

Measurements of Shure AXT100/200 for FCC and ETSI Regulatory Approval.

Conducted Zigbee-UHF IMDs for FCC Part15.

Report Prepared by: Mohit Shringi



6/2/2011

Table of Contents

1. Introduction	5
1.1 Test Equipment used:	5
1.2 Review and Approval	5
1.3 Revision History	5
1.4 References	6
1.5 Acronyms and Definitions.....	6
2. AXT 100 (BP TX) UHF-Zigbee IMD	7
2.1 G1 band (470-530 MHz) UHF-Zigbee IMD	8
2.1.1 Zigbee low frequency (Channel 11) 2405 MHz.....	9
2.1.2 Zigbee Mid frequency (Channel 19) 2445 MHz	15
2.1.3 Zigbee High frequency (Channel 26) 2480MHz:.....	21
2.2 H4 Band (518-578 MHz) UHF-Zigbee IMD:	27
2.2.1 Zigbee low frequency (Channel 11) 2405 MHz.....	28
2.2.2 Zigbee mid frequency (Channel 19) 2445 MHz	33
2.2.3 Zigbee high frequency (Channel 26) 2480 MHz	39
2.3 J5 band (578-638 MHz) UHF-Zigbee IMD	45
2.3.1 Zigbee low frequency (Channel 11) 2405 MHz.....	46
2.3.2 Zigbee mid frequency (Channel 19) 2445 MHz	52
2.3.3 Zigbee high frequency (Channel 26) 2480 MHz	58
2.4 L3 band 638-698 MHz UHF- Zigbee IMD.....	64
2.4.1 Zigbee low frequency (Channel 11) 2405 MHz.....	65
2.4.2 Zigbee mid frequency (Channel 19) 2445 MHz	71
2.4.3 Zigbee high frequency (Channel 26) 2480 MHz	77
2.5 P8 band 710-790 MHz UHF-Zigbee IMD	83
2.5.1 Zigbee low channel (Channel 11) 2405 MHz:.....	84

2.5.2	Zigbee mid frequency (channel 19) 2445 MHz	90
2.5.3	Zigbee high frequency (channel 26) 2480 MHz	96
2.6	K4E band 606-666 MHz UHF-Zigbee IMD	102
2.6.1	Zigbee low frequency (Channel 11) 2405 MHz	103
2.6.2	Zigbee mid frequency (Channel 19) 2445 MHz	109
2.6.3	Zigbee high frequency (Channel 26) 2480 MHz	115
2.7	M8E band 666-730 MHz UHF-Zigbee IMD:	121
2.7.1	Zigbee low frequency (Channel 11) 2405 MHz	122
2.7.2	Zigbee mid frequency (Channel 19) 2445 MHz	128
2.7.3	Zigbee high frequency (Channel 26) 2480 MHz	134
2.8	Q5 band 740-814 MHz UHF- Zigbee IMD:	140
2.8.1	Zigbee low frequency (Channel 11) 2405 MHz	141
2.8.2	Zigbee mid frequency (Channel 19) 2445 MHz	147
2.8.3	Zigbee high frequency (Channel 26) 2480 MHz	153
3.	AXT200 (HH TX) UHF-Zigbee IMD Measurements	159
3.1	G1 band 470-530 MHz UHF-Zigbee IMD	160
3.1.1	Zigbee low band (channel 11) 2405MHz	161
3.1.2	Zigbee mid frequency (channel 19) 2445 MHz	167
3.1.3	Zigbee high frequency (channel 26) 2480 MHz	173
3.2	H4 band 518-578 MHz UHF-Zigbee IMD	179
3.2.1	Zigbee low frequency (Channel 11) 2405 MHz	180
3.2.2	Zigbee mid frequency (channel 19) 2445 MHz	186
3.2.3	Zigbee high frequency (channel 26) 2480 MHz	192
3.3	J5 band 578-638 MHz UHF-Zigbee IMD	198
3.3.1	Zigbee low frequency (Channel 11) 2405 MHz	199
3.3.2	Zigbee mid frequency (Channel 19) 2445 MHz	205
3.3.3	Zigbee high frequency (Channel 26) 2480 MHz	211
3.4	L3 band 638-698 MHz UHF-Zigbee IMD	217
3.4.1	Zigbee low frequency (Channel 11) 2405 MHz	218
3.4.2	Zigbee mid frequency (Channel 19) 2445 MHz	224
3.4.3	Zigbee high frequency (Channel 26) 2480 MHz	230
3.5	P8 band 710-790MHz UHF-Zigbee IMD	236

3.5.1	Zigbee low frequency (Channel 11) 2405 MHz.....	237
3.5.2	Zigbee mid frequency (Channel 19) 2445 MHz	243
3.5.3	Zigbee high frequency (Channel 26) 2480 MHz	249
3.6	K4E band 606-666MHz UHF-Zigbee IMD.....	255
3.6.1	Zigbee low frequency (Channel 11) 2405 MHz.....	256
3.6.2	Zigbee mid frequency (Channel 19) 2445 MHz	262
3.6.3	Zigbee high frequency (Channel 26) 2480 MHz	268
3.7	M8E band 666-730 MHz UHF-Zigbee IMD	274
3.7.1	Zigbee low frequency (Channel 11) 2405 MHz.....	275
3.7.2	Zigbee mid frequency (Channel 19) 2445 MHz	281
3.7.3	Zigbee high frequency (Channel 26) 2480 MHz	287
3.8	Q5 band 740-814 MHz UHF-Zigbee IMD.....	293
3.8.1	Zigbee low frequency (Channel 11) 2405 MHz.....	294
3.8.2	Zigbee mid frequency (Channel 19) 2445 MHz	300
3.8.3	Zigbee high frequency (Channel 26) 2480 MHz	306

1. Introduction

Axient AXT100 Body Pack (BP) Transmitter (TX), AXT200 HandHeld (HH) Transmitter Wireless measurements for FCC and ETSI regulatory approval.

1.1 Test Equipment used:

- Spectrum Analyzer – Agilent E4407B (SN: MY45116757, Cal Date: 04/14/2011, Cal due:04/30/2012, Cal#46410-103. Calibration performed by SIMCO)
- Shure Axient System: AXT200, AXT100.

1.2 Review and Approval

This document must be reviewed and approved by Axient project manager(s).

1.3 Revision History

The most current version of this document can be found in Stellent ID:

Revision	Date	Author	Comments
1	03/17/2011	Mohit Shringi	

1.4 References

1.5 Acronyms and Definitions

AXT	Axient
BP	Body pack
HH	Hand held
IMD	Intermodulation distortion
Pwr	Power
RF	Radio frequency
TX	Transmitter
UHF	Ultra High Frequeuncy

2. AXT 100 (BP TX) UHF-Zigbee IMD Measurements

Typical power settings:

UHF Section settings:

UHF Power mode setting	UHF Power at Antenna SMA (dBm)
10 mW (low power)	9.5
50 mW (high power for EU bands)	16.5
100 mW (high power for US bands)	19.5

Zigbee Section settings:

Zigbee Frequency (MHz)	Zigbee Power at Antenna SMA (dBm)
2405 (ZB Ch: 11, Low Frequency)	7
2445 (ZB Ch: 19, Mid Frequency)	7
2480 (ZB Ch: 26, High Frequency)	7

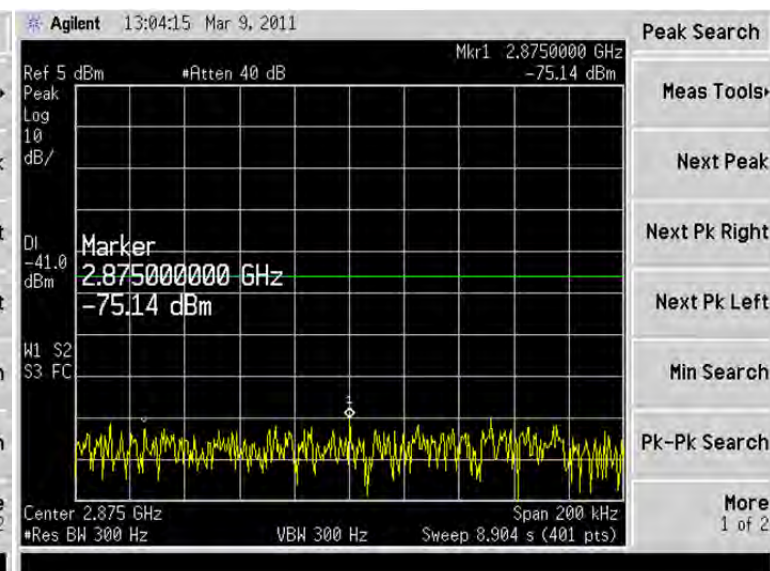
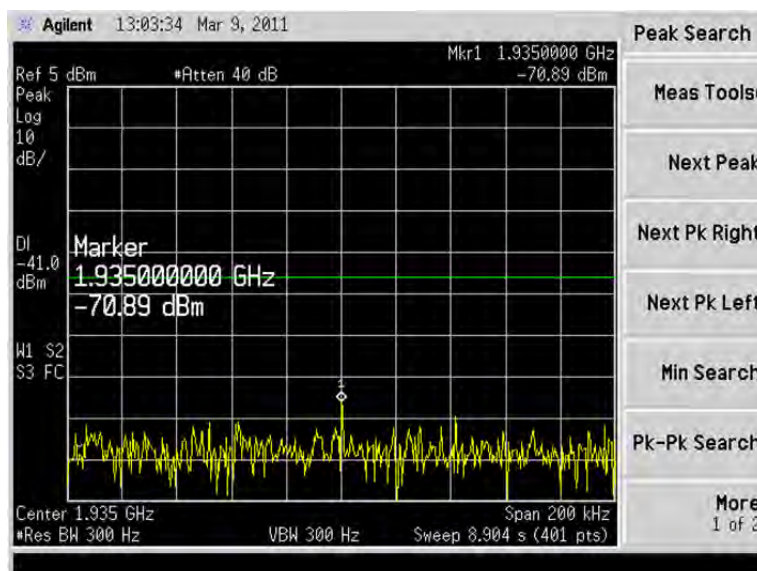
2.1 G1 band (470-530 MHz) UHF-Zigbee IMD

	UHF Freq (MHz)	UHF Pwr mode	Zb freq (MHz)	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
Zigbee Low band	470	10mw	2405	1935	-70.9	2875	-75.1
	500	10mw	2405	1905	-71.8	2905	-71.5
	530	10mw	2405	1875	-69	2935	-71.4
Zigbee Mid band	470	10mw	2445	1975	-70.6	2915	-71.9
	500	10mw	2445	1945	-74.4	2945	-71.4
	530	10mw	2445	1915	-68.8	2975	-72
Zigbee high band	470	10mw	2480	2010	-72.9	2950	-74.2
	500	10mw	2480	1980	-63.5	2980	-67.5
	530	10mw	2480	1950	-72.7	3010	-85.7
Zigbee Low band	470	100mW	2405	1935	-62.3	2875	-66.1
	500	100mW	2405	1905	-63.4	2905	-67.5
	530	100mW	2405	1875	-64.8	2935	-65.7
Zigbee mid band	470	100mW	2445	1975	-64.3	2915	-67.7
	500	100mW	2445	1945	-63.4	2945	-65.4
	530	100mW	2445	1915	-64.4	2975	-68.1
Zigbee high band	470	100mW	2480	2010	-63.2	2950	-66.9
	500	100mW	2480	1980	-64.6	2980	-66
	530	100mW	2480	1950	-65.3	3010	-88

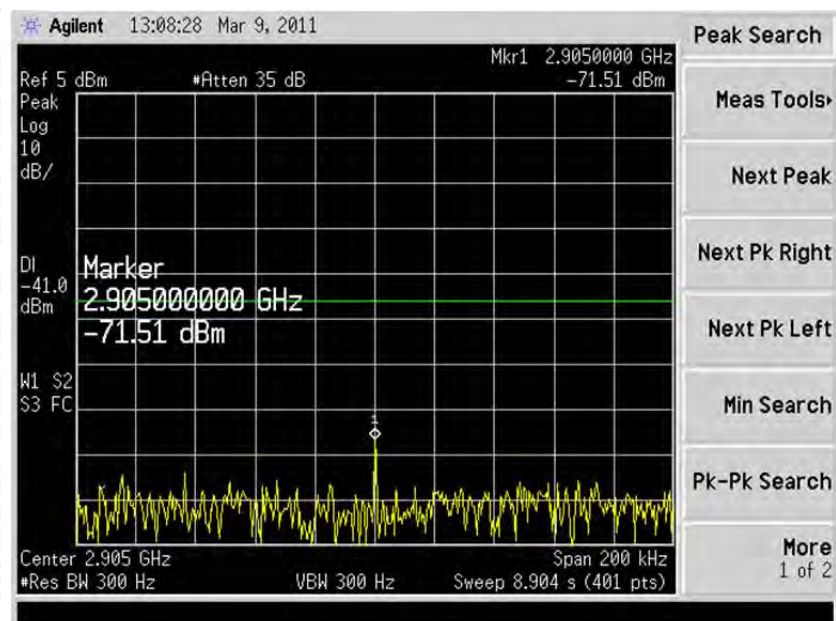
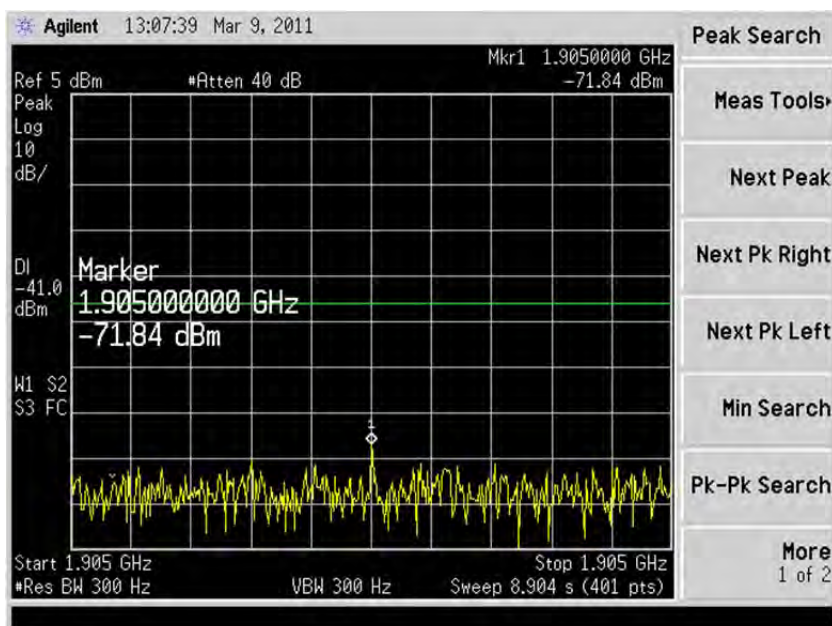
2.1.1 Zigbee low frequency (Channel 11) 2405 MHz

2.1.1.1 UHF Low power (10mW)

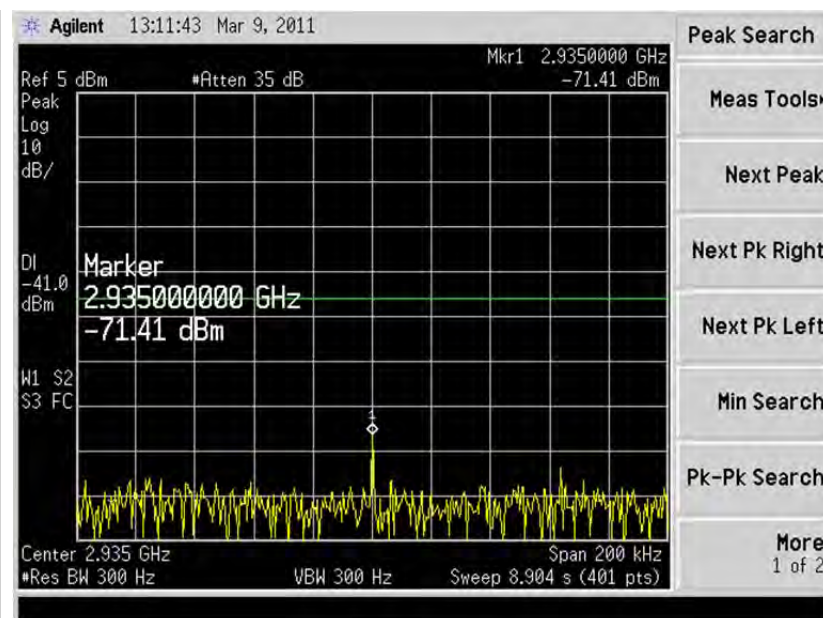
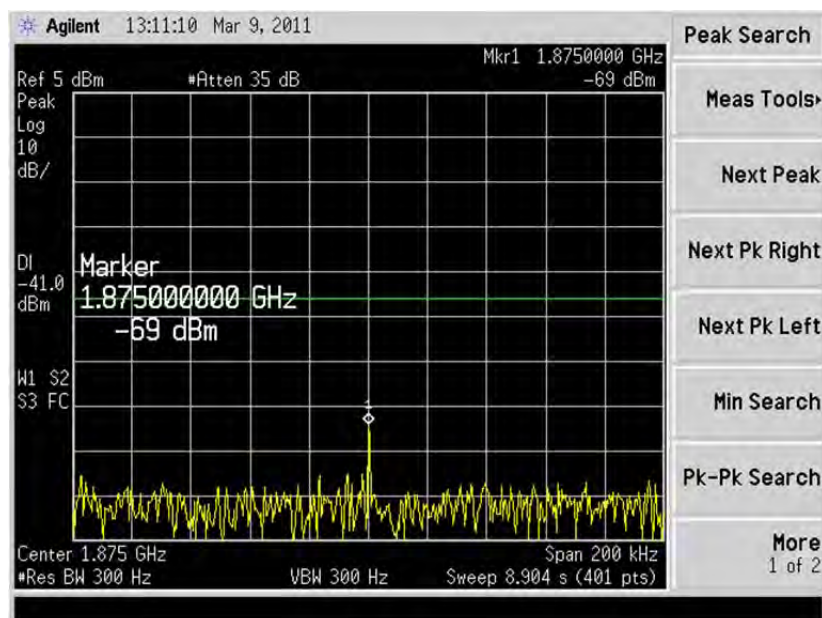
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
470	10mw	1935	-70.9	2875	-75.1



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
500	10mw	1905	-71.8	2905	-71

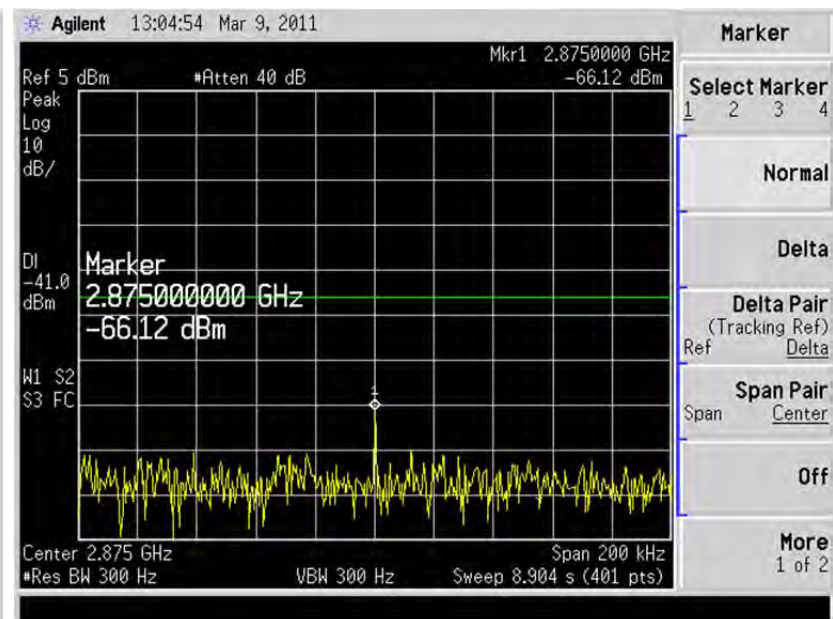
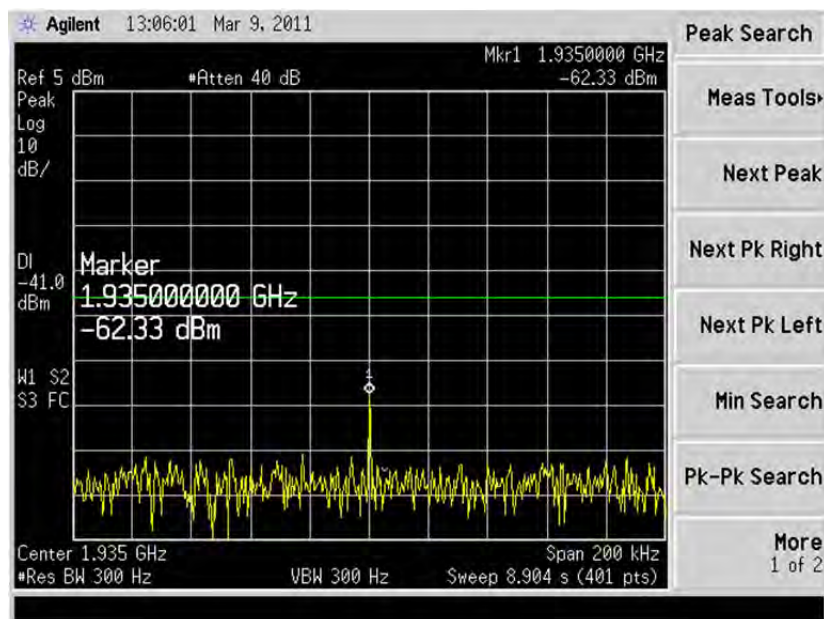


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
530	10mw	1875	-69	2935	-71.4

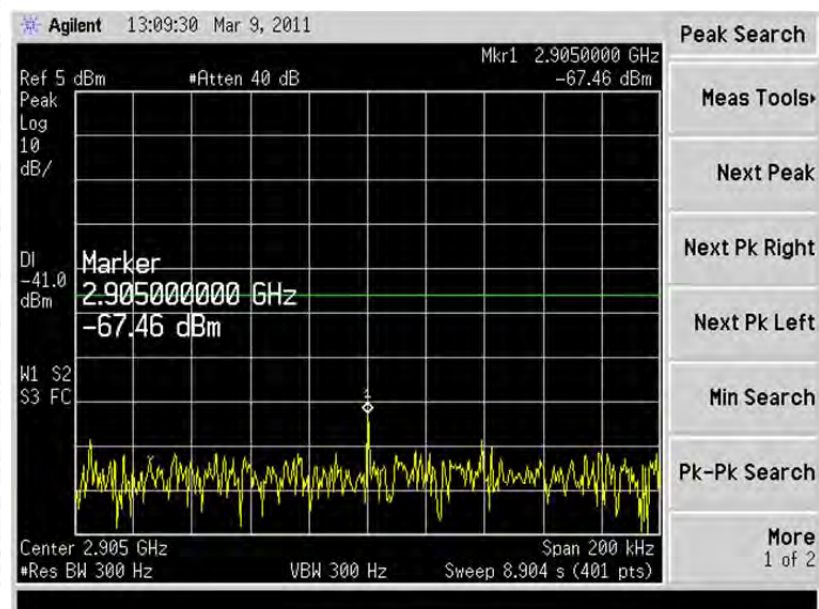
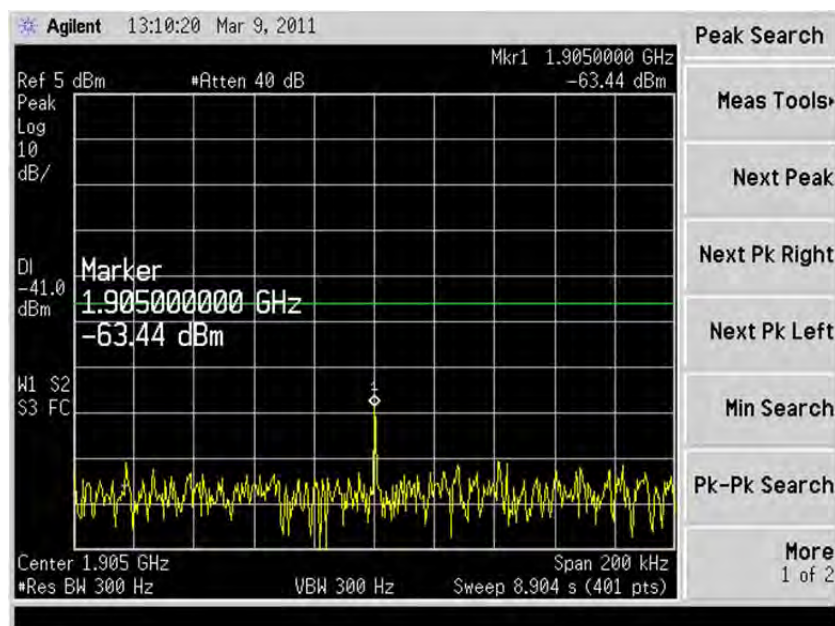


2.1.1.2 UHF High power (100mW)

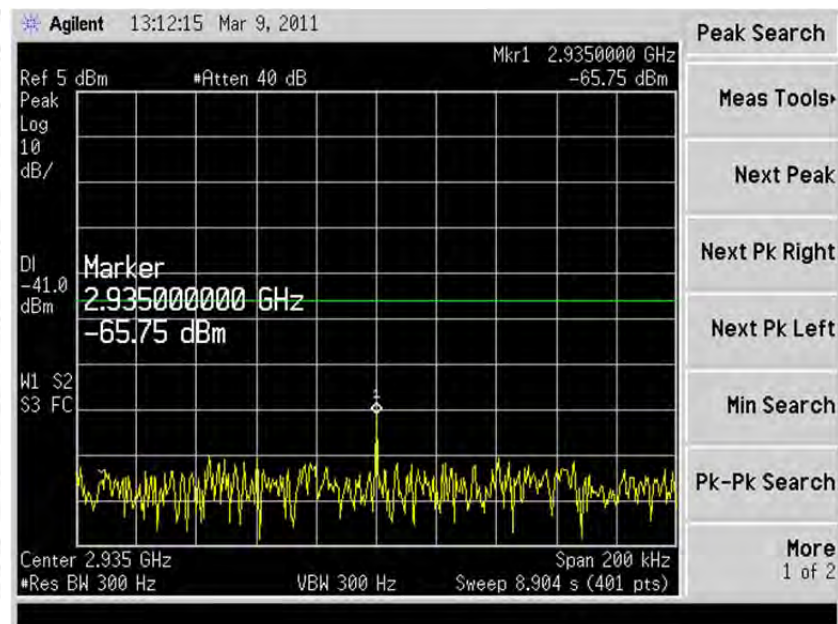
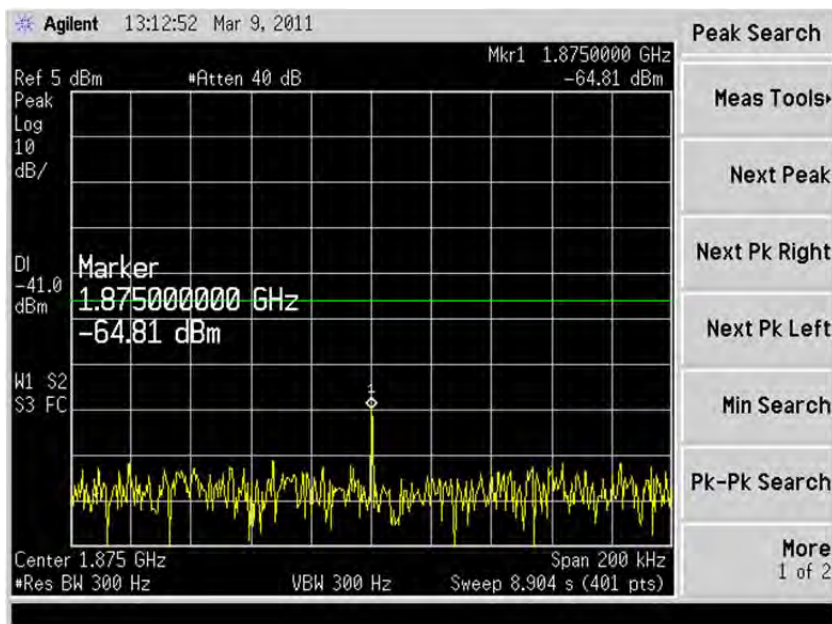
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
470	100mw	1935	-62.3	2875	-66.1



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
500	100mw	1905	-63.4	2905	-67.5



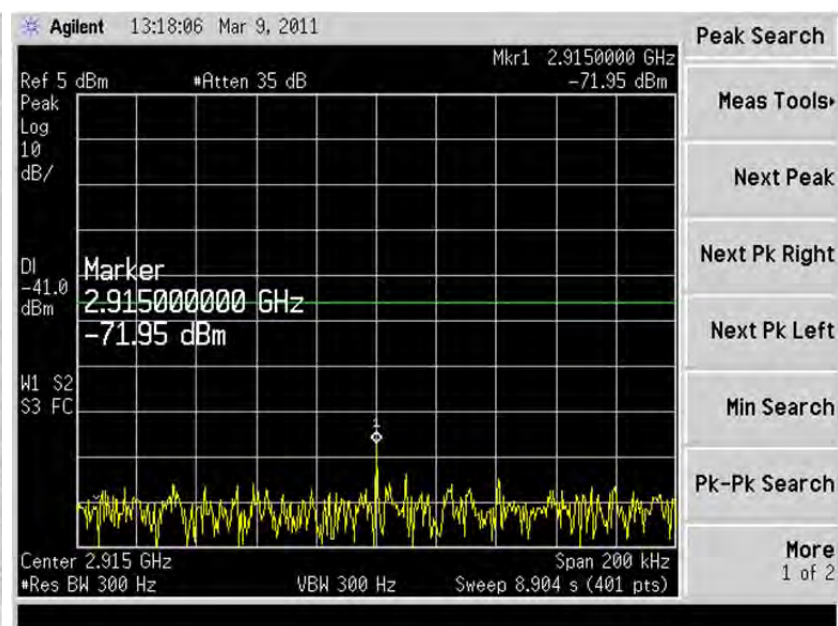
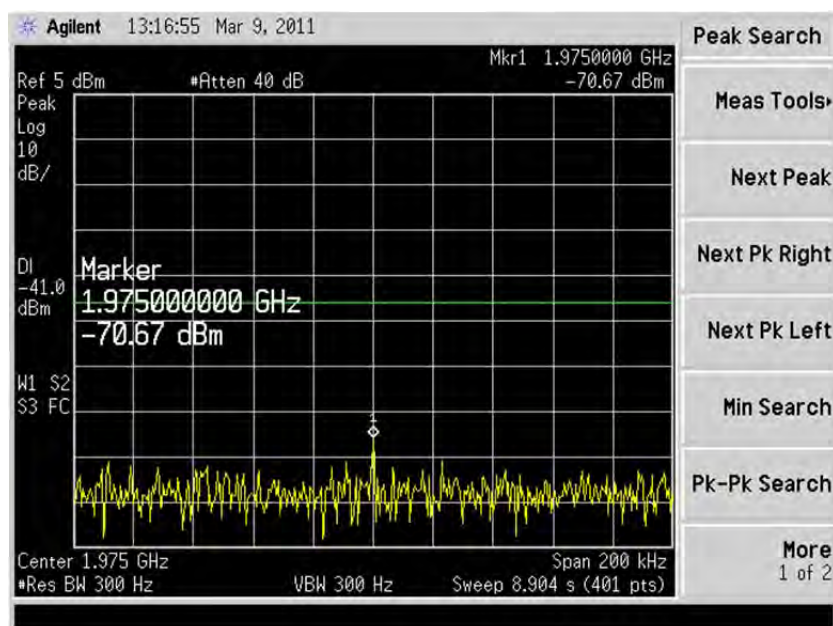
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
530	100mw	1875	-64.8	2935	-65.7



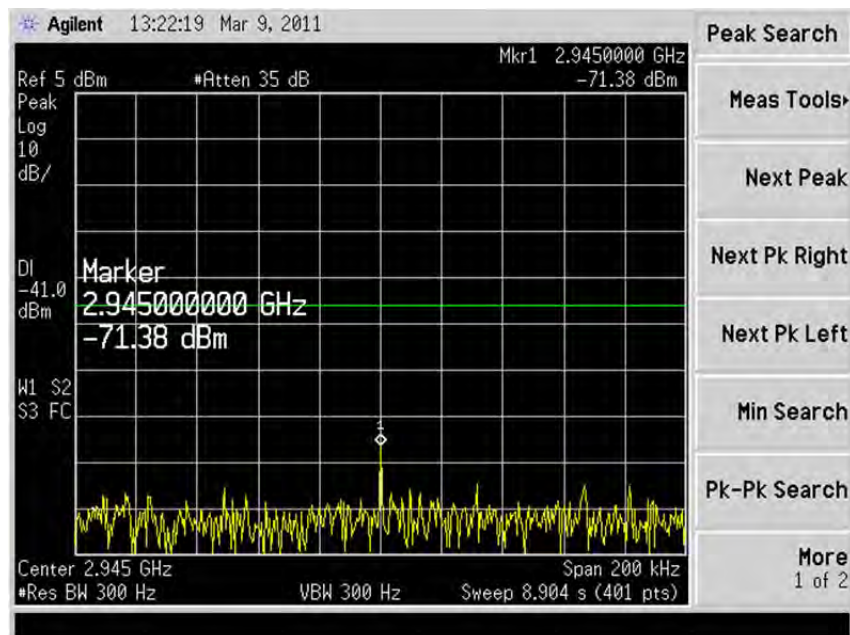
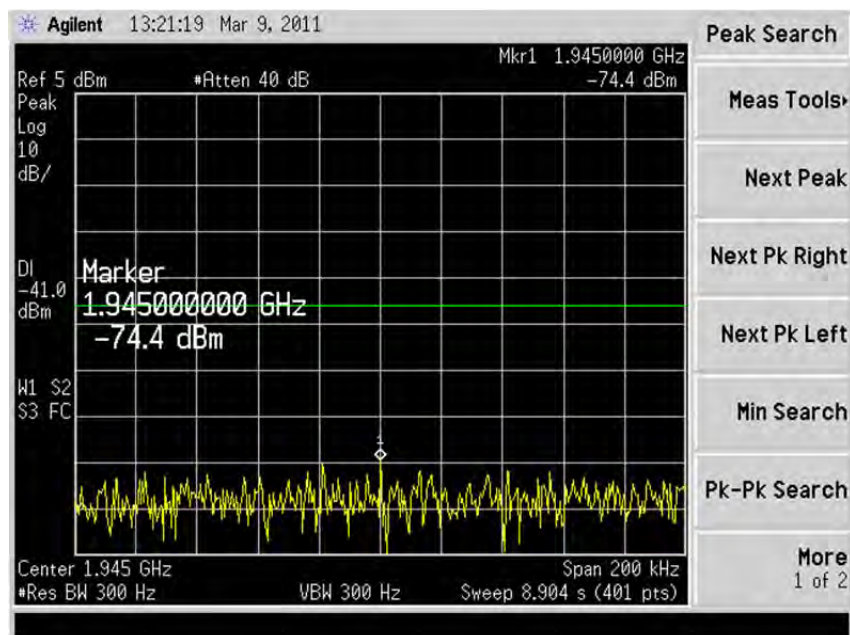
2.1.2 Zigbee Mid frequency (Channel 19) 2445 MHz

2.1.2.1 UHF Power low (10mW)

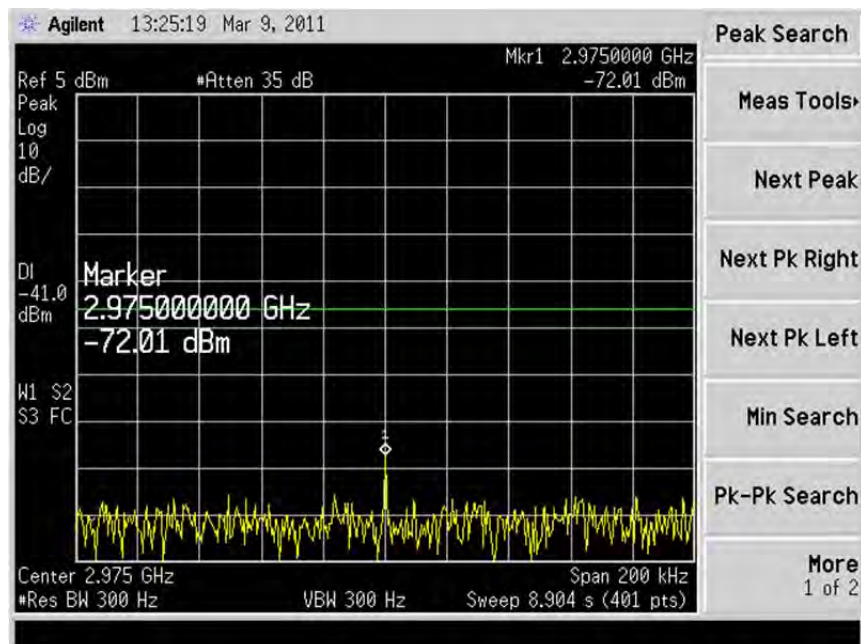
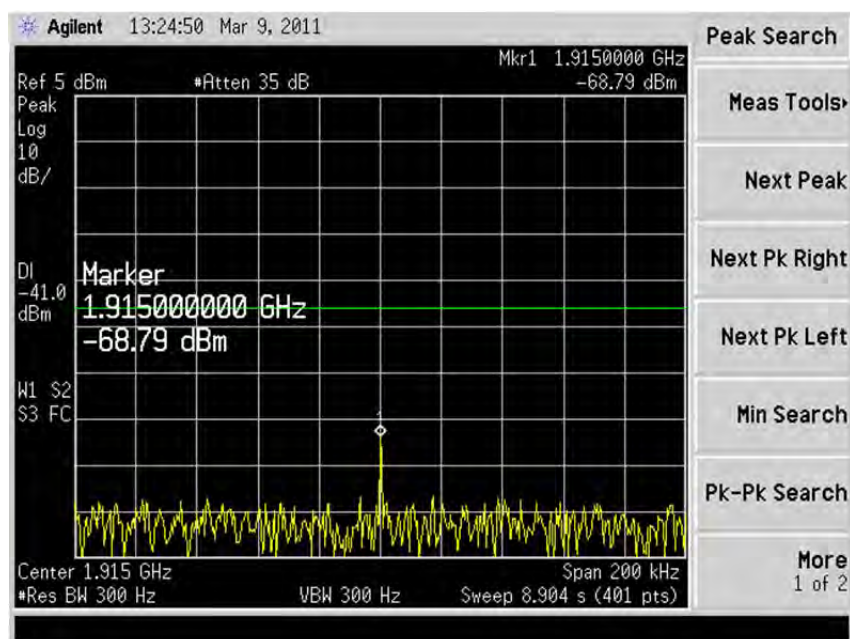
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
470	10mw	1975	-70.6	2915	-71.9



