FCC Test Report

Report No.:	RFBCKS-WTW-P21100725-1
FCC ID:	2AAAS-DS01
Test Model:	DS01
Received Date:	Oct. 22, 2021
Test Date:	Nov. 03, 2021 ~ Dec. 16, 2021
Issued Date:	Jan. 13, 2022
Applicant:	Vivint, Inc.
Address:	4931 N. 300 W. Provo, UT 84604 USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RFBCKS-WTW-P21100725-1	Original Release	Jan. 13, 2022

1 Certificate of Conformity

Product:	Alarm System Display
Brand:	Vivint, Inc.
Test Model:	DS01
Sample Status:	Engineering Sample
Applicant:	Vivint, Inc.
Test Date:	Nov. 03, 2021 ~ Dec. 16, 2021
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Vera Huang , **Date:** Jan. 13, 2022

Vera Huang / Specialist

Approved by : Jeremy Lin , **Date:** Jan. 13, 2022

Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	**Test Item**	**Result**	**Remarks**
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -4.93 dB at 0.41588 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.5 dB at 2387.32 MHz and 2390.00 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	Pass	Reference only
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX not a standard connector.

Note:

1. For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Alarm System Display
Brand	Vivint, Inc.
Test Model	DS01
Status of EUT	Engineering Sample
Power Supply Rating	12 Vdc (adapter) 3.8 Vdc (Li-ion battery)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to 400 Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20/VHT20) 7 for 802.11n (HT40/VHT40)
Output Power	733.371 mW
Antenna Type	Refer to Note as below
Antenna Connector	Refer to Note as below
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx Function
802.11b	2TX
802.11g	2TX
802.11n (HT20/VHT20)	2TX
802.11n (HT40/VHT40)	2TX

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	Zbpower	ZB-H120020A-88	I/P: 100-240 Vac, 50/60 Hz, 0.6 A O/P: 12 Vdc, 2 A 1.5m non-shielded DC cable without core
Adapter 2 (Support unit only)	HONOTO	ADS-24FUD-12 12024EPCU	I/P: 100-240 Vac, 50/60 Hz, 0.6 A O/P: 12 Vdc, 2 A 1.5m non-shielded DC cable without core
Battery	BYD	13199655-00	3.8 Vdc, 2110 mAh
LCD Panel	Wistron	WHVS1 7” LCM+TP	P/N: P81.0AZ45.0003
CPU	NXP	MIMX8MM6DVTLZAA	--
eMMC	SANDISK	SDINBDG4-8G	--
RAM	Micron	MT41K256M16TW-107:P	--

3. The antenna information is listed as below.

Ant. No.	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	0	WNC	81XKAB15.G69	3.8	2.4~2.4835	PIFA	ipex(MHF)	47
		WNC	81XKAB15.G69	3.3	5.15~5.25	PIFA	ipex(MHF)	47
		WNC	81XKAB15.G69	3.5	5.25~5.35	PIFA	ipex(MHF)	47
		WNC	81XKAB15.G69	3.6	5.47~5.725	PIFA	ipex(MHF)	47
		WNC	81XKAB15.G69	4.1	5.725~5.85	PIFA	ipex(MHF)	47
2	1	WNC	Display Pro	4.2	2.4~2.4835	PIFA	ipex(MHF)	123.5
		WNC	Display Pro	4.7	5.15~5.25	PIFA	ipex(MHF)	123.5
		WNC	Display Pro	4.4	5.25~5.35	PIFA	ipex(MHF)	123.5
		WNC	Display Pro	4.2	5.47~5.725	PIFA	ipex(MHF)	123.5
		WNC	Display Pro	4.3	5.725~5.85	PIFA	ipex(MHF)	123.5
3	0	WNC	81XKAB15.G70	4.2	2.4~2.4835 (BT)	Monopole	ipex(MHF)	129

4. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
5. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.
6. WLAN 2.4G and 5G cannot transmit at same time.
7. WLAN, BT LE, and DECT technology can transmit at same time.
8. Spurious emission of the simultaneous operation WLAN, BT LE, and DECT has been evaluated and no non-compliance was found.

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20/VHT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

7 channels are provided for 802.11n (HT40/VHT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
6	2437		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	EUT + Adapter 1
B	-	√	√	-	EUT + Adapter 2

Where **RE≥1G:** Radiated Emission above 1 GHz **RE<1G:** Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane.**
2. For radiated emission (below 1GHz) and power line conducted emission test items chosen the worst maximum power.
3. "-"means no effect.

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (VHT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
A	802.11n (VHT40)	3 to 9	3, 6, 9	OFDM	BPSK	15

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11n (VHT20)	1 to 11	6	OFDM	BPSK	7.2

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11n (VHT20)	1 to 11	6	OFDM	BPSK	7.2

Bandedge Measurement:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
A	802.11n (VHT20)	1 to 11	1, 11	OFDM	BPSK	7.2
A	802.11n (VHT40)	3 to 9	3, 9	OFDM	BPSK	15

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (VHT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
A	802.11n (VHT40)	3 to 9	3, 6, 9	OFDM	BPSK	15

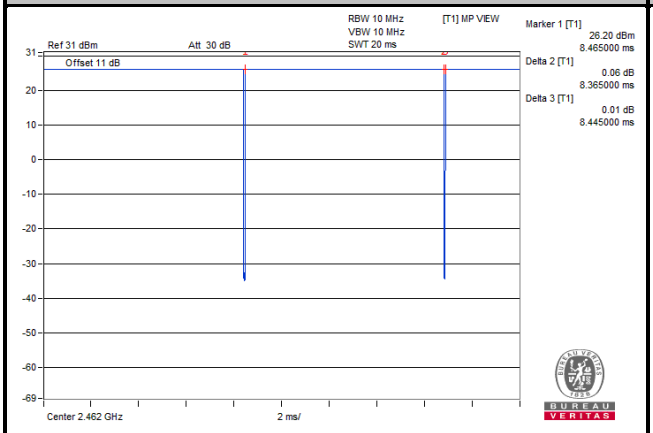
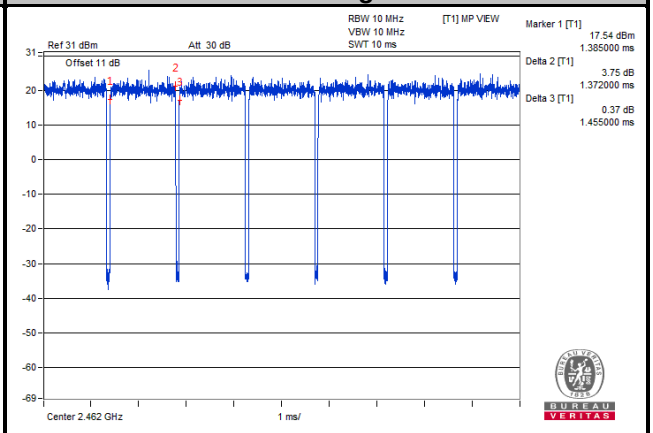
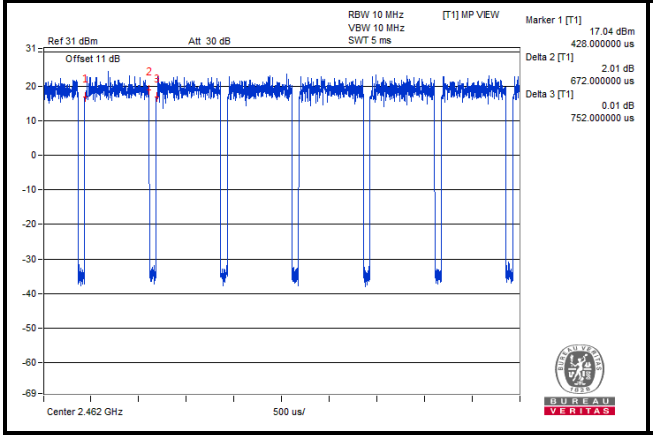
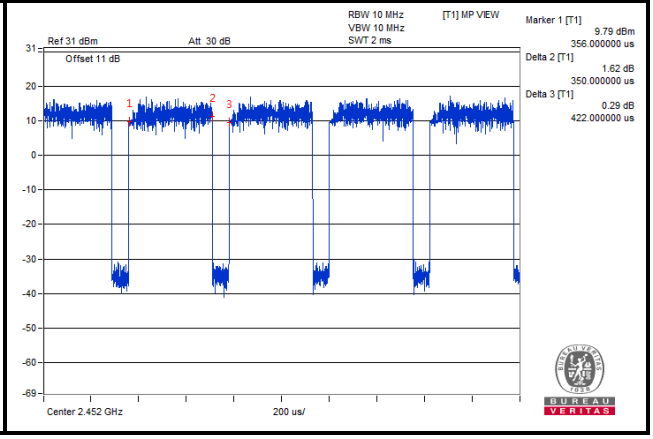
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	22 deg. C, 70 % RH	120 Vac, 60 Hz	Rex Wang
RE<1G	22 deg. C, 70 % RH	120 Vac, 60 Hz	Rex Wang / Titan Hsu
PLC	25 deg. C, 75 % RH	120 Vac, 60 Hz	Hans Wu / Titan Hsu
APCM	25 deg. C, 60 % RH	3.8 Vdc	Jisyong Wang

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is ≥ 98 %, duty factor is not required.
Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11b: Duty cycle = 8.365/8.445 = 0.991, duty factor is not required.
802.11g: Duty cycle = 1.372/1.455 = 0.943, Duty factor = 10 * log(1/0.943) = 0.26
802.11n (VHT20): Duty cycle = 0.672/0.752 = 0.894, Duty factor = 10 * log(1/0.894) = 0.49
802.11n (VHT40): Duty cycle = 0.35/0.422 = 0.829, Duty factor = 10 * log(1/0.829) = 0.81

802.11b	802.11g
	
802.11n (VHT20)	**802.11n (VHT40)**
	

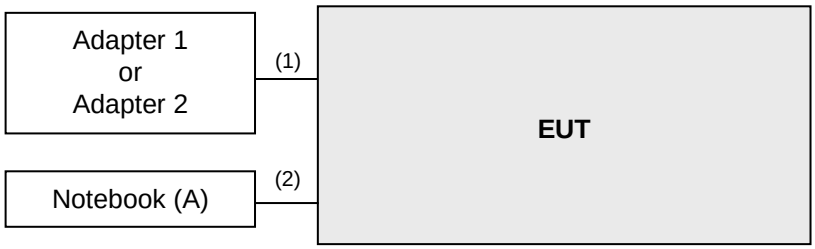
3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Notebook	DELL	E6230	N/A	N/A	--

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Power Cable	1	1.5	N	0	Accessory of the EUT
2.	Micro USB Cable	1	1	N	0	--

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart C (15.247)
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 558074 D01 Meas Guidance v05r02
KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.1.2 Test Instruments

Mode A

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102579	Jul. 05, 2021	Jul. 04, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 07, 2021	Jun. 06, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Oct. 29, 2021	Oct. 28, 2022
HORN Antenna SCHWARZBECK	9120D	209	Nov. 22, 2020	Nov. 21, 2021
			Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Oct. 26, 2021	Oct. 25, 2022
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2021	Sep. 15, 2022
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Jul. 24, 2021	Jul. 23, 2022
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Mar. 22, 2021	Mar. 21, 2022
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Jul. 24, 2021	Jul. 23, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Jul. 24, 2021	Jul. 23, 2022
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM- SM-8000	Cable-CH3-03 (309224+170907)	Jul. 24, 2021	Jul. 23, 2022
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 12, 2021	Jul. 11, 2022

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.

Mode B

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 10, 2021	Jun. 09, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Oct. 28, 2021	Oct. 27, 2022
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 05, 2021	Jun. 04, 2022
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

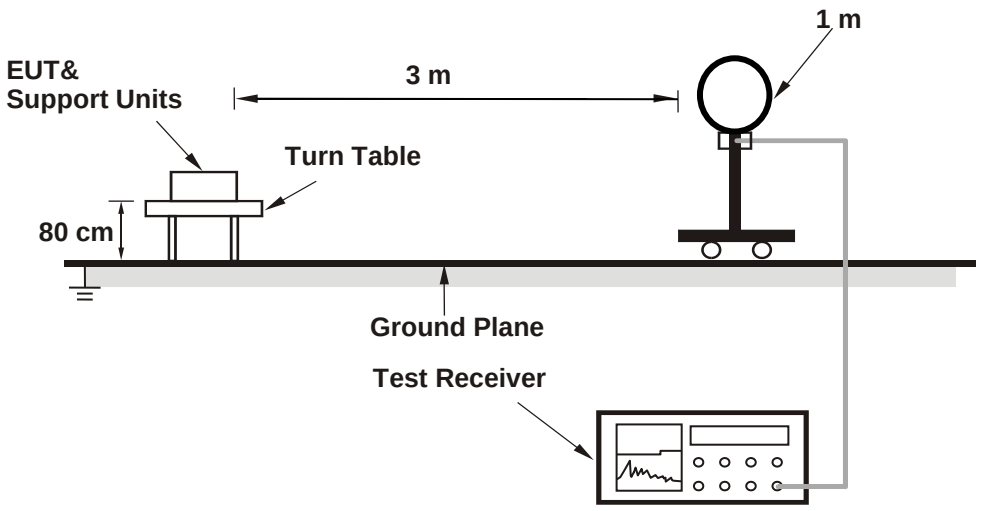
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz. (11b: RBW = 1 MHz, VBW =10 Hz ; 11g: RBW = 1 MHz, VBW = 1 kHz ;
   11n (VHT20): RBW = 1 MHz, VBW = 3 kHz ; 11n (VHT40): RBW = 1 MHz, VBW = 3 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

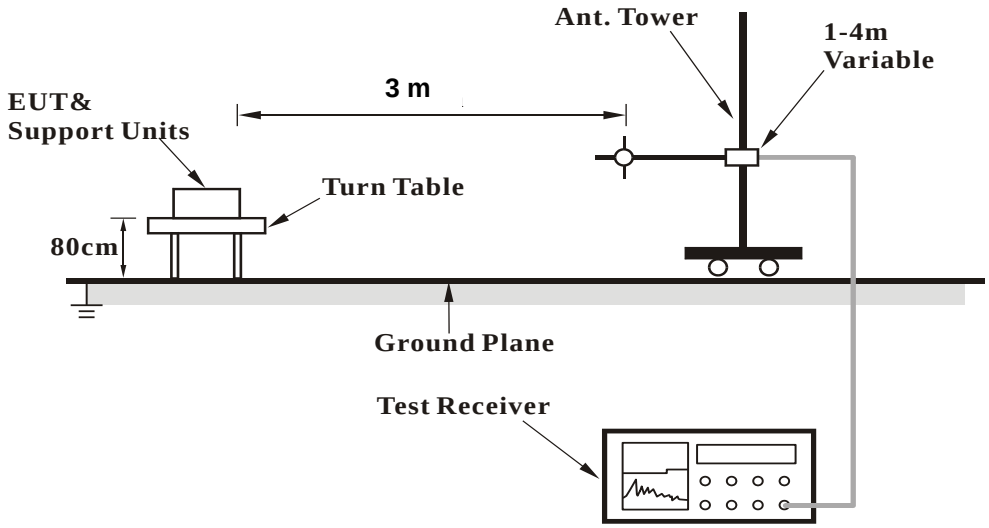
No deviation.

4.1.5 Test Set Up

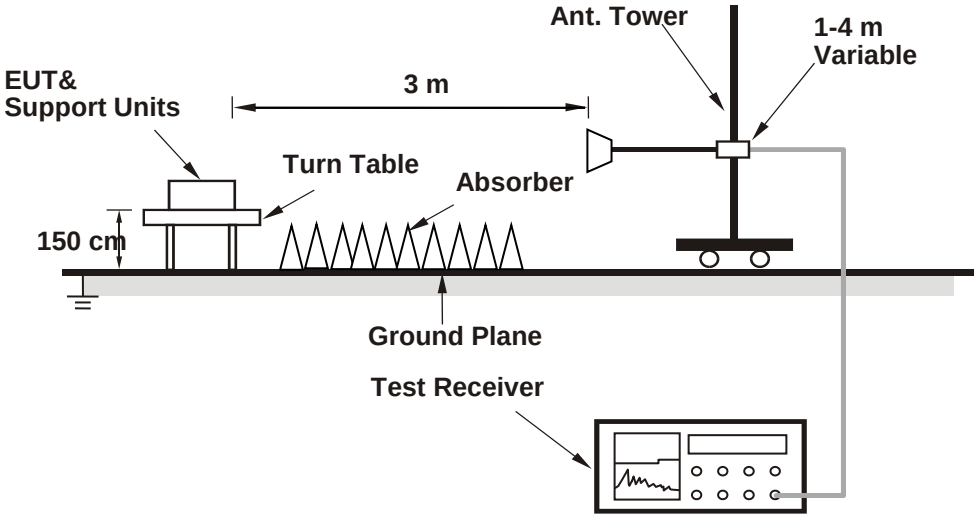
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data:

