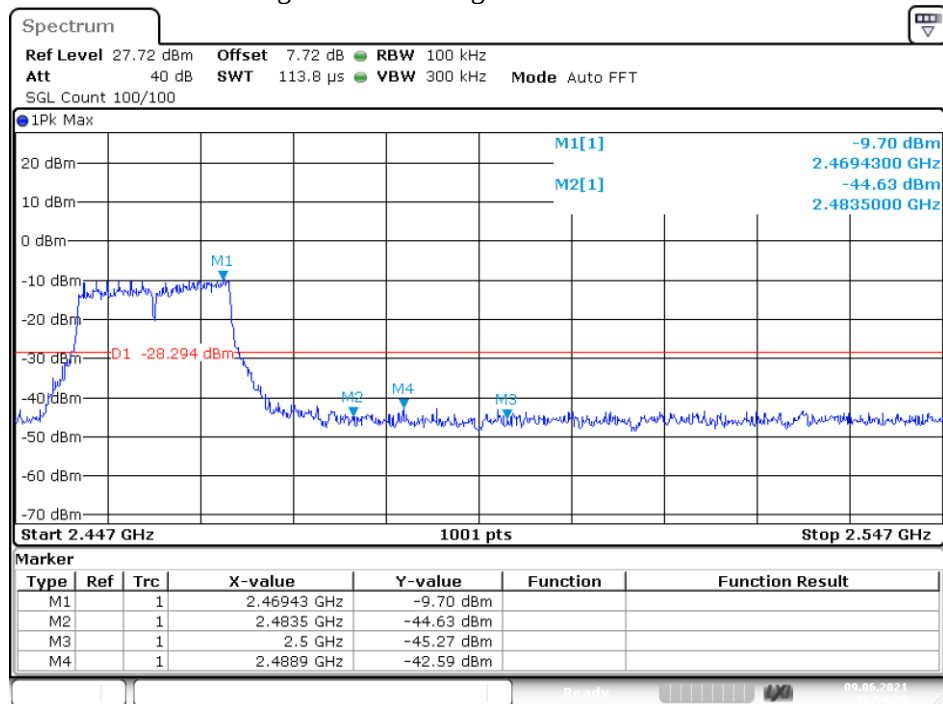
Date: 9.JUN.2021 07:00:30

Band Edge NVNT 802.11g 2462MHz Ant1 Ref



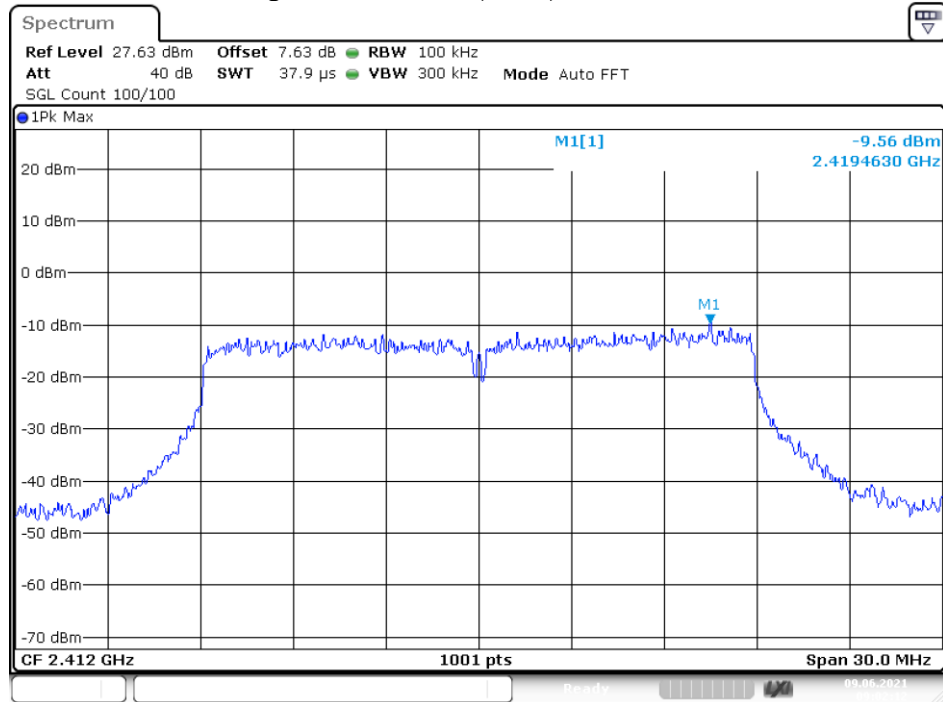
Date: 9.JUN.2021 08:59:18

Band Edge NVNT 802.11g 2462MHz Ant1 Emission



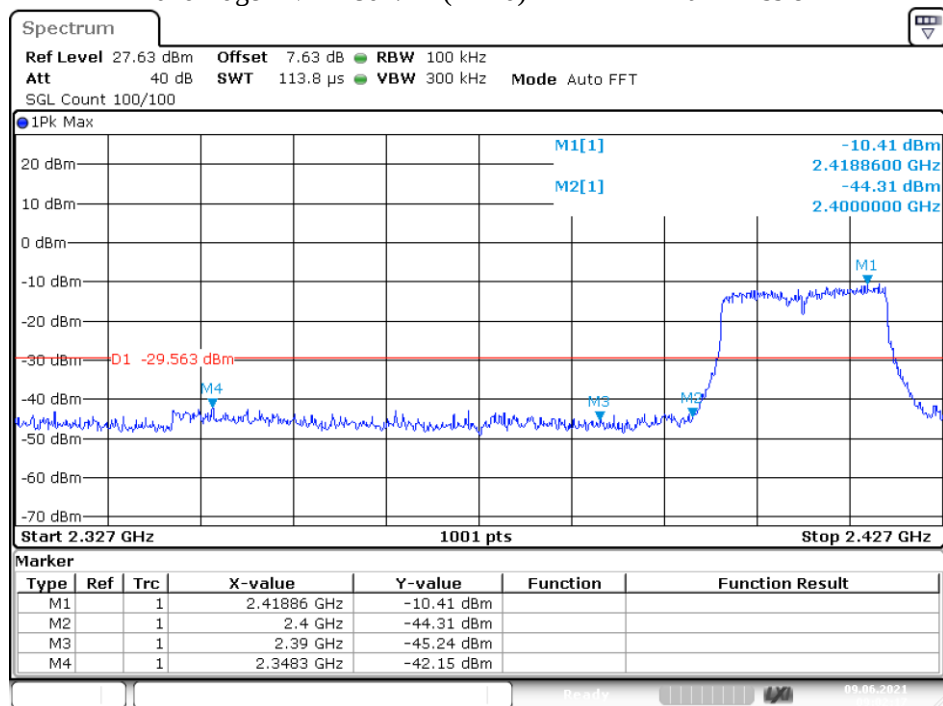
