

TEST REPORT

Applicant	Hangzhou Tuya Information Technology Co., Ltd.
Address	Room701, Building3, More Center, No.87 GuDun Road, Hangzhou, Zhejiang, China

Manufacturer or Supplier	Hangzhou Tuya Information Technology Co., Ltd.
Address	Room701, Building3, More Center, No.87 GuDun Road, Hangzhou, Zhejiang, China
Product	Tuya Zigbee Smart Hub Plus
Brand Name	N/A
Model	THP12-Z
Additional Model & Model Difference	N/A
Date of tests	Jul. 16, 2020 ~ Dec. 18, 2020

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.247**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Lucas Chen Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	 Date: Dec. 30, 2020

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF200716N016-1	Original release	Dec. 30, 2020

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output 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.

2 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	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GMHz	3.60dB
	1GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	5.00dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Tuya Zigbee Smart Hub Plus
BRAND	N/A
MODEL NO.	THP12-Z
ADDITIONAL NO.	N/A
FCC ID	2ANDL-THP12-Z
NOMINAL VOLTAGE	DC 5V from Adapter
MODULATION TECHNOLOGY	DSSS, OFDM
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
OPERATING FREQUENCY	2412MHz ~ 2462MHz for 11b/g/n(HT20) 2422MHz ~ 2452MHz for 11n(HT40)
PEAK OUTPUT POWER	224.388mW(Maximum)
ANTENNA TYPE	Chain 1: FPCB Antenna, with 3.3dBi gain Chain 2: FPCB Antenna, with -0.4dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	Network Cable: Unshielded, Detachable 45cm

NOTES:

1. 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.
2. Please refer to the EUT photo document (Reference No.: 200716N016) for detailed product photo.
3. The EUT was powered by the following adapter:

Adapter1	
BRAND:	N/A
MODEL:	KA06E-0501000US
INPUT:	AC 100-240V, 50/60Hz 0.25A MAX
OUTPUT:	DC 5V 1A 5W
USB LINE:	Unshielded, Detachable 50cm

4. The working status of the two antennas is as follows.

MODULATION MODE	FUNCTION
802.11b	2 Chains (SISO)
802.11g	2 Chains (SISO)
802.11n (HT20)	2 Chains (MIMO)
802.11n (HT40)	2 Chains (MIMO)

* 802.11b/g provided a SISO function, radiated emissions test is carried out on the maximum power "chain 1" antenna and shown in test report.

3.2 DESCRIPTION OF TEST MODES

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs of the test configuration for reference.

3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, power supply voltage range and antenna ports. The worst case was found when positioned on X axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	√	√	DC 5V from Adapter with WIFI function

Where **RE<1G**: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

RE≥1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

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	TESTED CONDITION
A	WIFI (2.4G) Link

RADIATED EMISSION TEST (BELOW 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis 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	DSSS	DBPSK	1.0

For the test results, only the worst case was shown in test report.

RADIATED EMISSION TEST (ABOVE 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis 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 HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	802.11n HT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5

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 HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	802.11n HT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER(ADAPTER)	TESTED BY
RE<1G	25deg. C, 53%RH	DC 5V from Adapter	Vincent
RE≥1G	25deg. C, 53%RH	DC 5V from Adapter	Vincent
PLC	20deg. C, 56%RH	DC 5V from Adapter	Ming Bai
APCM	25deg. C, 60%RH	DC 5V from Adapter	Daniel

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C, Section 15.247

KDB 558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10-2013

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

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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Wireless Router	TP-LINK	TL-WDR3310	1.24E+09	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.2m; Network Line: Unshielded, Detachable 4/10m

4 TEST TYPES AND RESULTS

4.1. CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTES:**
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 0.50MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Mar. 11,21
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 11,21
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Mar. 11,21
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Sep. 23,21
Test software	ADT	ADT_Cond_V7.3.7	N/A	N/A

- NOTES:**
1. The test was performed in shielded room 553.
 2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

4.1.3 TEST PROCEDURES

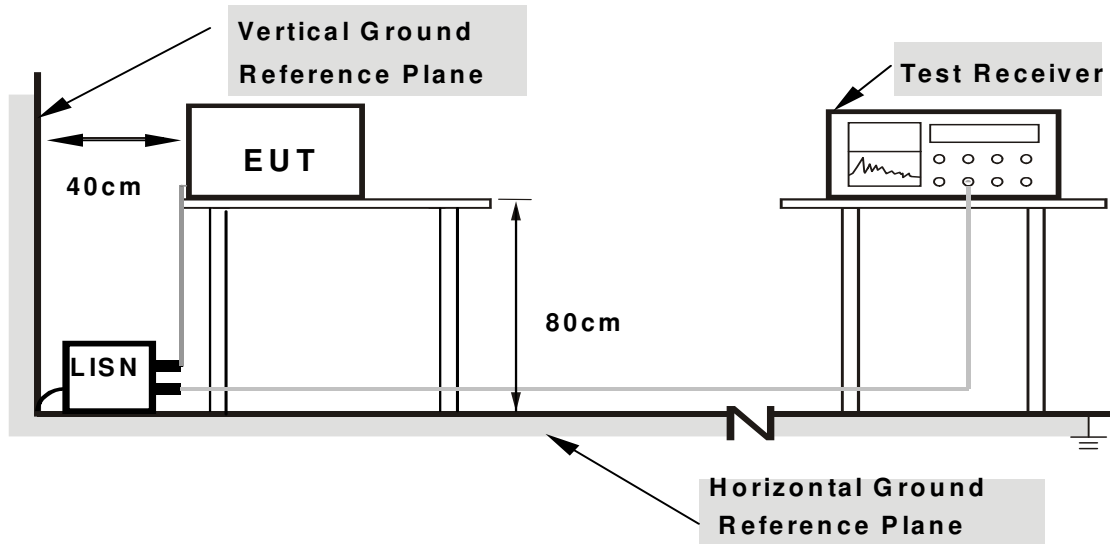
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: 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 SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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

4.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

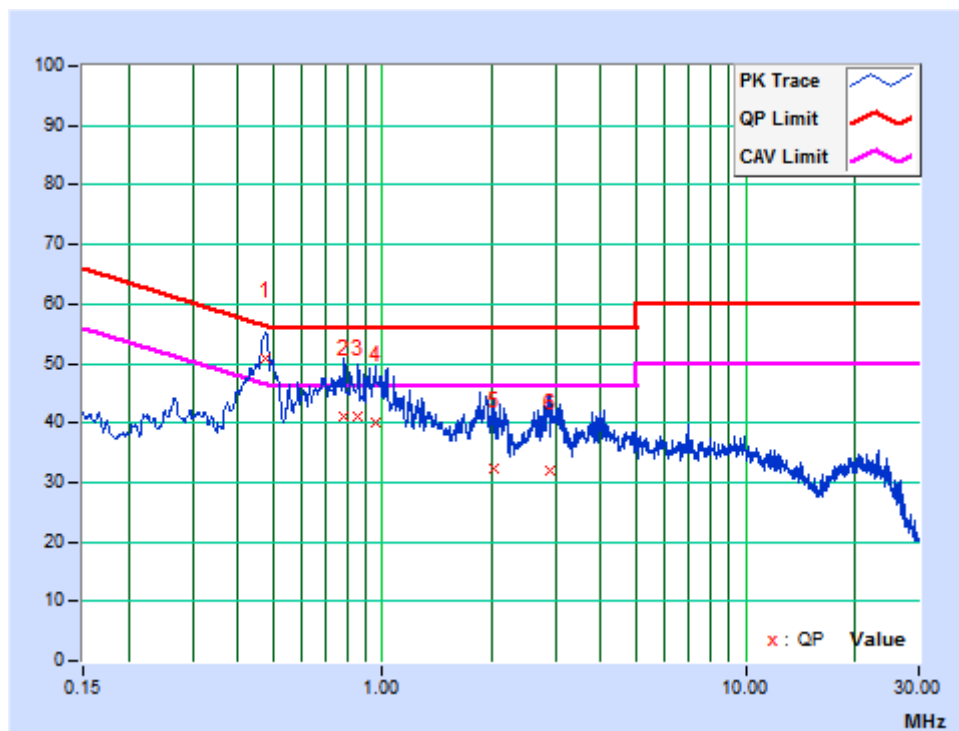
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: WIFI Link

PHASE	Line	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.47761	10.22	40.50	29.83	50.72	40.05	56.38	46.38	-5.66	-6.33
2	0.78667	10.24	30.67	20.57	40.91	30.81	56.00	46.00	-15.09	-15.19
3	0.85829	10.24	30.78	20.89	41.02	31.13	56.00	46.00	-14.98	-14.87
4	0.95775	10.24	29.71	17.66	39.95	27.90	56.00	46.00	-16.05	-18.10
5	2.01910	10.22	22.12	11.25	32.34	21.47	56.00	46.00	-23.66	-24.53
6	2.87925	10.22	21.93	10.60	32.15	20.82	56.00	46.00	-23.85	-25.18

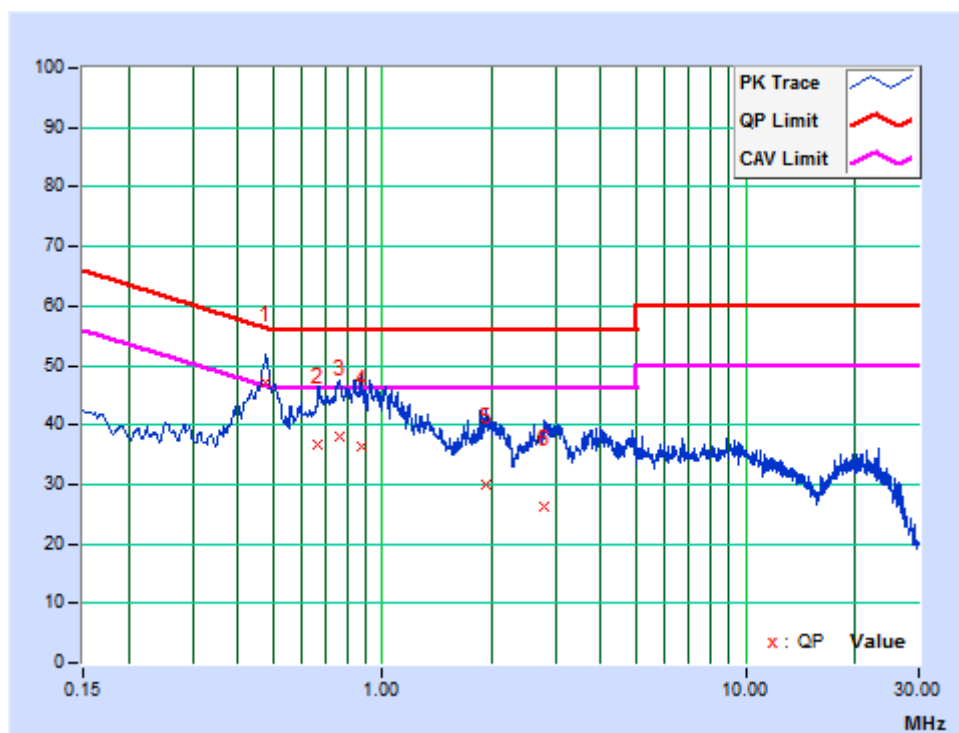
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



PHASE	Neutral	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.47887	10.02	37.22	26.04	47.24	36.06	56.36	46.36	-9.12	-10.30
2	0.66750	10.03	26.72	15.43	36.75	25.46	56.00	46.00	-19.25	-20.54
3	0.76415	10.03	27.88	16.58	37.91	26.61	56.00	46.00	-18.09	-19.39
4	0.87199	10.03	26.18	14.79	36.21	24.82	56.00	46.00	-19.79	-21.18
5	1.92750	10.01	19.79	9.56	29.80	19.57	56.00	46.00	-26.20	-26.43
6	2.77800	10.03	16.19	5.72	26.22	15.75	56.00	46.00	-29.78	-30.25

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



4.2. RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

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

NOTES:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, 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 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 17,21
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	May 13, 21
Active Loop Antenna (9KHz -30MHz)	SCHWARZBECK	FMZB 1519B	1519B-045	May 27,21
Amplifier (9KHz -1GHz)	Burgeon	BPA-530	100210	Mar. 14,21
Bilog Antenna (20MHz -2GHz)	Teseq	CBL 6111D	30643	May 29,21
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 29,21
Horn Antenna (18GHz -40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	May 09, 21
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	May 22,21
Test Software	ADT	ADT_Radiated_V 7.6.15.9.2	N/A	N/A
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	May 08,21
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Mar. 03,21
Test Software	ADT	ADT_Radiated_V 7.6.15.9.2	N/A	N/A
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	May 19,21

NOTES:

1. The test was performed in 966 Chamber.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 749762.

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber. 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. For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- g. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTES:

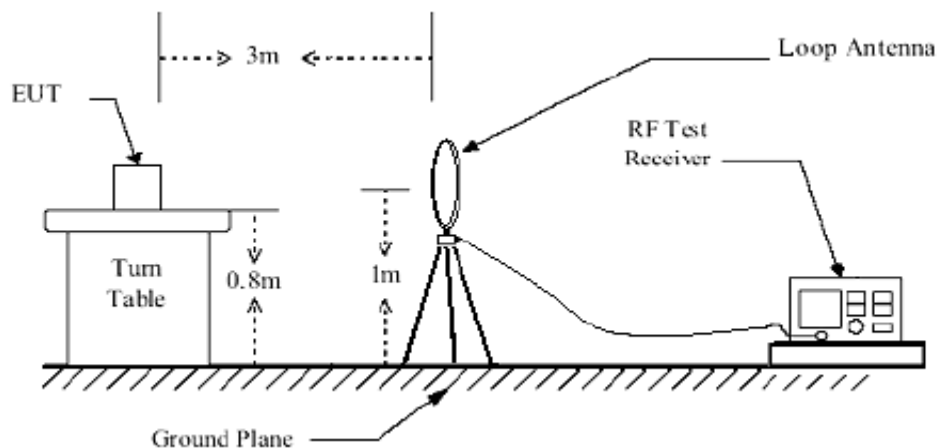
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes, the worst-case test configuration was reported on the file test setup photo.

4.2.4 DEVIATION FROM TEST STANDARD

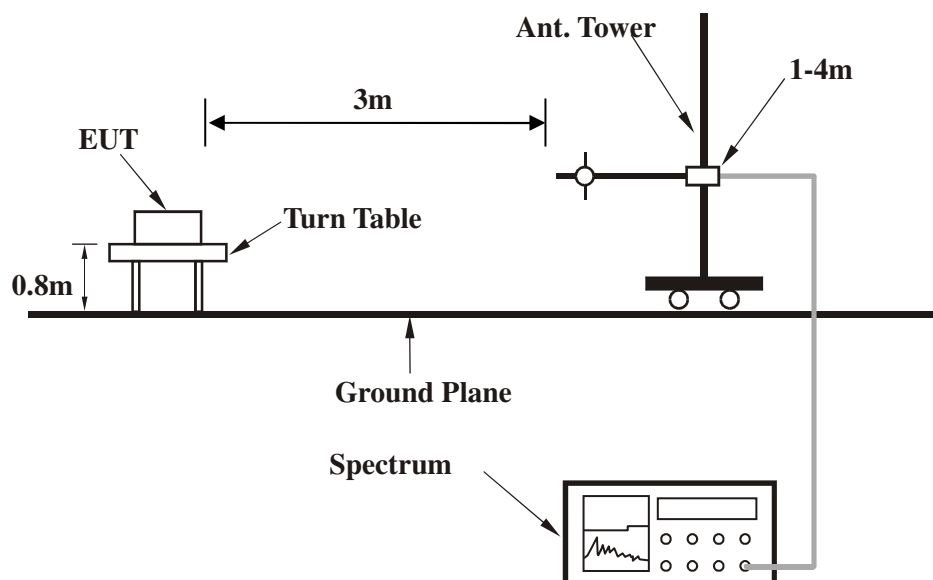
No deviation.

