FCC TEST REPORT

FCC ID: 2AFCB-LY-136

On Behalf of

Shenzhen Longzhiyuan Technology Co., Ltd.

Wi-Fi Video Doorbell

Model No.: LY-136

Prepared for	:	Shenzhen Longzhiyuan Technology Co., Ltd.
Address	:	2F & 5F, Bldg #2, Zhuangbian 2nd Industrial Park, Hezhou Community, Hangcheng, Bao'an, Shenzhen City, China

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	:	A2001047-C01-R01
Date of Receipt	:	January 09, 2020
Date of Test	:	January 09, 2020-March 12, 2020
Date of Report	:	March 12, 2020
Version Number	:	V0

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TEST REPORT DECLARATION

Applicant	:	Shenzhen Longzhiyuan Technology Co., Ltd.
Address	:	2F & 5F, Bldg #2, Zhuangbian 2nd Industrial Park, Hezhou Community, Hangcheng, Bao'an, Shenzhen City, China
Manufacturer	:	Shenzhen Longzhiyuan Technology Co., Ltd.
Address	:	2F & 5F, Bldg #2, Zhuangbian 2nd Industrial Park, Hezhou Community, Hangcheng, Bao'an, Shenzhen City, China
EUT Description	:	Wi-Fi Video Doorbell
		(A) Model No. : LY-136
		(B) Trademark : N/A

Measurement Standard Used:

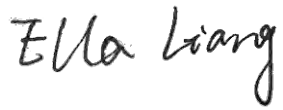
FCC Rules and Regulations Part 15 Subpart C Section 15.247

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).....…..:	Ella Liang Project Engineer	
Approved by (name + signature)…....:	Simple Guan Project Manager	
Date of issue…… ……..:	March 12, 2020	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	March 12, 2020	Initial released Issue	Simple Guan

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	Test Requirement	Standards Paragraph	Result
Conducted Emission	FCC PART 15	15.207	P
6dB Bandwidth	FCC PART 15	15.247 (a)(2)	P
Output Power	FCC PART 15	15.247 (b)(3)	P
Radiated Spurious Emission	FCC PART 15	15.247 (c)	P
Conducted Spurious & Band Edge Emission	FCC PART 15	15.247 (d)	P
Power Spectral Density	FCC PART 15	15.247 (e)	P
Radiated Band Edge Emission	FCC PART 15	15.205	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)

Description	:	Wi-Fi Video Doorbell
Model Number	:	LY-136
Diff	:	N/A
Trademark	:	N/A
Test Voltage	:	DC 3.7V by battery or DC 5V from USB port
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	:	1.2.30
Hardware version	:	V1.2

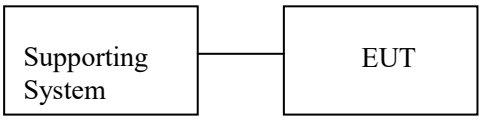
2.2.Accessories of Device (EUT)

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

2.3.Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1	Notebook	ACER	ZQT	N/A	DOC

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 with 2.4G	6.5	Low :CH1	2412
	6.5	Middle: CH6	2437
	6.5	High: CH11	2462
IEEE 802.11 n/HT40 with 2.4G	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.			

Channel list:					
For IEEE 802.11b, g, n/HT20 with 2.4G					
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
CH1	2412	CH5	2432	CH9	2452
CH2	2417	CH6	2437	CH10	2457
CH3	2422	CH7	2442	CH11	2462
CH4	2427	CH8	2447		
For IEEE 802.11 n/HT40 with 2.4G					
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
CH1	2422	CH5	2442		
CH2	2427	CH6	2447		
CH3	2432	CH7	2452		
CH4	2437				

Setting output power (Max)			
802.11b	**802.11g**	**802.11n(HT20)**	**802.11n(HT40)**
13±1dBm	15±1dBm	14±1dBm	19.5±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

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)	4.16dB(Polarize: H)
	4.13dB(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	2019.09.06	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	102137	2019.09.05	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2019.09.05	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-102082-Wa	2019.09.06	1Year
Receiver	R&S	ESCI	101165	2019.09.05	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2018.04.13	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2018.04.13	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2019.09.07	2Year
Cable	Resenberger	N/A	No.1	2019.09.05	1Year
Cable	Resenberger	N/A	No.2	2019.09.05	1Year
Cable	Resenberger	N/A	No.3	2019.09.05	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2019.09.05	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2019.09.05	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2019.09.05	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2019.09.05	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2019.08.26	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	00946	2019.09.07	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2019.09.06	1 Year
Power Meter	Agilent	E9300A	MY41496625	2019.09.06	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	100631	2019.09.06	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2019.09.05	1 Year

3. SPURIOUS EMISSION

3.1.Test Limits

Frequencies (MHz)	Field Strength (micorvolts/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

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.

NOTE:

a) The tighter limit applies at the band edges.
b) Emission Level(dB uV/m)=20log Emission Level(Uv/m)

3.2.Test Procedure

The measuring distance of 3m shall be used for measurements at frequency below 1GHz and above 1GHz, The EUT was placed on a rotating 80cm above the ground plane inside a semi-anechoic chamber for below 1GHz and 150cm above the ground plane inside a semi-anechoic chamber for above 1GHz, The table was rotated 360 degrees to determine the position of the highest radiation.

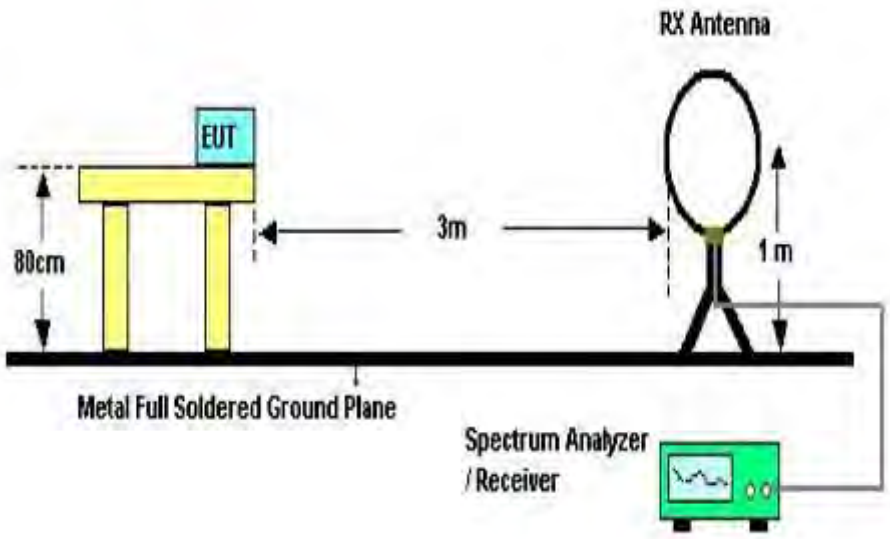
The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set of make measurement.

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

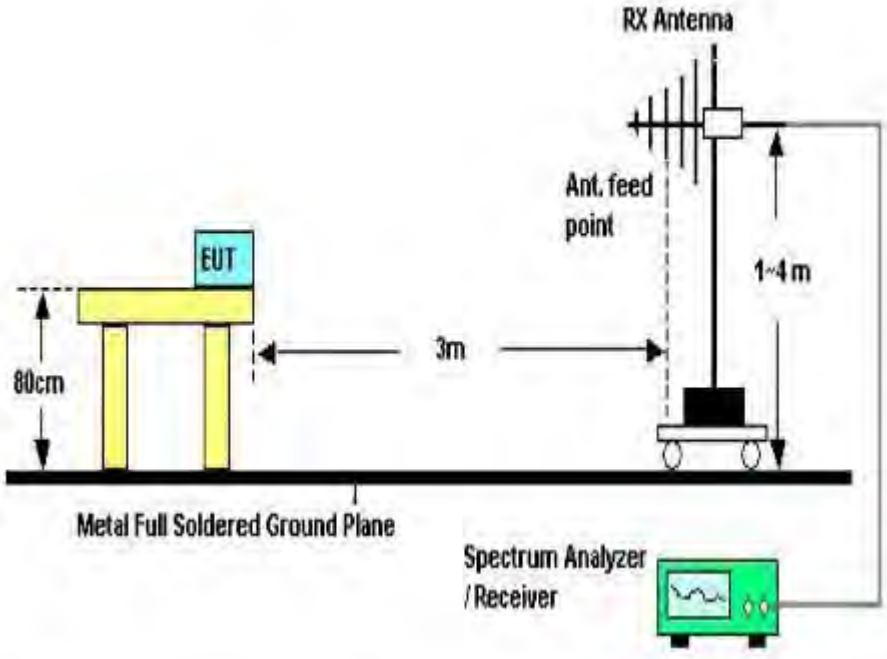
If Peak value comply with QP limit Below 1GHz.The EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.

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

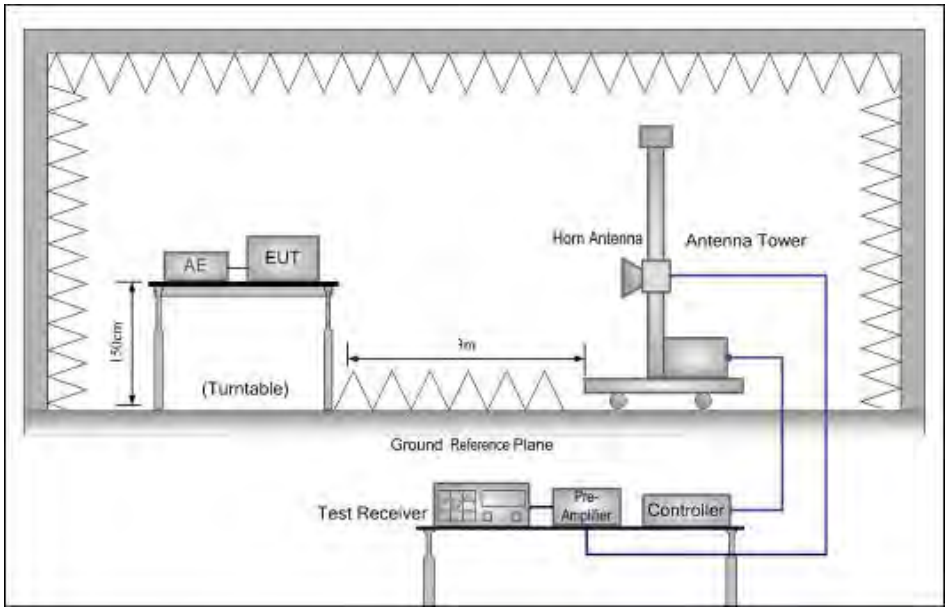
3.3.Test Setup



Below 30MHz Test Setup



Above 30MHz 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 10th harmonic from 9 kHz to the EUT.

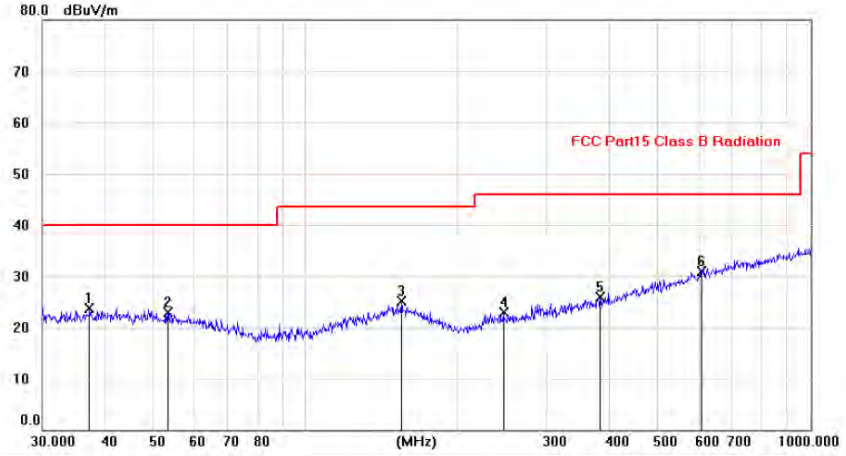
Detailed information please see the following page.

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.

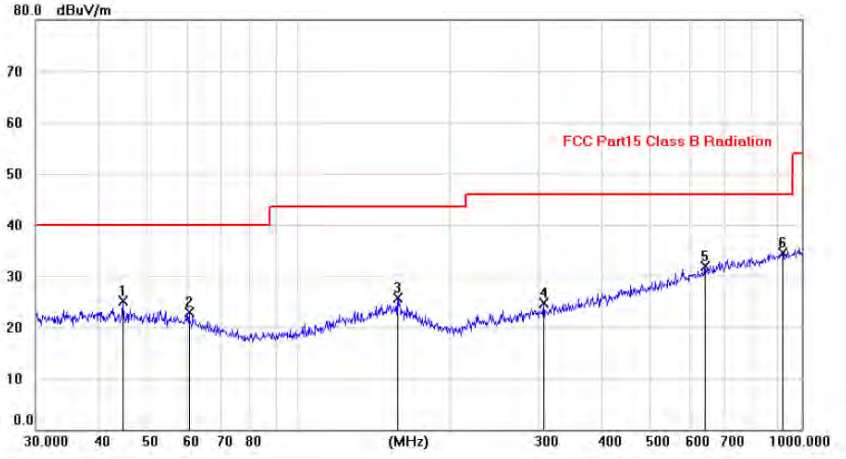
2.Only show the test data of the worst Channel in this report.

EUT Description	Wi-Fi Video Doorbell	Model No.	LY-136
Temperature	24℃	Humidity	56%
Pol	Vertical	Test date	2020/1/17
Test Voltage	DC 3.7V by battery	Test mode	802.11n(HT40) (2437MHz)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		cm	degree	
1		37.2724	9.64	14.10	23.74	40.00	-16.26	peak			
2		53.2245	9.22	13.72	22.94	40.00	-17.06	peak			
3		154.6577	10.15	15.05	25.20	43.50	-18.30	peak			
4		246.7284	10.15	12.70	22.85	46.00	-23.15	peak			
5		383.5281	9.83	15.98	25.81	46.00	-20.19	peak			
6	*	608.8533	10.62	20.38	31.00	46.00	-15.00	peak			

Pol	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		cm	degree	
1		44.7433	10.98	14.14	25.12	40.00	-14.88	peak			
2		60.6193	9.83	13.02	22.85	40.00	-17.15	peak			
3		157.5036	10.76	15.04	25.80	43.50	-17.70	peak			
4		306.9689	10.53	14.27	24.80	46.00	-21.20	peak			
5		643.9894	10.84	21.02	31.86	46.00	-14.14	peak			
6	*	917.3545	10.29	24.28	34.57	46.00	-11.43	peak			

From 1G-25GHz

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	46.17	V	33.95	10.18	34.26	56.04	74	17.96	PK
4824	34.08	V	33.95	10.18	34.26	43.95	54	10.05	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	46.65	H	33.95	10.18	34.26	56.52	74	17.48	PK
4824	35.83	H	33.95	10.18	34.26	45.70	54	8.30	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11b TX Mid									
4874	46.73	V	33.93	10.2	34.29	56.57	74	17.43	PK
4874	33.38	V	33.93	10.2	34.29	43.22	54	10.78	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	44.80	H	33.93	10.2	34.29	54.64	74	19.36	PK
4874	34.24	H	33.93	10.2	34.29	44.08	54	9.92	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11b TX High									
4924	45.77	V	33.98	10.22	34.25	55.72	74	18.28	PK
4924	34.92	V	33.98	10.22	34.25	44.87	54	9.13	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	45.79	H	33.98	10.22	34.25	55.74	74	18.26	PK
4924	36.27	H	33.98	10.22	34.25	46.22	54	7.78	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	47.00	V	33.95	10.18	34.26	56.87	74	17.13	PK
4824	37.02	V	33.95	10.18	34.26	46.89	54	7.11	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	49.72	H	33.95	10.18	34.26	59.59	74	14.41	PK
4824	39.43	H	33.95	10.18	34.26	49.30	54	4.70	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11g TX Mid									
4874	46.30	V	33.93	10.2	34.29	56.14	74	17.86	PK
4874	30.89	V	33.93	10.2	34.29	40.73	54	13.27	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	44.54	H	33.93	10.2	34.29	54.38	74	19.62	PK
4874	33.73	H	33.93	10.2	34.29	43.57	54	10.43	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode: IEEE 802.11g TX High									
4924	45.47	V	33.98	10.22	34.25	55.42	74	18.58	PK
4924	36.60	V	33.98	10.22	34.25	46.55	54	7.45	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	49.37	H	33.98	10.22	34.25	59.32	74	14.68	PK
4924	34.79	H	33.98	10.22	34.25	44.74	54	9.26	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	45.58	V	33.95	10.18	34.26	55.45	74	18.55	PK
4824	36.95	V	33.95	10.18	34.26	46.82	54	7.18	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
4824	46.99	H	33.95	10.18	34.26	56.86	74	17.14	PK
4824	38.71	H	33.95	10.18	34.26	48.58	54	5.42	AV
7236	/	/	/	/	/	/	/	/	/
9648	/	/	/	/	/	/	/	/	/
Test Mode:IEEE 802.11n HT20 TX Mid									
4874	45.31	V	33.93	10.2	34.29	55.15	74	18.85	PK
4874	31.36	V	33.93	10.2	34.29	41.20	54	12.80	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	47.86	H	33.93	10.2	34.29	57.70	74	16.30	PK
4874	32.92	H	33.93	10.2	34.29	42.76	54	11.24	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode:IEEE 802.11n HT20 TX High									
4924	44.76	V	33.98	10.22	34.25	54.71	74	19.29	PK
4924	37.32	V	33.98	10.22	34.25	47.27	54	6.73	AV
7386	/	/	/	/	/	/	/	/	/
9848	/	/	/	/	/	/	/	/	/
4924	48.03	H	33.98	10.22	34.25	57.98	74	16.02	PK
4924	35.90	H	33.98	10.22	34.25	45.85	54	8.15	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 HT40 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
4844	46.74	V	33.95	10.18	34.26	56.61	74	17.39	PK
4844	37.04	V	33.95	10.18	34.26	46.91	54	7.09	AV
7266	/	/	/	/	/	/	/	/	/
9688	/	/	/	/	/	/	/	/	/
4844	48.19	H	33.95	10.18	34.26	58.06	74	15.94	PK
4844	36.14	H	33.95	10.18	34.26	46.01	54	7.99	AV
7266	/	/	/	/	/	/	/	/	/
9688	/	/	/	/	/	/	/	/	/
Test Mode:IEEE 802.11n HT40 TX Mid									
4874	44.46	V	33.93	10.2	34.29	54.30	74	19.70	PK
4874	31.29	V	33.93	10.2	34.29	41.13	54	12.87	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
4874	46.83	H	33.93	10.2	34.29	56.67	74	17.33	PK
4874	34.64	H	33.93	10.2	34.29	44.48	54	9.52	AV
7311	/	/	/	/	/	/	/	/	/
9748	/	/	/	/	/	/	/	/	/
Test Mode:IEEE 802.11n HT40 TX High									
4904	47.10	V	33.98	10.22	34.25	57.05	74	16.95	PK
4904	37.27	V	33.98	10.22	34.25	47.22	54	6.78	AV
7356	/	/	/	/	/	/	/	/	/
9808	/	/	/	/	/	/	/	/	/
4904	49.28	H	33.98	10.22	34.25	59.23	74	14.77	PK
4904	35.87	H	33.98	10.22	34.25	45.82	54	8.18	AV
7356	/	/	/	/	/	/	/	/	/
9808	/	/	/	/	/	/	/	/	/

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

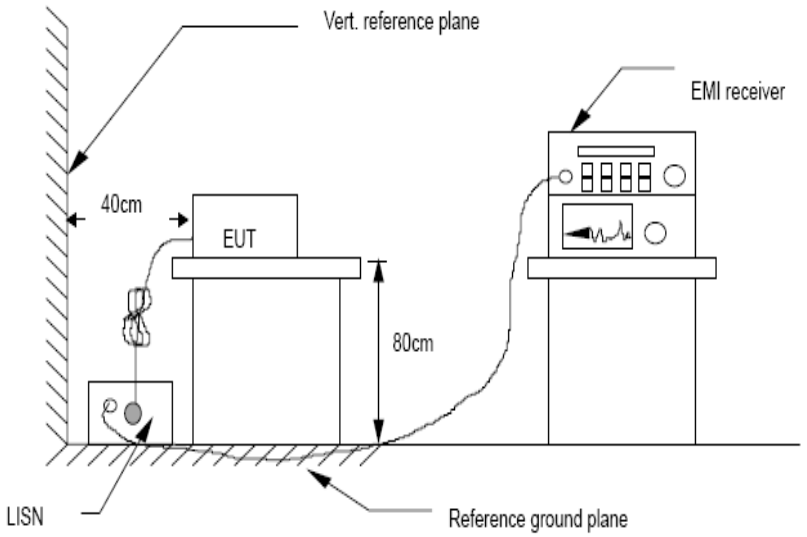
Frequency	Limits dB(μV)	
MHz	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

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 rang of 0.15 to 0.50 MHz.