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
500	10mw	1945	-74.4	2945	-71.4

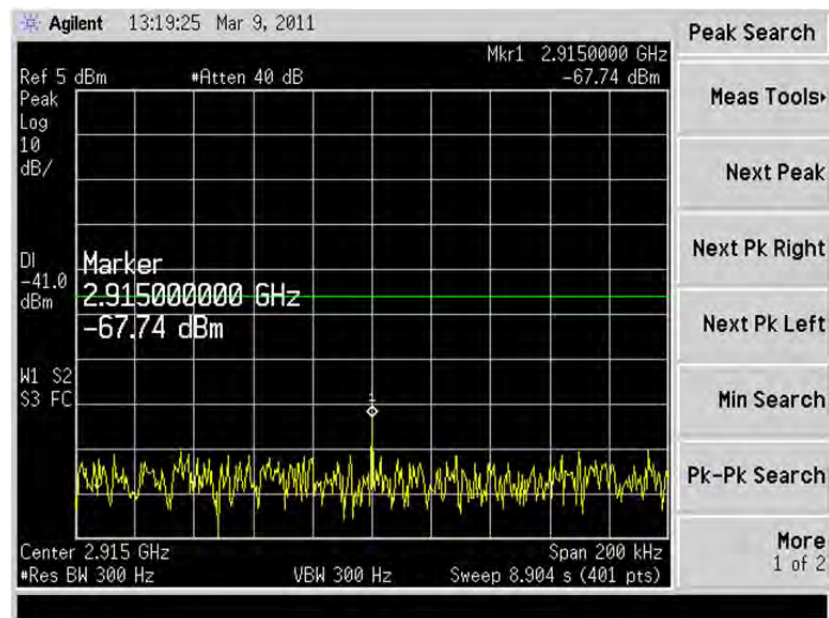
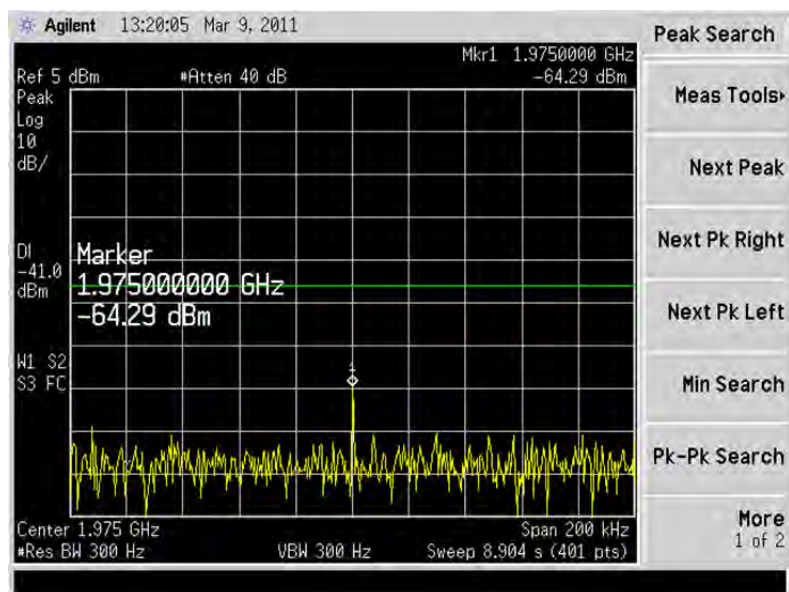


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
530	10mw	1915	-68.8	2975	-72

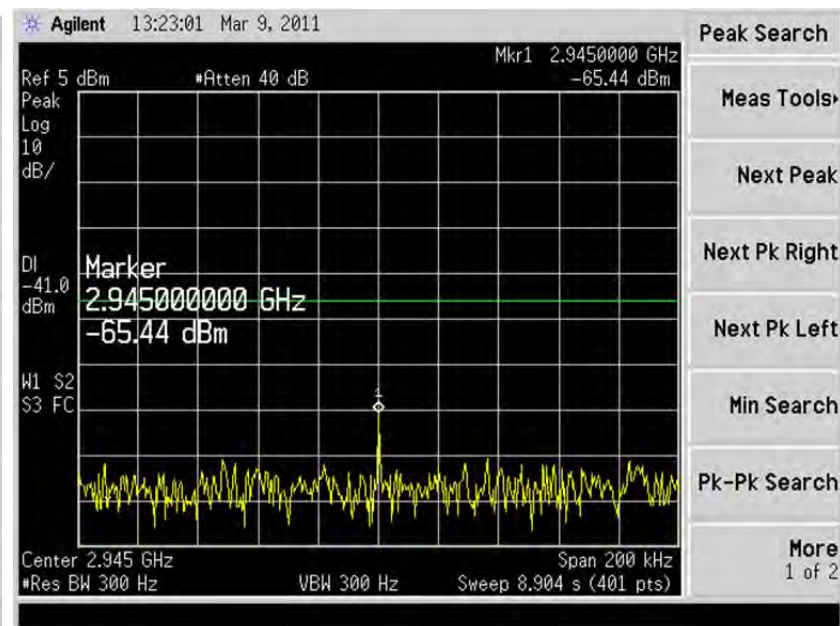
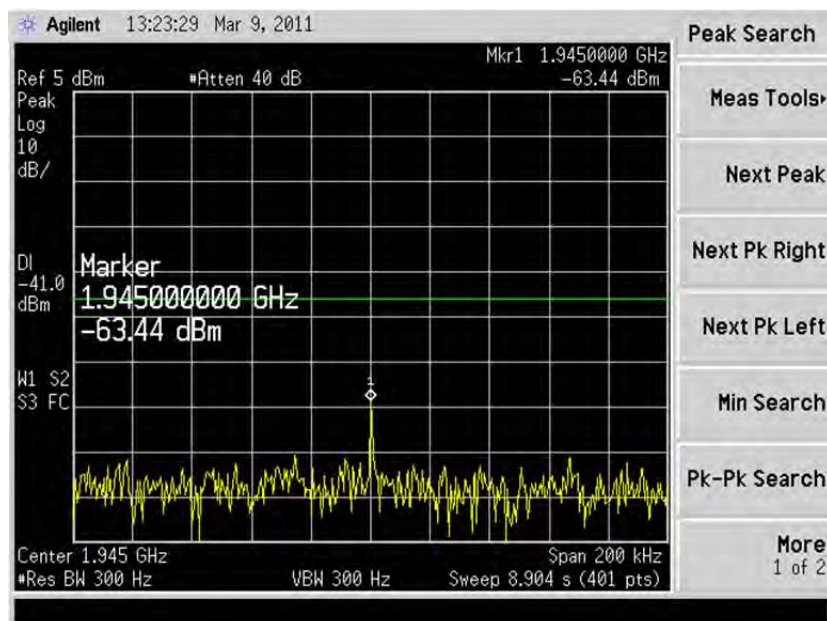


2.1.2.2 UHF Power high (100mW)

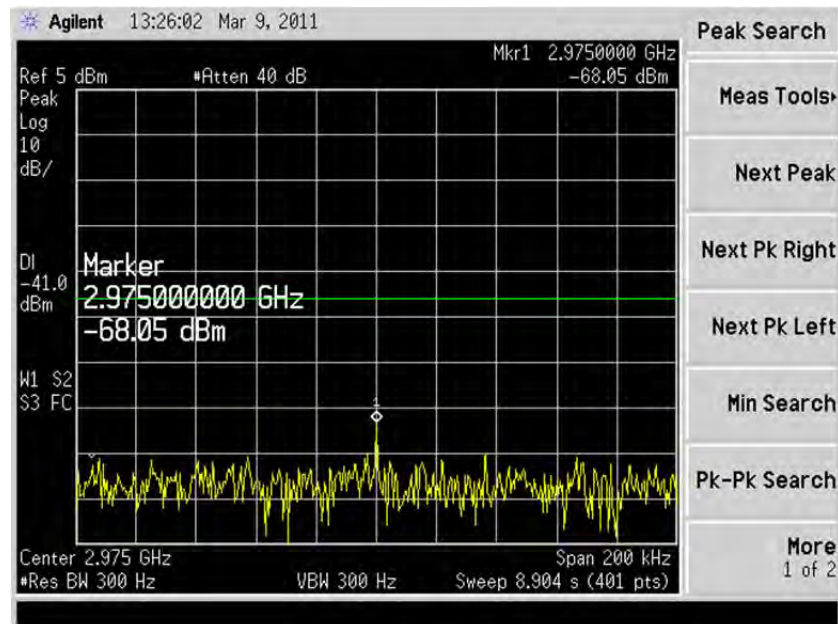
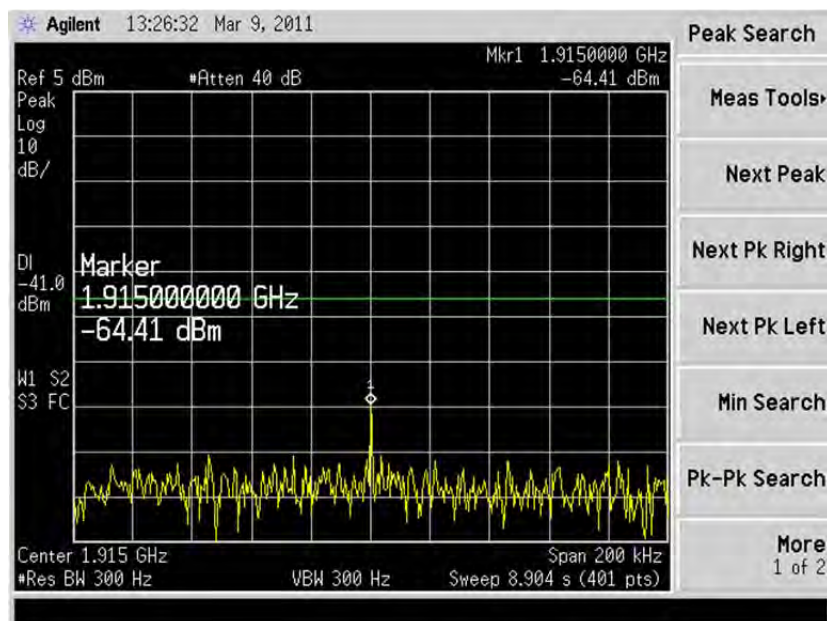
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
470	100mw	1975	-64.3	2915	-67.7



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
500	100mw	1945	-63.4	2945	-65.4



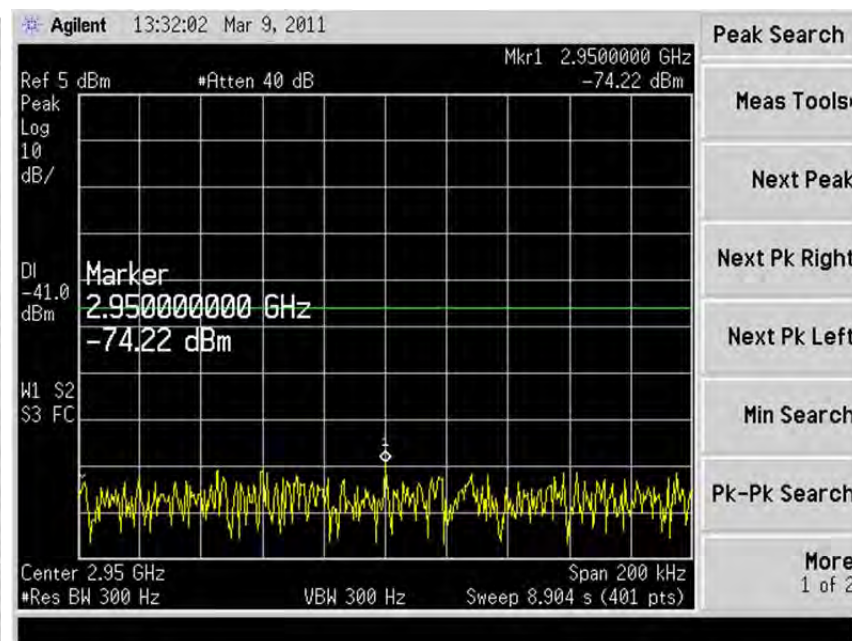
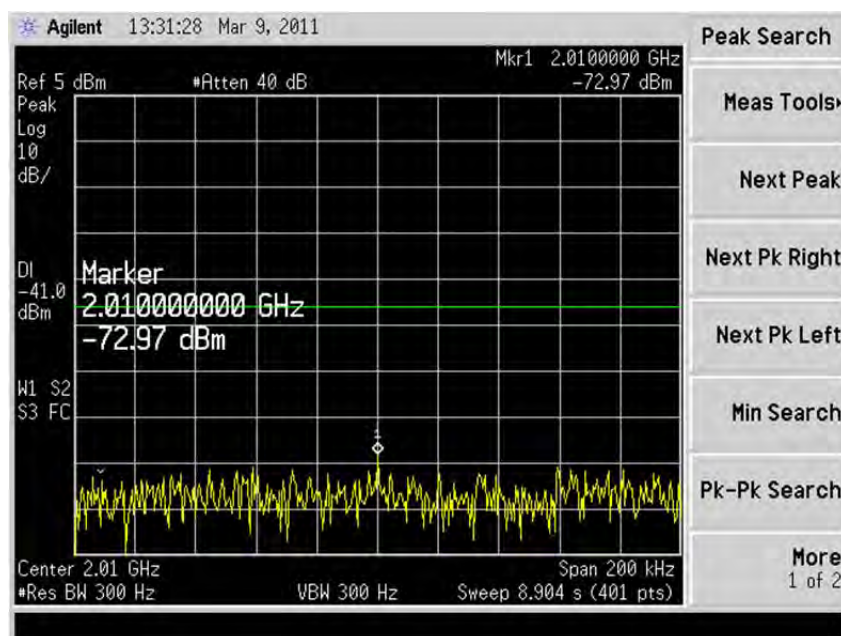
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
530	100mw	1915	-64.4	2975	-68.05



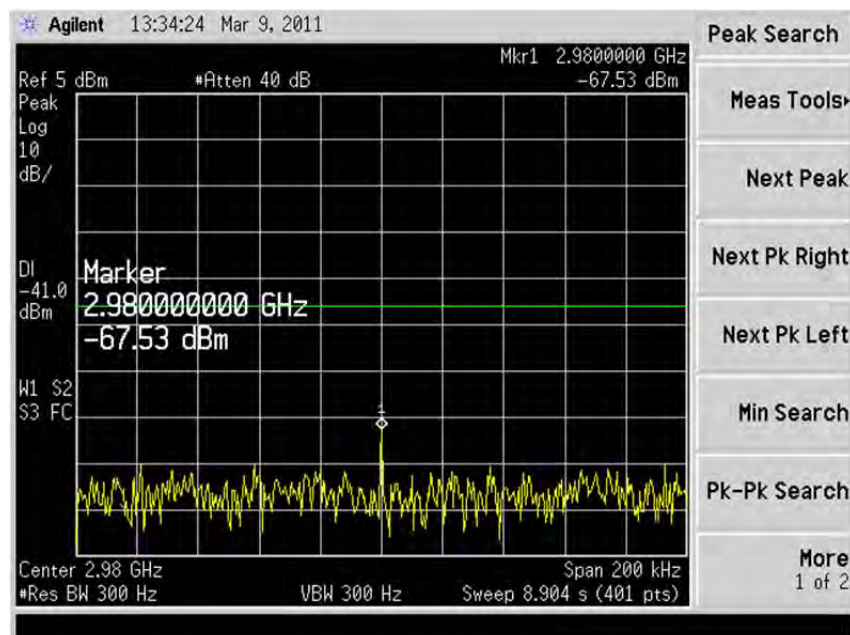
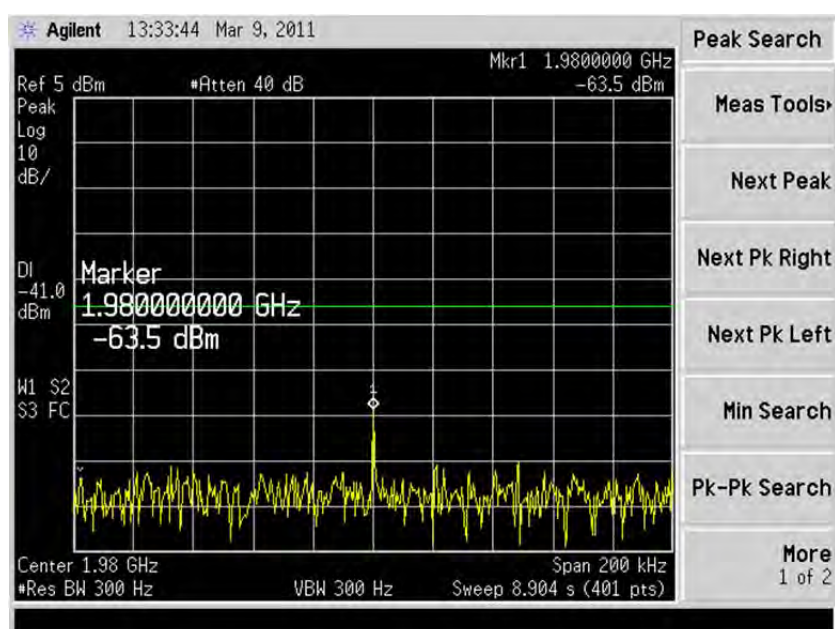
2.1.3 Zigbee High frequency (Channel 26) 2480MHz:

2.1.3.1 UHF Power low (10mW)

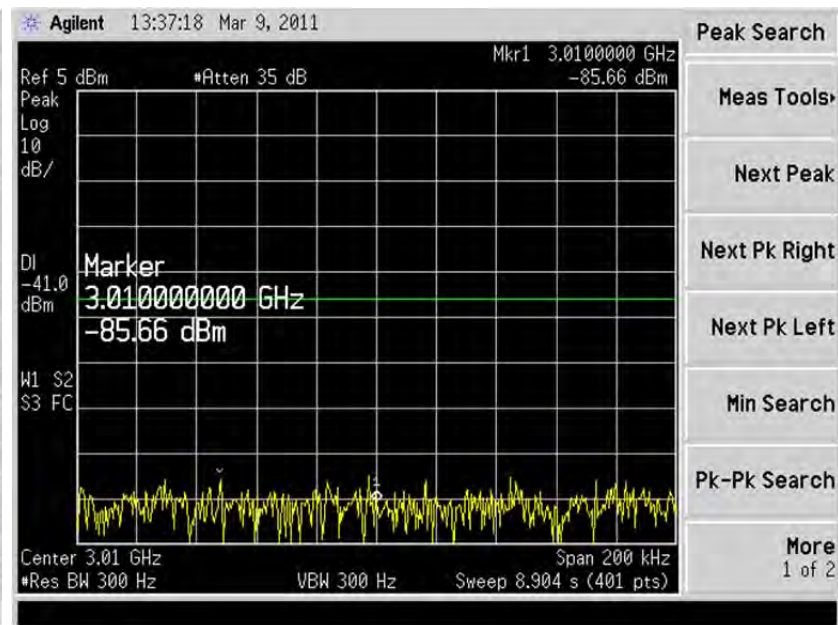
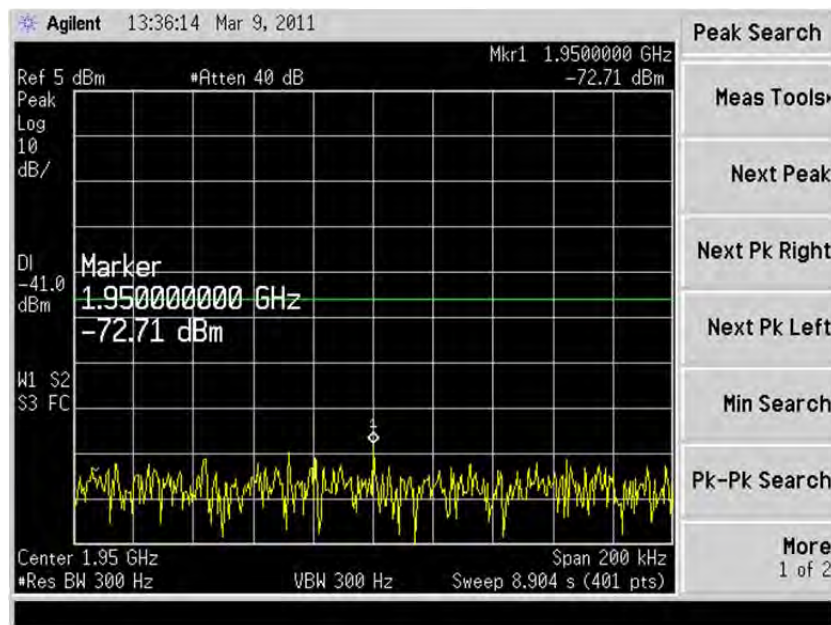
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
470	10mw	2010	-72.9	2950	-74.2



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
500	10mw	1980	-63.5	2980	-67.5

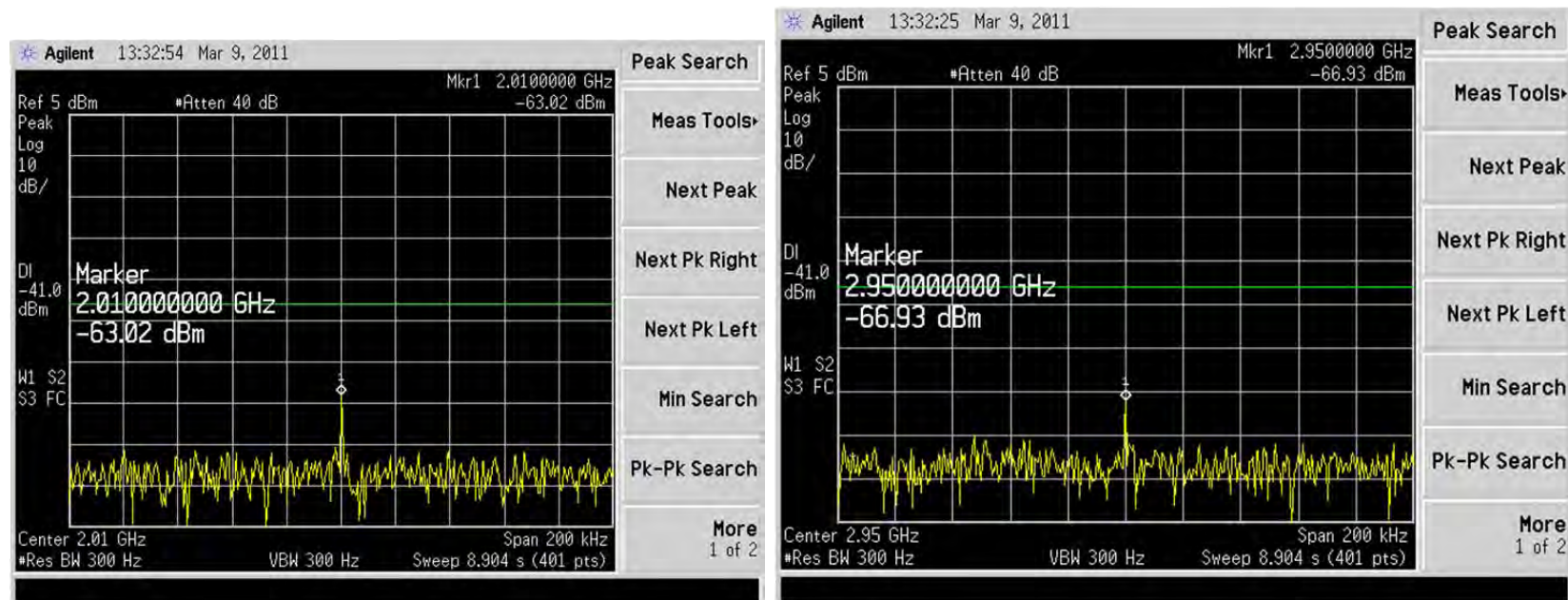


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
530	10mw	1950	-72.7	3010	-85.6

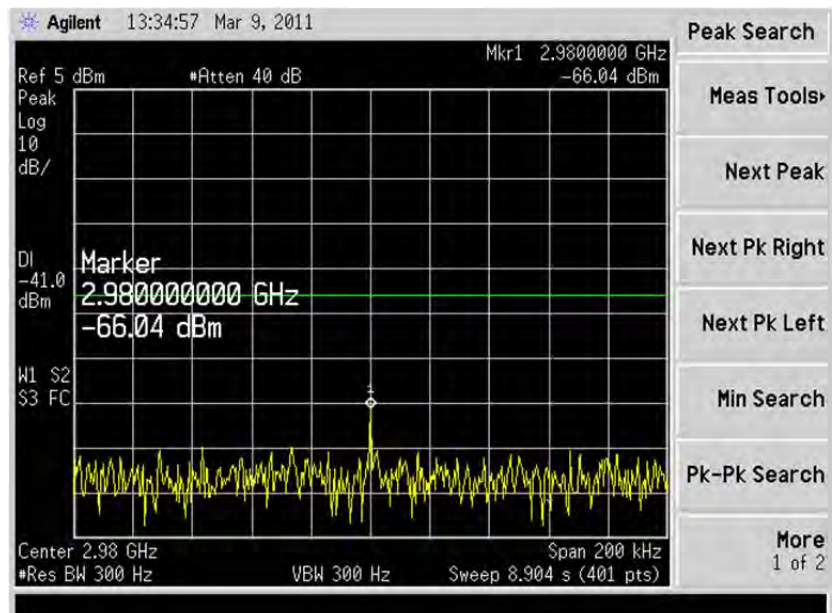
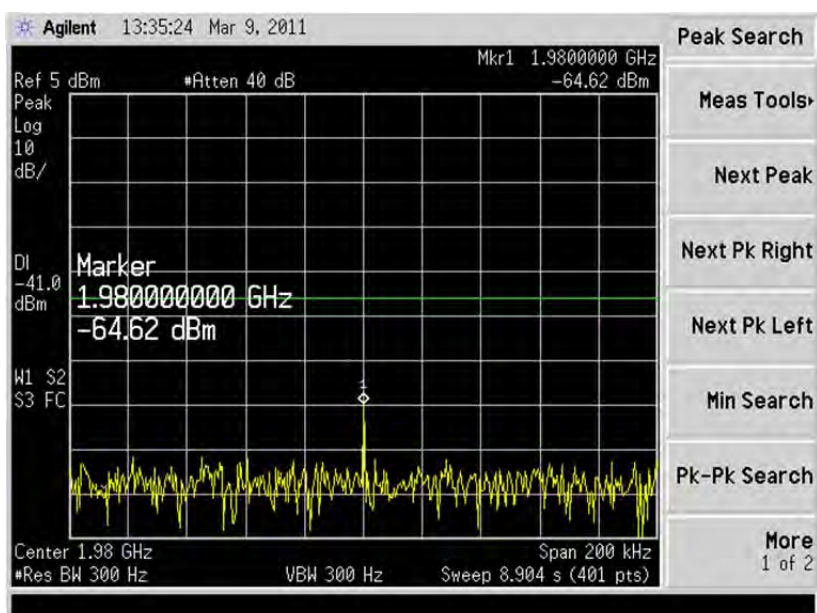


2.1.3.2 UHF Power high (100mW)

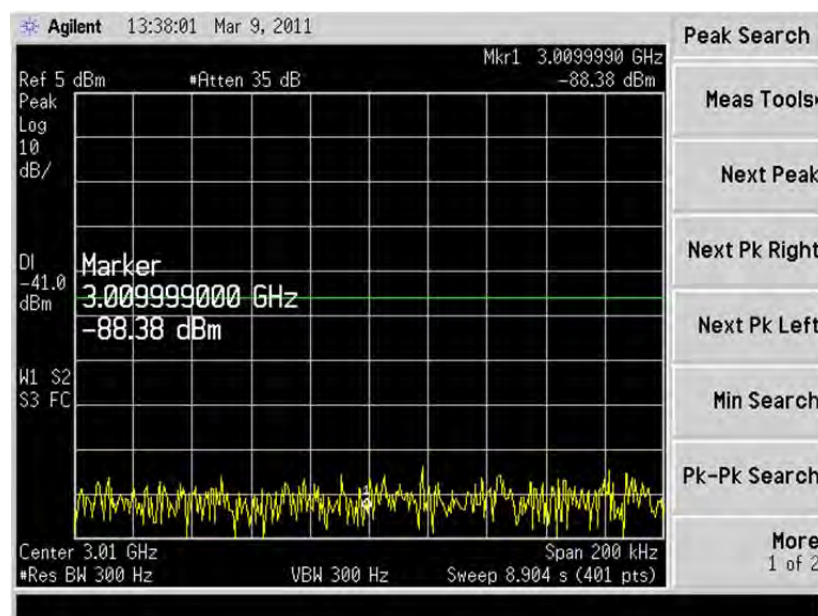
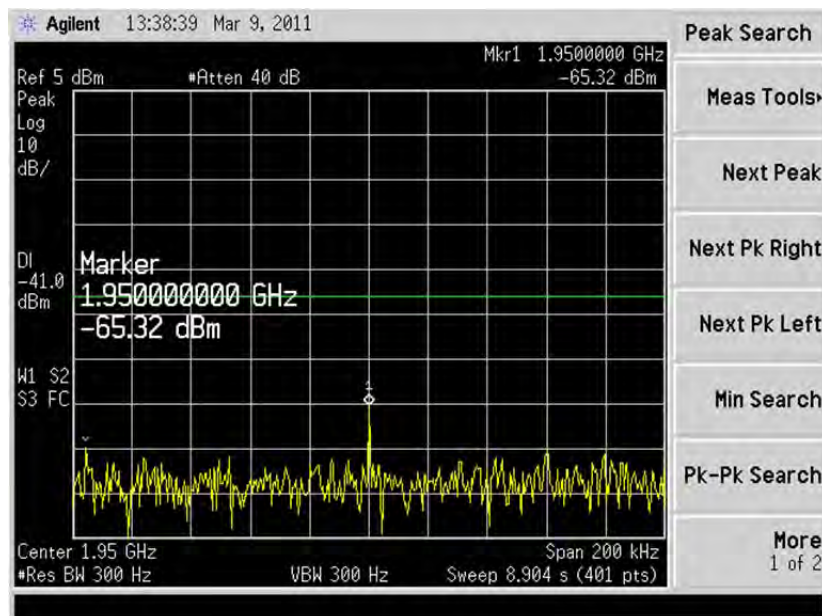
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
470	100mw	2010	-63.02	2950	-66.9



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
500	100mw	1980	-64.6	2980	-66



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
530	100mw	1950	-65.3	3010	-88.4



2.2 H4 Band (518-578 MHz) UHF-Zigbee IMD:

		UHF Freq (MHz)	Zb freq (MHz)	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
UHF Low Power	Zigbee Low band	518	2405	1887	-68.1	2923	-71
		548	2405	1857	-70.8	2953	-70.5
		578	2405	1827	-72	2983	-72.1
	Zigbee mid band	518	2445	1927	-70	2963	-71.5
		548	2445	1897	-70.06	2993	-72.6
		578	2445	1867	-72	3023	-82.7
	Zigbee high band	518	2480	1962	-73.6	2998	-70.7
		548	2480	1932	-69.6	3028	-96
		578	2480	1902	-70.5	3058	-82.5
UHF High Power	Zigbee Low band	518	2405	1887	-65.5	2923	-68.3
		548	2405	1857	-67.7	2953	-68.8
		578	2405	1827	-69.5	2983	-71.8
	Zigbee mid band	518	2445	1927	-65.7	2963	-70.4
		548	2445	1897	-67.4	2993	-70.6
		578	2445	1867	-69.6	3023	-80.5
	Zigbee high band	518	2480	1962	-66.6	2998	-70
		548	2480	1932	-67.8	3028	-87.5
		578	2480	1902	-68.5	3058	-77.3

Revision: 1

Date: 6/2/2011

Author: Mohit Shringi

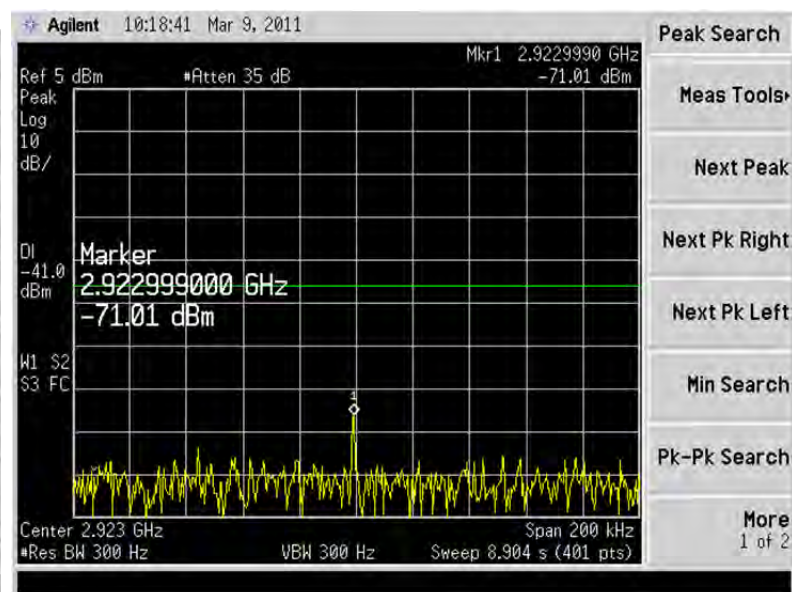
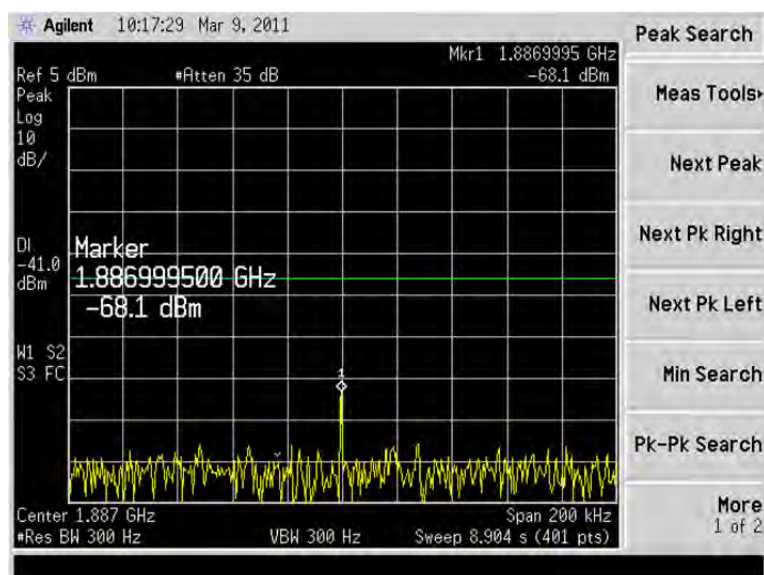
Page: 27 of 311

Shure Incorporated © 2009

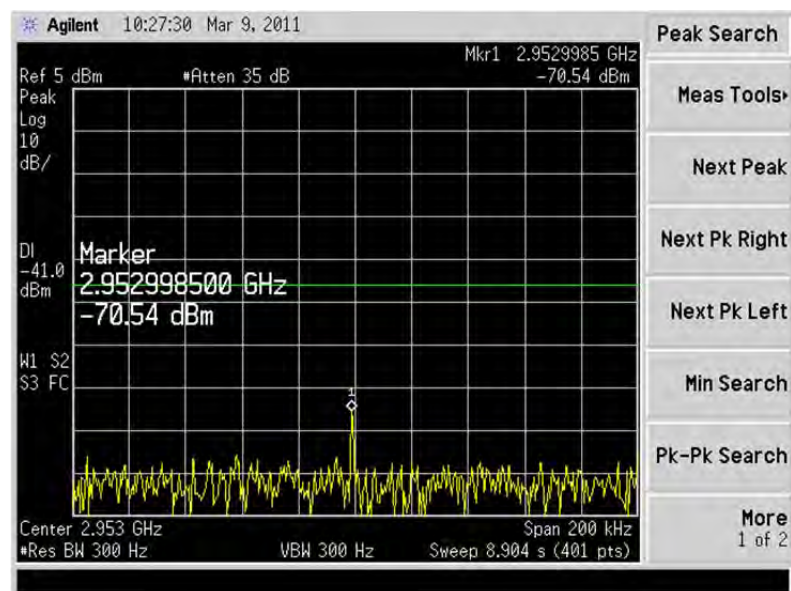
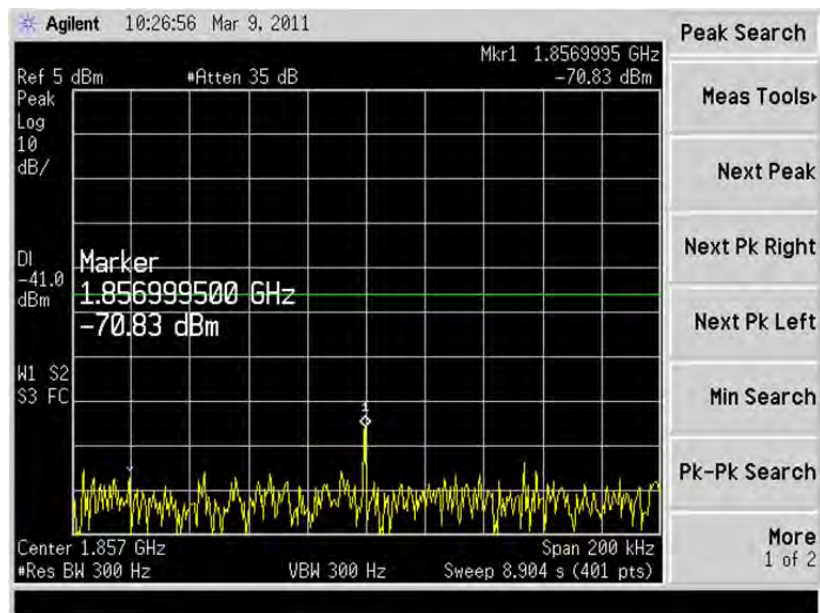
2.2.1 Zigbee low frequency (Channel 11) 2405 MHz