RF Mode	TX 802.11b	Channel	CH 1：2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2385.79	61.8 PK	74.0	-12.2	2.49 H	211	27.9	33.9
2	2385.79	53.3 AV	54.0	-0.7	2.49 H	211	19.4	33.9
3	*2412.00	117.6 PK			2.49 H	211	83.8	33.8
4	*2412.00	115.3 AV			2.49 H	211	81.5	33.8
5	4824.00	51.5 PK	74.0	-22.5	1.14 H	301	44.0	7.5
6	4824.00	46.1 AV	54.0	-7.9	1.14 H	301	38.6	7.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	58.8 PK	74.0	-15.2	1.05 V	44	25.0	33.8
2	2390.00	46.9 AV	54.0	-7.1	1.05 V	44	13.1	33.8
3	*2412.00	110.2 PK			1.05 V	44	76.4	33.8
4	*2412.00	108.0 AV			1.05 V	44	74.2	33.8
5	4824.00	52.3 PK	74.0	-21.7	1.60 V	247	44.8	7.5
6	4824.00	45.5 AV	54.0	-8.5	1.60 V	247	38.0	7.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11b	Channel	CH 6：2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	119.0 PK			2.49 H	247	85.4	33.6
2	*2437.00	116.6 AV			2.49 H	247	83.0	33.6
3	4874.00	50.2 PK	74.0	-23.8	1.14 H	293	42.9	7.3
4	4874.00	42.9 AV	54.0	-11.1	1.14 H	293	35.6	7.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	113.4 PK			3.61 V	300	79.8	33.6
2	*2437.00	110.4 AV			3.61 V	300	76.8	33.6
3	4874.00	51.6 PK	74.0	-22.4	2.72 V	247	44.3	7.3
4	4874.00	45.1 AV	54.0	-8.9	2.72 V	247	37.8	7.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11b	Channel	CH 11：2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	121.4 PK			2.84 H	243	87.6	33.8
2	*2462.00	118.8 AV			2.84 H	243	85.0	33.8
3	2486.34	62.6 PK	74.0	-11.4	2.84 H	243	28.8	33.8
4	2486.34	53.2 AV	54.0	-0.8	2.84 H	243	19.4	33.8
5	4924.00	54.5 PK	74.0	-19.5	1.08 H	301	47.3	7.2
6	4924.00	47.7 AV	54.0	-6.3	1.08 H	301	40.5	7.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	117.7 PK			3.43 V	298	83.9	33.8
2	*2462.00	115.2 AV			3.43 V	298	81.4	33.8
3	2483.50	60.9 PK	74.0	-13.1	3.44 V	298	27.1	33.8
4	2483.50	50.4 AV	54.0	-3.6	3.44 V	298	16.6	33.8
5	4924.00	51.5 PK	74.0	-22.5	3.00 V	255	44.3	7.2
6	4924.00	46.8 AV	54.0	-7.2	3.00 V	255	39.6	7.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11g	Channel	CH 1：2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2387.32	73.2 PK	74.0	-0.8	3.11 H	248	39.4	33.8
2	**2387.32**	**53.5 AV**	**54.0**	**-0.5**	**3.11 H**	**248**	**19.7**	**33.8**
3	*2412.00	117.6 PK			3.11 H	248	83.8	33.8
4	*2412.00	107.3 AV			3.11 H	248	73.5	33.8
5	4824.00	48.7 PK	74.0	-25.3	2.14 H	85	41.2	7.5
6	4824.00	36.2 AV	54.0	-17.8	2.14 H	85	28.7	7.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	70.0 PK	74.0	-4.0	3.41 V	311	36.2	33.8
2	2390.00	50.8 AV	54.0	-3.2	3.41 V	311	17.0	33.8
3	*2412.00	113.1 PK			3.41 V	311	79.3	33.8
4	*2412.00	104.0 AV			3.41 V	311	70.2	33.8
5	4824.00	49.0 PK	74.0	-25.0	1.66 V	298	41.5	7.5
6	4824.00	37.7 AV	54.0	-16.3	1.66 V	298	30.2	7.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11g	Channel	CH 6：2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	123.6 PK			2.20 H	53	90.0	33.6
2	*2437.00	114.1 AV			2.20 H	53	80.5	33.6
3	2483.50	64.1 PK	74.0	-9.9	2.20 H	53	30.4	33.7
4	2483.50	51.9 AV	54.0	-2.1	2.20 H	53	18.2	33.7
5	4874.00	48.2 PK	74.0	-25.8	2.06 H	112	40.9	7.3
6	4874.00	36.0 AV	54.0	-18.0	2.06 H	112	28.7	7.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	113.7 PK			1.00 V	233	80.1	33.6
2	*2437.00	103.9 AV			1.00 V	233	70.3	33.6
3	2483.50	59.3 PK	74.0	-14.7	1.00 V	233	25.6	33.7
4	2483.50	50.5 AV	54.0	-3.5	1.00 V	233	16.8	33.7
5	4874.00	49.4 PK	74.0	-24.6	1.68 V	294	42.1	7.3
6	4874.00	37.8 AV	54.0	-16.2	1.68 V	294	30.5	7.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11g	Channel	CH 11：2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	118.4 PK			3.07 H	251	84.6	33.8
2	*2462.00	108.9 AV			3.07 H	251	75.1	33.8
3	2485.10	68.0 PK	74.0	-6.0	3.07 H	251	34.2	33.8
4	2485.10	53.2 AV	54.0	-0.8	3.07 H	251	19.4	33.8
5	4924.00	46.1 PK	74.0	-27.9	2.04 H	122	38.9	7.2
6	4924.00	35.9 AV	54.0	-18.1	2.04 H	122	28.7	7.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	109.1 PK			3.41 V	293	75.3	33.8
2	*2462.00	100.0 AV			3.41 V	293	66.2	33.8
3	2483.50	64.3 PK	74.0	-9.7	3.41 V	293	30.5	33.8
4	2483.50	50.7 AV	54.0	-3.3	3.41 V	293	16.9	33.8
5	4924.00	47.7 PK	74.0	-26.3	1.53 V	326	40.5	7.2
6	4924.00	35.6 AV	54.0	-18.4	1.53 V	326	28.4	7.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11n (VHT20)	Channel	CH 1：2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	69.7 PK	74.0	-4.3	2.84 H	247	35.9	33.8
2	2390.00	53.2 AV	54.0	-0.8	2.84 H	247	19.4	33.8
3	*2412.00	117.2 PK			2.84 H	247	83.4	33.8
4	*2412.00	106.3 AV			2.84 H	247	72.5	33.8
5	4824.00	48.6 PK	74.0	-25.4	1.23 H	322	41.1	7.5
6	4824.00	35.1 AV	54.0	-18.9	1.23 H	322	27.6	7.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.9 PK	74.0	-10.1	3.51 V	297	30.1	33.8
2	2390.00	50.6 AV	54.0	-3.4	3.51 V	297	16.8	33.8
3	*2412.00	112.6 PK			3.51 V	297	78.8	33.8
4	*2412.00	101.7 AV			3.51 V	297	67.9	33.8
5	4824.00	48.5 PK	74.0	-25.5	2.84 V	252	41.0	7.5
6	4824.00	35.1 AV	54.0	-18.9	2.84 V	252	27.6	7.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11n (VHT20)	Channel	CH 6：2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	125.7 PK			2.90 H	253	92.0	33.7
2	*2437.00	115.0 AV			2.90 H	253	81.3	33.7
3	2483.50	69.2 PK	74.0	-4.8	2.90 H	253	35.4	33.8
4	2483.50	53.3 AV	54.0	-0.7	2.90 H	253	19.5	33.8
5	4874.00	48.4 PK	74.0	-25.6	1.14 H	283	41.0	7.4
6	4874.00	35.8 AV	54.0	-18.2	1.14 H	283	28.4	7.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	120.6 PK			3.48 V	295	86.9	33.7
2	*2437.00	109.9 AV			3.48 V	295	76.2	33.7
3	2483.50	64.9 PK	74.0	-9.1	3.48 V	295	31.1	33.8
4	2483.50	52.1 AV	54.0	-1.9	3.48 V	295	18.3	33.8
5	4874.00	48.7 PK	74.0	-25.3	3.18 V	261	41.3	7.4
6	4874.00	34.9 AV	54.0	-19.1	3.18 V	261	27.5	7.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11n (VHT20)	Channel	CH 11：2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	117.8 PK			2.85 H	251	84.0	33.8
2	*2462.00	107.3 AV			2.85 H	251	73.5	33.8
3	2483.50	66.9 PK	74.0	-7.1	2.85 H	251	33.1	33.8
4	2483.50	53.3 AV	54.0	-0.7	2.85 H	251	19.5	33.8
5	4924.00	48.8 PK	74.0	-25.2	1.10 H	309	41.6	7.2
6	4924.00	35.4 AV	54.0	-18.6	1.10 H	309	28.2	7.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	113.6 PK			3.38 V	295	79.8	33.8
2	*2462.00	102.7 AV			3.38 V	295	68.9	33.8
3	2483.50	63.2 PK	74.0	-10.8	3.38 V	295	29.4	33.8
4	2483.50	51.3 AV	54.0	-2.7	3.38 V	295	17.5	33.8
5	4924.00	47.8 PK	74.0	-26.2	3.00 V	249	40.6	7.2
6	4924.00	34.9 AV	54.0	-19.1	3.00 V	249	27.7	7.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11n (VHT40)	Channel	CH 3：2422 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	68.5 PK	74.0	-5.5	2.78 H	258	34.7	33.8
2	**2390.00**	**53.5 AV**	**54.0**	**-0.5**	**2.78 H**	**258**	**19.7**	**33.8**
3	*2422.00	113.0 PK			2.78 H	258	79.2	33.8
4	*2422.00	101.6 AV			2.78 H	258	67.8	33.8
5	4844.00	48.8 PK	74.0	-25.2	1.08 H	314	41.3	7.5
6	4844.00	35.0 AV	54.0	-19.0	1.08 H	314	27.5	7.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	64.4 PK	74.0	-9.6	3.50 V	297	30.6	33.8
2	2390.00	51.7 AV	54.0	-2.3	3.50 V	297	17.9	33.8
3	*2422.00	108.7 PK			3.50 V	297	74.9	33.8
4	*2422.00	96.8 AV			3.50 V	297	63.0	33.8
5	4844.00	48.1 PK	74.0	-25.9	3.04 V	261	40.6	7.5
6	4844.00	34.7 AV	54.0	-19.3	3.04 V	261	27.2	7.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11n (VHT40)	Channel	CH 6：2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	70.4 PK	74.0	-3.6	2.97 H	252	36.6	33.8
2	**2390.00**	**53.5 AV**	**54.0**	**-0.5**	**2.97 H**	**252**	**19.7**	**33.8**
3	*2437.00	116.7 PK			2.97 H	252	83.0	33.7
4	*2437.00	105.8 AV			2.97 H	252	72.1	33.7
5	2483.50	67.0 PK	74.0	-7.0	2.97 H	252	33.2	33.8
6	2483.50	53.0 AV	54.0	-1.0	2.97 H	252	19.2	33.8
7	4874.00	48.9 PK	74.0	-25.1	1.00 H	298	41.5	7.4
8	4874.00	35.8 AV	54.0	-18.2	1.00 H	298	28.4	7.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.9 PK	74.0	-10.1	3.50 V	298	30.1	33.8
2	2390.00	49.8 AV	54.0	-4.2	3.50 V	298	16.0	33.8
3	*2437.00	112.7 PK			3.50 V	298	79.0	33.7
4	*2437.00	100.4 AV			3.50 V	298	66.7	33.7
5	2483.50	64.0 PK	74.0	-10.0	3.50 V	298	30.2	33.8
6	2483.50	51.0 AV	54.0	-3.0	3.50 V	298	17.2	33.8
7	4874.00	48.6 PK	74.0	-25.4	3.12 V	255	41.2	7.4
8	4874.00	34.7 AV	54.0	-19.3	3.12 V	255	27.3	7.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11n (VHT40)	Channel	CH 9：2452 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	112.9 PK			2.87 H	251	79.1	33.8
2	*2452.00	101.2 AV			2.87 H	251	67.4	33.8
3	2483.50	66.6 PK	74.0	-7.4	2.87 H	251	32.8	33.8
4	2483.50	53.1 AV	54.0	-0.9	2.87 H	251	19.3	33.8
5	4904.00	48.2 PK	74.0	-25.8	1.26 H	307	41.0	7.2
6	4904.00	34.6 AV	54.0	-19.4	1.26 H	307	27.4	7.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	108.4 PK			3.42 V	292	74.6	33.8
2	*2452.00	96.8 AV			3.42 V	292	63.0	33.8
3	2483.50	63.3 PK	74.0	-10.7	3.42 V	292	29.5	33.8
4	2483.50	50.7 AV	54.0	-3.3	3.42 V	292	16.9	33.8
5	4904.00	47.9 PK	74.0	-26.1	3.12 V	254	40.7	7.2
6	4904.00	35.2 AV	54.0	-18.8	3.12 V	254	28.0	7.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

Below 1GHz worst-case data:

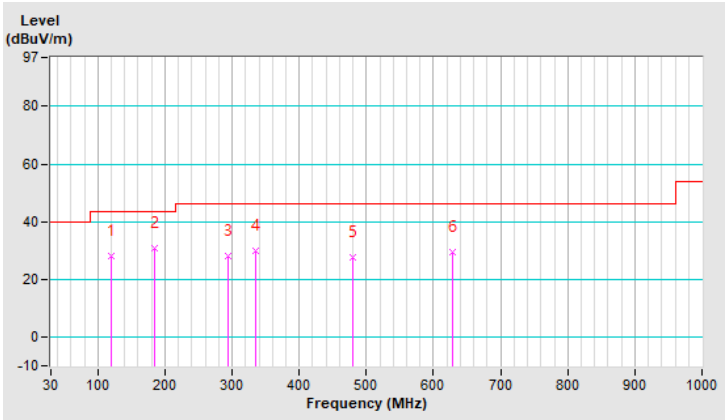
Mode A

RF Mode	TX 802.11n (VHT20)	Channel	CH 6：2437 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	120.21	28.0 QP	43.5	-15.5	1.00 H	5	39.2	-11.2
2	185.20	30.8 QP	43.5	-12.7	2.00 H	5	41.7	-10.9
3	293.84	28.1 QP	46.0	-17.9	1.00 H	22	35.2	-7.1
4	334.58	29.9 QP	46.0	-16.1	1.50 H	5	35.9	-6.0
5	480.08	27.8 QP	46.0	-18.2	1.25 H	5	30.8	-3.0
6	627.52	29.5 QP	46.0	-16.5	1.00 H	5	29.4	0.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

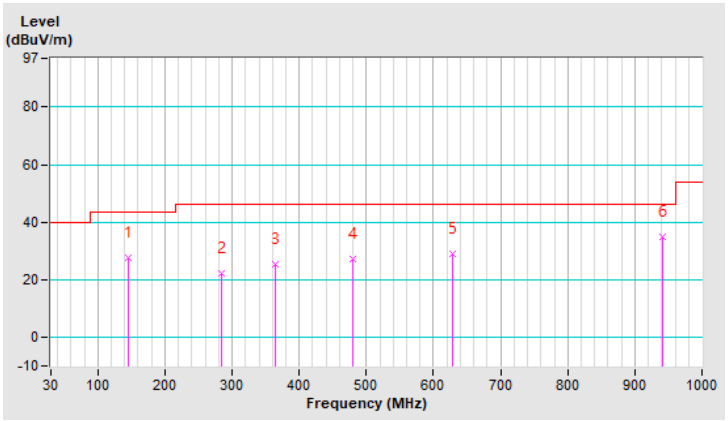


RF Mode	TX 802.11n (VHT20)	Channel	CH 6：2437 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	145.43	27.8 QP	43.5	-15.7	1.25 V	6	36.8	-9.0
2	284.14	22.4 QP	46.0	-23.6	1.00 V	57	29.7	-7.3
3	364.65	25.5 QP	46.0	-20.5	1.25 V	30	31.2	-5.7
4	480.08	27.2 QP	46.0	-18.8	1.00 V	52	30.2	-3.0
5	628.49	28.8 QP	46.0	-17.2	1.50 V	32	28.7	0.1
6	941.80	34.7 QP	46.0	-11.3	1.00 V	6	28.4	6.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



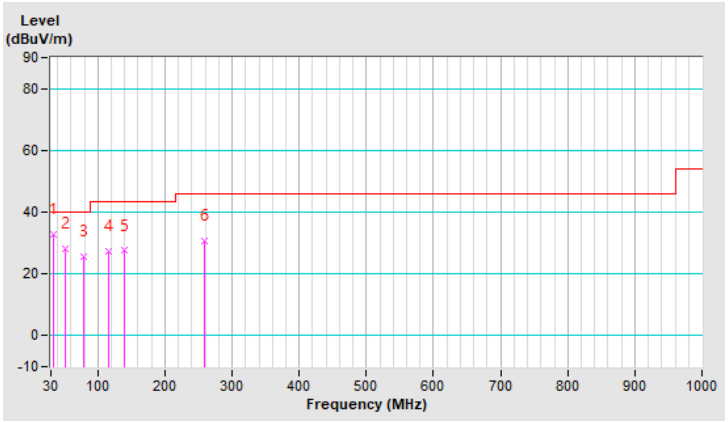
Mode B

RF Mode	TX 802.11n (VHT20)	Channel	CH 6：2437 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	33.88	32.6 QP	40.0	-7.4	1.49 H	23	42.7	-10.1
2	51.34	28.1 QP	40.0	-11.9	1.49 H	23	36.6	-8.5
3	78.50	25.6 QP	40.0	-14.4	1.49 H	6	38.2	-12.6
4	115.36	27.3 QP	43.5	-16.2	1.49 H	243	38.9	-11.6
5	138.64	27.5 QP	43.5	-16.0	1.49 H	173	36.8	-9.3
6	258.92	30.6 QP	46.0	-15.4	1.00 H	243	39.7	-9.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

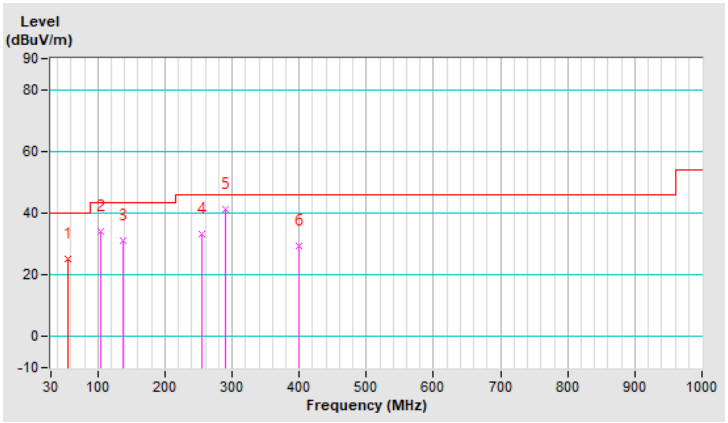


RF Mode	TX 802.11n (VHT20)	Channel	CH 6：2437 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	55.04	25.3 QP	40.0	-14.7	1.00 V	54	34.1	-8.8
2	103.72	33.9 QP	43.5	-9.6	1.99 V	32	46.7	-12.8
3	136.70	31.2 QP	43.5	-12.3	1.99 V	38	40.6	-9.4
4	255.04	33.4 QP	46.0	-12.6	1.99 V	34	42.6	-9.2
5	289.96	41.3 QP	46.0	-4.7	1.99 V	32	49.2	-7.9
6	400.54	29.4 QP	46.0	-16.6	1.00 V	317	35.4	-6.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102783	Dec. 21, 2020	Dec. 20, 2021
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2021	Sep. 03, 2022
AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 28, 2021	Jan. 27, 2022
AMN ROHDE & SCHWARZ (Peripheral)	ENV216	101196	Apr. 26, 2021	Apr. 25, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-12047.