4.2. Test Procedure

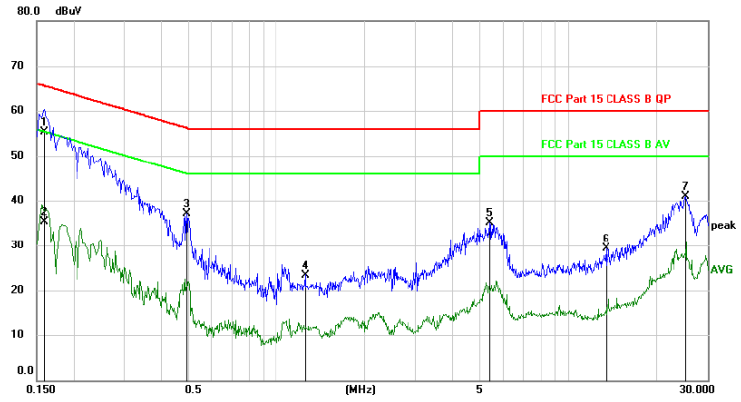
The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both 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



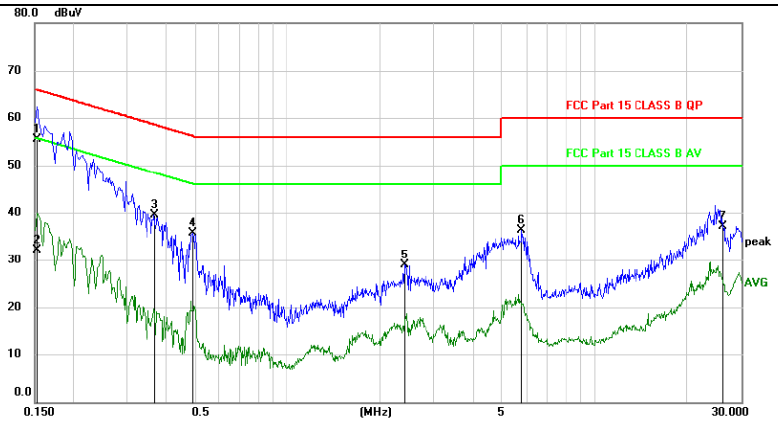
4.4.Test Results

EUT Description	Wi-Fi Video Doorbell	Model No.	LY-136
Temperature	24℃	Humidity	56%
Pol	Line	Test date	2020/01/16
Test Voltage	AC 120V/60Hz	Test mode	802.11n(HT40) (2437MHz)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1590	45.44	9.94	55.38	65.52	-10.14	QP	
2		0.1590	25.27	9.94	35.21	55.52	-20.31	AVG	
3		0.4890	27.19	9.96	37.15	56.18	-19.03	peak	
4		1.2540	13.51	9.89	23.40	56.00	-32.60	peak	
5		5.3670	25.00	10.05	35.05	60.00	-24.95	peak	
6		13.4190	19.06	10.29	29.35	60.00	-30.65	peak	
7		25.1910	30.36	10.45	40.81	60.00	-19.19	peak	

Pol	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1530	45.48	9.94	55.42	65.84	-10.42	QP	
2		0.1530	22.23	9.94	32.17	55.84	-23.67	AVG	
3		0.3690	29.50	9.95	39.45	58.52	-19.07	peak	
4		0.4890	25.82	9.96	35.78	56.18	-20.40	peak	
5		2.4090	19.04	9.90	28.94	56.00	-27.06	peak	
6		5.7960	26.27	10.07	36.34	60.00	-23.66	peak	
7		26.1840	26.71	10.49	37.20	60.00	-22.80	peak	

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

5. CONDUCTED MAXIMUM OUTPUT POWER

5.1.Test limits

Please refer section15.247.

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

5.2.Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

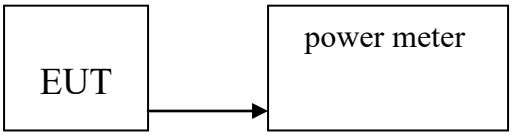
5.2.1 Place the EUT on the table and set it in transmitting mode.

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

5.2.3 Measure out each mode and each bands PK 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.

Mode	Frequency (MHz)	PK Output power(dBm)	Limit (dBm)	Result
IEEE 802.11 b	CH1: 2412	12.649	30	PASS
	CH6: 2437	13.213	30	PASS
	CH11: 2462	12.523	30	PASS
IEEE 802.11 g	CH1: 2412	15.406	30	PASS
	CH6: 2437	16.102	30	PASS
	CH11: 2462	15.646	30	PASS
IEEE 802.11 n/HT20	CH1: 2412	13.715	30	PASS
	CH6: 2437	14.845	30	PASS
	CH11: 2462	14.228	30	PASS
IEEE 802.11 n/HT40	CH3: 2422	14.015	30	PASS
	CH6: 2437	20.072	30	PASS
	CH9: 2452	19.255	30	PASS

6. POWER SPECTRAL DENSITY

6.1.Test limits

6.1.1 Please refer section15.247.

6.1.2 For direct sequence systems, the Average 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.

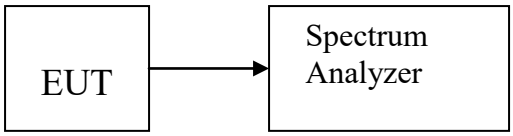
6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3 Detector = RMS. Set the spectrum analyzer as RBW = 3kHz(Set the RBW to: 3 kHz≤RBW ≤100 kHz.), VBW = 10kHz(Set the VBW≥3×RBW), span=1.5×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.

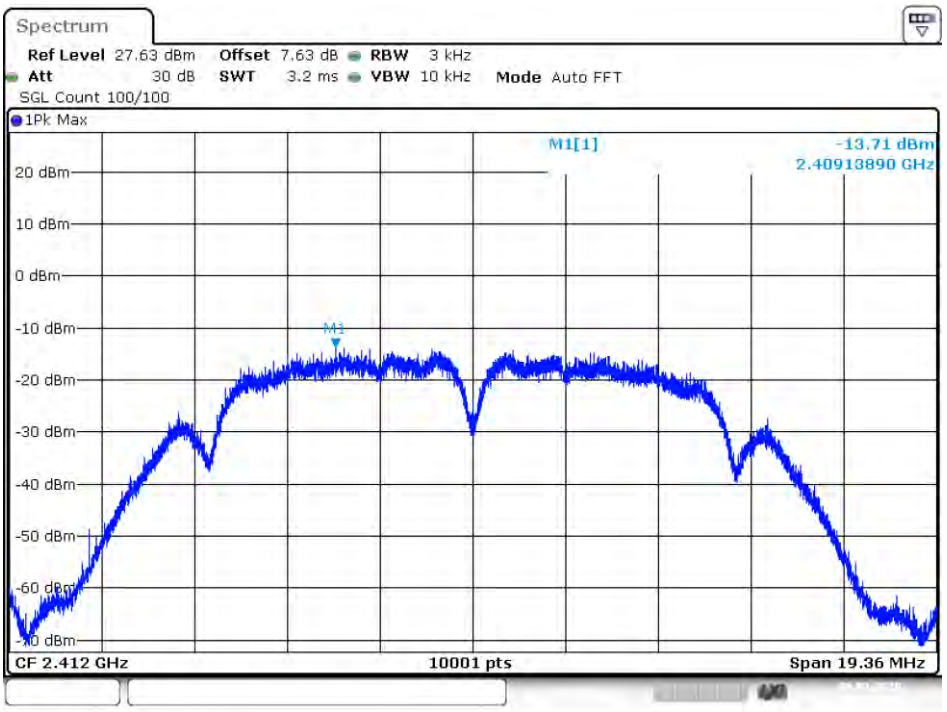
6.3.Test Setup



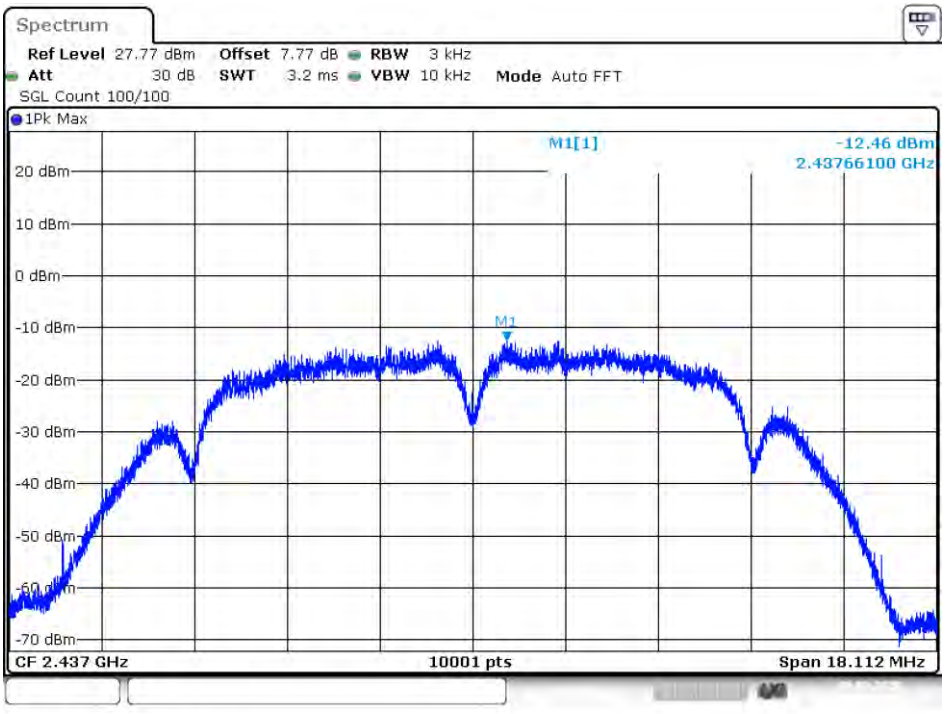
6.4.Test Results

Condition	Mode	Frequency (MHz)	Max PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	802.11b	2412	-13.714	8	Pass
NVNT	802.11b	2437	-12.462	8	Pass
NVNT	802.11b	2462	-13.207	8	Pass
NVNT	802.11g	2412	-15.953	8	Pass
NVNT	802.11g	2437	-13.799	8	Pass
NVNT	802.11g	2462	-14.848	8	Pass
NVNT	802.11n(HT20)	2412	-17.341	8	Pass
NVNT	802.11n(HT20)	2437	-15.612	8	Pass
NVNT	802.11n(HT20)	2462	-15.897	8	Pass
NVNT	802.11n(HT40)	2422	-20.409	8	Pass
NVNT	802.11n(HT40)	2437	-13.125	8	Pass
NVNT	802.11n(HT40)	2452	-14.813	8	Pass