2.2.1.1 UHF Low power (10mW)

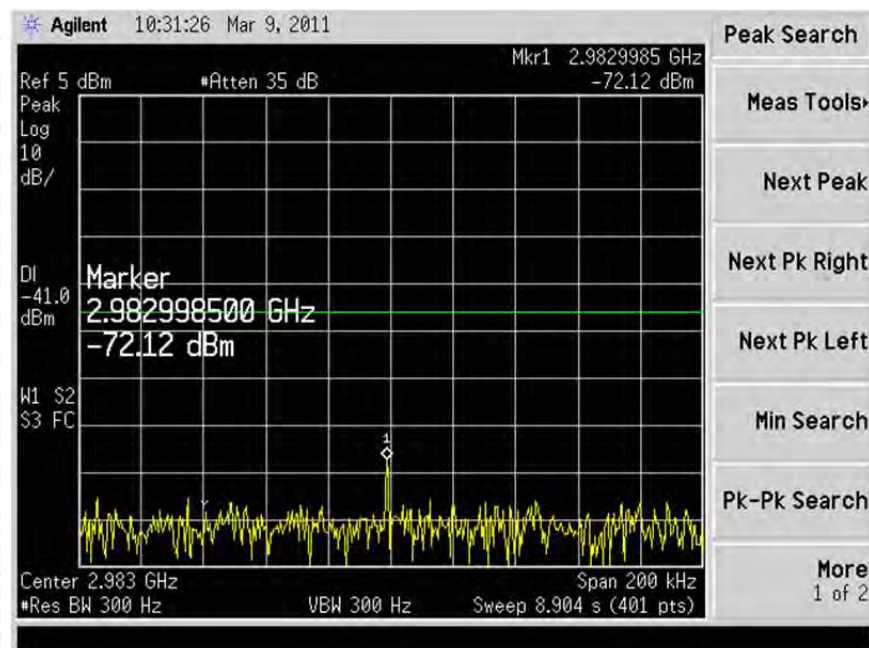
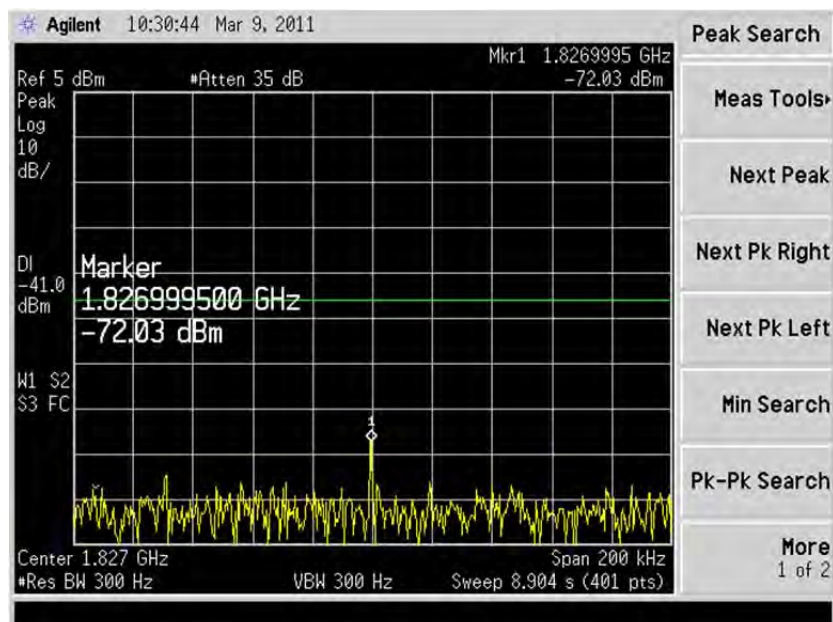
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
518	10mw	1887	-68.1	2923	-71



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
548	10mw	1857	-70.8	2953	-70.5

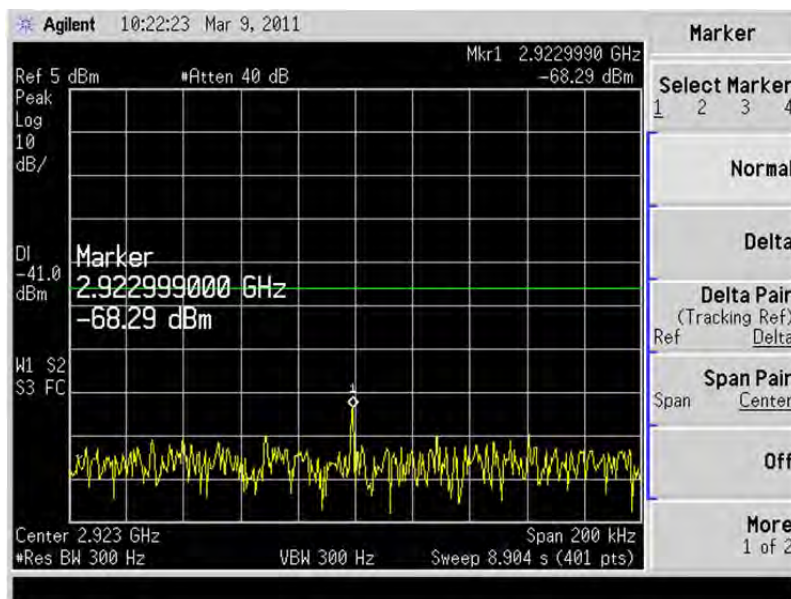
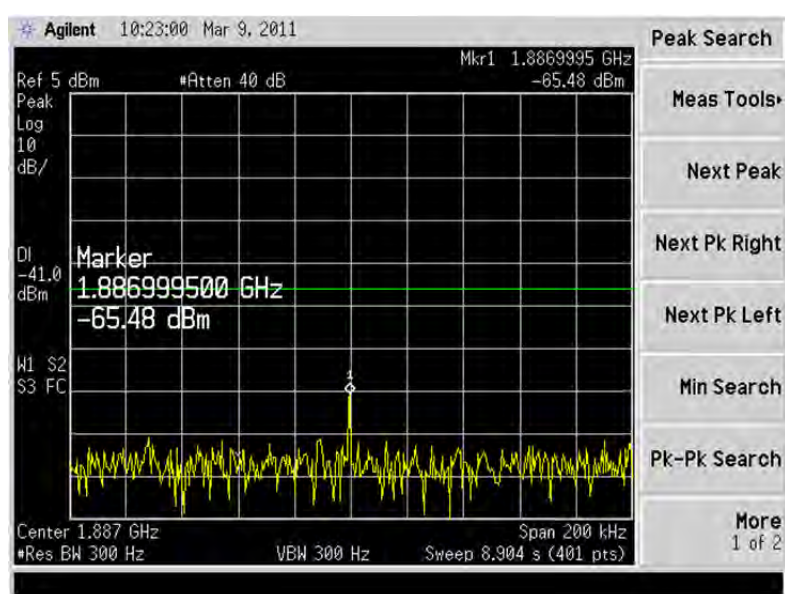


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	10mw	1827	-72	2983	-72.1

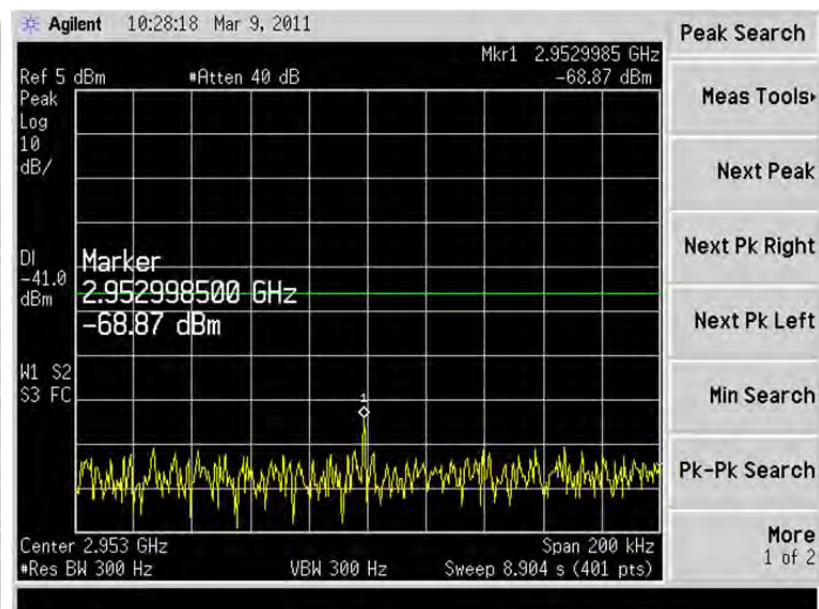
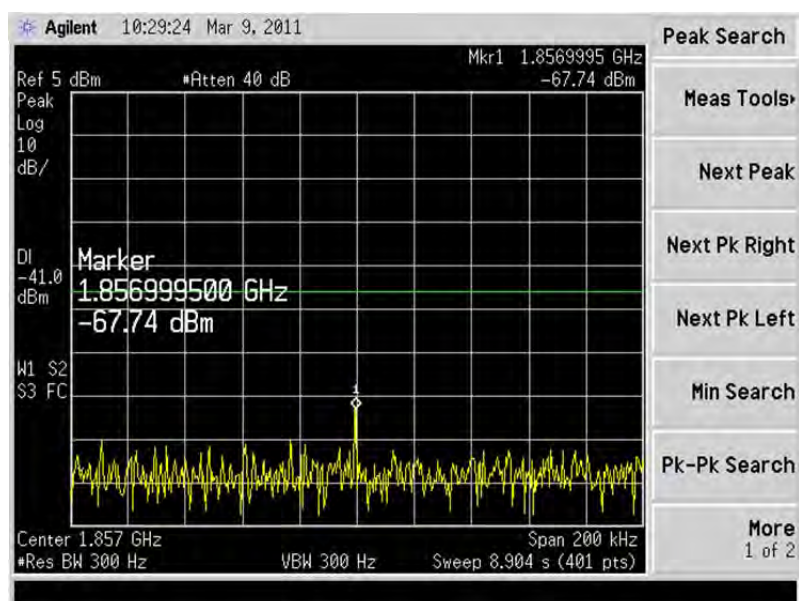


2.2.1.2 UHF Low power (100mW)

UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
518	100mw	1887	-65.5	2923	-68.3



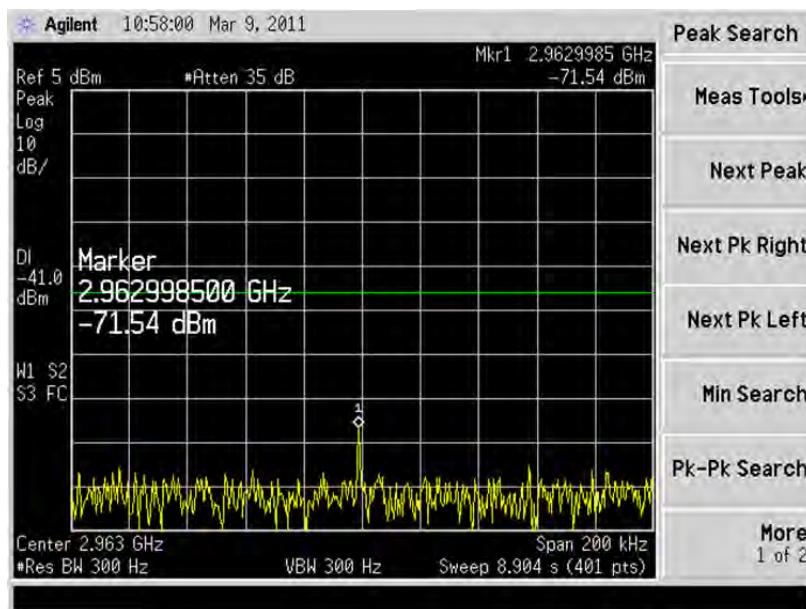
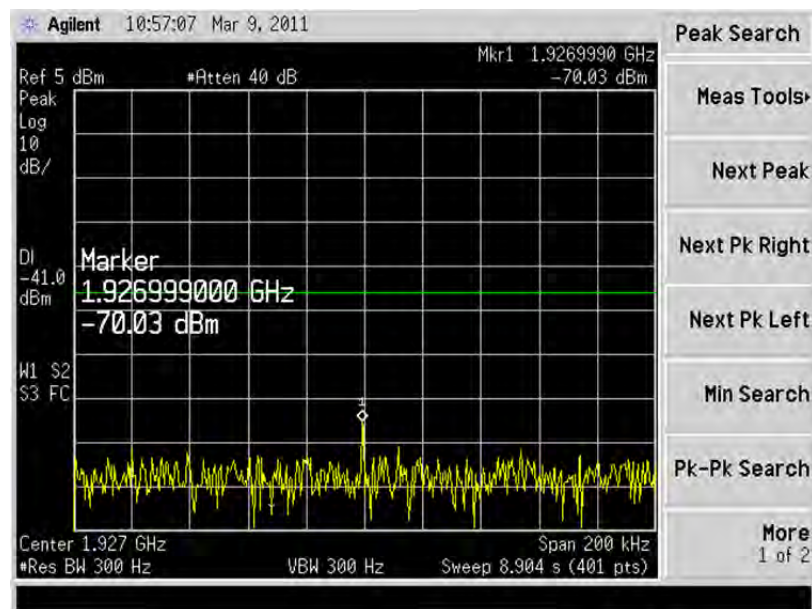
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
548	100mw	1857	-67.7	-2953	-68.8



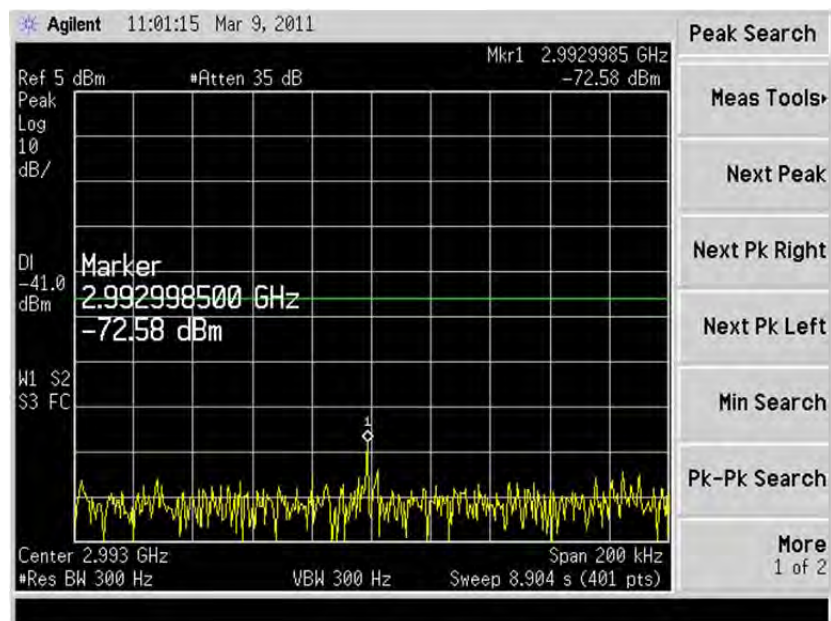
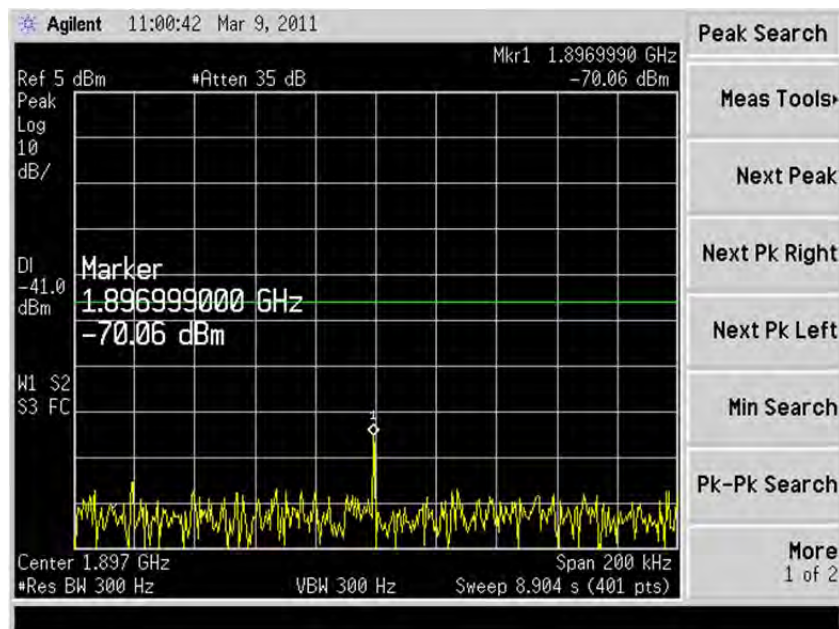
2.2.2 Zigbee mid frequency (Channel 19) 2445 MHz

2.2.2.1 UHF Power low (10mW)

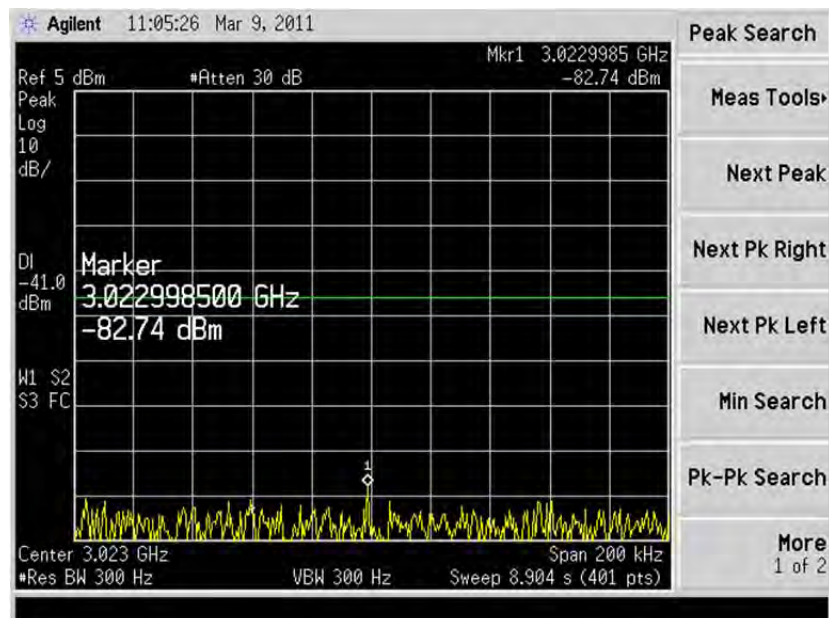
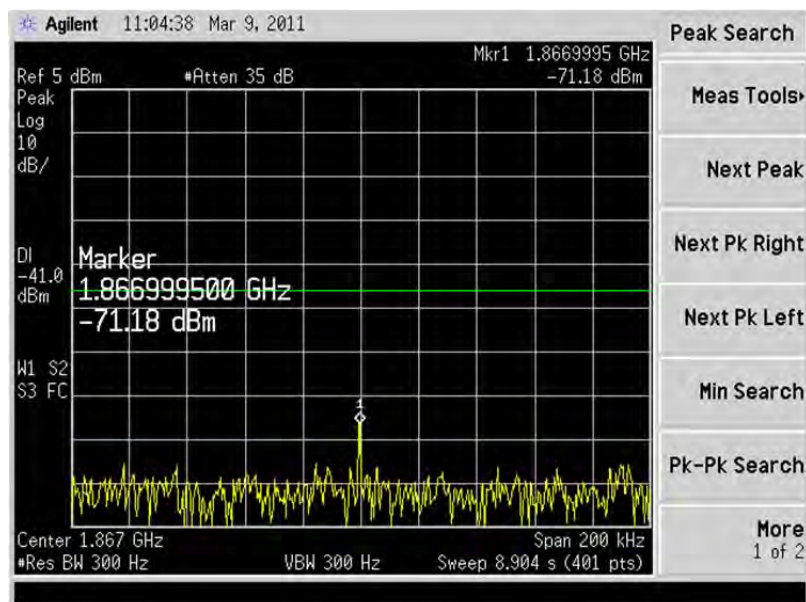
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
518	10mw	1927	-70	2963	-71.5



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
548	10mw	1897	-70.	2993	-72.6

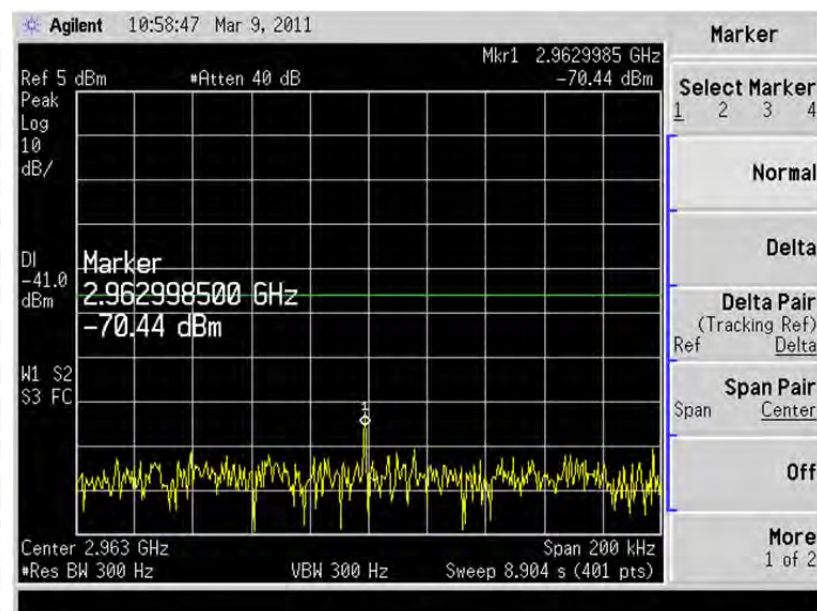
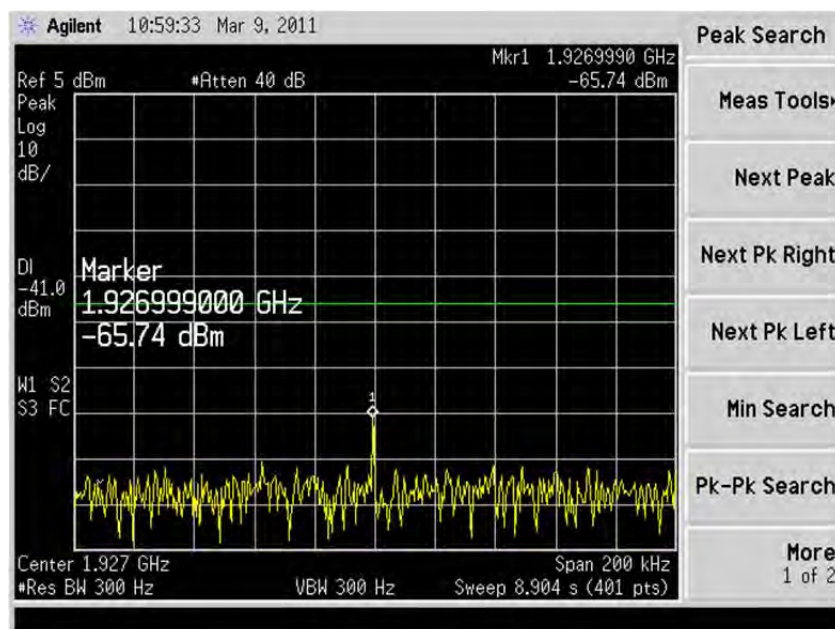


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	10mw	1867	-71.2	3023	-82.7

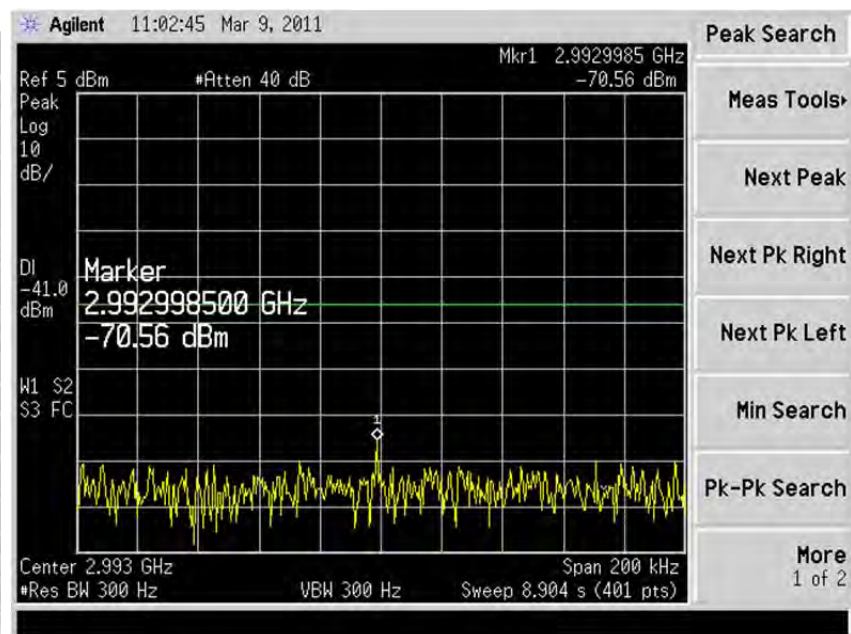
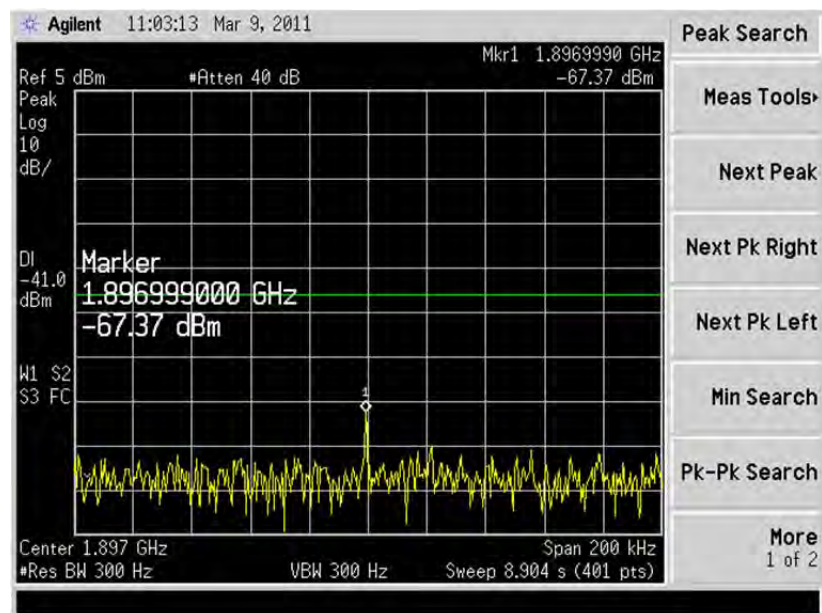


2.2.2.2 UHF Low power (100mW)

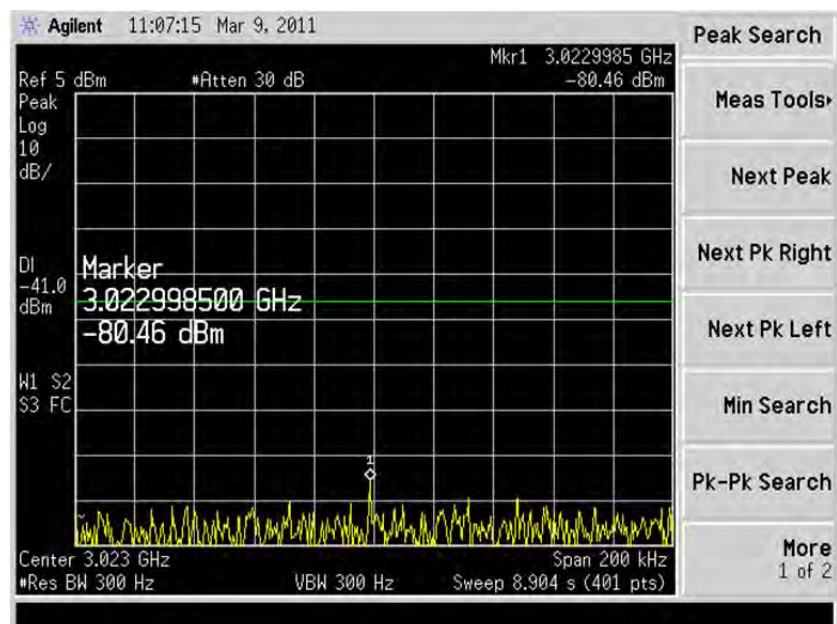
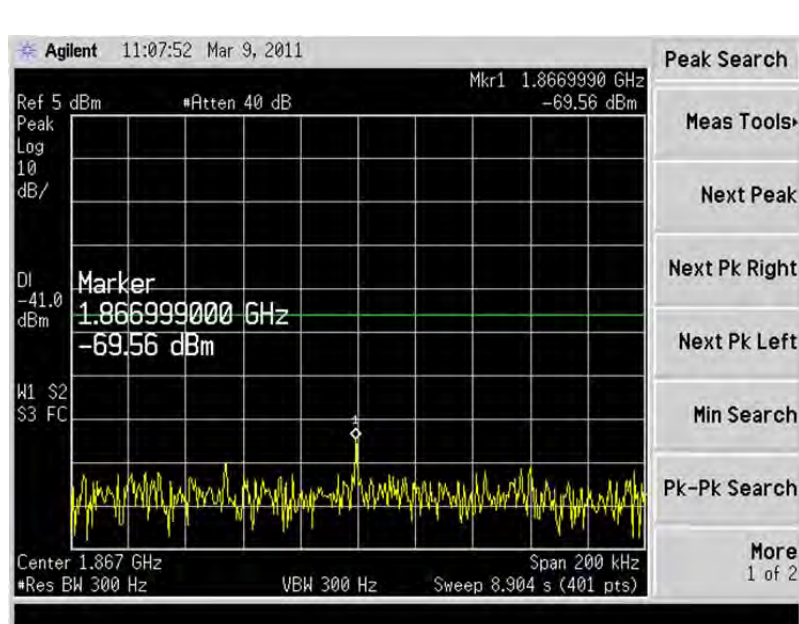
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
518	100mw	1927	-65.7	2963	-70.4



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
548	100mw	1897	-67.4	2993	-70.5



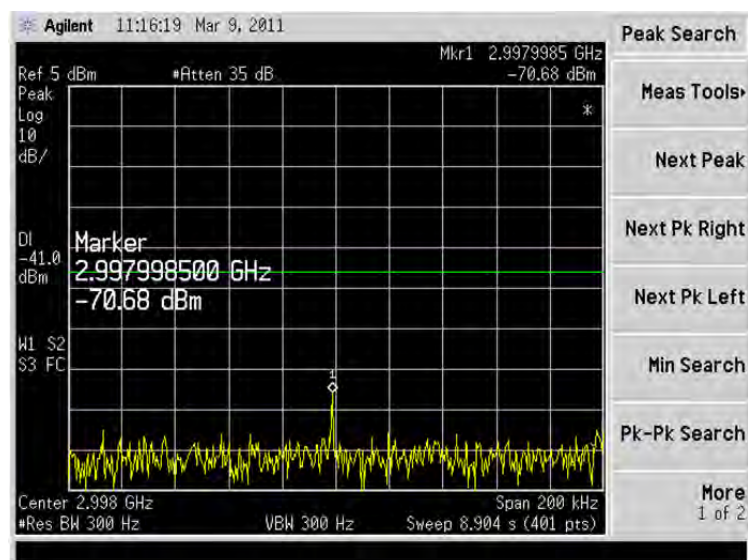
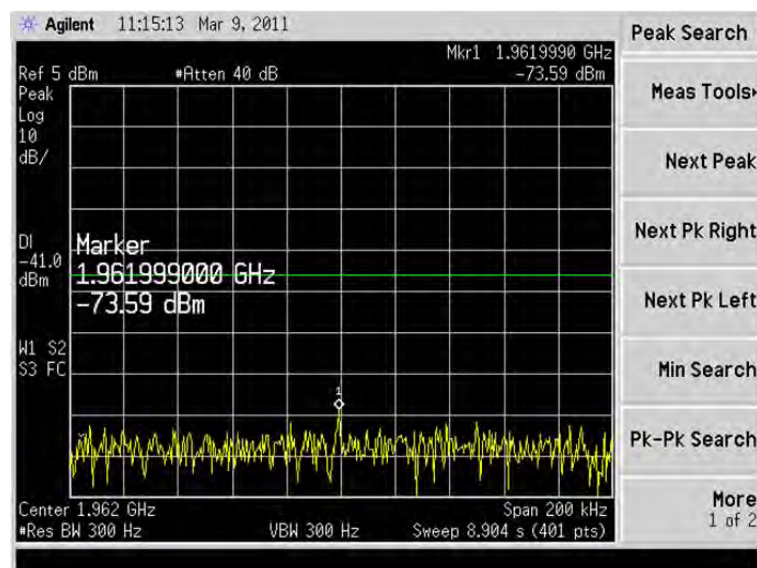
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	100mw	1867	-69.6	3023	-80.5



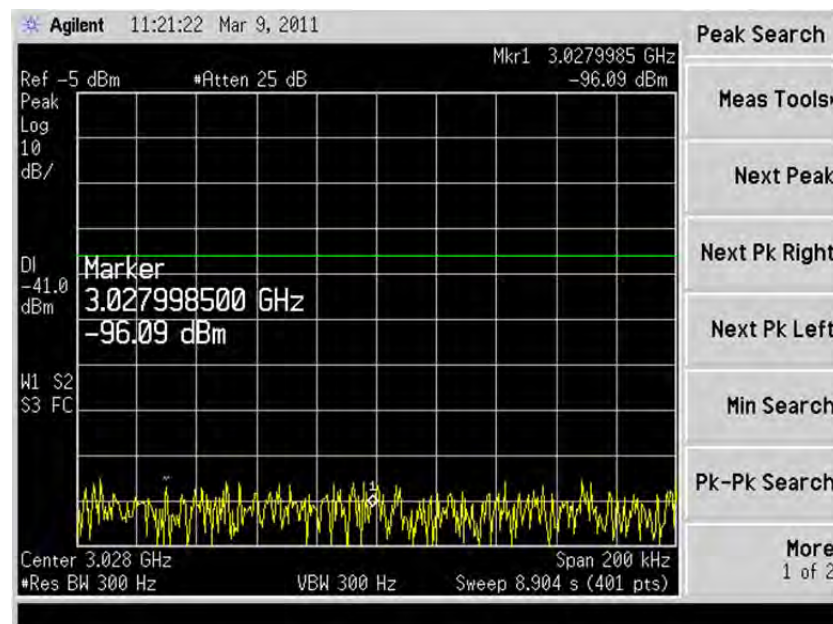
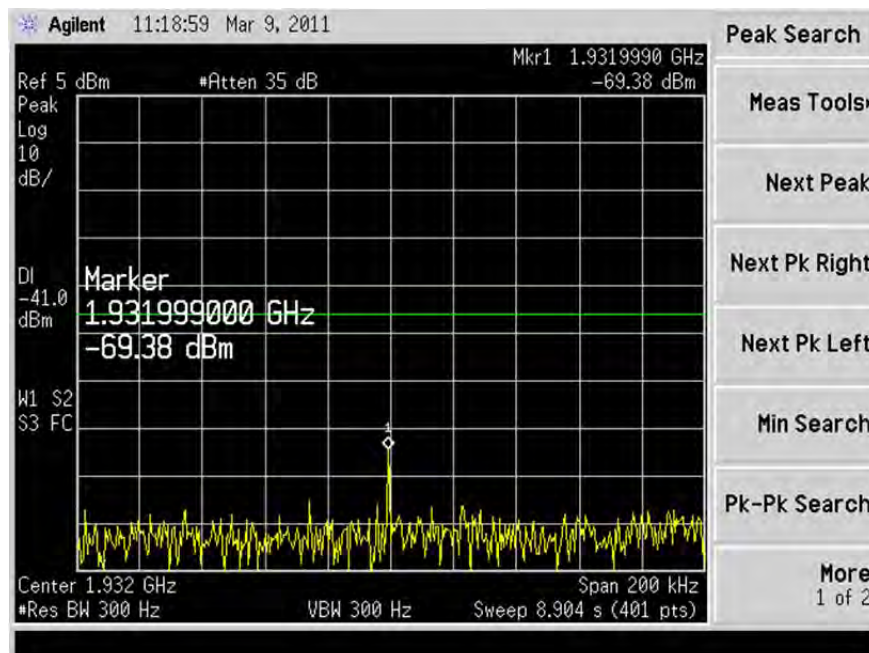
2.2.3 Zigbee high frequency (Channel 26) 2480 MHz

