FCC Test Report

Report No.:	FVC-ESH-P20112378B-13
FCC ID:	T2C-CTP18
Product:	Collaboration Touch Panel
Model:	CTP18
Received Date:	Dec.30, 2020
Test Date:	Jan.02 to Jan.18, 2021
Issued Date:	Jan.20, 2021
Applicant:	YEALINK(XIAMEN) NETWORK TECHNOLOGY CO.,LTD.
Address:	309, 3rd Floor, No.16, Yun Ding North Road, Huli District, Xiamen City, Fujian, P.R. China
Manufacturer:	YEALINK(XIAMEN) NETWORK TECHNOLOGY CO.,LTD.
Address:	309, 3rd Floor, No.16, Yun Ding North Road, Huli District, Xiamen City, Fujian, P.R. China
Issued By:	BUREAU VERITAS ADT (Shanghai) Corporation
Lab Address:	No. 829, Xinzhuan Road, Shanghai, P.R.China (201612)

ACCREDITED
Test Lab
Cert 2343.01

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Release Control Record

Issue No.	Description	Date Issued
FVC-ESH-P20112378B-13	Original release	Jan.20, 2021

1 Certificate of Conformity

Product: Collaboration Touch Panel

Brand: Yealink

Model: CTP18

Applicant: YEALINK(XIAMEN) NETWORK TECHNOLOGY CO.,LTD.

Test Date: Jan.02 to Jan.18, 2021

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

The above equipment has been tested by **BUREAU VERITAS ADT (Shanghai) Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Yuan ZHANG , **Date:** Jan.20, 2021

Yuan ZHANG
Project Engineer

Approved by : , **Date:** Jan.20, 2021

Daniel Sun
EMC Lab Manager

2 Summary of Test Results

The EUT has been tested according to the following specifications:

47 CFR FCC Part 15, Subpart C (SECTION 15.247)			
FCC Clause	Test Item	Result	Remarks
15.203	Antenna Requirement	PASS	No antenna connector is used.
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	Minimum 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.
15.247(d)	Conducted Band Edges Measurement	PASS	Meet the requirement of limit.
15.247(d)	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
15.247(d)	Emissions in restricted frequency bands	PASS	Meet the requirement of limit.
15.205 / 15.209 / 15.247(d)	Radiated Emissions Measurement	PASS	Meet the requirement of limit.

2.1 Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Hybrid Antenna(25MHz-1.5GHz)	Schwarzbeck	VULB9168	E1A1012	Jul.29, 20	Jul.28, 22
Horn Antenna(1GHz -18GHz)	Schwarzbeck	BBHA9120D	E1A1017	Aug.25, 20	Aug.24, 22
Double Ridge Horn Antenna(18G-40G)	COM-POWER	AH-840	E1A1040	Jul.15, 20	Jul.14, 22
Pre-Amplifier(100kHz-1.3GHz)	Agilent	8447D	E1A2001	Apr.20, 20	Apr.19, 21
Pre-Amplifier(0.5GHz-18GHz)	EMCI	EMC184045SE	E1A2009	Jul.06, 20	Jul.05, 21
Pre-Amplifier(18GHz-40GHz)	EMCI	EMC051845SE	E1A2008	Jul.06, 20	Jul.05, 21
EMI test recerver	R&S	ESR7	E1R1005	Apr.20, 20	Apr.19, 21
Spectrum Analyzer	Keysight	N9030B	E1S1003	Jul.23, 20	Jul.22, 21
Spectrum Analyzer	Keysight	N9020A	E1S1004	Mar.03, 20	Mar.02, 21
EMI test recerver	R&S	ESCS30	E1R1001	May.12, 20	May.11, 21
LISN	R&S	ENV216	E1L1011	May.12, 20	May.11, 21
Humidity&Temp Tester	Baolima	WS508	E1H1011	Apr. 03, 20	Apr. 02, 21
RF Control Unit	Toscend	JS0806-2	E1C5003	N/A	N/A
Test Software	ADT	ADT_COND_V7.3.1	N/A	N/A	N/A
Test Software	Toscend	JS32-RE	N/A	N/A	N/A
Test Software	Toscend	JS1120	N/A	N/A	N/A
Test Software	Toscend	JS1120-3	N/A	N/A	N/A

2.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.36 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.47 dB
	6GHz ~ 18GHz	3.75 dB
	18GHz ~ 40GHz	3.30 dB

2.3 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Collaboration Touch Panel
Brand	Yealink
Test Model	CTP18
Power Rating	48V ⎓, 0.2A or PoE 48V ⎓, 0.27A
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Operating Frequency	See clause 3.2
Number of Channel	See clause 3.2
Output Power	19.05dBm
Antenna Type	PCB Antenna
Antenna Connector	--
Antenna Gain	3dBi

Note: For more details, please refer to the User's manual of the EUT.

Special comments: All tests were performed with DAHUA POE Switch which model is DH-PFS3006-4ET-60.

Modulation Mode	TX /RX Function
802.11b	1TX / 1RX
802.11g	1TX / 1RX
802.11n (HT20)	1TX / 1RX
802.11n (HT40)	1TX / 1RX

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20) and 7 channels are provided for 802.11n (HT40).

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

3.2.1 Test Mode Applicability:

EUT Configure Mode	Applicable to				Description
	RE ≥ 1G	RE < 1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz **RE≤1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

Radiated Emission Test (Above 1 GHz):

☒□ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	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

Radiated Emission Test (Below 1 GHz):

☒□ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Power Line Conducted Emission Test:

☒□ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1	DSSS	DBPSK	1.0

Antenna Port Conducted 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, 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

3.2.2 Test Condition:

Applicable to	Normal Environmental Conditions	Normal Input Power
RE ≥ 1G	25deg. C, 60%RH	120Vac, 60Hz
RE < 1G	25deg. C, 60%RH	120Vac, 60Hz
PLC	25deg. C, 60%RH	120Vac, 60Hz
APCM	25deg. C, 60%RH	120Vac, 60Hz

3.3 Duty Cycle of Test Signal

Test Mode	Antenna	Channel [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11B	Ant1	2412	12.43	12.54	99.12
		2437	12.43	12.54	99.12
		2462	12.43	12.53	99.20
11G	Ant1	2412	2.06	2.22	92.79
		2437	2.06	2.18	94.50
		2462	2.06	2.17	94.93
11N20SISO	Ant1	2412	1.92	2.08	92.31
		2437	1.92	2.07	92.75
		2462	1.92	2.07	92.75
11N40SISO	Ant1	2422	0.95	1.08	87.96
		2437	0.95	1.11	85.59
		2452	0.95	1.05	90.48

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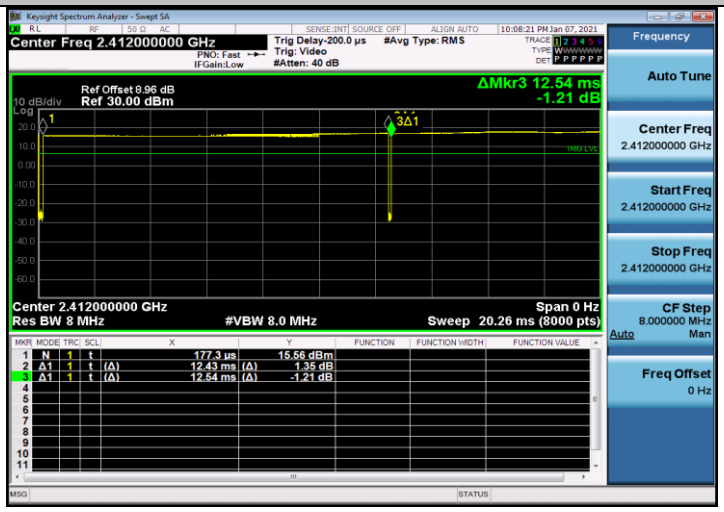
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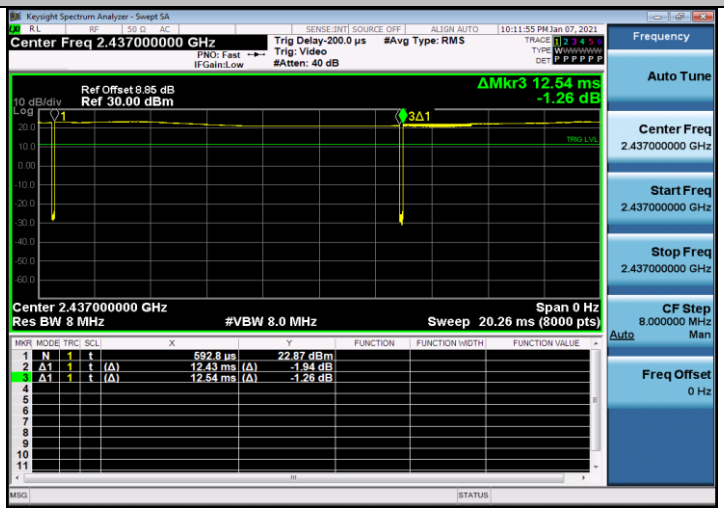
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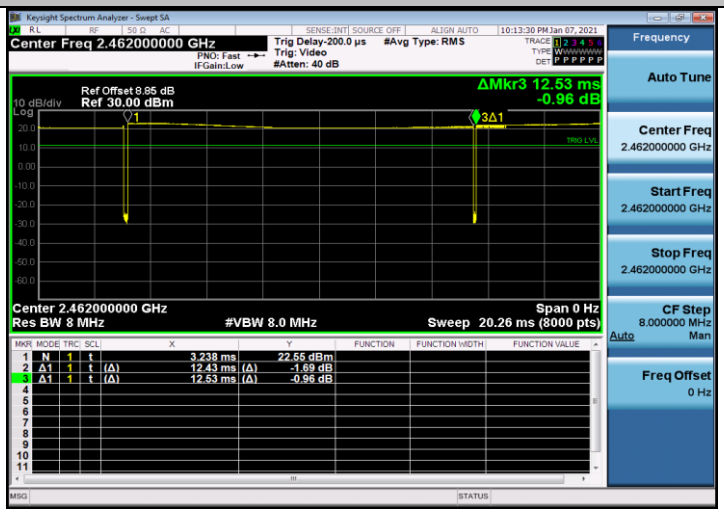

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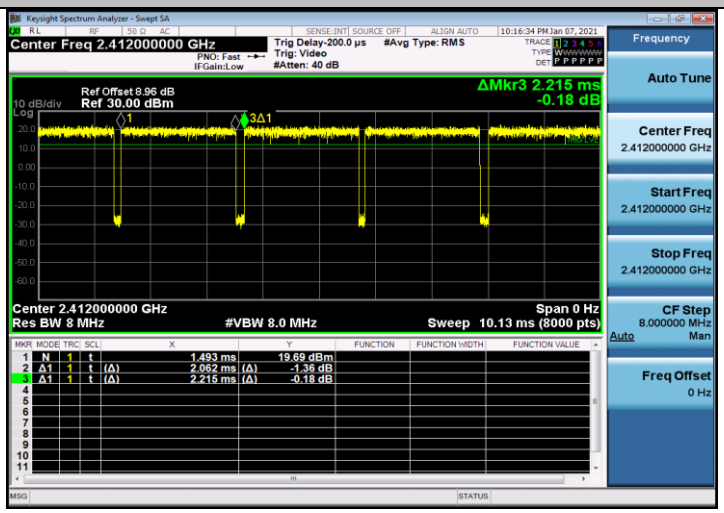

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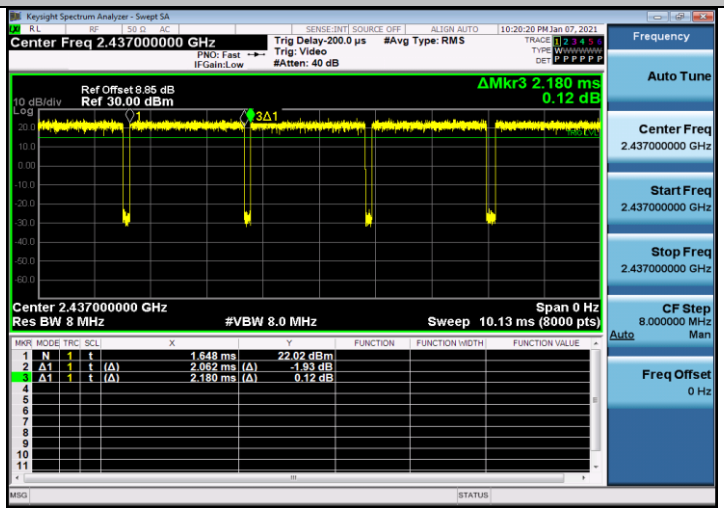

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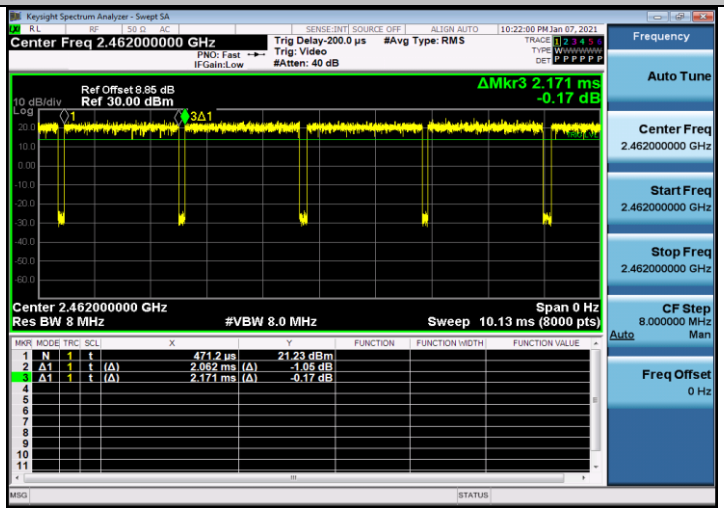