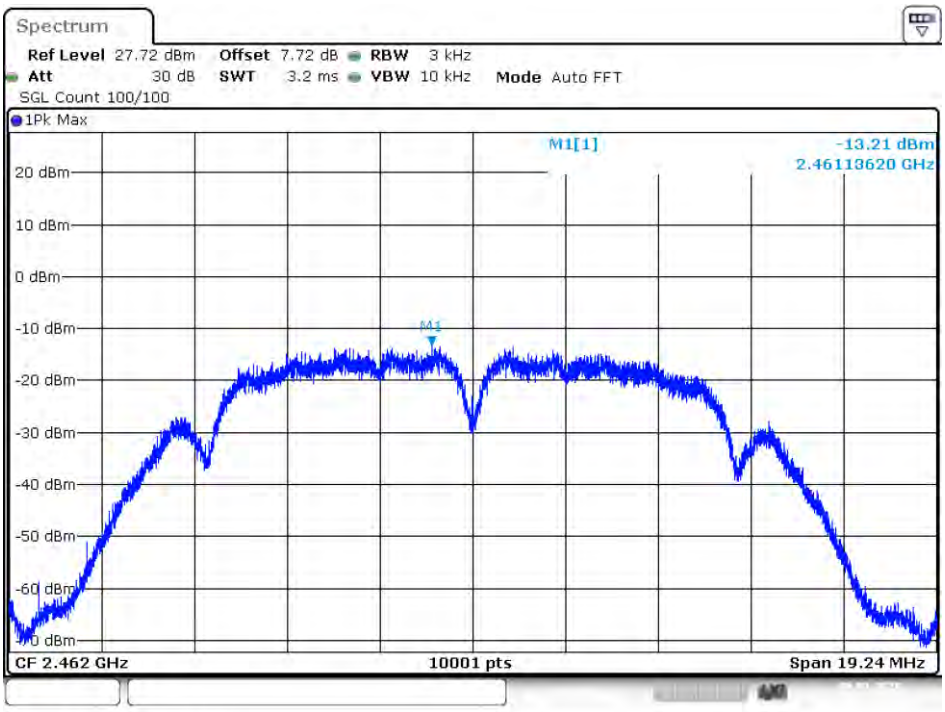
PSD NVNT 802.11b 2412MHz Ant1



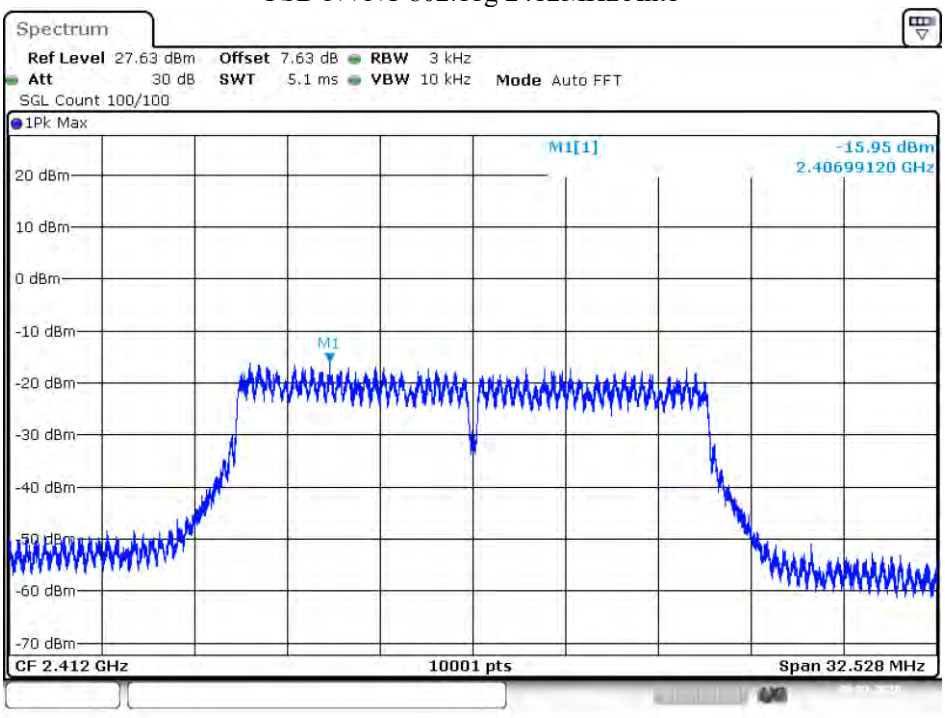
PSD NVNT 802.11b 2437MHz Ant1



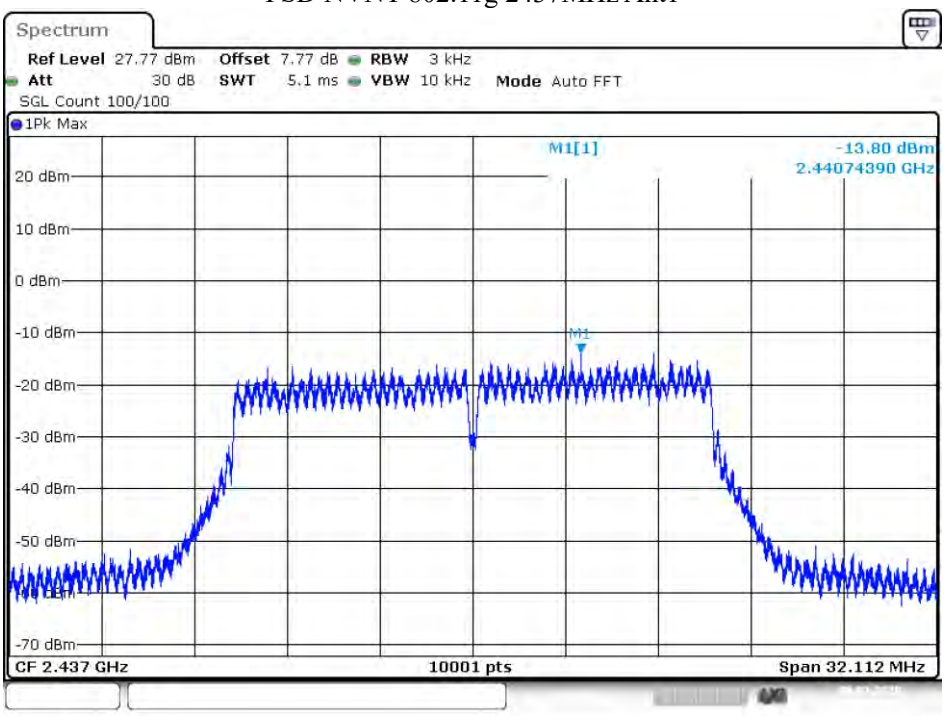
PSD NVNT 802.11b 2462MHz Ant1



PSD NVNT 802.11g 2412MHz Ant1

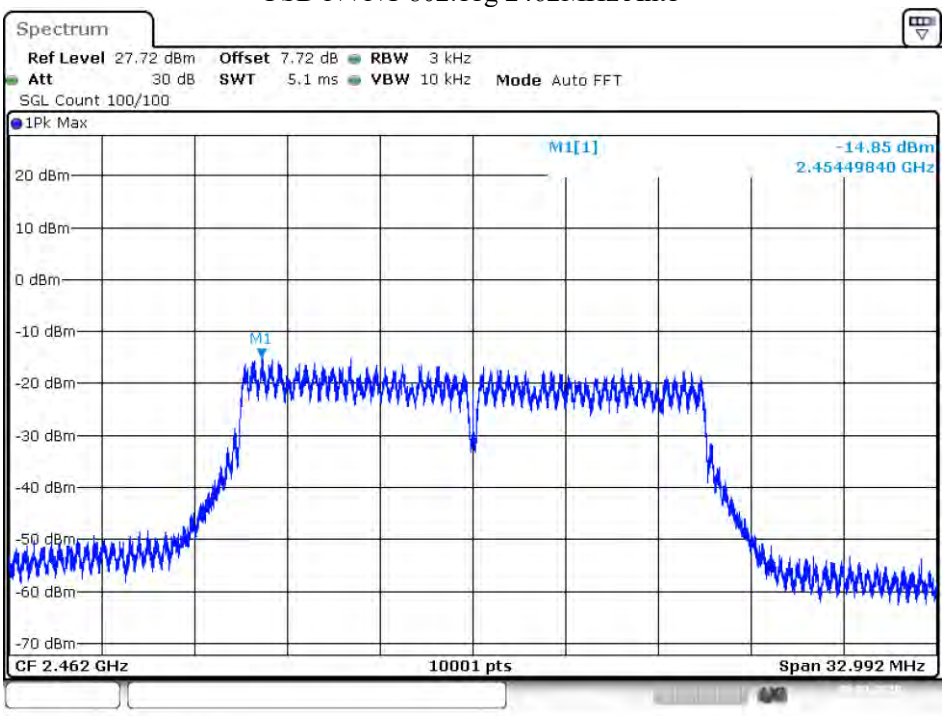


PSD NVNT 802.11g 2437MHz Ant1



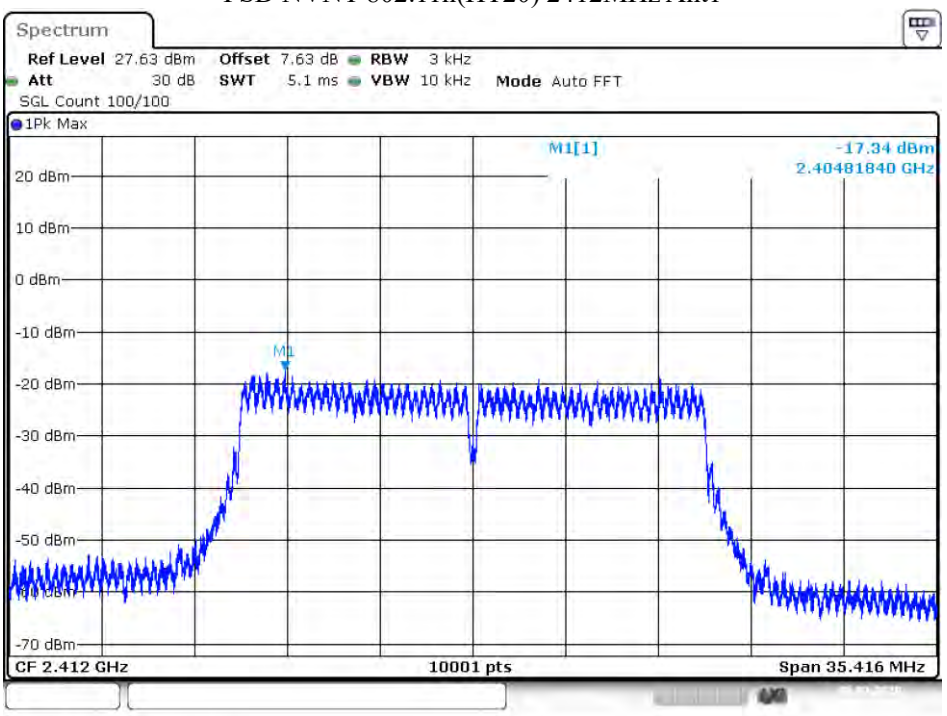
Date: 6.MAR.2020 10:02:32

PSD NVNT 802.11g 2462MHz Ant1

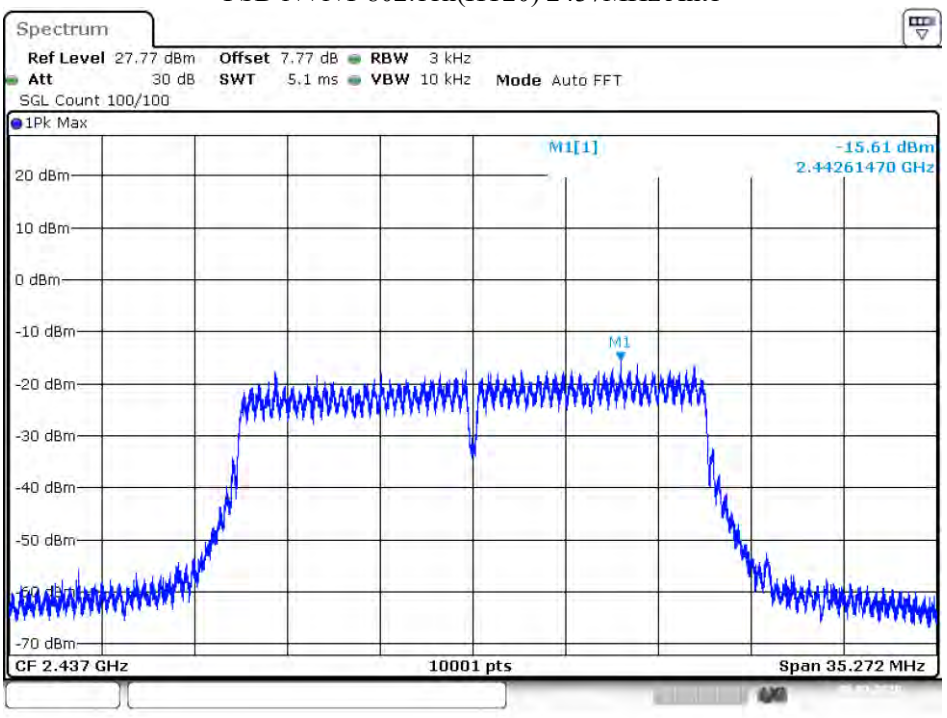


Date: 6.MAR.2020 10:04:20

PSD NVNT 802.11n(HT20) 2412MHz Ant1



PSD NVNT 802.11n(HT20) 2437MHz Ant1



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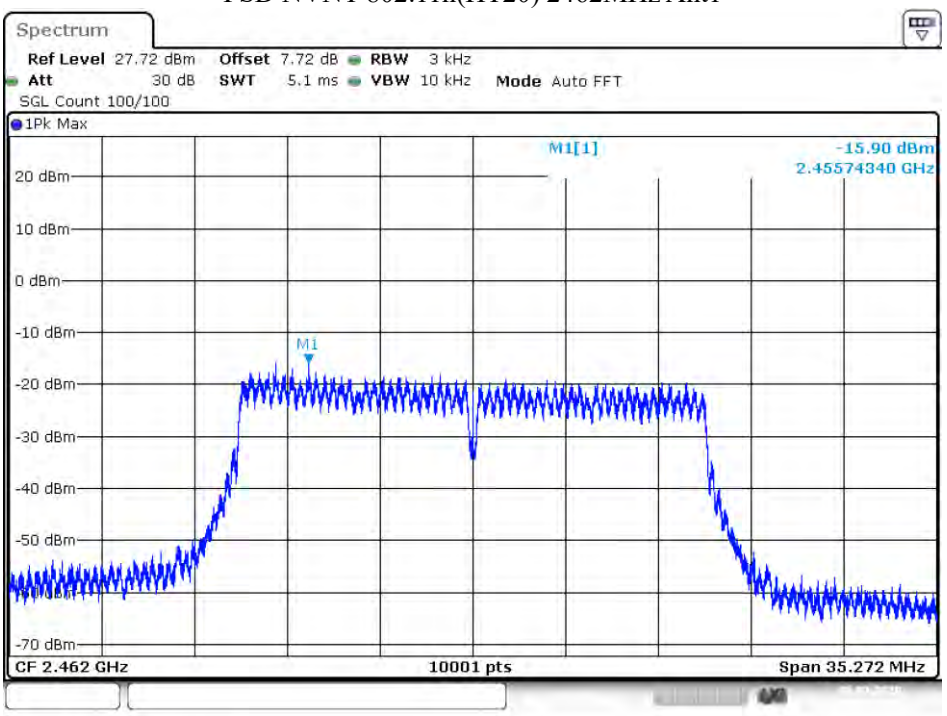
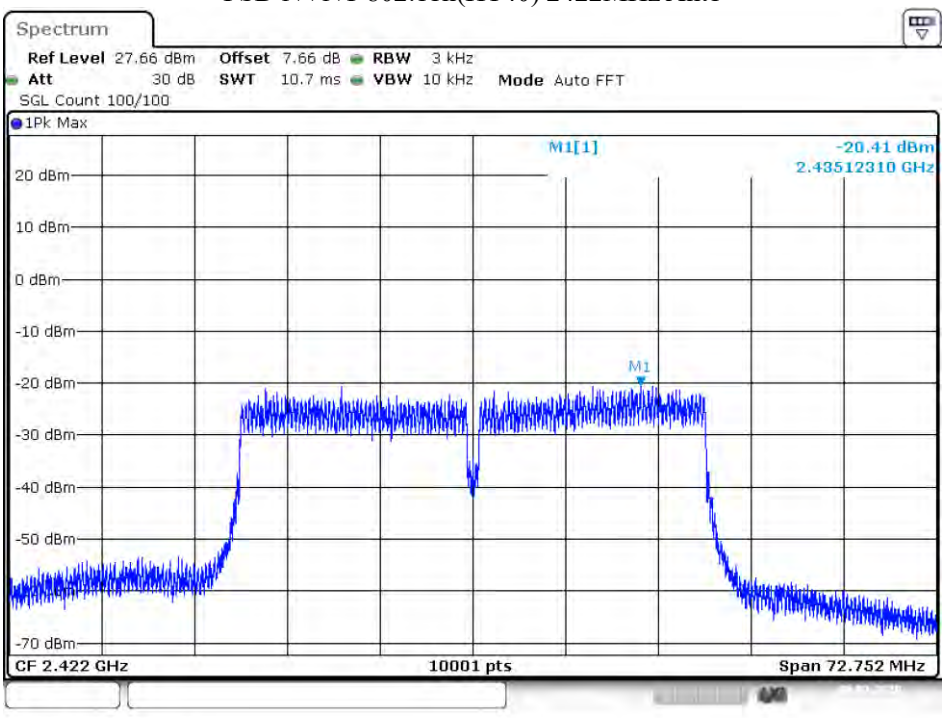
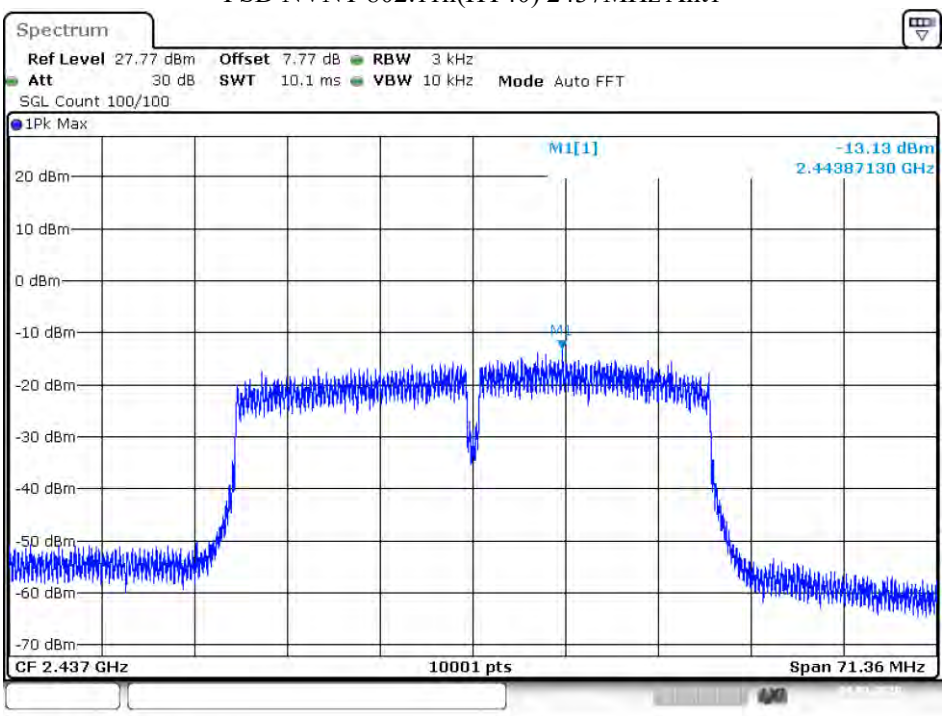


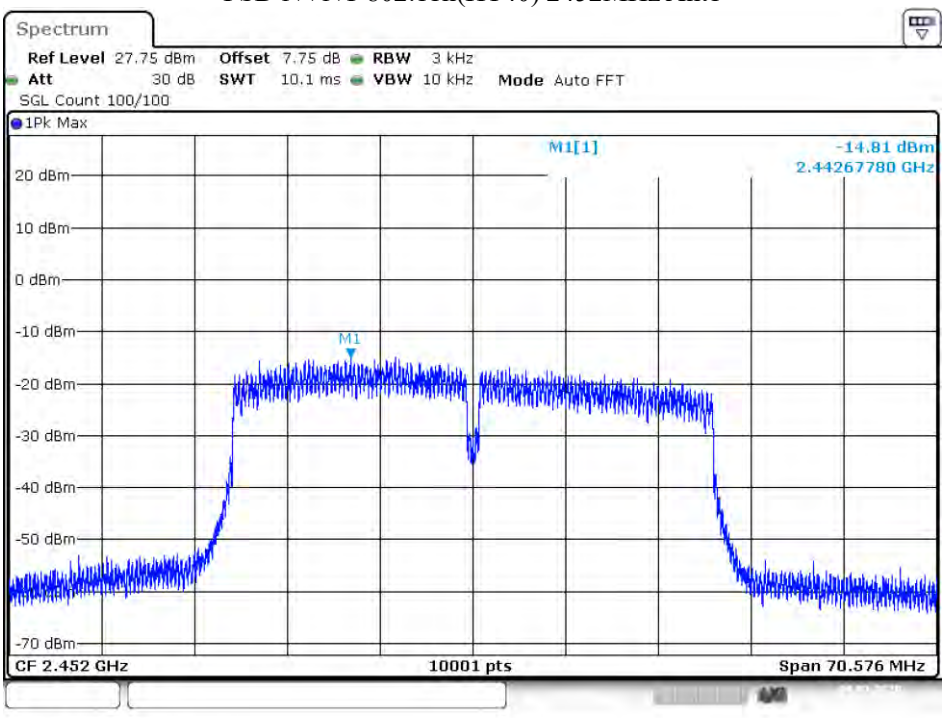
PSD NVNT 802.11n(HT40) 2422MHz Ant1



PSD NVNT 802.11n(HT40) 2437MHz Ant1



PSD NVNT 802.11n(HT40) 2452MHz Ant1



7. BANDWIDTH

7.1.Test limits

Please refer section15.247
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

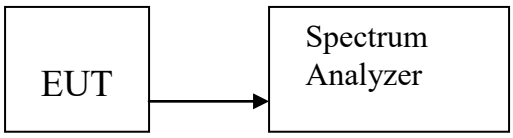
7.2.Test Procedure

Details see the KDB558074 D01 Meas Guidance v05r02

a) The bandwidth is measured at an amplitude level reduced 20dB 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≥3*RBW =300kHz, Peak Detector, Sweep time set auto, detail see the test plot.

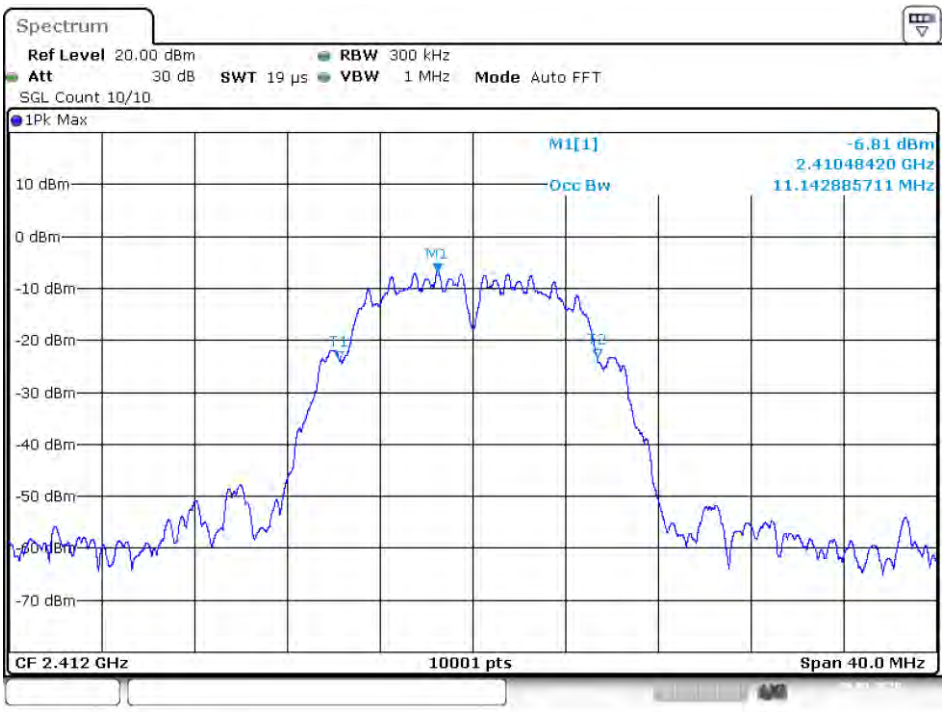
7.3.Test Setup



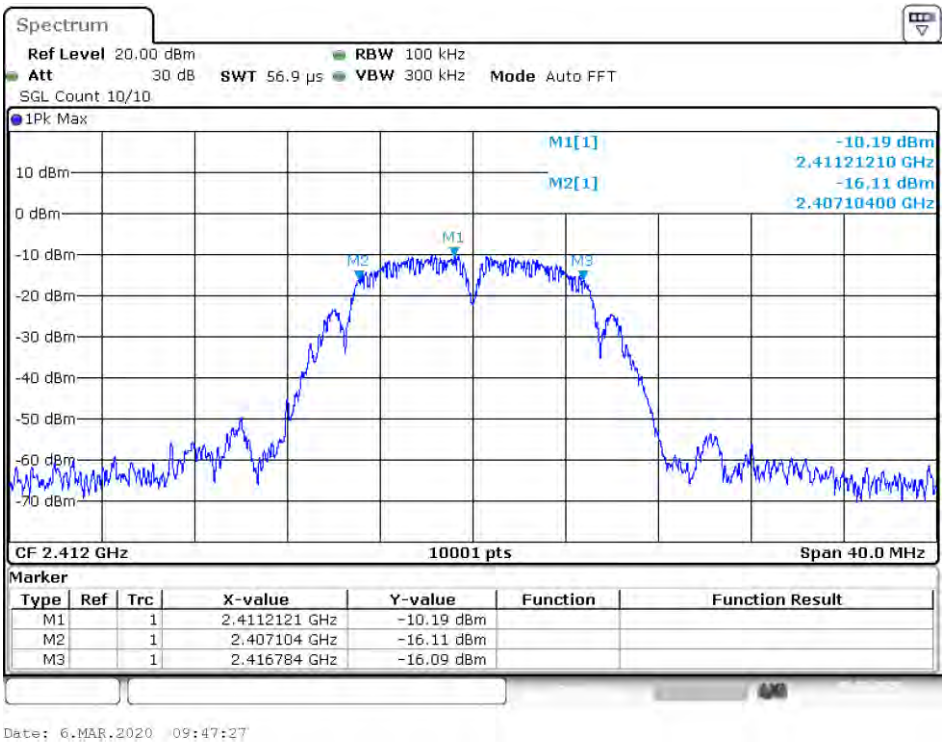
7.4.Test Results

Condition	Mode	Frequency (MHz)	99% OBW (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	802.11b	2412	11.1429	9.68	0.5	Pass
NVNT	802.11b	2437	11.1069	9.056	0.5	Pass
NVNT	802.11b	2462	11.2389	9.62	0.5	Pass
NVNT	802.11g	2412	16.6503	16.264	0.5	Pass
NVNT	802.11g	2437	16.6863	16.056	0.5	Pass
NVNT	802.11g	2462	16.5543	16.496	0.5	Pass
NVNT	802.11n(HT20)	2412	17.6342	17.708	0.5	Pass
NVNT	802.11n(HT20)	2437	17.6542	17.636	0.5	Pass
NVNT	802.11n(HT20)	2462	17.7582	17.636	0.5	Pass
NVNT	802.11n(HT40)	2422	36.1964	36.376	0.5	Pass
NVNT	802.11n(HT40)	2437	35.7804	35.68	0.5	Pass
NVNT	802.11n(HT40)	2452	35.7244	35.288	0.5	Pass

