

TEST REPORT



Applicant	Klein Tools Inc.
Address	450 Bond Street Lincolnshire, IL 60069 USA

Manufacturer or Supplier	---
Address	---
Product	Video instrument
Brand Name	KLEIN TOOLS
Model	ET20
Additional Model & Model Difference	N/A
Date of tests	Sep. 03. 2018 ~ Dec. 29. 2018

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 Ryan Lu Project Engineer / EMC Department	Approved by Chris Chen Manager / EMC Department
	 Date: Dec. 29. 2018

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Test Report No.: RF180903N054

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF180903N054	Original release	Dec. 29. 2018

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	No antenna connector is used

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	3.76dB
	1GHz ~ 18GHz	4.84dB
	18GHz ~ 40GHz	4.96dB

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	Video instrument
MODEL NO.	ET20
ADDITIONAL NO.	N/A
FCC ID	2A128-ET20
NOMINAL VOLTAGE	DC 3.7V from Battery Charging: DC 5V from USB host unit
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
PEAK OUTPUT POWER	23.94dBm(Maximum)
ANTENNA TYPE	FPCB Antenna, with 2dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB Cable : Unshielded, Detachable 1.0m

NOTE:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two transmitter and two receiver.

MODULATION MODE	FUNCTION
802.11b	2TX/2RX
802.11g	2TX/2RX
802.11n (HT20)	2TX/2RX
802.11n (HT40)	2TX/2RX

2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
4. Please refer to the EUT photo document (Reference No.: 180903N054) for detailed product photo.

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 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	-	-	-	√	Powered by Fully Battery with WIFI function
B	√	√	√	-	Powered by 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
B	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)
B	802.11b	1 to 11	1	DSSS	DBPSK	1.0

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)
B	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
B	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
B	802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
B	802.11n HT40	3 to 9	3, 9	OFDM	BPSK	13.5

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)
B	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
B	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
B	802.11n HT20	1 to 11	1, 11	OFDM	BPSK	6.5
B	802.11n HT40	3 to 9	3, 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	TEST VOLTAGE	TESTED BY
RE<1G	25deg. C, 53%RH	DC 5V from adapter	Tank
RE≥1G	25deg. C, 53%RH	DC 5V from adapter	Tank
PLC	20deg. C, 56%RH	DC 5V from adapter	Sen He
APCM	25deg. C, 60%RH	DC 3.7V from Fully Battery	Robert Cheng

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 DTS Meas Guidance v04

ANSI C63.10-2013

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

NOTE: It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B(sDoC). The test report has been issued separately.

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	Adapter	Apple	A1299	N/A	N/A
2	Adapter	Lenovo	C-P30	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1,2	N/A

4 TEST TYPES AND RESULTS

4.1. CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	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 0.50MHz.

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.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Mar. 21,18	Mar. 20,19
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 03,18	Mar. 02,19
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Apr. 11,18	Apr. 10,19
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Jan. 17,18	Jan. 16,19
Test software	ADT	ADT_Cond_V7.3.7	N/A	N/A	N/A

NOTE:

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

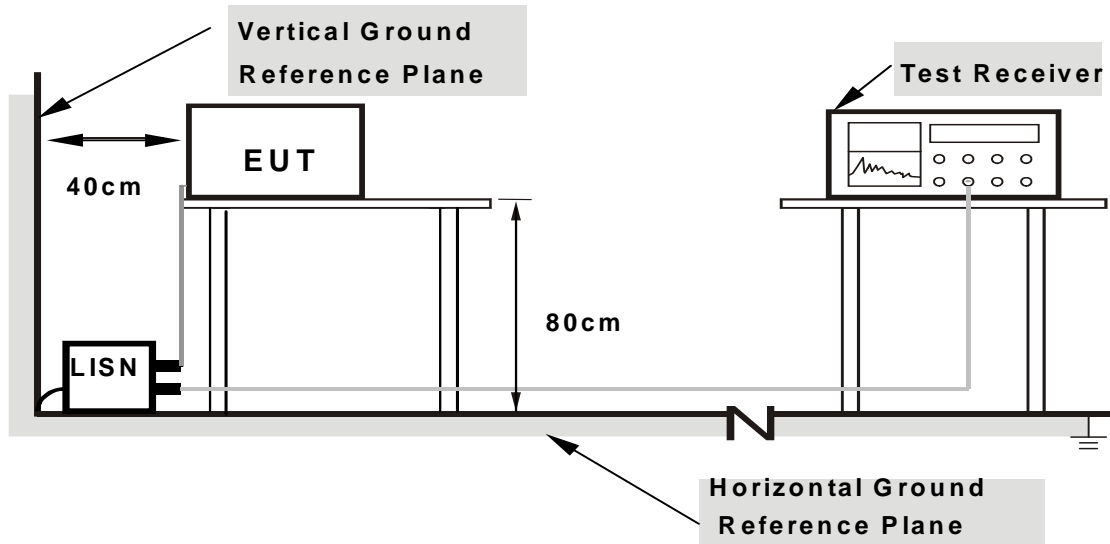
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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.

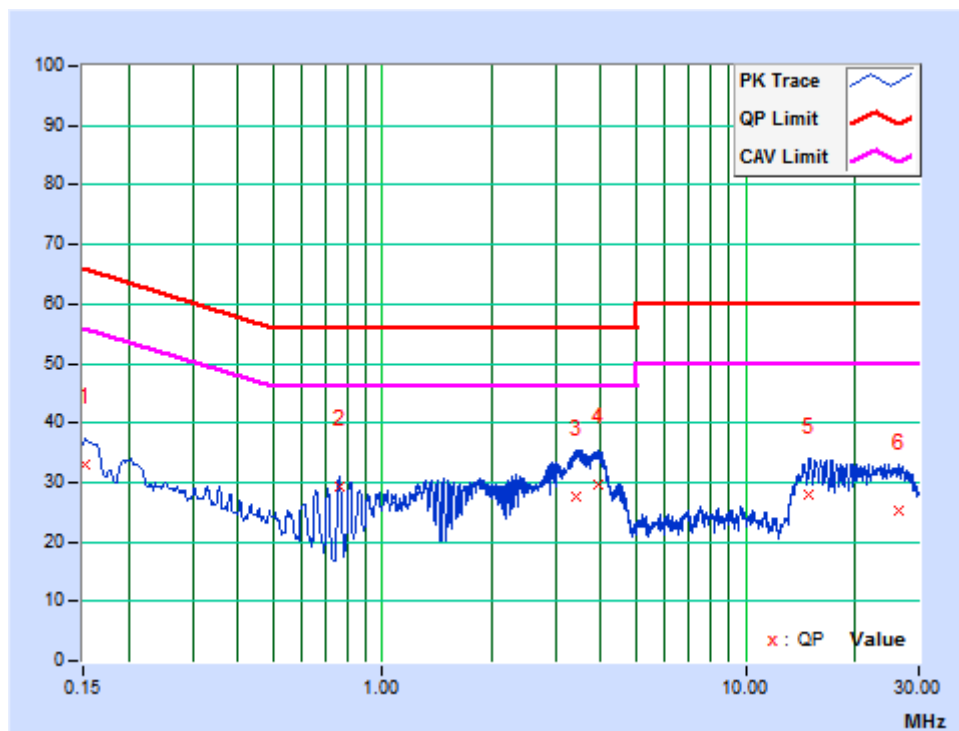
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA:

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	0.15225	9.89	23.05	15.09	32.94	24.98	65.88	55.88	-32.94	-30.90
2	0.76013	10.07	19.14	12.72	29.21	22.79	56.00	46.00	-26.79	-23.21
3	3.42825	9.98	17.75	6.86	27.73	16.84	56.00	46.00	-28.27	-29.16
4	3.91425	9.62	19.92	7.55	29.54	17.17	56.00	46.00	-26.46	-28.83
5	14.99325	10.01	17.83	7.44	27.84	17.45	60.00	50.00	-32.16	-32.55
6	26.42568	10.27	14.86	5.36	25.13	15.63	60.00	50.00	-34.87	-34.37

- 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	0.15000	9.56	27.33	11.13	36.89	20.69	66.00	56.00	-29.11	-35.31
2	0.19056	9.75	18.36	4.28	28.11	14.03	64.01	54.01	-35.91	-39.99
3	0.71250	10.43	19.17	17.73	29.60	28.16	56.00	46.00	-26.40	-17.84
4	3.48000	10.15	14.11	3.42	24.26	13.57	56.00	46.00	-31.74	-32.43
5	3.94350	10.41	18.39	4.86	28.80	15.27	56.00	46.00	-27.20	-30.73
6	14.92800	9.93	17.22	8.83	27.15	18.76	60.00	50.00	-32.85	-31.24

- 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

NOTE:

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.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 21,18	Mar. 20,19
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 04,18	Nov. 03,19
Active Loop Antenna (9KHz -30MHz)	SCHWARZBECK	FMZB 1519B	1519B-045	May 04,18	May 03,19
Amplifier (9KHz -1GHz)	Burgeon	BPA-530	100210	Apr. 18,18	Apr. 18,19
Bilog Antenna (20MHz -2GHz)	Teseq	CBL 6111D	30643	Aug. 11, 18	Aug. 10, 19
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	Jul. 21, 18	Jul. 20, 19
Horn Antenna (18GHz -40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170242	May 05,18	May 04,19
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Feb. 10,18	Feb. 09,19
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	Apr. 18,18	Apr. 18,19
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 08,18	Nov. 07,19
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A

NOTE:

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.

NOTE:

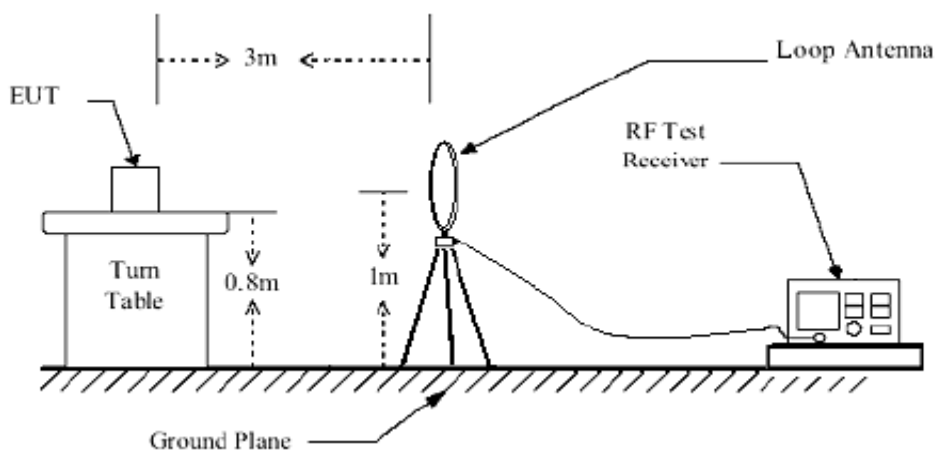
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution 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

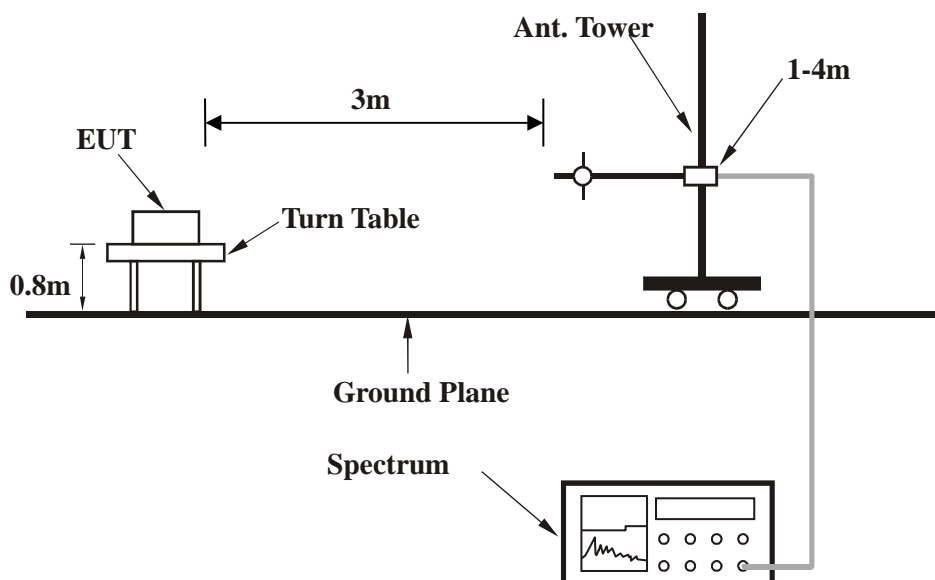
No deviation.

