Test Report of FCC CFR 47 Part 15 Subpart C

On Behalf of

SAPPHIRE TECHNOLOGY LIMITED

FCC ID:	**X4Y310**
Product Description:	**IP Camera**
Model No.:	**XPY310**
Supplementary Model:	**N/A**
Brand Name:	**N/A**
Prepared for:	**Nexxt Solutions** 3505 NW 107th Ave, Miami, Fl., 33178, USA
Prepared by:	**Bontek Compliance Testing Laboratory Co., Ltd** 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China Tel: 86-755-86337020 Fax: 86-755-86337028
Report No.:	BCT12KR-2200E
Issue Date:	January 19, 2013
Test Date:	November 26, 2012~January 19, 2013

Tested by: Lion Cai

Reviewed by: Kendy Wang

Approved by: Tony Wu

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	**Nexxt Solutions**
Address of Applicant:	3505 NW 107th Ave, Miami, Fl., 33178, USA
Manufacturer:	**Nexxt Solutions**
Address of Manufacturer:	3505 NW 107th Ave, Miami, Fl., 33178, USA

General Description of E.U.T

Items	Description
EUT Description:	**IP Camera**
Trade Name:	**NEXXT**
Model No.:	**XPY310**
Supplementary Model:	N/A
Frequency Band:	IEEE 802.11b/g, IEEE 802.11n HT20 (ISM Band) : 2412MHz～2462MHz, IEEE 802.11n HT40 (ISM Band) : 2422MHz～2452MHz
Channel Spacing:	IEEE 802.11b/g, 802.11n HT20/HT40: 5MHz
Number of Channels:	IEEE 802.11b/g, 802.11n HT20:11 Channels IEEE 802.11n HT40 :7 Channels
Transmit Data Rate:	maximum of 150Mbps
Type of Modulation:	IEEE 802.11b：DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g：OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40：OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Type:	Built-in Antenna
Antenna Gain:	2dB
Power Supply:	Input: 12V DC 1A
Adapter Information:	Model: RD20W120100 Input:100-240V 1.5A max 50/60Hz Output: 12V DC 1A

** The test data gathered are from the production sample provided by the manufacturer.*

1.2 Test Standards

The tests were performed based on the Electromagnetic Interference (EMI) tests performed on the EUT. Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2003 Radiated testing was performed at an antenna to EUT distance 3 meters.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.207, 15.209 and 15.247 rules and the FCC publication KDB558074 of Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247).

1.3 Test Facility

All measurement required was performed at laboratory of Bontek Compliance Testing Laboratory Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China.

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 338263

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March, 2011.

IC Registration No.: 7631A

The 3m alternate test site of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on January 2011.
The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

CNAS - Registration No.: L3923

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd. to ISO/IEC 17025:25 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.The acceptance letter from the CNAS is maintained in our files: Registration: L3923, March, 2012.

TUV - Registration No.: UA 50242657-0001

Shenzhen Bontek Compliance Testing Laboratory Co.,Ltd. An assessment of the laboratory was conducted according to the"Procedures and Conditions for EMC Test Laboratories"with reference to EN ISO/IEC 17025 by a TUV Rheinland auditor. Audit Report NO.17010783-003

2. SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

Support equipments or special accessories in test configuration：

AUX Description:	Manufacturer	Model No.	Certificate	CABLE
Host Computer	Dell	78MD82X	CE, FCC	1.5m Unshielded Power Cord
Monitor	Dell	E178Pc	CE, FCC	1.5m Unshielded Power Cord 1.8m shielded data Cable with core
Keyboard	Dell	L100	CE, FCC	1.8m shielded data Cable with core
LCD Colour TV	SHARP	LCD-32Z330A	CE, FCC	1.2m Unshielded Power Cord 1.5m shielded data Cable with core

2.3 General Test Procedures

Conducted Emissions:The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2003 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions: The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

2.4 Measurement Uncertainty

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

Parameter	Uncertainty
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

Uncertainty figures are valid to a confidence level of 95%.

2.5 List of Measuring Equipments Used

Test equipments list of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.

No.	Equipment	Manufacturer	Model No.	S/N	Calibration date	Calibration due date
1	EMI Test Receiver	R&S	ESCI	100687	2012-4-6	2013-4-5
2	EMI Test Receiver	R&S	ESPI	100097	2012-7-25	2013-7-24
3	Amplifier	HP	8447D	1937A02492	2012-4-6	2013-4-5
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2012-4-6	2013-4-5
5	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07102	2012-4-6	2013-4-5
6	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
7	Signal generator	Rhode & Schwarz	SMIQ 03HD + option SM-B1, SMIQB11, SMIQB12, SMIQB14, SMIQB17, SMIQB20	1125.5555.46	2012-4-6	2013-4-5
8	GSM system simulator	Rhode & Schwarz	CMU200 + option K20, K21, K22, K23, K24, K27, K28, K29, K42, K65, B12, B41, B52, B66, B56	1100.0008.34	2012-4-6	2013-4-5
9	GSM system simulator	Agilent	8960 Series 10 E1985A + GSM_AMPS	B.01.76 GB42450443	2012-4-6	2013-4-5
10	Spectrum Analyzer	Agilent	E4404B	US41192833	2012-4-6	2013-4-5
11	6dB Attenuator	Atten	Attenuator	DC-4GHz	2012-4-6	2013-4-5
12	Digital Multimeter	Fluke	15B	91280239	2012-4-6	2013-4-5
13	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2012-4-10	2013-4-9
14	Horn Antenna	SCHWARZBECK	BBHA9120A	0499	2012-11-27	2013-11-26
15	Active Loop Antenna	DAZE	ZN30900A	1200	2012-4-6	2013-4-6
16	9kHz-2.4GHz signal generator 2024	MARCONI	10S/6625-99-457-8730	112260/042	2012-4-6	2013-4-5
17	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2012-4-6	2013-4-5
18	Spectrum Analyzer	R&S	FSP	100397	2012-11-2	2013-11-1
19	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2012-4-6	2013-4-5
20	Temperature & Humidity Chamber	TOPSTAT	TOS-831A	3438A05208	2012-4-6	2013-4-5

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.207	AC Power Line Conducted Emission	Pass
FCC §15.247(b)	Maximum Peak Output Power	Pass
FCC §15.247(e)	Power Spectral Density	Pass
FCC §15.247(a)	6dB Bandwidth	Pass
FCC §15.247 (d)	Conducted Spurious Emission	Pass
FCC §15.205 and §15.209	Radiated Spurious Emission	Pass
FCC §15.203/15.247(b)/(c)	Antenna Requirement	Pass

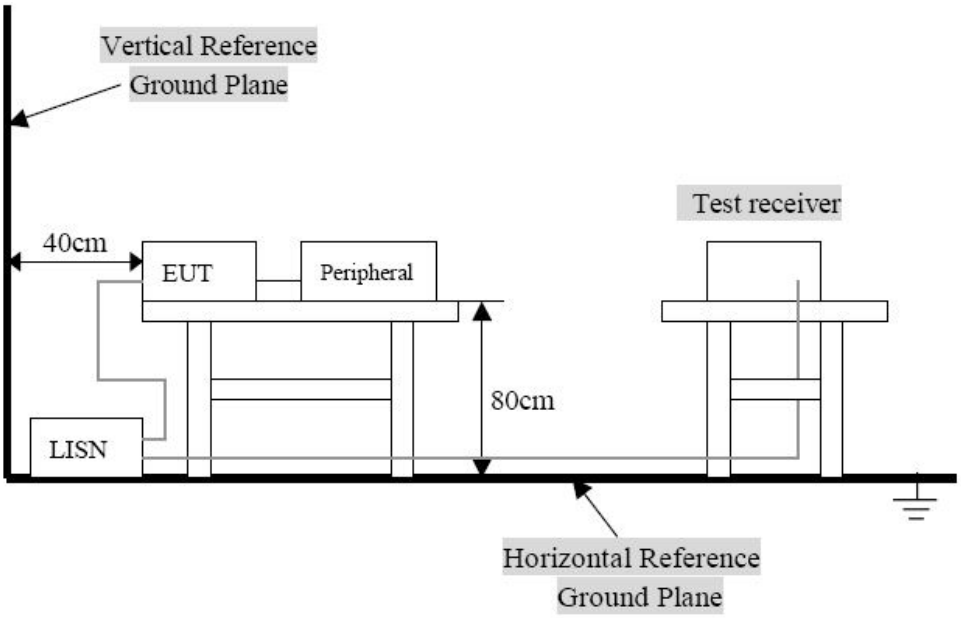
4. TEST OF AC POWER LINE CONDUCTED EMISSION

4.1 Applicable Standard

Refer to FCC §15.207.
For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150～0.500	66～56	56～46
0.500～5.000	56	46
5.000～30.00	60	50

4.2 Test Setup Diagram



Remark: The EUT was connected to a 120 VAC/ 60Hz power source.

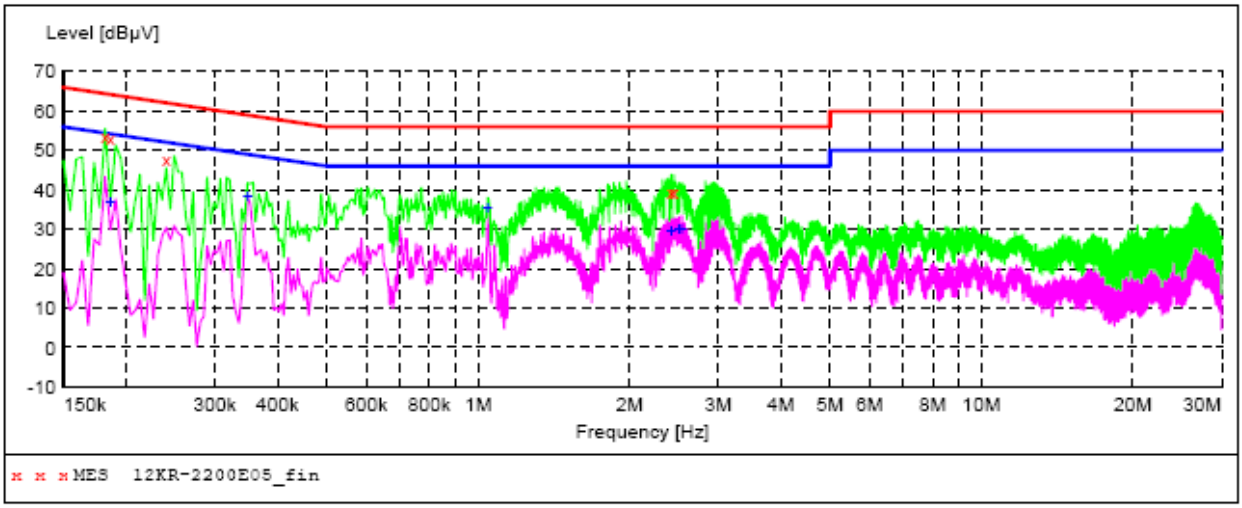
4.3 Test Result

Temperature (℃) : 23~25	EUT: IP Camera
Humidity (%RH): 45~58	M/N: XPY310
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

Conducted Emission:

EUT:	IP Camera
M/N:	XPY310
Operating Condition:	Tx Mode
Test Site:	Shielded Room
Operator:	Yang
Test Specification:	AC 120V/60Hz for adapter
Comment:	L Line

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "12KR-2200E05_fin"

1/13/2013

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.181500	53.70	11.0	64	10.7	QP	L1	GND
0.186000	53.20	11.0	64	11.0	QP	L1	GND
0.240000	47.70	10.7	62	14.4	QP	L1	GND
2.418000	39.40	10.2	56	16.6	QP	L1	GND
2.454000	39.50	10.2	56	16.5	QP	L1	GND

MEASUREMENT RESULT: "12KR-2200E05_fin2"

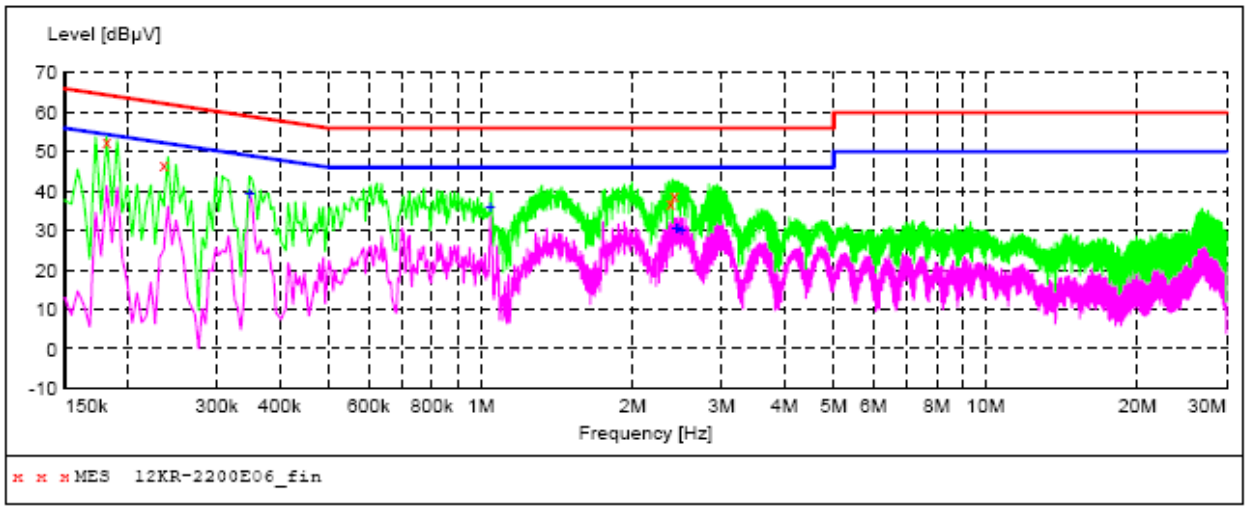
1/13/2013

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.186000	36.70	11.0	54	17.5	AV	L1	GND
0.348000	38.50	10.5	49	10.5	AV	L1	GND
1.045500	35.40	10.3	46	10.6	AV	L1	GND
2.418000	29.90	10.2	46	16.1	AV	L1	GND
2.503500	30.20	10.2	46	15.8	AV	L1	GND
2.539500	30.10	10.2	46	15.9	AV	L1	GND

Conducted Emission:

EUT:	IP Camera
M/N:	XPY310
Operating Condition:	Tx Mode
Test Site:	Shielded Room
Operator:	Yang
Test Specification:	AC 120V/60Hz for adapter
Comment:	N Line

SCAN TABLE: "Voltage (9K-30M) FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "12KR-2200E06_fin"

1/13/2013

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.181500	52.90	11.0	64	11.5	QP	N	GND
0.235500	47.00	10.7	62	15.3	QP	N	GND
2.373000	37.10	10.2	56	18.9	QP	N	GND
2.418000	39.20	10.2	56	16.8	QP	N	GND

MEASUREMENT RESULT: "12KR-2200E06_fin2"

1/13/2013

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.348000	39.40	10.5	49	9.6	AV	N	GND
1.045500	35.80	10.3	46	10.2	AV	N	GND
2.440500	30.60	10.2	46	15.4	AV	N	GND
2.445000	30.40	10.2	46	15.6	AV	N	GND
2.449500	30.40	10.2	46	15.6	AV	N	GND
2.499000	30.10	10.2	46	15.9	AV	N	GND

5. Test of Maximum Peak Output Power

5.1 Applicable Standard

Refer to FCC §15.247 (b)

5.2 EUT Setup

Spectrum Analyzer

5.3 Test Equipment List and Details

See section 2.5.

5.4 Test Procedure

This procedure should only be used when the maximum available RBW of the spectrum/signal analyzer is less than the DTS bandwidth. The transmitter output was connected to a spectrum analyzer and the parameter was set as below:

1. Set the RBW = maximum available (at least 1 MHz).

2. Set the VBW = 3 x RBW or maximum available setting (must be ≥ RBW).

3. Set the span to fully encompass the DTS bandwidth.

4. Detector = peak.

5. Sweep time = auto couple.

6. Trace mode = max hold.

7. Allow trace to fully stabilize.

8. Use the spectrum analyzer's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth.

5.5 Test Result

Temperature (℃) : 22~23	EUT: IP Camera
Humidity (%RH): 50~54	M/N: XPY310
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

IEEE 802.11b mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2412	15.37	30	PASS
Middle	2437	14.75	30	PASS
High	2462	15.35	30	PASS

NOTE : 1. At finial test to get the worst-case emission at 1Mbps.

IEEE 802.11g mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2412	14.07	30	PASS
Middle	2437	13.70	30	PASS
High	2462	13.80	30	PASS

NOTE : 1. At finial test to get the worst-case emission at 54Mbps.

IEEE 802.11n HT20mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2412	12.74	30	PASS
Middle	2437	12.29	30	PASS
High	2462	12.09	30	PASS

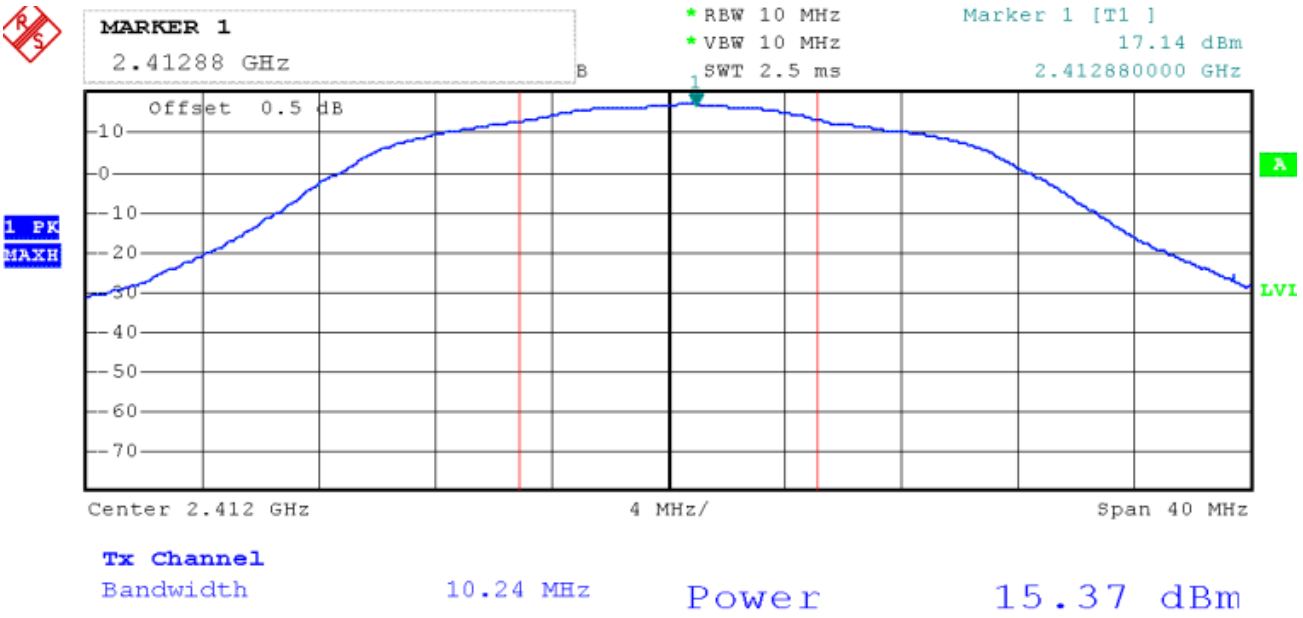
NOTE : 1. At finial test to get the worst-case emission at 12Mbps.

IEEE 802. 11n HT40 mode

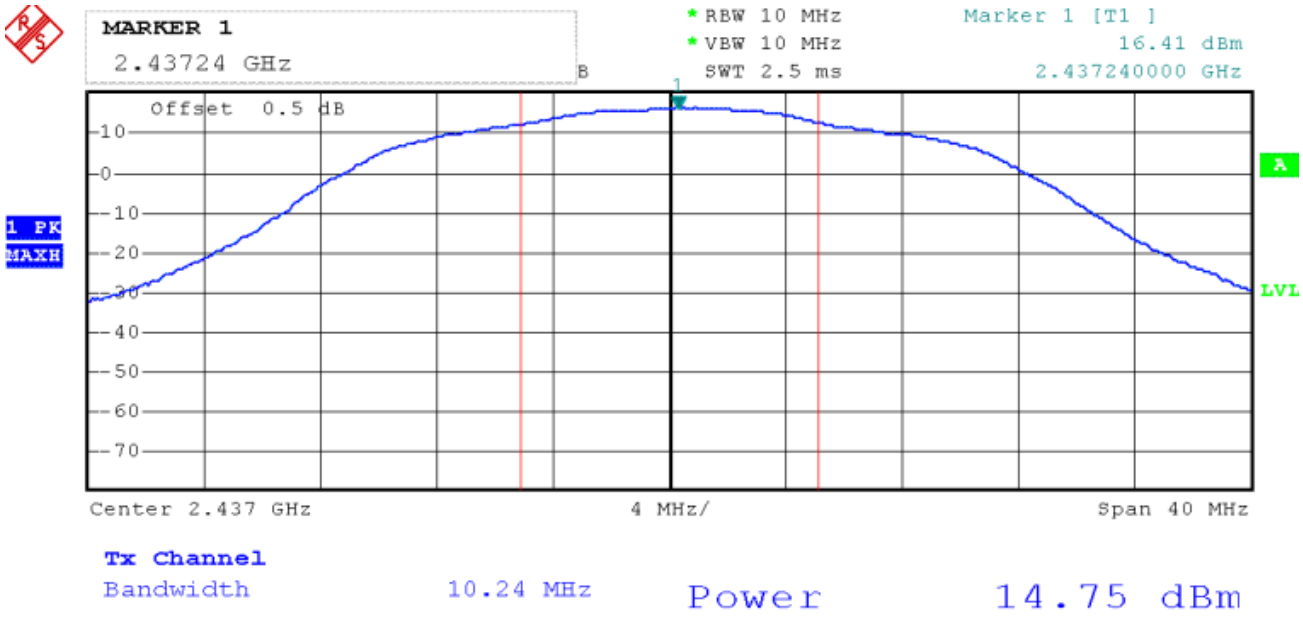
Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2422	10.86	30	PASS
Middle	2437	10.44	30	PASS
High	2452	10.20	30	PASS

NOTE : 1. At finial test to get the worst-case emission at 22Mbps.

