FCC Part 15C

Measurement And Test Report

For

Shenzhen Heyday Technology Co.,Ltd.

6F,B Building,Kelunte Low Carbon,Industrial Park,
Longhua,Bao'an District,Shenzhen,China

Model: KB-801

Apr. 01, 2012

This Report Concerns:	**Equipment Type:**
☒ Original Report	Wireless bluetooth keyboard

Report Number:	MTI120322001RF
Test Engineer:	Bill Chen
Reviewed By:	Jason zheng
Approved & Authorized By:	Hebe Lee
Test Date:	**Mar. 22-Apr. 01, 2012**
Prepared By:	**MTI Technology Laboratory Ltd.** 10F, Yinxing Business Hotel, Xixiang Road, Bao'an District, Shenzhen, P,R.China. Tel: +86-755-8885 0135 Fax: +86-755-8885 0136

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of MTI Technology Laboratory Ltd.

.

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	Shenzhen Heyday Technology Co.,Ltd.
Address of applicant:	6F,B Building,Kelunte Low Carbon,Industrial Park, Longhua,Bao'an District,Shenzhen,China
Manufacturer:	Shenzhen Heyday Technology Co.,Ltd.
Address of manufacturer:	6F,B Building,Kelunte Low Carbon,Industrial Park, Longhua,Bao'an District,Shenzhen,China
Equipment Under Test:	Wireless bluetooth keyboard
Trade Name:	N/A
Tested Model No.:	KB-801
FCC ID:	BC8SSYKB801
Type of Modulation:	FHSS
Frequency Band:	2402 MHz ~ 2480MHz
Number of Channels:	79
Channel Separation:	1MHz
Max. output power:	-6~4 dBm
Type of Antenna:	Integral Antenna, Max Gain 0dBi
Power Supply:	DC 4.2 from battery OR DC 5V from PC

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

1.2 Related Submittal(s) / Grant (s)

This submittal(s) is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with FCC Part 15:2010, Subpart C, and section 15.203, 15.207, and 15.247 rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

All measurement required was performed at laboratory of NTEK Testing Technology Co., Ltd., at 1/F, Building E, Fenda Science Park Sanwei Community, Xixiang Street, Baoan District， Shenzhen, Guangdong

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

FCC – Registration No.: 238937

NTEK Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 238937.

2. SYSTEM TEST CONFIGURATION

The tests documented in this report were performed in accordance with ANSI C63.4-2003 and FCC CFR 47 Part 15 Subpart C.

2.1 EUT Configuration

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

2.2 EUT Exercise

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

2.3 General Test Procedures

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

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

2.4 List of Measuring Equipments Used

Items	Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
1	EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100079	2011/11	1 year
2	Horn Antenna	R/S	CH14-H052	1091698	2011/11	1 year
3	3m Semi-Anechoic Chamber	ETS	N/A	N/A	2011/11	1 year
4	LISN	ROHDE&SCHWARZ	ESH3-Z5	100305	2011/11	1 year
5	Pulse Limiter	ROHDE&SCHWARZ	ESH3-Z2	100305	2011/11	1 year
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100038	2011/11	1 year
2	EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	2011/11	1 year
3	Receiver/ Spectrum Analyzer	ROHDE & SCHWARZ	ESCI	100106	2011/11	1 year
4	Spectrum Analyzer	Agilent	E7405A	US41160415	2011/11	1 year
5	Artificial Mains	ROHDE & SCHWARZ	ESH2-Z5	100028	2011/11	1 year
6	Pulse Limiter	ROHDE & SCHWARZ	ESHSZ2	100044	2011/11	1 year
7	LISN	COM Power	LI-200	12212	2011/11	1 year
8	LISN	COM Power	LI-200	12019	2011/11	1 year
9	3m/5m Semi-Anechoic Chamber	ETS	N/A	N/A	2011/11	1 year
10	Ultra-Broadband Antenna	R/S	HL562	100015	2011/11	1 year
11	Horn Antenna	R/S	HF906	100039	2011/11	1 year
12	Loop Antenna	R&S	FMZB1516	1516131	2011/11	1Year
13	Bilog Antenna	Sunol	JB3	A121206	2011/11	1Year
14	RF Test Panel	R/S	TS / RSP	335015/ 0017	N/A	N/A
15	Turntable	ETS	2088	2149	N/A	N/A
16	Antenna Mast	ETS	2075	2346	N/A	N/A

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
15.203/15.247(b)/(c)	Antenna Requirement	Pass
15.207	Conduction Emission	Pass
15.247(a)(1)(iii)	Quantity of Hopping Channel	Pass
15.247(a)(1)	Channel Separation	Pass
15.247(a)(1)(iii)	Time of Occupancy (Dwell time)	Pass
15.247(a)	20dB Bandwidth	Pass
15.247(b)(1)	Power Output	Pass
15.209(a)(f)	Radiated Emission	Pass
15.247(c)	Band edge	Pass

4. ANTENNA REQUIREMENT

4.1 Standard Applicable

Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Section 15.247(b)/(c):

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

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

4.2 Antenna Connected Construction

This product has a integral antenna, fulfill the requirement of this section.

5. CONDUCTED DISTURBANCES

5.1. Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is +2.4 dB.

5.2. Limit of Conducted Disturbances (Class B)

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

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

5.3. EUT Setup

The setup of EUT is according with CISPR 16-1: 2002, CISPR16-2: 2002 measurement procedure.

The EUT was placed center and the back edge of the test table.

The cables were draped along the test table and bundled to 30-40cm in the middle.

The spacing between the peripherals was 10 cm.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

5.4. Instrument Setup

The test receiver was set with the following configurations:
Test Receiver Setting:
Frequency Range……150 KHz to 30 MHz
Detector……Peak & Quasi-Peak & Average
Sweep Speed……Auto
IF Band Width……9 KHz

5.5. Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.
Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.
All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 dBμV of specification limits). Quasi-peak readings are distinguished with a **"QP"**. Average readings are distinguished with a **"AV".**

5.6. Summary of Test Results

According to the data in section 3.6, the worst margin reading of:

EUT Configuration on Test

Wireless bluetooth keyboard

Model Number	:	KB-801
Serial Number	:	N/A
Applicant	:	Shenzhen Heyday Technology Co.,Ltd.

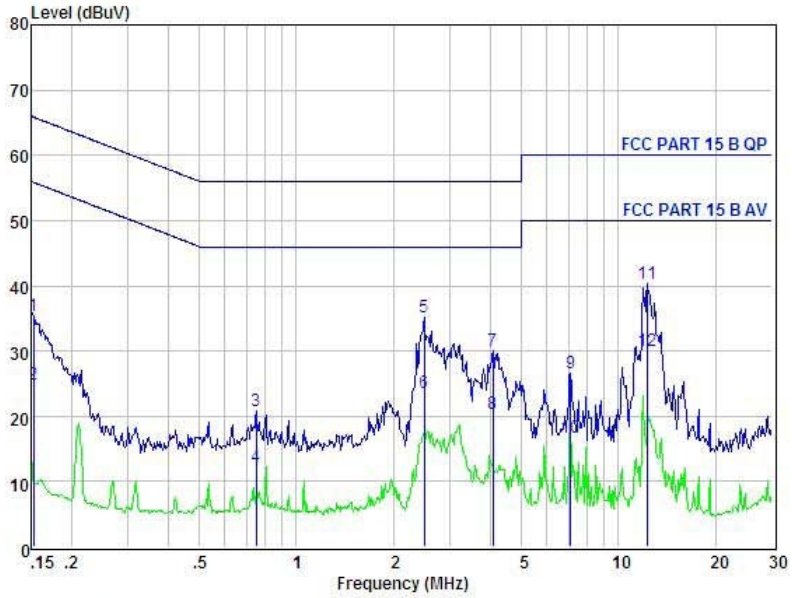
5.7. Test Result

Detailed information, Please refer to the following pages.

According to the data in section 3.8, the EUT complied with the FCC 15B Conducted margin for a Class B device, with the worst margin reading of:

-20.01 dBμV at 12.00 MHz in the **NEUTRAL** mode**, QP** detector, **0.15-30MHz**

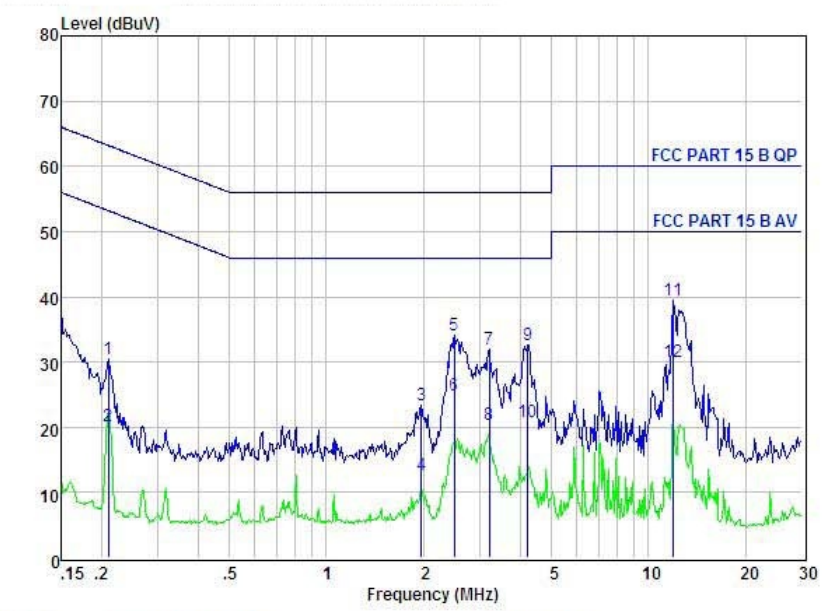
Plot of Conducted Emissions Test Data
Conducted Disturbance
EUT: Wireless bluetooth keyboard
M/N: KB-801
Operating Condition: Charging
Test Specification: L
Comment: AC 120V/60Hz connect to PC



Condition : FCC PART 15 B QP POL: LINE

Item	Freq	Read	LISN Factor	Preamp Factor	Cable Lose	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	0.15	25.57	0.03	-9.72	0.10	35.42	65.87	-30.45	QP
2	0.15	15.06	0.03	-9.72	0.10	24.91	55.87	-30.96	Average
3	0.75	11.04	0.04	-9.71	0.10	20.89	56.00	-35.11	QP
4	0.75	2.36	0.04	-9.71	0.10	12.21	46.00	-33.79	Average
5	2.50	25.23	0.06	-9.70	0.11	35.10	56.00	-20.90	QP
6	2.50	13.63	0.06	-9.70	0.11	23.50	46.00	-22.50	Average
7	4.07	20.24	0.08	-9.69	0.12	30.13	56.00	-25.87	QP
8	4.07	10.49	0.08	-9.69	0.12	20.38	46.00	-25.62	Average
9	7.10	16.75	0.12	-9.54	0.15	26.56	60.00	-33.44	QP
10	7.10	6.85	0.12	-9.54	0.15	16.66	50.00	-33.34	Average
11	12.25	30.30	0.26	-9.46	0.22	40.24	60.00	-19.76	QP
12	12.25	20.03	0.26	-9.46	0.22	29.97	50.00	-20.03	Average

