

TEST REPORT



Applicant	Hoymiles Converter Technology Co., Ltd.
Address	No. 18 Kangjing Road, HangZhou, Zhejiang Province

Manufacturer or Supplier	Hoymiles Converter Technology Co., Ltd.
Address	No. 18 Kangjing Road, HangZhou, Zhejiang Province
Product	Data Logger
Brand Name	 hoymiles
Model	DTU-W100
Additional Model & Model Difference	N/A
Date of tests	Oct. 19, 2018 ~ Dec. 18, 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 Breeze Jiang Project Engineer / EMC Department	Approved by Glyn He Supervisor / EMC Department
	 Date: Dec. 26, 2018

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF181019N017-1	Original release	Dec. 26, 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	3.83dB
	1GHz ~ 18GHz	4.93dB
	18GHz ~ 40GHz	4.80dB

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	Data Logger
MODEL NO.	DTU-W100
ADDITIONAL NO.	N/A
FCC ID	2ARNB-DTUW100
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	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
PEAK OUTPUT POWER	19.70dBm(Maximum)
ANTENNA TYPE	Ceramic Antenna, with 0.5dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTE:

1. The EUT provides completed transmitters and receivers:

MODULATION MODE	FUNCTION
802.11b	1TX/1RX
802.11g	1TX/1RX
802.11n (HT20)	1TX/1RX
802.11n (HT40)	1TX/1RX

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.: 181019N017) for detailed product photo.
5. The EUT was powered by the following adapter:

Adapter	
BRAND:	FLYPOWER
MODEL:	PS10I050K2000UU
INPUT:	AC 100-240V, 50/60Hz, 0.35A
OUTPUT:	DC 5V, 2A
DC LINE:	N/A

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 Y 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	
-	√	√	√	√	Powered by Adapter with WIFI function

Where **RE<1G**: Radiated Emission below 1GHz **RE≥1G**: Radiated Emission above 1GHz
PLC: Power Line Conducted Emission **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
-	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)
-	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)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	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)
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n HT20	1 to 11	1, 11	OFDM	BPSK	6.5
-	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)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n HT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5



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TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	25deg. C, 53%RH	DC 5V from Adapter	Walker
RE≥1G	25deg. C, 53%RH	DC 5V from Adapter	Walker
PLC	20deg. C, 56%RH	DC 5V from Adapter	Robert Cheng
APCM	25deg. C, 60%RH	DC 5V from Adapter	Robert Cheng



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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.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as a dependent unit together without any other necessary accessories or support units.

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

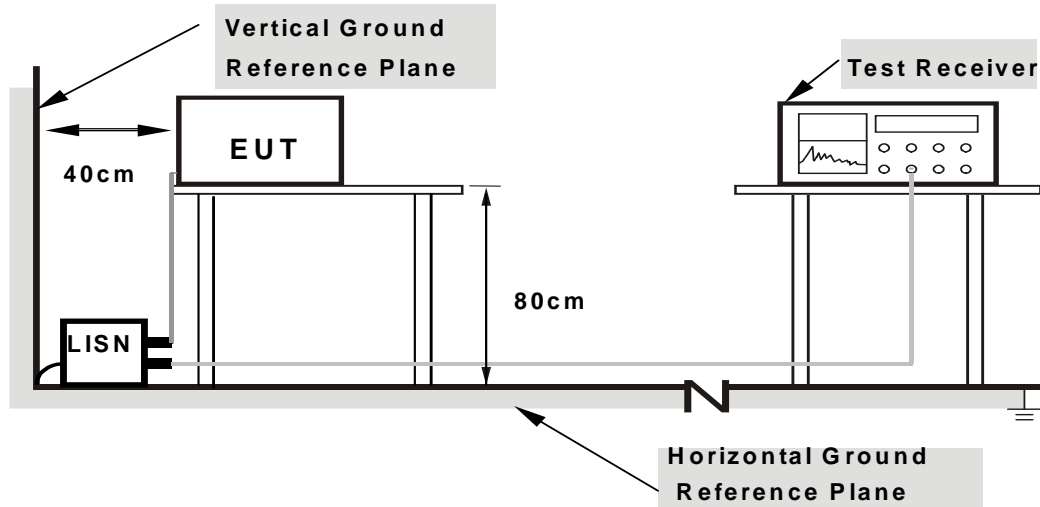
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

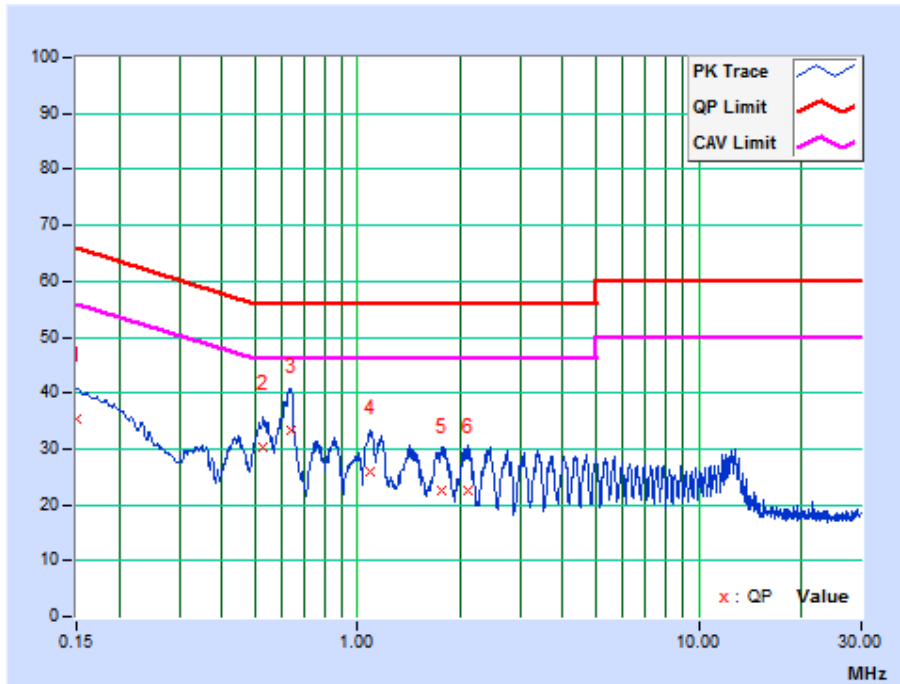
4.1.7 TEST RESULTS

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	0.15000	9.94	25.49	8.51	35.43	18.45	66.00	56.00	-30.57	-37.55
2	0.52801	10.39	19.75	12.90	30.14	23.29	56.00	46.00	-25.86	-22.71
3	0.63520	10.21	23.20	16.72	33.41	26.93	56.00	46.00	-22.59	-19.07
4	1.09050	10.23	15.86	7.60	26.09	17.83	56.00	46.00	-29.91	-28.17
5	1.77000	10.25	12.30	4.56	22.55	14.81	56.00	46.00	-33.45	-31.19
6	2.12100	10.18	12.28	5.01	22.46	15.19	56.00	46.00	-33.54	-30.81