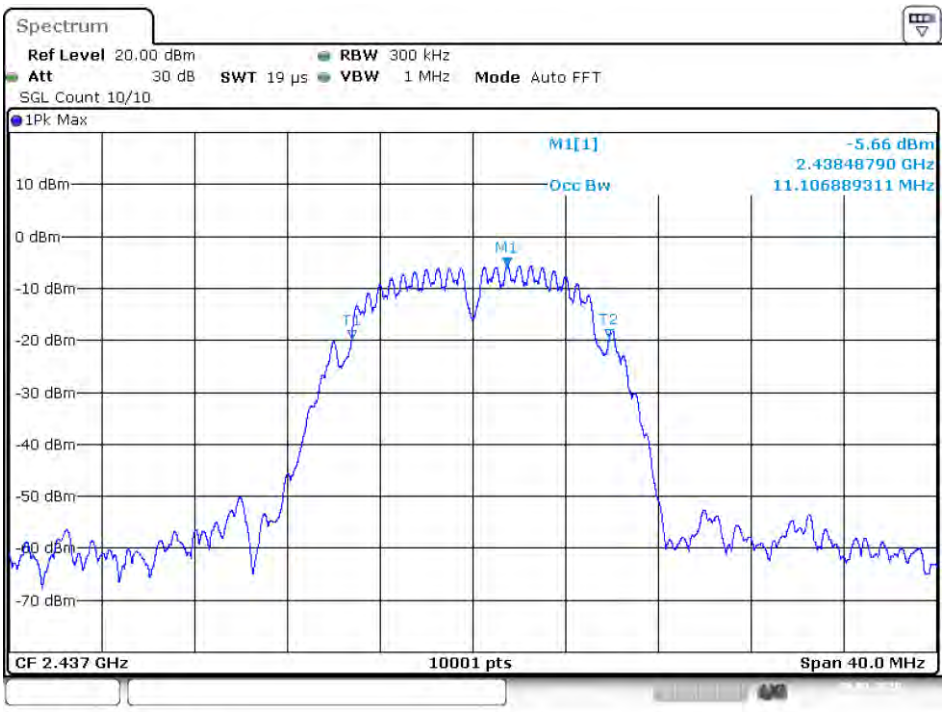
OBW NVNT 802.11b 2412MHz Ant1



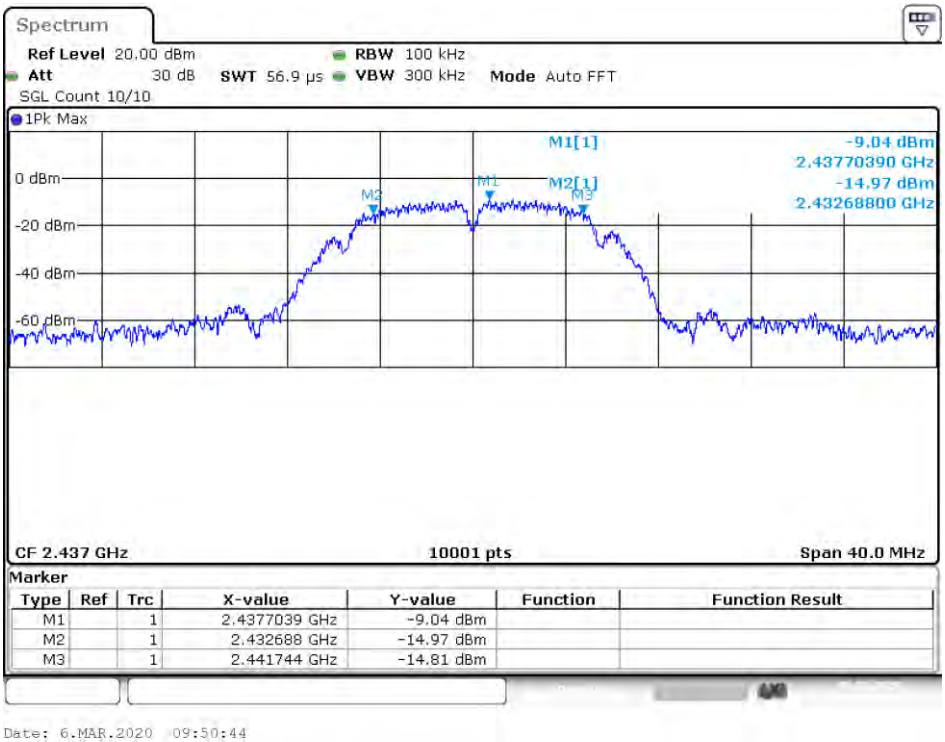
-6 dB BW NVNT 802.11b 2412MHz Ant1



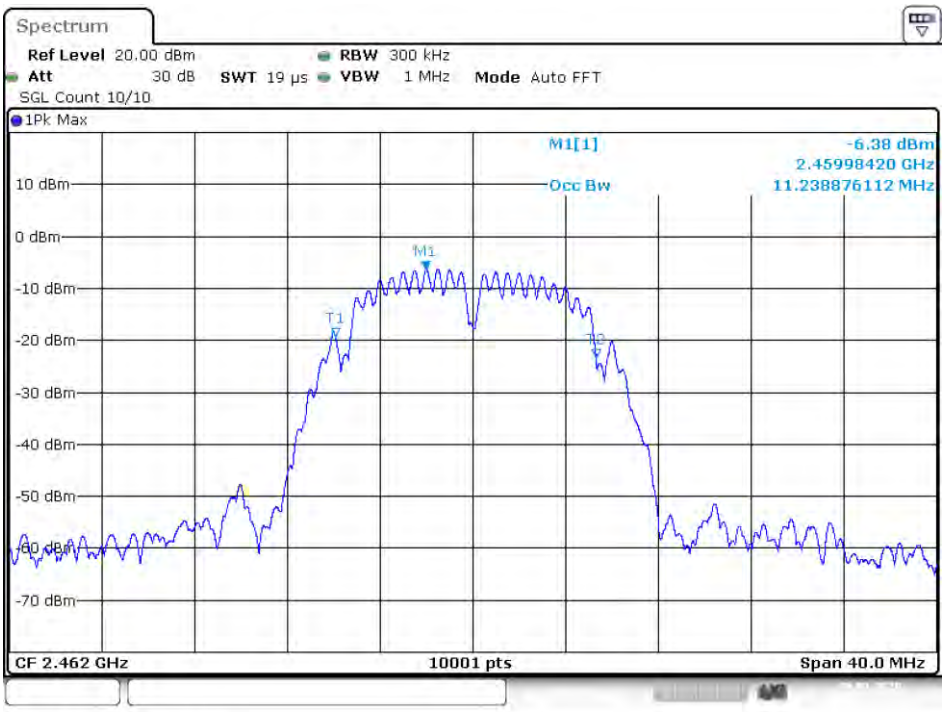
OBW NVNT 802.11b 2437MHz Ant1



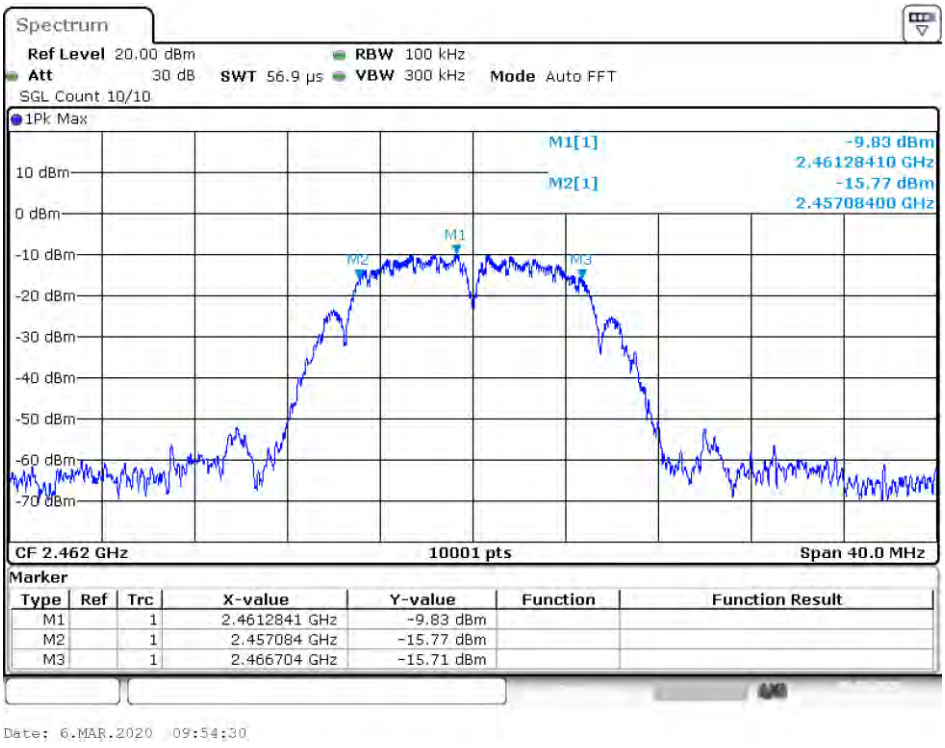
-6 dB BW NVNT 802.11b 2437MHz Ant1



OBW NVNT 802.11b 2462MHz Ant1

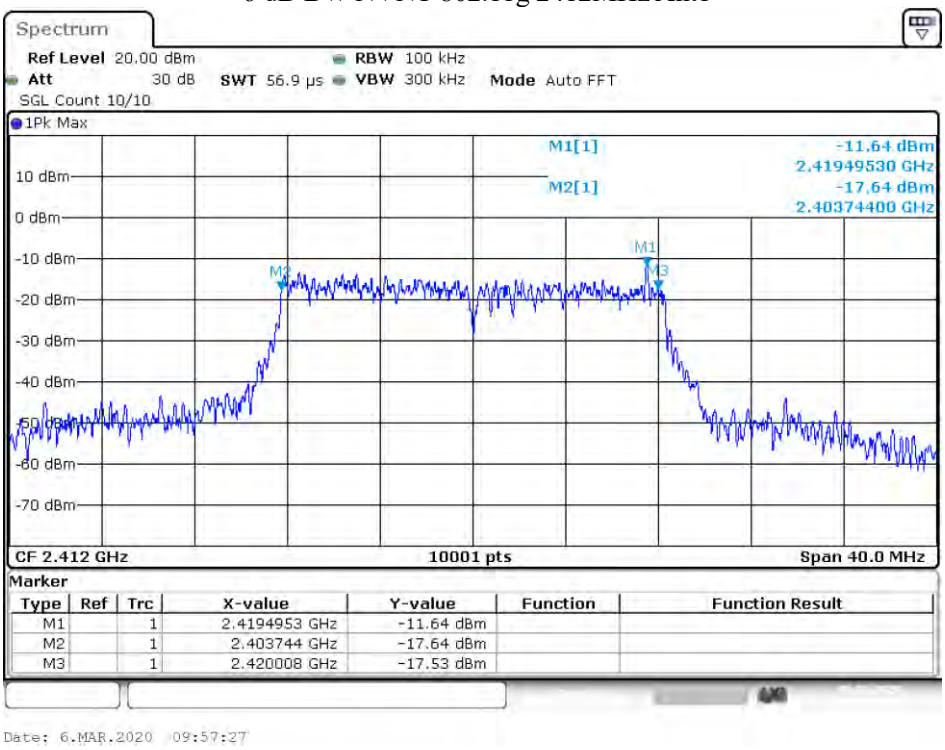


-6 dB BW NVNT 802.11b 2462MHz Ant1



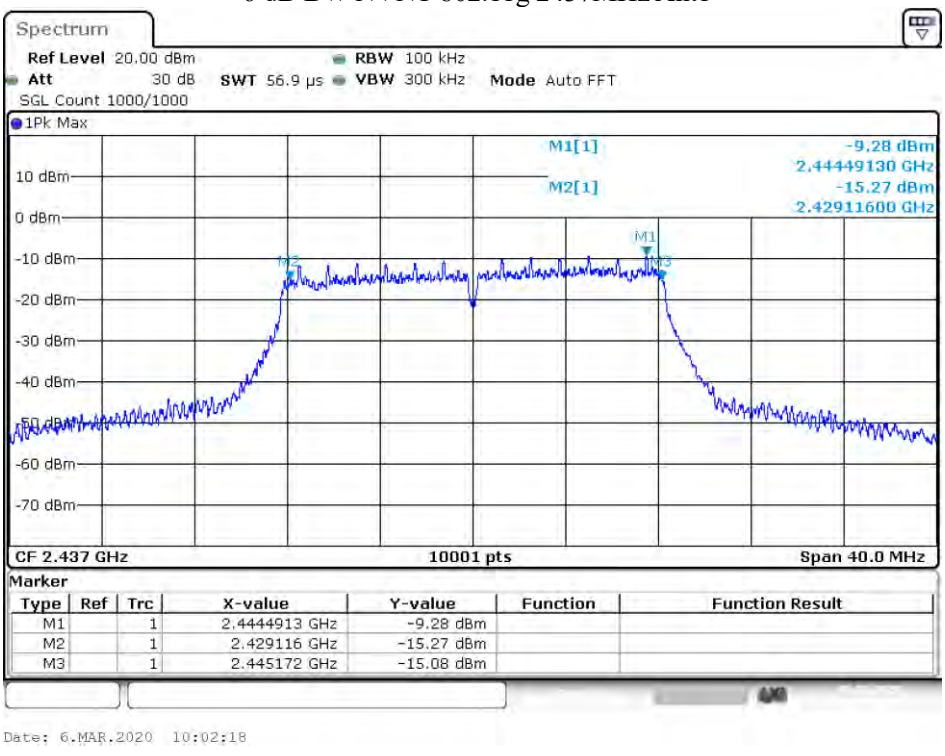
OBW NVNT 802.11g 2412MHz Ant1

-6 dB BW NVNT 802.11g 2412MHz Ant1



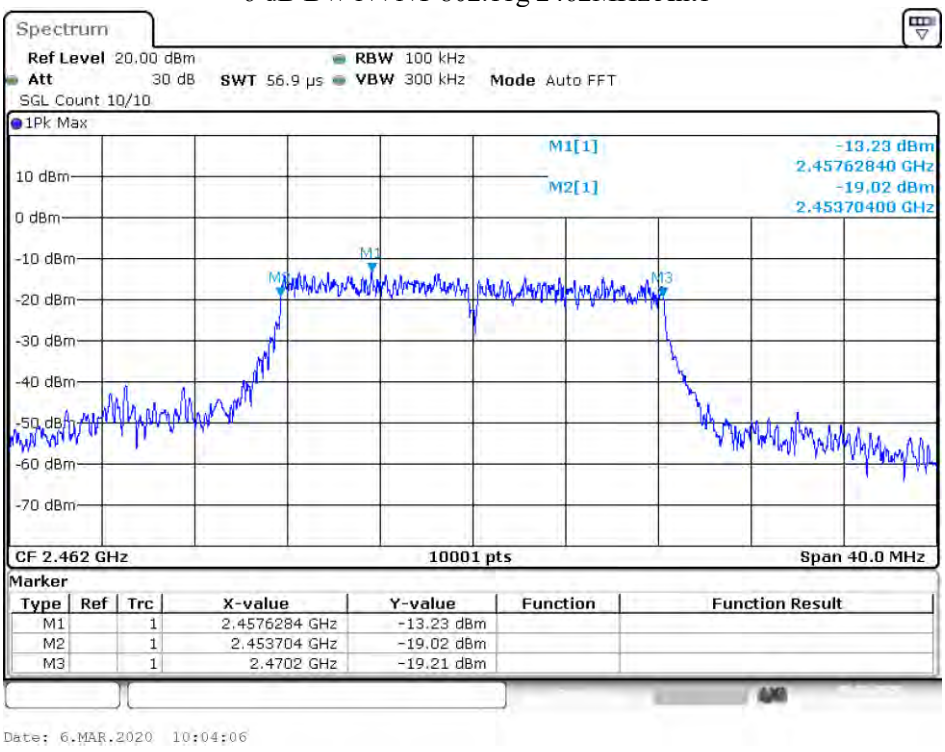
OBW NVNT 802.11g 2437MHz Ant1

-6 dB BW NVNT 802.11g 2437MHz Ant1

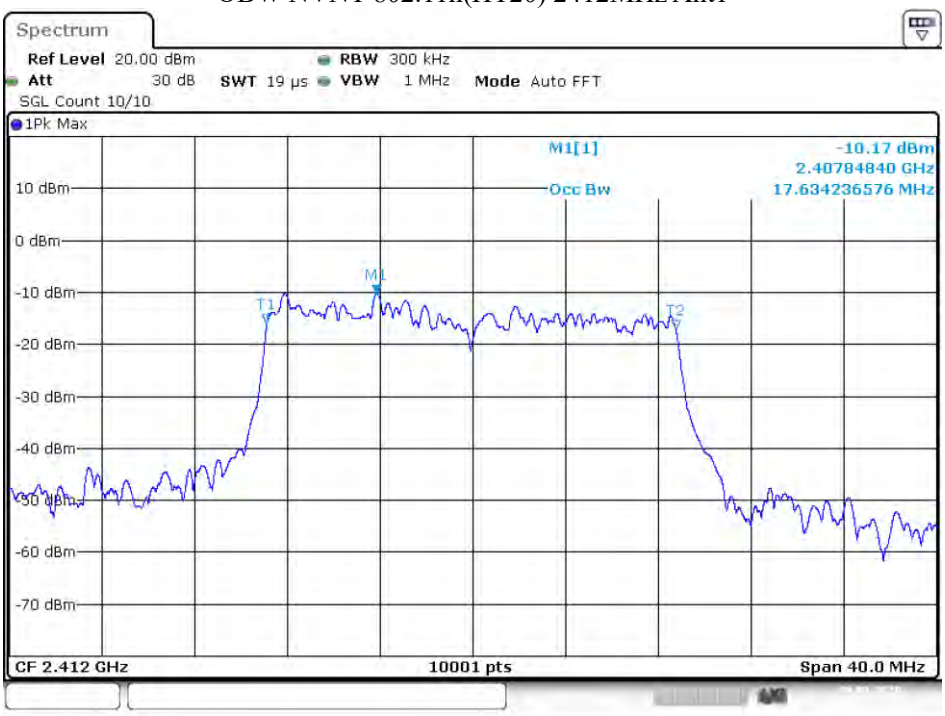


OBW NVNT 802.11g 2462MHz Ant1

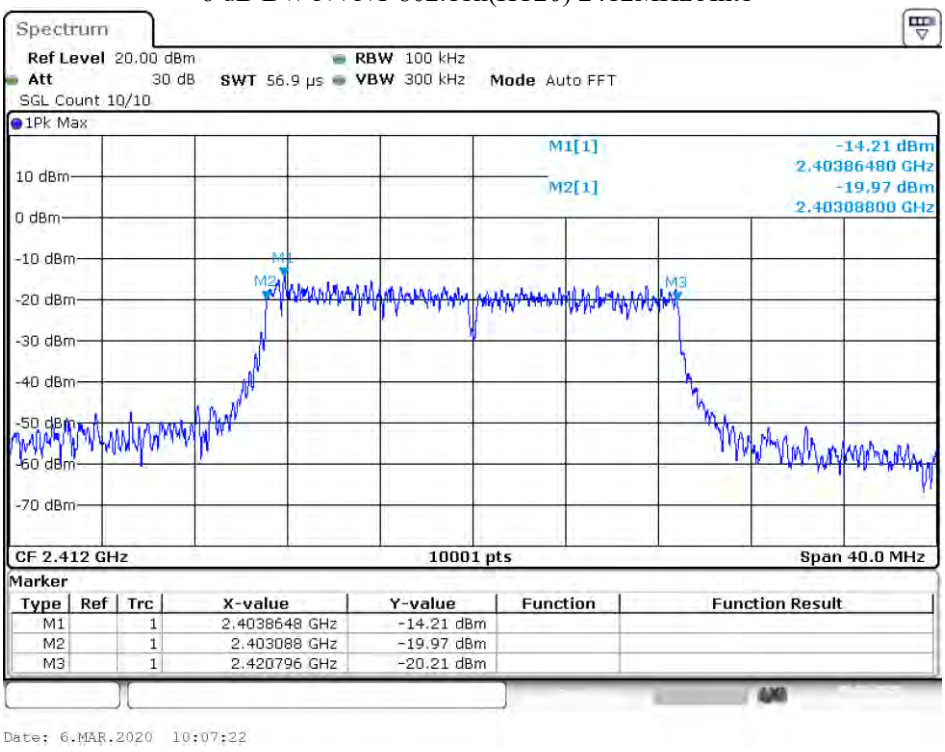
-6 dB BW NVNT 802.11g 2462MHz Ant1



OBW NVNT 802.11n(HT20) 2412MHz Ant1

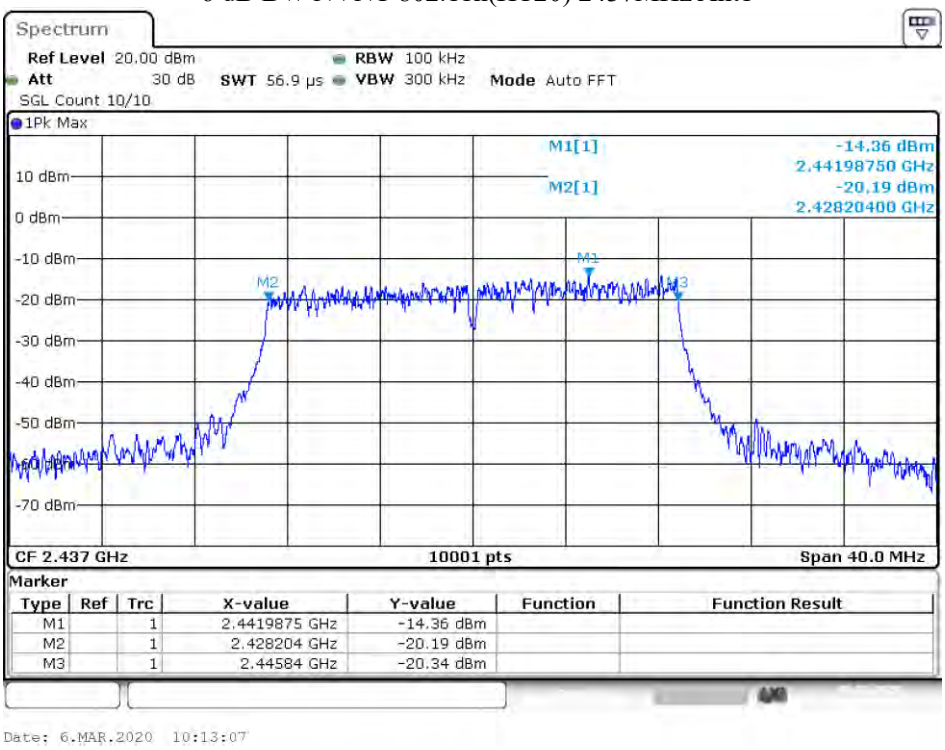


-6 dB BW NVNT 802.11n(HT20) 2412MHz Ant1

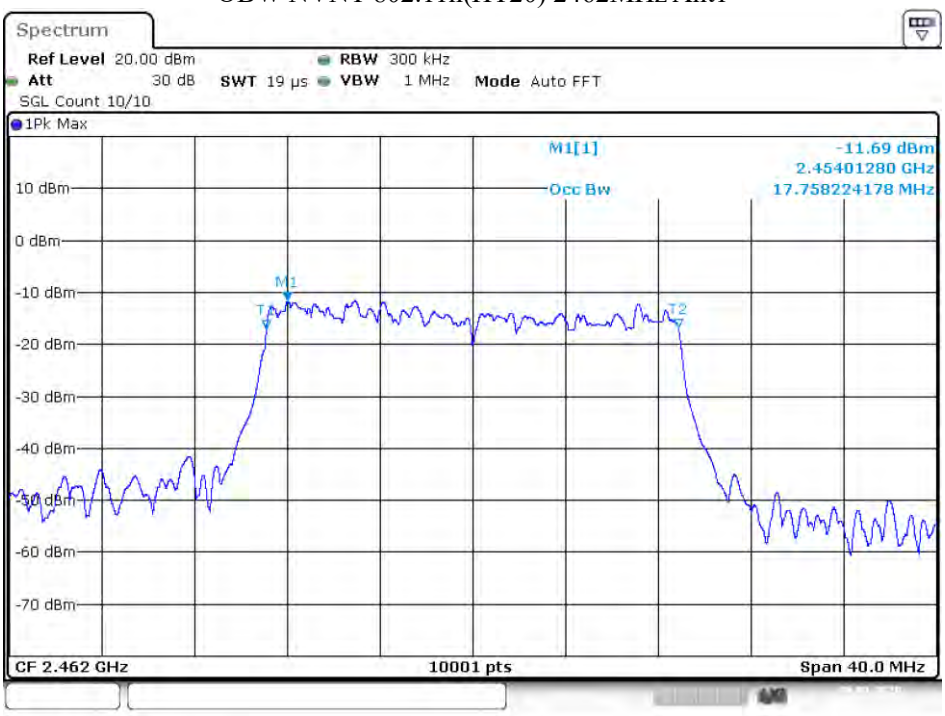


OBW NVNT 802.11n(HT20) 2437MHz Ant1

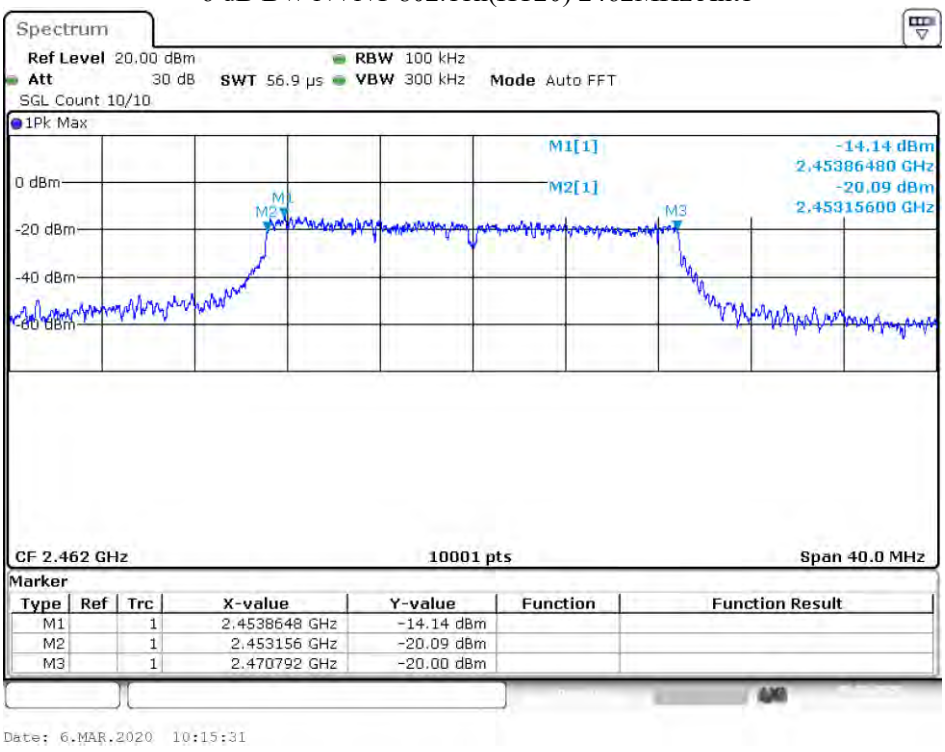
-6 dB BW NVNT 802.11n(HT20) 2437MHz Ant1



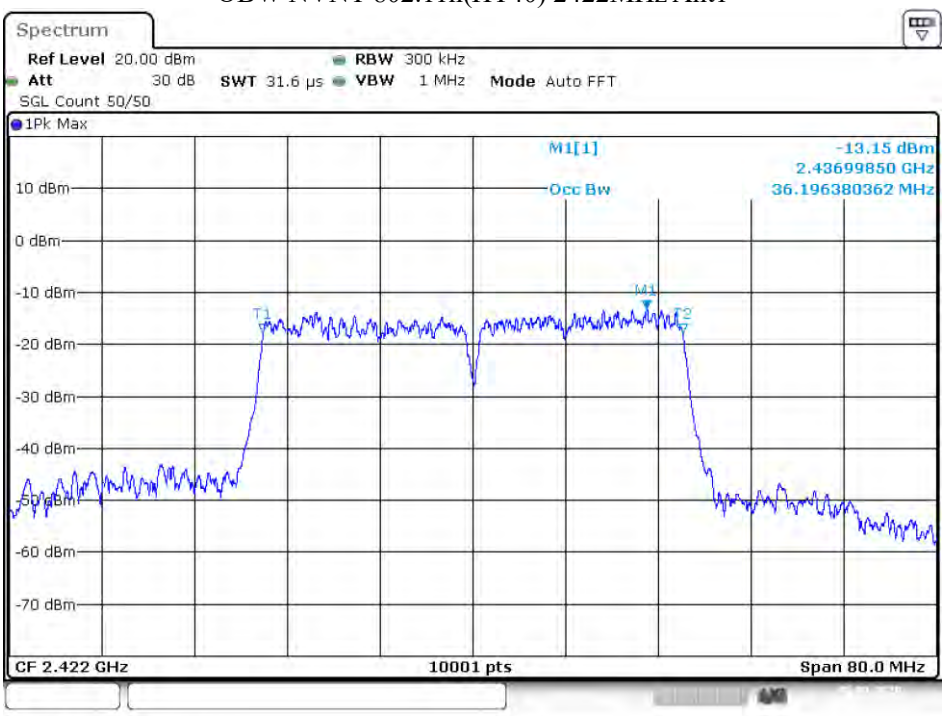
OBW NVNT 802.11n(HT20) 2462MHz Ant1