Plot of Conducted Emissions Test Data
Conducted Disturbance
EUT: Wireless bluetooth keyboard
M/N: KB-801
Operating Condition: Charging
Test Specification: N
Comment: AC 120V/60Hz connect to PC



Condition : FCC PART 15 B QP POL: NEUTRAL

Item	Freq	Read	LISN Factor	Preamp Factor	Cable Lose	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	0.21	20.56	0.03	-9.72	0.10	30.41	63.18	-32.77	QP
2	0.21	10.38	0.03	-9.72	0.10	20.23	53.18	-32.95	Average
3	1.97	13.41	0.06	-9.70	0.10	23.27	56.00	-32.73	QP
4	1.97	2.71	0.06	-9.70	0.10	12.57	46.00	-33.43	Average
5	2.50	24.24	0.06	-9.70	0.11	34.11	56.00	-21.89	QP
6	2.50	15.02	0.06	-9.70	0.11	24.89	46.00	-21.11	Average
7	3.21	21.99	0.07	-9.69	0.12	31.87	56.00	-24.13	QP
8	3.21	10.56	0.07	-9.69	0.12	20.44	46.00	-25.56	Average
9	4.22	22.75	0.08	-9.69	0.12	32.64	56.00	-23.36	QP
10	4.22	10.85	0.08	-9.69	0.12	20.74	46.00	-25.26	Average
11	12.00	29.46	0.26	-9.46	0.22	39.40	60.00	-20.60	QP
12	12.00	20.05	0.26	-9.46	0.22	29.99	50.00	-20.01	Average

6. NUMBER OF HOPPING CHANNELS AND CHANNEL SPACING

6.1 Standard Applicable

According to FCC 15.247(a)(1), 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, and frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

6.2 EUT Setup

Spectrum

6.3 Test Equipment List and Details

See section 2.4.

6.4 Test Procedure

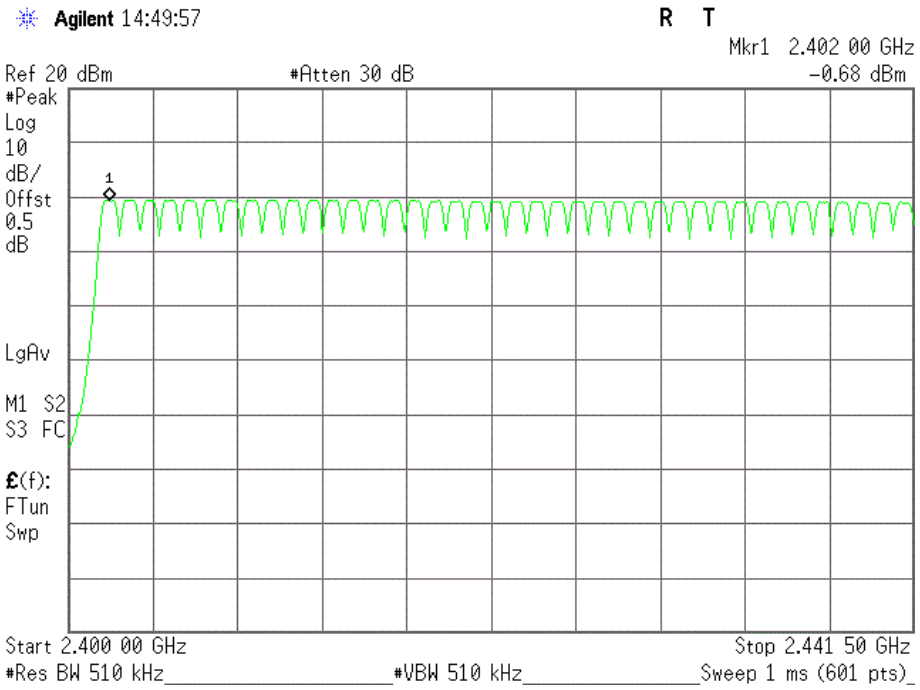
Set the Lowest channel to the Highest Channel, observed the band of 2400MHz to 2438.5MHz, than count it out the number of channels for comparing with the FCC rules. Adjust channel spacing can be read by adjusting the Analyzer SPAN.

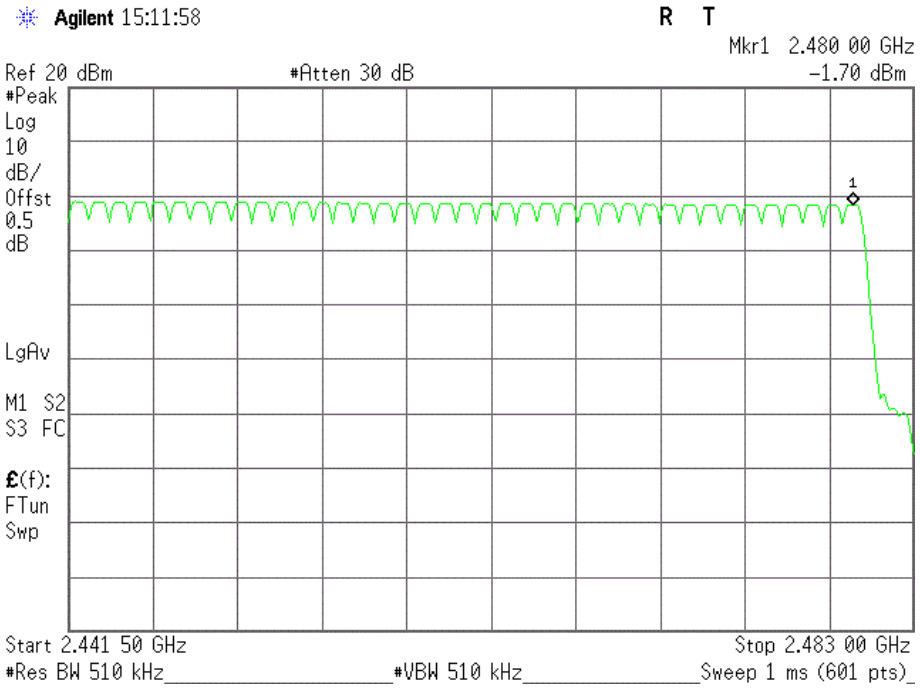
6.5 Test Result

PASS

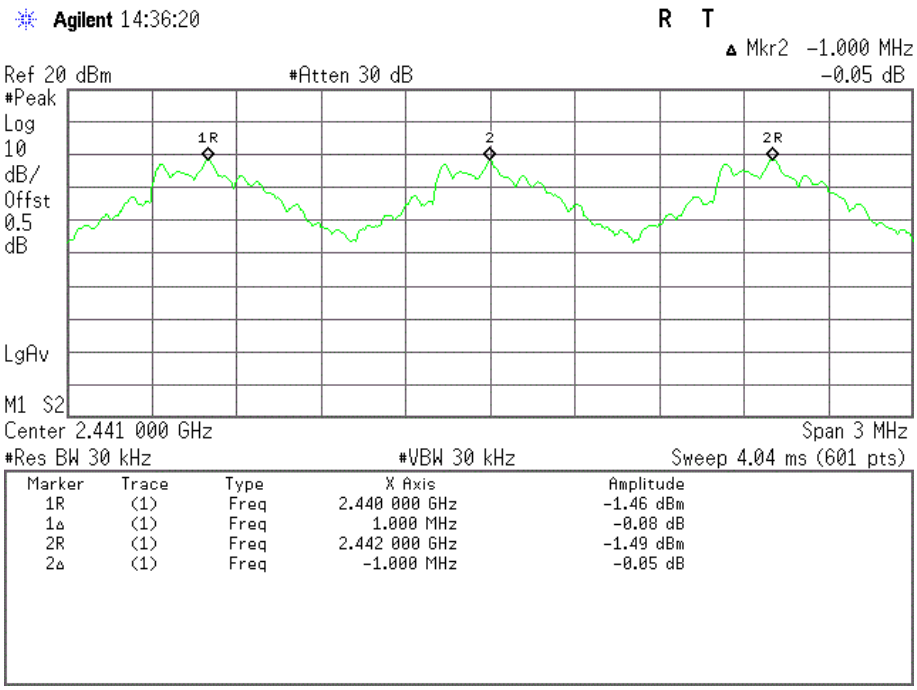
Detailed information, Please refer to the following pages.

No. of Channel=79





Channel Spacing (1MHz)



7. DWELL TIME OF A HOPPING CHANNEL

7.1 Limits of Dwell Time Measurement

According to 15.247(a)(1)(iii), Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. 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.

7.2 EUT Setup

Spectrum

7.3 Test Equipment List and Details

See section 2.4.