4.2.5 TEST SETUP

Below 30MHz test setup

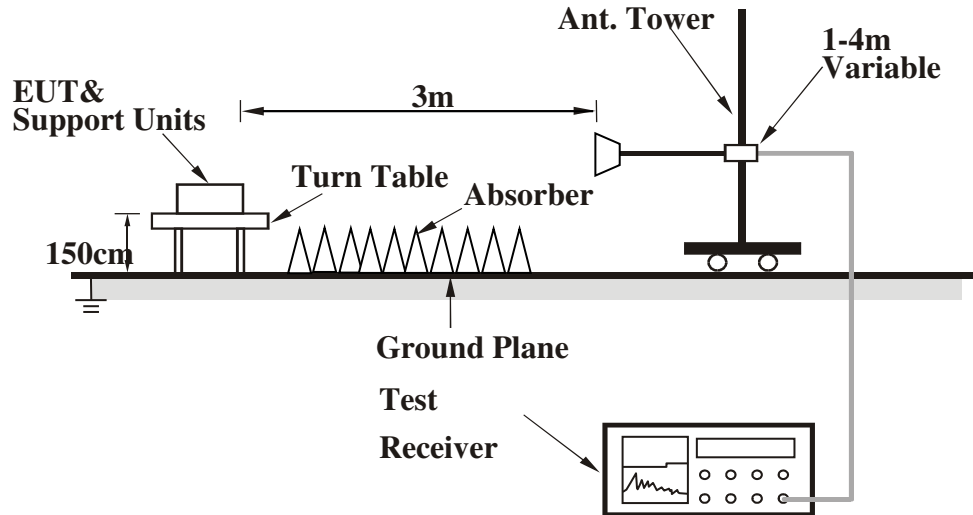


Below 1GHz test setup



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

Above 1GHz test setup



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

4.2.6 EUT OPERATING CONDITIONS

- Placed the EUT on a testing table.
- Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the EUT in full functions.

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

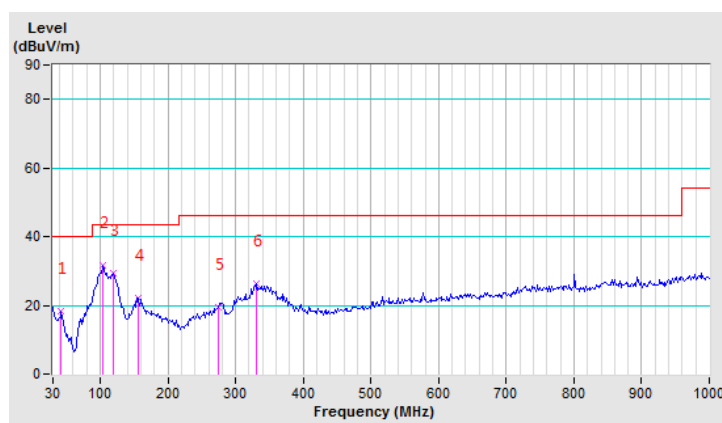
802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	42.44	18.38 QP	40.00	-21.62	1.00 H	88	35.61	-17.23
2	104.62	31.76 QP	43.50	-11.74	1.00 H	54	51.96	-20.20
3	118.61	29.29 QP	43.50	-14.21	1.00 H	42	49.14	-19.85
4	155.91	22.15 QP	43.50	-21.35	1.00 H	30	39.46	-17.31
5	274.05	19.26 QP	46.00	-26.74	1.00 H	20	34.76	-15.50
6	331.57	26.41 QP	46.00	-19.59	1.00 H	9	39.81	-13.40

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.

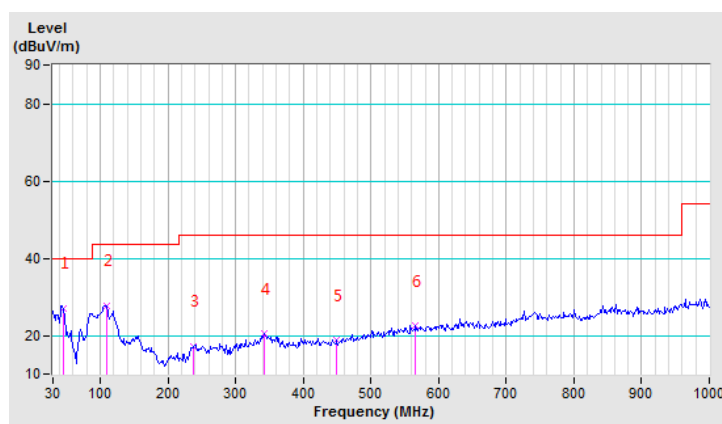


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	45.54	27.01 QP	40.00	-12.99	2.00 V	265	45.82	-18.81
2	109.28	27.57 QP	43.50	-15.93	2.00 V	289	47.65	-20.08
3	238.30	17.16 QP	46.00	-28.84	2.00 V	301	34.84	-17.68
4	342.45	20.35 QP	46.00	-25.65	2.00 V	313	33.46	-13.11
5	449.71	18.66 QP	46.00	-27.34	2.00 V	324	29.25	-10.59
6	566.30	22.43 QP	46.00	-23.57	2.00 V	336	29.77	-7.34

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.



ABOVE 1GHz DATA
802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	45.25 PK	74.00	-28.75	1.00 H	145	41.72	3.53
2	2390.00	32.66 AV	54.00	-21.34	1.00 H	145	29.13	3.53
3	*2412.00	93.30 PK			1.00 H	145	89.65	3.65
4	*2412.00	88.01 AV			1.00 H	145	84.36	3.65
5	4824.00	54.00 PK	74.00	-20.00	1.00 H	0	45.95	8.05
6	4824.00	47.69 AV	54.00	-6.31	1.00 H	0	39.64	8.05
7	#7236.00	54.63 PK	74.00	-19.37	1.00 H	0	41.06	13.57
8	#7236.00	36.28 AV	54.00	-17.72	1.00 H	0	22.71	13.57
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	49.66 PK	74.00	-24.34	1.00 V	215	46.13	3.53
2	2390.00	35.60 AV	54.00	-18.40	1.00 V	215	32.07	3.53
3	*2412.00	104.79 PK			1.00 V	215	101.14	3.65
4	*2412.00	99.31 AV			1.00 V	215	95.66	3.65
5	4824.00	50.32 PK	74.00	-23.68	1.00 V	0	42.27	8.05
6	4824.00	36.54 AV	54.00	-17.46	1.00 V	0	28.49	8.05
7	#7236.00	54.36 PK	74.00	-19.64	1.00 V	0	40.79	13.57
8	#7236.00	42.65 AV	54.00	-11.35	1.00 V	0	29.08	13.57

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	95.79 PK			1.00 H	0	92.02	3.77
2	*2437.00	90.34 AV			1.00 H	0	86.57	3.77
3	4874.00	53.68 PK	74.00	-20.32	1.00 H	0	45.45	8.23
4	4874.00	40.96 AV	54.00	-13.04	1.00 H	0	32.73	8.23
5	7311.00	58.36 PK	74.00	-15.64	1.00 H	0	44.56	13.80
6	7311.00	43.62 AV	54.00	-10.38	1.00 H	0	29.82	13.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	98.43 PK			1.00 V	125	94.66	3.77
2	*2437.00	76.22 AV			1.00 V	125	72.45	3.77
3	4874.00	50.08 PK	74.00	-23.92	1.00 V	0	41.85	8.23
4	4874.00	36.12 AV	54.00	-17.88	1.00 V	0	27.89	8.23
5	7311.00	50.69 PK	74.00	-23.31	1.00 V	0	36.89	13.80
6	7311.00	38.99 AV	54.00	-15.01	1.00 V	0	25.19	13.80

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	97.74 PK			1.00 H	58	93.85	3.89
2	*2462.00	91.94 AV			1.00 H	58	88.05	3.89
3	2483.50	44.35 PK	74.00	-29.65	1.00 H	58	40.35	4.00
4	2483.50	32.22 AV	54.00	-21.78	1.00 H	58	28.22	4.00
5	4924.00	52.41 PK	74.00	-21.59	1.00 H	0	44.01	8.40
6	4924.00	35.98 AV	54.00	-18.02	1.00 H	0	27.58	8.40
7	7386.00	53.62 PK	74.00	-20.38	1.00 H	0	39.59	14.03
8	7386.00	41.96 AV	54.00	-12.04	1.00 H	0	27.93	14.03
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	101.88 PK			1.00 V	125	97.99	3.89
2	*2462.00	96.27 AV			1.00 V	125	92.38	3.89
3	2483.50	48.00 PK	74.00	-26.00	1.00 V	125	44.00	4.00
4	2483.50	35.11 AV	54.00	-18.89	1.00 V	125	31.11	4.00
5	4924.00	49.65 PK	74.00	-24.35	1.00 V	0	41.25	8.40
6	4924.00	38.15 AV	54.00	-15.85	1.00 V	0	29.75	8.40
7	7386.00	54.62 PK	74.00	-19.38	1.00 V	0	40.59	14.03
8	7386.00	40.29 AV	54.00	-13.71	1.00 V	0	26.26	14.03

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. "*" : Fundamental frequency.

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	58.43 PK	74.00	-15.57	1.00 H	135	54.90	3.53
2	2390.00	40.93 AV	54.00	-13.07	1.00 H	135	37.40	3.53
3	*2412.00	95.66 PK			1.00 H	135	92.01	3.65
4	*2412.00	82.09 AV			1.00 H	135	78.44	3.65
5	4824.00	54.00 PK	74.00	-20.00	1.00 H	0	45.95	8.05
6	4824.00	36.00 AV	54.00	-18.00	1.00 H	0	27.95	8.05
7	#7236.00	56.00 PK	74.00	-18.00	1.00 H	0	42.43	13.57
8	#7236.00	37.00 AV	54.00	-17.00	1.00 H	0	23.43	13.57
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	71.31 PK	74.00	-2.69	1.00 V	125	67.78	3.53
2	2390.00	50.37 AV	54.00	-3.63	1.00 V	125	46.84	3.53
3	*2412.00	106.05 PK			1.00 V	125	102.40	3.65
4	*2412.00	91.36 AV			1.00 V	125	87.71	3.65
5	4824.00	52.45 PK	74.00	-21.55	1.00 V	0	44.40	8.05
6	4824.00	35.56 AV	54.00	-18.44	1.00 V	0	27.51	8.05
7	#7236.00	56.88 PK	74.00	-17.12	1.00 V	0	43.31	13.57
8	#7236.00	38.99 AV	54.00	-15.01	1.00 V	0	25.42	13.57

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	99.14 PK			1.00 H	159	95.37	3.77
2	*2437.00	85.35 AV			1.00 H	159	81.58	3.77
3	4874.00	51.62 PK	74.00	-22.38	1.00 H	0	43.39	8.23
4	4874.00	39.25 AV	54.00	-14.75	1.00 H	0	31.02	8.23
5	7311.00	52.21 PK	74.00	-21.79	1.00 H	0	38.41	13.80
6	7311.00	40.36 AV	54.00	-13.64	1.00 H	0	26.56	13.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	104.43 PK			1.00 V	226	100.66	3.77
2	*2437.00	89.82 AV			1.00 V	226	86.05	3.77
3	4874.00	48.36 PK	74.00	-25.64	1.00 V	0	40.13	8.23
4	4874.00	35.62 AV	54.00	-18.38	1.00 V	0	27.39	8.23
5	7311.00	52.12 PK	74.00	-21.88	1.00 V	0	38.32	13.80
6	7311.00	36.41 AV	54.00	-17.59	1.00 V	0	22.61	13.80

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	98.44 PK			1.00 H	215	94.55	3.89
2	*2462.00	84.35 AV			1.00 H	215	80.46	3.89
3	2483.50	58.24 PK	74.00	-15.76	1.00 H	215	54.24	4.00
4	2483.50	38.90 AV	54.00	-15.10	1.00 H	215	34.90	4.00
5	4924.00	58.36 PK	74.00	-15.64	1.00 H	0	49.96	8.40
6	4924.00	36.54 AV	54.00	-17.46	1.00 H	0	28.14	8.40
7	7286.00	52.12 PK	74.00	-21.88	1.00 H	0	38.40	13.72
8	7286.00	38.12 AV	54.00	-15.88	1.00 H	0	24.40	13.72
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	105.47 PK			1.00 V	142	101.58	3.89
2	*2462.00	91.28 AV			1.00 V	142	87.39	3.89
3	2483.50	70.53 PK	74.00	-3.47	1.00 V	142	66.53	4.00
4	2483.50	48.76 AV	54.00	-5.24	1.00 V	142	44.76	4.00
5	4924.00	51.36 PK	74.00	-22.64	1.00 V	0	42.96	8.40
6	4924.00	36.52 AV	54.00	-17.48	1.00 V	0	28.12	8.40
7	7386.00	55.62 PK	74.00	-18.38	1.00 V	0	41.59	14.03
8	7386.00	38.95 AV	54.00	-15.05	1.00 V	0	24.92	14.03

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

802.11n HT20

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	53.89 PK	74.00	-20.11	1.00 H	45	50.36	3.53
2	2390.00	35.38 AV	54.00	-18.62	1.00 H	45	31.85	3.53
3	*2412.00	102.52 PK			1.00 H	45	98.87	3.65
4	*2412.00	87.04 AV			1.00 H	45	83.39	3.65
5	4804.00	54.16 PK	74.00	-19.84	1.00 H	0	46.18	7.98
6	4804.00	44.15 AV	54.00	-9.85	1.00 H	0	36.17	7.98
7	#7206.00	52.26 PK	74.00	-21.74	1.00 H	0	38.79	13.47
8	#7206.00	42.96 AV	54.00	-11.04	1.00 H	0	29.49	13.47
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	71.82 PK	74.00	-2.18	1.00 V	182	68.29	3.53
2	2390.00	42.71 AV	54.00	-11.29	1.00 V	182	39.18	3.53
3	*2412.00	106.28 PK			1.00 V	182	102.63	3.65
4	*2412.00	88.46 AV			1.00 V	182	84.81	3.65
5	4804.00	56.14 PK	74.00	-17.86	1.00 V	0	48.16	7.98
6	4804.00	42.15 AV	54.00	-11.85	1.00 V	0	34.17	7.98
7	#7206.00	55.85 PK	74.00	-18.15	1.00 V	0	42.38	13.47
8	#7206.00	46.83 AV	54.00	-7.17	1.00 V	0	33.36	13.47

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	96.42 PK			1.00 H	148	92.65	3.77
2	*2437.00	85.62 AV			1.00 H	148	81.85	3.77
3	4874.00	46.32 PK	74.00	-27.68	1.00 H	0	38.09	8.23
4	4874.00	36.45 AV	54.00	-17.55	1.00 H	0	28.22	8.23
5	7311.00	52.42 PK	74.00	-21.58	1.00 H	0	38.62	13.80
6	7311.00	43.62 AV	54.00	-10.38	1.00 H	0	29.82	13.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	102.36 PK			1.00 V	29	98.59	3.77
2	*2437.00	90.21 AV			1.00 V	29	86.44	3.77
3	4874.00	44.25 PK	74.00	-29.75	1.00 V	0	36.02	8.23
4	4874.00	35.36 AV	54.00	-18.64	1.00 V	0	27.13	8.23
5	7311.00	50.14 PK	74.00	-23.86	1.00 V	0	36.34	13.80
6	7311.00	40.18 AV	54.00	-13.82	1.00 V	0	26.38	13.80

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	105.32 PK			1.00 H	76	101.43	3.89
2	*2462.00	87.68 AV			1.00 H	76	83.79	3.89
3	2483.50	64.52 PK	74.00	-9.48	1.00 H	76	60.52	4.00
4	2483.50	37.95 AV	54.00	-16.05	1.00 H	76	33.95	4.00
5	4924.00	50.41 PK	74.00	-23.59	1.00 H	0	42.01	8.40
6	4924.00	34.96 AV	54.00	-19.04	1.00 H	0	26.56	8.40
7	7386.00	54.85 PK	74.00	-19.15	1.00 H	0	40.82	14.03
8	7386.00	42.86 AV	54.00	-11.14	1.00 H	0	28.83	14.03
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	106.31 PK			1.00 V	158	102.42	3.89
2	*2462.00	90.60 AV			1.00 V	158	86.71	3.89
3	2483.50	66.76 PK	74.00	-7.24	1.00 V	158	62.76	4.00
4	2483.50	39.19 AV	54.00	-14.81	1.00 V	158	35.19	4.00
5	4924.00	52.14 PK	74.00	-21.86	1.00 V	0	43.74	8.40
6	4924.00	37.14 AV	54.00	-16.86	1.00 V	0	28.74	8.40
7	7386.00	57.14 PK	74.00	-16.86	1.00 V	0	43.11	14.03
8	7386.00	44.41 AV	54.00	-9.59	1.00 V	0	30.38	14.03

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. "*" : Fundamental frequency.