2.2.3.1 UHF Low power (10mW)

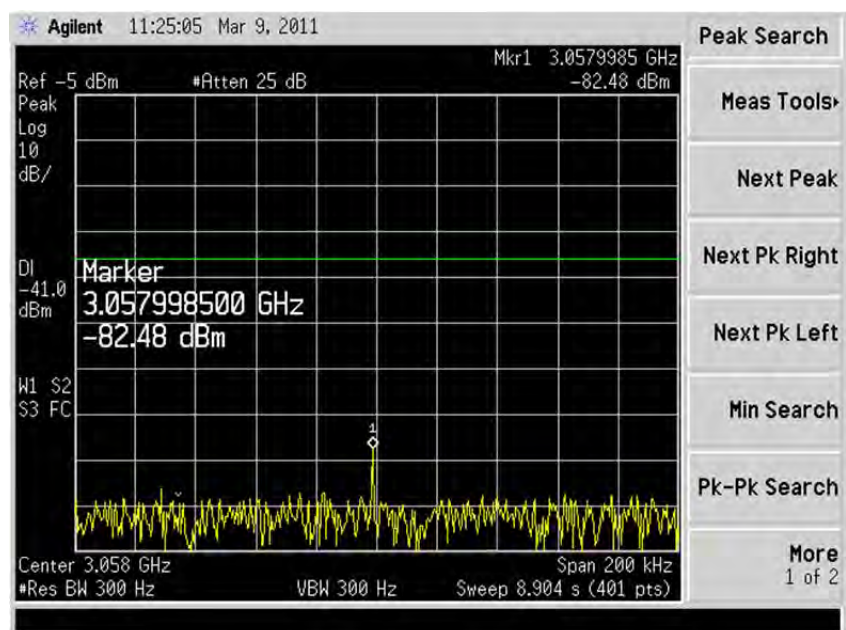
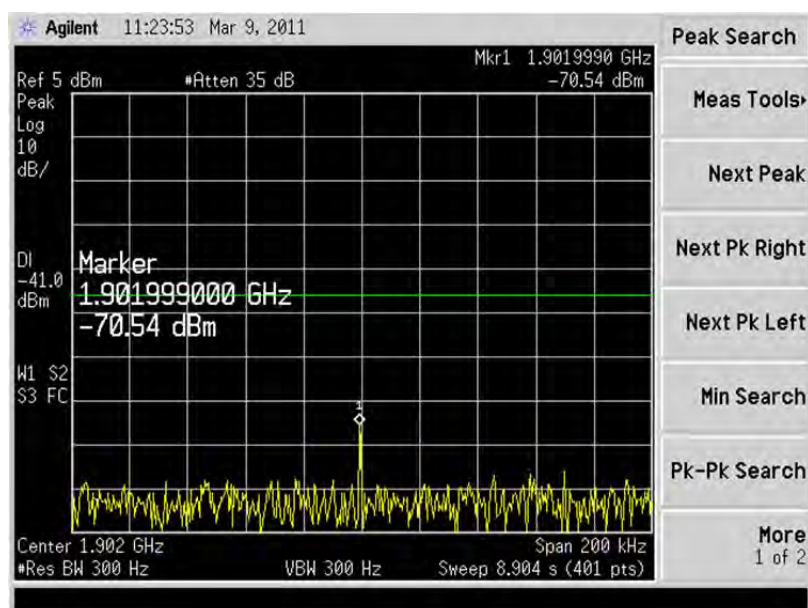
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
518	10mw	1962	-73.6	2998	-70.7



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
548	10mw	1932	-69.4	3027	-90

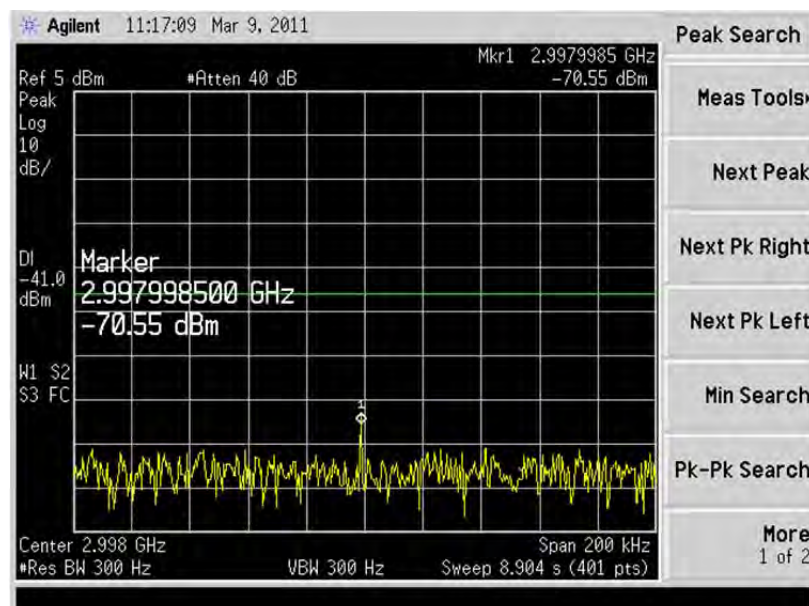
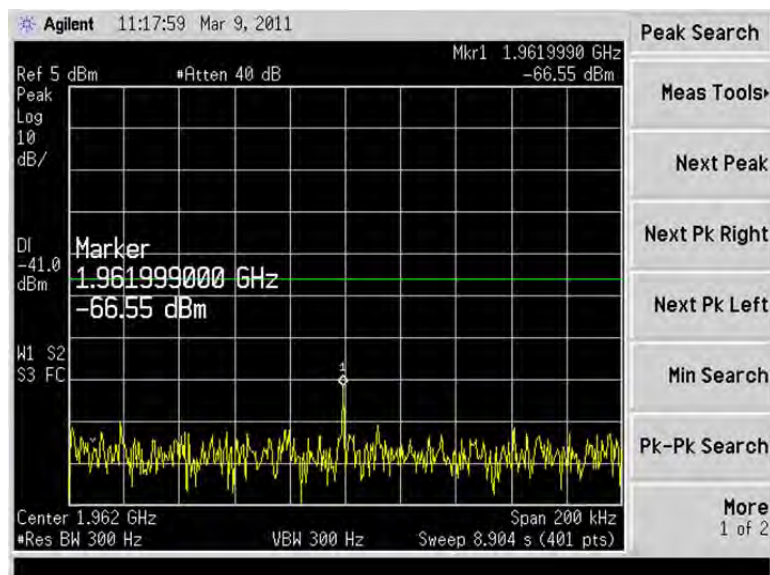


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	10mw	1902	-70.5	-3056	-82.5

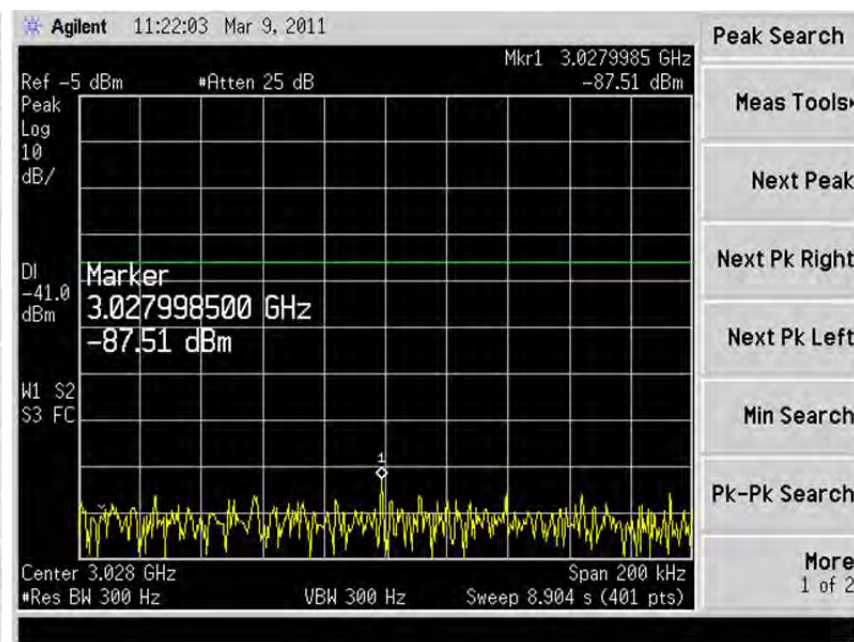
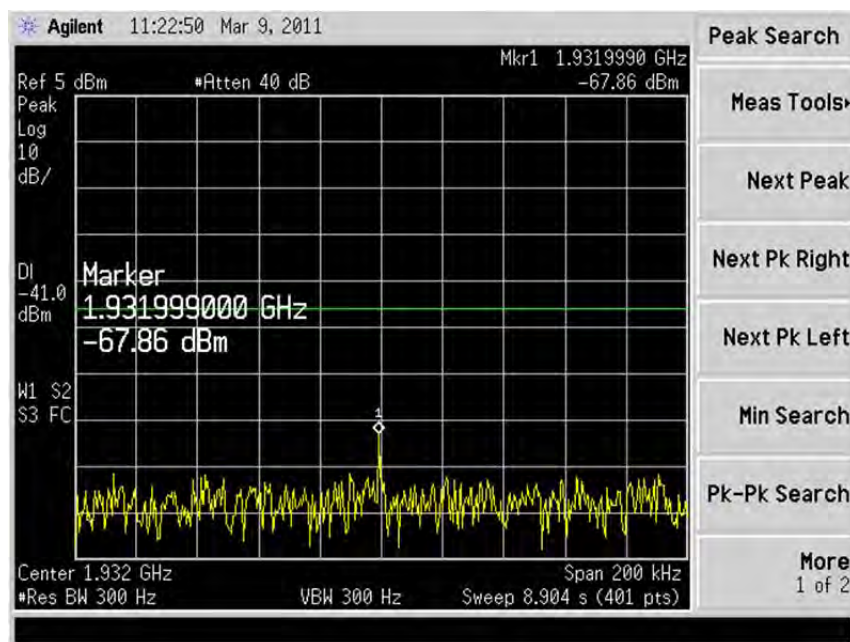


2.2.3.2 UHF Power high (100mW)

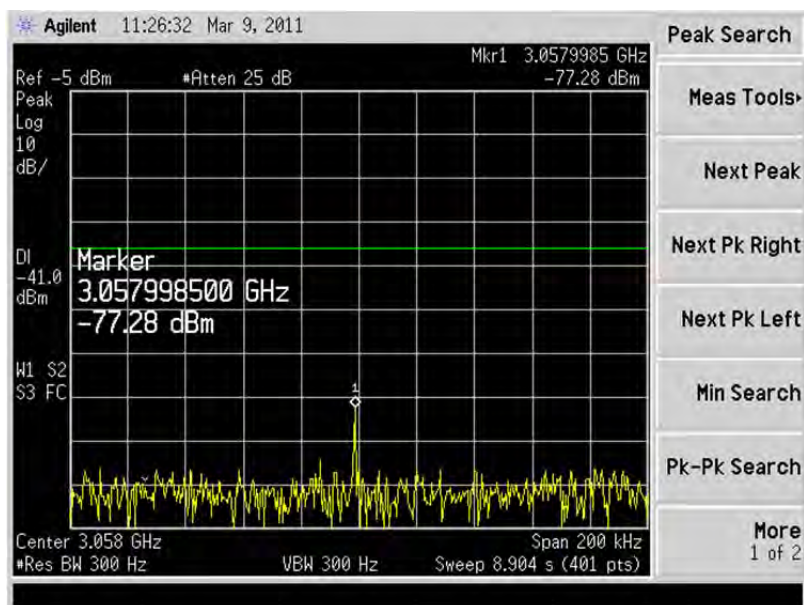
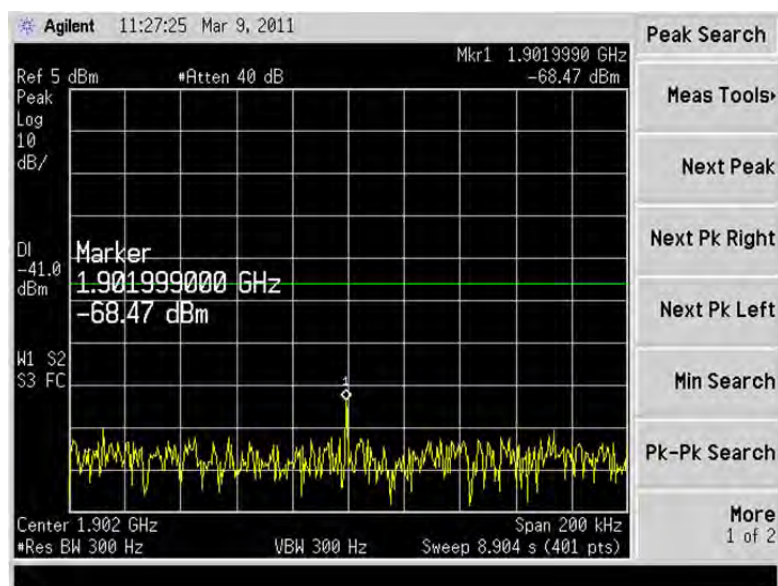
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
518	100mw	1962	-66.5	2998	-70.55



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
548	100mw	19.2	-67.8	3028	-87.5



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	100mw	1901	-68.5	3057	-77.3



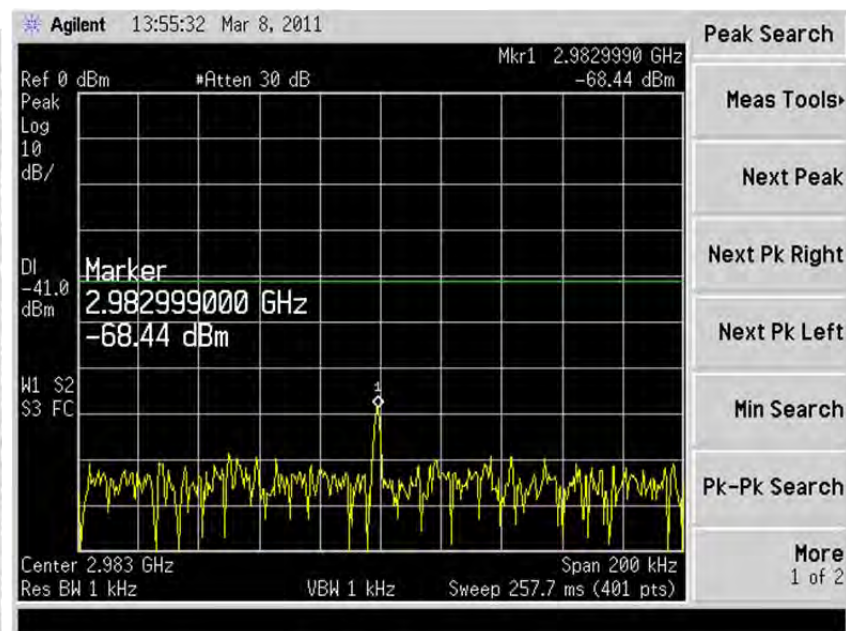
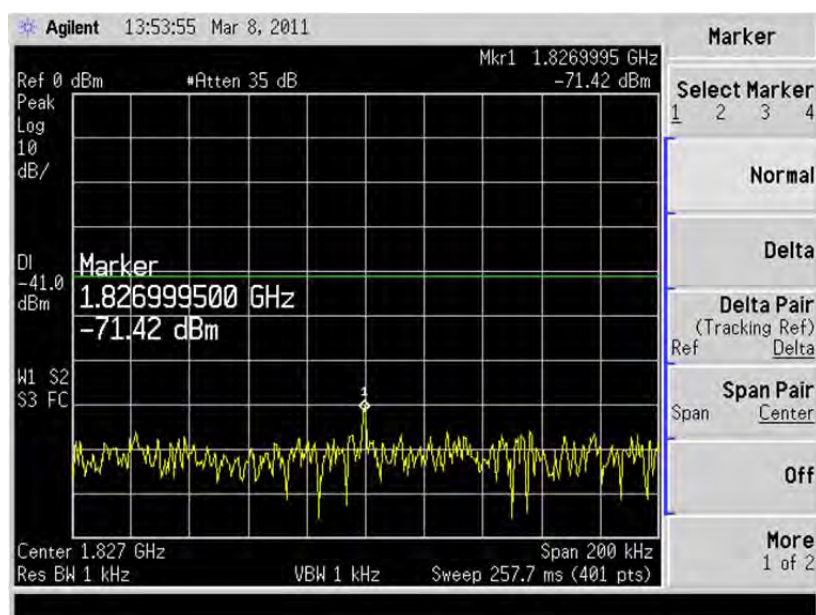
2.3 J5 band (578-638 MHz) UHF-Zigbee IMD

		UHF Freq (MHz)	Zb freq (MHz)	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
UHF Low Power	Zigbee Low band	578	2405	1827	-70	2983	-70
		607	2405	1798	-68	3012	-80
		638	2405	1767	-71	3043	-83
	Zigbee mid band	578	2445	1867	-70	3023	-76.8
		607	2445	1838	-71	3052	-82.8
		638	2445	1807	-93	3083	-118
	Zigbee high band	578	2480	1902	-71.3	3058	-79.4
		607	2480	1873	-72.5	3087	-87.6
		638	2480	1842	-72.6	3118	-88.44
UHF High Power	Zigbee Low band	578	2405	1827	-62.4	2983	-63
		607	2405	1798	-64.2	3012	-72
		638	2405	1767	-66	3043	-77.8
	Zigbee mid band	578	2445	1867	-66.2	3023	-73.4
		607	2445	1838	-66.6	3052	-77.8
		638	2445	1807	-93	3083	-118
	Zigbee high band	578	2480	1902	-61.44	3058	-73.4
		607	2480	1873	-65.6	3087	-79.7
		638	2480	1842	-64	3118	-85.4

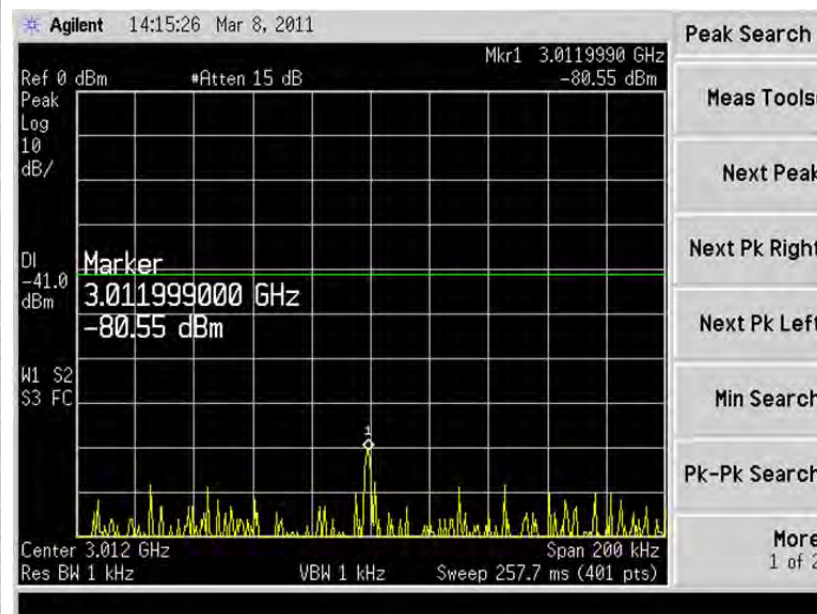
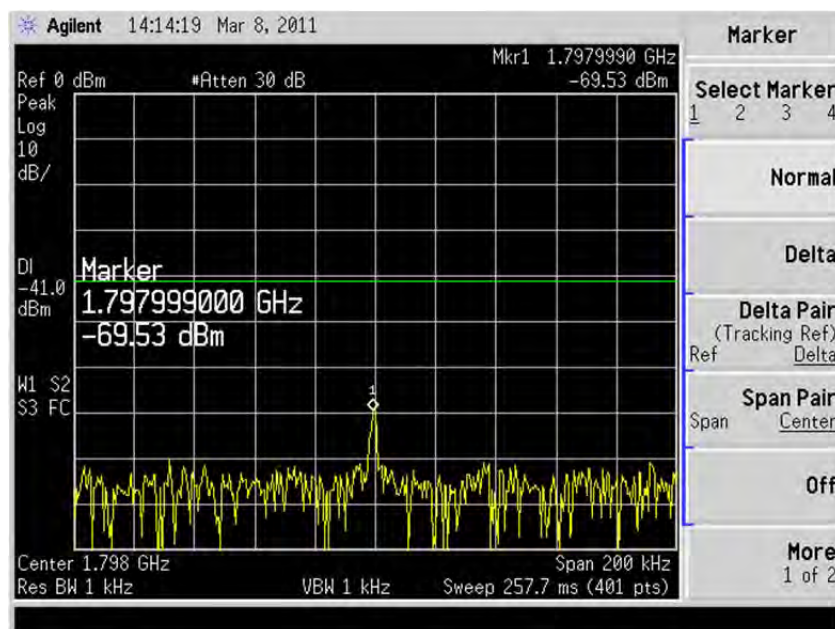
2.3.1 Zigbee low frequency (Channel 11) 2405 MHz

2.3.1.1 UHF Low power (10mW)

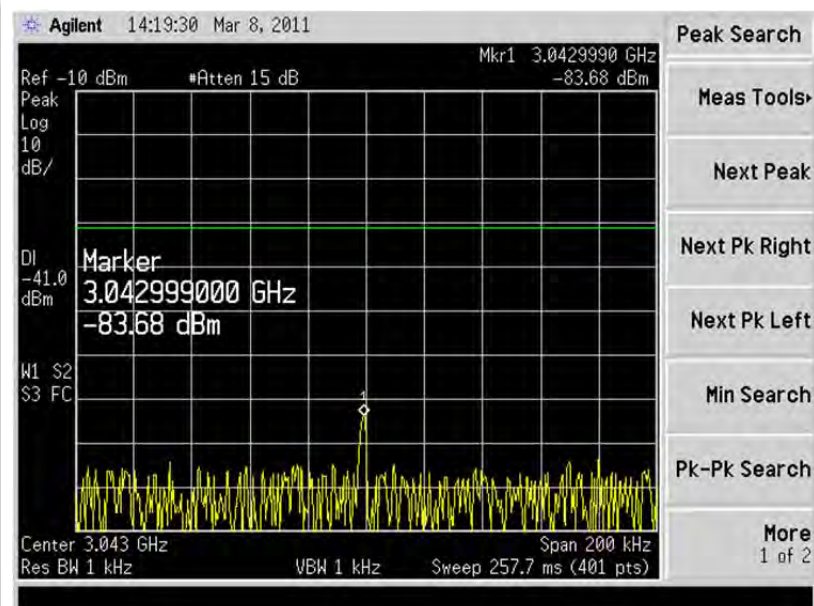
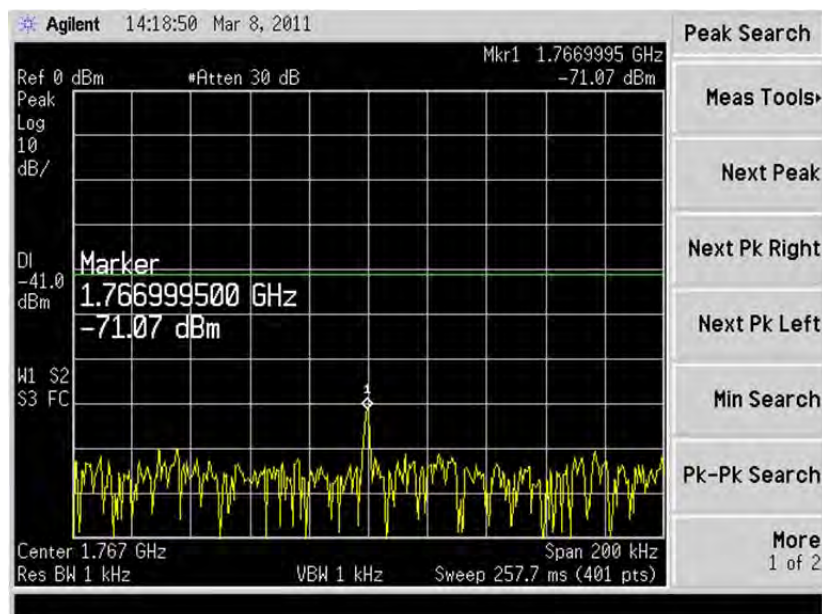
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	10mw	1827	-71.4	2983	-68.4



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
607	10mw	1978	-69.5	3012	-80

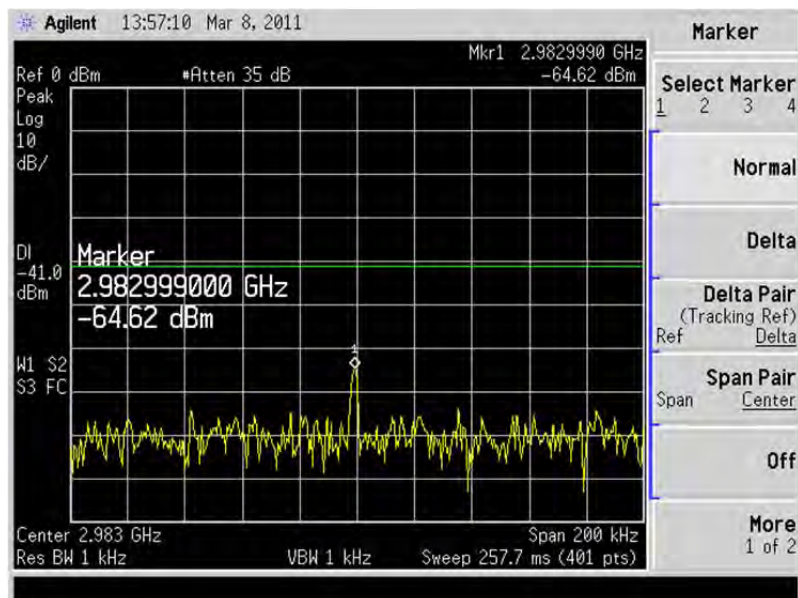
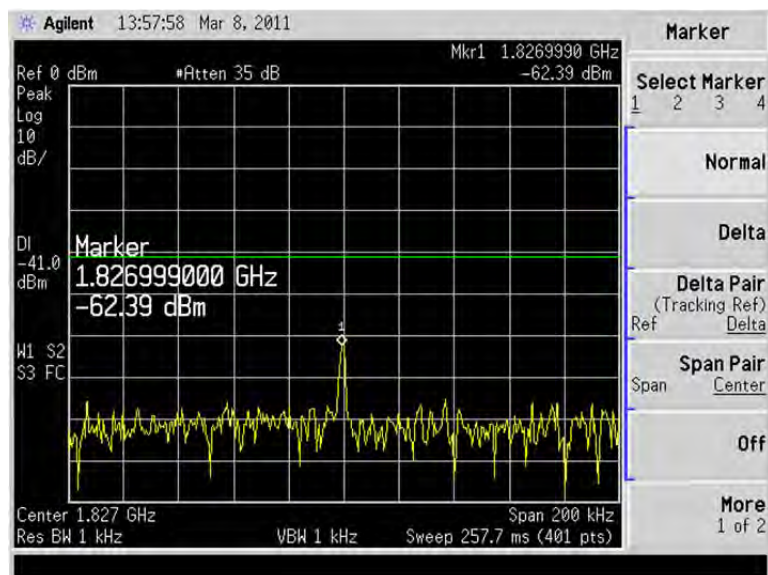


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	10mw	1767	-71	3043	-83.7

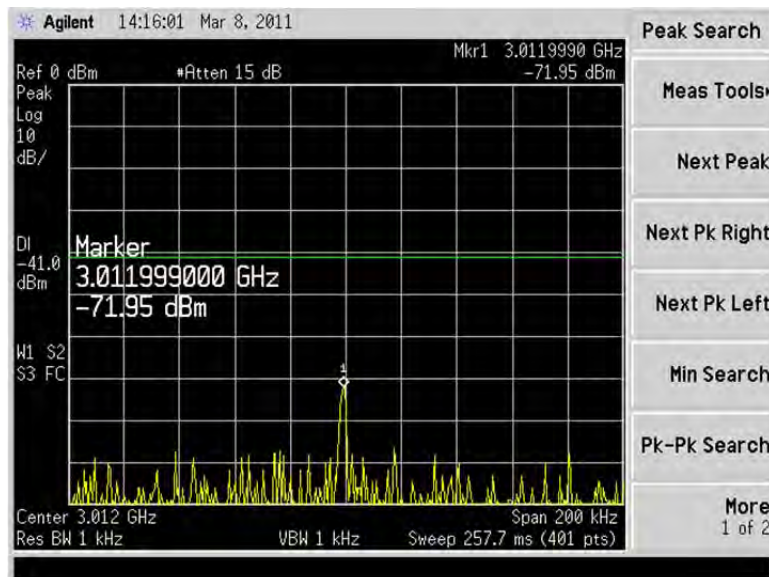
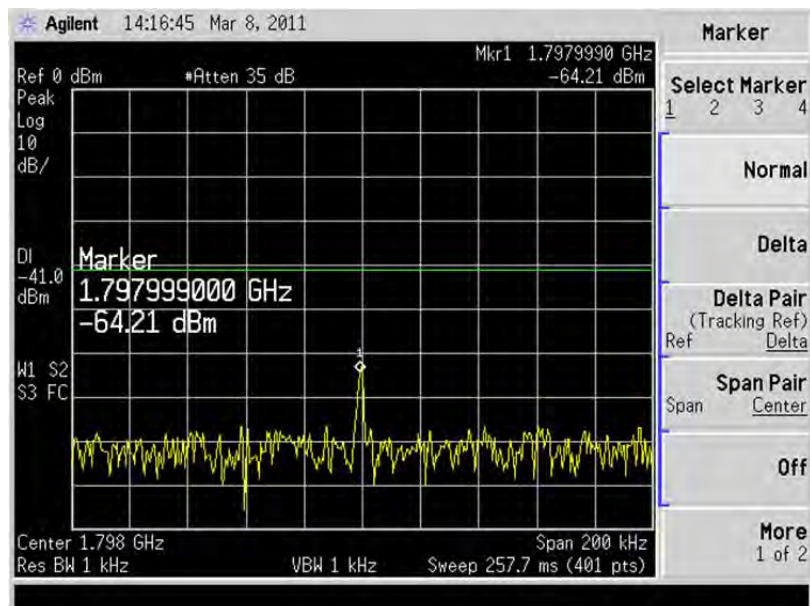


2.3.1.2 UHF Power (100 mW)

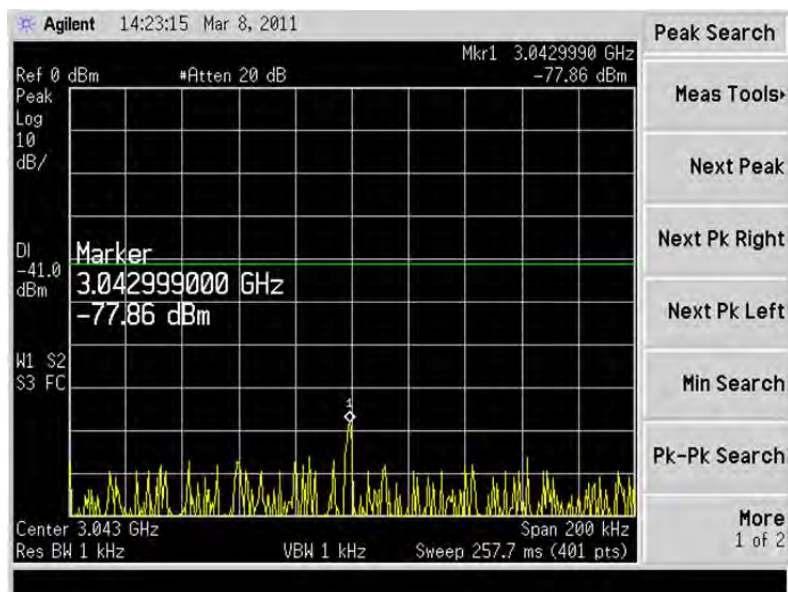
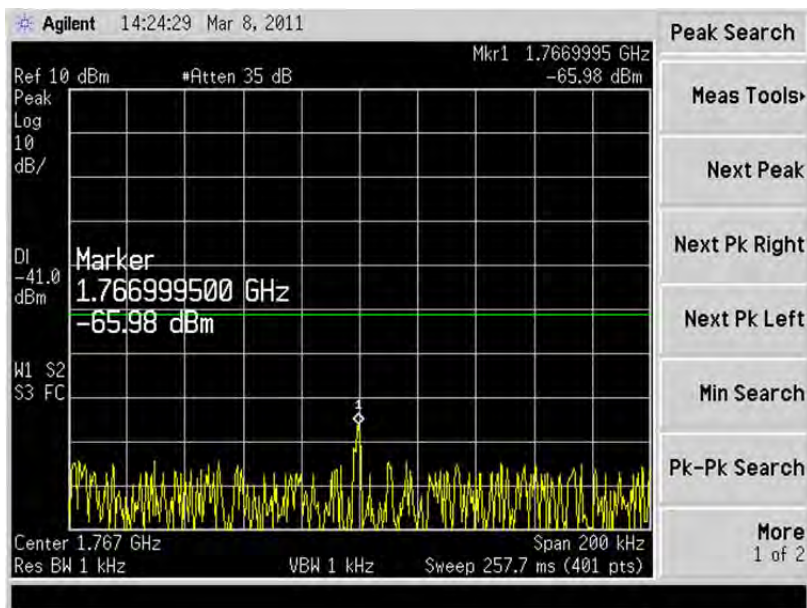
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	100mw	1827	-62.4	2983	-64.6



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
607	100mw	1798	-64.2	3012	-71.9



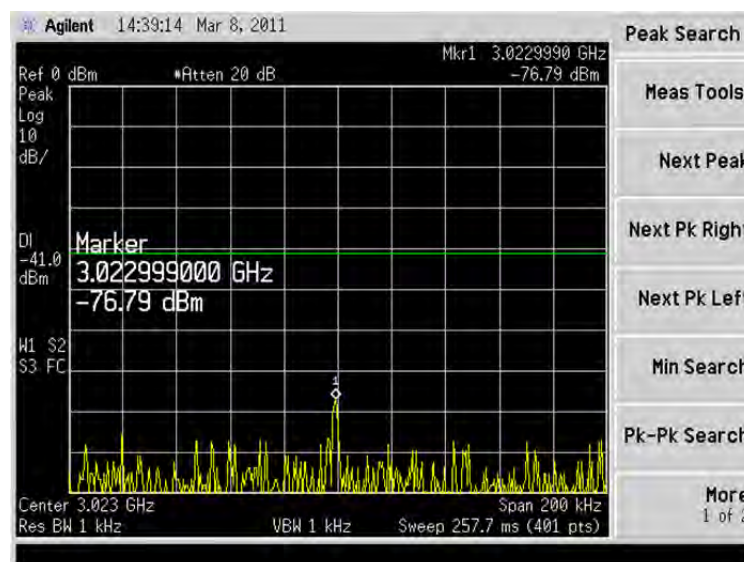
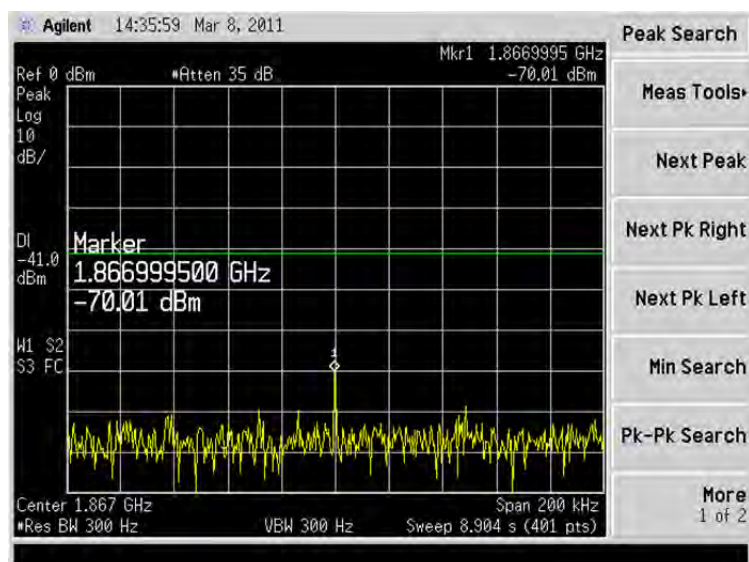
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	100mw	1767	-65.9	3024	-77.8