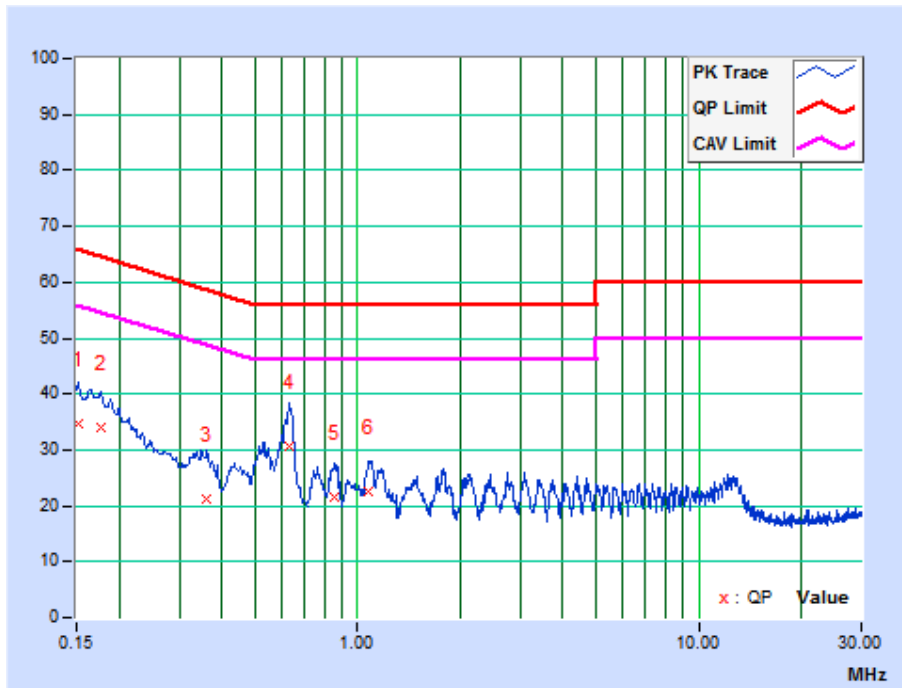
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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	0.15225	9.72	24.99	6.89	34.71	16.61	65.88	55.88	-31.17	-39.27
2	0.17651	10.22	23.86	6.07	34.08	16.29	64.65	54.65	-30.57	-38.36
3	0.36150	10.33	10.94	-1.61	21.27	8.72	58.69	48.69	-37.42	-39.97
4	0.63150	9.88	20.85	10.88	30.73	20.76	56.00	46.00	-25.27	-25.24
5	0.85603	10.03	11.60	3.46	21.63	13.49	56.00	46.00	-34.37	-32.51
6	1.07993	9.73	12.90	3.90	22.63	13.63	56.00	46.00	-33.37	-32.37

- 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.



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.

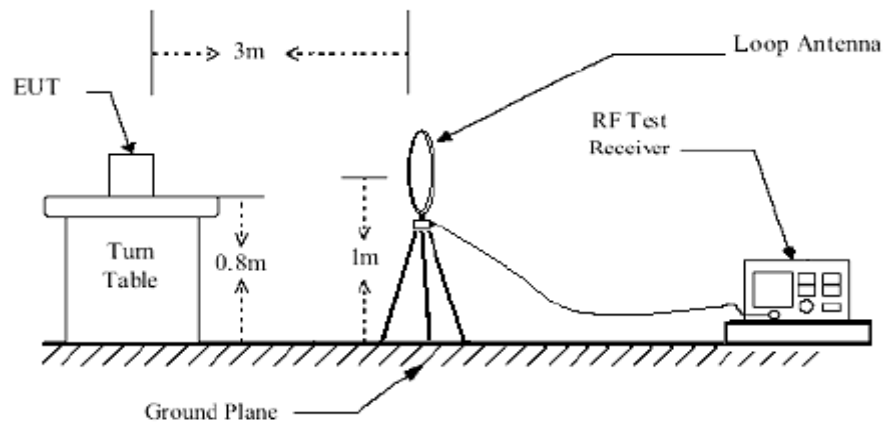


4.2.4 DEVIATION FROM TEST STANDARD

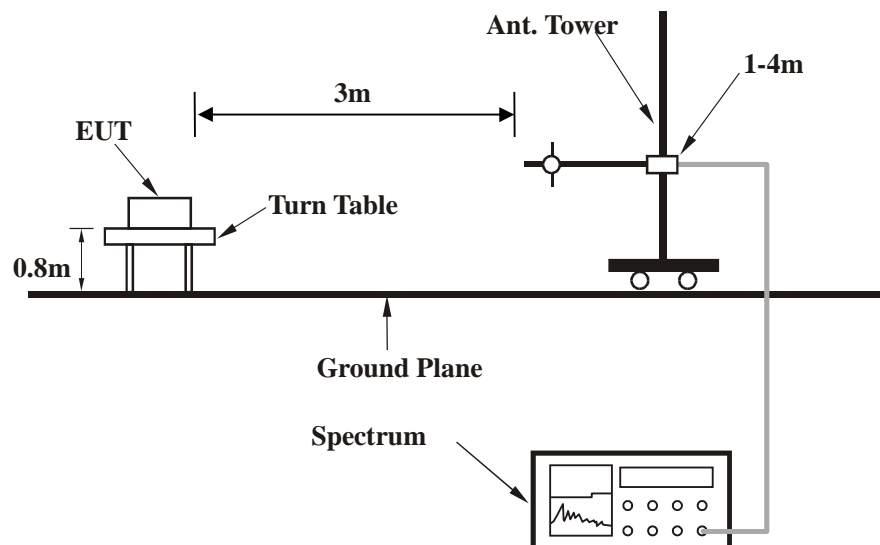
No deviation.

4.2.5 TEST SETUP

Below 30MHz test setup

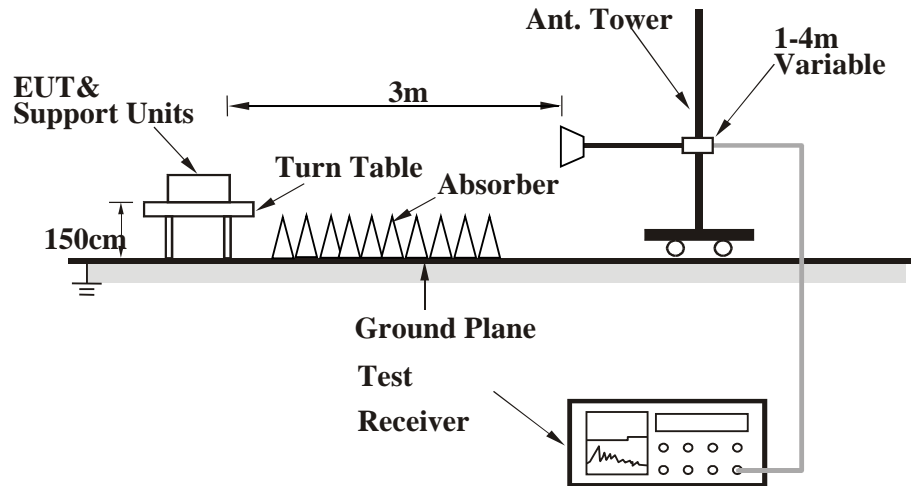


Below 1GHz test setup



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:

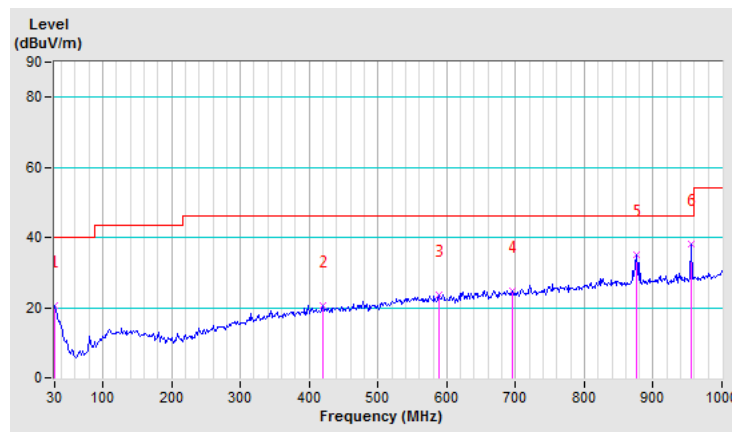
802.11b

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	30.00	20.52 QP	40.00	-19.48	1.00 H	359	30.65	-10.13
2	420.18	20.74 QP	46.00	-25.26	1.00 H	360	29.71	-8.97
3	588.06	23.63 QP	46.00	-22.37	1.00 H	0	29.44	-5.81
4	695.32	24.77 QP	46.00	-21.23	1.00 H	0	28.82	-4.05
5	875.64	34.98 QP	46.00	-11.02	1.00 H	344	35.83	-0.85
6	954.92	38.00 QP	46.00	-8.00	1.00 H	356	38.27	-0.27

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.