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CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	54.72 PK	74.00	-19.28	1.00 H	112	51.19	3.53
2	2390.00	45.16 AV	54.00	-8.84	1.00 H	112	41.63	3.53
3	*2422.00	90.99 PK			1.00 H	112	87.29	3.70
4	*2422.00	49.98 AV			1.00 H	112	46.28	3.70
5	4844.00	47.68 PK	74.00	-26.32	1.00 H	0	39.56	8.12
6	4844.00	36.64 AV	54.00	-17.36	1.00 H	0	28.52	8.12
7	7266.00	55.42 PK	74.00	-18.58	1.00 H	0	41.76	13.66
8	7266.00	43.47 AV	54.00	-10.53	1.00 H	0	29.81	13.66
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	59.58 PK	74.00	-14.42	1.00 V	320	56.05	3.53
2	2390.00	41.39 AV	54.00	-12.61	1.00 V	320	37.86	3.53
3	*2422.00	100.08 PK			1.00 V	320	96.38	3.70
4	*2422.00	80.96 AV			1.00 V	320	77.26	3.70
5	4844.00	52.12 PK	74.00	-21.88	1.00 V	0	44.00	8.12
6	4844.00	38.62 AV	54.00	-15.38	1.00 V	0	30.50	8.12
7	7266.00	56.14 PK	74.00	-17.86	1.00 V	0	42.48	13.66
8	7266.00	44.85 AV	54.00	-9.15	1.00 V	0	31.19	13.66

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	96.52 PK			1.00 H	58	92.75	3.77
2	*2437.00	83.12 AV			1.00 H	58	79.35	3.77
3	4874.00	52.96 PK	74.00	-21.04	1.00 H	0	44.73	8.23
4	4874.00	45.62 AV	54.00	-8.38	1.00 H	0	37.39	8.23
5	7311.00	57.41 PK	74.00	-16.59	1.00 H	0	43.61	13.80
6	7311.00	43.45 AV	54.00	-10.55	1.00 H	0	29.65	13.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	102.76 PK			1.00 V	148	98.99	3.77
2	*2437.00	76.40 AV			1.00 V	148	72.63	3.77
3	4874.00	55.00 PK	74.00	-19.00	1.00 V	0	46.77	8.23
4	4874.00	41.00 AV	54.00	-13.00	1.00 V	0	32.77	8.23
5	7311.00	56.11 PK	74.00	-17.89	1.00 V	0	42.31	13.80
6	7311.00	42.00 AV	54.00	-12.00	1.00 V	0	28.20	13.80

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	101.63 PK			1.00 H	148	97.79	3.84
2	*2452.00	82.31 AV			1.00 H	148	78.47	3.84
3	2483.50	59.94 PK	74.00	-14.06	1.00 H	148	55.94	4.00
4	2483.50	37.92 AV	54.00	-16.08	1.00 H	148	33.92	4.00
5	4904.00	57.95 PK	74.00	-16.05	1.00 H	0	49.62	8.33
6	4904.00	39.55 AV	54.00	-14.45	1.00 H	0	31.22	8.33
7	7356.00	56.00 PK	74.00	-18.00	1.00 H	0	42.06	13.94
8	7356.00	38.00 AV	54.00	-16.00	1.00 H	0	24.06	13.94
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	102.90 PK			1.00 V	145	99.06	3.84
2	*2452.00	80.92 AV			1.00 V	145	77.08	3.84
3	2483.50	60.82 PK	74.00	-13.18	1.00 V	145	56.82	4.00
4	2483.50	41.11 AV	54.00	-12.89	1.00 V	145	37.11	4.00
5	4904.00	56.00 PK	74.00	-18.00	1.00 V	0	47.67	8.33
6	4904.00	39.00 AV	54.00	-15.00	1.00 V	0	30.67	8.33
7	7356.00	58.99 PK	74.00	-15.01	1.00 V	0	45.05	13.94
8	7356.00	40.11 AV	54.00	-13.89	1.00 V	0	26.17	13.94

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).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	May 21,21
Power Sensor	Keysight	U2021XA	MY55060018	May 21,21
Power Meter	Anritsu	ML2495A	1139001	Mar. 11,21
Power Sensor	Anritsu	MA2411B	1531155	Mar. 11,21
Digital Multimeter	FLUKE	15B	A1220010DG	Oct.16, 21
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Nov. 14,21
Oscilloscope	Agilent	DSO9254A	MY51260160	Sep. 17,21
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Mar. 12,21
Signal Generator	Agilent	N5183A	MY50140980	Sep. 18,21
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Sep. 11,21
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A
DC Source	Keysight	E3642A	MY56146098	N/A

NOTES: 1. The test was performed in RF Oven room.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

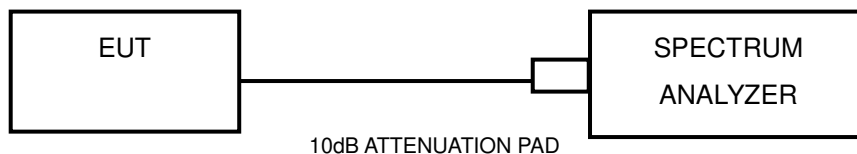
4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100KHz
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. 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.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



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 Chain 1

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	9.12	0.5	PASS
6	2437	9.59	0.5	PASS
11	2462	9.58	0.5	PASS

Chain 2

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	9.13	0.5	PASS
6	2437	9.58	0.5	PASS
11	2462	9.58	0.5	PASS

802.11g Chain 1

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.32	0.5	PASS
6	2437	16.30	0.5	PASS
11	2462	16.09	0.5	PASS

Chain 2

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.31	0.5	PASS
6	2437	16.08	0.5	PASS
11	2462	16.10	0.5	PASS

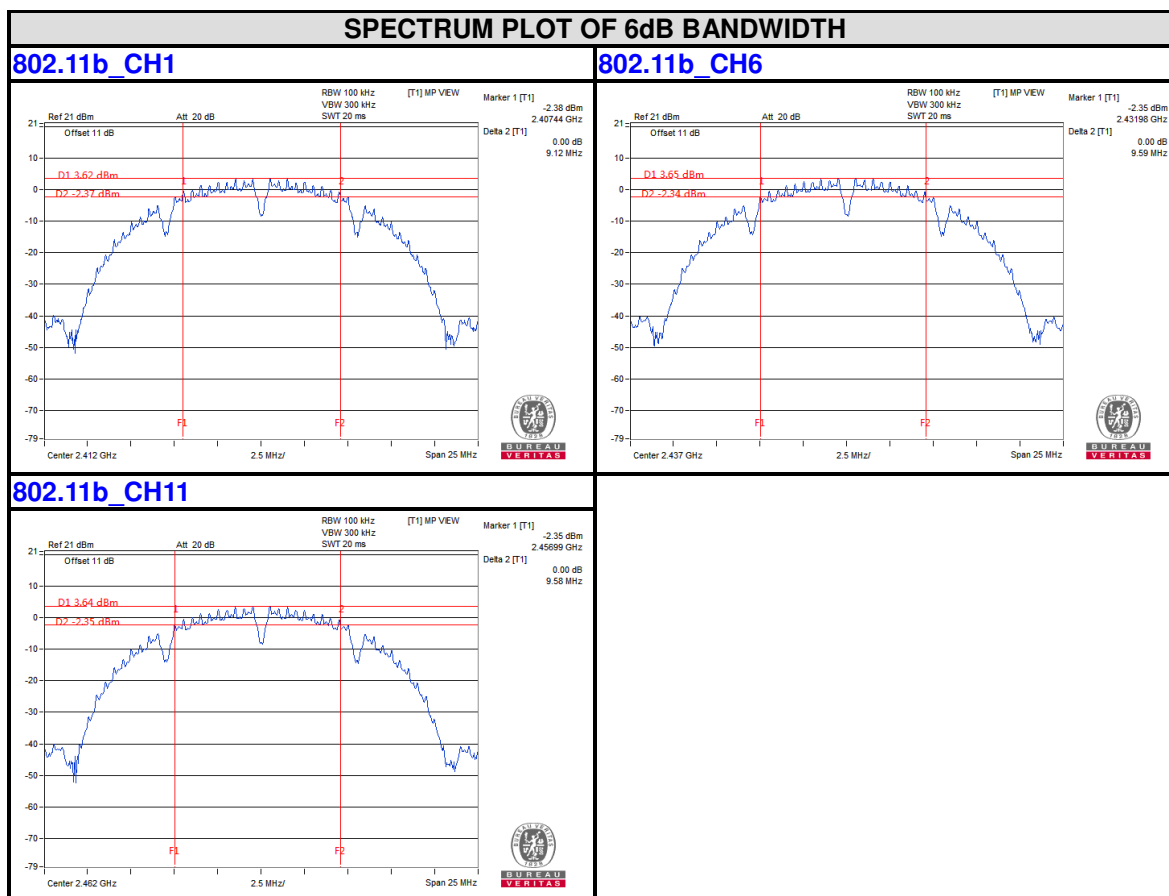
802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		Chain1	Chain2		
1	2412	16.13	16.57	0.5	PASS
6	2437	16.12	16.75	0.5	PASS
11	2462	16.36	16.35	0.5	PASS

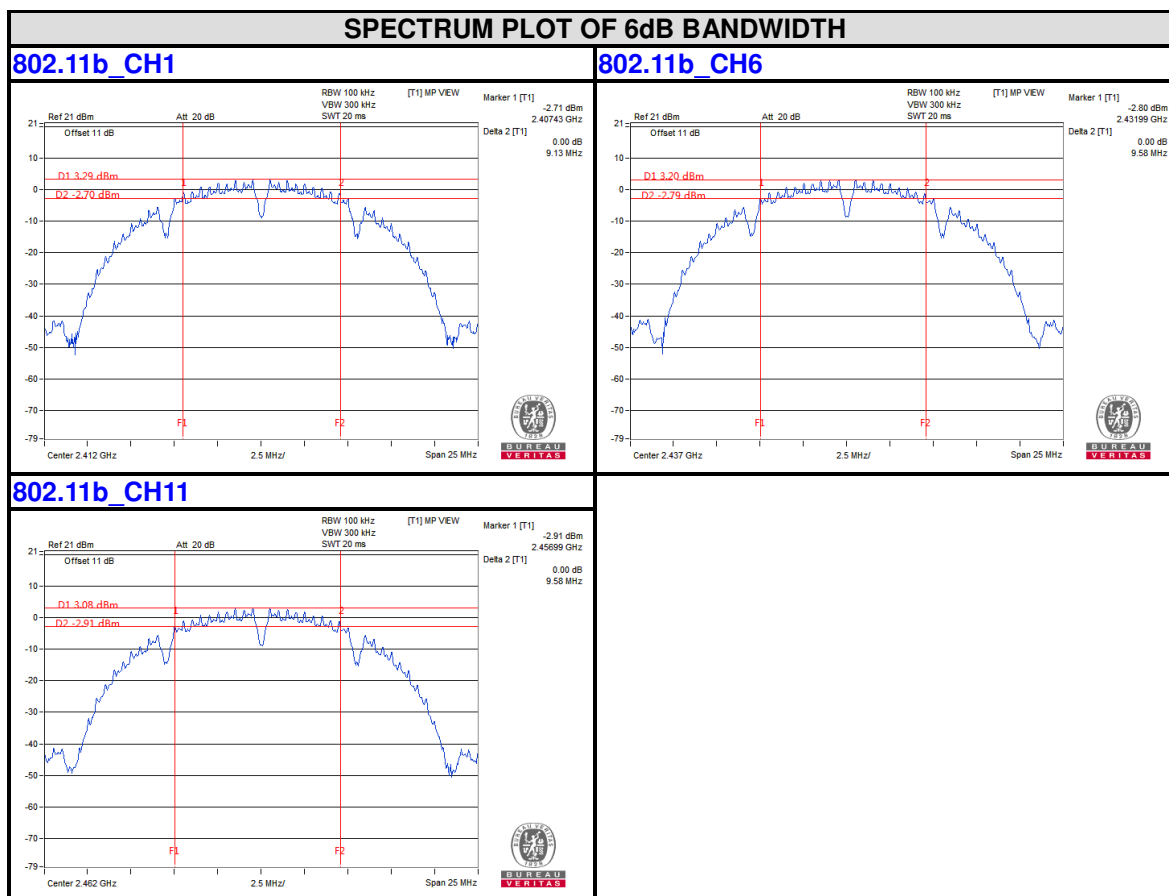
802.11n HT40

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		Chain1	Chain2		
3	2422	35.79	35.75	0.5	PASS
6	2437	35.79	35.74	0.5	PASS
9	2452	35.81	35.75	0.5	PASS