7.4 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

2. Set center frequency of spectrum analyzer = operating frequency.

3. Set the spectrum analyzer as RBW, VBW=1000 kHz, Span = 0Hz.

4. Repeat above procedures until all frequency measured was complete.

7.5 Test Result /Plots

PASS

A period time = 0.4 (s) * 79 = 31.6(s)

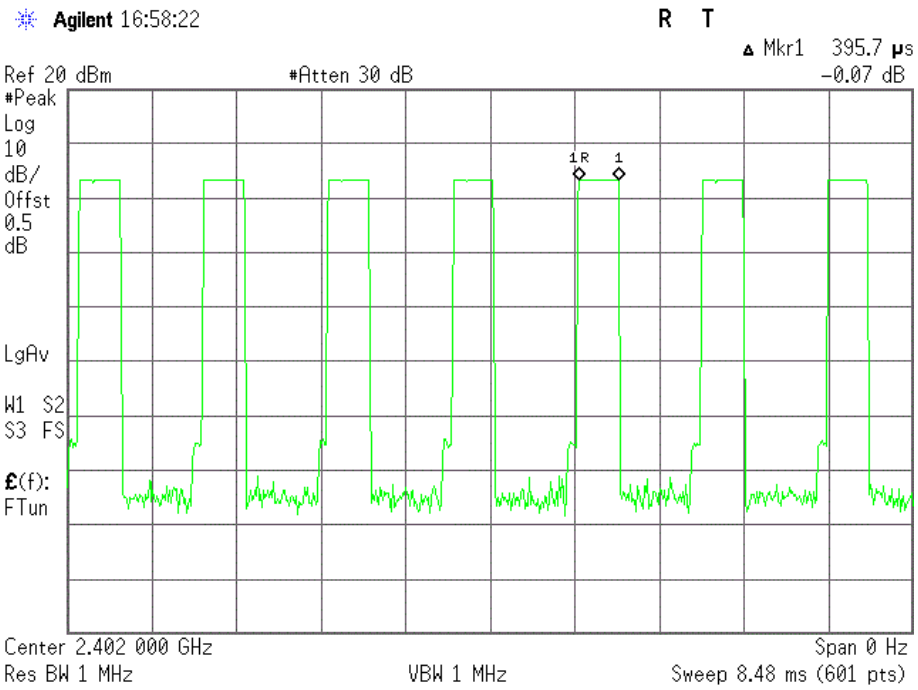
CH Low: DH1 time slot = 0.396 (ms) * (1600/(1*79)) * 31.6 = 253.4 (ms)
DH3 time slot = 1.630 (ms) * (1600/(3*79)) * 31.6 = 347.7 (ms)
DH5 time slot = 2.898 (ms) * (1600/(5*79)) * 31.6 = 370.9 (ms)

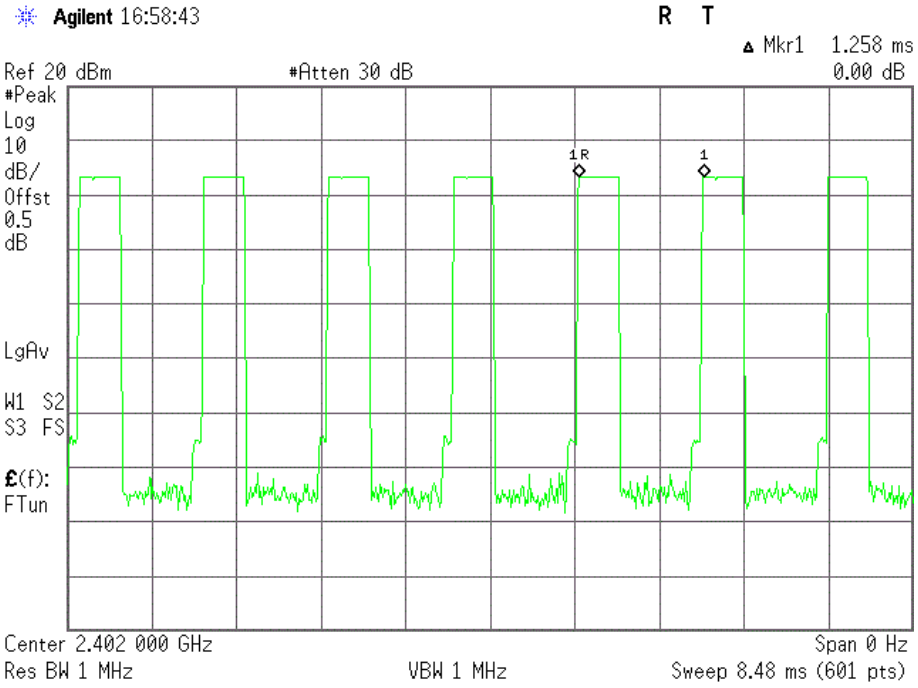
CH Mid: DH1 time slot = 0.396 (ms) * (1600/(1*79)) * 31.6 = 253.4 (ms)
DH3 time slot = 1.658 (ms) * (1600/(3*79)) * 31.6 = 353.7 (ms)
DH5 time slot = 2.898 (ms) * (1600/(5*79)) * 31.6 = 370.9 (ms)

CH High: DH1 time slot = 0.390 (ms) * (1600/(1*79)) * 31.6 = 249.6 (ms)
DH3 time slot = 1.644 (ms) * (1600/(3*79)) * 31.6 = 350.7 (ms)
DH5 time slot = 2.898 (ms) * (1600/(5*79)) * 31.6 = 370.9 (ms)

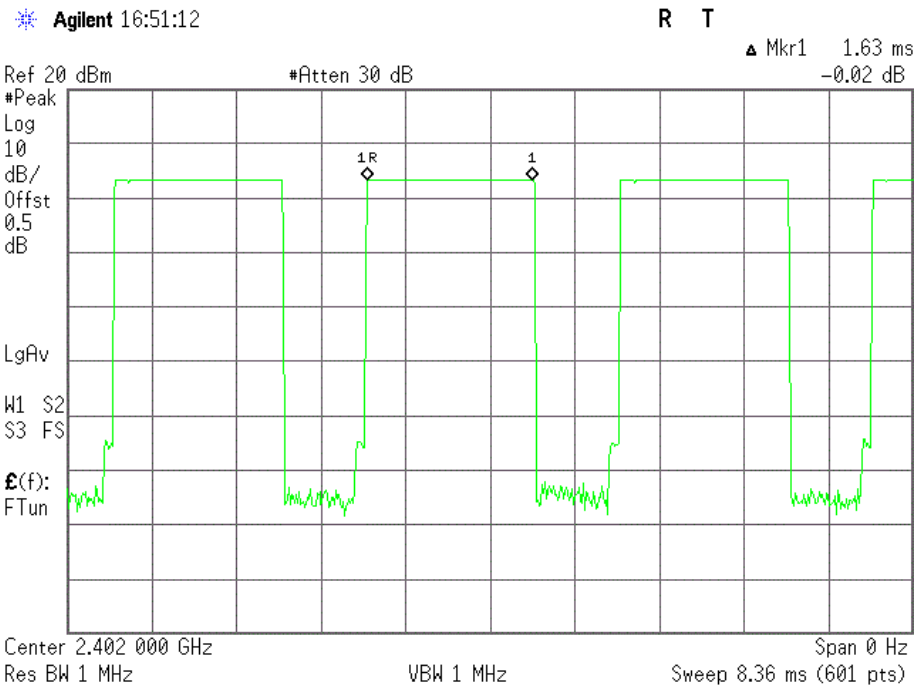
Detailed information please see the following page.

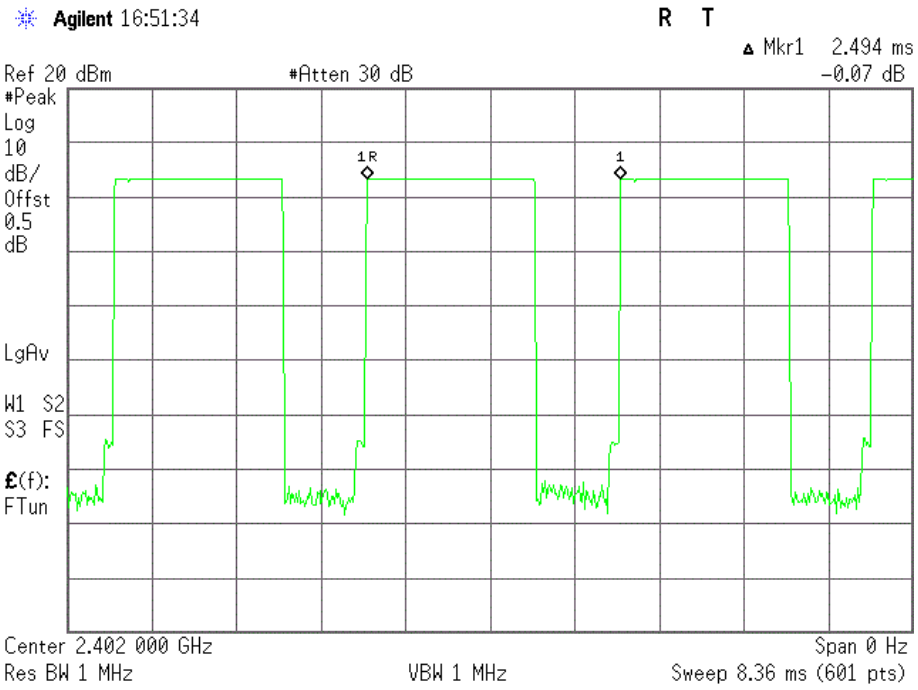
DH1: Low CH


Agilent 16:58:22
R T
Δ Mkr1 395.7 µs
Ref 20 dBm
#Atten 30 dB
-0.07 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R 1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.402 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.48 ms (601 pts)

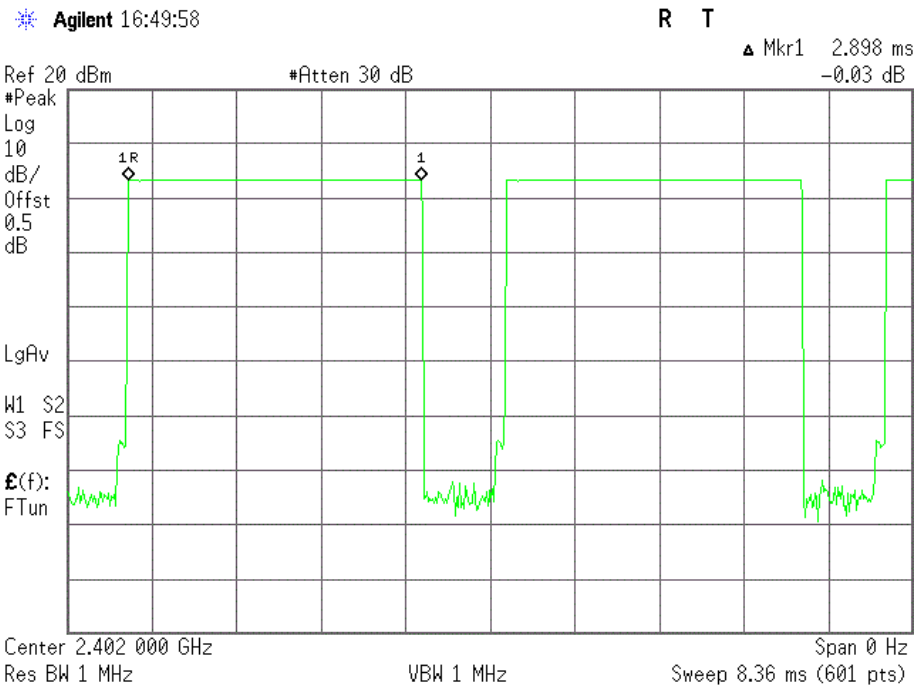

Agilent 16:58:43
R T
Δ Mkr1 1.258 ms
Ref 20 dBm
#Atten 30 dB
0.00 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R 1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.402 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.48 ms (601 pts)

