

Application for FCC Certification  
On behalf of

AFCO INC.

Product Name: Bluetooth remote control

Model No.: 16-SABTS

FCC ID: QWI16-SABTS

Prepared For : AFCO INC.  
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Report No. : ACI-F12179  
Date of Test : Oct. 31 – Nov. 03, 2012  
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## TEST REPORT FOR FCC CERTIFICATE

Applicant : AFCO INC.  
 Manufacturer : Hangzhou Newsources Electronics Co., Ltd.  
 EUT Description : Bluetooth remote control  
     (A) Model No. : 16-SABTS  
     (B) Power Supply : DC 12V  
     (C) Test Voltage : DC 12V

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART C OCTOBER 2011  
 AND ANSI C63.4-2003*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT (M/N: 16-SABTS), which was tested on Oct. 29 – Nov. 03, 2012 is technically compliance with the FCC limits.


This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Oct. 31 – Nov. 03, 2012 Date of Report : Nov. 05, 2012

Producer : *Kathy Wang*  
 KATHY WANG / Assistant

Review : *Dio Yang*  
 DIO YANG / Assistant Manager

 For and on behalf of  
 Audix Technology (Shanghai) Co., Ltd.

Signatory : *Sany Chen for*  
 Authorized Signature EMC BYRON/KWO / Assistant General Manager

# 1 SUMMARY OF STANDARDS AND RESULTS

## 1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Results	Meets Limit
<b>EMISSION</b>			
Conducted Emission Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2011 AND ANSI C63.4:2003	N/A	15.207
Spurious Radiated Emissions Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2011 AND ANSI C63.4:2003 AND DA 00-705	Pass	15.209(a) 15.205(a)(c)
20 dB Bandwidth Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2011 AND DA 00-705	Pass	15.247(a)(1)
Peak Output Power Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2011 AND DA 00-705	Pass	15.247(b)(1)
Spurious RF Conducted Emissions Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2011 AND DA 00-705	Pass	15.247(d)
Band-edge Compliance of RF Conducted Emissions Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2011 AND DA 00-705	Pass	15.247(d)
Number of Hopping Frequencies Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2011 AND DA 00-705	Pass	15.247(a)(1)
Carrier Frequency Separation Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2011 AND DA 00-705	Pass	15.247(a)(1)
Dwell Time Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C October 2011 AND DA 00-705	Pass	15.247(a)(1)

## 2 GENERAL INFORMATION

### 2.1 Description of Equipment Under Test

Description : Bluetooth remote control

Type of EUT  Production  Pre-product  Pro-type

Model Number : 16-SABTS

Radio Tech : Bluetooth

Modulation : GFSK,  $\pi/4$ -DQPSK, 8DPSK  
We evaluated and selected GFSK (non-EDR) and 8DPSK (EDR) to test and recorded in the report.

Freq. Band : 2402 MHz ~ 2480 MHz  
Total 79 Channels:

Tested Freq. : 2402 MHz (Channel 00)  
2441 MHz (Channel 39)  
2480 MHz (Channel 78)

Antenna Gain : 0.0 dBi

Antenna Type : PCB antenna

Applicant : AFCO INC.  
P.O. BOX 177 Memphis TN 38101, USA

Manufacturer : Hangzhou Newsources Electronics Co., Ltd.  
No. 7 Houyang Rd, Anxi Industrial Zone,  
Liangzhu, Hangzhou, China

## 2.2 Description of Test Facility

Site Description (Semi-Anechoic Chamber)	: Sept. 17, 1998 file on Mar 16, 2012 Renewed Federal Communications Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, USA
Name of Firm	: Audix Technology (Shanghai) Co., Ltd.
Site Location	: 3 F 34 Bldg 680 Guiping Rd., Caohejing Hi-Tech Park, Shanghai 200233, China
FCC registration Number	: 91789
Accredited by NVLAP, Lab Code	: 200371-0

## 2.3 Measurement Uncertainty

Radiated Emission Expanded Uncertainty (30-200MHz):	U = 4.14dB (Horizontal) U = 4.28dB (Vertical)
Radiated Emission Expanded Uncertainty (200M-1GHz):	U = 4.18dB (Horizontal) U = 4.26dB (Vertical)
Radiated Emission Expanded Uncertainty (Above 1GHz):	U= 4.50 dB (Horizontal) U= 4.16 dB (Vertical)
20 dB Bandwidth Expanded Uncertainty	: U = 0.05 kHz
Peak Output Power Expanded Uncertainty	: U = 0.30 dB
Spurious RF Conducted Emissions Expanded Uncertainty	: U = 0.15 dB

### 3 RADIATED EMISSION TEST

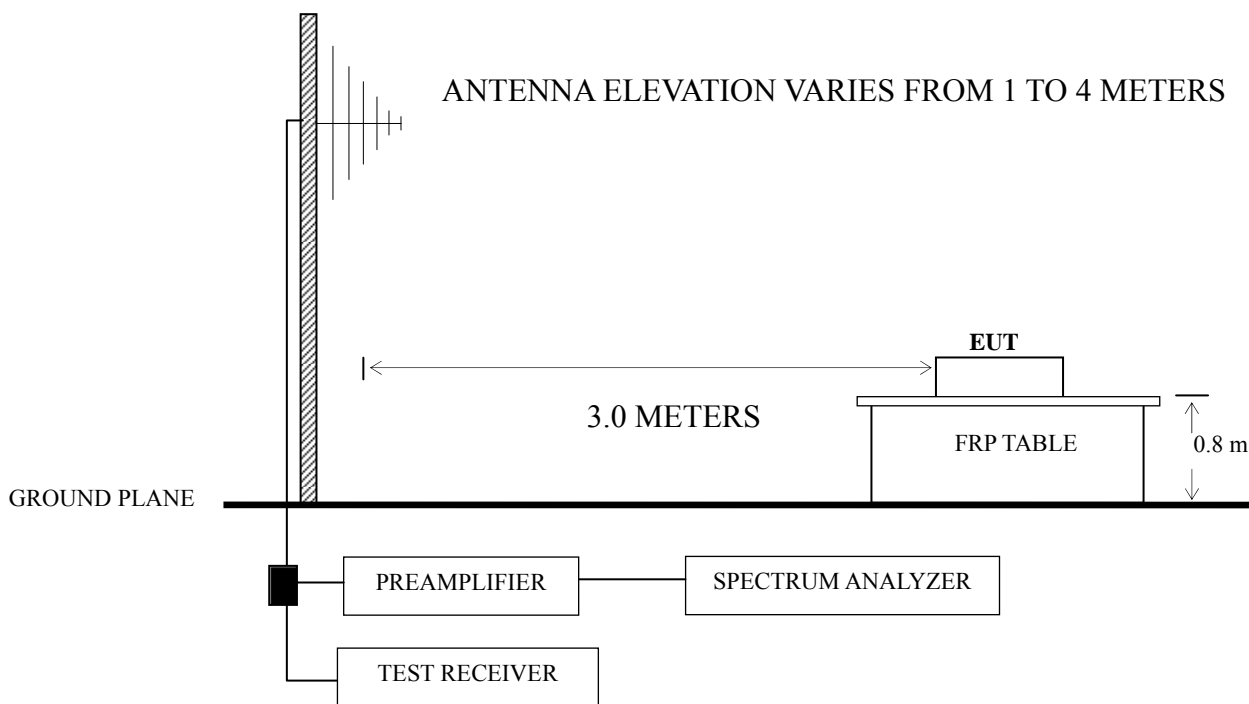
#### 3.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Preamplifier	Agilent	8447D	2944A10548	Sep 18, 2012	Mar 18, 2013
2.	Preamplifier	HP	8449B	3008A00864	Apr 29, 2012	Apr 29, 2013
3.	Spectrum Analyzer	Agilent	E7405A	MY45106600	Mar 22, 2012	Mar 22, 2013
4.	Test Receiver	R&S	ESVS10	844594/001	Mar 22, 2012	Mar 22, 2013
5.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 03, 2012	May 03, 2013
6.	Horn Antenna	EMCO	3115	9607-4878	May 03, 2012	May 03, 2013
7.	Horn Antenna	EMCO	3116	00062643	Jul 21, 2012	Jul 21, 2013
8.	50Ω Coaxial Switch	Anritsu	MP59B	6200426390	Sep 18, 2012	Mar 18, 2013
9.	Software	Audix	E3	SET00200 9912M295-2	-	-

#### 3.2 Block Diagram of Test Setup

##### 3.2.1 Test Setup



■ : 50 ohm Coaxial Switch



### 3.3 Radiated Emission Limit [FCC Part 15 Subpart C 15.209]

Frequency (MHz)	Distance (m)	Field strength limits ( $\mu\text{V/m}$ )	
		( $\mu\text{V/m}$ )	dB( $\mu\text{V/m}$ )
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

NOTE 1 - Emission Level dB ( $\mu\text{V/m}$ ) = 20 log Emission Level ( $\mu\text{V/m}$ )  
NOTE 2 - The tighter limit applies at the band edges.  
NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.  
NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.  
NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

### 3.4 Test Configuration

The EUT (listed in Sec.2.1) and the simulators (listed in Sec.2.2) were installed as shown on Sec.3.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

### 3.5 Operating Condition of EUT

3.5.1 Setup the EUT as shown in Sec. 3.2.

3.5.2 Turn on the power of all equipment.

3.5.3 Turn the EUT on the test mode, and then test.

### 3.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable that is 0.8 meter above ground. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.4:2003 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESVS10 was set at 120 kHz from 30MHz to 1000MHz.

The bandwidth of the VBW was set at 1MHz and RBW was set at 1MHz for peak emission measurement above 1GHz for Spectrum Agilent E7405A.

The frequency range from 30 MHz to 25 GHz (Up to 10<sup>th</sup> harmonics from fundamental frequency) was checked.

The EUT was tested under the following test modes:

Mode	Operation	Channel	Frequency
1.	Transmitting	00	2402 MHz
2.		39	2441 MHz
3.		78	2480 MHz
4.	Receiving	--	--
5.	Transmitting	00	2402 MHz
6.	Band-Edge	78	2480 MHz

All the test results are listed in Sec.3.7.

### 3.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

No.	Operation	Channel	Frequency	Data Page
1.	Transmitting	00	2402 MHz	P12
2.		39	2441 MHz	P13
3.		78	2480 MHz	P14
4.	Receiving	--	--	P15
5.	Transmitting	Band Edge		P16

NOTE 1 – Level = Read Level + Antenna Factor + Cable Loss (<1GHz)

NOTE 2 – Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor (>1GHz)

NOTE 3 – The emission levels recorded below is data of EUT configured in Lying direction, for Lying direction was the maximum emission direction during the test. The data of Side & Stand direction are too low against the official limit to be reported.

NOTE 4 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.

For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

EUT : Bluetooth remote control      Temperature : 25°C

Model No. : 16-SABTS      Humidity : 45%RH

Test Mode : Transmitting Ch00      Date of Test : Nov 03, 2012

Polarization	Frequency (MHz)	Meter Reading dB (µV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (µV/m)	Limits dB (µV/m)	Margin (dB)	Remark
Horizontal	32.91	-2.67	16.79	0.82	--	14.94	40.00	25.06	QP
	114.39	0.08	11.10	1.97	--	13.15	40.00	26.85	
	203.63	0.55	9.94	2.44	--	12.93	40.00	27.07	
	256.98	0.84	12.27	2.63	--	15.74	47.00	31.26	
	376.29	0.51	15.79	2.93	--	19.23	47.00	27.77	
	475.23	0.91	17.32	3.21	--	21.44	47.00	25.56	
	1060.00	47.95	25.15	5.26	38.07	40.29	74.00	33.71	PK
	1396.00	46.75	26.69	5.59	37.25	41.78	74.00	32.22	
	2992.00	46.54	31.87	6.49	35.90	49.00	74.00	25.00	
4516.00	44.39	33.95	8.86	35.46	51.74	74.00	22.26		
Vertical	32.91	-0.81	16.79	0.82	--	16.80	40.00	23.20	QP
	68.80	-1.56	9.79	1.39	--	9.62	40.00	30.38	
	133.79	-1.48	10.74	2.12	--	11.38	40.00	28.62	
	172.59	-1.27	10.08	2.33	--	11.14	40.00	28.86	
	303.54	-0.63	13.80	2.77	--	15.94	47.00	31.06	
	523.73	0.24	17.74	3.31	--	21.29	47.00	25.71	
	1120.00	46.36	25.42	5.30	37.94	39.14	74.00	34.86	PK
	1504.00	47.14	27.00	5.79	36.96	42.97	74.00	31.03	
	2644.00	46.02	30.27	6.81	36.02	47.08	74.00	26.92	
3892.00	44.46	33.07	7.88	35.71	49.70	74.00	24.30		

TEST ENGINEER: RAVEN JIN

EUT : Bluetooth remote control      Temperature : 25°C

Model No. : 16-SABTS      Humidity : 45%RH

Serial No. : Transmitting Ch39      Date of Test : Nov 03, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	30.97	-1.17	17.78	0.81	--	17.42	40.00	22.58	QP
	62.98	-0.60	9.36	1.26	--	10.02	40.00	29.98	
	124.09	-0.91	10.93	2.05	--	12.07	40.00	27.93	
	201.69	-0.25	9.87	2.43	--	12.05	40.00	27.95	
	353.98	0.42	15.25	2.89	--	18.56	47.00	28.44	
	601.33	0.20	18.23	3.47	--	21.90	47.00	25.10	
	1432.00	46.25	26.80	5.67	37.15	41.57	74.00	32.43	PK
	2200.00	45.95	28.33	6.67	36.15	44.80	74.00	29.20	
	2968.00	46.52	31.77	6.49	35.90	48.88	74.00	25.12	
4144.00	44.69	33.44	8.38	35.64	50.87	74.00	23.13		
Vertical	32.91	-2.87	16.79	0.82	--	14.74	40.00	25.26	QP
	53.28	-0.82	8.70	1.01	--	8.89	40.00	31.11	
	104.69	-2.18	11.27	1.89	--	10.98	40.00	29.02	
	153.19	-1.31	10.36	2.24	--	11.29	40.00	28.71	
	320.03	0.03	14.26	2.80	--	17.09	47.00	29.91	
	562.53	-1.24	17.99	3.39	--	20.14	47.00	26.86	
	1168.00	47.02	25.66	5.33	37.83	40.18	74.00	33.82	PK
	2344.00	46.06	29.02	6.82	36.11	45.79	74.00	28.21	
	3256.00	45.85	32.01	6.78	35.83	48.81	74.00	25.19	
4624.00	44.08	34.58	8.92	35.40	52.18	74.00	21.82		

TEST ENGINEER: RAVEN JIN

EUT : Bluetooth remote control      Temperature : 25°C

Model No. : 16-SABTS      Humidity : 45%RH

Serial No. : Transmitting Ch78      Date of Test : Nov 03, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	31.94	-0.84	17.29	0.82	--	17.27	40.00	22.73	QP
	94.99	-1.10	11.18	1.80	--	11.88	40.00	28.12	
	114.39	-0.83	11.10	1.97	--	12.24	40.00	27.76	
	193.93	0.98	9.86	2.41	--	13.25	40.00	26.75	
	318.09	-0.45	14.19	2.80	--	16.54	47.00	30.46	
	421.88	0.14	16.57	3.04	--	19.75	47.00	27.25	
	1528.00	46.08	27.02	5.83	36.90	42.03	74.00	31.97	PK
	2368.00	45.76	29.11	6.86	36.10	45.63	74.00	28.37	
	3436.00	44.36	32.08	7.05	35.79	47.70	74.00	26.30	
4528.00	44.11	34.03	8.86	35.45	51.55	74.00	22.45		
Vertical	32.91	-1.90	16.79	0.82	--	15.71	40.00	24.29	QP
	87.23	1.52	10.88	1.70	--	14.10	40.00	25.90	
	101.78	-1.49	11.32	1.86	--	11.69	40.00	28.31	
	145.43	-0.52	10.50	2.20	--	12.18	40.00	27.82	
	334.58	0.82	14.66	2.84	--	18.32	47.00	28.68	
	609.09	0.09	18.33	3.49	--	21.91	47.00	25.09	
	1168.00	48.39	25.66	5.33	37.83	41.55	74.00	32.45	PK
	2200.00	45.82	28.33	6.67	36.15	44.67	74.00	29.33	
	3232.00	45.90	32.00	6.78	35.83	48.85	74.00	25.15	
4480.00	44.01	33.79	8.81	35.48	51.13	74.00	22.87		

TEST ENGINEER: RAVEN JIN

EUT : Bluetooth remote control      Temperature : 25°C

Model No. : 16-SABTS      Humidity : 45%RH

Serial No. : Receiving      Date of Test : Nov 03, 2012

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	33.88	-1.47	16.26	0.83	--	15.62	40.00	24.38	QP
	92.08	-1.02	11.08	1.75	--	11.81	40.00	28.19	
	159.98	-0.42	10.25	2.27	--	12.10	40.00	27.90	
	298.69	0.09	13.67	2.75	--	16.51	47.00	30.49	
	455.83	-0.39	17.06	3.15	--	19.82	47.00	27.18	
	526.64	0.93	17.76	3.33	--	22.02	47.00	24.98	
	1744.00	46.84	27.21	6.13	36.51	43.67	74.00	30.33	PK
	2764.00	45.80	30.91	6.68	35.97	47.42	74.00	26.58	
	3760.00	46.05	32.76	7.62	35.73	50.70	74.00	23.30	
4600.00	44.46	34.42	8.92	35.42	52.38	74.00	21.62		
Vertical	31.94	-2.91	17.29	0.82	--	15.20	40.00	24.80	QP
	53.28	0.39	8.70	1.01	--	10.10	40.00	29.90	
	96.93	-1.80	11.24	1.82	--	11.26	40.00	28.74	
	198.78	-0.08	9.81	2.42	--	12.15	40.00	27.85	
	376.29	-0.02	15.79	2.93	--	18.70	47.00	28.30	
	625.58	-0.24	18.53	3.51	--	21.80	47.00	25.20	
	1444.00	47.03	26.84	5.67	37.11	42.43	74.00	31.57	PK
	2164.00	45.43	28.14	6.63	36.16	44.04	74.00	29.96	
	3280.00	45.95	32.02	6.85	35.82	49.00	74.00	25.00	
4564.00	44.37	34.18	8.86	35.43	51.98	74.00	22.02		

TEST ENGINEER: RAVEN JIN

**Radiated Band Edge measurement:****EDR:**

Polarization	Frequency (MHz)	Meter Reading dB ( $\mu$ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB ( $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Margin (dB)	Remark
Horizontal	2390.00	46.56	28.80	6.89	35.95	46.30	74.00	27.70	PK
	2483.50	63.14	28.36	6.96	35.91	62.55	74.00	11.45	
	2390.00	34.22	28.80	6.89	35.95	33.96	54.00	20.04	AV
	2483.50	46.71	28.36	6.96	35.91	46.12	54.00	7.88	
Vertical	2390.00	47.56	28.80	6.89	35.95	47.30	74.00	26.70	PK
	2483.50	60.87	28.36	6.96	35.91	60.28	74.00	13.72	
	2390.00	34.65	28.80	6.89	35.95	34.39	54.00	19.61	AV
	2483.50	47.34	28.36	6.96	35.91	46.75	54.00	7.25	

Note – Through pre-scan, find the EDR mode is the worst case.  
So we recorded the worst case in the report.



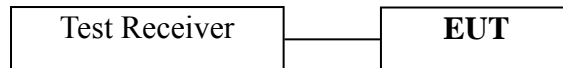
## 4 20 dB BANDWIDTH MEASUREMENT

### 4.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101303	Sep 11, 2012	Sep 11, 2013

### 4.2 Block Diagram of Test Setup



### 4.3 Specification Limits (§15.247(a)(1))

For frequency hopping systems, hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of hopping channel, whichever is greater.

### 4.4 Operating Condition of EUT

Enable the EUT to transmit data at different channel frequency individually.

### 4.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer.

Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

The test procedure is defined in DA 00-705.

## 4.6 Test Results

### **PASSED.**

All the test results are attached in next pages.