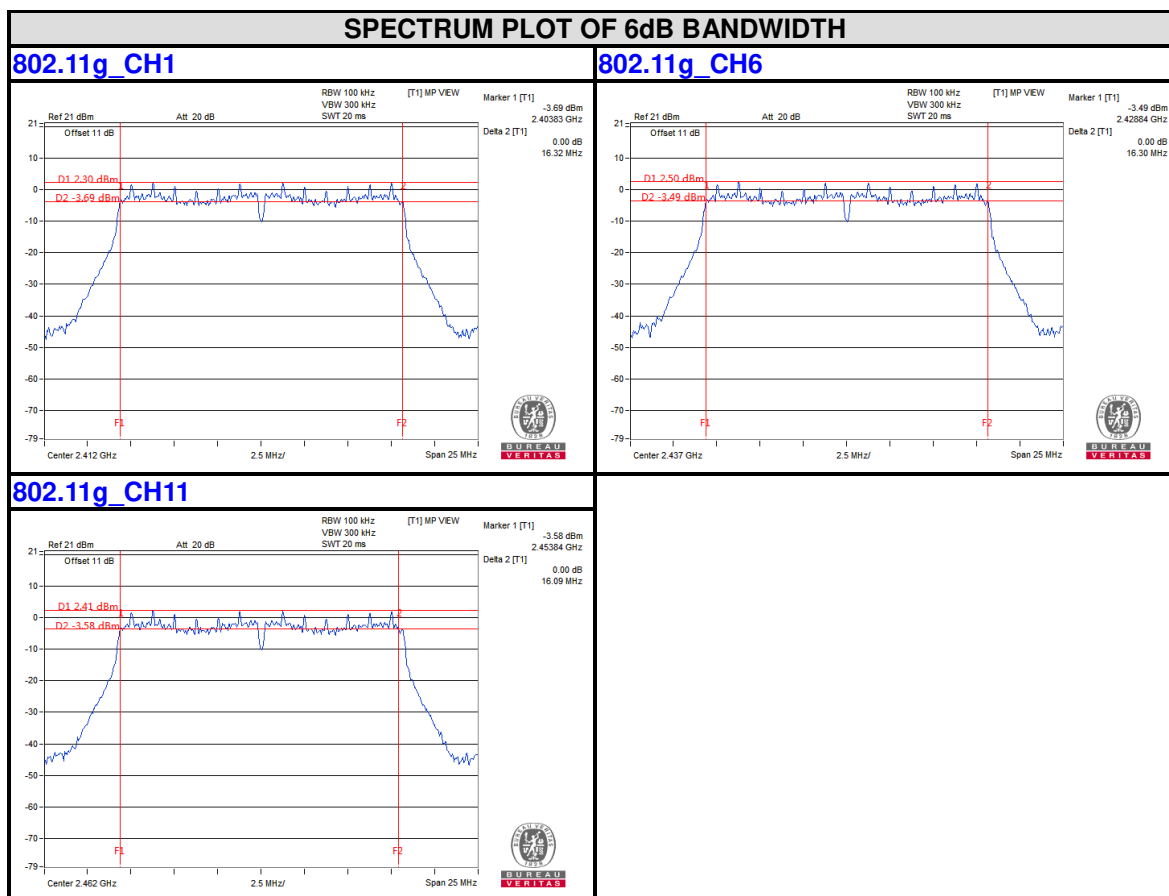
Chain 1



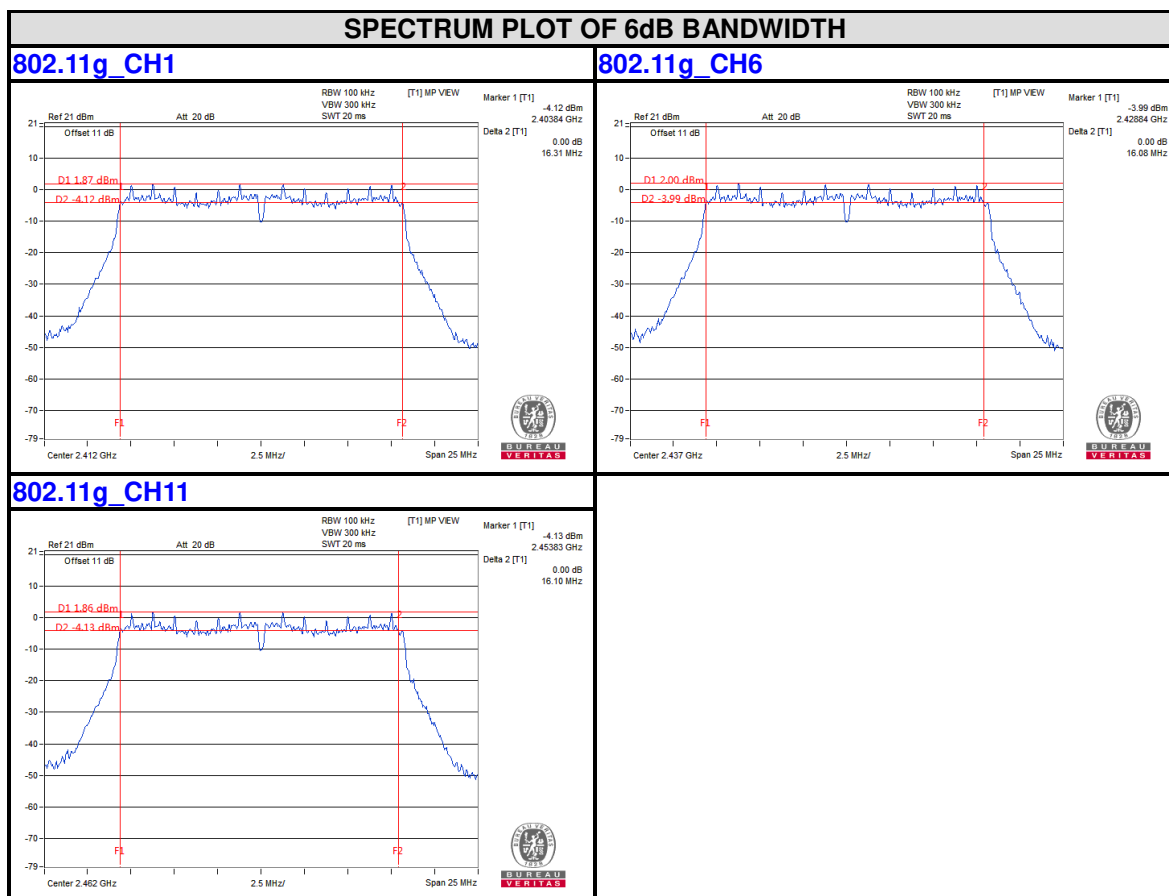
Chain 2



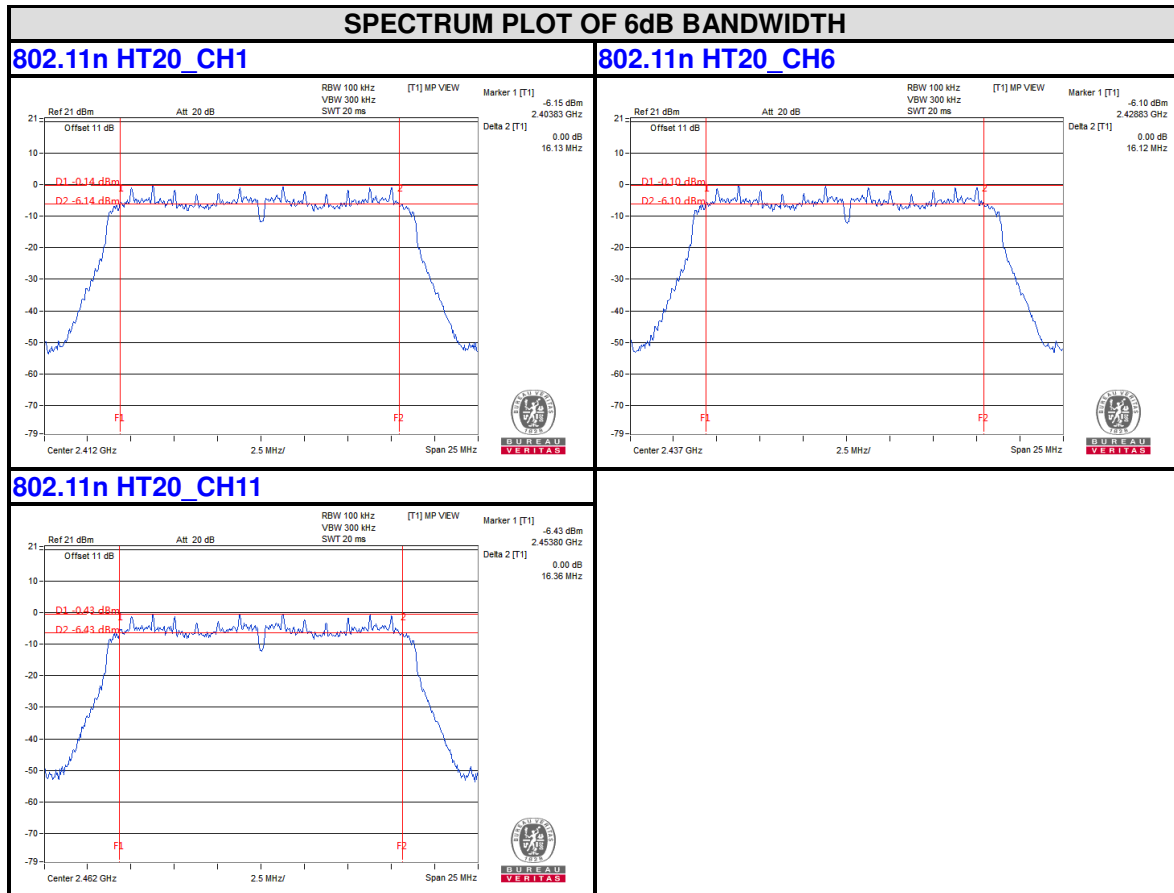
Chain 1



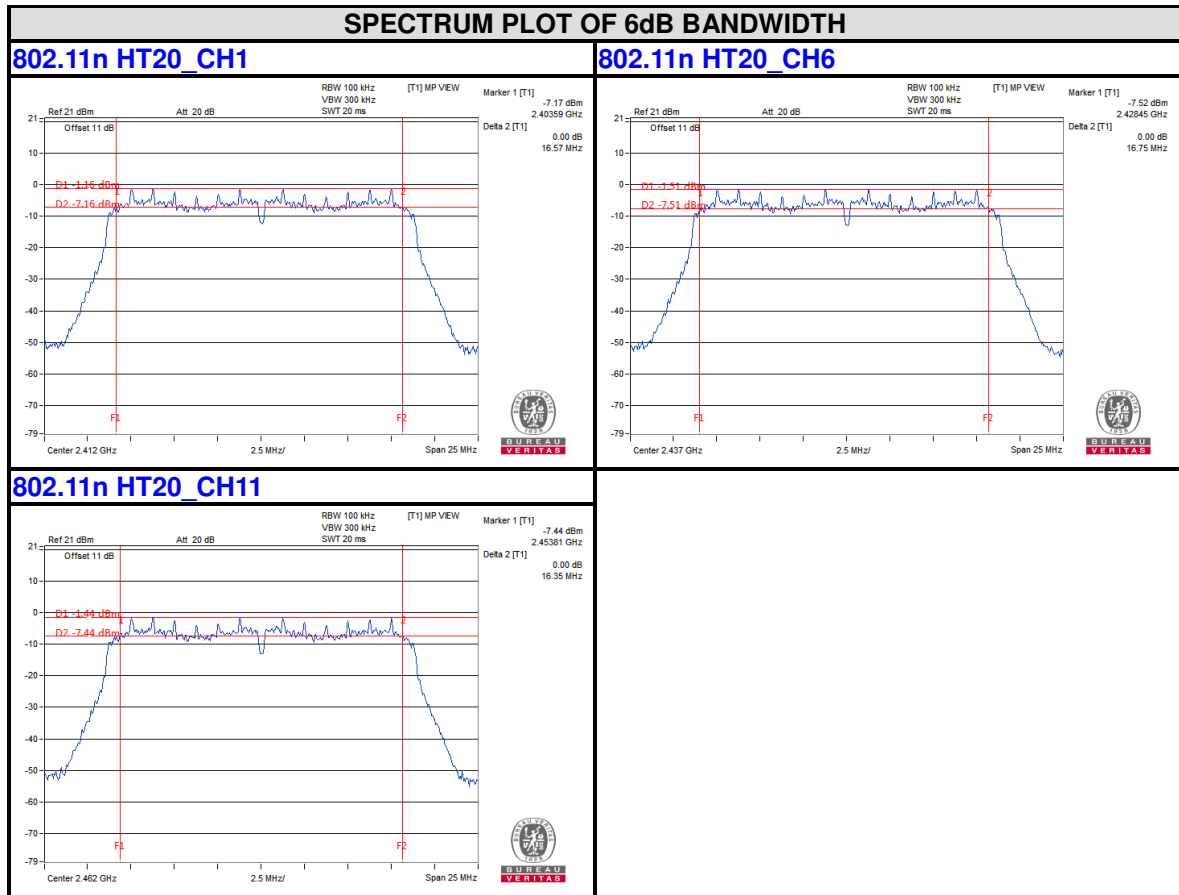
Chain 2



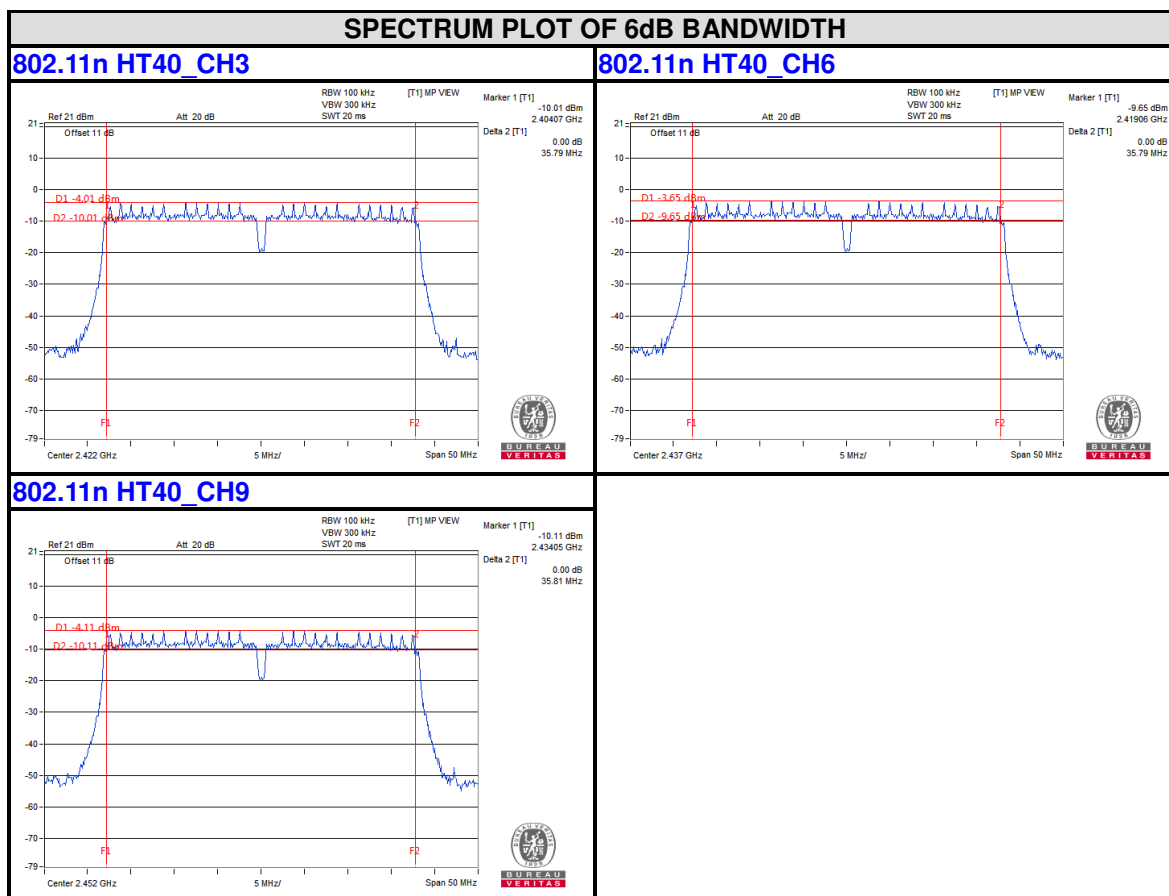
Chain 1



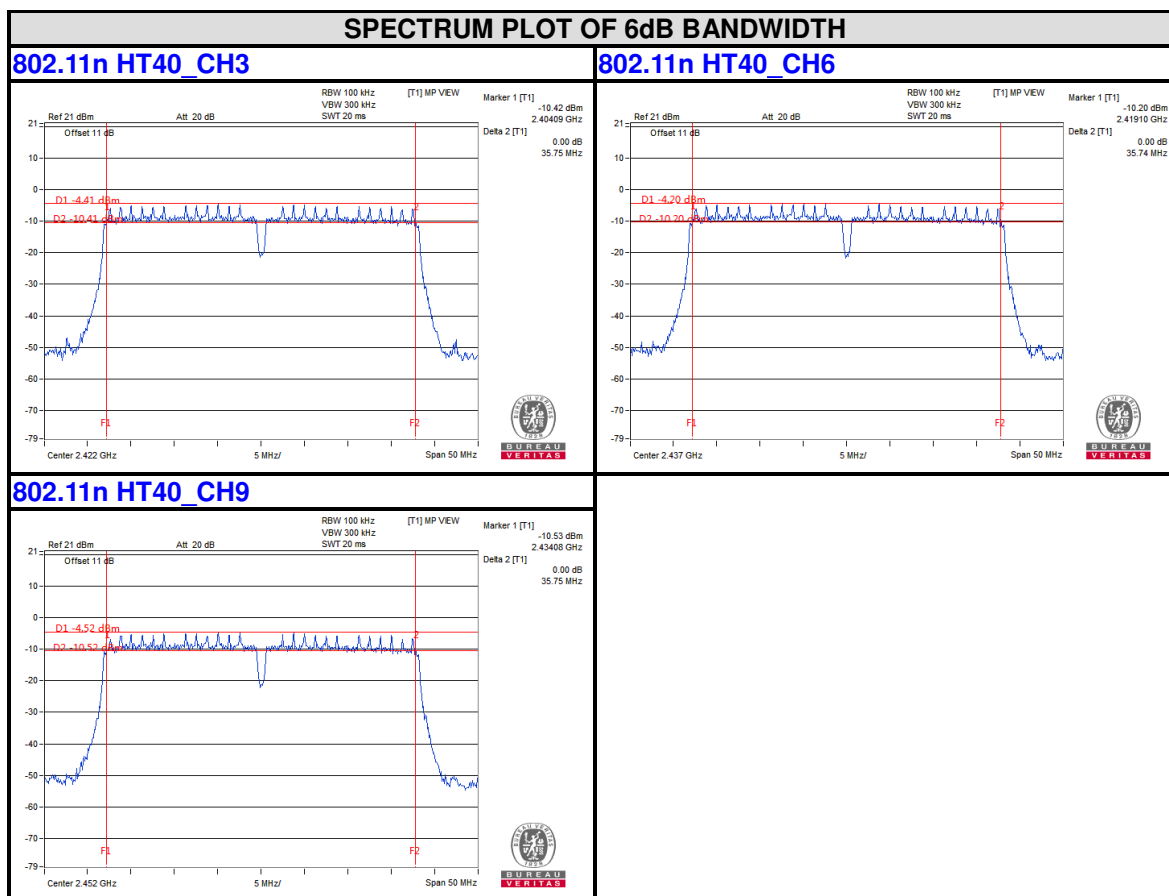
Chain 2



Chain 1



Chain 2

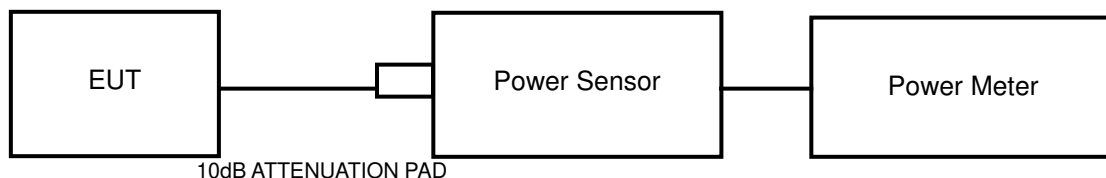


4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm).

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	May 21,21
Power Sensor	Keysight	U2021XA	MY55060018	May 21,21
Power Meter	Anritsu	ML2495A	1139001	Mar. 11,21
Power Sensor	Anritsu	MA2411B	1531155	Mar. 11,21
Digital Multimeter	FLUKE	15B	A1220010DG	Oct.16, 21
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Nov. 14,21
Oscilloscope	Agilent	DSO9254A	MY51260160	Sep. 17,21
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Mar. 12,21
Signal Generator	Agilent	N5183A	MY50140980	Sep. 18,21
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Sep. 11,21
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A
DC Source	Keysight	E3642A	MY56146098	N/A

NOTES:

1. The test was performed in RF Oven room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

4.4.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A peak power meter was used to read the response of the peak power sensor. Record the peak power level.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

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

4.4.7 TEST RESULTS

MAXIMUM PEAK OUTPUT POWER

802.11b

Chain 1

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	19.74	94.189	1	PASS
6	2437	19.21	83.368	1	PASS
11	2462	19.52	89.536	1	PASS

Chain 2

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	19.18	82.794	1	PASS
6	2437	18.35	68.391	1	PASS
11	2462	18.37	68.707	1	PASS

802.11g

Chain 1

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	23.51	224.388	1	PASS
6	2437	23.40	218.776	1	PASS
11	2462	23.16	207.014	1	PASS

Chain 2

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	22.80	190.546	1	PASS
6	2437	22.58	181.134	1	PASS
11	2462	22.15	164.059	1	PASS

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CHAN.	FRE. (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (W)	PASS/ FAIL
		CHAIN 1	CHAIN 2	CHAIN 1	CHAIN 2				
1	2412	20.46	19.94	111.173	98.628	209.801	23.22	1	PASS
6	2437	20.51	19.70	112.460	93.325	205.785	23.13	1	PASS
11	2462	20.65	19.88	116.145	97.275	213.420	23.29	1	PASS

802.11n HT40

CHAN.	FRE. (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (W)	PASS/ FAIL
		CHAIN 1	CHAIN 2	CHAIN 1	CHAIN 2				
3	2422	20.58	20.06	114.288	101.39 1	215.679	23.34	1	PASS
6	2437	20.60	19.96	114.815	99.083	213.898	23.30	1	PASS
9	2452	20.42	19.65	110.154	92.257	202.411	23.06	1	PASS

AVERAGE OUTPUT POWER (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

802.11b Chain 1

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	16.28	42.462