Date: 9.JUN.2021 08:59:23

Band Edge NVNT 802.11n(HT20) 2412MHz Ant1 Ref



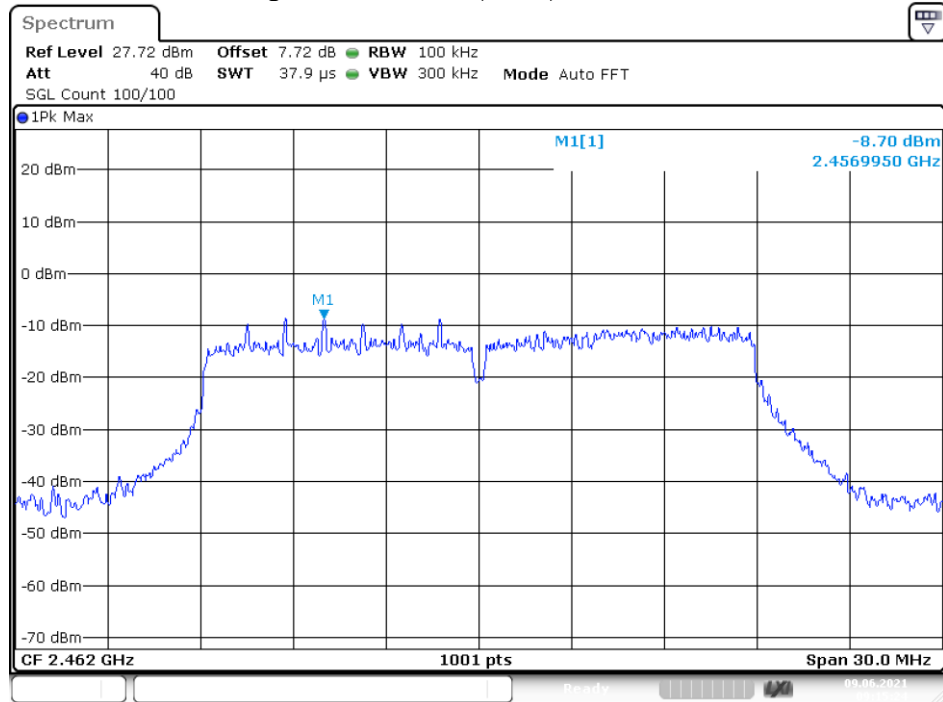
Date: 9.JUN.2021 09:02:12

Band Edge NVNT 802.11n(HT20) 2412MHz Ant1 Emission



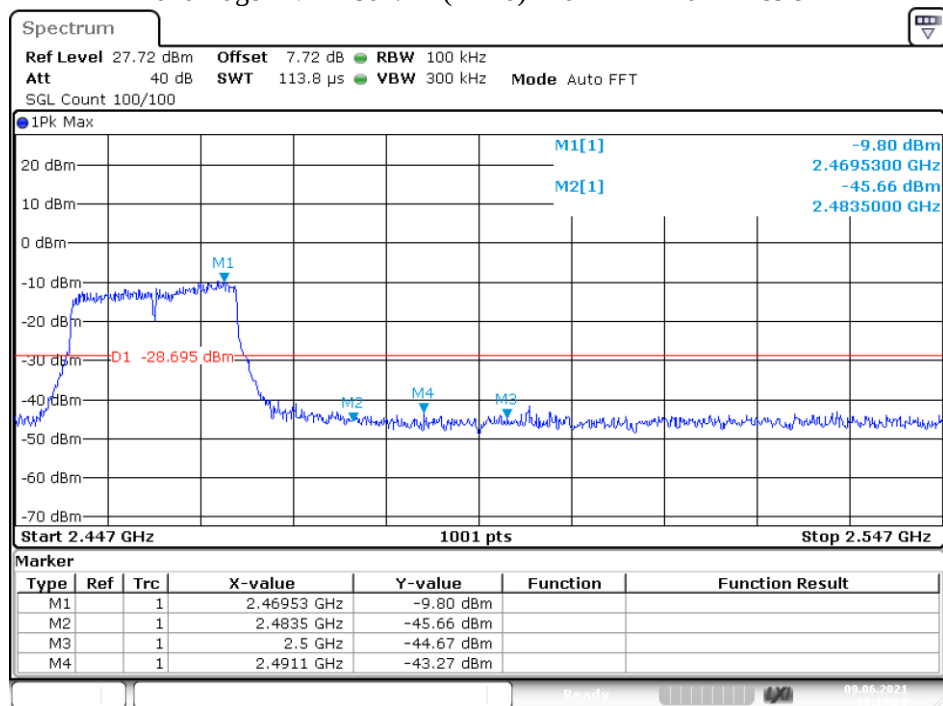
Date: 9.JUN.2021 09:02:17