(Test Date: Oct. 31, 2012 Temperature: 25°C Humidity: 48 %)

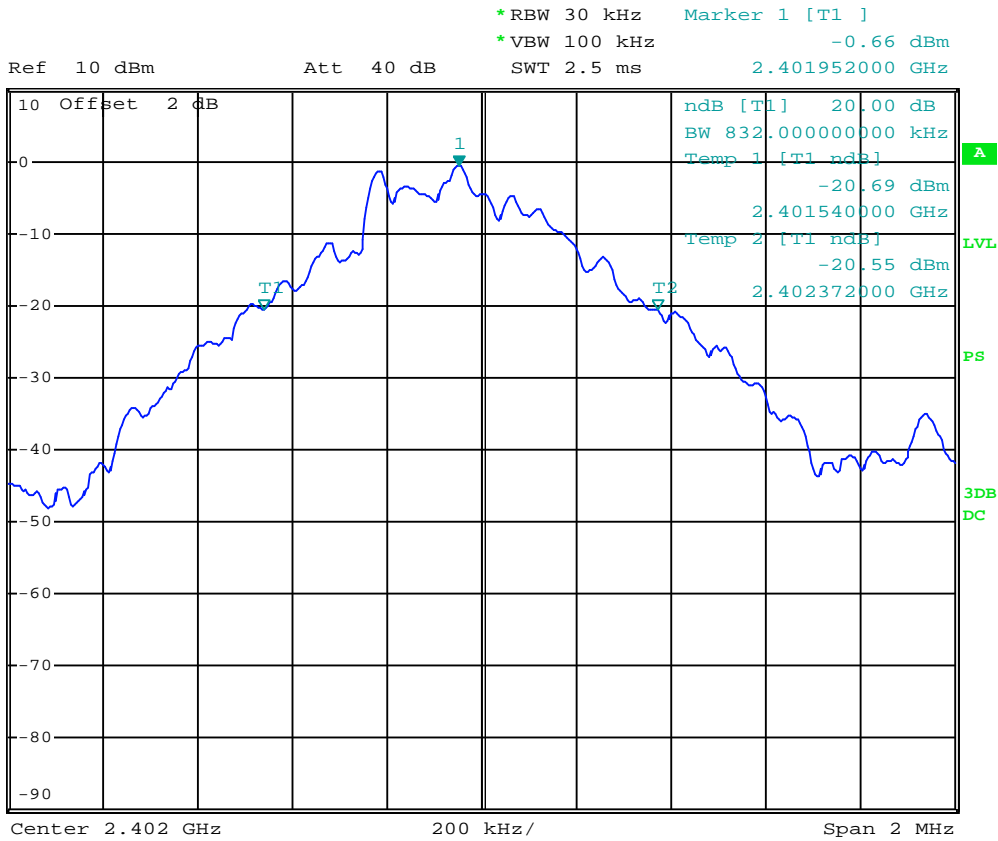
For Non-EDR

Channel	Frequency	20dB Bandwidth
00	2402 MHz	<b>0.832 MHz</b>
39	2441 MHz	<b>0.812 MHz</b>
78	2480 MHz	<b>0.852 MHz</b>

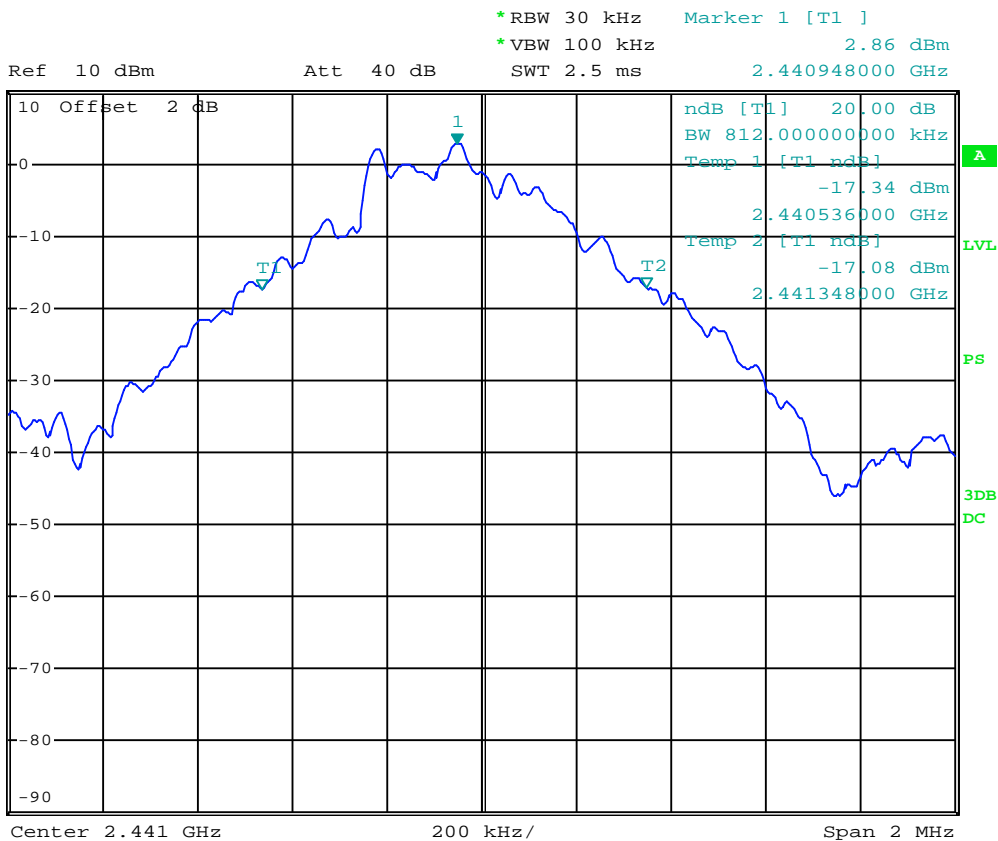
For EDR

Channel	Frequency	20dB Bandwidth
00	2402 MHz	<b>1.050 MHz</b>
39	2441 MHz	<b>1.044 MHz</b>
78	2480 MHz	<b>1.044 MHz</b>

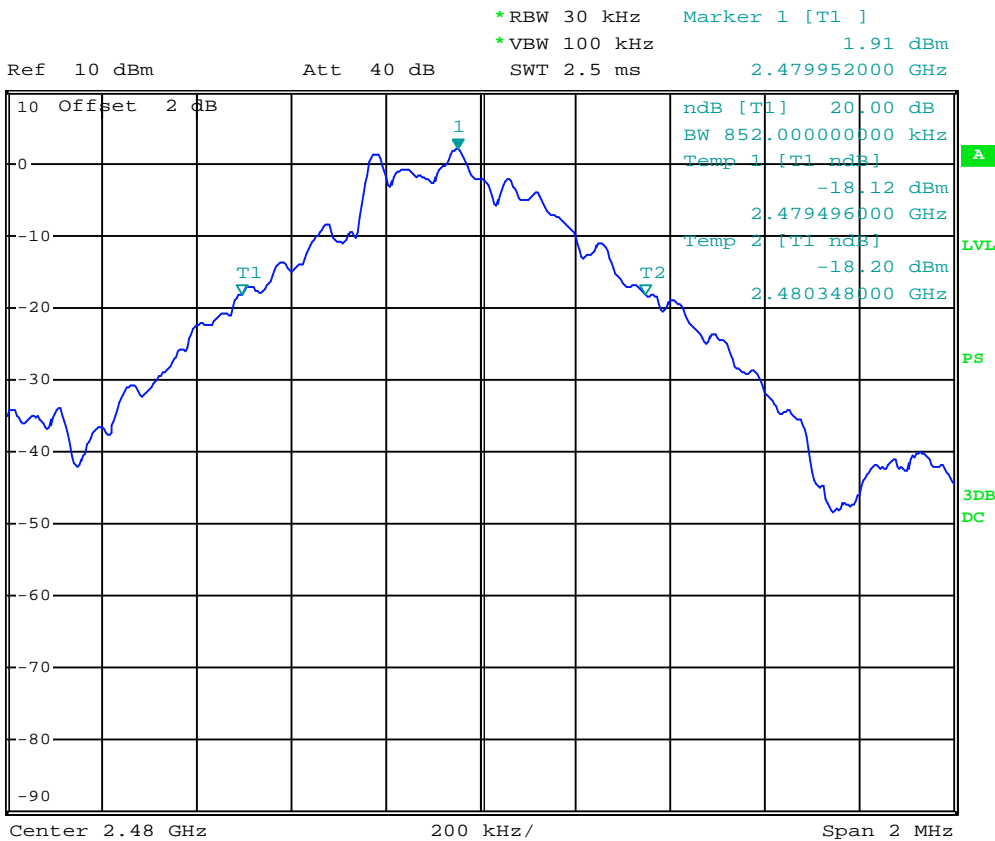
### Ch 00 (2402 MHz) NON-EDR



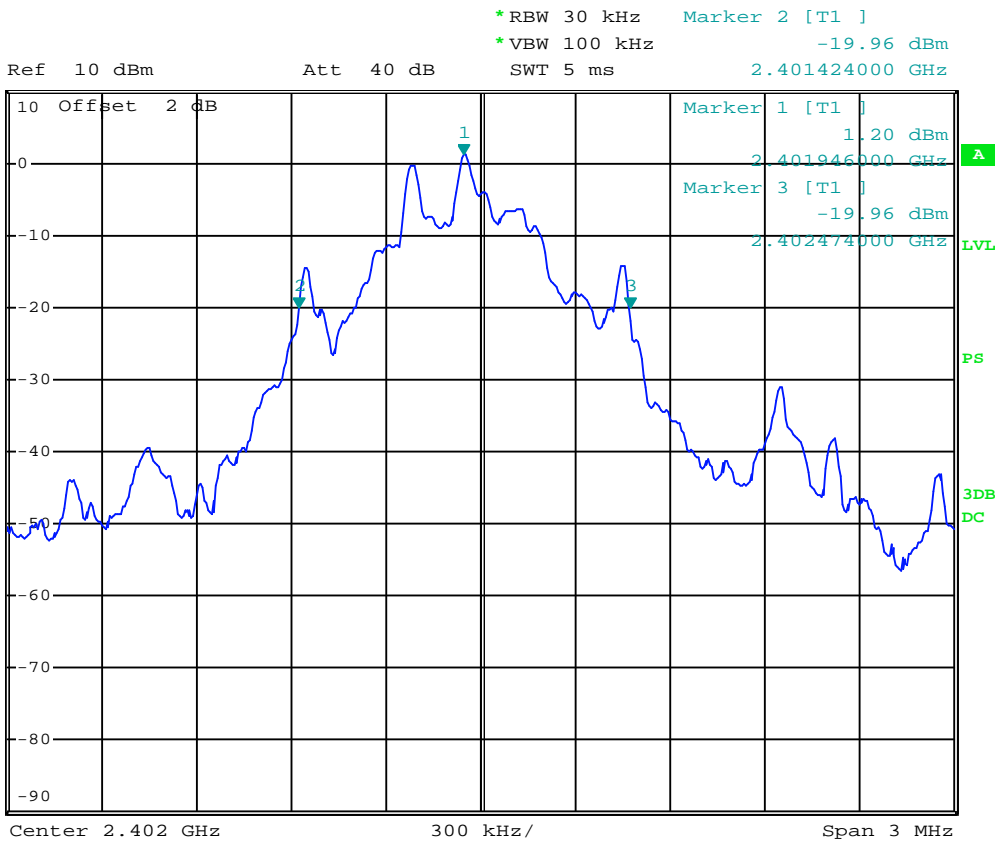
### Ch 39 (2441 MHz) NON-EDR



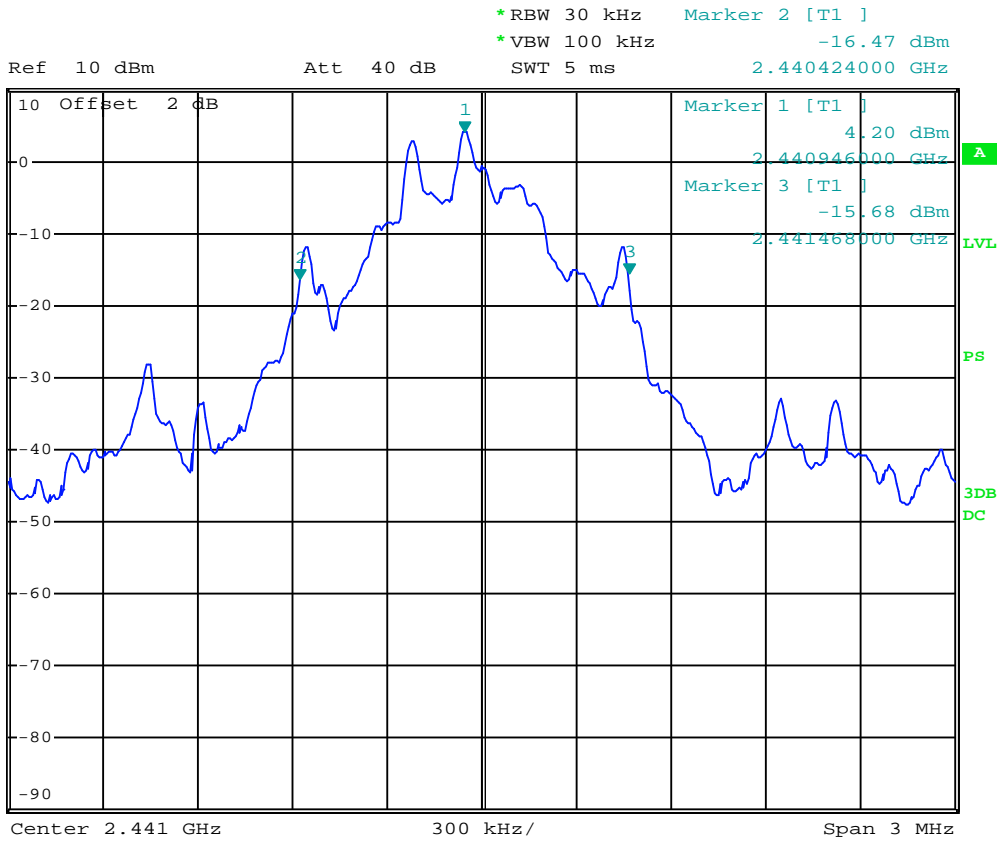
### Ch 78 (2480 MHz) NON-EDR



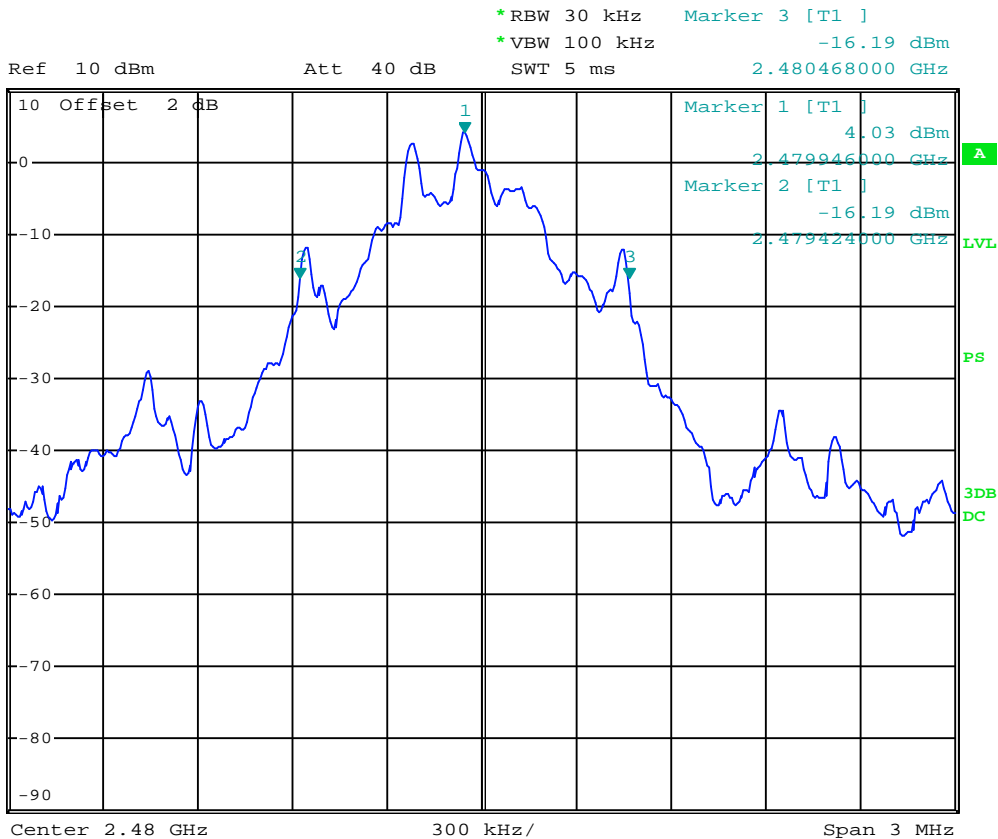
### Ch 00 (2402 MHz) EDR



### Ch 39 (2441 MHz) EDR



### Ch 78 (2480 MHz) EDR



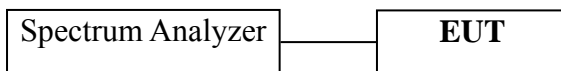
## 5 PEAK OUTPUT POWER MEASUREMENT

### 5.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	R&S	ESCI	101303	Sep 11, 2012	Sep 11, 2013

### 5.2 Block Diagram of Test Setup



### 5.3 Specification Limits ((§15.247(b)(1))

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt. (30 dBm)

### 5.4 Operating Condition of EUT

Enable the EUT to transmit data at different channel frequency individually.

### 5.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.  
The test procedure is defined in DA 00-705.

### 5.6 Test Results

**PASSED.**

(Test Date: Oct. 31, 2012 Temperature: 25°C Humidity: 48 %)

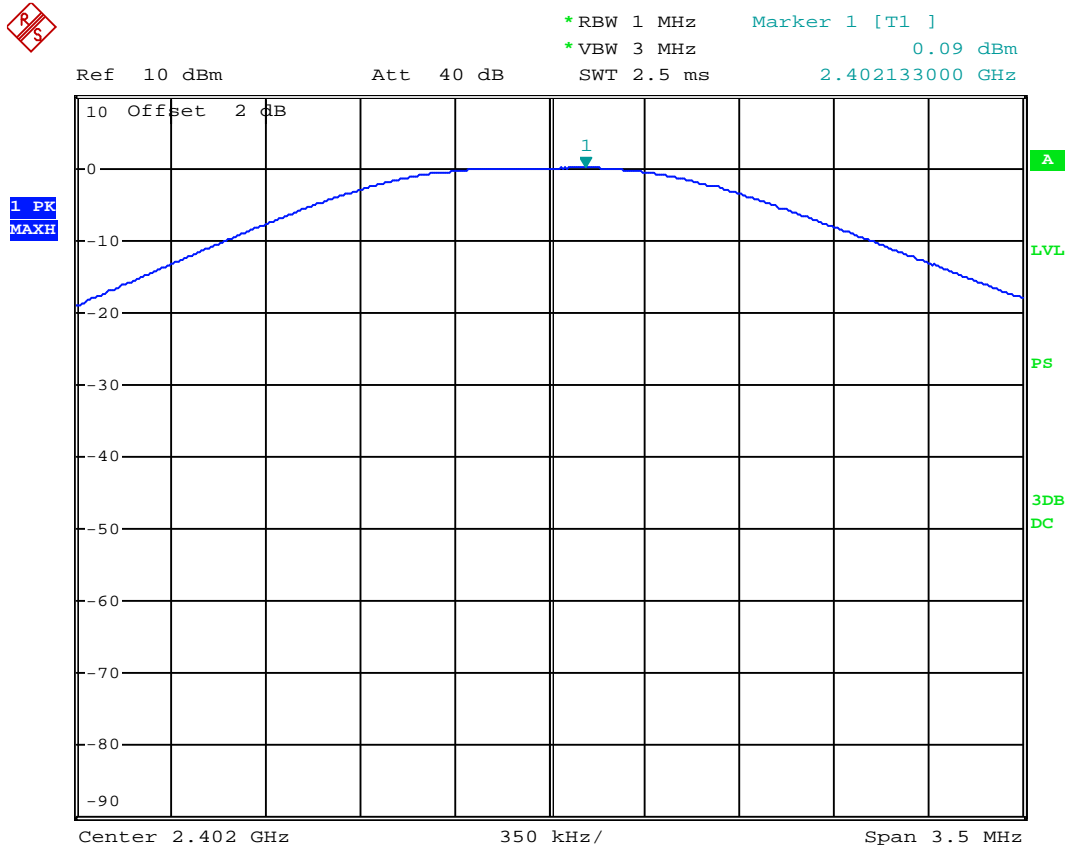
For Non-EDR

Channel	Frequency	Peak Output Power	Limit
00	2402 MHz	<b>0.09 dBm</b>	30 dBm
39	2441 MHz	<b>3.40 dBm</b>	30 dBm
78	2480 MHz	<b>2.71 dBm</b>	30 dBm

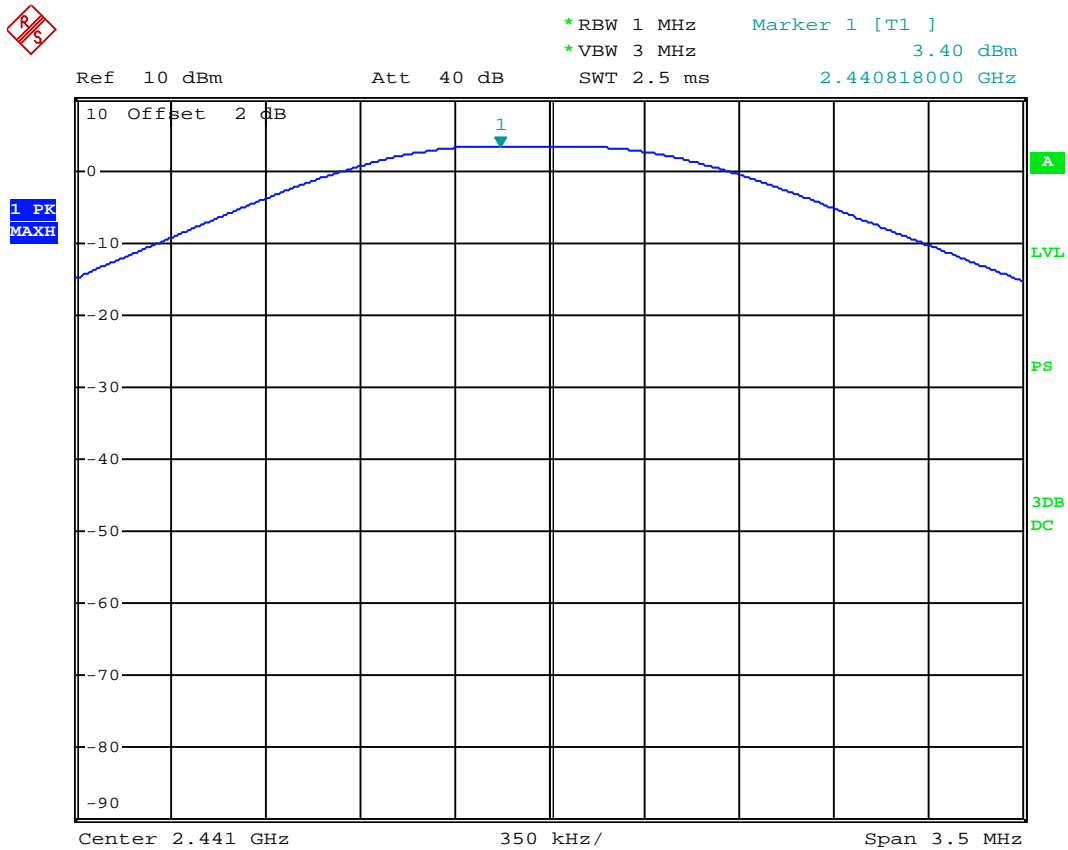
For EDR

Channel	Frequency	Peak Output Power	Limit
00	2402 MHz	<b>1.16 dBm</b>	30 dBm
39	2441 MHz	<b>4.09 dBm</b>	30 dBm
78	2480 MHz	<b>3.91 dBm</b>	30 dBm

