RADIO TEST REPORT

For

Guangzhou Huary Tec. Co., Ltd.

Product Name:	EKAA Smart Touch Table
Model :	ETT60
Series Model:	ETT80, ETT120, ETT-M42, ETT-M46, ETT-M55, ETT-M65, ETT-M75, ETT-M86
FCC ID:	2AMNP-ETT60
Prepared By :	Shenzhen BST Technology Co., Ltd. Building No.23-24, Zhiheng Industrial Park, Guankouer Road, Nantou,Nanshan District,Shenzhen,Guangdong,China
Test Date:	June 16-28, 2017
Date of Report :	June 28, 2017
Test Result	pass
Report No.:	BST1706776320001Y-ER-2

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	Guangzhou Huary Tec. Co., Ltd.
Address of applicant:	No.201, 2nd Floor, Building D, Guan Keng Industrial Park, Shizhong San Road, Pan Yu District,Guangzhou
Manufacturer:	Guangzhou Huary Tec. Co., Ltd.
Address of manufacturer:	No.201, 2nd Floor, Building D, Guan Keng Industrial Park, Shizhong San Road, Pan Yu District,Guangzhou

General Description of EUT	
Product Name:	EKAA Smart Touch Table
Trade Name:	
Model No.:	ETT60
Adding Model(s):	ETT80, ETT120, ETT-M42, ETT-M46, ETT-M55, ETT-M65, ETT-M75, ETT-M86
Rated Voltage:	Input: AC 100-240V, 50/60Hz
Battery Capacity:	N/A
Power Adapter Model:	N/A
Software Version:	N/A
Hardware Version:	N/A
Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model ETT60, but the circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)
RF Output Power:	13.83dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11 for 802.11b/g/n(HT20); 7 for 802.11n(HT40)
Channel Separation:	5MHz
Type of Antenna:	Internal antenna
Antenna Gain:	2dBi
Lowest Internal Frequency	32.768kHz

1.2 Test Standards

The following report is prepared on behalf of the Smart Car navigation mirror DVR . in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices, and ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 558074 D01 v03r05 for digital transmission systems shall be performed also.

1.4 Test Facility

Shenzhen Asia Test Technology Co.,Ltd.
7 / F, Xinwei Building, Gushu Village, Xixiang Town, Baoan District, Shenzhen, China
FCC Registration No.: 348715; IC Registration No.: 12198A

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11b	2412MHz, 2437MHz, 2462MHz
TM2	802.11g	2412MHz, 2437MHz, 2462MHz
TM3	802.11n-HT20	2412MHz, 2437MHz, 2462MHz
TM4	802.11n-HT40	2422MHz, 2437MHz, 2452MHz
Note: All test modes (different data rate and different modulation) are performed, but only the worst case is recorded in this report.		

Accessories Equipment List and Details			
Description	**Manufacturer**	**Model No.**	**Serial Number**
/	/	/	/
Accessories Cable List and Details			
Cable Description	**Length (m)**	**Shielded/Unshielded**	**With Core/Without Core**
/	/	/	/
EUT Cable List and Details			
Cable Description	**Length (m)**	**Shielded/Unshielded**	**With Core/Without Core**
/	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Power Spectral Density	Conducted	±1.8dB
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	±2.88dB
Transmitter Spurious Emissions	Radiated	±5.1dB

Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2017-06-04	2018-06-03
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2017-06-04	2018-06-03
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2017-06-04	2018-06-03
Amplifier	Agilent	8447F	3113A06717	2017-06-04	2018-06-03
Amplifier	C&D	PAP-1G18	2002	2017-06-04	2018-06-03
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-04	2018-06-03
Horn Antenna	ETS	3117	00086197	2017-06-04	2018-06-03
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2017-06-04	2018-06-03
Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-04	2018-06-03
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2017-06-04	2018-06-03
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2017-06-04	2018-06-03
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2017-06-04	2018-06-03

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 2.1093	RF Exposure	Compliant
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§ 15.207(a)	Conducted Emission	Compliant
§ 15.247(e)	Power Spectral Density	Compliant
§ 15.247(a)(2)	6 dB Bandwidth	Compliant
§ 15.247(b)(3)	RF Output Power	Compliant
§ 15.209(a)	Radiated Emission	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure Report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 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.

4.2 Evaluation Information

This product has an internal antenna, fulfill the requirement of this section.

5. Power Spectral Density

5.1 Standard Applicable

According to 15.247(a)(1)(iii), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 Test Procedure

According to the KDB 558074 D01 v03r05, such specifications require that the same method as used to determine the conducted output power shall also be used to determine the power spectral density. The test method of power spectral density as below:

(g) Set instrument center frequency to DTS channel center frequency.
(h) Set span to at least 1.5 times the OBW.
(i) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz. .
(j) Set VBW ≥3 x RBW.
(k) Detector = power averaging (RMS) or sample detector (when RMS not available).
(l) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
(m) Sweep time = auto couple.
(n) Employ trace averaging (RMS) mode over a minimum of 100 traces.
(o) Use the peak marker function to determine the maximum amplitude level.
(p) If measured value exceeds limit, 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).

5.3 Environmental Conditions

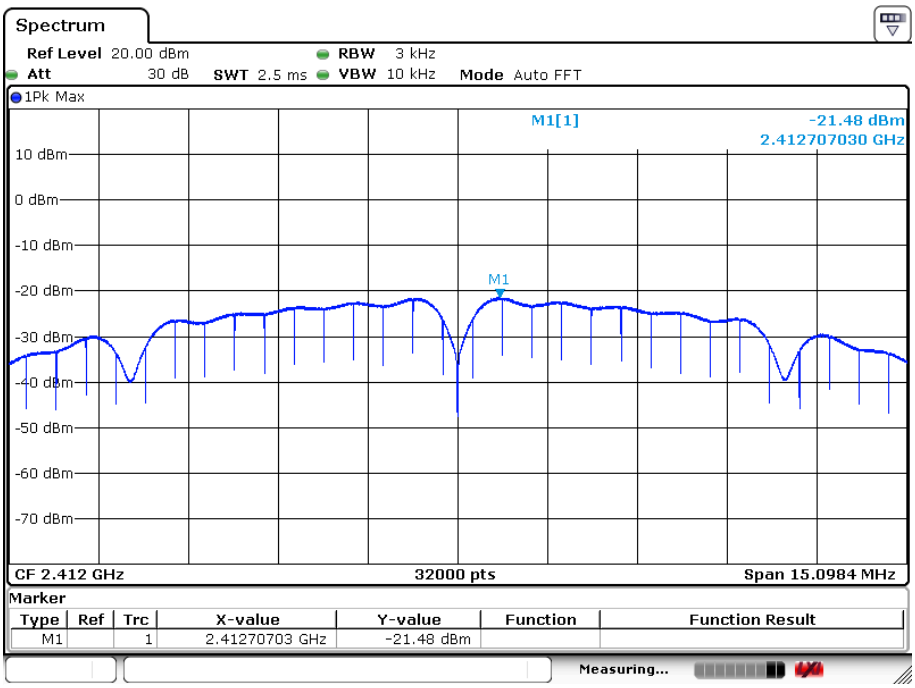
Temperature:	21℃
Relative Humidity:	50%
ATM Pressure:	101.2

5.4 Summary of Test Results/Plots

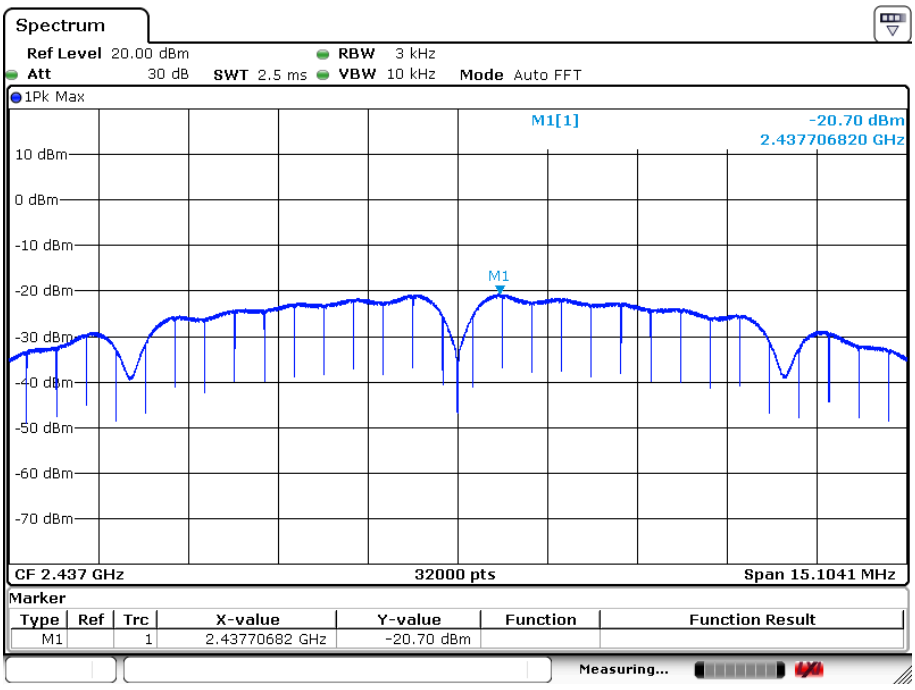
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-21.48	8
	2437	-20.70	8
	2462	-20.12	8
802.11g	2412	-23.13	8
	2437	-22.61	8
	2462	-21.96	8
802.11n HT20	2412	-22.50	8
	2437	-22.01	8
	2462	-21.47	8
802.11n HT40	2422	-23.44	8
	2437	-23.24	8
	2452	-22.92	8

Please refer to the following test plots:

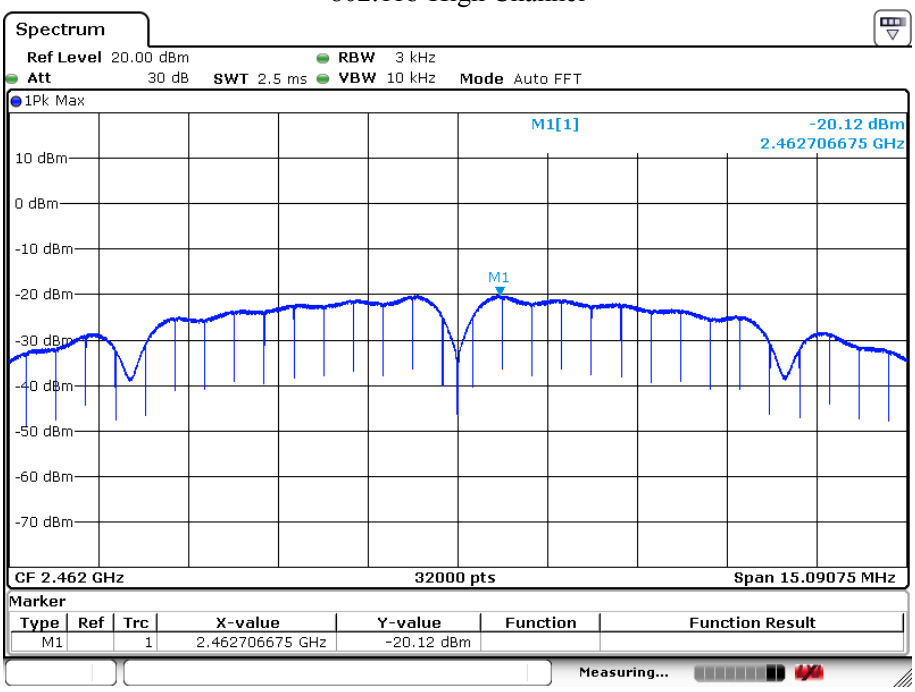
802.11b-Low Channel



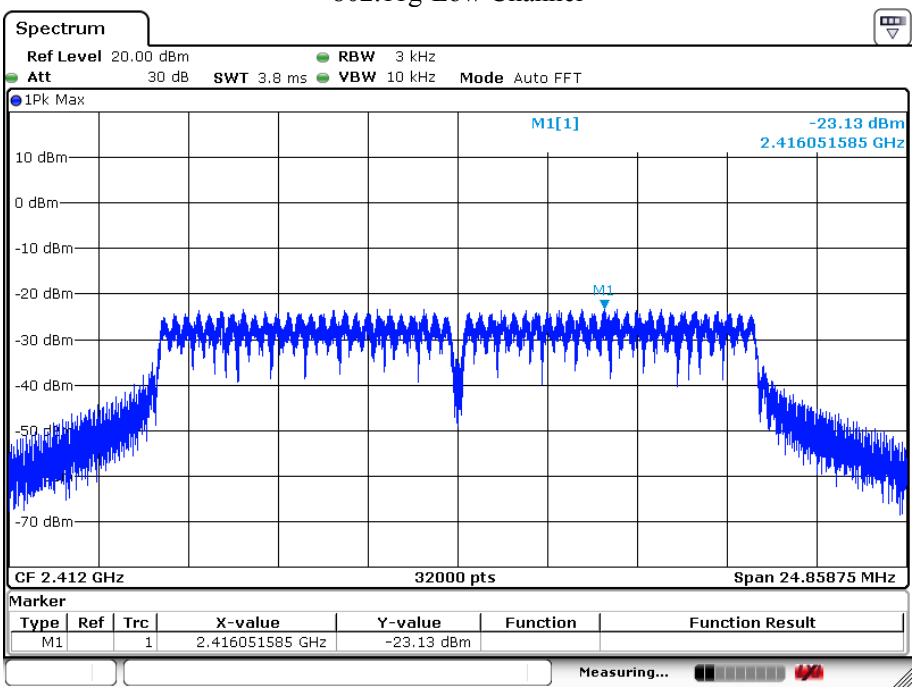
802.11b-Middle Channel



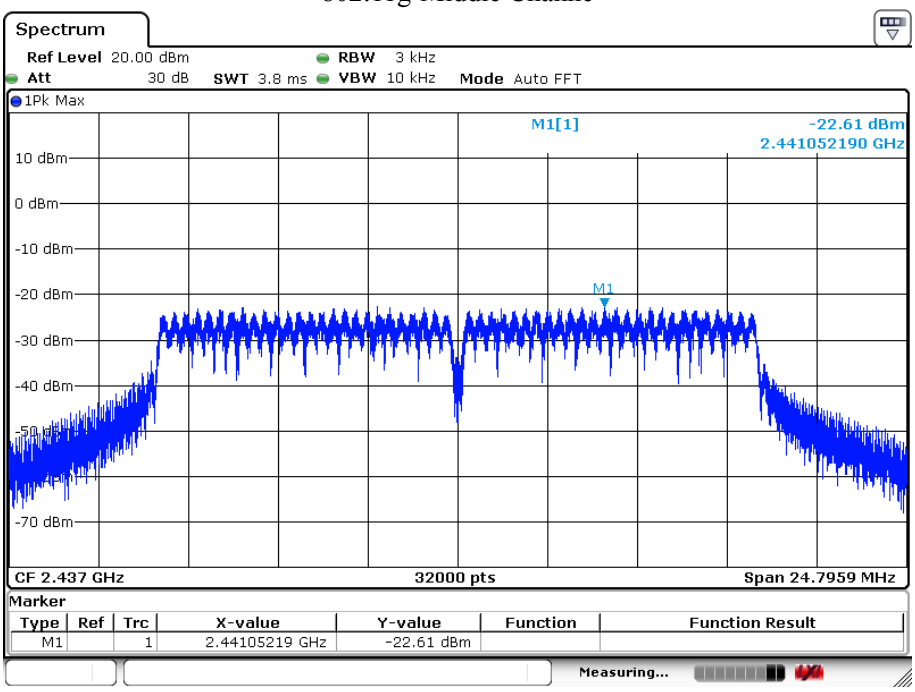
802.11b-High Channel



802.11g-Low Channel



802.11g-Middle Channe



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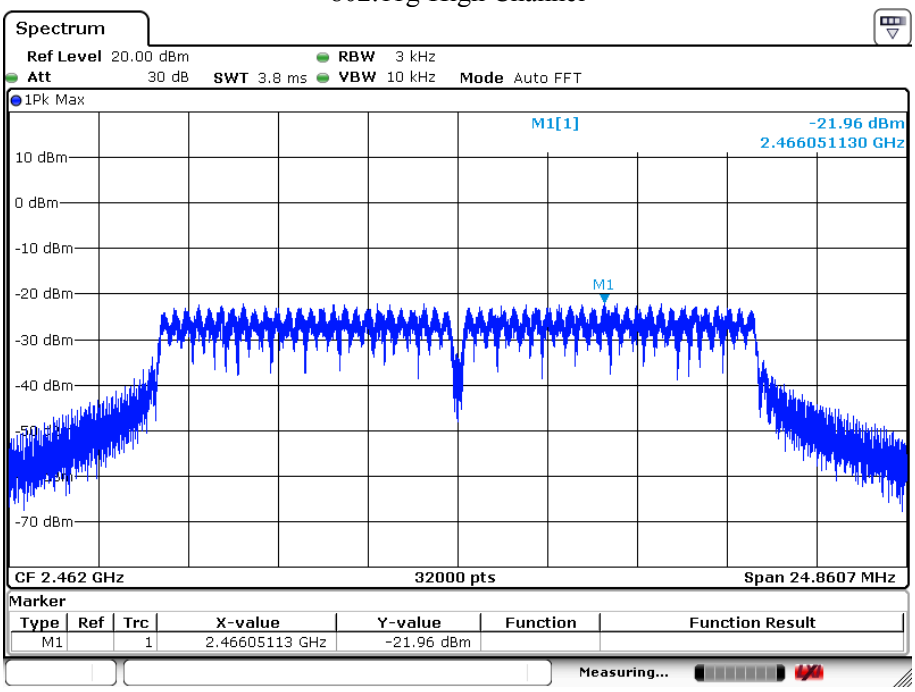
802.11g-High Channel



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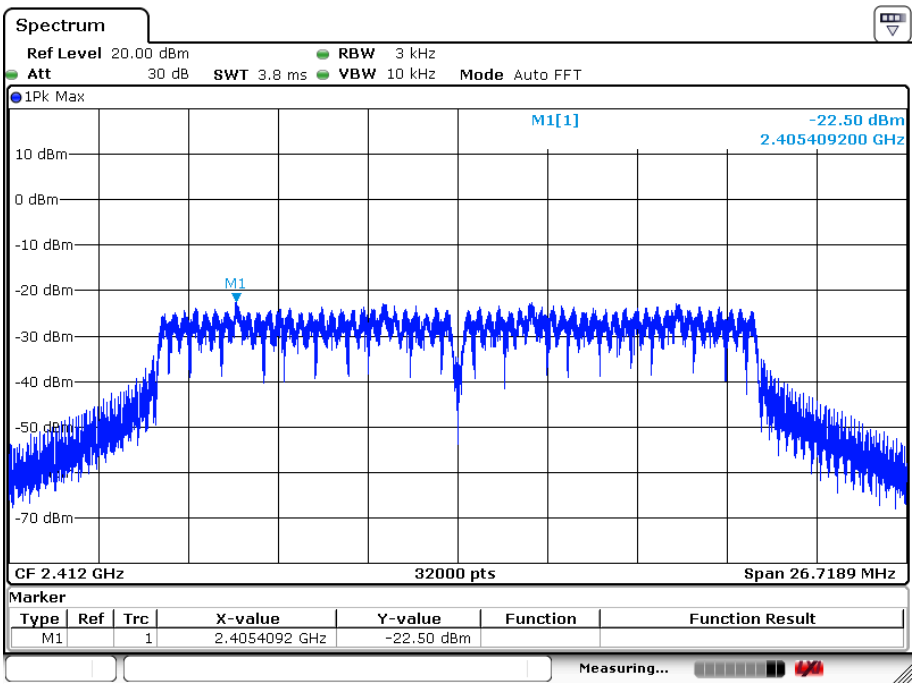
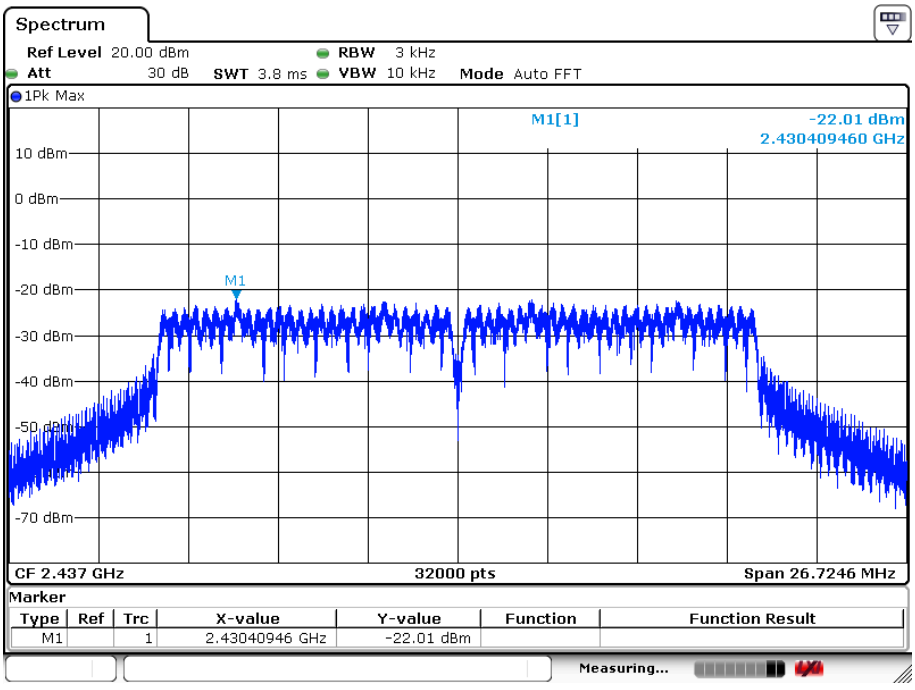
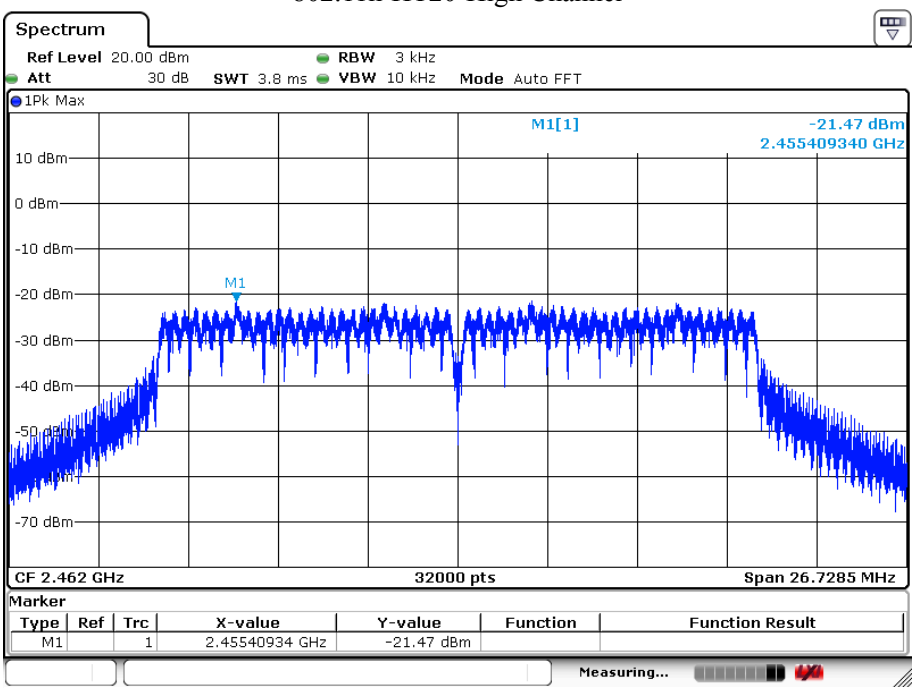
802.11n-HT20-Low Channel