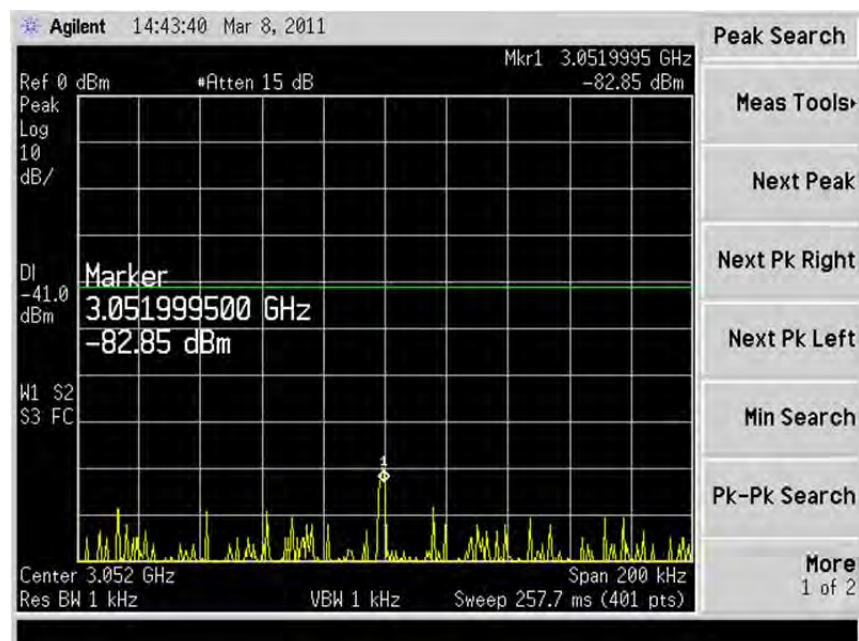
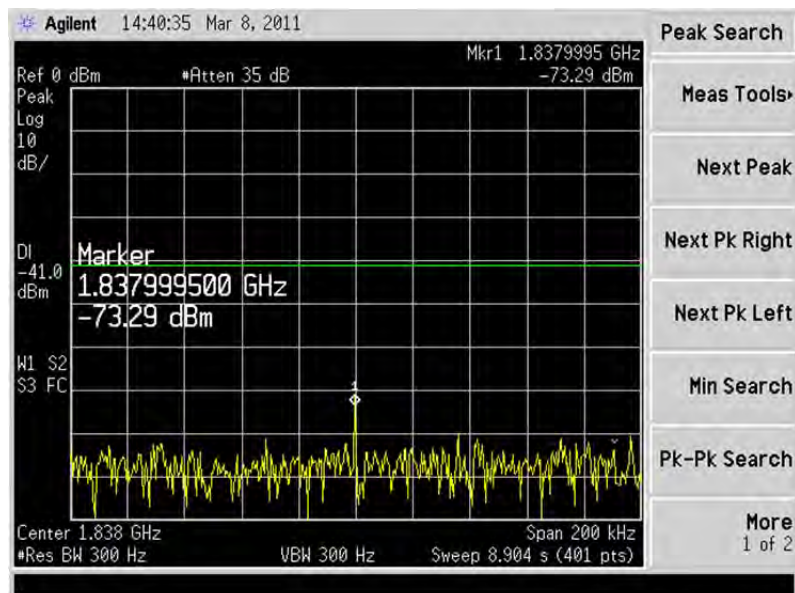
2.3.2 Zigbee mid frequency (Channel 19) 2445 MHz

2.3.2.1 UHF low power (10mW)

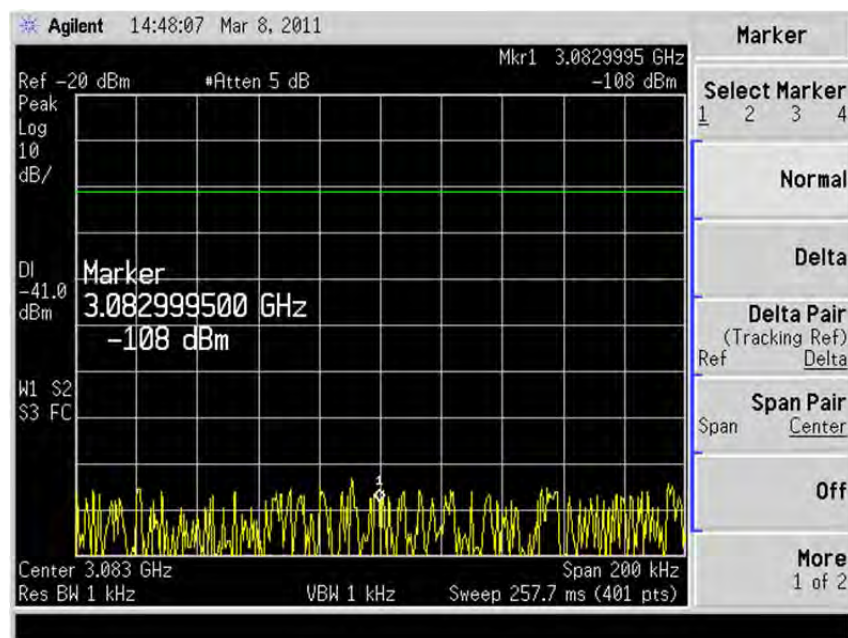
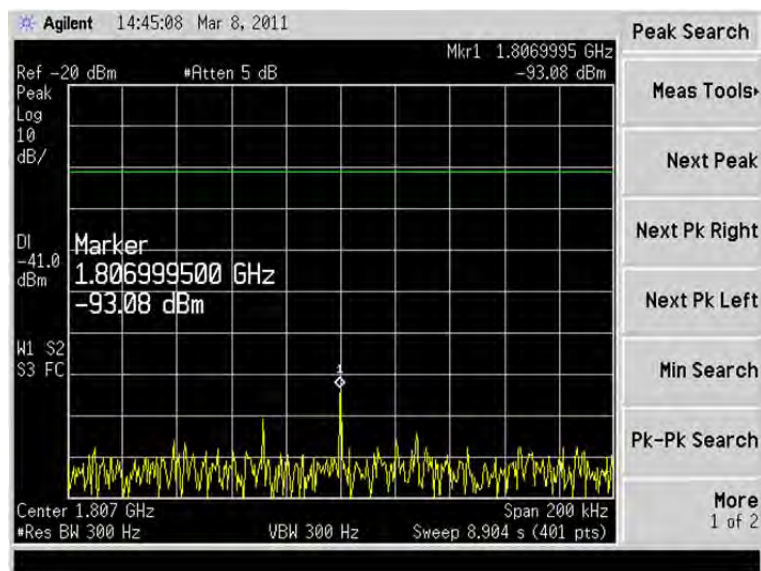
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	10mw	1867	-70	3023	-76.7



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
607	10mw	1838	-73.3	3052	-82.8

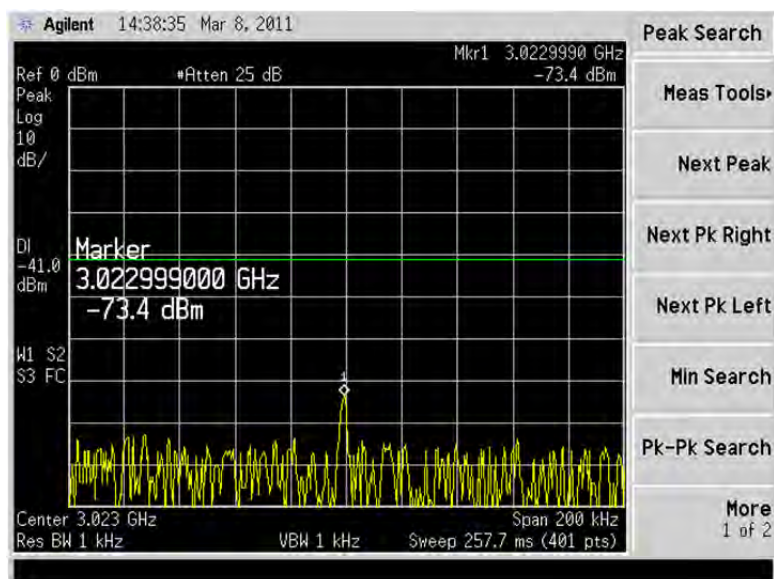
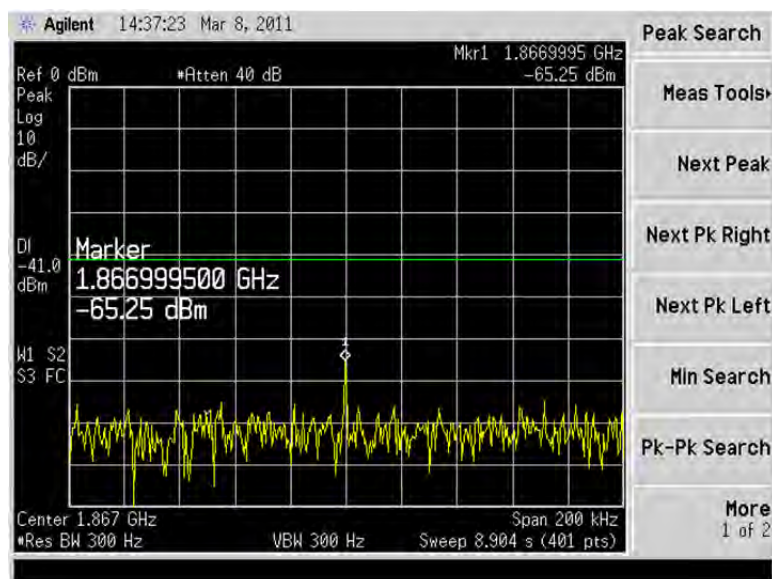


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	10mw	1807	-93	3083	-108

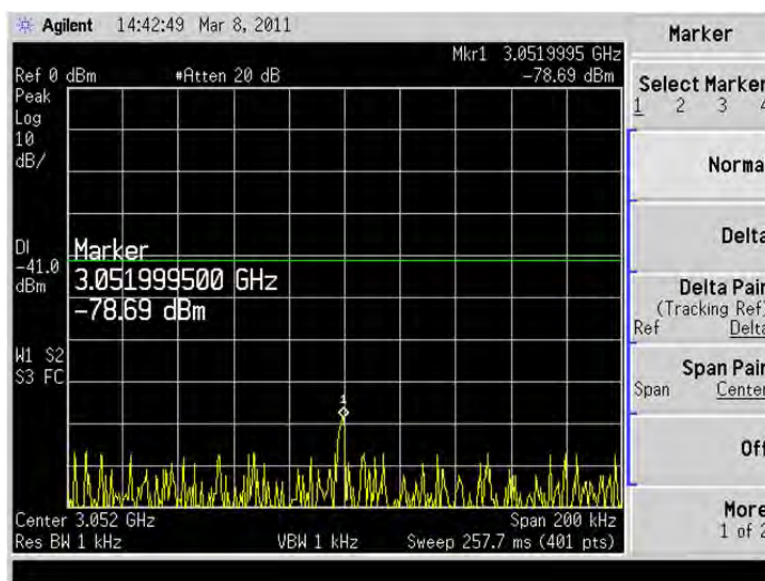
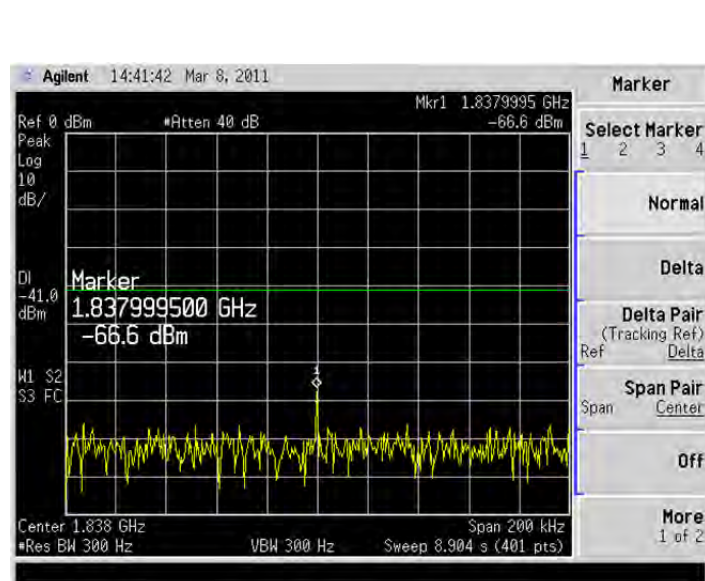


2.3.2.2 UHF power high 100mW

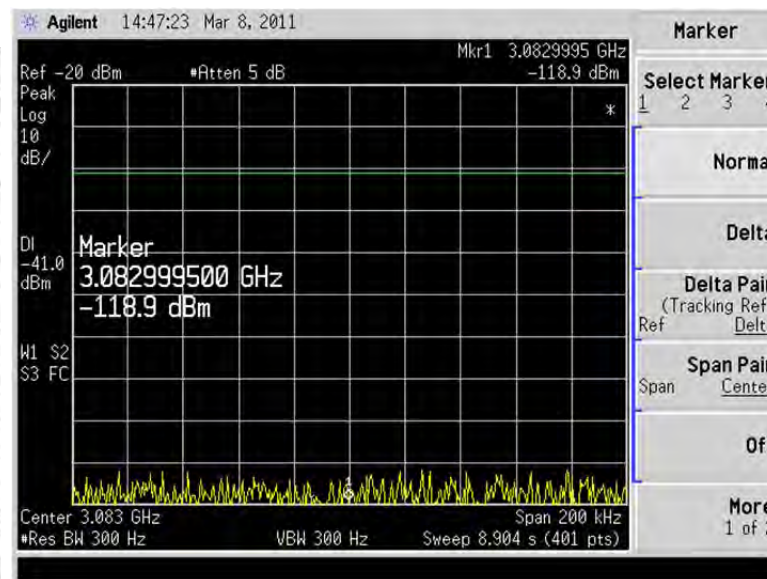
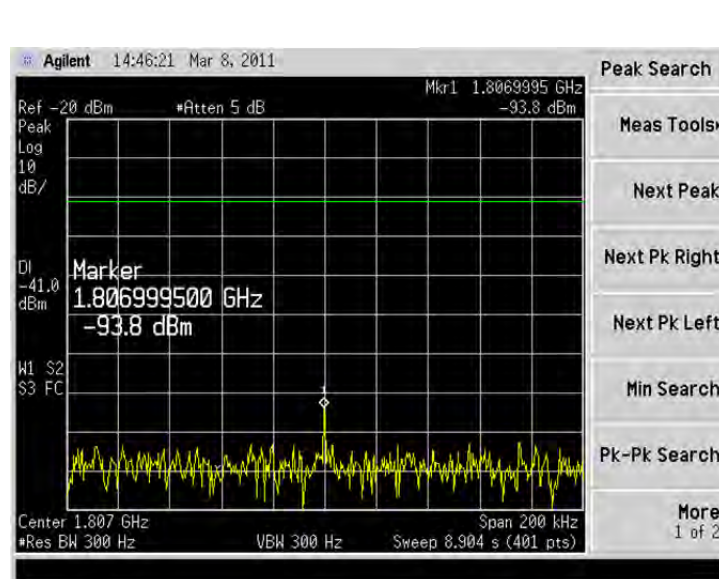
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	100mw	1867	-65.2	3023	-73



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
607	100mw	1838	-71	3052	-82.8



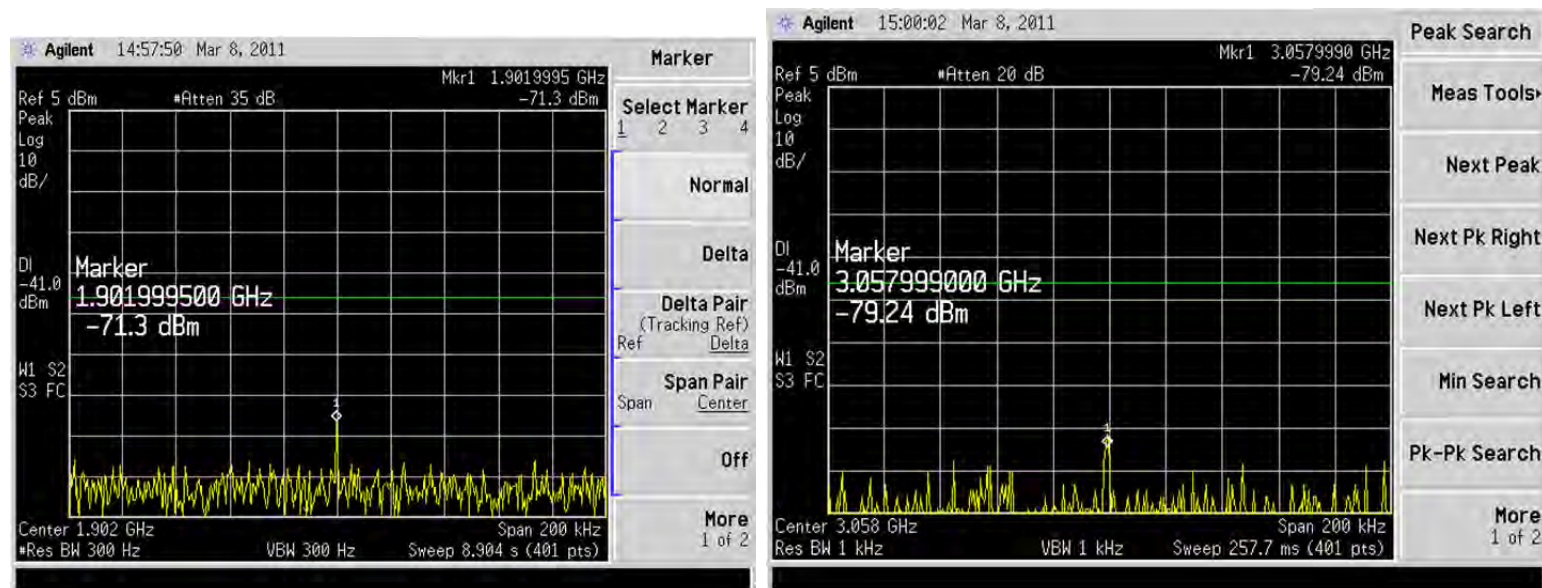
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	100mw	1807	-93	3083	-118



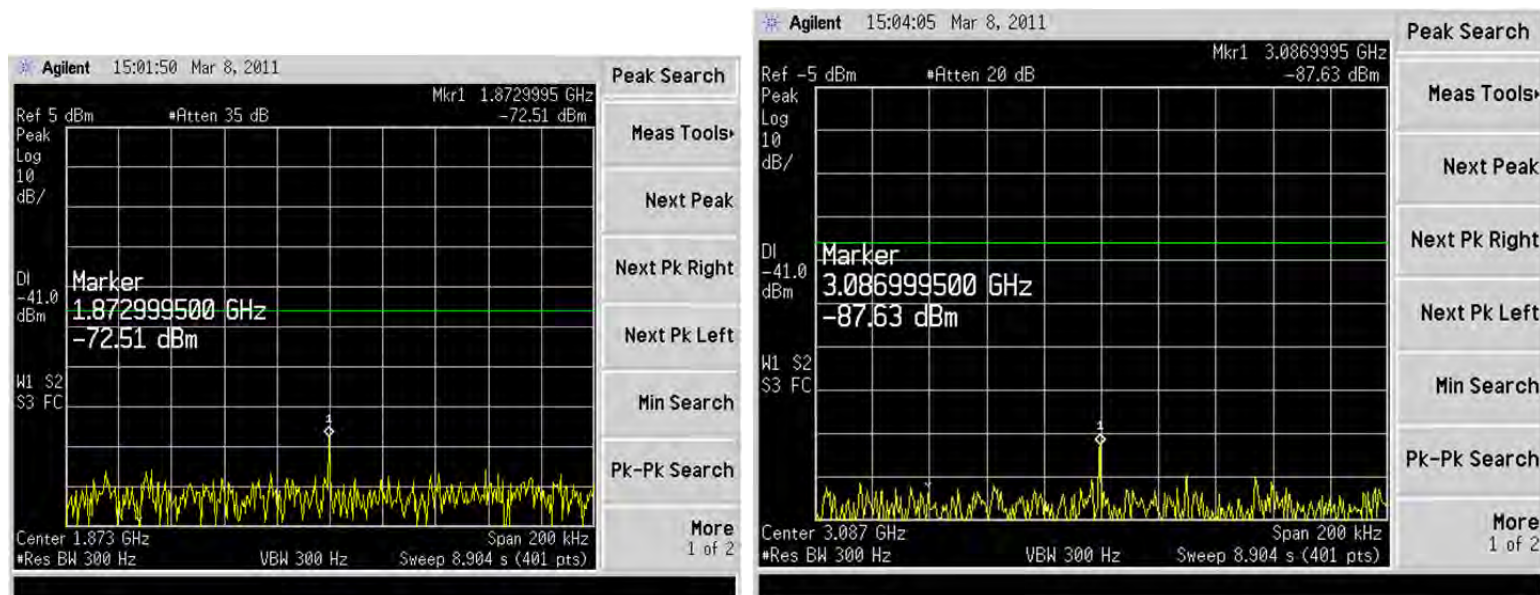
2.3.3 Zigbee high frequency (Channel 26) 2480 MHz

2.3.3.1 UHF power 10mW

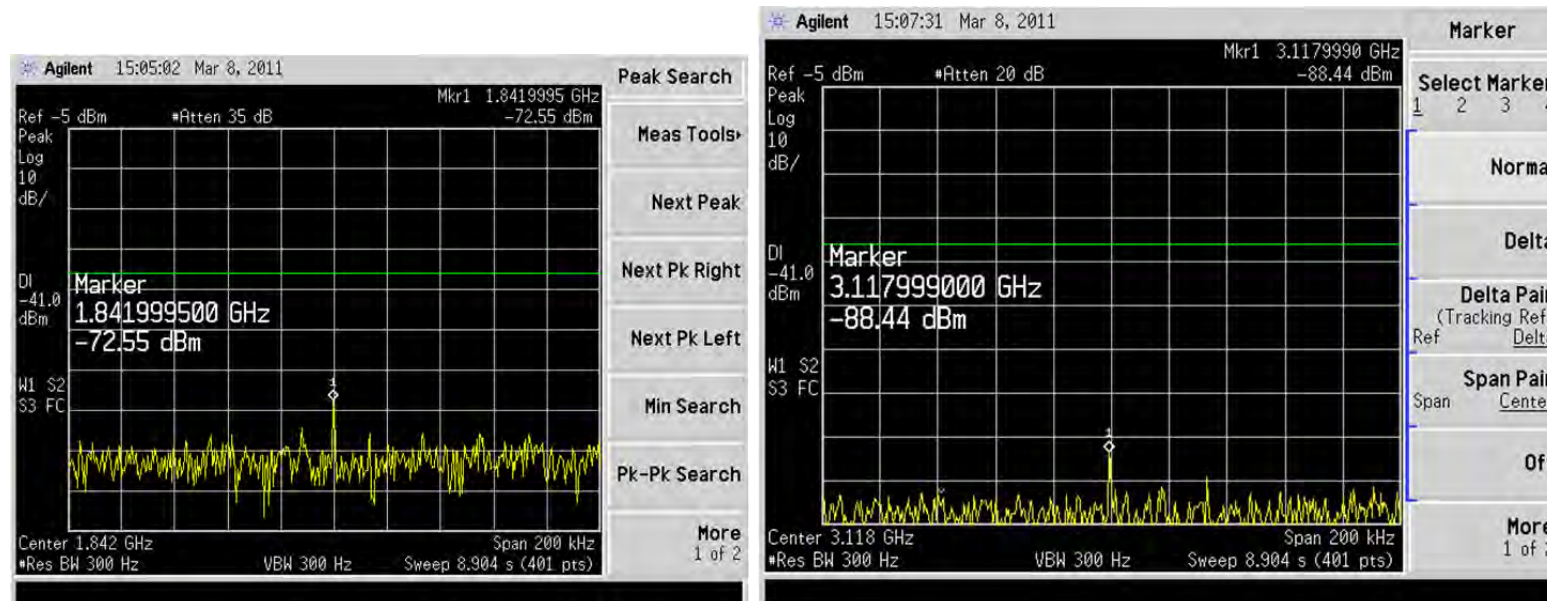
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	10mw	1902	-71.3	3058	-79.2



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
607	10mw	1873	-72.5	3087	-87

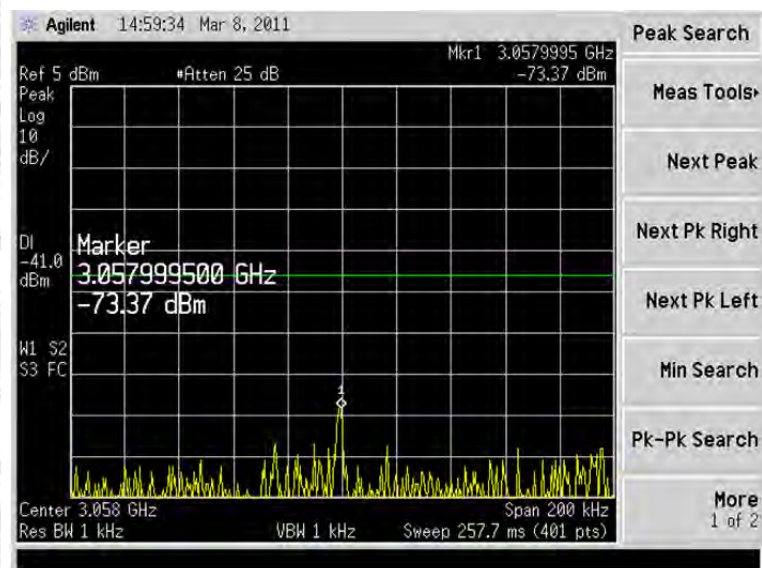
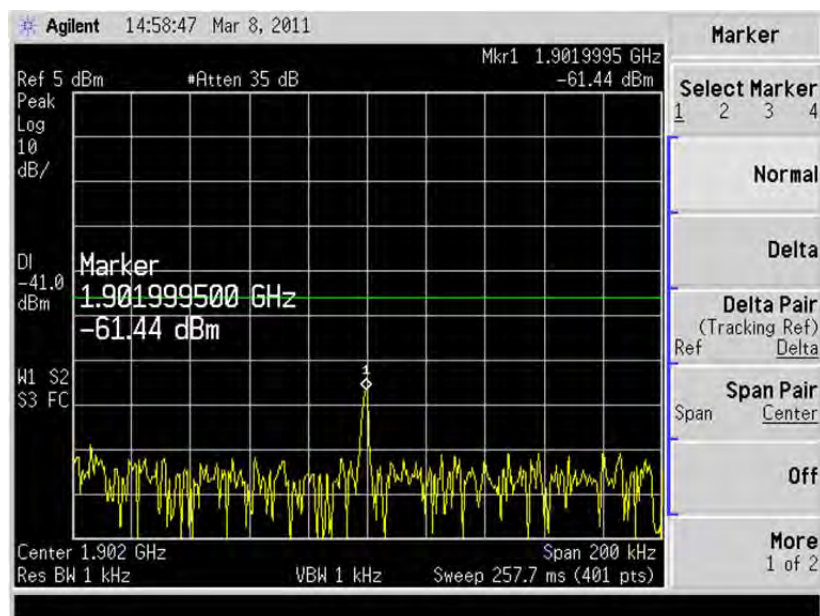


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	10mw	1842	-72.5	3118	-88.4

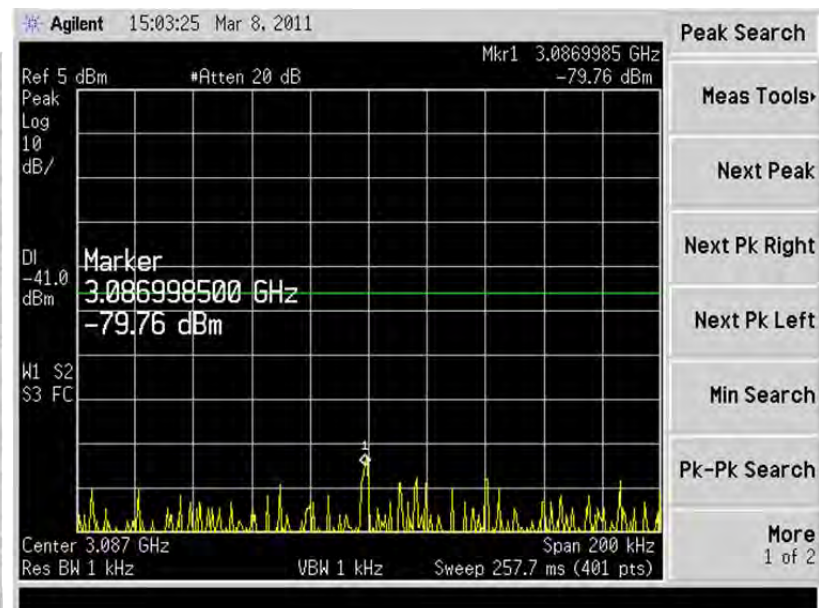
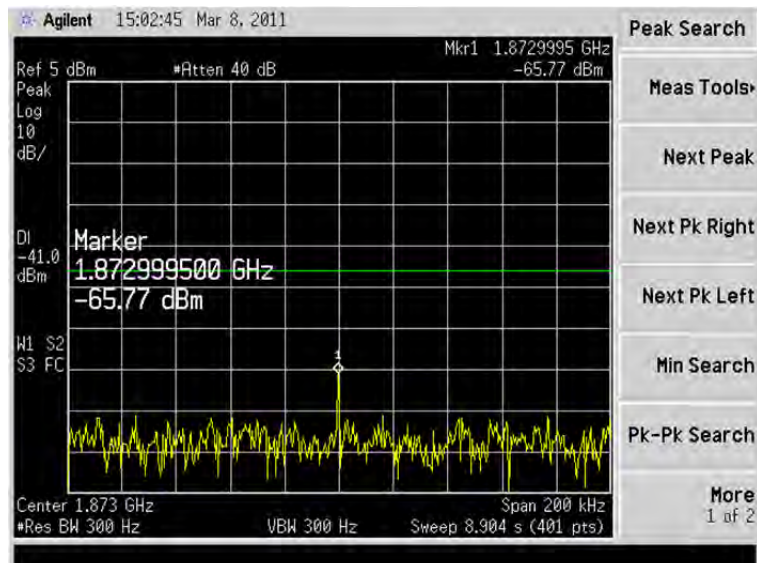


2.3.3.2 UHF power high 100mW

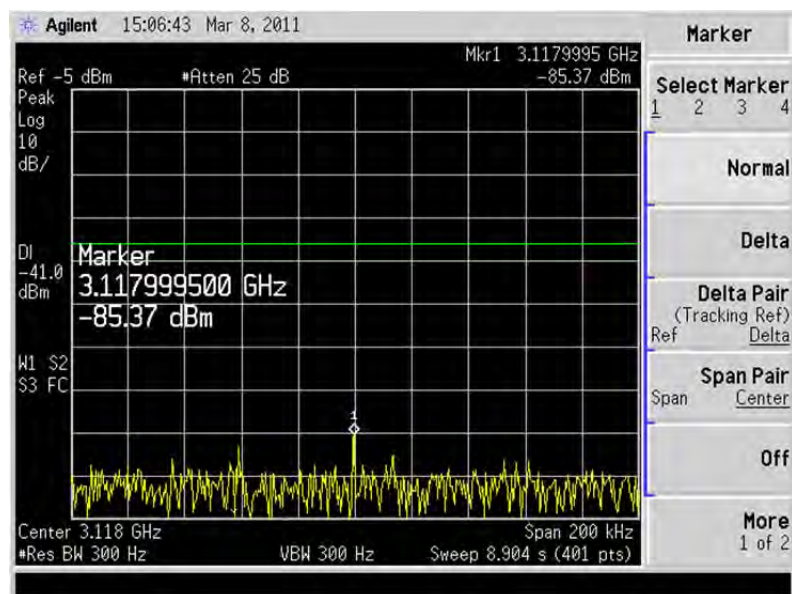
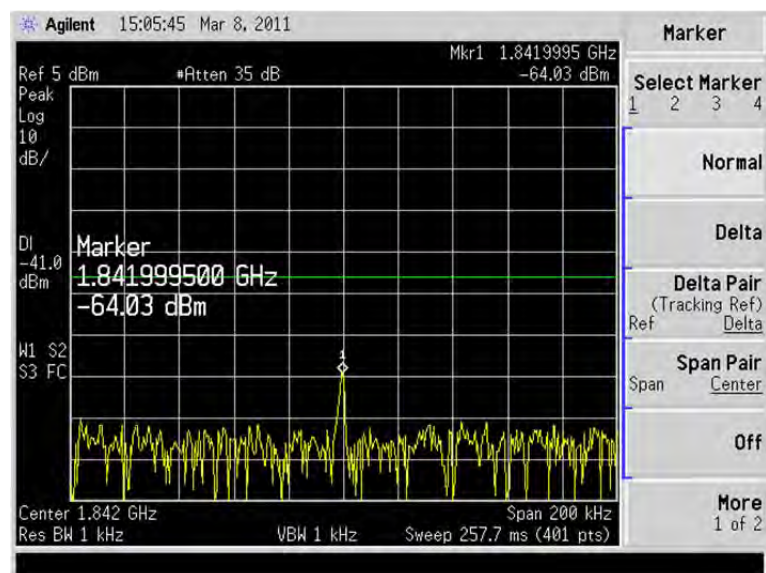
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
578	100mw	1902	-61.4	3058	-73



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
607	100mw	1873	-65.8	3087	-79.7



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	100mw	1842	-64	3118	-85.4



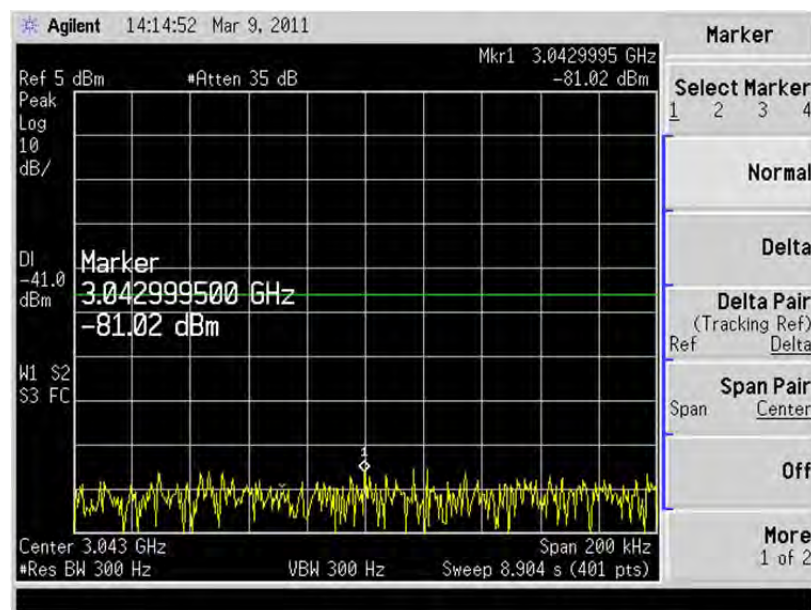
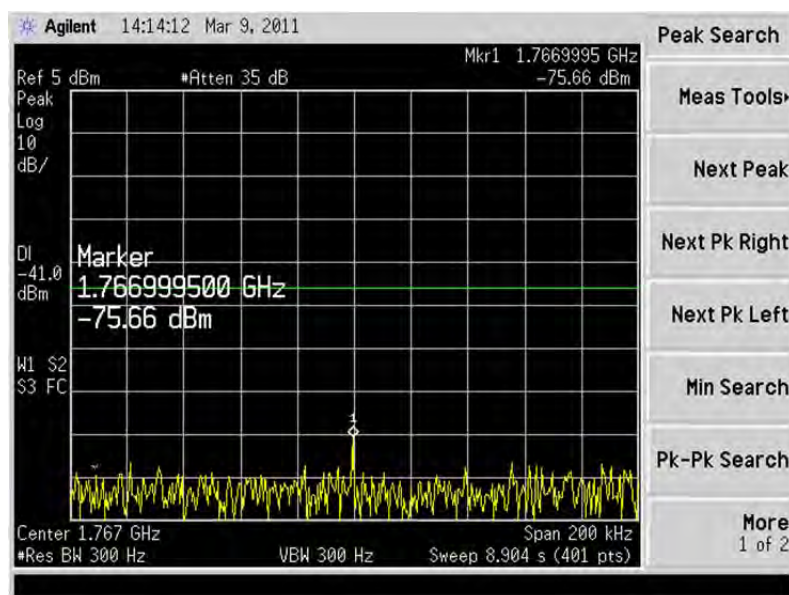
2.4 L3 band 638-698 MHz UHF- Zigbee IMD

		UHF Freq (MHz)	Zb freq (MHz)	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
UHF Low Power	Zigbee Low band	638	2405	1767	-74	3043	-81.02
		668	2405	1737	-74.1	3073	-94.2
		698	2405	1707	-76.6	3103	-89
	Zigbee mid band	638	2445	1807	-74.5	3083	-95
		668	2445	1777	-73.6	3113	-86
		698	2445	1747	-77	3143	-88
	Zigbee high band	638	2480	1842	-75.6	3118	-89
		668	2480	1812	-73.4	3148	-86.4
		698	2480	1782	-75.8	3178	-88
UHF High Power	Zigbee Low band	638	2405	1767	-70.33	3043	-84.2
		668	2405	1737	-70.4	3073	-81.9
		698	2405	1707	-69.6	3103	-90
	Zigbee mid band	638	2445	1807	-69.8	3083	-94
		668	2445	1777	-71.2	3113	-86
		698	2445	1747	-71.2	3143	-90
	Zigbee high band	638	2480	1842	-70.46	3118	-89
		668	2480	1812	-68.4	3148	-86
		698	2480	1782	-70.2	3178	-88