4.2.5 TEST SETUP

Below 30MHz test setup

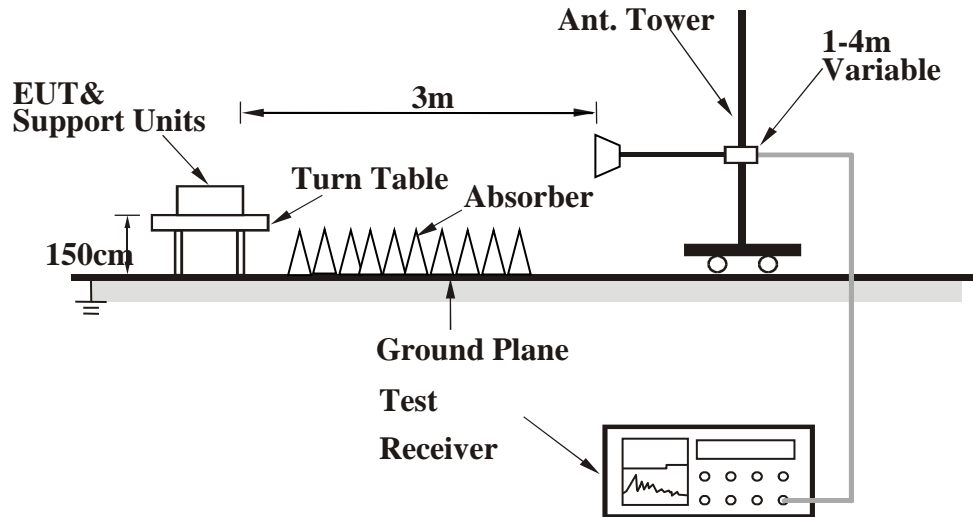


Below 1GHz test setup



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:

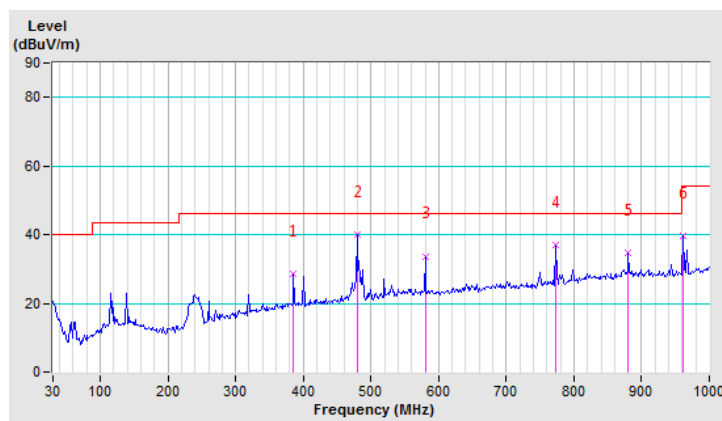
802.11b

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	385.98	28.63 QP	46.00	-17.37	2.00 H	360	38.29	-9.66
2	479.25	40.05 QP	46.00	-5.95	2.00 H	0	48.11	-8.06
3	580.29	33.73 QP	46.00	-12.27	2.00 H	359	39.58	-5.85
4	773.04	36.86 QP	46.00	-9.14	2.00 H	310	39.75	-2.89
5	880.30	34.80 QP	46.00	-11.20	2.00 H	296	35.58	-0.78
6	961.14	39.48 QP	54.00	-14.52	2.00 H	156	39.56	-0.08

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

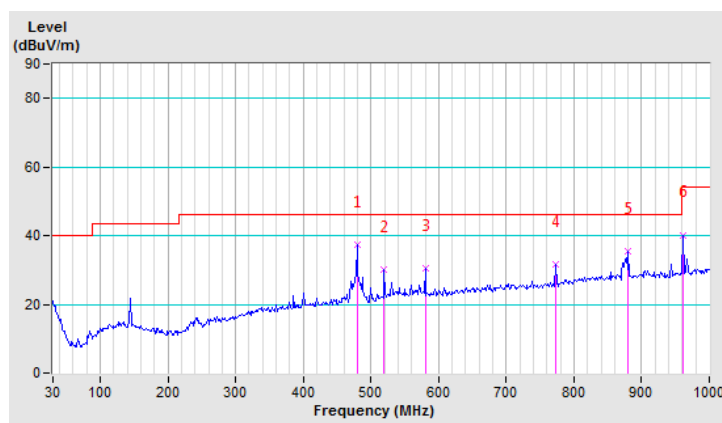


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

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	479.25	37.48 QP	46.00	-8.52	1.00 V	125	45.54	-8.06
2	519.66	30.23 QP	46.00	-15.77	1.00 V	230	37.20	-6.97
3	580.29	30.33 QP	46.00	-15.67	1.00 V	201	36.18	-5.85
4	773.04	31.79 QP	46.00	-14.21	1.00 V	85	34.68	-2.89
5	880.30	35.42 QP	46.00	-10.58	1.00 V	144	36.20	-0.78
6	961.14	40.20 QP	54.00	-13.80	1.00 V	167	40.28	-0.08

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 less than 20dB margin against the limit.
4. 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	46.44 PK	74.00	-27.56	1.00 H	272	44.39	2.05
2	2390.00	35.00 AV	54.00	-19.00	1.00 H	272	32.95	2.05
3	*2412.00	103.77 PK			1.00 H	272	101.56	2.21
4	*2412.00	99.45 AV			1.00 H	272	97.24	2.21
5	4824.00	54.09 PK	74.00	-19.91	1.49 H	298	49.23	4.86
6	4824.00	50.21 AV	54.00	-3.79	1.49 H	298	45.35	4.86
7	#7236.00	50.96 PK	74.00	-23.04	1.00 H	0	42.30	8.66
8	#7236.00	40.51 AV	54.00	-13.49	1.00 H	0	31.85	8.66
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	46.87 PK	74.00	-27.13	1.00 V	252	44.82	2.05
2	2390.00	34.11 AV	54.00	-19.89	1.00 V	252	32.06	2.05
3	*2412.00	100.54 PK			1.00 V	252	98.33	2.21
4	*2412.00	96.65 AV			1.00 V	252	94.44	2.21
5	4824.00	52.43 PK	74.00	-21.57	1.55 V	289	47.57	4.86
6	4824.00	48.15 AV	54.00	-5.85	1.55 V	289	43.29	4.86
7	#7236.00	52.41 PK	74.00	-21.59	1.00 V	360	43.75	8.66
8	#7236.00	41.08 AV	54.00	-12.92	1.00 V	360	32.42	8.66

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 less than 20dB margin against the limit.
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	102.59 PK			1.53 H	278	100.21	2.38
2	*2437.00	98.39 AV			1.53 H	278	96.01	2.38
3	4874.00	53.07 PK	74.00	-20.93	1.09 H	278	48.10	4.97
4	4874.00	50.37 AV	54.00	-3.63	1.09 H	278	45.40	4.97
5	7311.00	50.26 PK	74.00	-23.74	1.00 H	0	41.50	8.76
6	7311.00	39.51 AV	54.00	-14.49	1.00 H	0	30.75	8.76
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	101.13 PK			1.73 V	252	98.75	2.38
2	*2437.00	97.05 AV			1.73 V	252	94.67	2.38
3	4874.00	50.78 PK	74.00	-23.22	2.03 V	263	45.81	4.97
4	4874.00	46.01 AV	54.00	-7.99	2.03 V	263	41.04	4.97
5	7311.00	51.42 PK	74.00	-22.58	1.00 V	360	42.66	8.76
6	7311.00	42.61 AV	54.00	-11.39	1.00 V	360	33.85	8.76

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 less than 20dB margin against the limit.
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	103.65 PK			1.47 H	275	100.97	2.68
2	*2462.00	99.64 AV			1.47 H	275	96.96	2.68
3	2483.50	56.44 PK	74.00	-17.56	1.47 H	275	53.74	2.70
4	2483.50	50.87 AV	54.00	-3.13	1.47 H	275	48.17	2.70
5	4924.00	56.53 PK	74.00	-17.47	1.00 H	265	51.40	5.13
6	4924.00	47.25 AV	54.00	-6.75	1.00 H	265	42.12	5.13
7	7386.00	52.36 PK	74.00	-21.64	1.00 H	238	43.49	8.87
8	7386.00	43.15 AV	54.00	-10.85	1.00 H	238	34.28	8.87
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	101.79 PK			1.35 V	252	99.11	2.68
2	*2462.00	97.55 AV			1.35 V	252	94.87	2.68
3	2483.50	57.49 PK	74.00	-16.51	1.35 V	252	54.79	2.70
4	2483.50	50.50 AV	54.00	-3.50	1.35 V	252	47.80	2.70
5	4924.00	53.25 PK	74.00	-20.75	1.00 V	228	48.12	5.13
6	4924.00	44.28 AV	54.00	-9.72	1.00 V	228	39.15	5.13
7	7386.00	51.52 PK	74.00	-22.48	1.00 V	163	42.65	8.87
8	7386.00	40.70 AV	54.00	-13.30	1.00 V	163	31.83	8.87

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 less than 20dB margin against the limit.
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	63.86 PK	74.00	-10.14	1.00 H	265	61.81	2.05
2	2390.00	45.61 AV	54.00	-8.39	1.00 H	265	43.56	2.05
3	*2412.00	108.26 PK			1.00 H	265	106.05	2.21
4	*2412.00	98.91 AV			1.00 H	265	96.70	2.21
5	4824.00	59.28 PK	74.00	-14.72	1.69 H	273	54.42	4.86
6	4824.00	44.25 AV	54.00	-9.75	1.69 H	273	39.39	4.86
7	#7236.00	58.35 PK	74.00	-15.65	1.00 H	0	49.69	8.66
8	#7236.00	46.66 AV	54.00	-7.34	1.00 H	0	38.00	8.66
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	65.63 PK	74.00	-8.37	1.00 V	256	63.58	2.05
2	2390.00	47.74 AV	54.00	-6.26	1.00 V	256	45.69	2.05
3	*2412.00	107.56 PK			1.00 V	256	105.35	2.21
4	*2412.00	97.47 AV			1.00 V	256	95.26	2.21
5	4824.00	54.26 PK	74.00	-19.74	1.00 V	235	49.40	4.86
6	4824.00	44.51 AV	54.00	-9.49	1.00 V	235	39.65	4.86
7	#7236.00	64.96 PK	74.00	-9.04	1.00 V	251	56.30	8.66
8	#7236.00	49.37 AV	54.00	-4.63	1.00 V	251	40.71	8.66

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 less than 20dB margin against the limit.
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	107.84 PK			1.00 H	265	105.46	2.38
2	*2437.00	98.94 AV			1.00 H	265	96.56	2.38
3	4874.00	52.36 PK	74.00	-21.64	1.00 H	169	47.39	4.97
4	4874.00	41.47 AV	54.00	-12.53	1.00 H	169	36.50	4.97
5	7311.00	55.69 PK	74.00	-18.31	1.00 H	235	46.93	8.76
6	7311.00	41.97 AV	54.00	-12.03	1.00 H	235	33.21	8.76
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	106.10 PK			1.35 V	249	103.72	2.38
2	*2437.00	95.80 AV			1.35 V	249	93.42	2.38
3	4874.00	57.60 PK	74.00	-16.40	1.00 V	360	52.63	4.97
4	4874.00	43.95 AV	54.00	-10.05	1.00 V	360	38.98	4.97
5	7311.00	60.35 PK	74.00	-13.65	1.00 V	250	51.59	8.76
6	7311.00	44.45 AV	54.00	-9.55	1.00 V	250	35.69	8.76

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 less than 20dB margin against the limit.
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	103.18 PK			1.00 H	267	100.56	2.62
2	*2462.00	93.42 AV			1.00 H	267	90.80	2.62
3	2483.50	69.38 PK	74.00	-4.62	1.00 H	267	66.68	2.70
4	2483.50	50.48 AV	54.00	-3.52	1.00 H	267	47.78	2.70
5	4924.00	46.83 PK	74.00	-27.17	1.00 H	0	41.70	5.13
6	4924.00	35.26 AV	54.00	-18.74	1.00 H	0	30.13	5.13
7	7386.00	50.68 PK	74.00	-23.32	1.00 H	360	41.81	8.87
8	7386.00	36.96 AV	54.00	-17.04	1.00 H	360	28.09	8.87
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	101.42 PK			1.00 V	254	98.80	2.62
2	*2462.00	91.70 AV			1.00 V	254	89.08	2.62
3	2483.50	65.17 PK	74.00	-8.83	1.00 V	254	62.47	2.70
4	2483.50	48.52 AV	54.00	-5.48	1.00 V	254	45.82	2.70
5	4924.00	49.56 PK	74.00	-24.44	1.00 V	0	44.43	5.13
6	4924.00	38.56 AV	54.00	-15.44	1.00 V	0	33.43	5.13
7	7386.00	52.36 PK	74.00	-21.64	1.00 V	360	43.49	8.87
8	7386.00	39.65 AV	54.00	-14.35	1.00 V	360	30.78	8.87