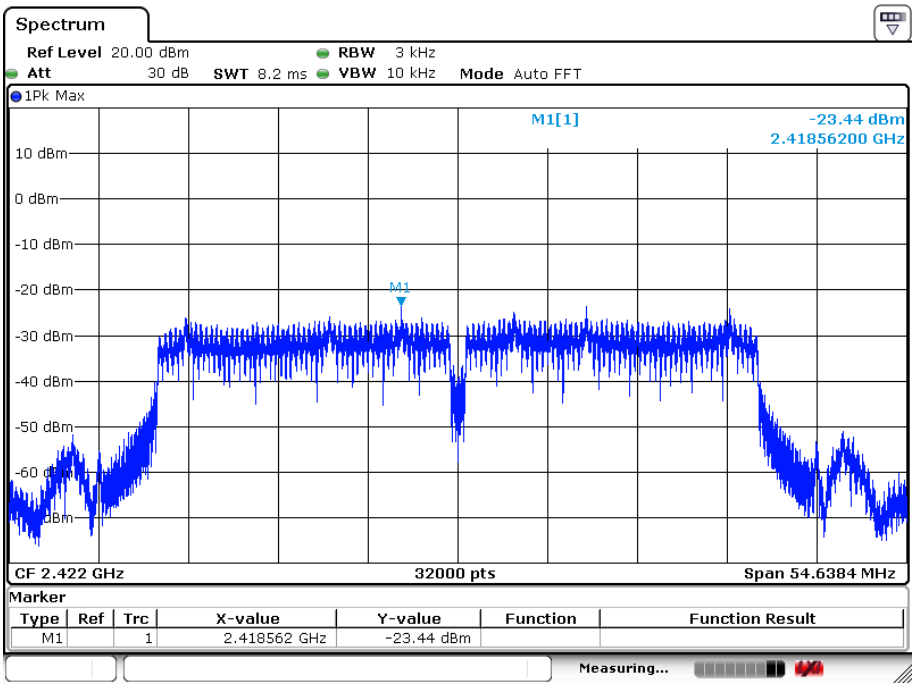
802.11n-HT20-Middle Channel



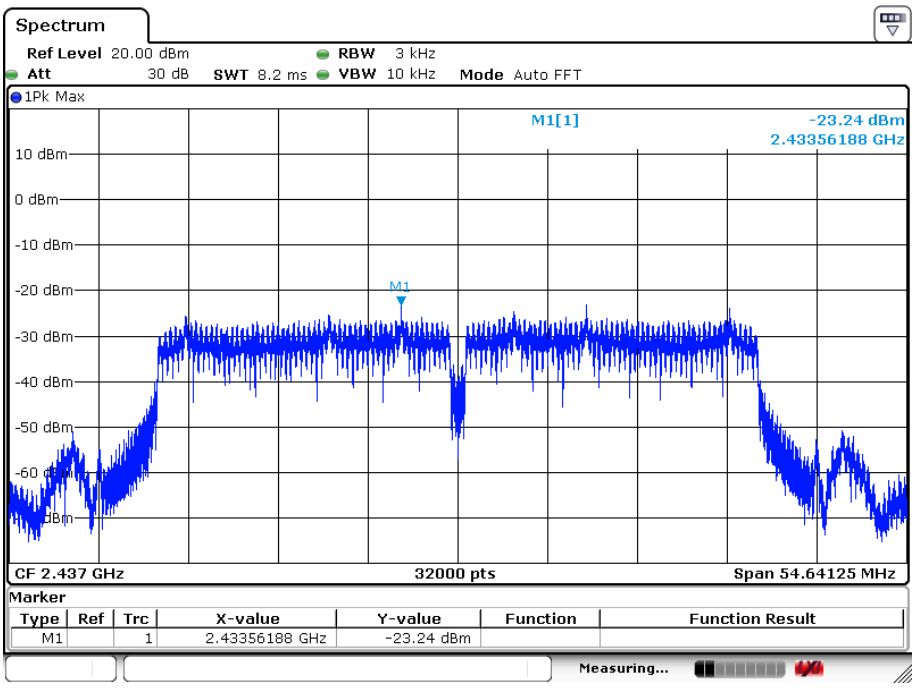
802.11n-HT20-High Channel



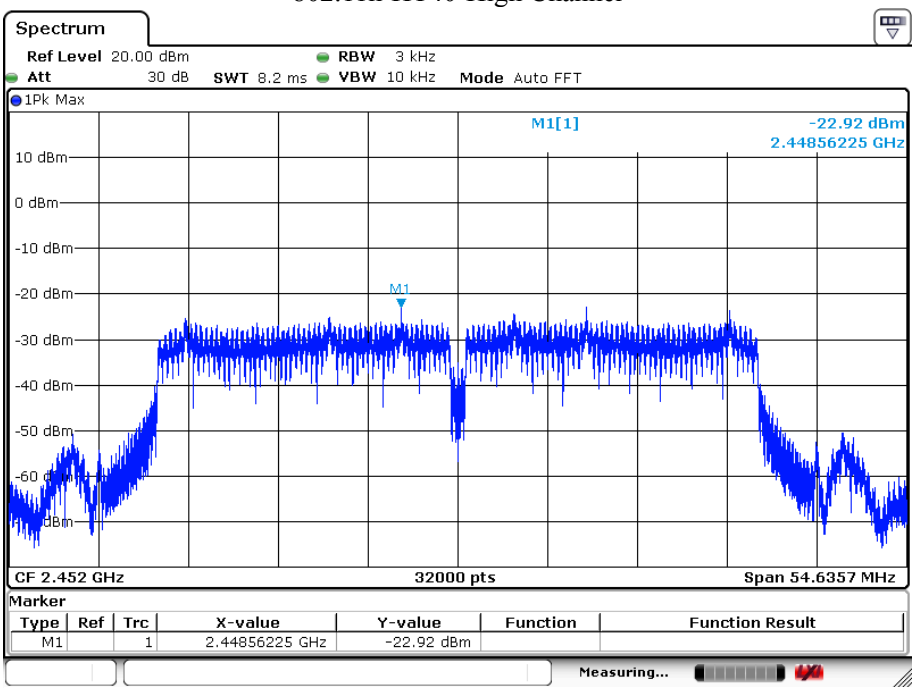
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel



802.11n-HT40-High Channel



6. 6dB Bandwidth

6.1 Standard Applicable

According to 15.247(a)(2). Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2 Test Procedure

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3 Environmental Conditions

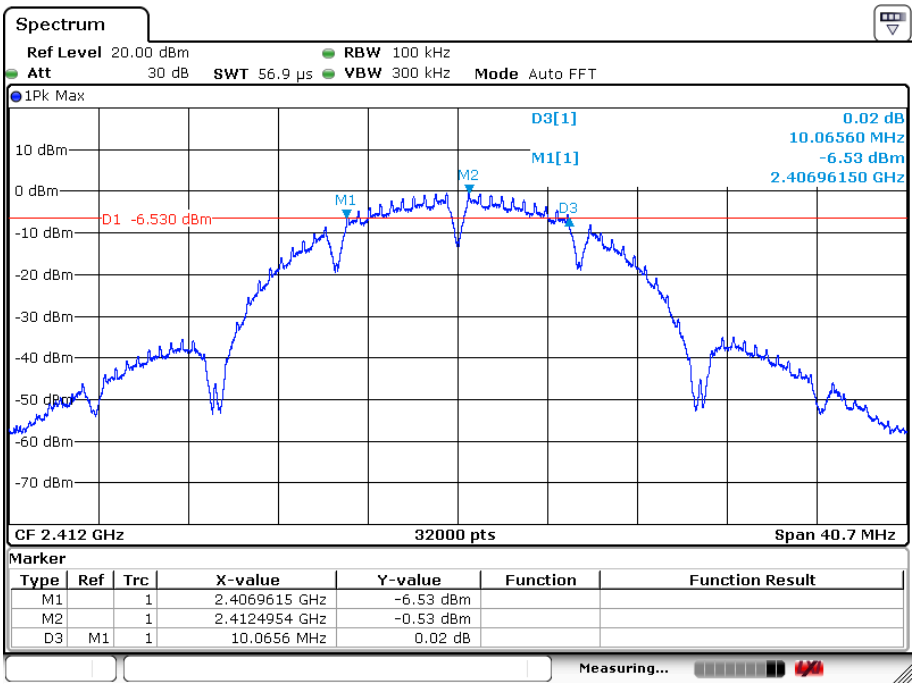
Temperature:	21℃
Relative Humidity:	50%
ATM Pressure:	101.2

6.4 Summary of Test Results/Plots

Test Mode	Test Channel MHz	6 dB Bandwidth MHz	Limit kHz
802.11b	2412	10.086	≥500
	2437	10.069	≥500
	2462	10.061	≥500
802.11g	2412	16.573	≥500
	2437	16.531	≥500
	2462	16.574	≥500
802.11n-HT20	2412	17.813	≥500
	2437	17.816	≥500
	2462	17.819	≥500
802.11n-HT40	2422	36.426	≥500
	2437	36.428	≥500
	2452	36.424	≥500

Please refer to the following test plots:

802.11b-Low Channel



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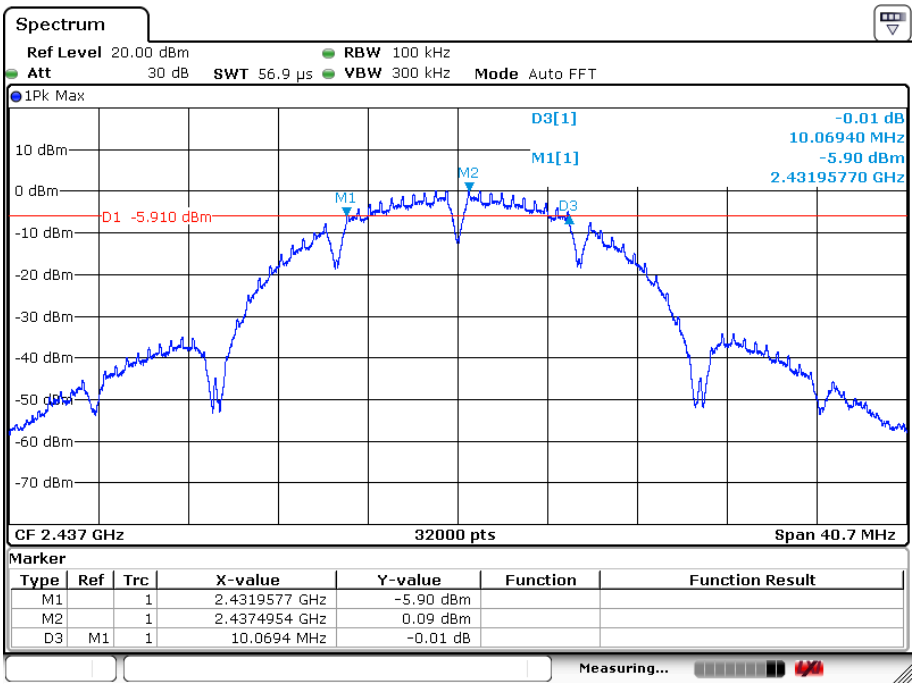
802.11b-Middle Channel



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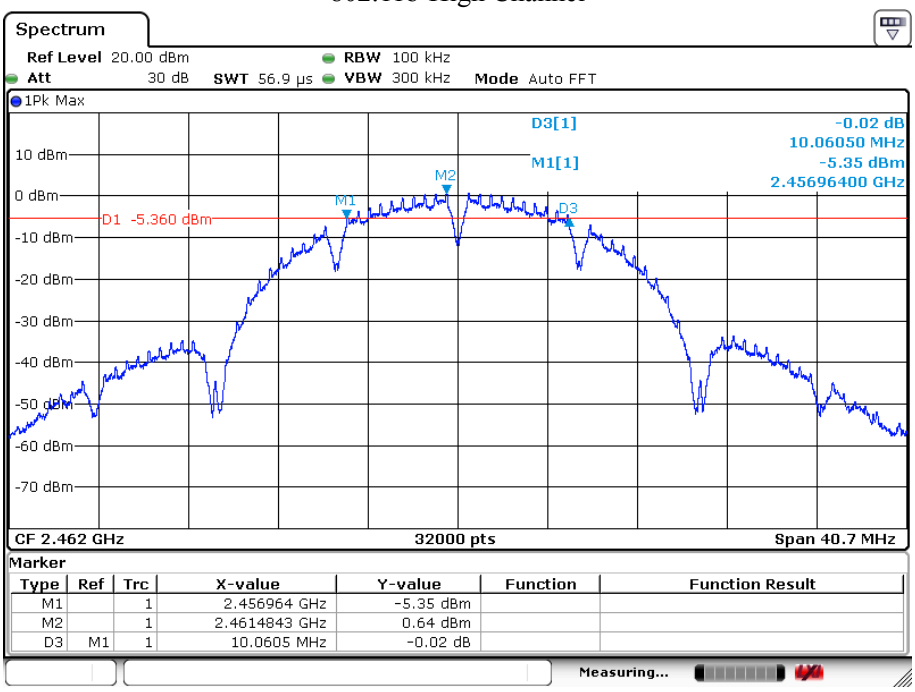
802.11b-High Channel



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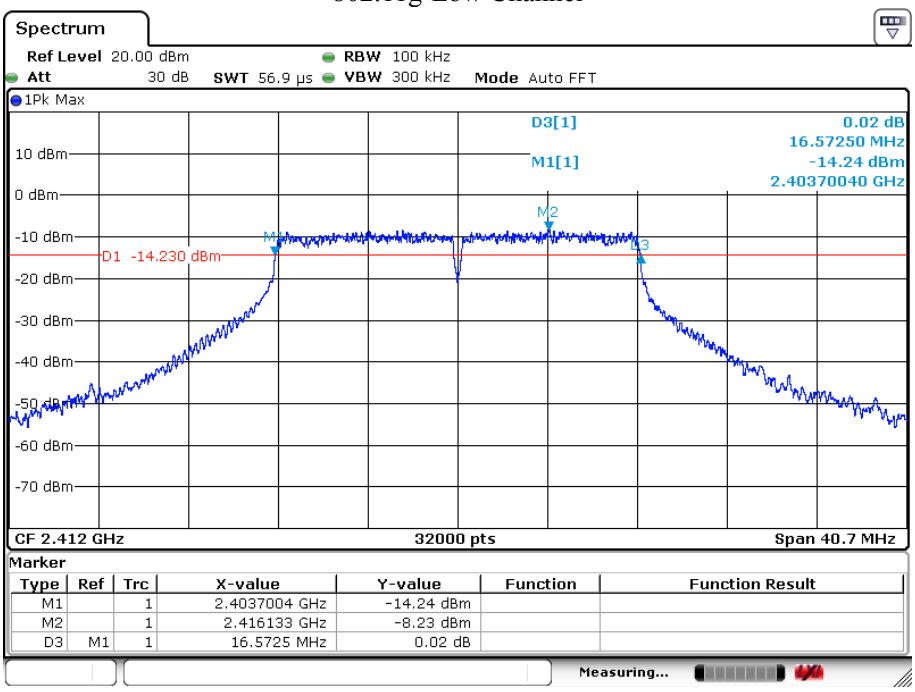
802.11g-Low Channel



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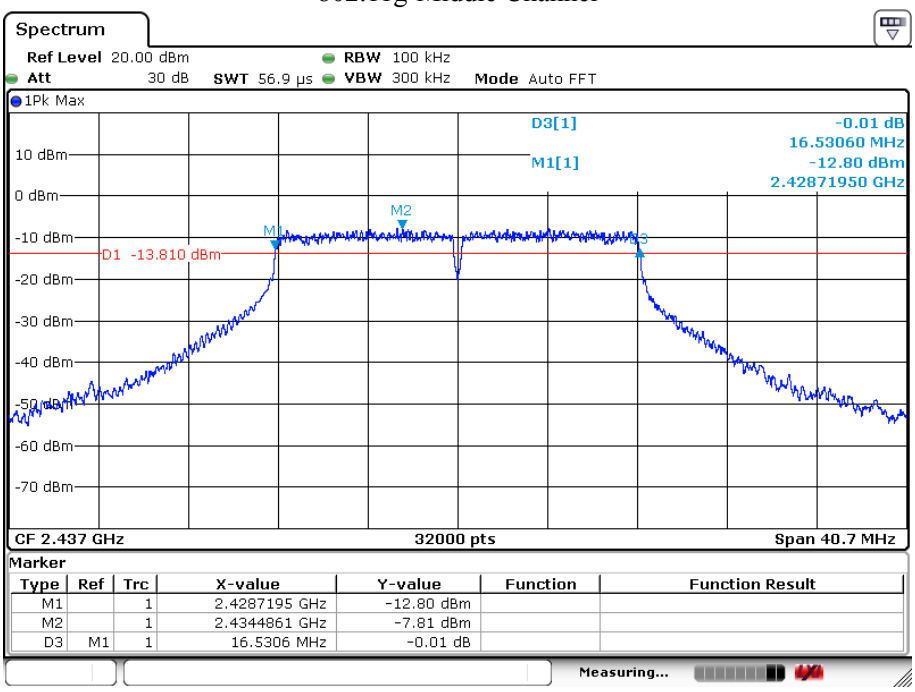
802.11g-Middle Channel



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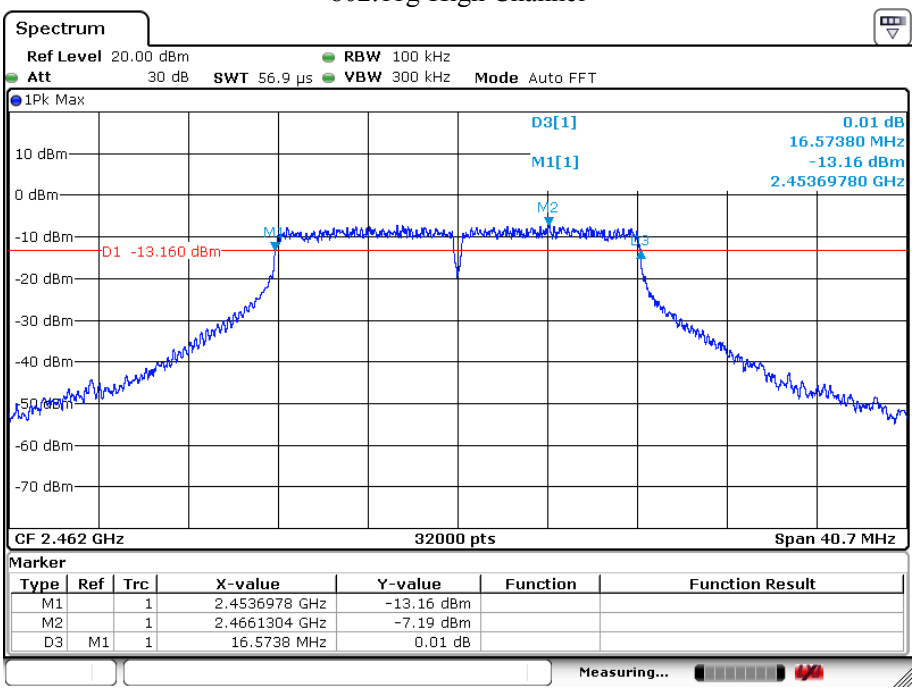
802.11g-High Channel



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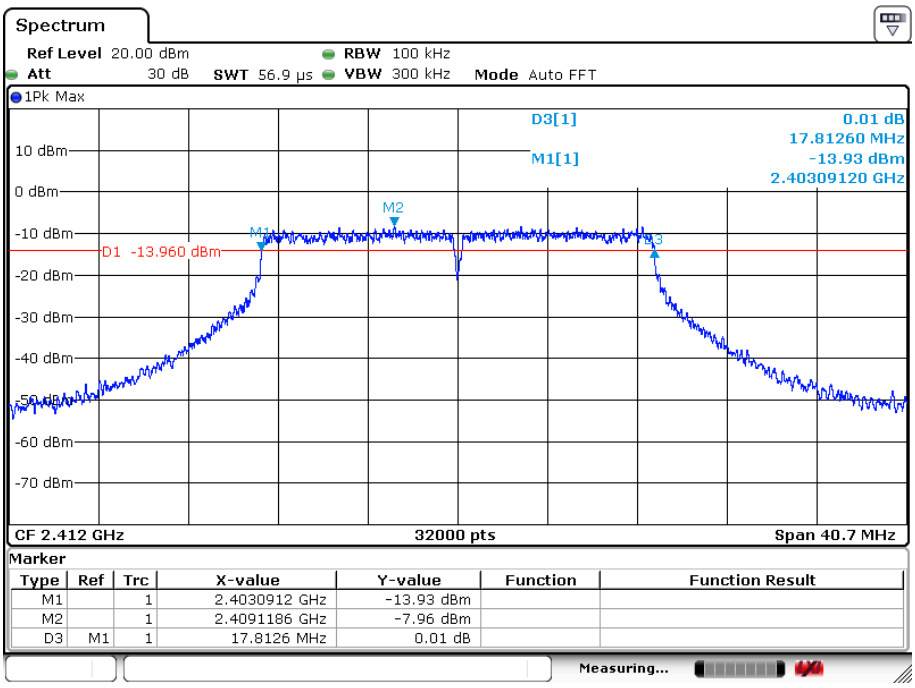
802.11n-HT20-Low Channel



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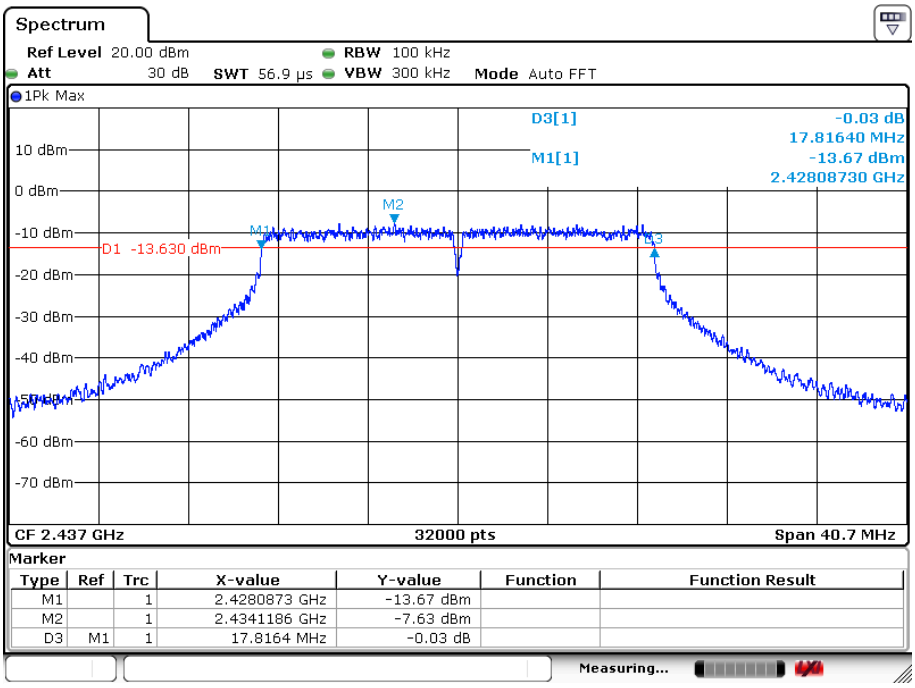
802.11n-HT20-Middle Channel



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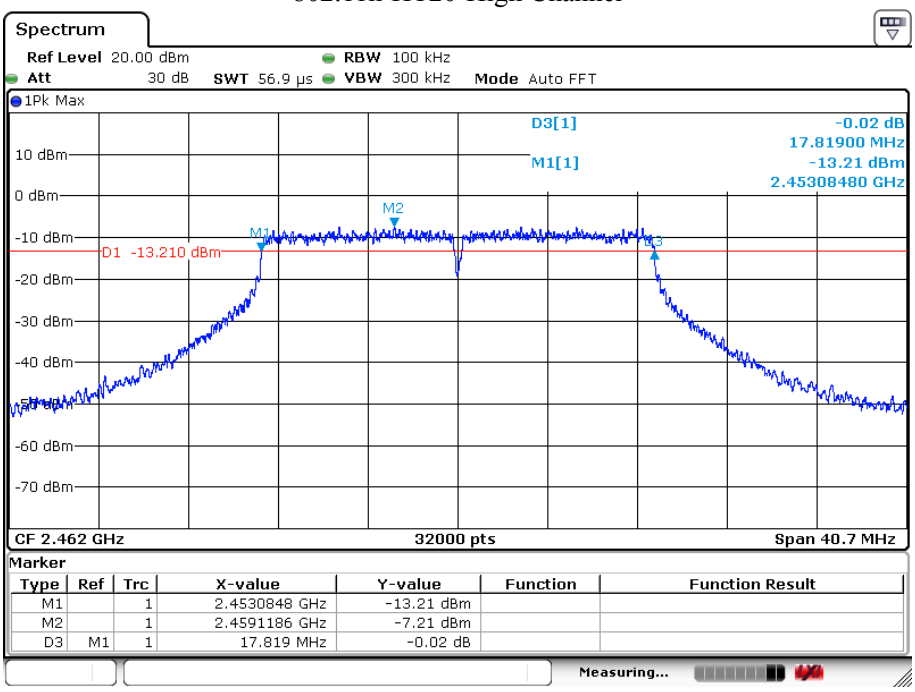
802.11n-HT20-High Channel