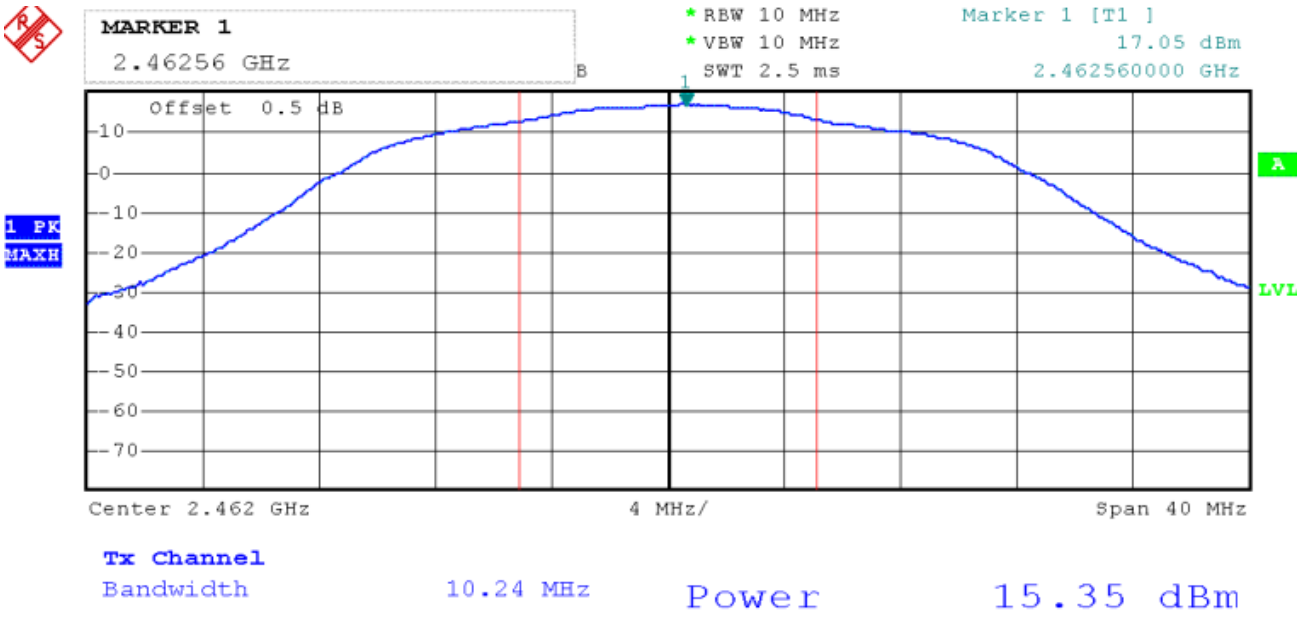
MAXIMUM PEAK OUTPUT POWER (802.11b MODE CH Low)



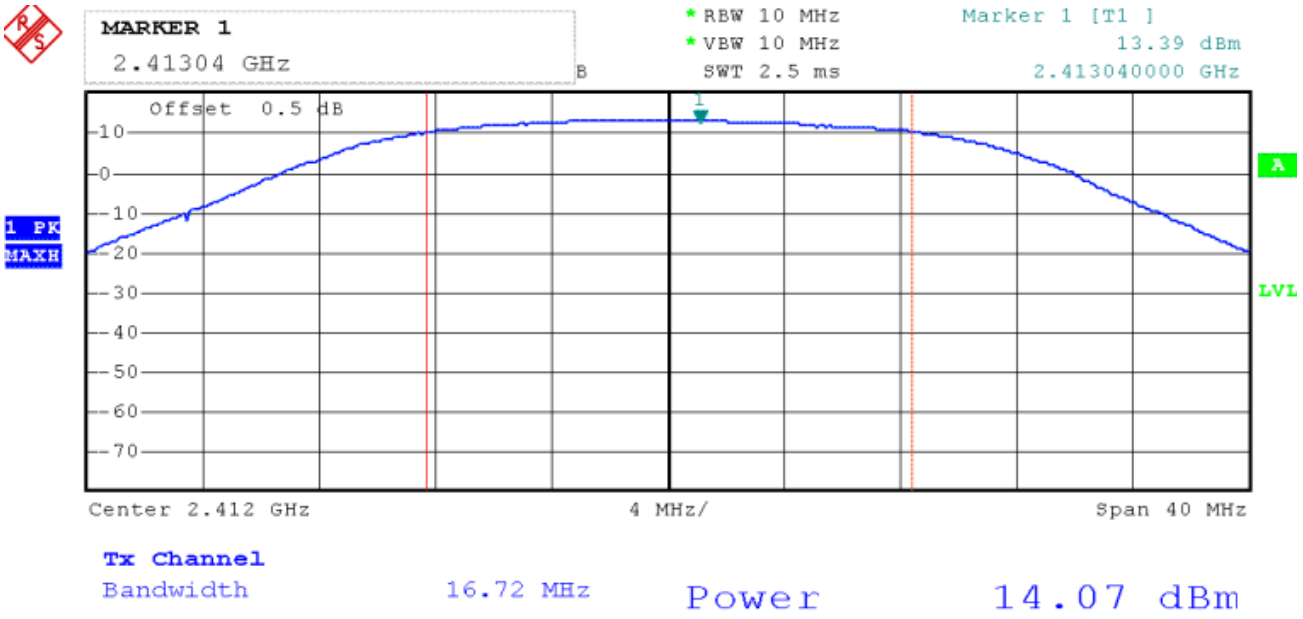
MAXIMUM PEAK OUTPUT POWER (802.11b MODE CH Mid)



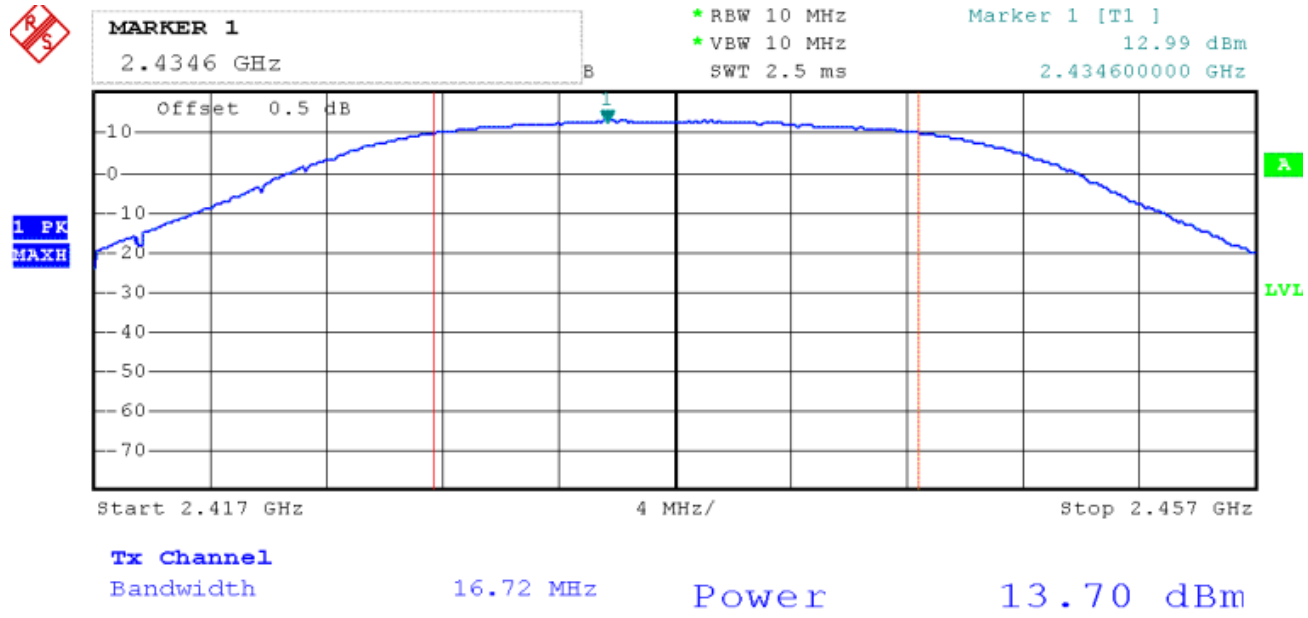
MAXIMUM PEAK OUTPUT POWER (802.11b MODE CH High)



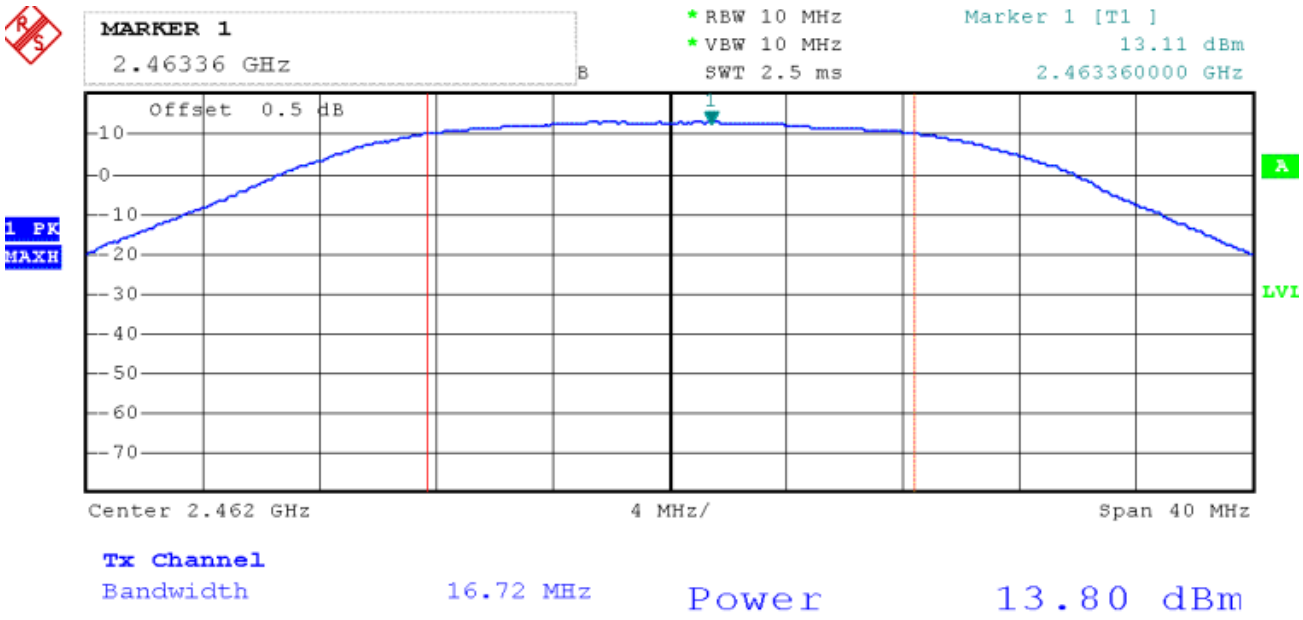
MAXIMUM PEAK OUTPUT POWER (802.11g MODE CH Low)



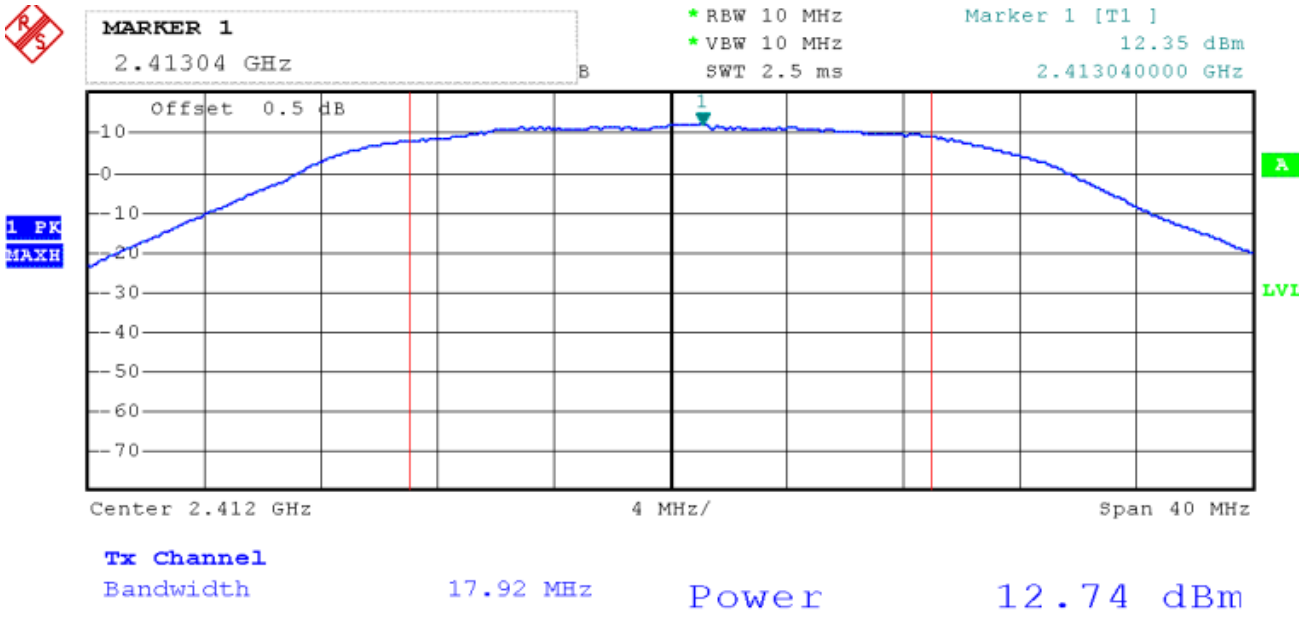
MAXIMUM PEAK OUTPUT POWER (802.11g MODE CH Mid)



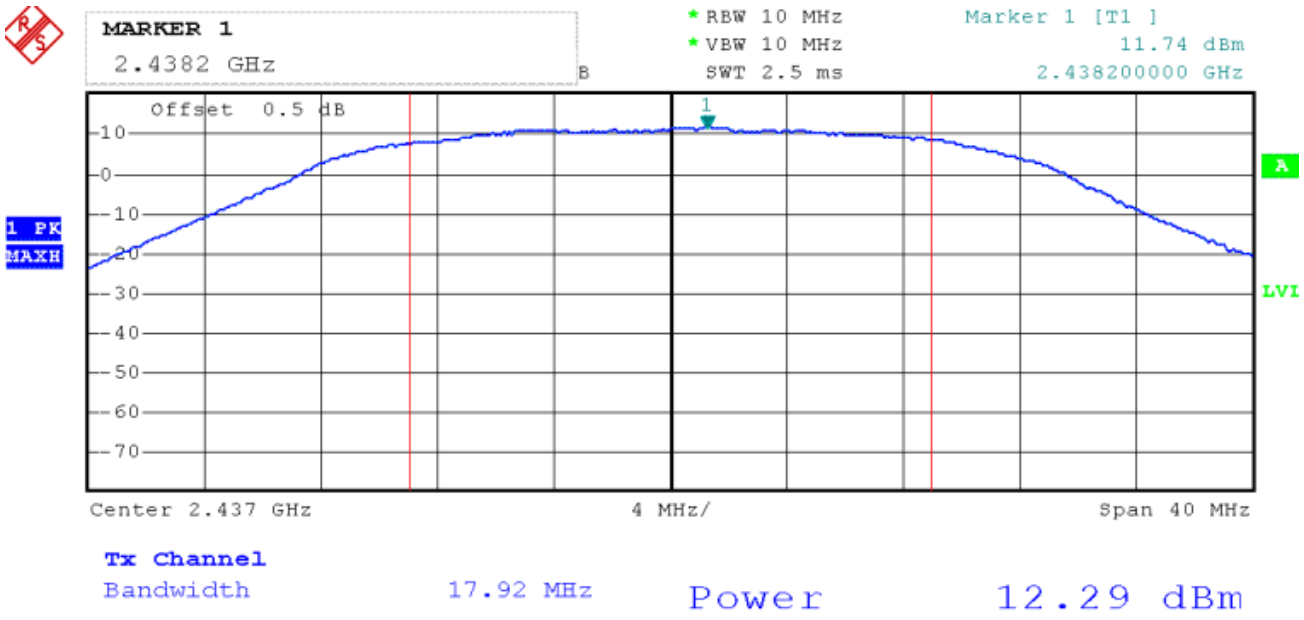
MAXIMUM PEAK OUTPUT POWER (802.11g MODE CH High)



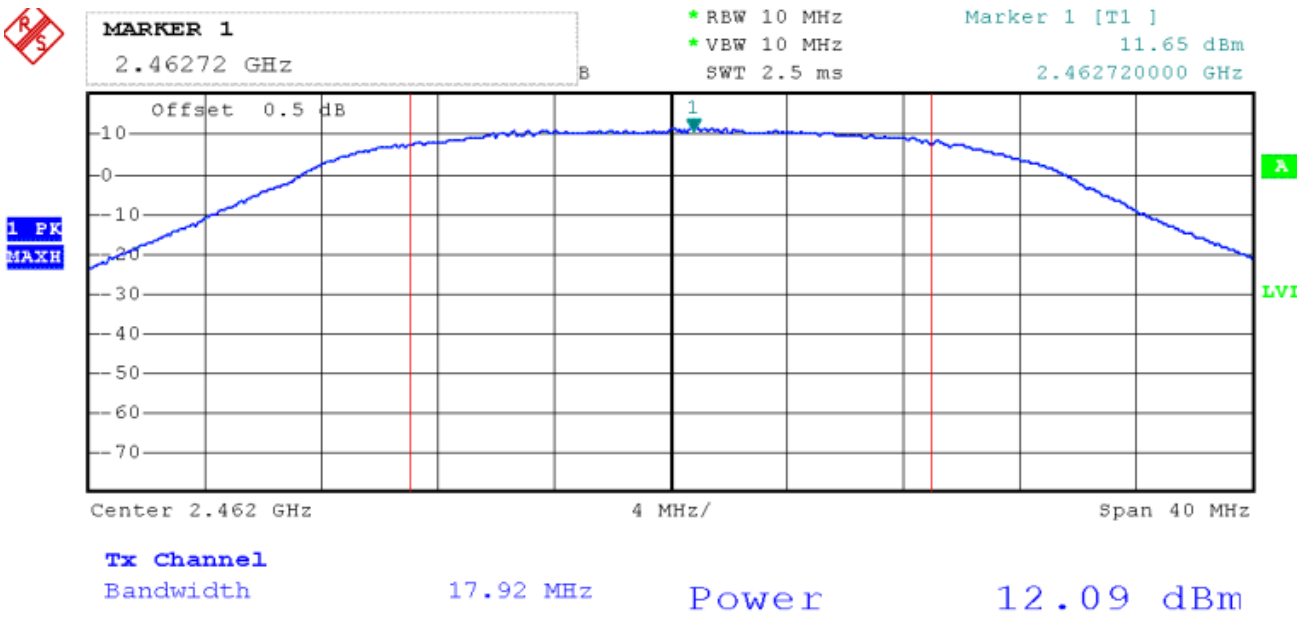
MAXIMUM PEAK OUTPUT POWER (802.11nHT20 MODE CH Low)



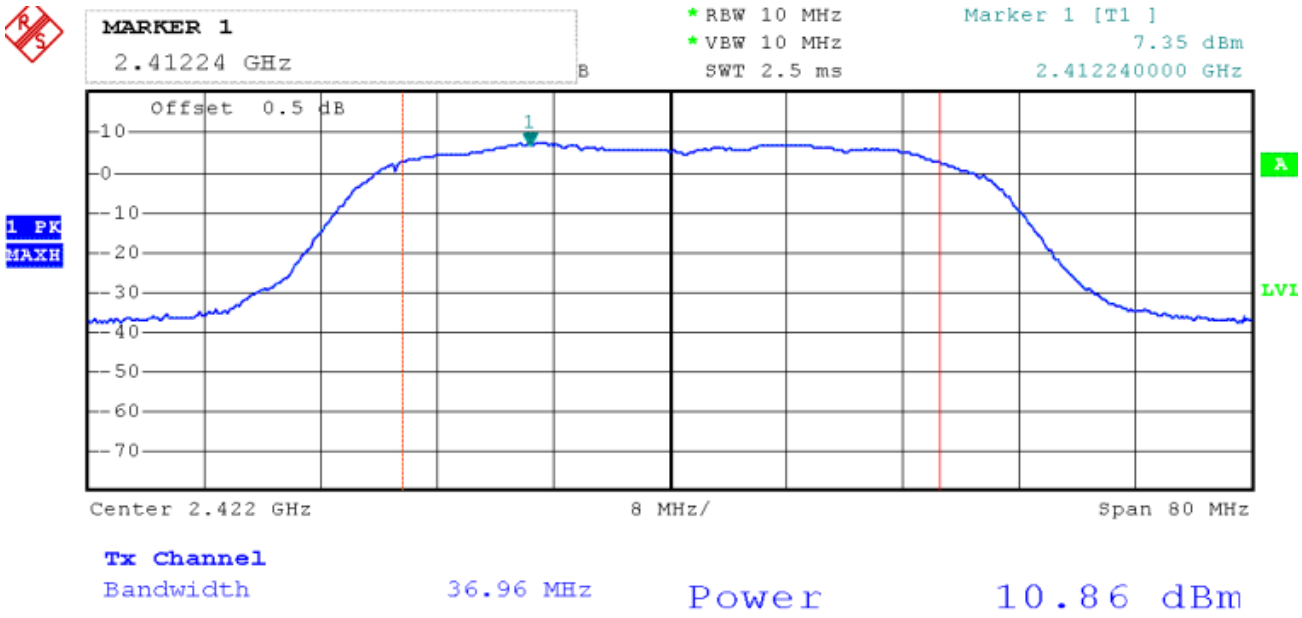
MAXIMUM PEAK OUTPUT POWER (802.11nHT20 MODE CH Mid)



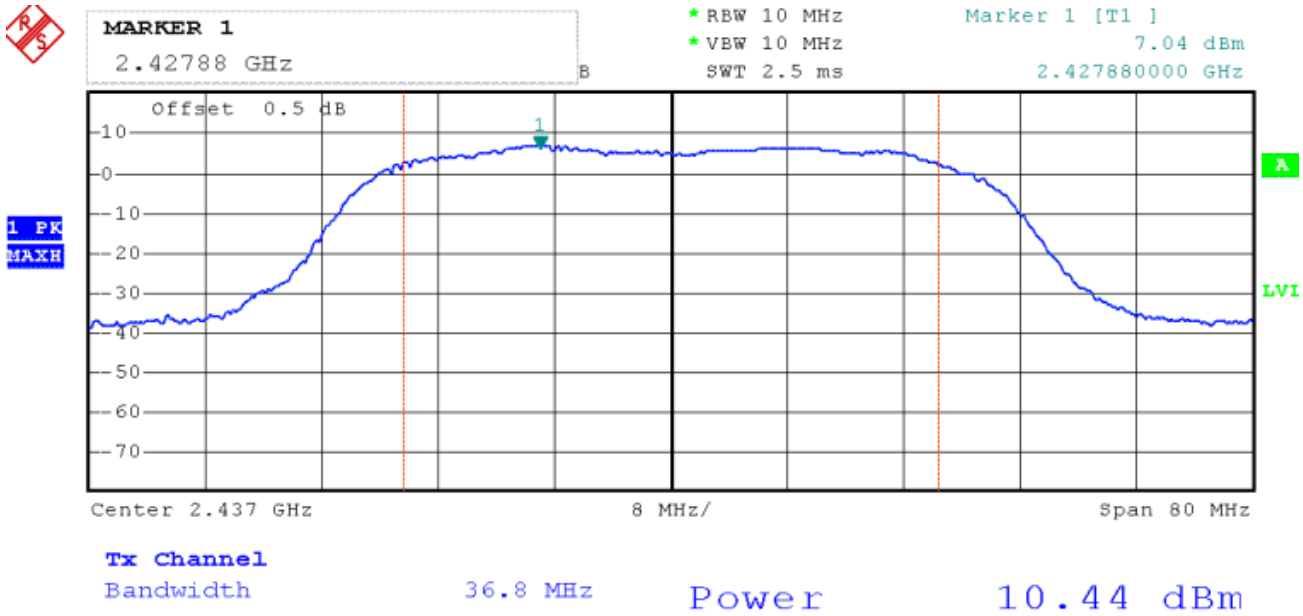
MAXIMUM PEAK OUTPUT POWER (802.11nHT20 MODE CH High)