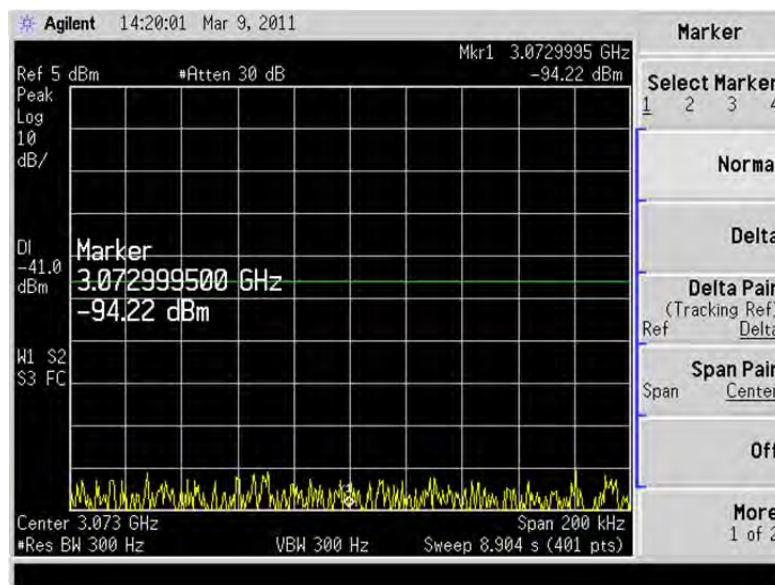
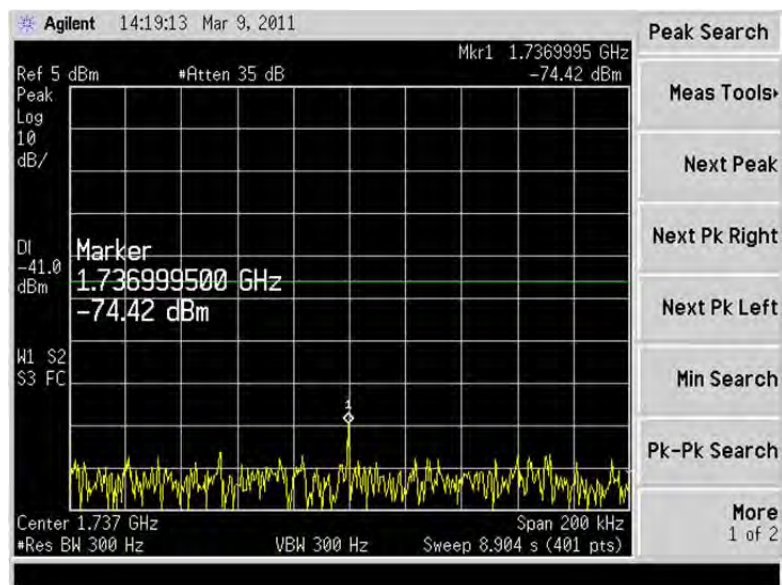
2.4.1 Zigbee low frequency (Channel 11) 2405 MHz

2.4.1.1 UHF low power 10mW

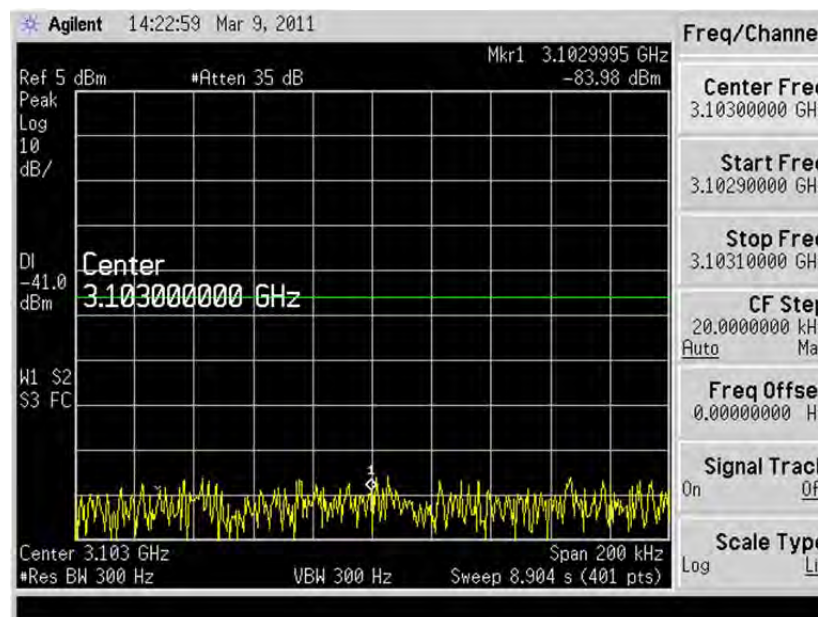
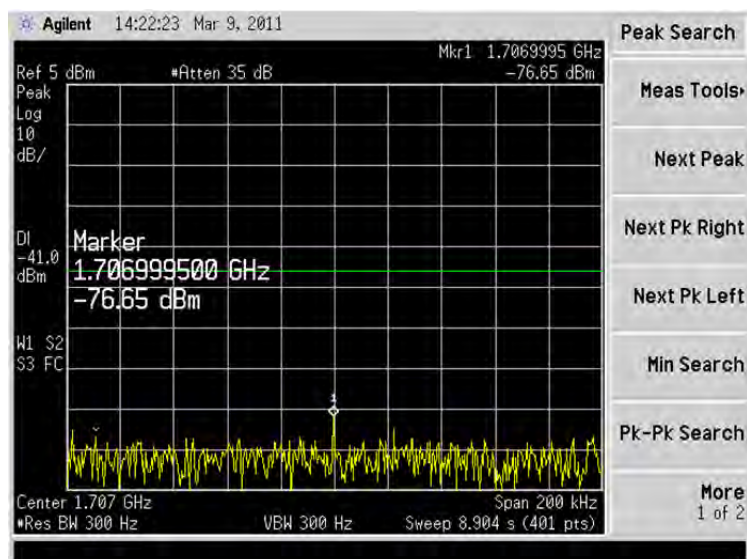
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	10mw	1767	-75.6	3043	-81



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
668	10mw	1737	-74	3073	-94

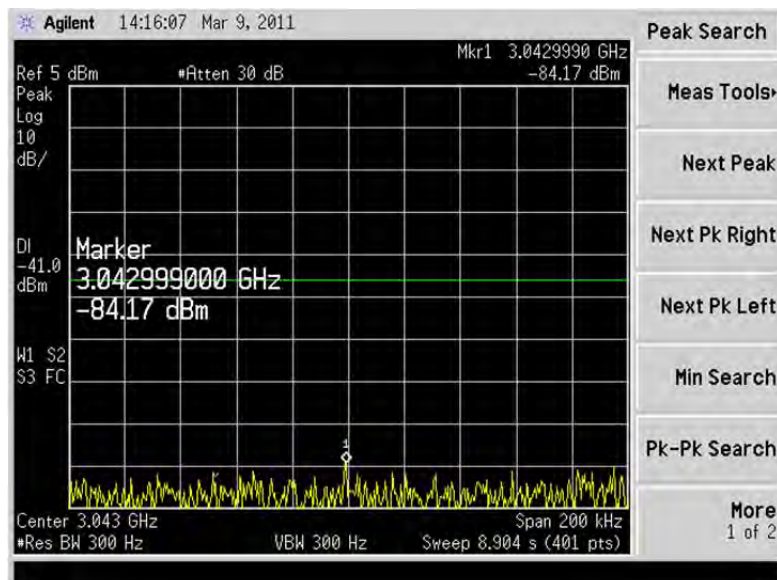
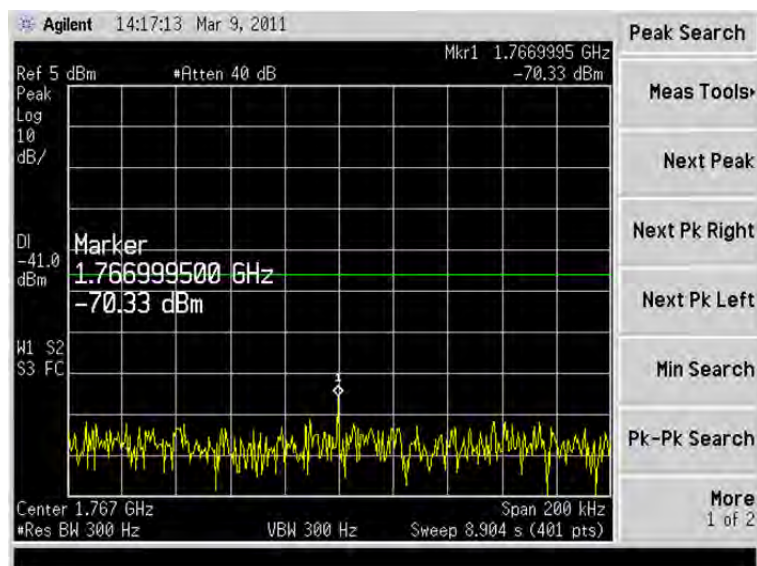


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
698	10mw	1707	-76.6	3103	-84

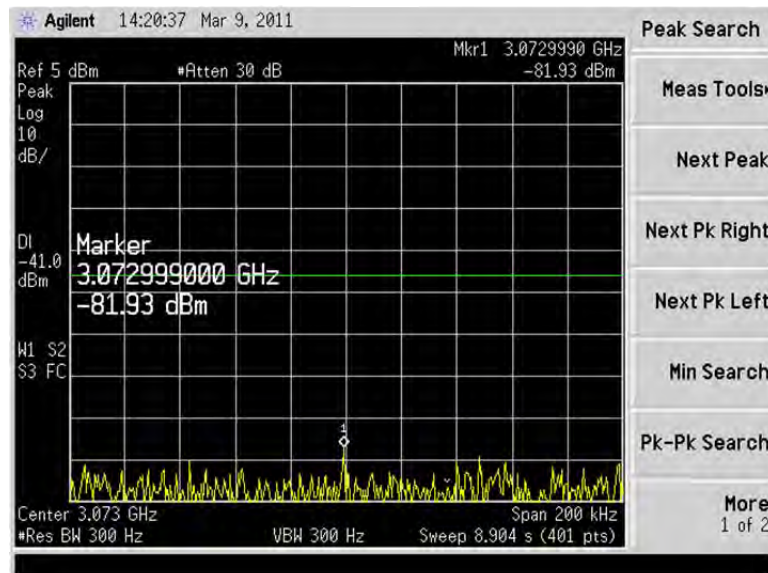
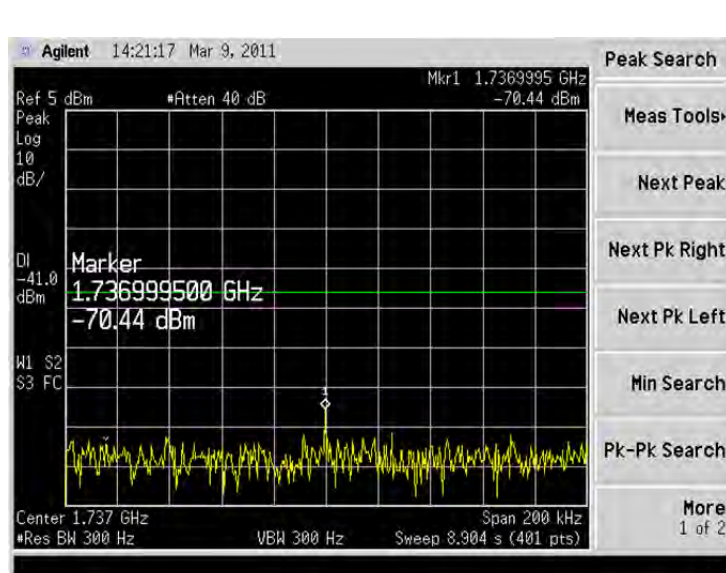


2.4.1.2 UHF high power 100mW

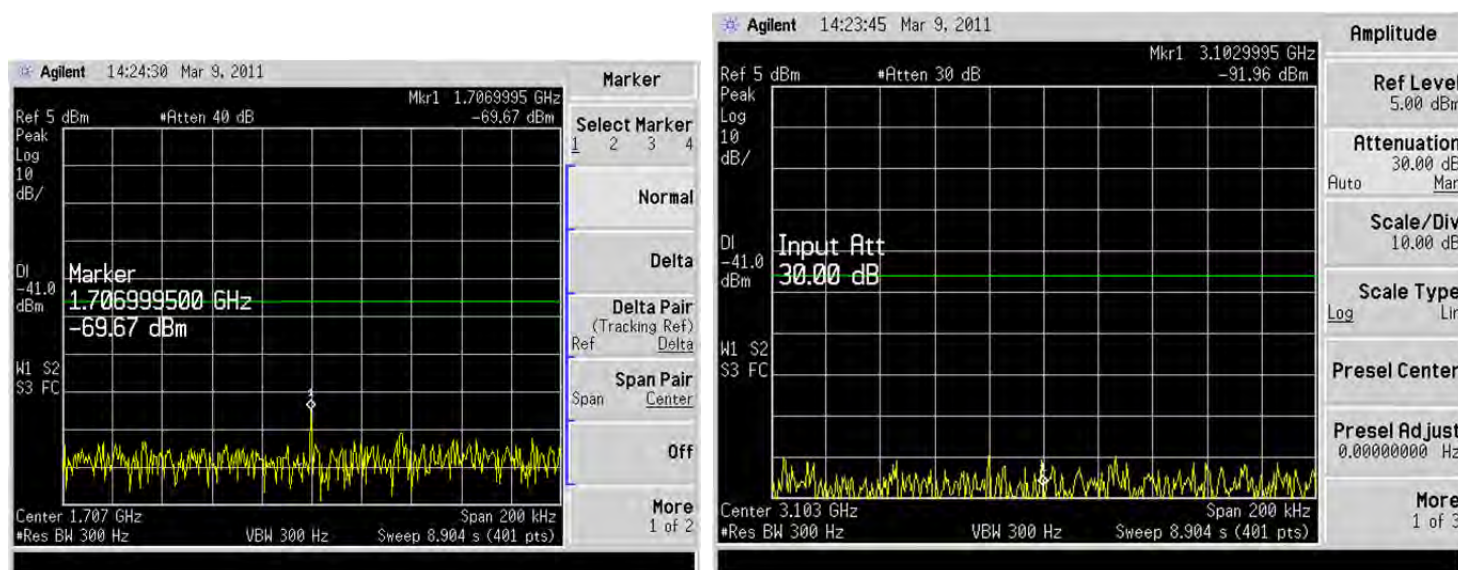
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	100mw	1767	-70.3	3043	-84



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
668	100mw	1737	-70.4	3073	-81



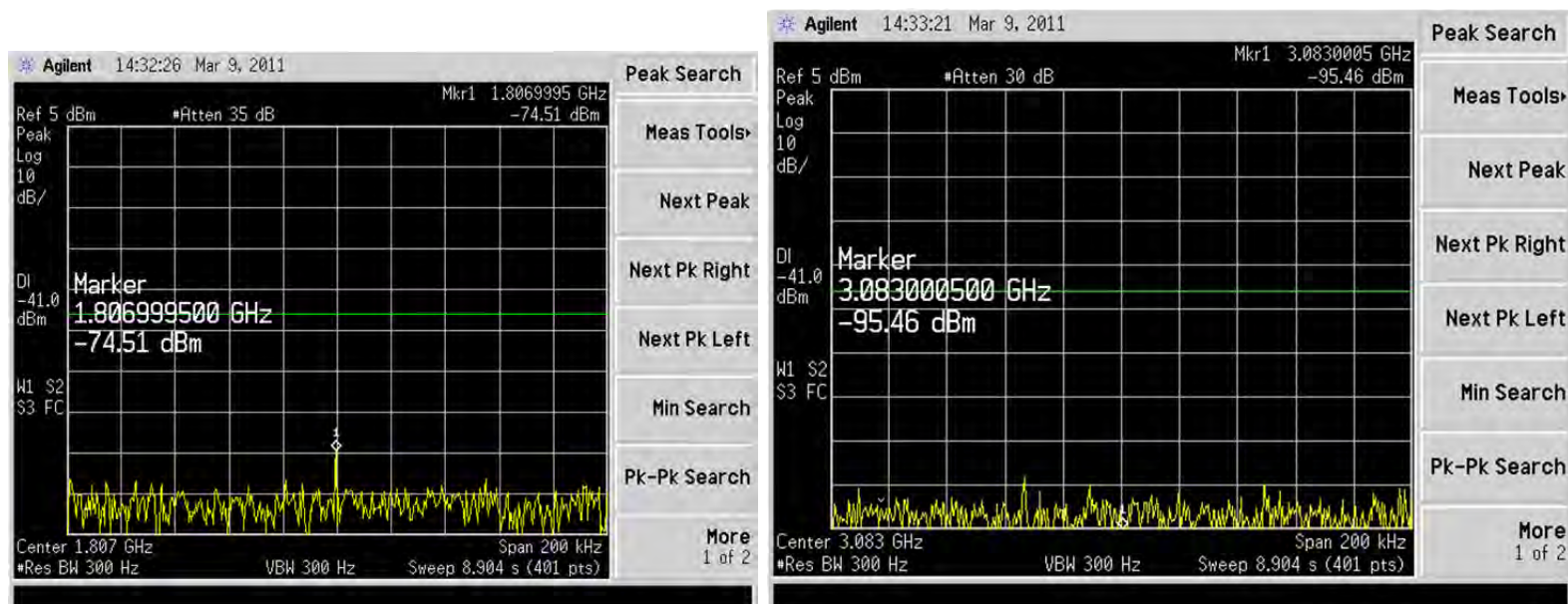
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
668	100mw	1707	-69.7	3103	-91



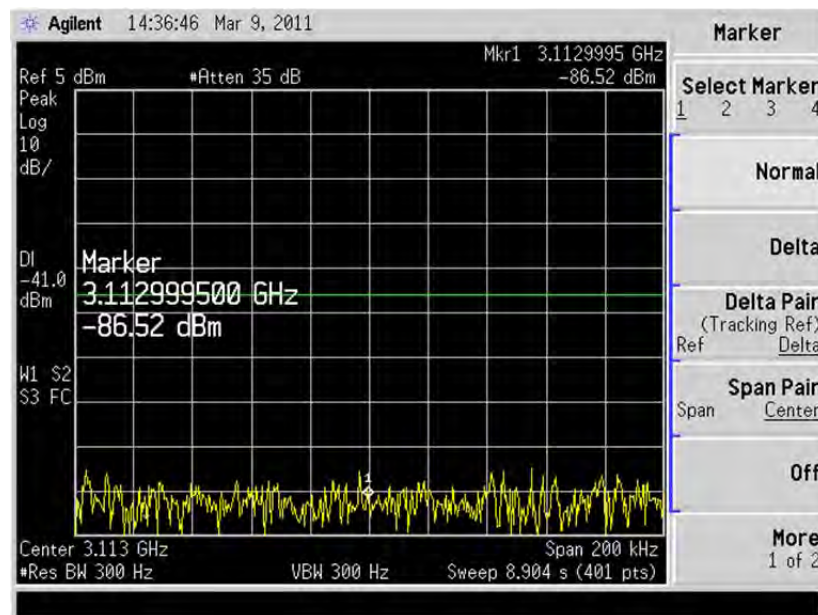
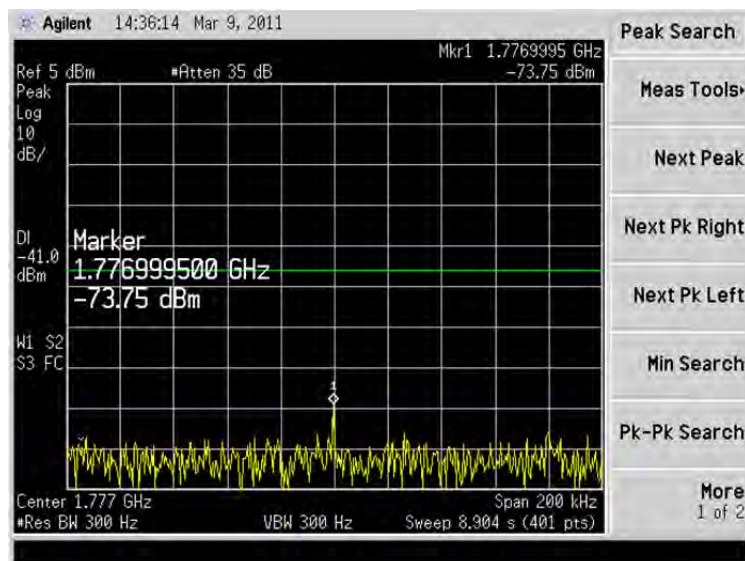
2.4.2 Zigbee mid frequency (Channel 19) 2445 MHz

2.4.2.1 UHF Power low 10mW

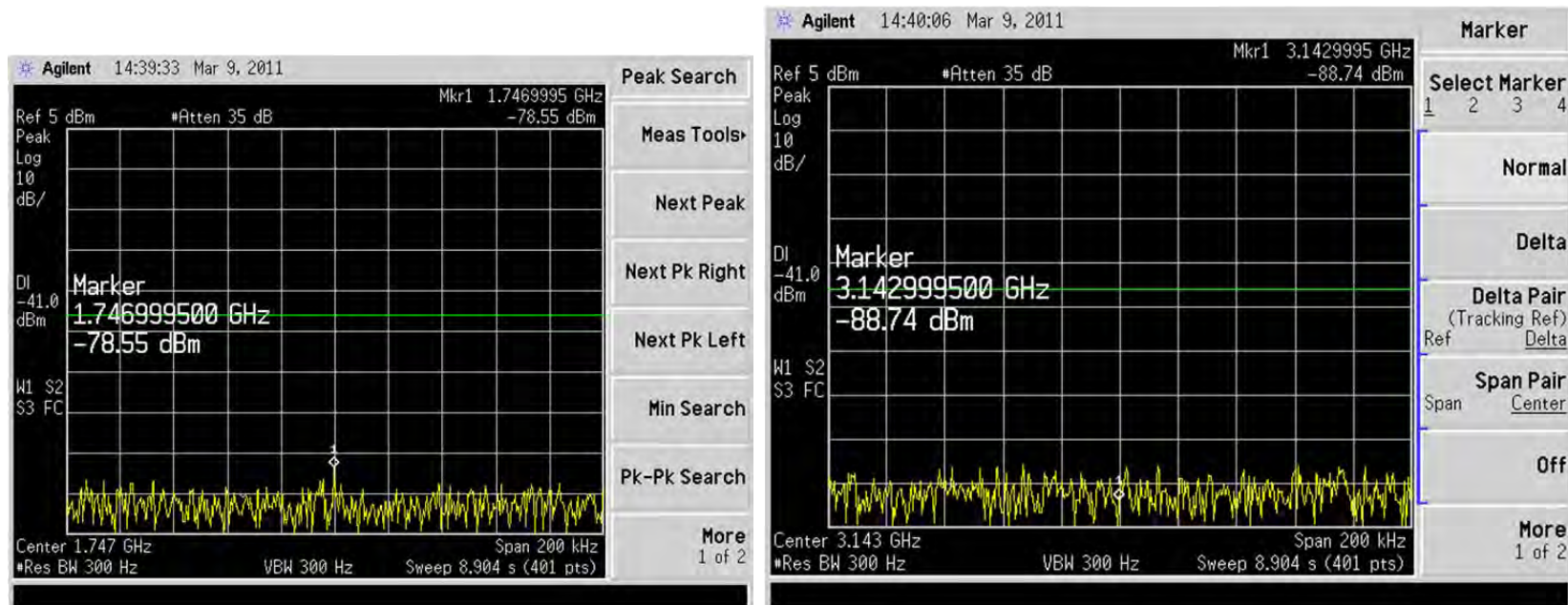
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	10mw	1807	-74.5	3083	-95



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
668	10mw	1777	-73.7	3113	-86.2

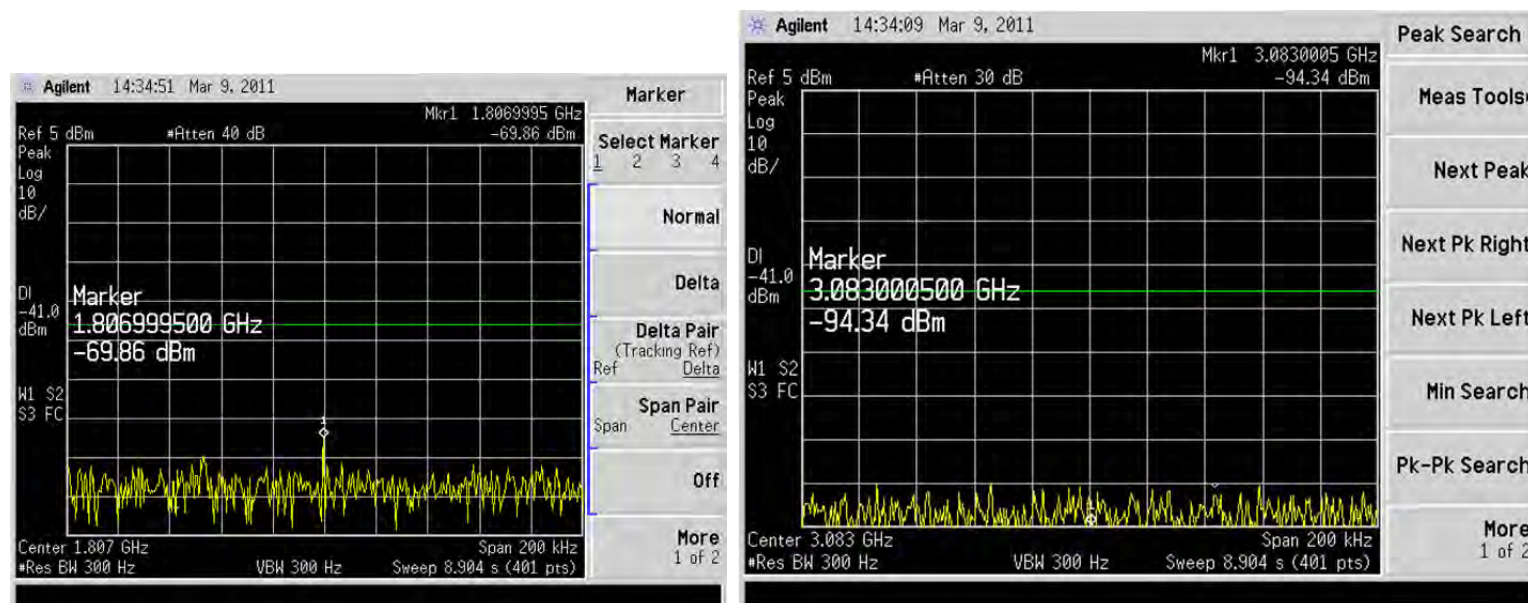


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
698	10mw	1747	-78.5	3143	-88

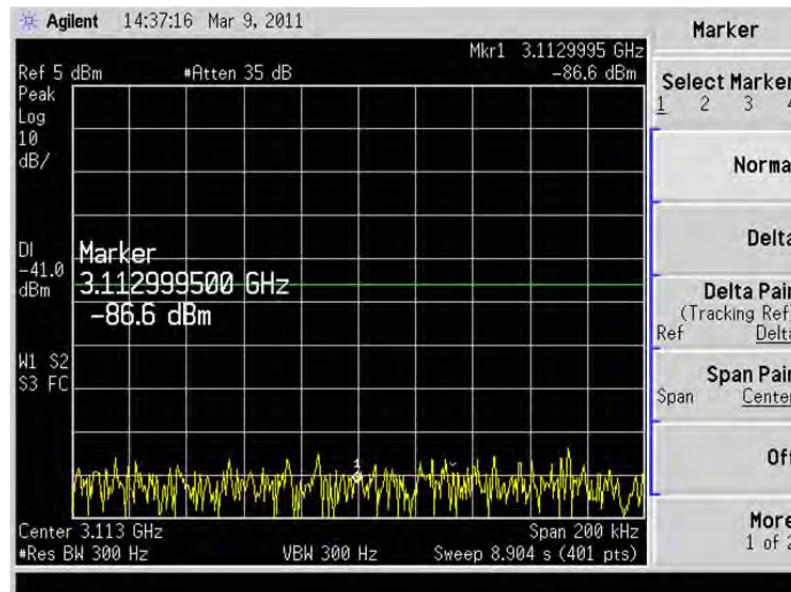
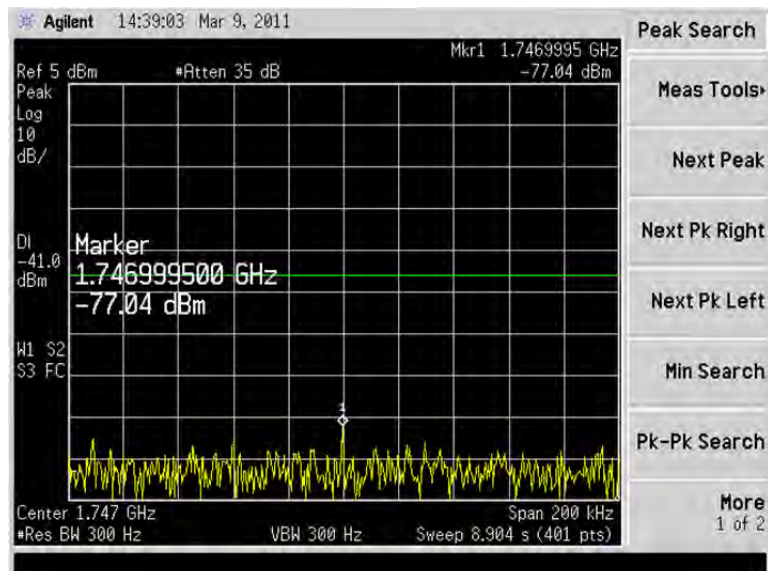


2.4.2.2 UHF high power 100mW

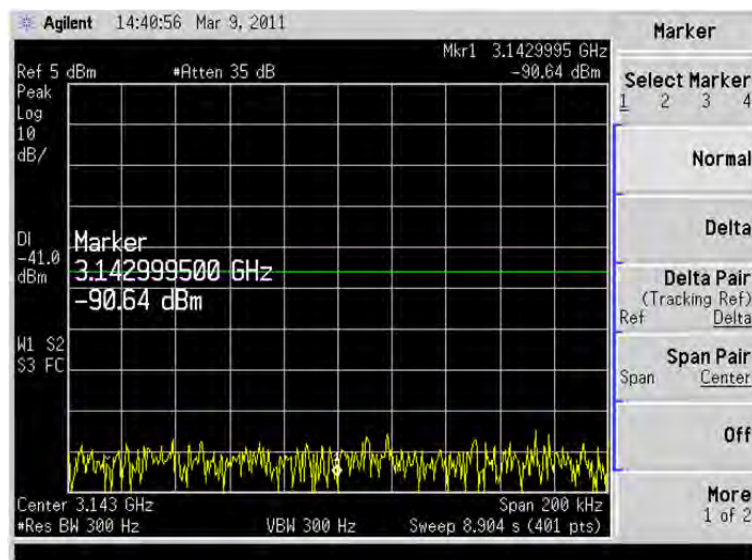
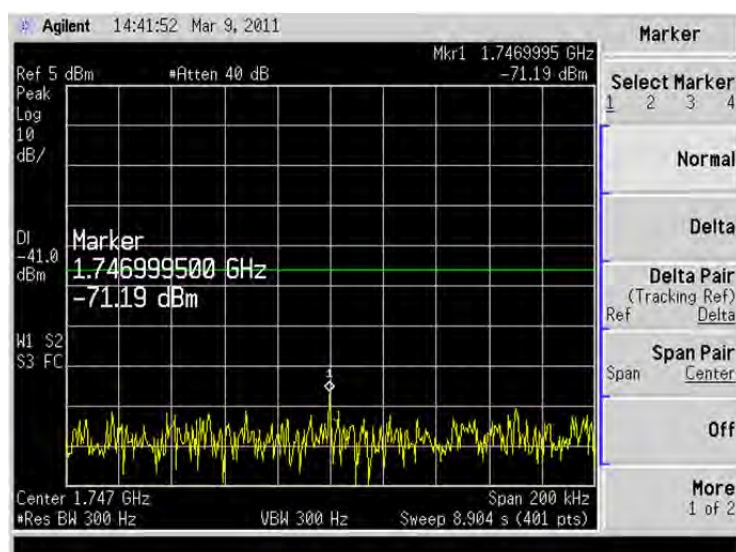
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	100mw	1807	-69	3083	-94



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
668	100mw	1747	-77	3113	-86.6



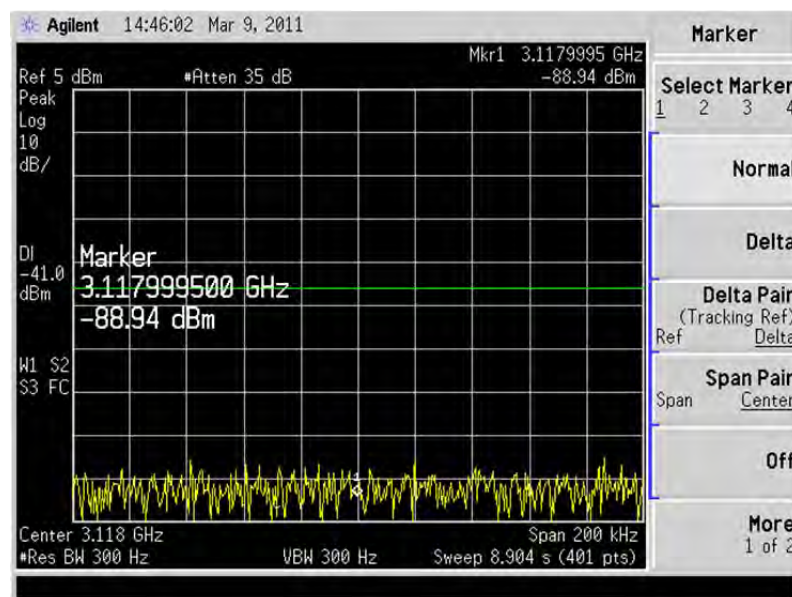
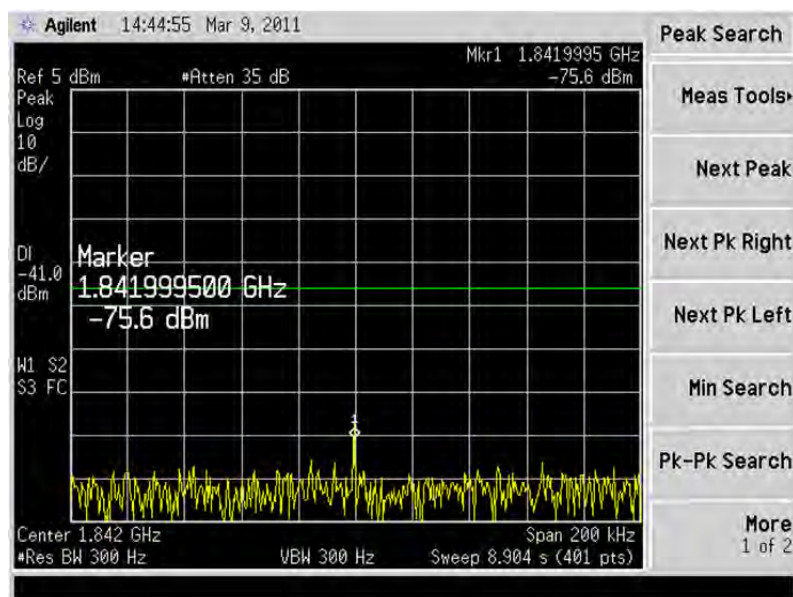
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
698	100mw	1747	-71.2	3143	-90



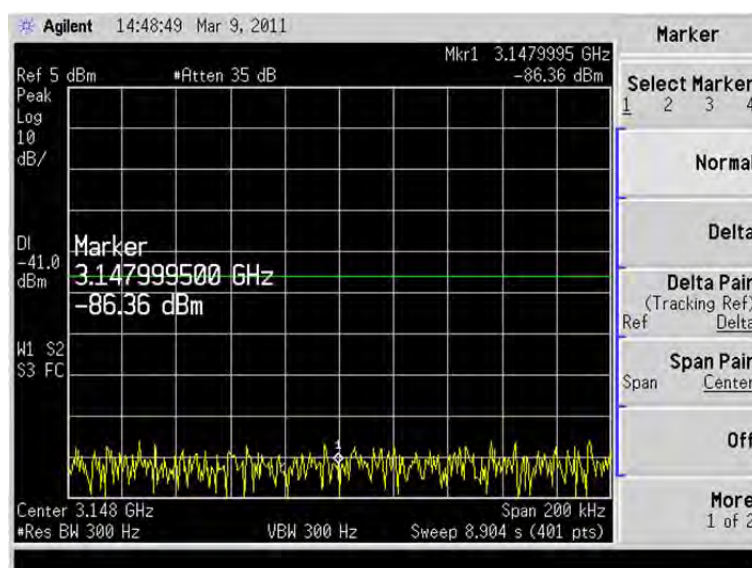
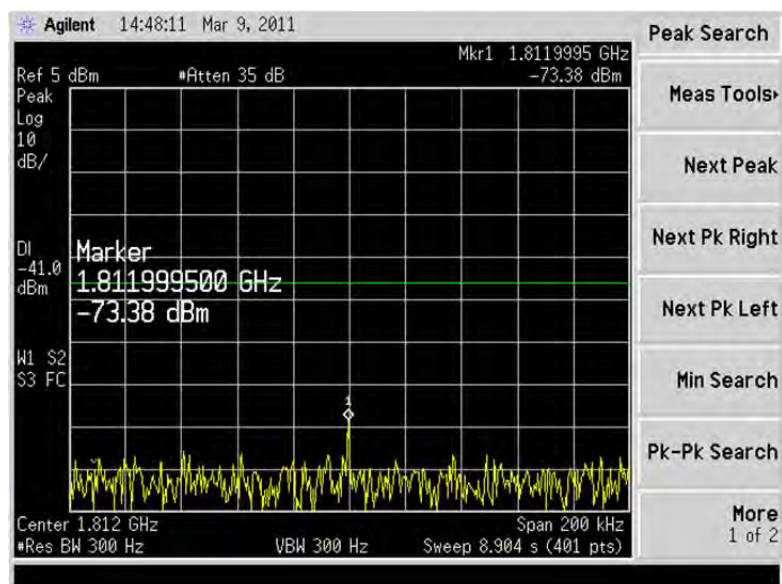
2.4.3 Zigbee high frequency (Channel 26) 2480 MHz