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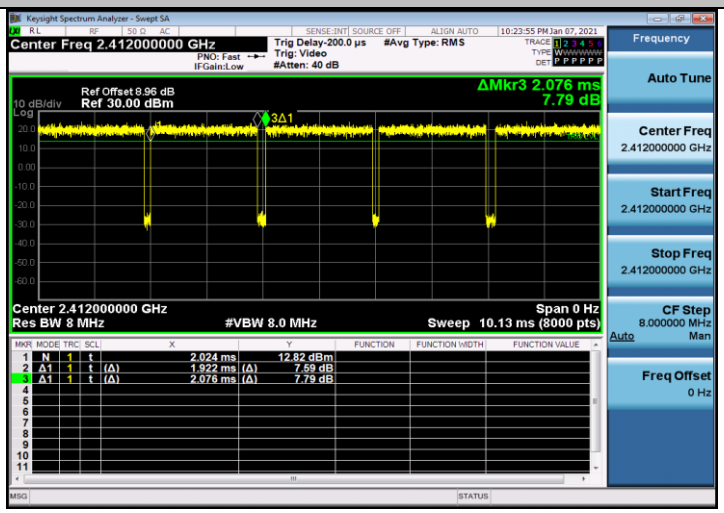

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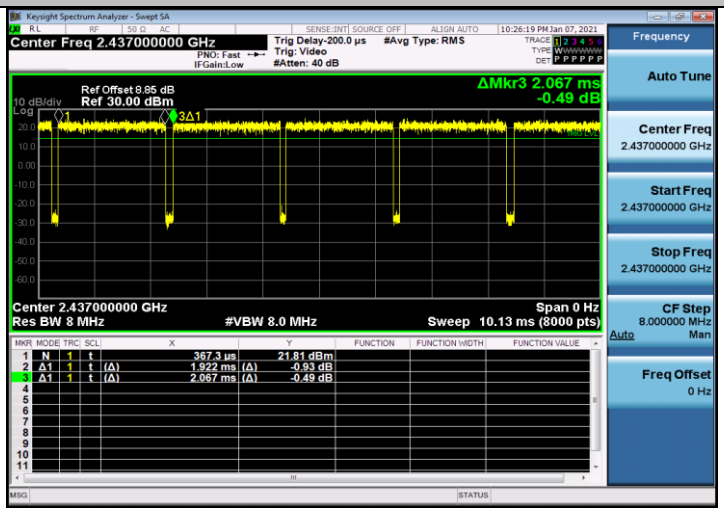

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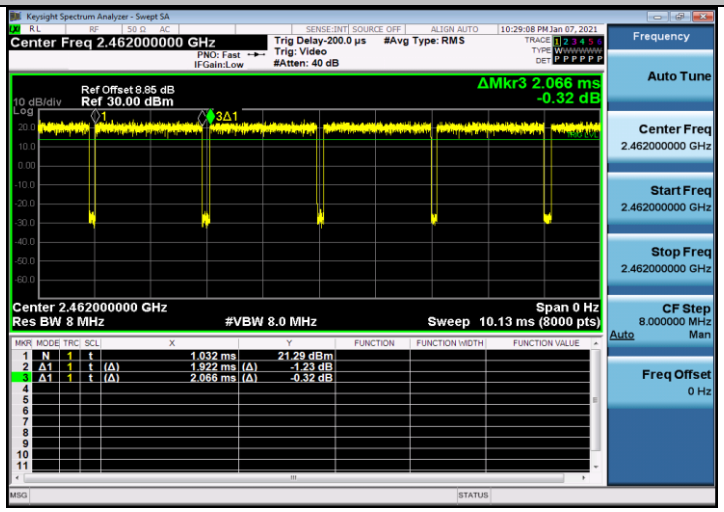

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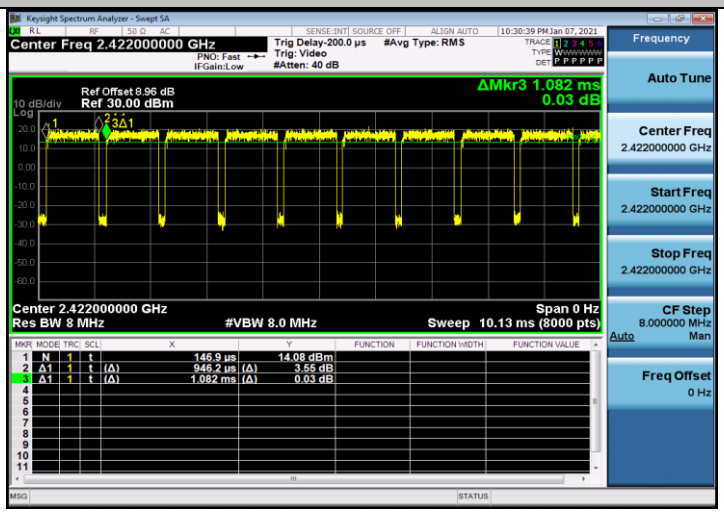
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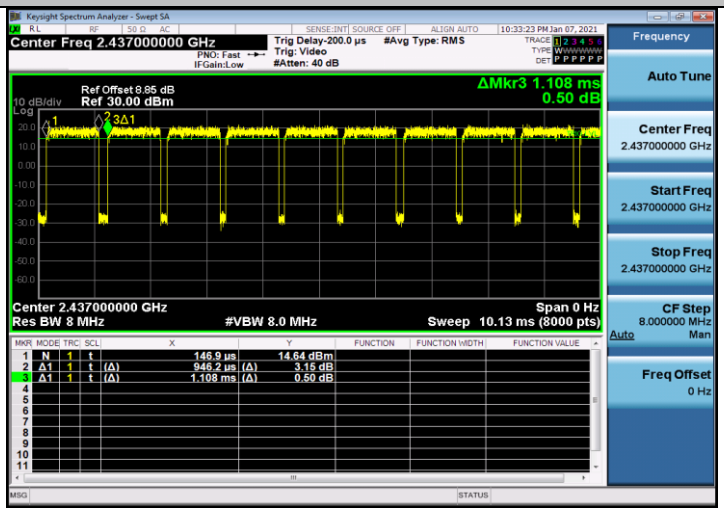
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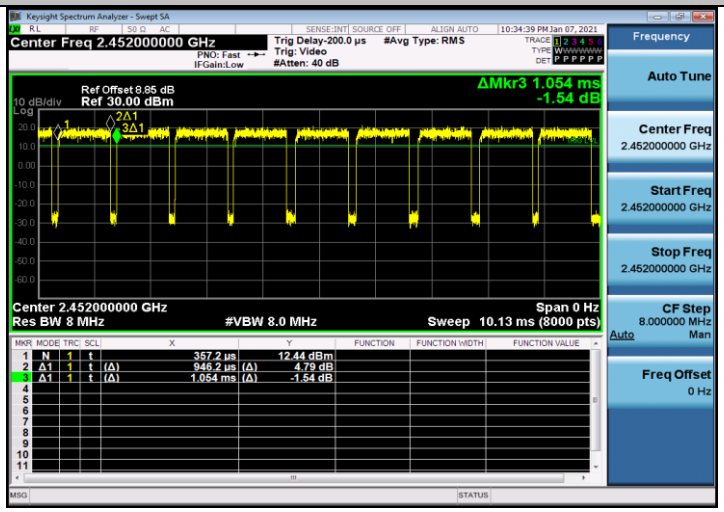


3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.5 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 standard:

FCC Part 15, Subpart C (15.247)

KDB 558074 D01 DTS Meas Guidance v05r02

ANSI C63.10:2013

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

4 Test Procedure and Results

4.1 AC Power Conducted Emission

4.1.1 Limits

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

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.1.2 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.

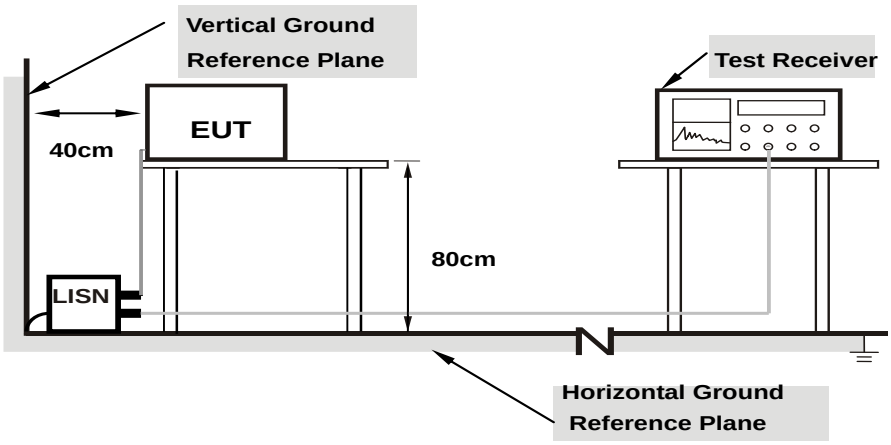
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.1.3 Deviation from Test Standard

No deviation.

4.1.4 Test Setup



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

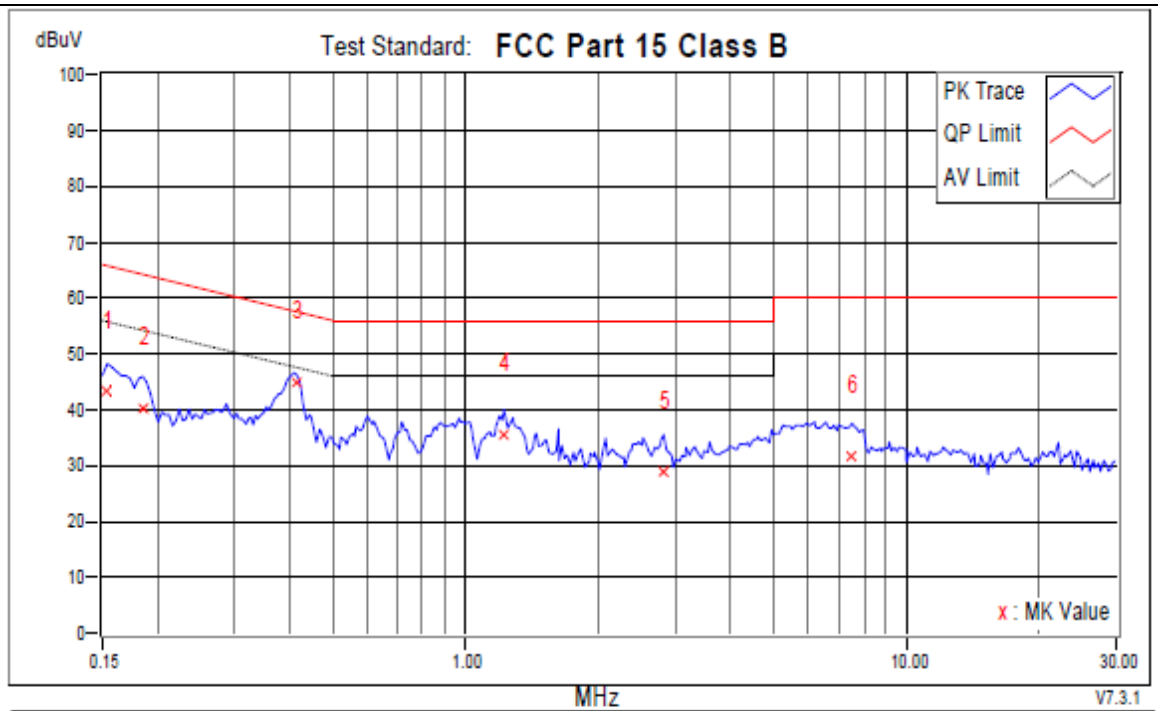
For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.5 EUT Operating Conditions

Same as 4.1.6.

4.1.6 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 120V, 60Hz		

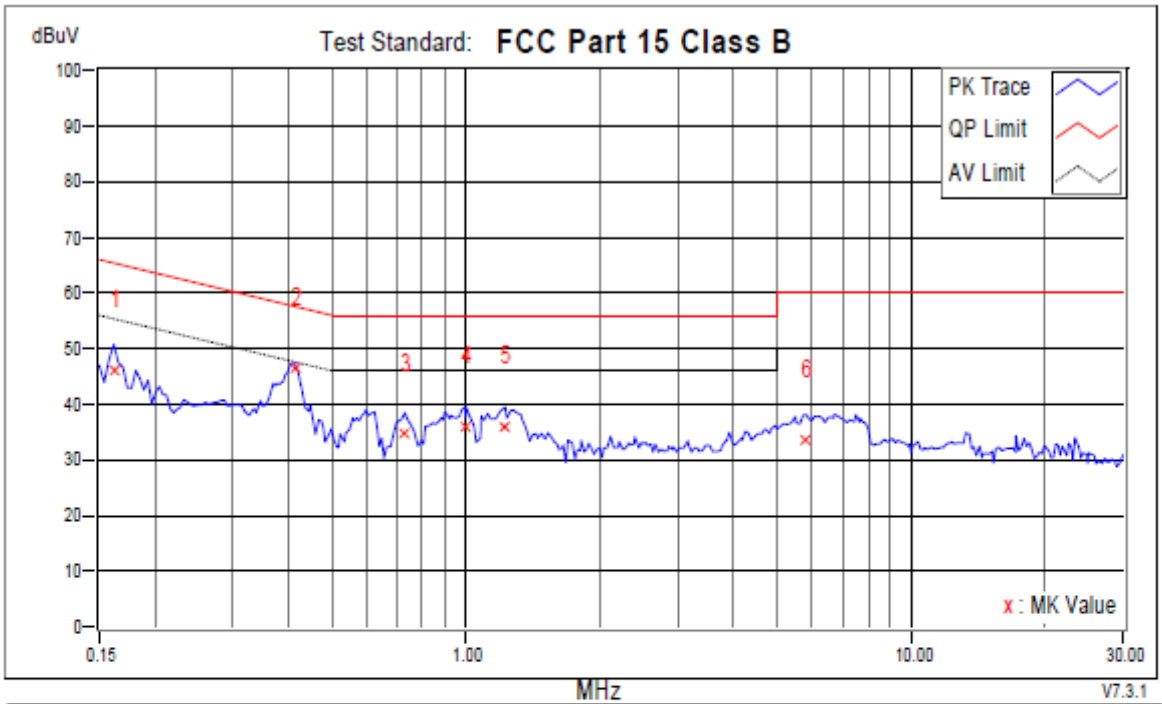


No.	Frequency MHz	Corr. Factor dB	Reading dBuV QP	Reading dBuV AV	Emission dBuV QP	Emission dBuV AV	Limit dBuV QP	Limit dBuV AV	Margins dB QP	Margins dB AV	Notes
1	0.15391	9.87	33.35	17.95	43.22	27.82	65.79	55.79	-22.56	-27.96	
2	0.18519	9.88	30.33	21.18	40.21	31.06	64.25	54.25	-24.04	-23.19	
+3	0.41197	9.75	35.06	25.97	44.81	35.72	57.61	47.61	-12.80	-11.89	
4	1.22287	9.65	25.85	19.31	35.50	28.96	56.00	46.00	-20.50	-17.04	
5	2.81424	9.87	19.07	11.68	28.94	21.55	56.00	46.00	-27.06	-24.45	
6	7.52188	10.25	21.25	14.25	31.50	24.50	60.00	50.00	-28.50	-25.50	