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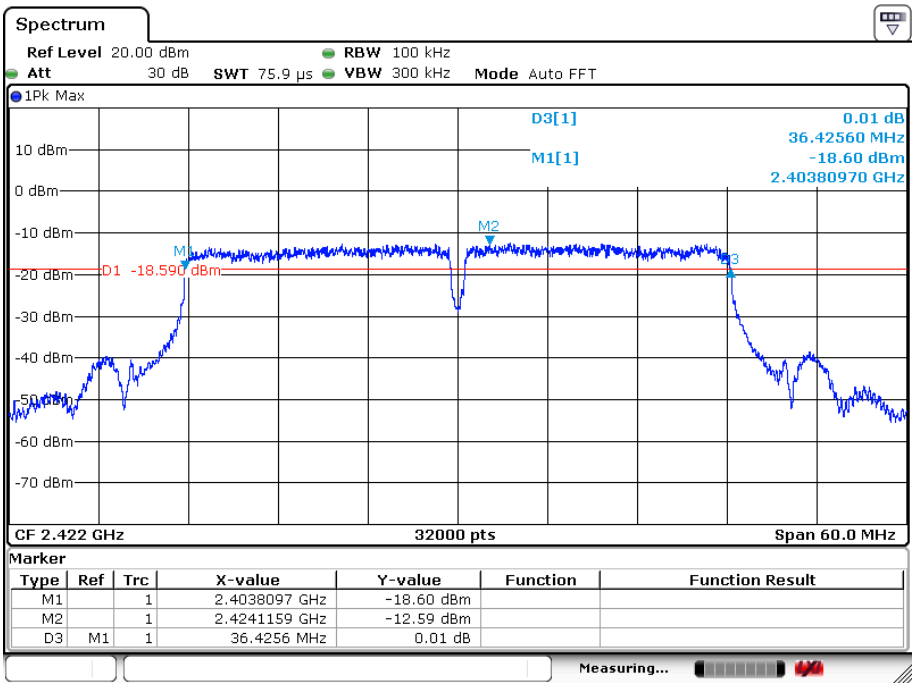
802.11n-HT40-Low Channel



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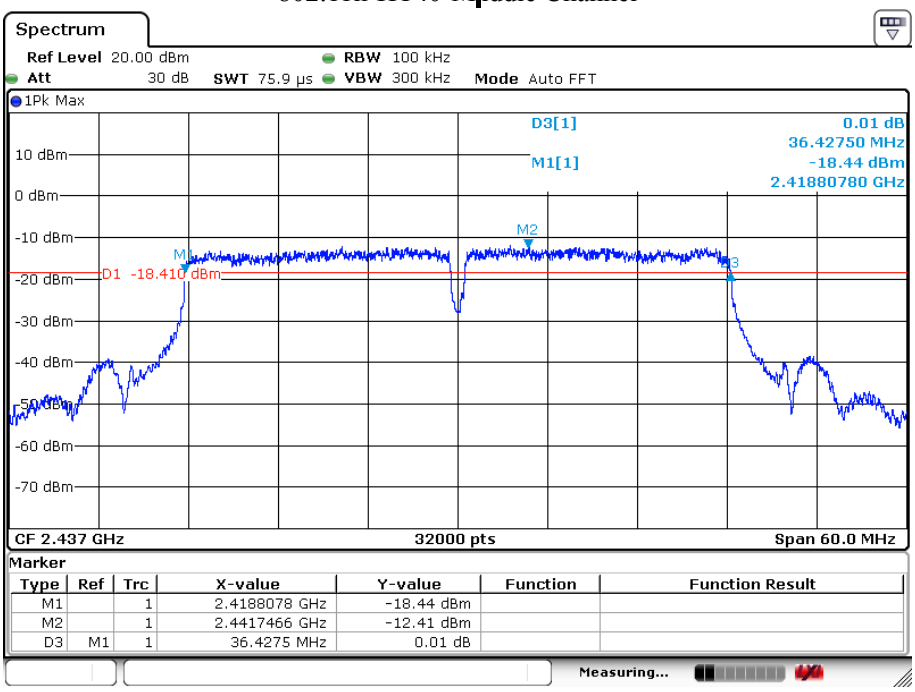
802.11n-HT40-Middle Channel



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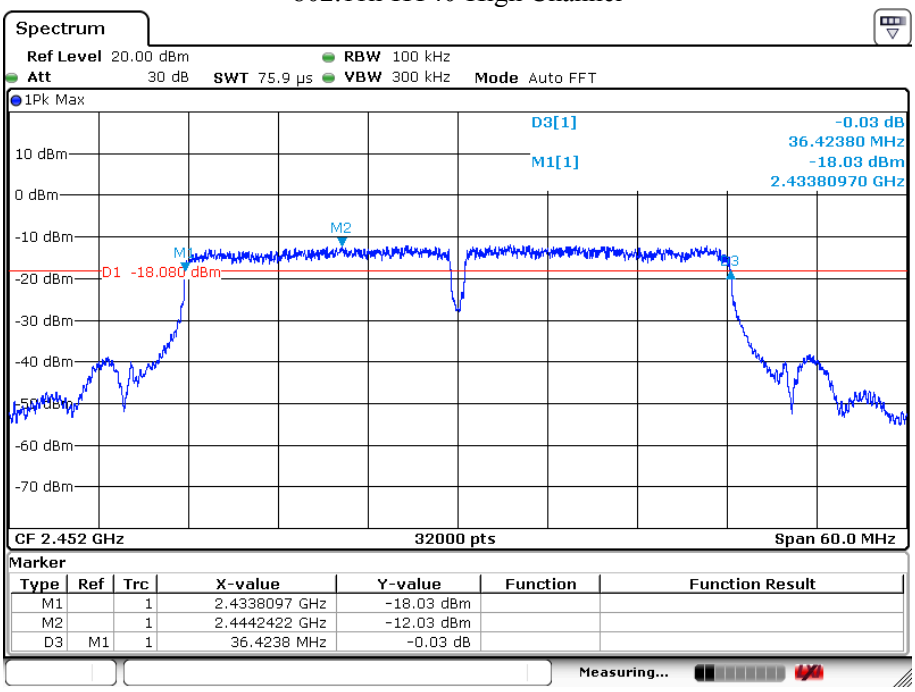
802.11n-HT40-High Channel



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7. RF Output Power

7.1 Standard Applicable

According to 15.247(b)(3). For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

7.2 Test Procedure

According to the KDB-558074 D01 v03r05, 9.2.2.2, when this option is exercised, the measured power is to be referenced to the OBW rather than the DTS bandwidth

a) Set span to at least 1.5 times the OBW.
b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
c) Set VBW ≥ 3 x RBW.
d) Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
e) Sweep time = auto.
f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
h) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
i) 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.

7.3 Environmental Conditions

Temperature:	21℃
Relative Humidity:	50%
ATM Pressure:	101.2

7.4 Summary of Test Results/Plots

Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b_11Mbps	2412	13.49	22.336	1000
	2437	13.47	22.233	1000
	2462	13.51	22.439	1000
802.11g_54Mbps	2412	13.57	22.751	1000
	2437	13.54	22.594	1000
	2462	13.46	22.182	1000
802.11n HT20_MCS7	2412	13.83	24.155	1000
	2437	13.81	24.034	1000
	2462	13.79	23.933	1000
802.11n HT40_MCS7	2422	13.08	20.324	1000
	2437	13.11	20.464	1000
	2452	13.10	20.417	1000

8. Field Strength of Spurious Emissions

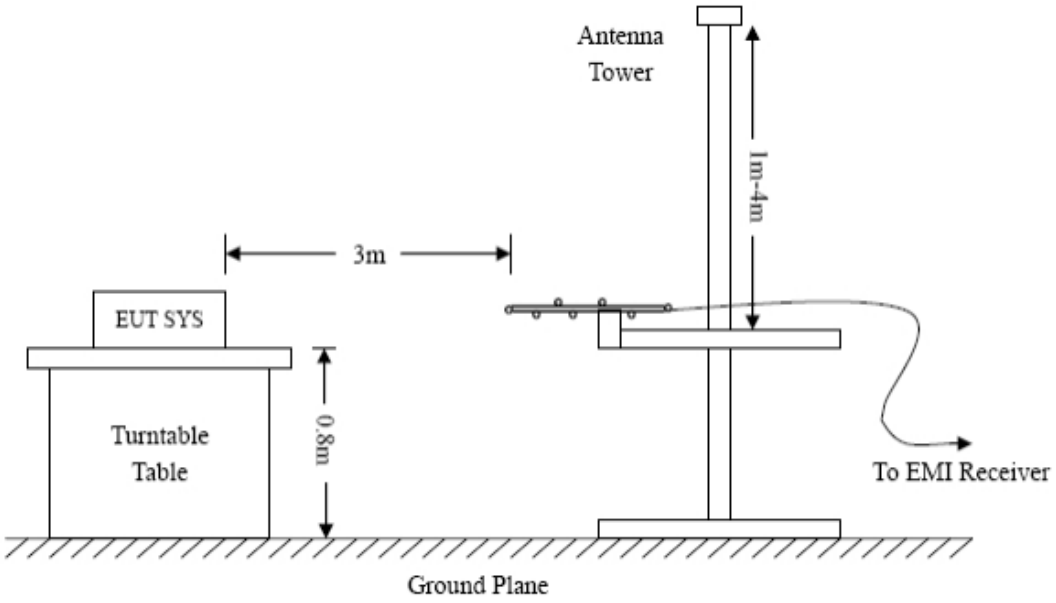
8.1 Standard Applicable

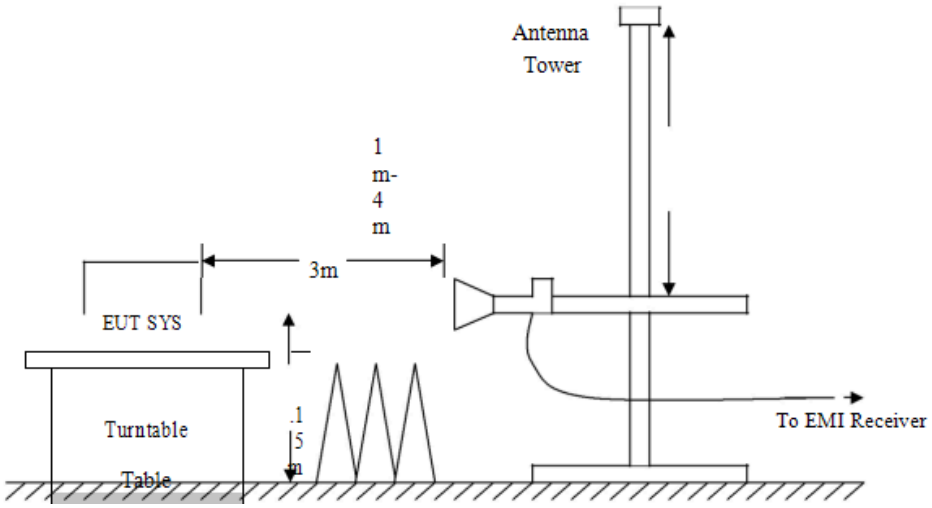
According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.





Ground Plane

Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

8.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

8.4 Environmental Conditions

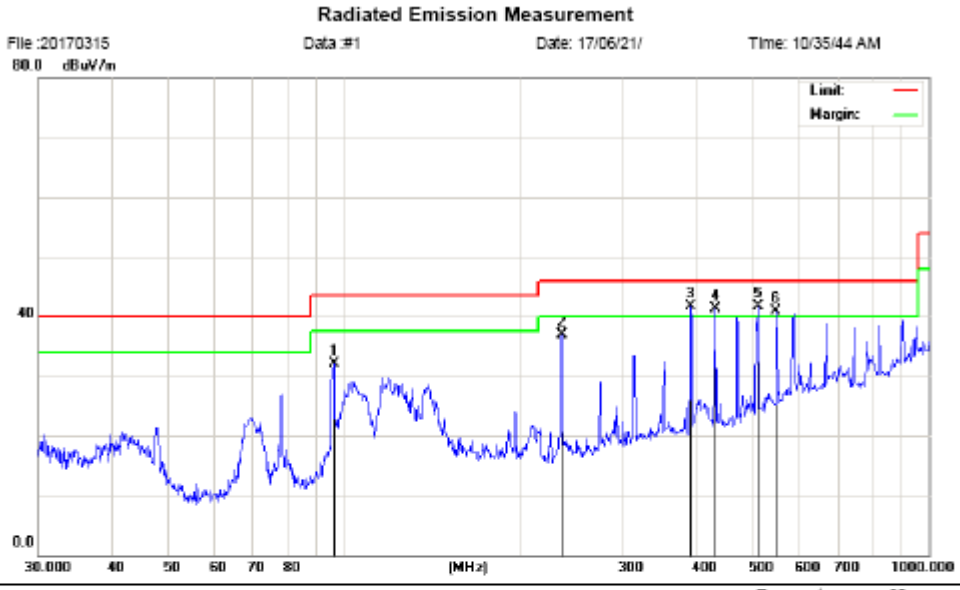
Temperature:	21℃
Relative Humidity:	50%
ATM Pressure:	101.2

8.5 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

Vertical



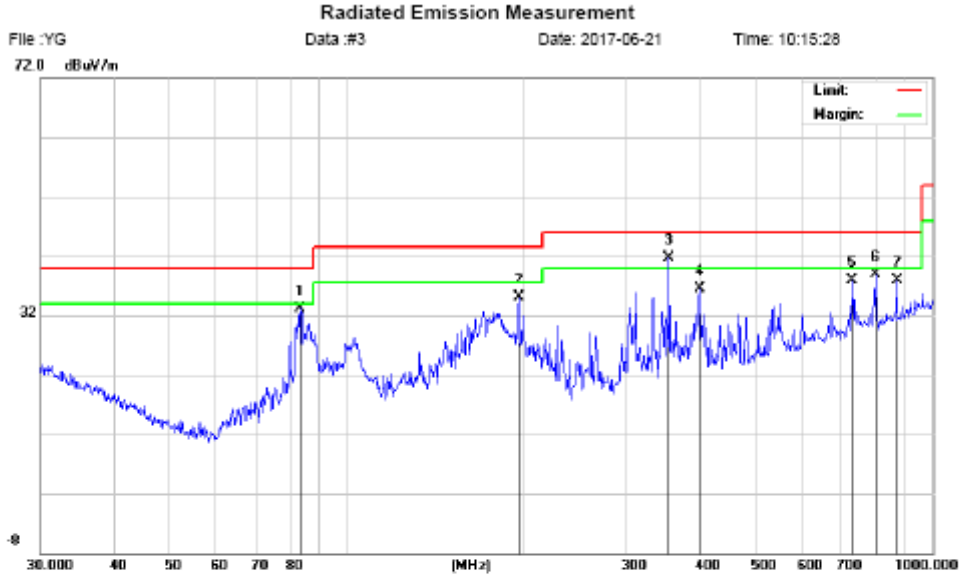
Site
Limit: FCC_PART15_B_03m_QP_
EUT:
M/N: 0
Mode:
Note:

Polarization: *Vertical*
Power: AC 120V/60Hz
Distance: 3m

Temperature: 25
Humidity: 50 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		96.0986	48.66	-16.54	32.12	43.50	-11.38	QP			
2		235.8163	51.43	-14.46	36.97	46.00	-9.03	QP			
3	!	392.0951	48.80	-7.02	41.78	46.00	-4.22	QP			
4	!	431.0316	47.92	-6.57	41.35	46.00	-4.65	QP			
5	*	510.0436	46.76	-4.96	41.80	46.00	-4.20	QP			
6	!	549.0193	44.54	-3.58	40.96	46.00	-5.04	QP			

Horizontal



Site
Limit: FCC_PART15_B_03m_QP
EUT:
M/N:
Mode:
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 26
Humidity: 56 %

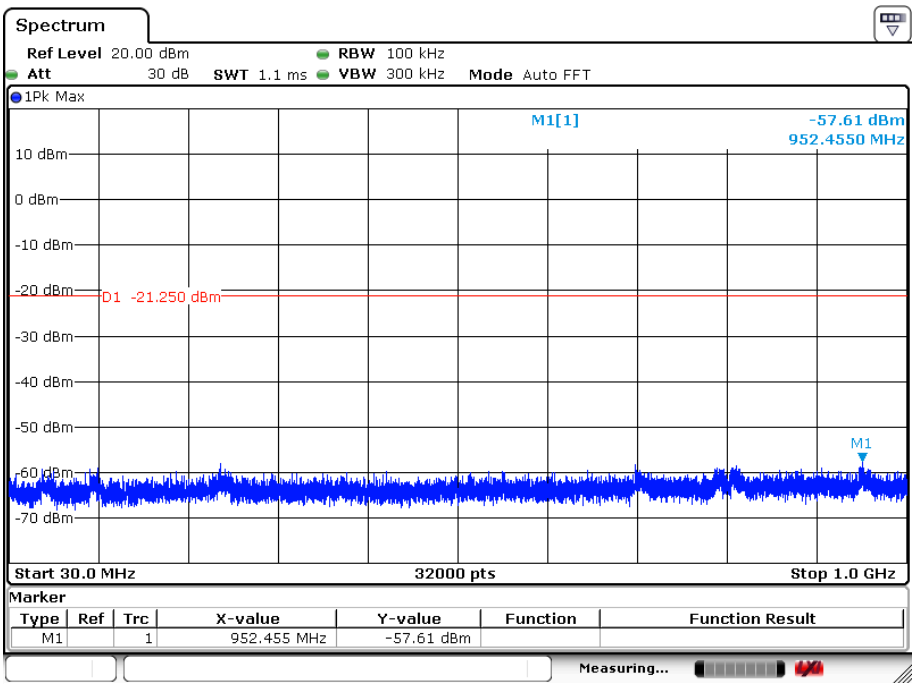
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		83.2298	24.85	8.35	33.20	40.00	-6.80	QP			
2		196.5098	26.45	8.69	35.14	43.50	-8.36	QP			
3	*	355.4273	26.28	15.47	41.75	46.00	-4.25	QP			
4		400.4318	19.34	17.22	36.56	46.00	-9.44	QP			
5		729.3582	14.02	23.86	37.88	46.00	-8.12	QP			
6		798.9796	15.01	23.84	38.85	46.00	-7.15	QP			
7		869.1299	12.47	25.34	37.81	46.00	-8.19	QP			

Spurious Emissions Above 1GHz
Test Mode: 802.11b (worst case)

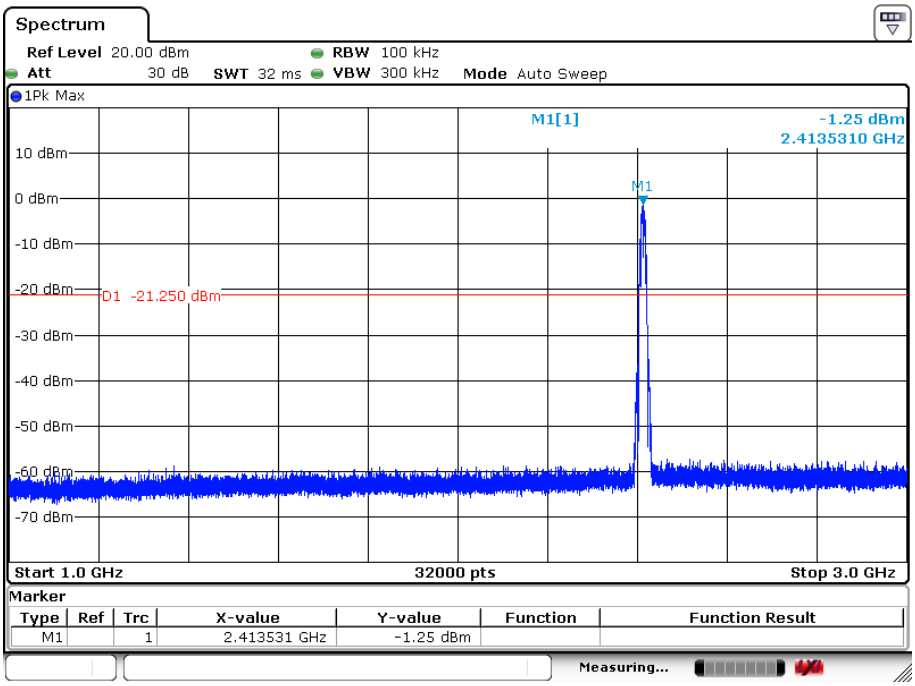
Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2412MHz							
4824.000	61.25	-3.81	57.44	74	-16.56	H	PK
4824.000	41.25	-3.81	37.44	54	-16.56	H	AV
7236.000	60.34	1.15	61.49	74	-12.51	H	PK
7236.000	47.61	1.15	48.76	54	-5.24	H	AV
4824.000	60.34	-3.81	56.53	74	-17.47	V	PK
4824.000	45.8	-3.81	41.99	54	-12.01	V	AV
7236.000	61.25	1.15	62.4	74	-12.90	V	PK
7236.000	48.25	1.15	49.4	54	-4.6	V	AV
Middle Channel-2437MHz							
4874.000	56.7	-3.69	53.01	74	-20.99	H	PK
4874.000	48.52	-3.69	44.83	54	-9.17	H	AV
7311.000	56.7	1.52	58.22	74	-15.78	H	PK
7311.000	42.16	1.52	43.68	54	-10.32	H	AV
4874.000	57.61	-3.69	53.92	74	-20.08	V	PK
4874.000	47.61	-3.69	43.92	54	-10.08	V	AV
7311.000	55.8	1.52	57.32	74	-16.68	V	PK
7311.000	48.25	1.52	49.77	54	-4.23	V	AV
High Channel-2462MHz							
4924.000	54.89	-3.58	51.31	74	-22.69	H	PK
4924.000	46.7	-3.58	43.12	54	-10.88	H	AV
7386.000	53.98	1.67	55.65	74	-18.35	H	PK
7386.000	42.16	1.67	43.83	54	-10.17	H	AV
4924.000	61.25	-3.58	57.67	74	-16.33	V	PK
4924.000	46.7	-3.58	43.12	54	-10.88	V	AV
7386.000	57.61	1.67	59.28	74	-14.72	V	PK
7386.000	48.25	1.67	49.92	54	-4.08	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength istoo small to be measured.