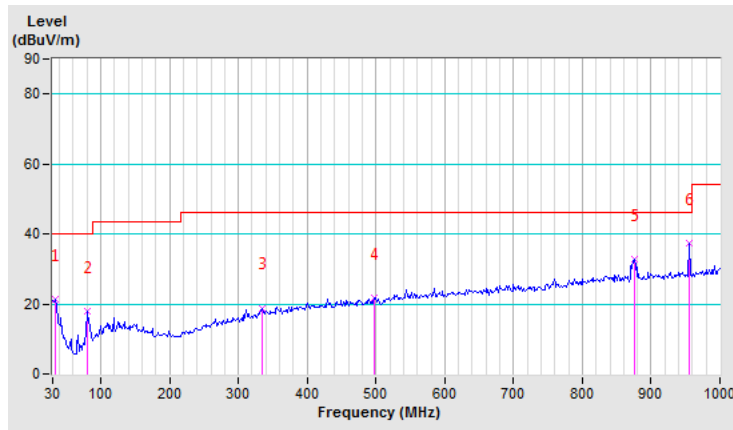


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

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	34.66	21.43 QP	40.00	-18.57	1.00 V	125	34.08	-12.65
2	79.74	17.91 QP	40.00	-22.09	1.00 V	230	39.22	-21.31
3	334.68	18.86 QP	46.00	-27.14	1.00 V	201	30.11	-11.25
4	497.90	21.81 QP	46.00	-24.19	1.00 V	85	29.48	-7.67
5	875.64	32.74 QP	46.00	-13.26	1.00 V	144	33.59	-0.85
6	954.92	37.36 QP	46.00	-8.64	1.00 V	167	37.63	-0.27

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	51.95 PK	74.00	-22.05	1.05 H	89	49.90	2.05
2	2390.00	47.84 AV	54.00	-6.16	1.05 H	89	45.79	2.05
3	*2412.00	107.47 PK			1.05 H	89	105.26	2.21
4	*2412.00	103.39 AV			1.05 H	89	101.18	2.21
5	4824.00	47.38 PK	74.00	-26.62	1.14 H	326	42.52	4.86
6	4824.00	41.60 AV	54.00	-12.40	1.14 H	326	36.74	4.86
7	#7236.00	54.36 PK	74.00	-19.64	1.00 H	70	45.70	8.66
8	#7236.00	46.99 AV	54.00	-7.01	1.00 H	70	38.33	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	47.12 PK	74.00	-26.88	1.00 V	305	45.07	2.05
2	2390.00	37.89 AV	54.00	-16.11	1.00 V	305	35.84	2.05
3	*2412.00	100.61 PK			1.00 V	305	98.40	2.21
4	*2412.00	97.07 AV			1.00 V	305	94.86	2.21
5	4824.00	50.73 PK	74.00	-23.27	1.00 V	260	45.87	4.86
6	4824.00	45.02 AV	54.00	-8.98	1.00 V	260	40.16	4.86
7	#7236.00	55.29 PK	74.00	-18.71	1.09 V	253	46.63	8.66
8	#7236.00	48.20 AV	54.00	-5.80	1.09 V	253	39.54	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.



Test Report No.: RF181019N017-1

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	109.15 PK			1.00 H	144	106.77	2.38
2	*2437.00	105.47 AV			1.00 H	144	103.09	2.38
3	4874.00	49.19 PK	74.00	-24.81	1.00 H	327	44.22	4.97
4	4874.00	43.04 AV	54.00	-10.96	1.00 H	327	38.07	4.97
5	7311.00	58.27 PK	74.00	-15.73	1.00 H	92	49.51	8.76
6	7311.00	52.34 AV	54.00	-1.66	1.00 H	92	43.58	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	99.38 PK			1.00 V	42	97.00	2.38
2	*2437.00	95.49 AV			1.00 V	42	93.11	2.38
3	4874.00	49.16 PK	74.00	-24.84	1.00 V	269	44.19	4.97
4	4874.00	44.06 AV	54.00	-9.94	1.00 V	269	39.09	4.97
5	7311.00	57.01 PK	74.00	-16.99	1.00 V	75	48.25	8.76
6	7311.00	51.29 AV	54.00	-2.71	1.00 V	75	42.53	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	107.59 PK			1.00 H	105	105.04	2.55
2	*2462.00	104.17 AV			1.00 H	105	101.62	2.55
3	2483.50	49.09 PK	74.00	-24.91	1.00 H	105	46.39	2.70
4	2483.50	38.95 AV	54.00	-15.05	1.00 H	105	36.25	2.70
5	4924.00	50.24 PK	74.00	-23.76	1.00 H	225	45.16	5.08
6	4924.00	45.39 AV	54.00	-8.61	1.00 H	225	40.31	5.08
7	7386.00	57.26 PK	74.00	-16.74	1.00 H	99	48.42	8.84
8	7386.00	51.25 AV	54.00	-2.75	1.00 H	99	42.41	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	*2462.00	97.99 PK			1.15 V	269	95.44	2.55
2	*2462.00	94.55 AV			1.15 V	269	92.00	2.55
3	2483.50	43.99 PK	74.00	-30.01	1.15 V	269	41.29	2.70
4	2483.50	32.91 AV	54.00	-21.09	1.15 V	269	30.21	2.70
5	4924.00	47.26 PK	74.00	-26.74	1.09 V	147	42.18	5.08
6	4924.00	40.23 AV	54.00	-13.77	1.09 V	147	35.15	5.08
7	7386.00	55.27 PK	74.00	-18.73	1.00 V	283	46.43	8.84
8	7386.00	49.81 AV	54.00	-4.19	1.00 V	283	40.97	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 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	70.57 PK	74.00	-3.43	1.00 H	94	68.52	2.05
2	2390.00	51.78 AV	54.00	-2.22	1.00 H	94	49.73	2.05
3	*2412.00	106.57 PK			1.00 H	94	104.36	2.21
4	*2412.00	97.49 AV			1.00 H	94	95.28	2.21
5	4824.00	46.31 PK	74.00	-27.69	1.05 H	96	41.45	4.86
6	4824.00	33.97 AV	54.00	-20.03	1.05 H	96	29.11	4.86
7	#7236.00	50.83 PK	74.00	-23.17	1.00 H	109	42.17	8.66
8	#7236.00	40.49 AV	54.00	-13.51	1.00 H	109	31.83	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	60.03 PK	74.00	-13.97	1.00 V	304	57.98	2.05
2	2390.00	45.25 AV	54.00	-8.75	1.00 V	304	43.20	2.05
3	*2412.00	98.43 PK			1.00 V	304	96.22	2.21
4	*2412.00	89.65 AV			1.00 V	304	87.44	2.21
5	4824.00	46.01 PK	74.00	-27.99	1.17 V	68	41.15	4.86
6	4824.00	32.65 AV	54.00	-21.35	1.17 V	68	27.79	4.86
7	#7236.00	49.15 PK	74.00	-24.85	1.05 V	207	40.49	8.66
8	#7236.00	39.02 AV	54.00	-14.98	1.05 V	207	30.36	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.



Test Report No.: RF181019N017-1

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	111.01 PK			1.00 H	143	108.63	2.38
2	*2437.00	101.85 AV			1.00 H	143	99.47	2.38
3	4874.00	48.62 PK	74.00	-25.38	1.09 H	203	43.65	4.97
4	4874.00	35.74 AV	54.00	-18.26	1.09 H	203	30.77	4.97
5	7311.00	61.52 PK	74.00	-12.48	1.00 H	91	52.76	8.76
6	7311.00	48.61 AV	54.00	-5.39	1.00 H	91	39.85	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	102.52 PK			1.00 V	202	100.14	2.38
2	*2437.00	92.74 AV			1.00 V	202	90.36	2.38
3	4874.00	47.05 PK	74.00	-26.95	1.20 V	199	42.08	4.97
4	4874.00	33.00 AV	54.00	-21.00	1.20 V	199	28.03	4.97
5	7311.00	59.47 PK	74.00	-14.53	1.00 V	303	50.71	8.76
6	7311.00	46.15 AV	54.00	-7.85	1.00 V	303	37.39	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.