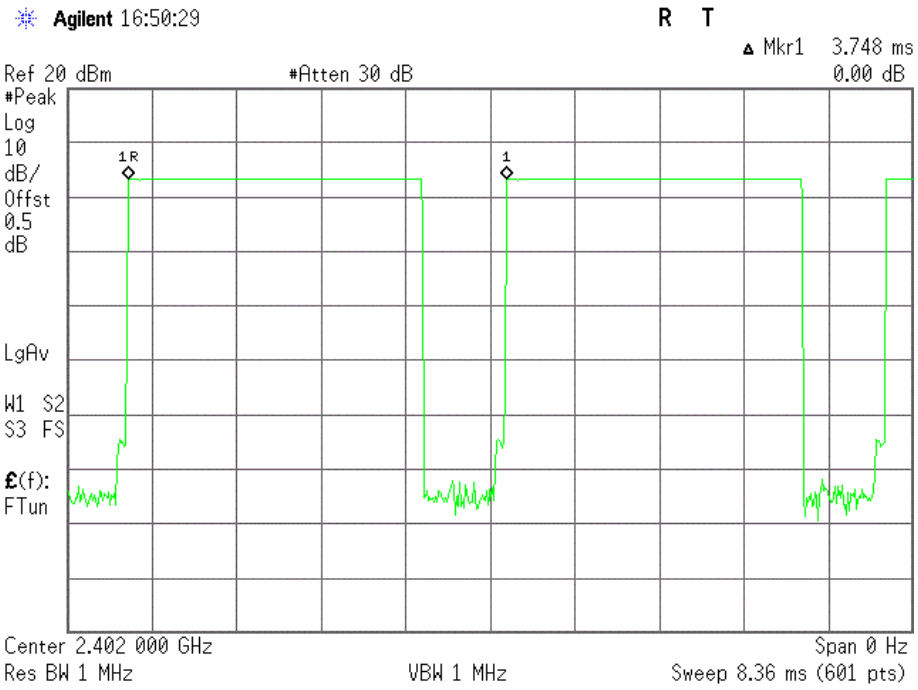
DH3: Low CH


Agilent 16:51:12
R T
Mkr1 1.63 ms
Ref 20 dBm
#Atten 30 dB
-0.02 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.402 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

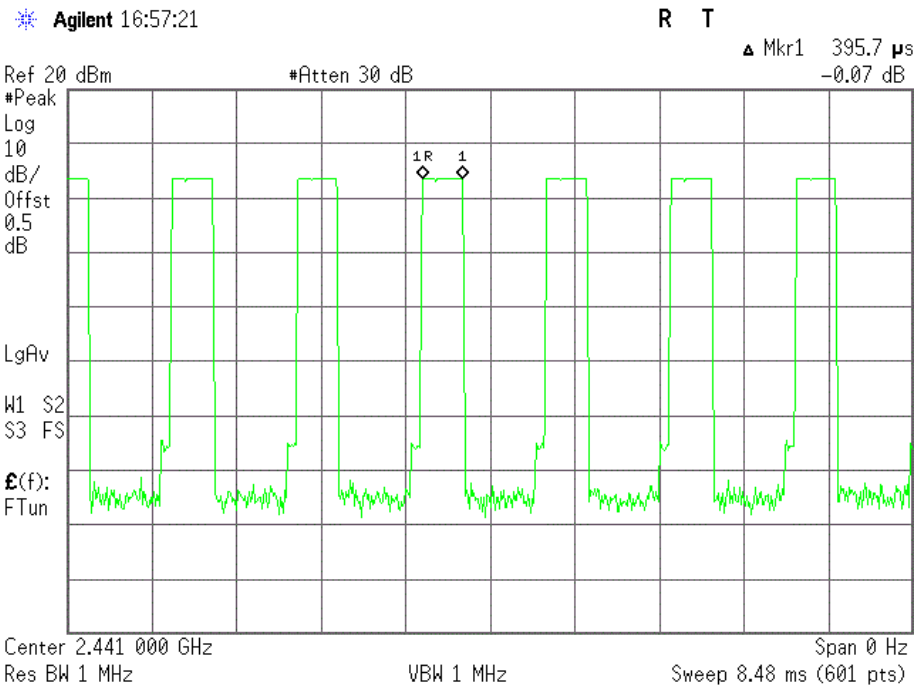

Agilent 16:51:34
R T
Mkr1 2.494 ms
Ref 20 dBm
#Atten 30 dB
-0.07 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.402 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

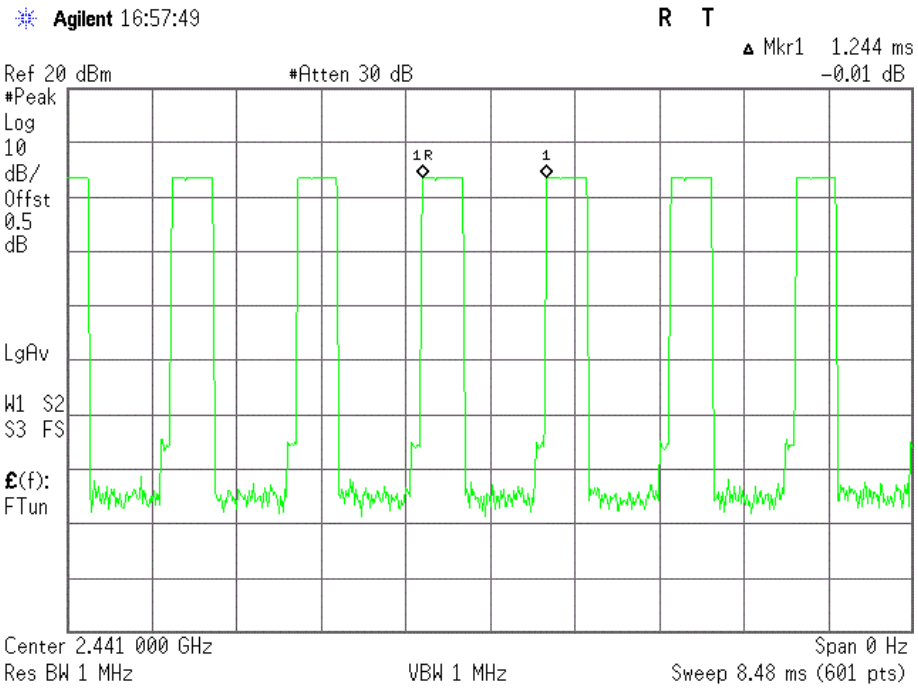
DH5: Low CH


Agilent 16:49:58
R T
Mkr1 2.898 ms
Ref 20 dBm
#Atten 30 dB
-0.03 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.402 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

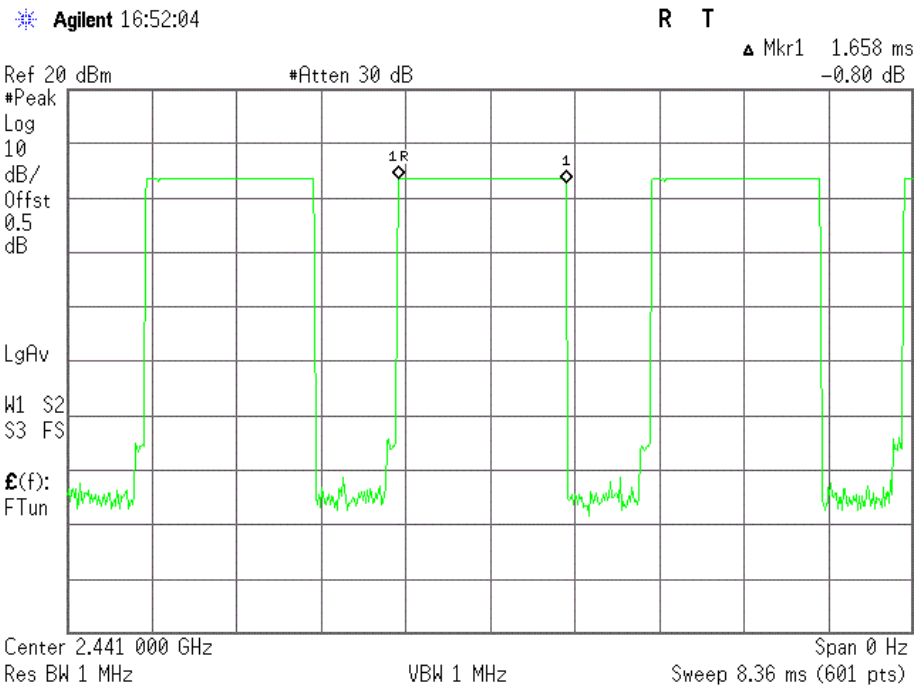

Agilent 16:50:29
R T
Mkr1 3.748 ms
Ref 20 dBm
#Atten 30 dB
0.00 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.402 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

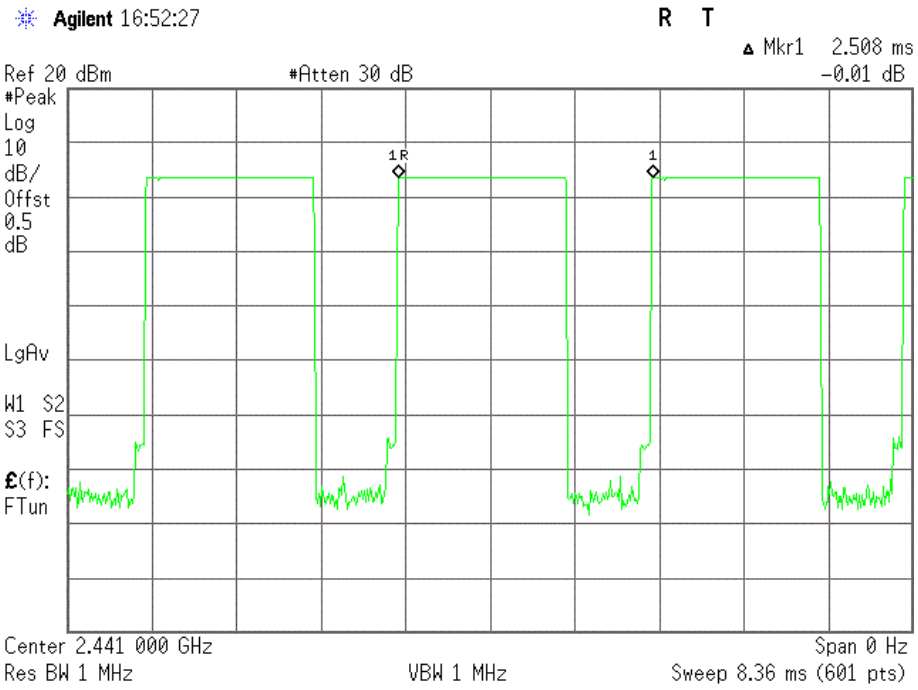
DH1: Mid CH


Agilent 16:57:21
R T
Mkr1 395.7 µs
-0.07 dB
Ref 20 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R 1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.441 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.48 ms (601 pts)

