

FCC TEST REPORT

FCC ID: 2A2DZ-NVR

Report Number : ZKT-210610L2484E

Date of Test Jun. 05, 2021 to Jun. 28, 2021

Date of issue : Jun. 28, 2021

Total number of pages 69

Test Result : PASS

Testing Laboratory : Shenzhen ZKT Technology Co., Ltd.Address : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue,
Fuhai Street, Bao'an District, Shenzhen, China**Applicant's name** : Shenzhen Hiseeu Technolgy Co., LtdAddress : K411, Jinhetian Business Center, No. 329, Longhuan 3rd Road,
Longhua District, Shenzhen, Guangdong, China**Manufacturer's name** : Shenzhen Hiseeu Technolgy Co., LtdAddress : K411, Jinhetian Business Center, No. 329, Longhuan 3rd Road,
Longhua District, Shenzhen, Guangdong, China**Test specification:**Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247
ANSI C63.10:2013

Test procedure : /

Non-standard test method : N/A

Test Report Form No. : TRF-EL-110_V0**Test Report Form(s) Originator** : ZKT Testing**Master TRF** : Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Product name : NVR

Trademark : N/A

Model/Type reference : TZ-NVR-8-A

K8208, TZ-JZ04, TZ-NVR-8, TZ-NVR10V-8, TZ-NVR12V-8, SFTZ-NVR-8, TZ-NVR2W-8, AMZ-TZ-NVR12V-8, WK-8HB612B-3T, WNKIT-8HB612-3T, WNKIT-8HB312-3T, WK-8HB312-3T, WNKIT-7V-2HB412, 8WK-4HC913-1T, 8WK-4HBK13-1T, 8WK-4HBC23-1T, 8WKNKIT-4HB612-1T, 8WKNKIT-4HB612, WNKIT-4HB312-3T, WNKIT-4HB312-1TA, WK-2C30TZ, 8WK-12V-4HB612-3T, 8WK-10V-4HB612B-1T, WNKIT10V-4HB612-1TA, SFWK-4HT822, SFWK-4HB913-1T, SFWK-4HB913, 8WK-2TB503-1T, WNKIT-4HB612-1T, 8WKNKIT-4HB612-1TA, WKIT-S2HB611, WNKIT-8HB611-1T, WNKIT-4HB611A, WNKIT-10V-4HB611-1T, AMZ-TZ-HB412, WNKIT-12V-4HB612A, WNKIT-4HB312, WNKIT-8HB612B-3T, 8WK-4HB613-1T, 8WK-12V-4HB312-3T, 8WK-4HB312-1T, 8WK-4HB613, 8WK-4HB312-3T, 8WK-12V-4HB613-3T, 8WK-10V-4HB613B-1T, 8WK-10V-4HB613-1T, 8WK-4HD203-1T, 8WK-3C40, 8WK-3C40-1T

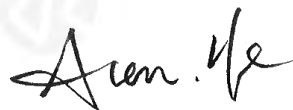
Ratings : DC 12V from Adapter

Testing procedure and testing location:

Testing Laboratory.....: **Shenzhen ZKT Technology Co., Ltd.**

Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

Tested by (name + signature).....: **Alen He**



Reviewer (name + signature).....: **Joe Liu**



Approved (name + signature).....: **Lake Xie**



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1. VERSION

Report No.	Version	Description	Approved
ZKT-210610L2484E	Rev.01	Initial issue of report	Jun. 17, 2021

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Result	Remark
FCC part 15.203/15.247 (c)	Antenna requirement	PASS	
FCC part 15.207	AC Power Line Conducted Emission	PASS	
FCC part 15.247 (b)(3)	Conducted Peak Output Power	PASS	
FCC part 15.247 (a)(2)	Channel Bandwidth& 99% OCB	PASS	
FCC part 15.247 (e)	Power Spectral Density	PASS	
FCC part 15.247(d)	Band Edge	PASS	
FCC part 15.205/15.209	Spurious Emission	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225

Designation Number: CN1299

IC Registered No.: 27033

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power conducted	$\pm 0.16\text{dB}$
3	Spurious emissions conducted	$\pm 0.21\text{dB}$
4	All emissions radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	NVR
Model No.:	TZ-NVR-8-A K8208, TZ-JZ04, TZ-NVR-8, TZ-NVR10V-8, TZ-NVR12V-8, SFTZ-NVR-8, TZ-NVR2W-8, AMZ-TZ-NVR12V-8, WK-8HB612B-3T, WNKIT-8HB612-3T, WNKIT-8HB312-3T, WK-8HB312-3T, WNKIT-7V-2HB412, 8WK-4HC913-1T, 8WK-4HBK13-1T, 8WK-4HBC23-1T, 8WNKIT-4HB612-1T, 8WNKIT-4HB612, WNKIT-4HB312-3T, WNKIT-4HB312-1TA, WK-2C30TZ, 8WK-12V-4HB612-3T, 8WK-10V-4HB612B-1T, WNKIT10V-4HB612-1TA, SFWK-4HT822, SFWK-4HB913-1T, SFWK-4HB913, 8WK-2TB503-1T, WNKIT-4HB612-1T, 8WNKIT-4HB612-1TA, WKIT-S2HB611, WNKIT-8HB611-1T, WNKIT-4HB611A, WNKIT-10V-4HB611-1T, AMZ-TZ-HB412, WNKIT-12V-4HB612A, WNKIT-4HB312, WNKIT-8HB612B-3T, 8WK-4HB613-1T, 8WK-12V-4HB312-3T, 8WK-4HB312-1T, 8WK-4HB613, 8WK-4HB312-3T, 8WK-12V-4HB613-3T, 8WK-10V-4HB613B-1T, 8WK-10V-4HB613-1T, 8WK-4HD203-1T, 8WK-3C40, 8WK-3C40-1T
Model Different.:	The product's different for model number and appearance color.
Serial No.:	N/A
Hardware Version:	H1.0
Software Version:	S1.0
Sample(s) Status:	Engineer sample
Channel numbers:	802.11b/802.11g /802.11n(HT20):11 802.11n(HT40):7
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum(DSSS) 802.11g/802.11n(H20)/802.11n(HT40): Orthogonal Frequency Division Multiplexing(OFDM)
Antenna Type:	External antenna/Internal antenna
Antenna gain:	External antenna 1/2: 5dBi Internal antenna: 0dBi
Power supply:	DC 12V from Adapter

Note: The MIMO mode only support external antenna1 and external antenna2 the 802.11n mode, the Directional Gain=5dBi+10log(2)=8.0dBi.

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

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency (MHz)	
	802.11b/802.11g/802.11n(HT20)	802.11n(HT40)
Lowest channel	2412MHz	2422MHz
Middle channel	2437MHz	2437MHz
Highest channel	2462MHz	2452MHz

3.2 DESCRIPTION OF TEST MODES

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the duty cycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:				
Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.				
Mode	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)
Data rate	1Mbps	6Mbps	6.5Mbps	13Mbps

Test Software	Realtek Test Tool
Power level setup	<8dBm

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission

EUT

Radiated Emission

EUT

Conducted Spurious

EUT

3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	NVR	N/A	TZ-NVR-8-A	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

3.5EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY45109572	Sep. 22, 2020	Sep. 21, 2021
2	Spectrum Analyzer (1GHz-40GHz)	Agilent	E4446A	100363	Sep. 22, 2020	Sep. 21, 2021
3	Test Receiver (9kHz-7GHz)	R&S	ESC17	101169	Sep. 22, 2020	Sep. 21, 2021
4	Bilog Antenna (30MHz-1400MHz)	Schwarzbeck	VULB9168	00877	Sep. 22, 2020	Sep. 21, 2021
5	Horn Antenna (1GHz-18GHz)	SCHWARZBEC K	BBHA9120D	1541	Sep. 22, 2020	Sep. 21, 2021
6	Horn Antenna (18GHz-40GHz)	A.H. System	SAS-574	588	Sep. 22, 2020	Sep. 21, 2021
7	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	N/A	Sep. 22, 2020	Sep. 21, 2021
8	Amplifier (1GHz-40GHz)	全聚达	DLE-161	097	Sep. 22, 2020	Sep. 21, 2021
9	Loop Antenna (9kHz-30MHz)	SCHWARZBEC K	FMZB1519B	014	Sep. 22, 2020	Sep. 21, 2021
10	RF cables1 (9kHz-30MHz)	N/A	9kHz-30MHz	N/A	Sep. 22, 2020	Sep. 21, 2021
11	RF cables2 (30MHz-1GHz)	N/A	30MHz-1GHz	N/A	Sep. 22, 2020	Sep. 21, 2021
12	RF cables3 (1GHz-40GHz)	N/A	1GHz-40GHz	N/A	Sep. 22, 2020	Sep. 21, 2021
13	CMW500 Test	R&S	CMW500	106504	Sep. 22, 2020	Sep. 21, 2021
14	ESG Signal Generator	Agilent	E4421B	GB40051203	Sep. 22, 2020	Sep. 21, 2021
15	Signal Generator	Agilent	N5182A	MY47420215	Sep. 22, 2020	Sep. 21, 2021
16	Power meter	Yokogama	WT210	91MB28517	Sep. 22, 2020	Sep. 21, 2021
17	D.C. Power Supply	LongWei	TPR-6405D	\	\	\
18	Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Sep. 22, 2020	Sep. 21, 2021
2	LISN	CYBERTEK	EM5040A	E1850400149	Sep. 22, 2020	Sep. 21, 2021
3	Test Cable	N/A	C01	N/A	Sep. 22, 2020	Sep. 21, 2021
4	Test Cable	N/A	C02	N/A	Sep. 22, 2020	Sep. 21, 2021
5	EMI Test Receiver	R&S	ESRP3	101946	Sep. 22, 2020	Sep. 21, 2021
6	Absorbing Clamp	DZ	ZN23201	N/A	Sep. 22, 2020	Sep. 21, 2021

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

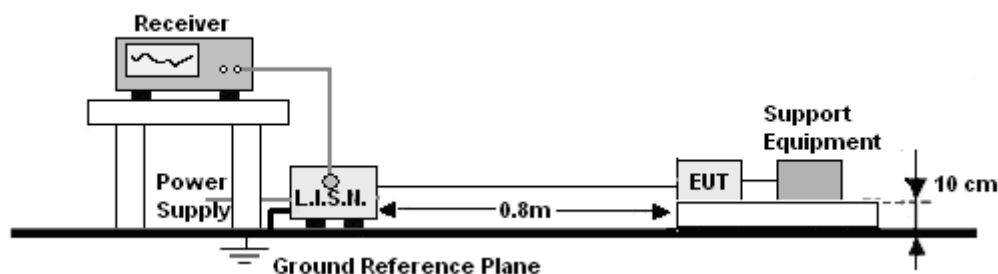
4.1.2 TEST PROCEDURE

- The EUT was placed 0.1 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



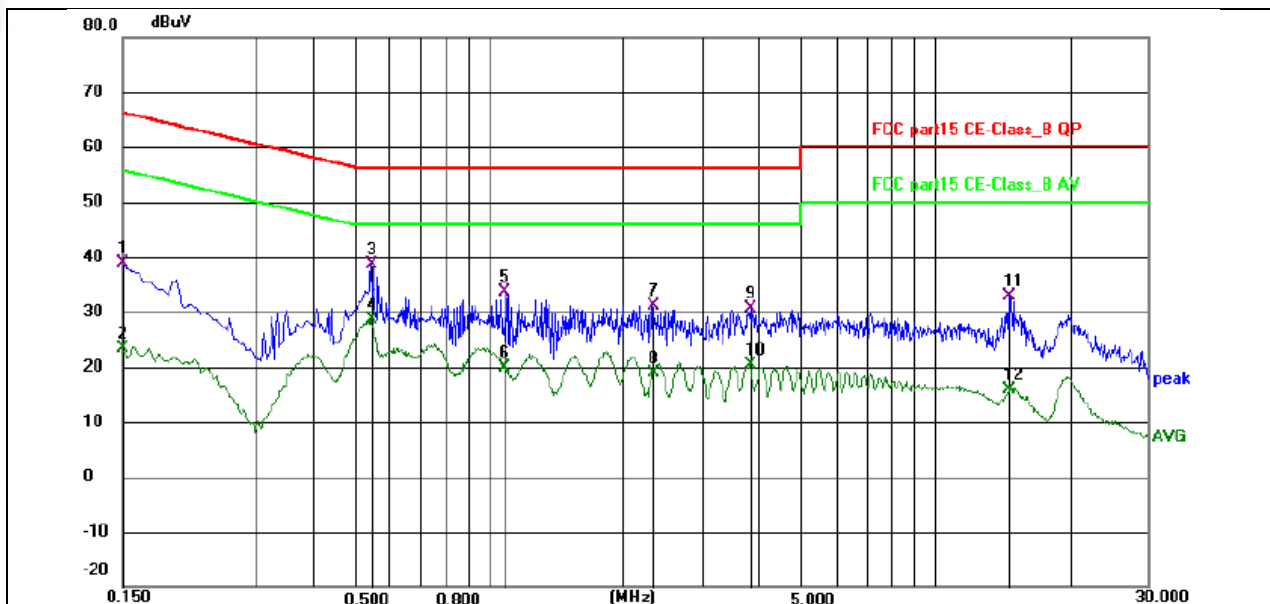
4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

Both high and low voltages have been tested to show only the worst low voltages test data.