Spurious(conducted)
802.11b-Lowest



Date:24.JUN.2017 16:26:38



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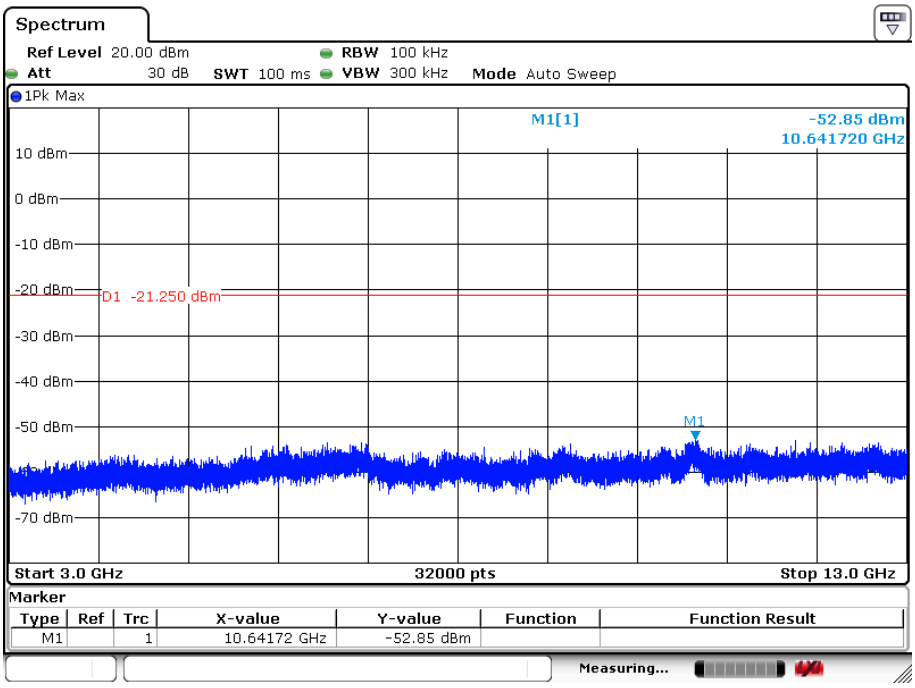
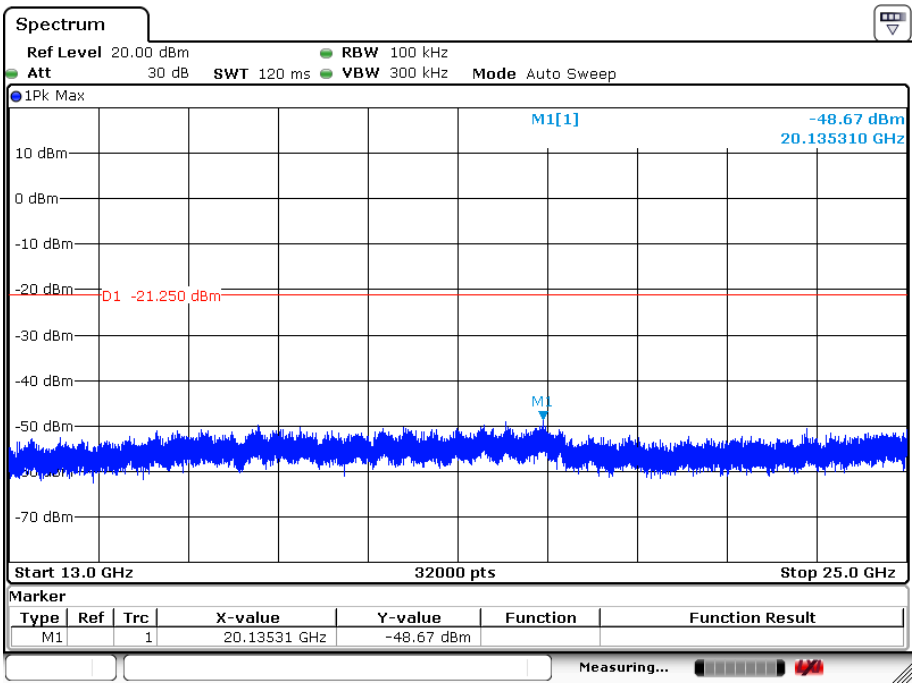
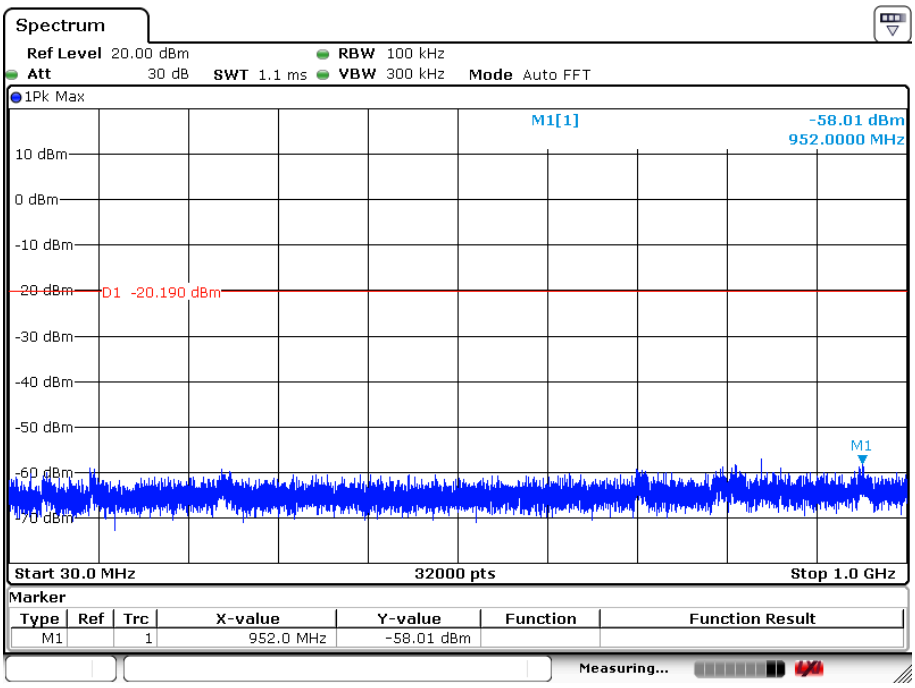
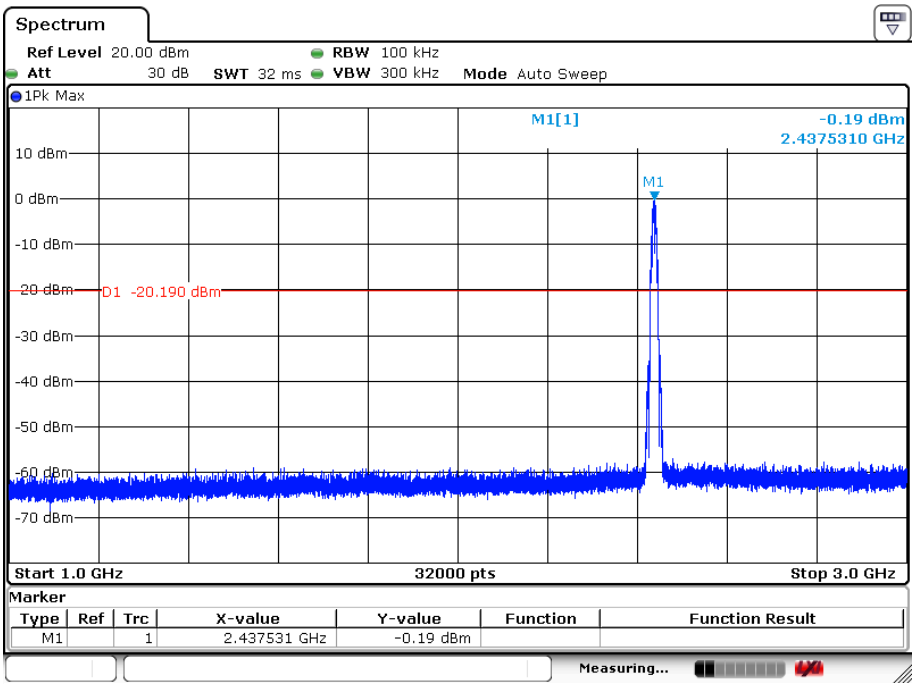
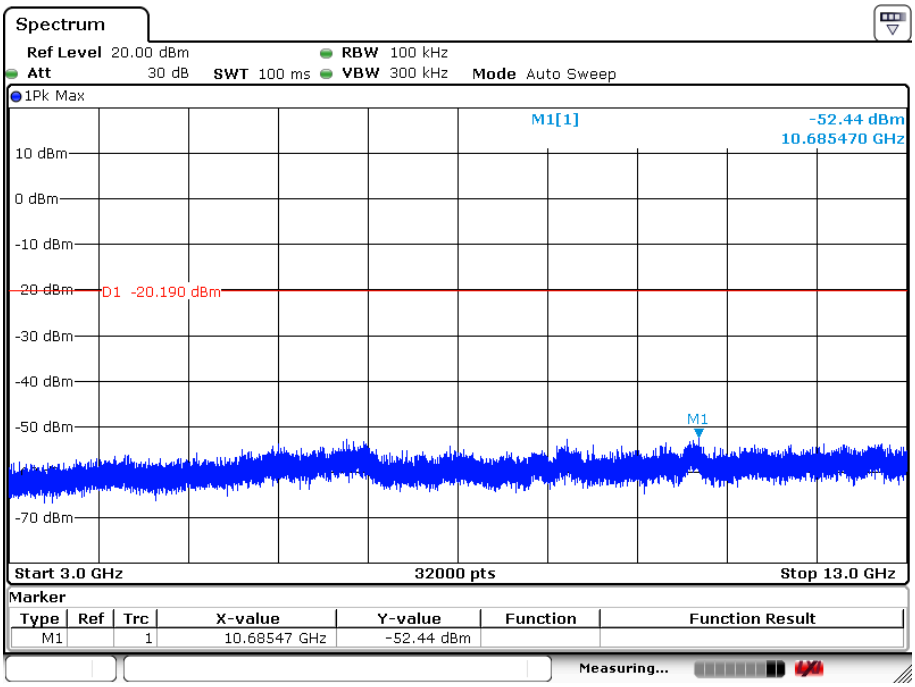

Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 100 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-52.85 dBm
10.641720 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -21.250 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
M1
Start 3.0 GHz
32000 pts
Stop 13.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 10.64172 GHz -52.85 dBm
Measuring...
Date:24.JUN.2017 16:26:48


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 120 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-48.67 dBm
20.135310 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -21.250 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
M1
Start 13.0 GHz
32000 pts
Stop 25.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 20.13531 GHz -48.67 dBm
Measuring...
Date:24.JUN.2017 16:26:59

Middle


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 1.1 ms
VBW 300 kHz
Mode Auto FFT
1Pk Max
M1[1]
-58.01 dBm
952.0000 MHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1 -20.190 dBm
M1
Start 30.0 MHz
32000 pts
Stop 1.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 952.0 MHz -58.01 dBm
Measuring...
Date:24.JUN.2017 16:27:28


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 32 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-0.19 dBm
2.4375310 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1 -20.190 dBm
M1
Start 1.0 GHz
32000 pts
Stop 3.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.437531 GHz -0.19 dBm
Measuring...
Date:24.JUN.2017 16:27:19



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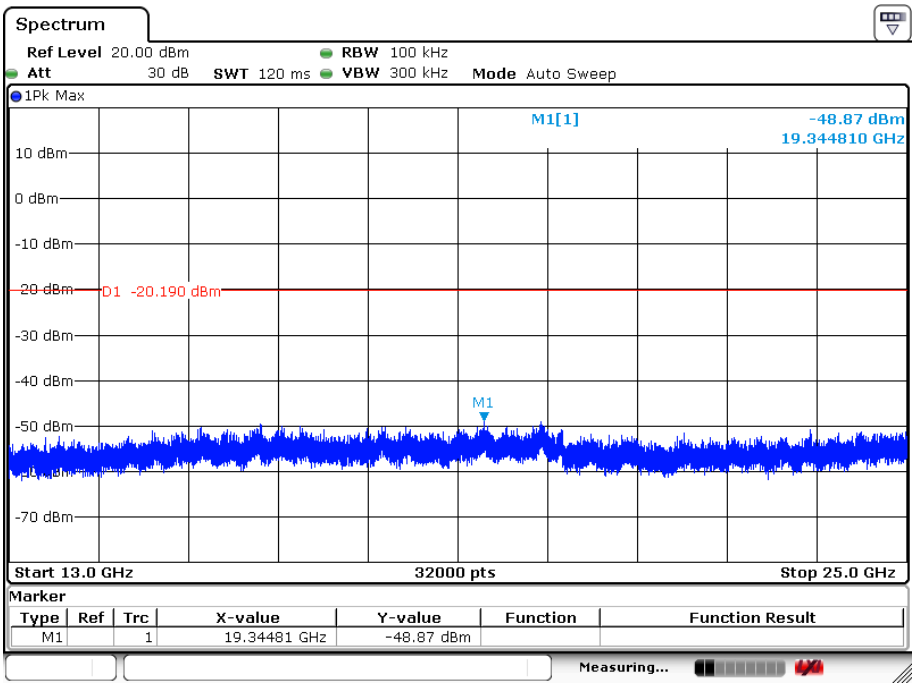
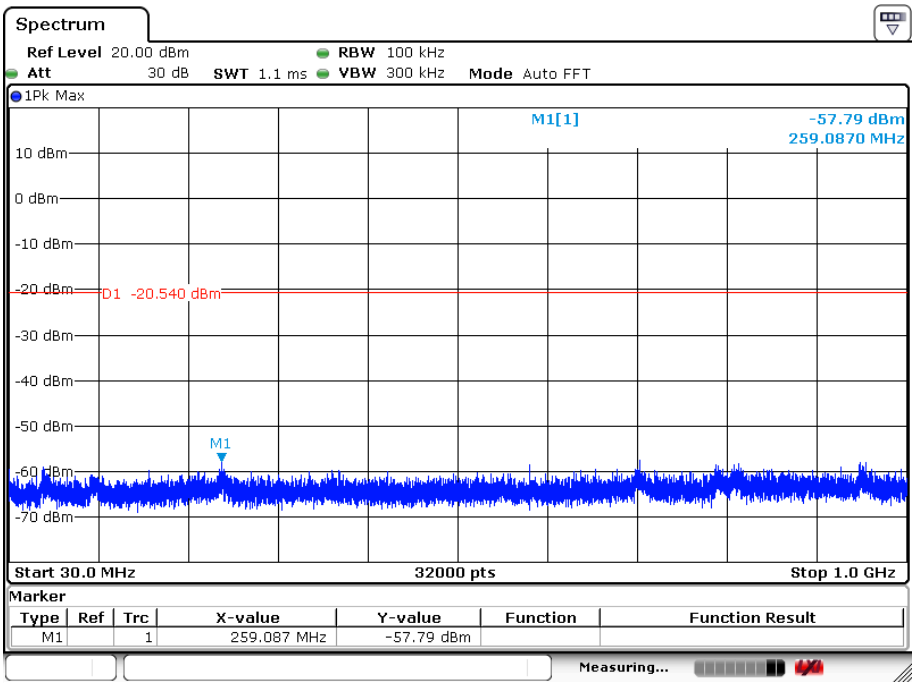
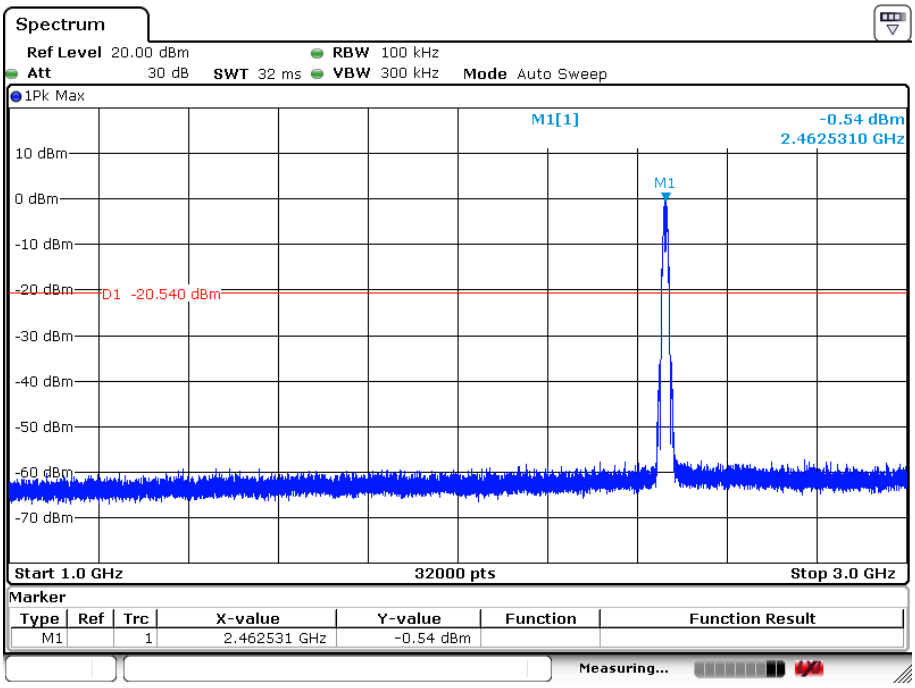
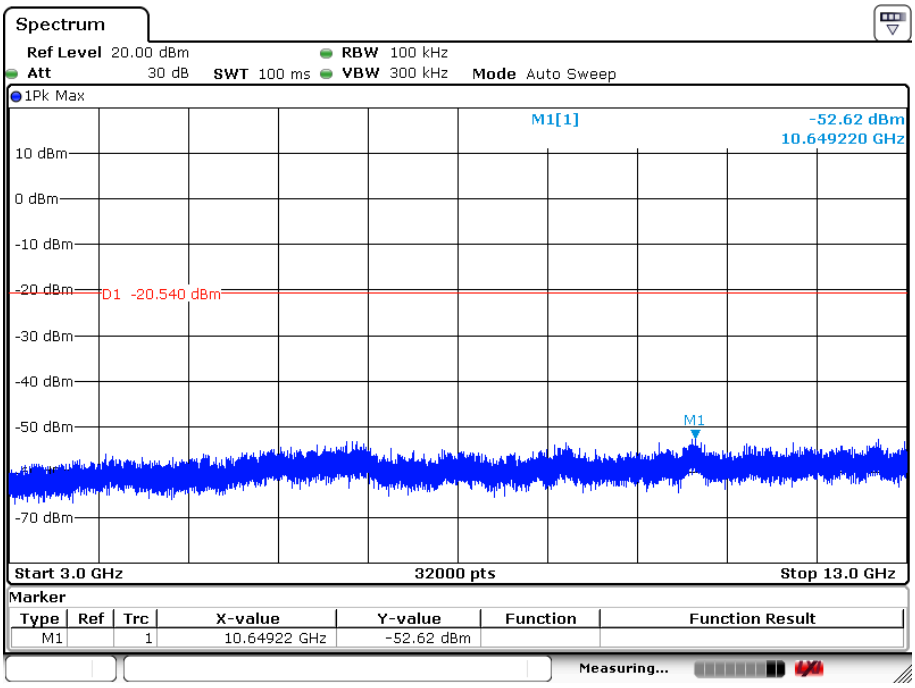


Date:24.JUN.2017 16:27:48

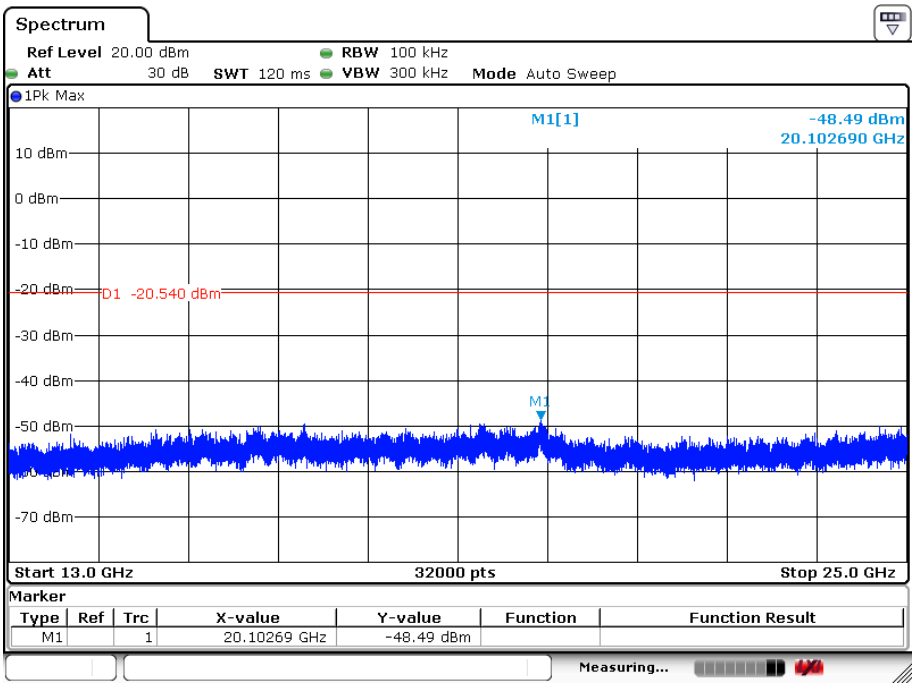
Highest


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 1.1 ms
VBW 300 kHz
Mode Auto FFT
1Pk Max
M1[1]
-57.79 dBm
259.0870 MHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -20.540 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
Start 30.0 MHz
32000 pts
Stop 1.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 259.087 MHz -57.79 dBm
Measuring...
Date:24.JUN.2017 16:28:22


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 32 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-0.54 dBm
2.4625310 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -20.540 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
Start 1.0 GHz
32000 pts
Stop 3.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.462531 GHz -0.54 dBm
Measuring...
Date:24.JUN.2017 16:28:11

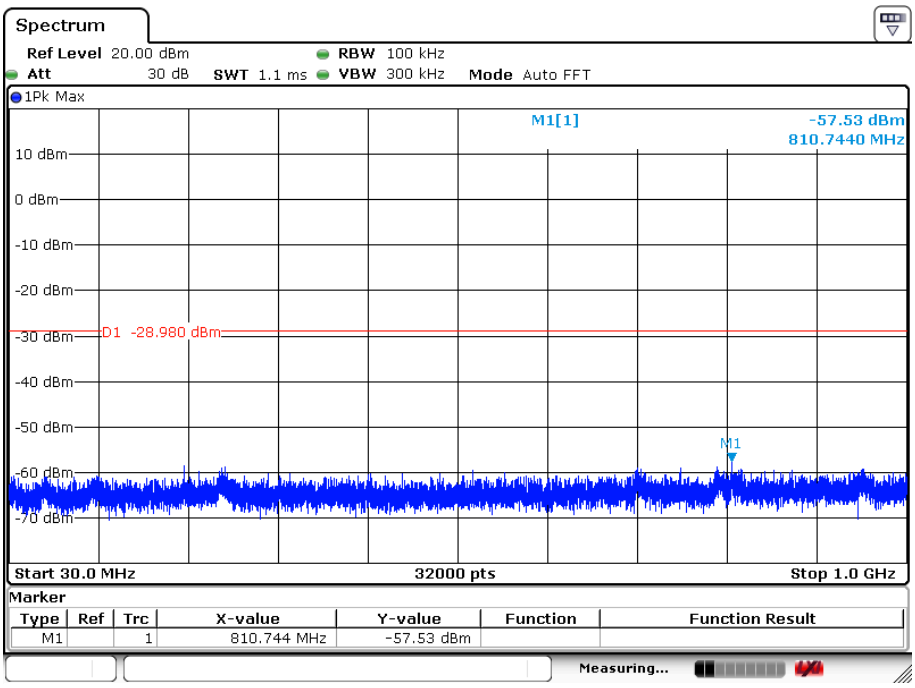


Date:24.JUN.2017 16:28:36



Date:24.JUN.2017 16:28:47

802.11g-Lowest



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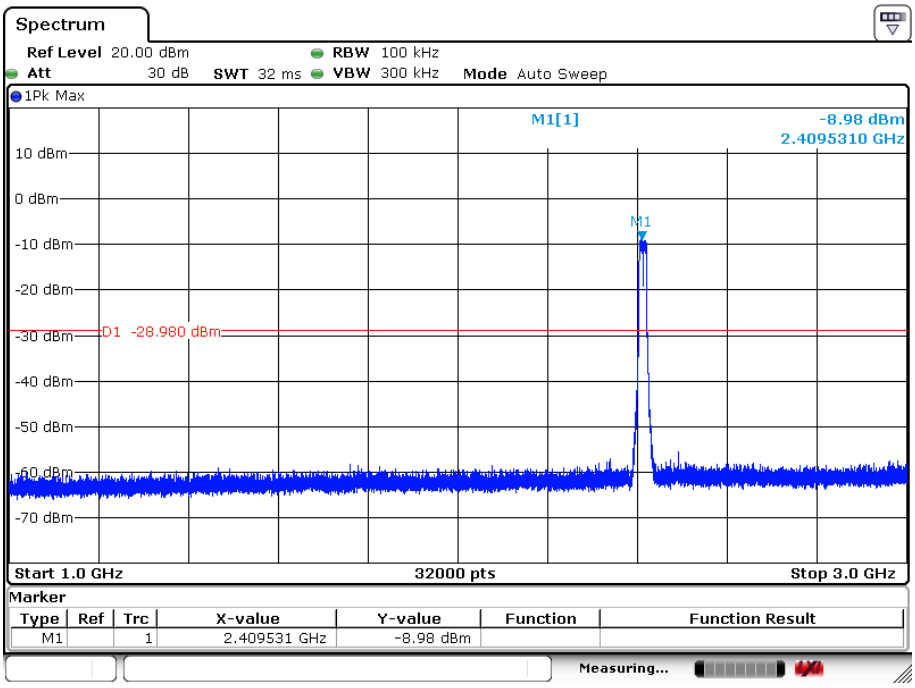
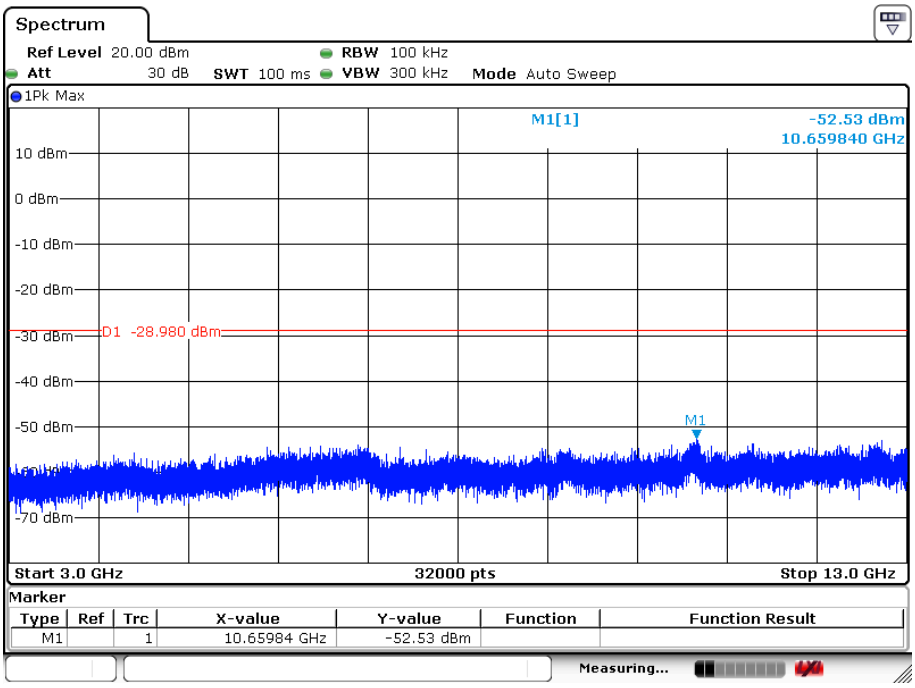
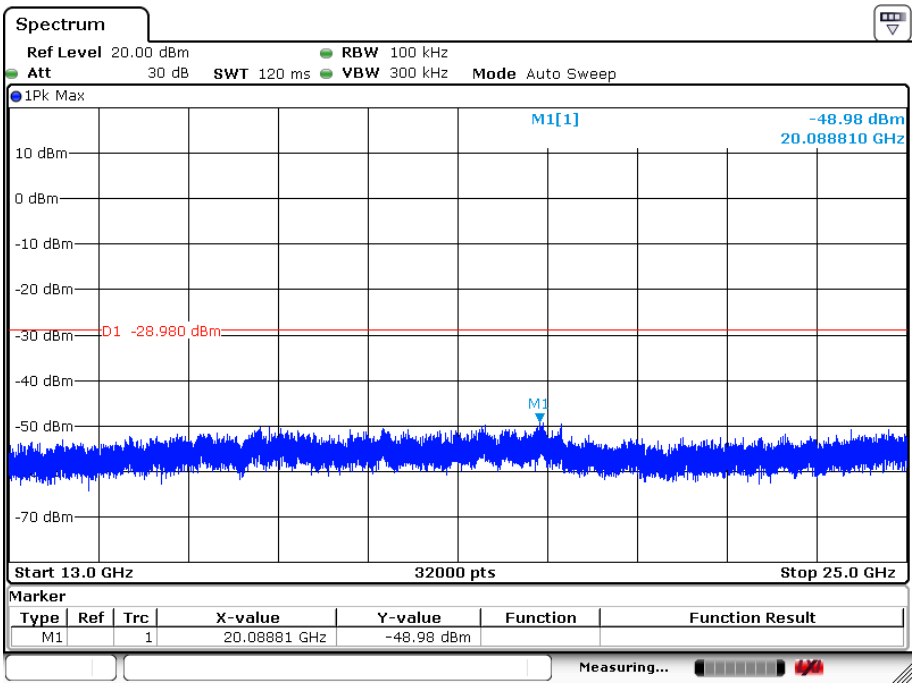
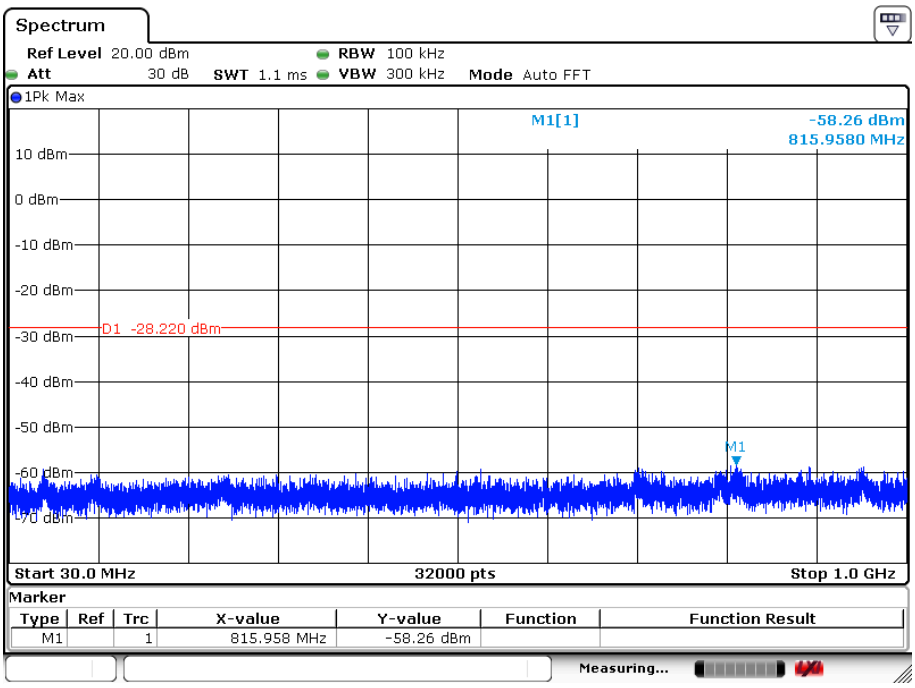