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



OBW NVNT 802.11n(HT40) 2422MHz Ant1



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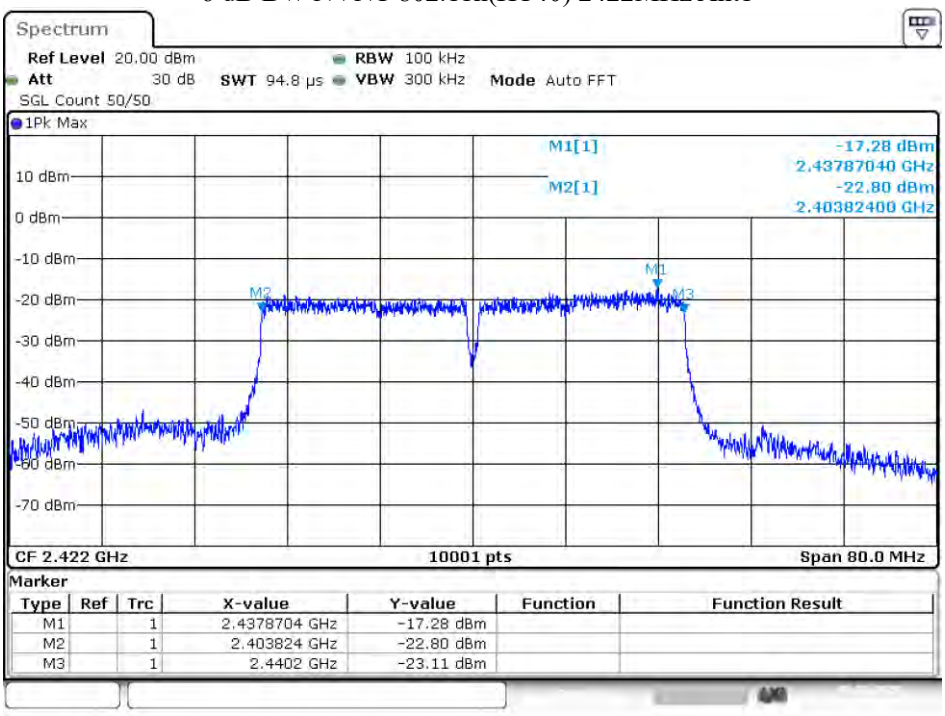
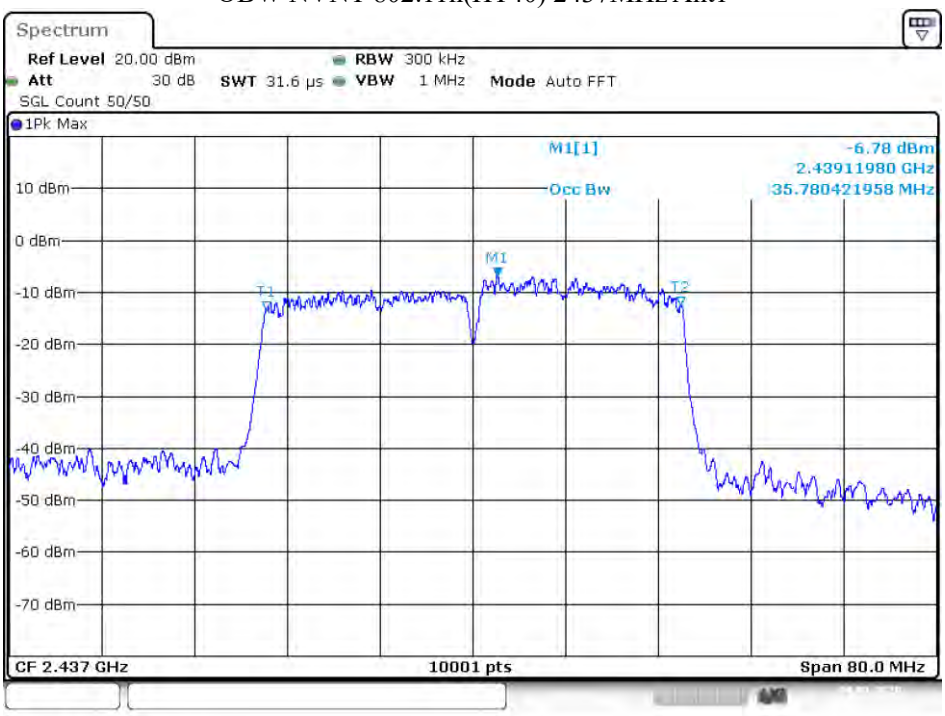
-6 dB BW NVNT 802.11n(HT40) 2422MHz Ant1



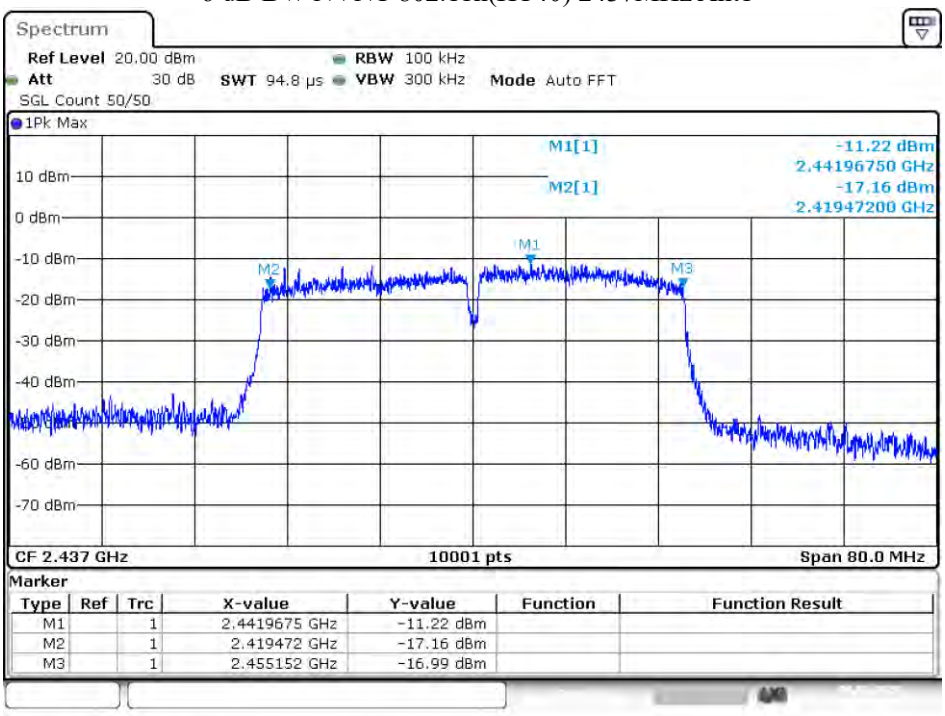
Date: 6.MAR.2020 10:32:24

OBW NVNT 802.11n(HT40) 2437MHz Ant1



Date: 9.MAR.2020 02:52:18

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

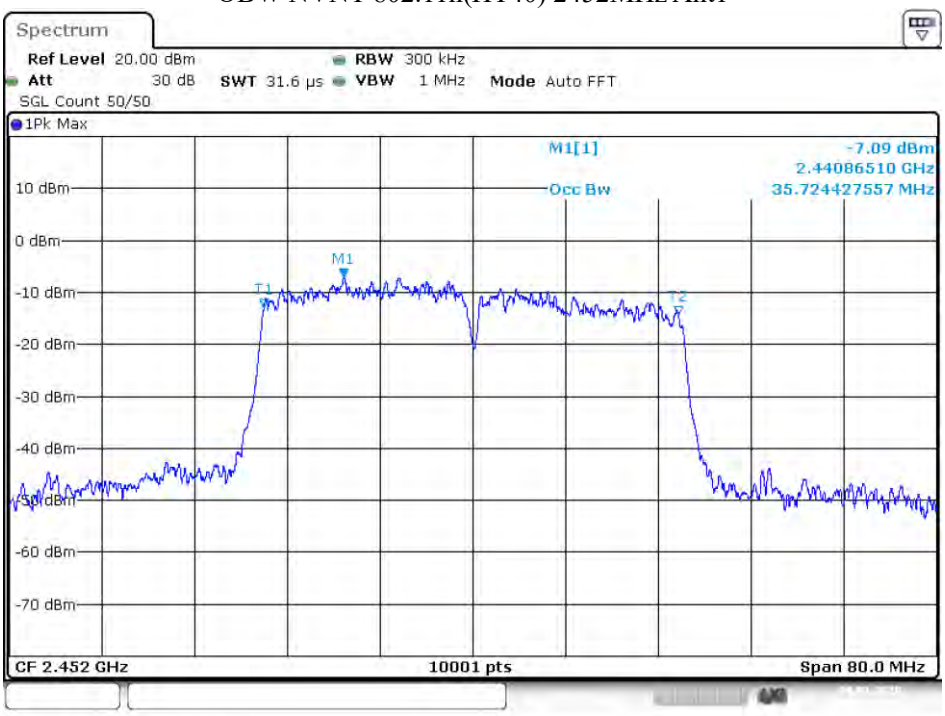


Marker

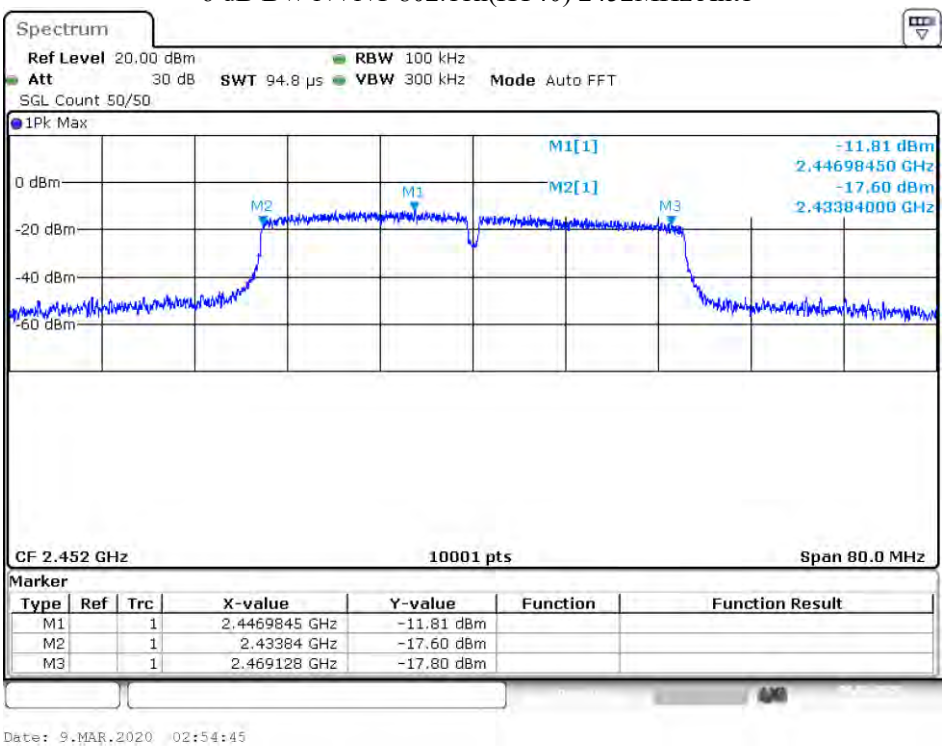
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4419675 GHz	-11.22 dBm		
M2		1	2.419472 GHz	-17.16 dBm		
M3		1	2.455152 GHz	-16.99 dBm		

Date: 9.MAR.2020 02:52:22

OBW NVNT 802.11n(HT40) 2452MHz Ant1



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



8. BAND EDGE CHECK

8.1.Test limits

Please refer section15.247

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 and 5725MHz to 5850MHz 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 5.2.2.

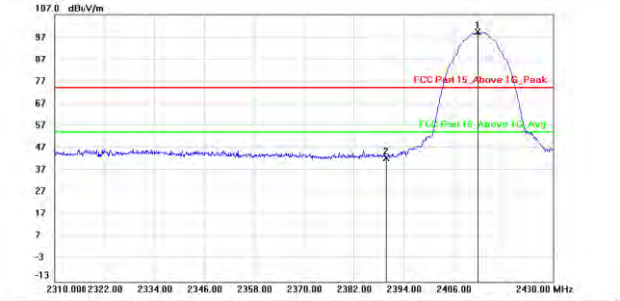
8.4.Test Results

PASS.

Detailed information please see the following page.