4.1.6 TEST RESULT

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode :	Mode 1

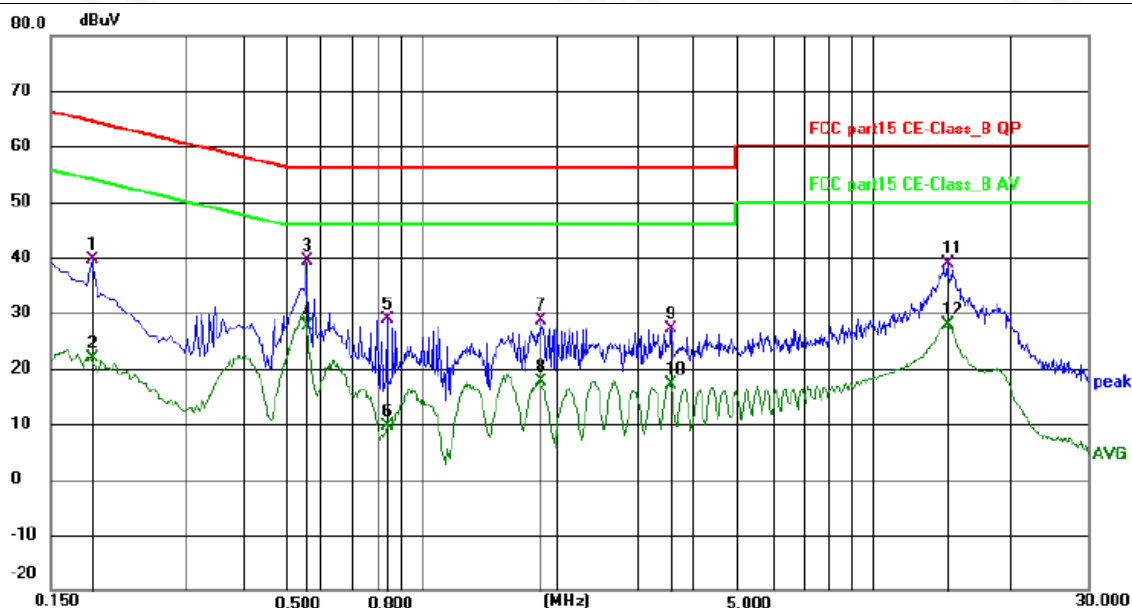


Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	28.26	10.68	38.94	66.00	27.06	QP	P	
2	0.1500	12.58	10.68	23.26	56.00	32.74	AVG	P	
3	0.5414	29.29	9.41	38.70	56.00	17.30	QP	P	
4 *	0.5414	19.34	9.41	28.75	46.00	17.25	AVG	P	
5	1.0859	24.16	9.49	33.65	56.00	22.35	QP	P	
6	1.0859	10.51	9.49	20.00	46.00	26.00	AVG	P	
7	2.3234	21.65	9.60	31.25	56.00	24.75	QP	P	
8	2.3234	9.29	9.60	18.89	46.00	27.11	AVG	P	
9	3.8490	20.94	9.60	30.54	56.00	25.46	QP	P	
10	3.8490	10.89	9.60	20.49	46.00	25.51	AVG	P	
11	14.6625	22.78	10.20	32.98	60.00	27.02	QP	P	
12	14.6625	5.78	10.20	15.98	50.00	34.02	AVG	P	

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode :	Mode 1



Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1860	30.15	9.45	39.60	64.21	24.61	QP	P	
2	0.1860	12.31	9.45	21.76	54.21	32.45	AVG	P	
3 *	0.5549	29.94	9.48	39.42	56.00	16.58	QP	P	
4	0.5549	18.20	9.48	27.68	46.00	18.32	AVG	P	
5	0.8384	19.43	9.46	28.89	56.00	27.11	QP	P	
6	0.8384	0.10	9.46	9.56	46.00	36.44	AVG	P	
7	1.8329	18.71	9.92	28.63	56.00	27.37	QP	P	
8	1.8329	7.69	9.92	17.61	46.00	28.39	AVG	P	
9	3.5655	17.26	9.95	27.21	56.00	28.79	QP	P	
10	3.5655	7.18	9.95	17.13	46.00	28.87	AVG	P	
11	14.6445	28.58	10.35	38.93	60.00	21.07	QP	P	
12	14.6445	17.49	10.35	27.84	50.00	22.16	AVG	P	

4.2 RADIATED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average

4.2.1 RADIATED EMISSION LIMITS

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

LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.1 meters above the ground at a 3 meter 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 variable-height antenna tower.

- c. The antenna 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) 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. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- g. Different from above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change from table 0.8 metre to 1.5 metre (Above 18GHz the distance is 1 meter and table is 1.5 metre).
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel

Note:

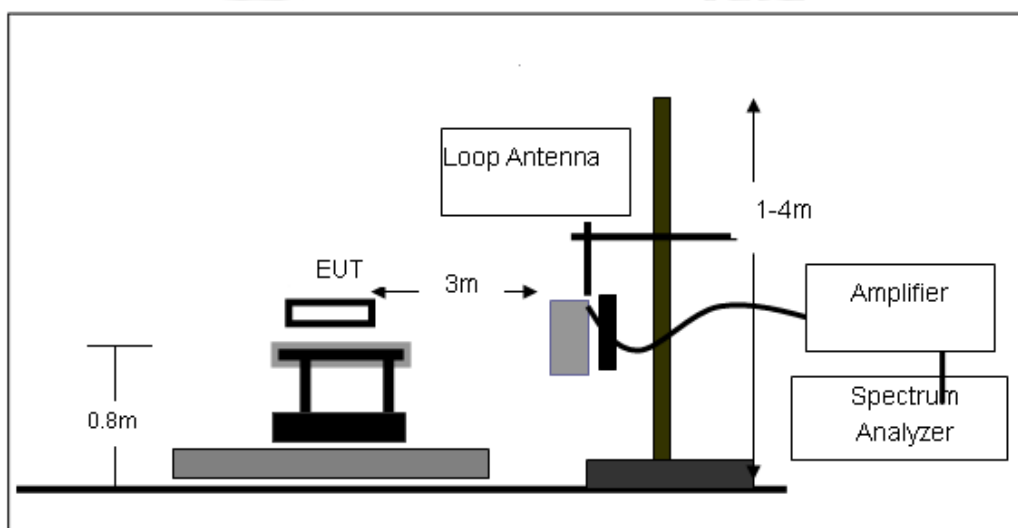
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

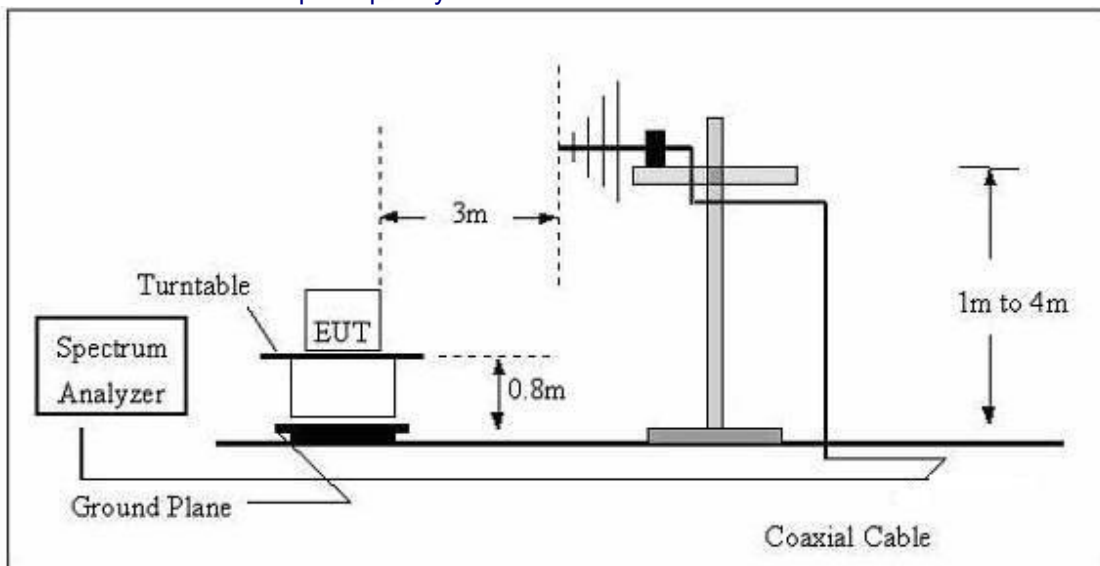
No deviation

4.2.4 TEST SETUP

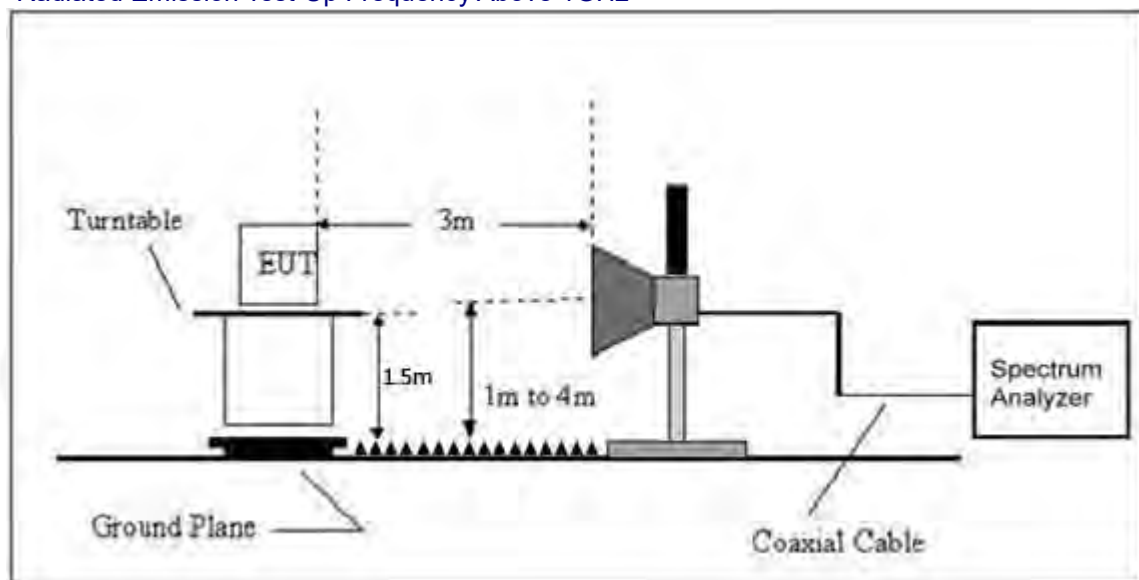
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

Both high and low voltages have been tested to show only the worst low voltages test data.

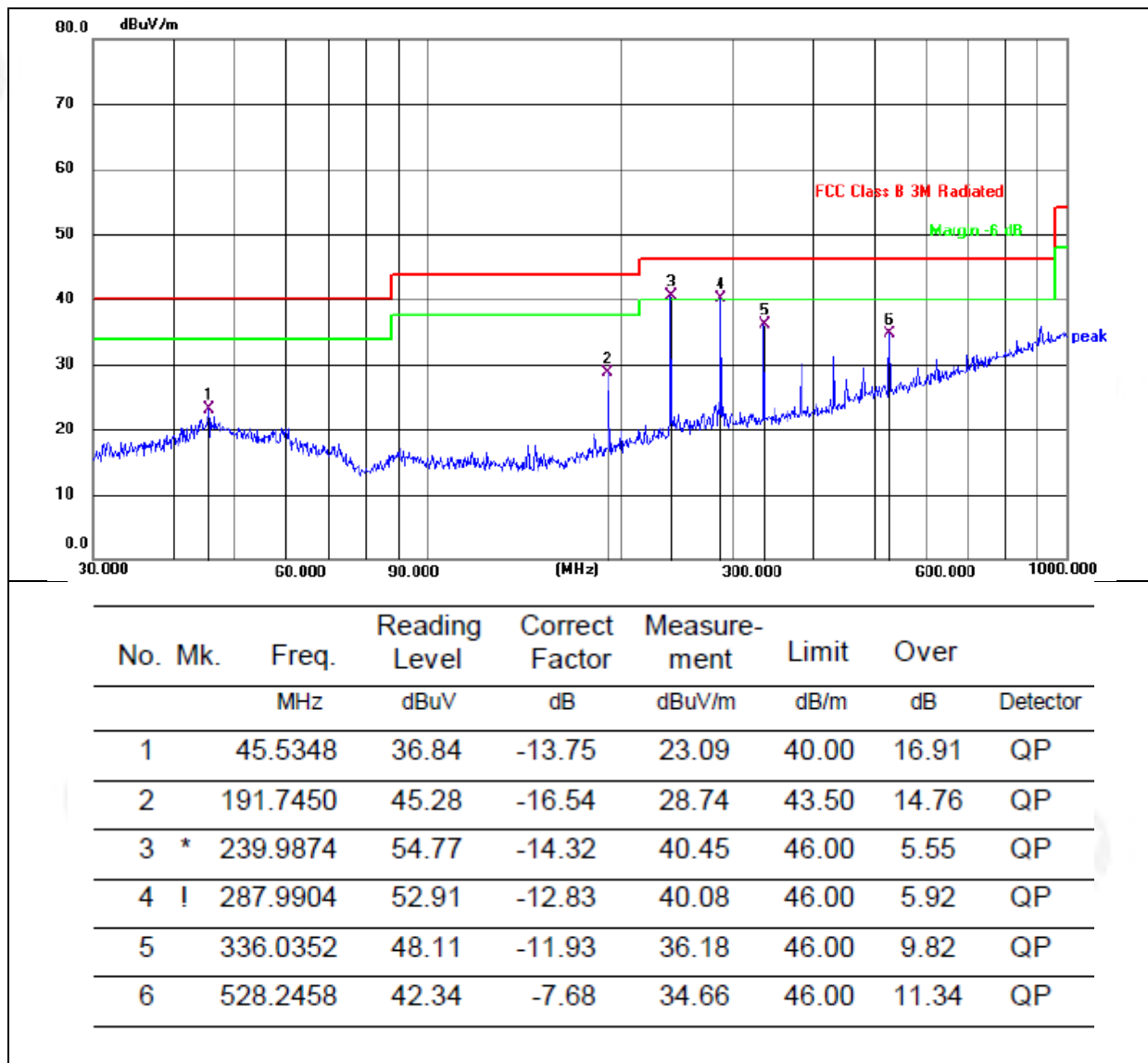
4.2.6 TEST RESULTS

Between 9KHz – 30MHz

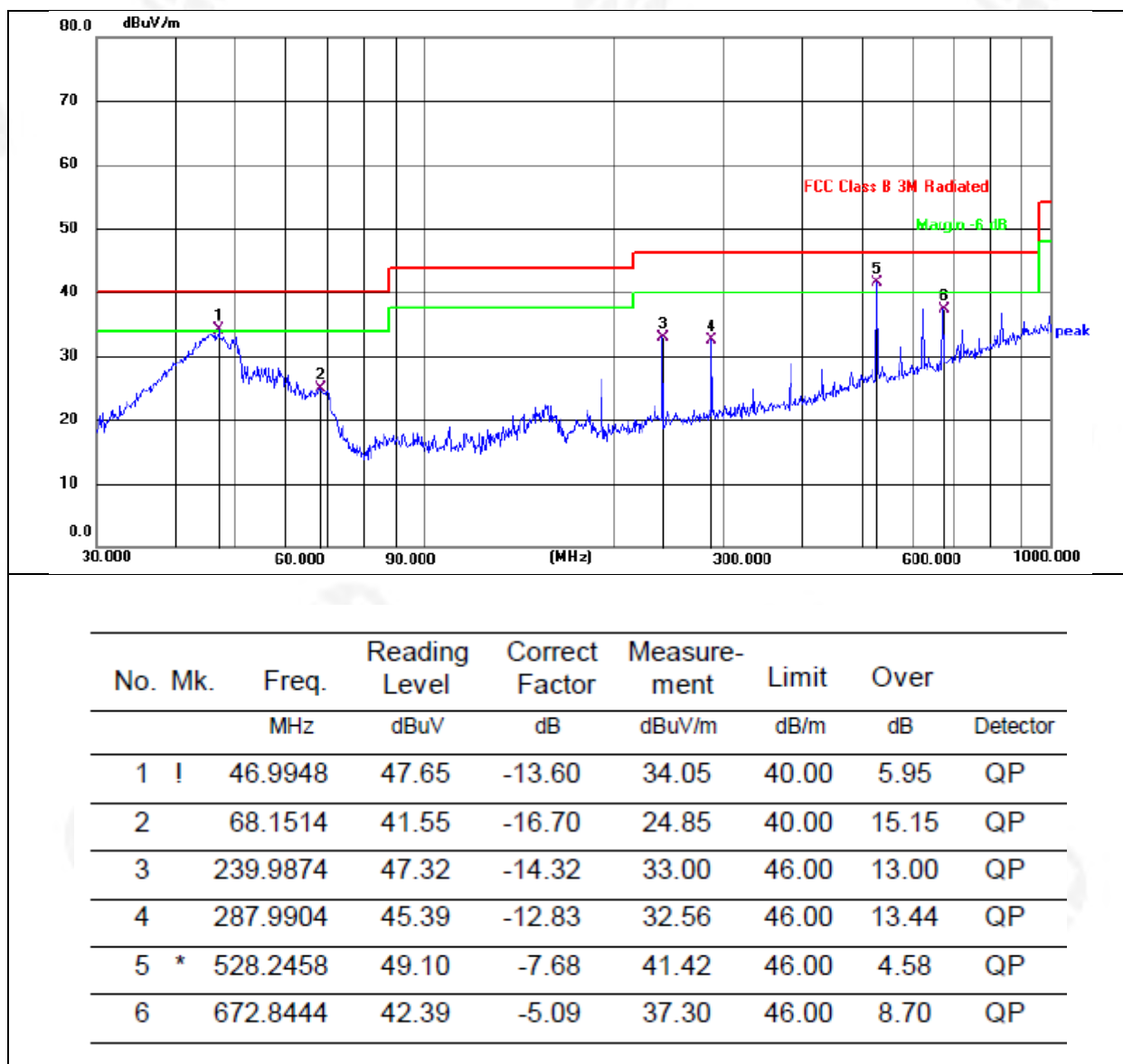
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Between 30MHz – 1GHz

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



Remarks:

- 1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2.The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3.The test data shows only the worst case 802.11b mode

1GHz~25GHz

We test all antenna's data, the data only show the antenna1 worst mode.