Date:24.JUN.2017 16:25:20

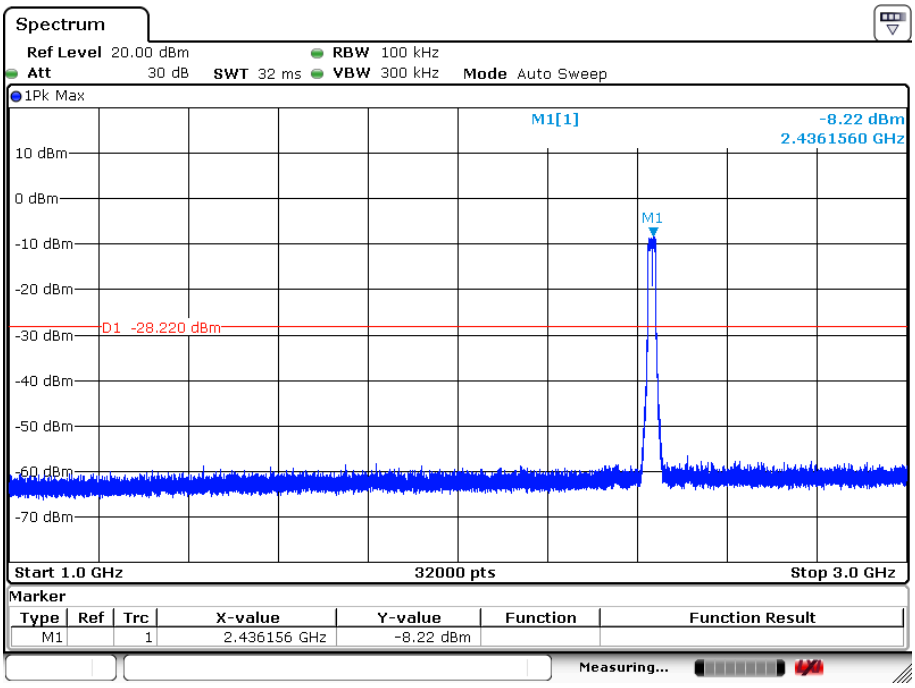

Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 100 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-52.53 dBm
10.659840 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
D1 -28.980 dBm
M1
Start 3.0 GHz
32000 pts
Stop 13.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 10.65984 GHz -52.53 dBm
Measuring...
Date:24.JUN.2017 16:25:42


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 120 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-48.98 dBm
20.088810 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
D1 -28.980 dBm
M1
Start 13.0 GHz
32000 pts
Stop 25.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 20.08881 GHz -48.98 dBm
Measuring...
Date:24.JUN.2017 16:25:55

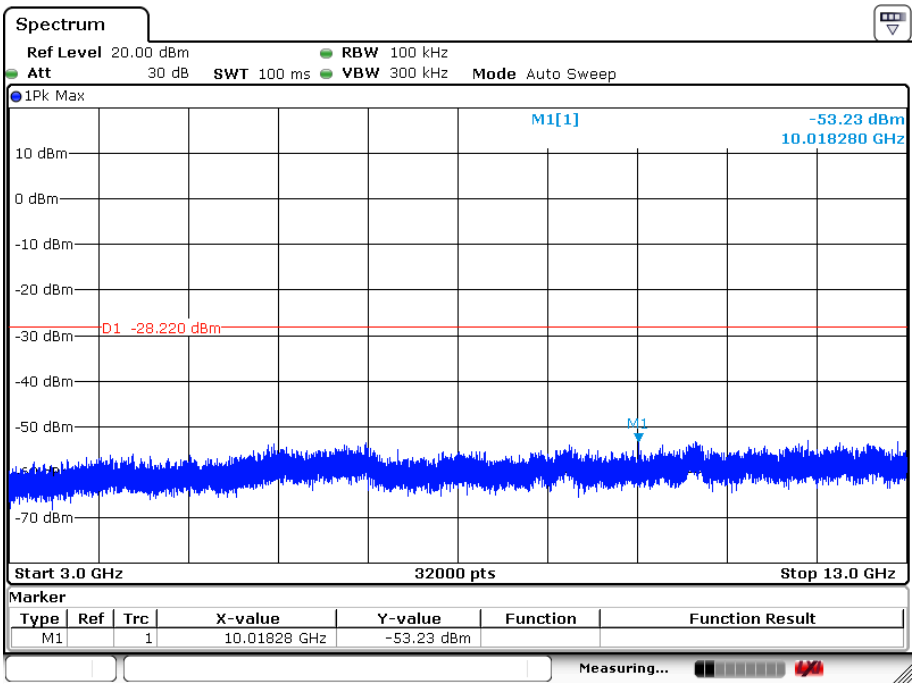
middle



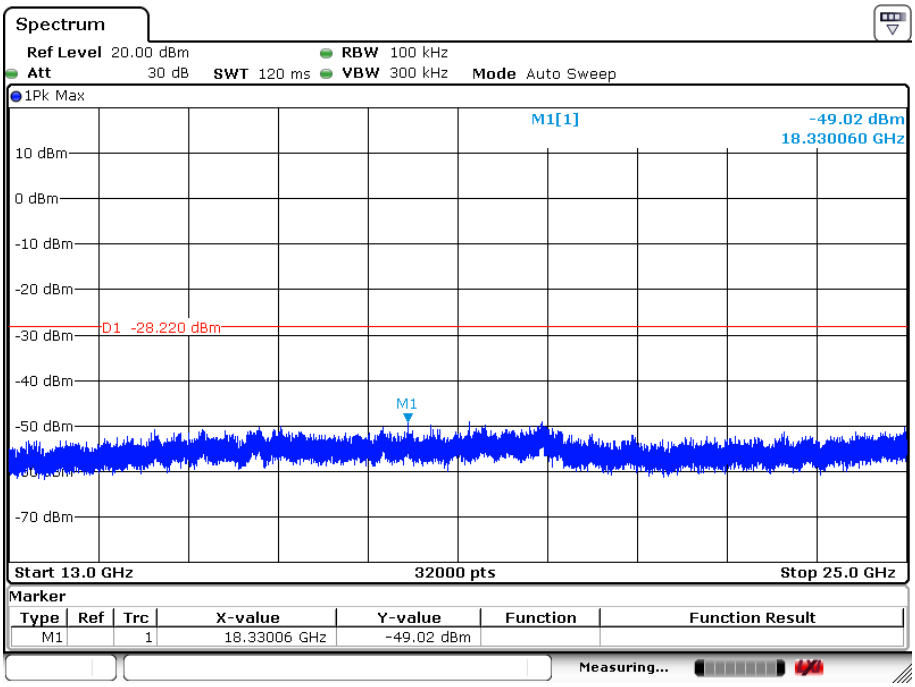
Date:24.JUN.2017 16:24:24



Date:24.JUN.2017 16:24:13

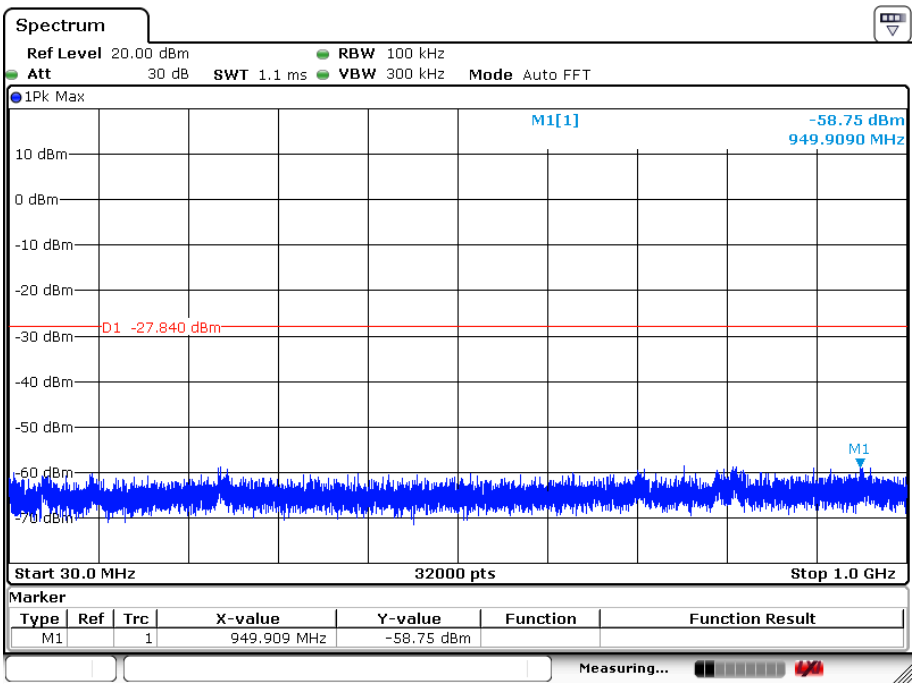


Date:24.JUN.2017 16:24:39



Date:24.JUN.2017 16:24:50

Highest



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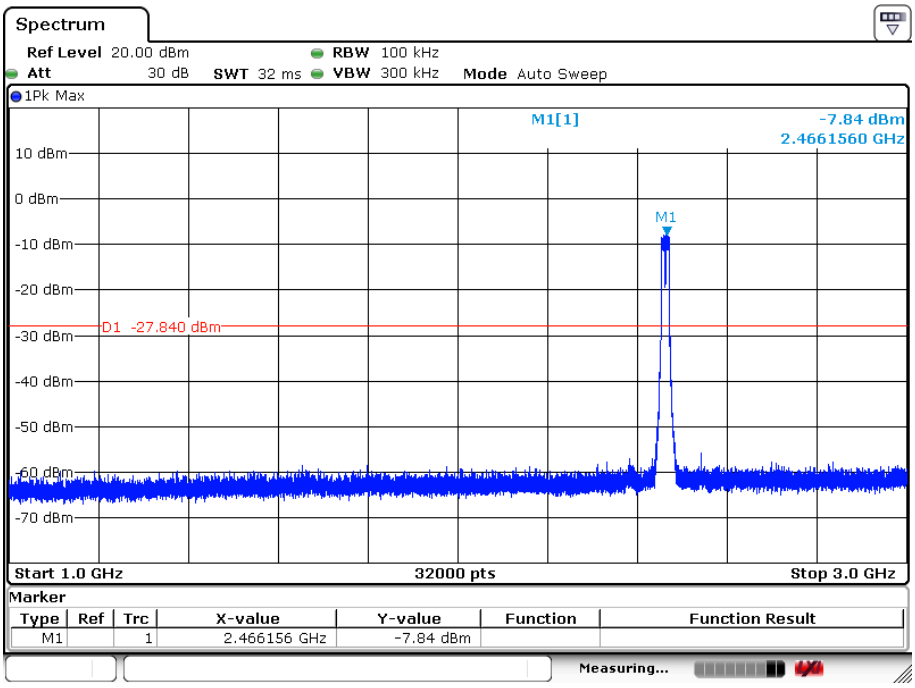
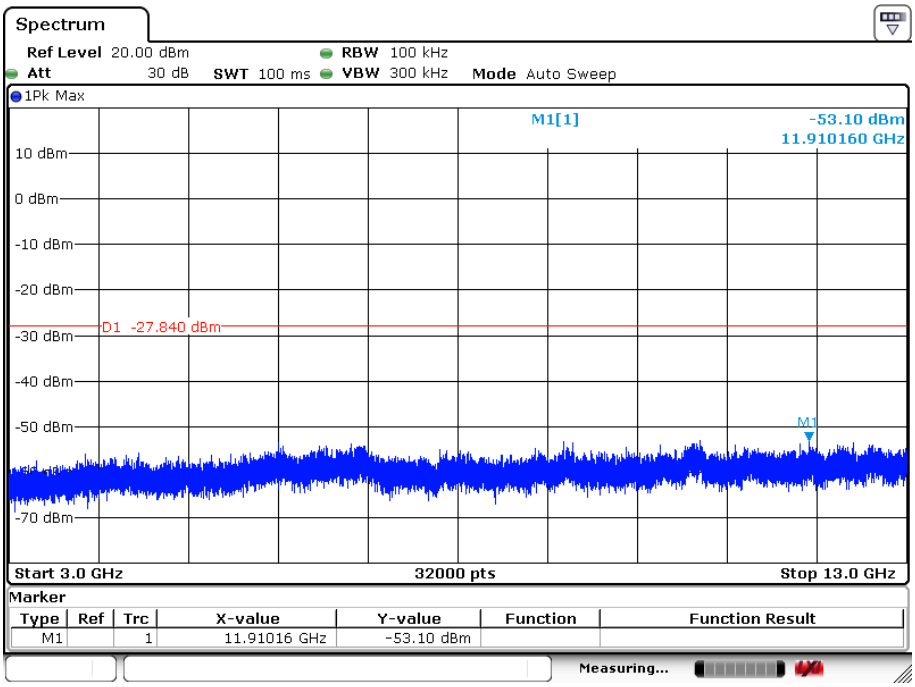
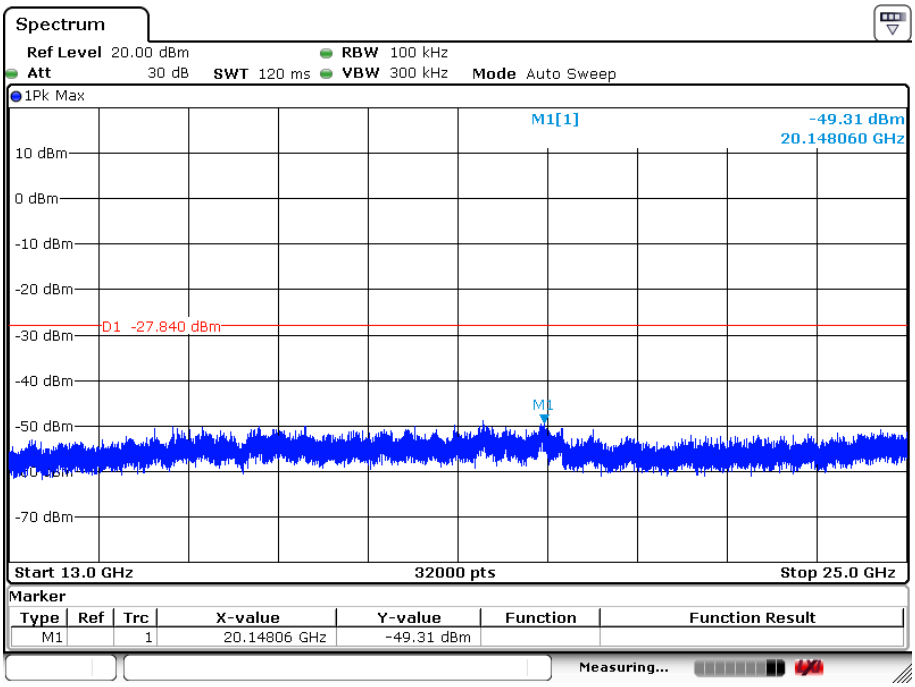
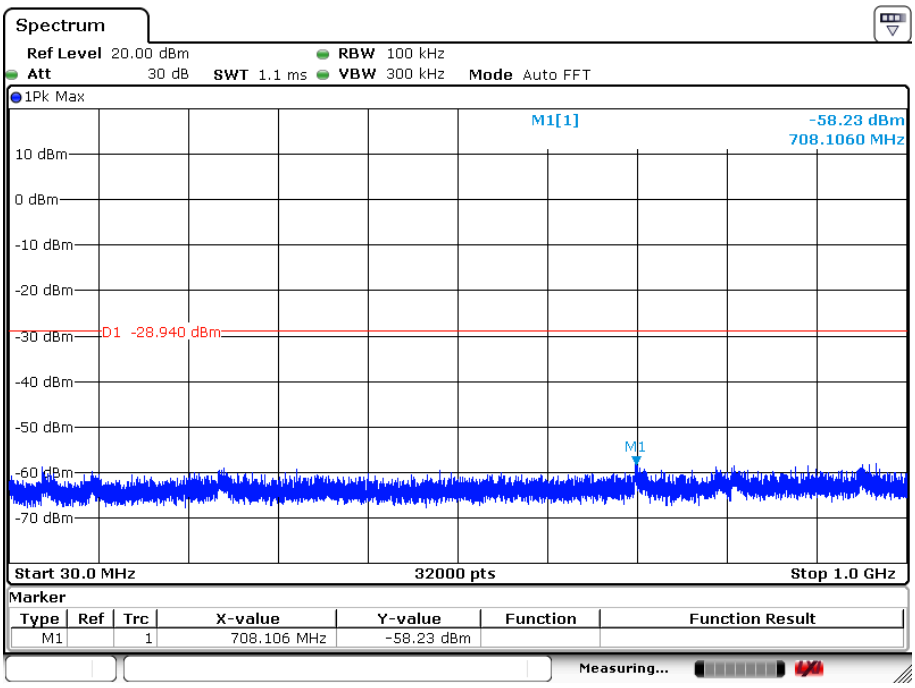


Date:24.JUN.2017 16:23:12

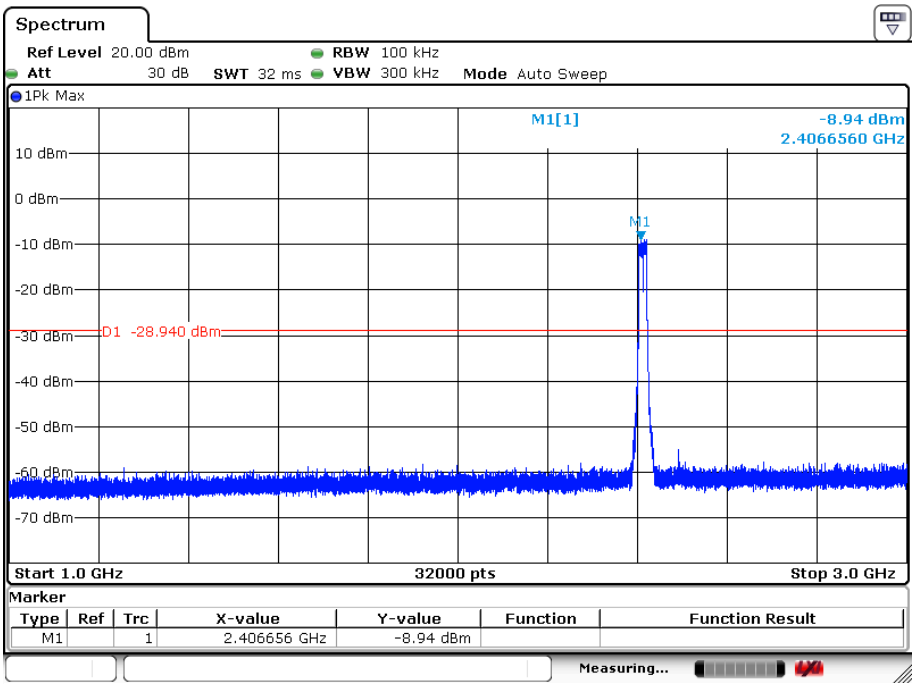

Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 100 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-53.10 dBm
11.910160 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -27.840 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
M1
Start 3.0 GHz
32000 pts
Stop 13.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 11.91016 GHz -53.10 dBm
Measuring...
Date:24.JUN.2017 16:23:35


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 120 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-49.31 dBm
20.148060 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -27.840 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
M1
Start 13.0 GHz
32000 pts
Stop 25.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 20.14806 GHz -49.31 dBm
Measuring...
Date:24.JUN.2017 16:23:44