Test Report No.: RF181019N017-1

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	107.09 PK			1.67 H	140	104.54	2.55
2	*2462.00	98.29 AV			1.67 H	140	95.74	2.55
3	2483.50	67.39 PK	74.00	-6.61	1.67 H	140	64.69	2.70
4	2483.50	52.55 AV	54.00	-1.45	1.67 H	140	49.85	2.70
5	4924.00	47.43 PK	74.00	-26.57	1.00 H	221	42.35	5.08
6	4924.00	35.17 AV	54.00	-18.83	1.00 H	221	30.09	5.08
7	7386.00	52.11 PK	74.00	-21.89	1.09 H	185	43.27	8.84
8	7386.00	39.67 AV	54.00	-14.33	1.09 H	185	30.83	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	*2462.00	97.17 PK			1.33 V	276	94.62	2.55
2	*2462.00	88.17 AV			1.33 V	276	85.62	2.55
3	2483.50	54.29 PK	74.00	-19.71	1.33 V	276	51.59	2.70
4	2483.50	37.78 AV	54.00	-16.22	1.33 V	276	35.08	2.70
5	4924.00	46.77 PK	74.00	-27.23	1.00 V	118	41.69	5.08
6	4924.00	36.20 AV	54.00	-17.80	1.00 V	118	31.12	5.08
7	7386.00	54.68 PK	74.00	-19.32	1.09 V	277	45.84	8.84
8	7386.00	42.03 AV	54.00	-11.97	1.09 V	277	33.19	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 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	71.00 PK	74.00	-3.00	1.00 H	95	68.95	2.05
2	2390.00	46.46 AV	54.00	-7.54	1.00 H	95	44.41	2.05
3	*2412.00	105.10 PK			1.00 H	95	102.89	2.21
4	*2412.00	95.88 AV			1.00 H	95	93.67	2.21
5	4824.00	46.51 PK	74.00	-27.49	1.00 H	208	41.65	4.86
6	4824.00	33.72 AV	54.00	-20.28	1.00 H	208	28.86	4.86
7	#7236.00	50.17 PK	74.00	-23.83	1.21 H	99	41.51	8.66
8	#7236.00	38.31 AV	54.00	-15.69	1.21 H	99	29.65	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	58.82 PK	74.00	-15.18	1.00 V	311	56.77	2.05
2	2390.00	37.92 AV	54.00	-16.08	1.00 V	311	35.87	2.05
3	*2412.00	96.01 PK			1.00 V	311	93.80	2.21
4	*2412.00	87.64 AV			1.00 V	311	85.43	2.21
5	4824.00	45.66 PK	74.00	-28.34	1.09 V	55	40.80	4.86
6	4824.00	34.02 AV	54.00	-19.98	1.09 V	55	29.16	4.86
7	#7236.00	49.52 PK	74.00	-24.48	1.00 V	99	40.86	8.66
8	#7236.00	38.33 AV	54.00	-15.67	1.00 V	99	29.67	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.



Test Report No.: RF181019N017-1

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	109.63 PK			1.00 H	145	107.25	2.38
2	*2437.00	100.90 AV			1.00 H	145	98.52	2.38
3	4874.00	47.13 PK	74.00	-26.87	1.25 H	0	42.16	4.97
4	4874.00	33.46 AV	54.00	-20.54	1.25 H	0	28.49	4.97
5	7311.00	60.96 PK	74.00	-13.04	1.00 H	91	52.20	8.76
6	7311.00	45.93 AV	54.00	-8.07	1.00 H	91	37.17	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	100.40 PK			1.00 V	200	98.02	2.38
2	*2437.00	91.19 AV			1.00 V	200	88.81	2.38
3	4874.00	47.65 PK	74.00	-26.35	1.22 V	200	42.68	4.97
4	4874.00	34.01 AV	54.00	-19.99	1.22 V	200	29.04	4.97
5	7311.00	59.20 PK	74.00	-14.80	1.00 V	78	50.44	8.76
6	7311.00	45.21 AV	54.00	-8.79	1.00 V	78	36.45	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.



Test Report No.: RF181019N017-1

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	106.94 PK			1.00 H	144	104.39	2.55
2	*2462.00	97.53 AV			1.00 H	144	94.98	2.55
3	2483.50	72.19 PK	74.00	-1.81	1.00 H	144	69.49	2.70
4	2483.50	50.85 AV	54.00	-3.15	1.00 H	144	48.15	2.70
5	4924.00	47.79 PK	74.00	-26.21	1.19 H	33	42.71	5.08
6	4924.00	34.12 AV	54.00	-19.88	1.19 H	33	29.04	5.08
7	7386.00	53.36 PK	74.00	-20.64	1.25 H	117	44.52	8.84
8	7386.00	41.79 AV	54.00	-12.21	1.25 H	117	32.95	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	*2462.00	95.47 PK			1.00 V	288	92.92	2.55
2	*2462.00	86.65 AV			1.00 V	288	84.10	2.55
3	2483.50	55.14 PK	74.00	-18.86	1.00 V	288	52.44	2.70
4	2483.50	36.47 AV	54.00	-17.53	1.00 V	288	33.77	2.70
5	4924.00	48.22 PK	74.00	-25.78	1.36 V	166	43.14	5.08
6	4924.00	35.11 AV	54.00	-18.89	1.36 V	166	30.03	5.08
7	7386.00	55.48 PK	74.00	-18.52	1.27 V	69	46.64	8.84
8	7386.00	45.32 AV	54.00	-8.68	1.27 V	69	36.48	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 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	68.53 PK	74.00	-5.47	1.00 H	144	66.48	2.05
2	2390.00	52.82 AV	54.00	-1.18	1.00 H	144	50.77	2.05
3	*2422.00	102.53 PK			1.00 H	144	100.25	2.28
4	*2422.00	93.62 AV			1.00 H	144	91.34	2.28
5	4844.00	46.25 PK	74.00	-27.75	1.00 H	132	41.34	4.91
6	4844.00	33.67 AV	54.00	-20.33	1.00 H	132	28.76	4.91
7	7266.00	49.91 PK	74.00	-24.09	1.02 H	39	41.20	8.71
8	7266.00	38.26 AV	54.00	-15.74	1.02 H	39	29.55	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	53.94 PK	74.00	-20.06	1.00 V	202	51.89	2.05
2	2390.00	38.45 AV	54.00	-15.55	1.00 V	202	36.40	2.05
3	*2422.00	93.18 PK			1.00 V	202	90.90	2.28
4	*2422.00	84.17 AV			1.00 V	202	81.89	2.28
5	4844.00	46.92 PK	74.00	-27.08	1.05 V	77	42.01	4.91
6	4844.00	34.01 AV	54.00	-19.99	1.05 V	77	29.10	4.91
7	7266.00	49.49 PK	74.00	-24.51	1.03 V	335	40.78	8.71
8	7266.00	37.62 AV	54.00	-16.38	1.03 V	335	28.91	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.



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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	107.72 PK			1.00 H	144	105.34	2.38
2	*2437.00	98.43 AV			1.00 H	144	96.05	2.38
3	4874.00	47.16 PK	74.00	-26.84	1.21 H	200	42.19	4.97
4	4874.00	34.03 AV	54.00	-19.97	1.21 H	200	29.06	4.97
5	7311.00	54.53 PK	74.00	-19.47	1.00 H	187	45.77	8.76
6	7311.00	45.01 AV	54.00	-8.99	1.00 H	187	36.25	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	98.80 PK			1.00 V	202	96.42	2.38
2	*2437.00	89.59 AV			1.00 V	202	87.21	2.38
3	4874.00	47.03 PK	74.00	-26.97	1.09 V	99	42.06	4.97
4	4874.00	34.02 AV	54.00	-19.98	1.09 V	99	29.05	4.97
5	7311.00	50.99 PK	74.00	-23.01	1.02 V	339	42.23	8.76
6	7311.00	38.77 AV	54.00	-15.23	1.02 V	339	30.01	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.