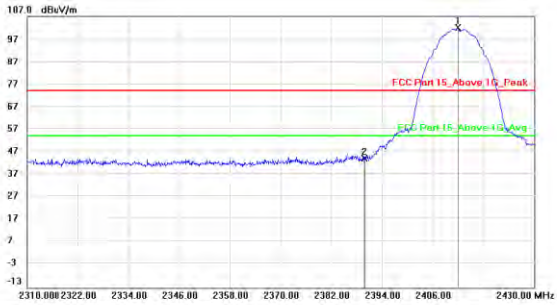
Test Mode: IEEE 802.11b-Low

Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree Comment
1	*	2411.880	102.89	-3.40	99.49	74.00	25.49	peak		
2		2390.000	46.20	-3.40	42.80	74.00	-31.20	peak		

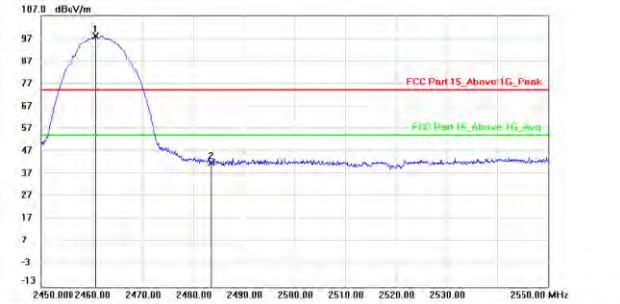
Polarization: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree Comment
1	*	2412.000	105.32	-3.40	101.92	74.00	27.92	peak		
2		2390.000	47.49	-3.40	44.09	74.00	-29.91	peak		

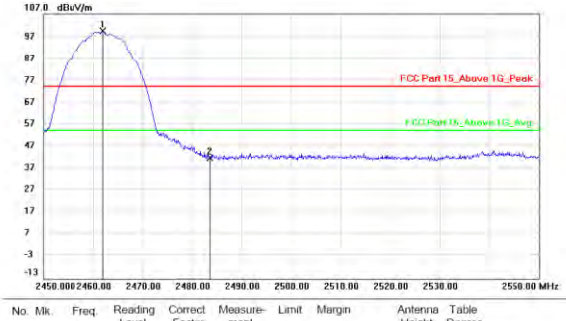
Test Mode: IEEE 802.11b-High

Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree Comment
1	*	2460.700	101.66	-3.39	98.27	74.00	24.27	peak		
2		2483.500	45.43	-3.38	42.05	74.00	-31.95	peak		

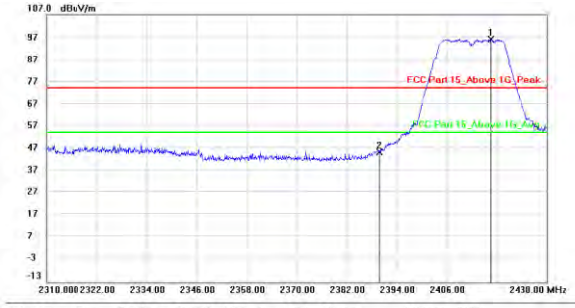
Polarization: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree Comment
1	*	2461.900	102.73	-3.39	99.34	74.00	25.34	peak		
2		2483.500	45.19	-3.38	41.81	74.00	-32.19	peak		

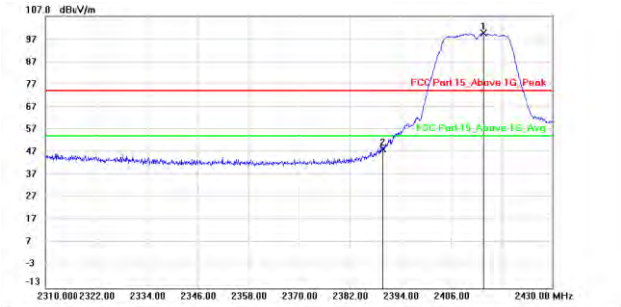
Test Mode: IEEE 802.11g-Low

Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2416.560	99.38	-3.41	95.97	74.00	21.97	peak			
2		2390.000	48.85	-3.40	45.45	74.00	-28.55	peak			

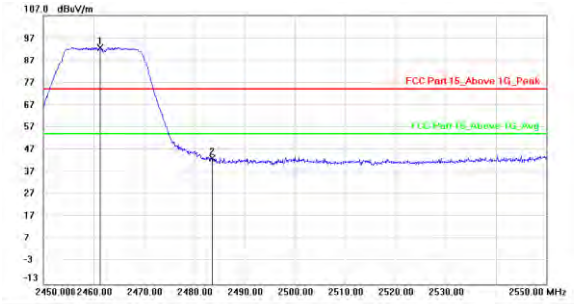
Polarization: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2413.680	102.96	-3.41	99.55	74.00	25.55	peak			
2		2390.000	51.82	-3.40	48.42	74.00	-25.58	peak			

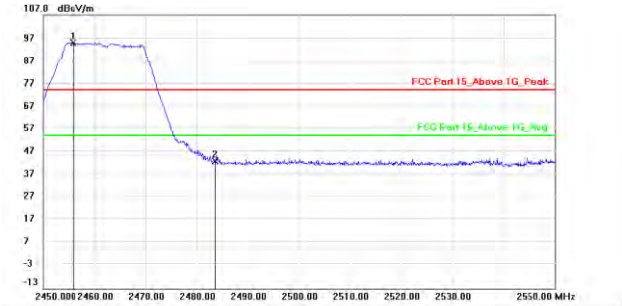
Test Mode: IEEE 802.11g-High

Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2461.200	96.17	-3.39	92.78	74.00	18.78	peak			
2		2483.500	46.60	-3.38	43.22	74.00	-30.78	peak			

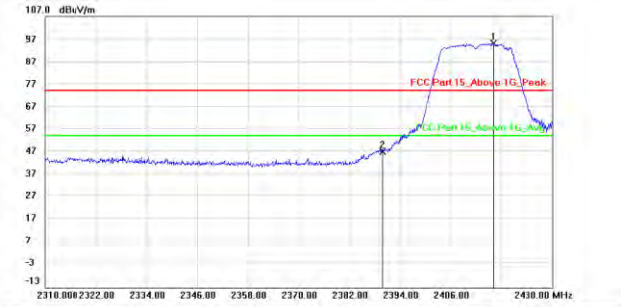
Polarization: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2455.800	98.33	-3.39	94.94	74.00	20.94	peak			
2		2483.500	46.37	-3.38	42.99	74.00	-31.01	peak			

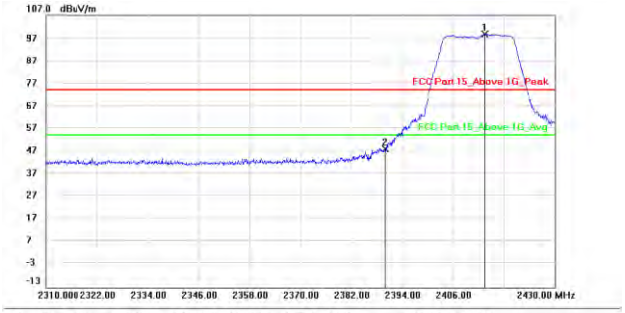
Test Mode: IEEE 802.11n20-Low

Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2416.200	98.47	-3.41	95.06	74.00	21.06	peak			
2		2390.000	50.56	-3.40	47.16	74.00	-26.84	peak			

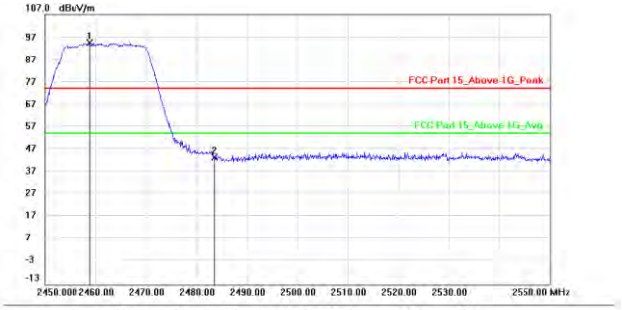
Polarization: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2413.560	102.18	-3.41	98.77	74.00	24.77	peak			
2		2390.000	51.36	-3.40	47.96	74.00	-26.04	peak			

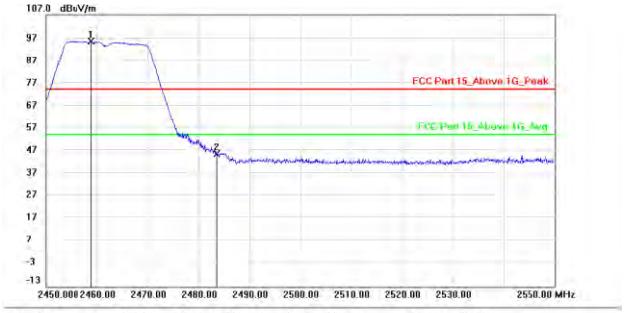
Test Mode: IEEE 802.11n20-High

Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2458.800	97.93	-3.39	94.54	74.00	20.54	peak			
2		2483.500	47.07	-3.38	43.69	74.00	-30.31	peak			

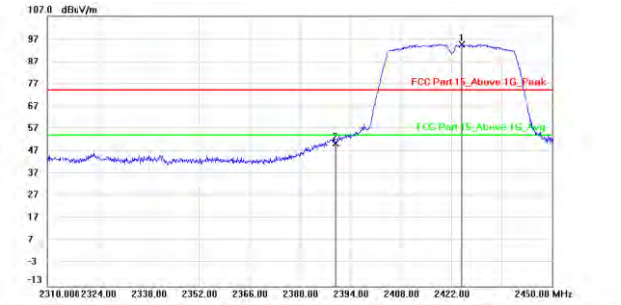
Polarization: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2458.800	98.89	-3.39	95.50	74.00	21.50	peak			
2		2483.500	49.08	-3.38	45.70	74.00	-28.30	peak			

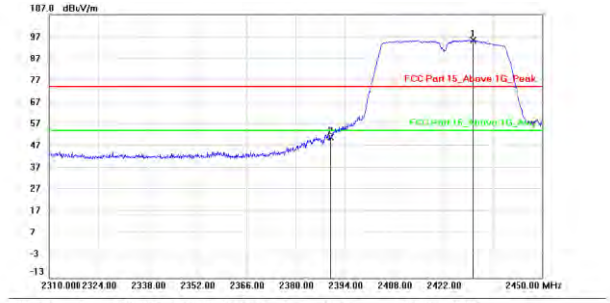
Test Mode: IEEE 802.11n40-Low

Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2424.940	98.03	-3.40	94.63	74.00	20.63	peak			
2		2390.000	53.78	-3.40	50.38	74.00	-23.62	peak			

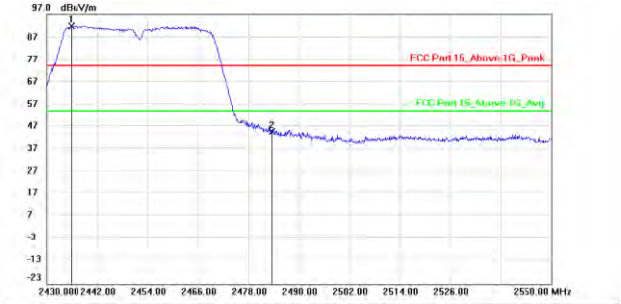
Polarization: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2430.540	98.78	-3.40	95.38	74.00	21.38	peak			
2		2390.000	54.42	-3.40	51.02	74.00	-22.98	peak			

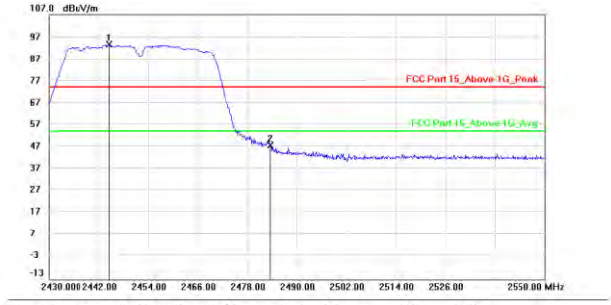
Test Mode: IEEE 802.11n40-High

Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2435.760	95.24	-3.40	91.84	74.00	17.84	peak			
2		2483.500	48.01	-3.38	44.63	74.00	-29.37	peak			

Polarization: Horizontal

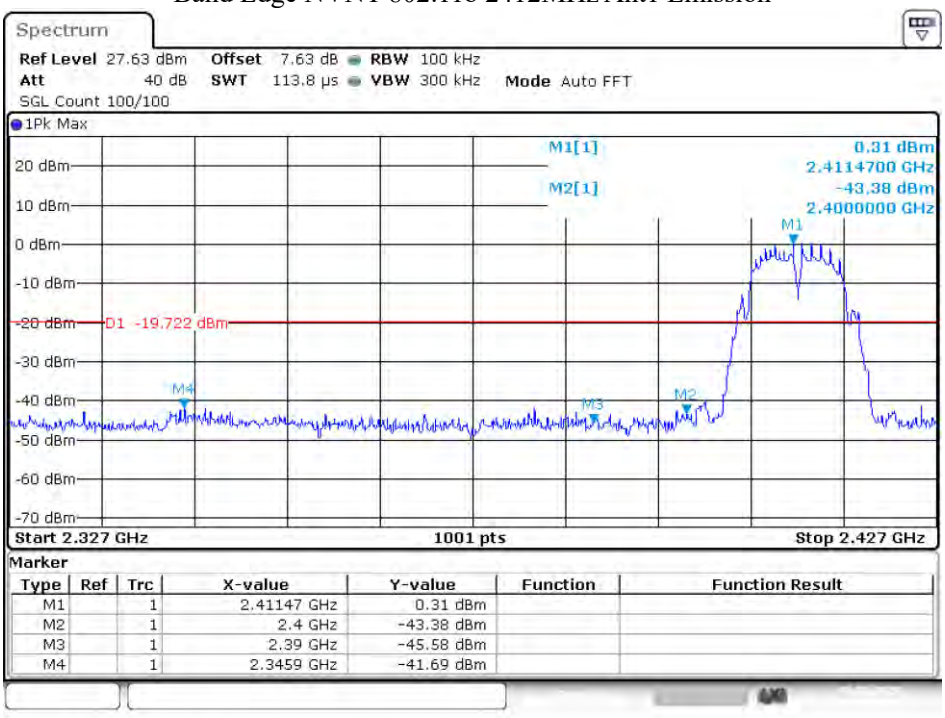


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2444.520	97.00	-3.40	93.60	74.00	19.60	peak			
2		2483.500	51.03	-3.38	47.65	74.00	-26.35	peak			

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

Conduction Band Edge:

Band Edge NVNT 802.11b 2412MHz Ant1 Emission

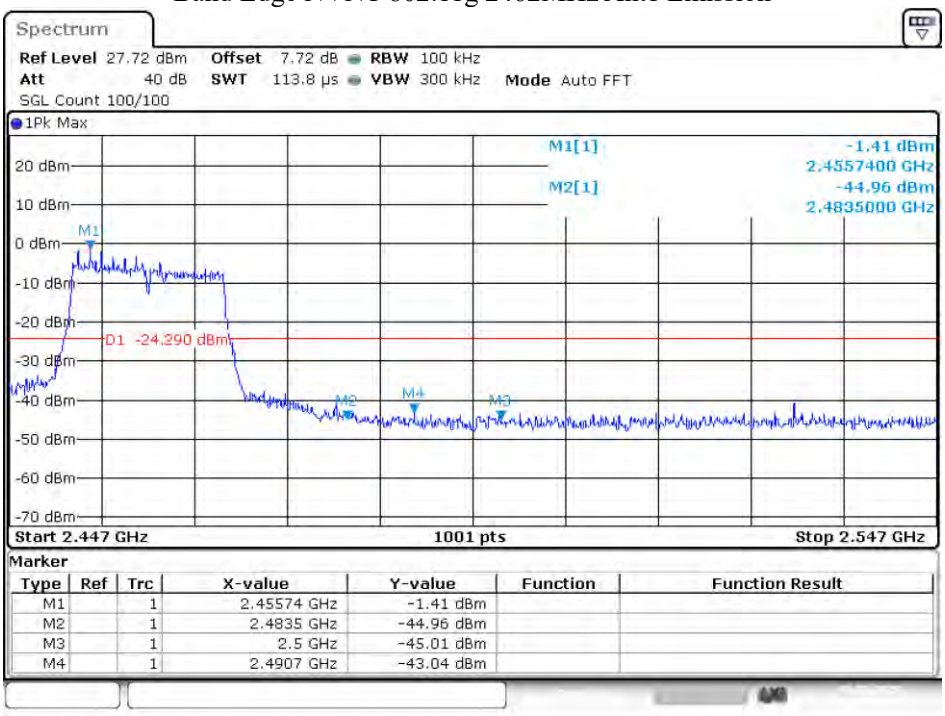


Band Edge NVNT 802.11b 2462MHz Ant1 Emission

Band Edge NVNT 802.11g 2412MHz Ant1 Emission

Date: 6.MAR.2020 09:57:53

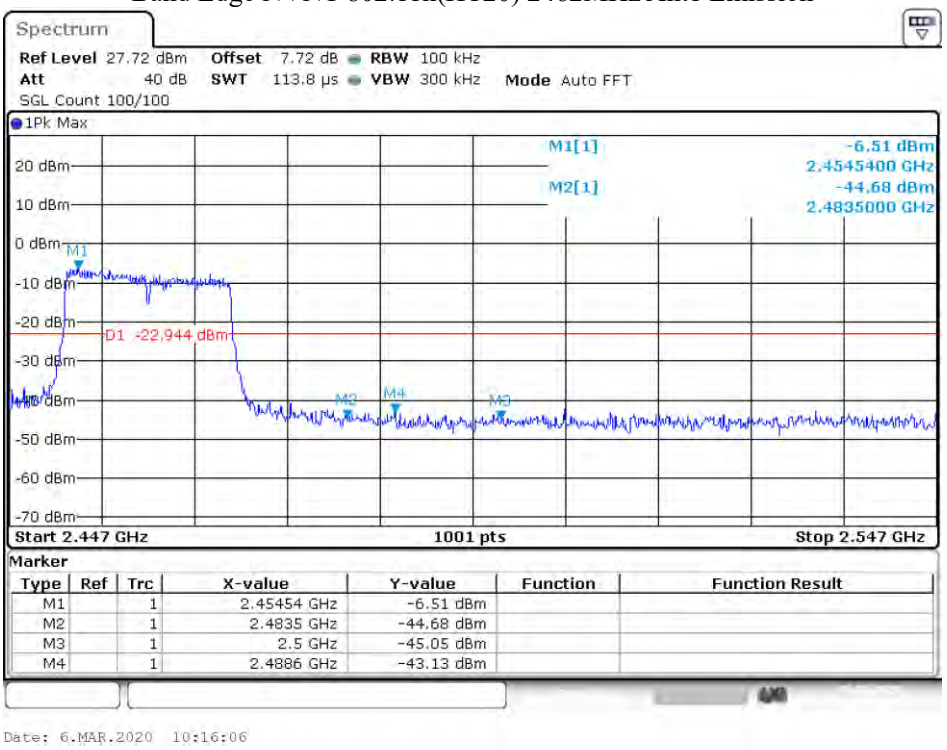
Band Edge NVNT 802.11g 2462MHz Ant1 Emission