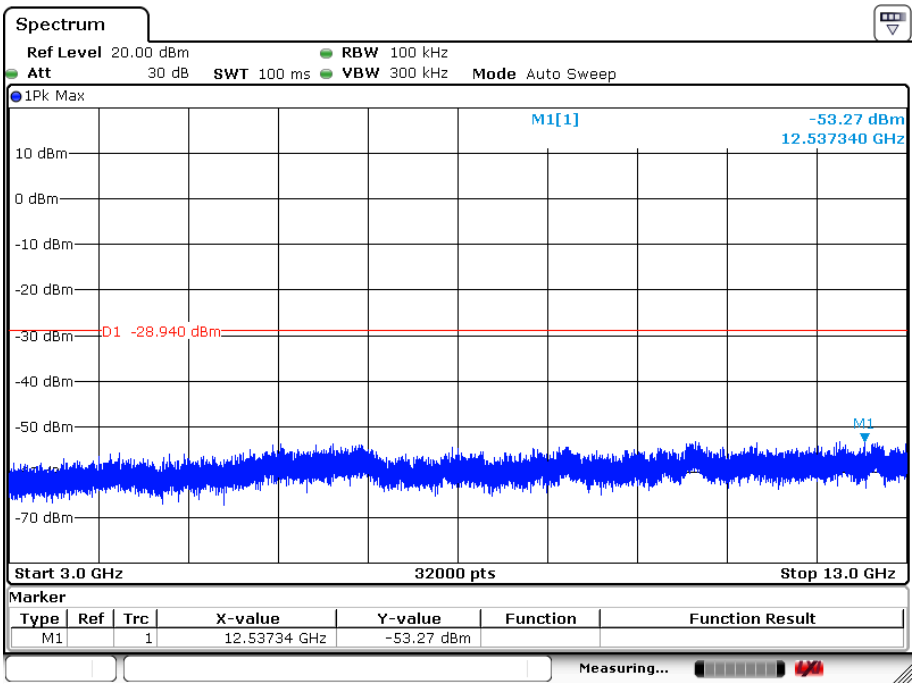
802.11n-20-Lowest



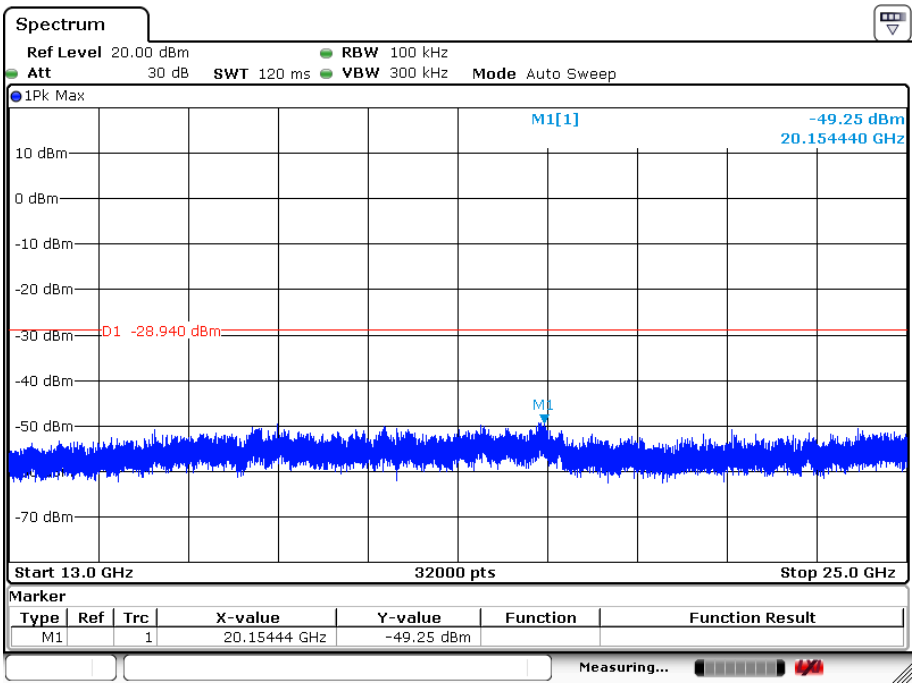
Date:24.JUN.2017 16:16:22



Date:24.JUN.2017 16:16:07

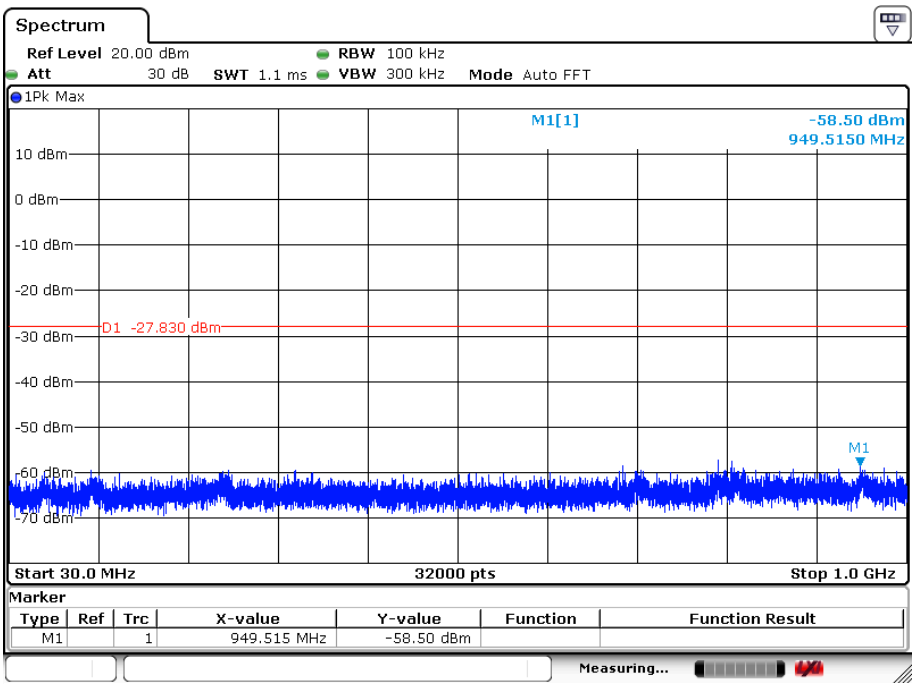


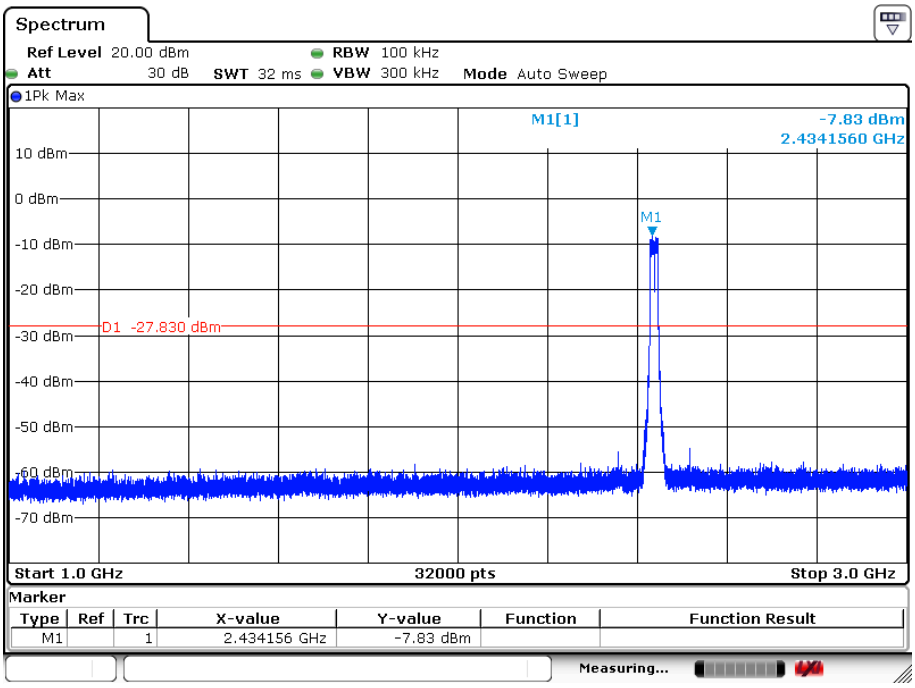
Date:24.JUN.2017 16:16:41

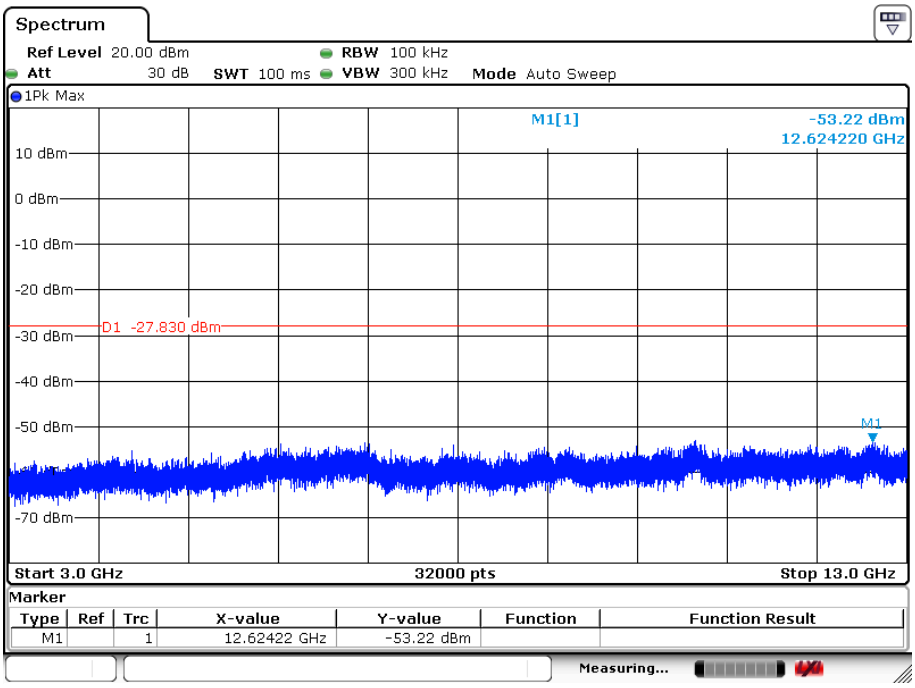


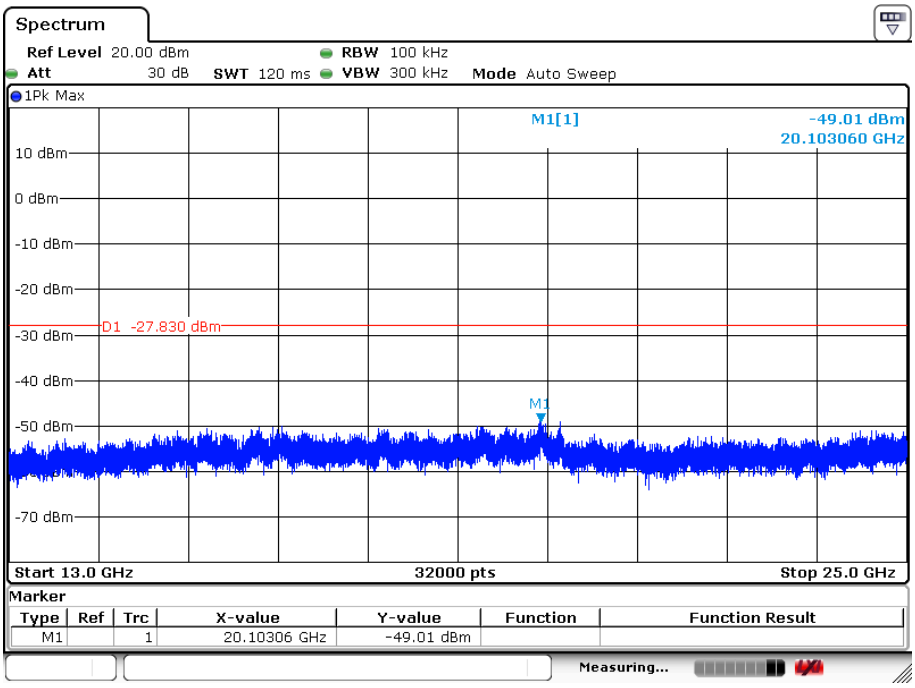
Date:24.JUN.2017 16:16:55

Middle

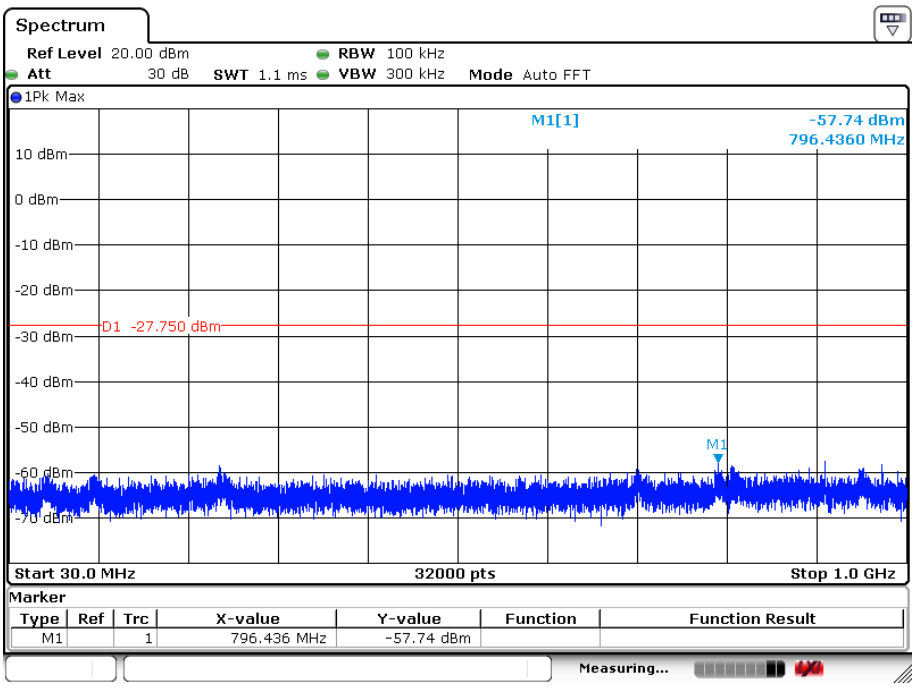

Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 1.1 ms
VBW 300 kHz
Mode Auto FFT
1Pk Max
M1[1]
-58.50 dBm
949.5150 MHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -27.830 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
Start 30.0 MHz
32000 pts
Stop 1.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 949.515 MHz -58.50 dBm
Measuring...
Date:24.JUN.2017 16:17:27

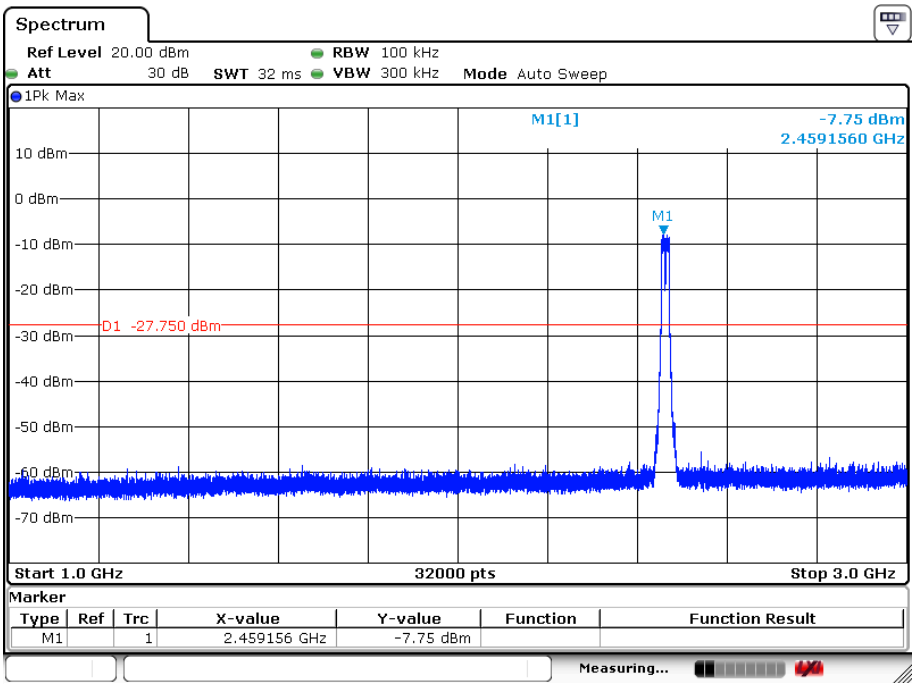

Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 32 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-7.83 dBm
2.4341560 GHz
10 dBm
0 dBm
M1
-10 dBm
-20 dBm
D1 -27.830 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
Start 1.0 GHz
32000 pts
Stop 3.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.434156 GHz -7.83 dBm
Measuring...
Date:24.JUN.2017 16:17:17

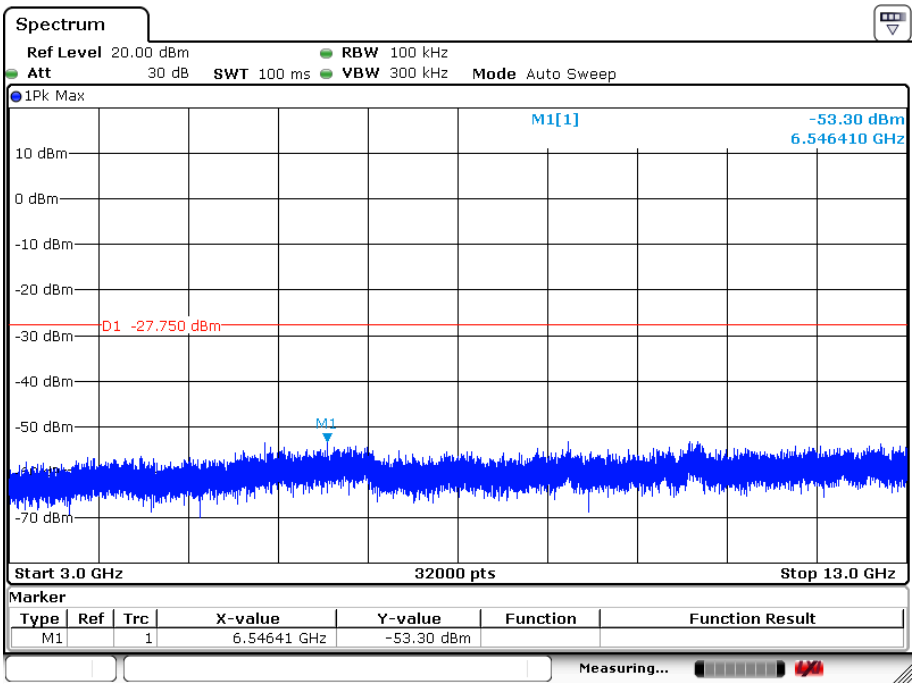

Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 100 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-53.22 dBm
12.624220 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -27.830 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
M1
Start 3.0 GHz
32000 pts
Stop 13.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 12.62422 GHz -53.22 dBm
Measuring...
Date:24.JUN.2017 16:21:14


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 120 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-49.01 dBm
20.103060 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -27.830 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
M1
Start 13.0 GHz
32000 pts
Stop 25.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 20.10306 GHz -49.01 dBm
Measuring...
Date:24.JUN.2017 16:21:22

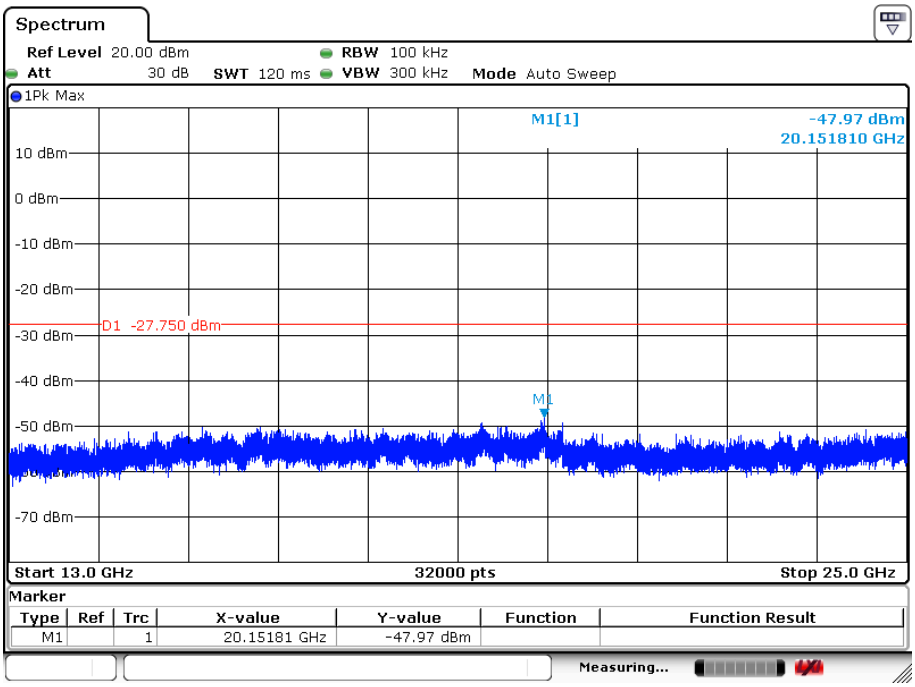
Highest


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 1.1 ms
VBW 300 kHz
Mode Auto FFT
1Pk Max
M1[1]
-57.74 dBm
796.4360 MHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -27.750 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
Start 30.0 MHz
32000 pts
Stop 1.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 796.436 MHz -57.74 dBm
Measuring...
Date:24.JUN.2017 16:22:26


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 32 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-7.75 dBm
2.4591560 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
D1 -27.750 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
Start 1.0 GHz
32000 pts
Stop 3.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.459156 GHz -7.75 dBm
Measuring...
Date:24.JUN.2017 16:22:18