REMARKS:

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

Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 120V, 60Hz		

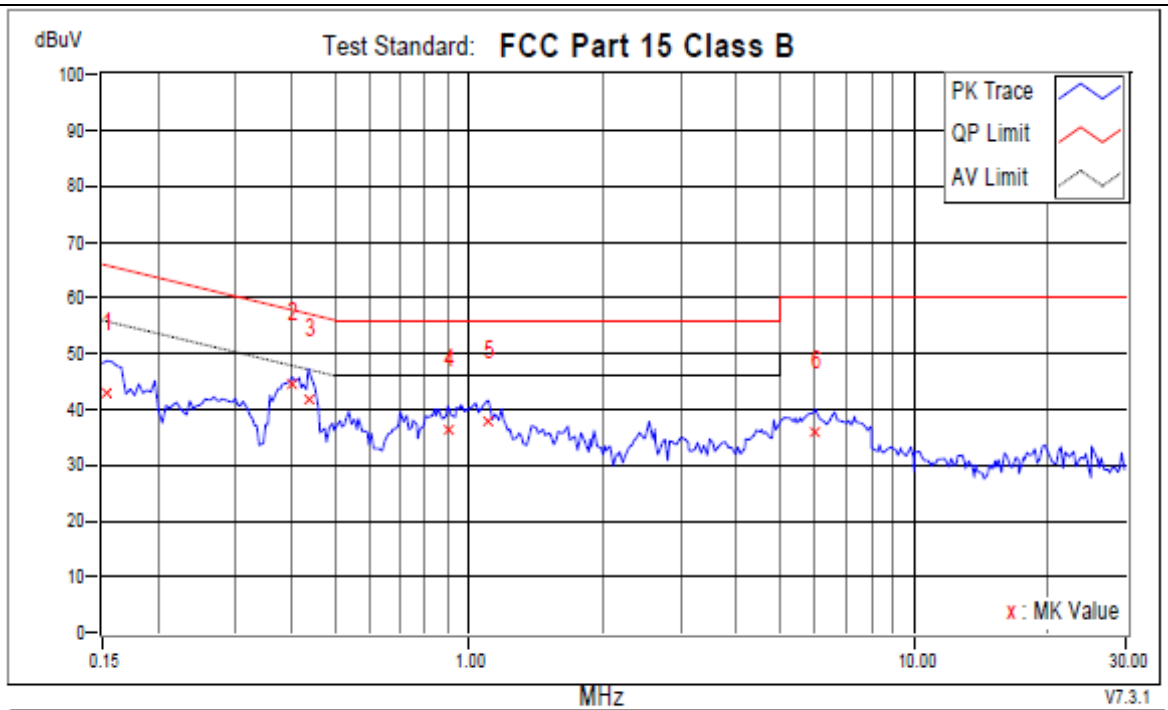


No.	Frequency MHz	Corr. Factor dB	Reading dBuV QP	Reading dBuV AV	Emission dBuV QP	Emission dBuV AV	Limit dBuV QP	Limit dBuV AV	Margins dB QP	Margins dB AV	Notes
1	0.16173	9.87	36.05	26.24	45.92	36.11	65.37	55.37	-19.46	-19.27	
+2	0.41197	9.89	36.61	26.32	46.50	36.21	57.61	47.61	-11.11	-11.40	
3	0.72868	9.85	24.88	18.01	34.73	27.86	56.00	46.00	-21.27	-18.14	
4	0.99456	9.91	26.05	19.41	35.96	29.32	56.00	46.00	-20.04	-16.68	
5	1.22678	9.92	26.12	19.97	36.04	29.89	56.00	46.00	-19.96	-16.11	
6	5.79757	9.92	23.84	17.79	33.76	27.71	60.00	50.00	-26.24	-22.29	

REMARKS:

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

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 240V, 50Hz		

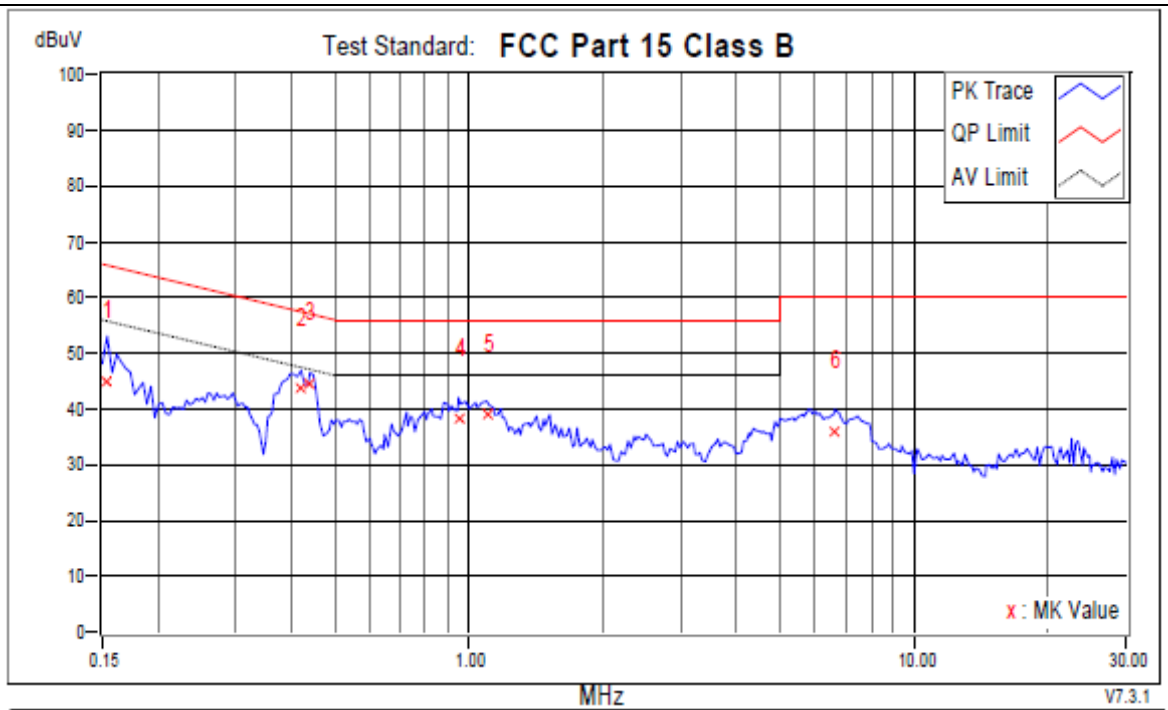


	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.15391	9.87	33.24	26.55	43.11	36.42	65.79	55.79	-22.67	-19.36	
+2	0.40024	9.75	34.59	28.56	44.34	38.31	57.85	47.85	-13.51	-9.54	
3	0.43543	9.75	32.08	25.33	41.83	35.08	57.15	47.15	-15.32	-12.07	
4	0.89681	9.61	26.58	21.35	36.19	30.96	56.00	46.00	-19.81	-15.04	
5	1.10166	9.63	28.27	23.05	37.90	32.68	56.00	46.00	-18.10	-13.32	
6	6.00480	10.14	25.74	20.87	35.88	31.01	60.00	50.00	-24.12	-18.99	

REMARKS:

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

Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Power supply	AC 240V, 50Hz		



No.	Frequency MHz	Corr. Factor dB	Reading dBuV QP	Reading dBuV AV	Emission dBuV QP	Emission dBuV AV	Limit dBuV QP	Limit dBuV AV	Margins dB QP	Margins dB AV	Notes
1	0.15391	9.88	35.15	27.49	45.03	37.37	65.79	55.79	-20.76	-18.42	
2	0.41979	9.89	33.84	27.21	43.73	37.10	57.45	47.45	-13.72	-10.35	
+3	0.43934	9.89	34.48	27.43	44.37	37.32	57.07	47.07	-12.71	-9.76	
4	0.94764	9.91	28.30	23.38	38.21	33.29	56.00	46.00	-17.79	-12.71	
5	1.09775	9.91	29.08	23.90	38.99	33.81	56.00	46.00	-17.01	-12.19	
6	6.63431	10.12	25.68	21.10	35.80	31.22	60.00	50.00	-24.20	-18.78	

REMARKS:

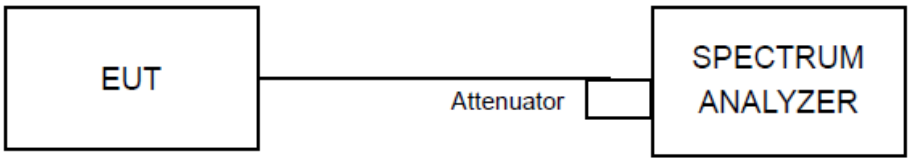
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

4.2 Minimum 6dB Bandwidth

4.2.1 Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz

4.2.2 Test Setup



4.2.3 Test Procedures

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” for compliance to FCC 47CFR 15.247 requirements (clause 8.2).

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW $\geqslant$ 3 · RBW, peak detector with maximum hold) is implemented by the instrumentation function.

4.2.4 Deviation of Test Standard

No deviation.

4.2.5 Test Results

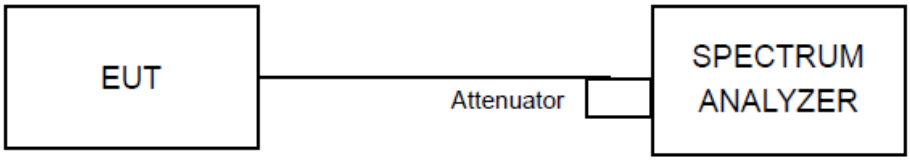
The test results refer to module FCC ID: T2C-YL1023

4.3 Conducted Output Power

4.3.1 Limit

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

4.3.2 Test Setup



4.3.3 Test Procedures

The EUT was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance" for compliance to FCC 47CFR 15.247 requirements (clause 9.2.2.4).

a) Measure the duty cycle, x, of the transmitter output signal as described in Section 6.0.

b) Set span to at least 1.5 OBW.

c) Set RBW = 1 % to 5 % of the OBW, not to exceed 1 MHz.

d) Set VBW $\geqslant$ 3 RBW.

e) Number of points in sweep $\geqslant$ 2 span / RBW. (This gives bin-to-bin spacing $\leqslant$ RBW/2, so that narrowband signals are not lost between frequency bins.)

f) Sweep time = auto.

g) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

h) Do not use sweep triggering. Allow the sweep to "free run".

i) Trace average at least 100 traces in power averaging (i.e., RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the on and off periods of the transmitter.

j) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

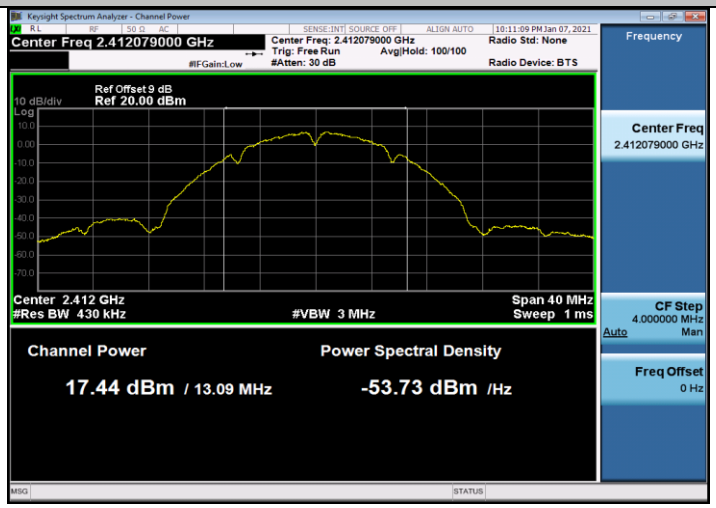
k) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on- and off-times of the transmission). For example, add 10 log (1/0.25) = 6 dB if the duty cycle is 25 %.

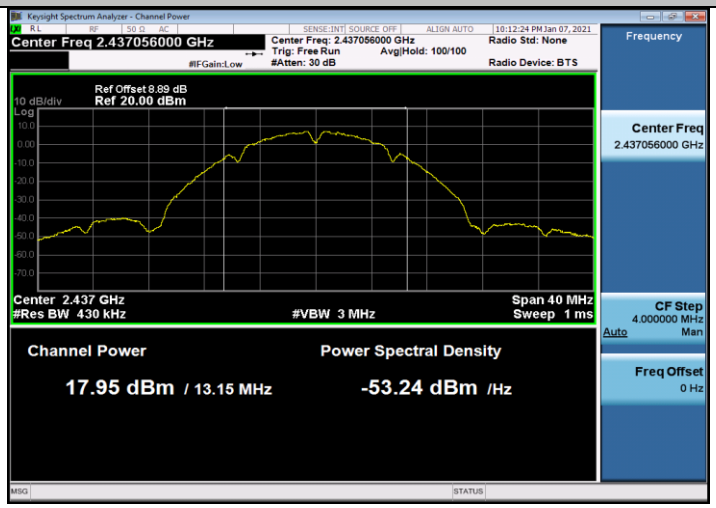
4.3.4 Deviation of Test Standard

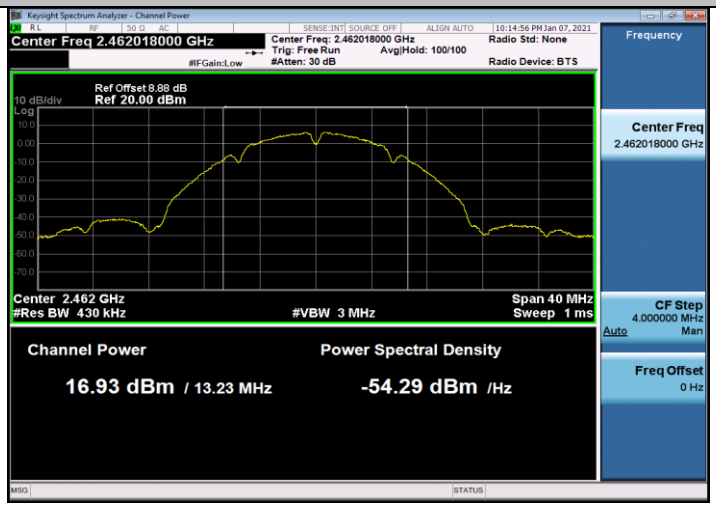
No deviation.