2.4.3.1 UHF power 10mW

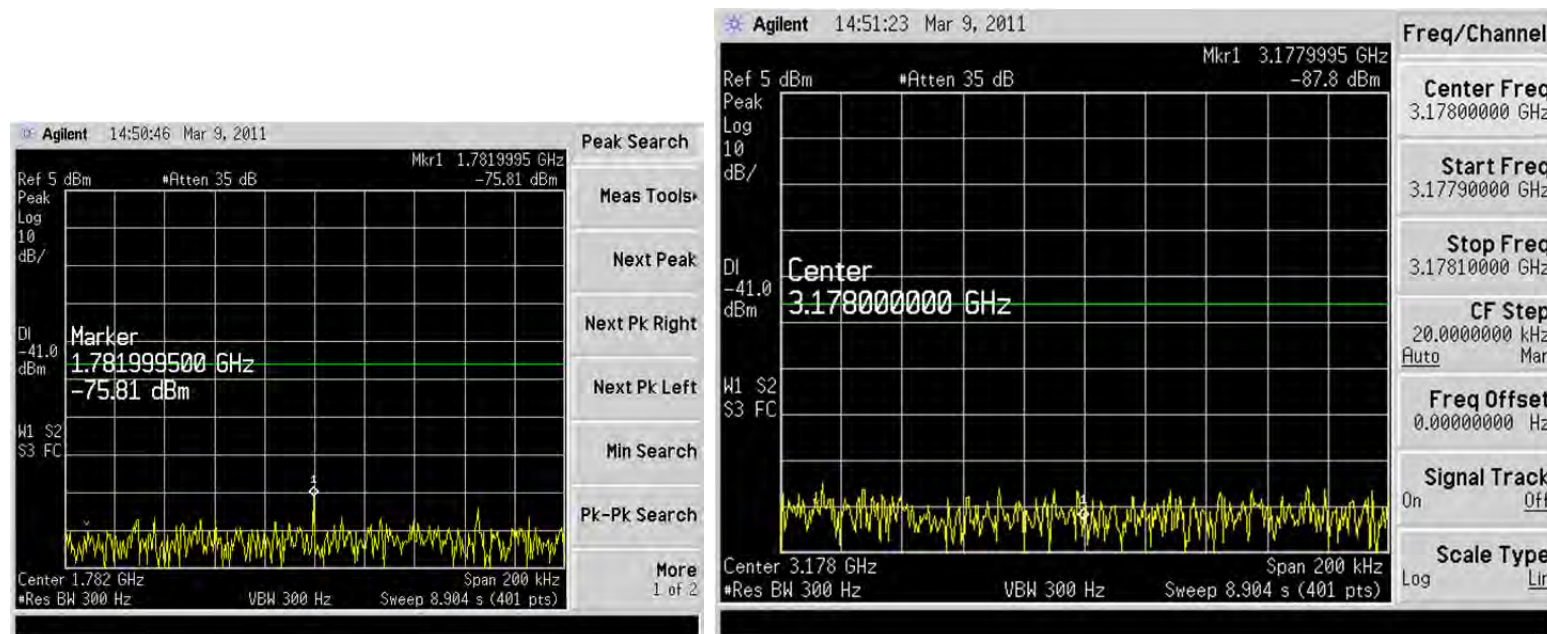
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	10mw	1842	-75.6	3118	-89



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
668	10mw	1812	-73.4	3148	-86

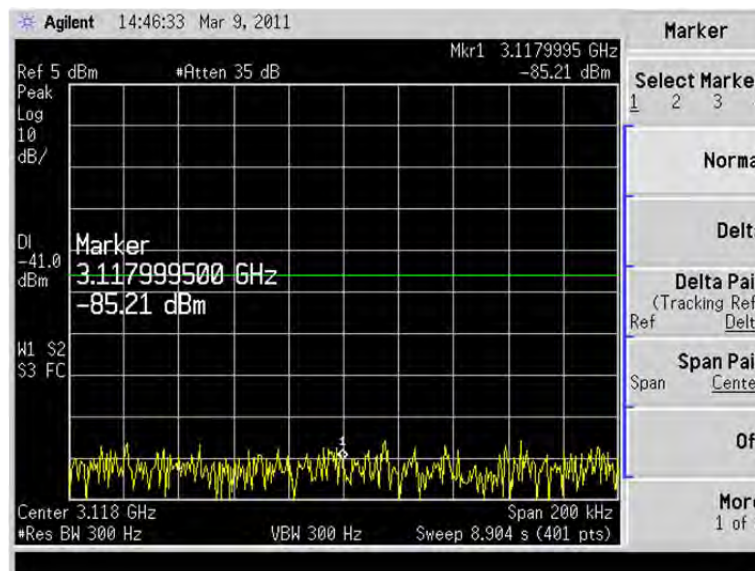
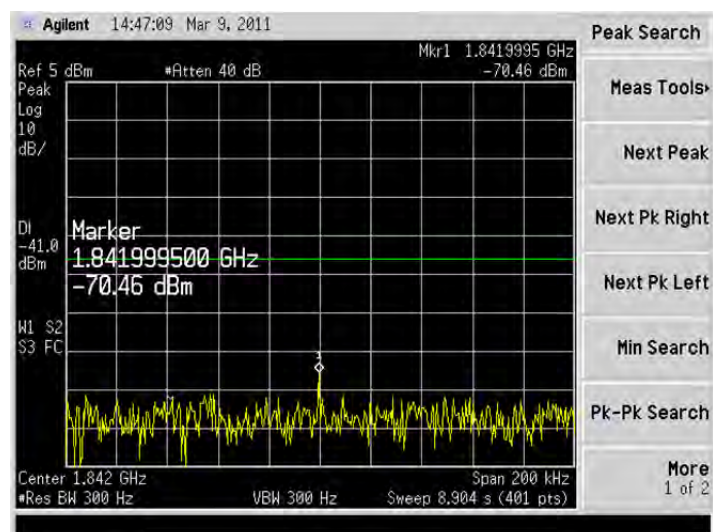


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
698	10mw	1782	-75.8	3178	-87

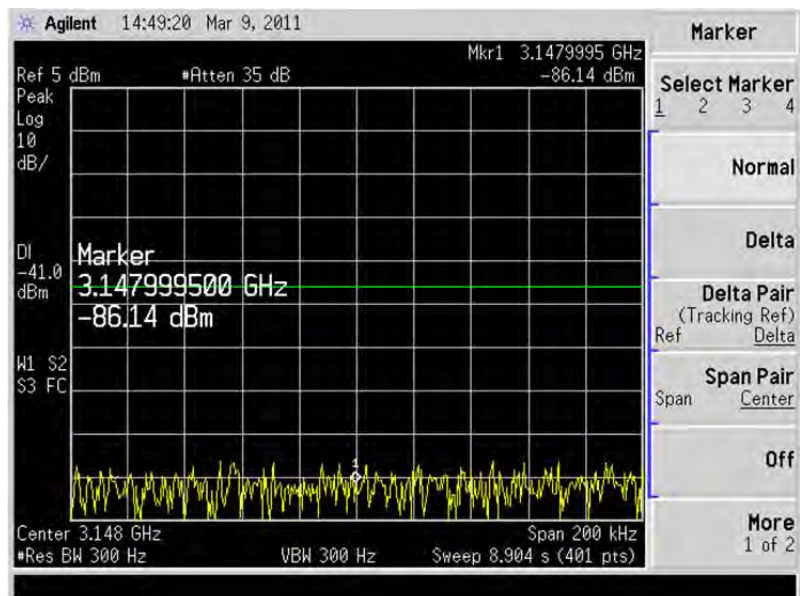
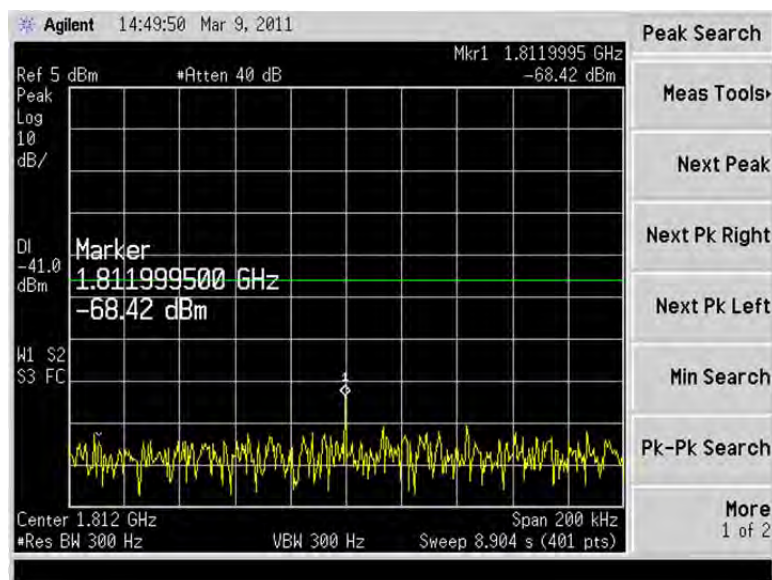


2.4.3.2 UHF Power high 100mW

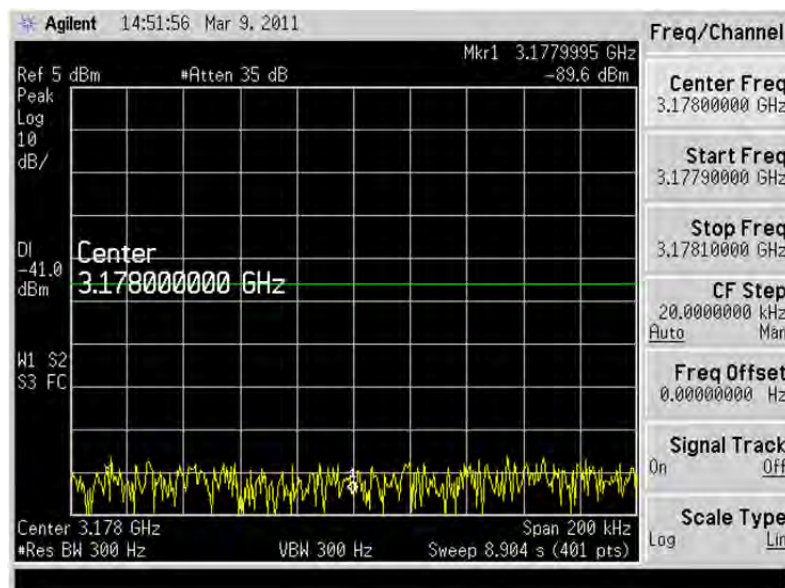
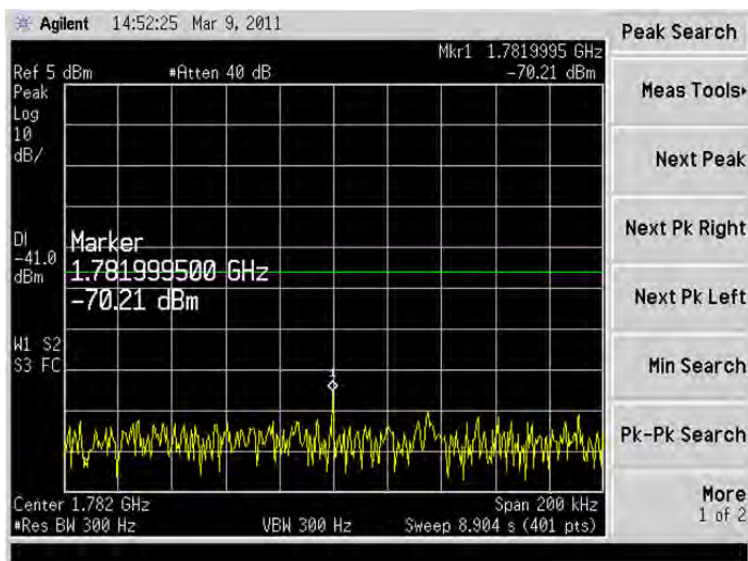
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
638	100mw	1842	-70.4	3118	-85



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
668	100mw	1812	-68.4	3148	-86



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
698	100mw	1782	-70.2	3178	-89



2.5 P8 band 710-790 MHz UHF-Zigbee IMD

		UHF Freq (MHz)	Zb freq (MHz)	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
UHF Low Power	Zigbee Low band	710	2405	1695	-74	3115	-81.02
		750	2405	1655	-74.1	3155	-94.2
		790	2405	1615	-76.6	3195	-89
	Zigbee mid band	710	2445	1735	-74.5	3155	-95
		750	2445	1695	-73.6	3195	-86
		790	2445	1655	-77	3235	-88
	Zigbee high band	710	2480	1770	-75.6	3190	-89
		750	2480	1730	-73.4	3230	-86.4
		790	2480	1690	-75.8	3270	-88
UHF High Power	Zigbee Low band	710	2405	1695	-70.33	3115	-84.2
		750	2405	1655	-70.4	3155	-81.9
		790	2405	1615	-69.6	3195	-90
	Zigbee mid band	710	2445	1735	-69.8	3155	-94
		750	2445	1695	-71.2	3195	-86
		790	2445	1655	-71.2	3235	-90
	Zigbee high band	710	2480	1770	-70.46	3190	-89
		750	2480	1730	-68.4	3230	-86
		790	2480	1690	-70.2	3270	-88

Revision: 1

Date: 6/2/2011

Author: Mohit Shringi

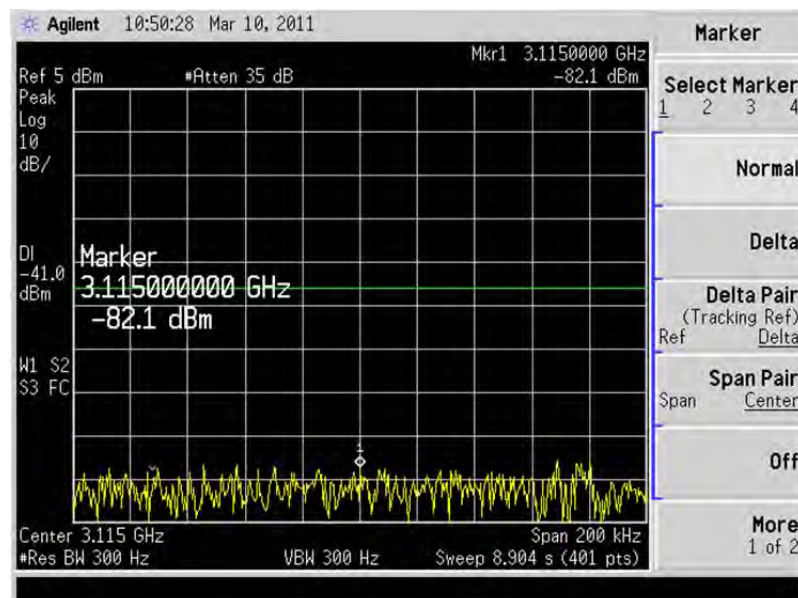
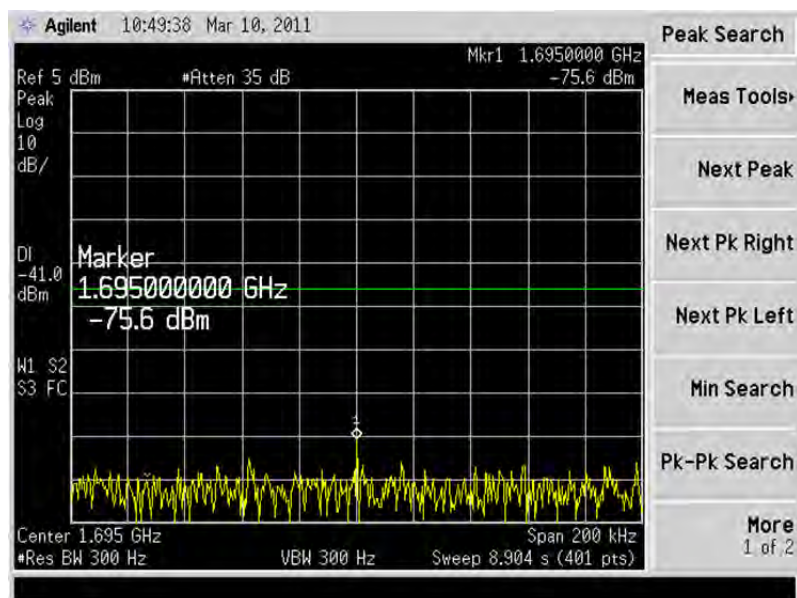
Page: 83 of 311

Shure Incorporated © 2009

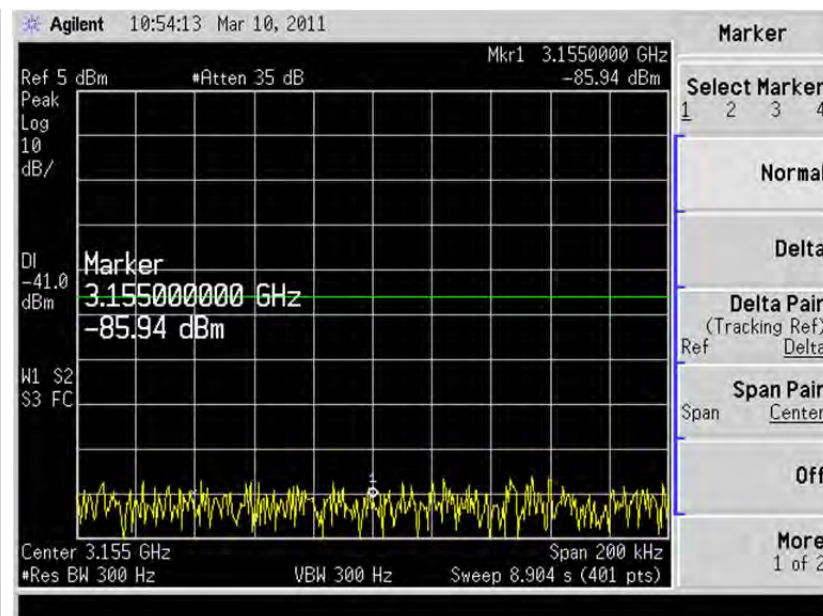
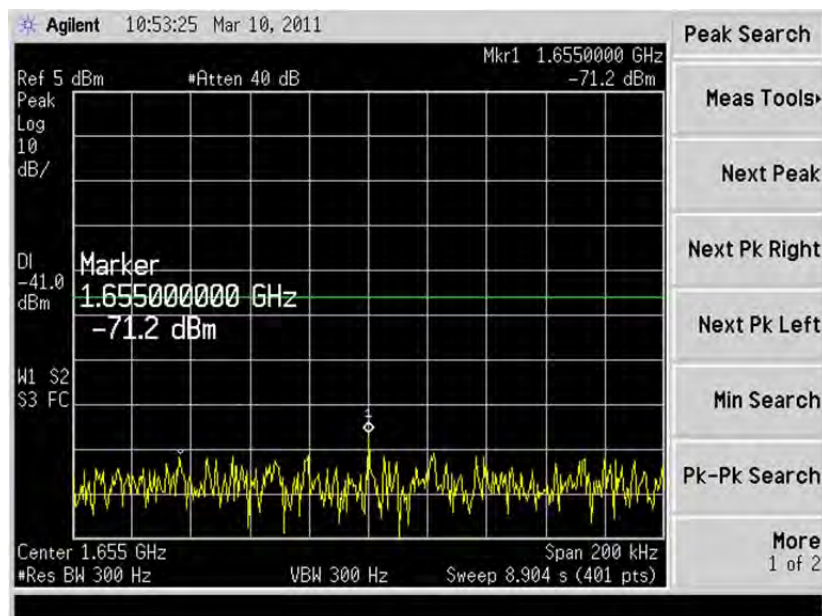
2.5.1 Zigbee low channel (Channel 11) 2405 MHz:

2.5.1.1 UHF low power 10 mW

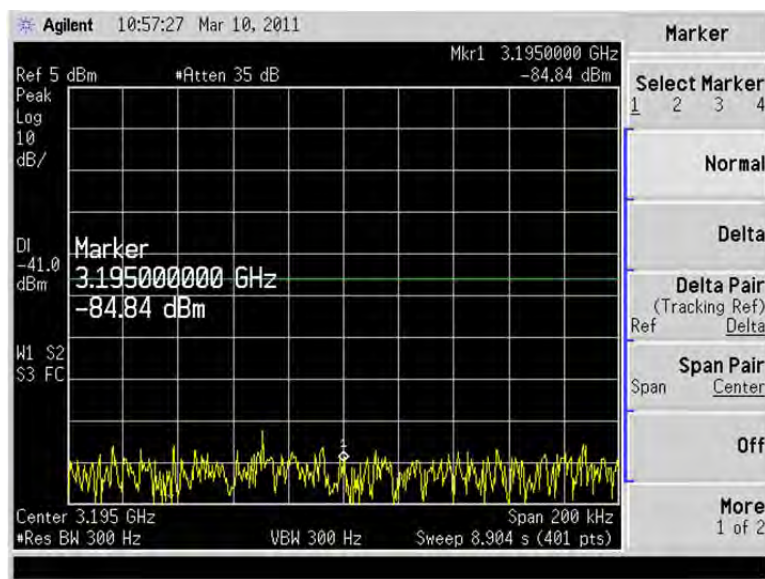
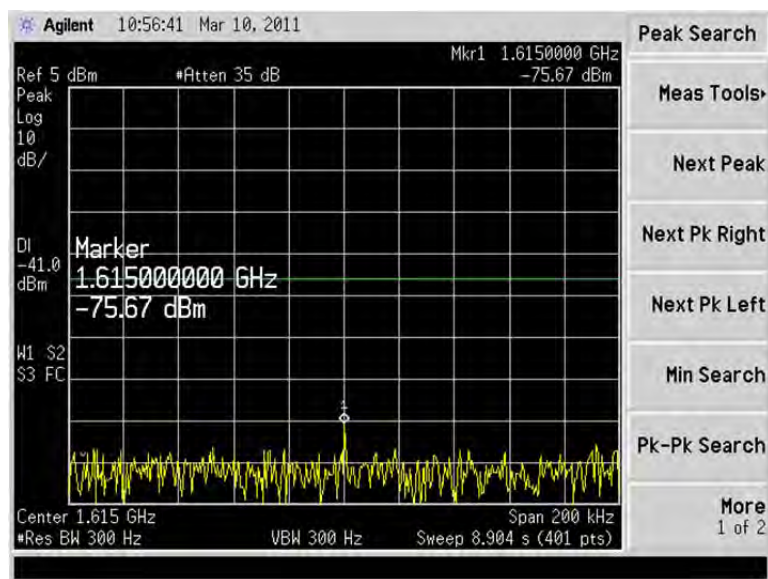
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
710	10mw	1695	-75.6	3115	-82



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
750	10mw	1655	-71.2	3155	-85

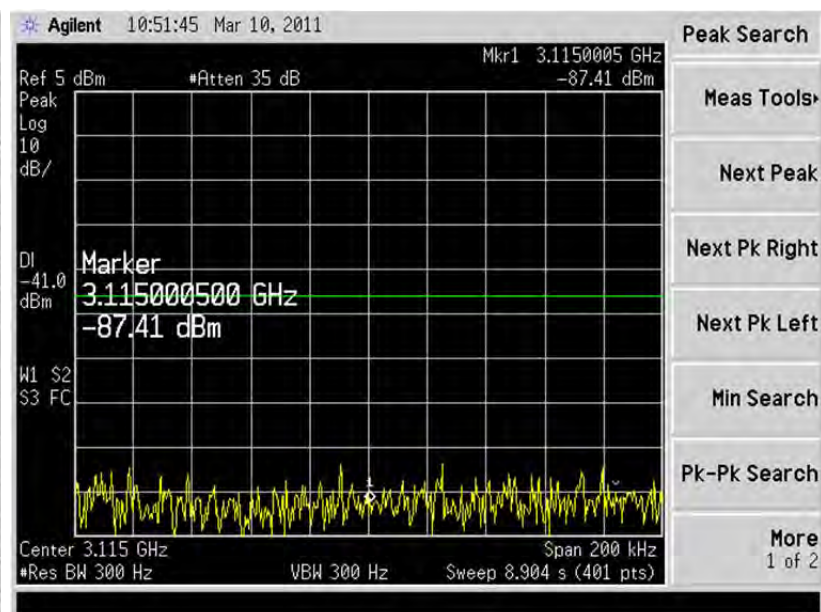
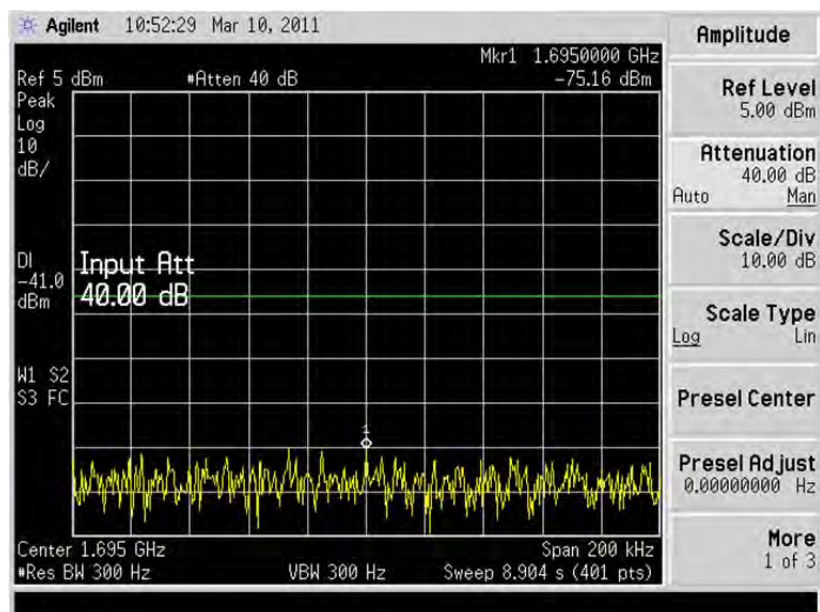


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
750	10mw	1615	-75.6	3195	-84.8

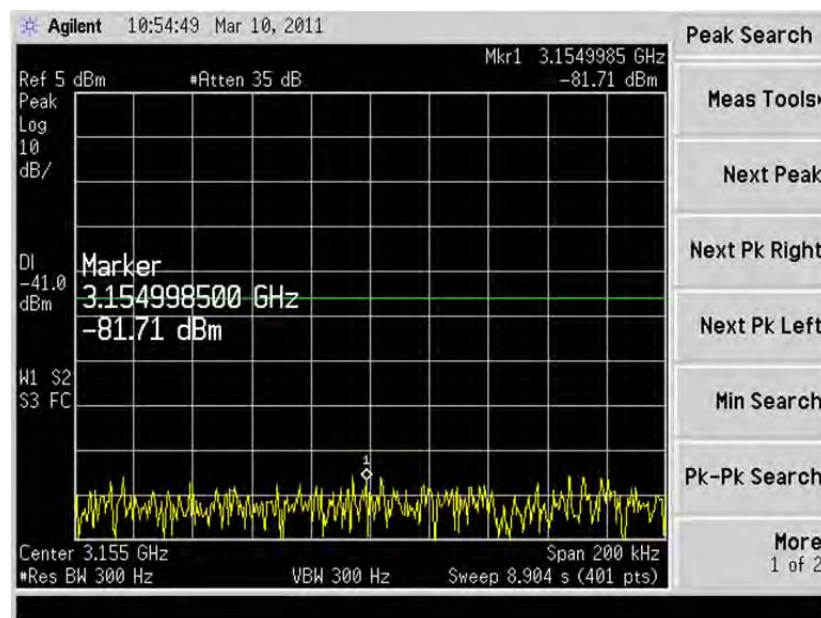
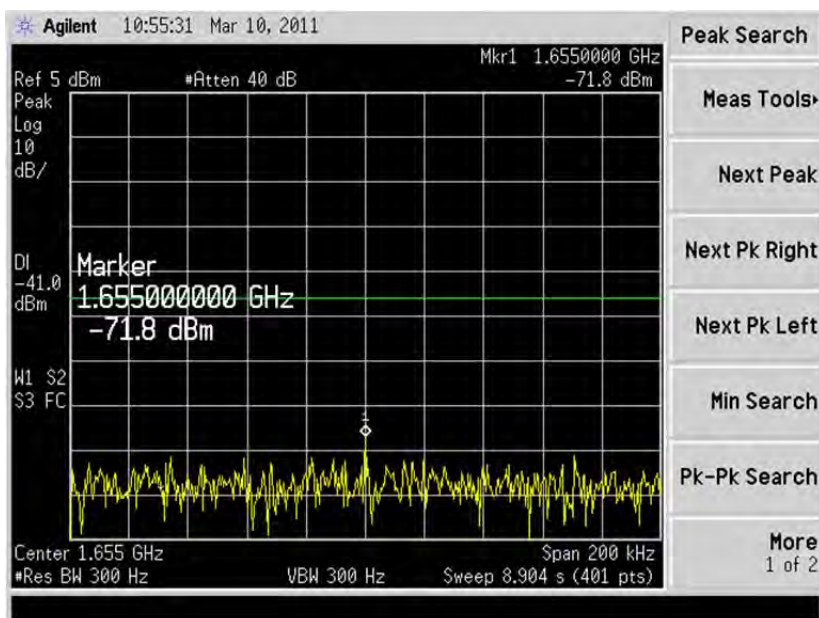


2.5.1.2 UHF high power 100mW

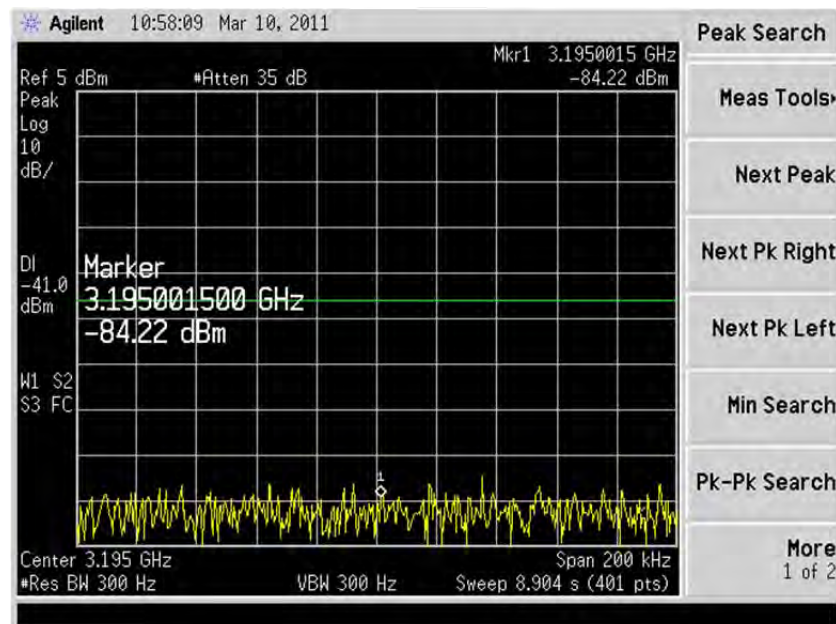
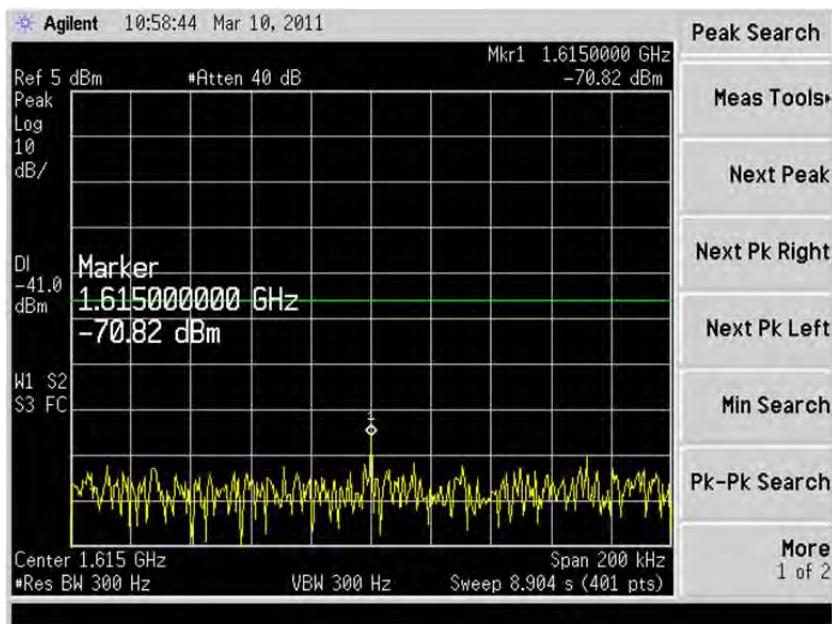
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
710	100mw	1695	-75.6	3115	-87



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
750	100mw	1655	-71.8	3155	-81.7



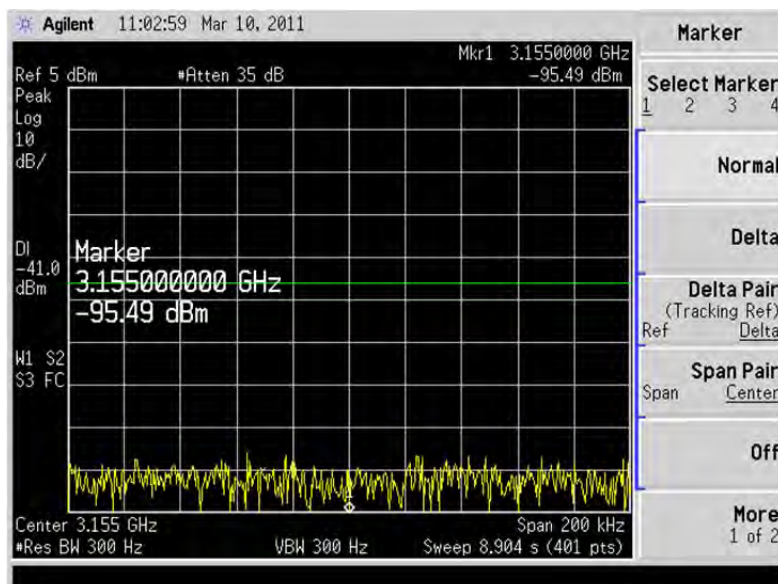
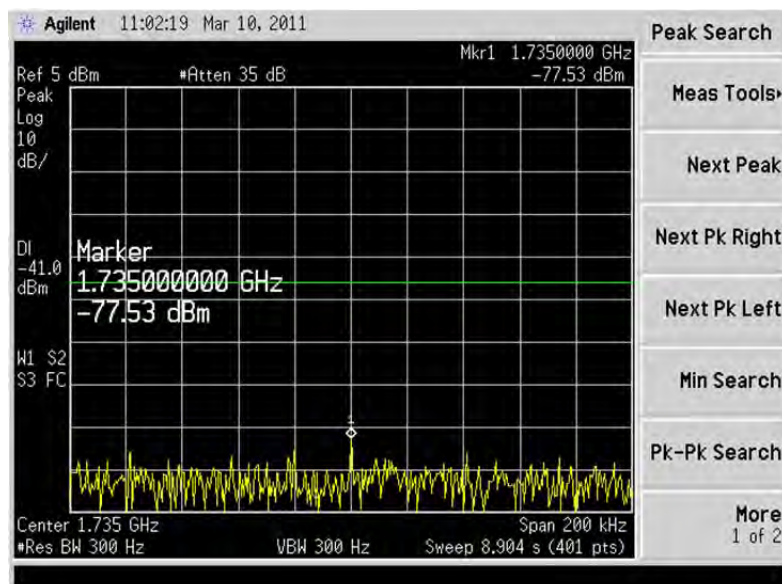
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
790	100mw	1615	-70.8	3195	-84.2



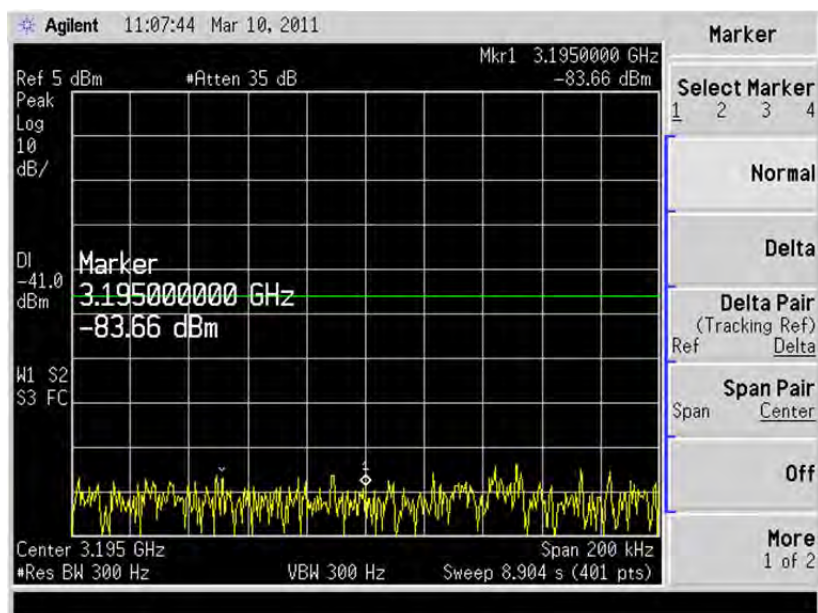
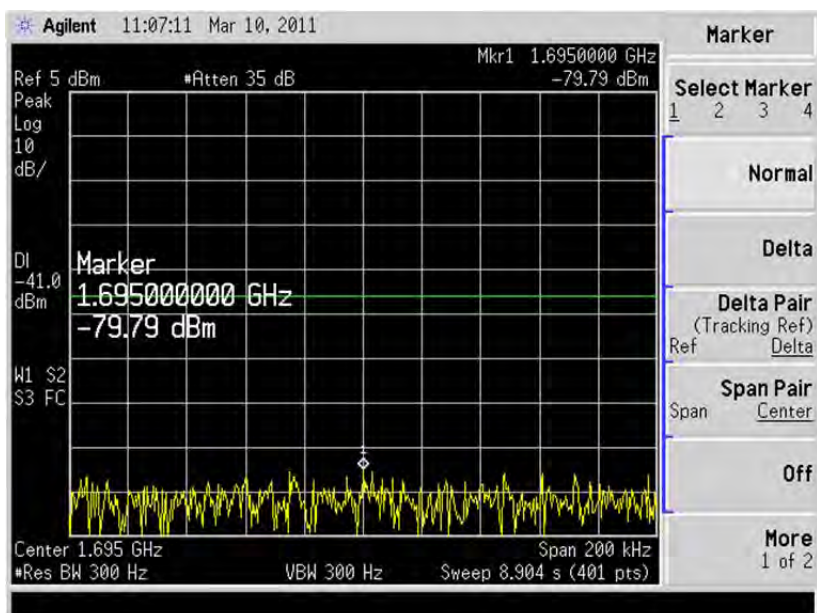
2.5.2 Zigbee mid frequency (channel 19) 2445 MHz