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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	102.44 PK			1.90 H	143	99.96	2.48
2	*2452.00	93.78 AV			1.90 H	143	91.30	2.48
3	2483.50	65.99 PK	74.00	-8.01	1.90 H	143	63.29	2.70
4	2483.50	51.10 AV	54.00	-2.90	1.90 H	143	48.40	2.70
5	4904.00	46.12 PK	74.00	-27.88	1.00 H	155	41.08	5.04
6	4904.00	34.32 AV	54.00	-19.68	1.00 H	155	29.28	5.04
7	7356.00	50.13 PK	74.00	-23.87	1.05 H	214	41.33	8.80
8	7356.00	38.04 AV	54.00	-15.96	1.05 H	214	29.24	8.80
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	*2452.00	92.66 PK			1.65 V	310	90.18	2.48
2	*2452.00	83.45 AV			1.65 V	310	80.97	2.48
3	2483.50	48.65 PK	74.00	-25.35	1.65 V	310	45.95	2.70
4	2483.50	34.84 AV	54.00	-19.16	1.65 V	310	32.14	2.70
5	4904.00	47.01 PK	74.00	-26.99	1.09 V	85	41.97	5.04
6	4904.00	33.46 AV	54.00	-20.54	1.09 V	85	28.42	5.04
7	7356.00	51.33 PK	74.00	-22.67	1.09 V	33	42.53	8.80
8	7356.00	38.59 AV	54.00	-15.41	1.09 V	33	29.79	8.80

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 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. 17, 18	Oct.16, 19
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.20,18	Sep. 19,19
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	Oct.27, 18	Oct.26, 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

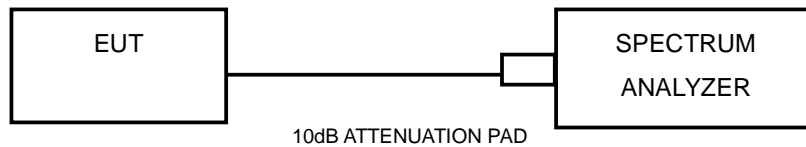
1. Set resolution bandwidth (RBW) = 100KHz
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) 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
1	2412	9.08	0.5	PASS
6	2437	9.08	0.5	PASS
11	2462	9.08	0.5	PASS

802.11g

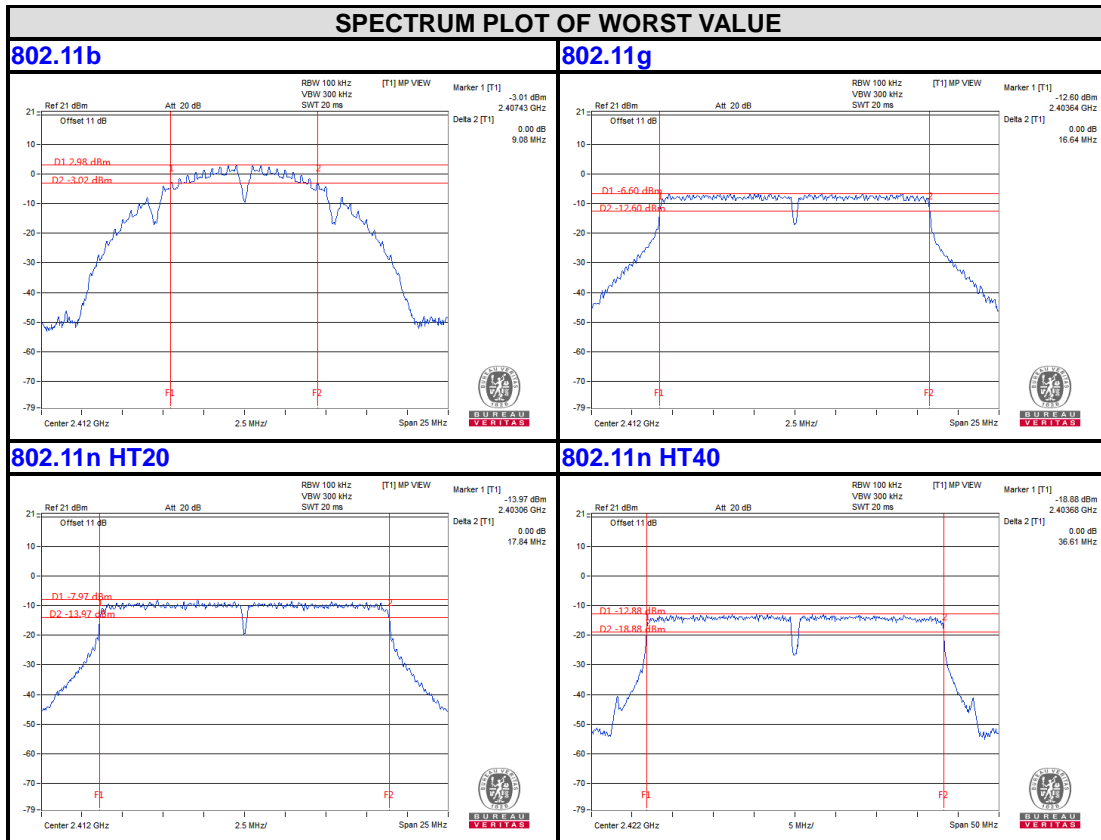
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.64	0.5	PASS
6	2437	16.63	0.5	PASS
11	2462	16.63	0.5	PASS

802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.84	0.5	PASS
6	2437	17.81	0.5	PASS
11	2462	17.81	0.5	PASS

802.11n HT40

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.61	0.5	PASS
6	2437	36.59	0.5	PASS
9	2452	36.59	0.5	PASS

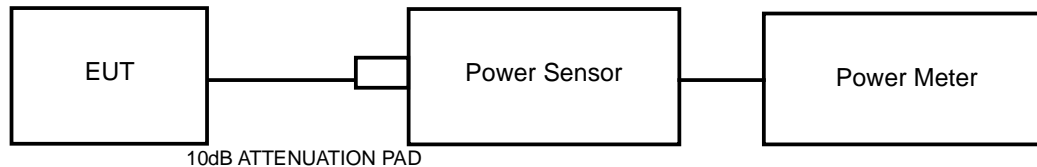


4.4 CONDUCTED OUTPUT POWER

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. 17, 18	Oct.16, 19
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.20,18	Sep. 19,19
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	Oct.27, 18	Oct.26, 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.



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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

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	15.48	35.318	1	PASS
6	2437	15.14	32.659	1	PASS
11	2462	13.71	23.496	1	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	15.12	32.509	1	PASS
6	2437	19.70	93.325	1	PASS
11	2462	16.30	42.658	1	PASS

802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	13.43	22.029	1	PASS
6	2437	18.02	63.387	1	PASS
11	2462	15.55	35.892	1	PASS

802.11n HT40

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
3	2422	12.02	15.922	1	PASS
6	2437	17.92	61.944	1	PASS
9	2452	12.30	16.982	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)
1	2412	12.68	18.535
6	2437	12.54	17.947
11	2462	11.07	12.794

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	8.16	6.546
6	2437	12.62	18.281
11	2462	9.29	8.492

802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	6.28	4.246
6	2437	10.91	12.331
11	2462	8.36	6.855

802.11n HT40

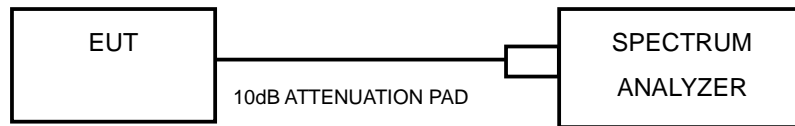
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
3	2422	4.91	3.097
6	2437	10.87	12.218
9	2452	5.24	3.342

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 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
1	2412	-17.25	8.00	PASS
6	2437	-17.44	8.00	PASS
11	2462	-18.82	8.00	PASS