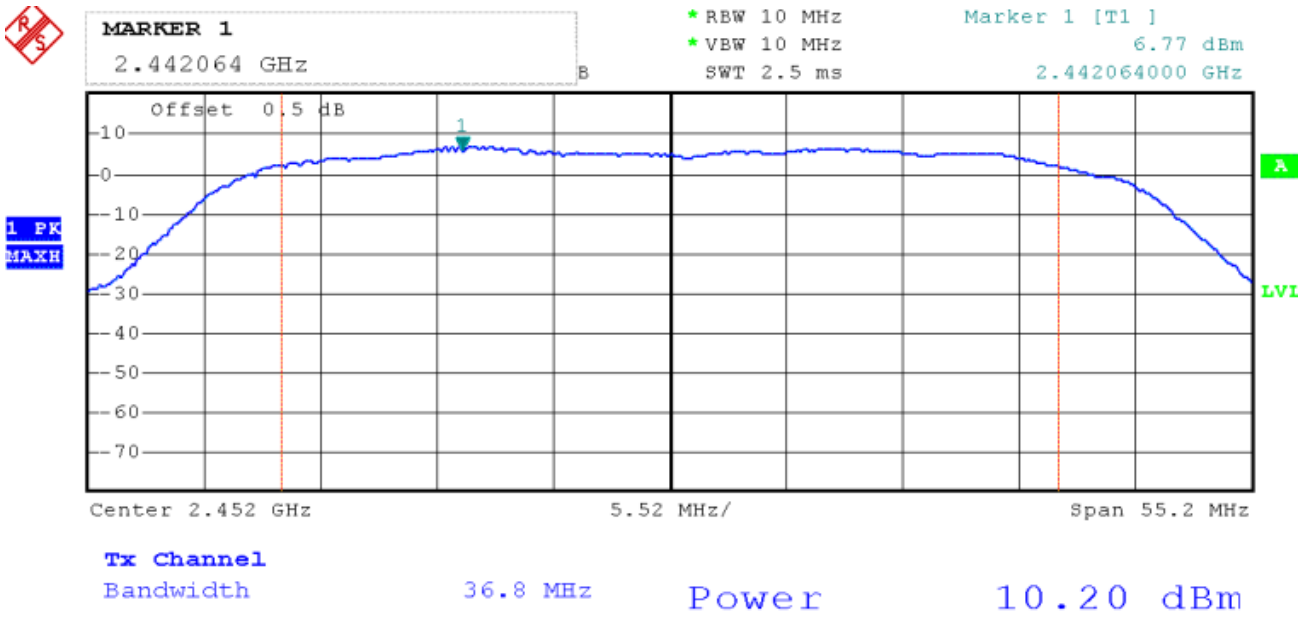
MAXIMUM PEAK OUTPUT POWER (802.11nHT40 MODE CH Low)



MAXIMUM PEAK OUTPUT POWER (802.11nHT40 MODE CH Mid)



MAXIMUM PEAK OUTPUT POWER (802.11nHT40 MODE CH High)



6. Test of Peak Power Spectral Density

6.1 Applicable Standard

Refer to FCC §15.247 (e).

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

6.2 EUT Setup

Spectrum Analyzer

6.3 Test Equipment List and Details

See section 2.5.

6.4 Test Procedure

The transmitter output was connected to the spectrum analyzer and the parameter was set as below:

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x 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.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

6.5 Test Result

Temperature (℃) : 22~23	EUT: IP Camera
Humidity (%RH): 50~54	M/N: XPY310
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

IEEE 802.11b mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maximum Limit (dBm)	Pass / Fail
Low	2412	-17.01	8	PASS
Middle	2437	-16.37	8	PASS
High	2462	-17.10	8	PASS

NOTE : 1. At finial test to get the worst-case emission at 11Mbps.

IEEE 802.11 g mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maximum Limit (dBm)	Pass / Fail
Low	2412	-22.25	8	PASS
Middle	2437	-22.38	8	PASS
High	2462	-22.84	8	PASS

NOTE : 1. At finial test to get the worst-case emission at 54Mbps.

IEEE 802.11nHT20 mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maximum Limit (dBm)	Pass / Fail
Low	2412	-24.26	8	PASS
Middle	2437	-23.77	8	PASS
High	2462	-23.87	8	PASS

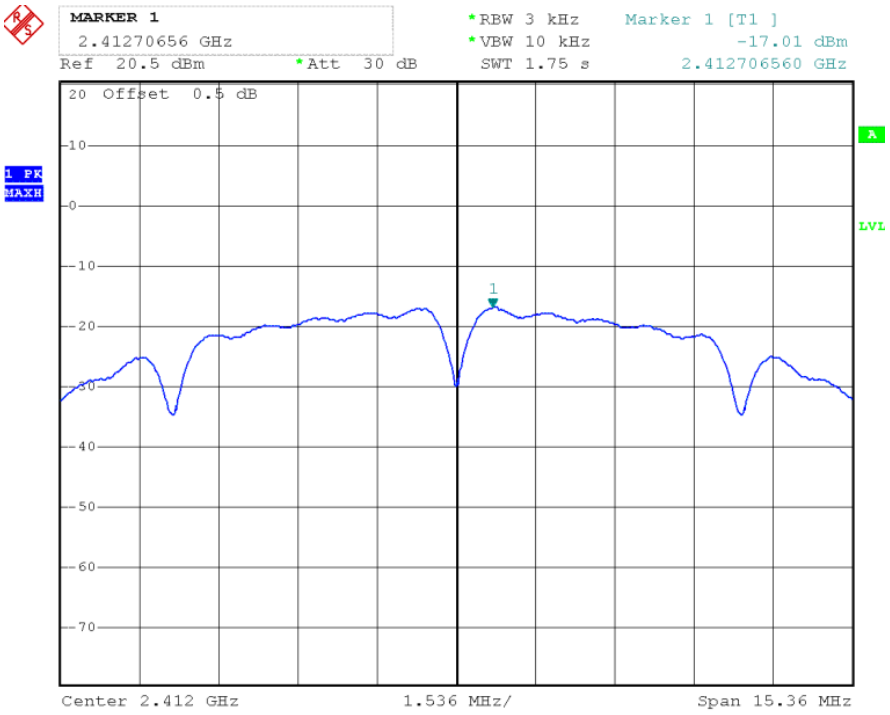
NOTE : 1. At finial test to get the worst-case emission at 12Mbps.

IEEE 802.11nHT40 mode

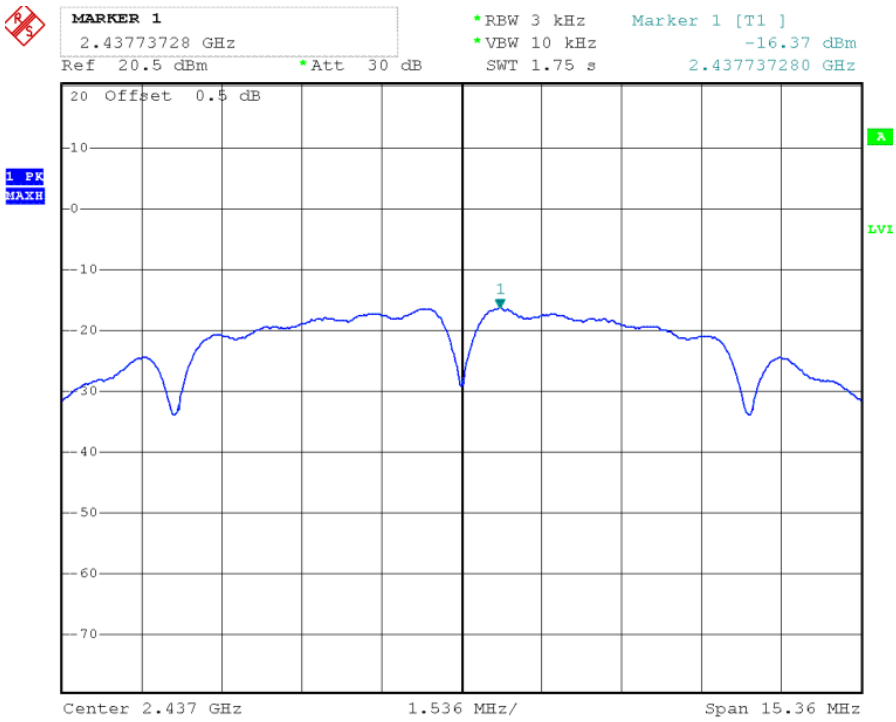
Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maximum Limit (dBm)	Pass / Fail
Low	2422	-27.53	8	PASS
Middle	2437	-27.90	8	PASS
High	2452	-28.86	8	PASS

NOTE : 1. At finial test to get the worst-case emission at 22Mbps.

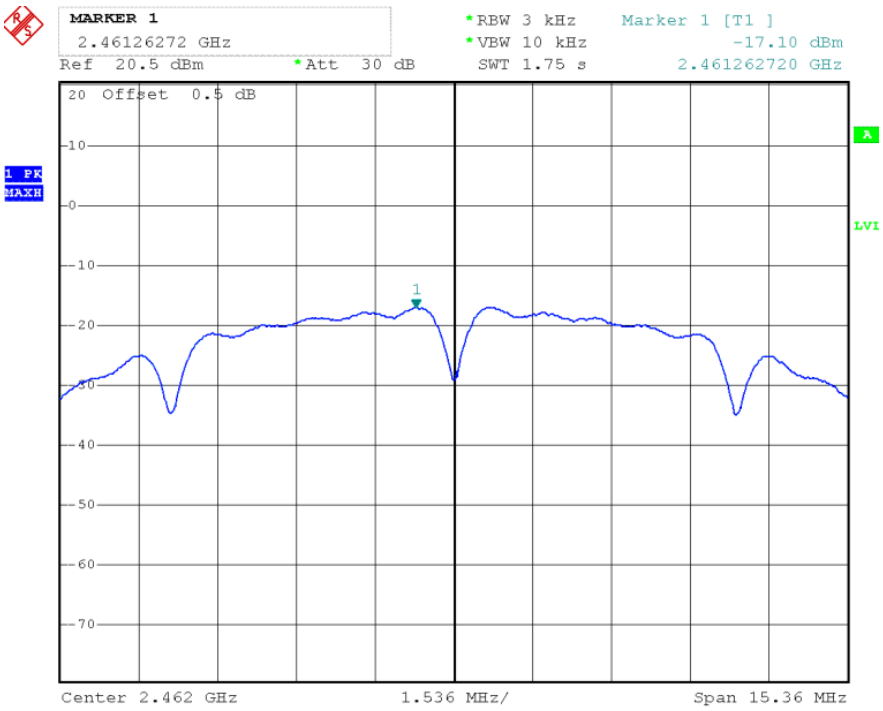
POWER SPECTRAL DENSITY (802.11b MODE CH Low)



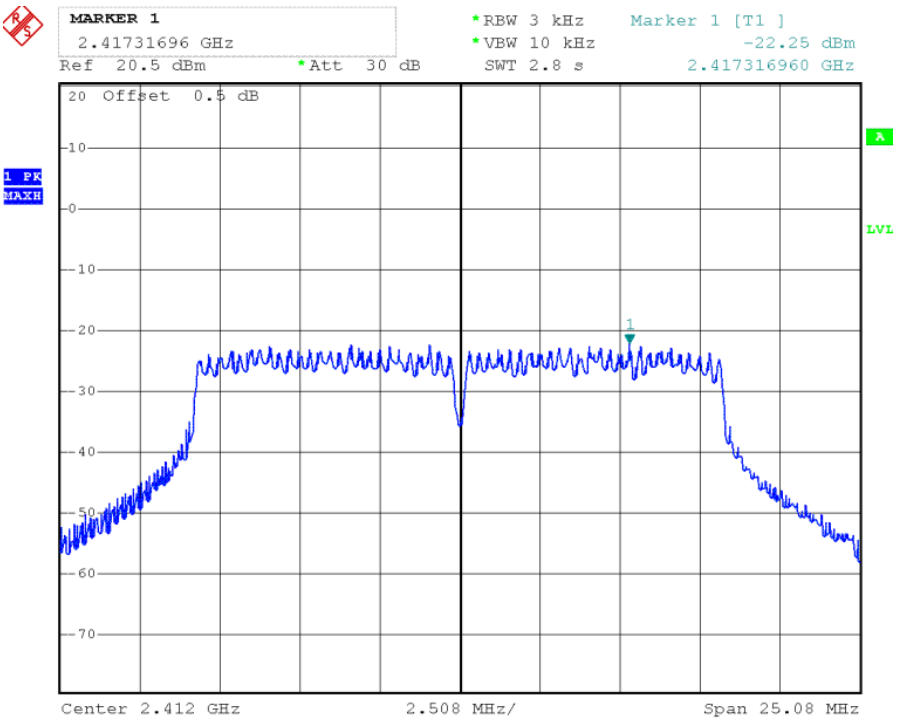
POWER SPECTRAL DENSITY (802.11b MODE CH Mid)



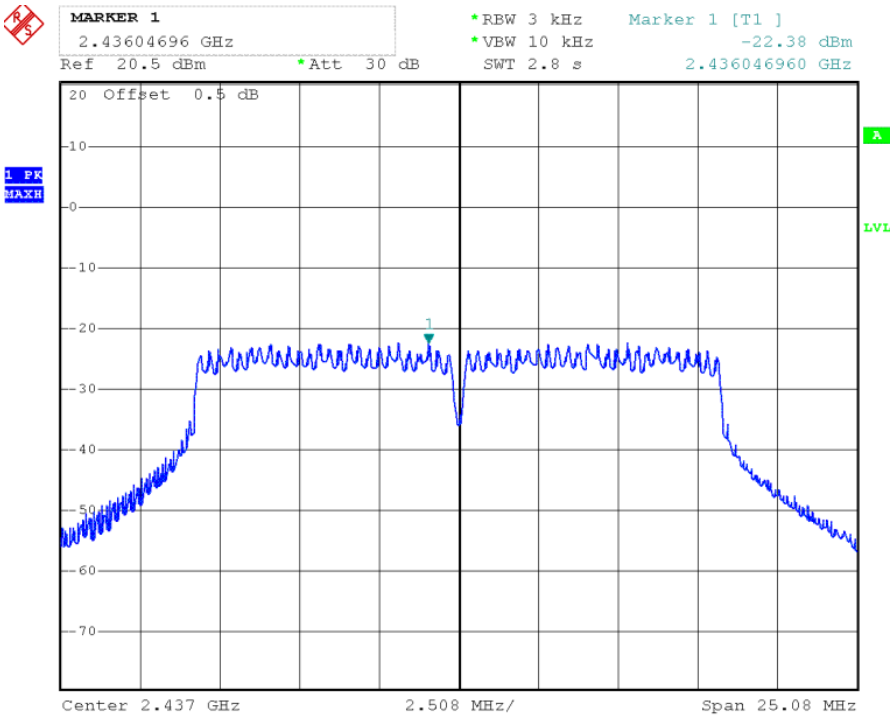
POWER SPECTRAL DENSITY (802.11b MODE CH High)



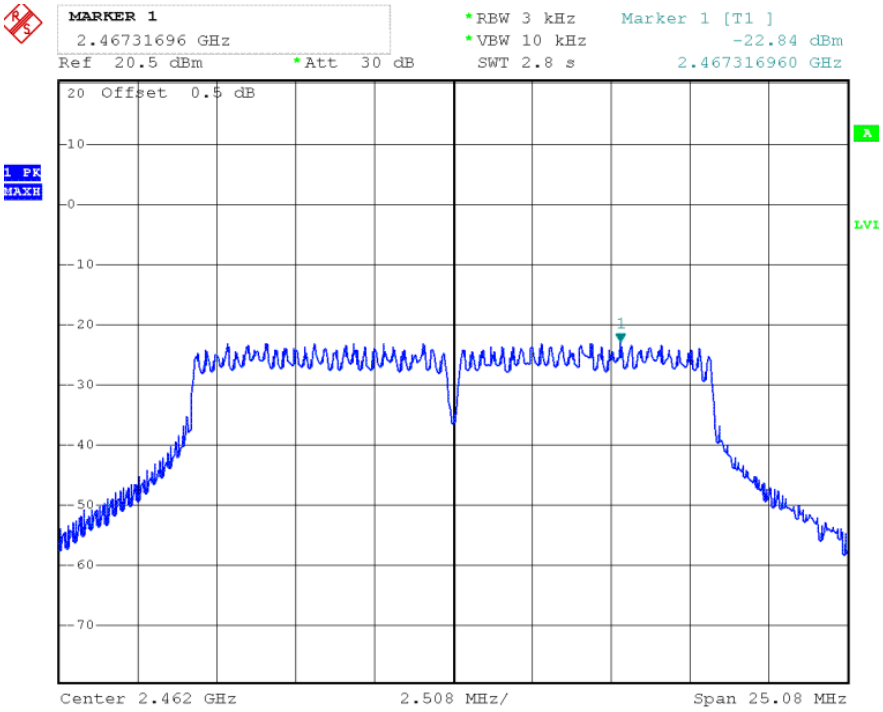
POWER SPECTRAL DENSITY (802.11g MODE CH Low)



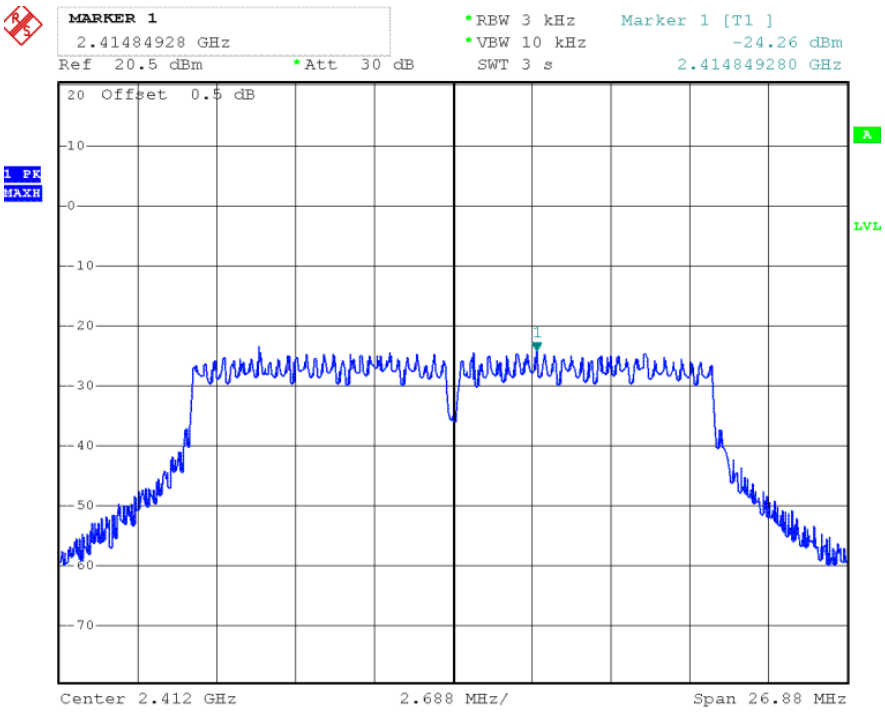
POWER SPECTRAL DENSITY (802.11g MODE CH Mid)



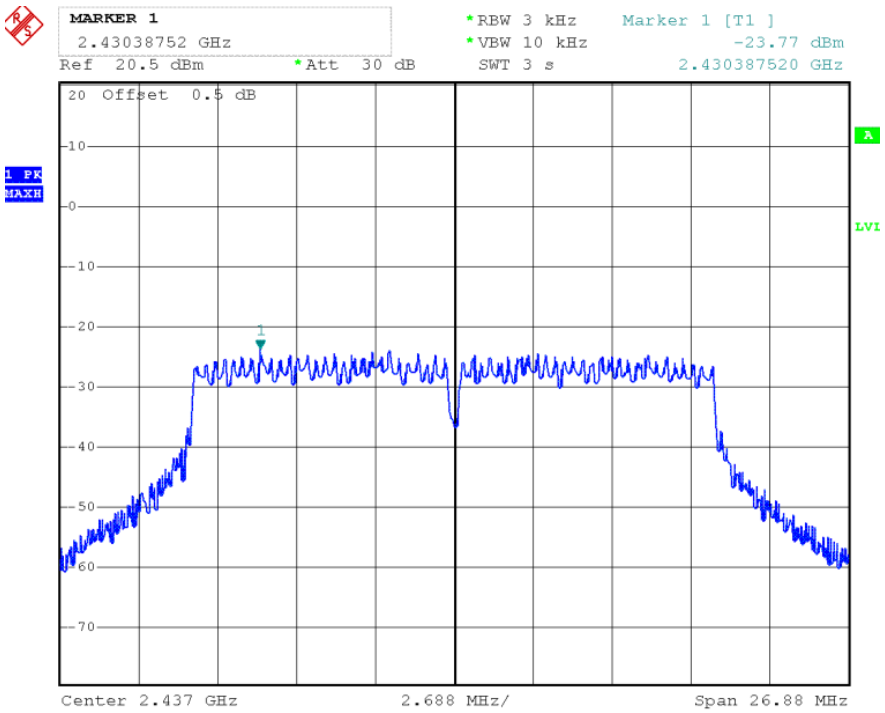
POWER SPECTRAL DENSITY (802.11g MODE CH High)



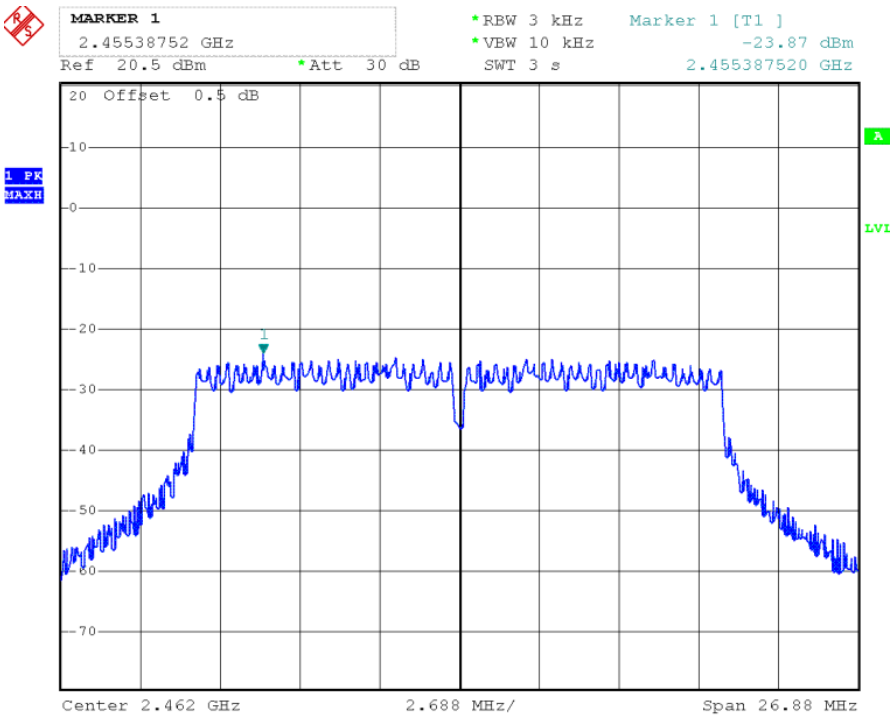
POWER SPECTRAL DENSITY (802.11nHT20 MODE CH Low)