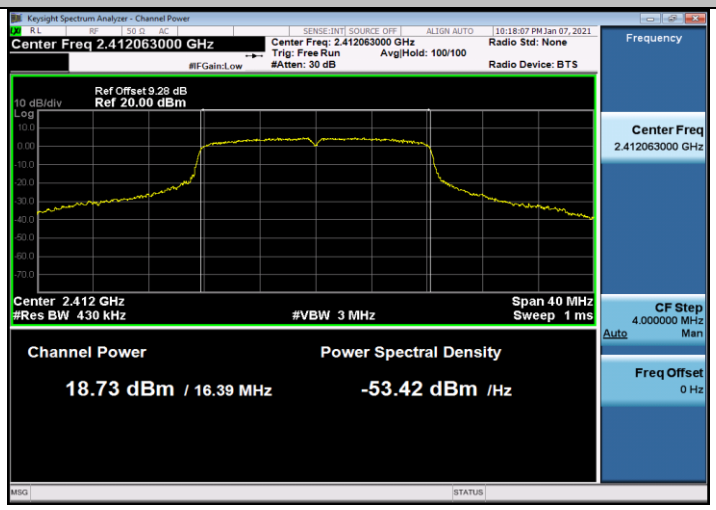
4.3.5 Test Results

Test Mode	Antenna	Channel [MHz]	Level [dBm]	10log(1/x) Factor[dB]	Power [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	17.44	0.04	17.48	<=30	PASS
		2437	17.95	0.04	17.99	<=30	PASS
		2462	16.93	0.03	16.96	<=30	PASS
11G	Ant1	2412	18.73	0.32	19.05	<=30	PASS
		2437	18.04	0.25	18.29	<=30	PASS
		2462	18.20	0.23	18.43	<=30	PASS
11N20SISO	Ant1	2412	17.91	0.35	18.26	<=30	PASS
		2437	17.96	0.33	18.29	<=30	PASS
		2462	16.86	0.33	17.19	<=30	PASS
11N40SISO	Ant1	2422	18.02	0.56	18.58	<=30	PASS
		2437	17.95	0.68	18.63	<=30	PASS
		2452	18.02	0.43	18.45	<=30	PASS

11B_Ant1_2412


11B_Ant1_2437


11B_Ant1_2462


11G_Ant1_2412


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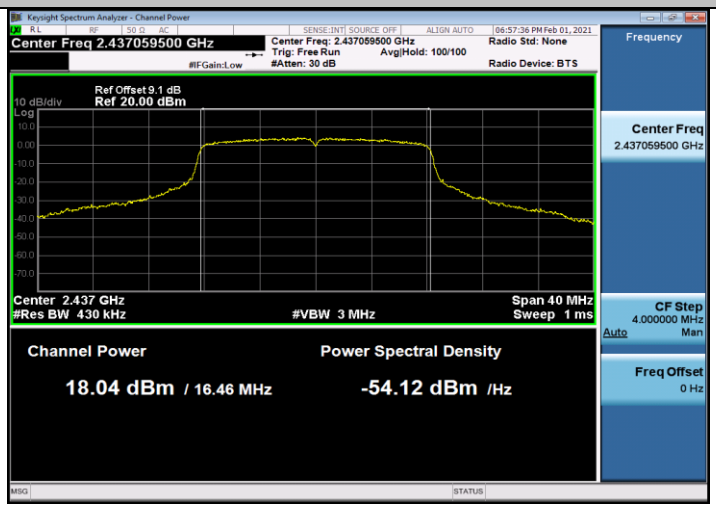

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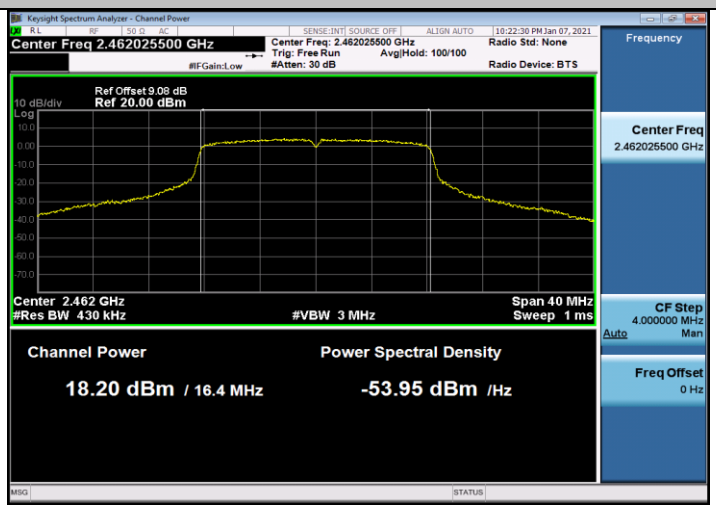
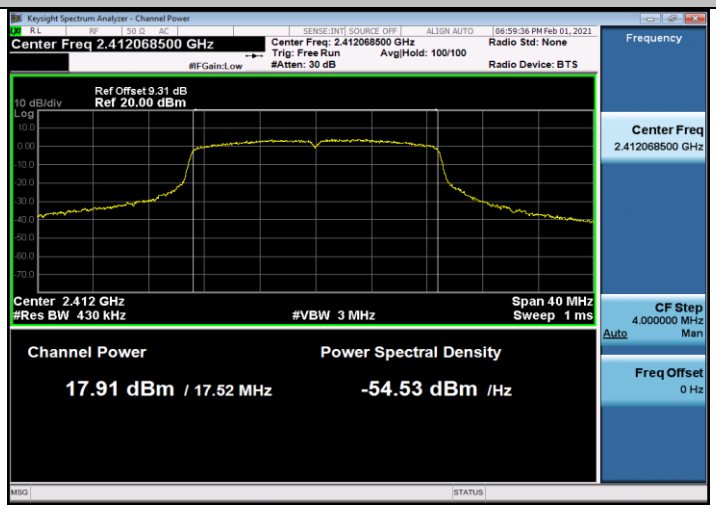
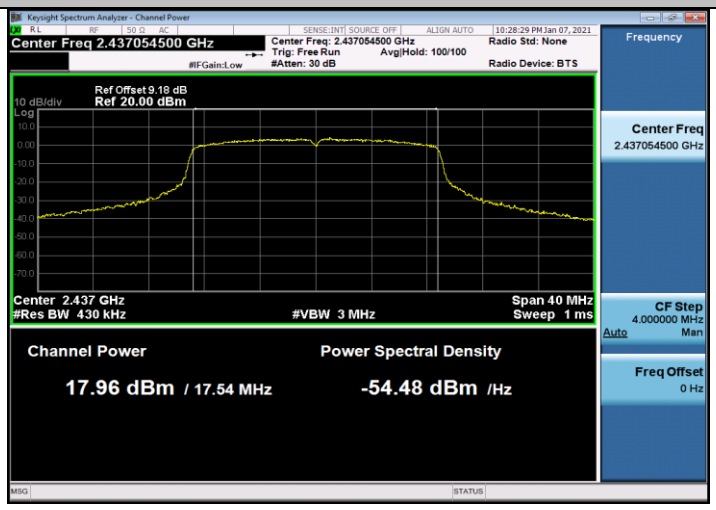
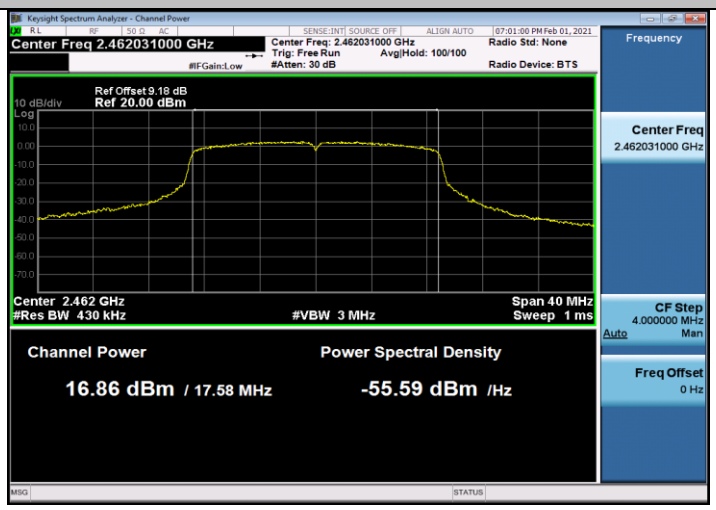
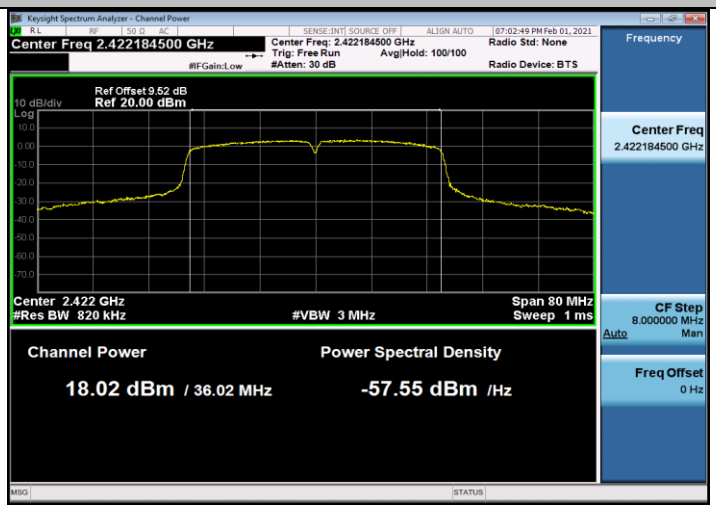
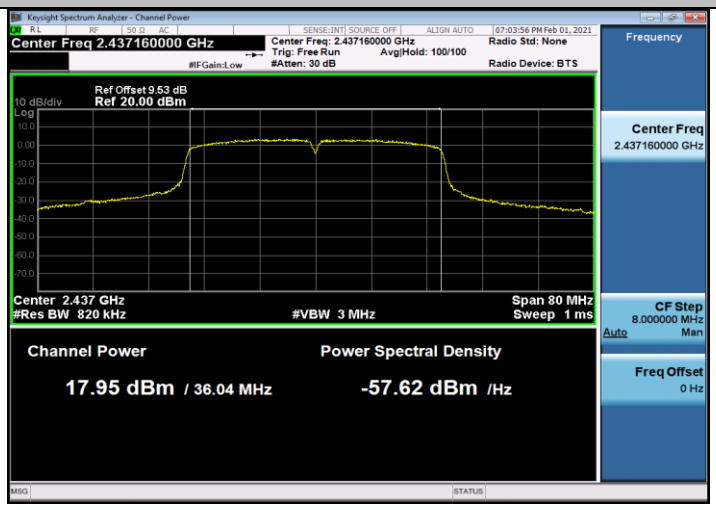


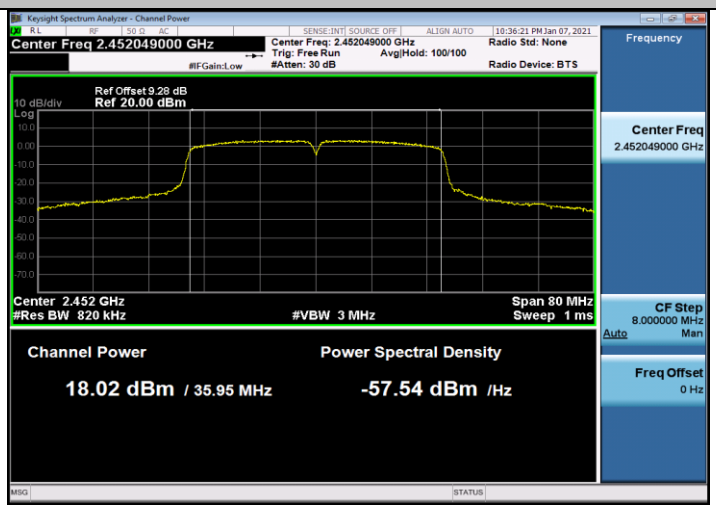
11N20SISO_Ant1_2412


11N20SISO_Ant1_2437


11N20SISO_Ant1_2462


11N40SISO_Ant1_2422


11N40SISO_Ant1_2437


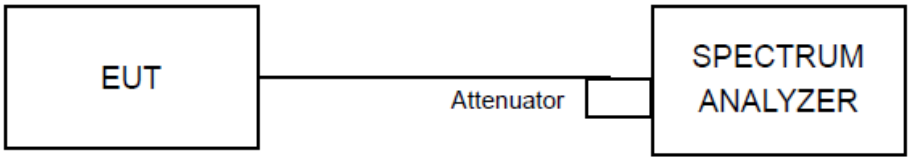
11N40SISO_Ant1_2452


4.4 Power Spectral Density

4.4.1 Limit

The Maximum of Power Spectral Density Measurement is 8 dBm in any 3 kHz band.