802.11b

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detect or Type
Low Channel:2412MHz									
V	4824.00	52.36	30.55	5.77	24.66	52.24	74.00	-21.76	PK
V	4824.00	42.35	30.55	5.77	24.66	42.23	54.00	-11.77	AV
V	7236.00	50.15	30.33	6.32	24.55	50.69	74.00	-23.31	PK
V	7236.00	43.43	30.33	6.32	24.55	43.97	54.00	-10.03	AV
V	9648.00	51.11	30.85	7.45	24.69	52.40	74.00	-21.60	PK
V	9648.00	42.23	30.85	7.45	24.69	43.52	54.00	-10.48	AV
V	12060.00	51.53	31.02	8.99	25.57	55.07	74.00	-18.93	PK
V	12060.00	42.15	31.02	8.99	25.57	45.69	54.00	-8.31	AV
H	4824.00	52.53	30.55	5.77	24.66	52.41	74.00	-21.59	PK
H	4824.00	42.32	30.55	5.77	24.66	42.20	54.00	-11.80	AV
H	7236.00	51.37	30.33	6.32	24.55	51.91	74.00	-22.09	PK
H	7236.00	42.16	30.33	6.32	24.55	42.70	54.00	-11.30	AV
H	9648.00	51.74	30.85	7.45	24.69	53.03	74.00	-20.97	PK
H	9648.00	42.26	30.85	7.45	24.69	43.55	54.00	-10.45	AV
H	12060.00	51.23	31.02	8.99	25.57	54.77	74.00	-19.23	PK
H	12060.00	41.15	31.02	8.99	25.57	44.69	54.00	-9.31	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detect or Type
Middle Channel:2437MHz									
V	4874.00	51.34	30.55	5.77	24.66	51.22	74.00	-22.78	PK
V	4874.00	42.63	30.55	5.77	24.66	42.51	54.00	-11.49	AV
V	7311.00	50.45	30.33	6.32	24.55	50.99	74.00	-23.01	PK
V	7311.00	42.36	30.33	6.32	24.55	42.90	54.00	-11.10	AV
V	9748.00	50.34	30.85	7.45	24.69	51.63	74.00	-22.37	PK
V	9748.00	42.42	30.85	7.45	24.69	43.71	54.00	-10.29	AV
V	12185.00	50.62	31.02	8.99	25.57	54.16	74.00	-19.84	PK
V	12185.00	42.45	31.02	8.99	25.57	45.99	54.00	-8.01	AV
H	4874.00	52.11	30.55	5.77	24.66	51.99	74.00	-22.01	PK
H	4874.00	42.22	30.55	5.77	24.66	42.10	54.00	-11.90	AV
H	7311.00	53.63	30.33	6.32	24.55	54.17	74.00	-19.83	PK
H	7311.00	42.25	30.33	6.32	24.55	42.79	54.00	-11.21	AV
H	9748.00	53.34	30.85	7.45	24.69	54.63	74.00	-19.37	PK
H	9748.00	42.34	30.85	7.45	24.69	43.63	54.00	-10.37	AV
H	12185.00	54.43	31.02	8.99	25.57	57.97	74.00	-16.03	PK
H	12185.00	42.62	31.02	8.99	25.57	46.16	54.00	-7.84	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-ampli fier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/ m)	Margin (dB)	Detect or Type
High Channel:2462MHz									
V	4924.00	51.23	30.55	5.77	24.66	51.11	74.00	-22.89	PK
V	4924.00	42.34	30.55	5.77	24.66	42.22	54.00	-11.78	AV
V	7386.00	53.13	30.33	6.32	24.55	53.67	74.00	-20.33	PK
V	7386.00	43.15	30.33	6.32	24.55	43.69	54.00	-10.31	AV
V	9848.00	53.42	30.85	7.45	24.69	54.71	74.00	-19.29	PK
V	9848.00	43.34	30.85	7.45	24.69	44.63	54.00	-9.37	AV
V	12310.00	53.13	31.02	8.99	25.57	56.67	74.00	-17.33	PK
V	12310.00	42.75	31.02	8.99	25.57	46.29	54.00	-7.71	AV
H	4924.00	51.33	30.55	5.77	24.66	51.21	74.00	-22.79	PK
H	4924.00	42.24	30.55	5.77	24.66	42.12	54.00	-11.88	AV
H	7386.00	52.45	30.33	6.32	24.55	52.99	74.00	-21.01	PK
H	7386.00	43.23	30.33	6.32	24.55	43.77	54.00	-10.23	AV
H	9848.00	53.15	30.85	7.45	24.69	54.44	74.00	-19.56	PK
H	9848.00	43.26	30.85	7.45	24.69	44.55	54.00	-9.45	AV
H	12310.00	53.52	31.02	8.99	25.57	57.06	74.00	-16.94	PK
H	12310.00	43.24	31.02	8.99	25.57	46.78	54.00	-7.22	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11g

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Low Channel:2412MHz									
V	4824.00	52.44	30.55	5.77	24.66	52.32	74.00	-21.68	PK
V	4824.00	42.35	30.55	5.77	24.66	42.23	54.00	-11.77	AV
V	7236.00	50.23	30.33	6.32	24.55	50.77	74.00	-23.23	PK
V	7236.00	43.42	30.33	6.32	24.55	43.96	54.00	-10.04	AV
V	9648.00	50.53	30.85	7.45	24.69	51.82	74.00	-22.18	PK
V	9648.00	42.35	30.85	7.45	24.69	43.64	54.00	-10.36	AV
V	12060.00	50.14	31.02	8.99	25.57	53.68	74.00	-20.32	PK
V	12060.00	42.43	31.02	8.99	25.57	45.97	54.00	-8.03	AV
H	4824.00	52.45	30.55	5.77	24.66	52.33	74.00	-21.67	PK
H	4824.00	42.42	30.55	5.77	24.66	42.30	54.00	-11.70	AV
H	7236.00	51.44	30.33	6.32	24.55	51.98	74.00	-22.02	PK
H	7236.00	42.53	30.33	6.32	24.55	43.07	54.00	-10.93	AV
H	9648.00	51.23	30.85	7.45	24.69	52.52	74.00	-21.48	PK
H	9648.00	42.23	30.85	7.45	24.69	43.52	54.00	-10.48	AV
H	12060.00	51.54	31.02	8.99	25.57	55.08	74.00	-18.92	PK
H	12060.00	41.63	31.02	8.99	25.57	45.17	54.00	-8.83	AV

Polar (H/V)	Frequency	Meter Reading	Pre-amp lifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Middle Channel:2437MHz									
V	4874.00	51.23	30.55	5.77	24.66	51.11	74.00	-22.89	PK
V	4874.00	42.34	30.55	5.77	24.66	42.22	54.00	-11.78	AV
V	7311.00	50.51	30.33	6.32	24.55	51.05	74.00	-22.95	PK
V	7311.00	42.55	30.33	6.32	24.55	43.09	54.00	-10.91	AV
V	9748.00	50.33	30.85	7.45	24.69	51.62	74.00	-22.38	PK
V	9748.00	42.12	30.85	7.45	24.69	43.41	54.00	-10.59	AV
V	12185.00	50.34	31.02	8.99	25.57	53.88	74.00	-20.12	PK
V	12185.00	42.52	31.02	8.99	25.57	46.06	54.00	-7.94	AV
H	4874.00	52.54	30.55	5.77	24.66	52.42	74.00	-21.58	PK
H	4874.00	42.23	30.55	5.77	24.66	42.11	54.00	-11.89	AV
H	7311.00	53.31	30.33	6.32	24.55	53.85	74.00	-20.15	PK
H	7311.00	42.14	30.33	6.32	24.55	42.68	54.00	-11.32	AV
H	9748.00	53.23	30.85	7.45	24.69	54.52	74.00	-19.48	PK
H	9748.00	42.15	30.85	7.45	24.69	43.44	54.00	-10.56	AV
H	12185.00	54.55	31.02	8.99	25.57	58.09	74.00	-15.91	PK
H	12185.00	42.42	31.02	8.99	25.57	45.96	54.00	-8.04	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-ampl ifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/ m)	Margin (dB)	Detect or Type
High Channel:2462MHz									
V	4924.00	51.21	30.55	5.77	24.66	51.09	74.00	-22.91	PK
V	4924.00	42.33	30.55	5.77	24.66	42.21	54.00	-11.79	AV
V	7386.00	53.04	30.33	6.32	24.55	53.58	74.00	-20.42	PK
V	7386.00	43.52	30.33	6.32	24.55	44.06	54.00	-9.94	AV
V	9848.00	53.21	30.85	7.45	24.69	54.50	74.00	-19.50	PK
V	9848.00	43.14	30.85	7.45	24.69	44.43	54.00	-9.57	AV
V	12310.00	53.73	31.02	8.99	25.57	57.27	74.00	-16.73	PK
V	12310.00	42.54	31.02	8.99	25.57	46.08	54.00	-7.92	AV
H	4924.00	51.32	30.55	5.77	24.66	51.20	74.00	-22.80	PK
H	4924.00	42.53	30.55	5.77	24.66	42.41	54.00	-11.59	AV
H	7386.00	52.65	30.33	6.32	24.55	53.19	74.00	-20.81	PK
H	7386.00	43.33	30.33	6.32	24.55	43.87	54.00	-10.13	AV
H	9848.00	53.22	30.85	7.45	24.69	54.51	74.00	-19.49	PK
H	9848.00	43.11	30.85	7.45	24.69	44.40	54.00	-9.60	AV
H	12310.00	53.15	31.02	8.99	25.57	56.69	74.00	-17.31	PK
H	12310.00	43.32	31.02	8.99	25.57	46.86	54.00	-7.14	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11n20(MIMO)

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Low Channel:2412MHz									
V	4824.00	52.33	30.55	5.77	24.66	52.21	74.00	-21.79	PK
V	4824.00	42.42	30.55	5.77	24.66	42.30	54.00	-11.70	AV
V	7236.00	49.21	30.33	6.32	24.55	49.75	74.00	-24.25	PK
V	7236.00	43.34	30.33	6.32	24.55	43.88	54.00	-10.12	AV
V	9648.00	50.43	30.85	7.45	24.69	51.72	74.00	-22.28	PK
V	9648.00	42.33	30.85	7.45	24.69	43.62	54.00	-10.38	AV
V	12060.00	50.82	31.02	8.99	25.57	54.36	74.00	-19.64	PK
V	12060.00	42.21	31.02	8.99	25.57	45.75	54.00	-8.25	AV
H	4824.00	52.23	30.55	5.77	24.66	52.11	74.00	-21.89	PK
H	4824.00	42.35	30.55	5.77	24.66	42.23	54.00	-11.77	AV
H	7236.00	51.33	30.33	6.32	24.55	51.87	74.00	-22.13	PK
H	7236.00	42.42	30.33	6.32	24.55	42.96	54.00	-11.04	AV
H	9648.00	51.24	30.85	7.45	24.69	52.53	74.00	-21.47	PK
H	9648.00	42.25	30.85	7.45	24.69	43.54	54.00	-10.46	AV
H	12060.00	51.23	31.02	8.99	25.57	54.77	74.00	-19.23	PK
H	12060.00	41.21	31.02	8.99	25.57	44.75	54.00	-9.25	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Middle Channel:2437MHz									
V	4874.00	51.25	30.55	5.77	24.66	51.13	74.00	-22.87	PK
V	4874.00	42.43	30.55	5.77	24.66	42.31	54.00	-11.69	AV
V	7311.00	49.31	30.33	6.32	24.55	49.85	74.00	-24.15	PK
V	7311.00	41.72	30.33	6.32	24.55	42.26	54.00	-11.74	AV
V	9748.00	50.33	30.85	7.45	24.69	51.62	74.00	-22.38	PK
V	9748.00	42.52	30.85	7.45	24.69	43.81	54.00	-10.19	AV
V	12185.00	50.12	31.02	8.99	25.57	53.66	74.00	-20.34	PK
V	12185.00	42.33	31.02	8.99	25.57	45.87	54.00	-8.13	AV
H	4874.00	52.15	30.55	5.77	24.66	52.03	74.00	-21.97	PK
H	4874.00	42.11	30.55	5.77	24.66	41.99	54.00	-12.01	AV
H	7311.00	53.34	30.33	6.32	24.55	53.88	74.00	-20.12	PK
H	7311.00	42.24	30.33	6.32	24.55	42.78	54.00	-11.22	AV
H	9748.00	53.33	30.85	7.45	24.69	54.62	74.00	-19.38	PK
H	9748.00	42.55	30.85	7.45	24.69	43.84	54.00	-10.16	AV
H	12185.00	54.17	31.02	8.99	25.57	57.71	74.00	-16.29	PK
H	12185.00	42.42	31.02	8.99	25.57	45.96	54.00	-8.04	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-ampl ifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/ m)	Margin (dB)	Detect or Type
High Channel:2462MHz									
V	4924.00	51.42	30.55	5.77	24.66	51.30	74.00	-22.70	PK
V	4924.00	42.33	30.55	5.77	24.66	42.21	54.00	-11.79	AV
V	7386.00	53.55	30.33	6.32	24.55	54.09	74.00	-19.91	PK
V	7386.00	43.22	30.33	6.32	24.55	43.76	54.00	-10.24	AV
V	9848.00	53.11	30.85	7.45	24.69	54.40	74.00	-19.60	PK
V	9848.00	43.31	30.85	7.45	24.69	44.60	54.00	-9.40	AV
V	12310.00	53.21	31.02	8.99	25.57	56.75	74.00	-17.25	PK
V	12310.00	42.45	31.02	8.99	25.57	45.99	54.00	-8.01	AV
H	4924.00	51.26	30.55	5.77	24.66	51.14	74.00	-22.86	PK
H	4924.00	42.21	30.55	5.77	24.66	42.09	54.00	-11.91	AV
H	7386.00	52.44	30.33	6.32	24.55	52.98	74.00	-21.02	PK
H	7386.00	43.34	30.33	6.32	24.55	43.88	54.00	-10.12	AV
H	9848.00	53.42	30.85	7.45	24.69	54.71	74.00	-19.29	PK
H	9848.00	43.37	30.85	7.45	24.69	44.66	54.00	-9.34	AV
H	12310.00	53.14	31.02	8.99	25.57	56.68	74.00	-17.32	PK
H	12310.00	43.33	31.02	8.99	25.57	46.87	54.00	-7.13	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11n40(MIMO)