### Ch 00 (2402 MHz) NON-EDR



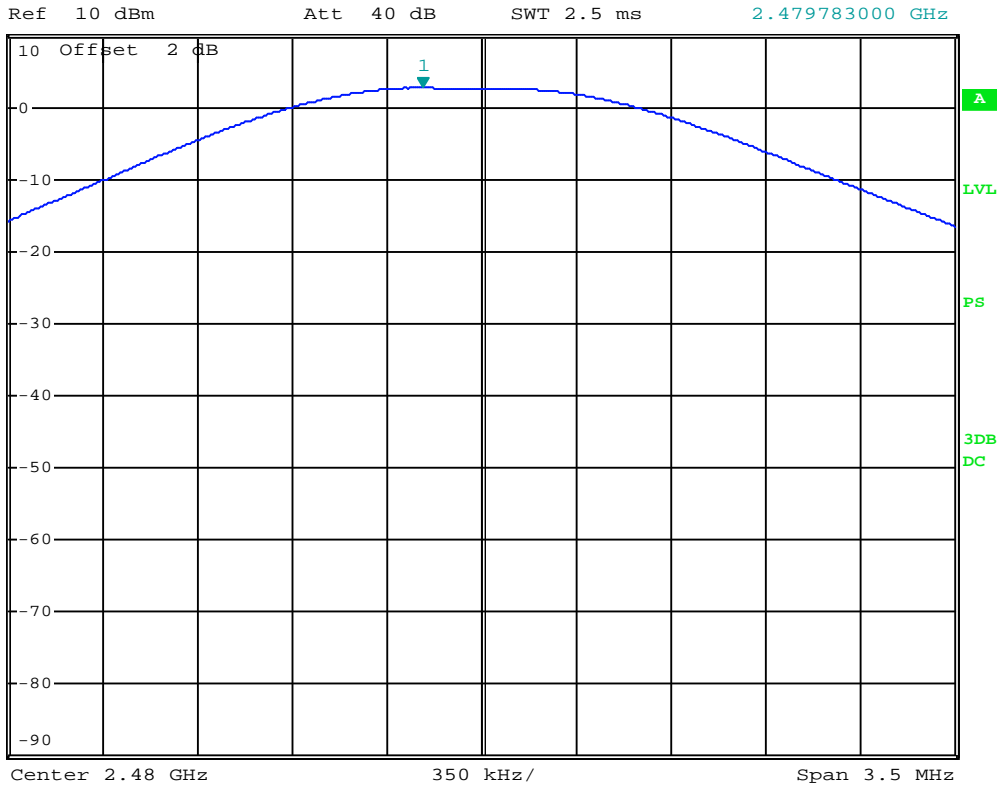
### Ch 39 (2441 MHz) NON-EDR



### Ch 78 (2480 MHz) NON-EDR



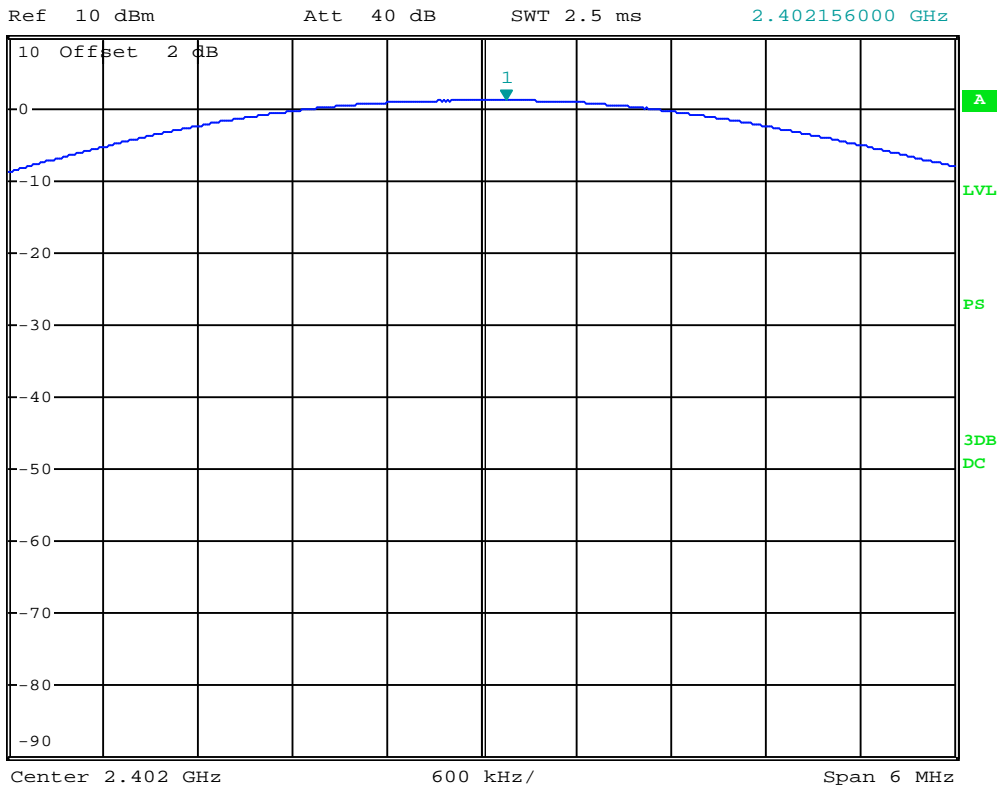
\*RBW 1 MHz      Marker 1 [T1 ]  
\*VBW 3 MHz      2.71 dBm  
SWT 2.5 ms      2.479783000 GHz



### Ch 00 (2402 MHz) EDR

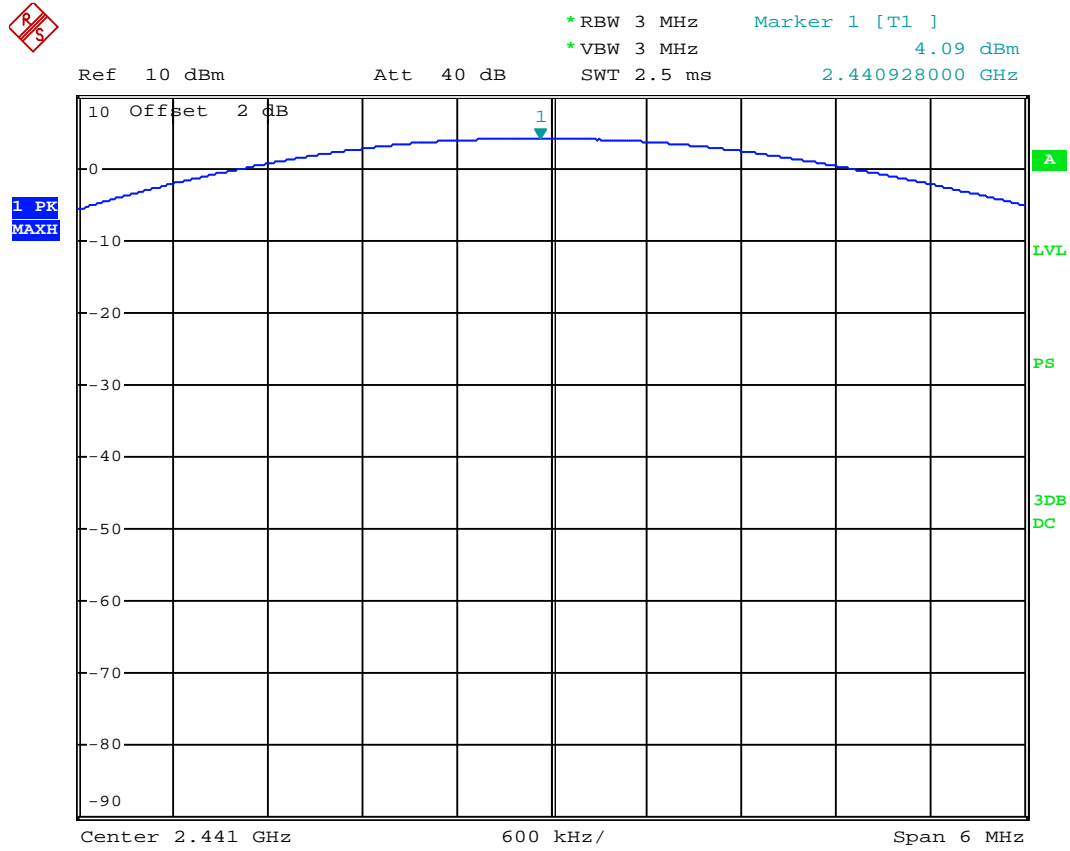


\*RBW 3 MHz      Marker 1 [T1 ]  
\*VBW 3 MHz      1.16 dBm  
SWT 2.5 ms      2.402156000 GHz

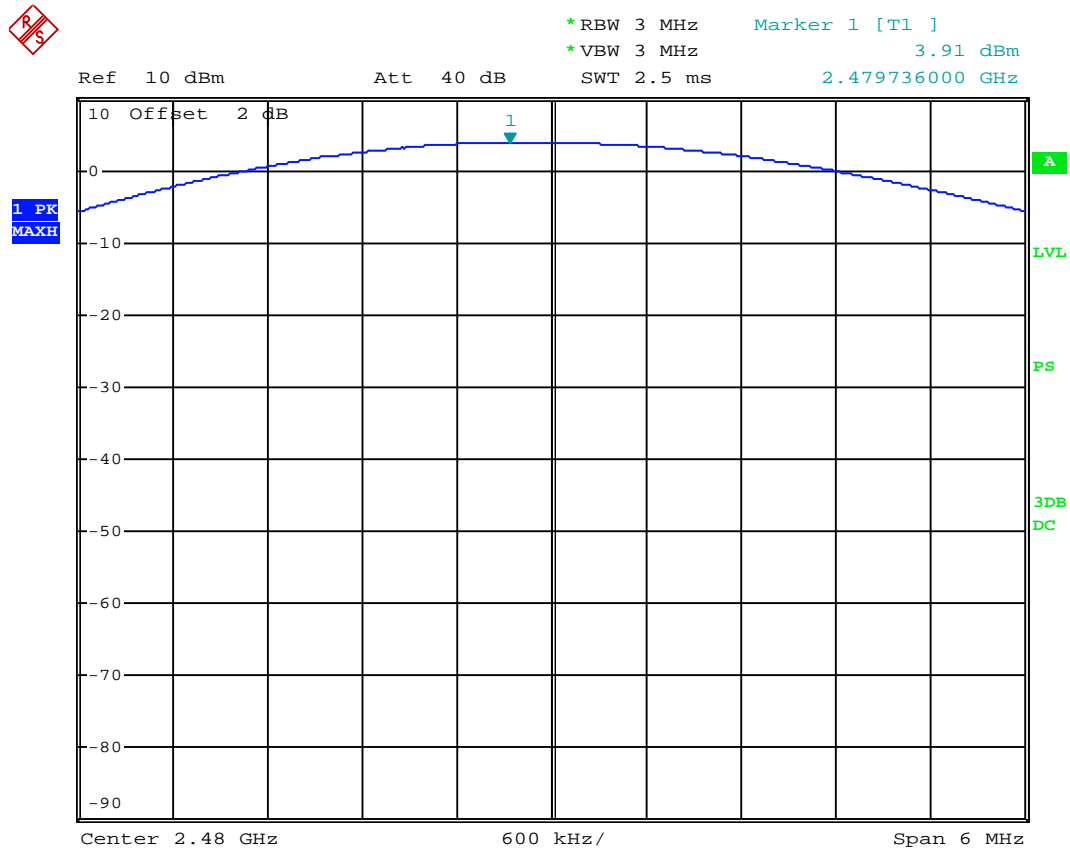




### Ch 39 (2441 MHz) EDR



### Ch 78 (2480 MHz) EDR



## 6 SPURIOUS RF CONDUCTED EMISSIONS

### MEASUREMENT

#### 6.1 Test Equipment

The following test equipment was used during the emission limitations test :

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY45106600	Mar 22, 2012	Mar 22, 2013

#### 6.2 Block Diagram of Test Setup

The same as Section. 4.2.

#### 6.3 Specification Limits (§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. Attenuation below the general limits specified in Section 15.209(a) is not required.

In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).(※This test result attaching to Section. 4.7)

#### 6.4 Operating Condition of EUT

Enable the EUT to transmit data at different channel frequency individually.

#### 6.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. Set RBW = 100 kHz, VBW = 300 kHz, scan up through 10<sup>th</sup> harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

The test procedure is defined in DA 00-705.

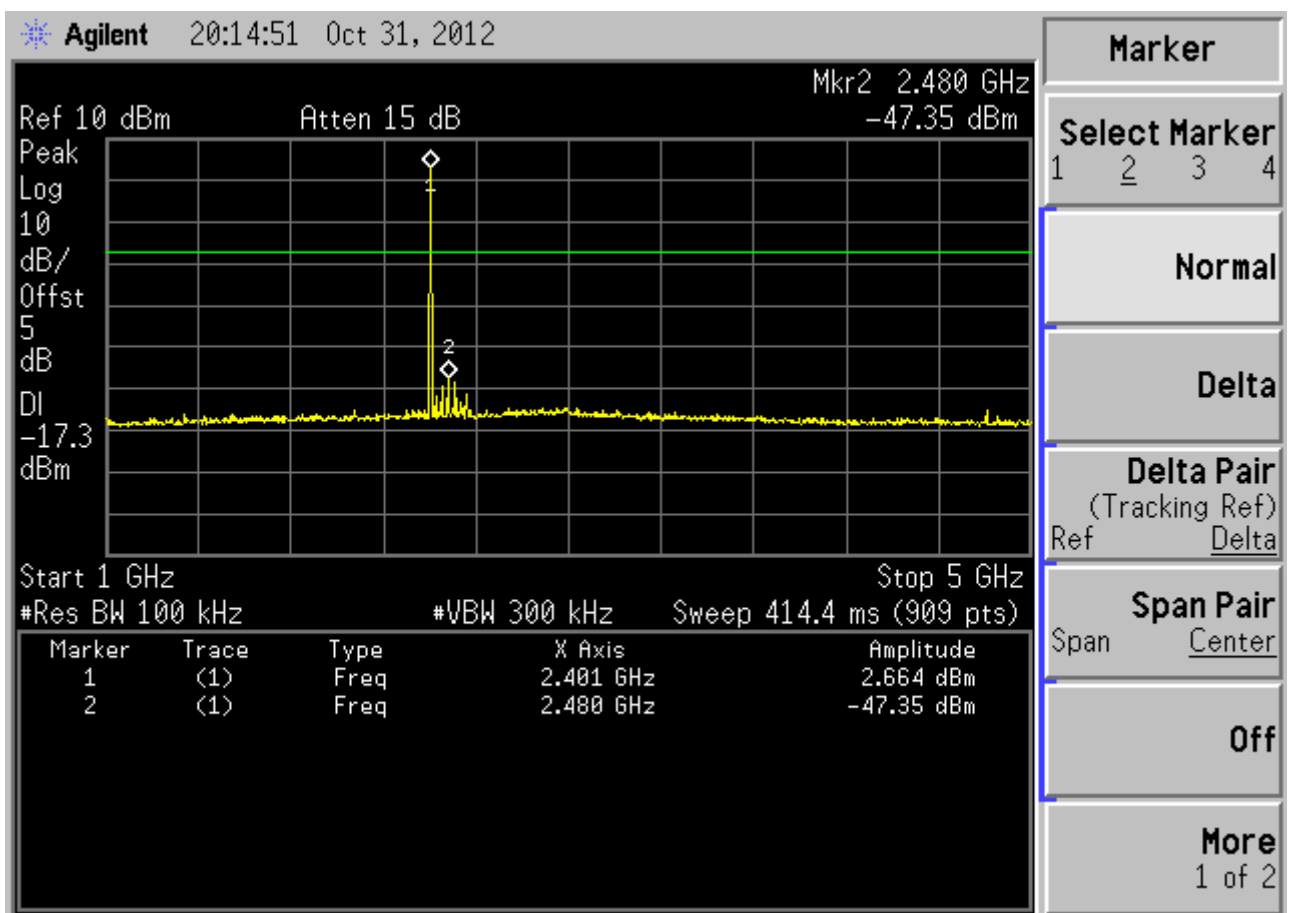
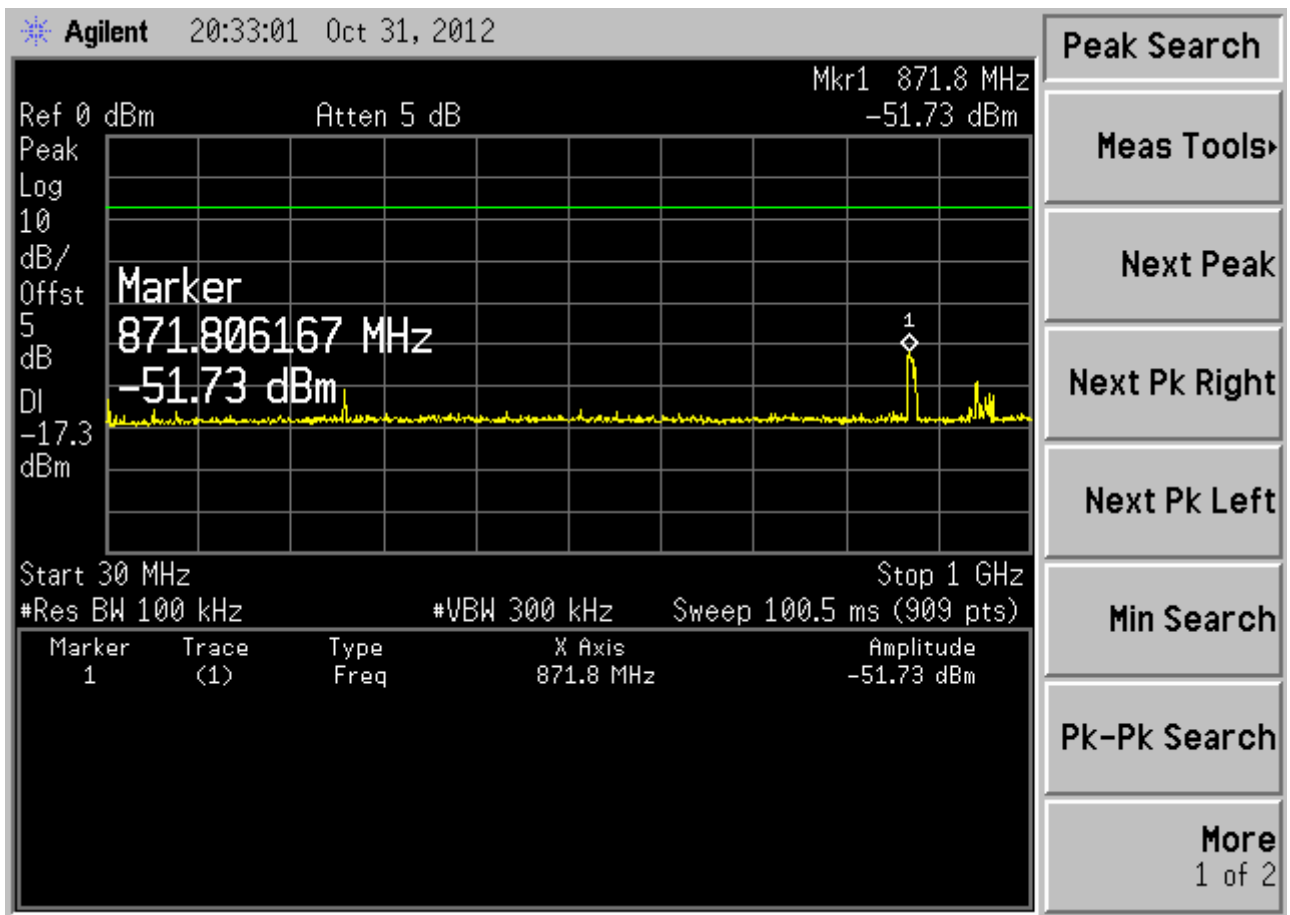
#### 6.6 Test Results

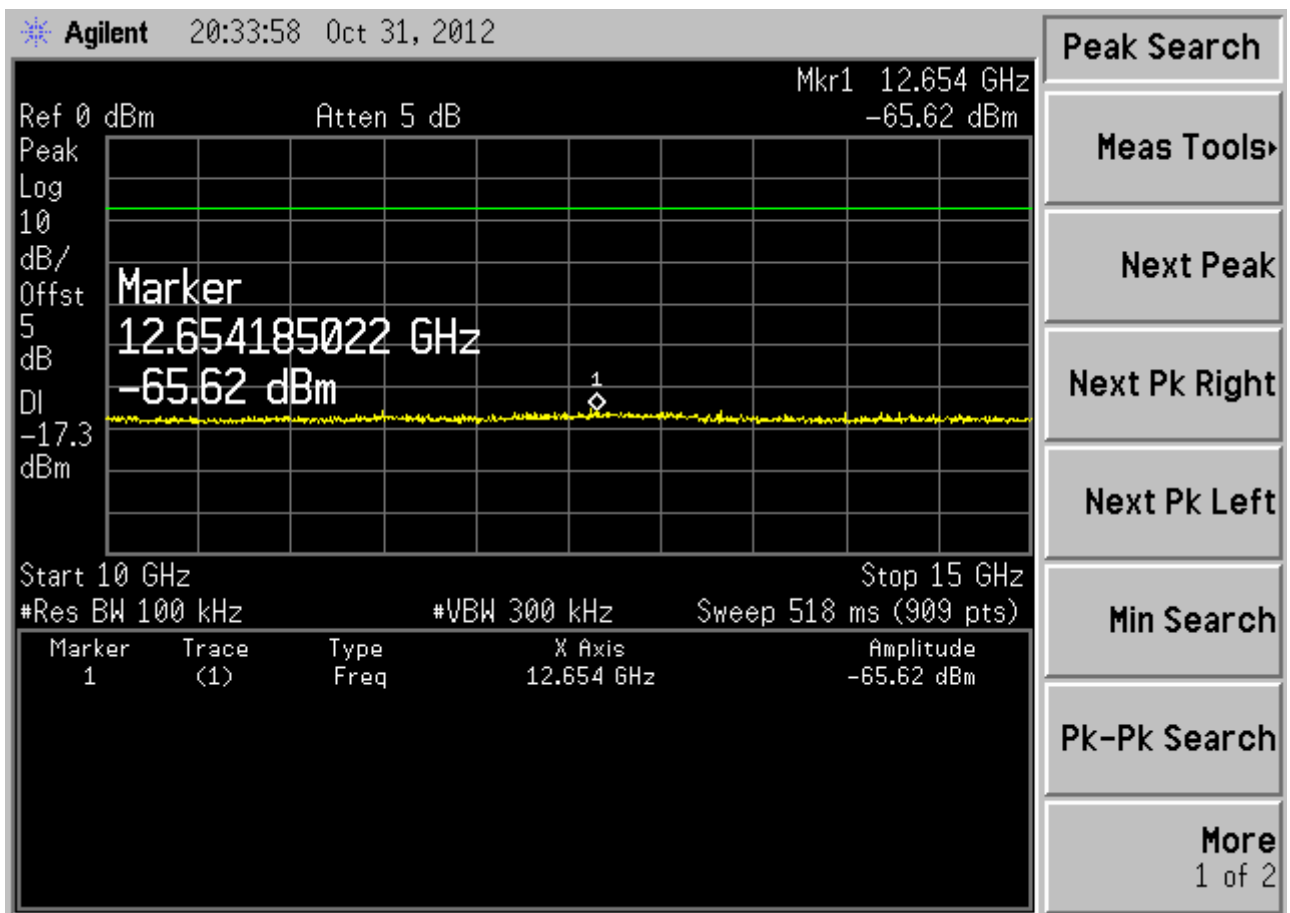
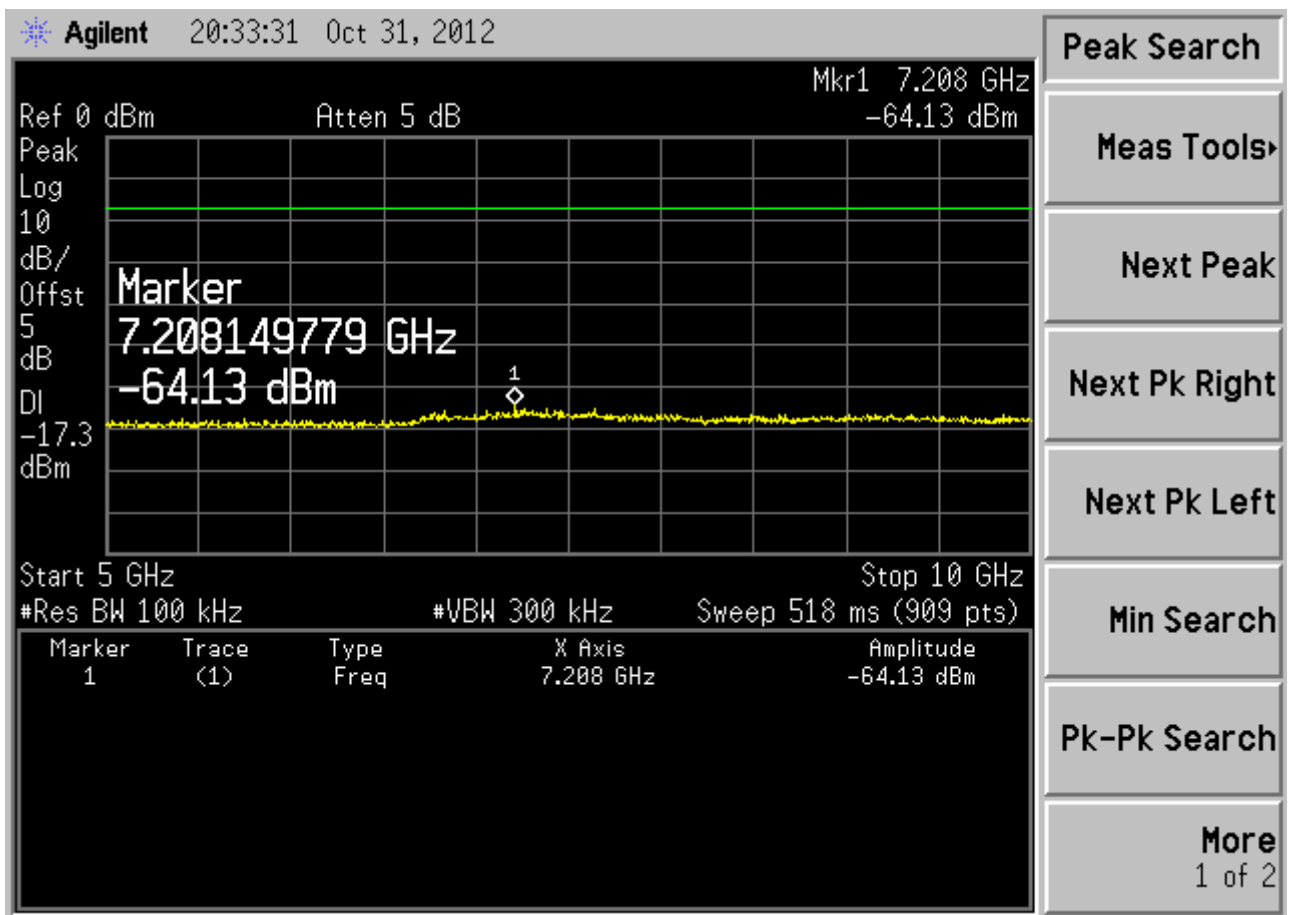
**PASSED.**