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 less than 20dB margin against the limit.
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	68.67 PK	74.00	-5.33	1.89 H	242	66.62	2.05
2	2390.00	47.74 AV	54.00	-6.26	1.89 H	242	45.69	2.05
3	*2412.00	105.82 PK			1.89 H	242	103.61	2.21
4	*2412.00	96.61 AV			1.89 H	242	94.40	2.21
5	4824.00	55.94 PK	74.00	-18.06	1.00 H	313	51.08	4.86
6	4824.00	41.64 AV	54.00	-12.36	1.00 H	313	36.78	4.86
7	#7236.00	61.74 PK	74.00	-12.26	1.00 H	72	53.08	8.66
8	#7236.00	45.64 AV	54.00	-8.36	1.00 H	72	36.98	8.66
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	64.71 PK	74.00	-9.29	1.12 V	229	62.66	2.05
2	2390.00	42.83 AV	54.00	-11.17	1.12 V	229	40.78	2.05
3	*2412.00	103.53 PK			1.12 V	229	101.32	2.21
4	*2412.00	93.69 AV			1.12 V	229	91.48	2.21
5	4824.00	55.56 PK	74.00	-18.44	1.73 V	278	50.70	4.86
6	4824.00	41.62 AV	54.00	-12.38	1.73 V	278	36.76	4.86
7	#7236.00	62.76 PK	74.00	-11.24	1.00 V	23	54.10	8.66
8	#7236.00	46.41 AV	54.00	-7.59	1.00 V	23	37.75	8.66

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 less than 20dB margin against the limit.
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	105.90 PK			1.00 H	235	103.52	2.38
2	*2437.00	96.34 AV			1.00 H	235	93.96	2.38
3	4874.00	55.74 PK	74.00	-18.26	1.23 H	260	50.77	4.97
4	4874.00	41.38 AV	54.00	-12.62	1.23 H	260	36.41	4.97
5	7311.00	58.92 PK	74.00	-15.08	1.00 H	79	50.16	8.76
6	7311.00	41.78 AV	54.00	-12.22	1.00 H	79	33.02	8.76
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	103.87 PK			1.00 V	169	101.49	2.38
2	*2437.00	93.19 AV			1.00 V	169	90.81	2.38
3	4874.00	56.38 PK	74.00	-17.62	1.28 V	210	51.41	4.97
4	4874.00	41.86 AV	54.00	-12.14	1.28 V	210	36.89	4.97
5	7311.00	61.33 PK	74.00	-12.67	1.00 V	246	52.57	8.76
6	7311.00	44.40 AV	54.00	-9.60	1.00 V	246	35.64	8.76

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 less than 20dB margin against the limit.
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	101.37 PK			3.06 H	249	98.75	2.62
2	*2462.00	91.47 AV			3.06 H	249	88.85	2.62
3	2483.50	66.62 PK	74.00	-7.38	3.06 H	249	63.92	2.70
4	2483.50	50.92 AV	54.00	-3.08	3.06 H	249	48.22	2.70
5	4924.00	46.58 PK	74.00	-27.42	1.00 H	0	41.45	5.13
6	4924.00	34.58 AV	54.00	-19.42	1.00 H	0	29.45	5.13
7	7386.00	51.36 PK	74.00	-22.64	1.00 H	360	42.49	8.87
8	7386.00	38.69 AV	54.00	-15.31	1.00 H	360	29.82	8.87
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	98.24 PK			1.00 V	234	95.62	2.62
2	*2462.00	87.45 AV			1.00 V	234	84.83	2.62
3	2483.50	63.78 PK	74.00	-10.22	1.00 V	234	61.08	2.70
4	2483.50	47.90 AV	54.00	-6.10	1.00 V	234	45.20	2.70
5	4924.00	47.69 PK	74.00	-26.31	1.00 V	360	42.56	5.13
6	4924.00	34.28 AV	54.00	-19.72	1.00 V	360	29.15	5.13
7	7386.00	50.25 PK	74.00	-23.75	1.00 V	0	41.38	8.87
8	7386.00	37.55 AV	54.00	-16.45	1.00 V	0	28.68	8.87

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 less than 20dB margin against the limit.
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	67.93 PK	74.00	-6.07	3.02 H	287	65.88	2.05
2	2390.00	50.21 AV	54.00	-3.79	3.02 H	287	48.16	2.05
3	*2422.00	103.76 PK			3.00 H	287	101.48	2.28
4	*2422.00	94.30 AV			3.00 H	287	92.02	2.28
5	4844.00	50.26 PK	74.00	-23.74	1.00 H	268	45.35	4.91
6	4844.00	38.56 AV	54.00	-15.44	1.00 H	268	33.65	4.91
7	7266.00	53.70 PK	74.00	-20.30	1.00 H	287	44.99	8.71
8	7266.00	42.59 AV	54.00	-11.41	1.00 H	287	33.88	8.71
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	68.82 PK	74.00	-5.18	1.00 V	228	66.77	2.05
2	2390.00	49.43 AV	54.00	-4.57	1.00 V	228	47.38	2.05
3	*2422.00	101.42 PK			1.00 V	228	99.14	2.28
4	*2422.00	90.83 AV			1.00 V	228	88.55	2.28
5	4844.00	55.26 PK	74.00	-18.74	1.28 V	265	50.35	4.91
6	4844.00	39.56 AV	54.00	-14.44	1.28 V	265	34.65	4.91
7	7266.00	57.50 PK	74.00	-16.50	1.00 V	219	48.79	8.71
8	7266.00	43.35 AV	54.00	-10.65	1.00 V	219	34.64	8.71

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 other emission levels were very low against the limit.
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	106.30 PK			1.00 H	236	103.92	2.38
2	*2437.00	96.81 AV			1.00 H	236	94.43	2.38
3	4874.00	51.53 PK	74.00	-22.47	1.00 H	264	46.56	4.97
4	4874.00	40.25 AV	54.00	-13.75	1.00 H	264	35.28	4.97
5	7311.00	55.98 PK	74.00	-18.02	1.00 H	168	47.22	8.76
6	7311.00	43.56 AV	54.00	-10.44	1.00 H	168	34.80	8.76
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	106.30 PK			1.00 H	236	103.92	2.38
2	*2437.00	96.81 AV			1.00 H	236	94.43	2.38
3	4874.00	51.53 PK	74.00	-22.47	1.00 H	264	46.56	4.97
4	4874.00	40.25 AV	54.00	-13.75	1.00 H	264	35.28	4.97
5	7311.00	55.98 PK	74.00	-18.02	1.00 H	168	47.22	8.76
6	7311.00	43.56 AV	54.00	-10.44	1.00 H	168	34.80	8.76

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 other emission levels were very low against the limit.
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	101.88 PK			3.05 H	251	99.33	2.55
2	*2452.00	92.27 AV			3.05 H	251	89.72	2.55
3	2483.50	66.96 PK	74.00	-7.04	3.05 H	251	64.26	2.70
4	2483.50	50.98 AV	54.00	-3.02	3.05 H	251	48.28	2.70
5	4904.00	48.65 PK	74.00	-25.35	1.00 H	235	43.57	5.08
6	4904.00	35.28 AV	54.00	-18.72	1.00 H	235	30.20	5.08
7	7356.00	51.25 PK	74.00	-22.75	1.00 H	256	42.41	8.84
8	7356.00	40.23 AV	54.00	-13.77	1.00 H	256	31.39	8.84
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	98.54 PK			1.00 V	230	95.99	2.55
2	*2452.00	88.72 AV			1.00 V	230	86.17	2.55
3	2483.50	65.77 PK	74.00	-8.23	1.00 V	230	63.07	2.70
4	2483.50	50.58 AV	54.00	-3.42	1.00 V	230	47.88	2.70
5	4904.00	46.90 PK	74.00	-27.10	1.00 V	0	41.82	5.08
6	4904.00	36.53 AV	54.00	-17.47	1.00 V	0	31.45	5.08
7	7356.00	53.26 PK	74.00	-20.74	1.00 V	360	44.42	8.84
8	7356.00	39.84 AV	54.00	-14.16	1.00 V	360	31.00	8.84

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 other emission levels were very low against the limit.
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.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	Jun. 13,18	Jun. 12,19
Power Sensor	Keysight	U2021XA	MY55060018	Jun. 13,18	Jun. 12,19
Power Meter	Anritsu	ML2495A	1139001	Apr. 13,18	Apr. 13,19
Power Sensor	Anritsu	MA2411B	1531155	Apr. 13,18	Apr. 13,19
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 21, 18	Oct.20, 19
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05, 18	Sep. 04,19
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 08,17	Nov. 07,18
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 04,18	Nov. 03,19
Signal Generator	Agilent	N5183A	MY50140980	Jan. 02,18	Jan. 01,19
Agile Signal Generator	Agilent	8645A	Agilent	Sep.01, 18	Aug.31, 19
Spectrum Analyzer	Keysight	N9020A	MY55400499	Mar. 21,18	Mar. 20,19
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Jan. 02,18	Jan. 01,19
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A	N/A
DC Source	Keysight	E3642A	MY56146098	N/A	N/A

NOTE: 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.

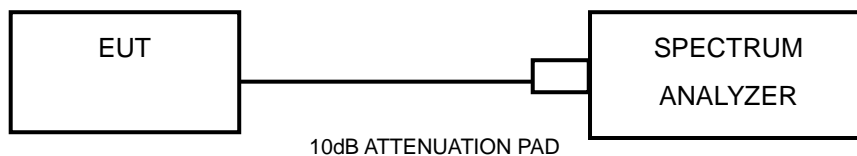
4.3.3 TEST PROCEDURE

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

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	9.10	9.11	0.5	PASS
6	2437	10.05	9.57	0.5	PASS
11	2462	9.10	9.55	0.5	PASS

802.11g

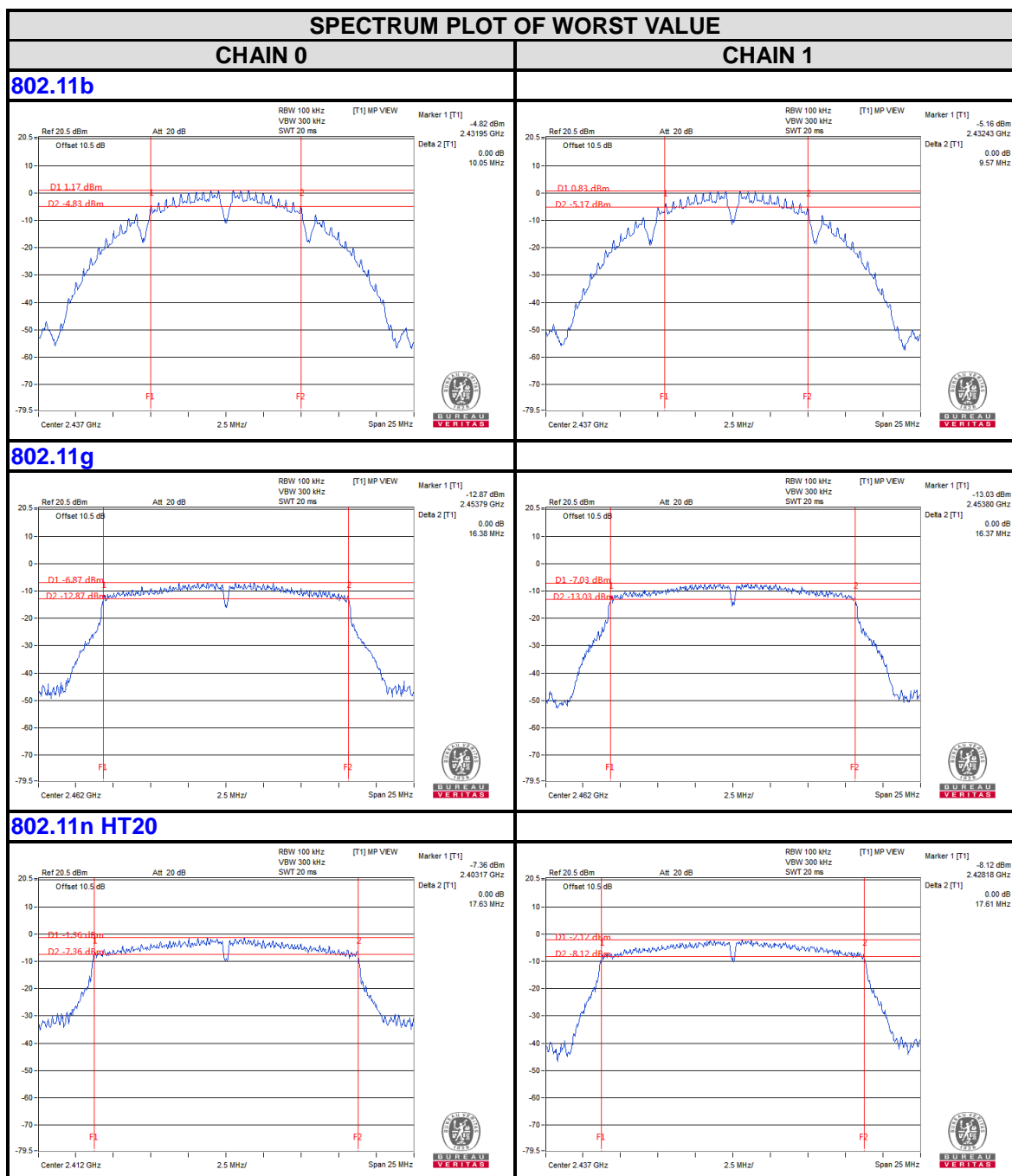
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.37	16.36	0.5	PASS
6	2437	16.37	16.34	0.5	PASS
11	2462	16.38	16.37	0.5	PASS