6	2437	16.12	40.926
11	2462	16.25	42.170

Chain 2

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	15.55	35.892
6	2437	15.25	33.497
11	2462	15.09	32.285

802.11g Chain 1

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	15.69	37.068
6	2437	15.74	37.497
11	2462	15.52	35.645

Chain 2

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	15.28	33.729
6	2437	14.87	30.690
11	2462	14.50	28.184

802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (dBm)	TOTAL POWER (mW)
		CHAIN 1	CHAIN 2	CHAIN 1	CHAIN 2		
1	2412	12.41	12.01	17.418	15.885	33.303	15.22
6	2437	12.62	11.72	18.281	14.859	33.140	15.20
11	2462	12.79	11.69	19.011	14.757	33.768	15.29

802.11n HT40

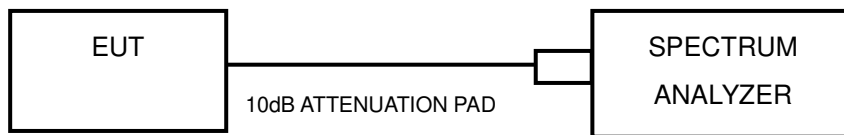
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (dBm)	TOTAL POWER (mW)
		CHAIN 1	CHAIN 2	CHAIN 1	CHAIN 2		
3	2422	12.98	11.86	19.861	15.346	35.207	15.47
6	2437	12.55	11.92	17.989	15.560	33.549	15.26
9	2452	12.42	11.52	17.458	14.191	31.649	15.00

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

- Set instrument center frequency to DTS channel center frequency.
- Set span to 1.5 times the DTS bandwidth.
- Set RBW to: 3KHz
- Set VBW $\geq 3 \times$ RBW.
- Detector = peak
- Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
- Sweep time = auto couple.
- Use the peak marker function to determine the maximum amplitude level.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as item 4.3.6.

4.5.7 TEST RESULTS

802.11b

Chain 1

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-15.00	8.00	PASS
6	2437	-15.08	8.00	PASS
11	2462	-14.73	8.00	PASS

Chain 2

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-14.91	8.00	PASS
6	2437	-15.21	8.00	PASS
11	2462	-15.18	8.00	PASS

802.11g

Chain 1

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.59	8.00	PASS
6	2437	-13.59	8.00	PASS
11	2462	-13.46	8.00	PASS

Chain 2

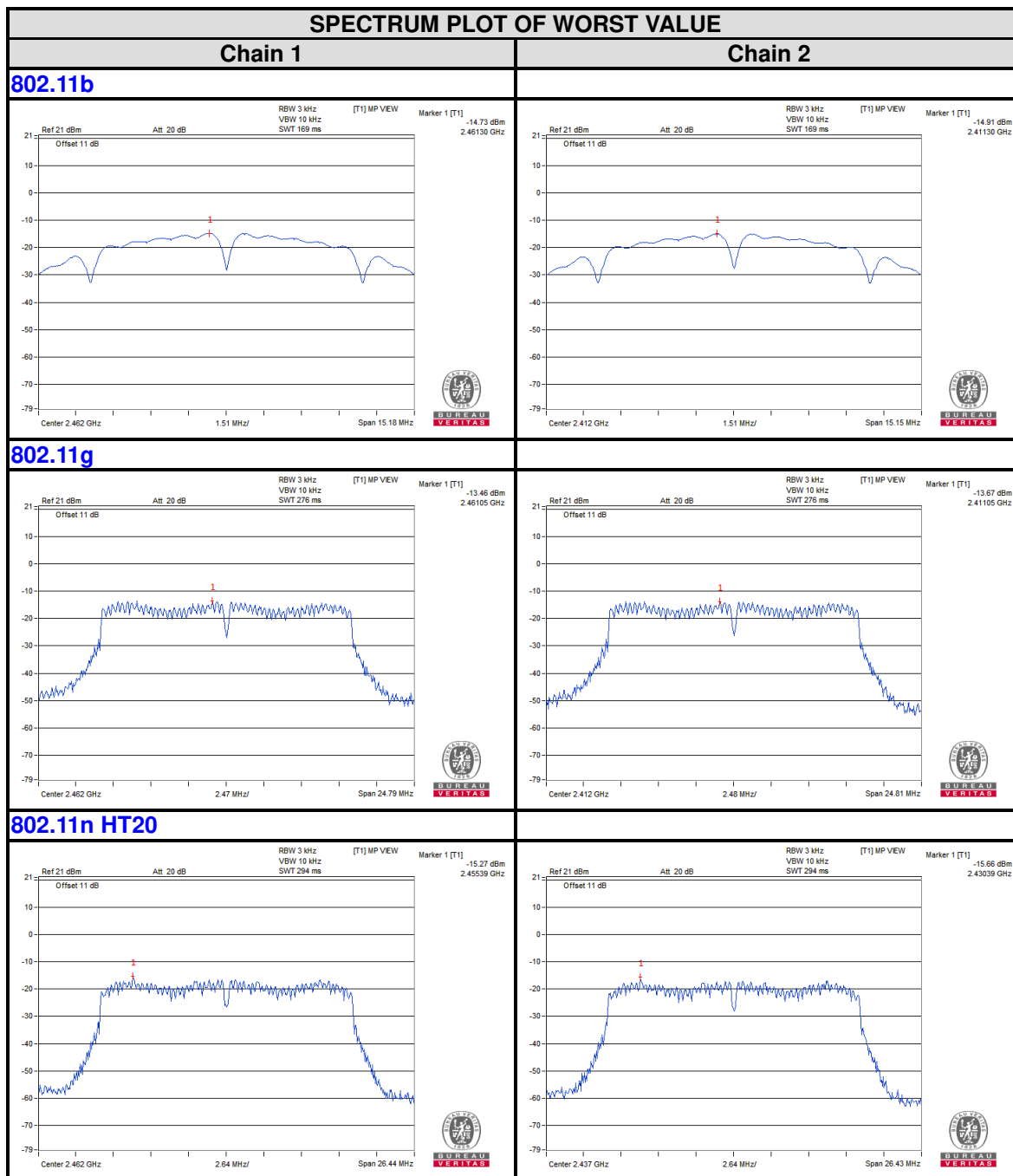
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.67	8.00	PASS
6	2437	-13.69	8.00	PASS
11	2462	-14.06	8.00	PASS

802.11n HT20

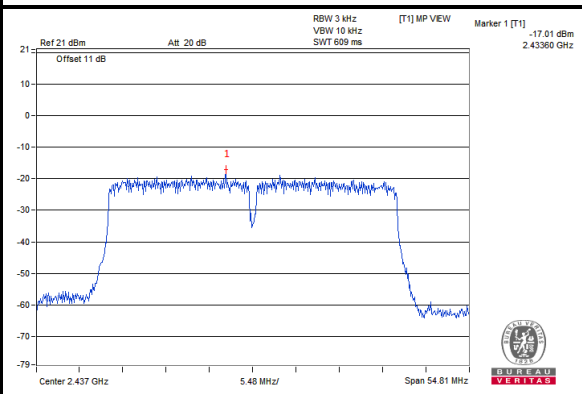
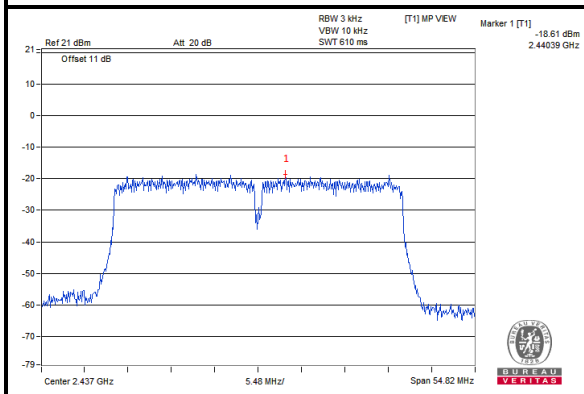
Channel	FREQ. (MHz)	PSD (dBm/3kHz)		TOTAL (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
		Chain 1	Chain 2			
1	2412	-15.61	-15.93	-12.60	8.00	PASS
6	2437	-15.88	-15.66	-12.87	8.00	PASS
11	2462	-15.27	-15.94	-12.26	8.00	PASS

802.11n HT40

Channel	FREQ. (MHz)	PSD (dBm/3kHz)		TOTAL (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
		Chain 1	Chain 2			
3	2422	-19.04	-19.50	-16.03	8.00	PASS
6	2437	-18.61	-17.01	-15.60	8.00	PASS
9	2452	-18.95	-18.22	-15.94	8.00	PASS



802.11n HT40



4.6 OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

Measurement Procedure - Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 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 –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