Polar (H/V)	Frequenc y	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Low Channel:2422MHz									
V	4844.00	51.23	30.55	5.77	24.66	51.11	74.00	-22.89	PK
V	4844.00	42.13	30.55	5.77	24.66	42.01	54.00	-11.99	AV
V	7266.00	53.42	30.33	6.32	24.55	53.96	74.00	-20.04	PK
V	7266.00	43.13	30.33	6.32	24.55	43.67	54.00	-10.33	AV
V	9688.00	53.33	30.85	7.45	24.69	54.62	74.00	-19.38	PK
V	9688.00	43.23	30.85	7.45	24.69	44.52	54.00	-9.48	AV
V	12110.00	53.71	31.02	8.99	25.57	57.25	74.00	-16.75	PK
V	12110.00	42.22	31.02	8.99	25.57	45.76	54.00	-8.24	AV
H	4844.00	51.53	30.55	5.77	24.66	51.41	74.00	-22.59	PK
H	4844.00	42.43	30.55	5.77	24.66	42.31	54.00	-11.69	AV
H	7266.00	52.21	30.33	6.32	24.55	52.75	74.00	-21.25	PK
H	7266.00	43.24	30.33	6.32	24.55	43.78	54.00	-10.22	AV
H	9688.00	53.46	30.85	7.45	24.69	54.75	74.00	-19.25	PK
H	9688.00	43.43	30.85	7.45	24.69	44.72	54.00	-9.28	AV
H	12110.00	53.11	31.02	8.99	25.57	56.65	74.00	-17.35	PK
H	12110.00	43.04	31.02	8.99	25.57	46.58	54.00	-7.42	AV

Polar (H/V)	Frequenc y	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Middle Channel:2437MHz									
V	4874.00	51.12	30.55	5.77	24.66	51.00	74.00	-23.00	PK
V	4874.00	42.53	30.55	5.77	24.66	42.41	54.00	-11.59	AV
V	7311.00	53.14	30.33	6.32	24.55	53.68	74.00	-20.32	PK
V	7311.00	43.22	30.33	6.32	24.55	43.76	54.00	-10.24	AV
V	9748.00	53.42	30.85	7.45	24.69	54.71	74.00	-19.29	PK
V	9748.00	43.33	30.85	7.45	24.69	44.62	54.00	-9.38	AV
V	12185.00	53.14	31.02	8.99	25.57	56.68	74.00	-17.32	PK
V	12185.00	42.32	31.02	8.99	25.57	45.86	54.00	-8.14	AV
H	4874.00	51.25	30.55	5.77	24.66	51.13	74.00	-22.87	PK
H	4874.00	42.54	30.55	5.77	24.66	42.42	54.00	-11.58	AV
H	7311.00	52.46	30.33	6.32	24.55	53.00	74.00	-21.00	PK
H	7311.00	43.34	30.33	6.32	24.55	43.88	54.00	-10.12	AV
H	9748.00	53.26	30.85	7.45	24.69	54.55	74.00	-19.45	PK
H	9748.00	43.27	30.85	7.45	24.69	44.56	54.00	-9.44	AV
H	12185.00	53.62	31.02	8.99	25.57	57.16	74.00	-16.84	PK
H	12185.00	43.41	31.02	8.99	25.57	46.95	54.00	-7.05	AV

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Polar (H/V)	Frequency	Meter Reading	Pre-amp lifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
High Channel:2452MHz									
V	4904.00	51.13	30.55	5.77	24.66	51.01	74.00	-22.99	PK
V	4904.00	42.25	30.55	5.77	24.66	42.13	54.00	-11.87	AV
V	7356.00	53.41	30.33	6.32	24.55	53.95	74.00	-20.05	PK
V	7356.00	43.35	30.33	6.32	24.55	43.89	54.00	-10.11	AV
V	9808.00	53.47	30.85	7.45	24.69	54.76	74.00	-19.24	PK
V	9808.00	43.14	30.85	7.45	24.69	44.43	54.00	-9.57	AV
V	12260.00	53.26	31.02	8.99	25.57	56.80	74.00	-17.20	PK
V	12260.00	42.71	31.02	8.99	25.57	46.25	54.00	-7.75	AV
H	4904.00	51.35	30.55	5.77	24.66	51.23	74.00	-22.77	PK
H	4904.00	42.63	30.55	5.77	24.66	42.51	54.00	-11.49	AV
H	7356.00	52.64	30.33	6.32	24.55	53.18	74.00	-20.82	PK
H	7356.00	43.33	30.33	6.32	24.55	43.87	54.00	-10.13	AV
H	9808.00	53.12	30.85	7.45	24.69	54.41	74.00	-19.59	PK
H	9808.00	43.21	30.85	7.45	24.69	44.50	54.00	-9.50	AV
H	12260.00	53.23	31.02	8.99	25.57	56.77	74.00	-17.23	PK
H	12260.00	43.25	31.02	8.99	25.57	46.79	54.00	-7.21	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

5. RADIATED BAND EMISSION MEASUREMENT

5.1 TEST REQUIREMENT:

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above	Peak	1MHz	3MHz	Peak
	1GHz	Average	1MHz	3MHz	Average

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m) = 20log Emission level (uV/m).

5.2 TEST PROCEDURE

Above 1GHz test procedure as below:

- a. 1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna 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 rota 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. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the Highest channel

Note:

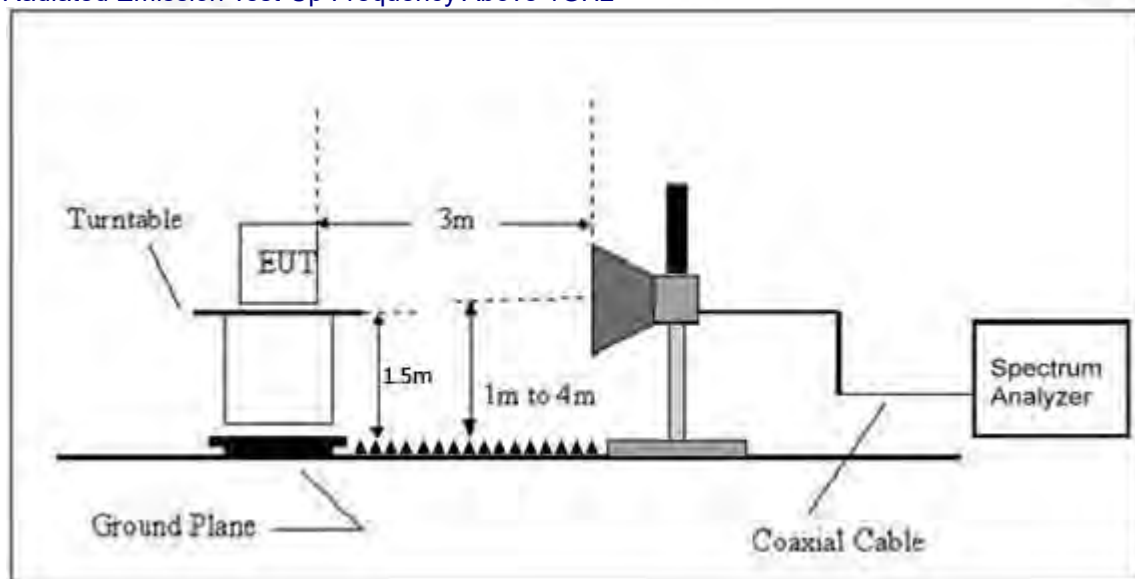
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

5.3 DEVIATION FROM TEST STANDARD

No deviation

5.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



5.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULT

We test all antenna's data, the data only show the antenna1 worst mode.

	Polar (H/V)	Frequenc y (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV /m)	Detec tor Type	Result
802.11b	Low Channel 2412MHz									
	H	2390.00	60.44	30.22	4.85	23.98	59.05	74.00	PK	PASS
	H	2390.00	52.23	30.22	4.85	23.98	50.84	54.00	AV	PASS
	H	2400.00	62.24	30.22	4.85	23.98	60.85	74.00	PK	PASS
	H	2400.00	52.31	30.22	4.85	23.98	50.92	54.00	AV	PASS
	V	2390.00	60.24	30.22	4.85	23.98	58.85	74.00	PK	PASS
	V	2390.00	52.32	30.22	4.85	23.98	50.93	54.00	AV	PASS
	V	2400.00	62.13	30.22	4.85	23.98	60.74	74.00	PK	PASS
	V	2400.00	52.15	30.22	4.85	23.98	50.76	54.00	AV	PASS
	High Channel 2462MHz									
	H	2483.50	60.14	30.22	4.85	23.98	58.75	74.00	PK	PASS
	H	2485.50	51.52	30.22	4.85	23.98	50.13	54.00	AV	PASS
	H	2483.50	61.53	30.22	4.85	23.98	60.14	74.00	PK	PASS
	H	2485.50	52.11	30.22	4.85	23.98	50.72	54.00	AV	PASS
	V	2483.50	61.05	30.22	4.85	23.98	59.66	74.00	PK	PASS
	V	2485.50	52.22	30.22	4.85	23.98	50.83	54.00	AV	PASS
	V	2483.50	61.23	30.22	4.85	23.98	59.84	74.00	PK	PASS
	V	2485.50	52.14	30.22	4.85	23.98	50.75	54.00	AV	PASS
802.11g	Low Channel 2412MHz									
	H	2390.00	60.62	30.22	4.85	23.98	59.23	74.00	PK	PASS
	H	2390.00	52.13	30.22	4.85	23.98	50.74	54.00	AV	PASS
	H	2400.00	62.45	30.22	4.85	23.98	61.06	74.00	PK	PASS
	H	2400.00	52.13	30.22	4.85	23.98	50.74	54.00	AV	PASS
	V	2390.00	60.51	30.22	4.85	23.98	59.12	74.00	PK	PASS
	V	2390.00	52.12	30.22	4.85	23.98	50.73	54.00	AV	PASS
	V	2400.00	62.03	30.22	4.85	23.98	60.64	74.00	PK	PASS
	V	2400.00	52.25	30.22	4.85	23.98	50.86	54.00	AV	PASS
	High Channel 2462MHz									
	H	2483.50	60.43	30.22	4.85	23.98	59.04	74.00	PK	PASS
	H	2485.50	52.02	30.22	4.85	23.98	50.63	54.00	AV	PASS
	H	2483.50	62.33	30.22	4.85	23.98	60.94	74.00	PK	PASS
	H	2485.50	52.14	30.22	4.85	23.98	50.75	54.00	AV	PASS
	V	2483.50	60.25	30.22	4.85	23.98	58.86	74.00	PK	PASS
	V	2485.50	52.13	30.22	4.85	23.98	50.74	54.00	AV	PASS
	V	2483.50	62.32	30.22	4.85	23.98	60.93	74.00	PK	PASS
	V	2485.50	52.35	30.22	4.85	23.98	50.96	54.00	AV	PASS
802.11n20	Low Channel 2412MHz									
	H	2390.00	59.22	30.22	4.85	23.98	57.83	74.00	PK	PASS
	H	2390.00	51.35	30.22	4.85	23.98	49.96	54.00	AV	PASS
	H	2400.00	61.61	30.22	4.85	23.98	60.22	74.00	PK	PASS
	H	2400.00	51.25	30.22	4.85	23.98	49.86	54.00	AV	PASS
	V	2390.00	59.53	30.22	4.85	23.98	58.14	74.00	PK	PASS
	V	2390.00	51.14	30.22	4.85	23.98	49.75	54.00	AV	PASS
	V	2400.00	62.12	30.22	4.85	23.98	60.73	74.00	PK	PASS
	V	2400.00	51.37	30.22	4.85	23.98	49.98	54.00	AV	PASS
	High Channel 2462MHz									
	H	2483.50	59.22	30.22	4.85	23.98	57.83	74.00	PK	PASS
	H	2485.50	51.11	30.22	4.85	23.98	49.72	54.00	AV	PASS
	H	2483.50	61.03	30.22	4.85	23.98	59.64	74.00	PK	PASS
	H	2485.50	51.24	30.22	4.85	23.98	49.85	54.00	AV	PASS
	V	2483.50	59.15	30.22	4.85	23.98	57.76	74.00	PK	PASS
	V	2485.50	51.26	30.22	4.85	23.98	49.87	54.00	AV	PASS

	V	2483.50	62.22	30.22	4.85	23.98	60.83	74.00	PK	PASS
	V	2485.50	51.13	30.22	4.85	23.98	49.74	54.00	AV	PASS
802.11n40	LowChannel 2422MHz									
	H	2390.00	59.21	30.22	4.85	23.98	57.82	74.00	PK	PASS
	H	2390.00	51.16	30.22	4.85	23.98	49.77	54.00	AV	PASS
	H	2400.00	61.22	30.22	4.85	23.98	59.83	74.00	PK	PASS
	H	2400.00	51.33	30.22	4.85	23.98	49.94	54.00	AV	PASS
	V	2390.00	59.24	30.22	4.85	23.98	57.85	74.00	PK	PASS
	V	2390.00	51.25	30.22	4.85	23.98	49.86	54.00	AV	PASS
	V	2400.00	61.13	30.22	4.85	23.98	59.74	74.00	PK	PASS
	V	2400.00	51.41	30.22	4.85	23.98	50.02	54.00	AV	PASS
	High Channel 2452MHz									
	H	2483.50	59.24	30.22	4.85	23.98	57.85	74.00	PK	PASS
	H	2485.50	51.33	30.22	4.85	23.98	49.94	54.00	AV	PASS
	H	2483.50	61.15	30.22	4.85	23.98	59.76	74.00	PK	PASS
	H	2485.50	51.02	30.22	4.85	23.98	49.63	54.00	AV	PASS
	V	2483.50	59.23	30.22	4.85	23.98	57.84	74.00	PK	PASS
	V	2485.50	51.14	30.22	4.85	23.98	49.75	54.00	AV	PASS
	V	2483.50	62.32	30.22	4.85	23.98	60.93	74.00	PK	PASS
	V	2485.50	51.53	30.22	4.85	23.98	50.14	74.00	AV	PASS

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

6. POWER SPECTRAL DENSITY TEST

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074 D0115.247 Meas Guidance v 05r02

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8dBm/3kHz	2400-2483.5	PASS

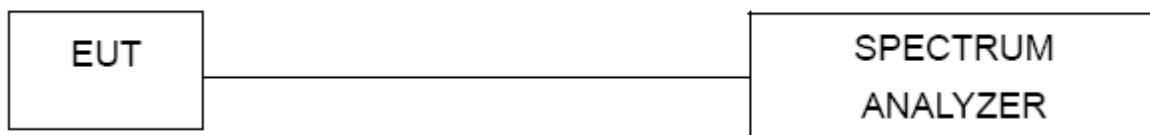
6.2 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULT

Temperature :	26℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX Mode		

	Frequency	Reading Level(dBm)			Cable Loss (dB)	Power Spectral Density (dBm)			ANT1&ANT2 MIMO Power Spectral Density (dBm)	Limit (dBm)	Result
		ANT1	ANT2	ANT3		ANT1	ANT2	ANT3			
802.11b	2412 MHz	-2.975	-2.816	-2.945	0.5	-2.475	-2.316	-2.445	/	<8	PASS
	2437 MHz	-3.048	-3.809	-2.865	0.5	-2.548	-3.309	-2.365	/	<8	PASS
	2462 MHz	-3.193	-3.479	-2.949	0.5	-2.693	-2.979	-2.449	/	<8	PASS
802.11g	2412 MHz	-4.313	-4.954	-4.613	0.5	-3.813	-4.454	-4.113	/	<8	PASS
	2437 MHz	-4.253	-4.541	-4.002	0.5	-3.753	-4.041	-3.502	/	<8	PASS
	2462 MHz	-4.539	-3.87	-4.104	0.5	-4.039	-3.370	-3.604	/	<8	PASS
802.11n (20MHz)	2412 MHz	-5.406	-4.562	-5.349	0.5	/		-4.849	-1.453	<8	PASS
	2437 MHz	-3.425	-3.591	-3.341	0.5	/		-2.841	0.003	<8	PASS
	2462 MHz	-5.663	-5.495	-5.462	0.5	/		-4.962	-2.068	<8	PASS
802.11n (40MHz)	2422 MHz	-8.786	-8.126	-8.123	0.5	/		-7.623	-4.933	<8	PASS
	2437 MHz	-7.604	-7.467	-7.618	0.5	/		-7.118	-4.025	<8	PASS
	2452 MHz	-9.293	-9.228	-8.941	0.5	/		-8.441	-5.750	<8	PASS

Test plot as follows: 802.11b

Ant1

Ant2

Lowest channel



Middle channel



Highest channel



Ant3
Lowest channel



Middle channel



Highest channel

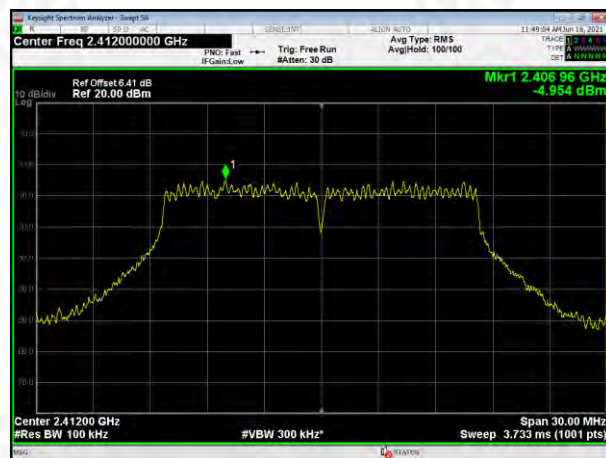
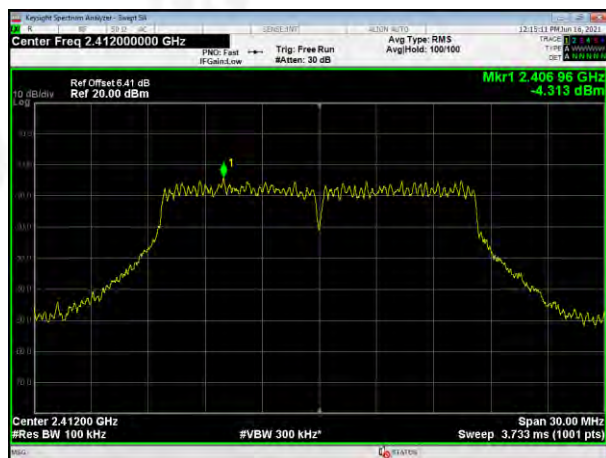


Test plot as follows: 802.11g

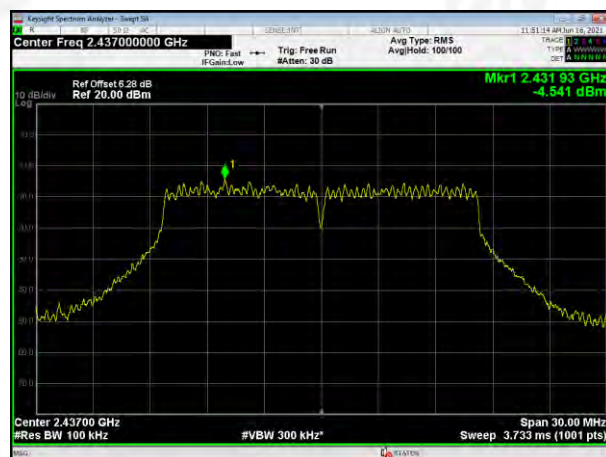
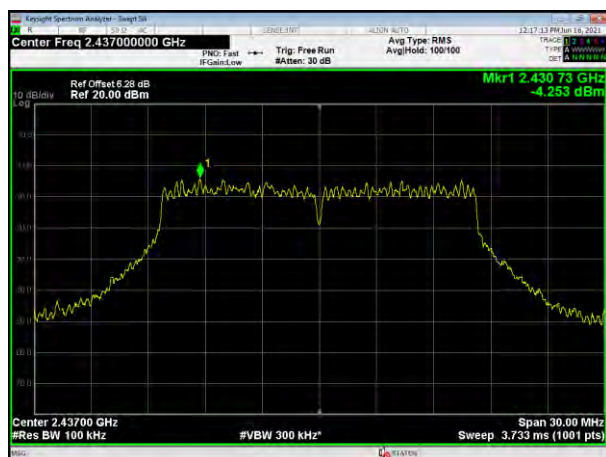
Ant1

Ant2

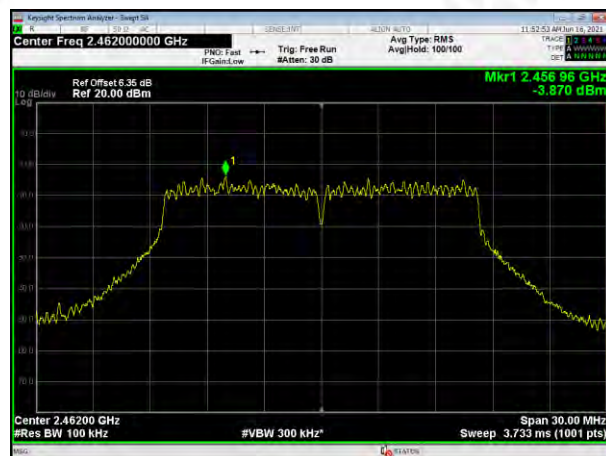
Lowest channel



Middle channel



Highest channel



Ant3
Lowest channel



Middle channel



Highest channel



Test plot as follows: 802.11n(20MHz)

Ant1

Ant2

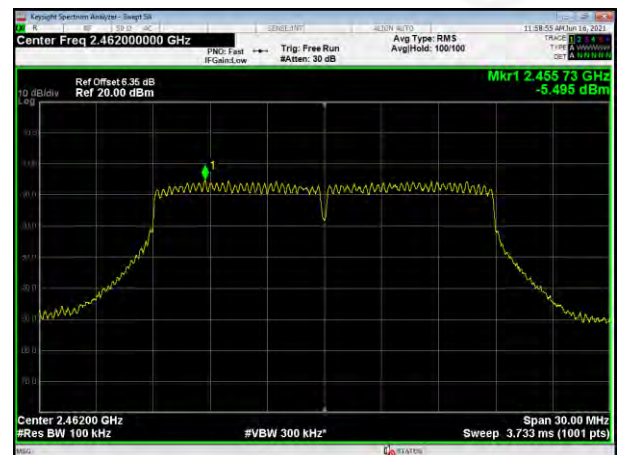
Lowest channel



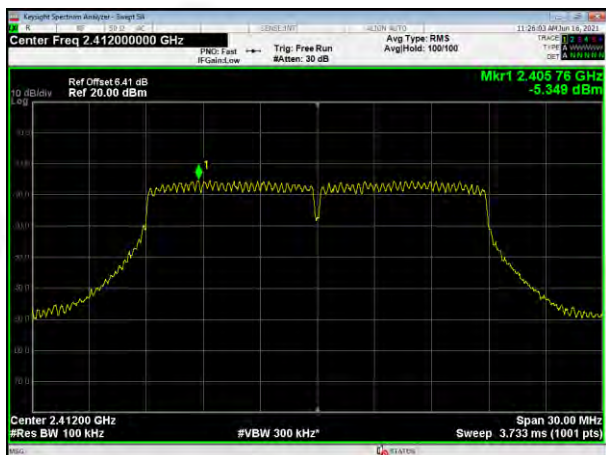
Middle channel



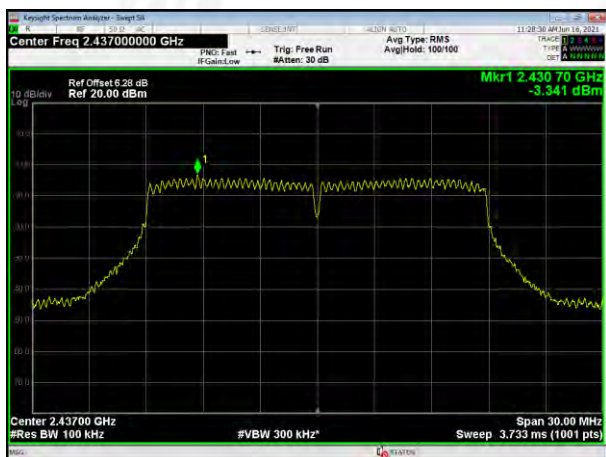
Highest channel



Ant3
Lowest channel



Middle channel



Highest channel



Test plot as follows: 802.11n(40MHz)

Ant1

Ant2

Lowest channel



Middle channel



Highest channel



Ant3 Lowest channel



Middle channel



Highest channel



7. CHANNEL BANDWIDTH& 99% OCCUPY BANDWIDTH

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

7.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

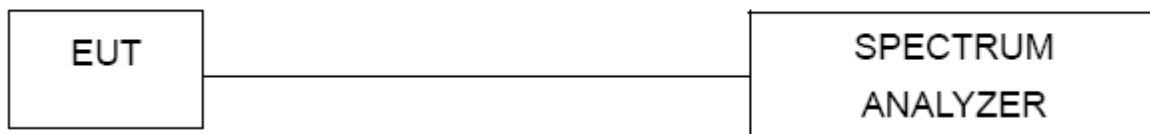
7.2 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULT

Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX b Mode		

Antenna	Test CH	Channel Bandwidth (MHz)				Limit(KHz)	Result
		802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Ant1	Lowest	8.654	16.389	17.039	36.045	>500	Pass
	Middle	7.870	16.384	17.121	36.266		
	Highest	8.380	16.401	17.321	35.845		
Ant2	Lowest	9.088	16.394	17.025	36.045		
	Middle	9.022	16.306	16.768	36.012		
	Highest	9.828	16.127	16.733	35.985		
Ant3	Lowest	9.063	16.396	17.034	36.062		
	Middle	9.404	16.403	17.016	35.992		
	Highest	9.053	16.404	17.135	36.287		

Antenna	Test CH	99% Occupancy Bandwidth (MHz)				Result
		802.11b	802.11g	802.11n(HT20)	802.11n(HT40)	
Ant1	Lowest	13.365	16.390	17.584	36.177	Pass
	Middle	13.421	16.396	17.602	36.202	
	Highest	13.413	16.392	17.585	36.183	
Ant2	Lowest	13.443	16.389	17.578	36.177	
	Middle	13.444	16.392	17.582	36.192	
	Highest	13.485	16.388	17.586	36.196	
Ant3	Lowest	13.425	16.395	17.575	36.188	
	Middle	13.459	16.396	17.598	36.197	
	Highest	13.454	16.384	17.587	36.185	

Test plot as follows:

802.11b
Ant1
Lowest channel
Ant2



Middle channel



Highest channel



802.11b
Ant3

Lowest channel



Middle channel



Highest channel

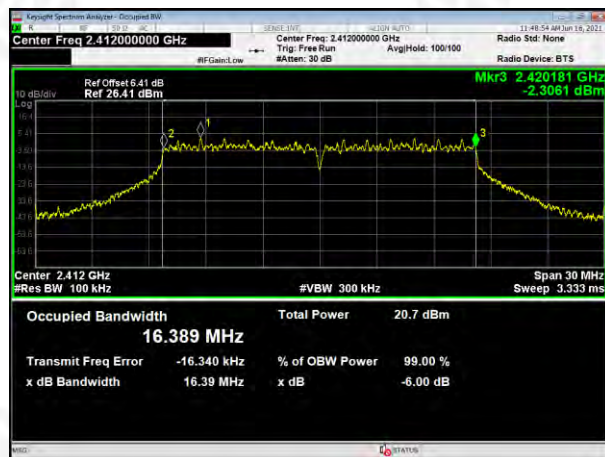


802.11g

Ant1

Ant2

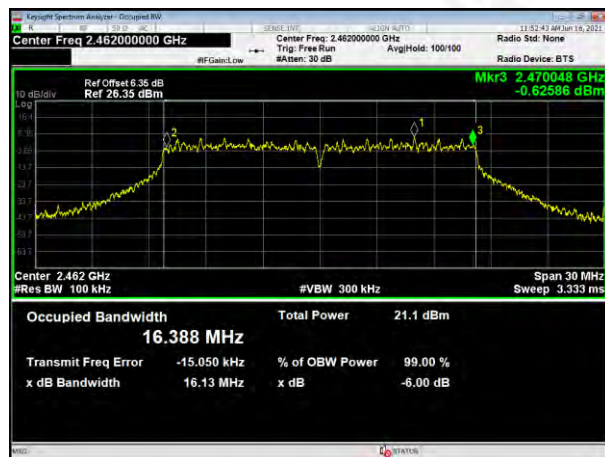
Lowest channel



Middle channel



Highest channel



802.11g
Ant3

Lowest channel



Middle channel



Highest channel



802.11n(HT20)

Ant1

Ant2

Lowest channel



Middle channel



Highest channel



802.11n(HT20)
Ant3

Lowest channel



Middle channel



Highest channel



802.11n(HT40)

Ant1

Ant2

Lowest channel



Middle channel



Highest channel



802.11n(HT40)
Ant3

Lowest channel



Middle channel



Highest channel



8. PEAK OUTPUT POWER TEST

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

8.1 APPLIED PROCEDURES/LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

8.2 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULT

Temperature :	26℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC 120V/60HZ

Mode	Frequency (MHz)	Maximum Conducted Output Power(PK) (dBm)			ANT1&ANT2 MIMO Maximum Conducted Output Power (dBm)	LIMIT dBm
		Antenna1	Antenna2	Antenna3		
802.11b	2412	8.445	8.439	7.900	/	30
	2437	7.628	7.809	8.280	/	30
	2462	7.925	7.827	8.251	/	30
802.11g	2412	7.726	8.417	7.748	/	30
	2437	8.043	7.785	8.073	/	30
	2462	8.150	7.907	8.192	/	30
802.11n20	2412	7.748	8.150	7.987	10.964	30
	2437	7.812	8.302	7.996	11.074	30
	2462	8.131	7.987	8.178	11.070	30
802.11n40	2422	8.071	8.150	8.323	11.121	30
	2437	8.376	8.302	7.520	11.349	30
	2452	7.741	7.987	7.943	10.876	30

9. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

9.1 APPLICABLE STANDARD

in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in15.209(a).

9.2 TEST PROCEDURE

Using the following spectrum analyzer setting:

- A) Set the RBW = 100KHz.
- B) Set the VBW = 300KHz.
- C) Sweep time = auto couple.
- D) Detector function = peak.
- E) Trace mode = max hold.
- F) Allow trace to fully stabilize.

9.3 DEVIATION FROM STANDARD

No deviation.