802.11n HT20

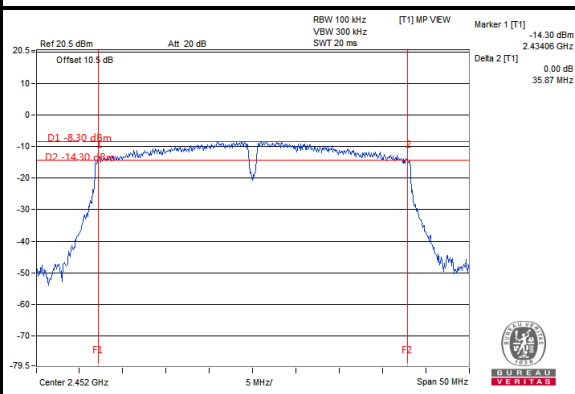
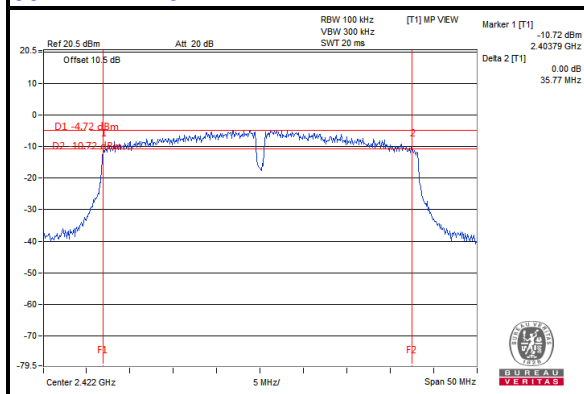
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.63	17.58	0.5	PASS
6	2437	17.56	17.61	0.5	PASS
11	2462	17.60	17.58	0.5	PASS

802.11n HT40

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	35.77	35.59	0.5	PASS
6	2437	33.86	35.77	0.5	PASS
9	2452	34.49	35.87	0.5	PASS



802.11n HT40

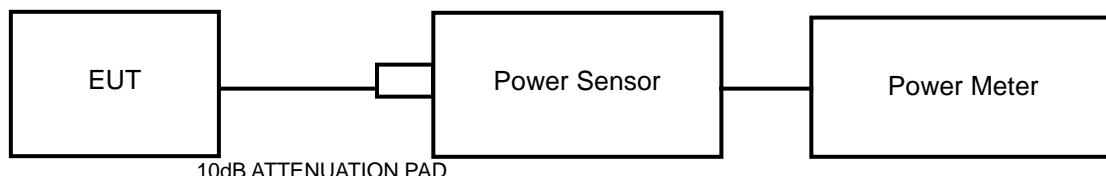


4.4 CONDUCTED OUTPUT POWER

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.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	Jun. 13,18	Jun. 12,19
Power Sensor	Keysight	U2021XA	MY55060018	Jun. 13,18	Jun. 12,19
Power Meter	Anritsu	ML2495A	1139001	Apr. 13,18	Apr. 13,19
Power Sensor	Anritsu	MA2411B	1531155	Apr. 13,18	Apr. 13,19
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 21, 18	Oct.20, 19
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05,18	Sep. 04,19
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 08,18	Nov. 07,19
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 04,18	Nov. 03,19
Signal Generator	Agilent	N5183A	MY50140980	Jan. 02,18	Jan. 01,19
Agile Signal Generator	Agilent	8645A	Agilent	Sep.01, 18	Aug.31, 19
Spectrum Analyzer	Keysight	N9020A	MY55400499	Mar. 21,18	Mar. 20,19
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Jan. 02,18	Jan. 01,19
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A	N/A
DC Source	Keysight	E3642A	MY56146098	N/A	N/A

NOTE:

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

CHAN.	FRE. (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (W)	PASS/ FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	16.72	16.29	46.989	42.560	89.549	19.52	1	PASS
6	2437	16.84	16.06	48.306	40.365	88.671	19.48	1	PASS
11	2462	16.67	16.05	46.452	40.272	86.724	19.38	1	PASS

802.11g

CHAN.	FRE. (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (W)	PASS/ FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	20.92	20.59	123.59	114.55	238.146	23.77	1	PASS
6	2437	20.95	20.55	124.45	113.50	237.952	23.76	1	PASS
11	2462	21.05	20.49	127.35	111.94	239.294	23.79	1	PASS

802.11n HT20

CHAN.	FRE. (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (W)	PASS/ FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	20.77	20.83	119.399	121.060	240.459	23.81	1	PASS
6	2437	21.08	20.74	128.233	118.577	246.810	23.92	1	PASS
11	2462	21.06	20.79	127.644	119.950	247.594	23.94	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 0	CHAIN 1	CHAIN 0	CHAIN 1				
3	2422	20.01	19.87	100.231	97.051	197.282	22.95	1	PASS
6	2437	20.32	19.76	107.647	94.624	202.271	23.06	1	PASS
9	2452	20.41	19.89	109.901	97.499	207.400	23.17	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

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (dBm)	TOTAL POWER (mW)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
1	2412	13.61	13.32	22.961	21.478	16.48	44.439
6	2437	13.59	13.27	22.856	21.232	16.44	44.088
11	2462	14.02	13.15	25.235	20.654	16.62	45.889

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (dBm)	TOTAL POWER (mW)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
1	2412	12.96	12.53	19.770	17.906	15.76	37.676
6	2437	12.87	12.54	19.364	17.947	15.72	37.311
11	2462	12.76	12.45	18.880	17.579	15.62	36.459

802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (dBm)	TOTAL POWER (mW)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
1	2412	13.00	12.64	19.953	18.365	15.83	38.318
6	2437	13.35	12.55	21.627	17.989	15.98	39.616
11	2462	13.21	12.64	20.941	18.365	15.94	39.306

802.11n HT40

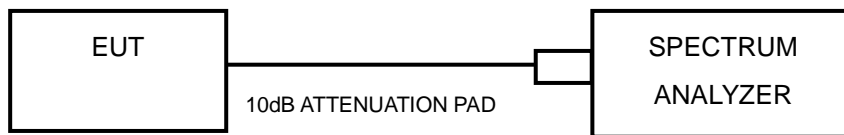
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (dBm)	TOTAL POWER (mW)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
3	2422	12.14	11.68	16.368	14.723	14.93	31.091
6	2437	12.53	11.60	17.906	14.454	15.10	32.360
9	2452	12.64	11.68	18.365	14.723	15.20	33.088

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

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set span to at least 1.5 times the DTS Bandwidth.
- c) Set RBW to: 3KHz
- d) Set VBW $\geq 3 \times$ RBW.
- e) Detector = peak
- f) Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
- g) Sweep time = auto couple.
- h) 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

Channel	FREQ. (MHz)	PSD (dBm/3kHz)		Limit (dBm/3kHz)	PASS /FAIL
		Chain 0	Chain 1		
1	2412	-15.41	-14.25	8.00	PASS
6	2437	-12.41	-13.33	8.00	PASS
11	2462	-13.38	-14.33	8.00	PASS

802.11g

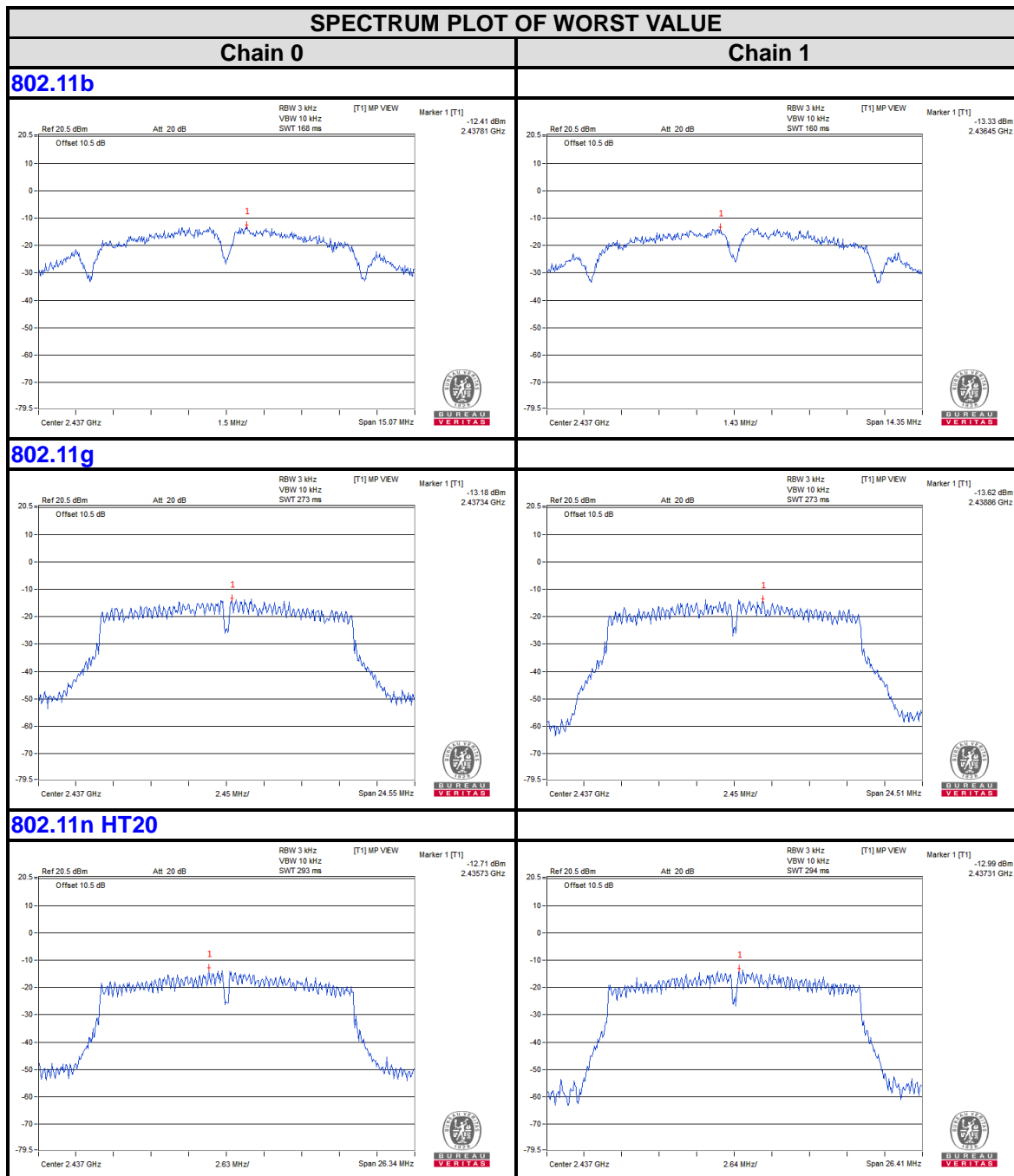
Channel	FREQ. (MHz)	PSD (dBm/3kHz)		Limit (dBm/3kHz)	PASS /FAIL
		Chain 0	Chain 1		
1	2412	-13.31	-13.62	8.00	PASS
6	2437	-13.18	-13.62	8.00	PASS
11	2462	-18.40	-18.57	8.00	PASS