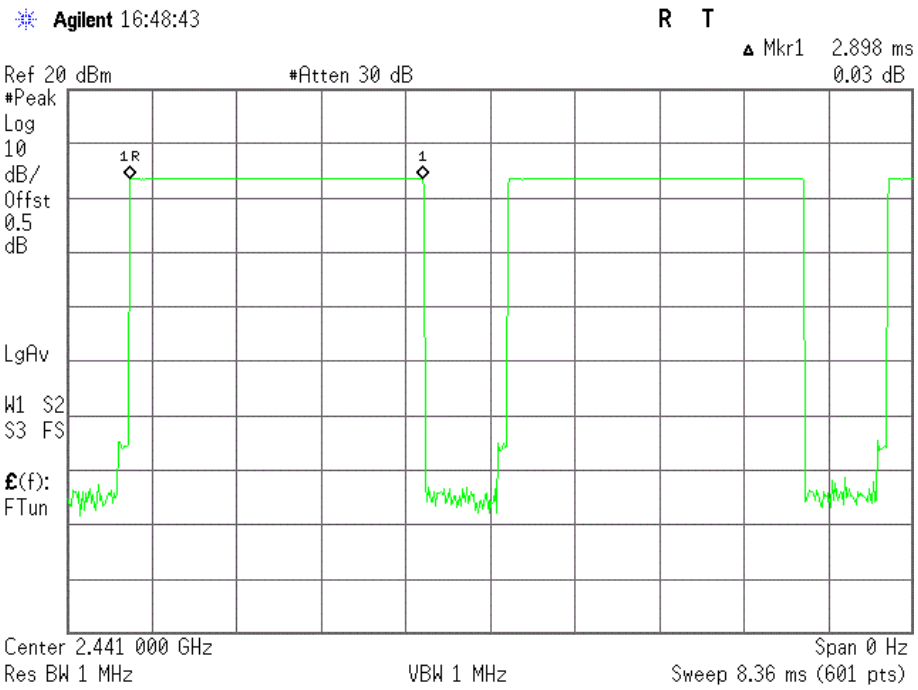

Agilent 16:57:49
R T
Mkr1 1.244 ms
-0.01 dB
Ref 20 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R 1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.441 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.48 ms (601 pts)

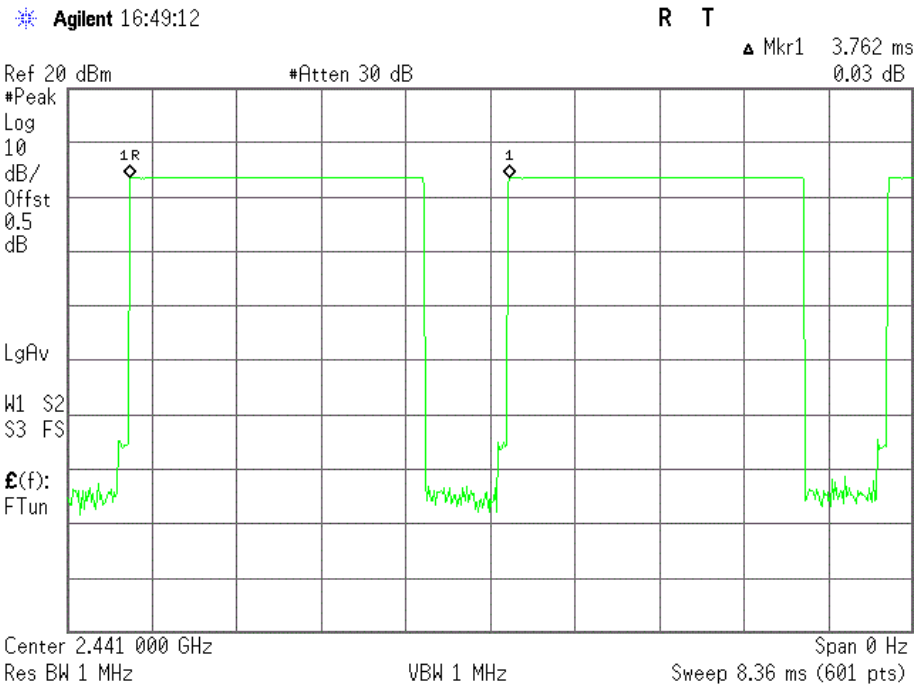
DH3: Mid CH


Agilent 16:52:04
R T
Mkr1 1.658 ms
Ref 20 dBm
#Atten 30 dB
-0.80 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.441 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

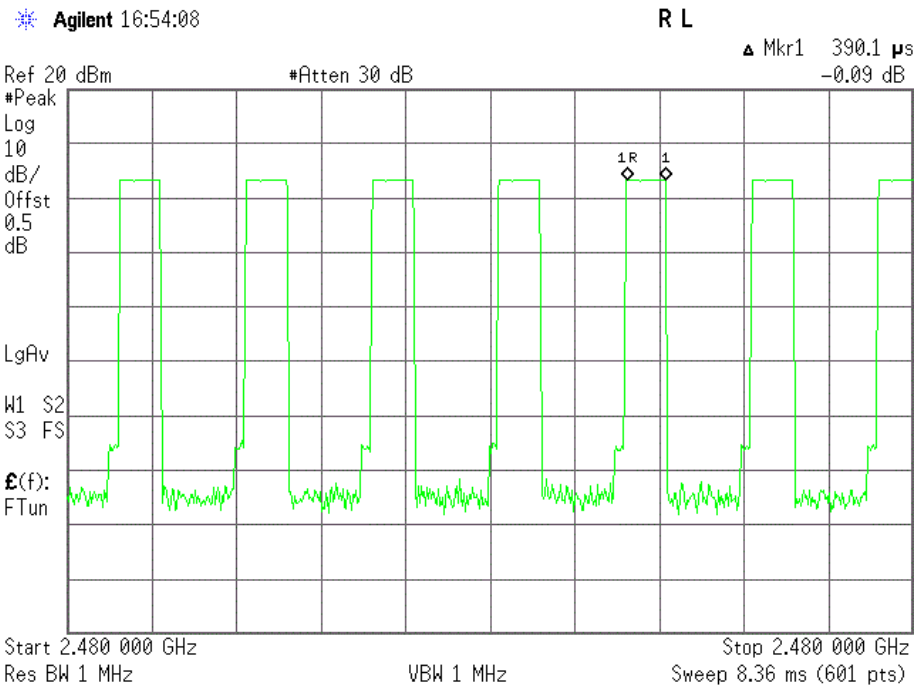

Agilent 16:52:27
R T
Mkr1 2.508 ms
Ref 20 dBm
#Atten 30 dB
-0.01 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.441 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

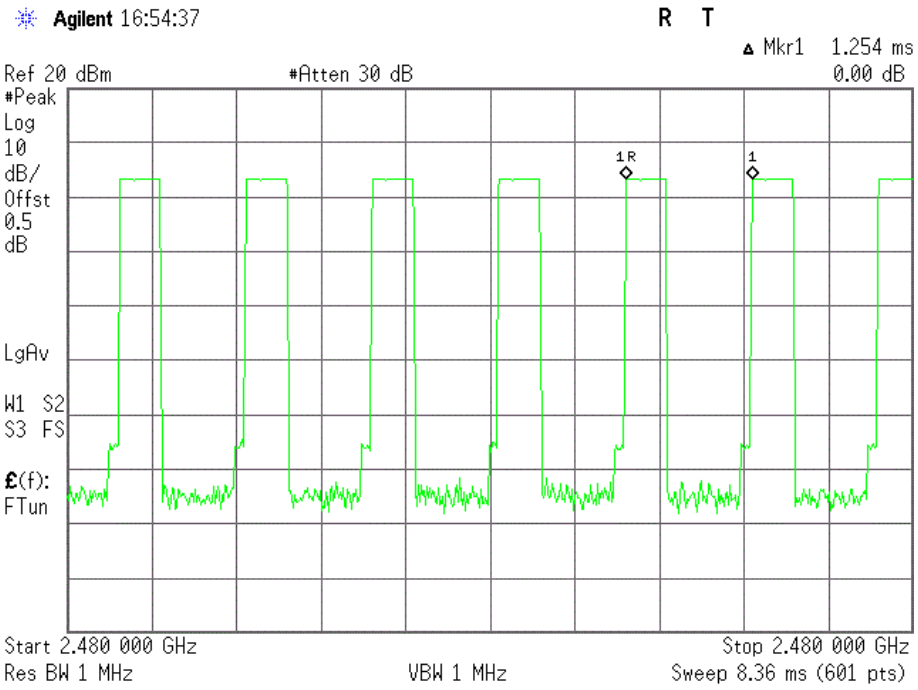
DH5: Mid CH


Agilent 16:48:43
R T
Mkr1 2.898 ms
Ref 20 dBm
#Atten 30 dB
0.03 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.441 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

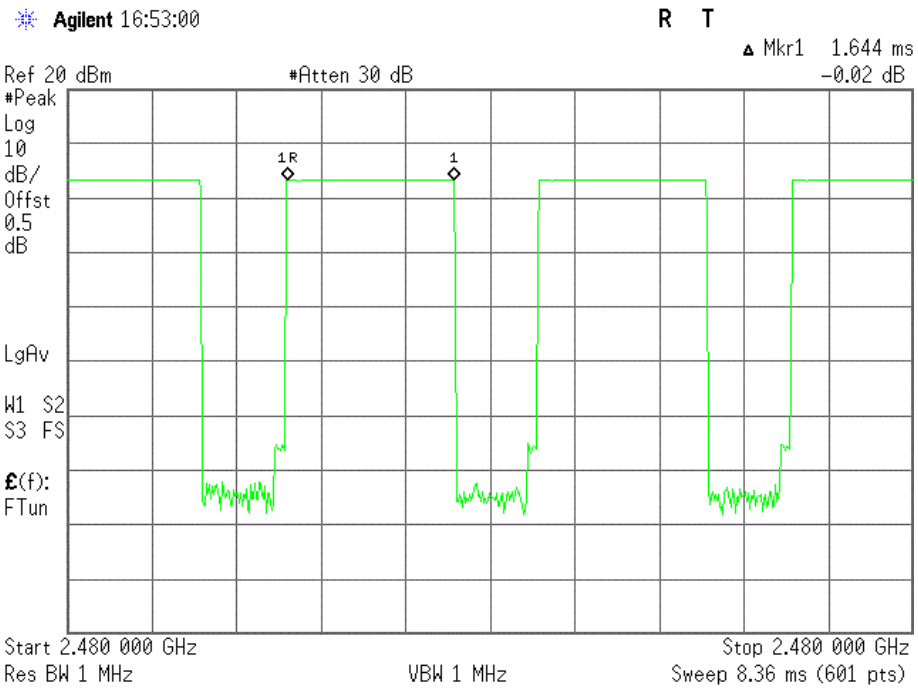

Agilent 16:49:12
R T
Mkr1 3.762 ms
Ref 20 dBm
#Atten 30 dB
0.03 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.441 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