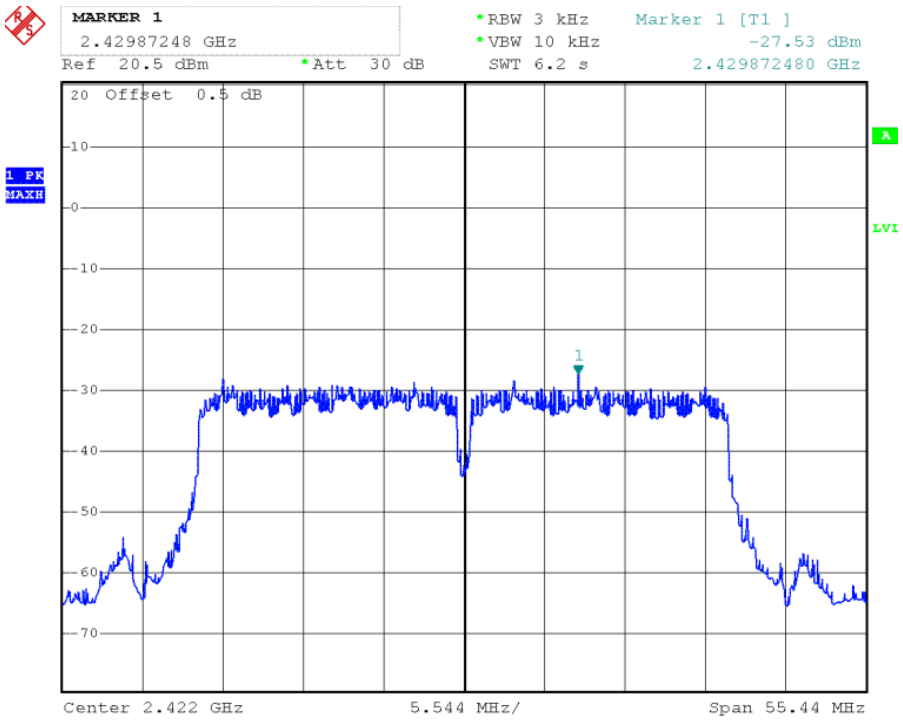
POWER SPECTRAL DENSITY (802.11nHT20 MODE CH Mid)



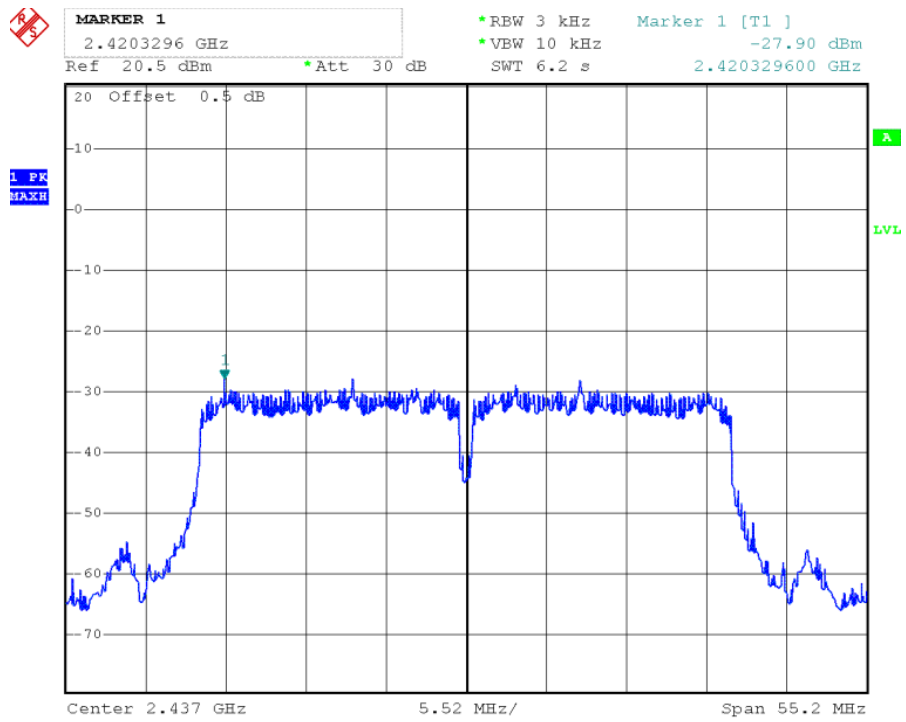
POWER SPECTRAL DENSITY (802.11nHT20 MODE CH High)



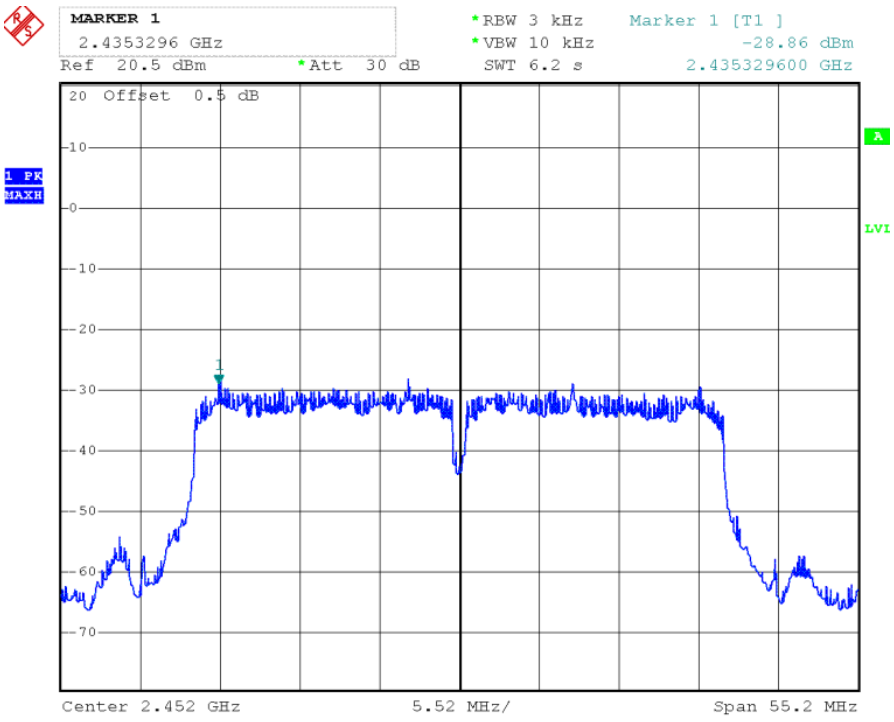
POWER SPECTRAL DENSITY (802.11nHT40 MODE CH Low)



POWER SPECTRAL DENSITY (802.11nHT40 MODE CH Mid)



POWER SPECTRAL DENSITY (802.11nHT40 MODE CH High)



7. Test of 6dB Bandwidth

7.1 Applicable Standard

Refer to FCC §15.247 (a) (2) .

The minimum 6 dB bandwidth shall be at least 500 kHz.

7.2 EUT Setup

Spectrum Analyzer

7.3 Test Equipment List and Details

See section 2.5.

7.4 Test Procedure

The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB. The transmitter output was connected to a spectrum analyzer and the parameter was set as below:

1. Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.

2. Set the video bandwidth (VBW) ⩾ 3 x 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) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.5 Test Result

Temperature (℃) : 22~23	EUT: IP Camera
Humidity (%RH): 50~54	M/N: XPY310
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

IEEE 802.11b mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	10.24	500	PASS
Middle	2437	10.24	500	PASS
High	2462	10.32	500	PASS

NOTE : 1. At finial test to get the worst-case emission at 1Mbps.

IEEE 802.11g mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	16.72	500	PASS
Middle	2437	16.72	500	PASS
High	2462	16.72	500	PASS

NOTE : 1. At finial test to get the worst-case emission at 6Mbps.

IEEE 802.11n HT20 mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	17.92	500	PASS
Middle	2437	17.92	500	PASS
High	2462	17.92	500	PASS

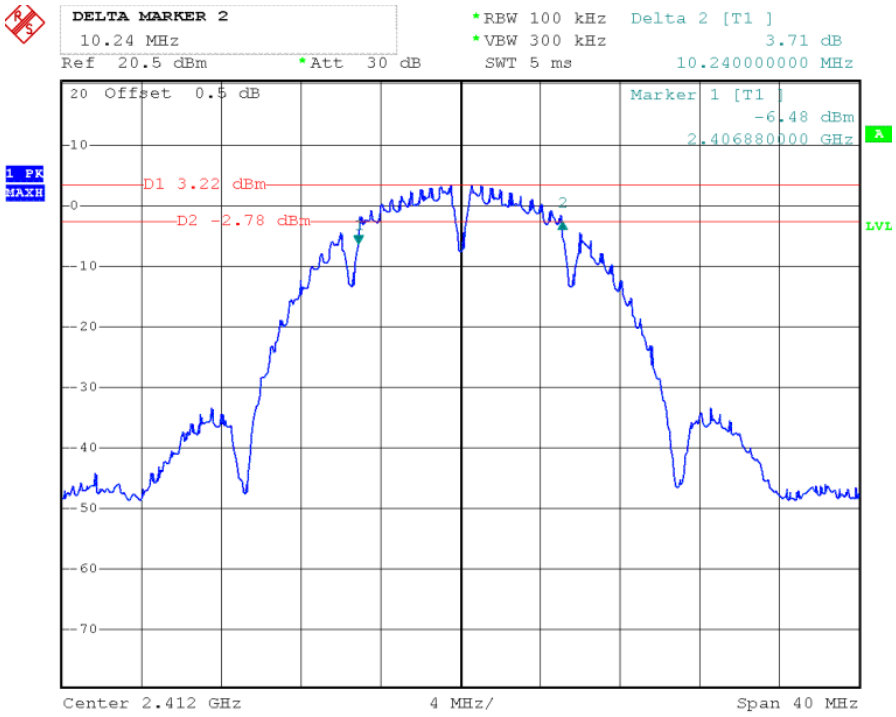
NOTE : 1. At finial test to get the worst-case emission at 13Mbps.

IEEE 802.11 n HT40mode

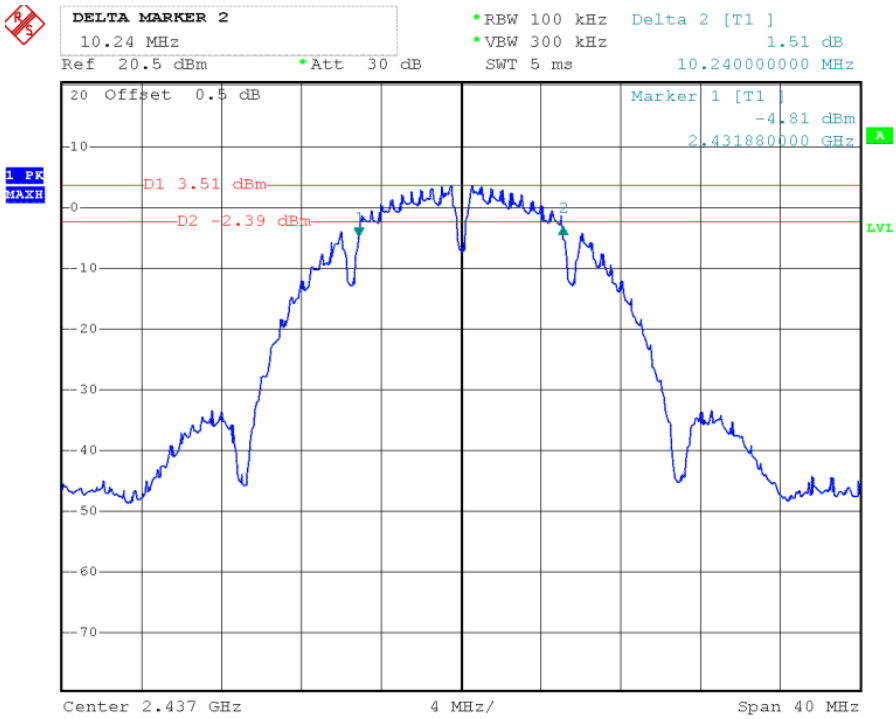
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2422	36.96	500	PASS
Middle	2437	36.80	500	PASS
High	2452	36.80	500	PASS

NOTE : 1. At finial test to get the worst-case emission at 13Mbps.

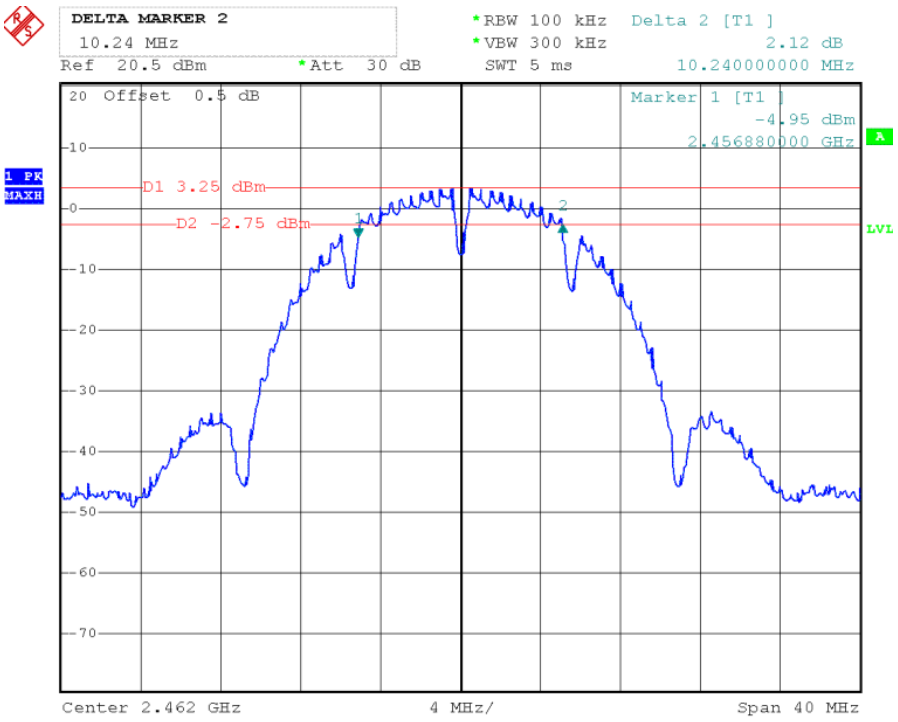
6dB BANDWIDTH (802.11b MODE CH Low)



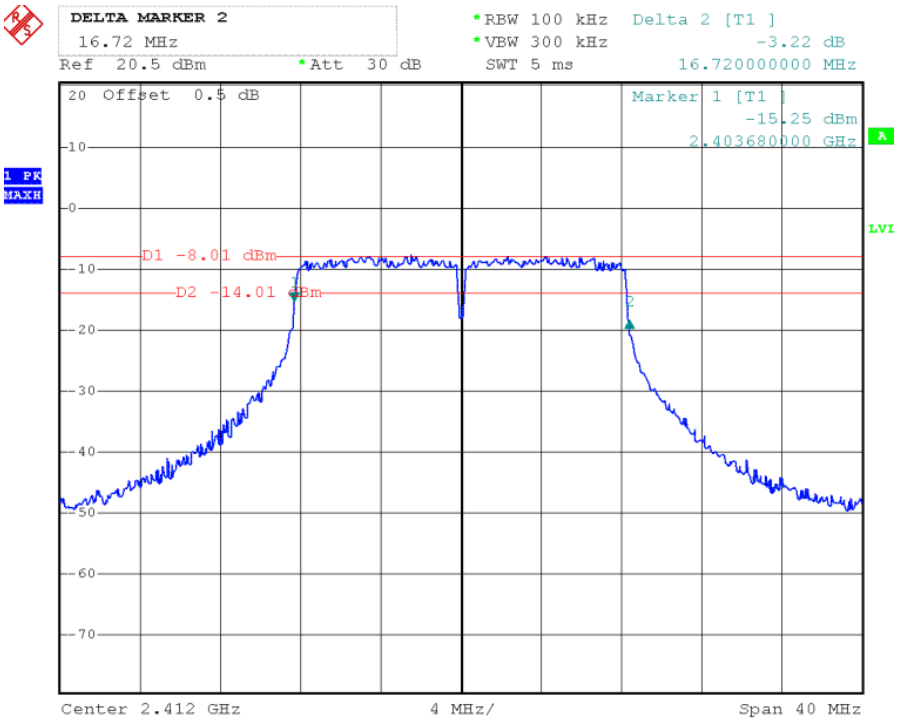
6dB BANDWIDTH (802.11b MODE CH Mid)



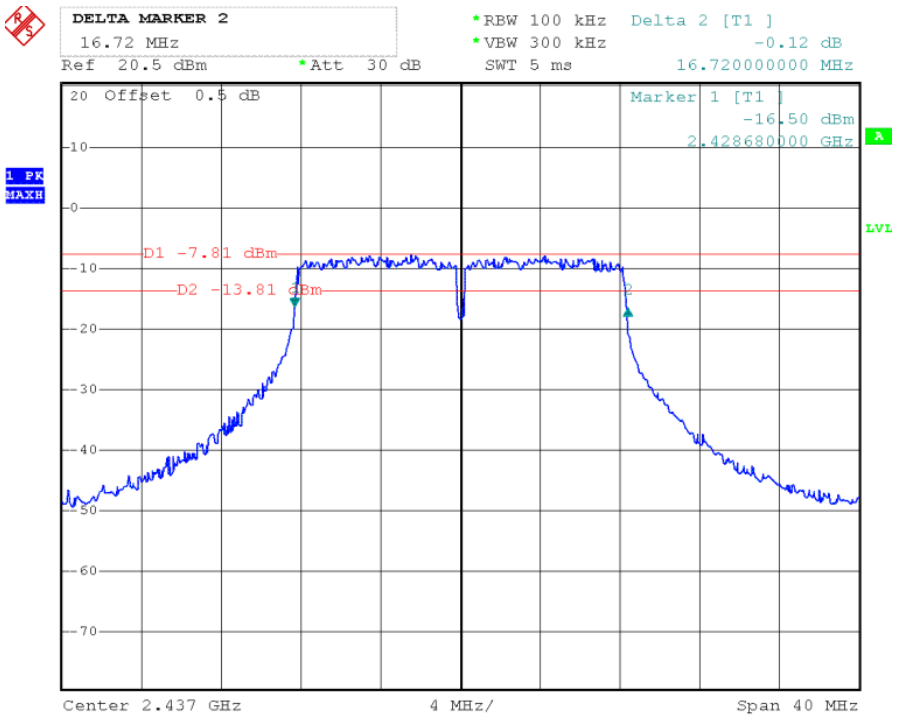
6dB BANDWIDTH (802.11b MODE CH High)



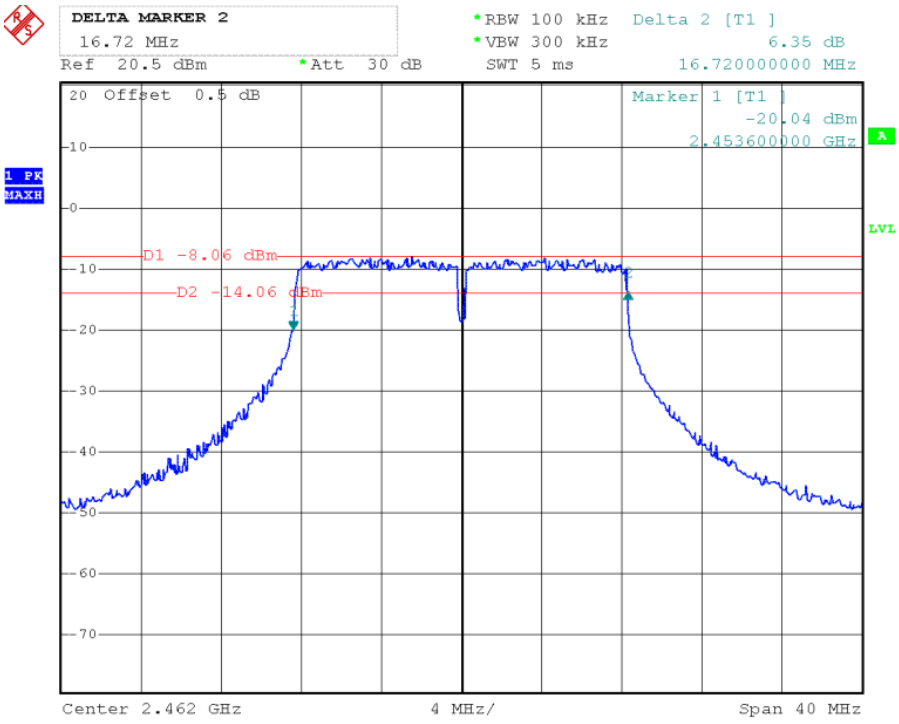
6dB BANDWIDTH (802.11g MODE CH Low)



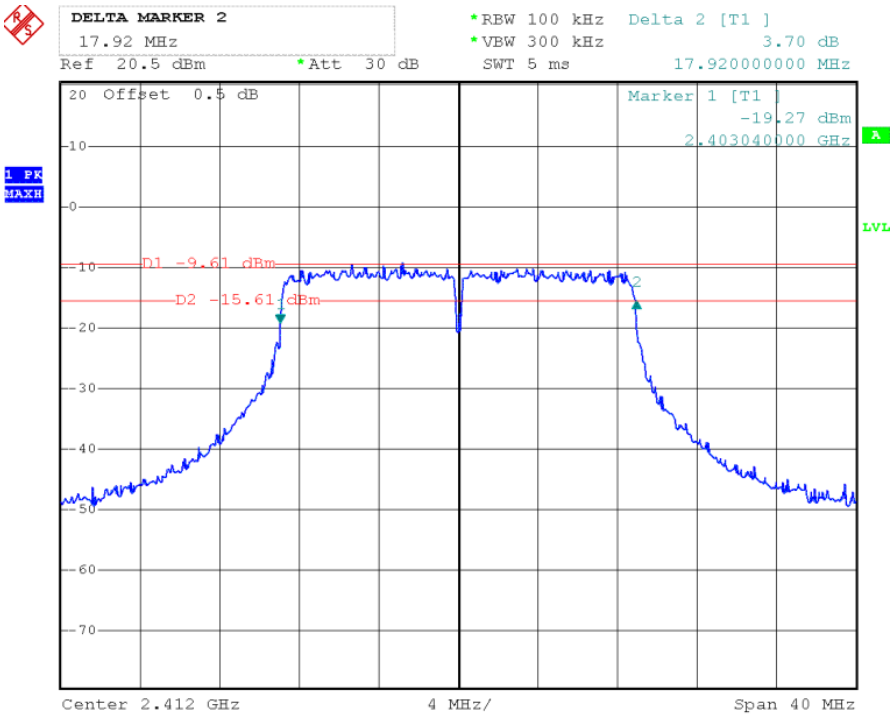
6dB BANDWIDTH (802.11g MODE CH Mid)