802.11n HT20

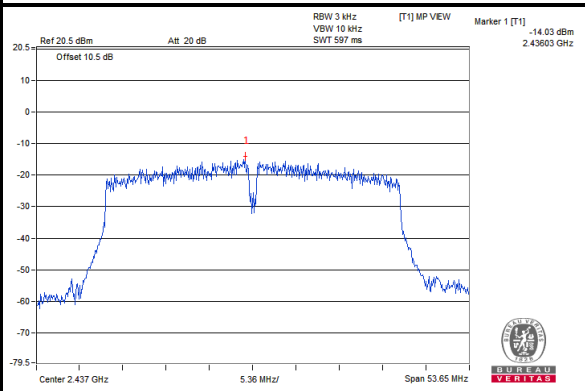
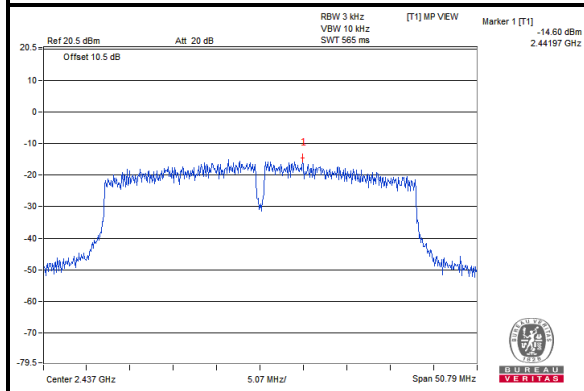
Channel	FREQ. (MHz)	PSD (dBm/3kHz)		Limit (dBm/3kHz)	PASS /FAIL
		Chain 0	Chain 1		
1	2412	-13.08	-14.46	8.00	PASS
6	2437	-12.71	-12.99	8.00	PASS
11	2462	-20.64	-20.58	8.00	PASS

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Channel	FREQ. (MHz)	PSD (dBm/3kHz)		Limit (dBm/3kHz)	PASS /FAIL
		Chain 0	Chain 1		
3	2422	-17.07	-16.13	8.00	PASS
6	2437	-14.60	-14.03	8.00	PASS
9	2452	-19.99	-19.94	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