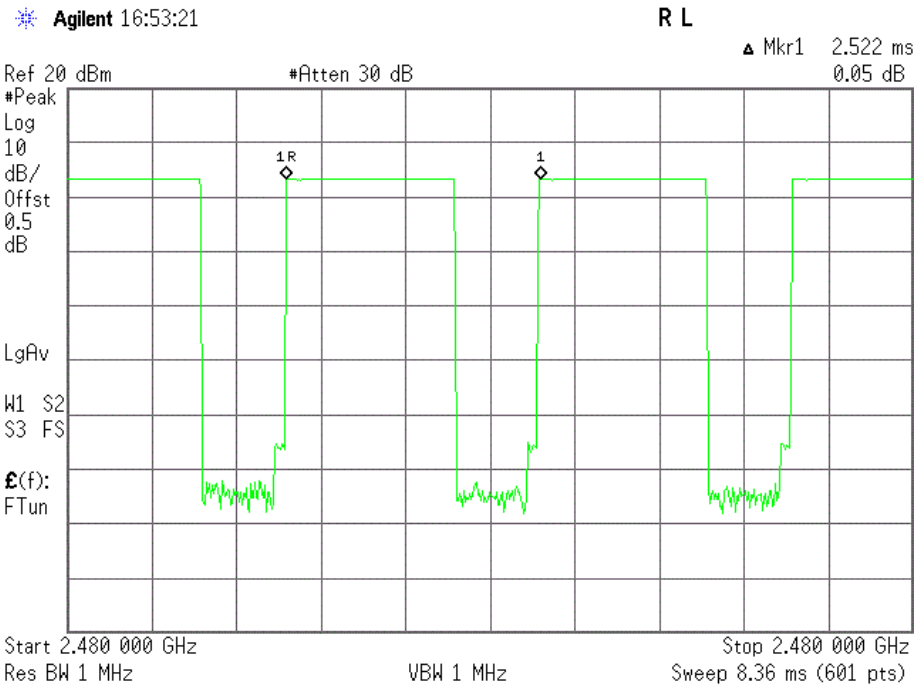
DH1: High CH


Agilent 16:54:08
R L
Mkr1 390.1 µs
-0.09 dB
Ref 20 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Start 2.480 000 GHz
Stop 2.480 000 GHz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

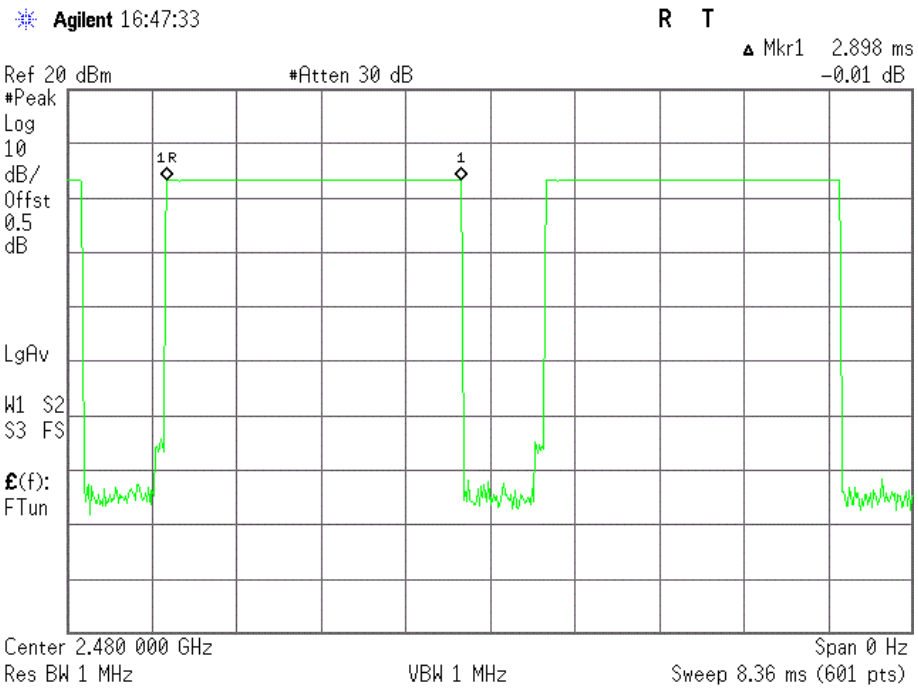

Agilent 16:54:37
R T
Mkr1 1.254 ms
0.00 dB
Ref 20 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Start 2.480 000 GHz
Stop 2.480 000 GHz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

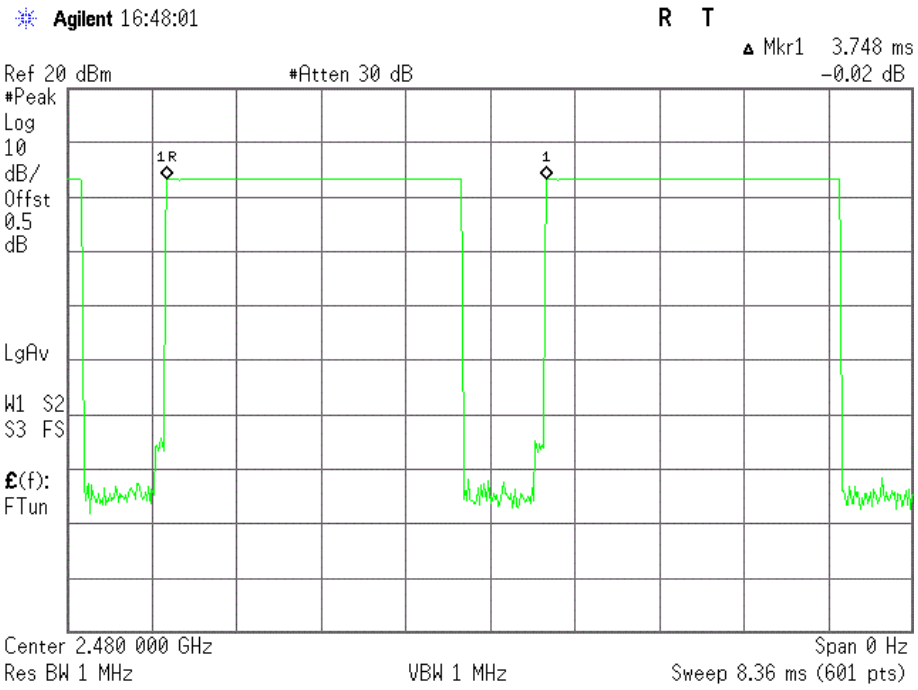
DH3: High CH


Agilent 16:53:00
R T
Mkr1 1.644 ms
Ref 20 dBm
#Atten 30 dB
-0.02 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Start 2.480 000 GHz
Stop 2.480 000 GHz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)


Agilent 16:53:21
R L
Mkr1 2.522 ms
Ref 20 dBm
#Atten 30 dB
0.05 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Start 2.480 000 GHz
Stop 2.480 000 GHz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

DH5: High CH


Agilent 16:47:33
R T
Mkr1 2.898 ms
Ref 20 dBm
#Atten 30 dB
-0.01 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.480 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

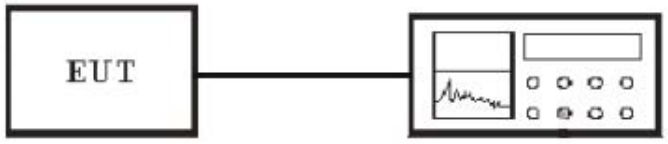

Agilent 16:48:01
R T
Mkr1 3.748 ms
Ref 20 dBm
#Atten 30 dB
-0.02 dB
#Peak
Log
10
dB/
Offst
0.5
dB
1R
1
LgAv
W1 S2
S3 FS
£(f):
FTun
Center 2.480 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 8.36 ms (601 pts)

8. 20-dB BANDWIDTH

8.1 Limits of 20-dB Bandwidth Measurement

According to 15.247(a)(1)(iii). For frequency hopping systems operating in the 2400MHz-2483.5 MHz no limit for 20dB bandwidth.

8.2 EUT Setup



Spectrum

8.3 Test Equipment List and Details

See section 2.4.

8.4 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

2. Set center frequency of spectrum analyzer = operating frequency.

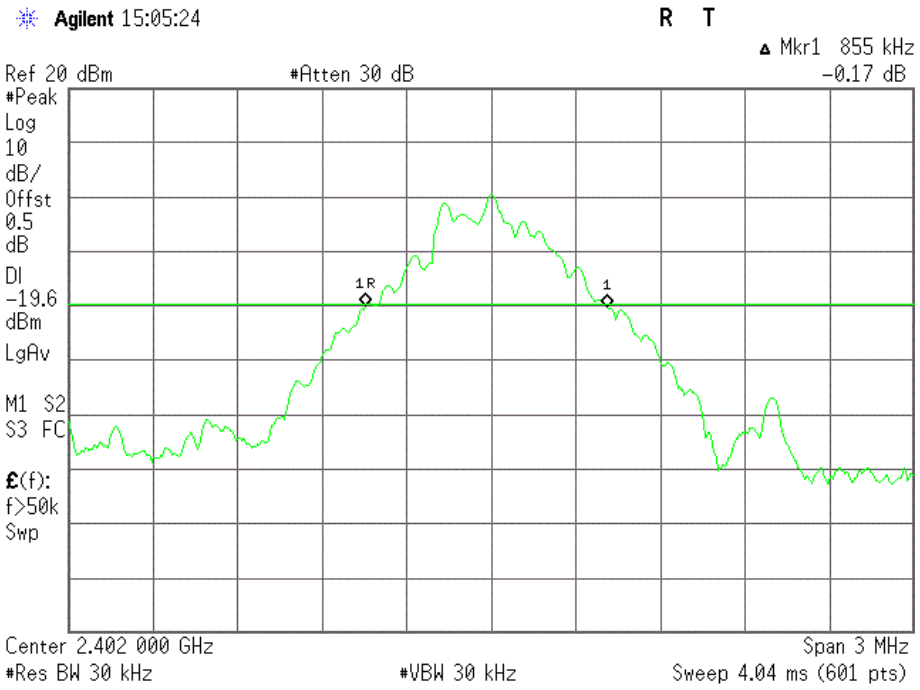
3. The spectrum analyzer as RBW=30 kHz (1 % of Bandwidth.), Sweep=auto