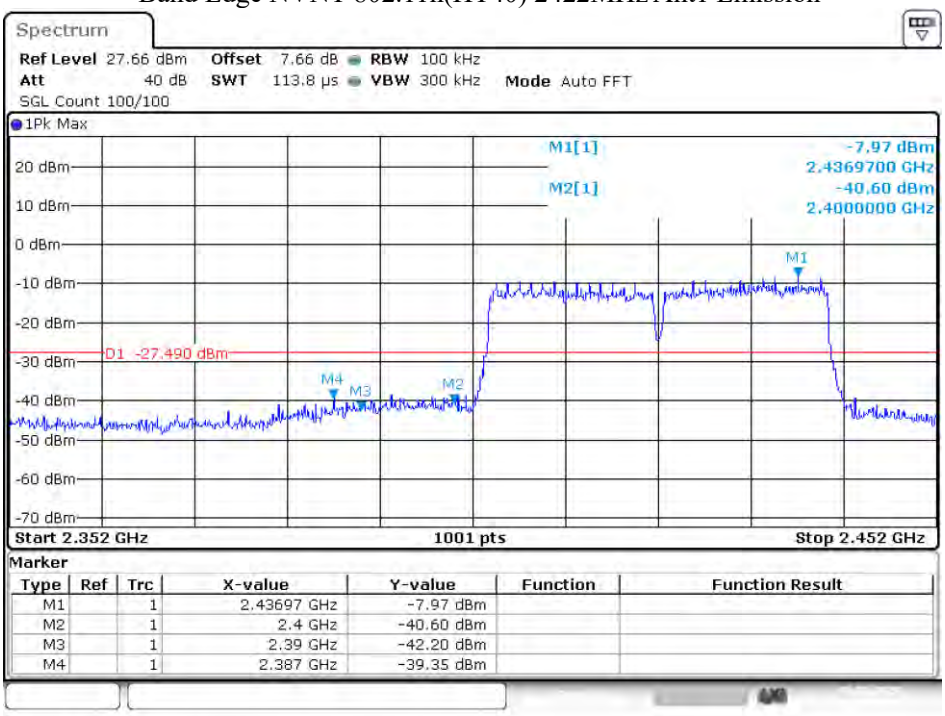
Date: 6.MAR.2020 10:04:36

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

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

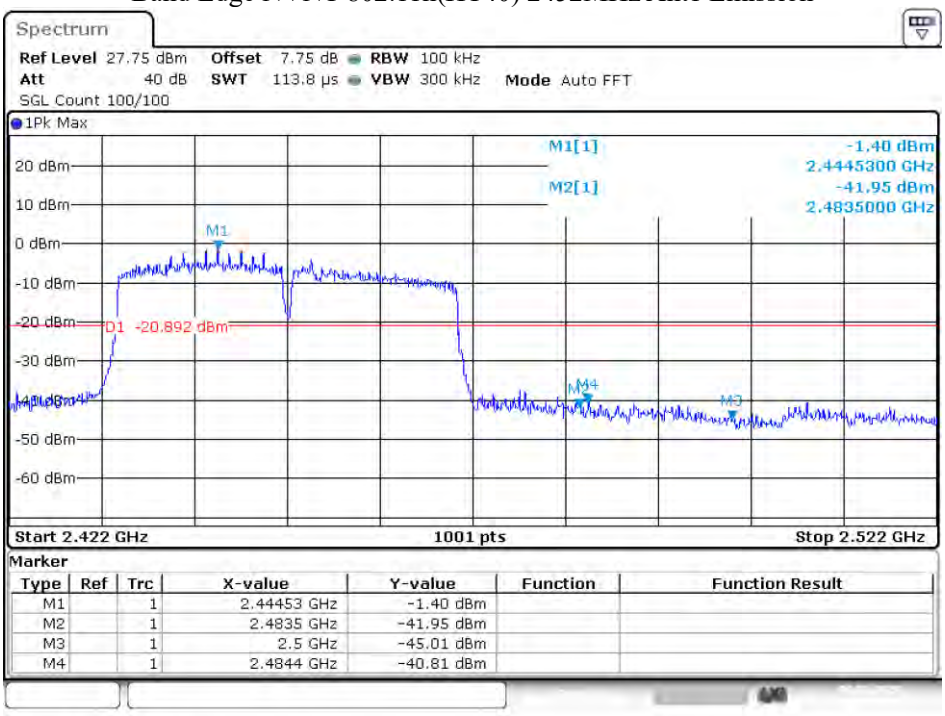


Band Edge NVNT 802.11n(HT40) 2422MHz Ant1 Emission



Date: 6.MAR.2020 10:33:11

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



Date: 9.MAR.2020 02:55:14

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

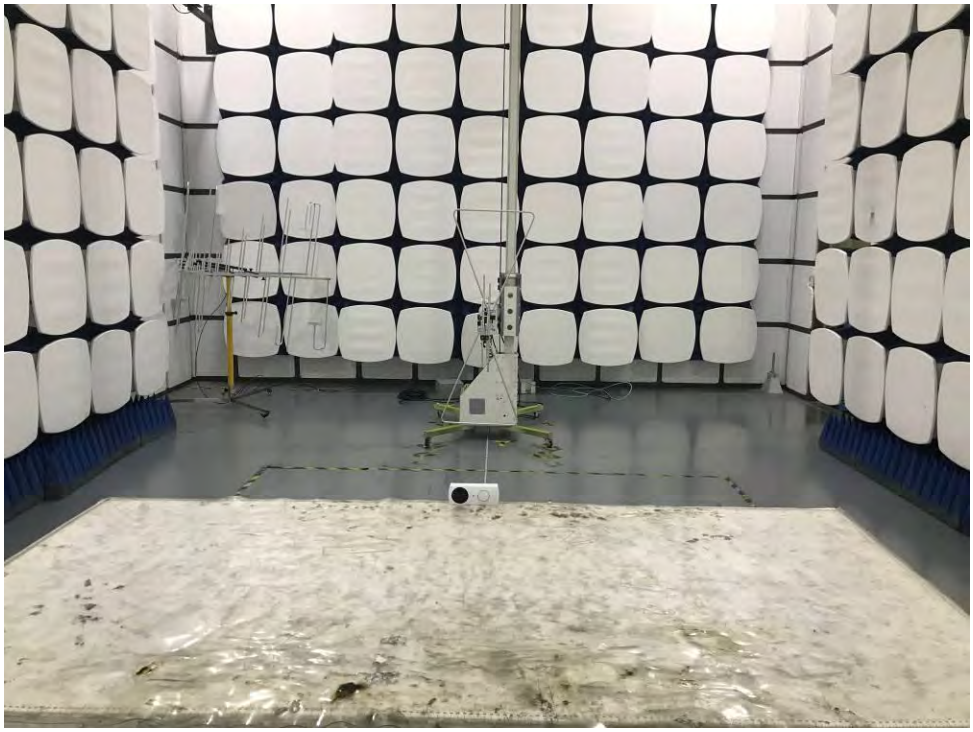
The antenna connector is unique antenna and no consideration of replacement. Please see EUT photo for details.