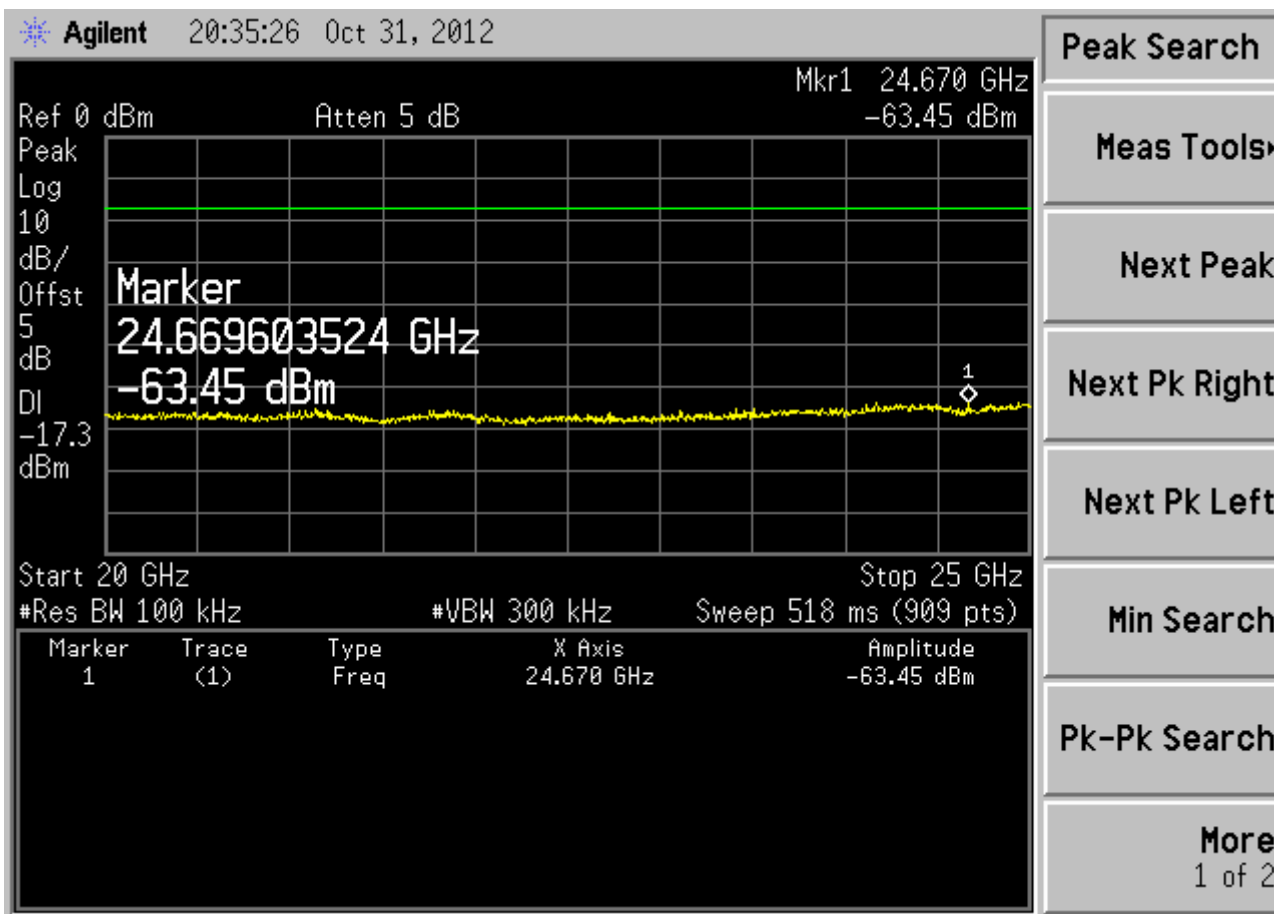
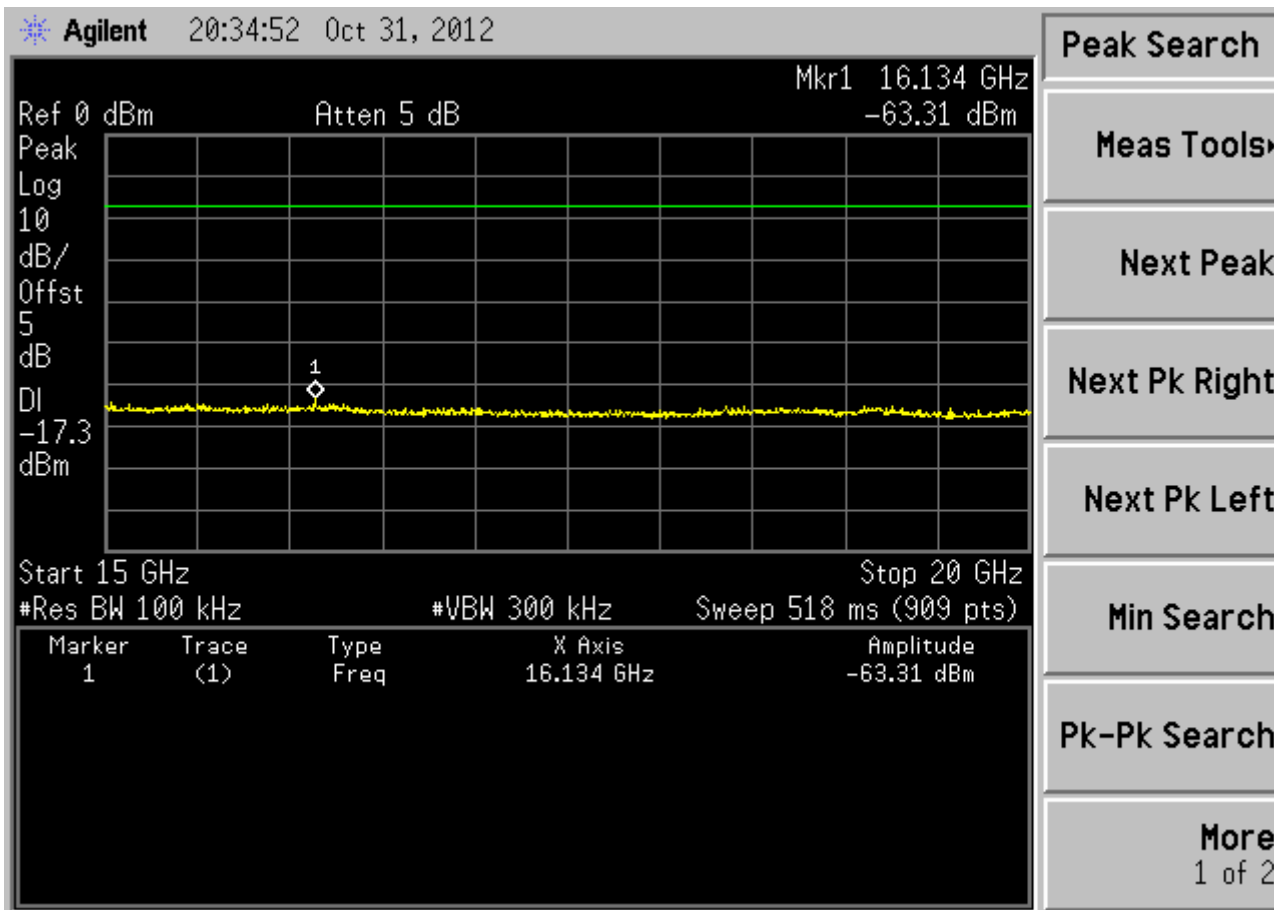
The test data was attached in the next pages.

(Test Date: Oct. 31, 2012 Temperature: 25°C Humidity: 48 %)

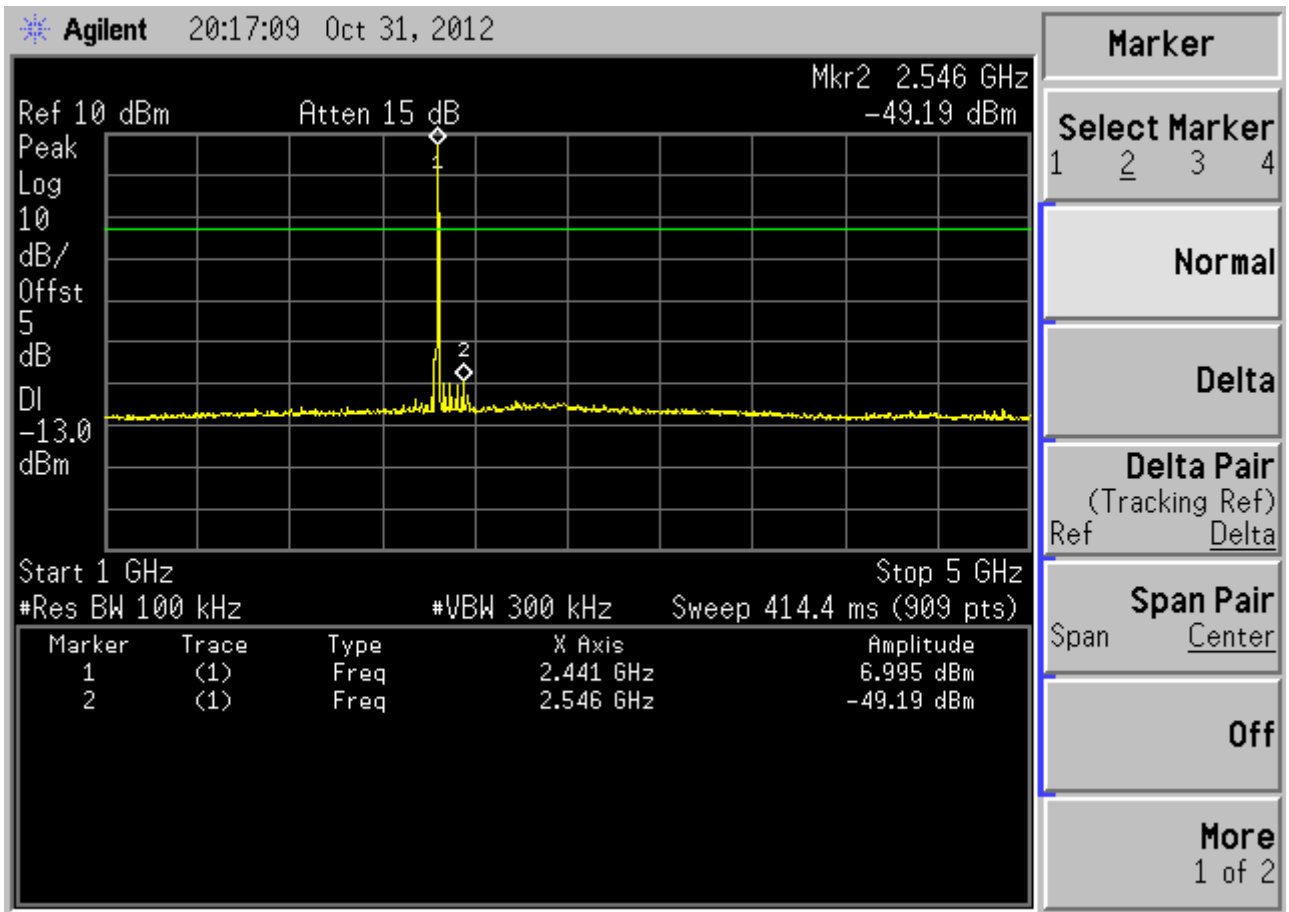
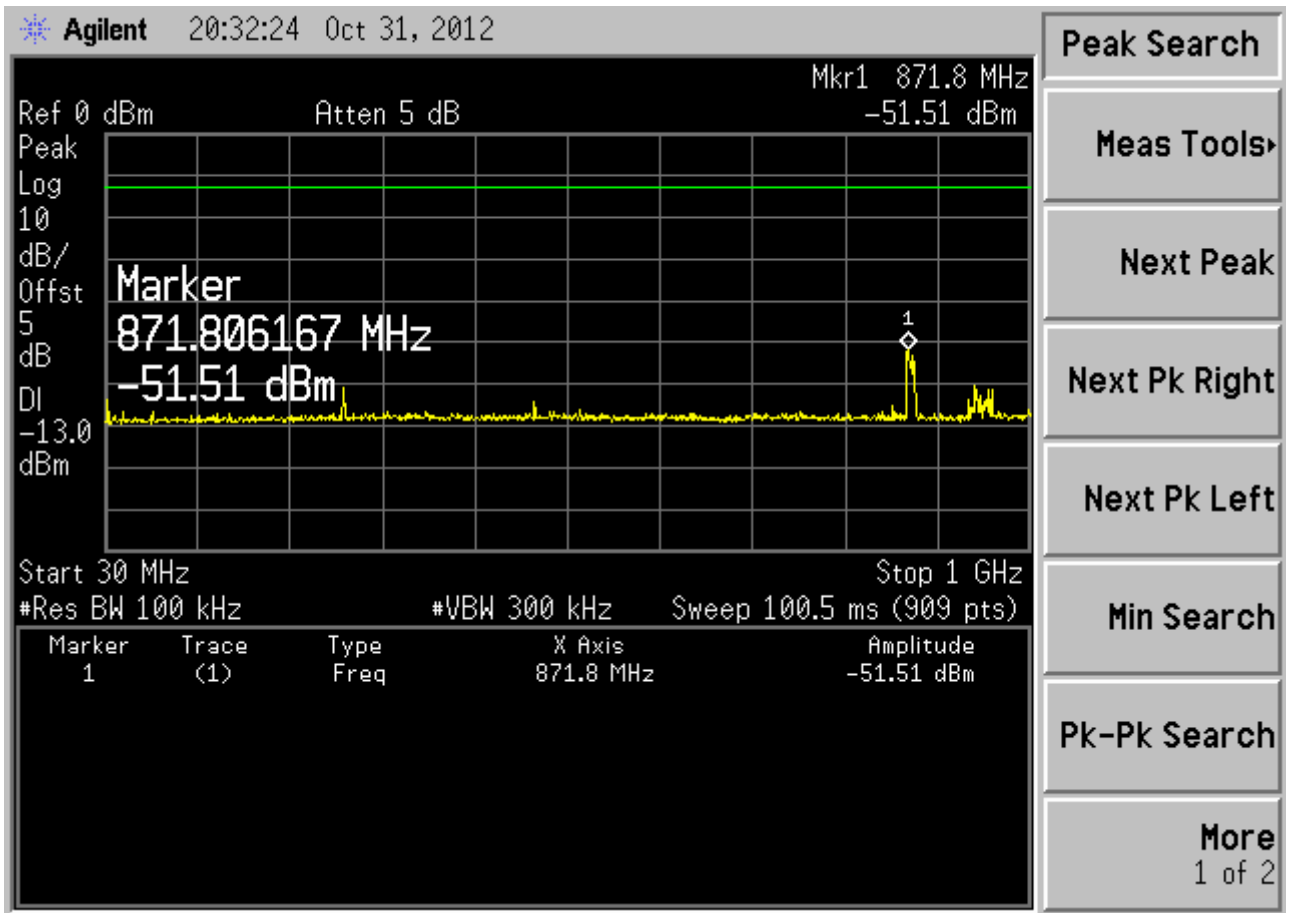
Ch 00 (2402 MHz)

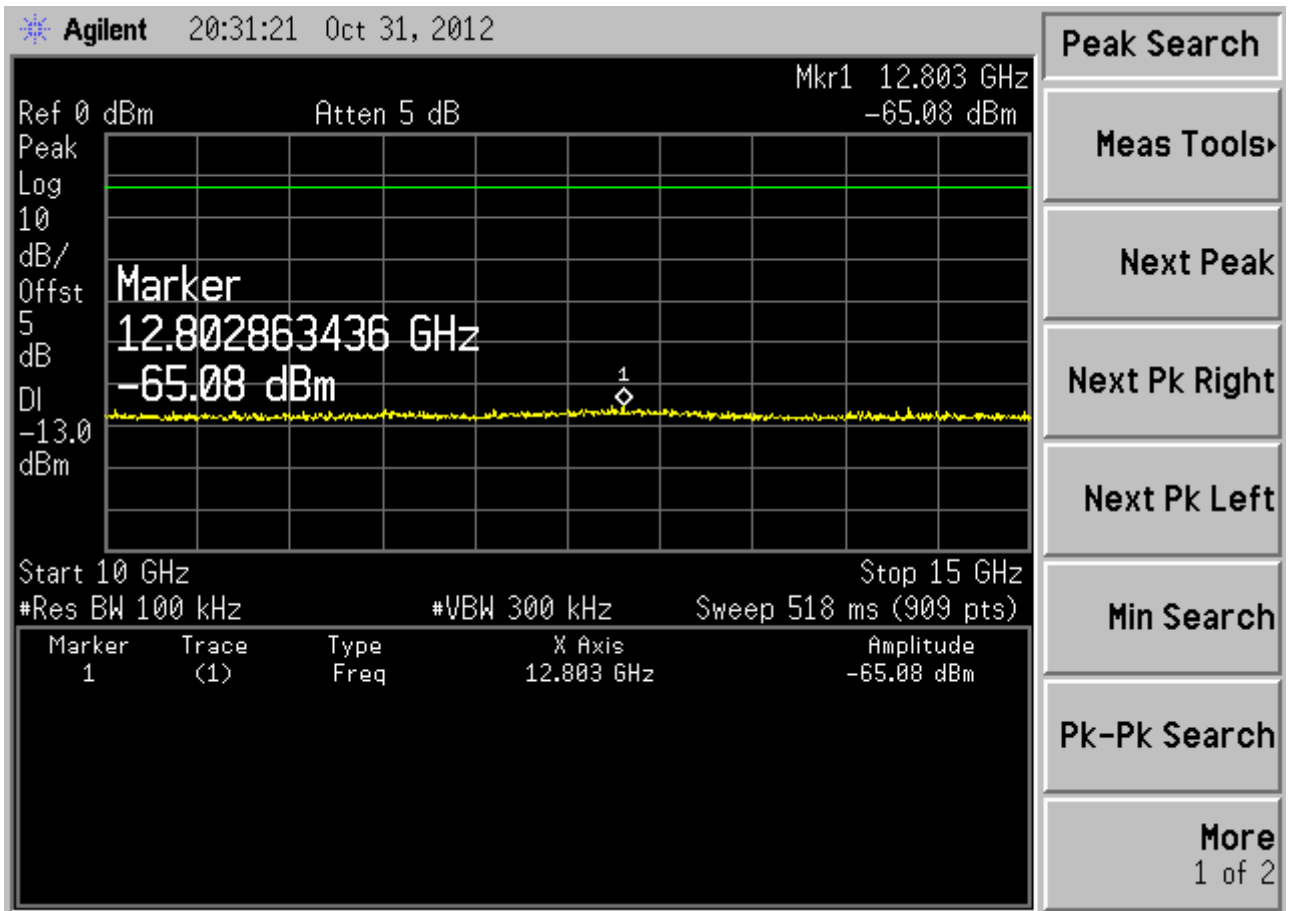
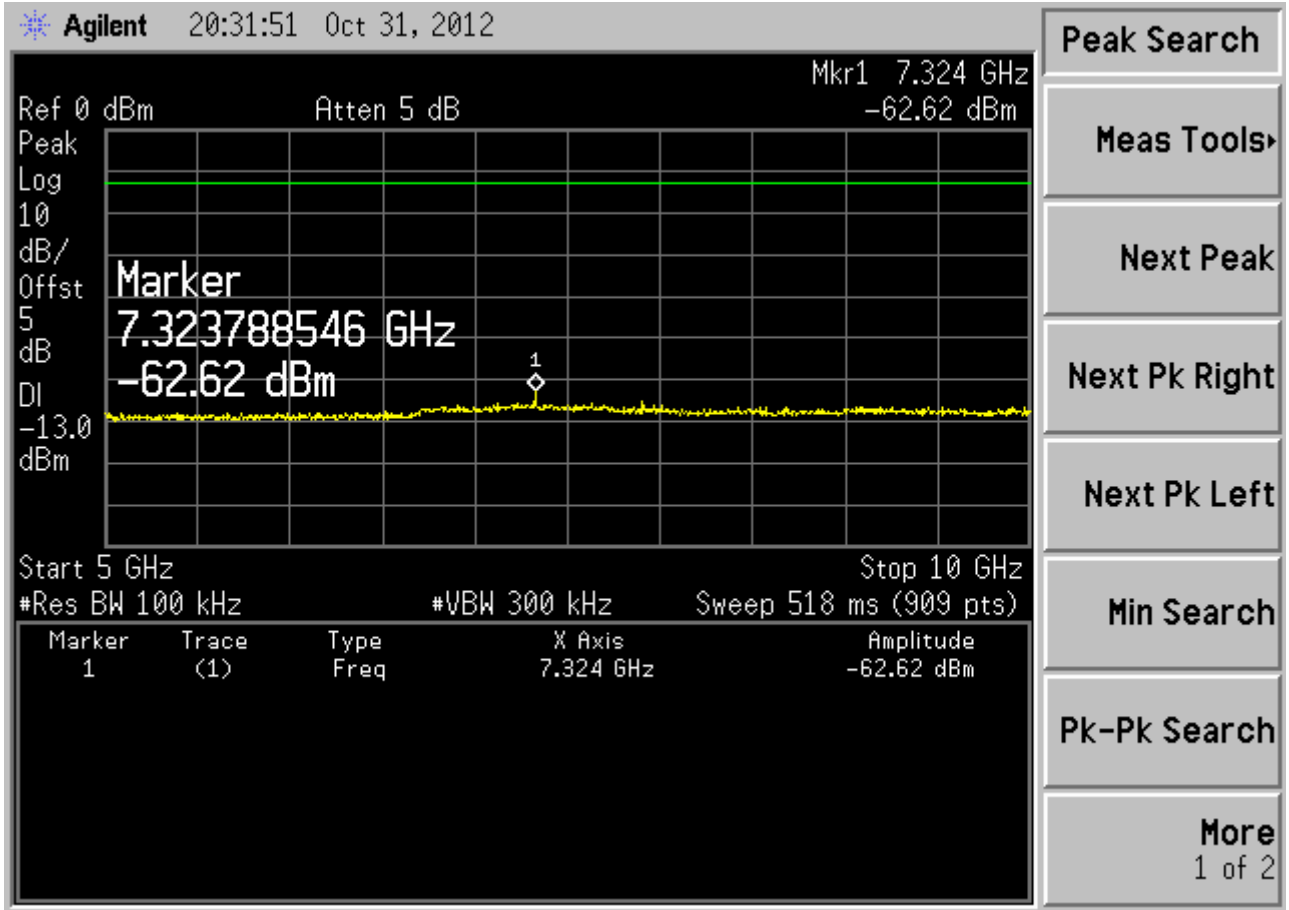