4. Mark the peak frequency and –20dB (upper and lower) frequency.

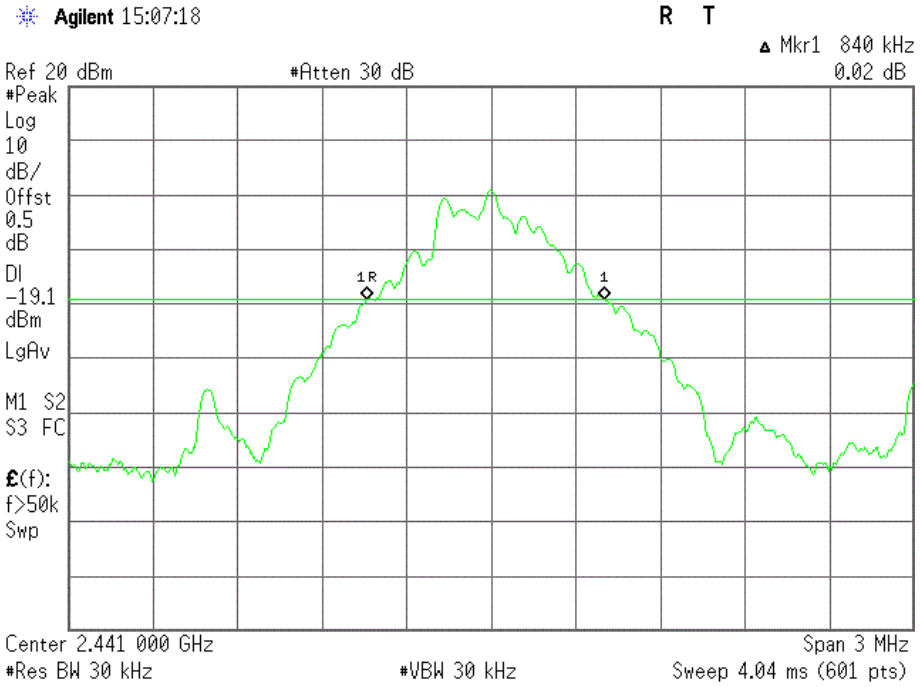
8.5 Test Result /Plots

Frequency MHz	20 dB Bandwidth kHz	Limit dB
2402	855	/
2441	840	/
2480	850	/

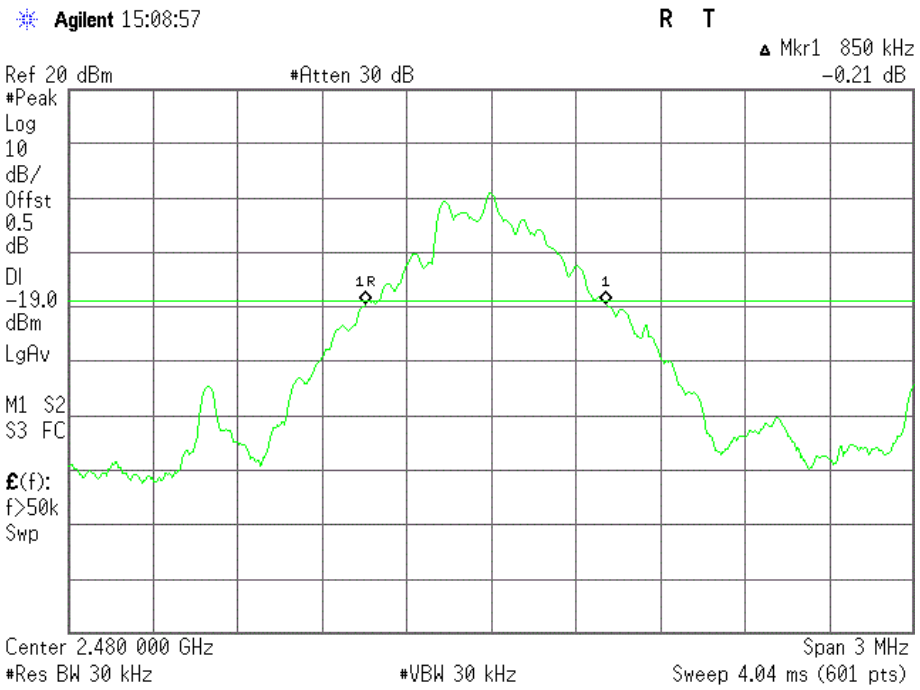
CH Low


Agilent 15:05:24
R T
Mkr1 855 kHz
-0.17 dB
Ref 20 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Dl
-19.6
dBm
LgAv
M1 S2
S3 FC
£(f):
f>50k
Swp
1R
1
Center 2.402 000 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 30 kHz
Sweep 4.04 ms (601 pts)

Mid CH


Agilent 15:07:18
R T
Mkr1 840 kHz
0.02 dB
Ref 20 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Dl
-19.1
dBm
LgAv
M1 S2
S3 FC
£(f):
f>50k
Swp
1R
1
Center 2.441 000 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 30 kHz
Sweep 4.04 ms (601 pts)

High CH


Agilent 15:08:57
R T
Mkr1 850 kHz
-0.21 dB
Ref 20 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Dl
-19.0
dBm
LgAv
M1 S2
S3 FC
£(f):
f>50k
Swp
1R
1
Center 2.480 000 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 30 kHz
Sweep 4.04 ms (601 pts)

9. PEAK POWER

9.1 Limits of Power Measurement

According to 15.247(b)(1). For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

9.2 Test Equipment List and Details

See section 2.4.

9.3 EUT Setup

Spectrum

9.4 Test Procedure

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram Above, Spectrum Setting : RBW= 1MHz, VBW= 1MHz, Sweep time = Auto.

9.5 Test Result of Peak Power

PASS.

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	LIMIT (dBm)	LIMIT (W)
Low CH	2402 MHz	-1.60 dBm	0.6918 mW	30	1
Mid CH	2441 MHz	-1.54 dBm	0.7015 mW	30	1
High CH	2480 MHz	-1.56 dBm	0.6982 mW	30	1

.

10. FIELD STRENGTH OF SPURIOUS EMISSIONS

10.1 Limits of Radiated Emission Measurement

According to §15.247(c), 15.205 15.209(b) &15.35 (b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Section 15.209:
0.009-0.490MHz 67.6 dBuV/m /F（KHz）@300M
0.490-1.705MHz 87.6 dBuV/m /F（KHz）@30M
1.705-30MHz 29.5 dBuV/m @30M
30 - 88 MHz 40 dBuV/m @3M
88 -216 MHz 43.5 dBuV/m @3M
216 -960 MHz 46 dBuV/m @3M
Above 960 MHz 54dBuV/m @3M

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

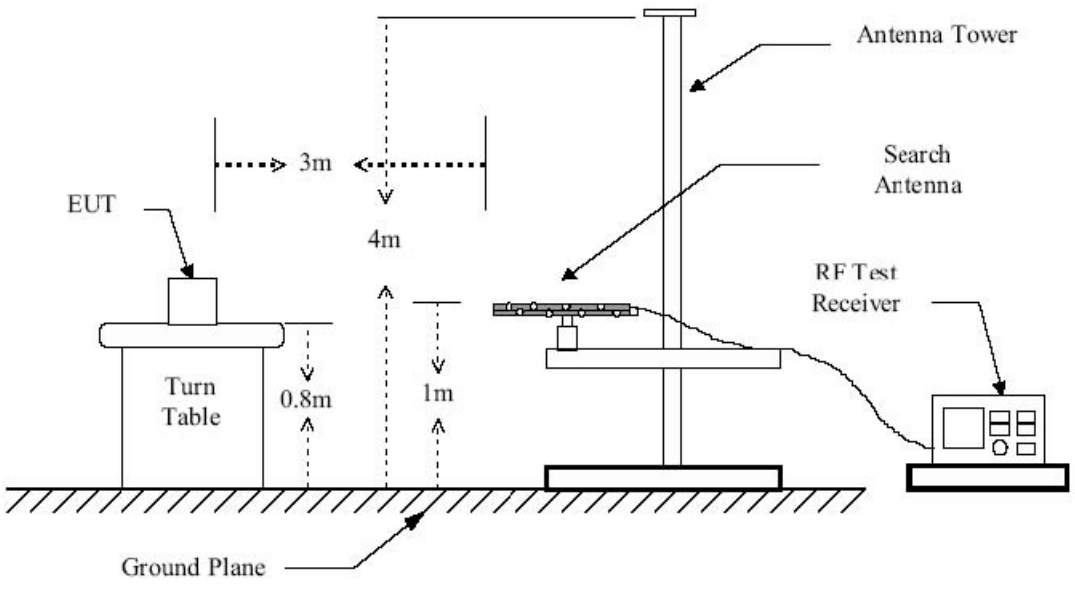
Emissions Radiated Outside Of The Specified Frequency Bands, Except For Harmonics, Shall Be Attenuated By At Least 20 Db Below The Level Of The Fundamental Or To The General Radiated Emission Limits In 15.209, Whichever Is The Lesser Attenuation.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

Note: 30m to 3m correction factor calculation:
40*Log(30m/3m)=40

10.2 EUT Setup

Radiated Measurement Setup



10.3 Test Equipment List and Details

See section 2.4.