4.2.3 Test Procedures

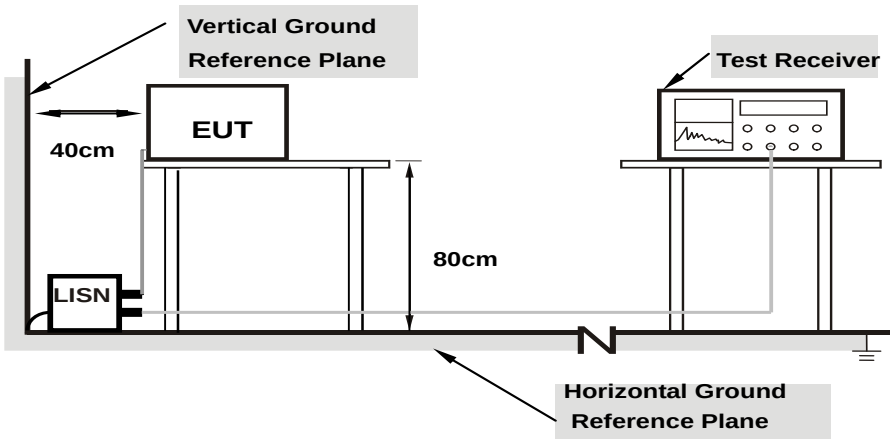
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz – 30 MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.2.7 Test Results

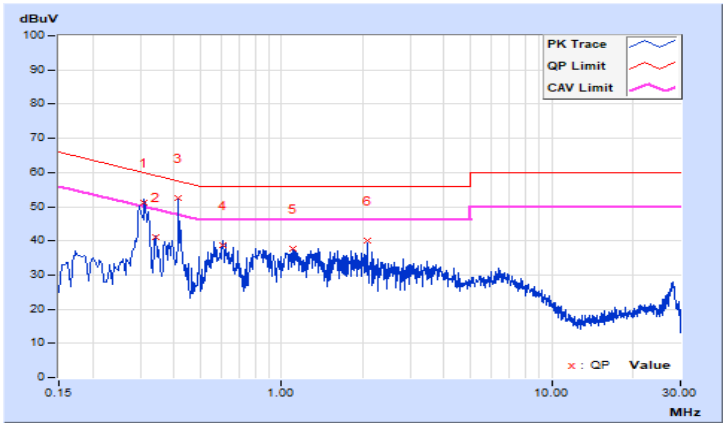
Mode A

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25 °C, 75% RH
Tested by	Hans Wu	Test Date	2021/11/3

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.31031	10.09	41.24	31.21	51.33	41.30	59.96	49.96	-8.63	-8.66
2	0.34159	10.09	30.91	17.35	41.00	27.44	59.16	49.16	-18.16	-21.72
3	**0.41588**	**10.09**	**42.51**	**27.24**	**52.60**	**37.33**	**57.53**	**47.53**	**-4.93**	**-10.20**
4	0.60737	10.11	28.50	16.75	38.61	26.86	56.00	46.00	-17.39	-19.14
5	1.10795	10.14	27.68	17.68	37.82	27.82	56.00	46.00	-18.18	-18.18
6	2.07763	10.16	29.78	14.17	39.94	24.33	56.00	46.00	-16.06	-21.67

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

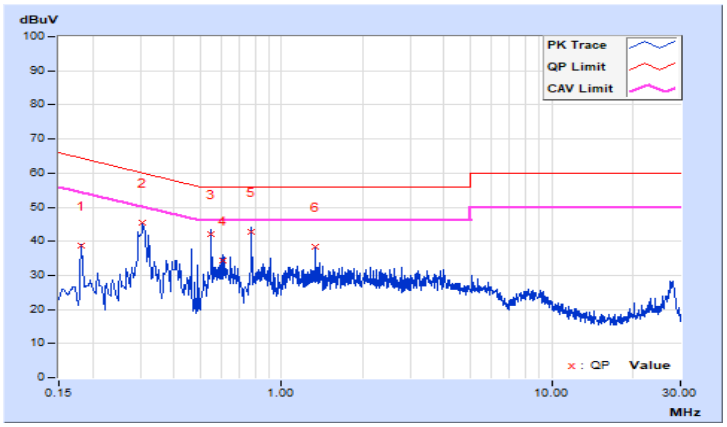


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25 °C, 75% RH
Tested by	Hans Wu	Test Date	2021/11/3

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18128	10.08	28.61	19.38	38.69	29.46	64.43	54.43	-25.74	-24.97
2	0.30615	10.09	35.53	24.81	45.62	34.90	60.07	50.07	-14.45	-15.17
3	0.54882	10.11	31.99	20.79	42.10	30.90	56.00	46.00	-13.90	-15.10
4	0.60356	10.12	24.17	13.66	34.29	23.78	56.00	46.00	-21.71	-22.22
5	0.77169	10.13	32.77	18.59	42.90	28.72	56.00	46.00	-13.10	-17.28
6	1.33473	10.16	28.09	13.67	38.25	23.83	56.00	46.00	-17.75	-22.17

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



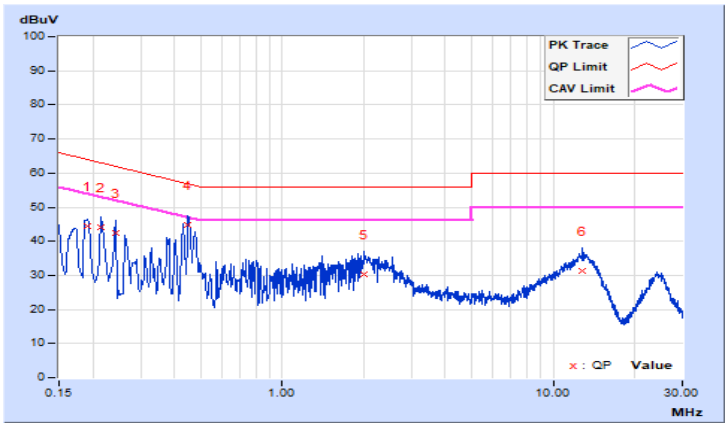
Mode B

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23 °C, 66% RH
Tested by	Titan Hsu	Test Date	2021/12/16

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19000	10.14	34.18	15.62	44.32	25.76	64.04	54.04	-19.72	-28.28
2	0.21400	10.15	34.07	15.88	44.22	26.03	63.05	53.05	-18.83	-27.02
3	0.24200	10.16	32.20	13.26	42.36	23.42	62.03	52.03	-19.67	-28.61
4	0.44999	10.22	34.59	24.88	44.81	35.10	56.88	46.88	-12.07	-11.78
5	1.99400	10.36	19.88	7.53	30.24	17.89	56.00	46.00	-25.76	-28.11
6	12.87000	10.55	20.66	13.19	31.21	23.74	60.00	50.00	-28.79	-26.26

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

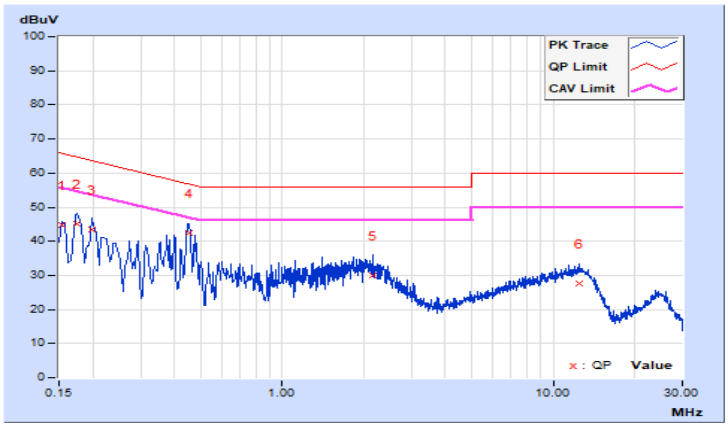


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23 °C, 66% RH
Tested by	Titan Hsu	Test Date	2021/12/16

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	10.14	34.53	20.84	44.67	30.98	65.78	55.78	-21.11	-24.80
2	0.17384	10.15	35.07	20.74	45.22	30.89	64.77	54.77	-19.55	-23.88
3	0.19800	10.17	33.15	19.63	43.32	29.80	63.69	53.69	-20.37	-23.89
4	0.45400	10.24	32.13	23.96	42.37	34.20	56.80	46.80	-14.43	-12.60
5	2.15800	10.35	19.75	12.25	30.10	22.60	56.00	46.00	-25.90	-23.40
6	12.40600	10.64	16.93	10.92	27.57	21.56	60.00	50.00	-32.43	-28.44

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

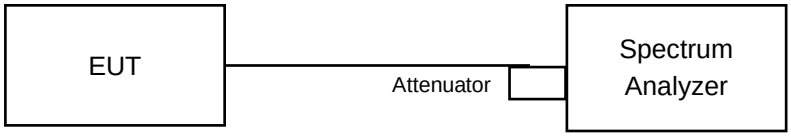


4.3 6 dB Bandwidth Measurement

4.3.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100 kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Results

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.58	9.01	0.5	Pass
6	2437	8.59	9.07	0.5	Pass
11	2462	9.09	9.06	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.37	15.19	0.5	Pass
6	2437	15.16	15.19	0.5	Pass
11	2462	15.19	15.20	0.5	Pass

802.11n (VHT20)

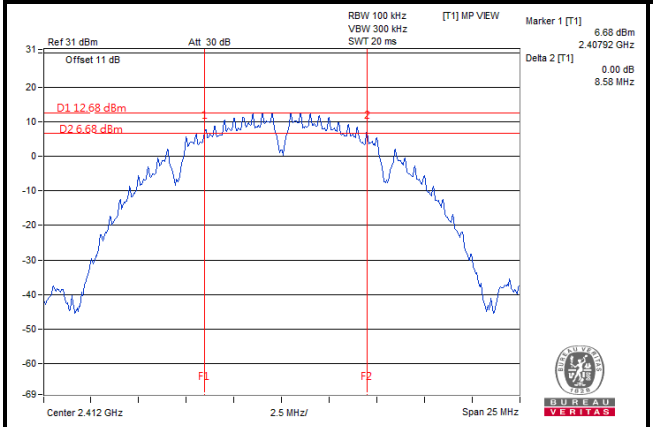
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.19	15.20	0.5	Pass
6	2437	15.19	15.19	0.5	Pass
11	2462	15.19	15.20	0.5	Pass

802.11n (VHT40)

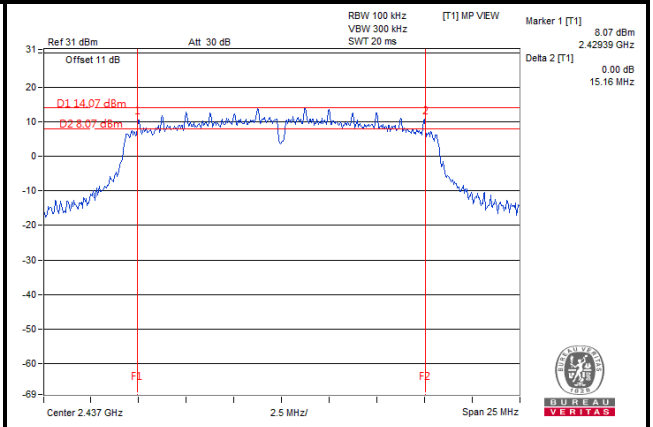
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.25	35.25	0.5	Pass
6	2437	35.24	35.25	0.5	Pass
9	2452	35.24	35.25	0.5	Pass

Spectrum Plot of Worst Value

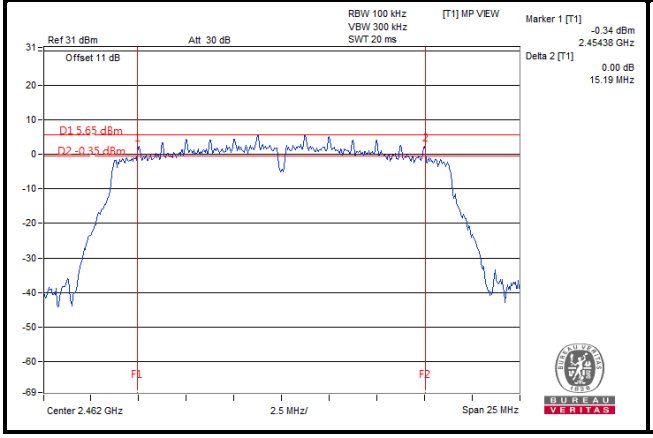
802.11b



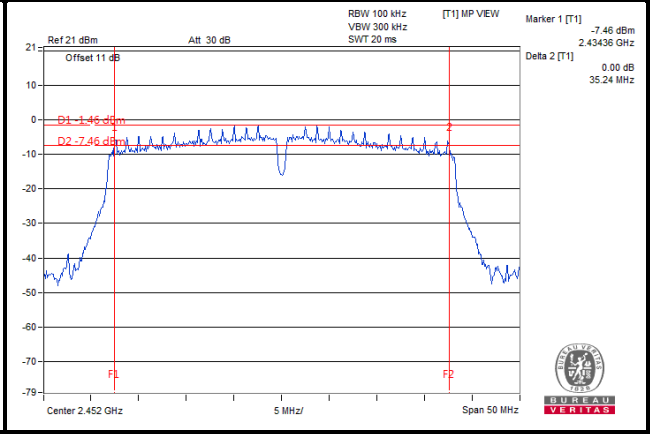
802.11g



802.11n (VHT20)

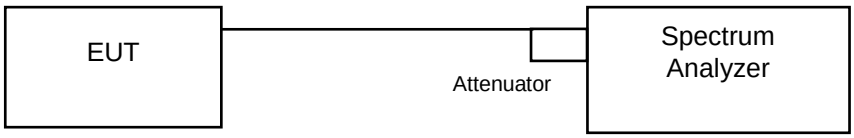


802.11n (VHT40)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.4 Deviation from Test Standard

No deviation.

4.4.5 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.4.6 Test Results

802.11b

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	13.22	13.22	Pass
6	2437	13.32	13.32	Pass
11	2462	13.56	13.56	Pass

802.11g

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	16.61	16.56	Pass
6	2437	17.04	16.92	Pass
11	2462	16.68	16.68	Pass

802.11n (VHT20)

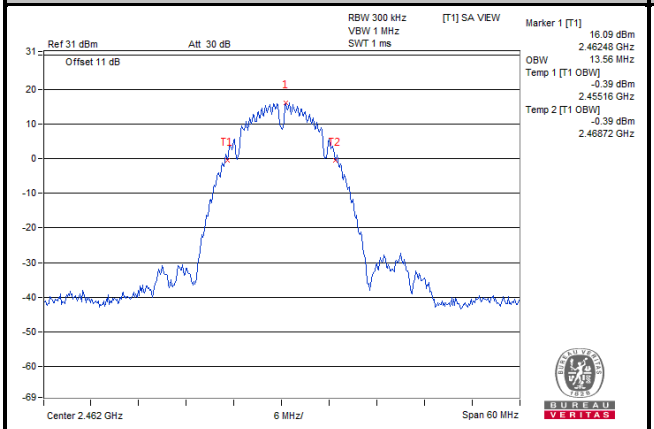
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	17.64	17.64	Pass
6	2437	17.88	17.88	Pass
11	2462	17.64	17.64	Pass

802.11n (VHT40)

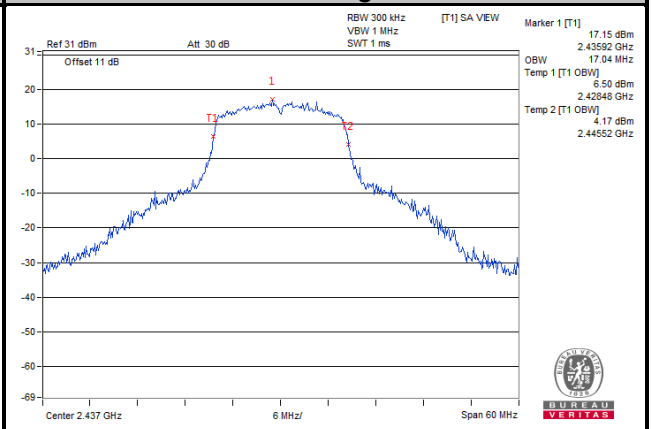
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
3	2422	36.12	36.12	Pass
6	2437	36.12	36.12	Pass
9	2452	36.24	36.24	Pass

Spectrum Plot of Worst Value

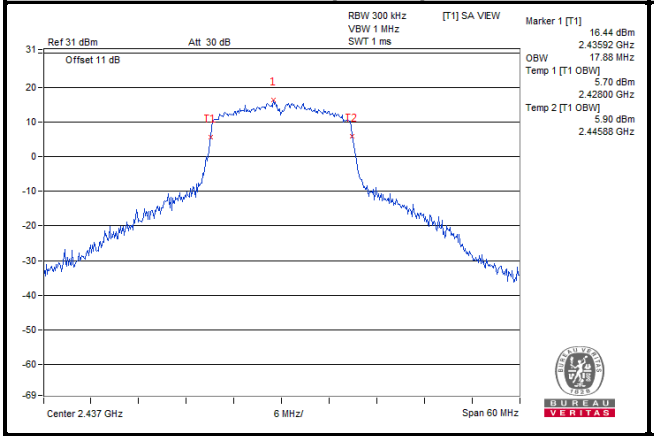
802.11b



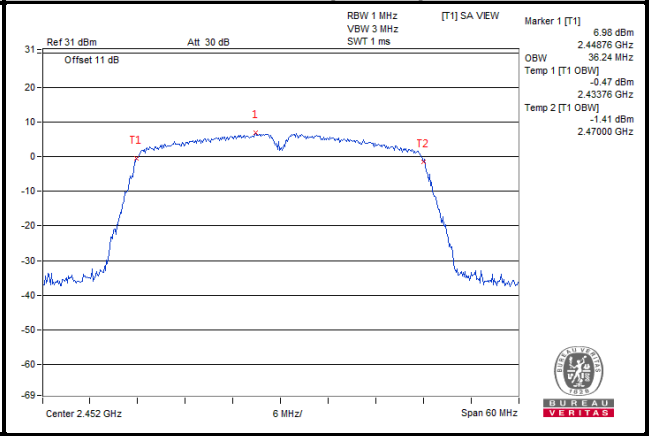
802.11g



802.11n (VHT20)



802.11n (VHT40)



4.5 Conducted Output Power Measurement

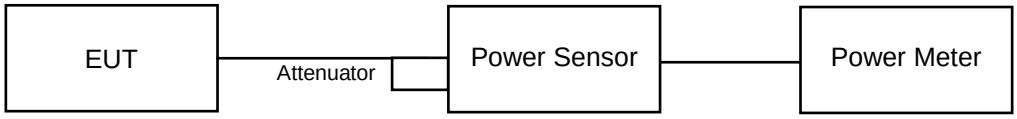
4.5.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30 dBm)
Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20 MHz channel widths with NANT ≥ 5.