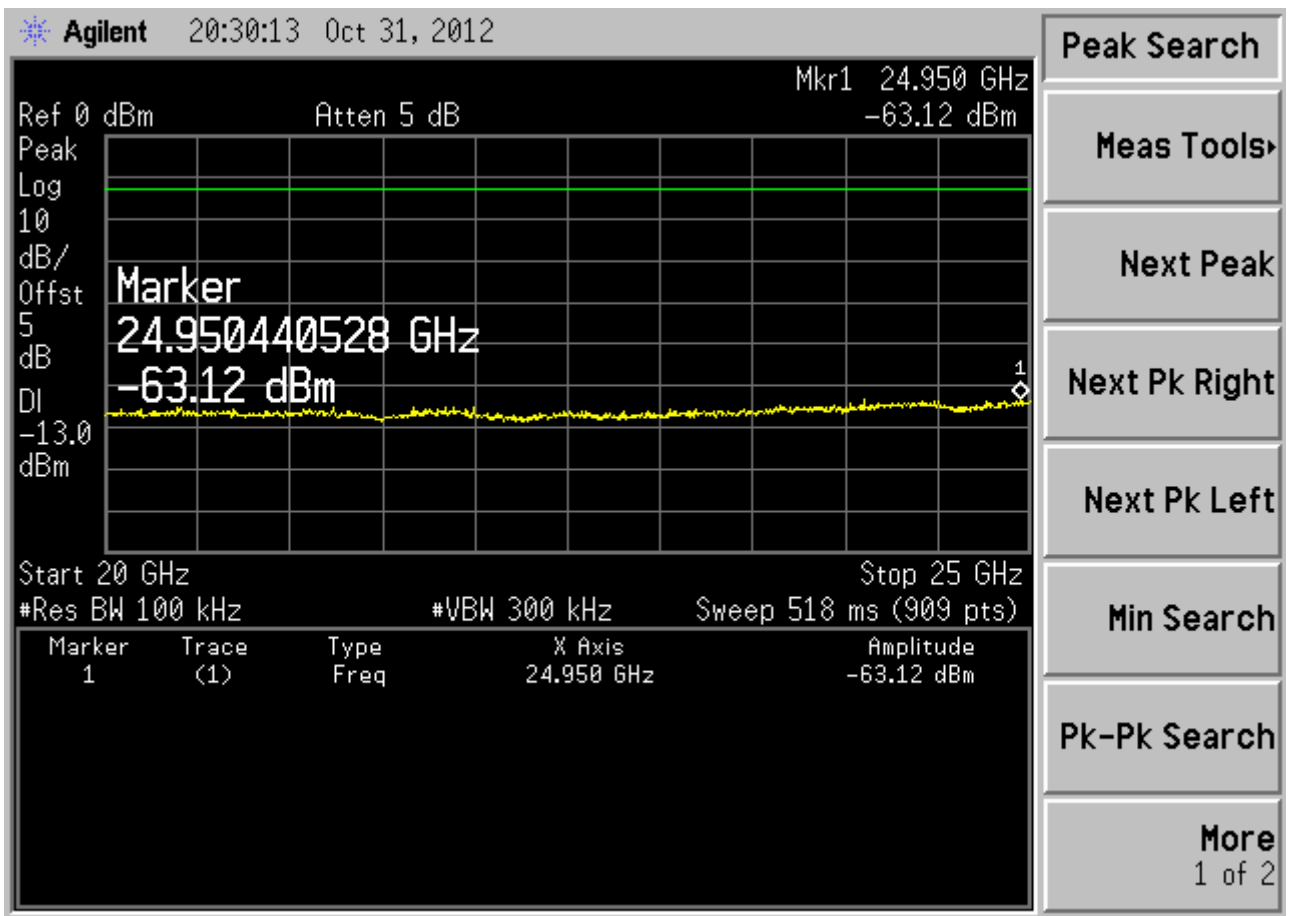
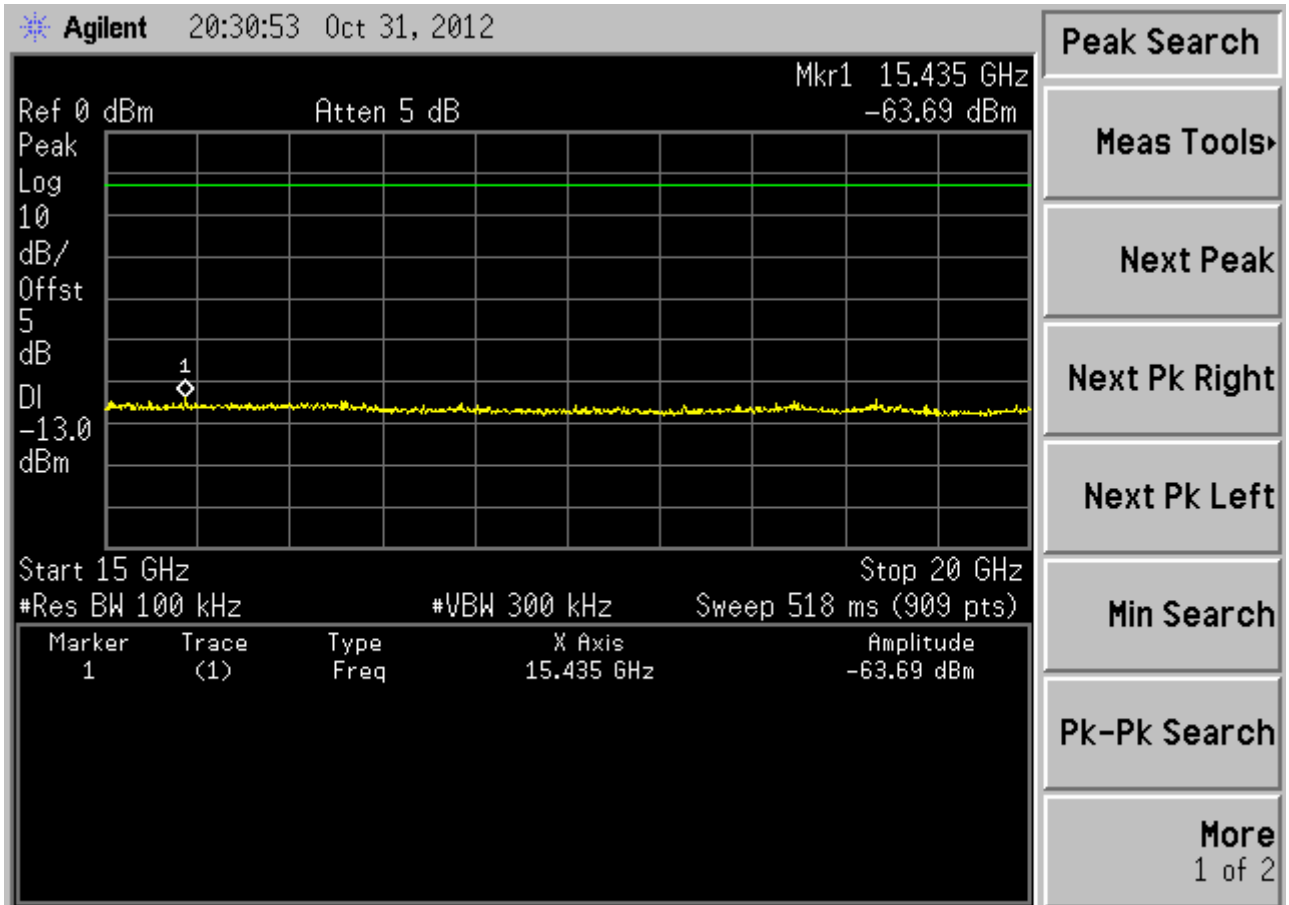




Ch 39 (2441 MHz)

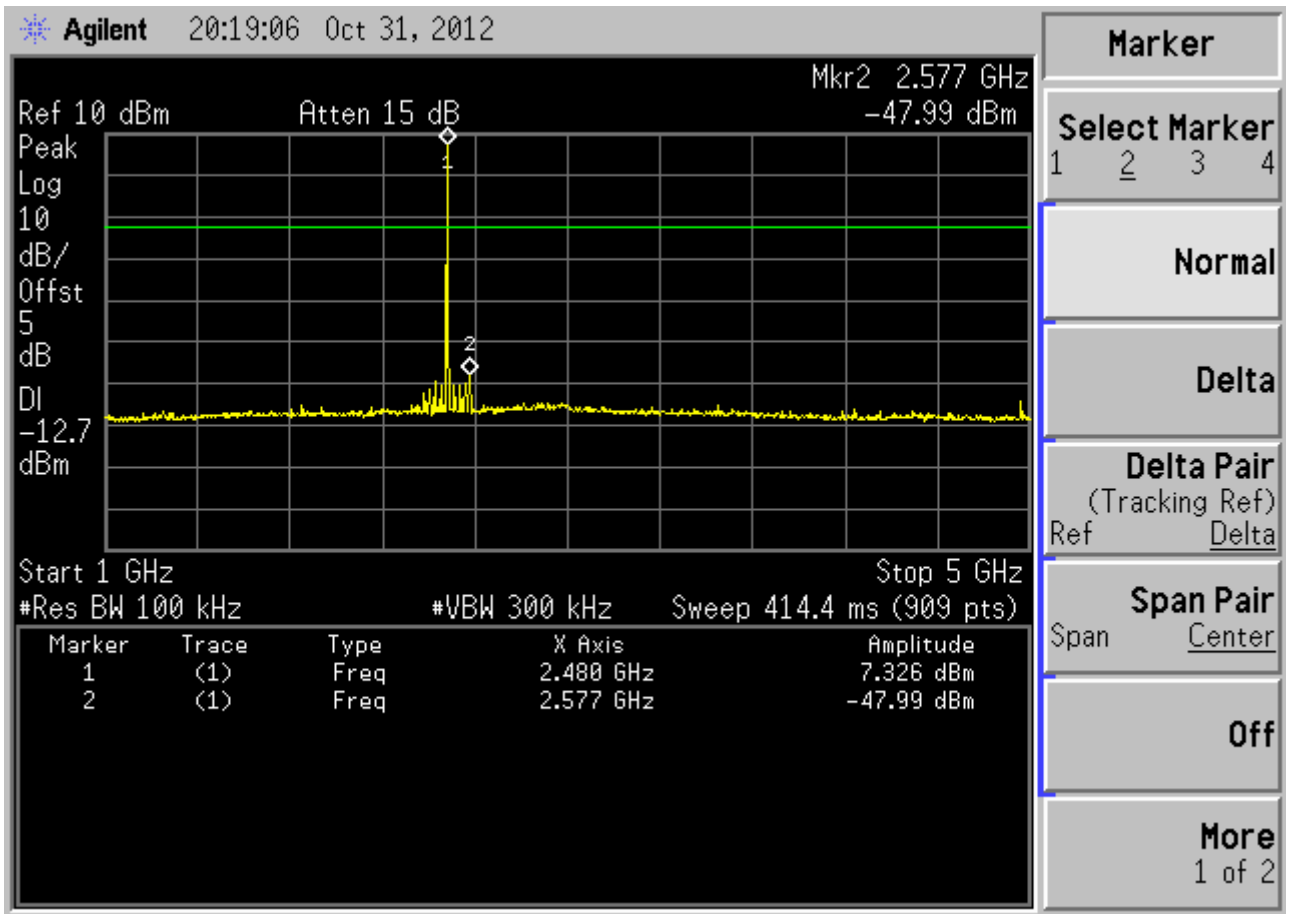
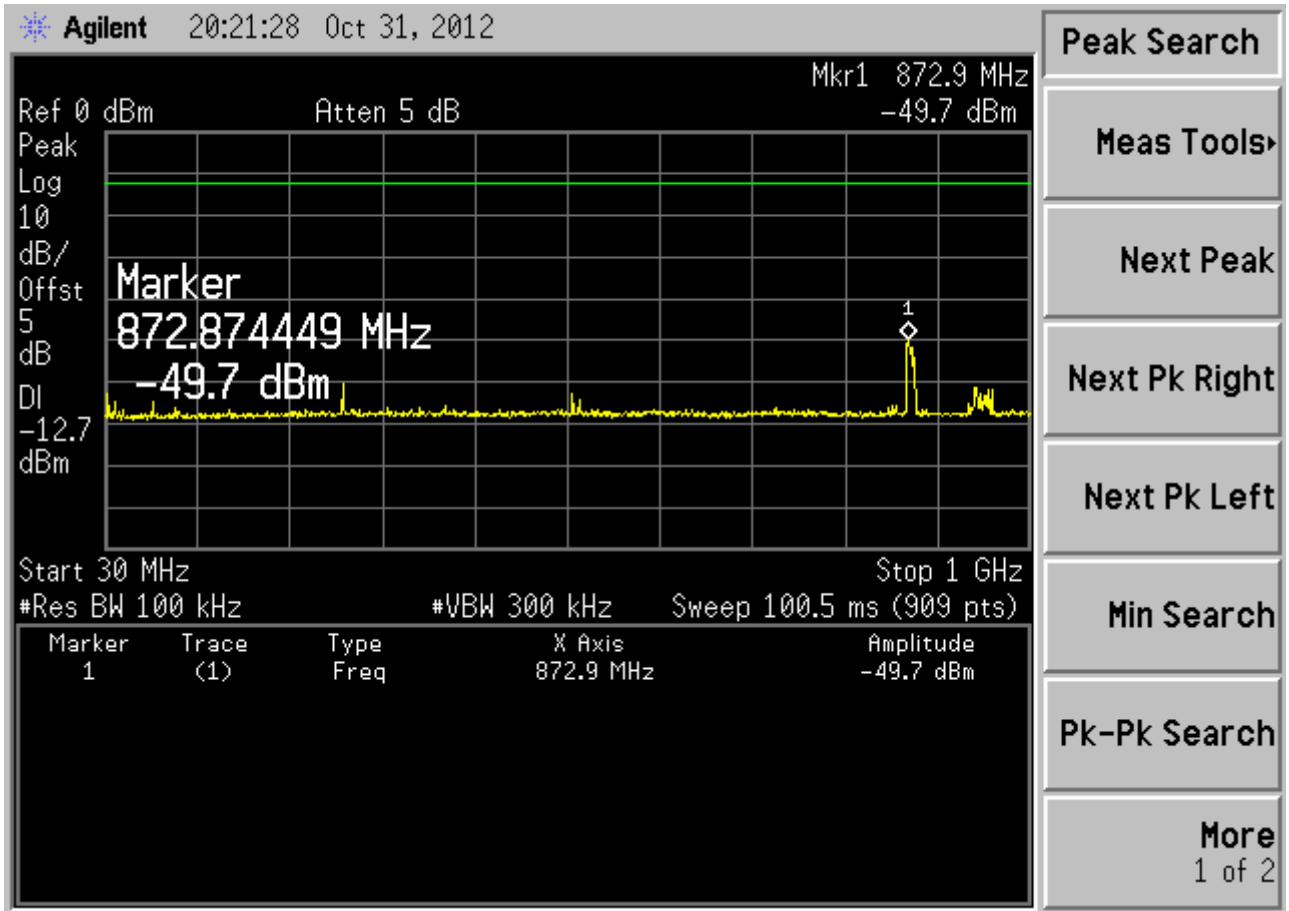


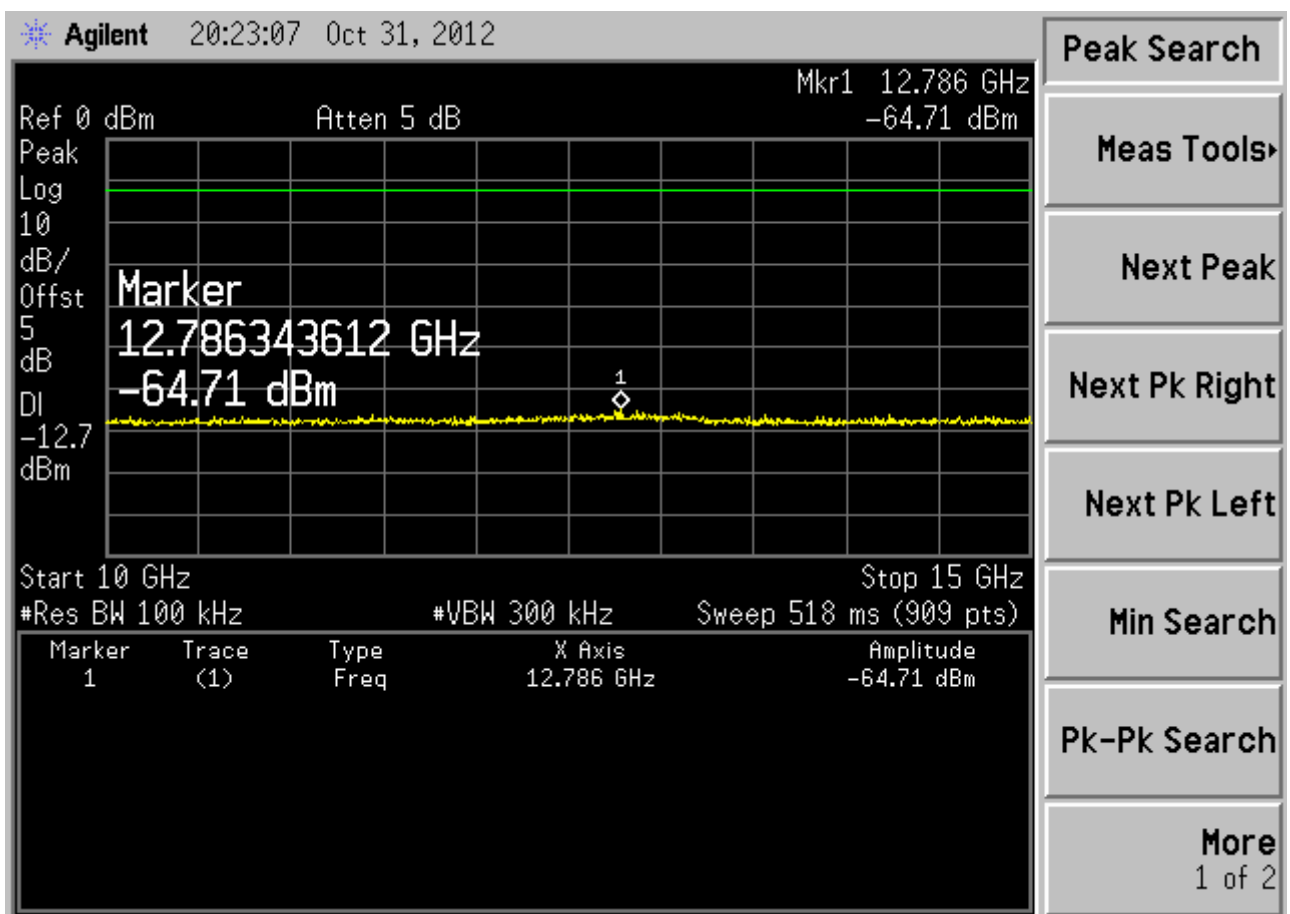
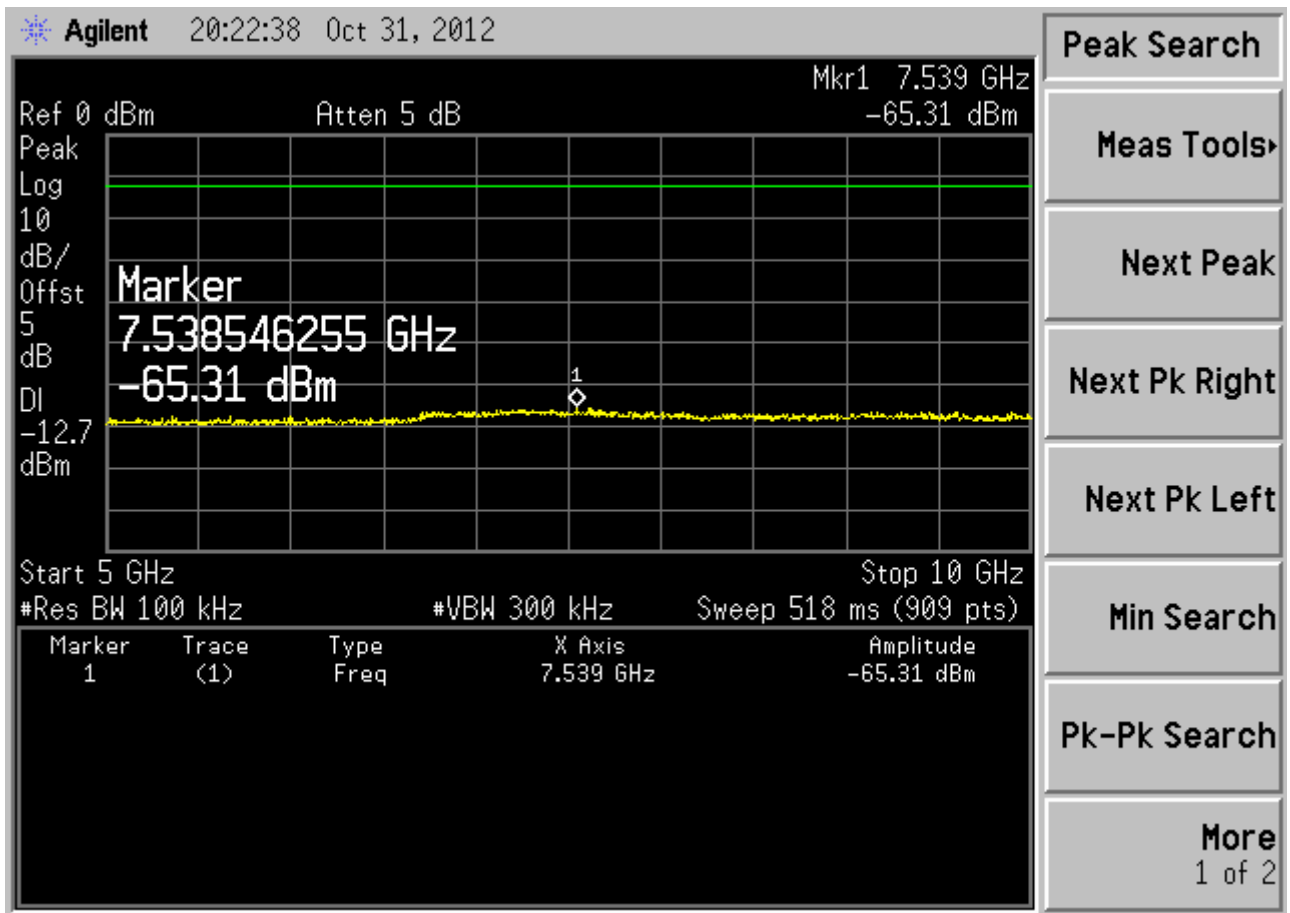