802.11g

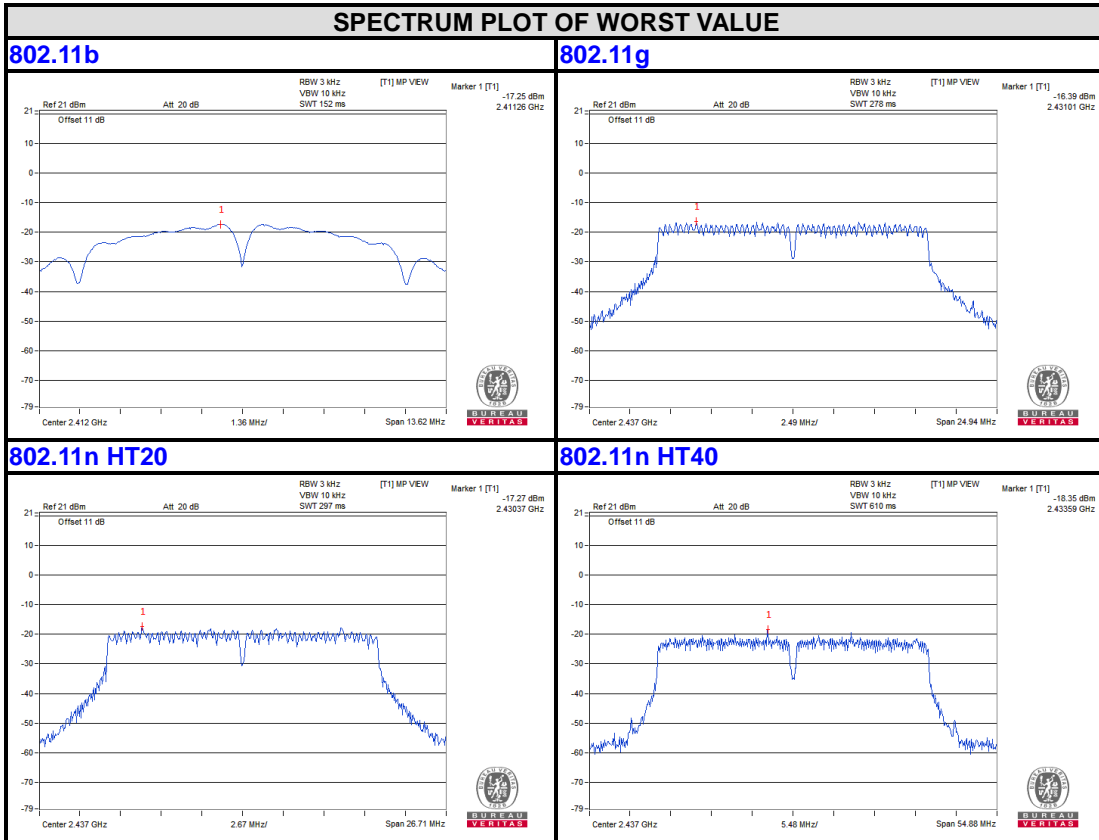
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-20.79	8.00	PASS
6	2437	-16.39	8.00	PASS
11	2462	-19.49	8.00	PASS

802.11n HT20

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-21.83	8.00	PASS
6	2437	-17.27	8.00	PASS
11	2462	-19.69	8.00	PASS

802.11n HT40

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-24.62	8.00	PASS
6	2437	-18.35	8.00	PASS
9	2452	-24.21	8.00	PASS



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.



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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

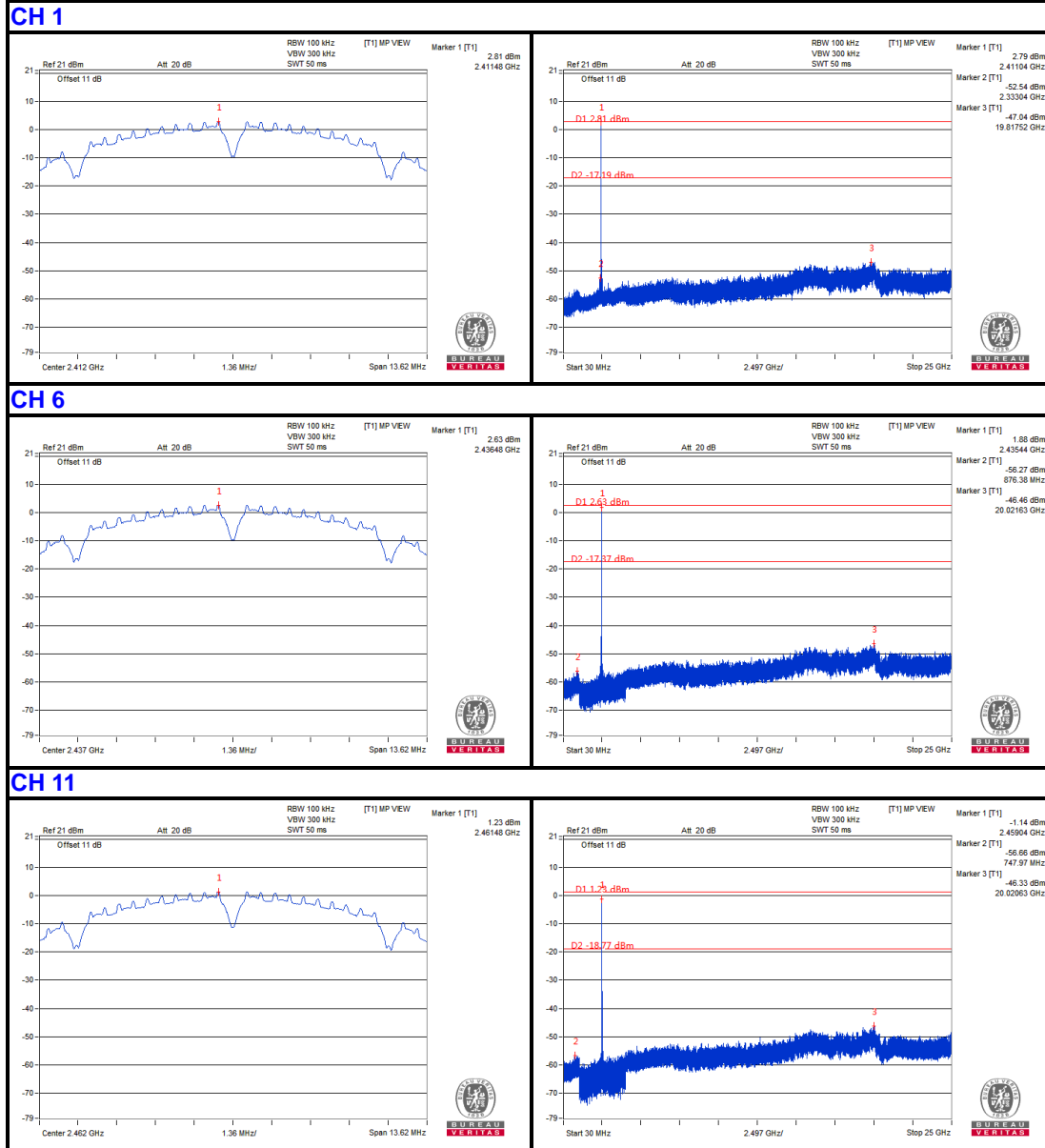
No deviation.