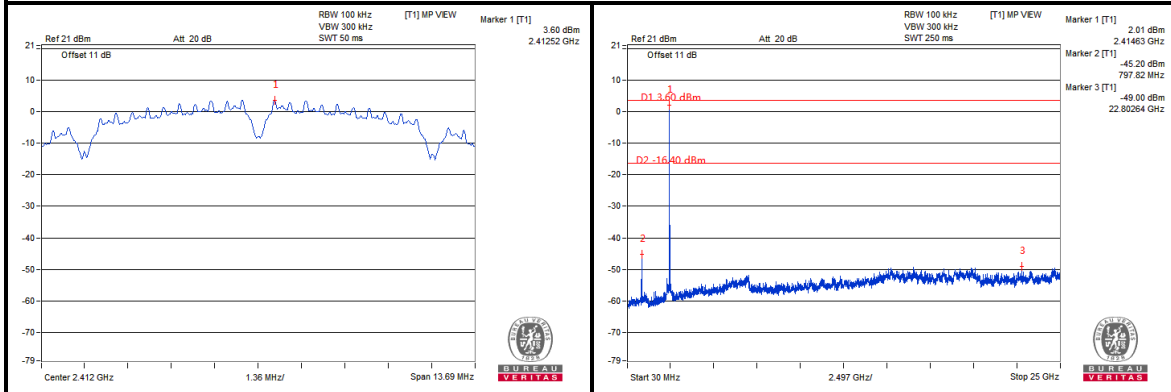
Same as item 4.3.6

4.6.7 TEST RESULTS

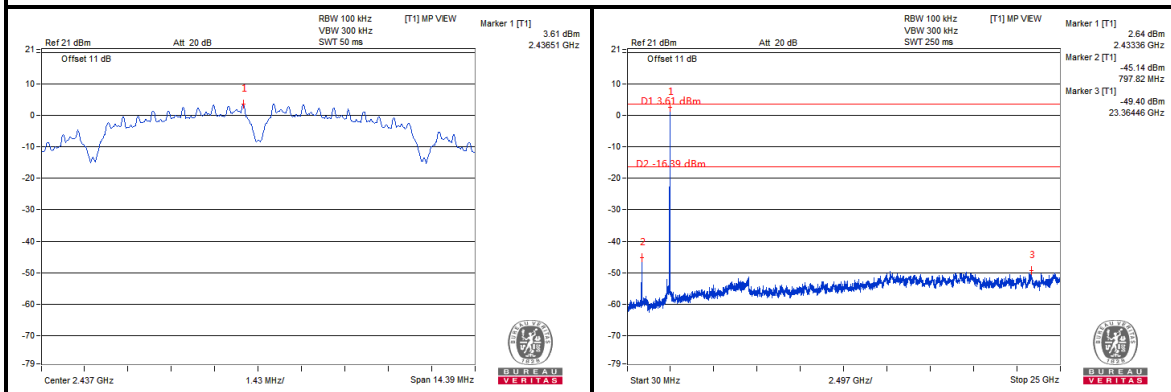
802.11b

Chain 1

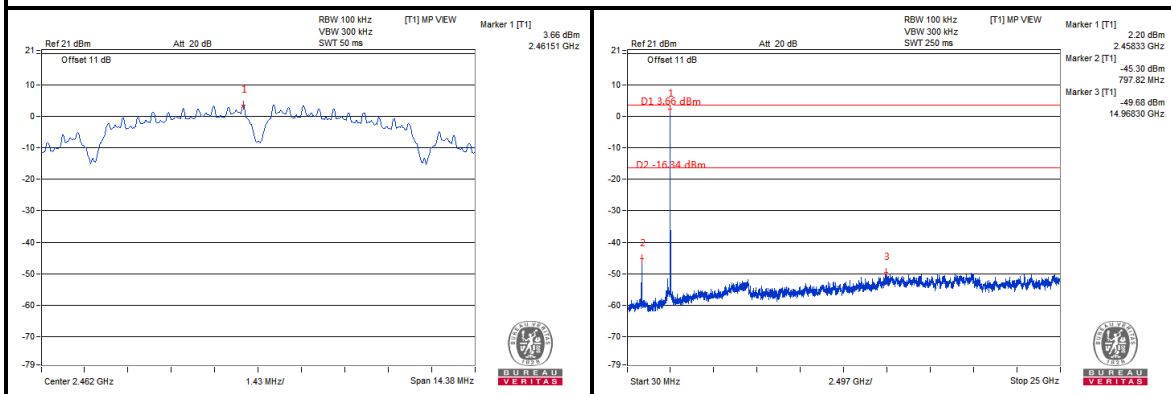
CH 1



CH 6

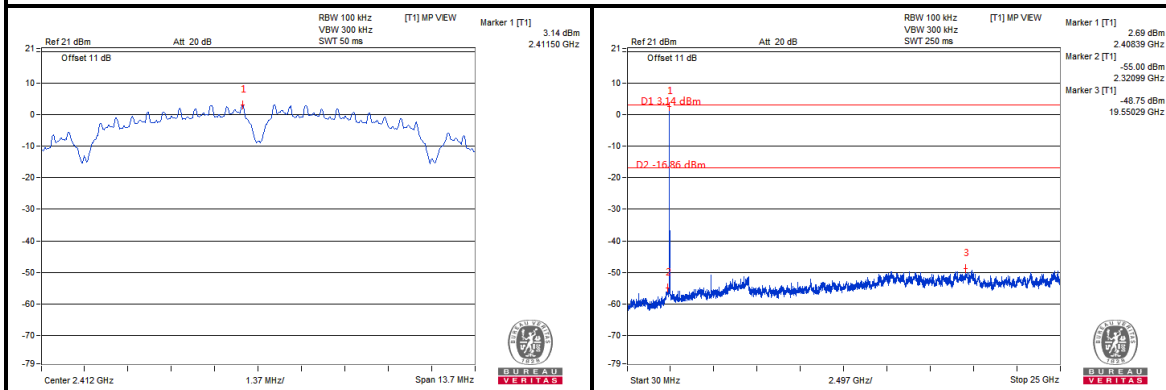


CH 11

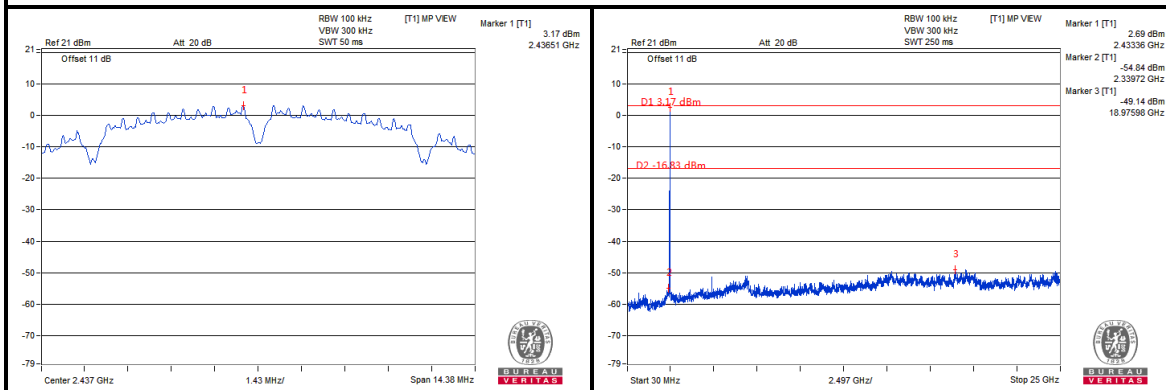


Chain 2

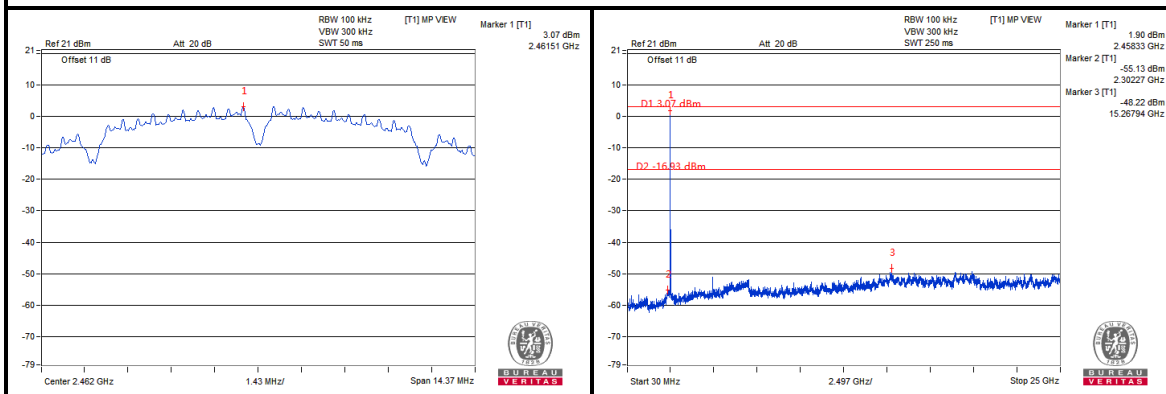
CH 1



CH 6

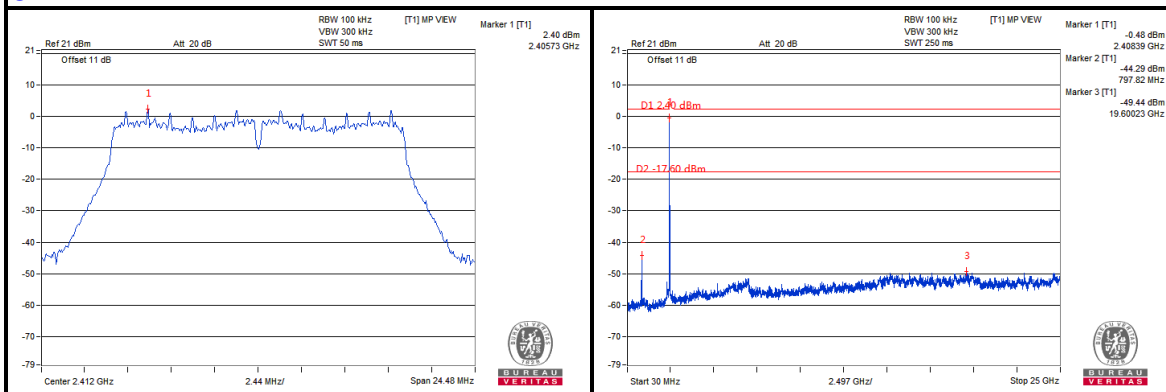


CH 11

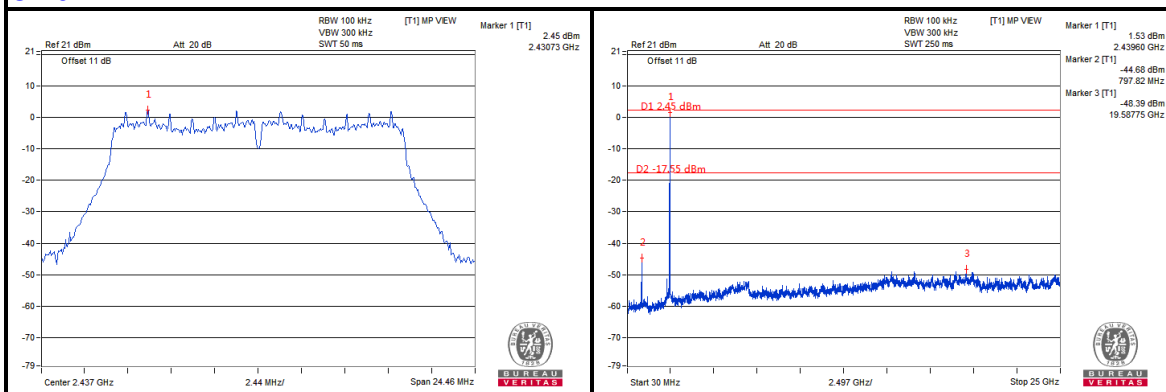


802.11g
Chain 1

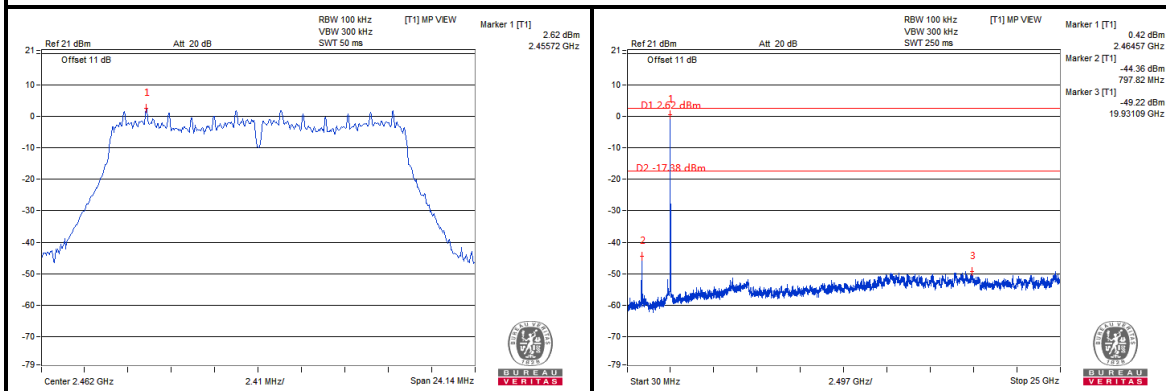
CH 1



CH 6

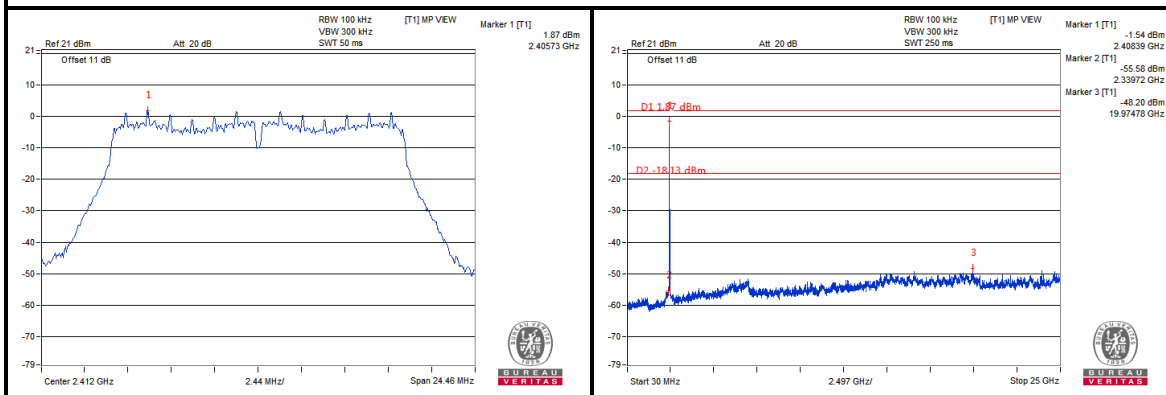


CH 11

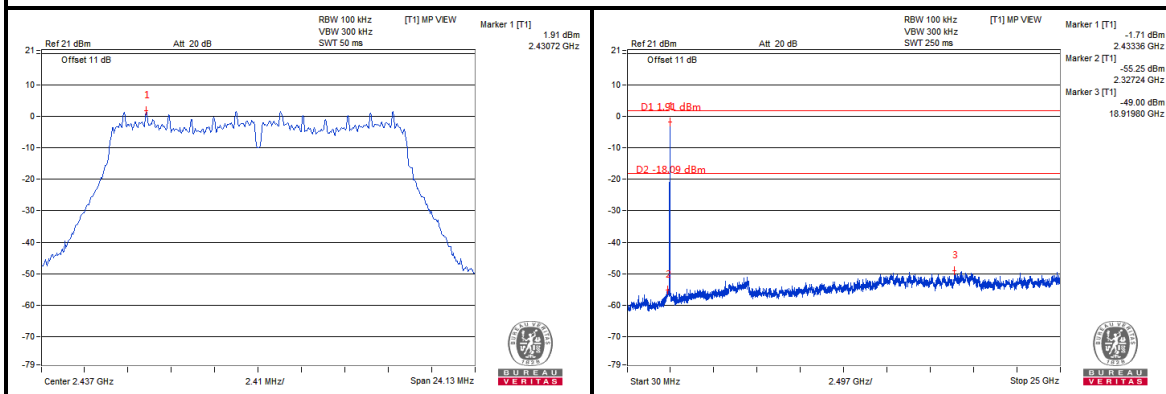


Chain 2

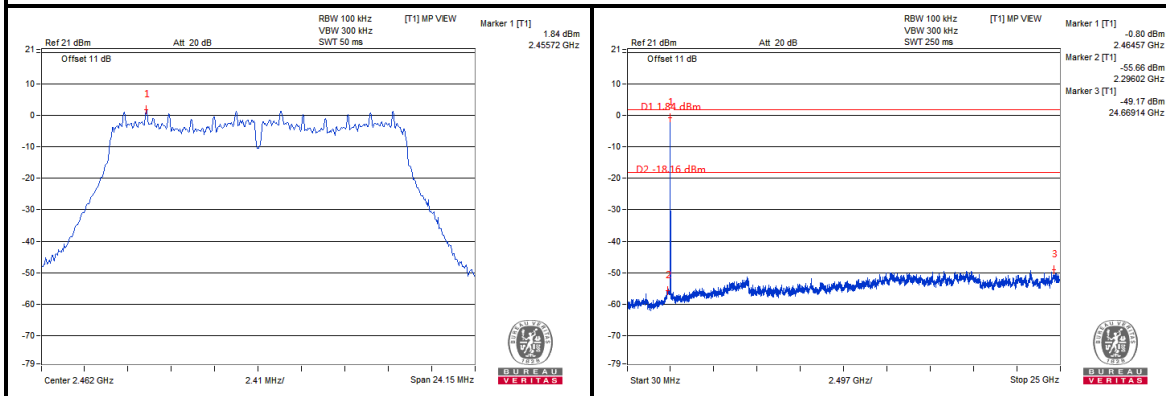
CH 1



CH 6



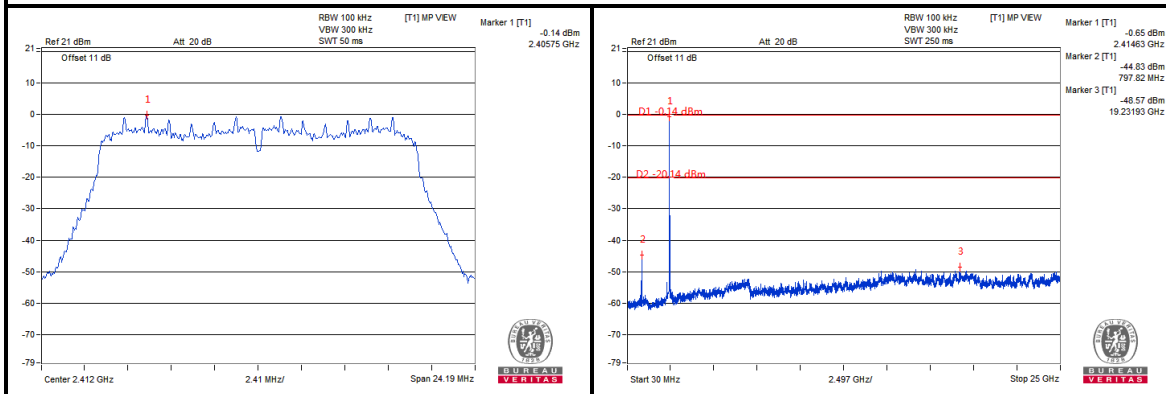