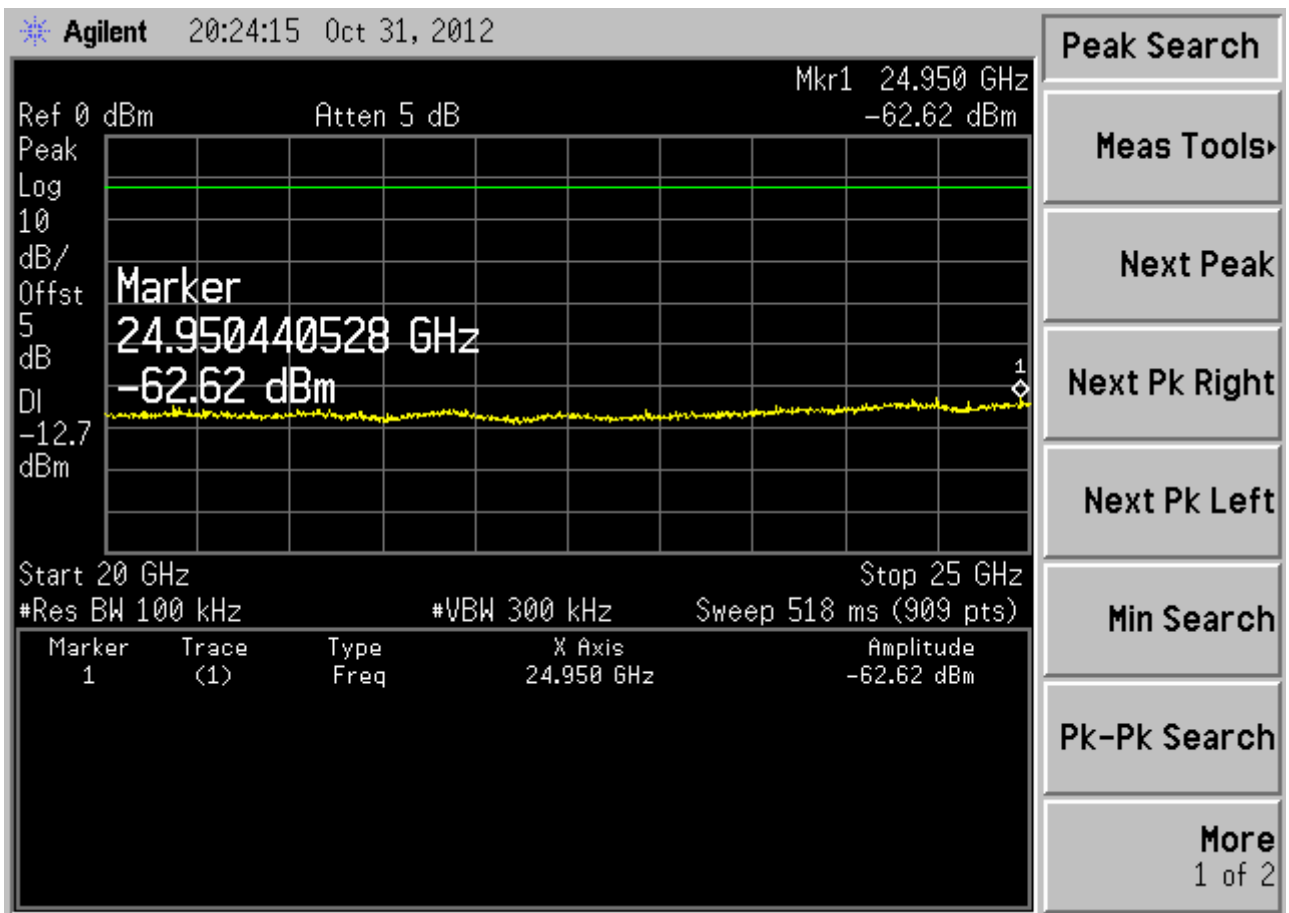
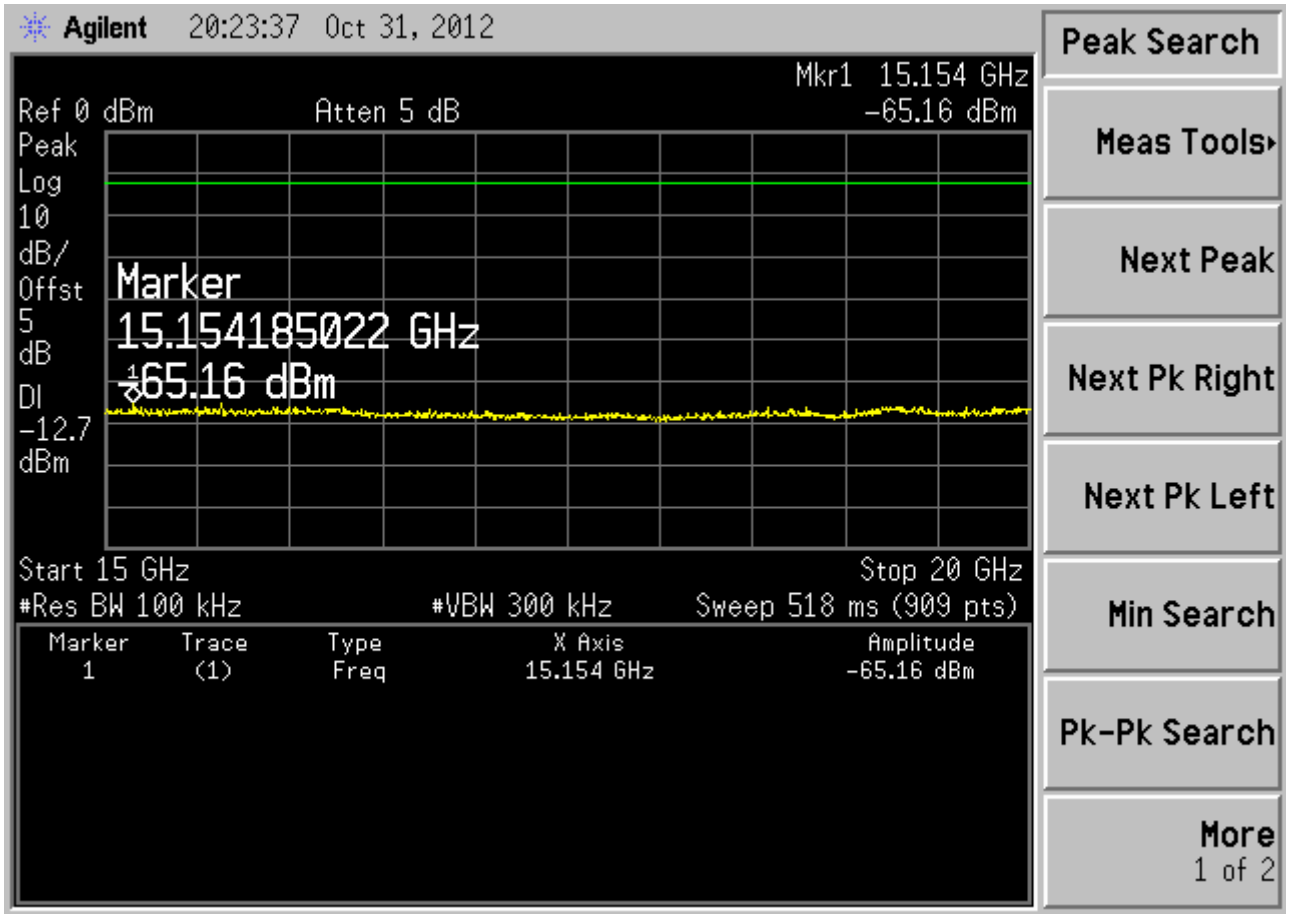




Ch 78 (2480 MHz)







## 7 BAND-EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS MEASUREMENT

### 7.1 Test Equipment

The following test equipment was used during the band edges measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	R&S	ESCI	101303	Sep 11, 2012	Sep 11, 2013

### 7.2 Block Diagram of Test Setup

The same as section.4.2.

### 7.3 Specification Limits (§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.

### 7.4 Operating Condition of EUT

Enable the EUT to transmit data at different channel frequency individually.

### 7.5 Test Procedure

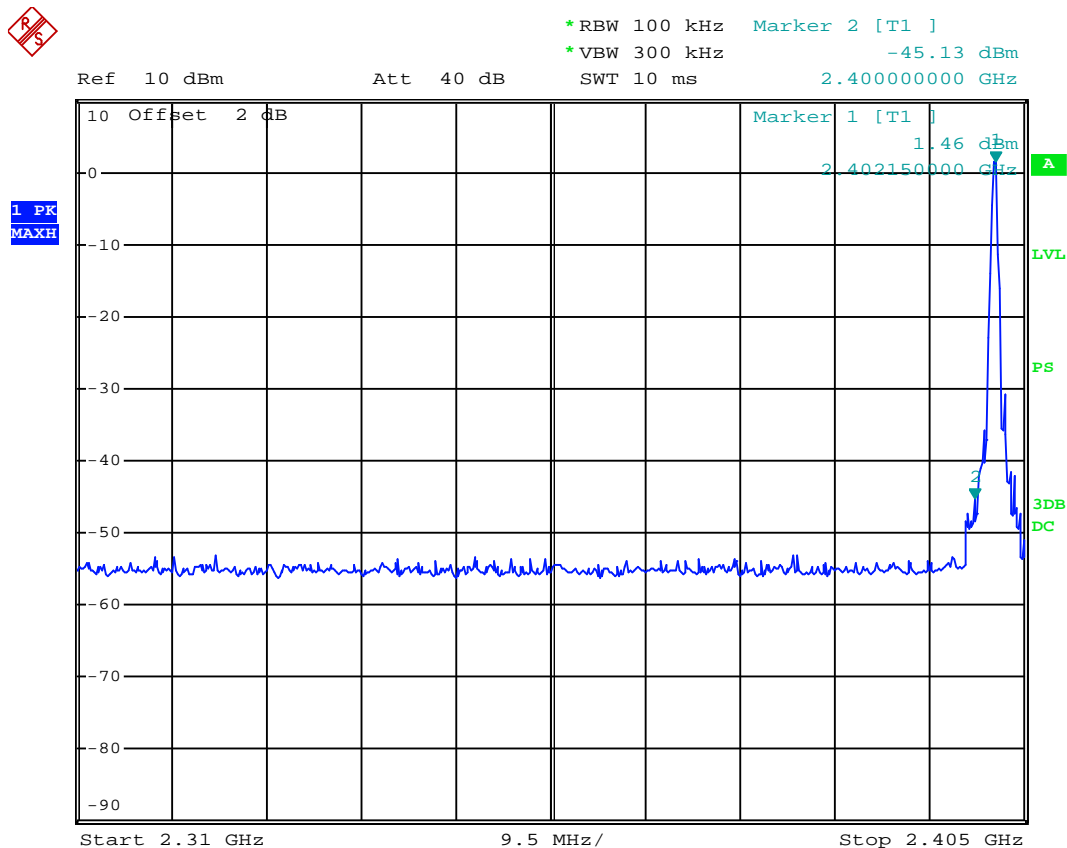
The transmitter output was connected to the spectrum analyzer. Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz with span wide enough to fully capture the emission being measured.  
The test procedure is defined in DA 00-705.

### 7.6 Test Results

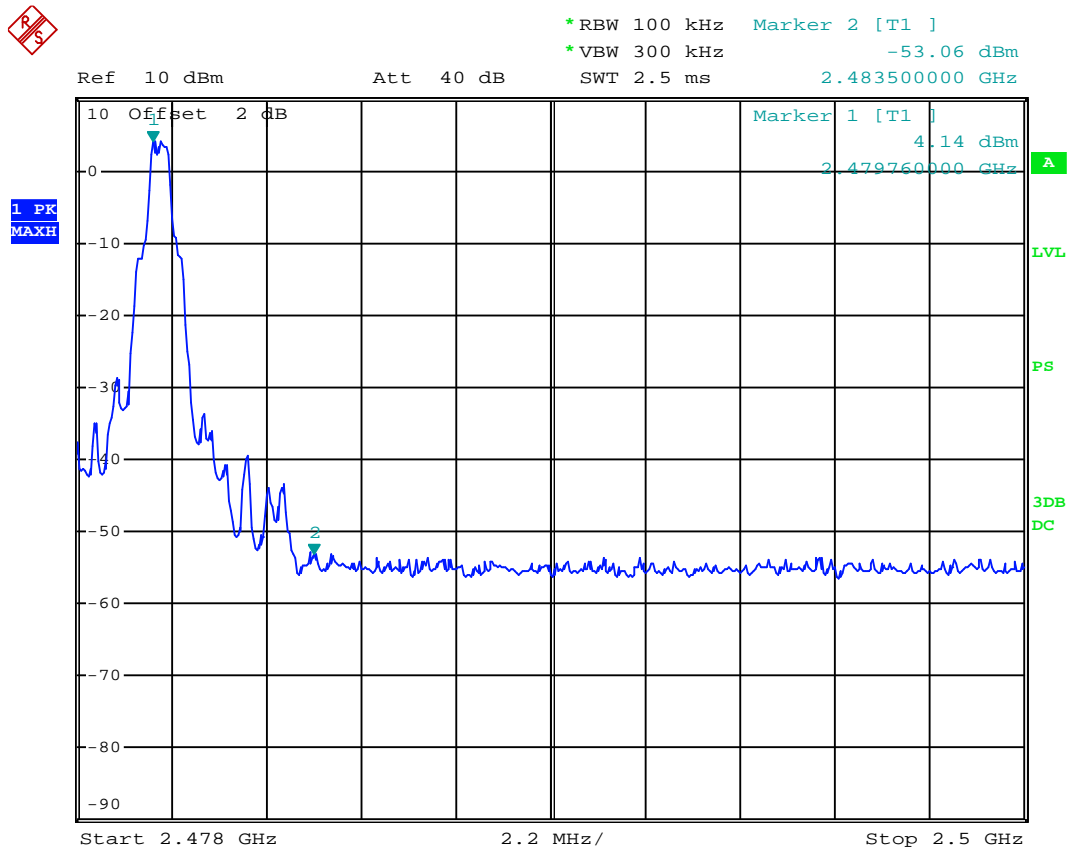
**PASSED.** All the test results are attached in next pages.

(Test Date: Nov. 01, 2012 Temperature: 25°C Humidity: 48 %)

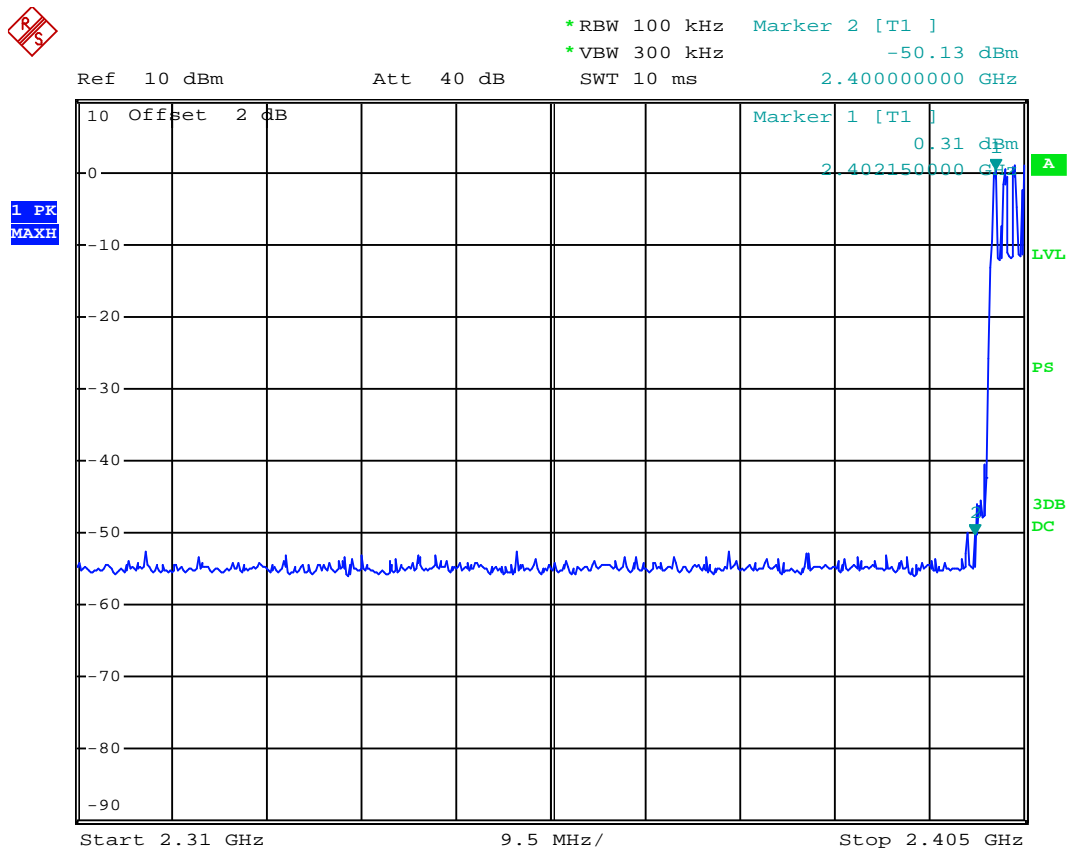
### Ch00 2402MHz (Below Edge 2400 MHz) NON-EDR



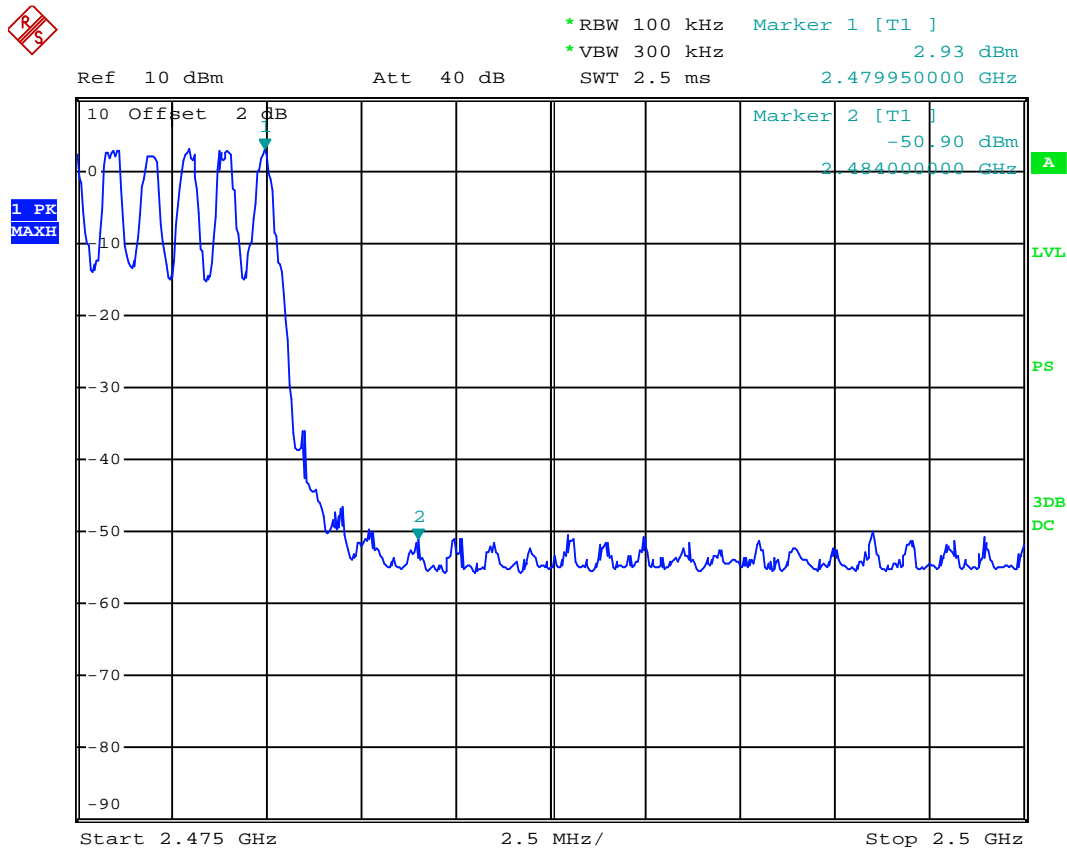
### Ch78 2480MHz (Upper Edge 2483.5 MHz) NON-EDR



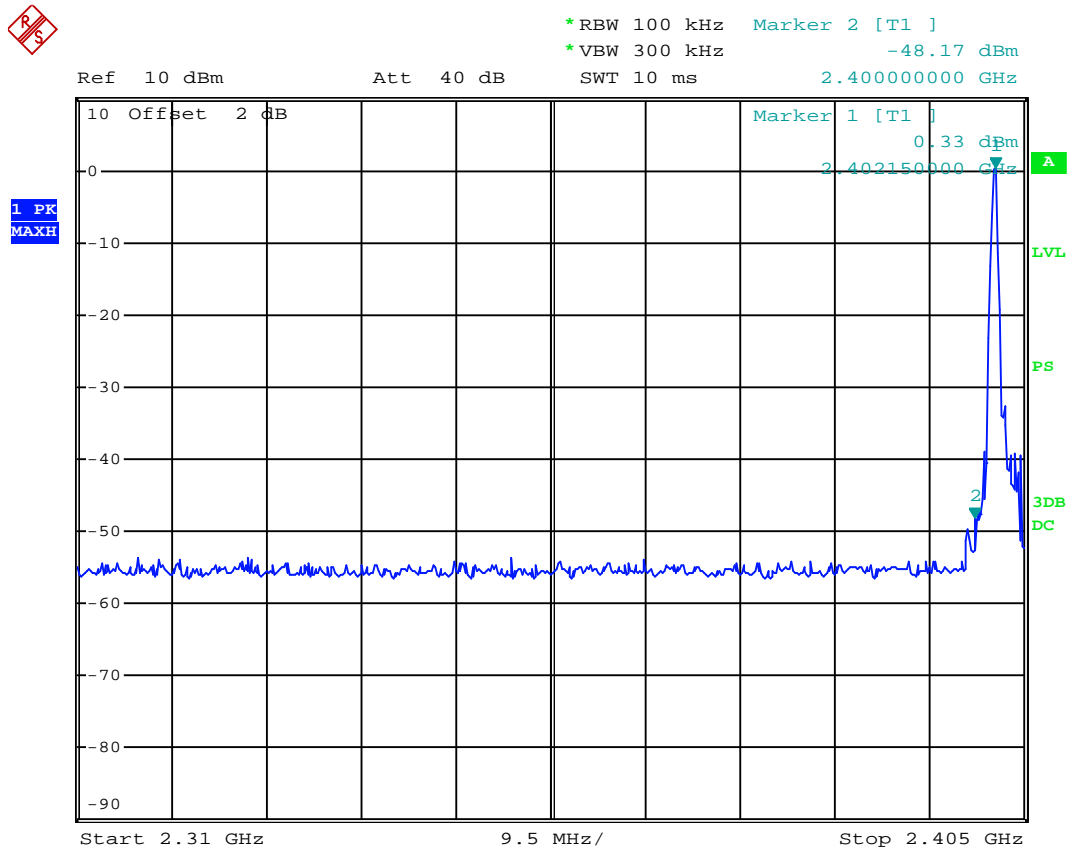
### Ch00 2402MHz (Below Edge 2400 MHz) NON-EDR HOPPING