For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.5.7 Test Results

802.11b

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	23.85	24.36	515.559	27.12	30	Pass
6	2437	25.14	25.85	711.18	28.52	30	Pass
11	2462	25.12	25.94	717.732	28.56	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.02	21.23	259.213	24.14	30	Pass
6	2437	25.34	25.85	726.571	28.61	30	Pass
11	2462	18.33	19.08	148.987	21.73	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.92	18.71	136.246	21.34	30	Pass
6	2437	25.21	25.98	728.172	28.62	30	Pass
11	2462	17.97	18.92	140.644	21.48	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	15.00	15.91	70.617	18.49	30	Pass
6	2437	18.30	18.89	145.054	21.62	30	Pass
9	2452	14.12	14.95	57.083	17.57	30	Pass

802.11n (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.96	18.74	137.334	21.38	30	Pass
6	2437	25.23	26.02	**733.371**	**28.65**	30	Pass
11	2462	18.01	18.96	141.946	21.52	30	Pass

802.11n (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	15.02	15.96	71.214	18.53	30	Pass
6	2437	18.32	19.01	147.536	21.69	30	Pass
9	2452	14.15	14.98	57.479	17.60	30	Pass

4.6 Power Spectral Density Measurement

4.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.6.2 Test Setup

4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. Set analyzer center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d. Set the VBW ≥ 3 × RBW.
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level within the RBW.

For Average Power (duty cycle ≥ 98%)
a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz. .
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.

For Average Power (duty cycle < 98%)
a) Measure the duty cycle (x).
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 times the OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
e) Set VBW ≥3 x RBW.
f) Detector = power averaging (RMS) or sample detector (when RMS not available).
g) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h) Sweep time = auto couple.
i) Do not use sweep triggering. Allow sweep to “free run”.
j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.6.7 Test Results

802.11b

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-11.8	3.01	-8.79	6.99	Pass
	6	2437	-8.21	3.01	-5.2	6.99	Pass
	11	2462	-8.86	3.01	-5.85	6.99	Pass
1	1	2412	-11.55	3.01	-8.54	6.99	Pass
	6	2437	-7.97	3.01	-4.96	6.99	Pass
	11	2462	-8.45	3.01	-5.44	6.99	Pass

NOTE:
1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}]$ = 7.01 dBi > 6 dBi, so the power density limit shall be reduced to 8-(7.01-6) = 6.99 dBm.
2. Method 2) C) of power density measurement of KDB 662911 is using for calculating total power density.

802.11g

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-14.73	3.01	0.26	-11.46	6.99	Pass
	6	2437	-10.03	3.01	0.26	-6.76	6.99	Pass
	11	2462	-18.48	3.01	0.26	-15.21	6.99	Pass
1	1	2412	-14.53	3.01	0.26	-11.26	6.99	Pass
	6	2437	-9.54	3.01	0.26	-6.27	6.99	Pass
	11	2462	-17.89	3.01	0.26	-14.62	6.99	Pass

NOTE:
1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}]$ = 7.01 dBi > 6 dBi, so the power density limit shall be reduced to 8-(7.01-6) = 6.99 dBm.
2. Method 2) C) of power density measurement of KDB 662911 is using for calculating total power density.

802.11n (VHT20)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-18.46	3.01	0.49	-14.96	6.99	Pass
	6	2437	-10.04	3.01	0.49	-6.54	6.99	Pass
	11	2462	-17.5	3.01	0.49	-14	6.99	Pass
1	1	2412	-18.29	3.01	0.49	-14.79	6.99	Pass
	6	2437	-9.15	3.01	0.49	-5.65	6.99	Pass
	11	2462	-17.42	3.01	0.49	-13.92	6.99	Pass

NOTE:
1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 7.01$ dBi > 6 dBi, so the power density limit shall be reduced to 8-(7.01-6) = 6.99 dBm.
2. Method 2) C) of power density measurement of KDB 662911 is using for calculating total power density.

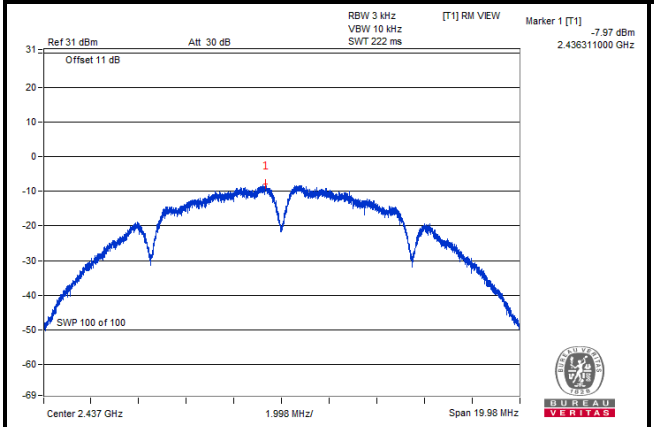
802.11n (VHT40)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	3	2422	-22.53	3.01	0.81	-18.71	6.99	Pass
	6	2437	-18.5	3.01	0.81	-14.68	6.99	Pass
	9	2452	-23.78	3.01	0.81	-19.96	6.99	Pass
1	3	2422	-21.93	3.01	0.81	-18.11	6.99	Pass
	6	2437	-18.36	3.01	0.81	-14.54	6.99	Pass
	9	2452	-22.57	3.01	0.81	-18.75	6.99	Pass

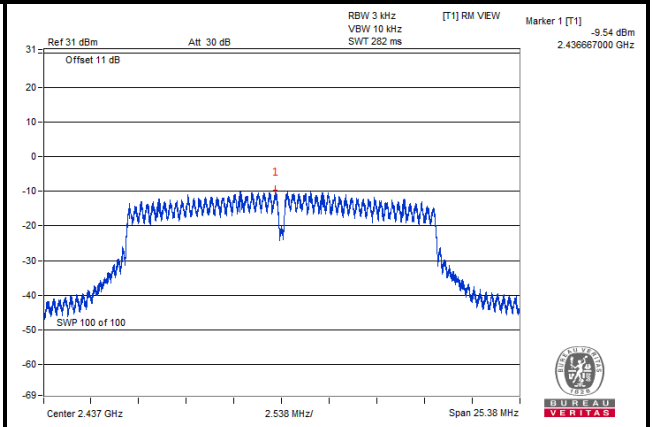
NOTE:
1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 7.01$ dBi > 6 dBi, so the power density limit shall be reduced to 8-(7.01-6) = 6.99 dBm.
2. Method 2) C) of power density measurement of KDB 662911 is using for calculating total power density.

Spectrum Plot of Worst Value

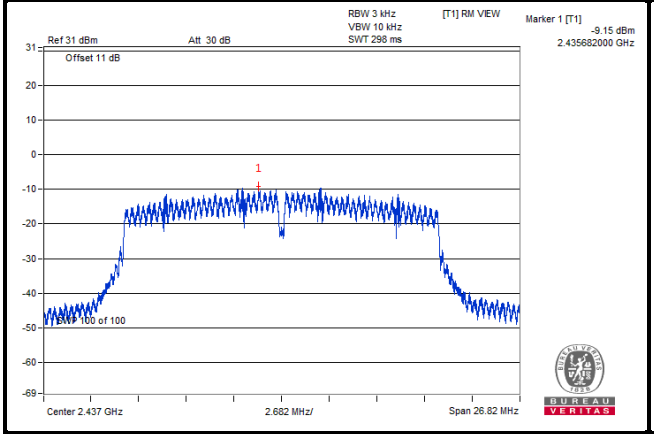
802.11b



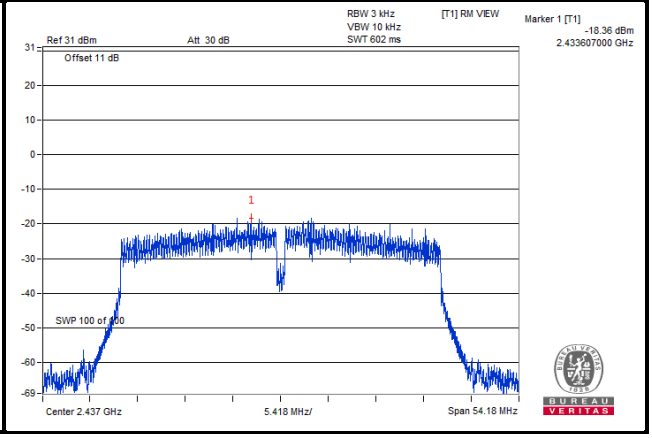
802.11g



802.11n (VHT20)



802.11n (VHT40)

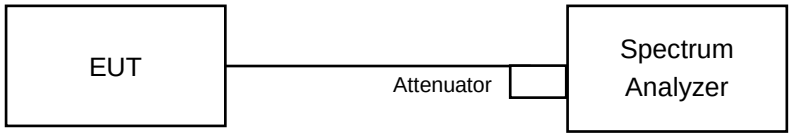


4.7 Conducted Out of Band Emission Measurement

4.7.1 Limits of Conducted Out of Band Emission Measurement

Below -30 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

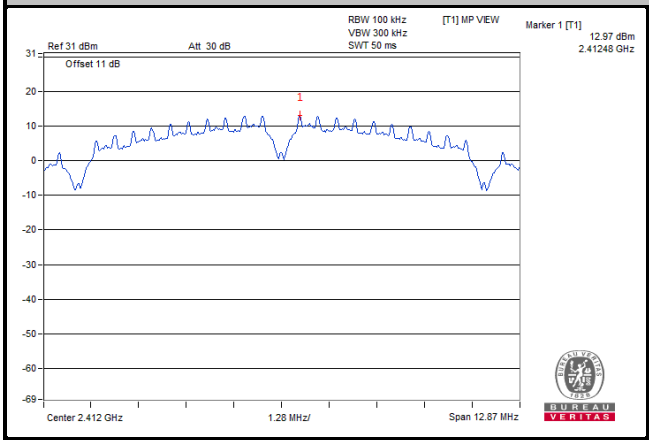
4.7.7 Test Results

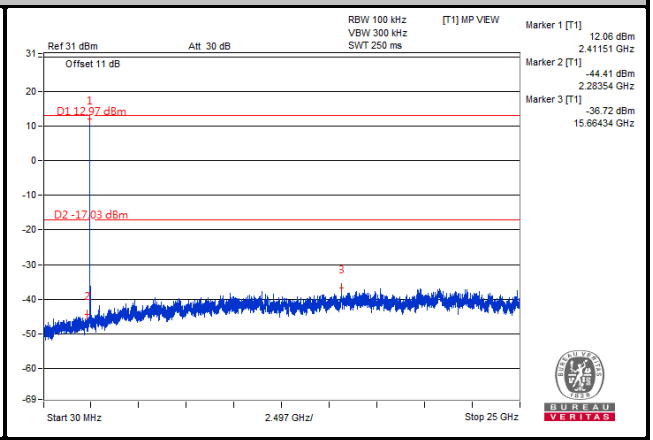
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 30 dB offset below D1. It shows compliance with the requirement.