9.4 TEST SETUP



9.5 EUT OPERATION CONDITIONS

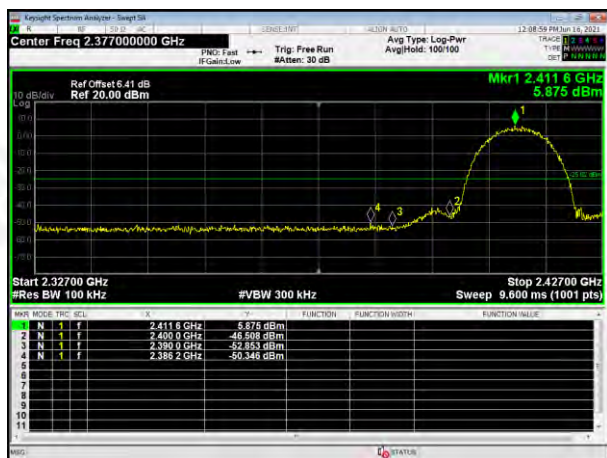
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

9.6 TEST RESULTS

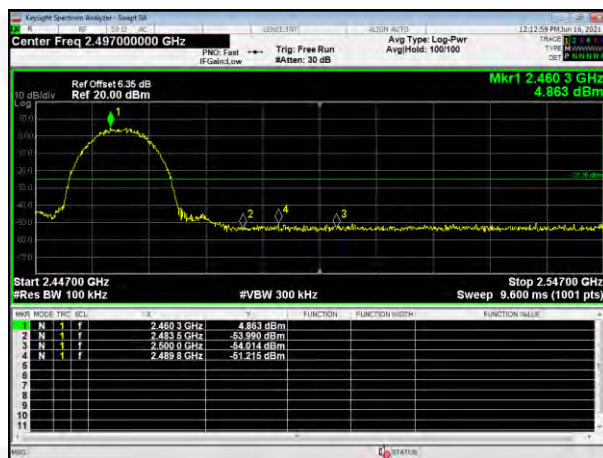
Test plot as follows:

Test mode:	802.11b
------------	---------

Ant1

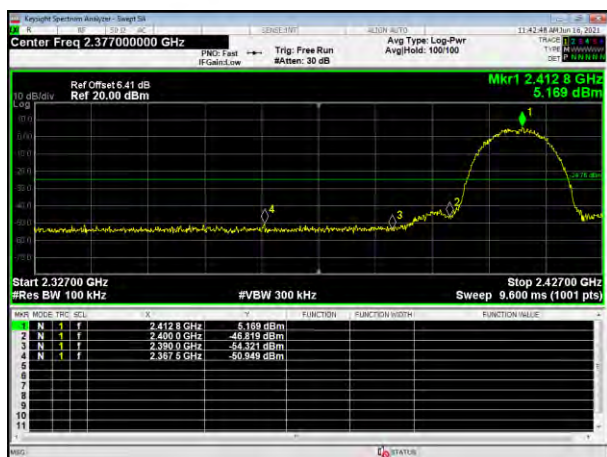


Lowest channel

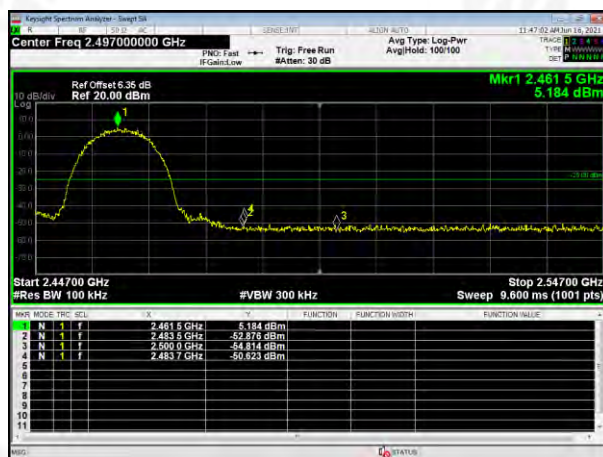


Highest channel

Ant2

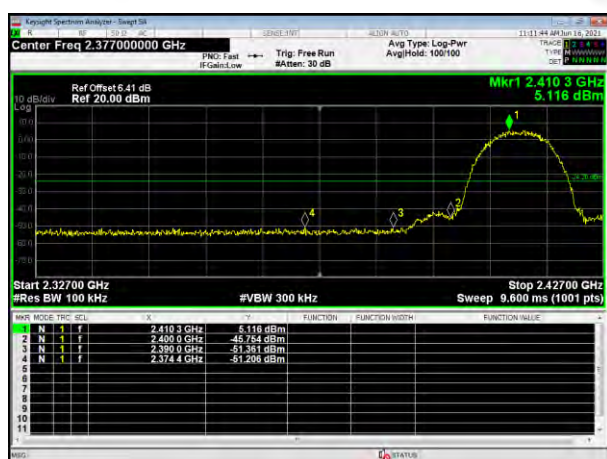


Lowest channel

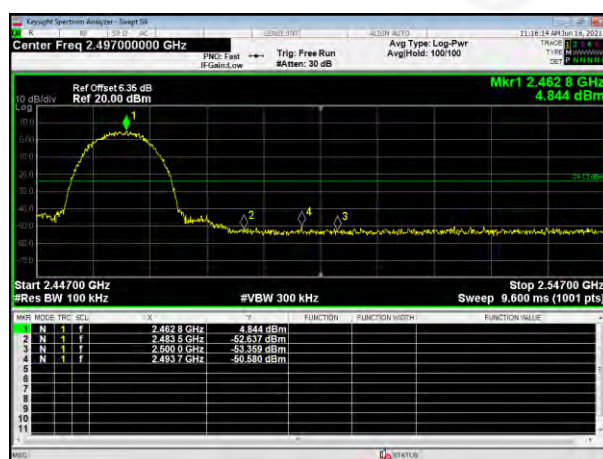


Highest channel

Ant3



Lowest channel



Highest channel

802.11g

Keysight Spectrum Analyzer - Sweep 50

Center Freq 2.37700000 GHz

Ref Offset 5.41 dB
Ref 20.00 dBm

Trig: Free Run
#Att: 30 dB

Avg Type: Log-Pwr
Avg/Hold: 100/100

12:15:23 PM Jun 15, 2021

TRACE 1: 0.0 dB
T: 0.0 dB
SET: 0.0 dB

Mkr1 2.4057 GHz
3.983 dBm

Start 2.32700 GHz
#Res BW 100 kHz

#VBW 300 kHz

Stop 2.42700 GHz
Sweep 9.600 ms (1001 pts)

MNR	MODE	TRIG	SCN	F	FUNC	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	F	2.4057 GHz			3.983 dBm
2	N	1	F	2.4000 GHz			-35.927 dBm
3	N	1	F	2.3800 GHz			-47.583 dBm
4	N	1	F	2.3885 GHz			-43.815 dBm

MNR MODE TRIG SCN F FUNCTION FUNCTION WIDTH FUNCTION VALUE

1 N 1 F 2.4057 GHz 3.983 dBm

2 N 1 F 2.4000 GHz -35.927 dBm

3 N 1 F 2.3800 GHz -47.583 dBm

4 N 1 F 2.3885 GHz -43.815 dBm

5

6

7

8

9

10

11

MSO: STATUS

Lowest channel



Highest channel

Knightly Spectrom Analyzer - Sweep Ssa

Center Freq 2.377000000 GHz

PNG: Fast
F-Calculow

TRIP: Free Run
E-Mem: 30 dB

Avg Type: Log-Pwr
AvgHolds: 100/100

11-49-18 AM Sun 12, 2013

TRACE: 5 5 A V
TIME: 60.000000
SET: PWR10dB

Ref Offset 6.41 dB
Ref 20.00 dBm

Mkr1 2.405 7 GHz
3.700 dBm

Start 2.32700 GHz
#Res BW 100 kHz

#VBW 300 kHz

Stop 2.42700 GHz
Sweep 9.600 ms (1001 pts)

MARK MODE TRG SC L

FUNCTION FUNCTION WIDTH FUNCTION VALUE

2	N	1	F	2.405 7 GHz	3.700 dBm
3	N	1	F	2.400 0 GHz	-36.449 dBm
4	N	1	F	2.390 0 GHz	-48.882 dBm
4	N	1	F	2.389 5 GHz	-45.837 dBm

MARK MODE TRG SC L

FUNCTION FUNCTION WIDTH FUNCTION VALUE

5					
6					
7					
8					
9					
10					
11					

MSG: STATUS

Lowest channel



Highest channel

[illegible]

Lowest channel

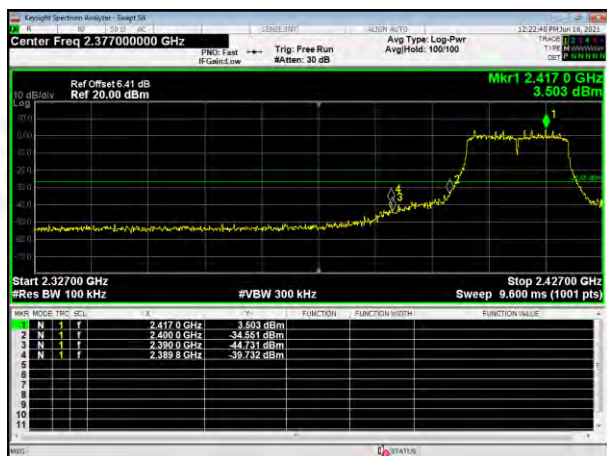


Highest channel

Test mode:

802.11n(HT20)

Ant1

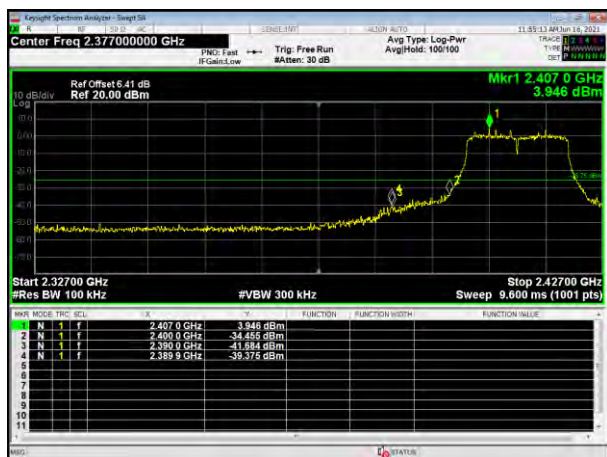


Lowest channel



Highest channel

Ant2

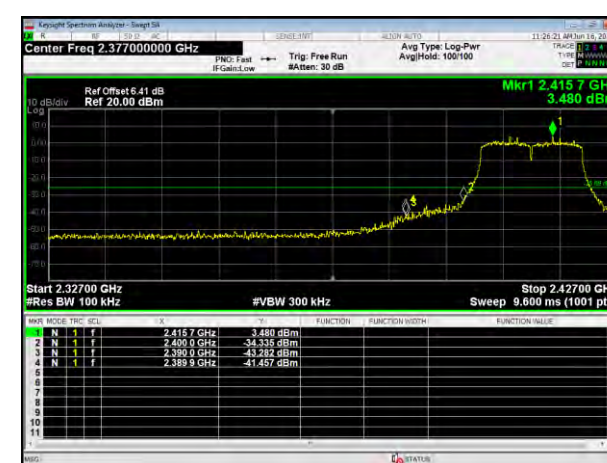


Lowest channel

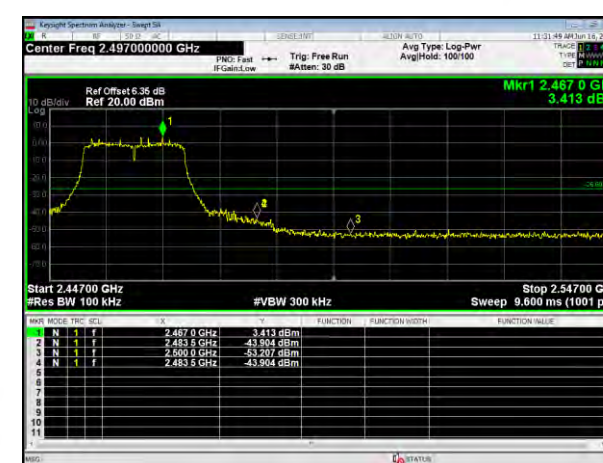


Highest channel

Ant3



Lowest channel

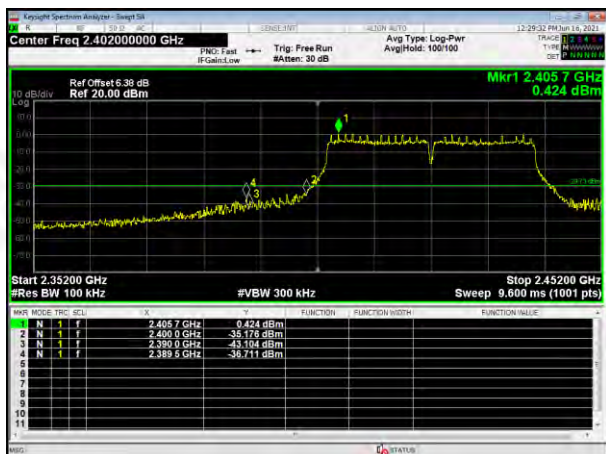


Highest channel

Test mode:

802.11n(HT40)