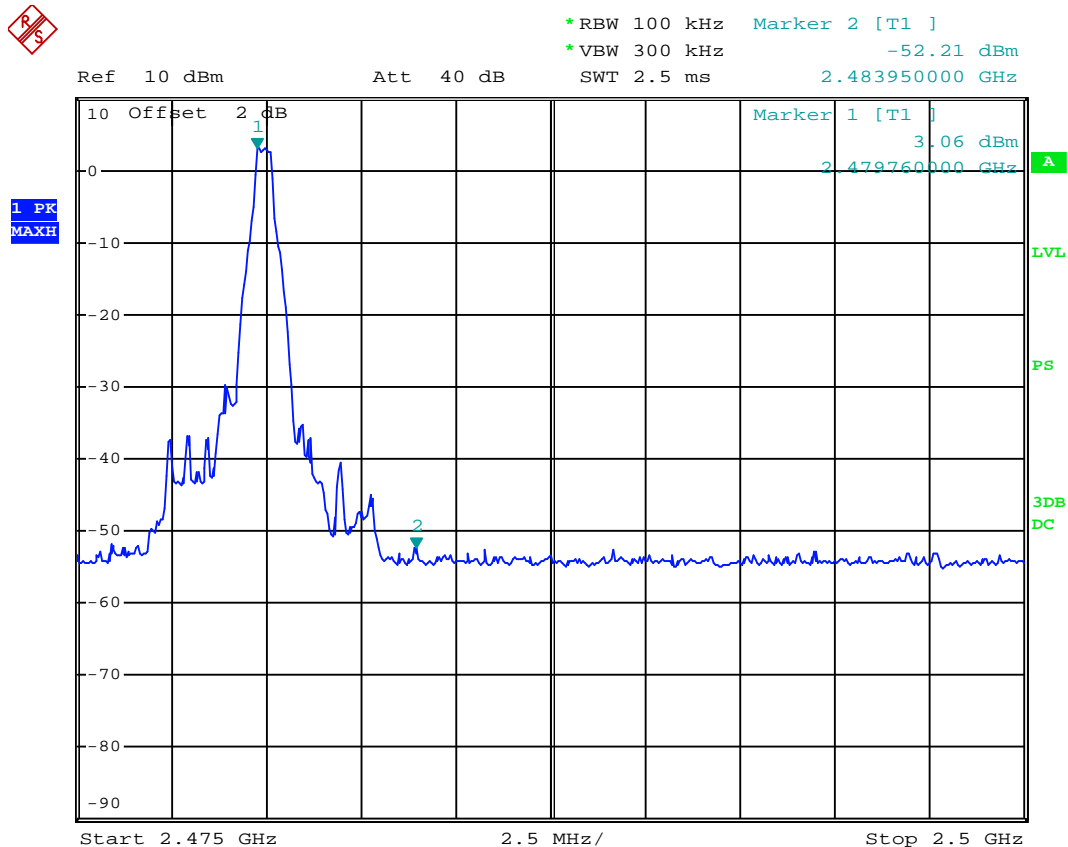
### Ch78 2480MHz (Upper Edge 2483.5 MHz) NON-EDR HOPPING



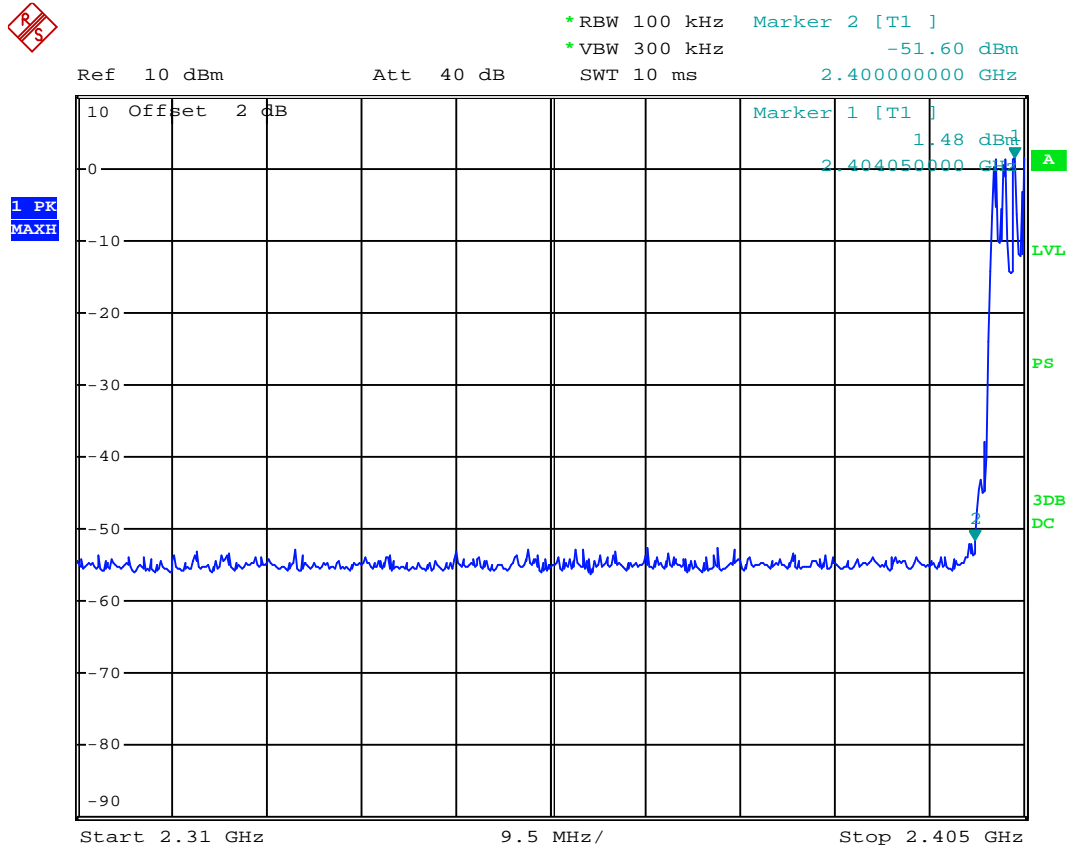
### Ch00 2402MHz (Below Edge 2400 MHz) EDR



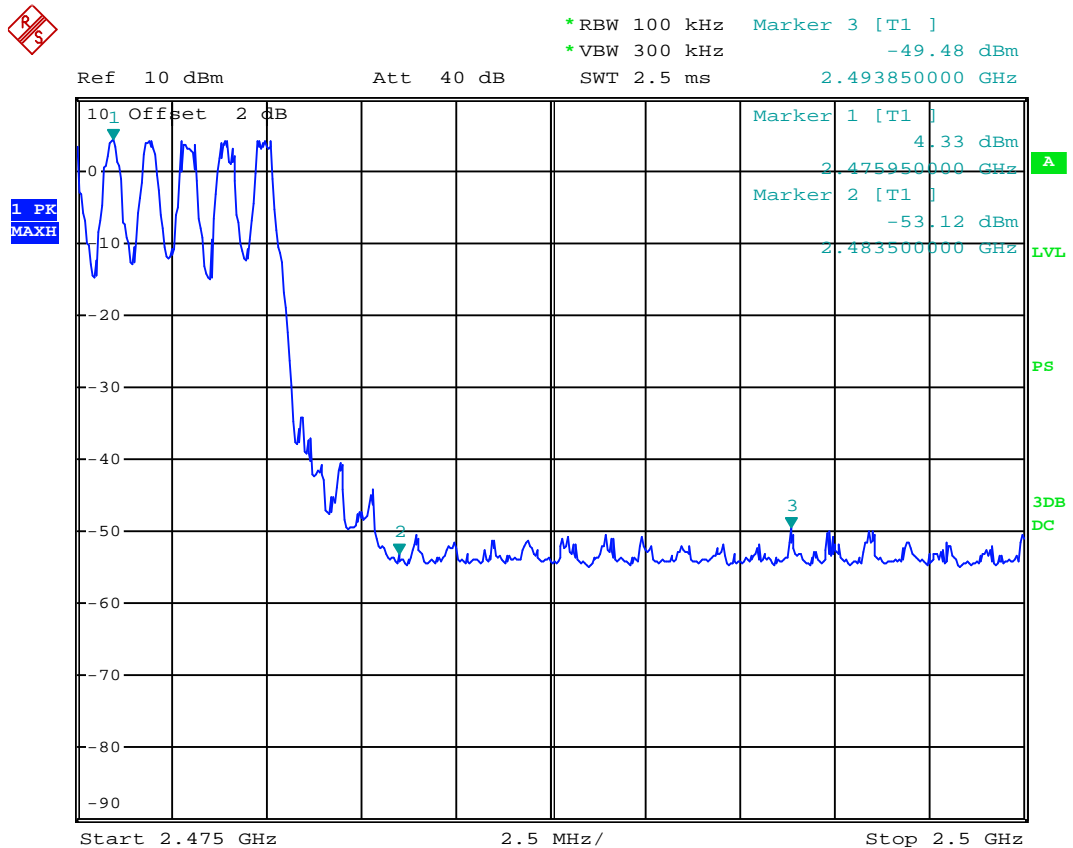
### Ch78 2480MHz (Upper Edge 2483.5 MHz) EDR



### Ch00 2402MHz (Below Edge 2400 MHz) EDR HOPPING



### Ch78 2480MHz (Upper Edge 2483.5 MHz) EDR HOPPING





## 8 NUMBER OF HOPPING FREQUENCIES

### MEASUREMENT

#### 8.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	R&S	ESCI	101303	Sep 11, 2012	Sep 11, 2013

#### 8.2 Block Diagram of Test Setup

The same as section.4.2.

#### 8.3 Specification Limits (§15.247(a)(1)(iii))

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

#### 8.4 Operating Condition of EUT

Enable the EUT hopping function.

#### 8.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The spectrum analyzer was set as RBW = 300kHz, VBW = 300kHz, count the number of hopping frequencies used and recorded.

The test procedure is defined in DA 00-705.

#### 8.6 Test Results

**PASSED.** All the test results are attached in next pages.

(Test Date: Nov. 01, 2012 Temperature: 25°C Humidity: 48 %)

Result	Limit	Conclusion
79	> 15	Pass



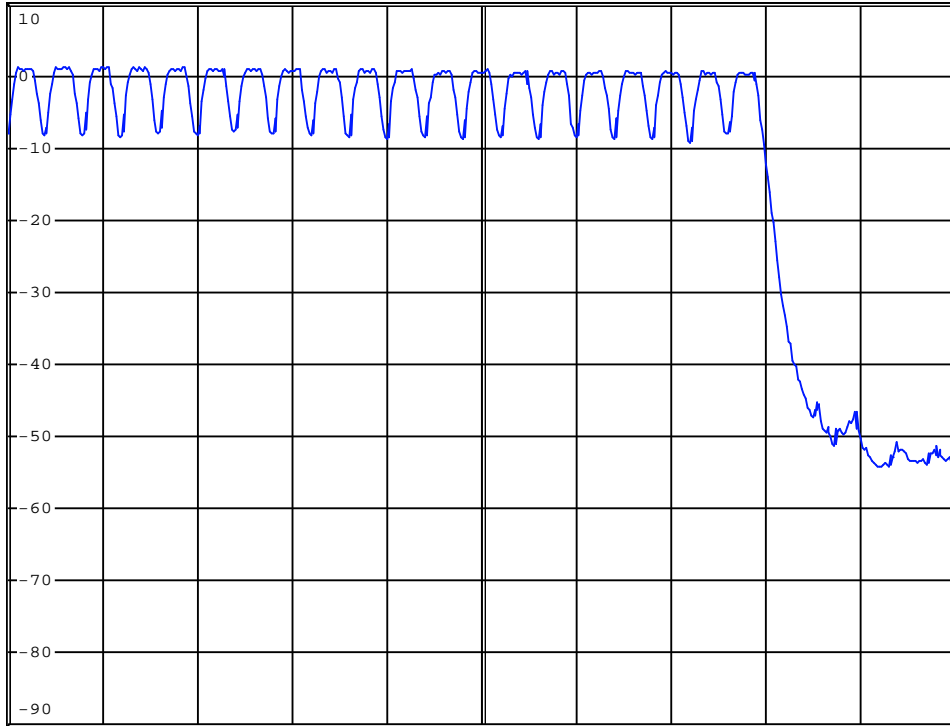


\*RBW 300 kHz  
\*VBW 300 kHz  
SWT 2.5 ms

Ref 10 dBm

Att 40 dB

1. PK  
MAXH



Start 2.4605 GHz

2.5 MHz/

Stop 2.4855 GHz

## 9 CARRIER FREQUENCY SEPARATION

### MEASUREMENT

#### 9.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	R&S	ESCI	101303	Sep 11, 2012	Sep 11, 2013

#### 9.2 Block Diagram of Test Setup

The same as section.4.2.

#### 9.3 Specification Limits (§15.247(a)(1))

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

#### 9.4 Operating Condition of EUT

Enable the EUT hopping function.

#### 9.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The spectrum analyzer was set as RBW = 100kHz, VBW = 300kHz, span = wide enough to capture the peaks of two adjacent channels. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

The test procedure is defined in DA 00-705.

#### 9.6 Test Results

**PASSED.** All the test results are attached in next pages.

(Test Date: Nov. 01, 2012 Temperature: 25°C Humidity: 48 %)

Result	Limit (20dB Bandwidth)	Conclusion
1.005 MHz	>0.812 MHz	Pass

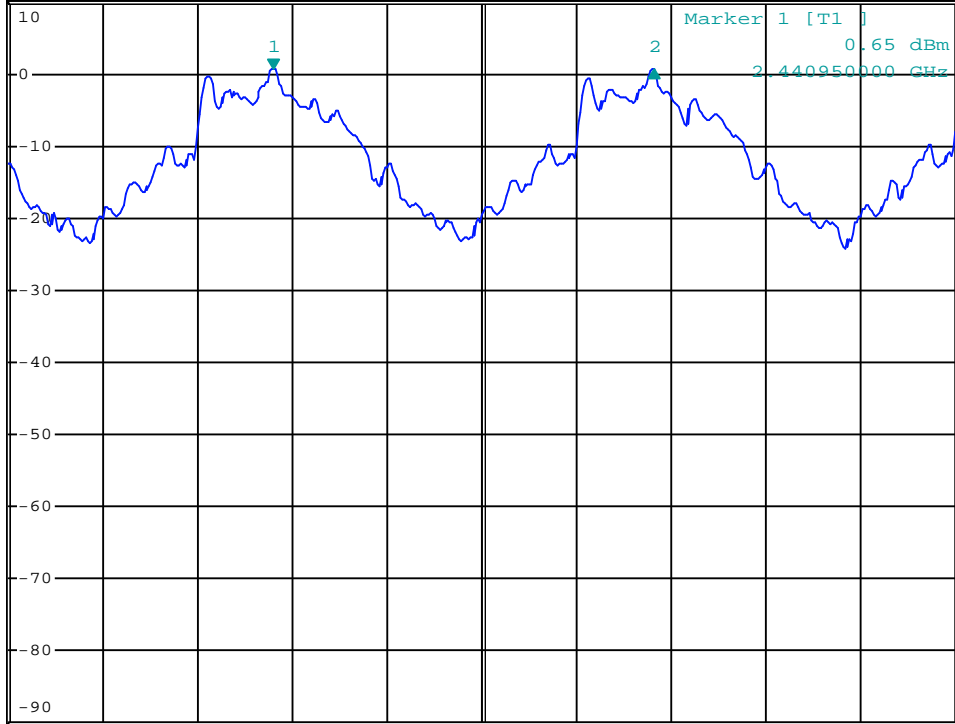


\*RBW 30 kHz Delta 2 [T1 ]  
\*VBW 100 kHz 0.07 dB  
SWT 5 ms 1.005000000 MHz

Ref 10 dBm

Att 40 dB

1. PK  
MAXH



Center 2.4415 GHz

250 kHz/

Span 2.5 MHz

## 10 DEWLL TIME MEASUREMENT

### 10.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	R&S	ESCI	101303	Sep 11, 2012	Sep 11, 2013

### 10.2 Block Diagram of Test Setup

The same as section.4.2.

### 10.3 Specification Limits (§15.247(a)(1)(iii))

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 10.4 Operating Condition of EUT

Enable the EUT hopping function.

### 10.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The spectrum analyzer was set as RBW = 1MHz, VBW = 1MHz, span = zero span, centered on a hopping channel. Use the marker-delta function to calculate the dwell time.

The test procedure is defined in DA 00-705.

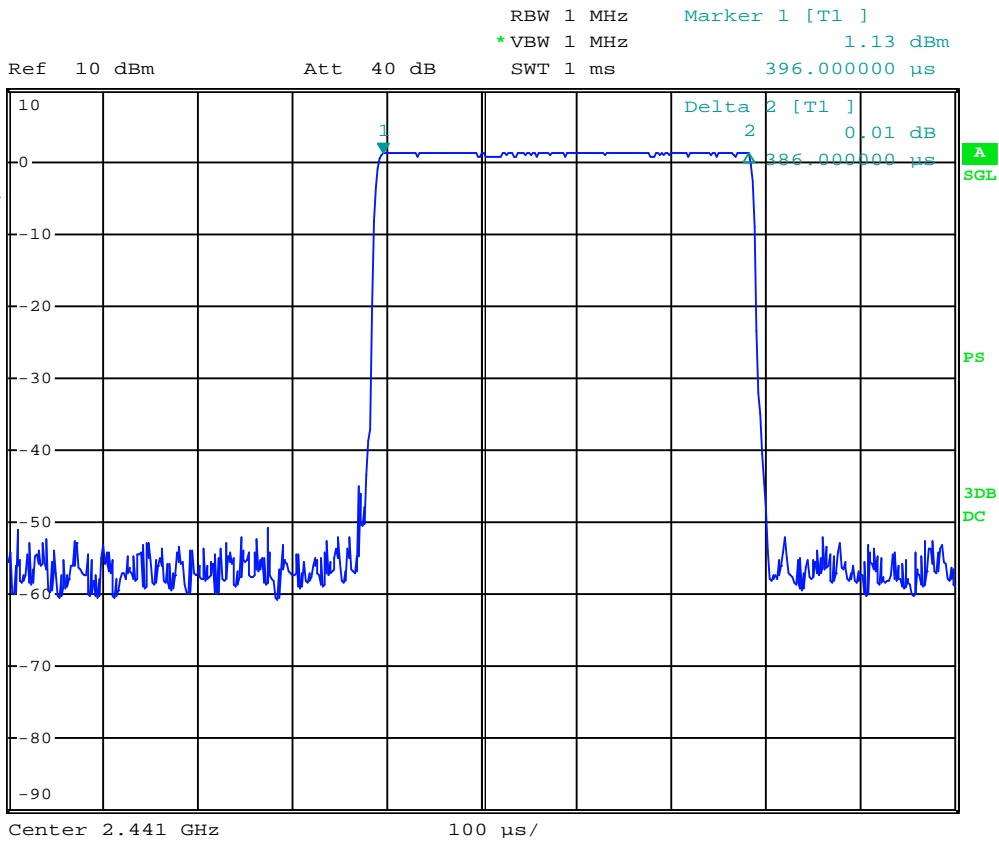
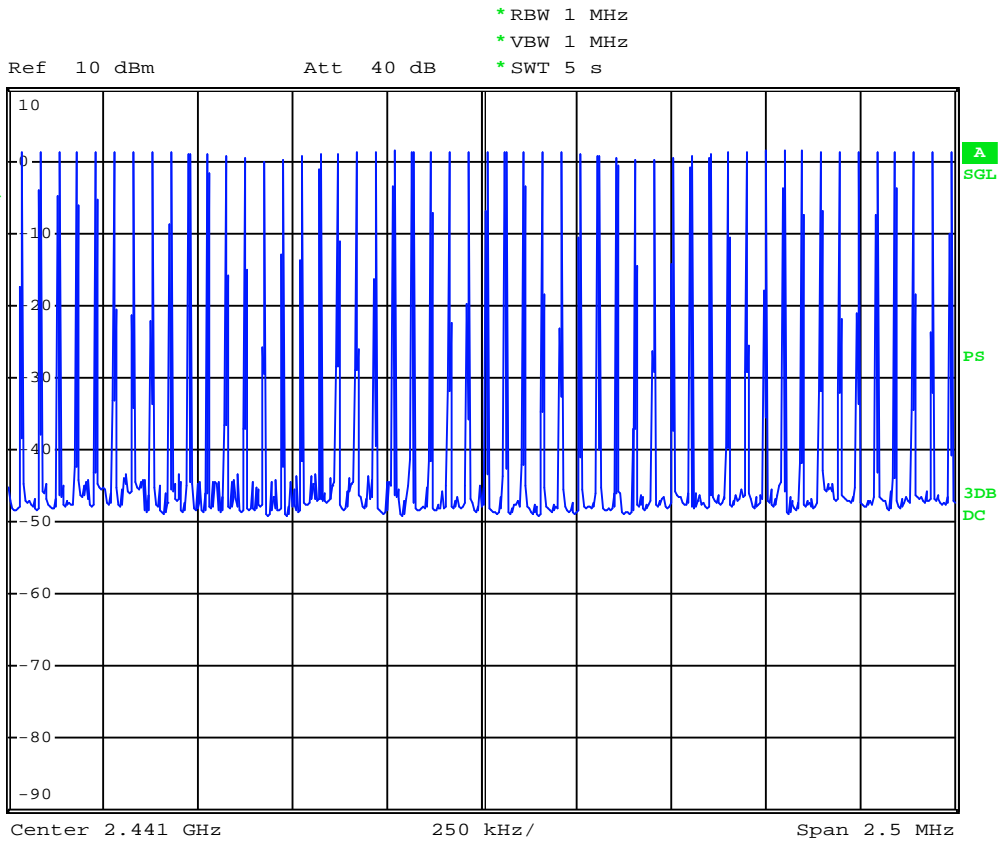
### 10.6 Test Results