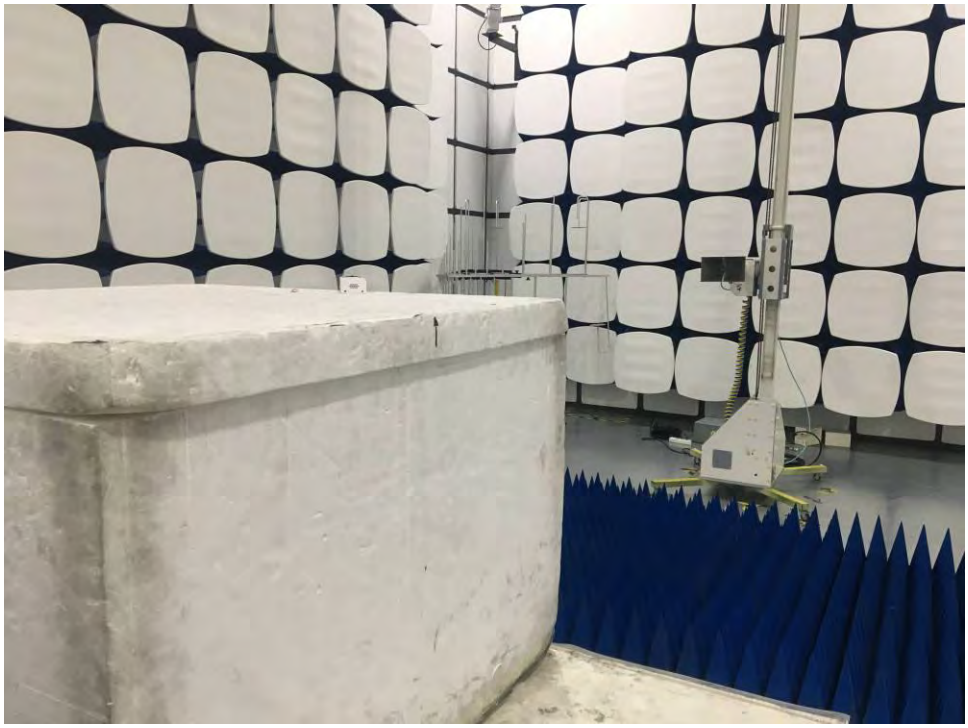
9.3.Results

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

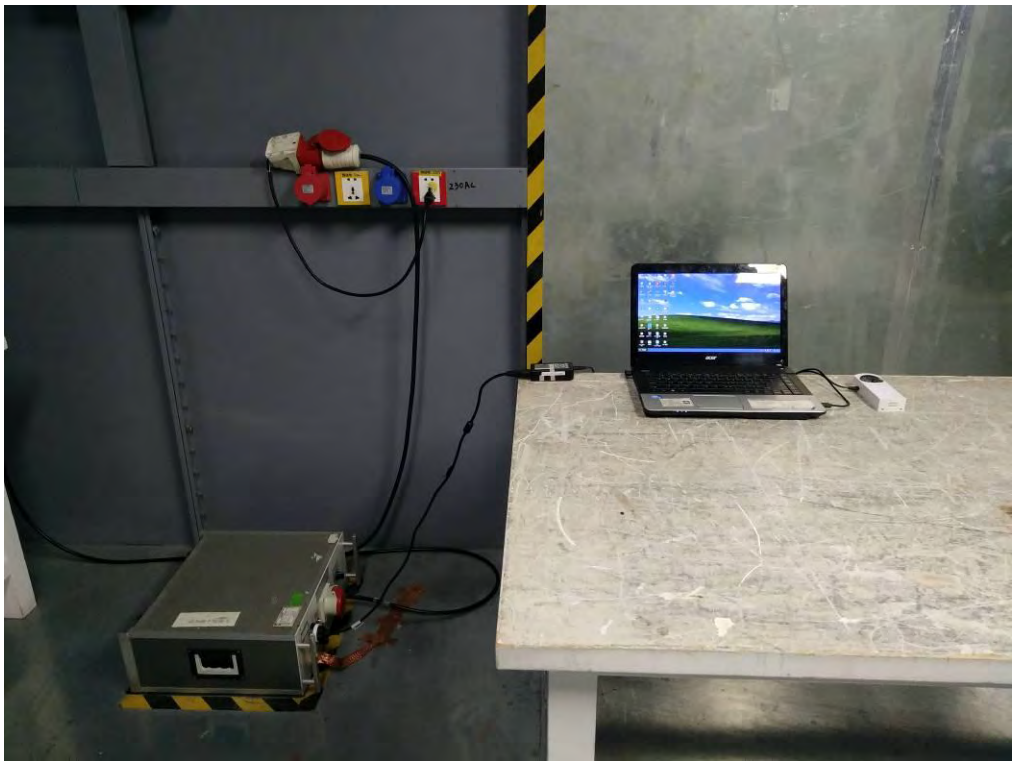
10. TEST SETUP PHOTO

10.1. Photos of Radiated emission

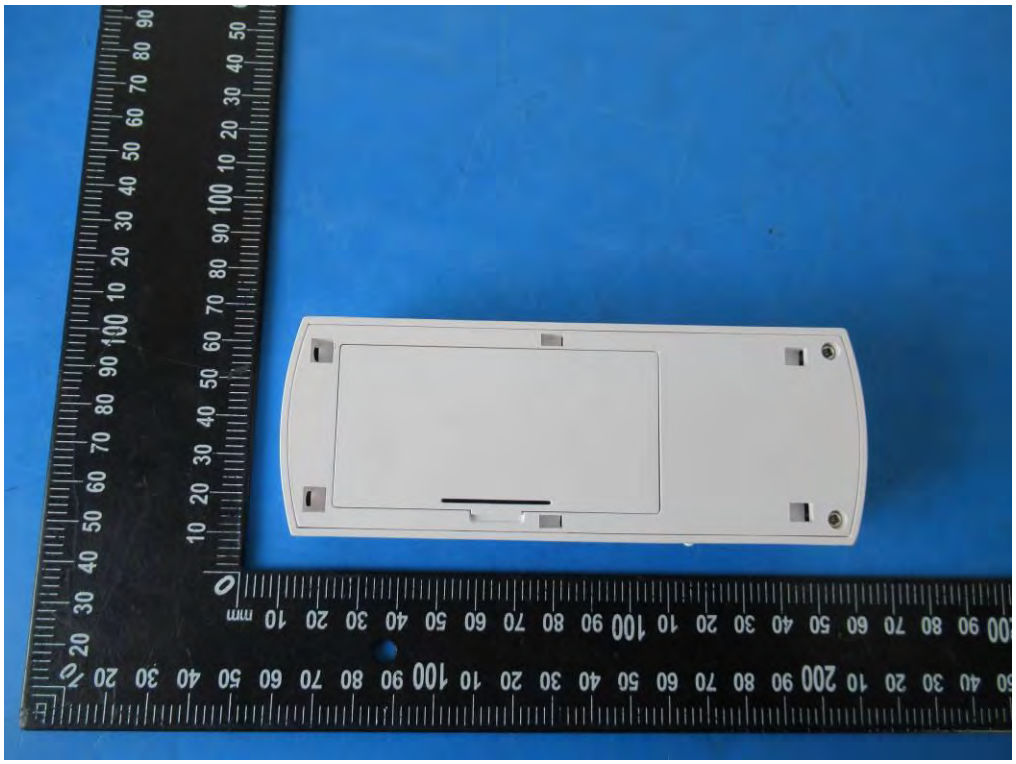


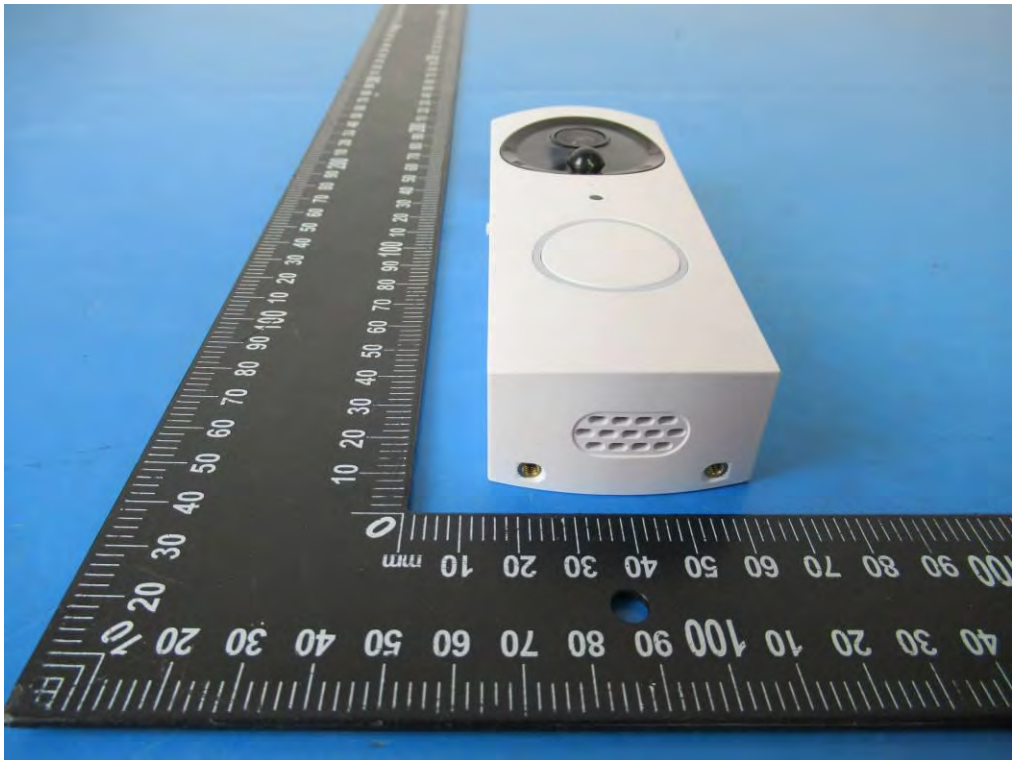


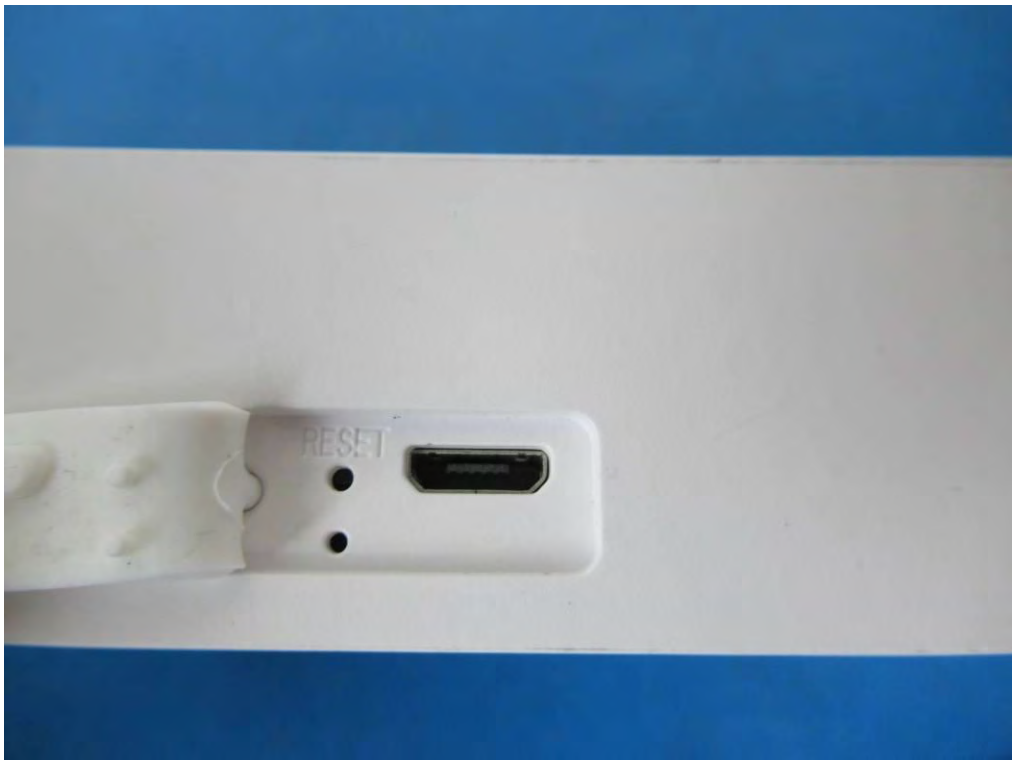
10.2.Photos of Conducted Emission test

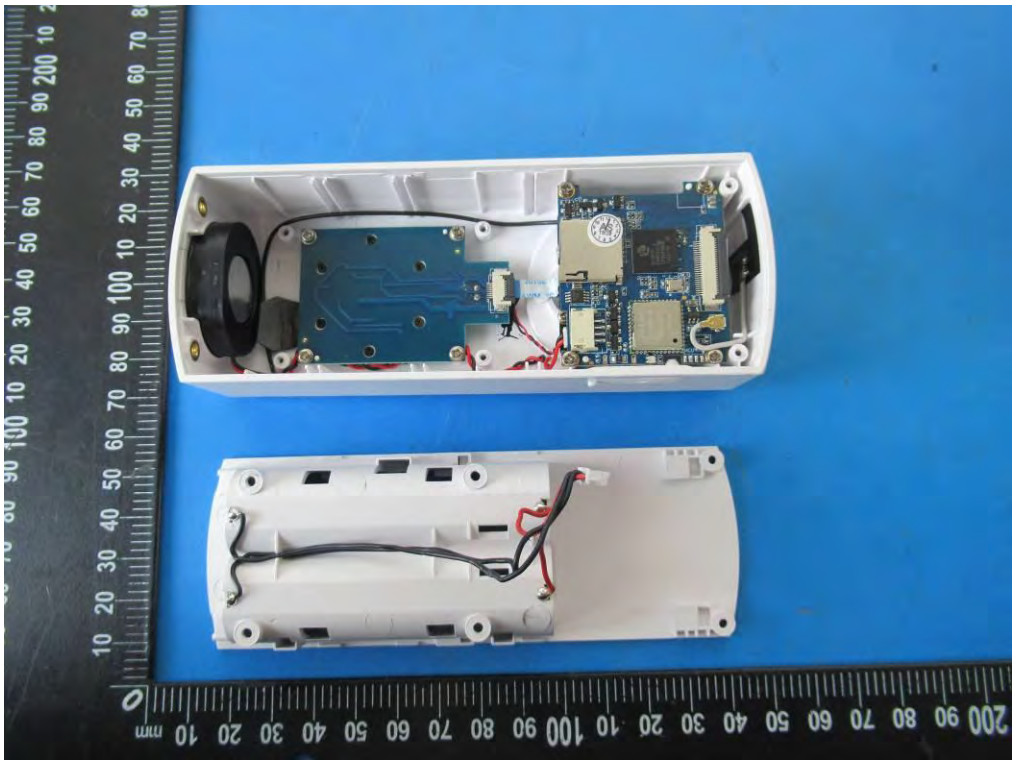


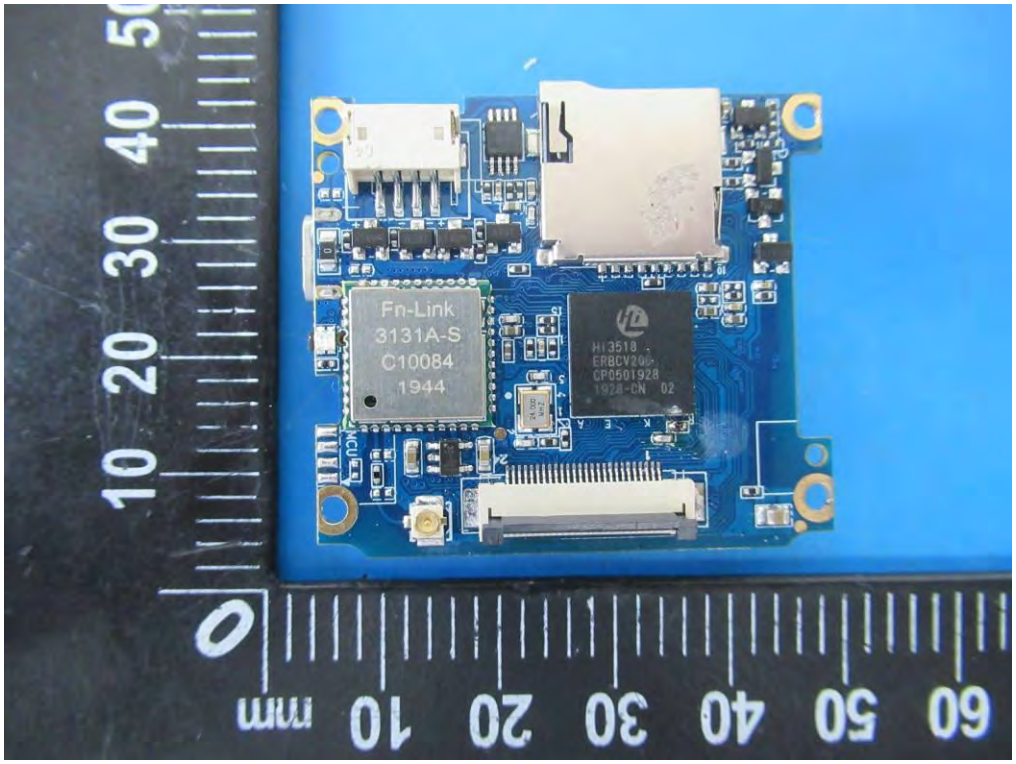
11.EUT PHOTO

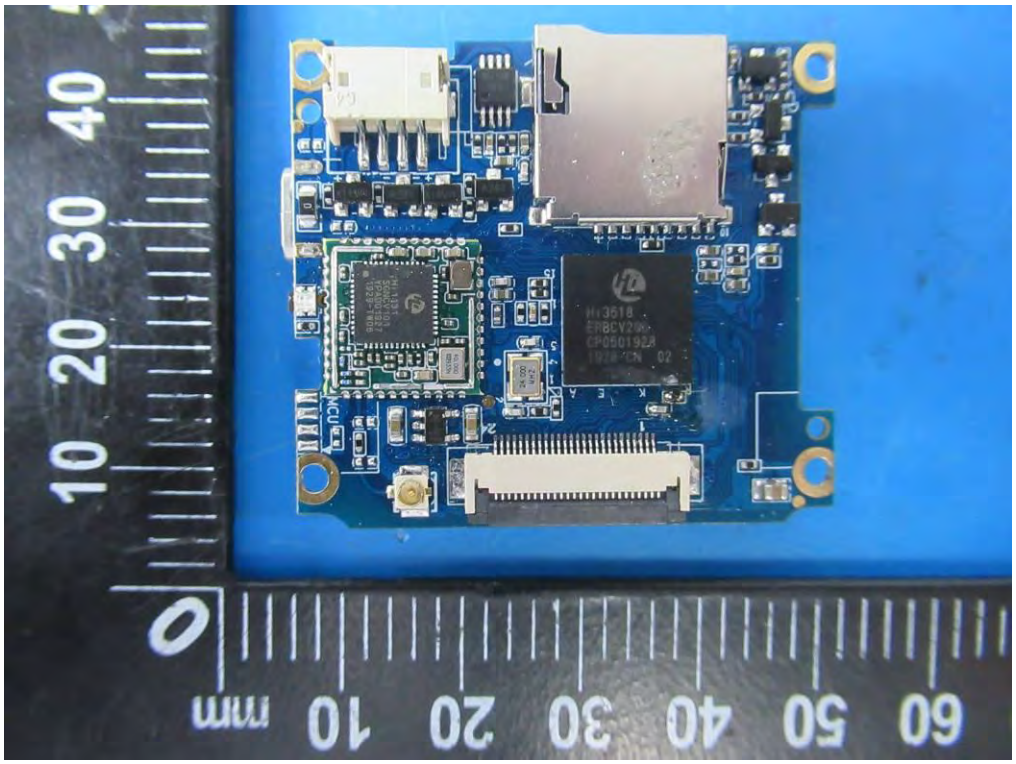





RESET




Fn-Link
3131A-S
C10084
1944


Hi3518
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CP0501928
1929-CN 02
MCU
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20
30
40
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20
30
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50
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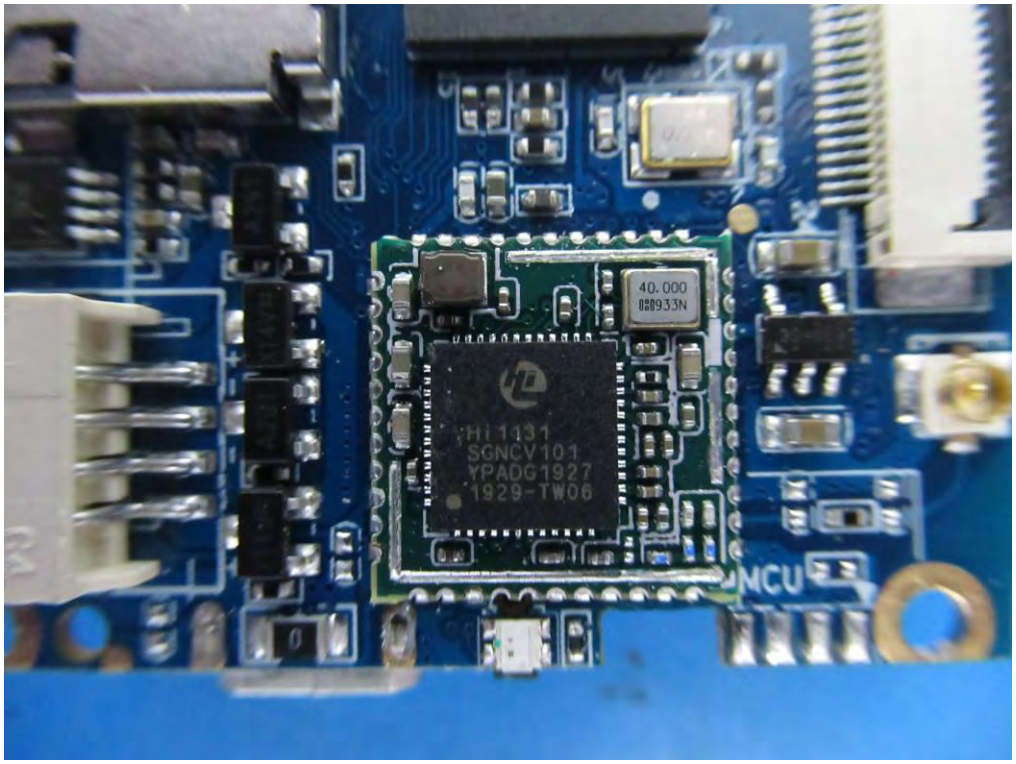
40.000
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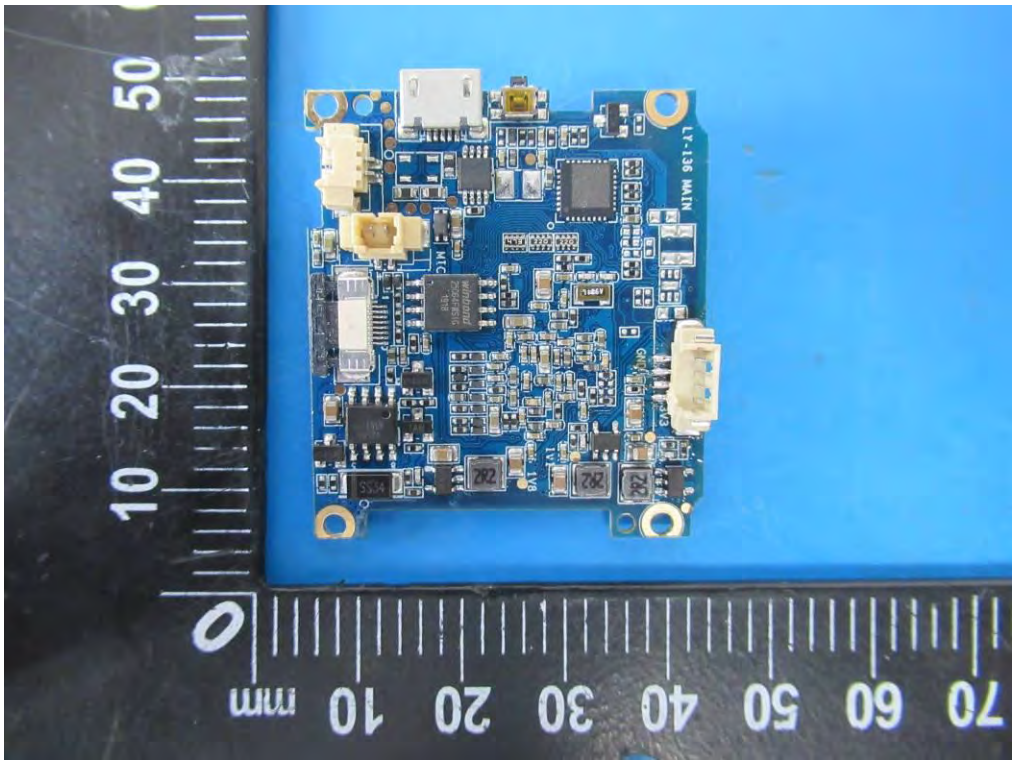
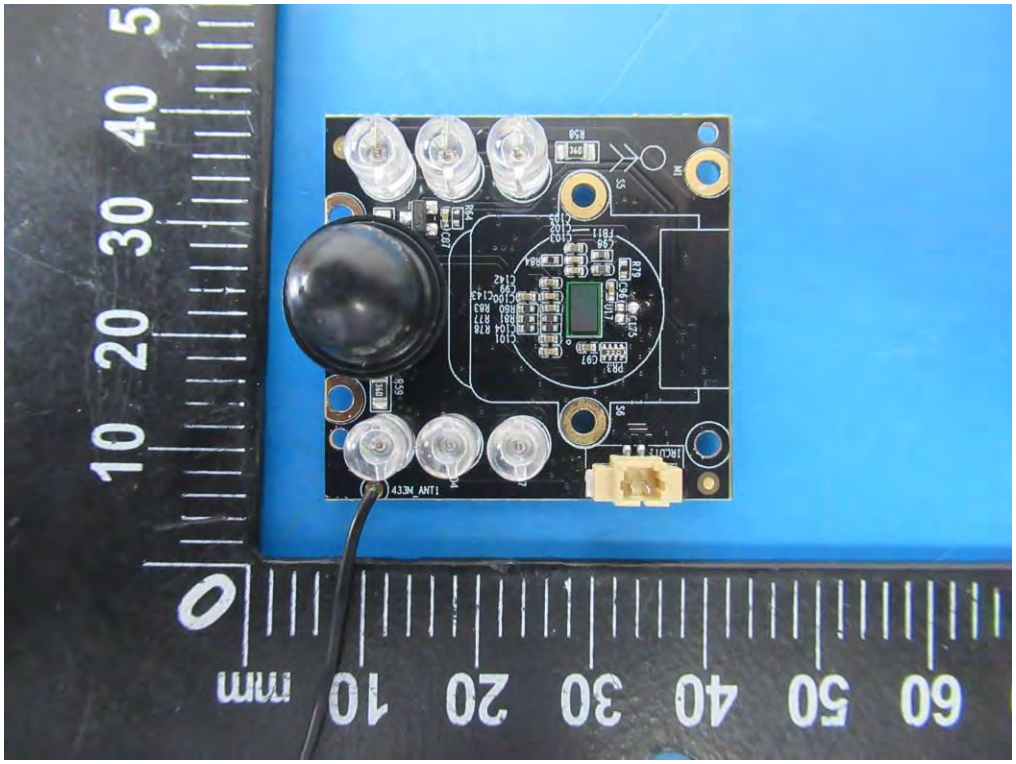
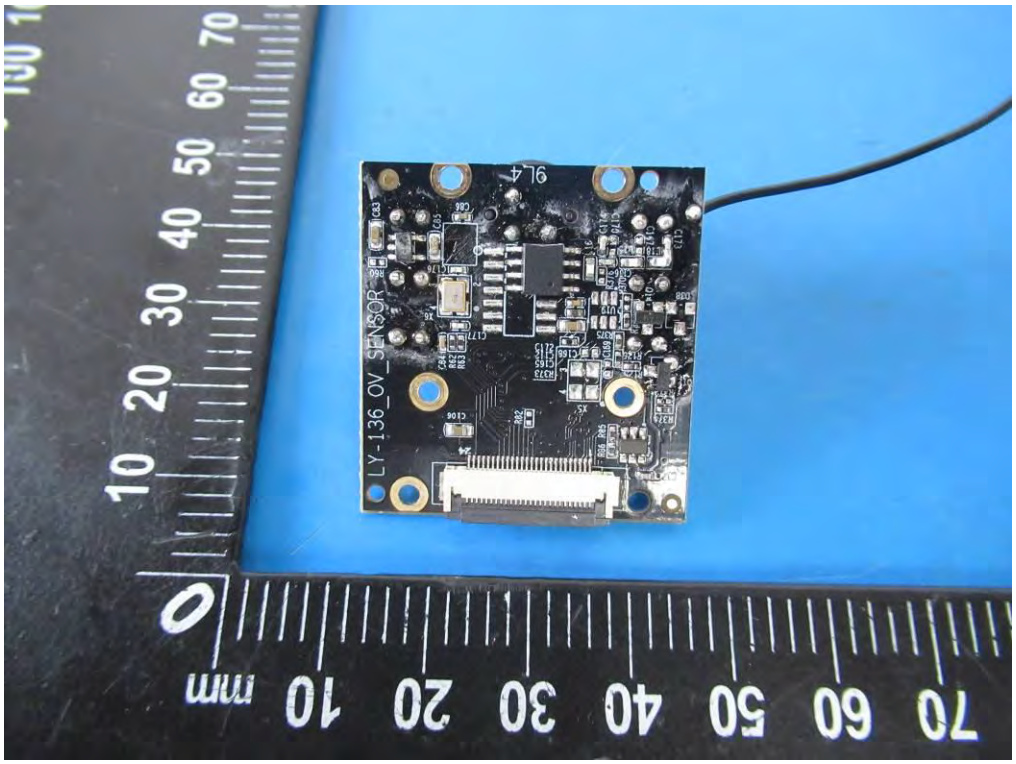
Hi1131
SGNCV101
YPADG1927
1929-TW06
MCU






LY-136_OV_SENSOR
mm
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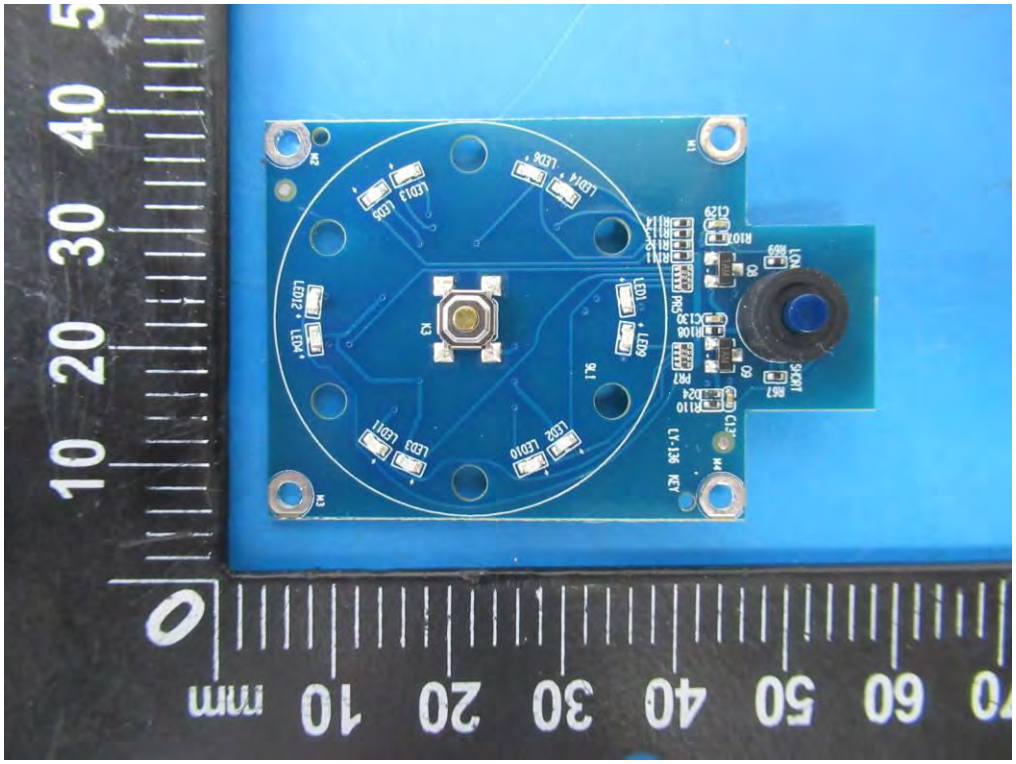
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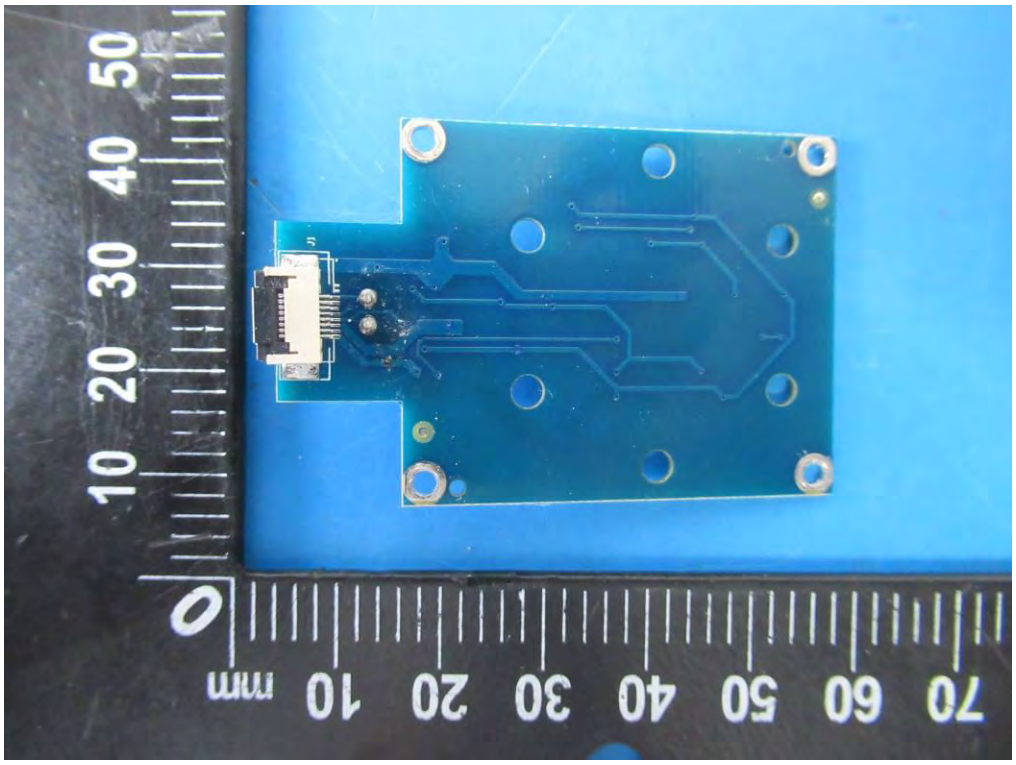

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