4.4.2 Test Setup



4.4.3 Test Procedures

The power output per FCC § 15.247(e) was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance" (clause 10.5) for compliance to FCC 47CFR 15.247 requirements.

a) Measure the duty cycle (x) of the transmitter output signal.

b) Set instrument center frequency to DTS channel center frequency.

c) Set span to at least 1.5 OBW.

d) Set RBW to: 3 kHz $\leqslant$ RBW $\leqslant$ 100 kHz.

e) Set VBW $\geqslant$ 3 RBW.

f) Detector = power averaging (RMS) or sample detector (when RMS not available).

g) Ensure that the number of measurement points in the sweep $\geqslant$ 2 span/RBW.

h) Sweep time = auto couple.

i) Do not use sweep triggering. Allow sweep to "free run".

j) Employ trace averaging (RMS) mode over a minimum of 100 traces.

k) Use the peak marker function to determine the maximum amplitude level.

l) Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

m) If resultant value exceeds the limit, then reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

4.4.4 Deviation of Test Standard

No deviation.

4.4.5 Test Results

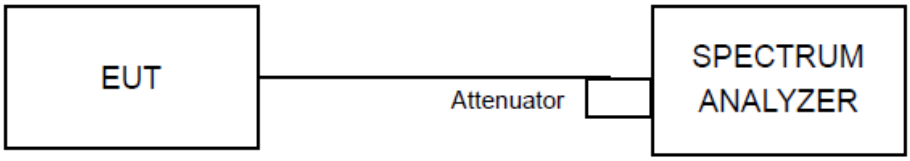
The test results refer to module FCC ID: T2C-YL1023

4.5 Conducted Band Edges Measurement

4.5.1 Limit

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

4.5.2 Test Setup



4.5.3 Test Procedures

The EUT was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance" (clause 11.0) for compliance to FCC 47CFR 15.247 requirements.

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOBE

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

4.5.4 Deviation of Test Standard

No deviation.

4.5.5 Test Results

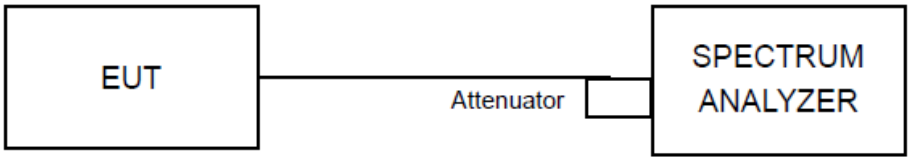
The test results refer to module FCC ID: T2C-YL1023

4.6 Conducted Spurious Emissions

4.6.1 Limit

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

4.6.2 Test Setup



4.6.3 Test Procedures

The EUT was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance" (clause 11.0) for compliance to FCC 47CFR 15.247 requirements.

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOBE

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

4.6.4 Deviation of Test Standard

No deviation.

4.6.5 Test Results

The test results refer to module FCC ID: T2C-YL1023

4.7 Emissions in restricted frequency bands

4.7.1 Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
1 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

4.7.2 Test Procedure Reference

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

4.7.3 Test Procedures

Peak Field Strength Measurements

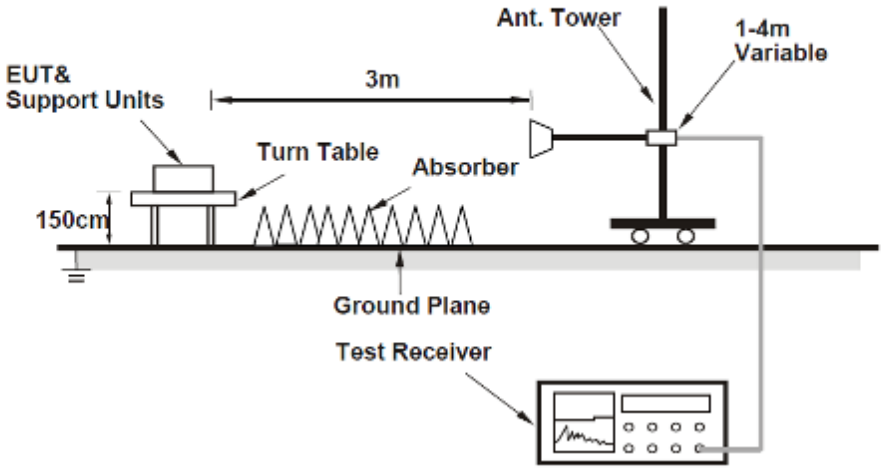
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

8. 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
9. 2. RBW = 1MHz
10. 3. VBW; If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10 Hz.
11. If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.
12. 4. Detector = Peak
13. 5. Sweep time = auto
14. 6. Trace mode = max hold
15. 7. Trace was allowed to stabilize

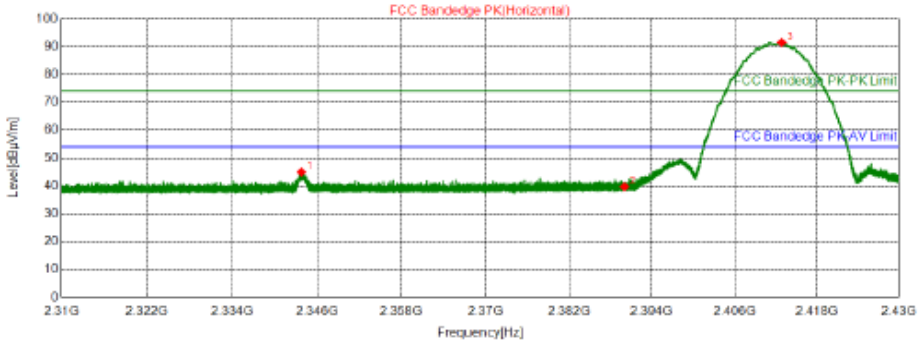
4.7.4 Test Setup

For Radiated emission above 1GHz



4.7.5 Test Results

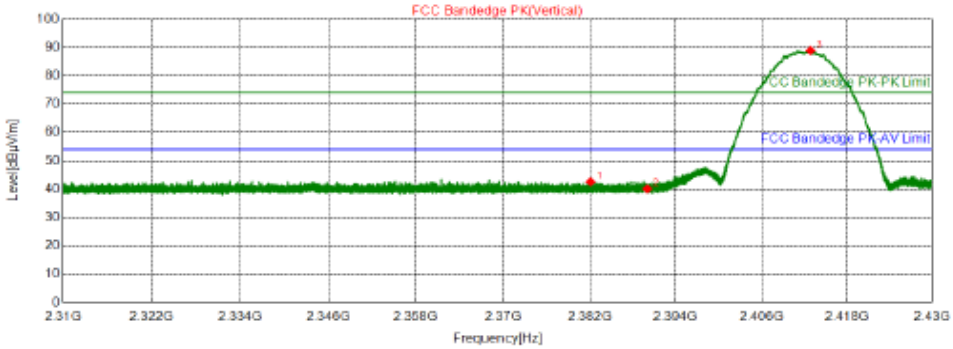
802.11b-2412MHz/ Horizontal



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2343.7920	40.64	44.97	74.00	29.03	155	194	Horizontal	PK
2	2390.0040	35.12	39.72	74.00	34.28	155	173	Horizontal	PK
3	2412.8520	86.79	91.52	74.00	-17.52	155	153	Horizontal	PK

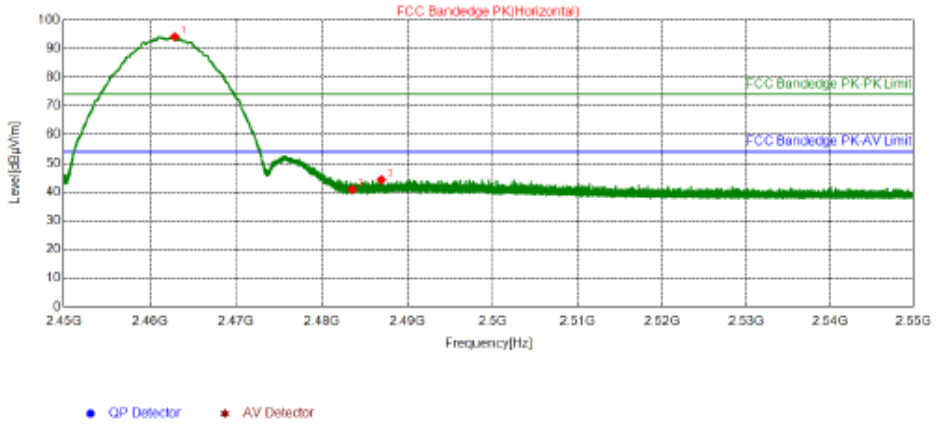
802.11b-2412MHz/ Vertical



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2382.1200	38.02	42.58	74.00	31.42	155	32	Vertical	PK
2	2390.0040	35.51	40.11	74.00	33.89	155	91	Vertical	PK
3	2412.8580	84.15	88.88	74.00	-14.88	155	52	Vertical	PK

802.11b-2462MHz/ Horizontal



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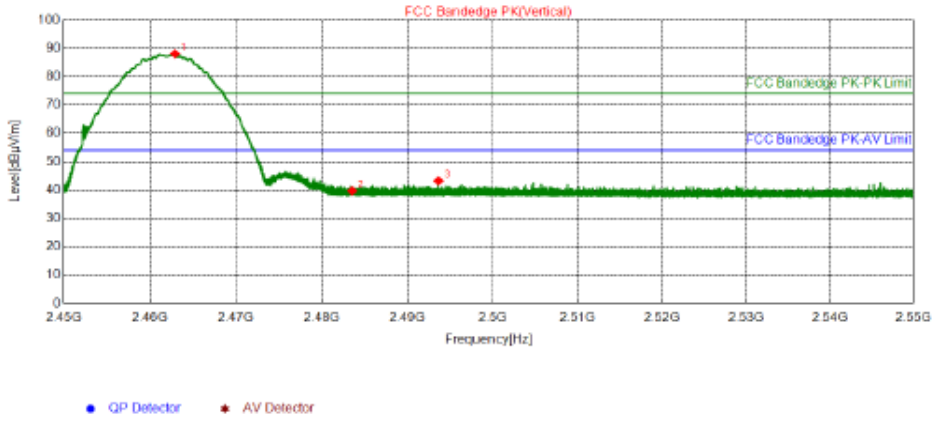
Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2462.8650	89.15	94.11	74.00	-20.11	200	147	Horizontal	PK
2	2483.5000	35.83	40.88	74.00	33.12	200	174	Horizontal	PK
3	2486.9500	39.23	44.29	74.00	29.71	155	166	Horizontal	PK

802.11b-2462MHz/ Vertical



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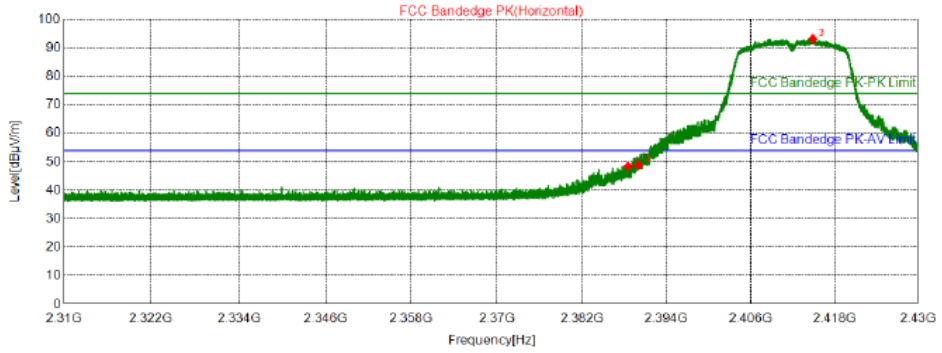
Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2462.8950	83.11	88.07	74.00	-14.07	175	301	Vertical	PK
2	2483.5000	34.67	39.72	74.00	34.28	200	24	Vertical	PK
3	2493.6200	38.14	43.23	74.00	30.77	155	58	Vertical	PK

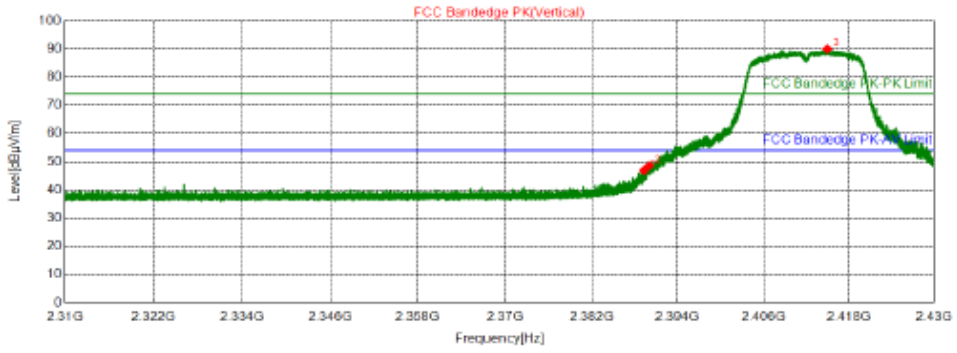
802.11g-2412MHz/ Horizontal



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2388.5340	43.78	48.37	74.00	25.63	155	187	Horizontal	PK
2	2390.0040	44.08	48.68	74.00	25.32	155	180	Horizontal	PK
3	2414.8680	88.36	93.11	74.00	-19.11	200	139	Horizontal	PK

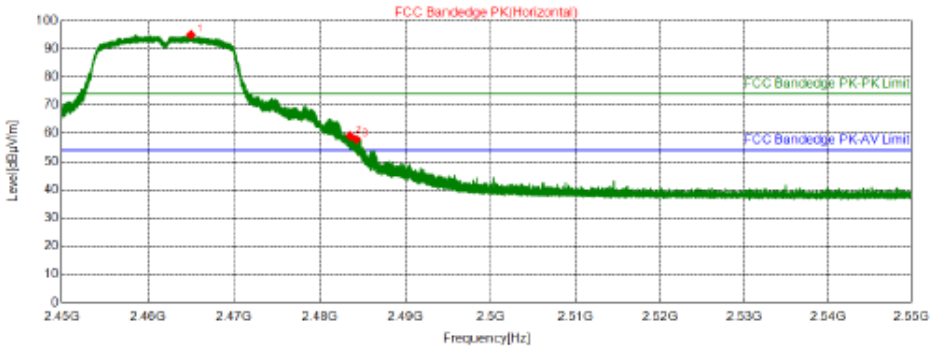
802.11g-2412MHz/ Vertical



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2389.2780	42.28	46.88	74.00	27.12	200	288	Vertical	PK
2	2390.0040	44.03	48.63	74.00	25.37	200	308	Vertical	PK
3	2414.9460	85.22	89.97	74.00	-15.97	200	308	Vertical	PK