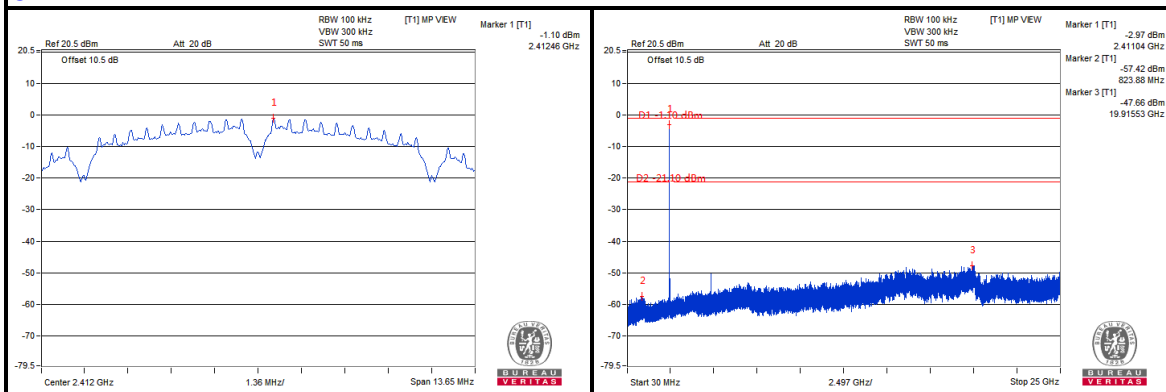
Same as item 4.3.6

4.6.7 TEST RESULTS

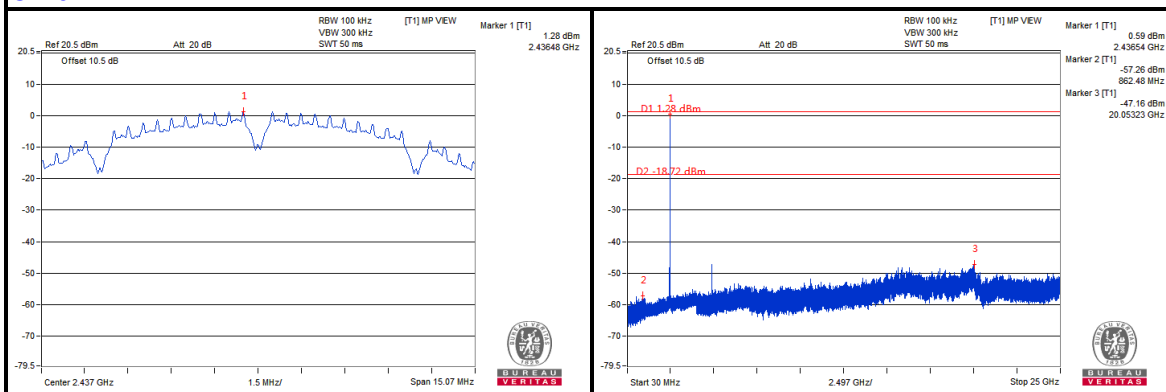
802.11b

Chain 0

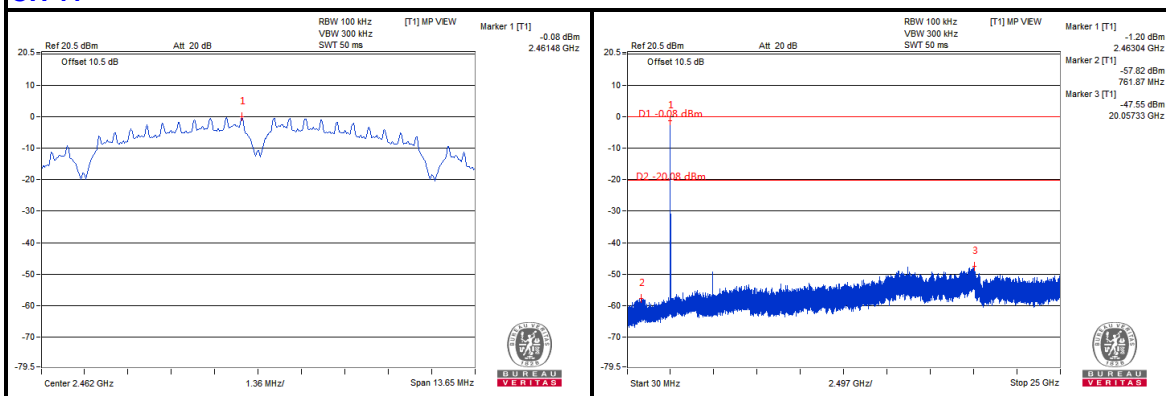
CH 1



CH 6

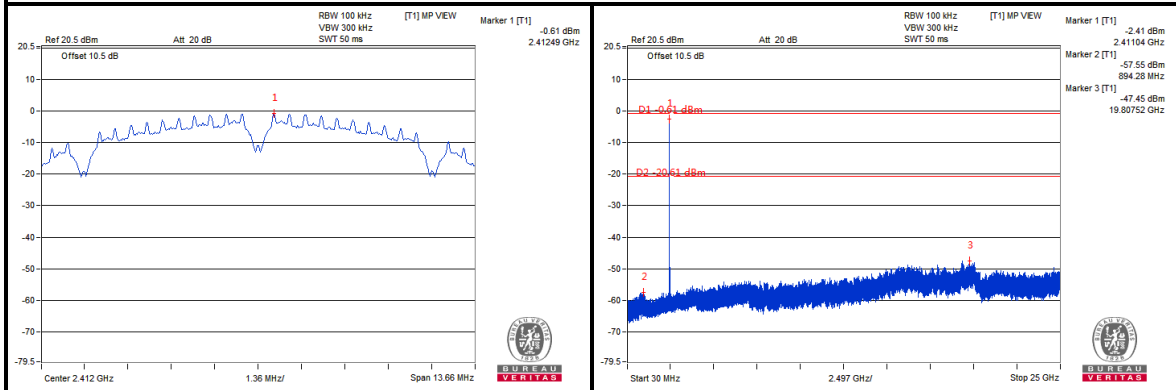


CH 11

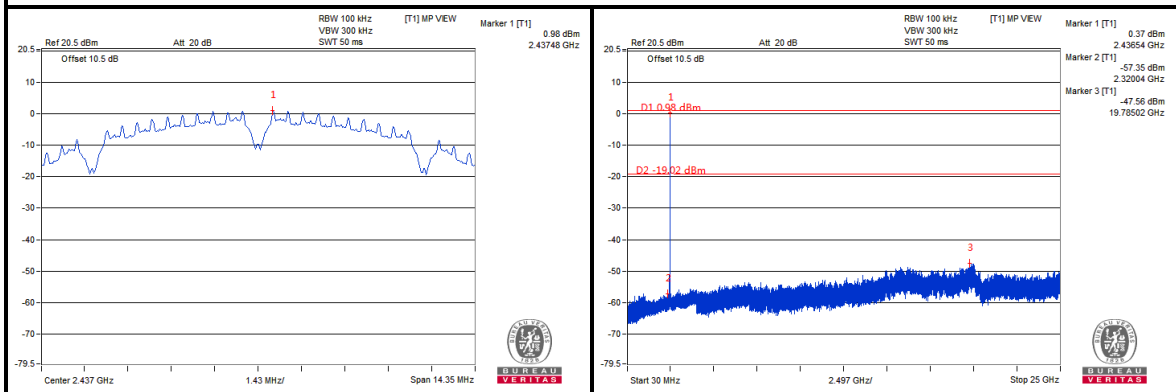


Chain 1

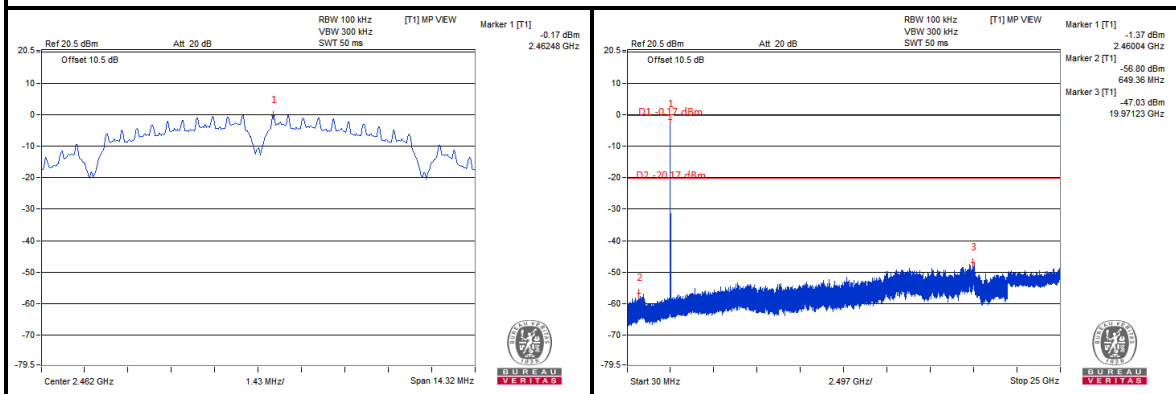
CH 1



CH 6

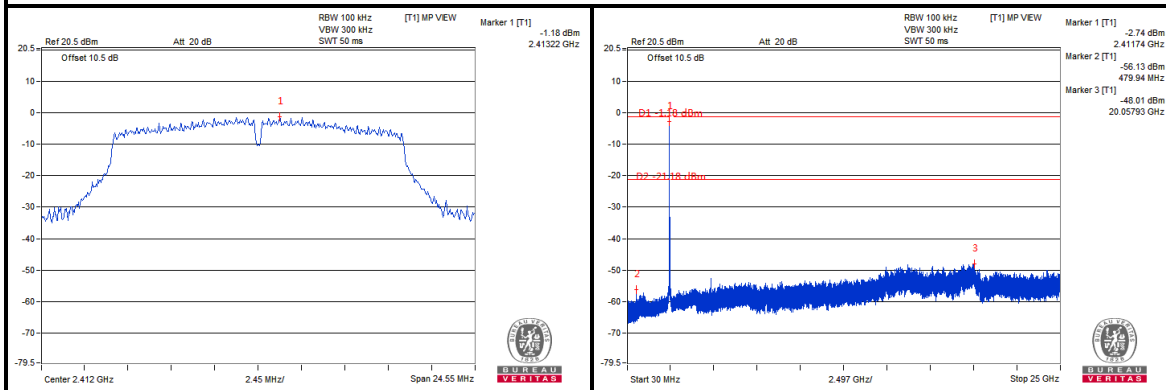


CH 11

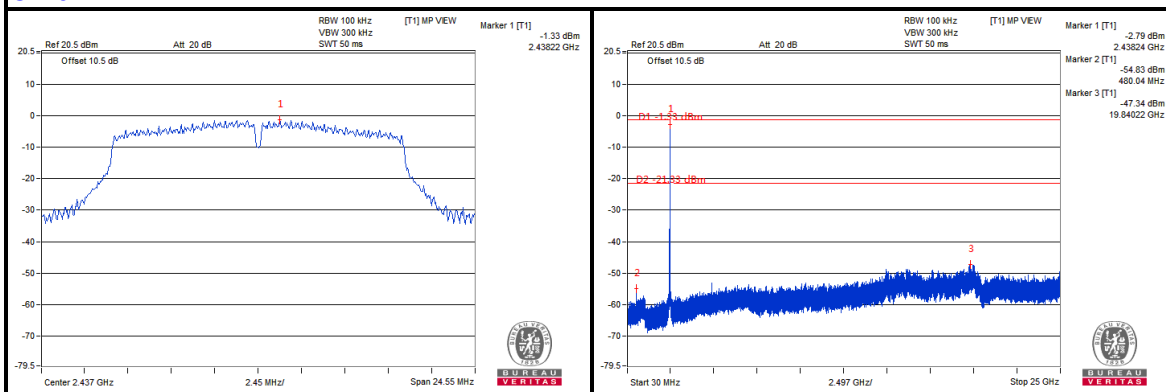


802.11g
Chain 0

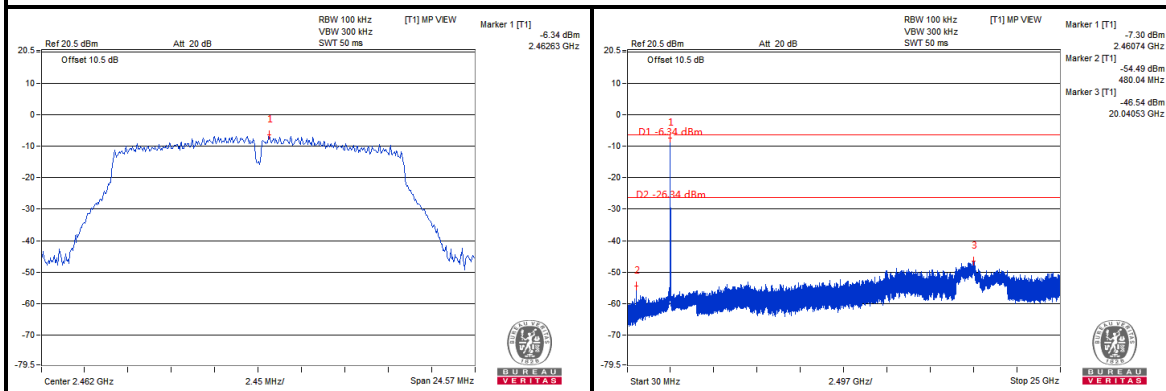
CH 1



CH 6

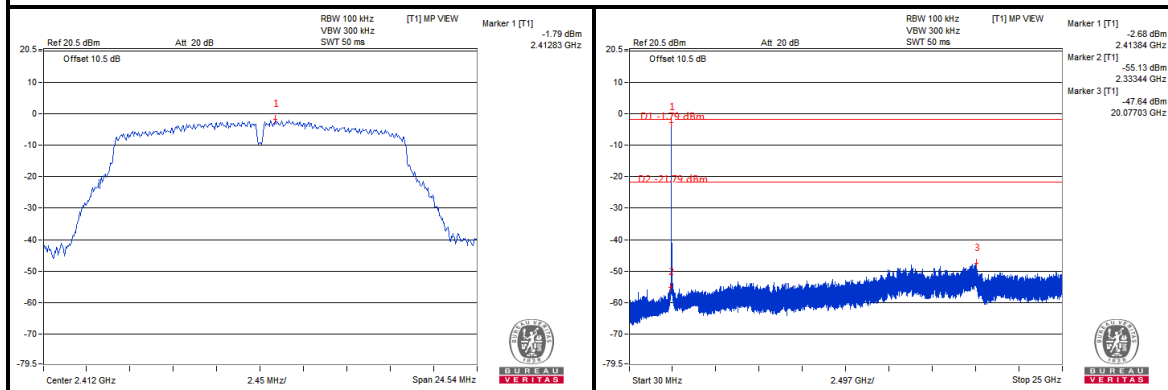


CH 11

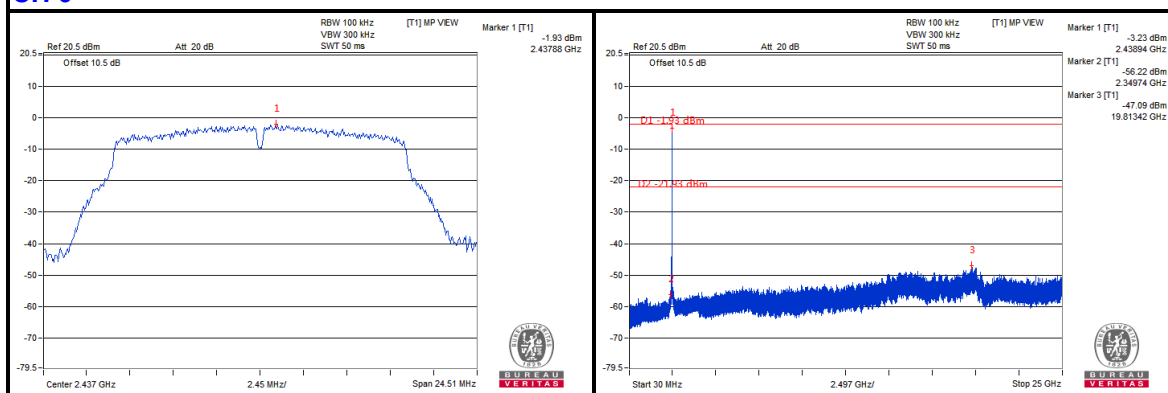


Chain 1

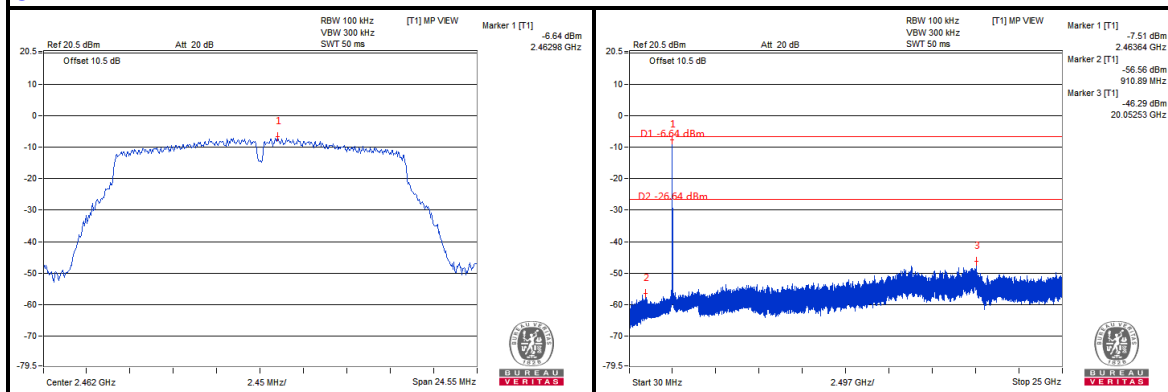
CH 1



CH 6



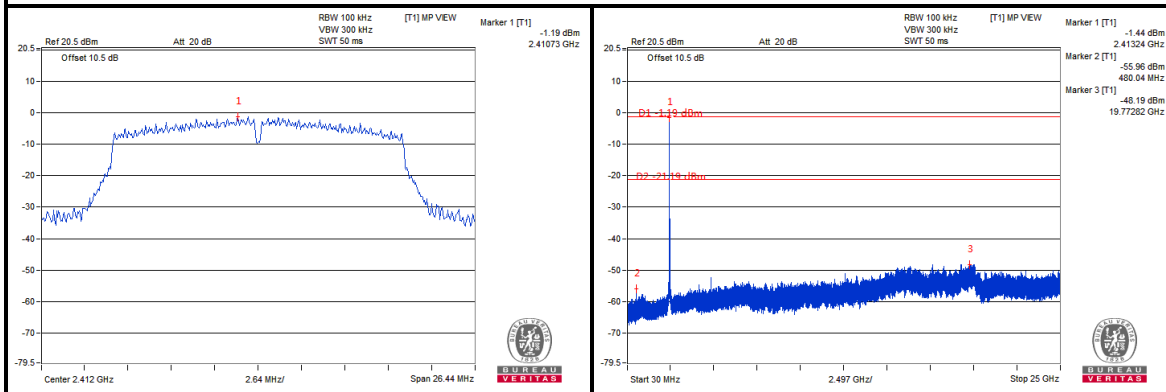
CH 11



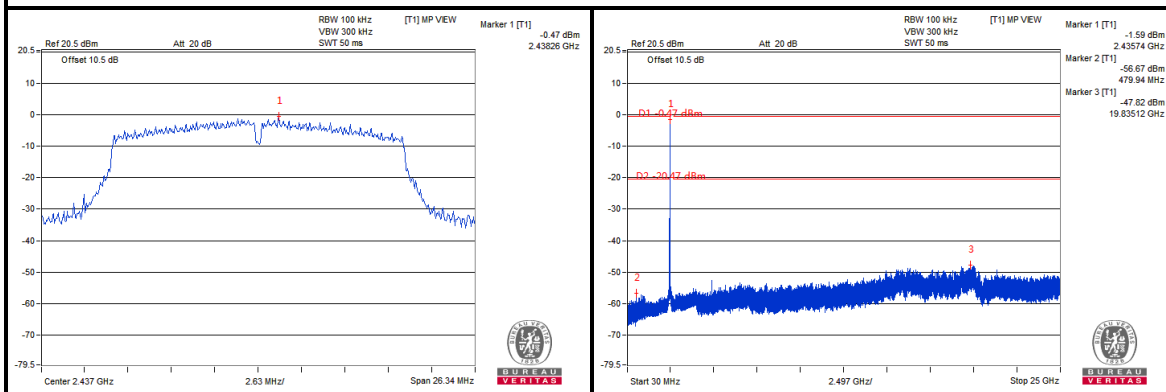
802.11n HT20