802.11b

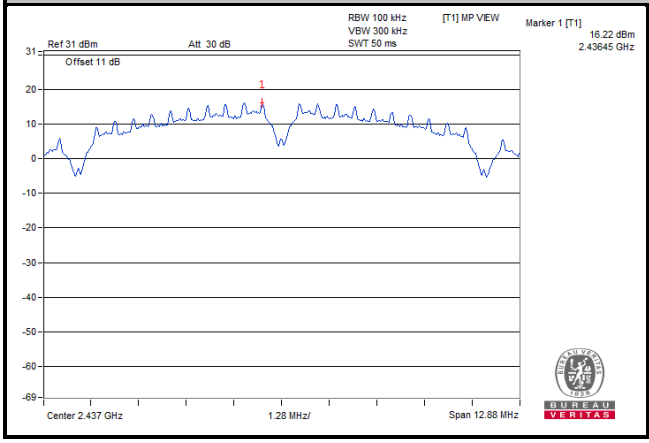
CHAIN 0

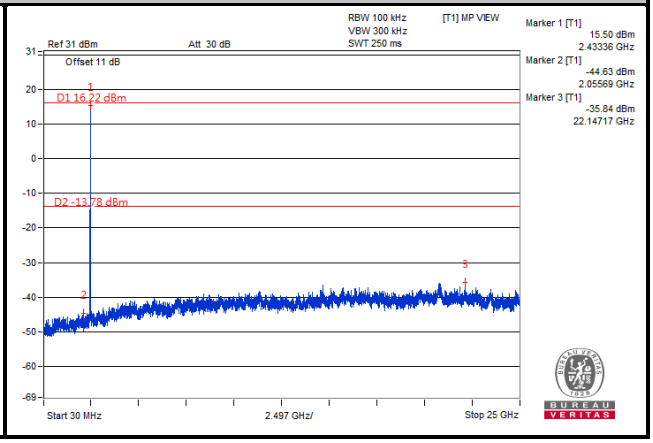
Ch 1



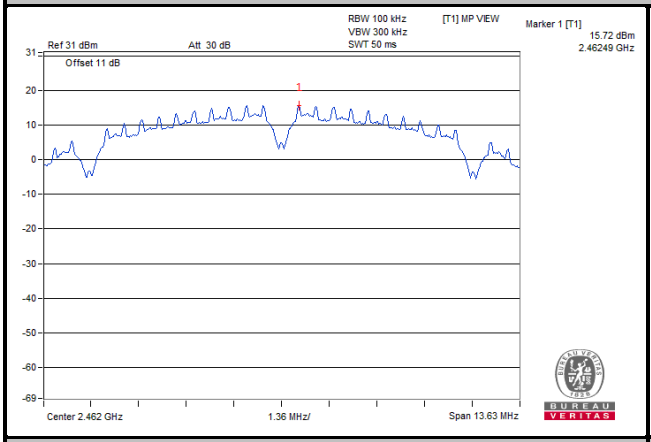


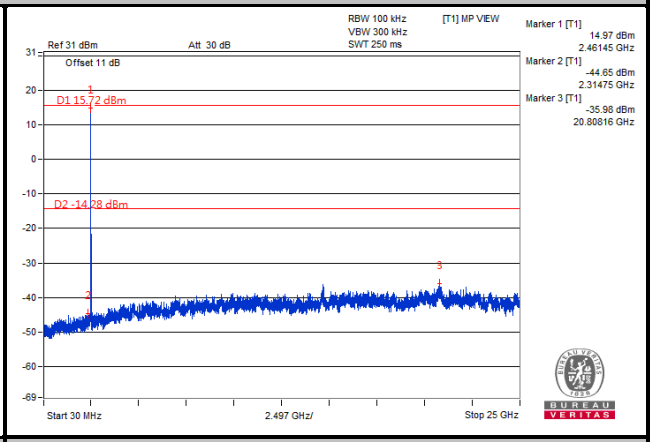
Ch 6



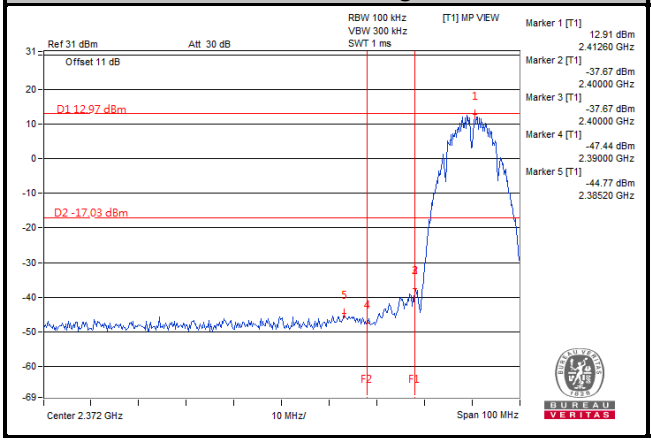


Ch 11

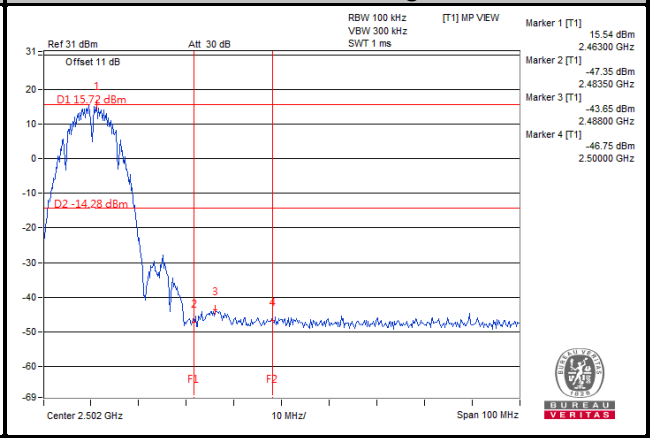




Ch 1 Band Edge

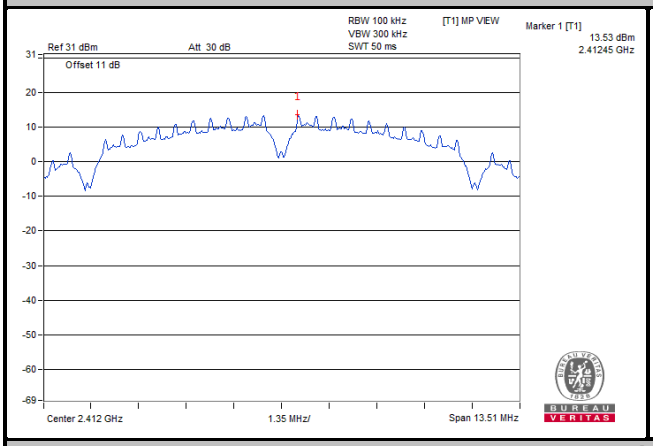


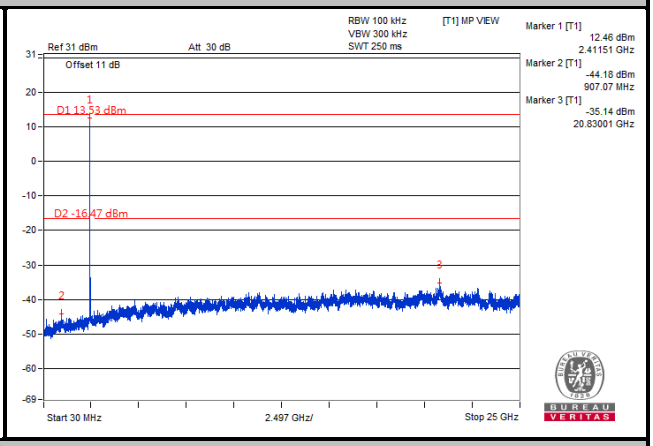
Ch 11 Band Edge



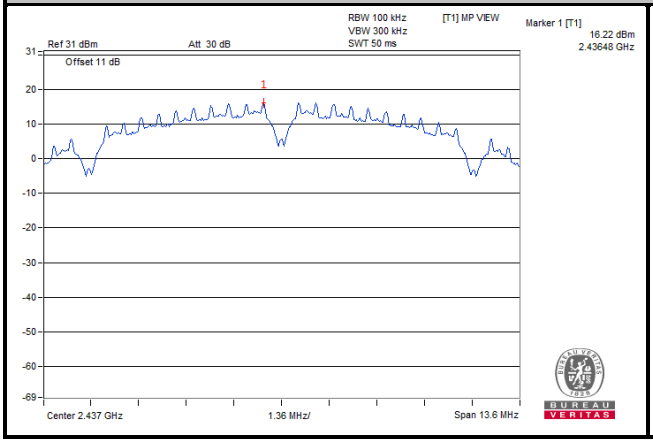
CHAIN 1

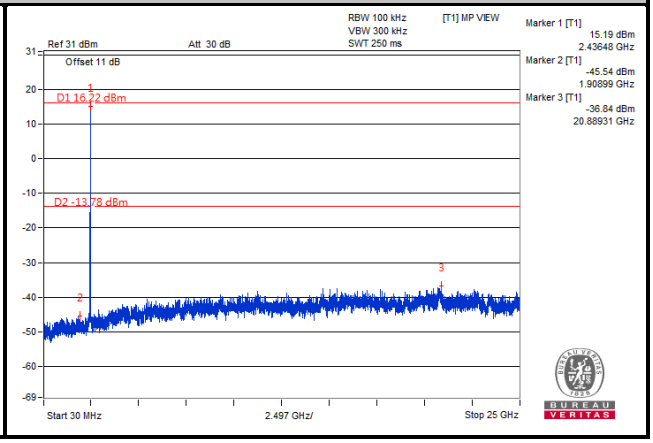
Ch 1



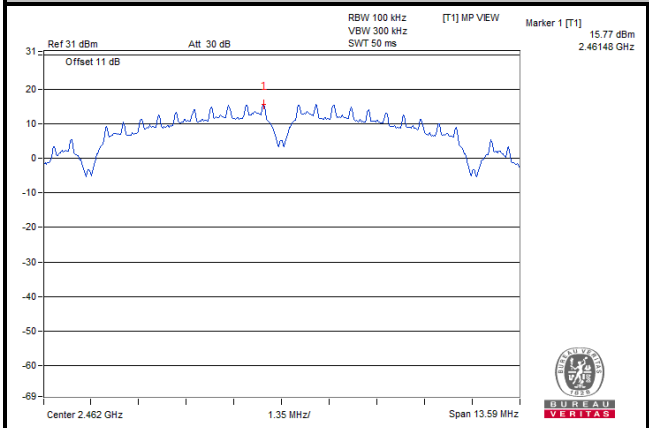


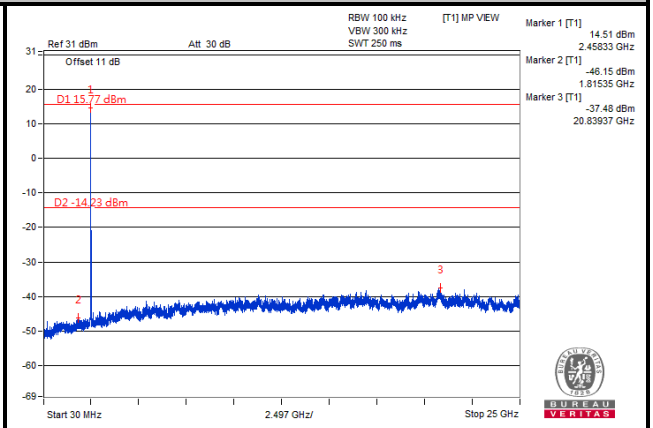
Ch 6



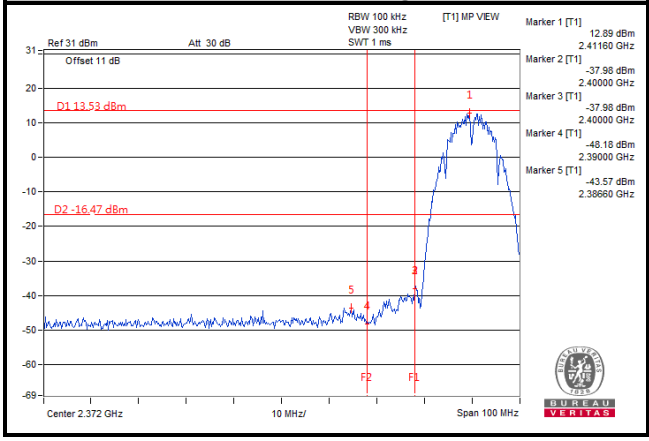


Ch 11

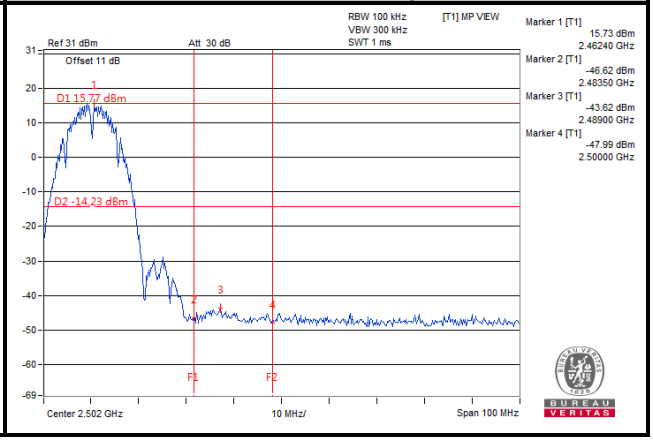




Ch 1 Band Edge



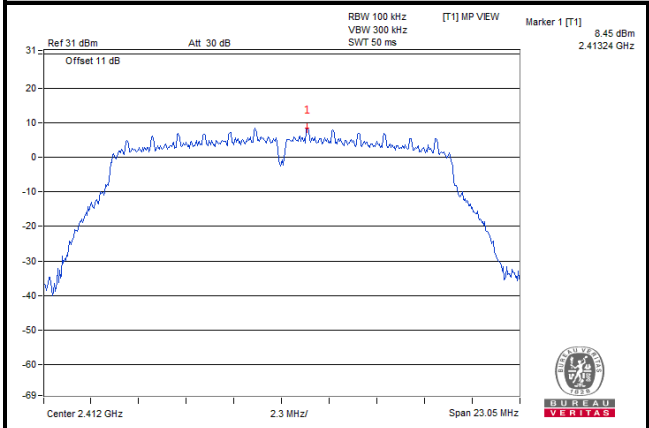
Ch 11 Band Edge

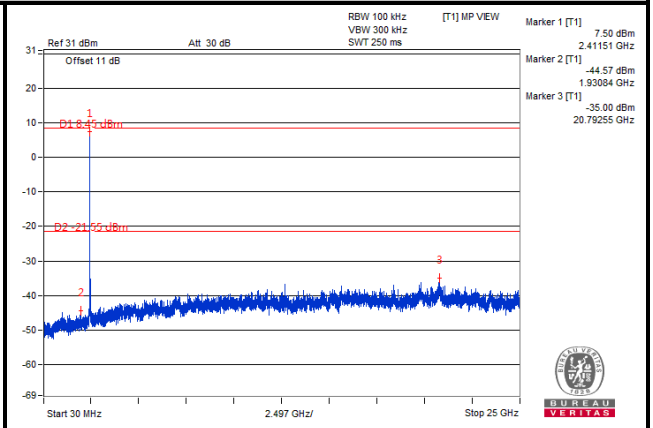


802.11g

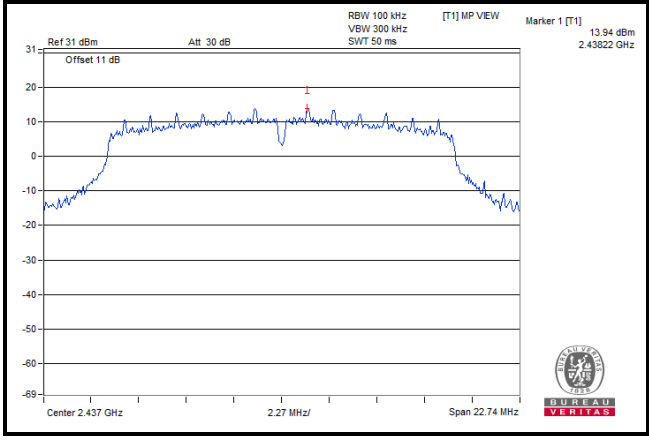
CHAIN 0

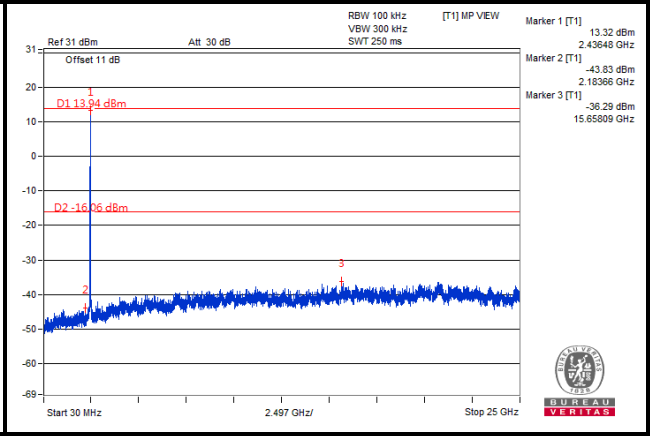
Ch 1



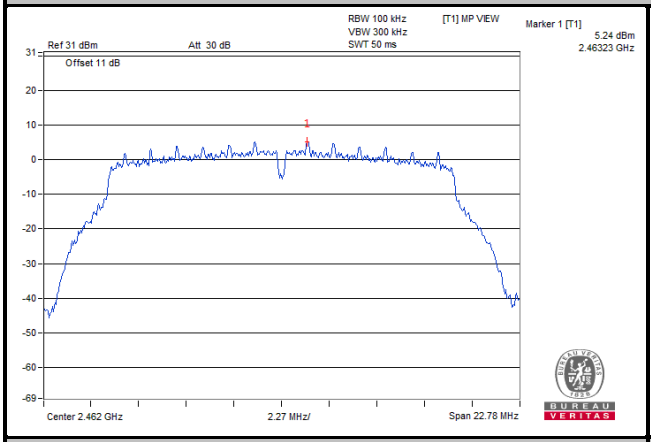


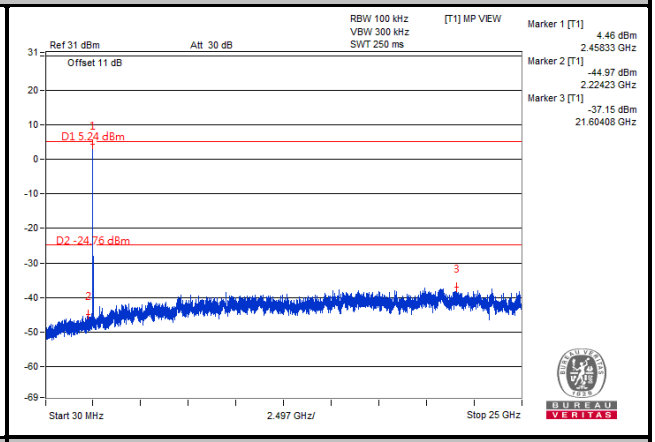
Ch 6



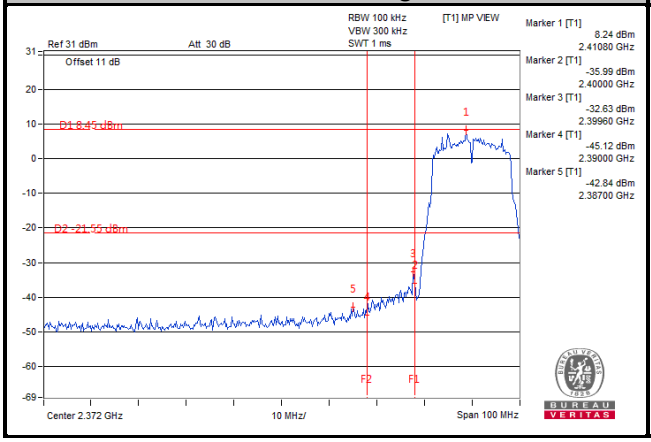


Ch 11

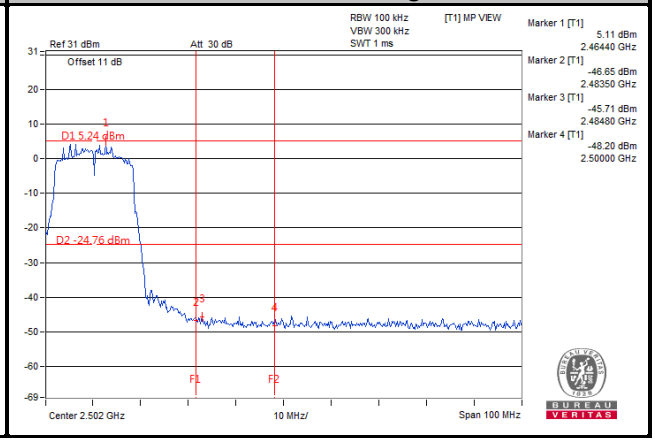




Ch 1 Band Edge

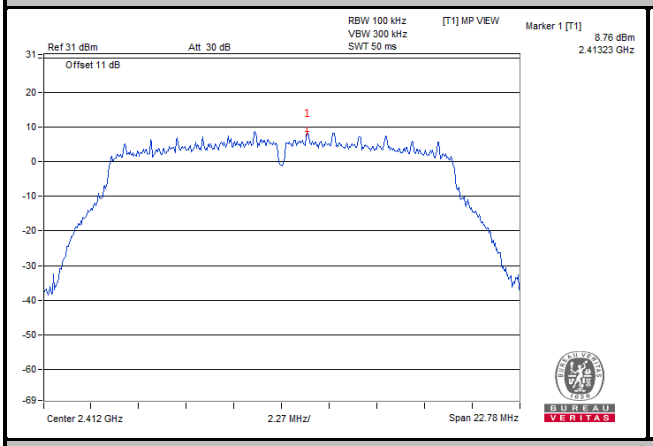


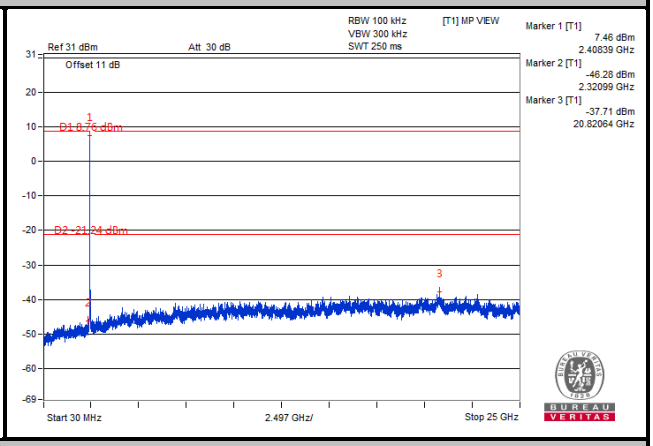
Ch 11 Band Edge