CH 11



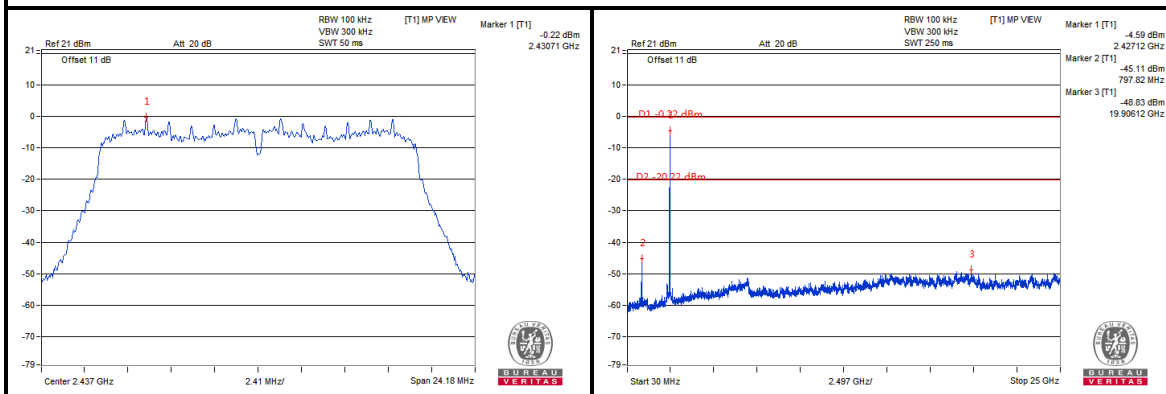
802.11n HT20

Chain 1

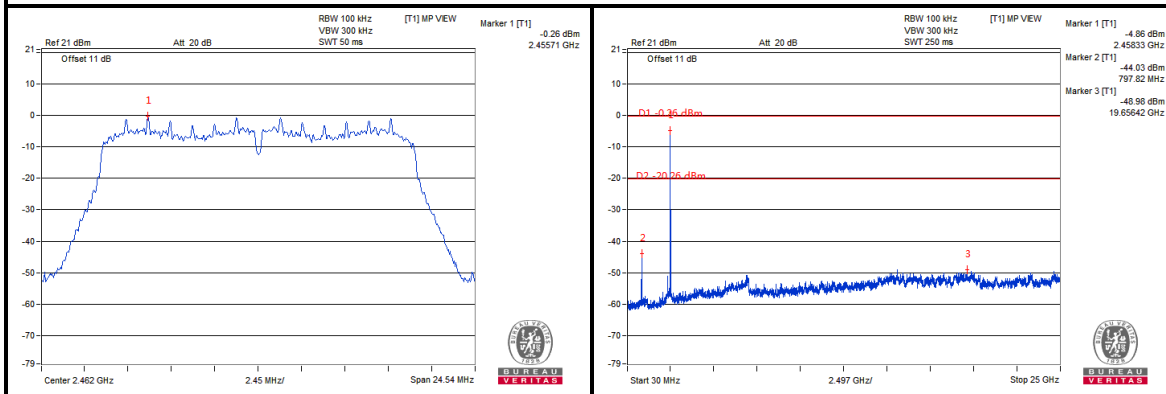
CH 1



CH 6

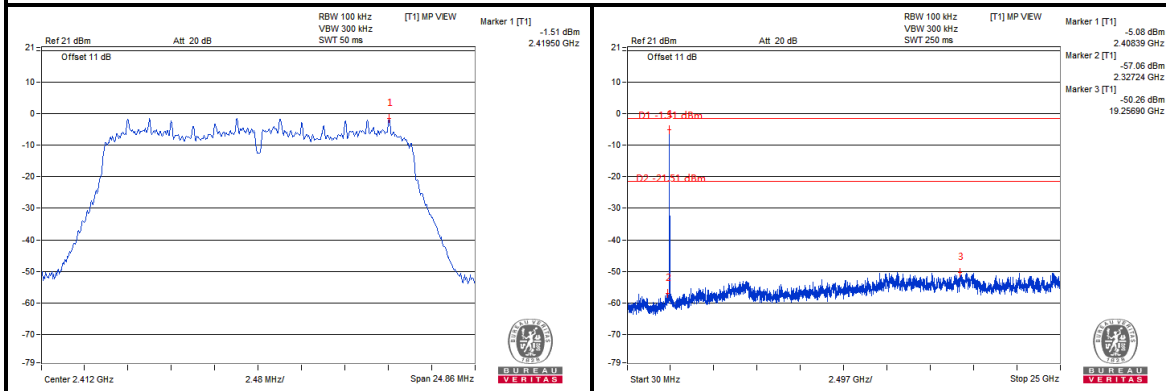


CH 11

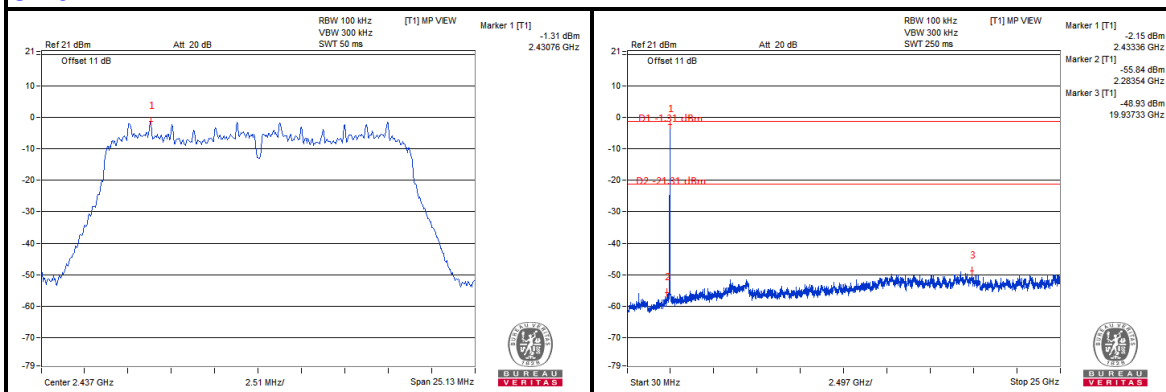


Chain 2

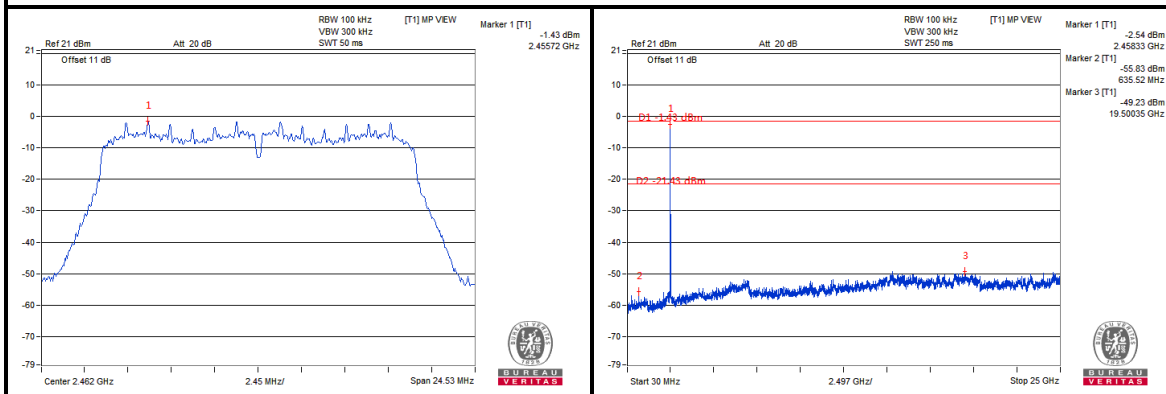
CH 1



CH 6



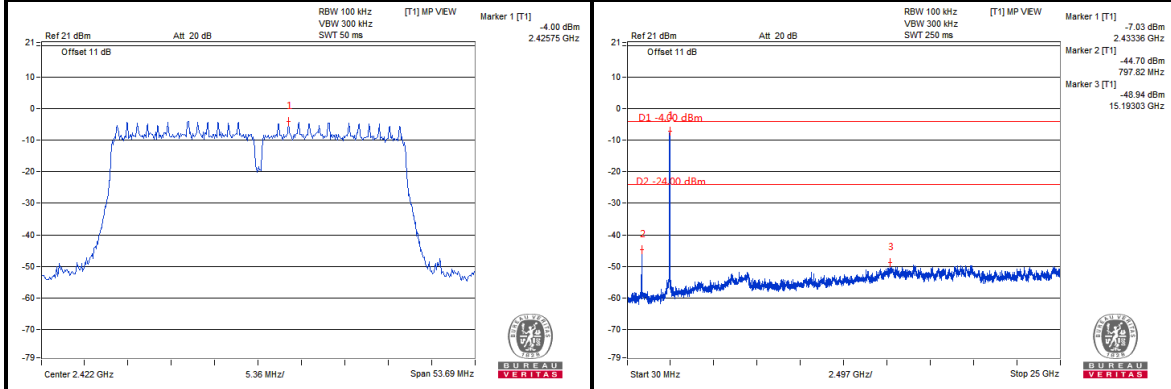
CH 11



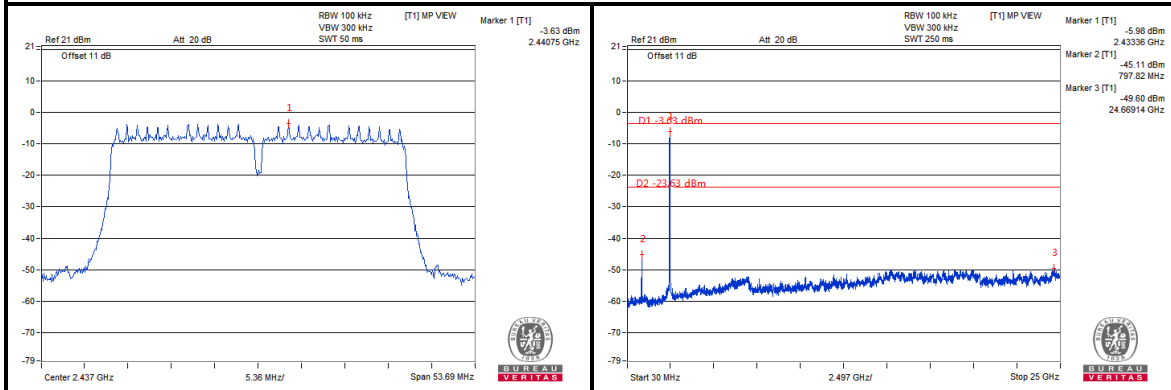
802.11n HT40

Chain 1

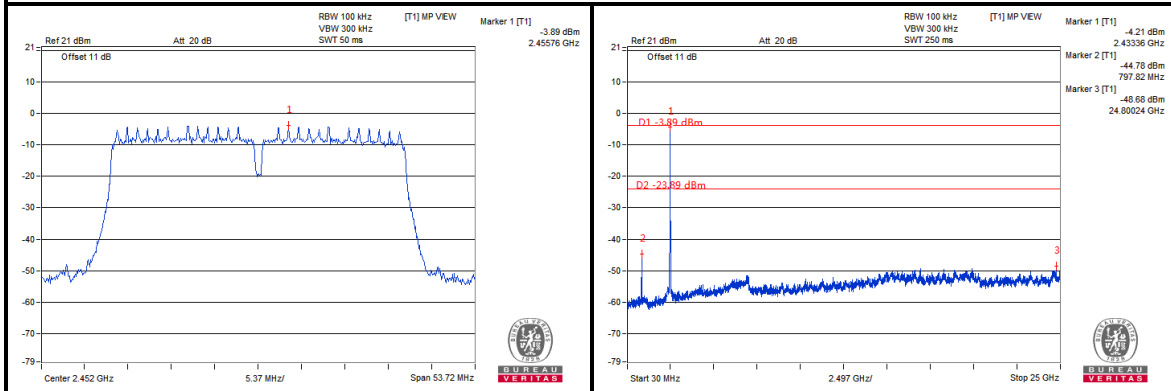
CH 3



CH 6

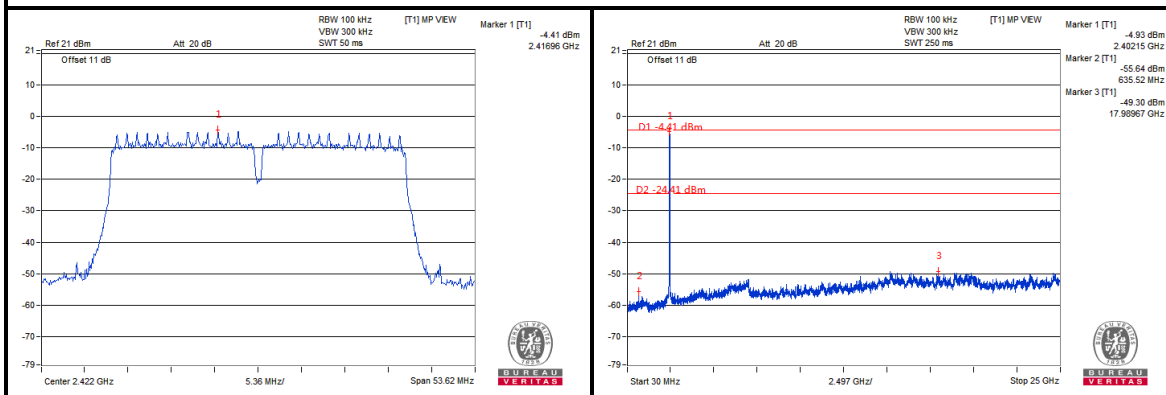


CH 9

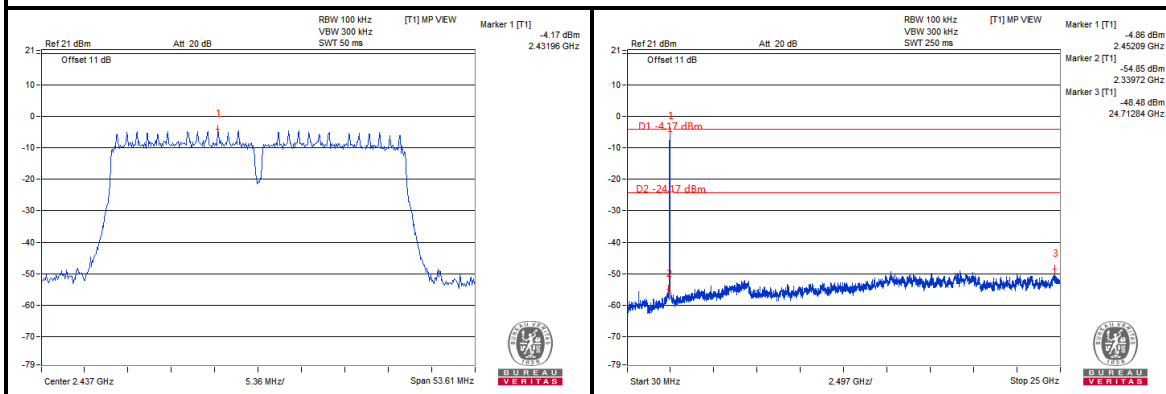


Chain 2

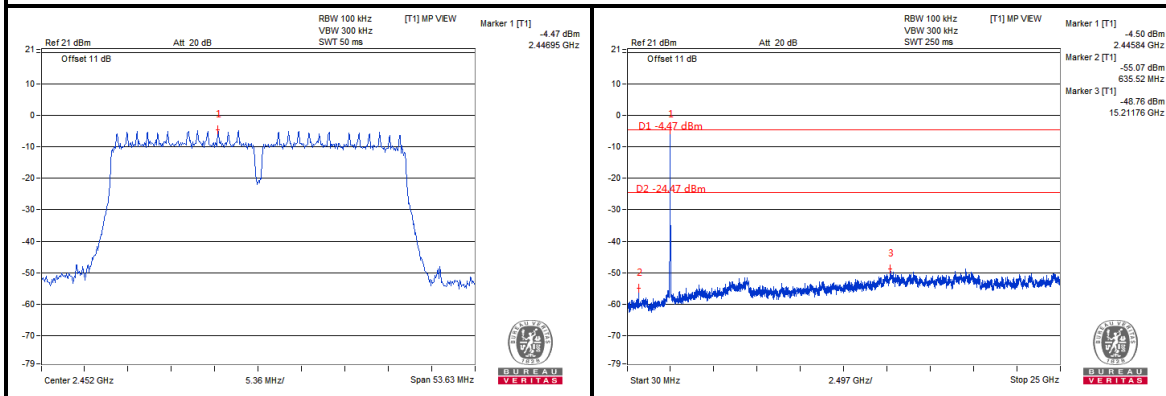
CH 3



CH 6

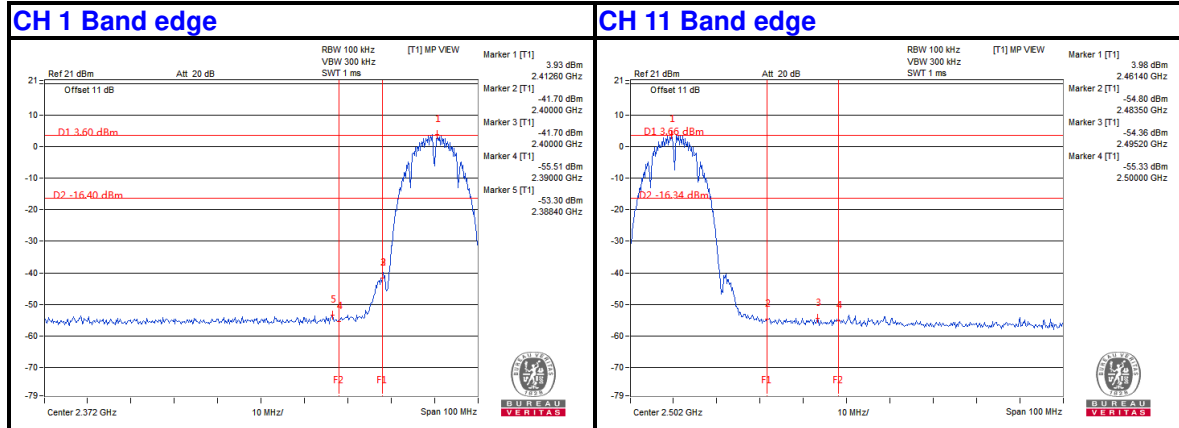


CH 9

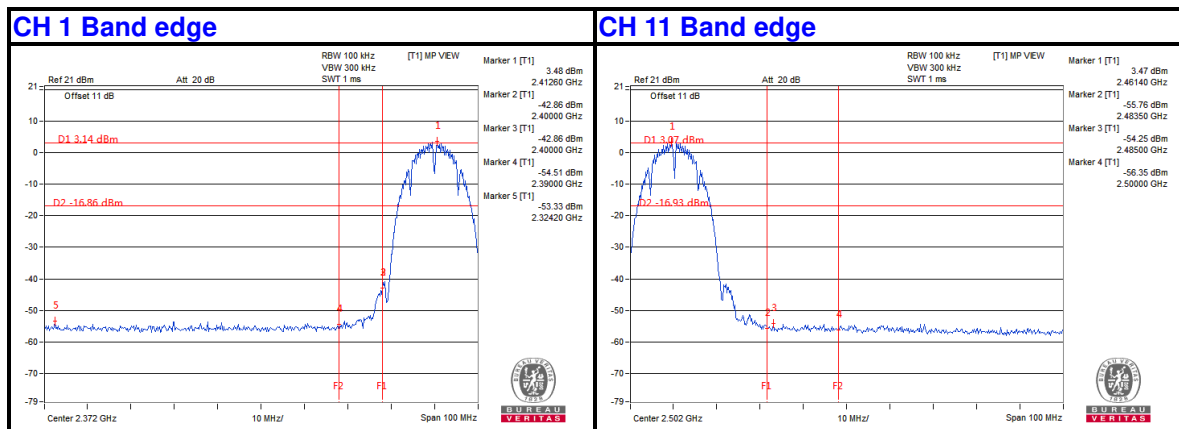


802.11b.