802.11g-2462MHz/ Horizontal-PK



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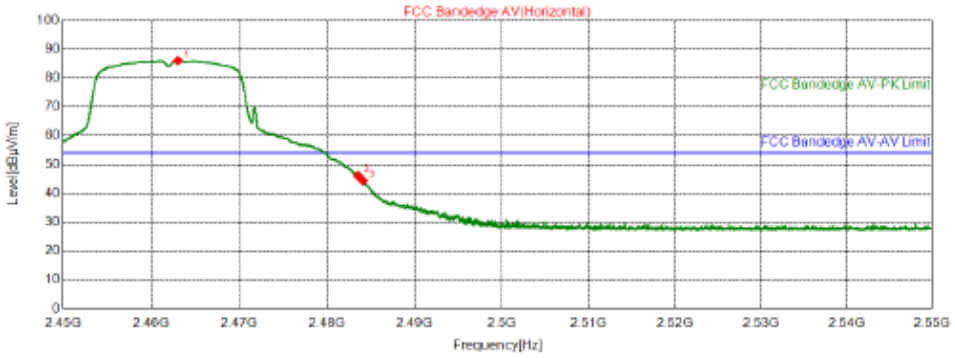
Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2464.9800	90.02	94.99	74.00	-20.99	155	153	Horizontal	PK
2	2483.5000	54.04	59.09	74.00	14.91	155	146	Horizontal	PK
3	2484.2400	52.81	57.86	74.00	16.14	155	160	Horizontal	PK

802.11g-2462MHz/ Horizontal-AV



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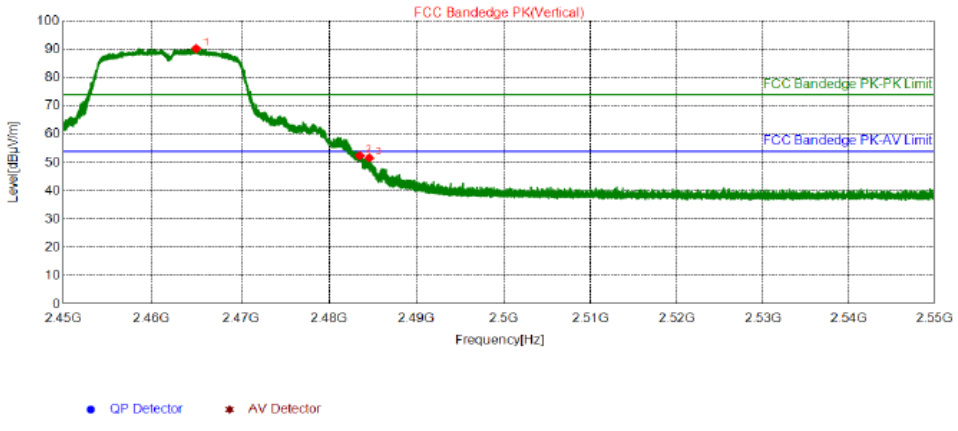
Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2463.0000	81.01	85.98	54.00	-31.98	155	146	Horizontal	PK
2	2483.5000	41.07	46.12	54.00	7.88	175	165	Horizontal	PK
3	2484.0875	39.27	44.32	54.00	9.68	175	165	Horizontal	PK

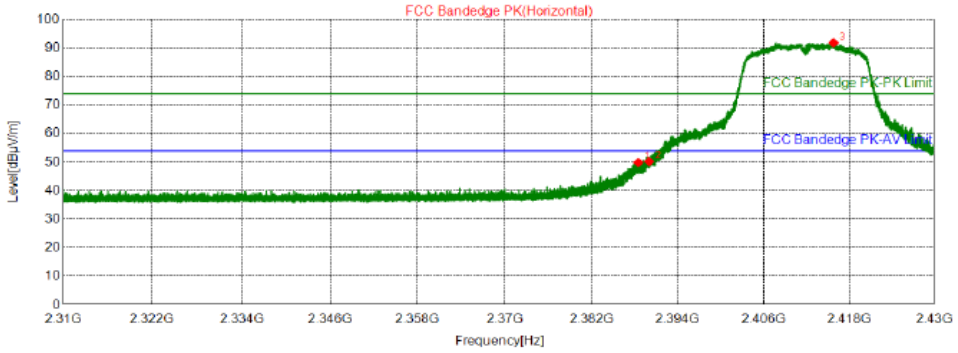
802.11g-2462MHz/ Vertical



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2465.0350	85.29	90.26	74.00	-16.26	175	300	Vertical	PK
2	2483.5000	47.37	52.42	74.00	21.58	155	294	Vertical	PK
3	2484.6000	46.52	51.57	74.00	22.43	175	52	Vertical	PK

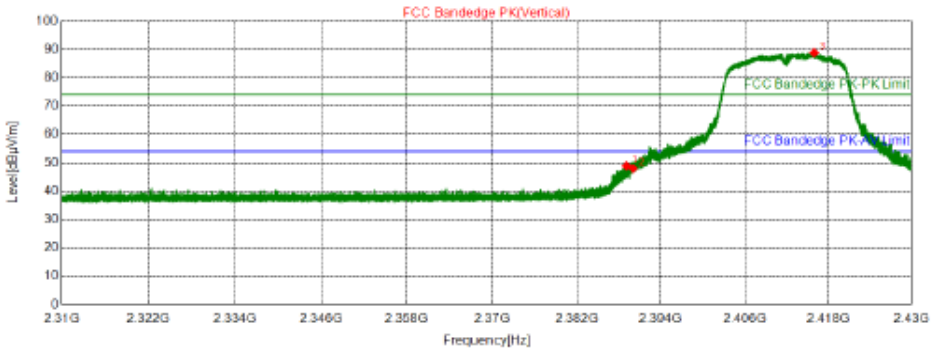
802.11n (HT20)-2412MHz/ Horizontal



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2388.4980	45.26	49.85	74.00	24.15	155	147	Horizontal	PK
2	2390.0040	45.61	50.21	74.00	23.79	155	194	Horizontal	PK
3	2415.7980	87.04	91.79	74.00	-17.79	155	153	Horizontal	PK

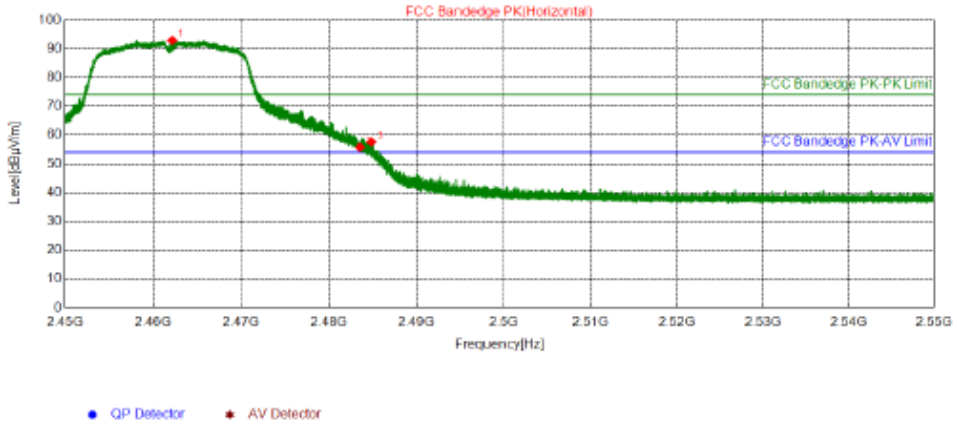
802.11n (HT20)-2412MHz/ Vertical



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2389.0800	44.24	48.84	74.00	25.16	200	288	Vertical	PK
2	2390.0040	43.43	48.03	74.00	25.97	175	294	Vertical	PK
3	2415.9480	84.06	88.81	74.00	-14.81	200	302	Vertical	PK

802.11n (ht20)-2462MHz/ Horizontal-PK



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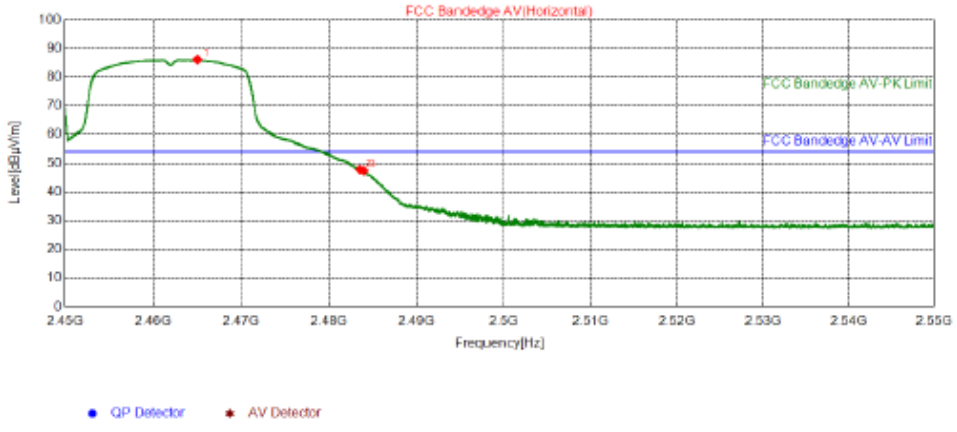
Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2462.1500	87.95	92.91	74.00	-18.91	200	139	Horizontal	PK
2	2483.5000	50.73	55.78	74.00	18.22	200	153	Horizontal	PK
3	2484.8350	52.60	57.65	74.00	16.35	155	146	Horizontal	PK

802.11n (ht20)-2462MHz/ Horizontal-AV



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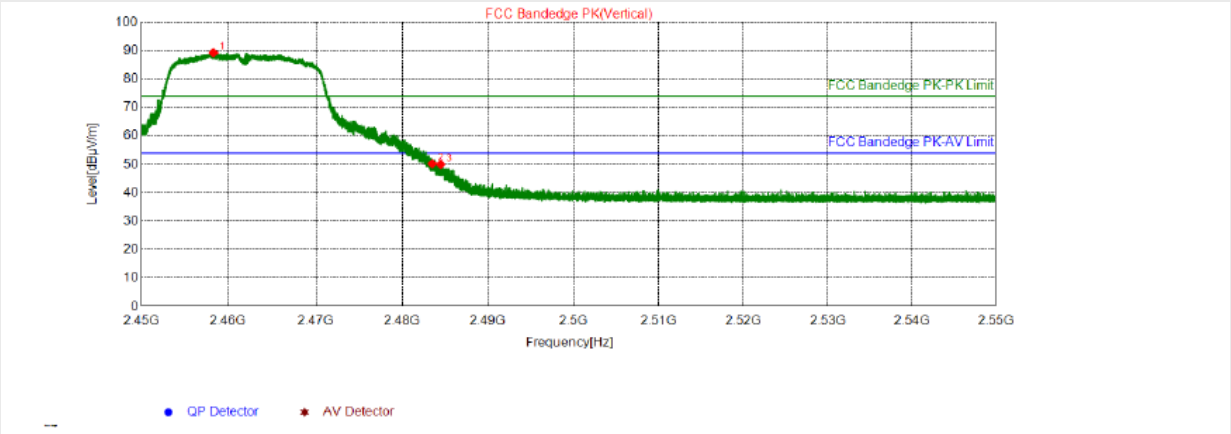
Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2465.0125	81.14	86.11	54.00	-32.11	155	151	Horizontal	PK
2	2483.5000	42.79	47.84	54.00	6.16	155	154	Horizontal	PK
3	2483.9500	42.36	47.41	54.00	6.59	155	158	Horizontal	PK

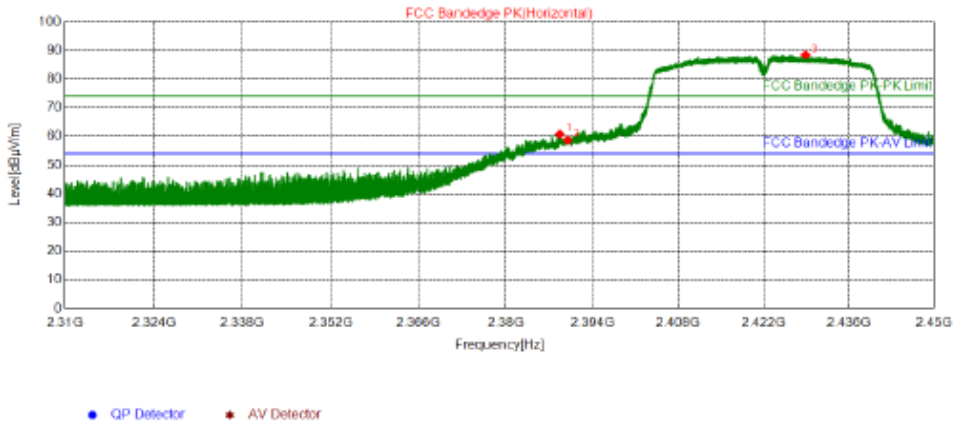
802.11n (HT20)-2462MHz/ Vertical



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2458.3100	84.28	89.23	74.00	-15.23	200	294	Vertical	PK
2	2483.5000	45.19	50.24	74.00	23.76	200	320	Vertical	PK
3	2484.4800	44.93	49.98	74.00	24.02	200	320	Vertical	PK

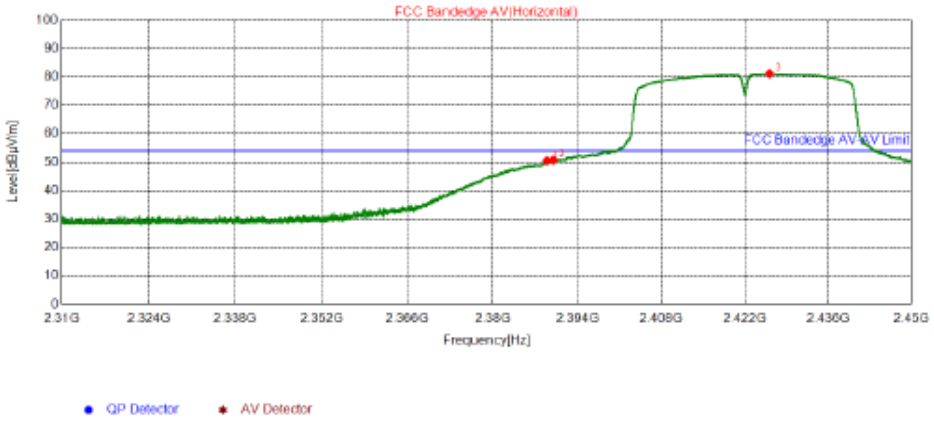
802.11n (HT40)-2422MHz/ Horizontal-PK



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2388.7010	56.21	60.80	74.00	13.20	175	193	Horizontal	PK
2	2390.0030	54.10	58.70	74.00	15.30	175	173	Horizontal	PK
3	2428.8040	83.64	88.47	74.00	-14.47	155	147	Horizontal	PK