Ant1

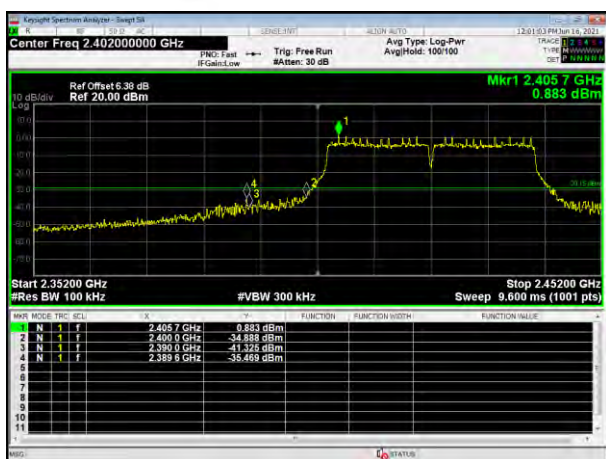


Lowest channel



Highest channel

Ant2

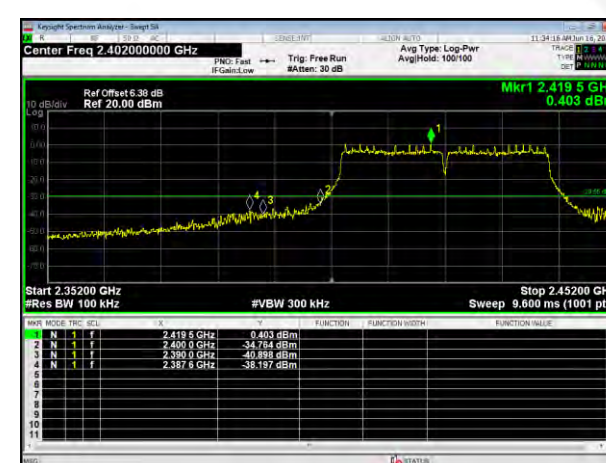


Lowest channel



Highest channel

Ant3

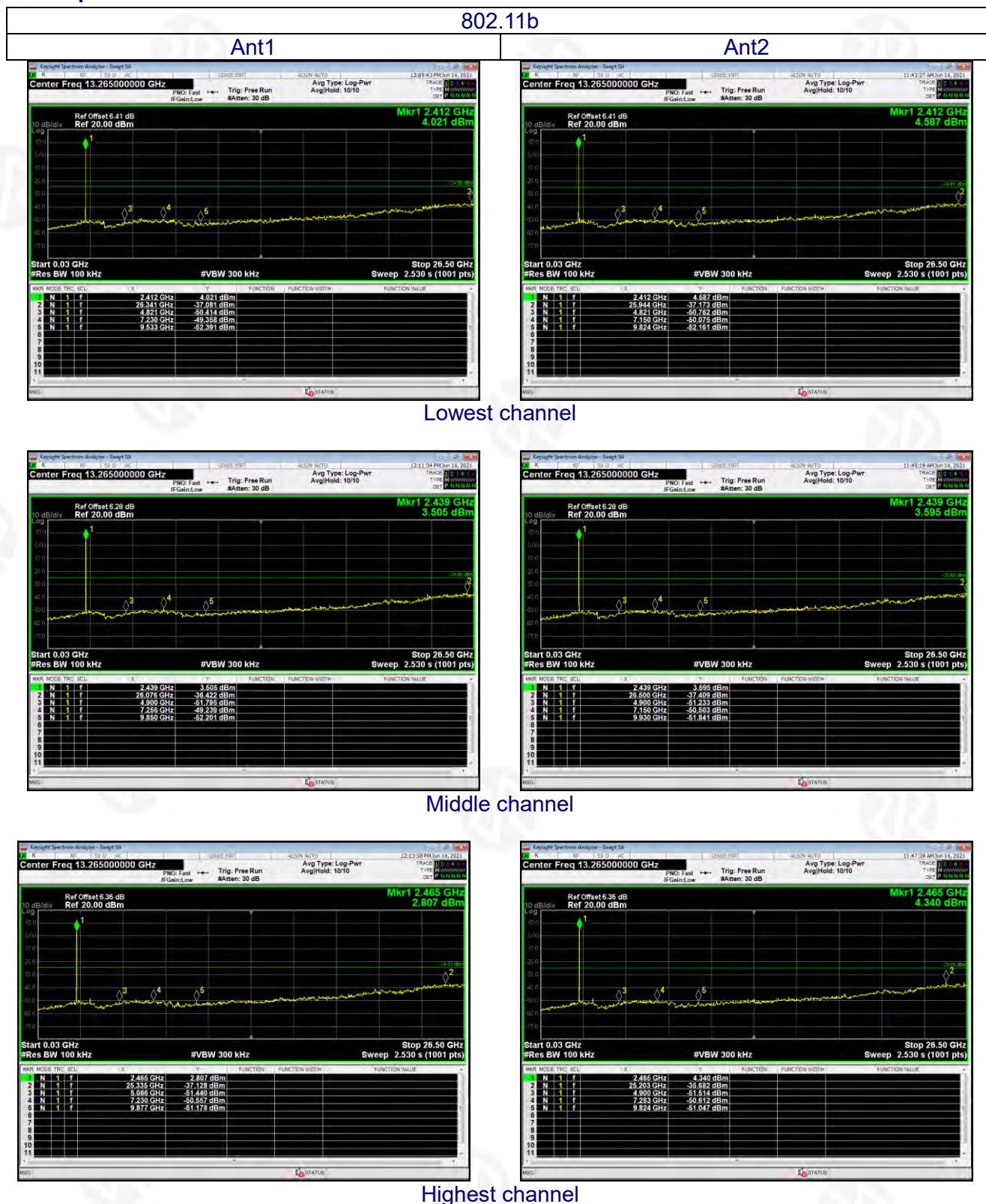


Lowest channel



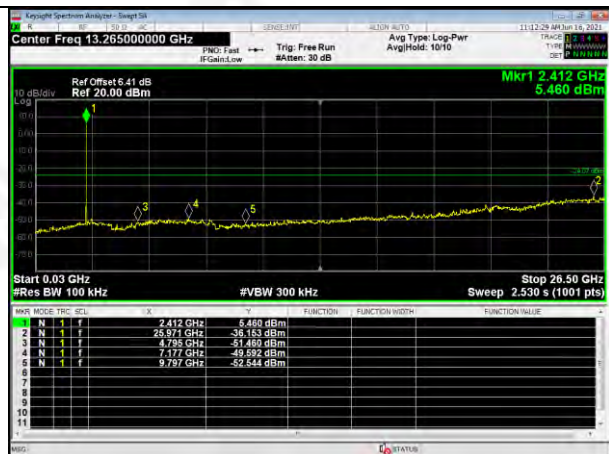
Highest channel

Test plot as follows:

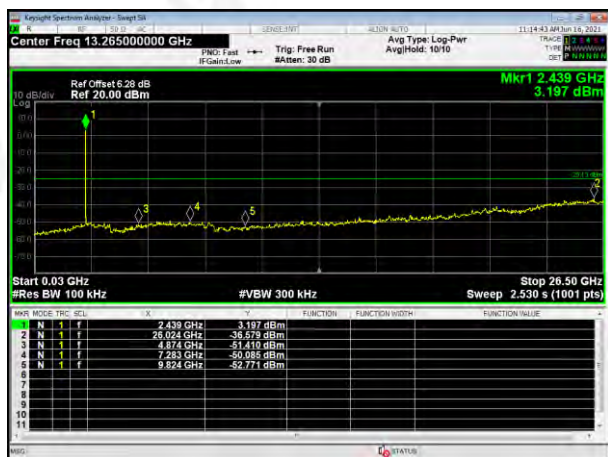


802.11b

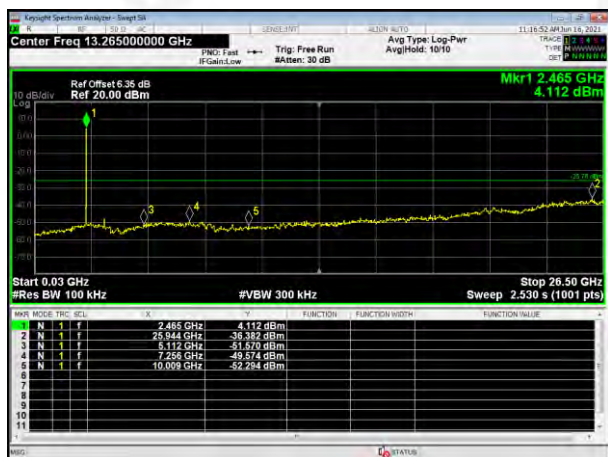
Ant3



Lowest channel



Middle channel

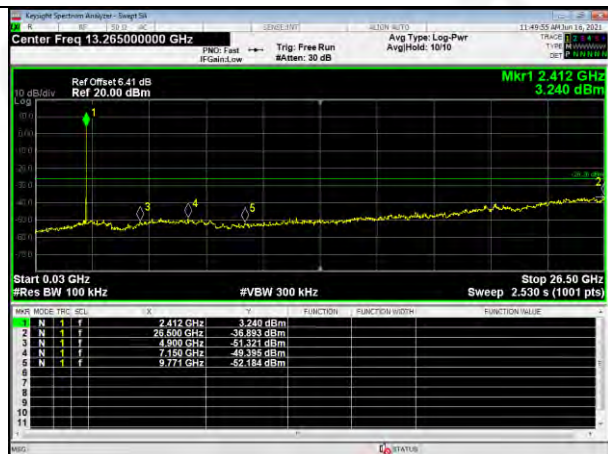
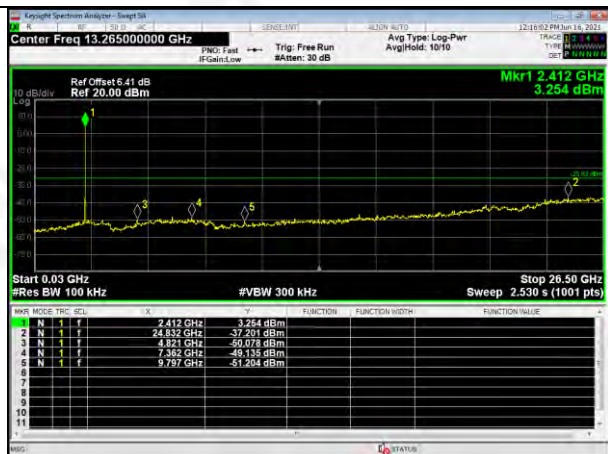


Highest channel

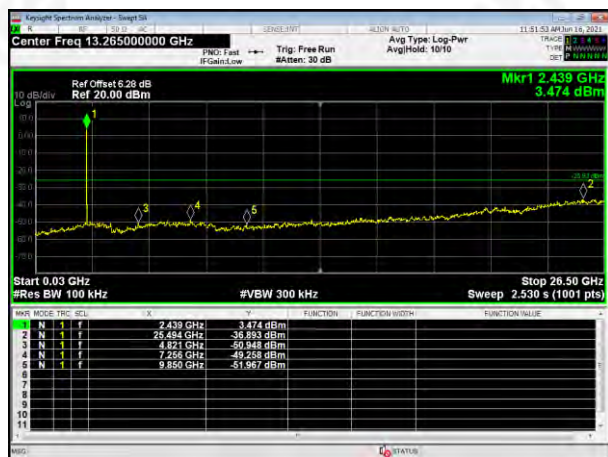
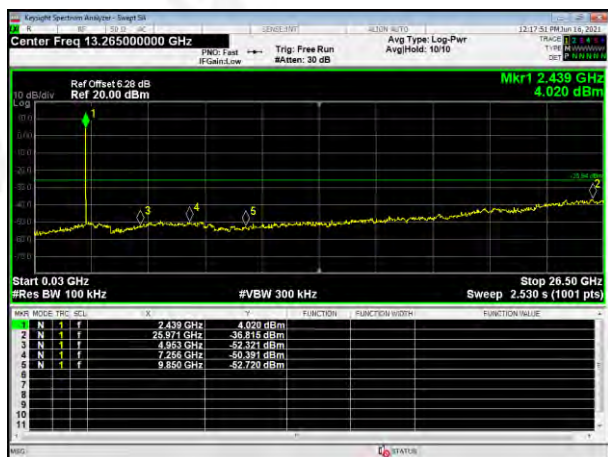
802.11g

Ant1

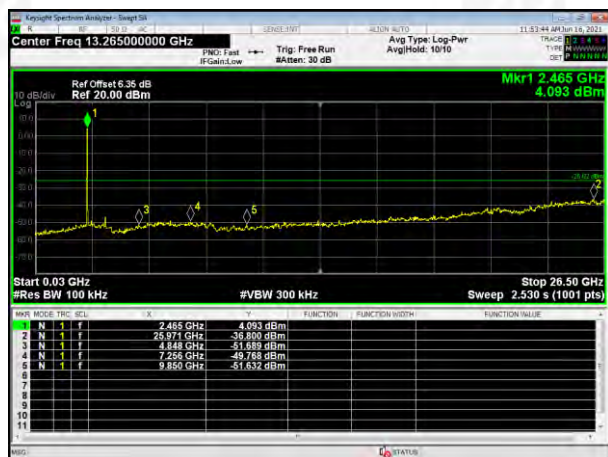
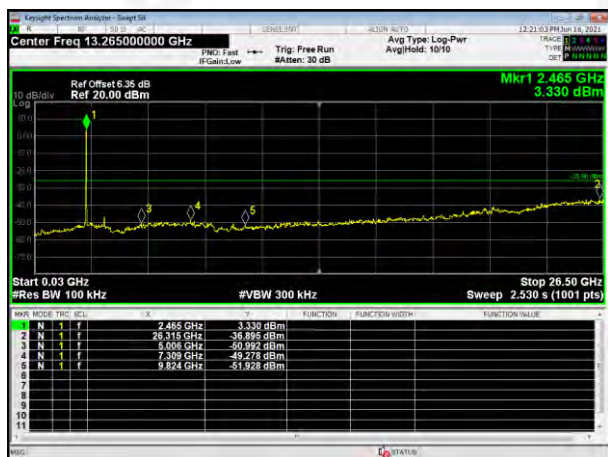
Ant2



Lowest channel



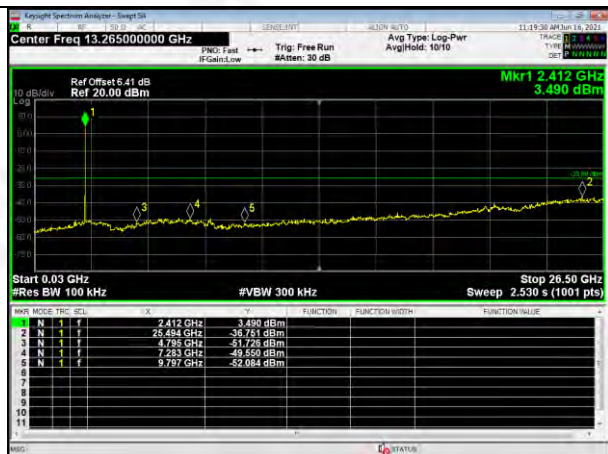
Middle channel



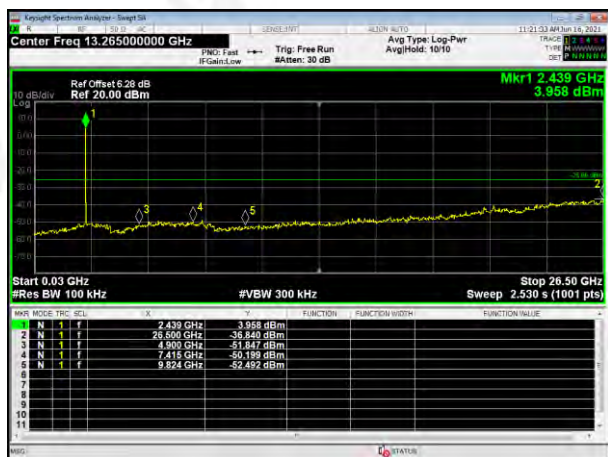
Highest channel

802.11g

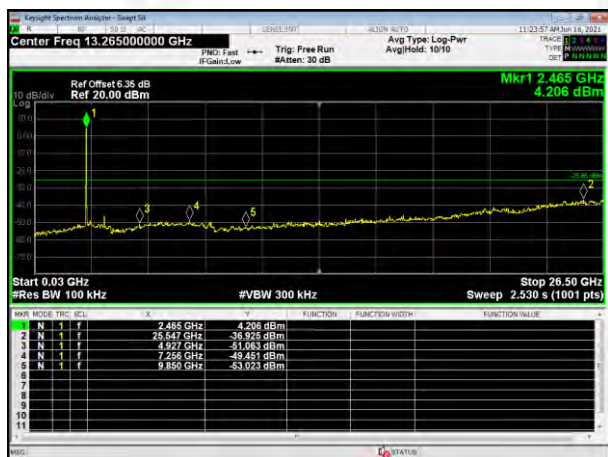
Ant3



Lowest channel



Middle channel

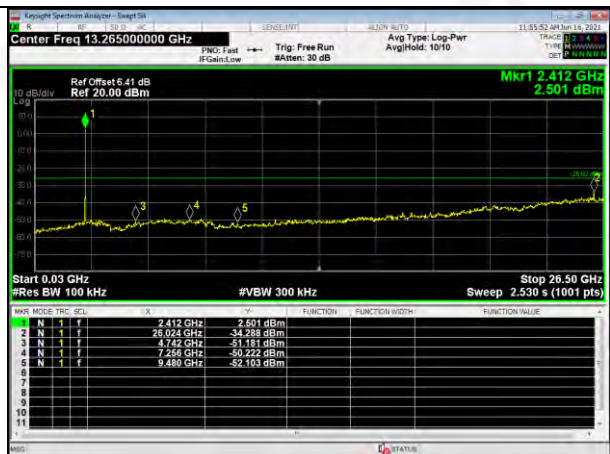
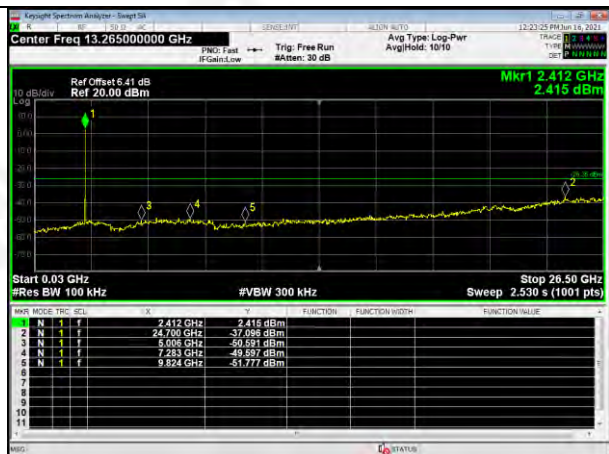