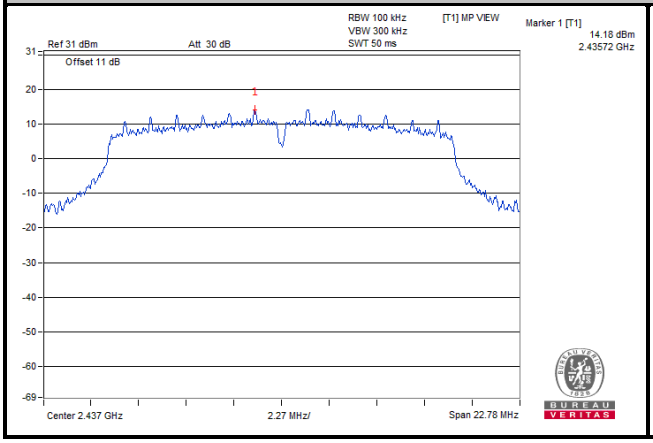
CHAIN 1

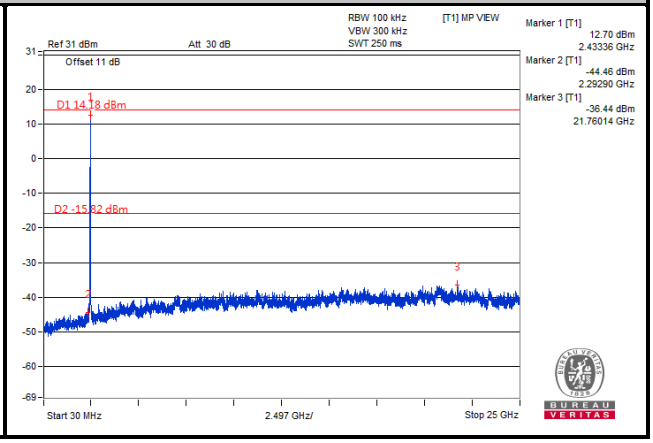
Ch 1



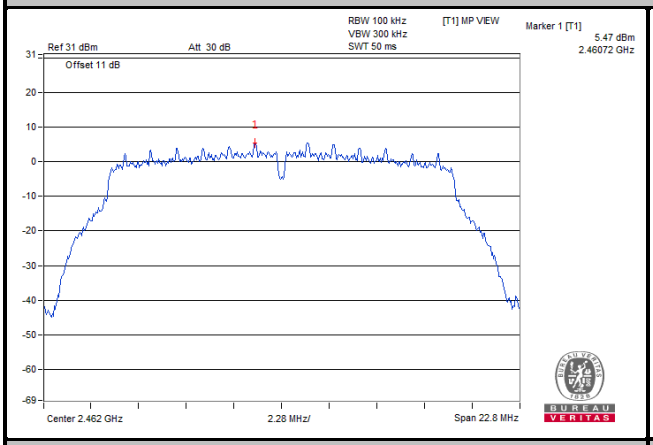


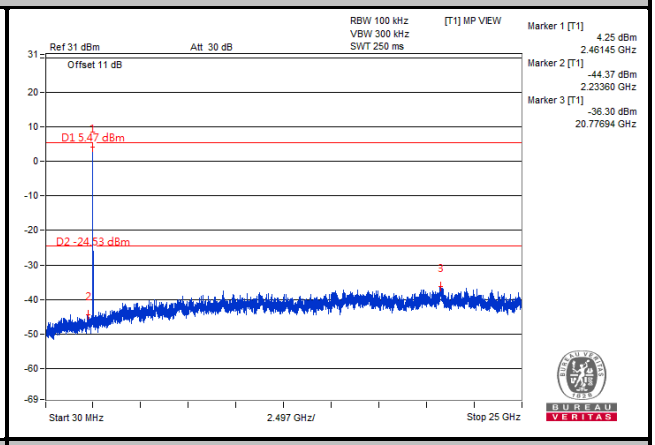
Ch 6



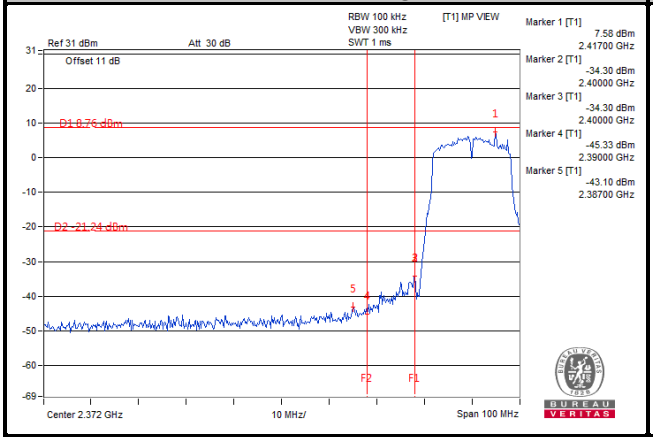


Ch 11

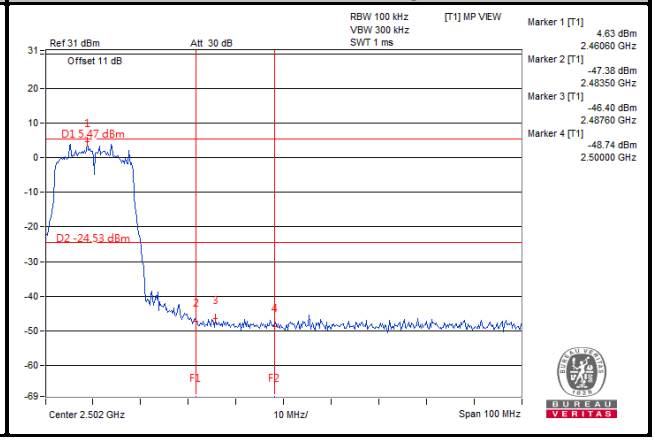




Ch 1 Band Edge



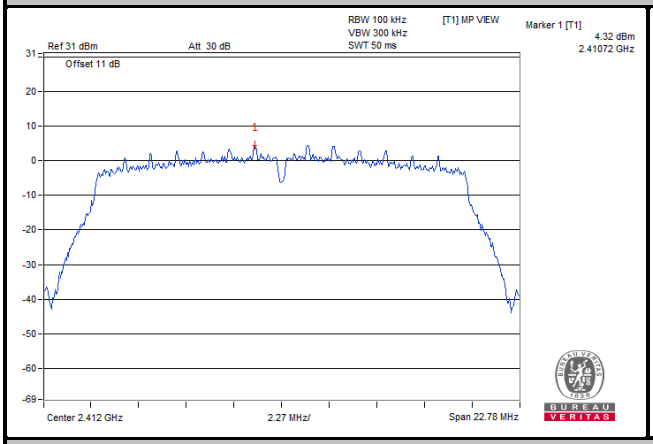
Ch 11 Band Edge

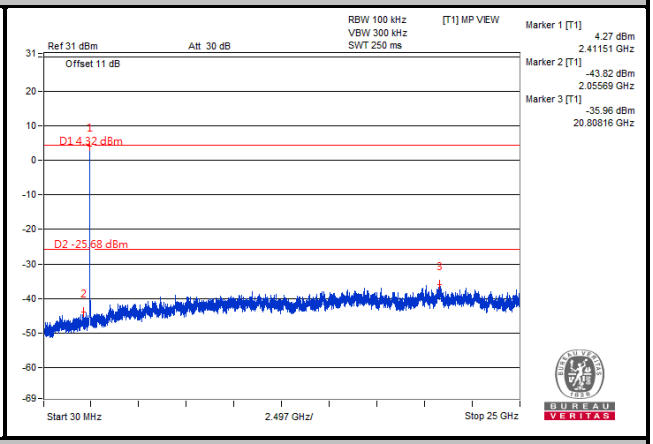


802.11n (VHT20)

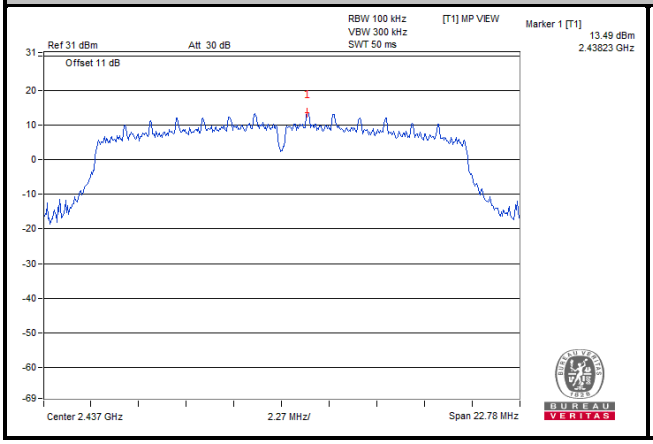
CHAIN 0

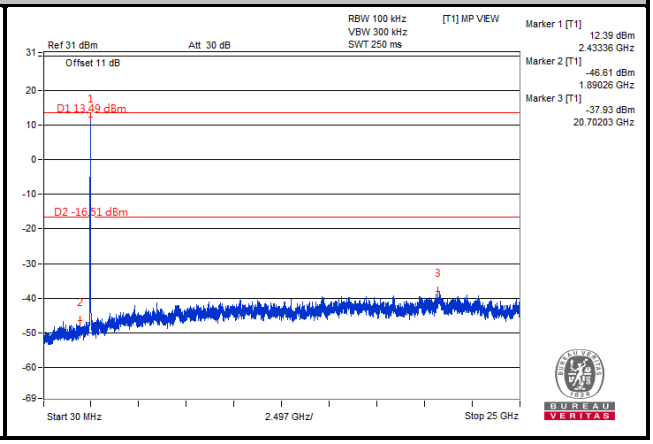
Ch 1



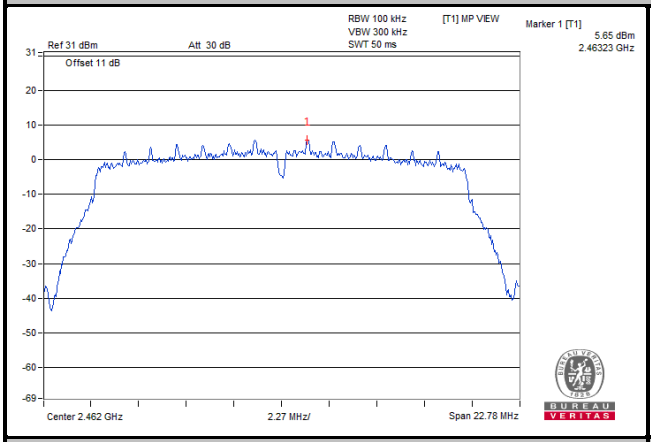


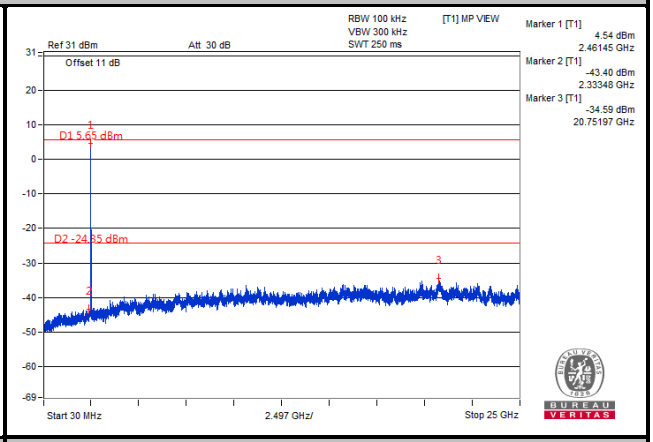
Ch 6



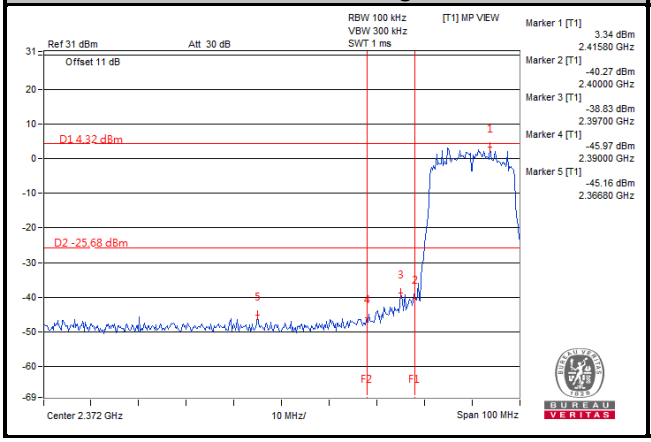


Ch 11

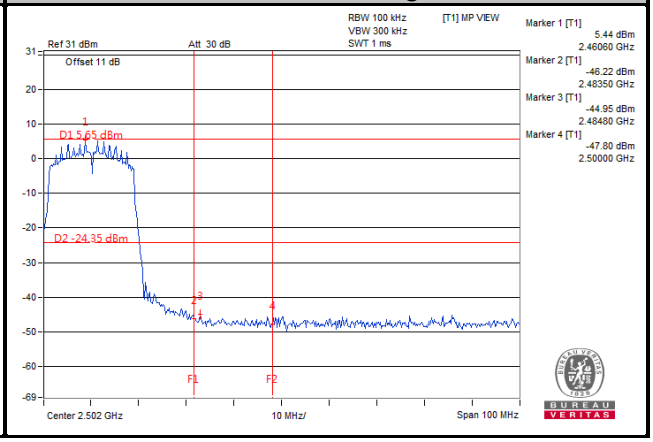




Ch 1 Band Edge

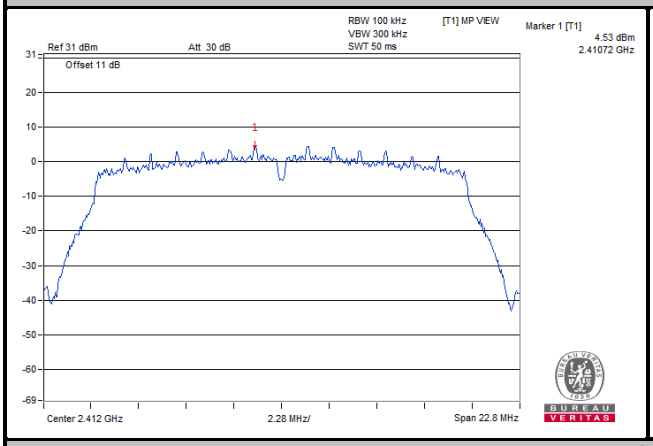


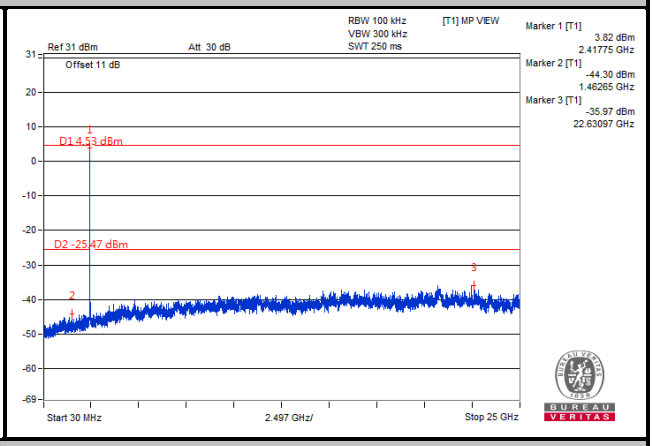
Ch 11 Band Edge



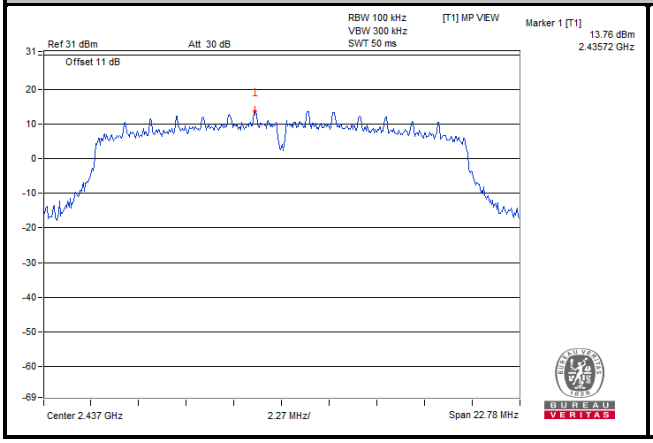
CHAIN 1

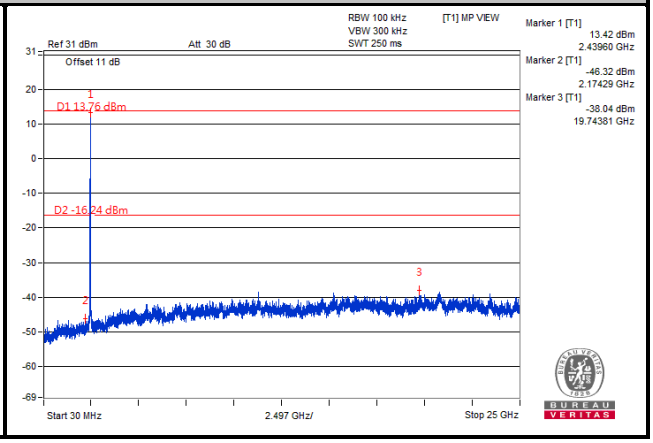
Ch 1



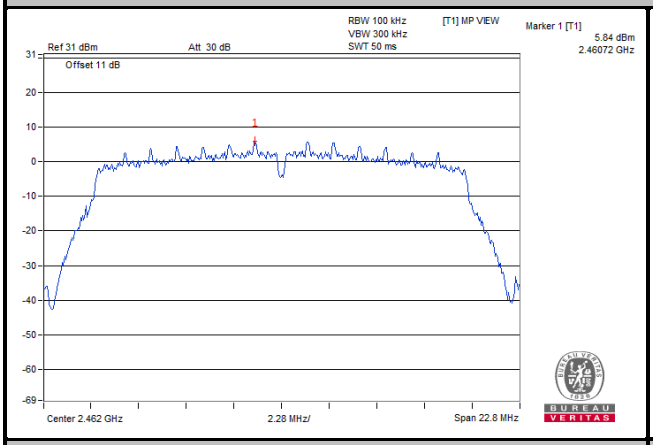


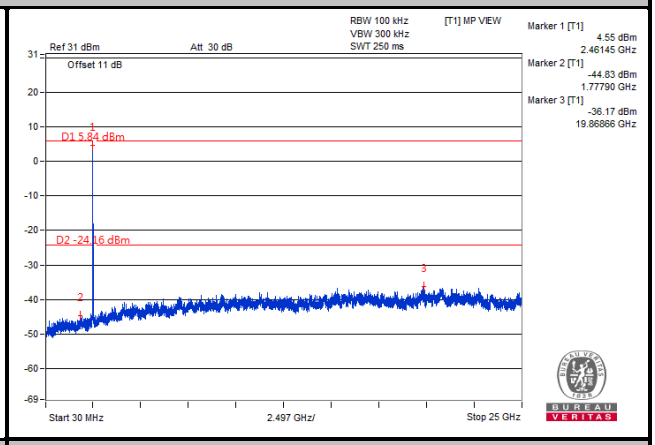
Ch 6



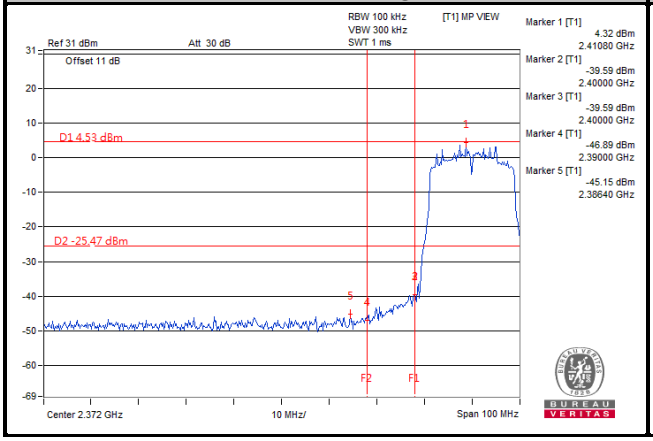


Ch 11

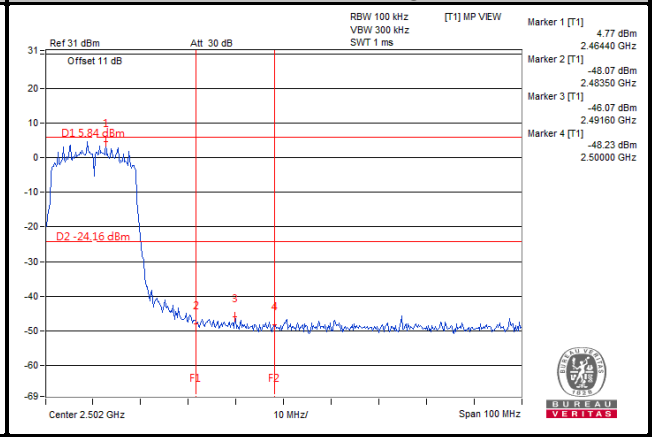




Ch 1 Band Edge



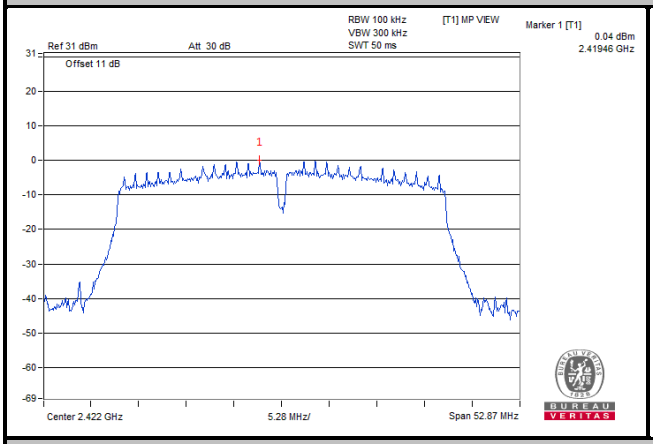
Ch 11 Band Edge

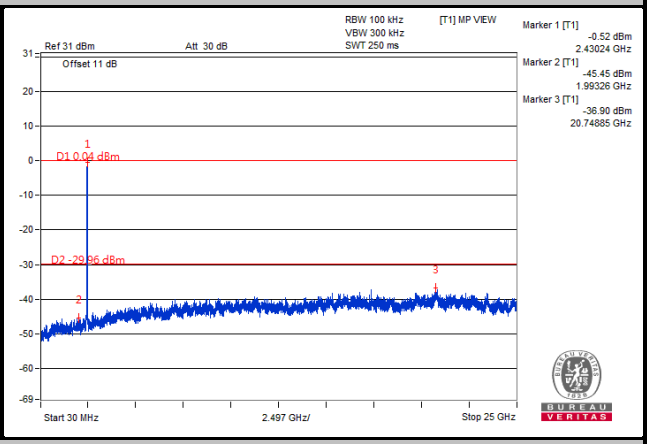


802.11n (VHT40)