4.6.6 EUT OPERATING CONDITION

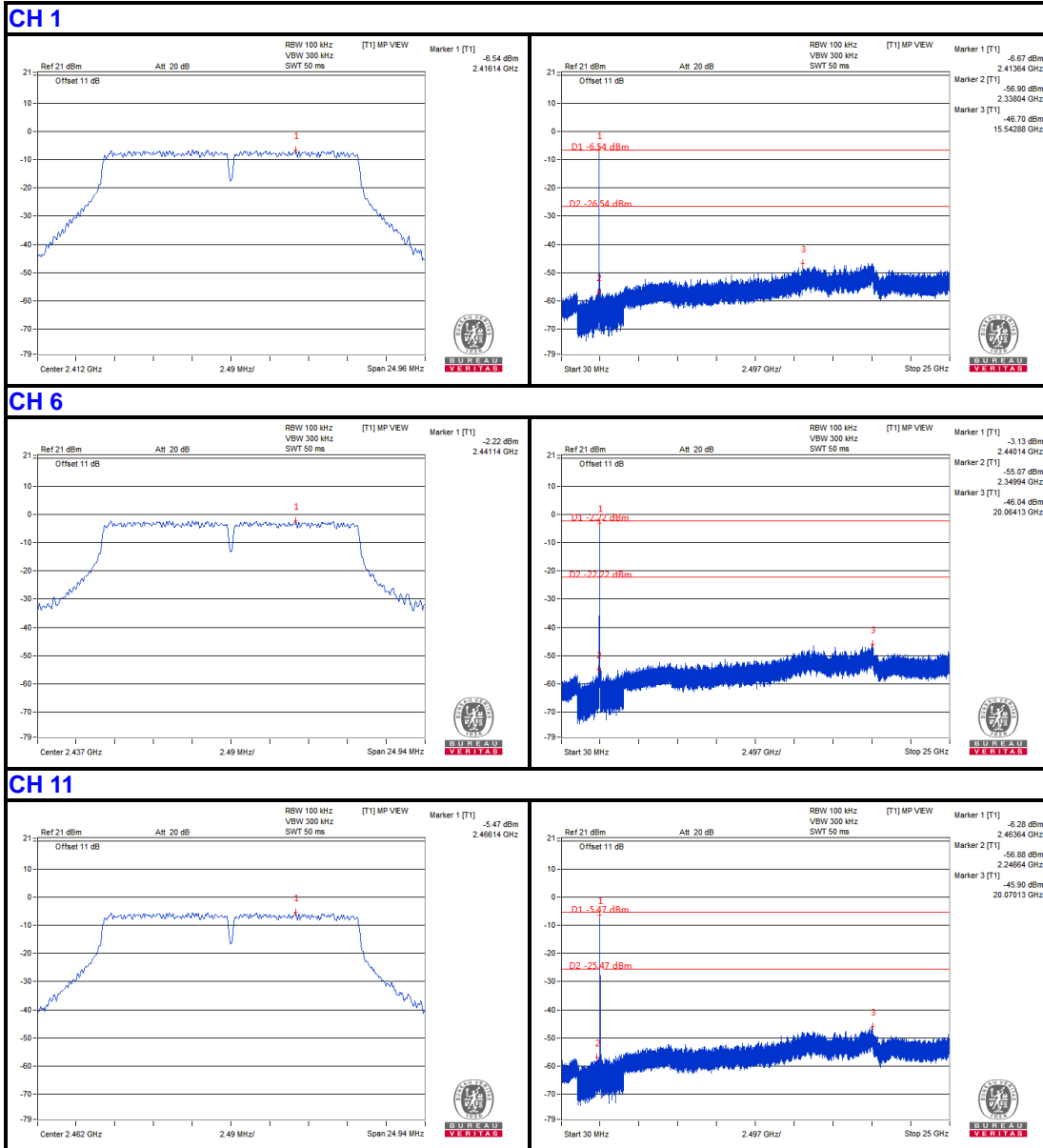
Same as item 4.3.6

4.6.7 TEST RESULTS

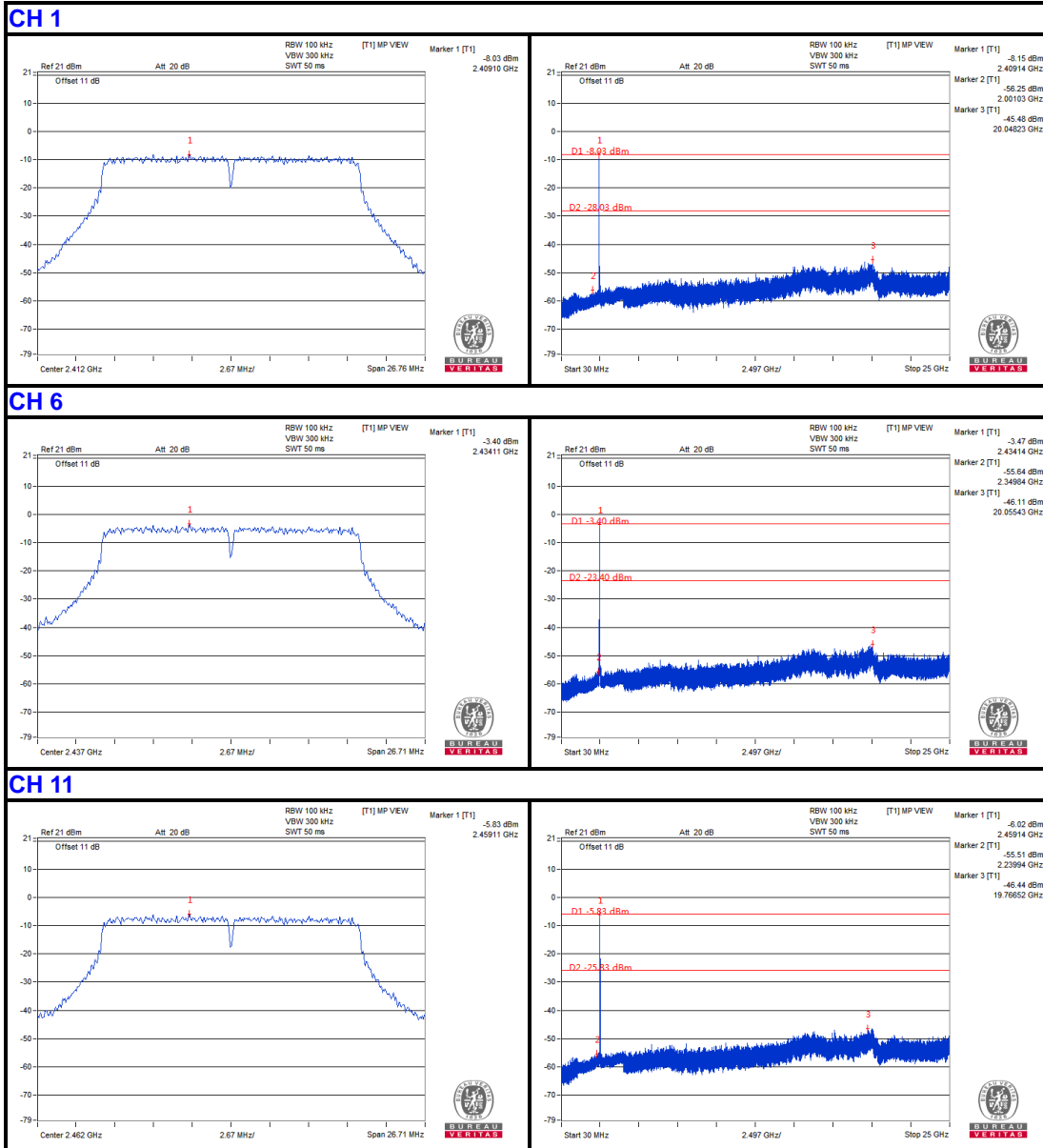
802.11b



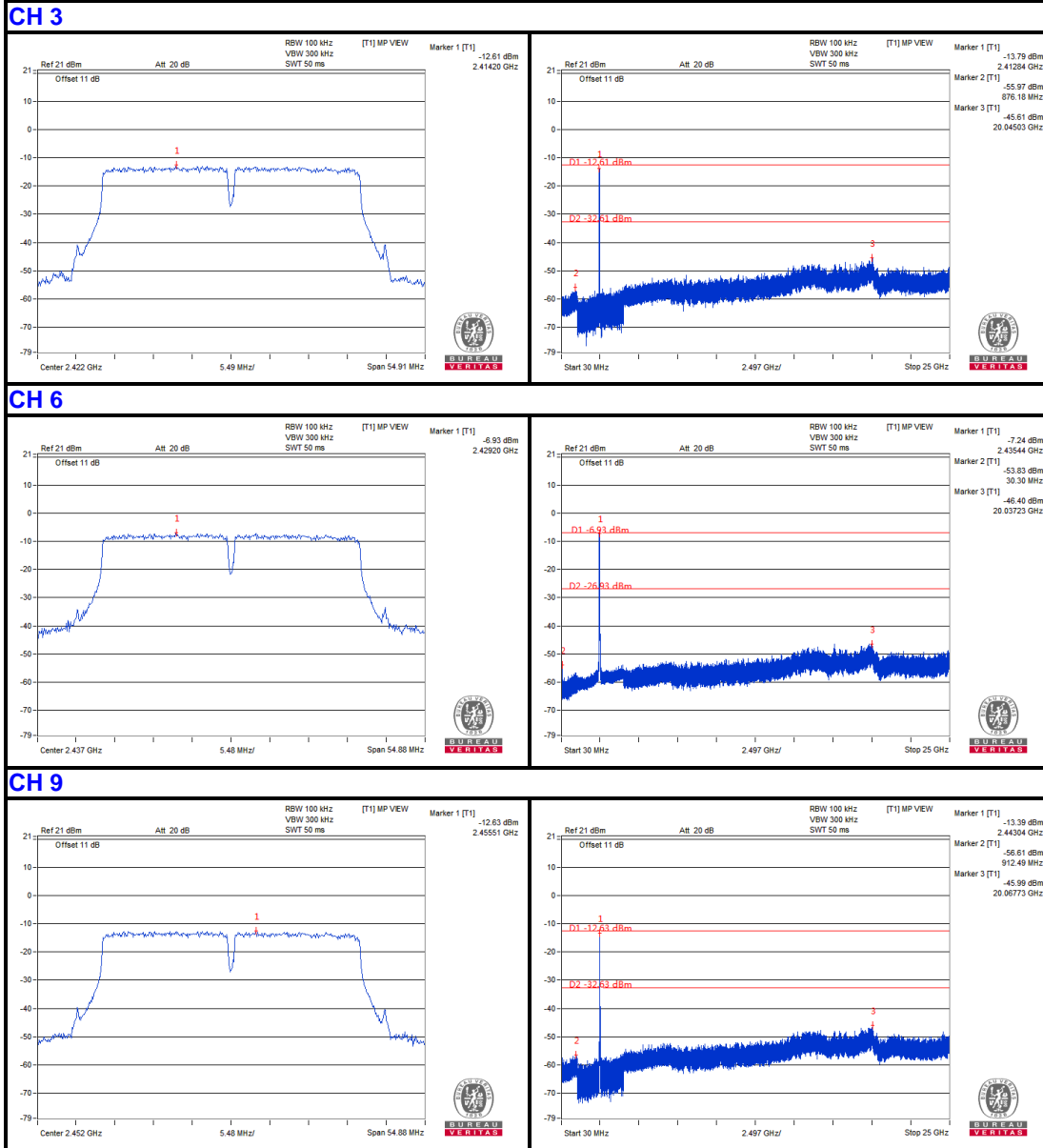
802.11g



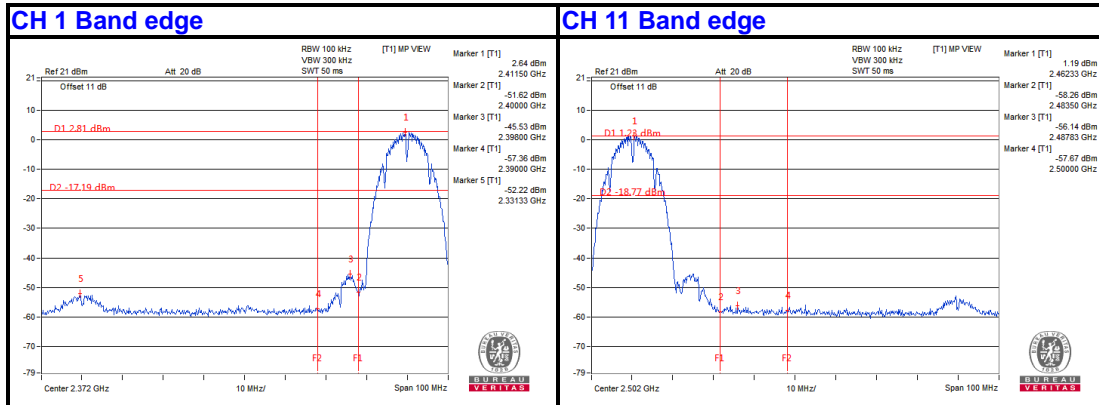
802.11n HT20



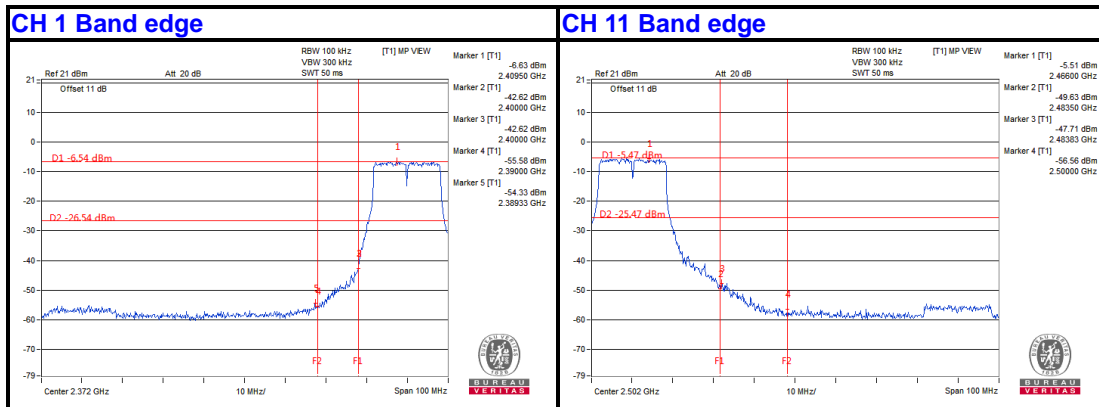
802.11n HT40