Chain 0

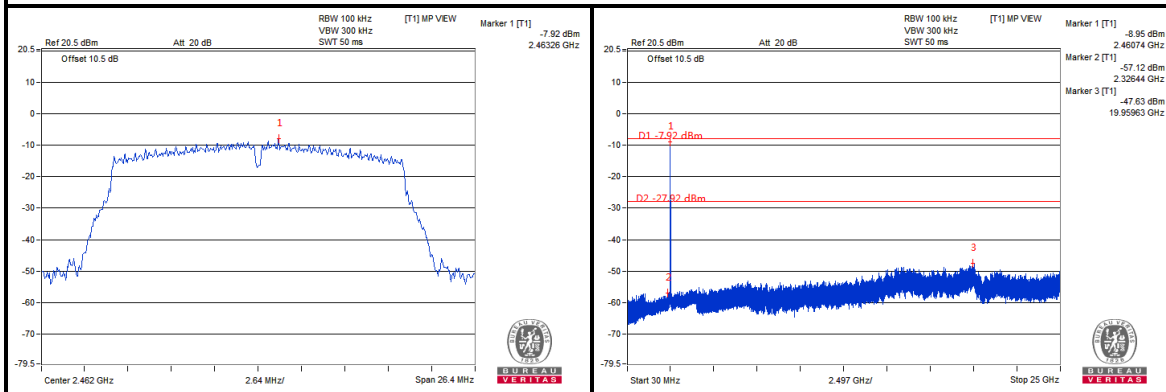
CH 1



CH 6

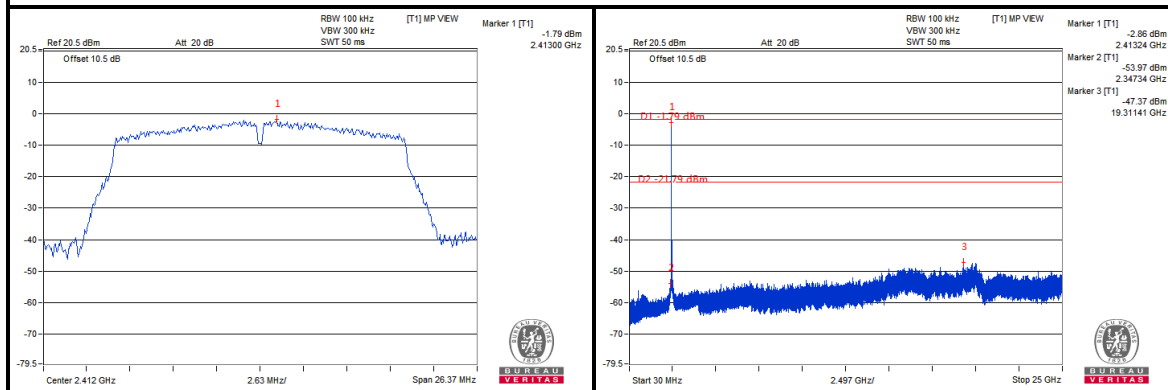


CH 11

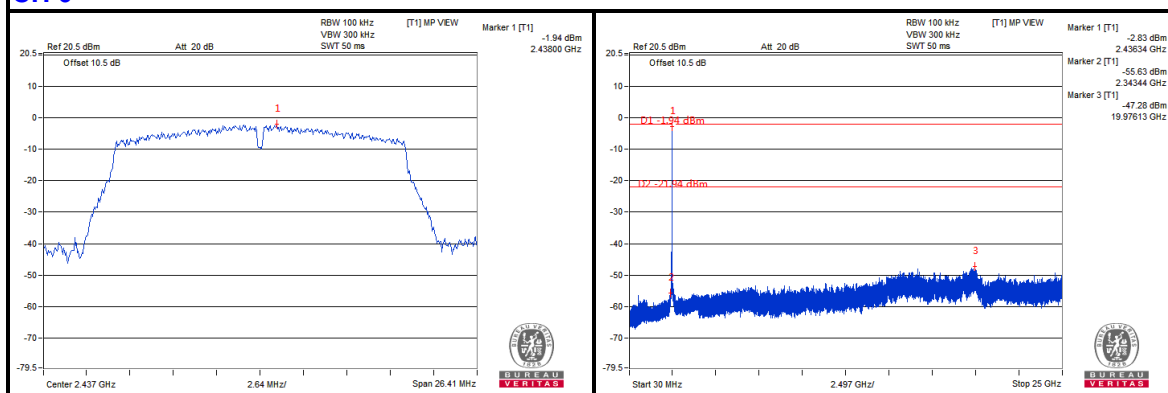


Chain 1

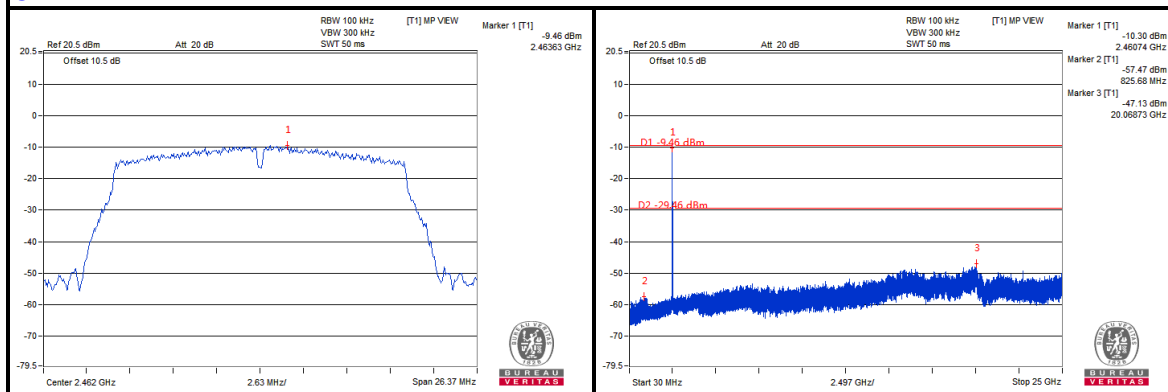
CH 1



CH 6



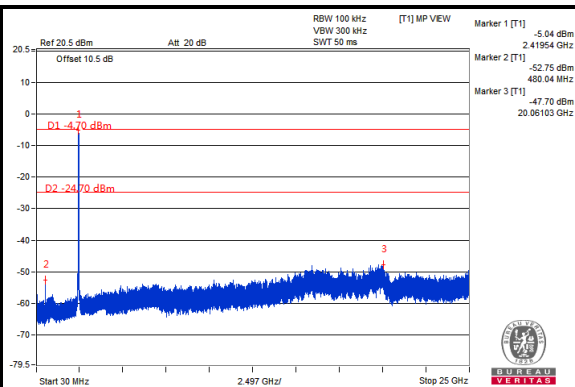
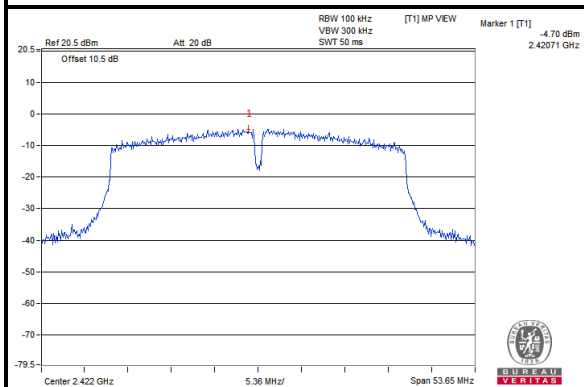
CH 11



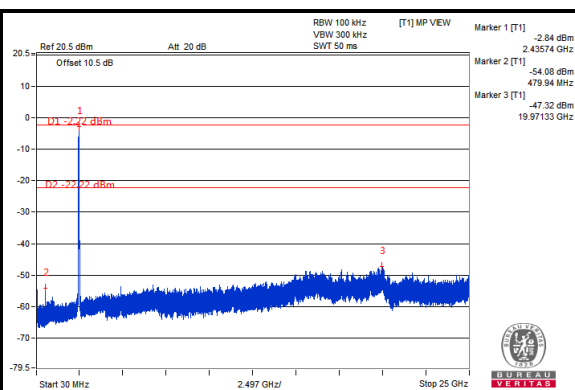
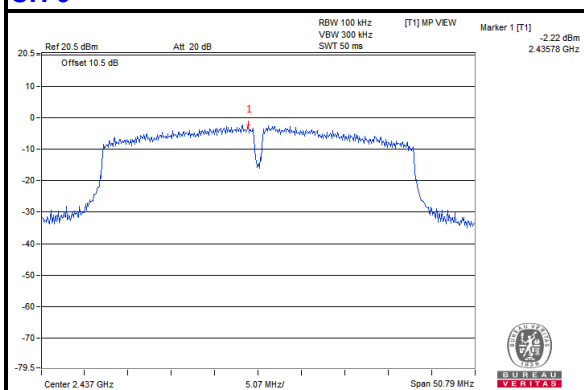
802.11n HT40

Chain 0

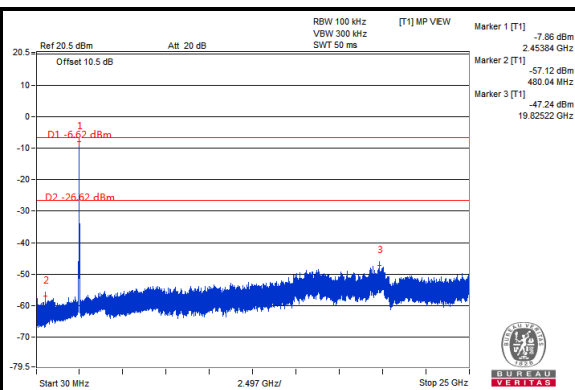
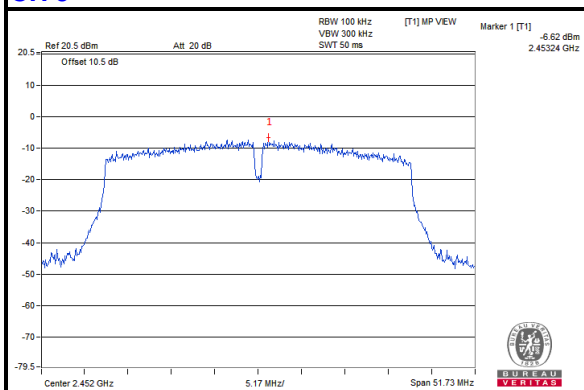
CH 3



CH 6

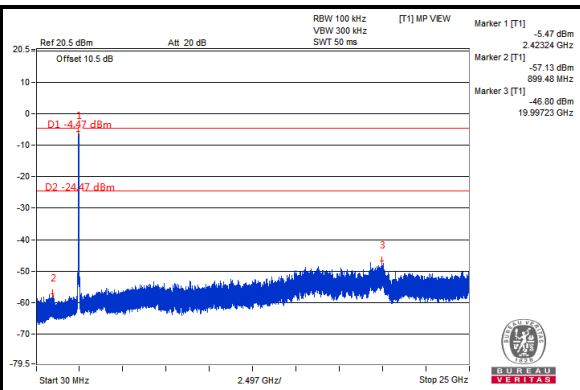
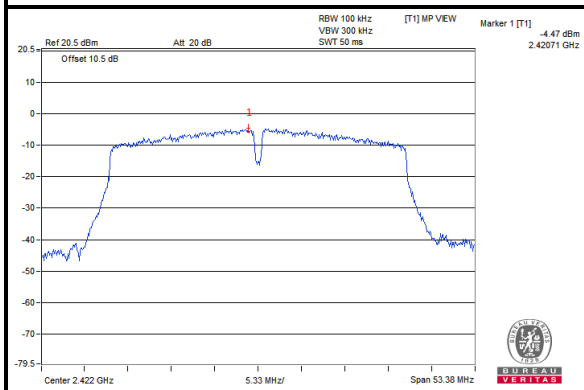


CH 9

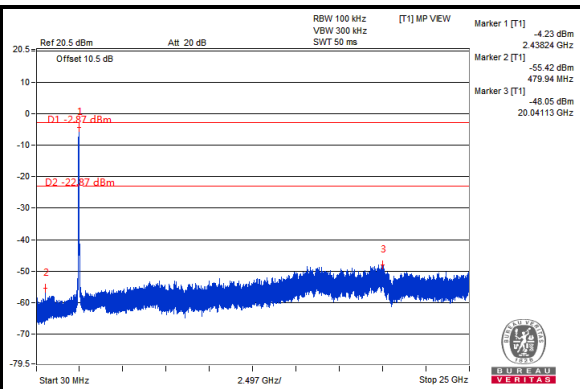
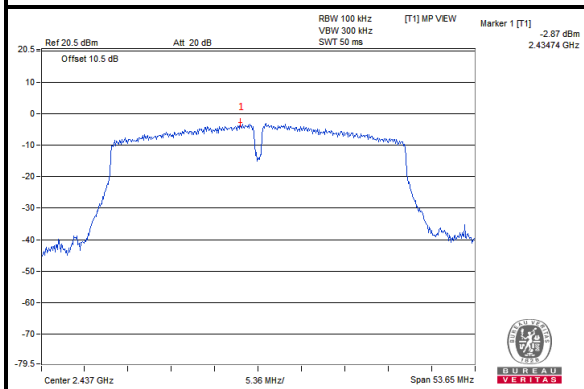


Chain 1

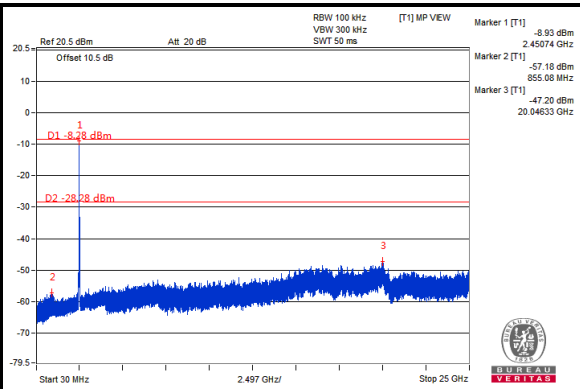
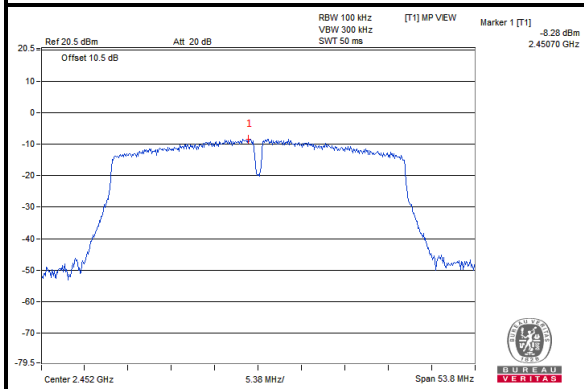
CH 3