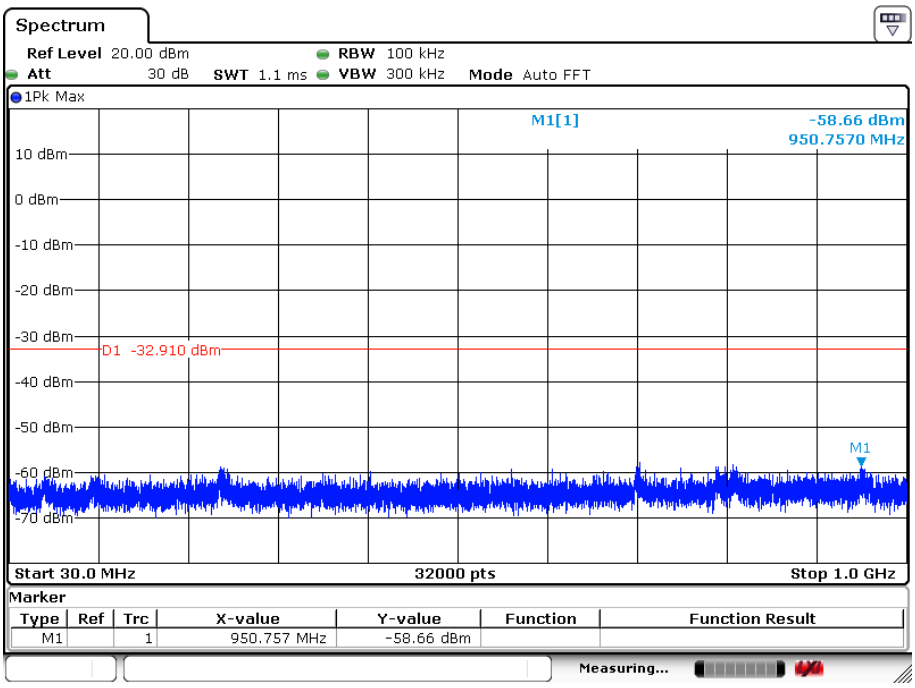


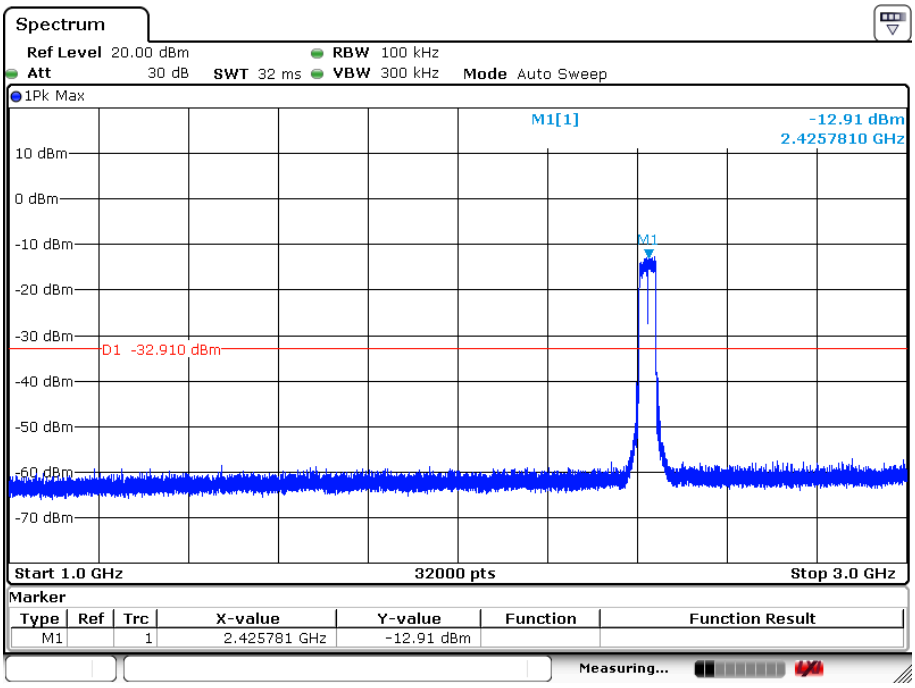
Date:24.JUN.2017 16:22:35

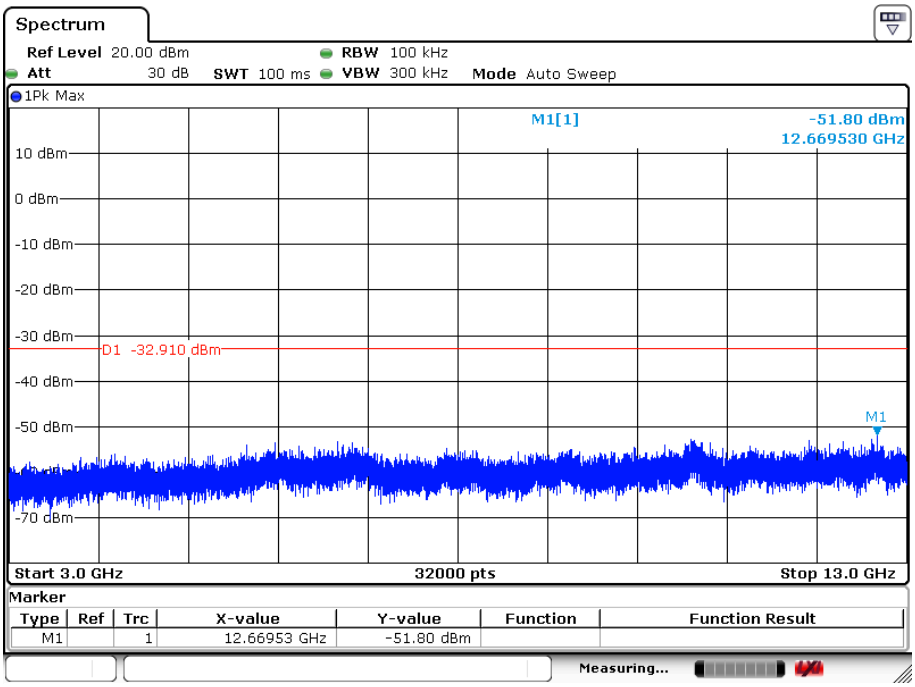


Date:24.JUN.2017 16:22:50

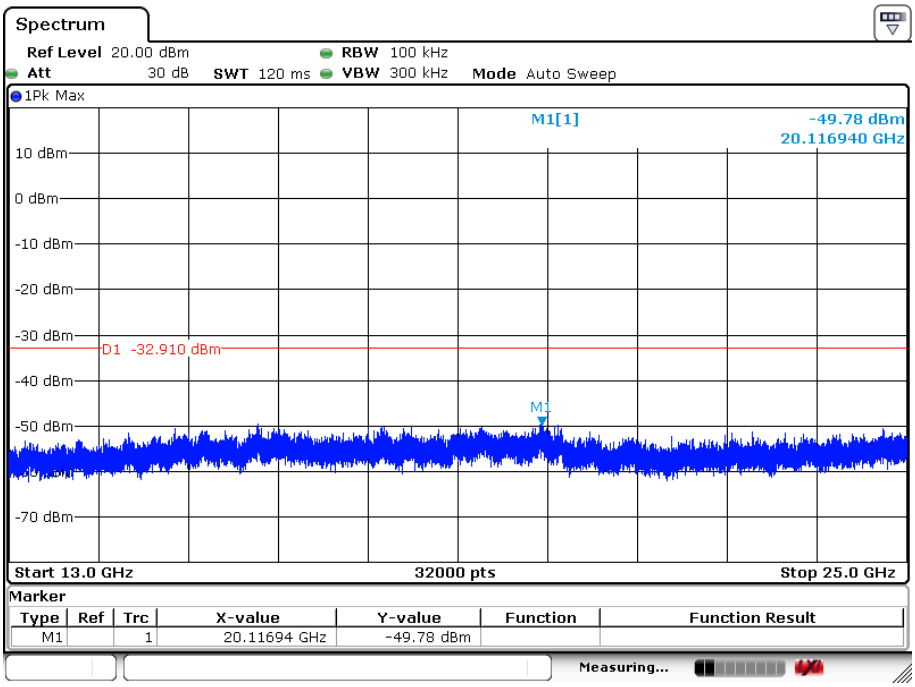
802.11-40-lowest





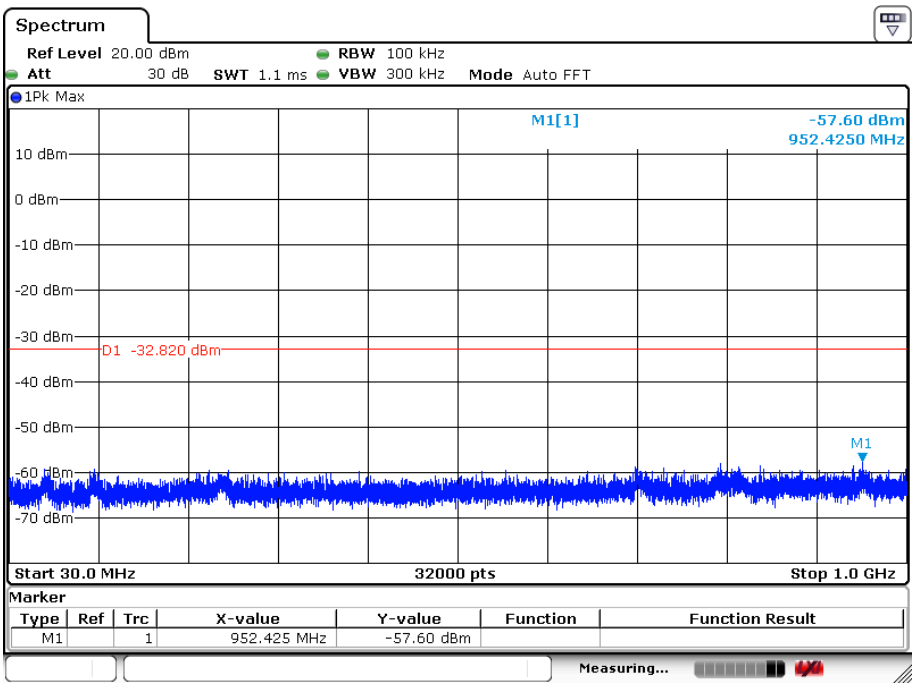


Date:24.JUN.2017 16:15:28

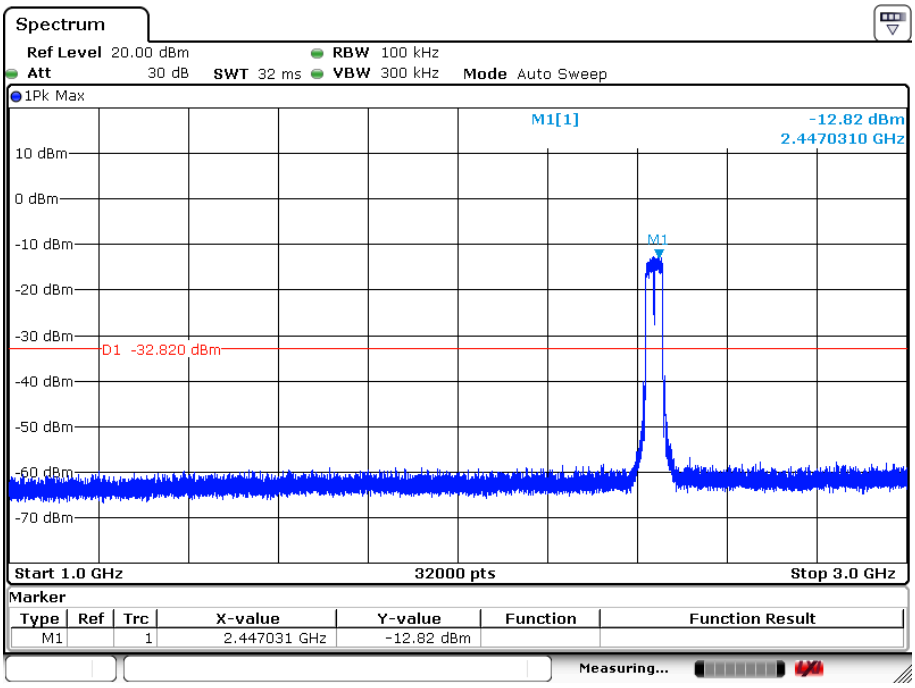


Date:24.JUN.2017 16:15:39

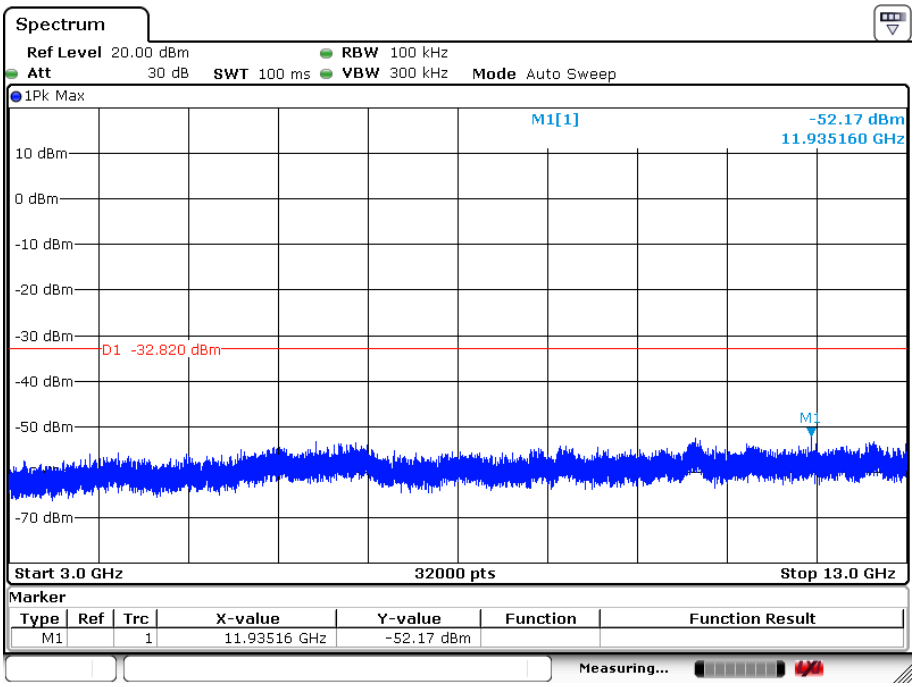
Middle



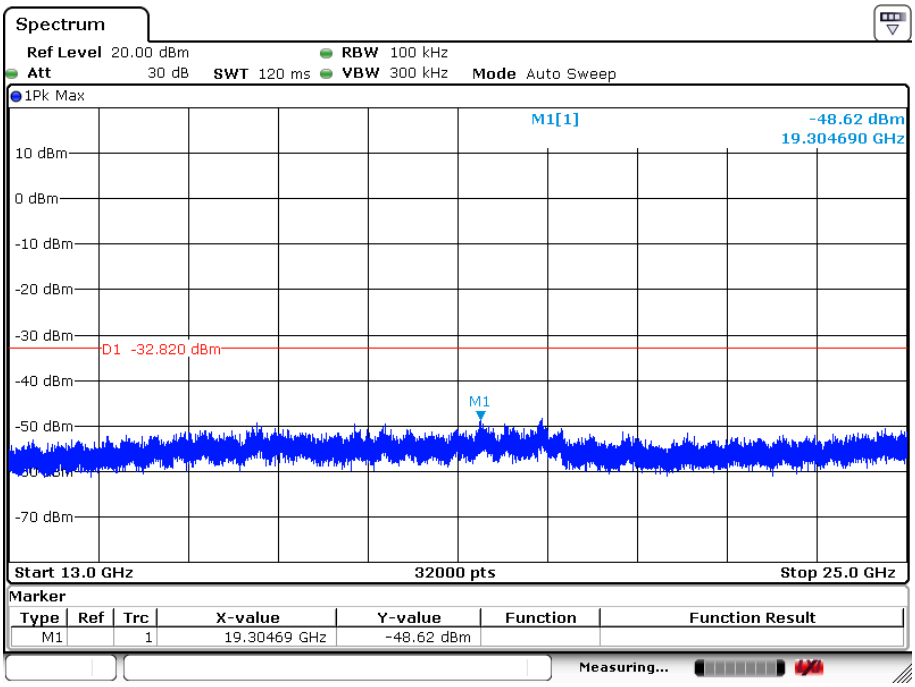
Date:24.JUN.2017 16:14:09



Date:24.JUN.2017 16:13:59

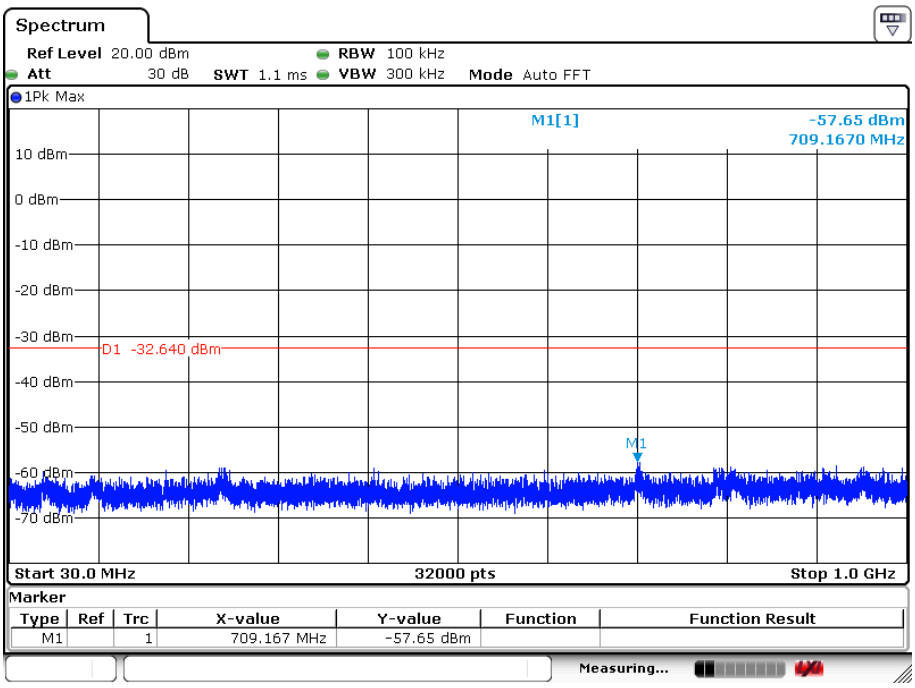


Date:24.JUN.2017 16:14:21

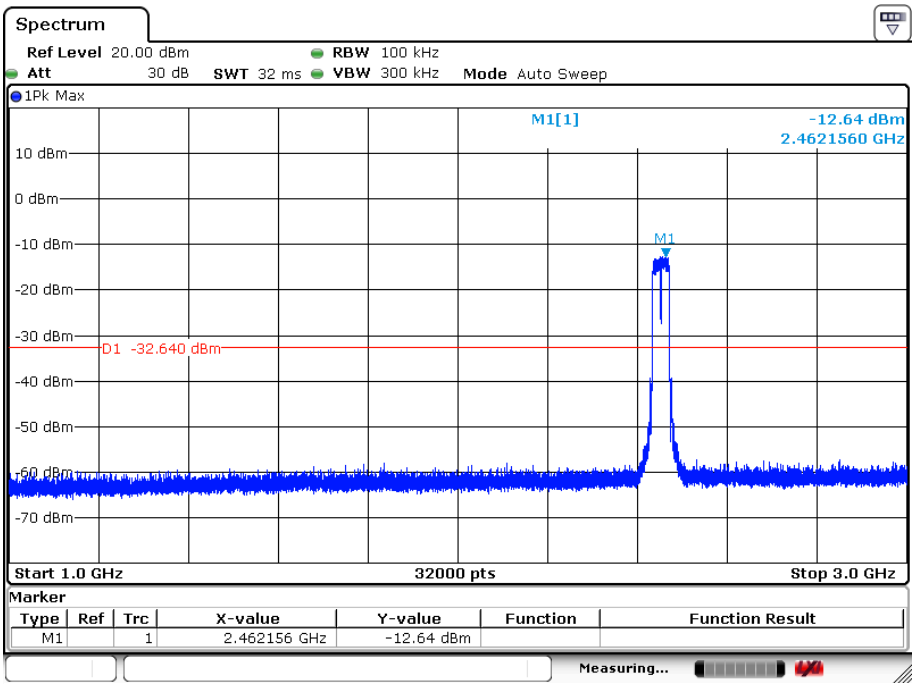


Date:24.JUN.2017 16:14:33

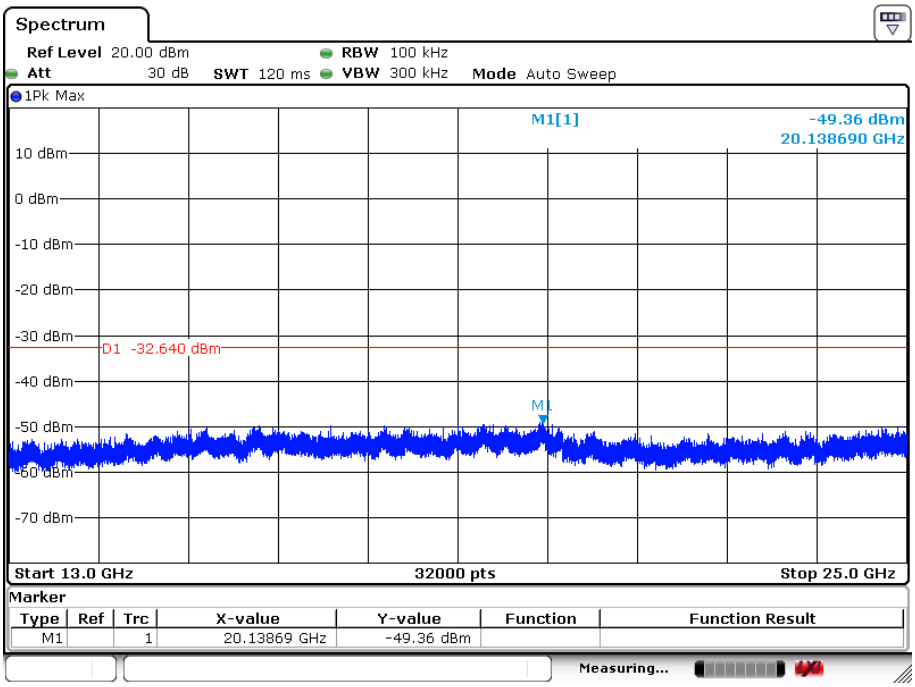
Highest



Date:24.JUN.2017 16:13:09



Date:24.JUN.2017 16:12:51


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 120 ms
VBW 300 kHz
Mode Auto Sweep
1Pk Max
M1[1]
-49.36 dBm
20.138690 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
D1 -32.640 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
Start 13.0 GHz
32000 pts
Stop 25.0 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 20.13869 GHz -49.36 dBm
Measuring...
Date:24.JUN.2017 16:13:37

9. Out of Band Emissions

9.1 Standard Applicable

According to §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

9.2 Test Procedure

According to the KDB 558074D01 v03r05, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)
RBW = 1MHz, VBW = 1MHz for peak value measured
RBW = 1MHz, VBW = 10Hz for average value measured
Sweep = auto; Detector function = peak/average; Trace = max hold
All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

According to the KDB 558074 D01 v03r05, the conducted spurious emissions test method as follows:
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.

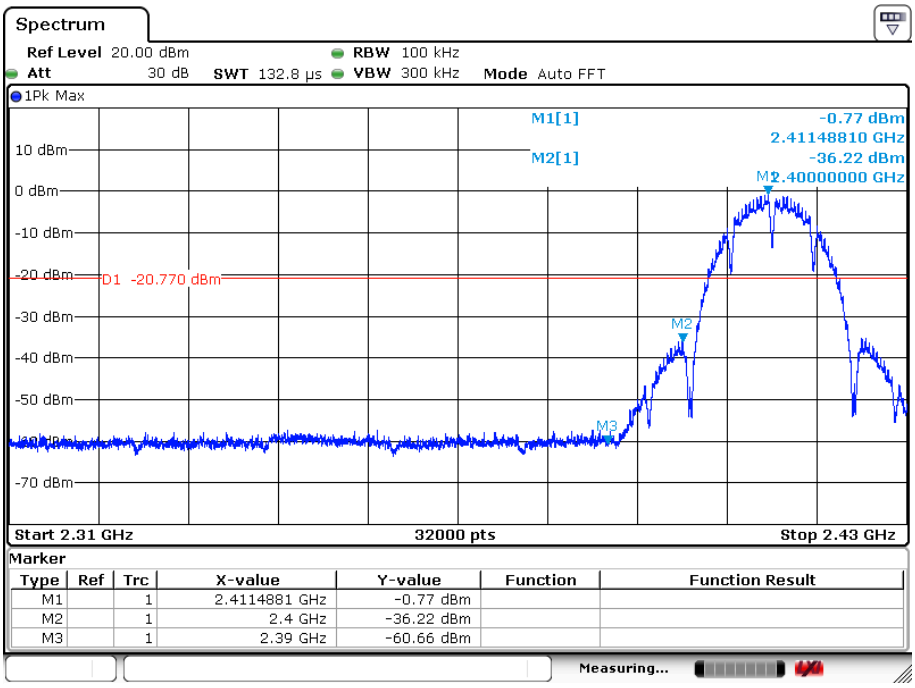
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

9.3 Environmental Conditions

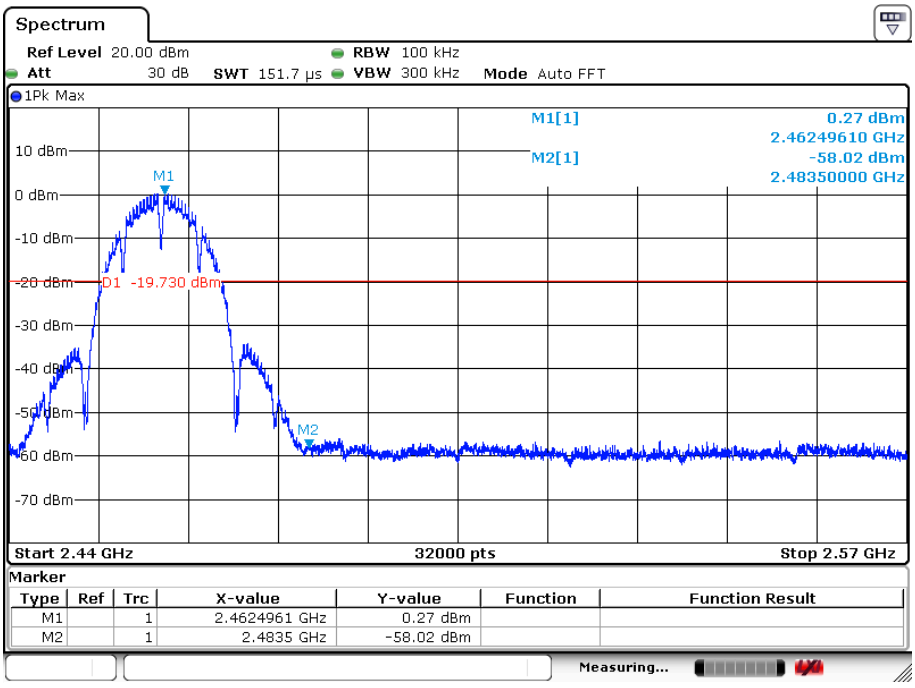
Temperature:	21℃
Relative Humidity:	50%
ATM Pressure:	101.2