2.5.2.1 UHF power low 10mW

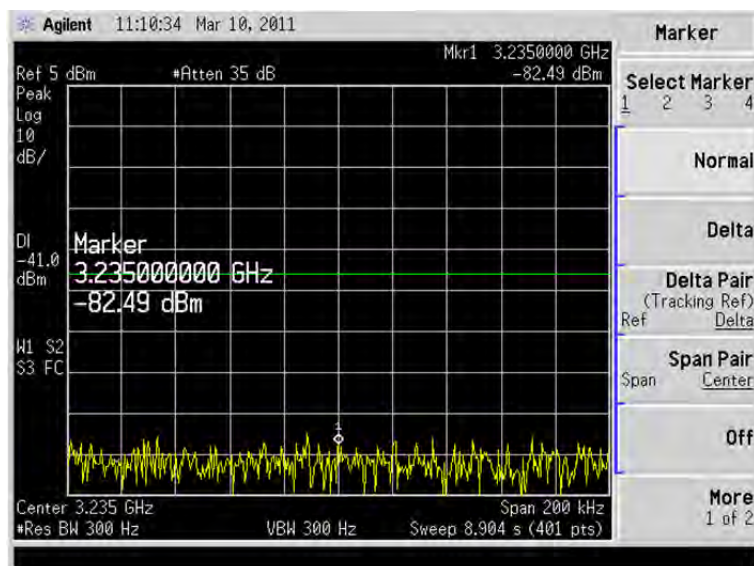
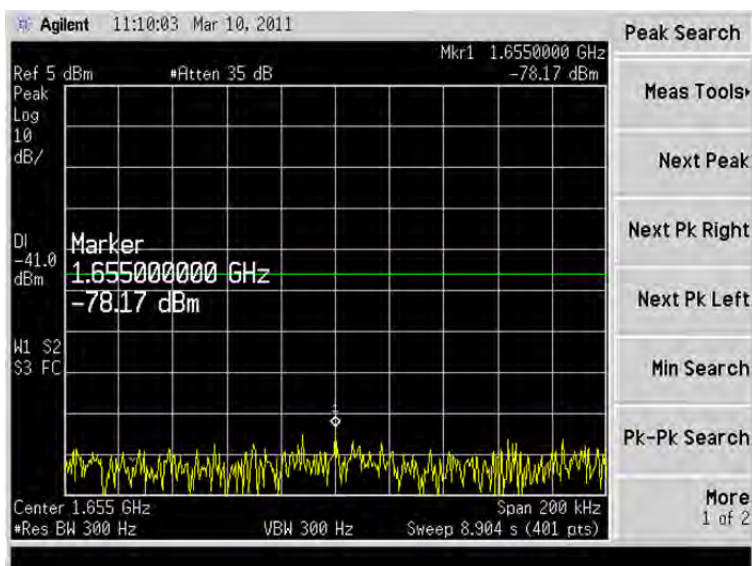
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
710	10mw	1735	-77.5	3155	-95



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
750	10mw	1695	-79	3195	-83

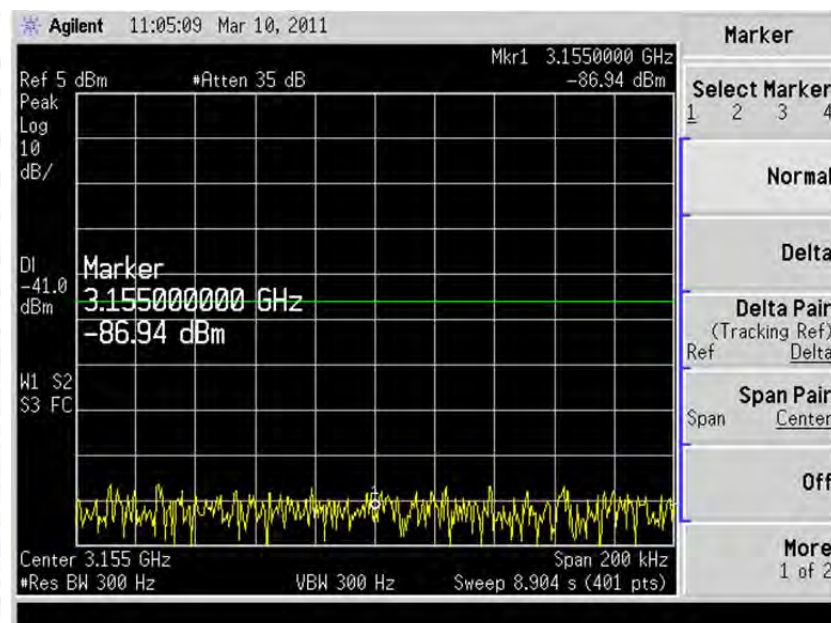
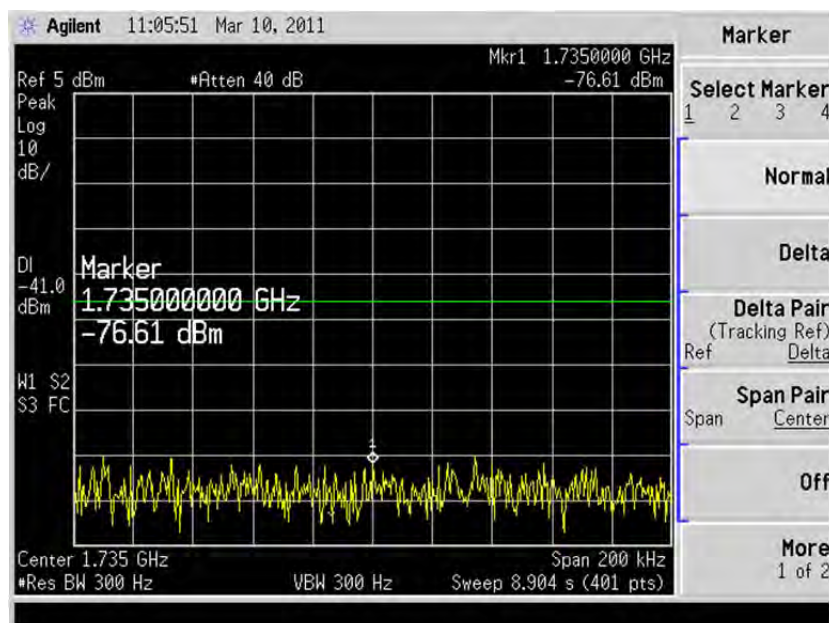


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
790	10mw	1655	-78	3238	-82.5

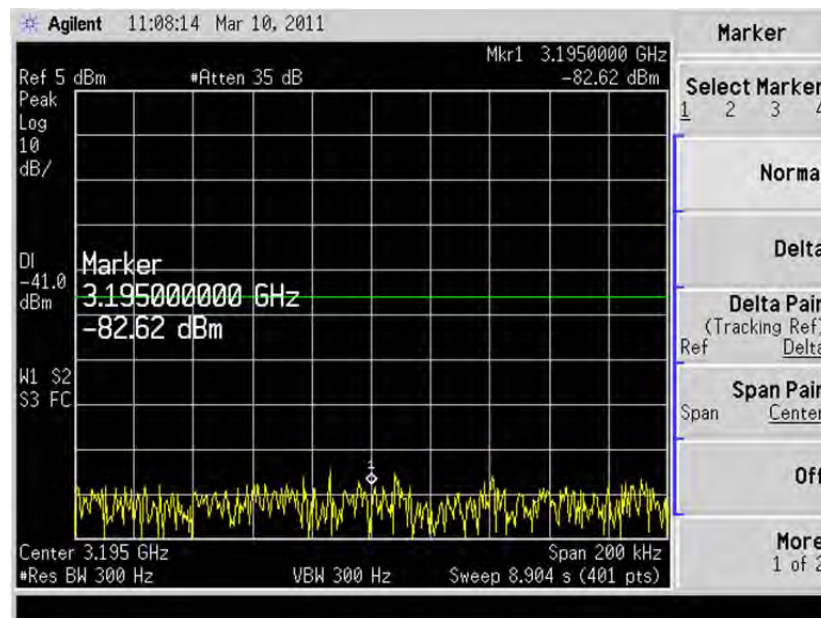
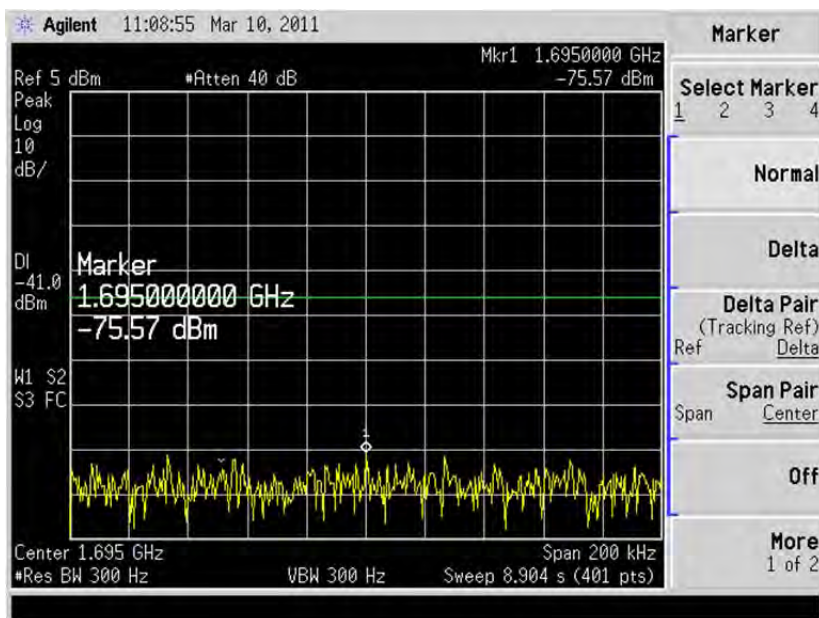


2.5.2.2 UHF power high 100mW

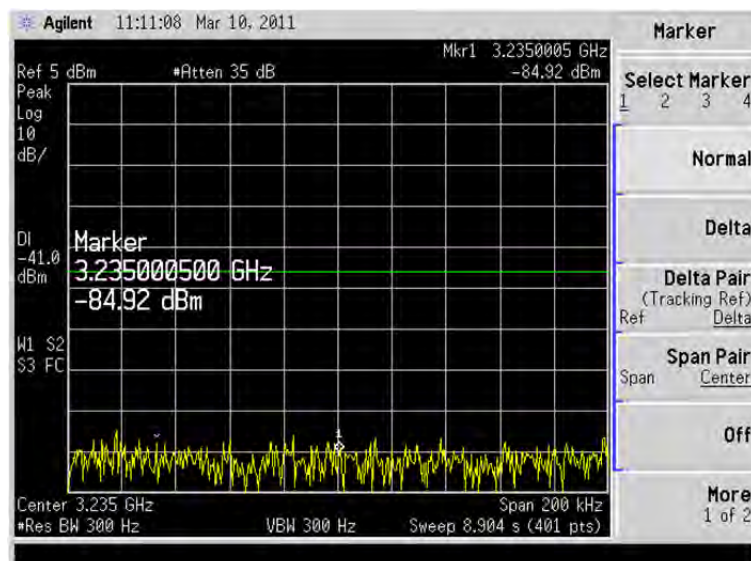
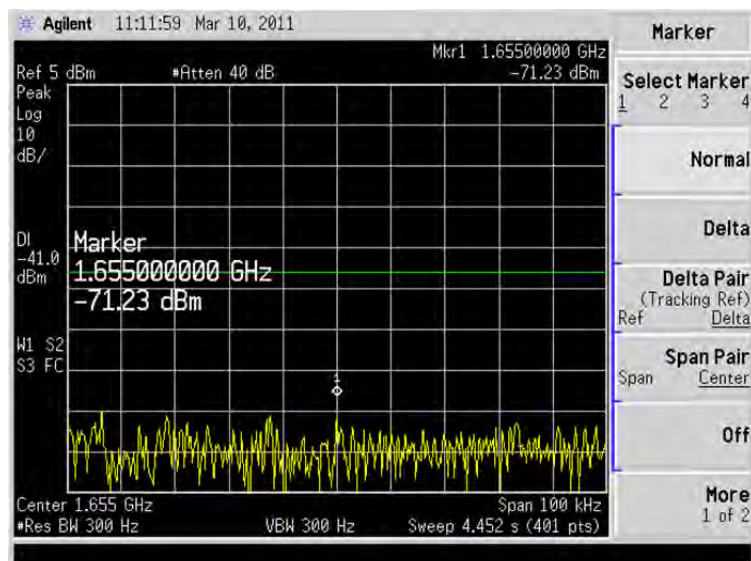
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
710	100mw	1735	-76.6	3155	-86.9



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
750	100mw	1695	-75.6	3195	-82



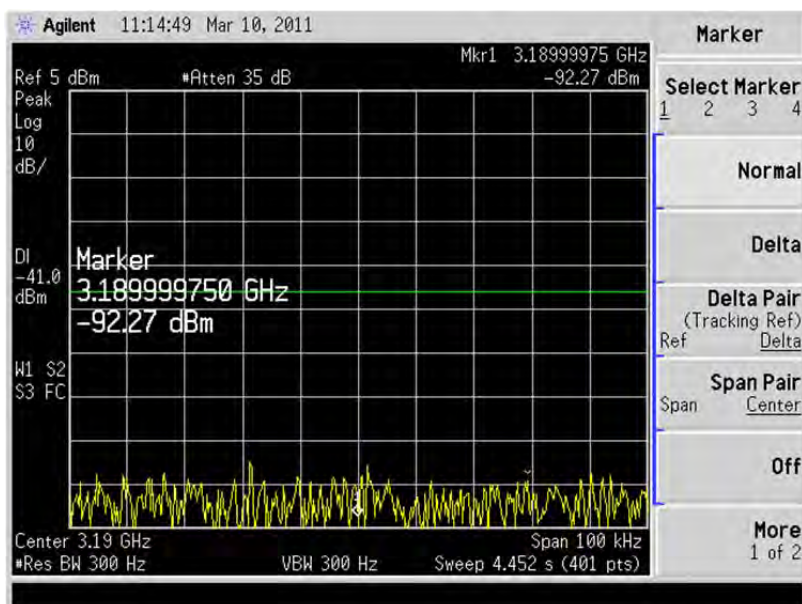
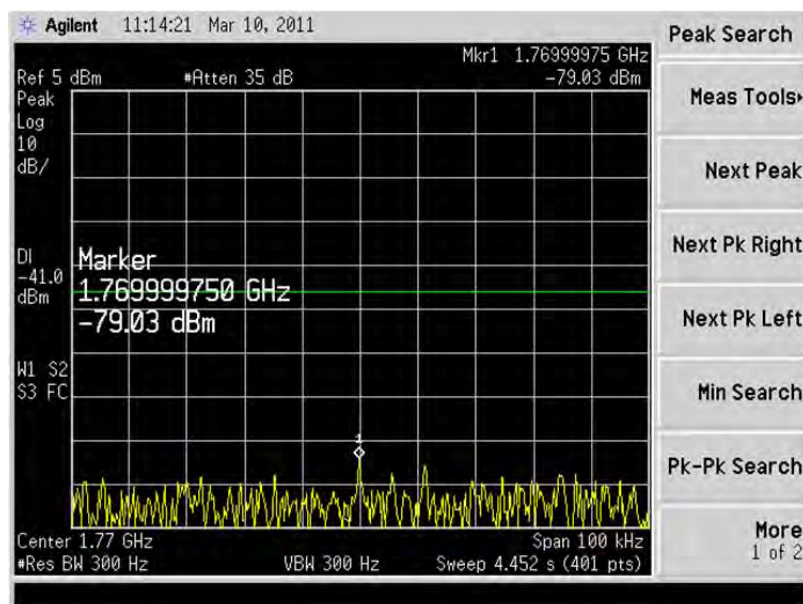
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
790	100mw	1655	-71.2	3235	-84



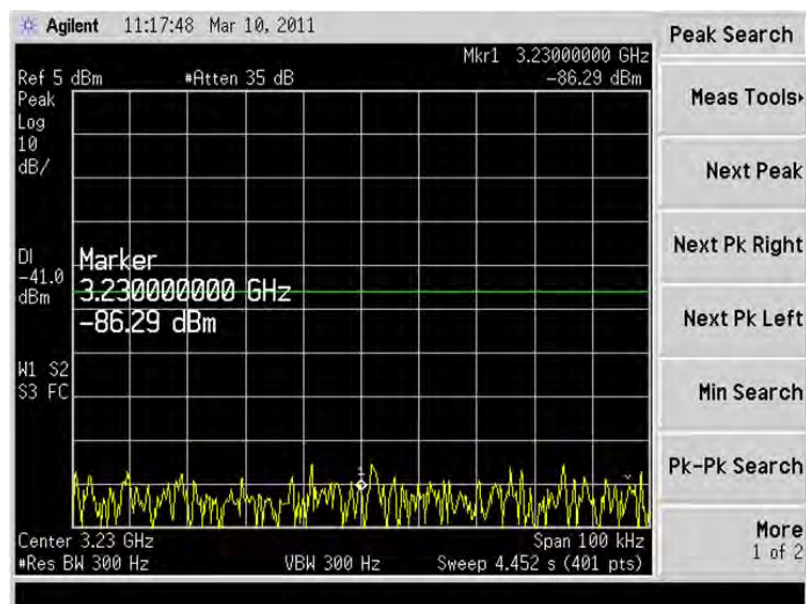
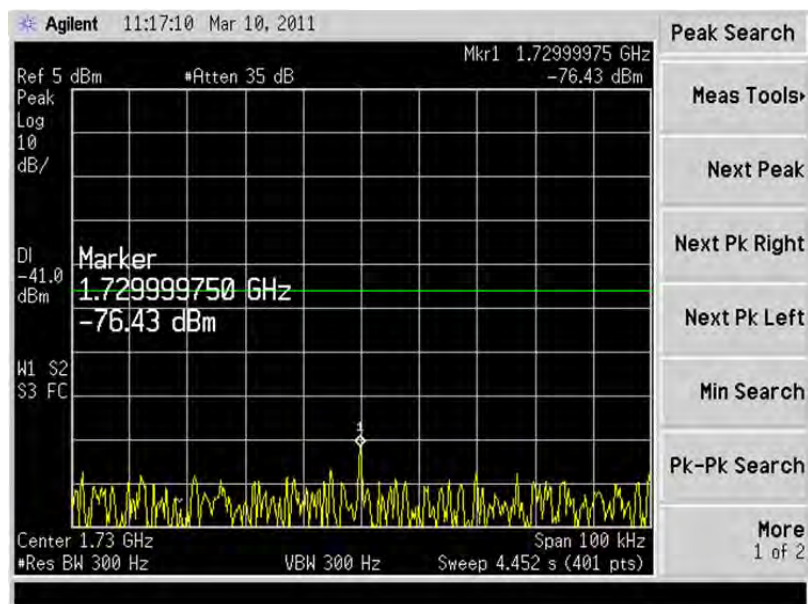
2.5.3 Zigbee high frequency (channel 26) 2480 MHz

2.5.3.1 UHF power low 10mW

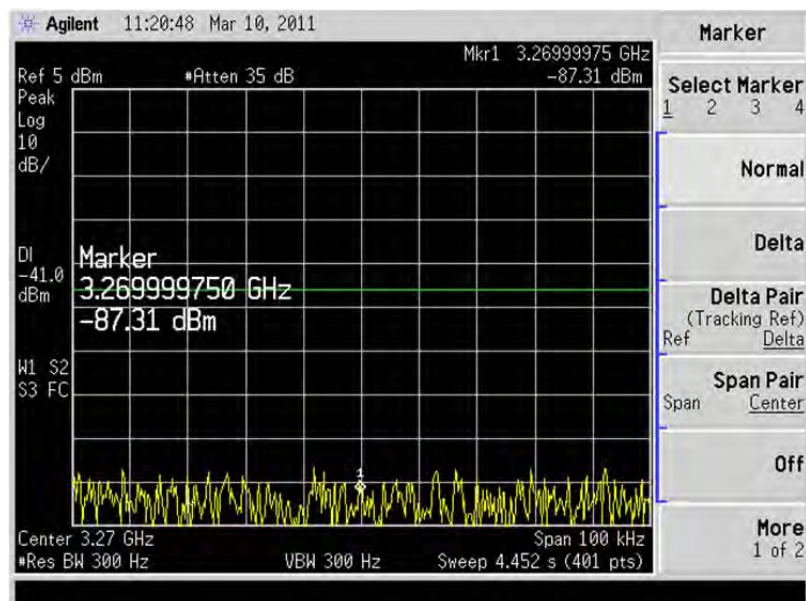
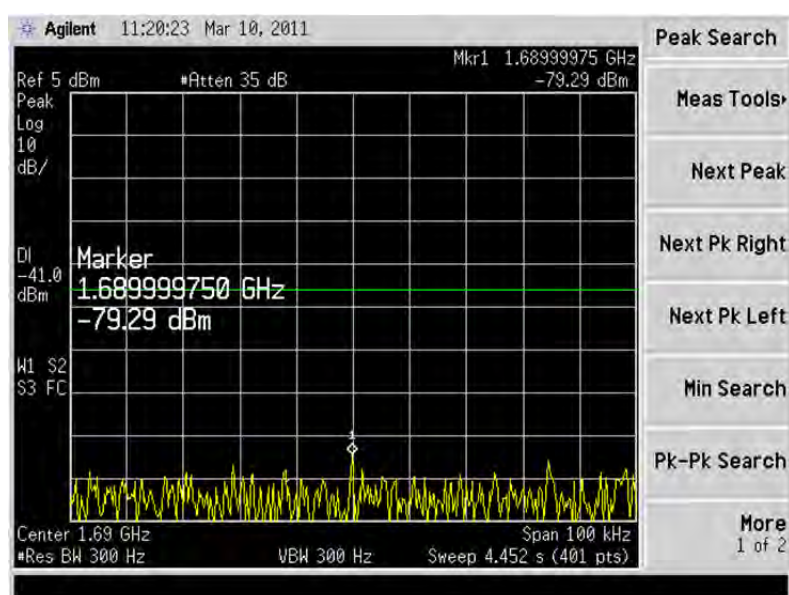
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
710	10mw	1770	-79.0	3190	-92.3



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
710	10mw	1730	-76.4	3230	-86.3

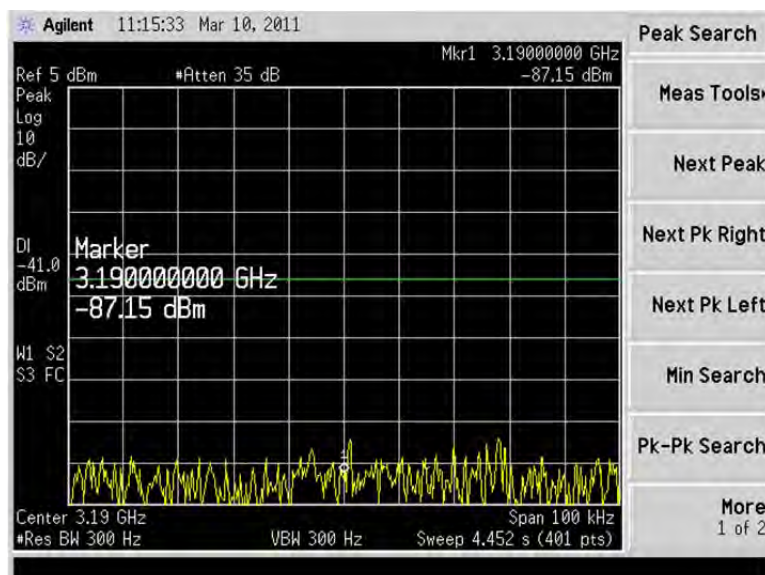
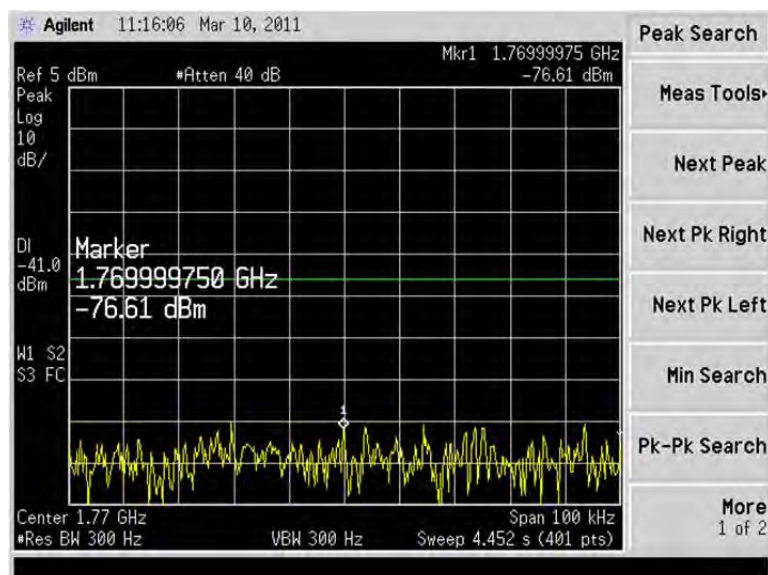


UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
790	10mw	1690	-79.3	3270	-87

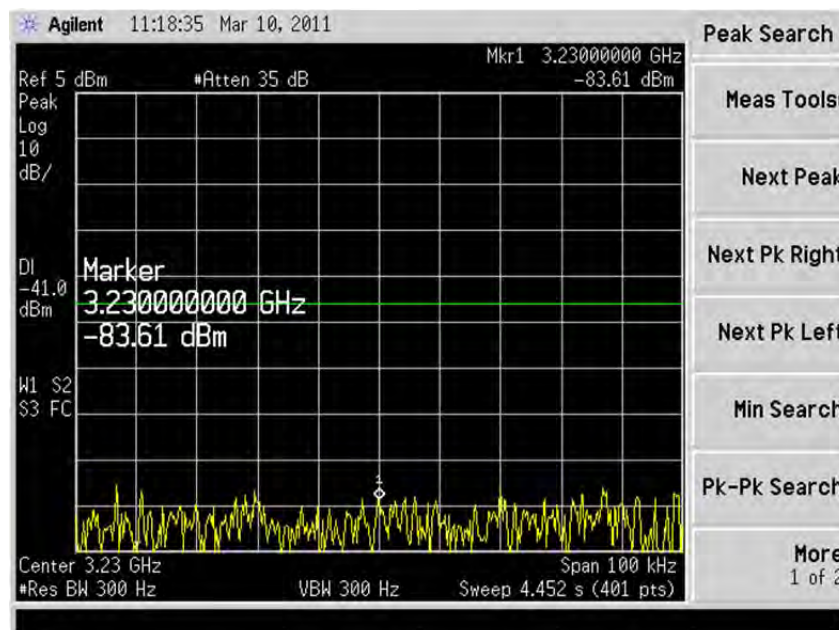
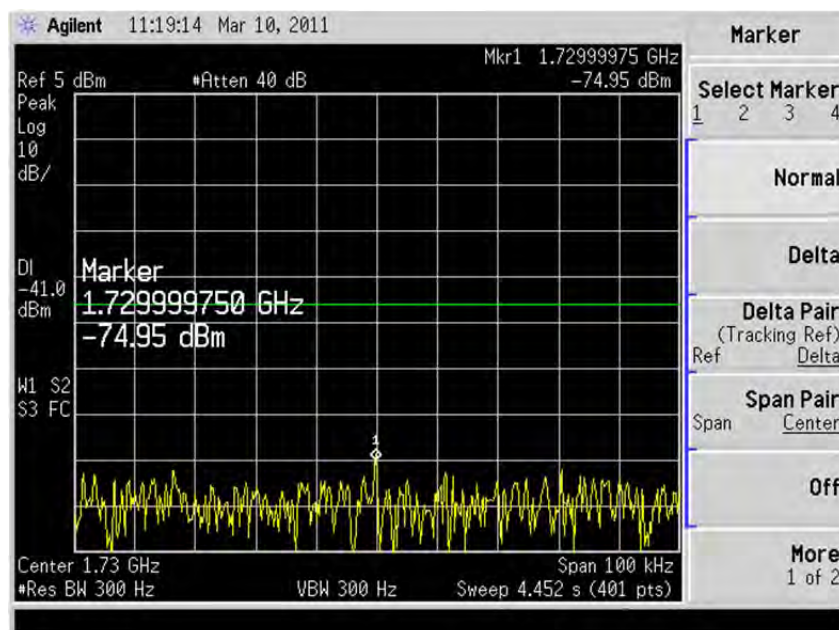


2.5.3.2 UHF power high 100mW

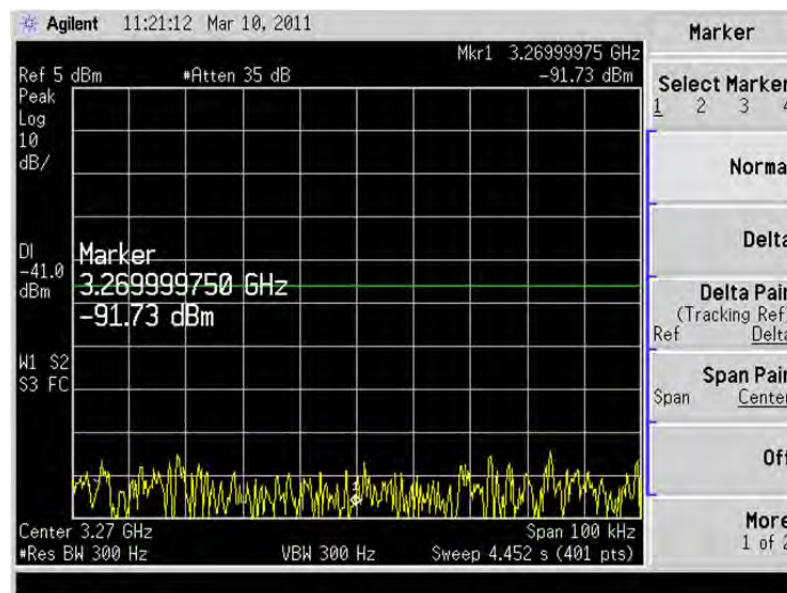
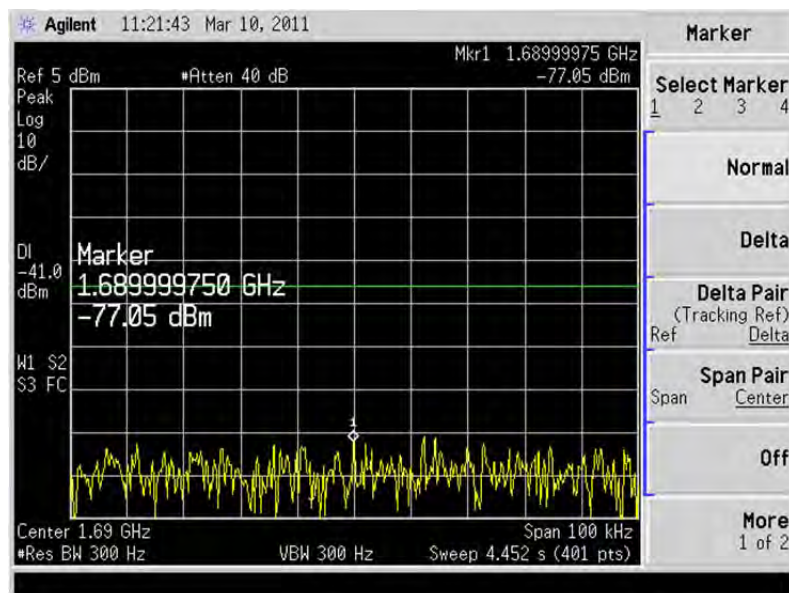
UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
710	100mw	1770	-76	3190	-87



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
750	100mw	1730	-74.9	3230	-83.6



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
790	100mw	1690	-77.1	3270	-91.7



2.6 K4E band 606-666 MHz UHF-Zigbee IMD

		UHF Freq (MHz)	Zb freq (MHz)	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
UHF Low Power	Zigbee Low band	606	2405	1799	-74.9	3011	-89
		636	2405	1769	-74	3041	-86
		666	2405	1739	-78.2	3071	-80
	Zigbee mid band	606	2445	1839	-71	3051	-89
		636	2445	1809	-73	3081	-87.2
		666	2445	1779	-76.2	3111	-91
	Zigbee high band	606	2480	1874	-71.9	3086	-89.4
		636	2480	1844	-74.9	3116	-84
		666	2480	1814	-75.1	3146	-90
UHF High Power	Zigbee Low band	606	2405	1799	-72.4	3011	-89
		636	2405	1769	-74.3	3041	-89
		666	2405	1739	-75.7	3071	-85
	Zigbee mid band	606	2445	1839	-70	3051	-90
		636	2445	1809	-71.2	3081	-85
		666	2445	1779	-76.2	3111	-84
	Zigbee high band	606	2480	1874	-70.1	3086	-88
		636	2480	1844	-71	3116	-90
		666	2480	1814	-71.7	3146	-84

Revision: 1

Date: 6/2/2011

Author: Mohit Shringi

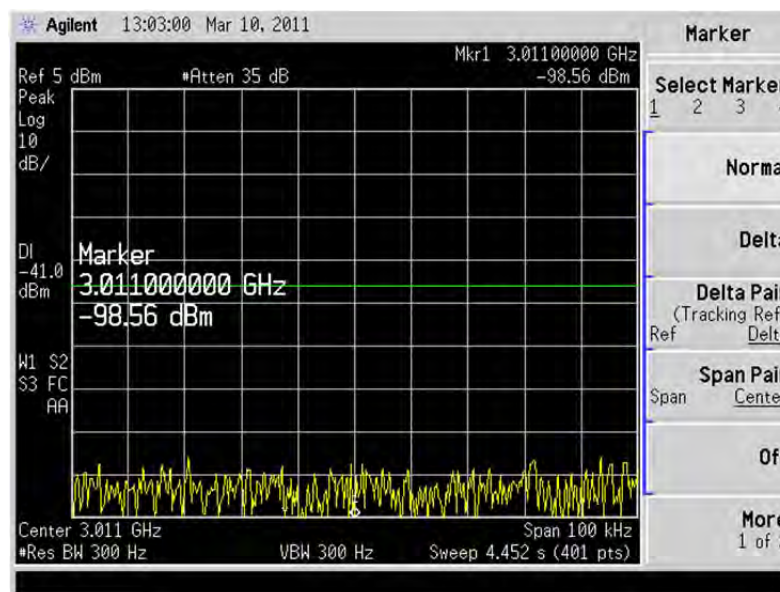
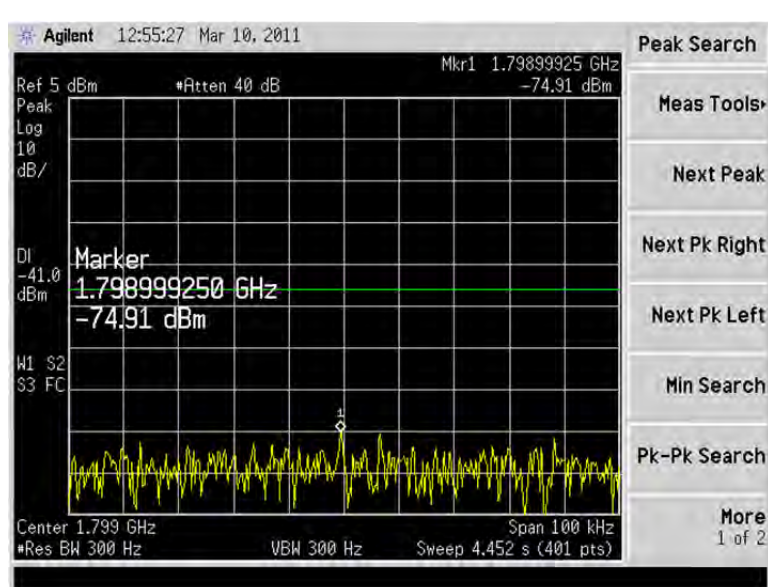
Page: 102 of 311

Shure Incorporated © 2009

2.6.1 Zigbee low frequency (Channel 11) 2405 MHz

2.6.1.1 UHF power low 10mW

UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
606	10mw	1799	-74.9	3011	-98



UHF Freq (MHz)	UHF Pwr	UHF-ZB IMD Freq low (MHz)	IMD Pwr (dBm)	UHF-ZB IMD Freq high (MHz)	IMD Pwr (dBm)
636	10mw	1769	-74.3	3041	-86.4