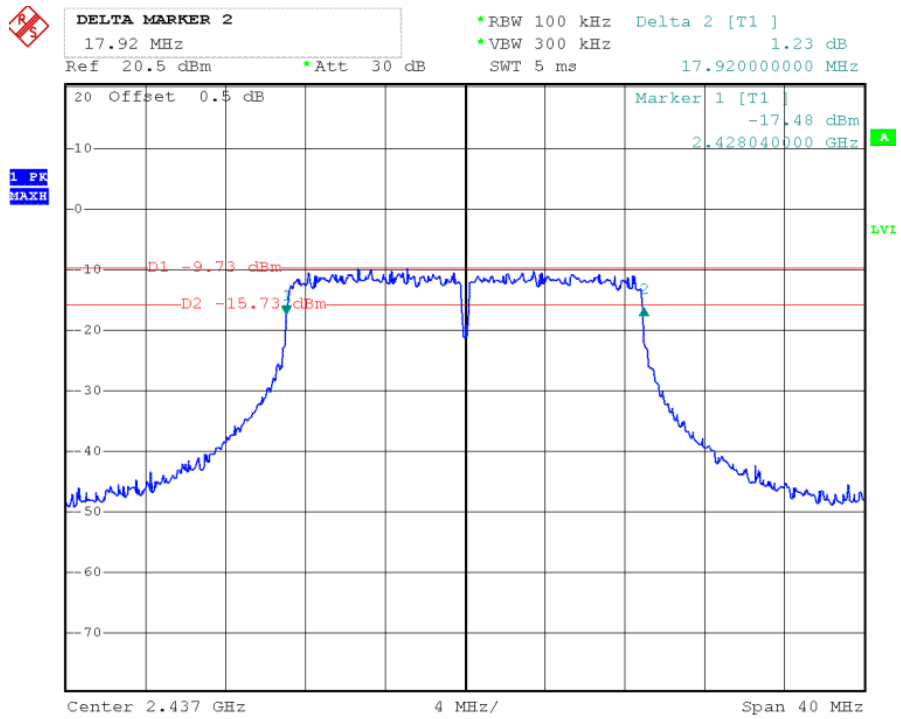
6dB BANDWIDTH (802.11g MODE CH High)



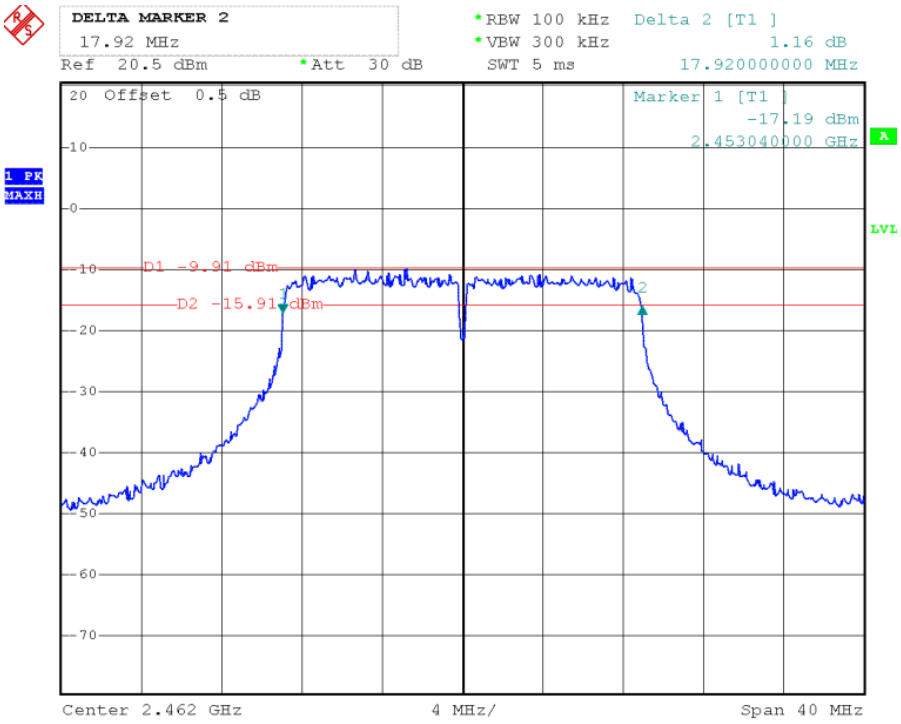
6dB BANDWIDTH (802.11n HT20 MODE CH Low)



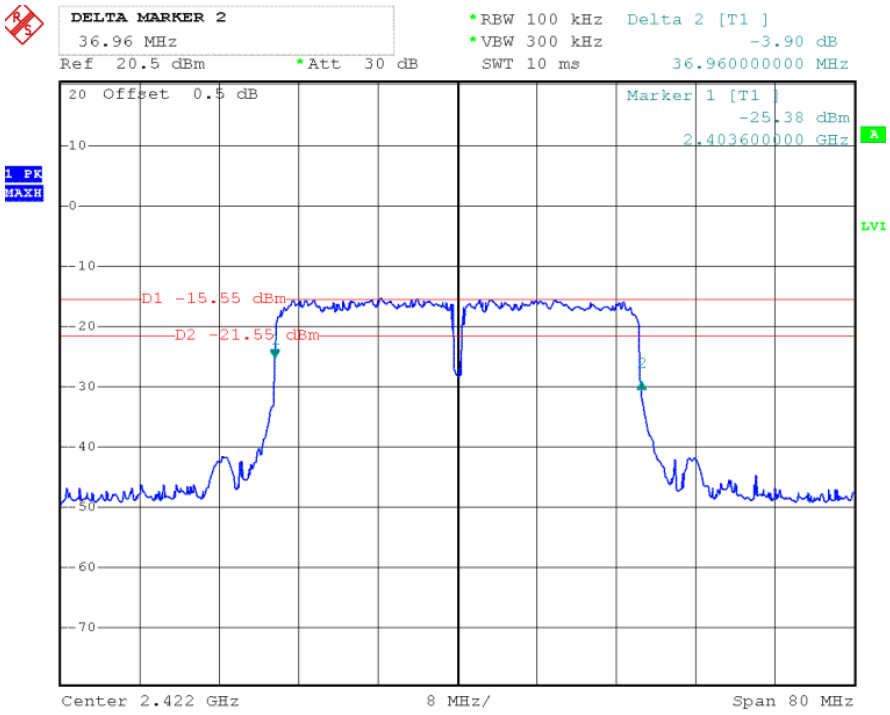
6dB BANDWIDTH (802.11n HT20 MODE CH Mid)



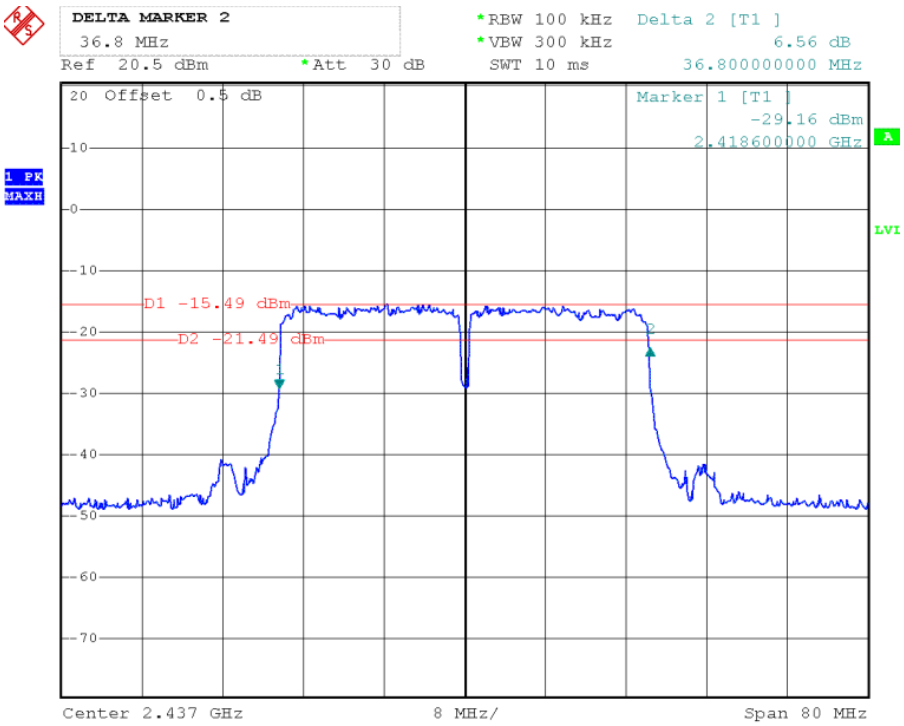
6dB BANDWIDTH (802.11n HT20 MODE CH High)



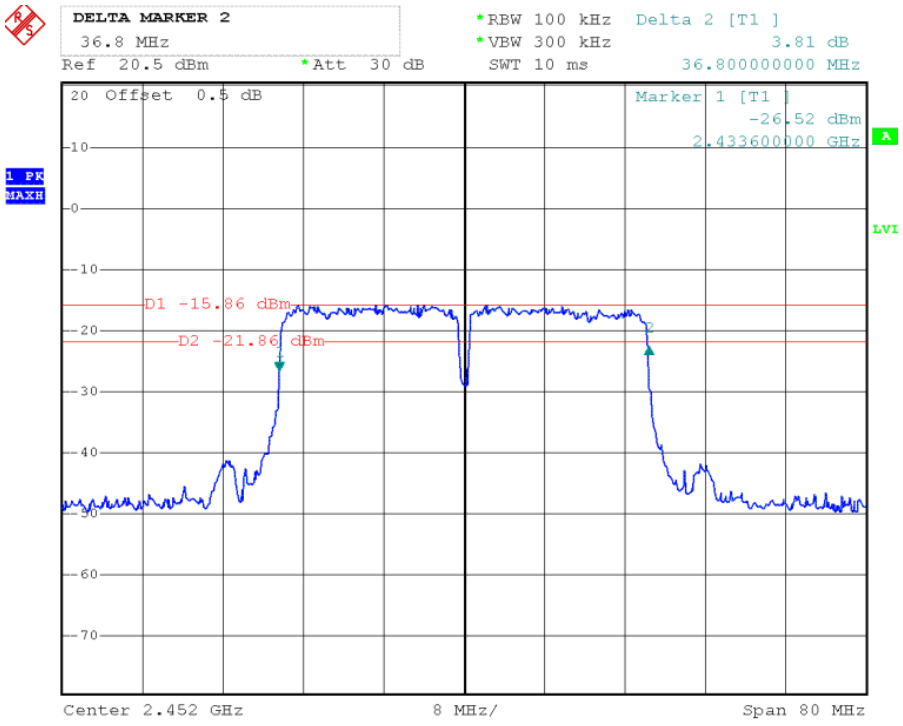
6dB BANDWIDTH (802.11n HT40 MODE CH Low)



6dB BANDWIDTH (802.11n HT40 MODE CH Mid)



6dB BANDWIDTH (802.11n HT40 MODE CH High)



8. Test of Conducted Spurious Emission

8.1 Applicable Standard

Refer to FCC §15.247 (d)

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

8.2 EUT Setup

Spectrum Analyzer

8.3 Test Equipment List and Details

See section 2.5.

8.4 Test Procedure

The transmitter output was connected to a spectrum analyzer. The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.The parameter of the spectrum analyzer was set as below:

1. Set start frequency to DTS channel edge frequency.

2. Set stop frequency so as to encompass the spectrum to be examined.

3. Set RBW = 100 kHz.

4. Set VBW ≥ 300 kHz.

5. Detector = peak.

6. Trace Mode = max hold.

7. Sweep = auto couple.

8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

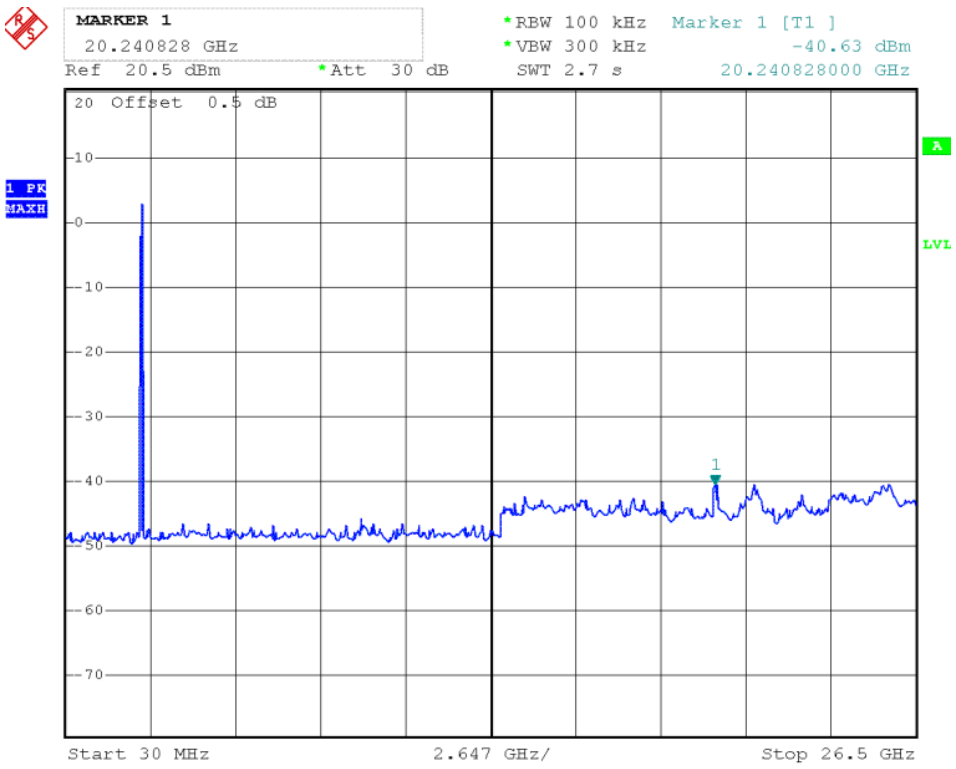
9. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

8.5 Test Result

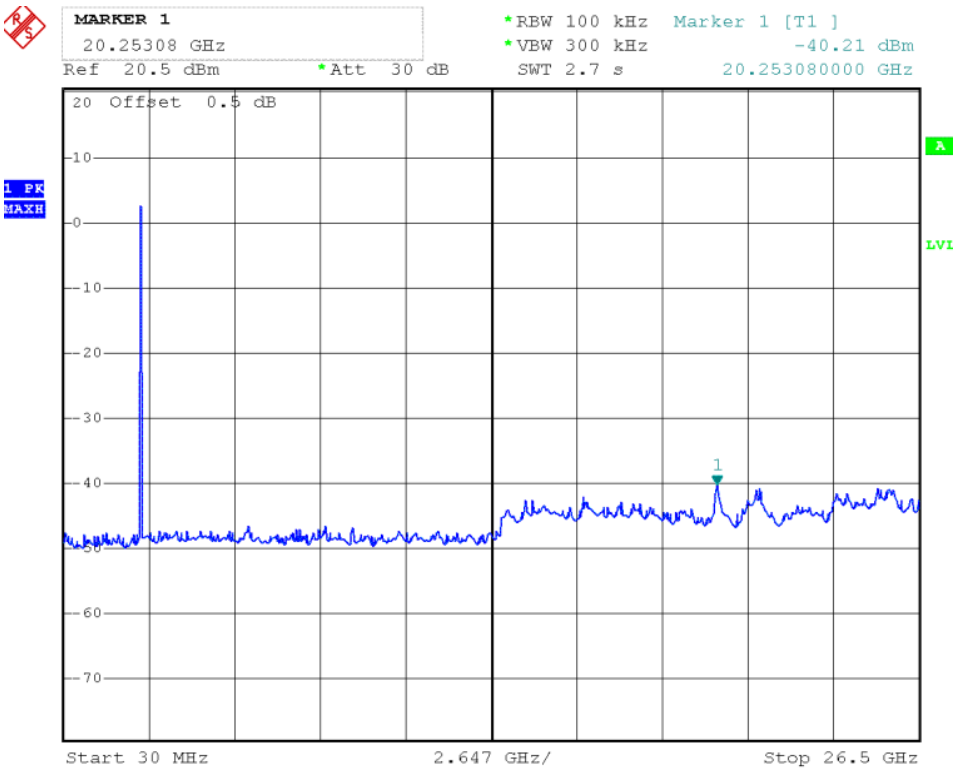
Temperature (℃) : 22~23	EUT: IP Camera
Humidity (%RH): 50~54	M/N: XPY310
Barometric Pressure (mbar): 950~1000	Operation Condition: TX Mode