Band Edge NVNT 802.11n(HT20) 2462MHz Ant1 Ref



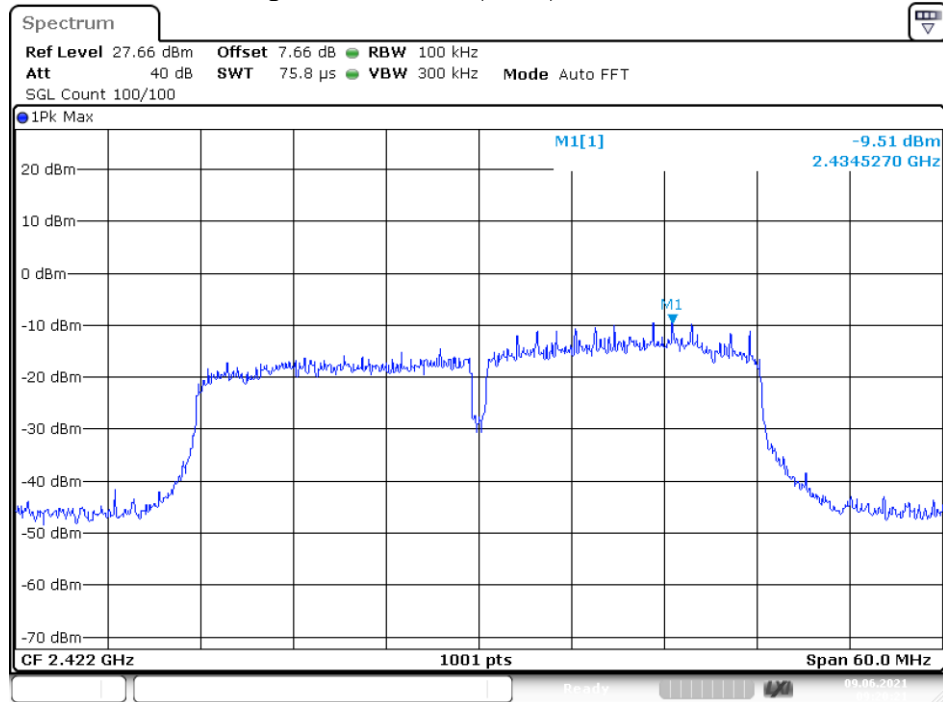
Date: 9.JUN.2021 09:15:24

Band Edge NVNT 802.11n(HT20) 2462MHz Ant1 Emission



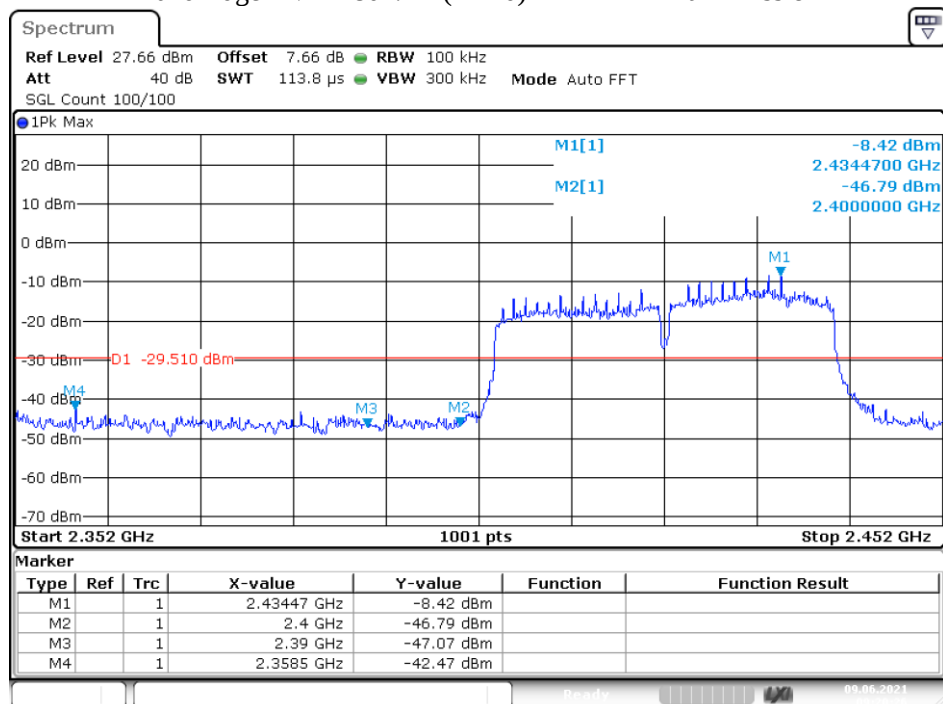
Date: 9.JUN.2021 09:15:29

Band Edge NVNT 802.11n(HT40) 2422MHz Ant1 Ref