Highest channel

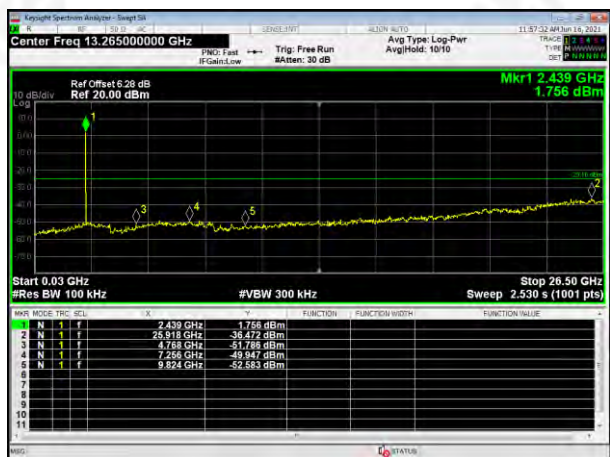
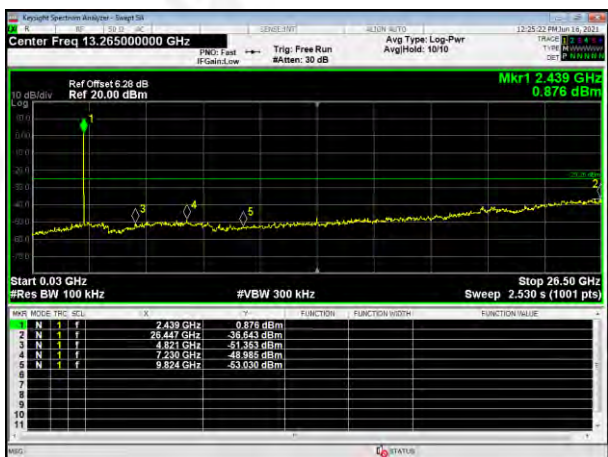
802.11n(HT20)

Ant1

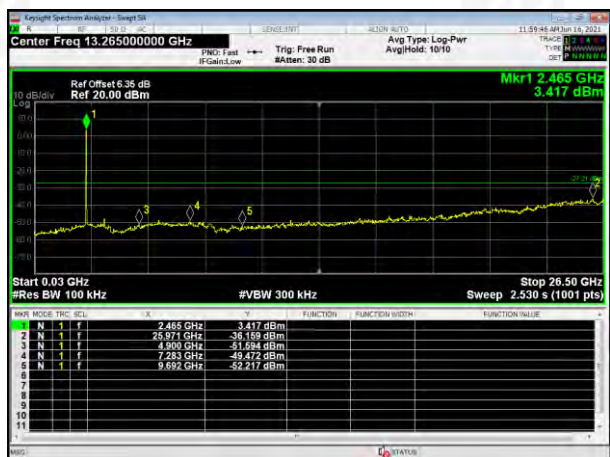
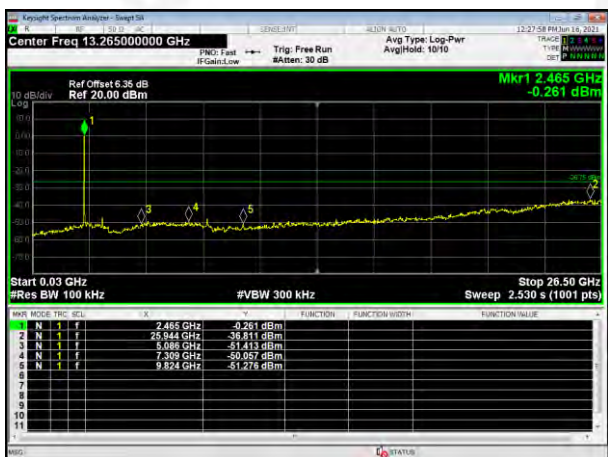
Ant2



Lowest channel



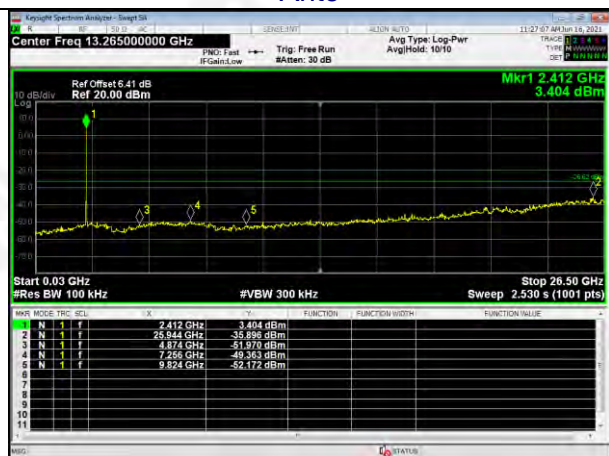
Middle channel



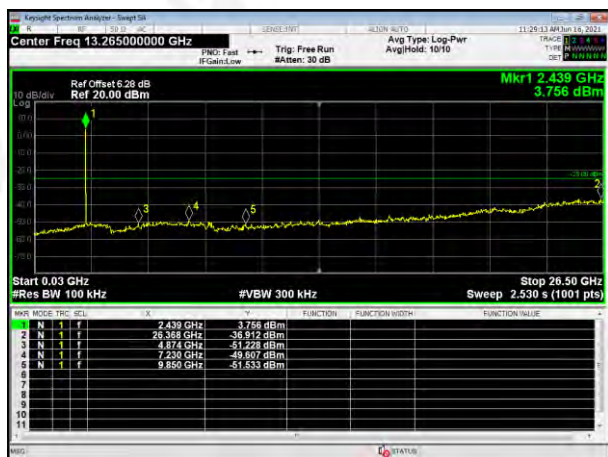
Highest channel

802.11n(HT20)

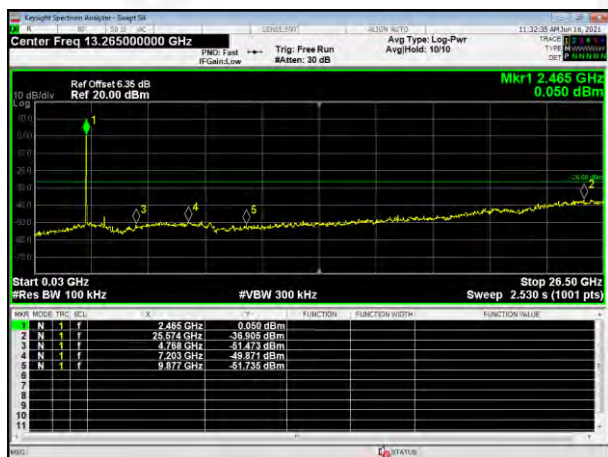
Ant3



Lowest channel



Middle channel

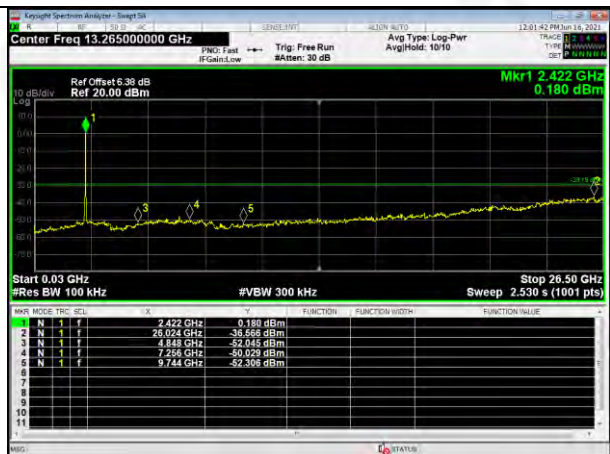


Highest channel

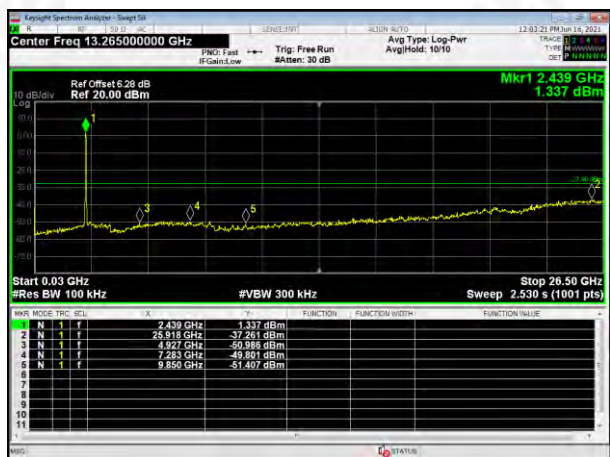
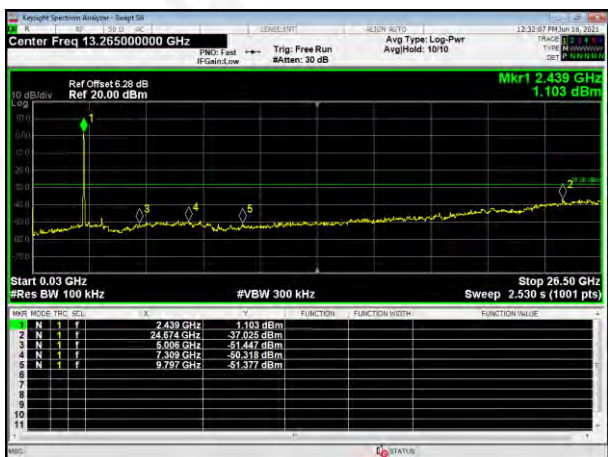
802.11n(HT40)

Ant1

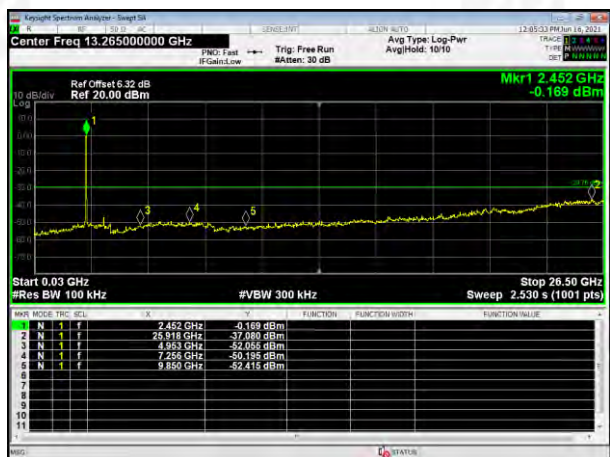
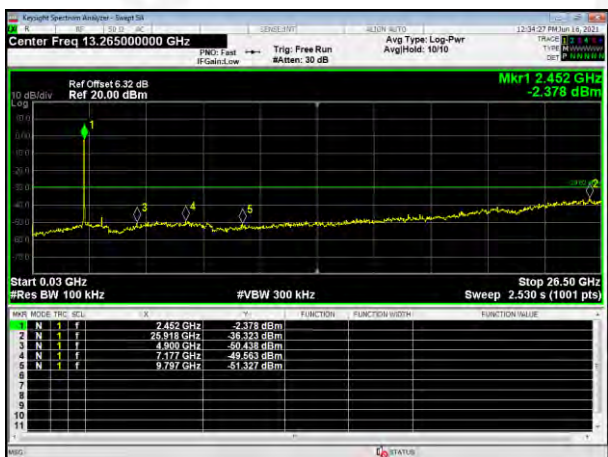
Ant2



Lowest channel



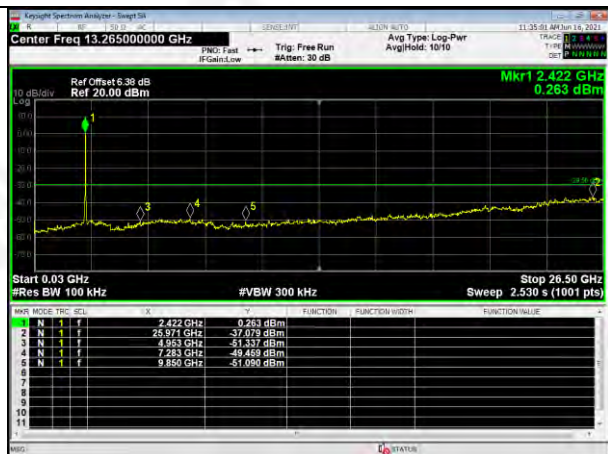
Middle channel



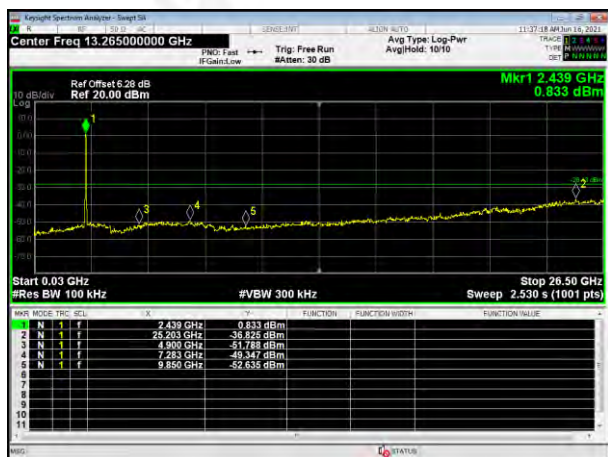
Highest channel

802.11n(HT40)

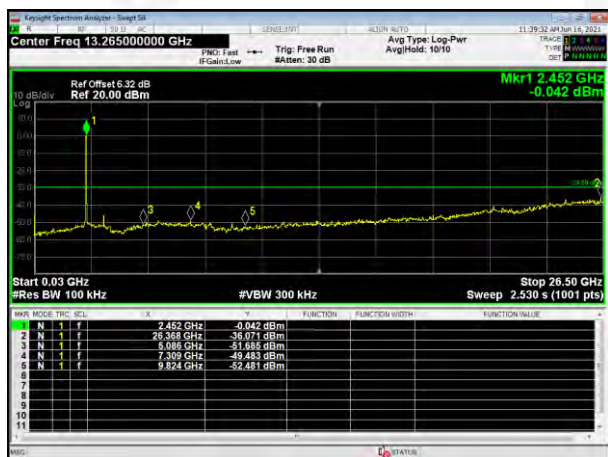
Ant3



Lowest channel



Middle channel



Highest channel

10. ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
EUT Antenna:	
The antennas are External antenna and Internal antenna, the best case gain of the antennas are External antenna 1/2: 5dBi, Internal antenna: 0dBi, reference to the appendix II for details	

11. TEST SETUP PHOTO

Reference to the appendix I for details.

12. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

***** END OF REPORT *****