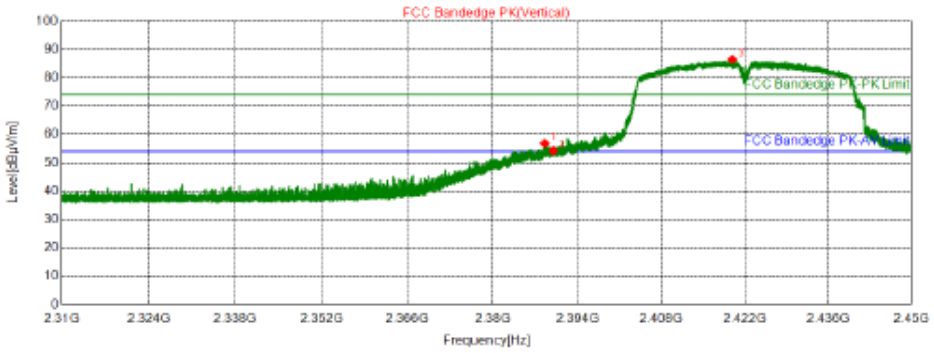
802.11n (HT40)-2422MHz/ Horizontal-AV



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2388.9425	45.94	50.53	54.00	3.47	175	186	Horizontal	PK
2	2390.0100	46.19	50.79	54.00	3.21	175	186	Horizontal	PK
3	2426.0600	76.40	81.21	54.00	-27.21	155	151	Horizontal	PK

802.11n (HT40)-2422MHz/ Vertical-PK



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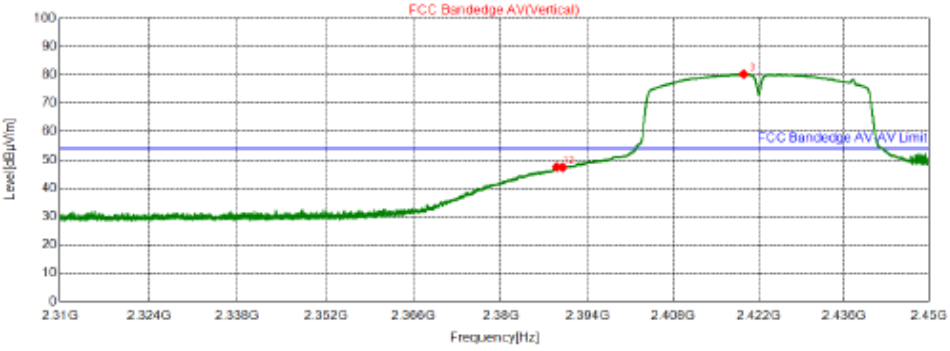
Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2388.5820	52.26	56.85	74.00	17.15	200	293	Vertical	PK
2	2390.0030	49.71	54.31	74.00	19.69	200	286	Vertical	PK
3	2419.8090	81.70	86.47	74.00	-12.47	200	307	Vertical	PK

802.11n (HT40)-2422MHz/ Vertical-AV



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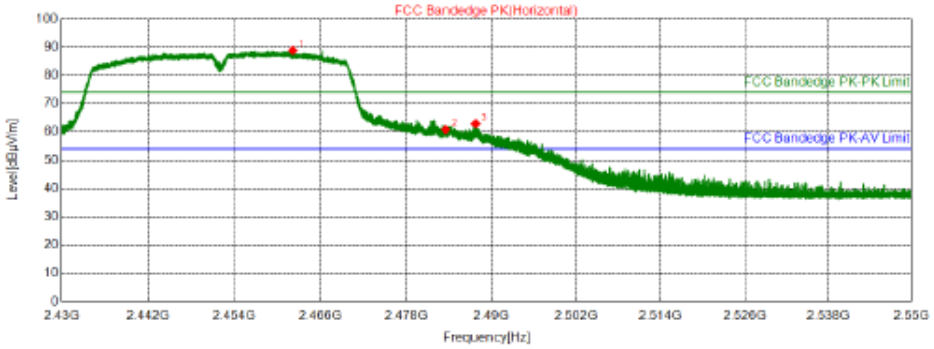
Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2389.0125	42.94	47.54	54.00	6.46	200	286	Vertical	PK
2	2390.0100	42.82	47.42	54.00	6.58	200	283	Vertical	PK
3	2419.4625	75.50	80.27	54.00	-26.27	200	303	Vertical	PK

802.11n (HT40)-2452MHz/ Horizontal-PK



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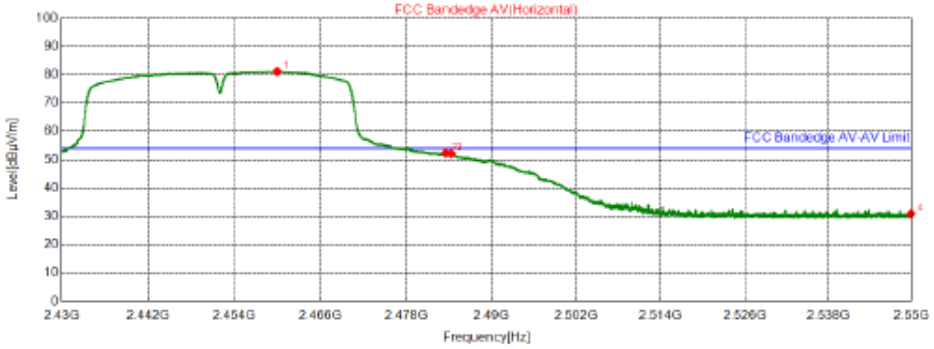
Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2462.1000	83.87	88.83	74.00	-14.83	155	147	Horizontal	PK
2	2483.5020	55.80	60.85	74.00	13.15	155	154	Horizontal	PK
3	2487.7560	57.86	62.92	74.00	11.08	155	147	Horizontal	PK

802.11n (HT40)-2452MHz/ Horizontal-AV



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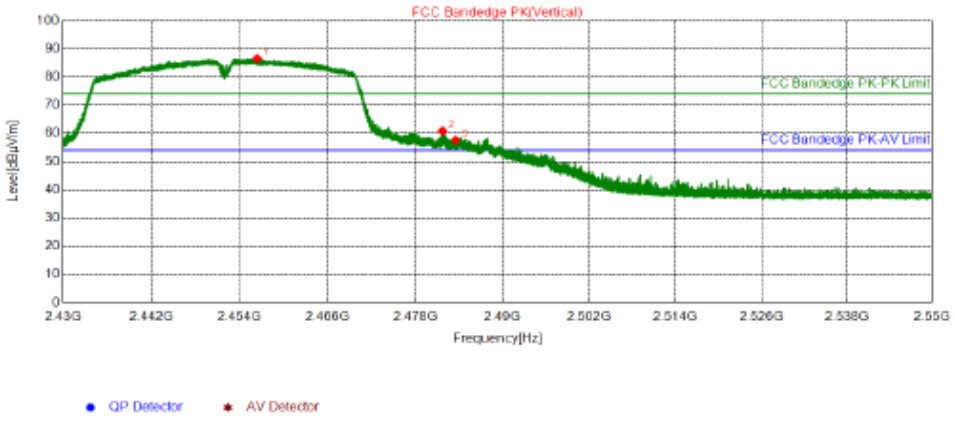
Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2459.9100	76.25	81.20	54.00	-27.20	155	150	Horizontal	PK
2	2483.5050	47.26	52.31	54.00	1.69	175	159	Horizontal	PK
3	2484.2850	47.08	52.13	54.00	1.87	175	159	Horizontal	PK
4	2549.9250	25.59	30.92	54.00	23.08	155	130	Horizontal	PK

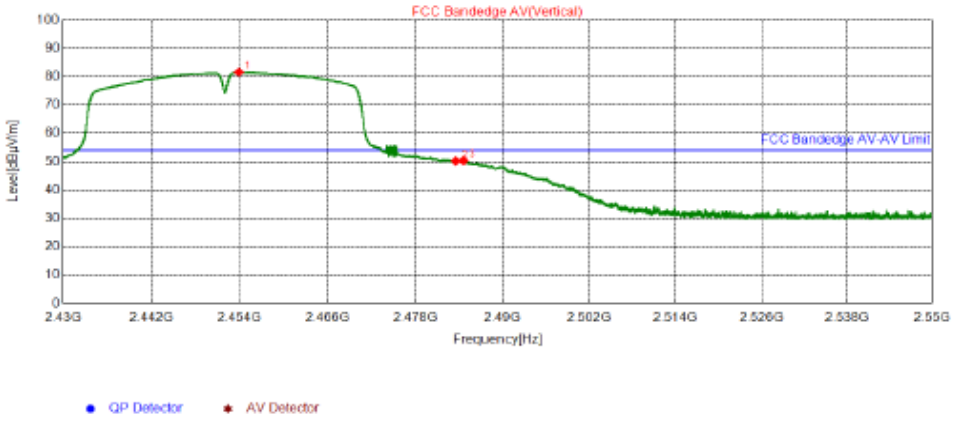
802.11n (HT40)-2452MHz/ Vertical-PK



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2456.3460	81.60	86.54	74.00	-12.54	200	293	Vertical	PK
2	2481.7320	55.84	60.88	74.00	13.12	200	306	Vertical	PK
3	2483.5020	52.52	57.57	74.00	16.43	200	306	Vertical	PK

802.11n (HT40)-2452MHz/ Vertical-AV



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2453.8350	76.68	81.61	54.00	-27.61	200	289	Vertical	PK
2	2483.5050	45.17	50.22	54.00	3.78	200	300	Vertical	PK
3	2484.6000	45.34	50.39	54.00	3.61	200	68	Vertical	PK

4.8 Radiated Emission Measurement

4.8.1 Limits

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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

NOTE:

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

4.8.2 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degree 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. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotate table was turned from 0 degree to 360 degree to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

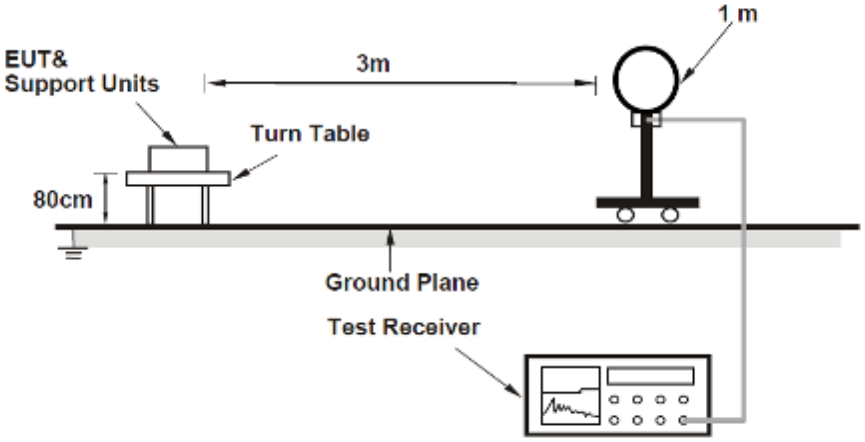
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for RMS Average (Duty cycle < 98 %) for Peak detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle $\geqslant$ 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.8.3 Deviation from Test Standard

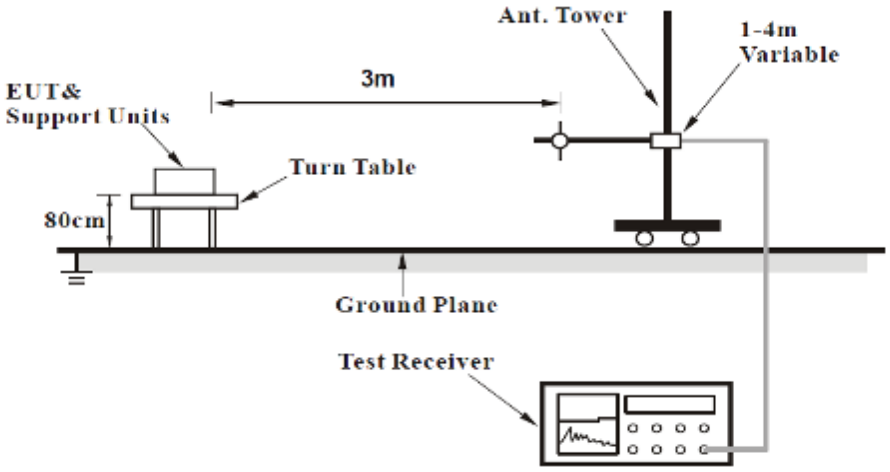
No deviation.