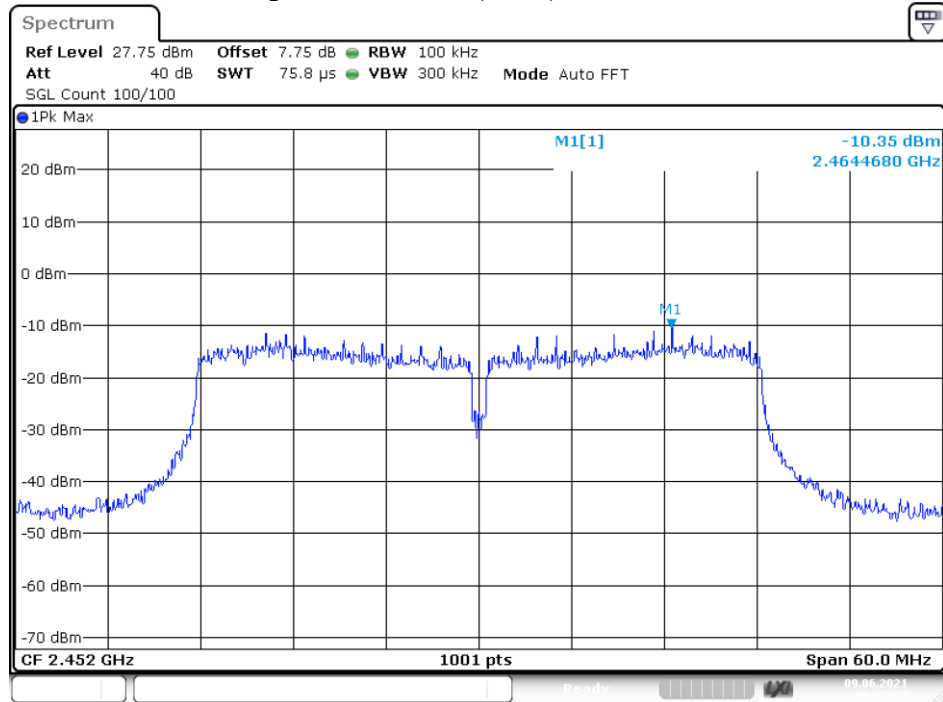
Date: 9.JUN.2021 09:20:21

Band Edge NVNT 802.11n(HT40) 2422MHz Ant1 Emission



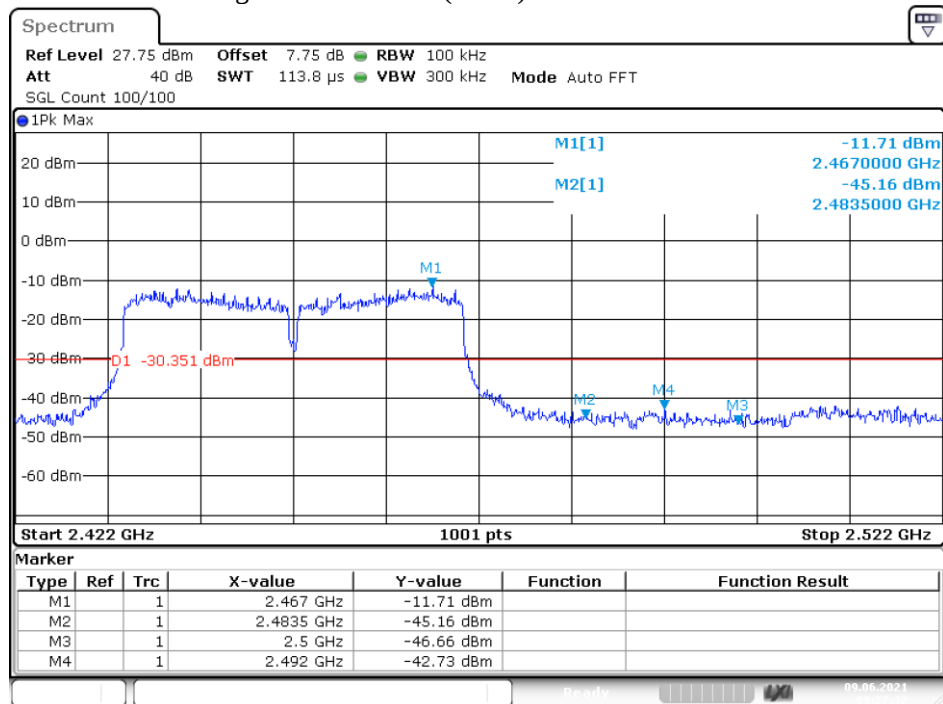
Date: 9.JUN.2021 09:20:26

Band Edge NVNT 802.11n(HT40) 2452MHz Ant1 Ref



Date: 9.JUN.2021 09:27:27

Band Edge NVNT 802.11n(HT40) 2452MHz Ant1 Emission



Date: 9.JUN.2021 09:27:32

9. Antenna Requirement

9.1. 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 shall be considered sufficient to comply with the provisions of this Section. 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.