CH 6

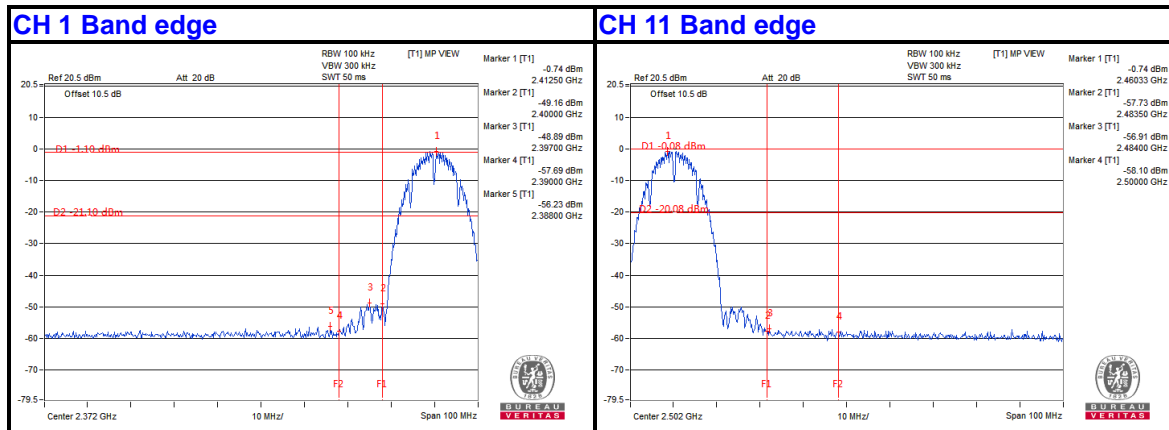


CH 9

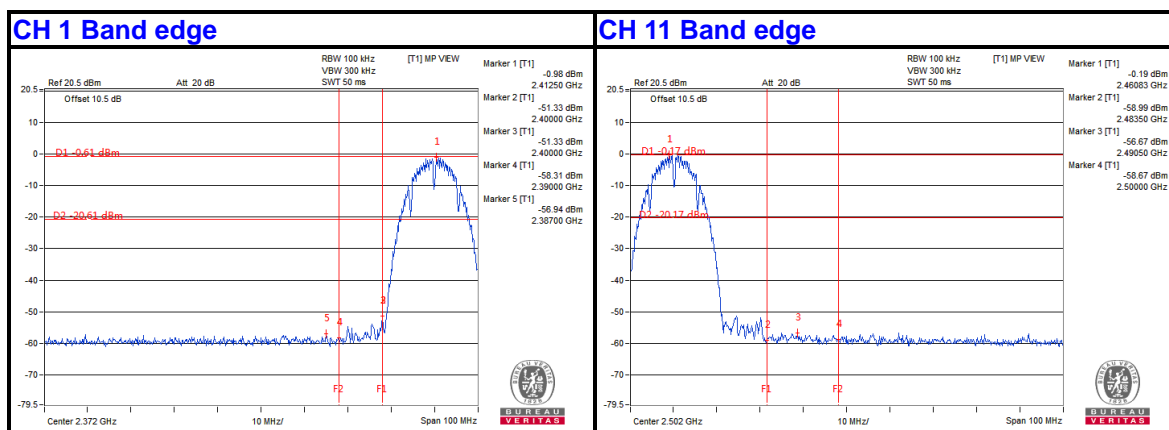


802.11b

Chain 0

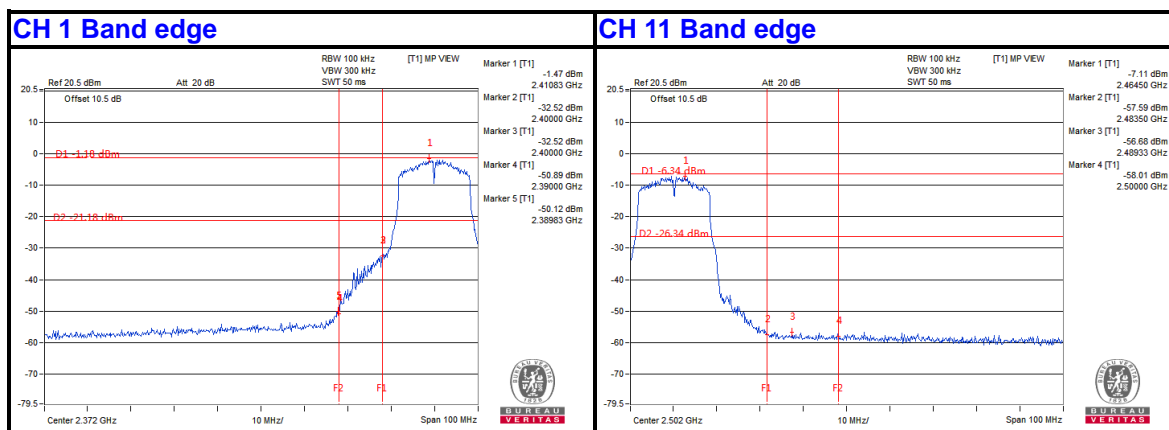


Chain 1

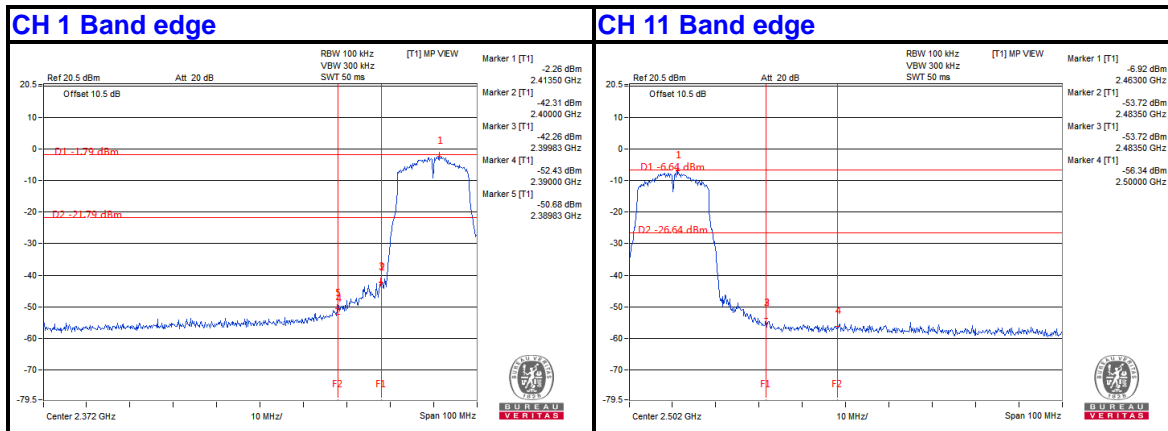


802.11g

Chain 0

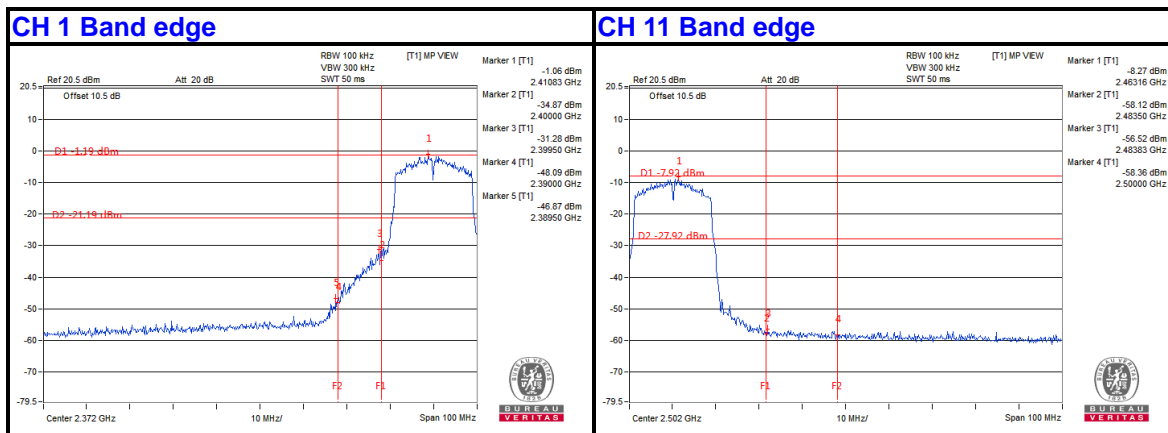


Chain 1

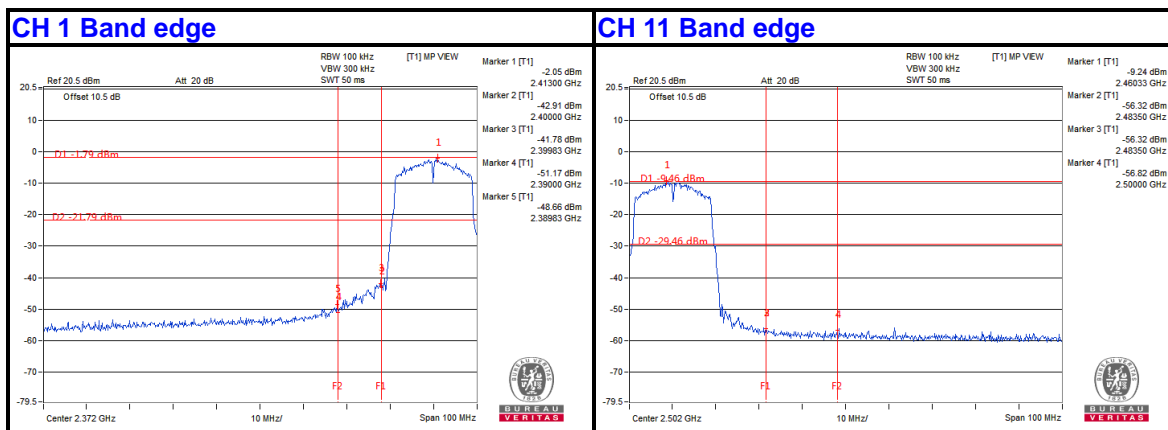


802.11n HT20

Chain 0



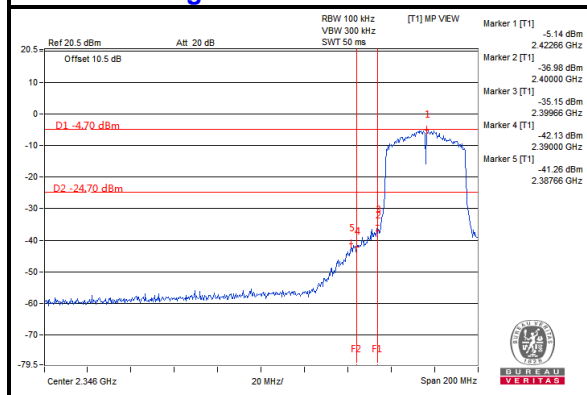
Chain 1



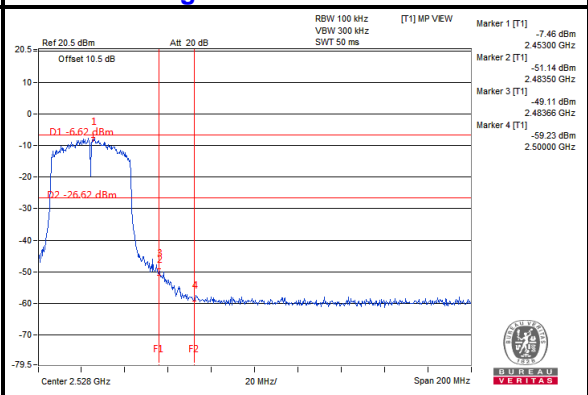
802.11n HT40

Chain 0

CH 3 Band edge

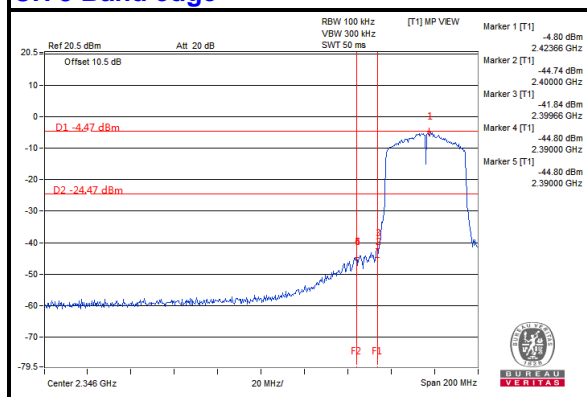


CH 9 Band edge

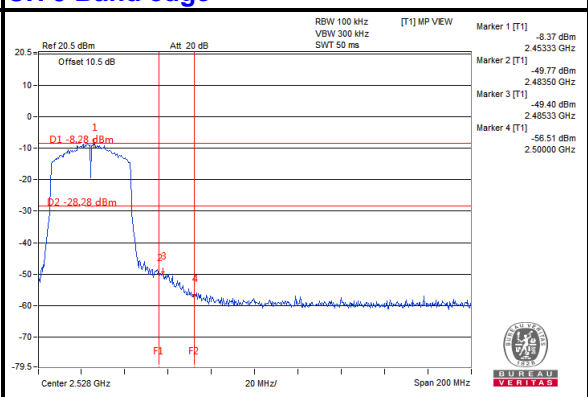


Chain 1

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---