9.4 Summary of Test Results/Plots

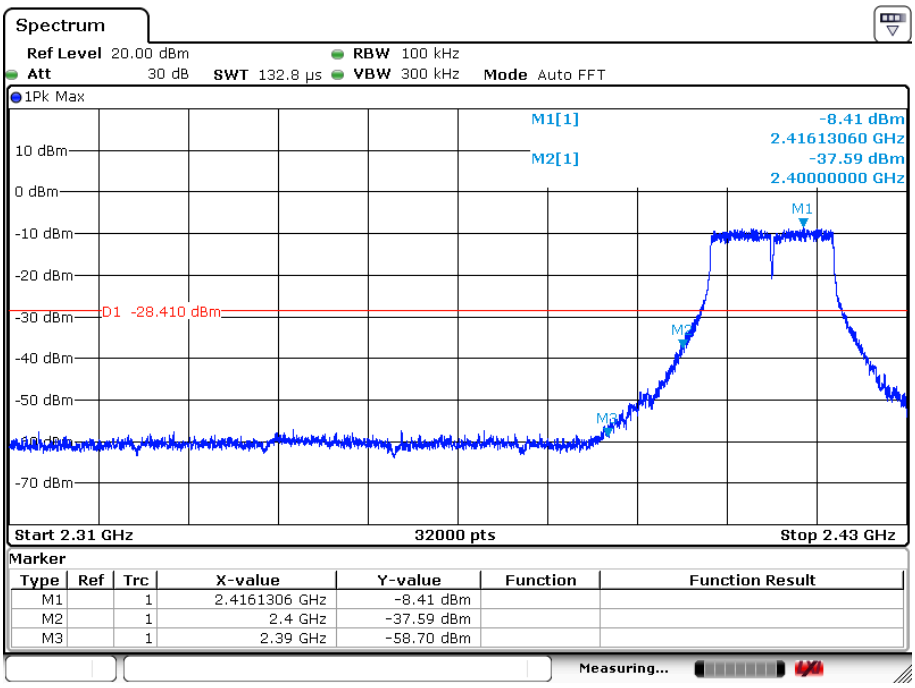
802.11b-low channel



802.11b-high

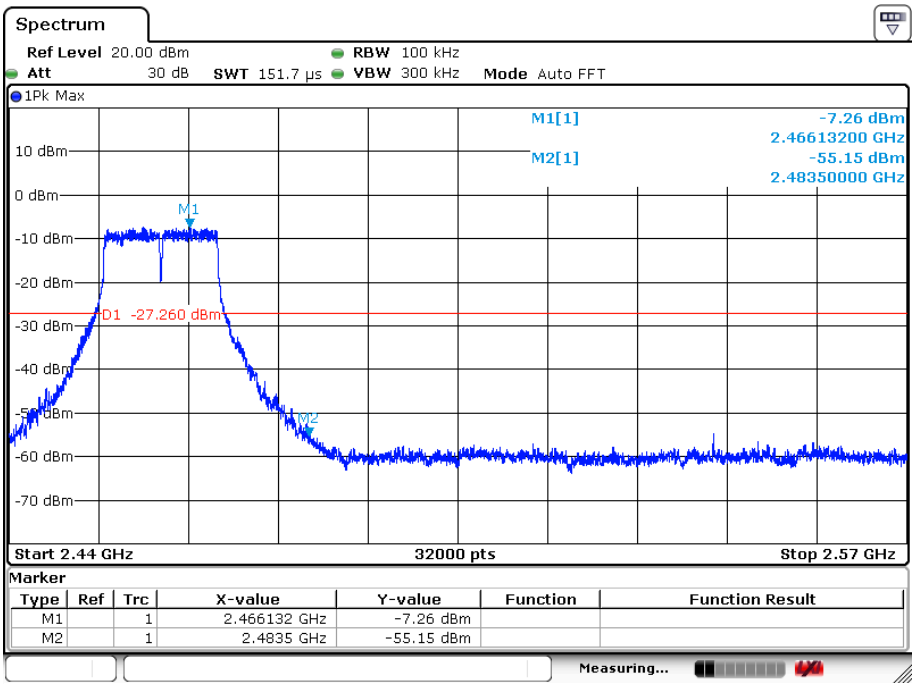


802.11g-low



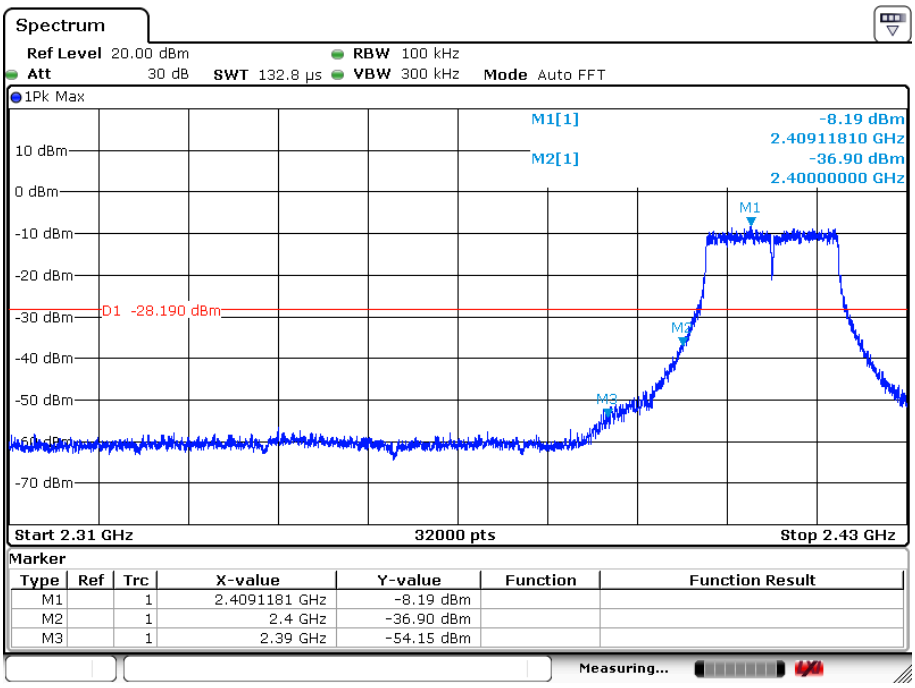
Date:24.JUN.2017 15:38:04

802.11g-high

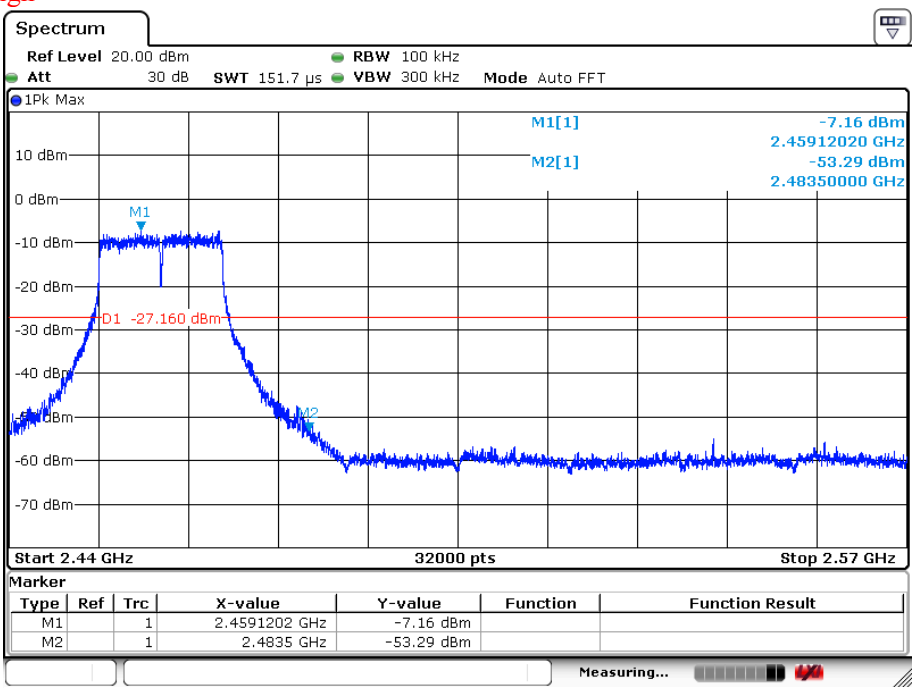


Date:24.JUN.2017 15:39:51

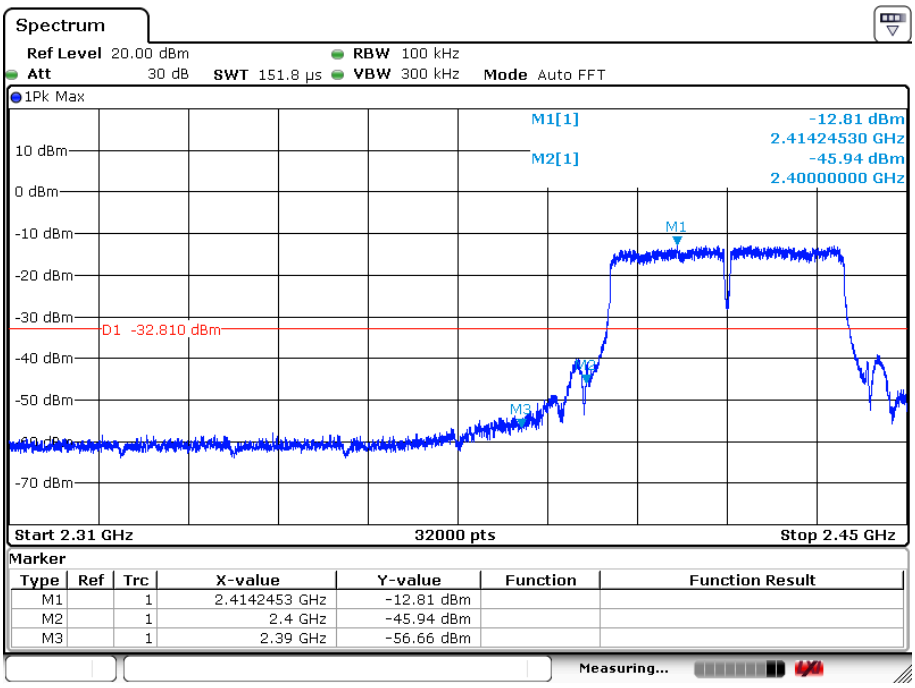
802.11n HT20-low



802.11n HT20-high

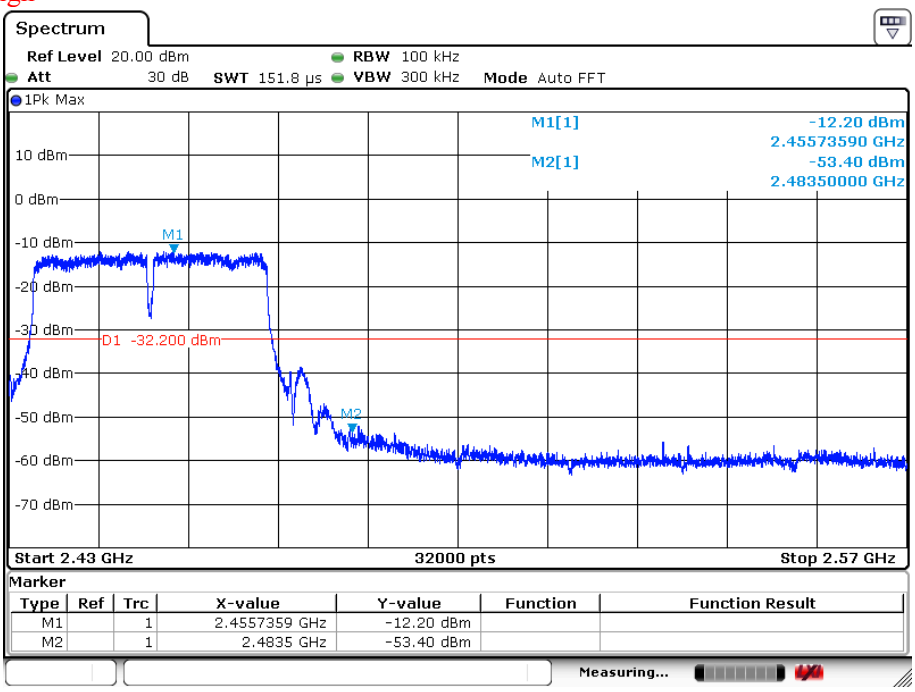


802.11n HT40-low



Date:24.JUN.2017 15:37:02

802.11n HT40-high



Date:24.JUN.2017 15:40:54

10. Conducted Emissions

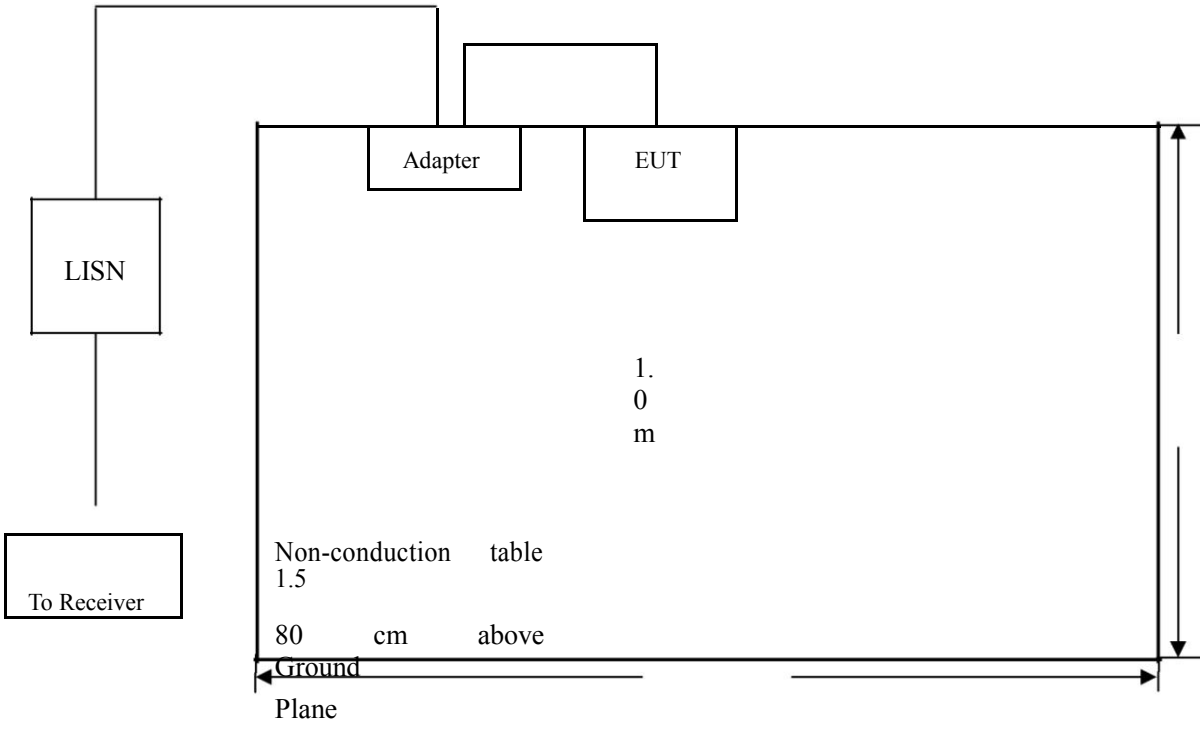
10.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

10.2 Basic Test Setup Block Diagram



10.3 Environmental Conditions

Temperature:	22°C
Relative Humidity:	53%
ATM Pressure:	101.1 mbar

10.4 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 150 kHz
Stop Frequency..... 30 MHz
Sweep Speed ..... Auto
IF Bandwidth ..... 10 kHz
Quasi-Peak Adapter Bandwidth ..... 9 kHz
Quasi-Peak Adapter Mode ..... Normal

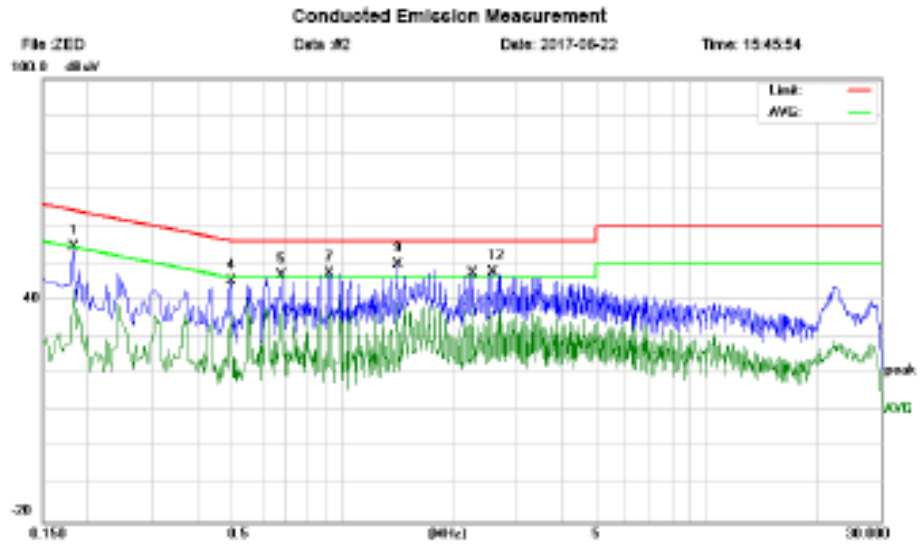
10.5 Summary of Test Results/Plots

According to the data in section 12.6, the EUT complied with the FCC Part 15.207 Conducted margin for this device, with the *worst* margin reading of:

-3.67 dB at 1.718MHz in the **L** mode**,AVG** detector, **0.15-30MHz**

10.6 Conducted Emissions Test Data

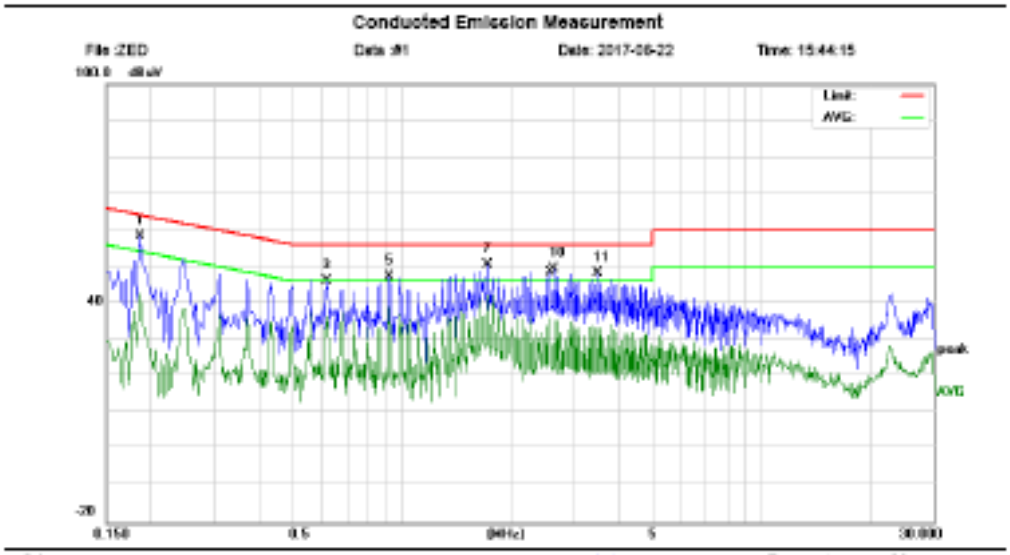
N



Site Phase: N Temperature: 26
Limit: EN55022 CE-Class B_QP Power: Humidity: 56 %
EUT:
M/N:
Mode:
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1819	44.08	10.44	54.52	64.39	-9.87	peak	
2		0.1819	32.65	10.44	43.09	54.39	-11.30	AVG	
3		0.4900	26.90	10.40	37.30	46.17	-8.87	AVG	
4		0.4940	34.79	10.40	45.19	56.10	-10.91	peak	
5		0.6780	36.20	10.41	46.61	56.00	-9.39	peak	
6		0.6780	27.58	10.41	37.99	46.00	-8.01	AVG	
7		0.9220	36.86	10.41	47.27	56.00	-8.73	peak	
8		0.9260	26.79	10.41	37.20	46.00	-8.80	AVG	
9	*	1.4180	39.41	10.41	49.82	56.00	-6.18	peak	
10		1.4180	28.93	10.41	39.34	46.00	-6.66	AVG	
11		2.2780	28.55	10.42	38.97	46.00	-7.03	AVG	
12		2.5860	37.13	10.42	47.55	56.00	-8.45	peak	

L



Site Phase: L1 Temperature: 26

Limit: EN55022 CE-Class B_QP Power: Humidity: 56 %

EUT:

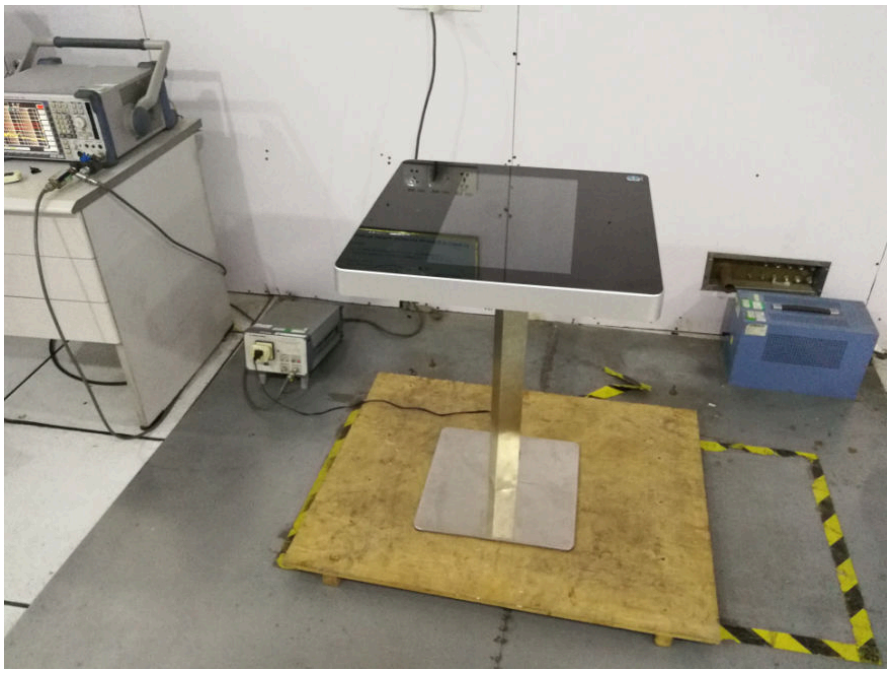
M/N:

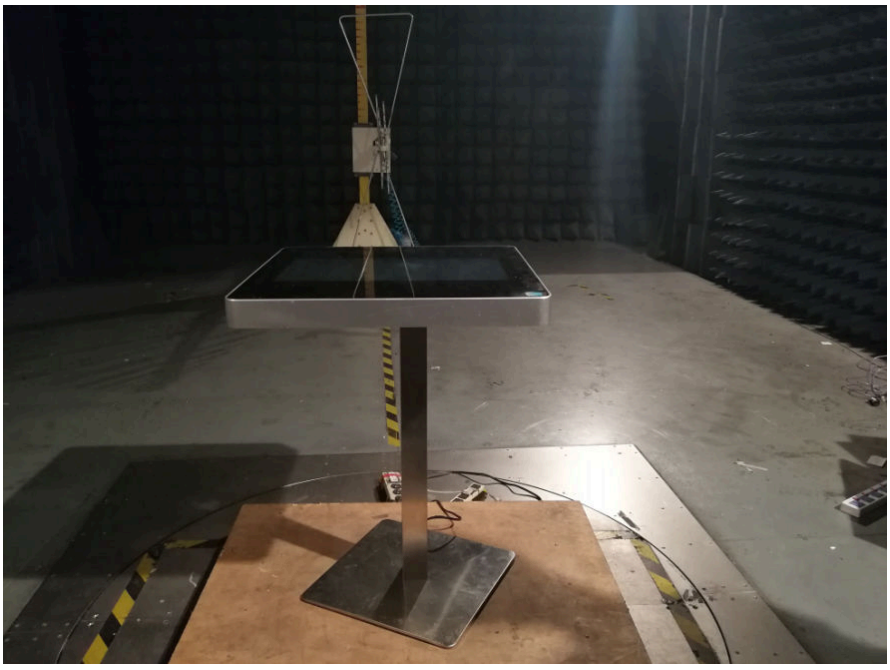
Mode:

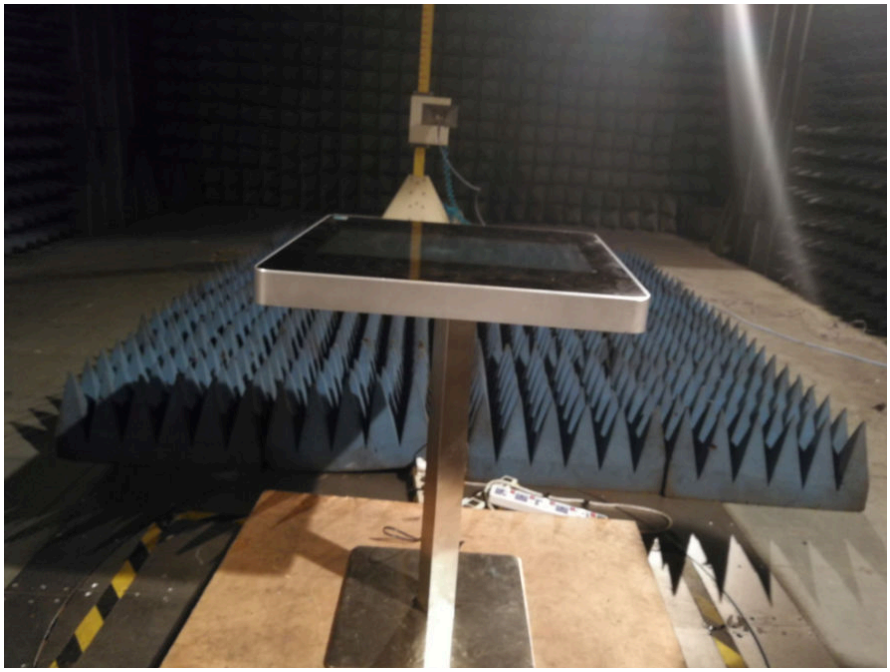
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1860	47.99	10.44	58.43	64.21	-5.78	peak	
2		0.1860	32.09	10.44	42.53	54.21	-11.68	AVG	
3		0.6140	35.69	10.41	46.10	56.00	-9.90	peak	
4		0.6140	26.04	10.41	36.45	46.00	-9.55	AVG	
5		0.9220	37.04	10.41	47.45	56.00	-8.55	peak	
6		0.9220	28.63	10.41	39.04	46.00	-6.96	AVG	
7		1.7180	40.21	10.42	50.63	56.00	-5.37	peak	
8	*	1.7180	31.91	10.42	42.33	46.00	-3.67	AVG	
9		2.5820	25.59	10.42	36.01	46.00	-9.99	AVG	
10		2.6420	38.93	10.42	49.35	56.00	-6.65	peak	
11		3.5060	37.53	10.61	48.14	56.00	-7.86	peak	
12		3.5060	22.77	10.61	33.38	46.00	-12.62	AVG	

11.Test Photo







Test report