9.2. Antenna Connected Construction

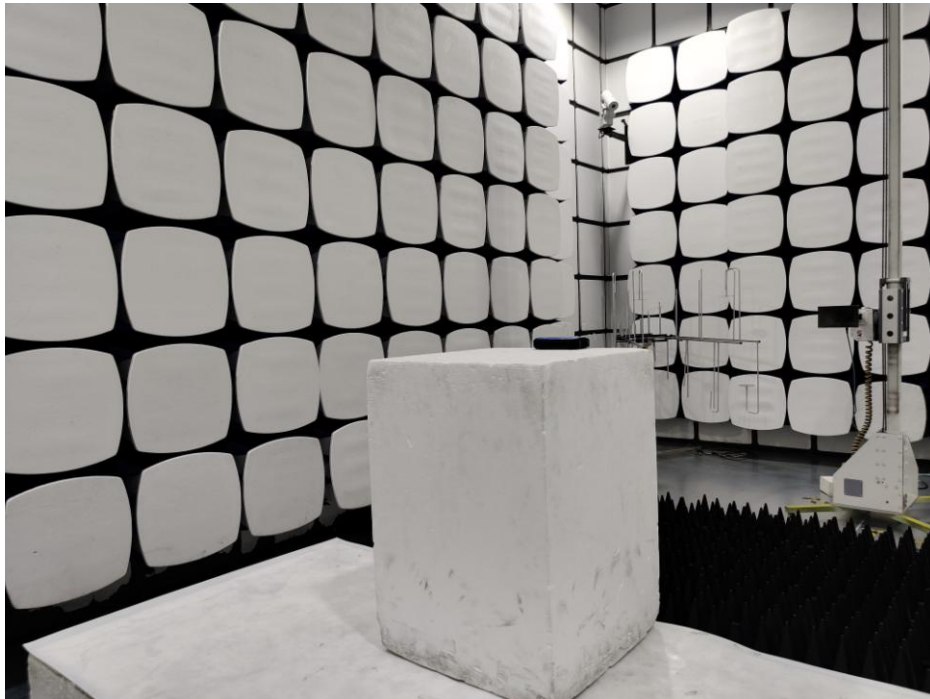
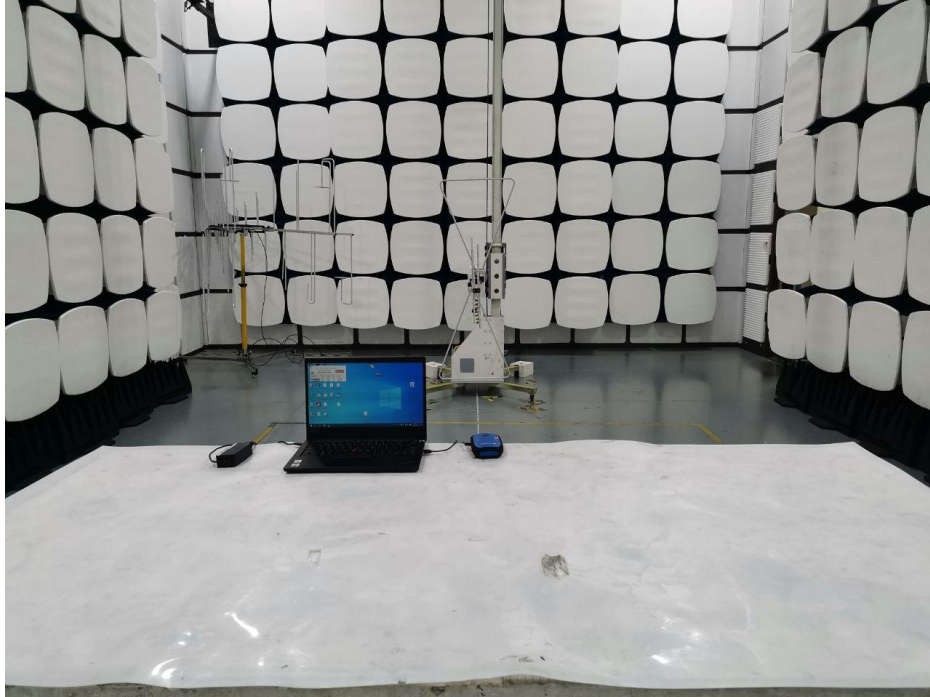
The antenna connector is unique antenna and no consideration of replacement. Please see EUT photo for details.

9.3. Results

The EUT antenna is internal antenna. It complies with the standard requirement.

10. Test setup photo

10.1. Photos of Radiated emission



10.2.Photos of Power Line Conducted Emission Test



11. Photos of EUT

Please refer to report A2105079-C01-R02

----- **END OF REPORT** -----