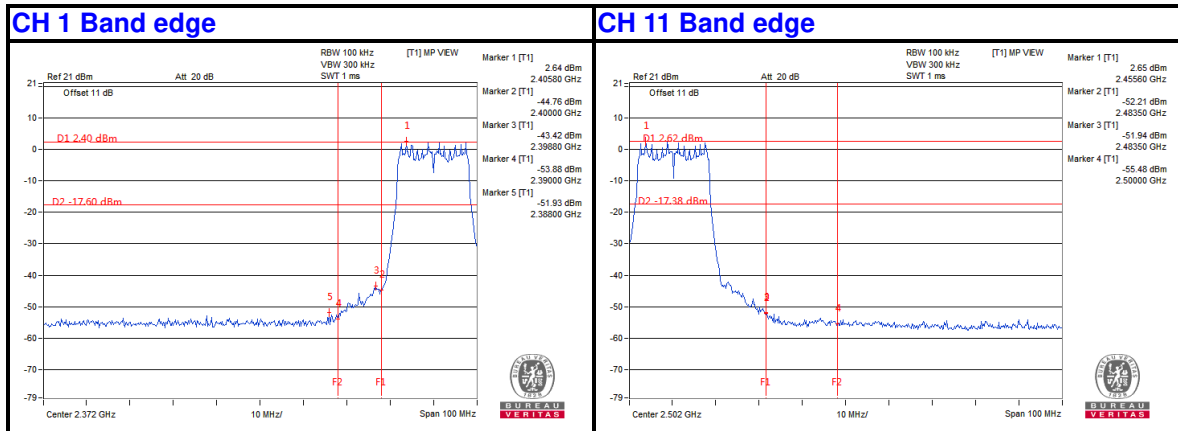
Chain 1



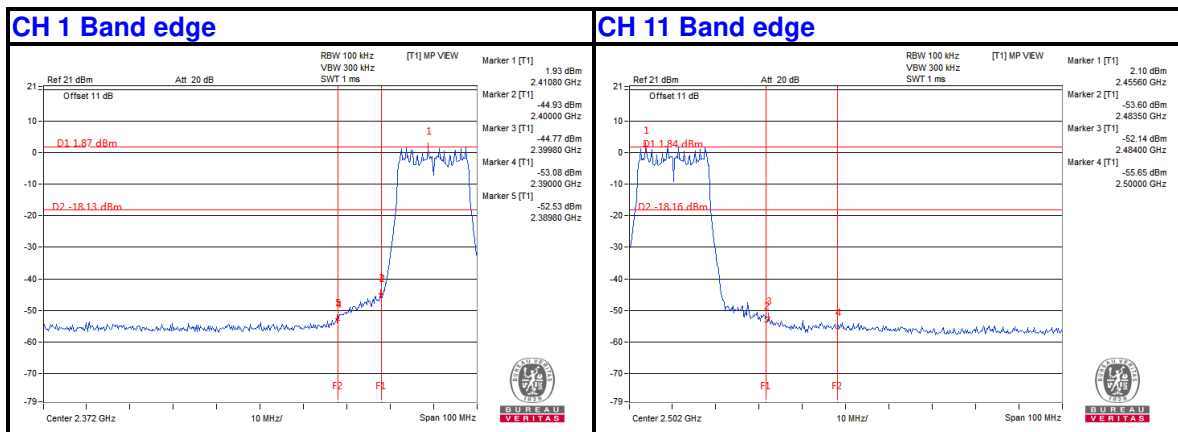
Chain 2



802.11g
Chain 1



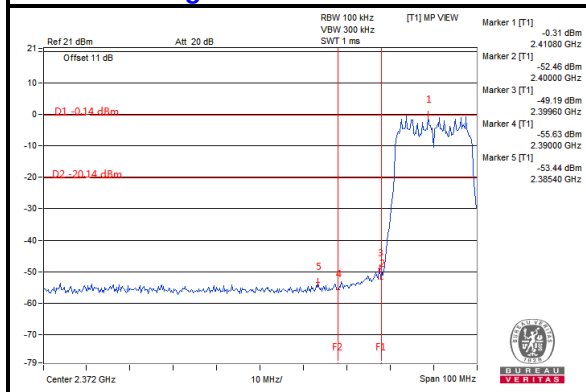
Chain 2



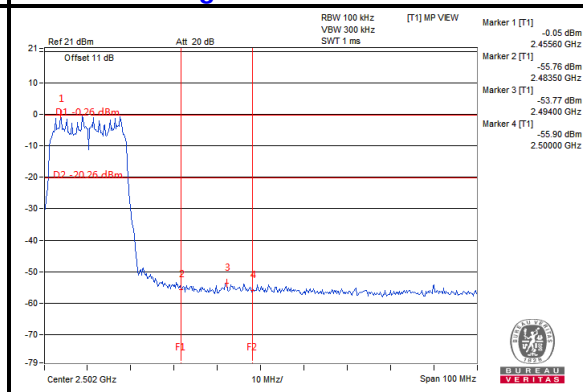
802.11n HT20

Chain 1

CH 1 Band edge

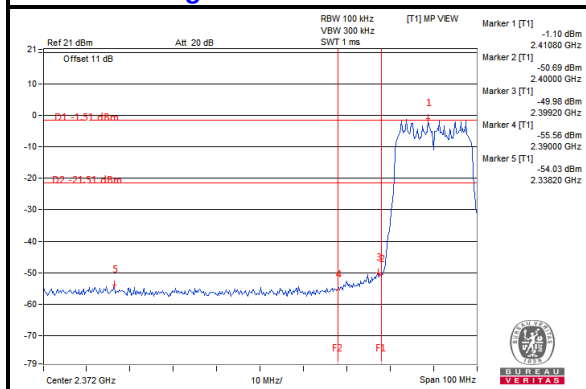


CH 11 Band edge

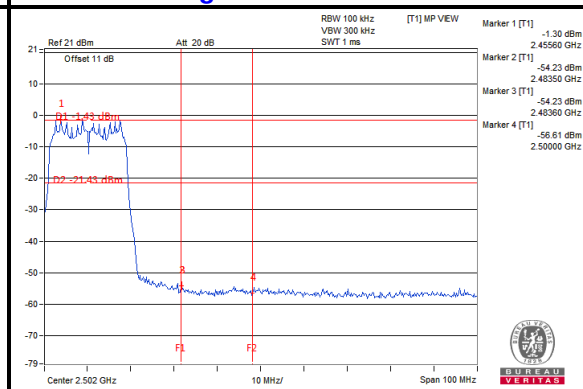


Chain 2

CH 1 Band edge



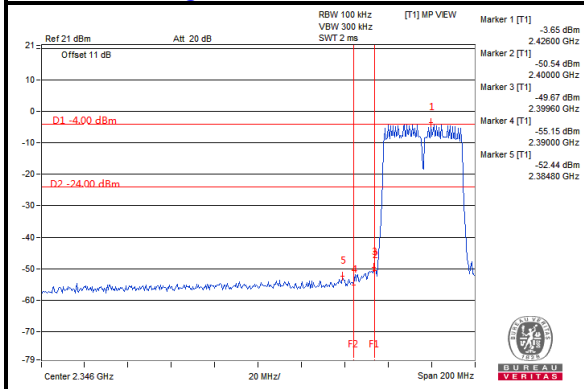
CH 11 Band edge



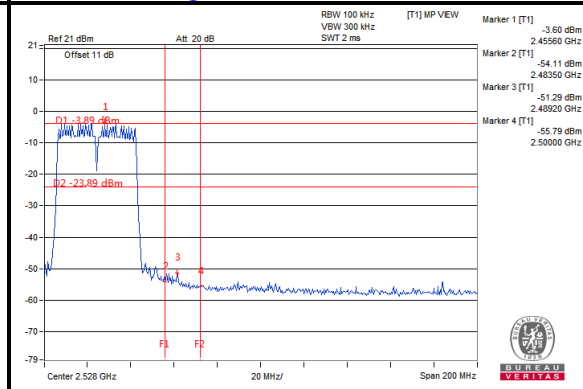
802.11n HT40

Chain 1

CH 3 Band edge

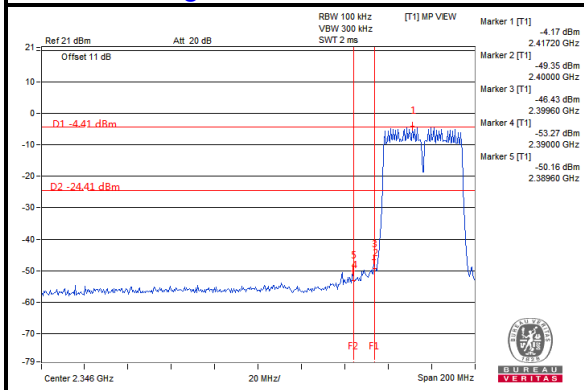


CH 9 Band edge

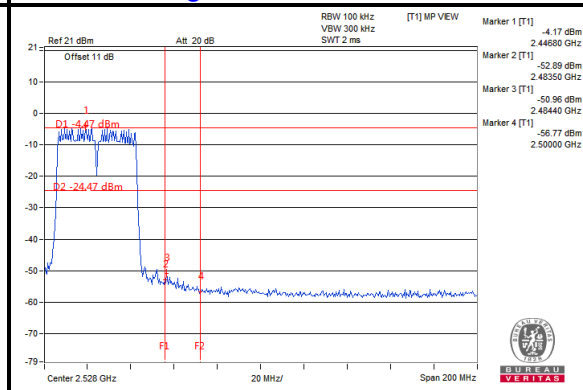


Chain 2

CH 3 Band edge



CH 9 Band edge



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---