IEEE 802.11b mode

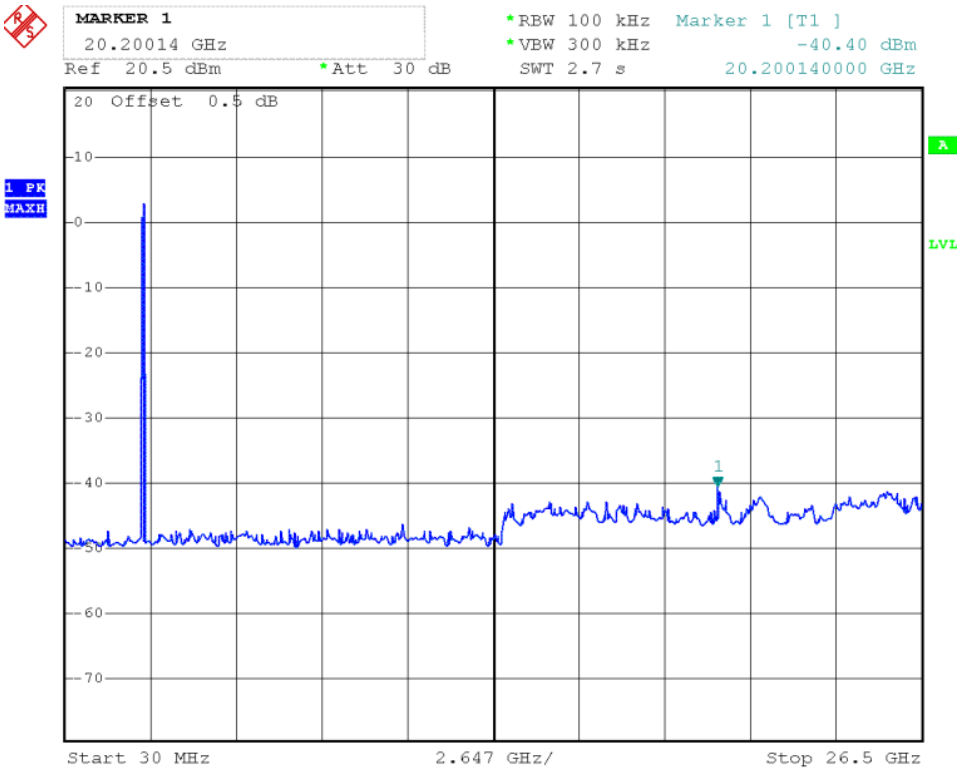
CH Low



CH Mid

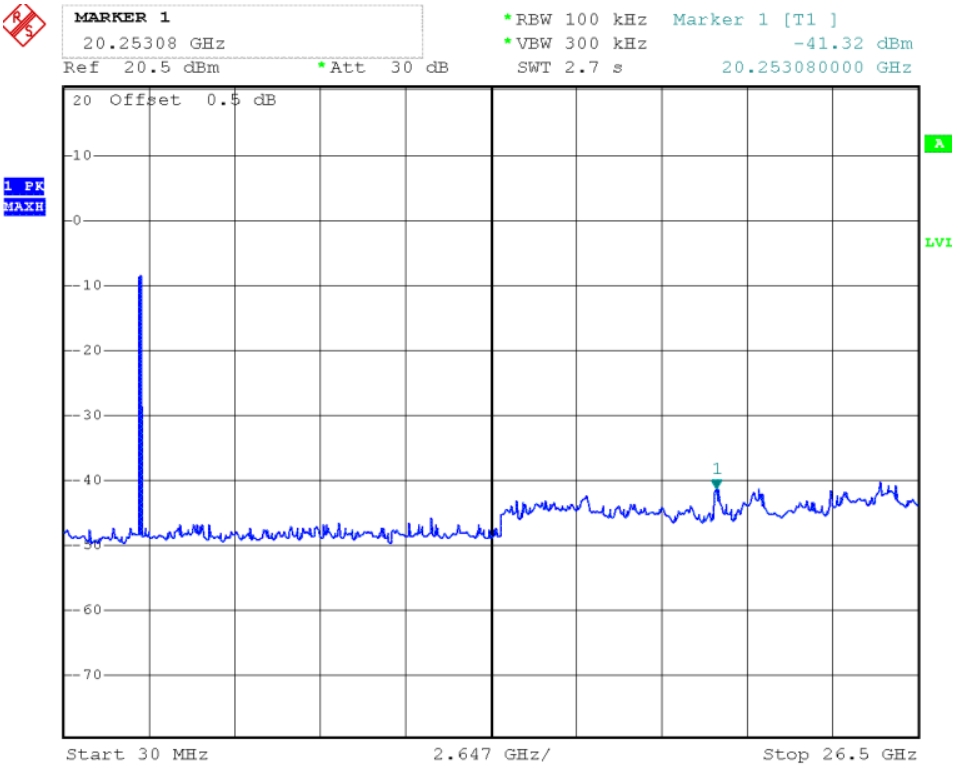


CH High

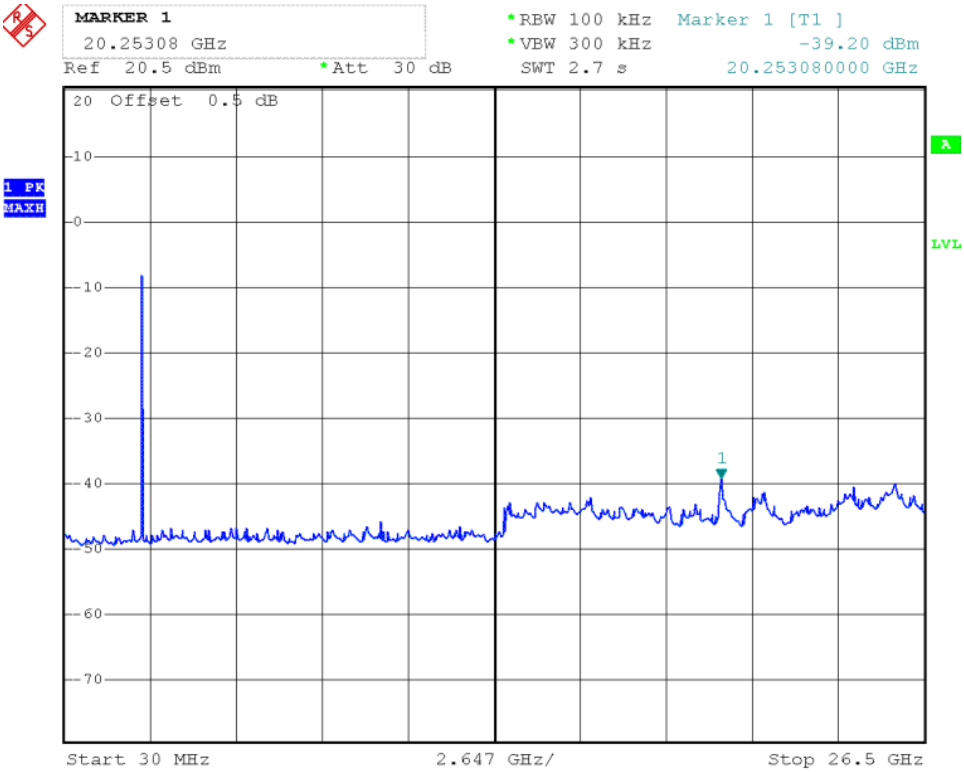


IEEE 802.11g mode

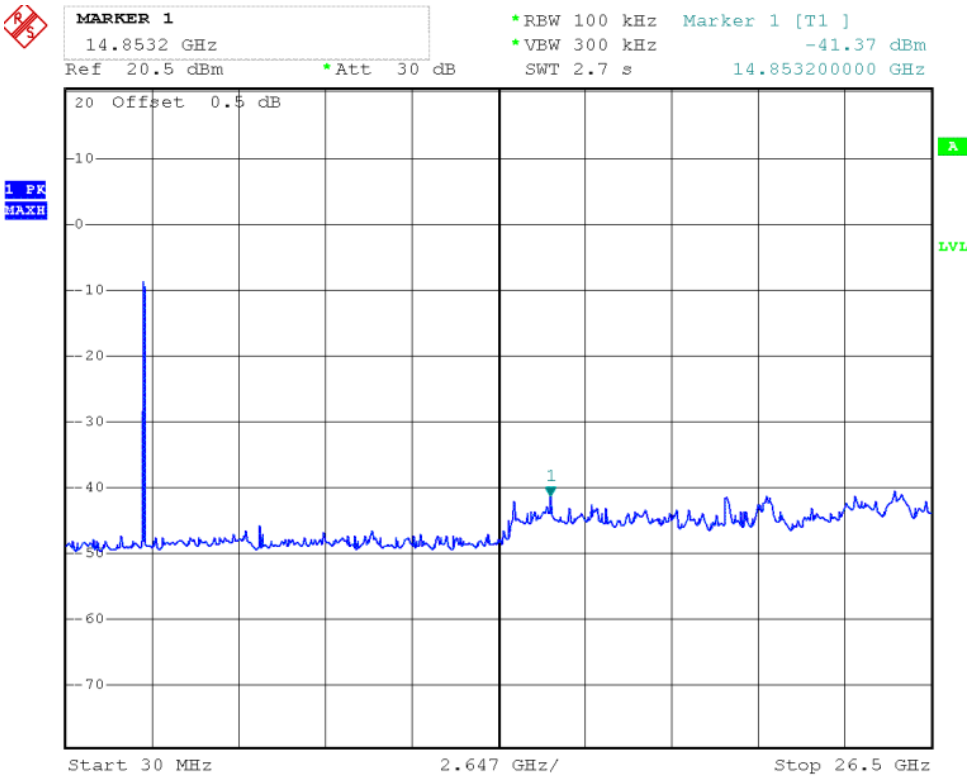
CH Low



CH Mid

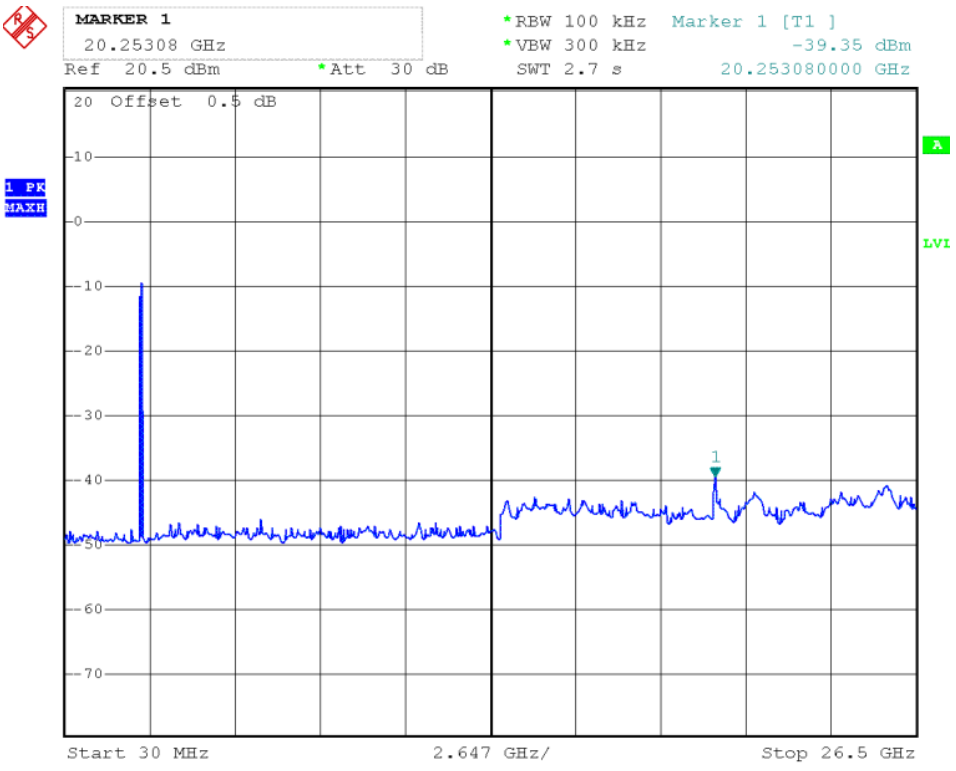


CH High

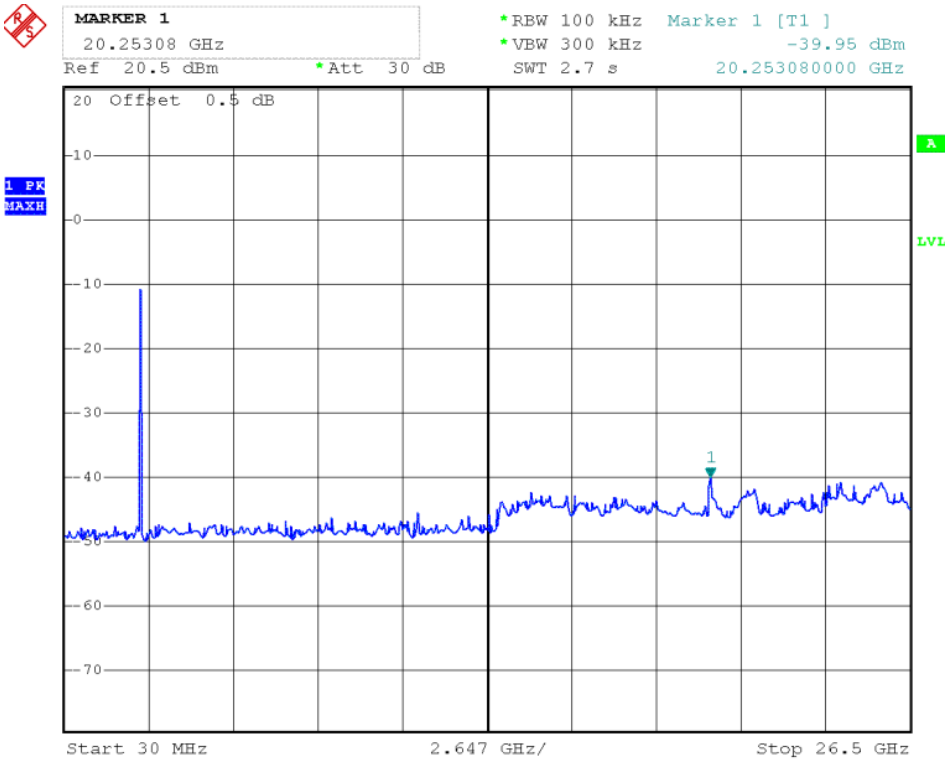


IEEE 802.11n HT20 mode

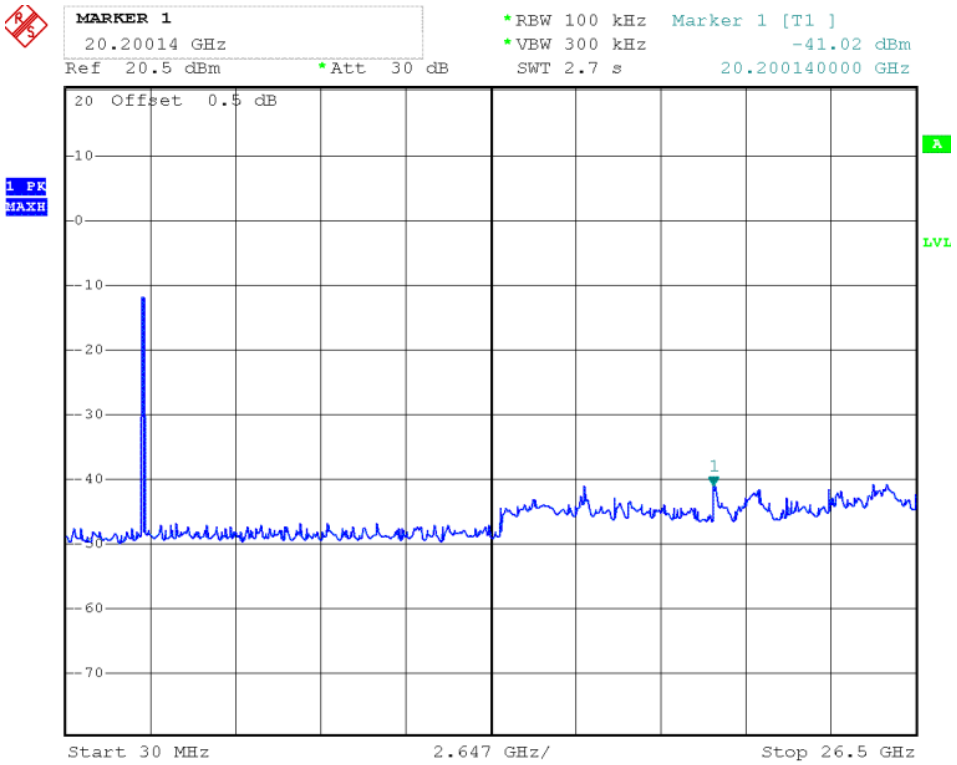
CH Low



CH Mid

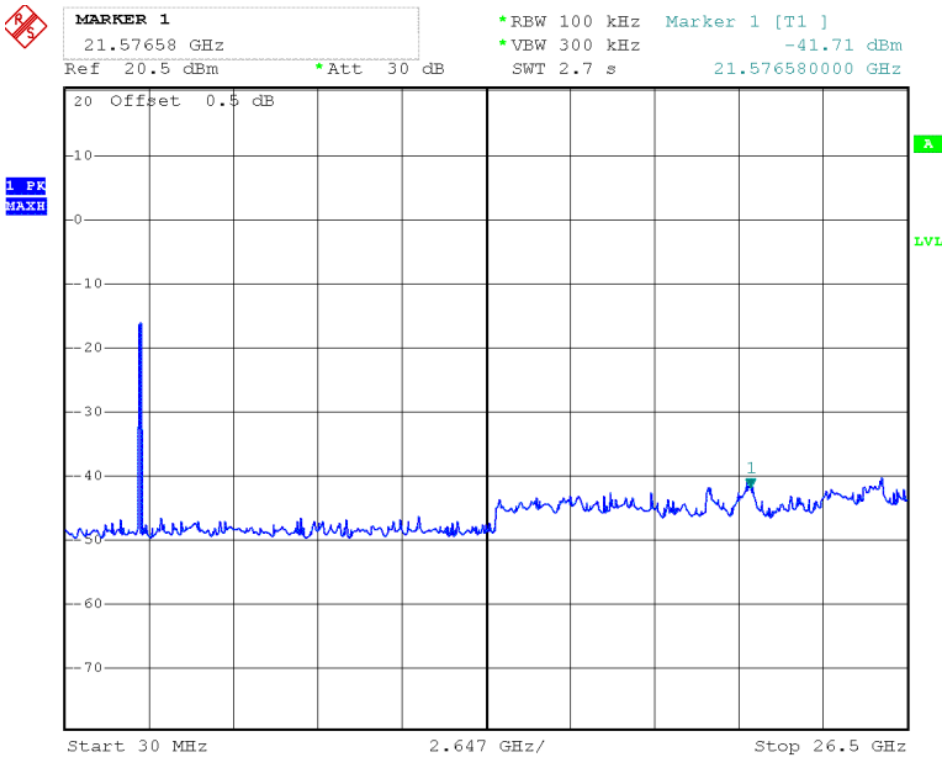


CH High

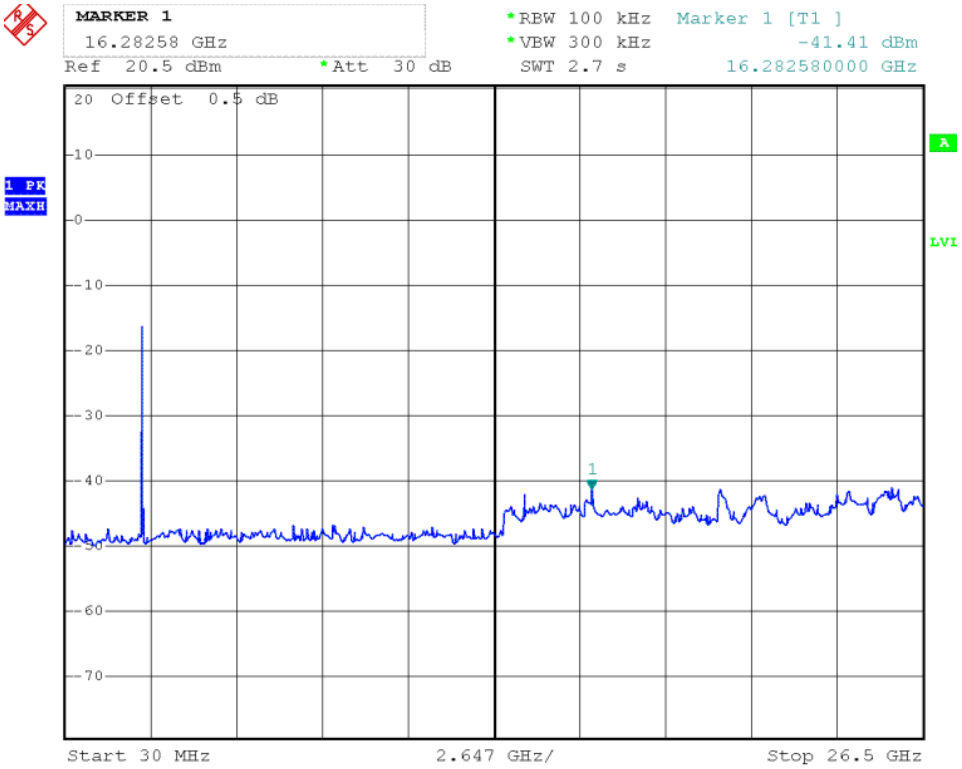


IEEE 802.11n HT40 mode

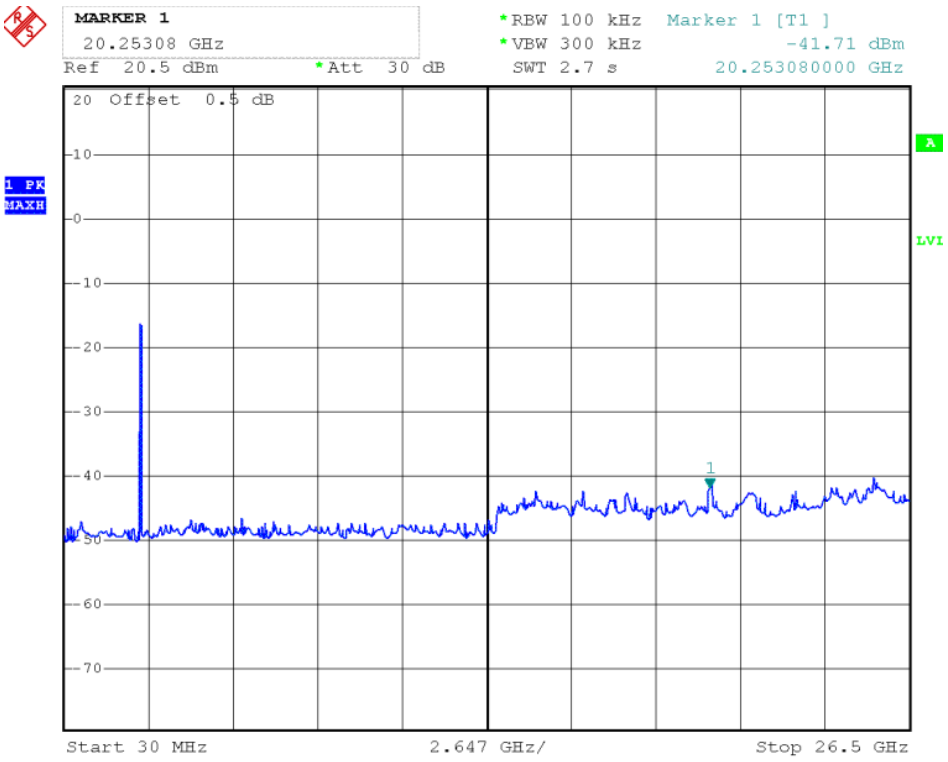
CH Low



CH Mid



CH High


MARKER 1
20.25308 GHz
*RBW 100 kHz
*VBW 300 kHz
SWT 2.7 s
Marker 1 [T1]
-41.71 dBm
20.253080000 GHz
Ref 20.5 dBm
*Att 30 dB
20 Offset 0.5 dB
1 PK
MAXH
A
LVI
10
0
-10
-20
-30
-40
-50
-60
-70
Start 30 MHz
2.647 GHz/
Stop 26.5 GHz

9. Test of Radiated Spurious Emission

9.1 Radiated Spurious Emission

9.1.1 Limits

15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	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 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 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 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz

or 470-806 MHz, However, operation within these frequency bands is permitted under other sections of this Part, e-g, Sections 15.231 and 15.241.
15.209 (b) In the emission table above, the tighter limit applies at the band edges.

9.1.2 EUT Setup

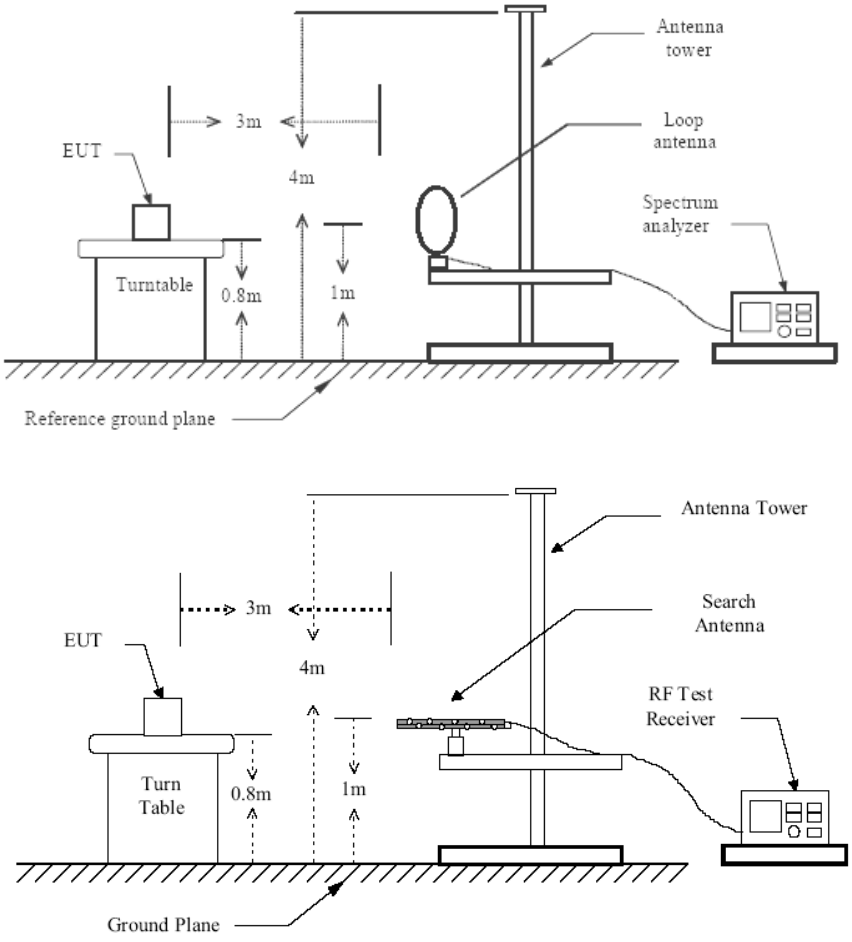


Figure 1 : Frequencies measured below 1 GHz configuration

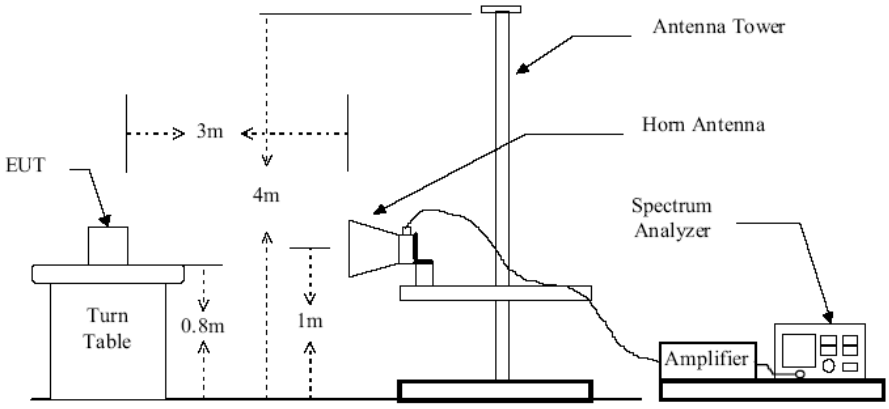


Figure 2 : Frequencies measured above 1 GHz configuration

9.1.3 Test Procedure

1. Configure the EUT according to ANSI C63.4-2003

2. The EUT was placed on the top of the turntable 0.8 meter above ground.

3. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

4. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

5. According to the characteristic of the EUT crystals, the range of frequencies was investigated from 9KHz to 30MHz, 30MHz to 1GHz and 1GHz to 24.8GHz.