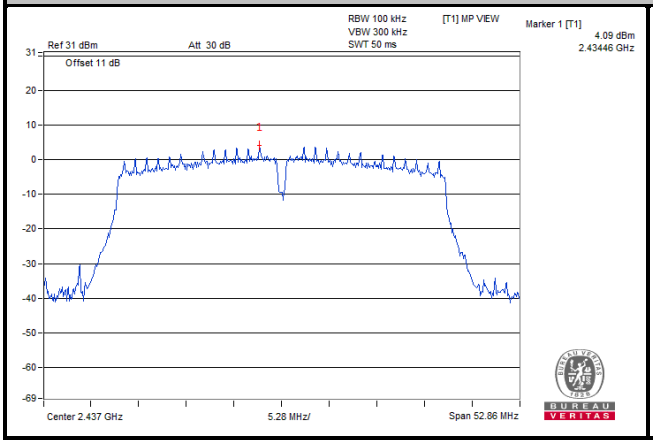
CHAIN 0

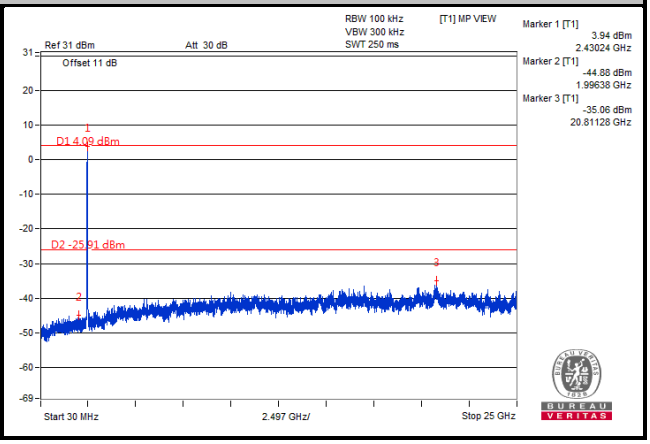
Ch 3



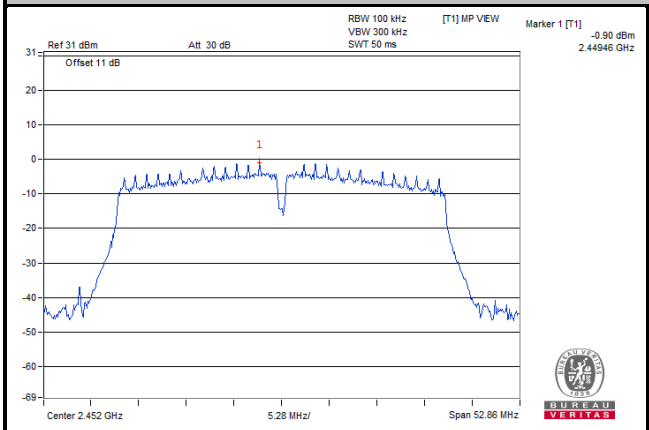


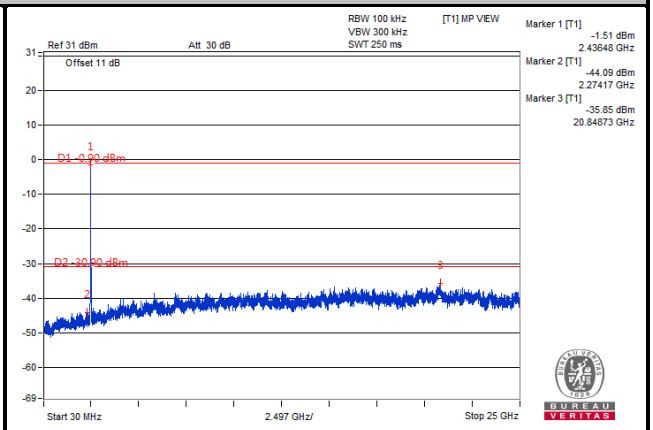
Ch 6



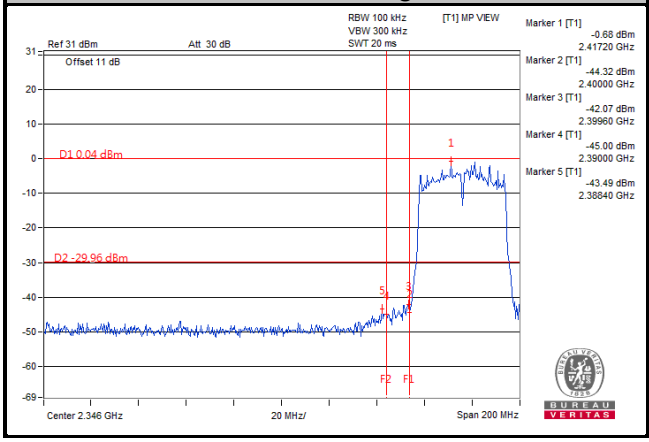


Ch 9

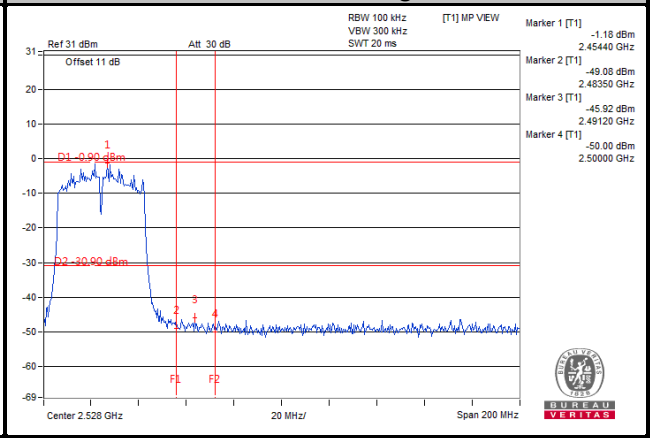




Ch 3 Band Edge

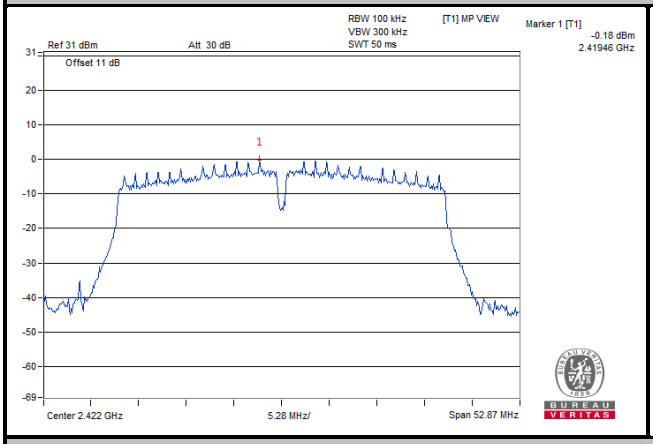


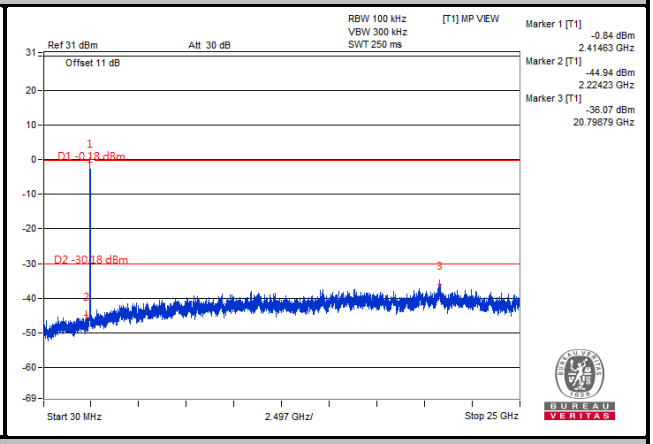
Ch 9 Band Edge



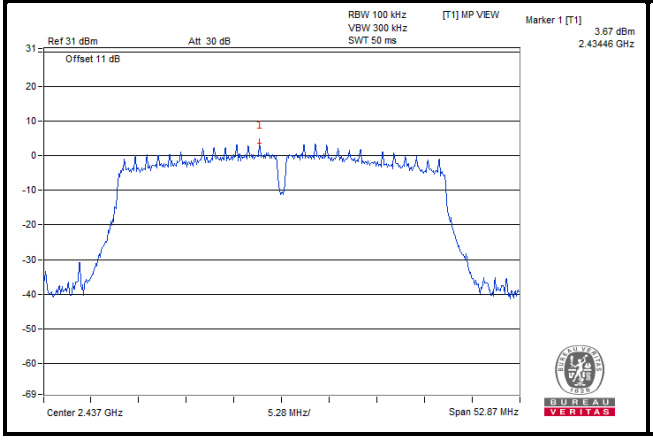
CHAIN 1

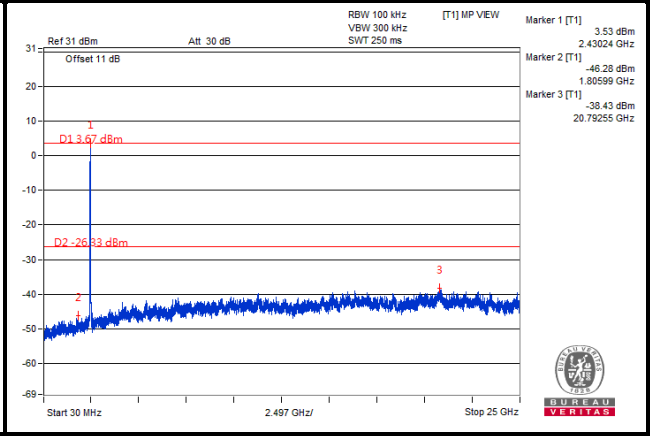
Ch 3



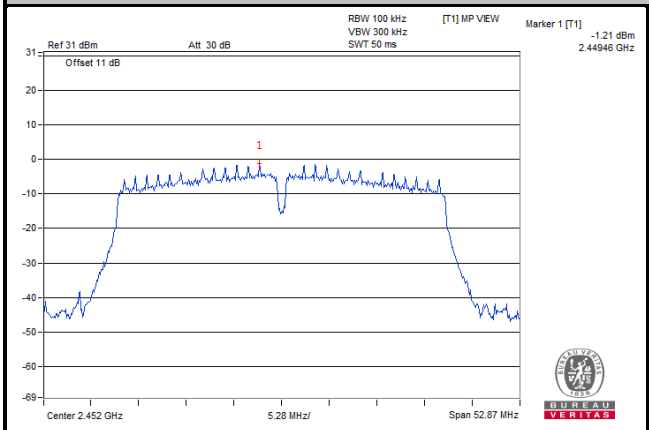


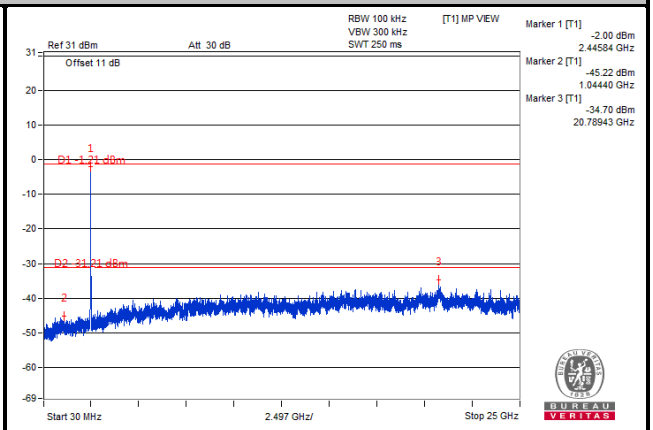
Ch 6



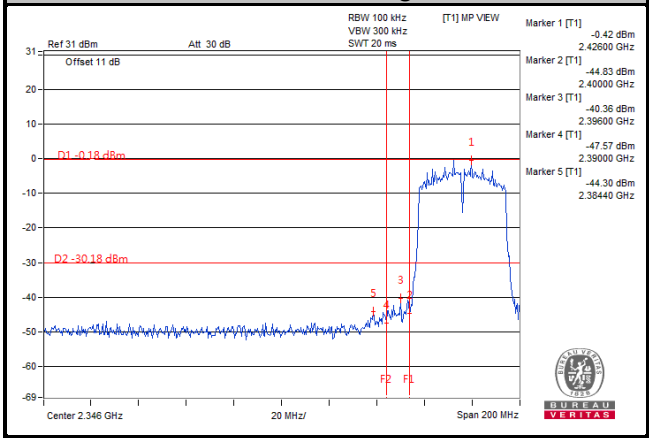


Ch 9

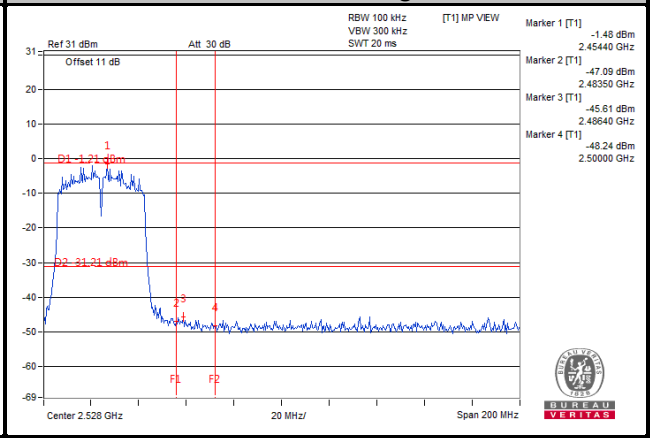




Ch 3 Band Edge



Ch 9 Band Edge



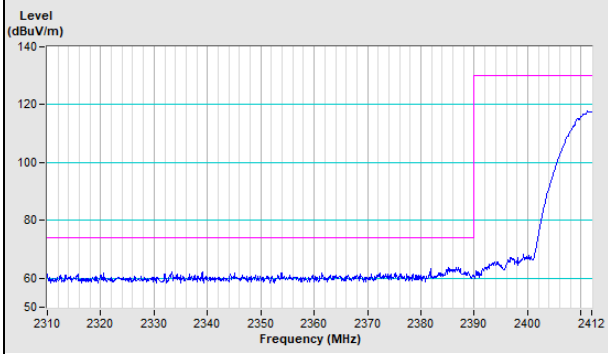
5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

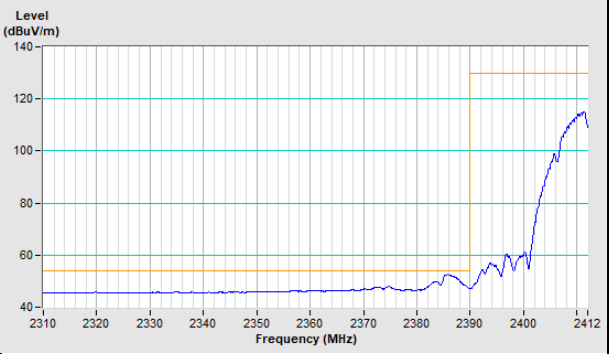
Annex A- Band Edge Measurement

802.11b Channel 1

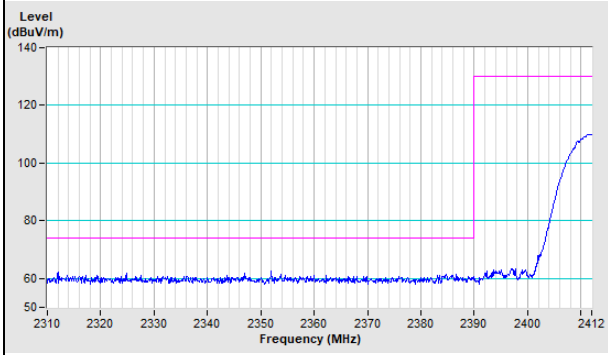
Horizontal (Peak)



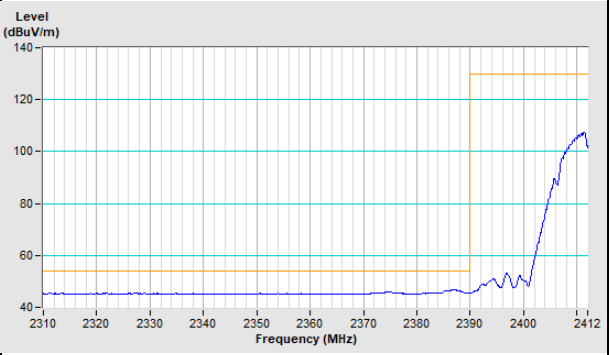
Horizontal (Average)



Vertical (Peak)

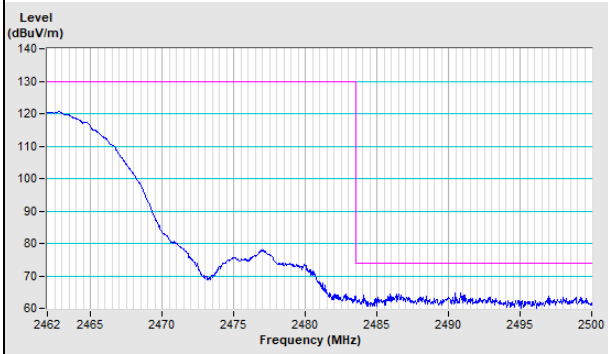


Vertical (Average)

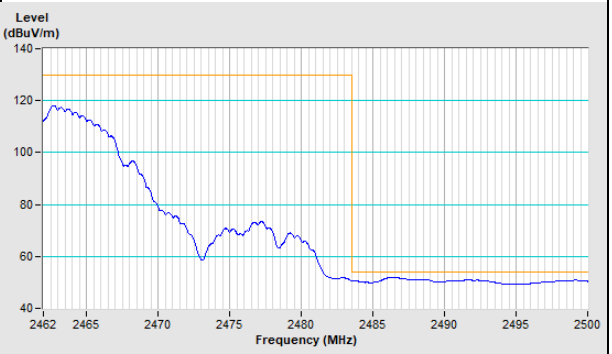


802.11b Channel 11

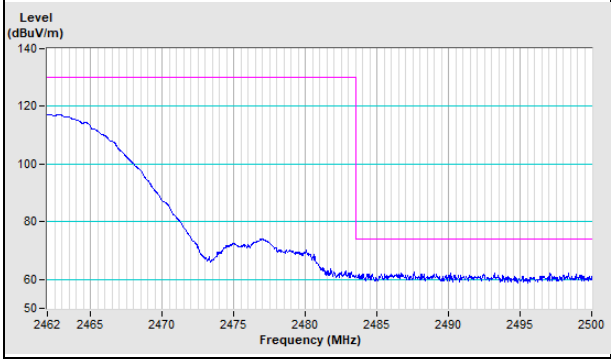
Horizontal (Peak)