**PASSED.** All the test results are attached in next pages.

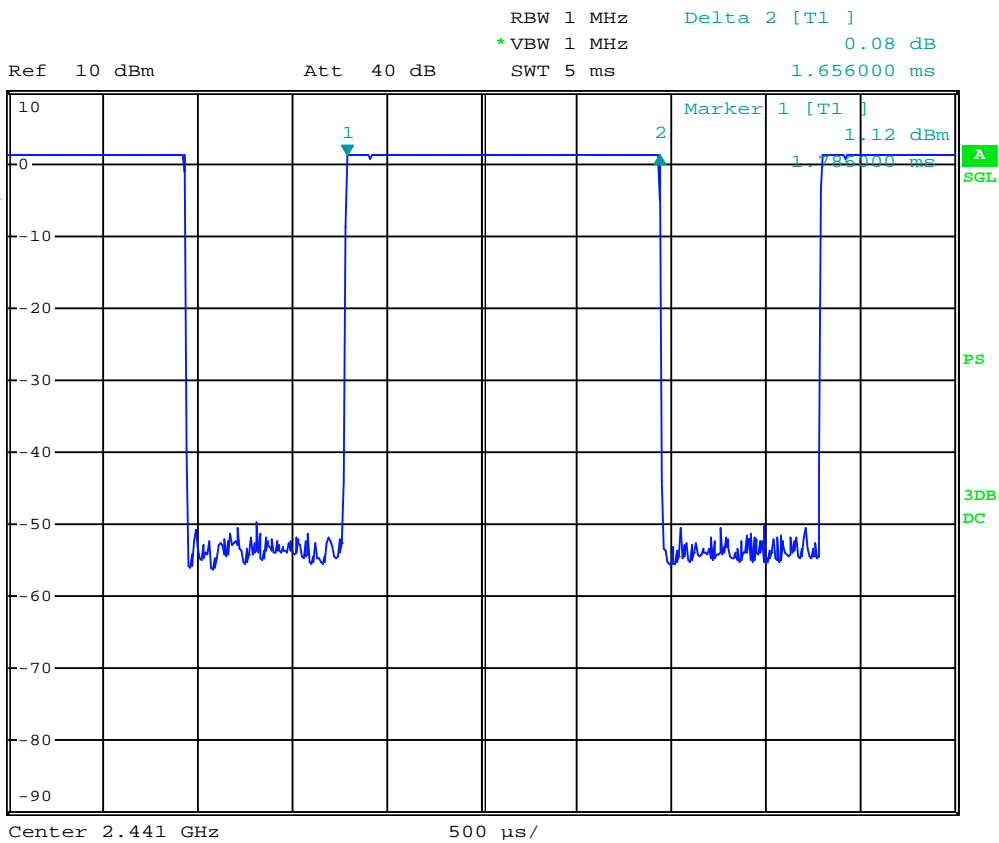
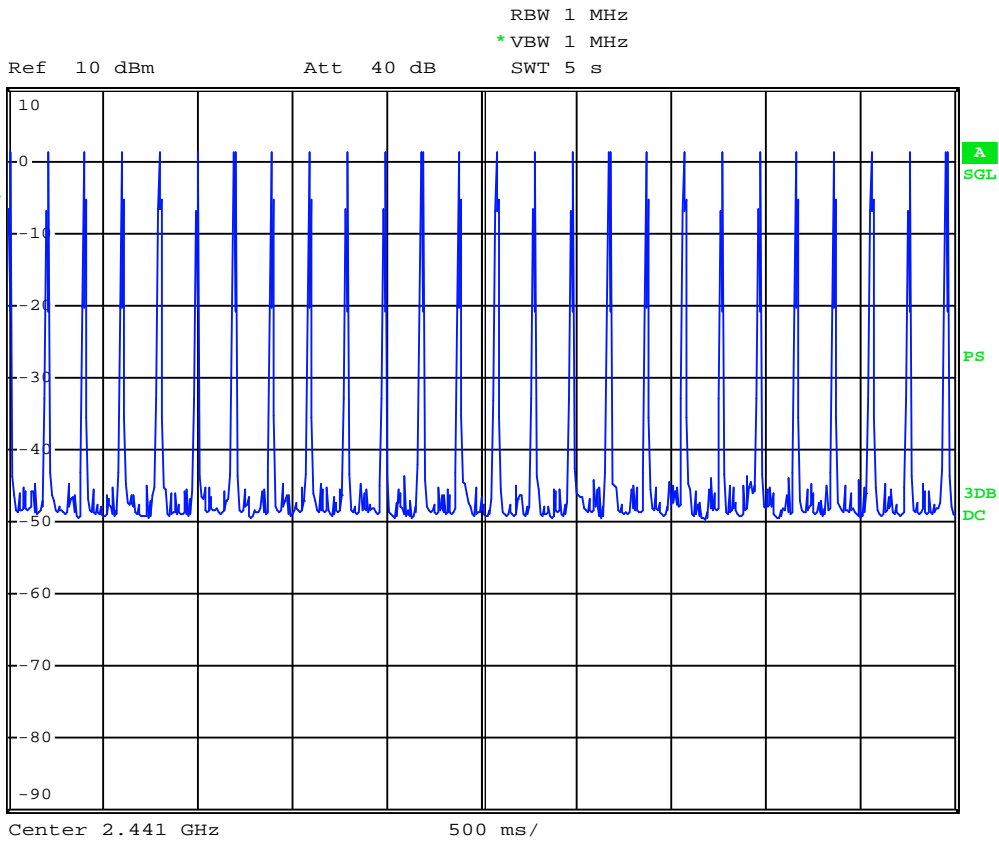
(Test Date: Nov. 01, 2012 Temperature: 25°C Humidity: 48 %)

Mode	Number of transmission in a 31.6 (79 hopping*0.4) second period	Length of transmission time (msec)	Result (msec)	Limit (msec)	Conclusion
DH1	51 times/5 sec * 31.6=322 times	0.386	322*0.386 = 124.3	< 400	Pass
DH3	25 times/5 sec * 31.6=158 times	1.656	158*1.656 = 261.6	< 400	Pass
DH5	17 times/5 sec * 31.6=107 times	2.902	107*2.902 = 310.5	< 400	Pass

For DH1

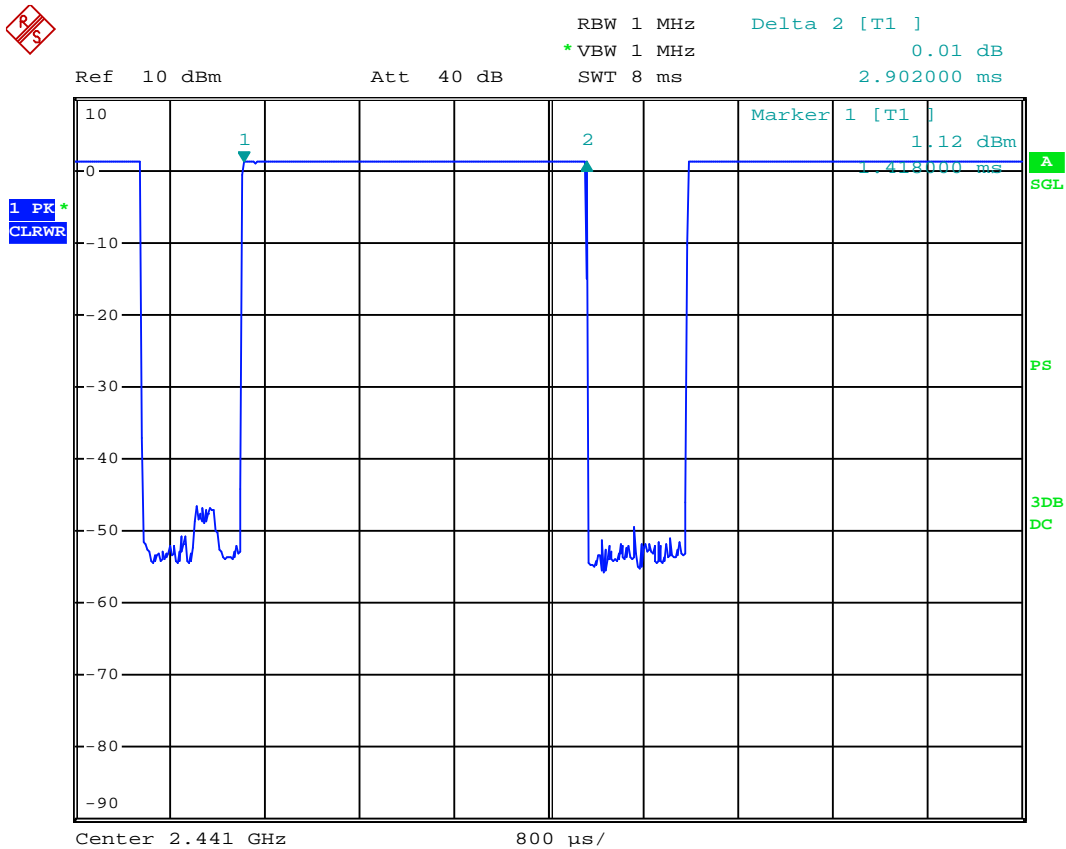
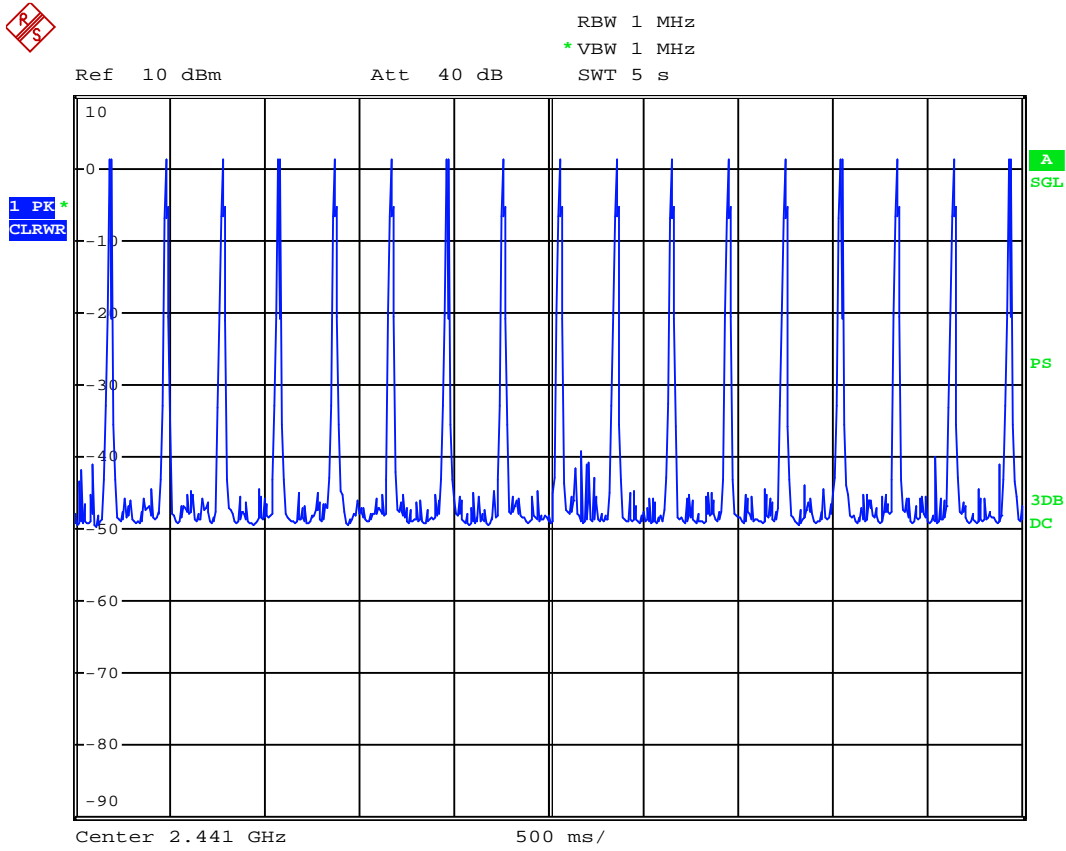


For DH3





For DH5



## **11 DEVIATION TO TEST SPECIFICATIONS**

None.

# APPENDIX I

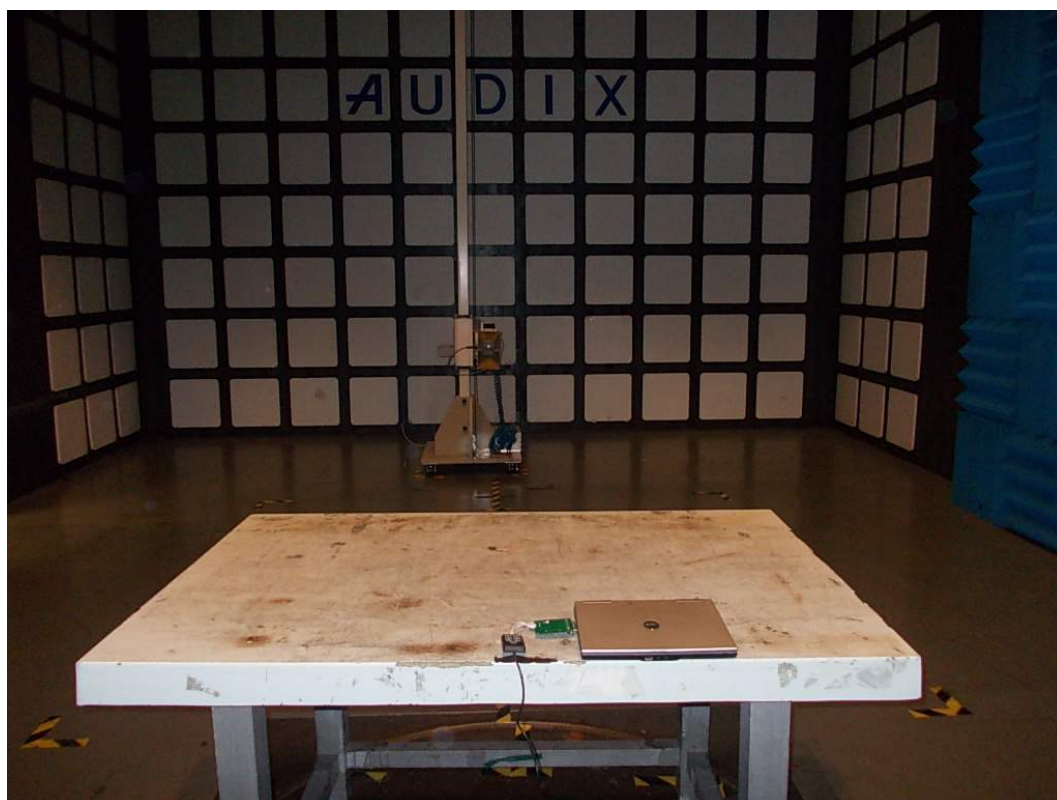
PHOTOGRAPHS OF TEST

## *Test Set-Up Photos*

### 1. Radiated Electromagnetic Emission Test



*BELOW 1GHZ*



*ABOVE 1GHZ*

## 2. RF Test



# APPENDIX II

PHOTOGRAPHS OF EUT

*FIGURE 1*  
*BLUETOOTH REMOTE CONTROL (M/N: 16-SABTS)*  
*GENERAL APPEARANCE*



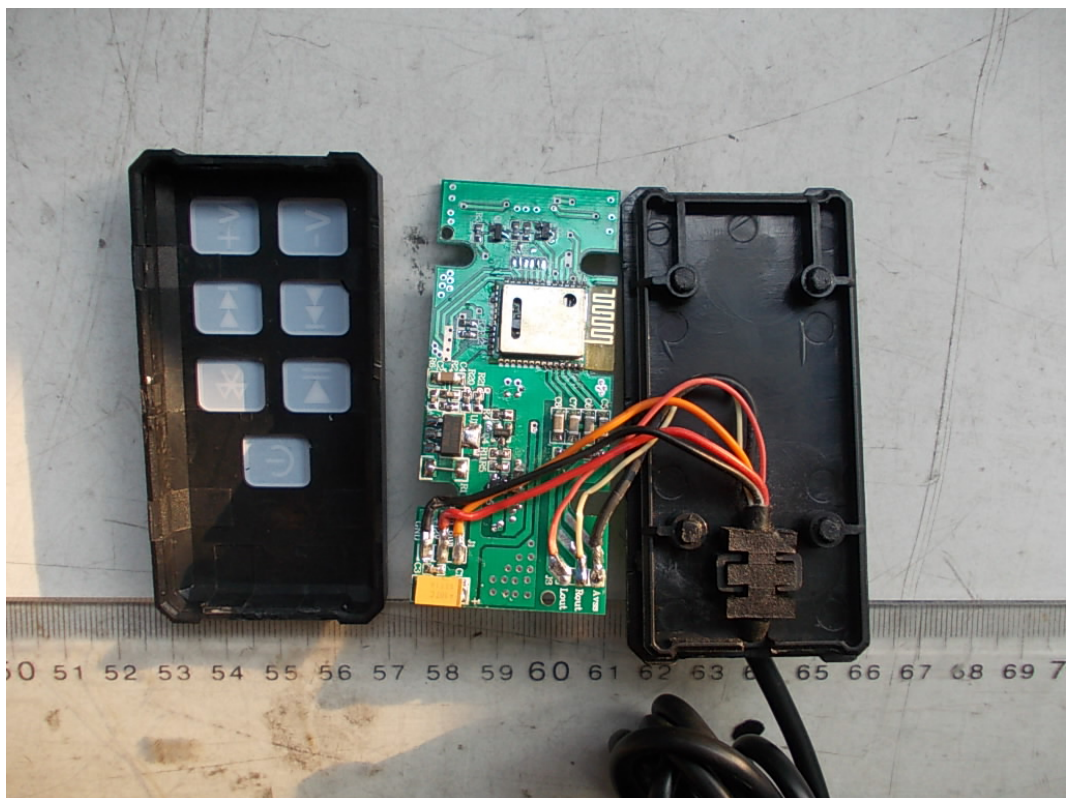
*FIGURE 2*  
*BLUETOOTH REMOTE CONTROL (M/N: 16-SABTS)*  
*GENERAL APPEARANCE (FRONT VIEW)*



*FIGURE 3*  
*BLUETOOTH REMOTE CONTROL (M/N: 16-SABTS)*  
*GENERAL APPEARANCE (BACK VIEW)*

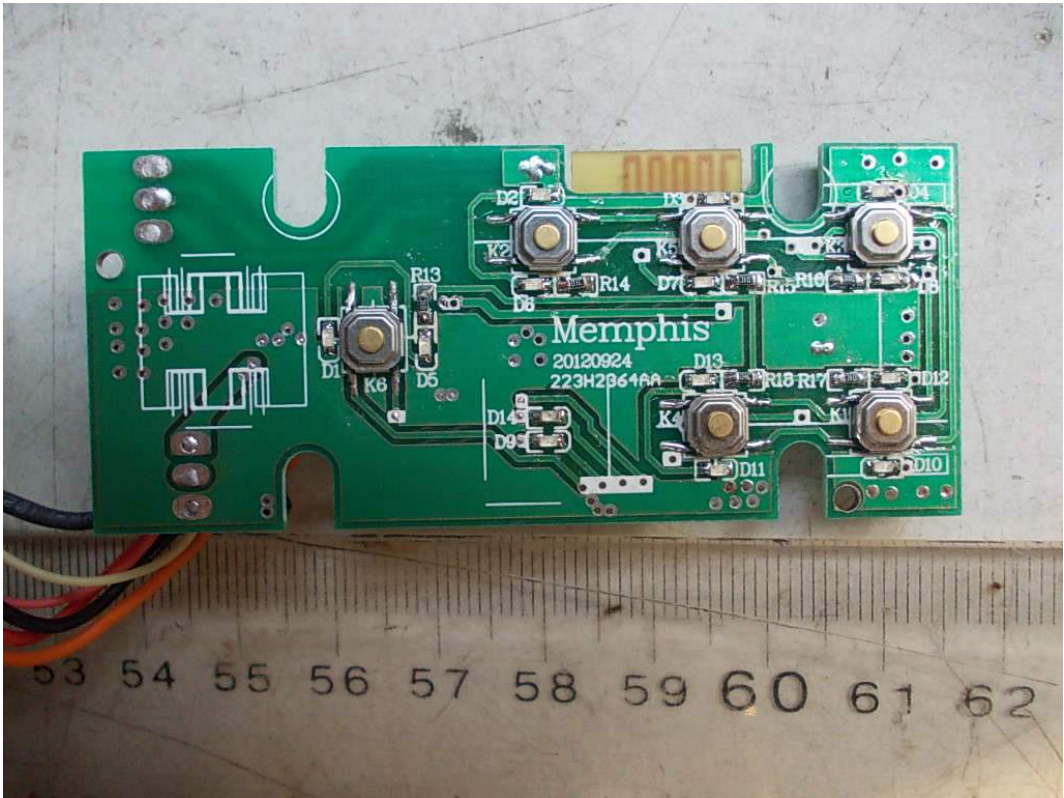


*FIGURE 4*  
*BLUETOOTH REMOTE CONTROL (M/N: 16-SABTS)*  
*COVER REMOVED*





*FIGURE 5*  
*BLUETOOTH REMOTE CONTROL (M/N: 16-SABTS)*  
*MAIN BOARD (FRONT VIEW)*



*FIGURE 6*  
*BLUETOOTH REMOTE CONTROL (M/N: 16-SABTS)*  
*MAIN BOARD (BACK VIEW)*

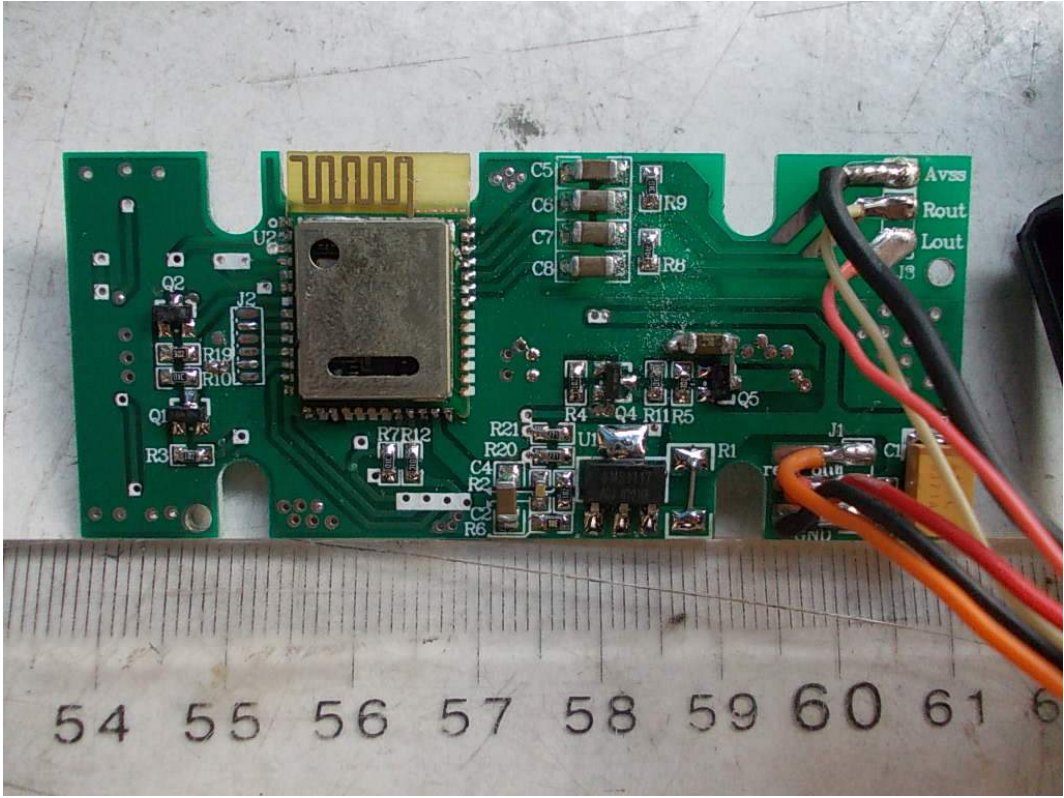


FIGURE 7  
BLUETOOTH REMOTE CONTROL (M/N: 16-SABTS)  
RF PART ON MAIN BOARD