6. Any testing performed below 30 MHz was performed using a magnetic loop antenna in accordance with ANSI C63.10: section 4.5, Table 1

7. In accordance with 15.35(b), above 1 GHz, emissions measured using a peak detector shall not exceed a level 20 dB above the average limit.

8. Measurements at 2400 & 2483.5 MHz were made to ensure band edge compliance.

9. Testing was performed with the EUT orientated in three orthogonal planes and the maximum emissions level recorded. In addition, the EUT antenna was varied within its range of motion in order to maximise emissions.

10. For Frequencies below 1 GHz, RBW= 100 kHz, testing was performed with CISPR16 compliant test receiver with QP detector. Above 1 GHz tests were performed using a spectrum analyser using the following settings:
Peak RBW=VBW= 1MHz
Average RBW=VBW= 1MHz

These settings as per ANSI C63.10

9.1.4 Test Result

Temperature (℃) : 22~23	EUT: IP Camera
Humidity (%RH): 50~54	M/N: XPY310
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal operation & TX Mode

Note: In this testing, the EUT was respectively tested in three different orientations. That is:

1. EUT was lie vertically, and then its Antenna oriented upward
2. EUT was lie vertically, and then its Antenna oriented downward
3. EUT was lie flatwise, and then its Antenna oriented to the receiving antenna

The worst test data see following pages
When the EUT was lie flatwise, and its Antenna oriented to the receiving antenna, the worst test data was got as following table.

WORST-CASE RADIATED EMISSION BELOW 30 MHz

Normal operating Mode:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Emission Levels	Limits	Margin	Detector Mode
(MHz)	(dBμV)	(dB/M)	(dB)	(dBμV/M)	(dB μ V/M)	(dB)	PK/QP
0.45	20.65	7.85	1.03	29.53	67	-37.47	QP
17.3	20.35	8.71	1.19	30.25	49.5	-19.25	QP
19.4	21.22	8.73	1.08	31.03	49.5	-18.47	QP
25.5	23.36	7.25	1.66	32.27	49.5	-17.23	QP

WORST-CASE RADIATED EMISSION BELOW 1 GHz

Normal operating Mode:

Horizontal

Frequency	Meter Reading	Antenna Factor	Cable Loss	Emission Levels	Limits	Margin	Detector Mode
(MHz)	(dBμV)	(dB/M)	(dB)	(dBμV/M)	(dB μ V/M)	(dB)	PK/QP
84.32	24.45	8.62	1.18	34.25	40	-5.75	QP
154.57	20.23	11.23	1.59	33.05	43.5	-10.45	QP
421.61	19.67	14.51	2.72	36.9	46	-9.1	QP
543.29	18.26	16.23	3.05	37.54	46	-8.46	QP
721.15	12.14	20.24	3.84	36.22	46	-9.78	QP
806.24	13.28	21.42	4.14	38.84	46	-7.16	QP
N/A	----	----	----	----	----	----	----

Vertical

Frequency	Meter Reading	Antenna Factor	Cable Loss	Emission Levels	Limits	Margin	Detector Mode
(MHz)	(dBμV)	(dB/M)	(dB)	(dBμV/M)	(dB μ V/M)	(dB)	PK/QP
115.52	25.14	7.52	1.01	33.67	43.5	-9.83	QP
209.12	21.85	12.33	1.59	35.77	43.5	-7.73	QP
243.29	22.57	13.15	2.02	37.74	46	-8.26	QP
365.49	25.12	13.73	2.72	41.57	46	-4.43	QP
523.22	20.73	16.36	3.05	40.14	46	-5.86	QP
748.15	14.56	20.56	4.14	39.26	46	-6.74	QP
N/A	----	----	----	----	----	----	----

Note: Emission level (dBμV/m) =Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBμV).

WORST-CASE RADIATED EMISSION ABOVE 1 GHz
IEEE 802.11b TX (CH Low)

Channel Low（2412MHz）								
Maximum Frequency (MHz)	Polarity and Level					Limit (dBµV/m)	Margin (dBµV/m)	Mark (P/Q/A)
	Polarity	Height (m)	Reading dBµV	Transd	Result dBµV/m			
1241.88	H	1	51.37	-9.22	42.15	74	-31.85	P
			31.28	-9.25	22.03	54	-31.97	A
1249.02	V	1	53.71	-9.37	44.34	74	-29.66	P
			31.63	-9.35	22.28	54	-31.72	A
2412	H	1	108.58	-7.05	101.53	N/A	N/A	P
			96.47	-7.05	89.42	N/A	N/A	A
2412	V	1	109.71	-7.05	102.66	N/A	N/A	P
			99.55	-7.05	92.5	N/A	N/A	A
4824	H	1	54.64	2.45	57.09	74	-16.91	P
			33.49	2.45	35.94	54	-18.06	A
4824	V	1	56.93	2.45	59.38	74	-14.62	P
			33.78	2.45	36.23	54	-17.77	A
5173	H	1	46.75	6.7	53.45	74	-20.55	P
			32.47	6.75	39.22	54	-14.78	A
5174	V	1	50.38	6.55	56.93	74	-17.07	P
			35.72	6.87	42.59	54	-11.41	A
7236	H	1	44.75	7.43	52.18	74	-21.82	P
			33.61	7.43	41.04	54	-12.96	A
7236	V	1	45.35	7.43	52.78	74	-21.22	P
			34.93	7.43	42.36	54	-11.64	A
11243.55	H	1	44.42	9.91	54.33	74	-19.67	P
			33.85	9.91	43.76	54	-10.24	A
16329.45	----	----	----	----	----	----	----	----
25378.42	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier
Margin = Level-Limit
Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11b TX (CH Middle)

Channel Middle（2437MHz）								
Maximum Frequency	Polarity and Level					Limit	Margin	
(MHz)	Polarity	Height (m)	Reading dBμV	Transd	Result dBμV/m	(dBμV/m)	(dBμV/m)	Mark (P/Q/A)
1227.24	H	1	52.53	-9.31	43.22	74	-30.78	P
			33.22	-9.28	23.94	54	-30.06	A
1227.37	V	1	54.71	-9.43	45.28	74	-28.72	P
			34.52	-9.39	25.13	54	-28.87	A
2437	H	1	107.85	-6.98	100.87	N/A	N/A	P
			98.44	-6.98	91.46	N/A	N/A	A
2437	V	1	109.12	-6.98	102.14	N/A	N/A	P
			98.45	-6.98	91.47	N/A	N/A	A
4874	H	1	54.12	2.67	56.79	74	-17.21	P
			36.32	2.67	38.99	54	-15.01	A
4874	V	1	55.14	2.67	57.81	74	-16.19	P
			37.27	2.67	39.94	54	-14.06	A
5165	H	1	47.23	5.38	52.61	74	-21.39	P
			35.62	5.26	40.88	54	-13.12	A
5163	V	1	49.46	5.59	55.05	74	-18.95	P
			34.35	5.75	40.1	54	-13.9	A
7311	H	1	46.62	7.69	54.31	74	-19.69	P
			34.55	7.69	42.24	54	-11.76	A
7311	V	1	48.72	7.69	56.41	74	-17.59	P
			34.79	7.69	42.48	54	-11.52	A
11245.24	H	1	45.61	9.37	54.98	74	-19.02	P
			33.25	9.68	42.93	54	-11.07	A
16330.25	----	----	----	----	----	----	----	----
25380.75	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11b TX (CH High)

Channel High（2462MHz）								
Maximum Frequency	Polarity and Level					Limit	Margin	
(MHz)	Polarity	Height (m)	Reading dBμV	Transd	Result dBμV/m	(dBμV/m)	(dBμV/m)	Mark (P/Q/A)
1215.67	H	1	54.67	-9.39	45.28	74	-28.72	P
			33.32	-9.43	23.89	54	-30.11	A
1216.49	V	1	55.38	-9.25	46.13	74	-27.87	P
			33.79	-9.27	24.52	54	-29.48	A
2462	H	1	108.67	-7.05	101.62	N/A	N/A	P
			98.75	-7.05	91.7	N/A	N/A	A
2462	V	1	109.25	-7.05	102.2	N/A	N/A	P
			98.28	-7.05	91.23	N/A	N/A	A
4924	H	1	53.29	2.45	55.74	74	-18.26	P
			34.55	2.45	37	54	-17	A
4924	V	1	54.39	2.45	56.84	74	-17.16	P
			33.65	2.45	36.1	54	-17.9	A
5178.65	H	1	46.51	5.17	51.68	74	-22.32	P
			32.54	5.29	37.83	54	-16.17	A
5179.67	V	1	43.77	5.61	49.38	74	-24.62	P
			33.59	5.67	39.26	54	-14.74	A
7356	H	1	43.35	7.43	50.78	74	-23.22	P
			32.52	7.43	39.95	54	-14.05	A
7386	V	1	44.52	7.43	51.95	74	-22.05	P
			33.57	7.43	41	54	-13	A
11245.68	H	1	45.42	9.62	55.04	74	-18.96	P
			35.67	9.68	45.35	54	-8.65	A
16336.25	----	----	----	----	----	----	----	----
25383.93	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11g TX (CH Low)

Channel Low（2412MHz）								
Maximum Frequency	Polarity and Level					Limit	Margin	
(MHz)	Polarity	Height (m)	Reading dBμV	Transd	Result dBμV/m	(dBμV/m)	(dBμV/m)	Mark (P/Q/A)
1221.56	H	1	51.32	-9.18	42.14	74	-31.86	P
			31.25	-9.21	22.04	54	-31.96	A
1227.12	V	1	53.64	-9.32	44.32	74	-29.68	P
			31.51	-9.29	22.22	54	-31.78	A
2412	H	1	107.42	-7.05	100.37	N/A	N/A	P
			95.35	-7.05	88.3	N/A	N/A	A
2412	V	1	108.56	-7.05	101.51	N/A	N/A	P
			98.42	-7.05	91.37	N/A	N/A	A
4824	H	1	54.15	2.45	56.6	74	-17.4	P
			33.15	2.45	35.6	54	-18.4	A
4824	V	1	55.43	2.45	57.88	74	-16.12	P
			33.29	2.45	35.74	54	-18.26	A
5153	H	1	46.43	6.65	53.08	74	-20.92	P
			32.15	6.61	38.76	54	-15.24	A
5152	V	1	50.16	6.42	56.58	74	-17.42	P
			35.41	6.56	41.97	54	-12.03	A
7236	H	1	44.18	7.43	51.61	74	-22.39	P
			33.25	7.43	40.68	54	-13.32	A
7236	V	1	45.12	7.43	52.55	74	-21.45	P
			34.53	7.43	41.96	54	-12.04	A
11242.53	H	1	44.29	9.91	54.2	74	-19.8	P
			33.54	9.91	43.45	54	-10.55	A
16329.37	----	----	----	----	----	----	----	----
25378.22	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11g TX (CH Middle)

Channel Middle（2437MHz）								
Maximum Frequency (MHz)	Polarity and Level					Limit (dBμV/m)	Margin (dBμV/m)	Mark (P/Q/A)
	Polarity	Height (m)	Reading dBμV	Transd	Result dBμV/m			
1208.57	H	1	52.25	-9.25	43	74	-31	P
			33.27	-9.23	24.04	54	-29.96	A
1209.25	V	1	54.19	-9.35	44.84	74	-29.16	P
			34.23	-9.31	24.92	54	-29.08	A
2437	H	1	106.42	-6.98	99.44	N/A	N/A	P
			97.25	-6.98	90.27	N/A	N/A	A
2437	V	1	108.53	-6.98	101.55	N/A	N/A	P
			97.36	-6.98	90.38	N/A	N/A	A
4874	H	1	53.67	2.67	56.34	74	-17.66	P
			35.73	2.67	38.4	54	-15.6	A
4874	V	1	54.69	2.67	57.36	74	-16.64	P
			36.15	2.67	38.82	54	-15.18	A
5143	H	1	46.41	5.17	51.58	74	-22.42	P
			34.43	5.12	39.55	54	-14.45	A
5141	V	1	48.22	5.28	53.5	74	-20.5	P
			33.55	5.37	38.92	54	-15.08	A
7311	H	1	45.33	7.69	53.02	74	-20.98	P
			33.62	7.69	41.31	54	-12.69	A
7311	V	1	48.14	7.69	55.83	74	-18.17	P
			34.23	7.69	41.92	54	-12.08	A
11244.65	H	1	45.18	9.22	54.4	74	-19.6	P
			32.73	9.49	42.22	54	-11.78	A
16329.36	----	----	----	----	----	----	----	----
25379.34	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11g TX (CH High)

Channel High（2462MHz）								
Maximum Frequency	Polarity and Level					Limit	Margin	
(MHz)	Polarity	Height (m)	Reading dBμV	Transd	Result dBμV/m	(dBμV/m)	(dBμV/m)	Mark (P/Q/A)
1196.23	H	1	54.25	-9.22	45.03	74	-28.97	P
			33.11	-9.25	23.86	54	-30.14	A
1195.42	V	1	55.13	-9.19	45.94	74	-28.06	P
			33.54	-9.24	24.3	54	-29.7	A
2462	H	1	107.53	-7.05	100.48	N/A	N/A	P
			97.29	-7.05	90.24	N/A	N/A	A
2462	V	1	108.36	-7.05	101.31	N/A	N/A	P
			97.43	-7.05	90.38	N/A	N/A	A
4924	H	1	53.12	2.45	55.57	74	-18.43	P
			34.26	2.45	36.71	54	-17.29	A
4924	V	1	54.13	2.45	56.58	74	-17.42	P
			33.29	2.45	35.74	54	-18.26	A
5153.43	H	1	46.27	5.09	51.36	74	-22.64	P
			32.18	5.15	37.33	54	-16.67	A
5157.52	V	1	43.57	5.37	48.94	74	-25.06	P
			33.27	5.43	38.7	54	-15.3	A
7356	H	1	43.14	7.43	50.57	74	-23.43	P
			32.22	7.43	39.65	54	-14.35	A
7386	V	1	44.36	7.43	51.79	74	-22.21	P
			33.27	7.43	40.7	54	-13.3	A
11245.34	H	1	45.14	9.47	54.61	74	-19.39	P
			35.29	9.42	44.71	54	-9.29	A
16336.19	----	----	----	----	----	----	----	----
25383.57	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11n HT20 TX (CH Low)

Channel Low（2412MHz）								
Maximum Frequency (MHz)	Polarity and Level					Limit (dBµV/m)	Margin (dBµV/m)	Mark (P/Q/A)
	Polarity	Height (m)	Reading dBµV	Transd	Result dBµV/m			
1230.26	H	1	51.16	-9.09	42.07	74	-31.93	P
			31.13	-9.16	21.97	54	-32.03	A
1235.25	V	1	53.29	-9.26	44.03	74	-29.97	P
			31.32	-9.23	22.09	54	-31.91	A
2412	H	1	106.58	-7.05	99.53	N/A	N/A	P
			94.63	-7.05	87.58	N/A	N/A	A
2412	V	1	107.22	-7.05	100.17	N/A	N/A	P
			97.61	-7.05	90.56	N/A	N/A	A
4824	H	1	53.87	2.45	56.32	74	-17.68	P
			32.94	2.45	35.39	54	-18.61	A
4824	V	1	55.25	2.45	57.7	74	-16.3	P
			33.07	2.45	35.52	54	-18.48	A
5164	H	1	46.29	6.49	52.78	74	-21.22	P
			32.01	6.43	38.44	54	-15.56	A
5163	V	1	50.06	6.21	56.27	74	-17.73	P
			35.27	6.37	41.64	54	-12.36	A
7236	H	1	44.03	7.43	51.46	74	-22.54	P
			33.13	7.43	40.56	54	-13.44	A
7236	V	1	45.06	7.43	52.49	74	-21.51	P
			34.34	7.43	41.77	54	-12.23	A
11242.25	H	1	44.07	9.91	53.98	74	-20.02	P
			33.29	9.91	43.2	54	-10.8	A
16328.84	----	----	----	----	----	----	----	----
25378.13	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier
Margin = Level-Limit
Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11n HT20 TX (CH Middle)

Channel Middle（2437MHz）								
Maximum Frequency	Polarity and Level					Limit	Margin	
(MHz)	Polarity	Height (m)	Reading dBμV	Transd	Result dBμV/m	(dBμV/m)	(dBμV/m)	Mark (P/Q/A)
1219.23	H	1	52.05	-9.17	42.88	74	-31.12	P
			33.16	-9.13	24.03	54	-29.97	A
1219.13	V	1	54.03	-9.27	44.76	74	-29.24	P
			34.17	-9.25	24.92	54	-29.08	A
2437	H	1	105.08	-6.98	98.1	N/A	N/A	P
			96.17	-6.98	89.19	N/A	N/A	A
2437	V	1	107.27	-6.98	100.29	N/A	N/A	P
			96.23	-6.98	89.25	N/A	N/A	A
4874	H	1	53.46	2.67	56.13	74	-17.87	P
			35.37	2.67	38.04	54	-15.96	A
4874	V	1	54.23	2.67	56.9	74	-17.1	P
			36.04	2.67	38.71	54	-15.29	A
5152	H	1	46.27	5.09	51.36	74	-22.64	P
			34.21	5.05	39.26	54	-14.74	A
5151	V	1	47.81	5.12	52.93	74	-21.07	P
			33.27	5.26	38.53	54	-15.47	A
7311	H	1	45.01	7.69	52.7	74	-21.3	P
			33.27	7.69	40.96	54	-13.04	A
7311	V	1	48.03	7.69	55.72	74	-18.28	P
			34.15	7.69	41.84	54	-12.16	A
11244.23	H	1	45.05	9.19	54.24	74	-19.76	P
			32.41	9.26	41.67	54	-12.33	A
16329.05	----	----	----	----	----	----	----	----
25379.17	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11n HT20 TX (CH High)

Channel High（2462MHz）								
Maximum Frequency	Polarity and Level					Limit	Margin	
(MHz)	Polarity	Height (m)	Reading dBμV	Transd	Result dBμV/m	(dBμV/m)	(dBμV/m)	Mark (P/Q/A)
1207.53	H	1	54.07	-9.17	44.9	74	-29.1	P
			33.01	-9.13	23.88	54	-30.12	A
1205.71	V	1	55.06	-9.09	45.97	74	-28.03	P
			33.37	-9.16	24.21	54	-29.79	A
2462	H	1	106.29	-7.05	99.24	N/A	N/A	P
			96.12	-7.05	89.07	N/A	N/A	A
2462	V	1	107.23	-7.05	100.18	N/A	N/A	P
			96.34	-7.05	89.29	N/A	N/A	A
4924	H	1	53.01	2.45	55.46	74	-18.54	P
			34.13	2.45	36.58	54	-17.42	A
4924	V	1	53.91	2.45	56.36	74	-17.64	P
			33.07	2.45	35.52	54	-18.48	A
5162.17	H	1	46.03	4.94	50.97	74	-23.03	P
			32.13	5.08	37.21	54	-16.79	A
5166.23	V	1	43.28	5.21	48.49	74	-25.51	P
			33.13	5.27	38.4	54	-15.6	A
7356	H	1	43.07	7.43	50.5	74	-23.5	P
			32.15	7.43	39.58	54	-14.42	A
7386	V	1	44.29	7.43	51.72	74	-22.28	P
			33.04	7.43	40.47	54	-13.53	A
11245.26	H	1	45.03	9.35	54.38	74	-19.62	P
			35.17	9.29	44.46	54	-9.54	A
16336.09	----	----	----	----	----	----	----	----
25383.27	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11n HT40 TX (CH Low)

Channel Low（2422MHz）								
Maximum Frequency	Polarity and Level					Limit	Margin	
(MHz)	Polarity	Height (m)	Reading dBμV	Transd	Result dBμV/m	(dBμV/m)	(dBμV/m)	Mark (P/Q/A)
1235.54	H	1	51.09	-9.02	42.07	74	-31.93	P
			31.01	-9.09	21.92	54	-32.08	A
1240.61	V	1	53.14	-9.14	44	74	-30	P
			31.13	-9.16	21.97	54	-32.03	A
2412	H	1	105.23	-7.05	98.18	N/A	N/A	P
			93.47	-7.05	86.42	N/A	N/A	A
2412	V	1	106.07	-7.05	99.02	N/A	N/A	P
			97.41	-7.05	90.36	N/A	N/A	A
4824	H	1	53.56	2.45	56.01	74	-17.99	P
			32.57	2.45	35.02	54	-18.98	A
4824	V	1	55.16	2.45	57.61	74	-16.39	P
			32.84	2.45	35.29	54	-18.71	A
5169	H	1	46.13	6.37	52.5	74	-21.5	P
			31.83	6.29	38.12	54	-15.88	A
5168	V	1	49.87	6.15	56.02	74	-17.98	P
			35.08	6.27	41.35	54	-12.65	A
7236	H	1	43.92	7.43	51.35	74	-22.65	P
			33.03	7.43	40.46	54	-13.54	A
7236	V	1	44.81	7.43	52.24	74	-21.76	P
			34.27	7.43	41.7	54	-12.3	A
11242.19	H	1	43.95	9.91	53.86	74	-20.14	P
			33.06	9.91	42.97	54	-11.03	A
16328.63	----	----	----	----	----	----	----	----
25378.08	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11n HT40 TX (CH Mid)

Channel Middle（2437MHz）								
Maximum Frequency	Polarity and Level					Limit	Margin	
(MHz)	Polarity	Height (m)	Reading dBμV	Transd	Result dBμV/m	(dBμV/m)	(dBμV/m)	Mark (P/Q/A)
1224.39	H	1	51.84	-9.05	42.79	74	-31.21	P
			33.05	-9.09	23.96	54	-30.04	A
1224.62	V	1	53.83	-9.16	44.67	74	-29.33	P
			33.83	-9.17	24.66	54	-29.34	A
2437	H	1	104.73	-6.98	97.75	N/A	N/A	P
			95.88	-6.98	88.9	N/A	N/A	A
2437	V	1	106.53	-6.98	99.55	N/A	N/A	P
			95.69	-6.98	88.71	N/A	N/A	A
4874	H	1	53.17	2.67	55.84	74	-18.16	P
			35.25	2.67	37.92	54	-16.08	A
4874	V	1	54.07	2.67	56.74	74	-17.26	P
			35.87	2.67	38.54	54	-15.46	A
5157	H	1	46.05	4.85	50.9	74	-23.1	P
			34.17	4.9	39.07	54	-14.93	A
5156	V	1	47.59	5.07	52.66	74	-21.34	P
			33.16	5.19	38.35	54	-15.65	A
7311	H	1	44.83	7.69	52.52	74	-21.48	P
			33.13	7.69	40.82	54	-13.18	A
7311	V	1	47.82	7.69	55.51	74	-18.49	P
			34.09	7.69	41.78	54	-12.22	A
11244.07	H	1	44.73	9.06	53.79	74	-20.21	P
			32.29	9.17	41.46	54	-12.54	A
16328.94	----	----	----	----	----	----	----	----
25379.09	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