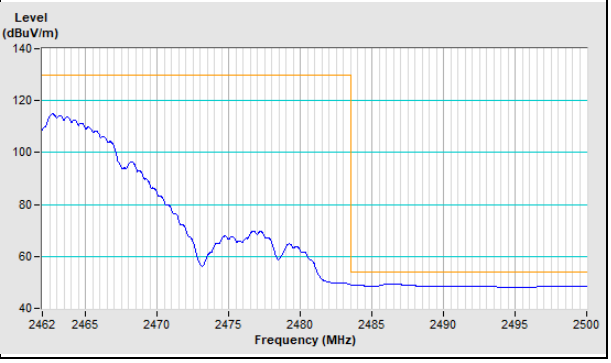
Horizontal (Average)



Vertical (Peak)

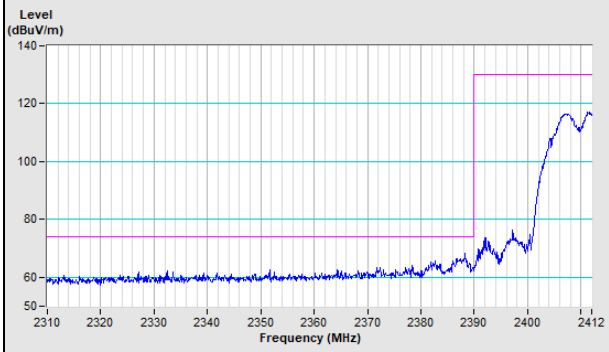


Vertical (Average)

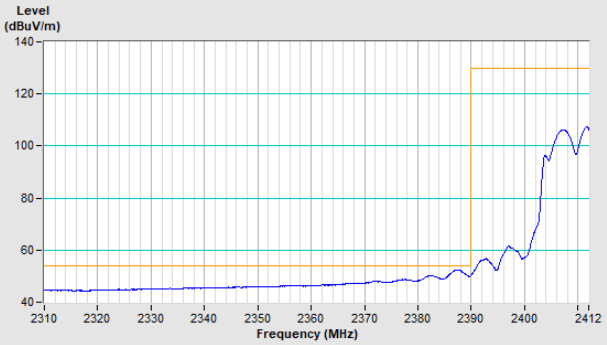


802.11g Channel 1

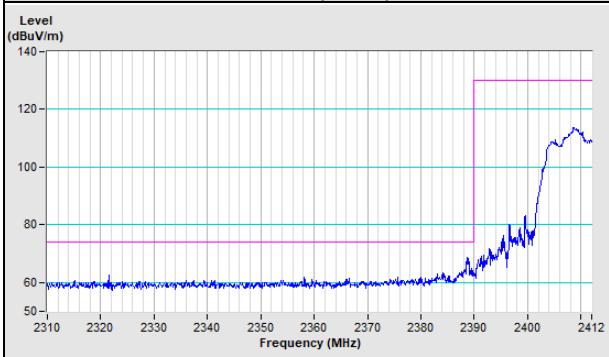
Horizontal (Peak)



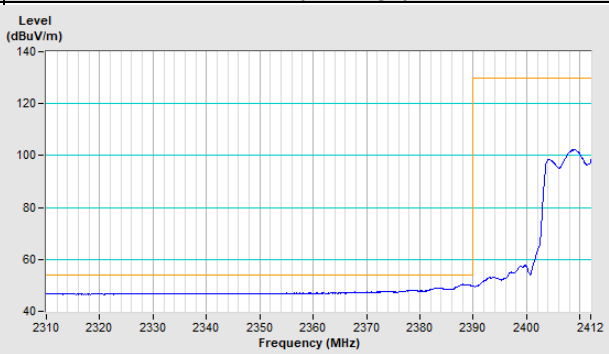
Horizontal (Average)



Vertical (Peak)

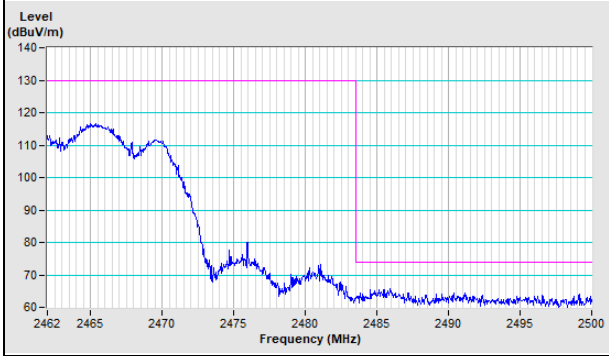


Vertical (Average)

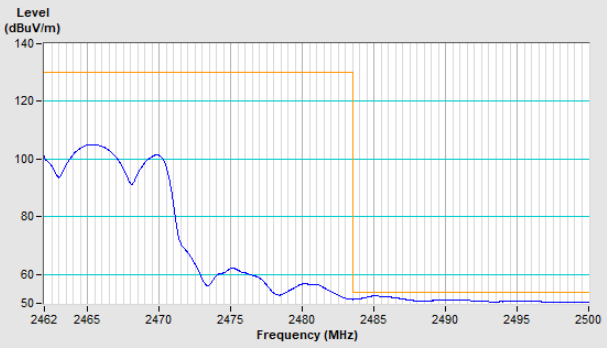


802.11g Channel 11

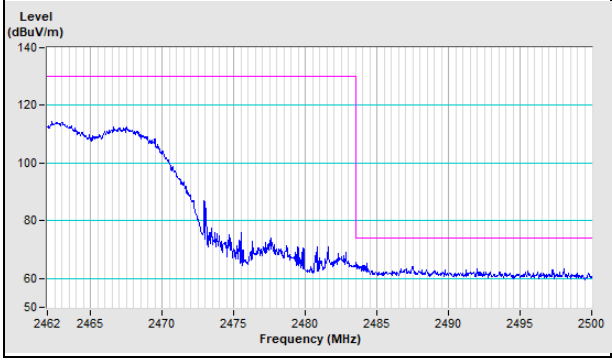
Horizontal (Peak)



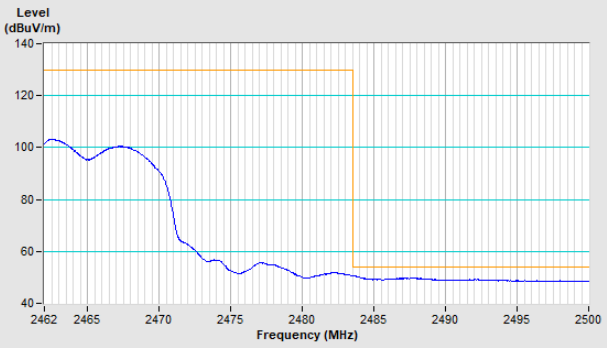
Horizontal (Average)



Vertical (Peak)

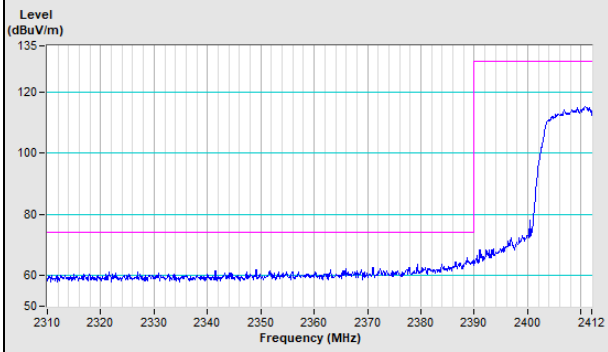


Vertical (Average)

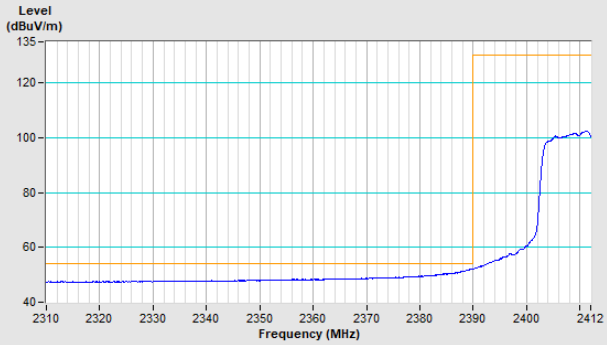


802.11n (VHT20) Channel 1

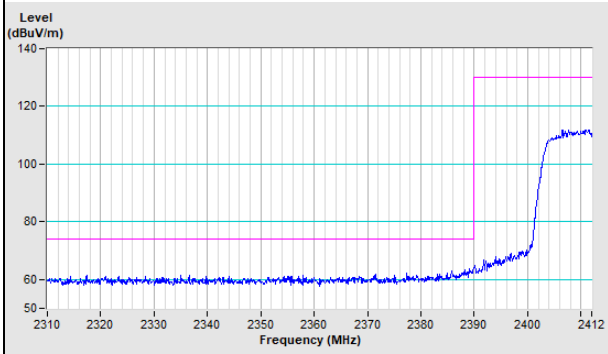
Horizontal (Peak)



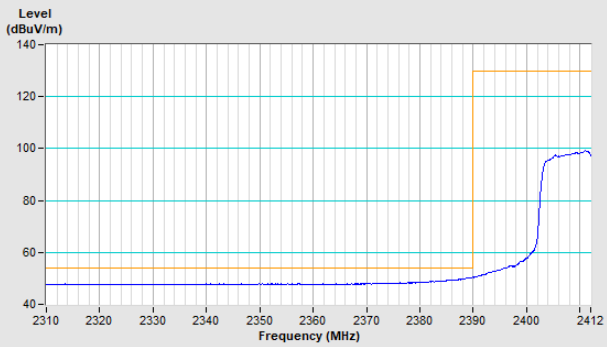
Horizontal (Average)



Vertical (Peak)

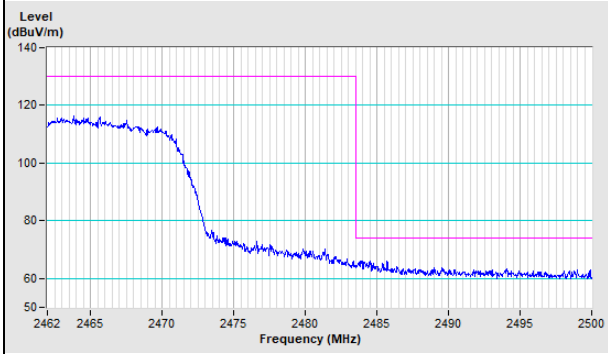


Vertical (Average)

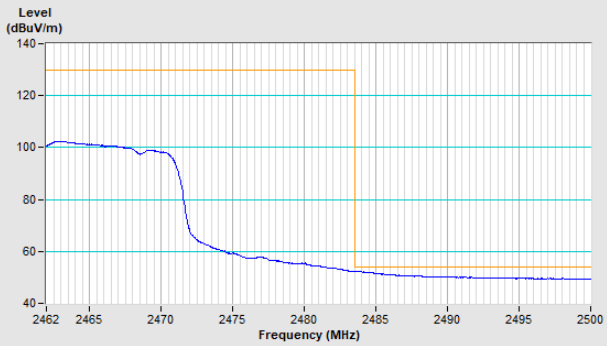


802.11n (VHT20) Channel 11

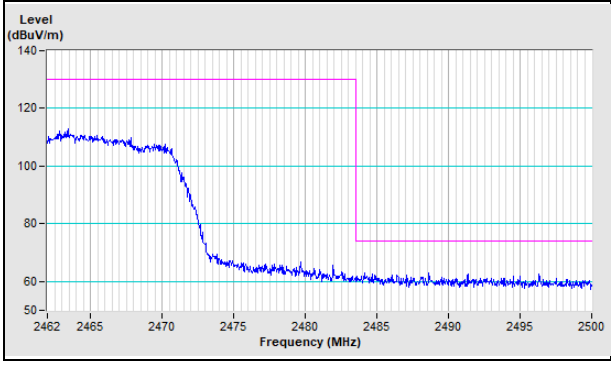
Horizontal (Peak)



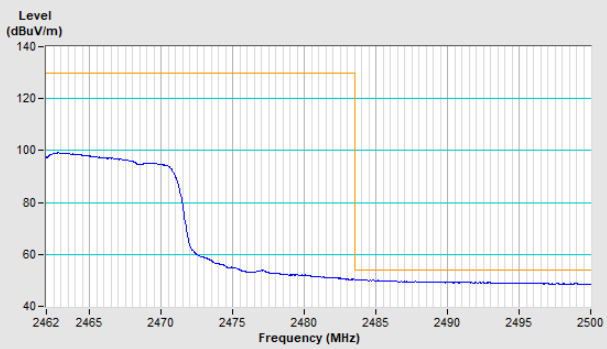
Horizontal (Average)

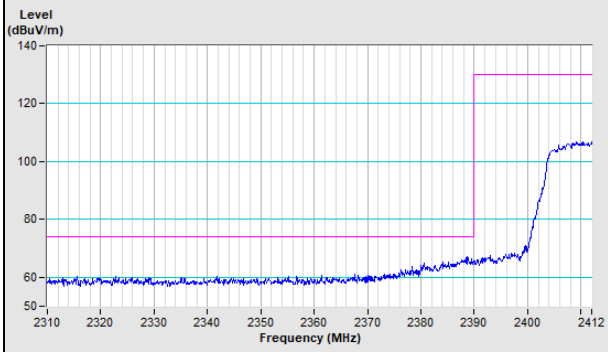
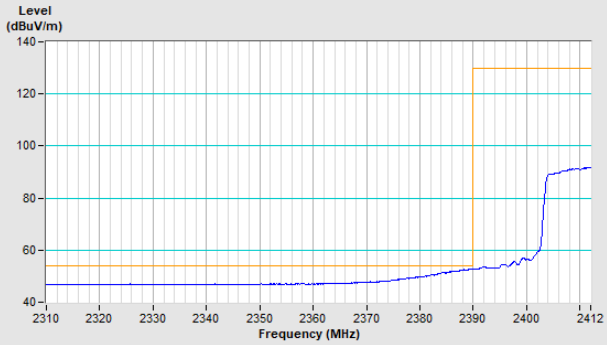
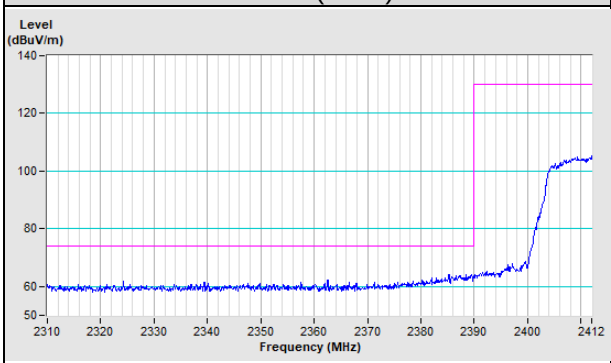
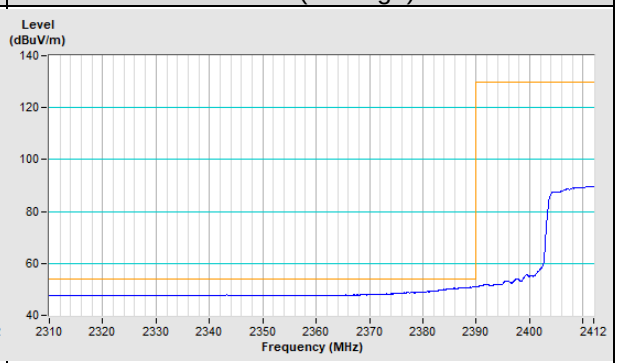
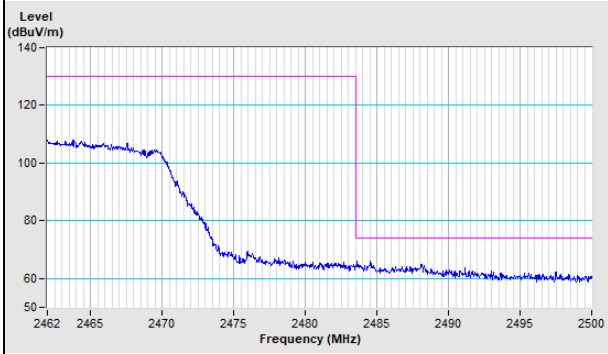
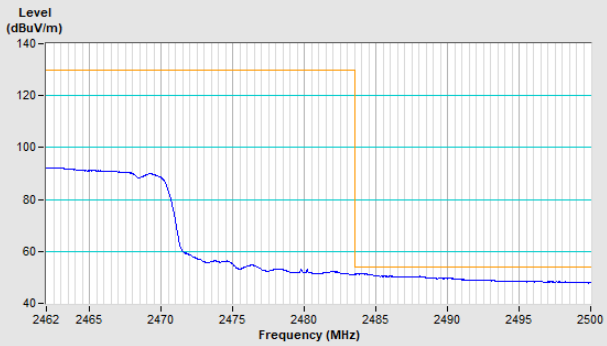
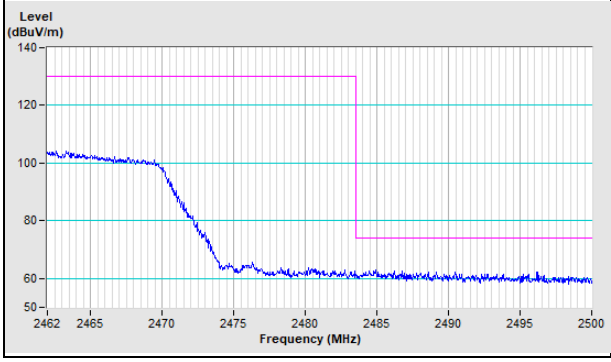
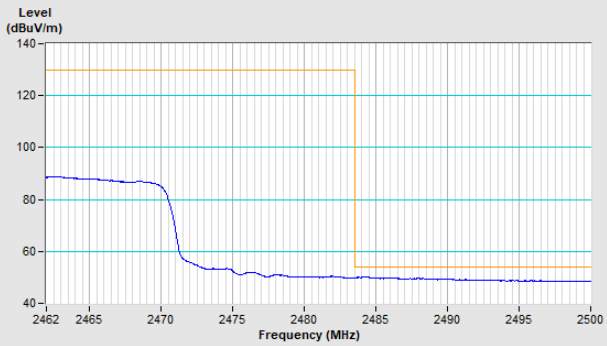


Vertical (Peak)



Vertical (Average)



802.11n (VHT40) Channel 3	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
802.11n (VHT40) Channel 9	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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The address and road map of all our labs can be found in our web site also.

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