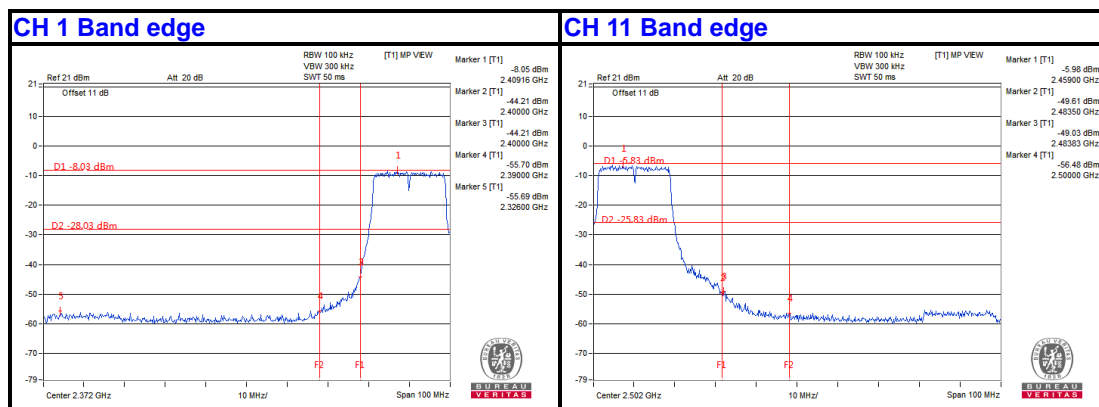
802.11b



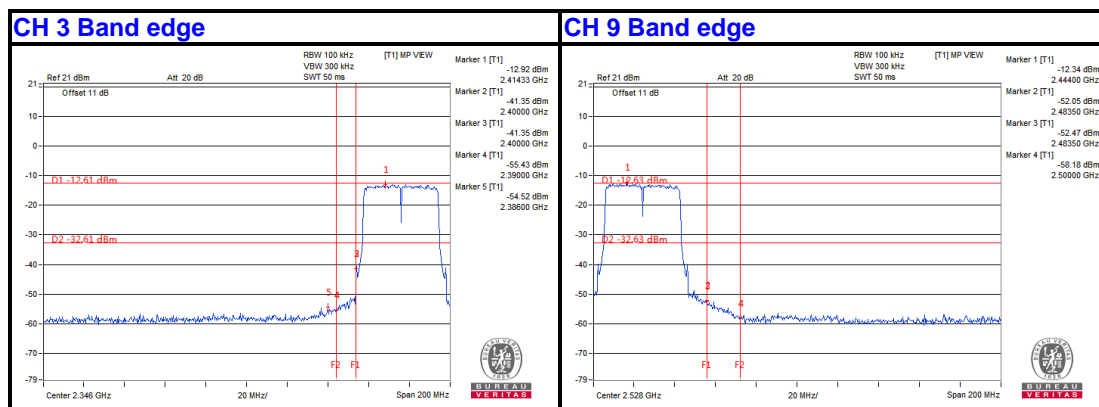
802.11g



802.11n HT20



802.11n HT40





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5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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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---