IEEE 802.11n HT40 TX (CH High)

Channel High（2452MHz）								
Maximum Frequency	Polarity and Level					Limit	Margin	
(MHz)	Polarity	Height (m)	Reading dBμV	Transd	Result dBμV/m	(dBμV/m)	(dBμV/m)	Mark (P/Q/A)
1212.27	H	1	53.85	-9.09	44.76	74	-29.24	P
			32.92	-9.05	23.87	54	-30.13	A
1210.56	V	1	54.83	-9.01	45.82	74	-28.18	P
			33.16	-9.07	24.09	54	-29.91	A
2462	H	1	105.03	-7.05	97.98	N/A	N/A	P
			95.79	-7.05	88.74	N/A	N/A	A
2462	V	1	106.68	-7.05	99.63	N/A	N/A	P
			95.63	-7.05	88.58	N/A	N/A	A
4924	H	1	52.88	2.45	55.33	74	-18.67	P
			33.69	2.45	36.14	54	-17.86	A
4924	V	1	53.57	2.45	56.02	74	-17.98	P
			32.81	2.45	35.26	54	-18.74	A
5167.22	H	1	45.83	4.85	50.68	74	-23.32	P
			31.75	5.05	36.8	54	-17.2	A
5171.45	V	1	43.03	5.17	48.2	74	-25.8	P
			33.04	5.13	38.17	54	-15.83	A
7356	H	1	42.69	7.43	50.12	74	-23.88	P
			31.52	7.43	38.95	54	-15.05	A
7386	V	1	44.09	7.43	51.52	74	-22.48	P
			32.66	7.43	40.09	54	-13.91	A
11245.13	H	1	44.73	9.26	53.99	74	-20.01	P
			35.02	9.21	44.23	54	-9.77	A
16335.88	----	----	----	----	----	----	----	----
25383.15	----	----	----	----	----	----	----	----

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " -" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

9.2 RESTRICTED BAND EDGES

TEST RESULT

IEEE 802.11b mode

Channel	Freq.(MHz)	Level(dBuV)	Limit(dBuV)	Margin(dB)	Detector
	2390	54.62	74	-19.38	Peak
LOW	2390	49	54	-5	Average
	2483.5	53.73	74	-20.27	Peak
HIGH	2483.5	51.97	54	-2.03	Average

IEEE 802.11g mode

Channel	Freq.(MHz)	Level(dBuV)	Limit(dBuV)	Margin(dB)	Detector
	2390	53.77	74	-20.23	Peak
LOW	2390	47.8	54	-6.2	Average
	2483.5	53.56	74	-20.44	Peak
HIGH	2483.5	51.28	54	-2.72	Average

IEEE 802.11n HT20 mode

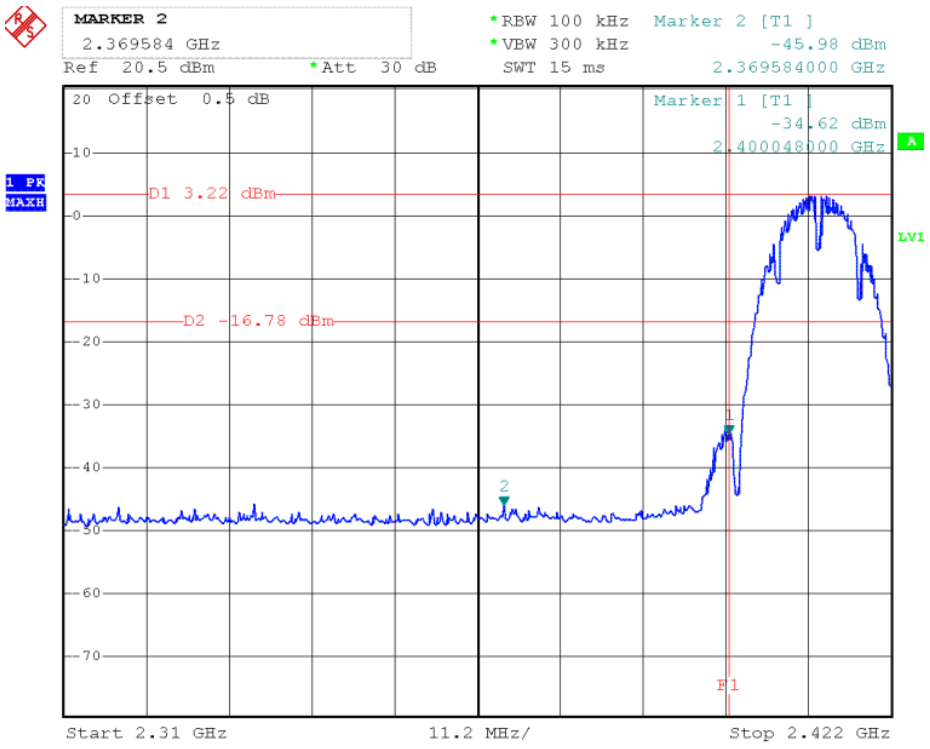
Channel	Freq.(MHz)	Level(dBuV)	Limit(dBuV)	Margin(dB)	Detector
	2390	52.93	74	-21.07	Peak
LOW	2390	48.18	54	-5.18	Average
	2483.5	53.27	74	-20.73	Peak
HIGH	2483.5	50.10	54	-3.90	Average

IEEE 802.11n HT40 mode

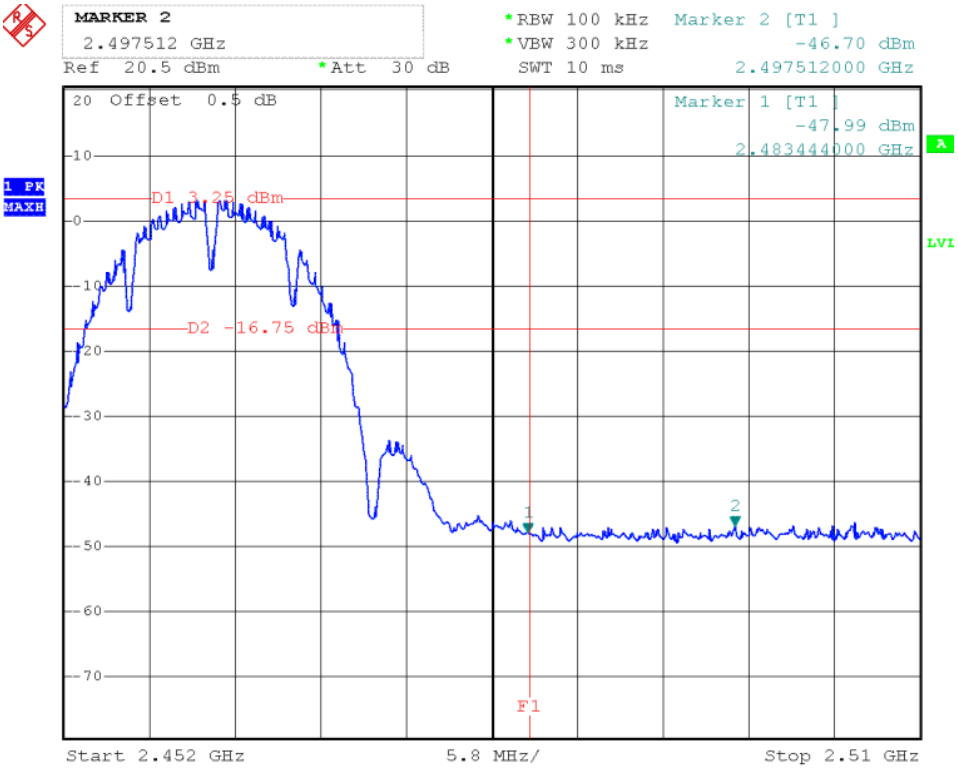
Channel	Freq.(MHz)	Level(dBuV)	Limit(dBuV)	Margin(dB)	Detector
	2390	52.05	74	-21.95	Peak
LOW	2390	48.61	54	-5.39	Average
	2483.5	53.33	74	-20.67	Peak
HIGH	2483.5	50.73	54	-3.27	Average

Test of Conducted band edges

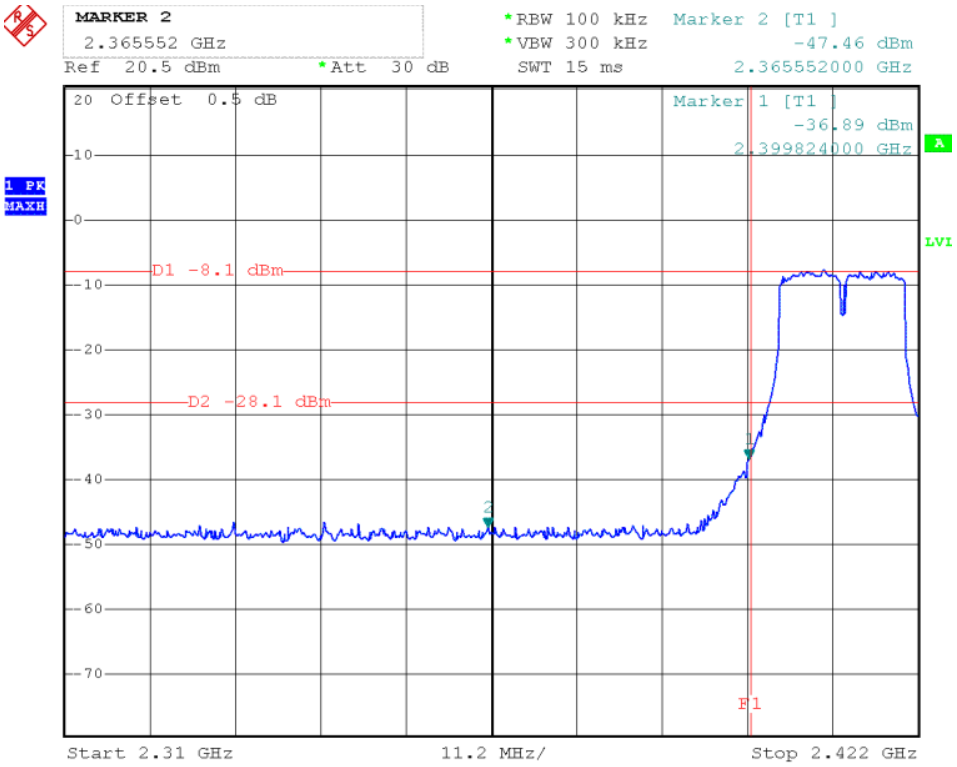
CH Low (802.11b MODE)



CH High (802.11b MODE)



CH Low (802.11g MODE)



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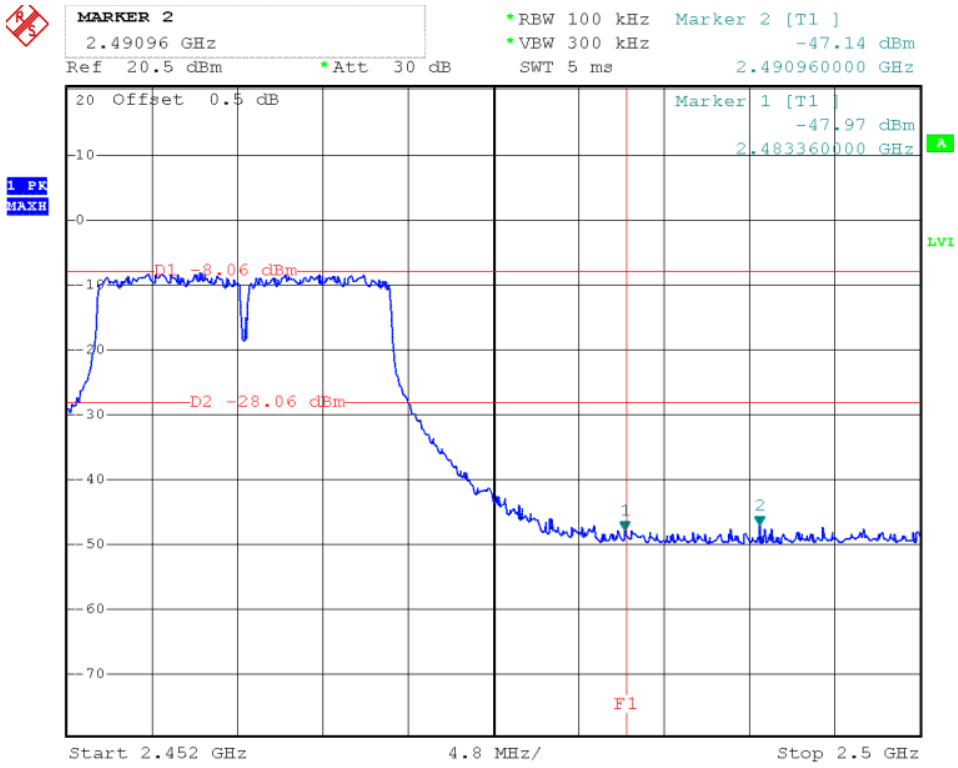
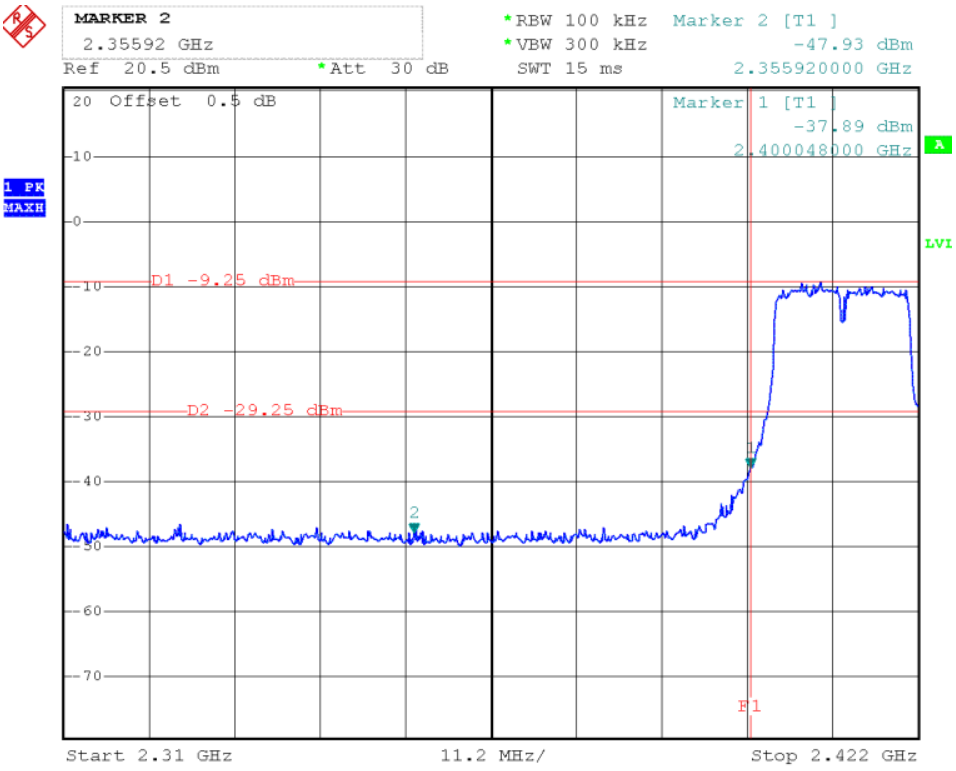
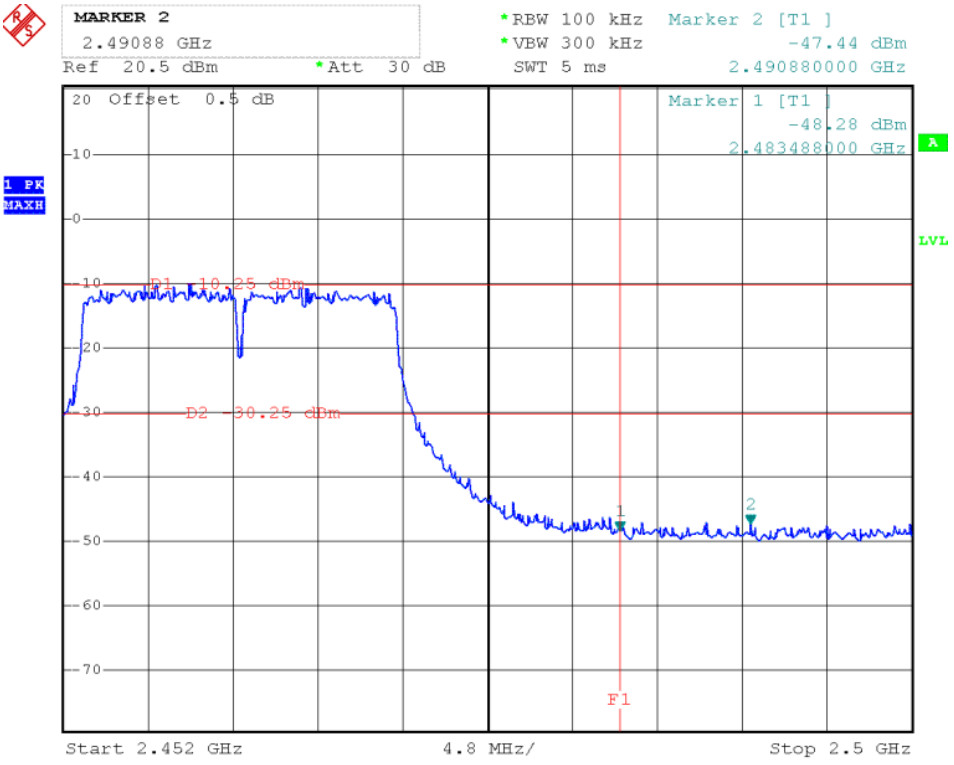


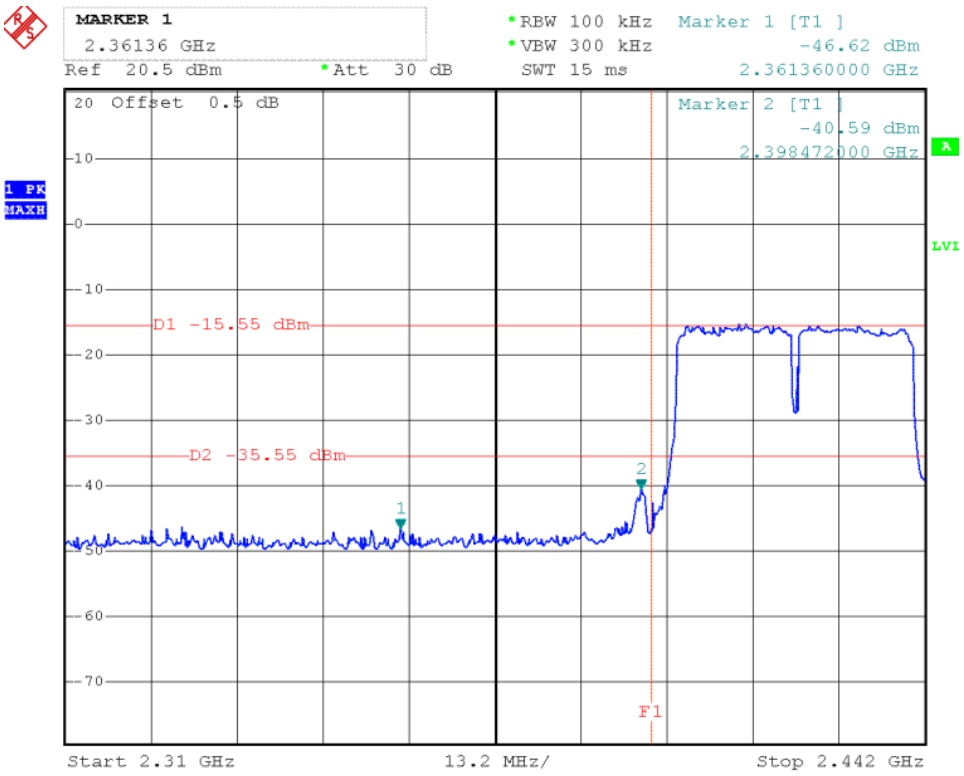
CH Low (802.11n HT20 MODE)



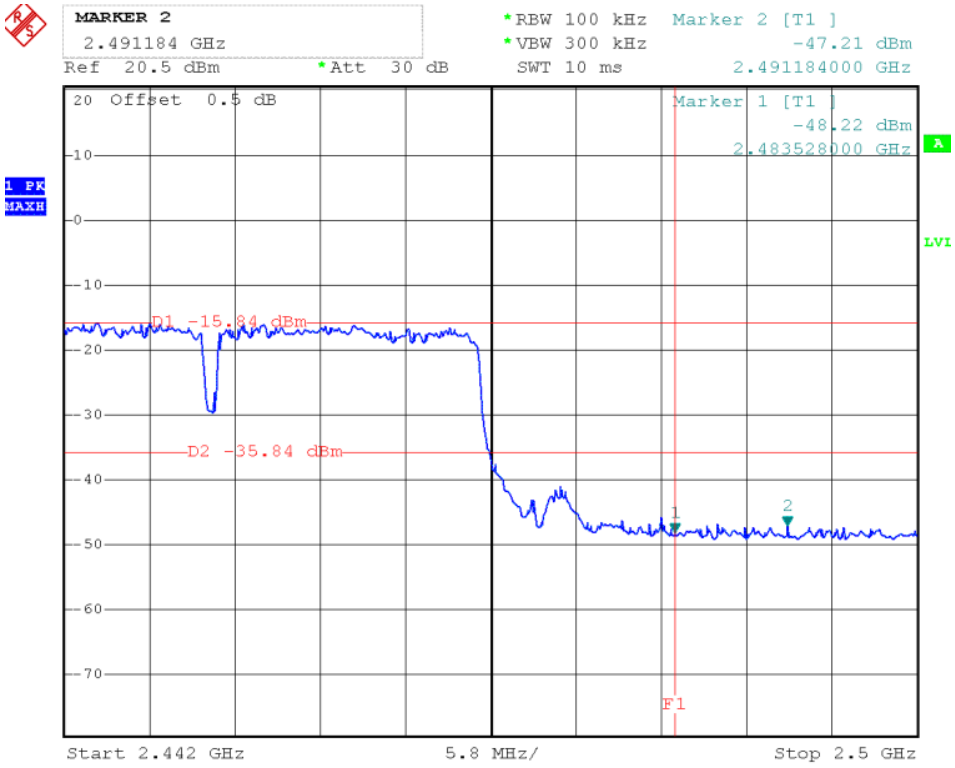
CH Low (802.11n HT20 MODE)



CH High (802.11n HT40 MODE)



CH High (802.11n HT40 MODE)



10. ANTENNA REQUIREMENT

10.1 Standard Applicable

Section 15.203:

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 shall be considered sufficient to comply with the provisions of this Section. 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.

Section 15.247(b)/(c):

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

10.2 Antenna Connected Construction

The antenna is designed with permanent attachment and no consideration of replacement. The antenna used in this product is complied with Standard. The maximum Gain of the antenna lower than 6.0dBi and have the definite antenna Specification.