4.8.4 Test Setup

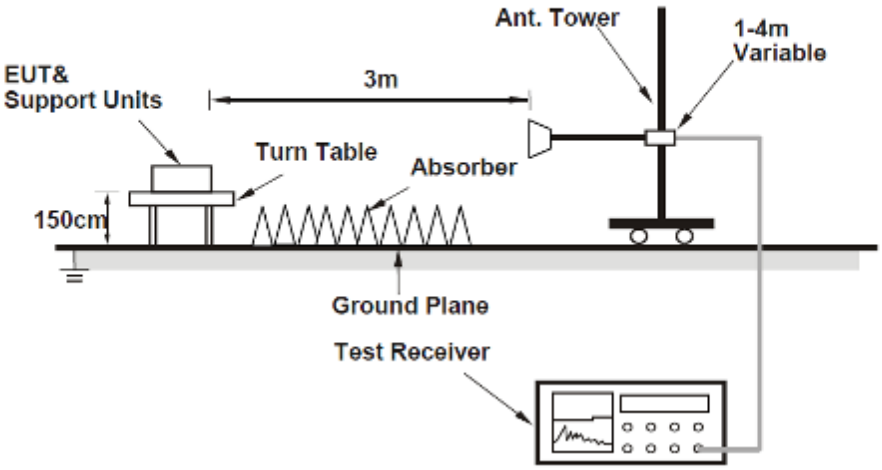
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.8.5 EUT Operating Conditions

a. Placed the EUT on a testing table.

b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

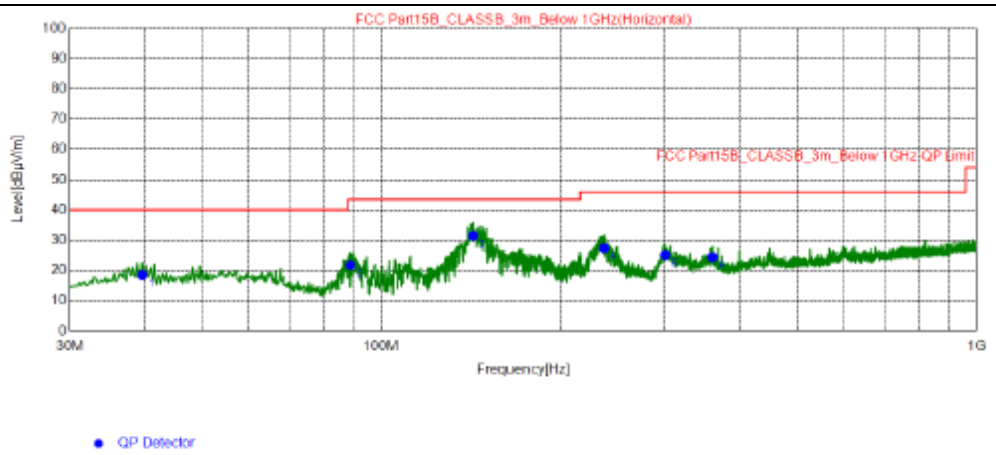
4.8.6 Test Results

Radiated Emissions Range 9kHz~30MHz

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

Radiated Emissions Range 30MHz~1GHz

Mode	802.11b-2412MHz	**Detector Function**	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz	**Antenna Polarity**	Horizontal
Power supply	AC 120V, 60Hz		



Final Data List

NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	39.70	29.01	-10.47	18.54	40.00	21.46	200	329	Horizontal
2	88.78	37.52	-15.70	21.82	43.50	21.68	200	208	Horizontal
3	142.7	41.75	-10.25	31.50	43.50	12.00	200	6	Horizontal
4	236.9	38.59	-11.16	27.43	46.00	18.57	200	6	Horizontal
5	300.0	33.76	-8.62	25.14	46.00	20.86	200	172	Horizontal
6	360.3	31.62	-7.20	24.42	46.00	21.58	200	185	Horizontal

REMARKS:

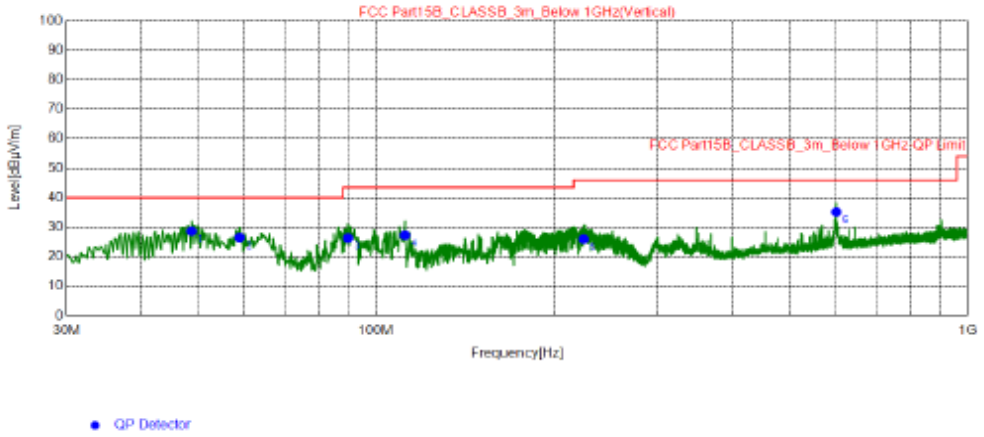
1. Emission Level(dBuV/m) = Spectrum reading (dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value =Limit value – Emission Level

Mode	802.11b-2412MHz	**Detector Function**	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz	**Antenna Polarity**	Vertical
Power supply	AC 120V, 60Hz		



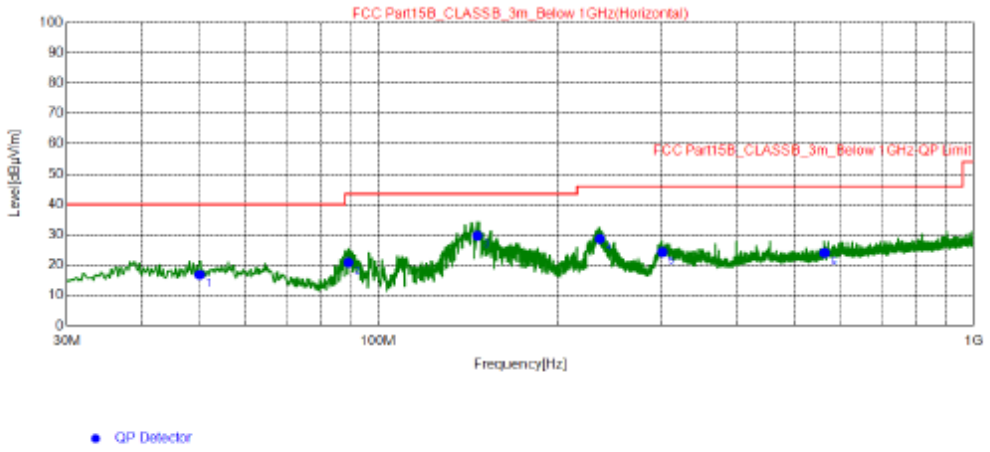
Final Data List

NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.81	38.45	-9.79	28.66	40.00	11.34	100	335	Vertical
2	58.90	36.71	-10.21	26.50	40.00	13.50	100	156	Vertical
3	89.75	42.19	-15.86	26.33	43.50	17.17	100	268	Vertical
4	112.0	40.79	-13.48	27.31	43.50	16.19	100	326	Vertical
5	224.5	37.55	-11.59	25.96	46.00	20.04	100	313	Vertical
6	599.9	37.6	-2.43	35.17	46.00	10.83	100	286	Vertical

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value =Limit value – Emission Level

Channel	802.11b-2412MHz	**Detector Function**	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz	**Antenna Polarity**	Horizontal
Power supply	AC 240V, 50Hz		



Final Data List

NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	50.17	26.53	-9.71	16.82	40.00	23.18	200	331	Horizontal
2	89.17	36.67	-15.77	20.90	43.50	22.60	200	231	Horizontal
3	146.7	39.82	-10.13	29.69	43.50	13.81	200	167	Horizontal
4	235.8	39.86	-11.20	28.66	46.00	17.34	200	1	Horizontal
5	300.2	32.95	-8.61	24.34	46.00	21.66	200	345	Horizontal
6	562.5	27.44	-3.37	24.07	46.00	21.93	200	149	Horizontal

REMARKS:

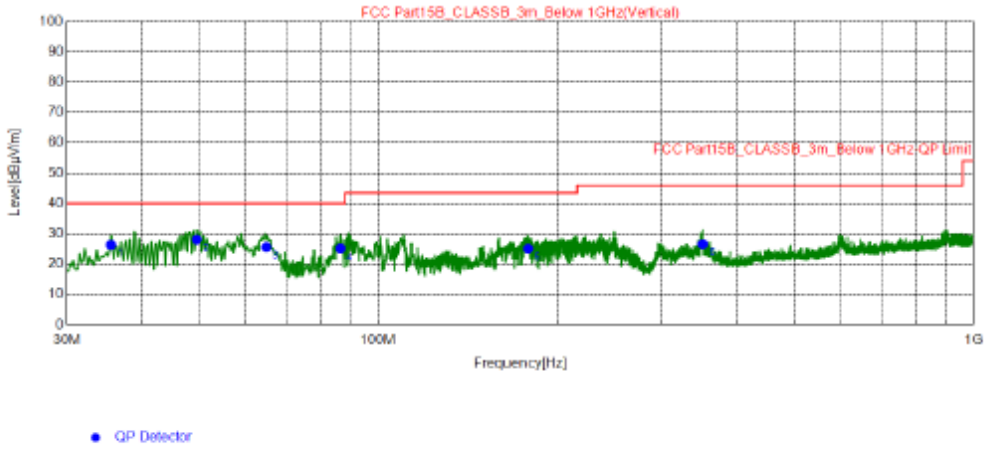
1. Emission Level(dBuV/m) = Spectrum reading (dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Limit value – Emission Level

Channel	802.11b-2412MHz	**Detector Function**	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz	**Antenna Polarity**	Vertical
Power supply	AC 240V, 50Hz		



Final Data List

NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.62	37.32	-10.97	26.35	40.00	13.65	100	242	Vertical
2	49.59	37.88	-9.73	28.15	40.00	11.85	100	74	Vertical
3	64.92	36.74	-11.15	25.59	40.00	14.41	100	228	Vertical
4	86.45	40.52	-15.34	25.18	40.00	14.82	100	242	Vertical
5	178.7	35.94	-10.83	25.11	43.50	18.39	100	295	Vertical
6	351.0	33.99	-7.39	26.60	46.00	19.40	100	151	Vertical

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Limit value – Emission Level

Radiated Emission Range 1GHz~10th Harmonic

802.11b

Channel	TX Channel 1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	7237.3000	33.04	74.00	40.96	-0.66	H	PK
2	7237.3000	27.36	54.00	26.64	-0.66	H	AV
3	7237.3000	32.68	74.00	41.32	-0.66	V	PK
4	7237.3000	27.55	54.00	26.45	-0.66	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	TX Channel 6	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	7312.1000	32.12	74.00	41.88	-0.85	H	PK
2	7312.1000	25.75	54.00	28.25	-0.85	H	AV
3	7312.1000	33.15	74.00	40.85	-0.85	V	PK
4	7312.1000	26.97	54.00	27.03	-0.85	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	TX Channel 11	**Detector Function**	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Correction Factor (dB/m)**	**Antenna Polarity**	**Detector**
1	7386.9000	34.24	74.00	39.76	-1.05	H	PK
2	7386.9000	28.17	54.00	25.83	-1.05	H	AV
3	7386.9000	34.26	74.00	39.74	-1.05	V	PK
4	7386.9000	27.26	54.00	26.74	-1.05	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value =Limit value – Emission Level

802.11g

Channel	TX Channel 1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	7237.3000	33.53	74.00	40.47	-0.66	H	PK
2	7237.3000	27.54	54.00	26.46	-0.66	H	AV
3	7237.3000	33.06	74.00	40.94	-0.66	V	PK
4	7237.3000	28.75	54.00	25.25	-0.66	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	TX Channel 6	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	7312.1000	33.01	74.00	40.99	-0.85	H	PK
2	7312.1000	28.01	54.00	25.99	-0.85	H	AV
3	7312.1000	32.08	74.00	41.92	-0.85	V	PK
4	7312.1000	27.53	54.00	26.47	-0.85	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value =Limit value – Emission Level

Channel	TX Channel 11	**Detector Function**	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Correction Factor (dB/m)**	**Antenna Polarity**	**Detector**
1	7386.9000	35.17	74.00	38.83	-1.05	H	PK
2	7386.9000	28.31	54.00	25.69	-1.05	H	AV
3	7386.9000	33.12	74.00	40.88	-1.05	V	PK
4	7386.9000	27.03	54.00	26.97	-1.05	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

802.11n (HT20)

Channel	TX Channel 1	**Detector Function**	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Correction Factor (dB/m)**	**Antenna Polarity**	**Detector**
1	7237.3000	33.36	74.00	40.64	-0.66	H	PK
2	7237.3000	28.62	54.00	25.38	-0.66	H	AV
3	7237.3000	32.10	74.00	41.90	-0.66	V	PK
4	7237.3000	28.76	54.00	25.24	-0.66	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	TX Channel 6	**Detector Function**	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Correction Factor (dB/m)**	**Antenna Polarity**	**Detector**
1	7312.1000	34.99	74.00	39.01	-0.85	H	PK
2	7312.1000	28.53	54.00	25.47	-0.85	H	AV
3	7312.1000	33.31	74.00	40.69	-0.85	V	PK
4	7312.1000	28.96	54.00	25.04	-0.85	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value =Limit value – Emission Level

Channel	TX Channel 11	**Detector Function**	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Correction Factor (dB/m)**	**Antenna Polarity**	**Detector**
1	7386.9000	35.32	74.00	38.68	-1.05	H	PK
2	7386.9000	29.12	54.00	24.88	-1.05	H	AV
3	7386.9000	35.10	74.00	38.90	-1.05	V	PK
4	7386.9000	29.06	54.00	24.94	-1.05	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

802.11n (HT40)

Channel	TX Channel 3	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	7266.2000	33.45	74.00	40.55	-0.73	H	PK
2	7266.2000	28.31	54.00	25.69	-0.73	H	AV
3	7266.2000	33.23	74.00	40.77	-0.73	V	PK
4	7266.2000	28.01	54.00	25.99	-0.73	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	TX Channel 6	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	7312.1000	33.34	74.00	40.66	-0.85	H	PK
2	7312.1000	28.02	54.00	25.98	-0.85	H	AV
3	7312.1000	35.00	74.00	39.00	-0.85	V	PK
4	7312.1000	27.22	54.00	26.78	-0.85	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	TX Channel 9	**Detector Function**	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Correction Factor (dB/m)**	**Antenna Polarity**	**Detector**
1	7356.3000	33.33	74.00	40.67	-0.97	H	PK
2	7356.3000	28.11	54.00	25.89	-0.97	H	AV
3	7356.3000	33.66	74.00	40.34	33.66	V	PK
4	7356.3000	28.41	54.00	25.59	28.41	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Limit value – Emission Level

5 Pictures of Test Arrangements

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

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