10.4 Test Procedure

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

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

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

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

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

6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

10.5 Test Result

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

-8.5 dBμV at **4804.0** MHz in the **Horizontal** polarization for Middle Channel, 30 MHz to 25 GHz, 3 Meters, Transmitting mode

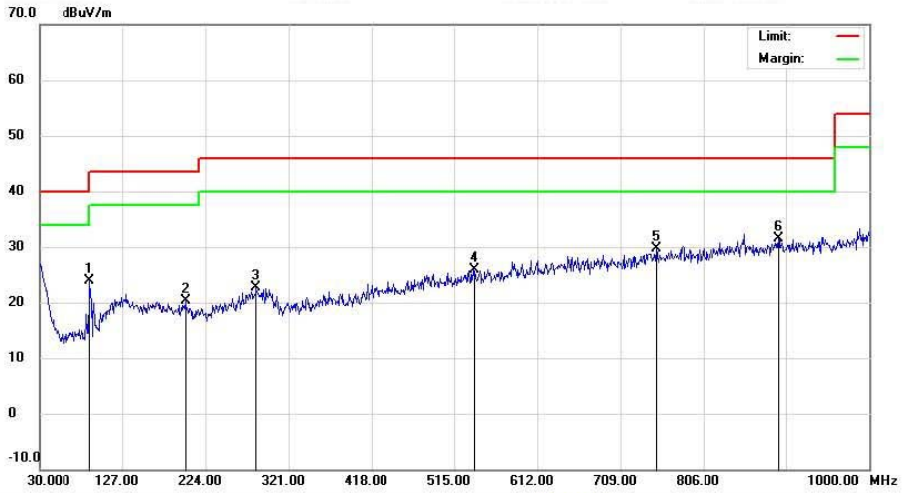
-13.52 dBμV at **937.9199** MHz in the **Horizontal** polarization for Middle Channel, 30 MHz to 1 GHz, 3 Meters, Charging mode

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Spurious emission 9K-30MHz ：

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Test mode: normal										
12.14	PK	56.7	134	H	18.9	0.1	28.6	47.1	69.5	-22.4
14.36	PK	55.4	153	H	18.9	0.1	28.6	45.8	69.5	-23.7
15.73	PK	56.2	96	H	19.0	0.1	28.6	46.7	69.5	-22.8
17.25	PK	54.8	107	H	19.0	0.1	28.6	45.3	69.5	-24.2
19.35	PK	54.2	182	H	19.2	0.1	28.6	44.9	69.5	-24.6
24.27	PK	55.2	137	H	19.2	0.1	28.7	45.8	69.5	-23.7
13.84	PK	54.4	128	V	18.9	0.1	28.6	44.8	69.5	-24.7
15.29	PK	56.2	158	V	19.0	0.1	28.6	46.7	69.5	-22.8
17.94	PK	55.2	272	V	19.0	0.1	28.6	45.7	69.5	-23.8
21.68	PK	54.2	305	V	19.2	0.1	28.7	44.8	69.5	-24.7
25.72	PK	55.7	254	V	19.3	0.1	28.7	46.4	69.5	-23.1
28.49	PK	53.1	189	V	19.3	0.1	28.7	43.8	69.5	-25.7
NOTE: 1 The test distance 3m. 2 Radiation Emission Test (Below 30MHz) is tested in SEM Test Compliance Service Co., Ltd.										

From 30 MHz to 1 GHz
Test Mode: Normal
Vertical

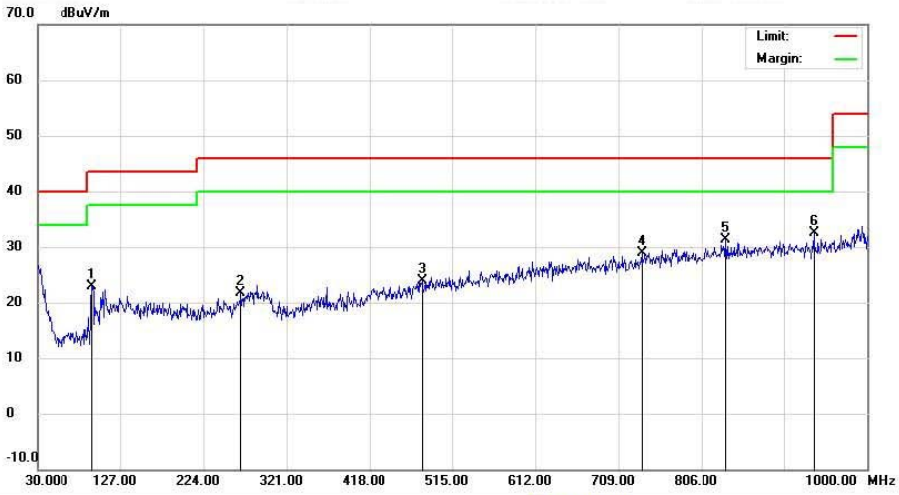


Site site MOST 3M PASS Polarization: *Vertical* Temperature: 26
Limit: FCC Part15 B 3M Radiation Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		89.1700	12.56	11.38	23.94	43.50	-19.56	QP			
2		200.7199	2.87	17.37	20.24	43.50	-23.26	QP			
3		283.1700	3.19	19.43	22.62	46.00	-23.38	QP			
4		537.3099	3.62	22.22	25.84	46.00	-20.16	QP			
5		750.7100	3.97	25.79	29.76	46.00	-16.24	QP			
6	*	894.2699	4.18	27.34	31.52	46.00	-14.48	QP			

*:Maximum data x:Over limit !:over margin

Horizontal



Site site MOST 3M PASS Polarization: **Horizontal** Temperature: 26

Limit: FCC Part15 B 3M Radiation Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		94.0199	11.02	11.92	22.94	43.50	-20.56	QP			
2		267.6499	3.09	18.60	21.69	46.00	-24.31	QP			
3		480.0799	2.27	21.70	23.97	46.00	-22.03	QP			
4		736.1599	3.68	25.23	28.91	46.00	-17.09	QP			
5		835.1000	4.21	27.10	31.31	46.00	-14.69	QP			
6	*	937.9199	4.96	27.52	32.48	46.00	-13.52	QP			

*:Maximum data x:Over limit !:over margin

Spurious emission above 1G

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (1G to 25GHz)										
4804.0	AV	39.2	128	H	34.1	5.2	33.0	45.5	54	-8.5
4804.0	AV	38.1	174	V	34.1	5.2	33.0	44.4	54	-9.6
7206.0	AV	30.5	216	H	37.4	6.1	33.5	40.5	54	-13.5
7206.0	AV	30.2	153	V	37.4	6.1	33.5	40.2	54	-13.8
2402.0	AV	100.9	189	H	29.1	3.7	34.0	99.7		(Fund.)
2402.0	AV	101.5	283	V	29.1	3.7	34.0	100.3		(Fund.)
4804.0	PK	45.9	97	H	34.1	5.2	33.0	52.2	74	-21.8
4804.0	PK	47.2	148	V	34.1	5.2	33.0	53.5	74	-20.5
7206.0	PK	40.3	159	H	37.4	6.1	33.5	50.3	74	-23.7
7206.0	PK	41.1	215	V	37.4	6.1	33.5	51.1	74	-22.9
2402.0	PK	103.9	273	H	29.1	3.7	34.0	102.7		(Fund.)
2402.0	PK	104.5	162	V	29.1	3.7	34.0	103.3		(Fund.)
Middle Channel (1G to 25GHz)										
4882.0	AV	38.8	108	H	34.1	5.2	33.0	45.1	54	-8.9
4882.0	AV	37.5	142	V	34.1	5.2	33.0	43.8	54	-10.2
7323.0	AV	30.2	128	H	37.4	6.1	33.5	40.2	54	-13.8
7323.0	AV	29.8	193	V	37.4	6.1	33.5	39.8	54	-14.2
2441.0	AV	102.0	118	H	29.1	3.7	34.0	100.8		(Fund.)
2441.0	AV	101.5	74	V	29.1	3.7	34.0	100.3		(Fund.)
4882.0	PK	45.0	128	H	34.1	5.2	33.0	51.3	74	-22.7
4882.0	PK	46.1	232	V	34.1	5.2	33.0	52.4	74	-21.6
7323.0	PK	40.5	273	H	37.4	6.1	33.5	50.5	74	-23.5
7323.0	PK	40.2	163	V	37.4	6.1	33.5	50.2	74	-23.8
2441.0	PK	104.3	108	H	29.1	3.7	34.0	103.1		(Fund.)
2441.0	PK	103.6	172	V	29.1	3.7	34.0	102.4		(Fund.)

High Channel (1G to 25GHz)										
4960.0	AV	39.0	169	H	34.1	5.2	33.0	45.3	54	-8.7
4960.0	AV	38.2	284	V	34.1	5.2	33.0	44.5	54	-9.5
7440.0	AV	30.6	137	H	37.4	6.1	33.5	40.6	54	-13.4
7440.0	AV	31.2	86	V	37.4	6.1	33.5	41.2	54	-12.8
2480.0	AV	99.7	157	H	29.1	3.7	34.0	98.5		(Fund.)
2480.0	AV	99.4	192	V	29.1	3.7	34.0	98.2		(Fund.)
4960.0	PK	45.2	114	H	34.1	5.2	33.0	51.5	74	-22.5
4960.0	PK	44.6	75	V	34.1	5.2	33.0	50.9	74	-23.1
7440.0	PK	42.2	253	H	37.4	6.1	33.5	52.2	74	-21.8
7440.0	PK	41.6	188	V	37.4	6.1	33.5	51.6	74	-22.4
2480.0	PK	103.1	219	H	29.1	3.7	34.0	101.9		(Fund.)
2480.0	PK	101.6	133	V	29.1	3.7	34.0	100.4		(Fund.)

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 4th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

11. Band Edges Measurement

11.1 Limits of Band Edges Measurement

According to §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak radiated power limits.

11.2 Test Equipment List and Details

See section 2.4.

11.3 Test Procedure

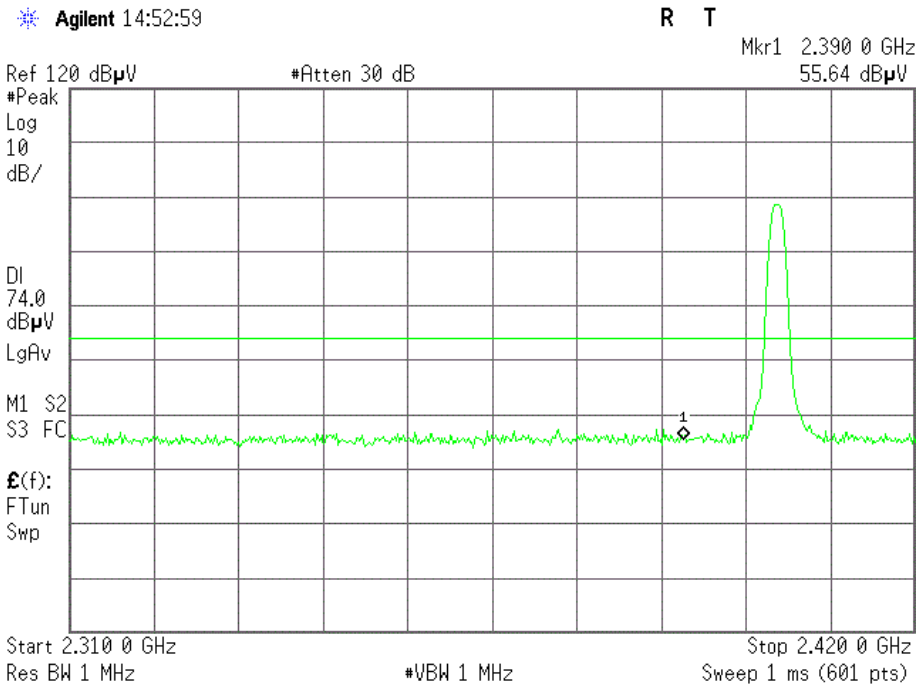
Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded. The spectrum plots (Peak RBW=VBW=100 kHz; Average RBW=1 MHz, VBW=10 Hz) are attached on the following pages.

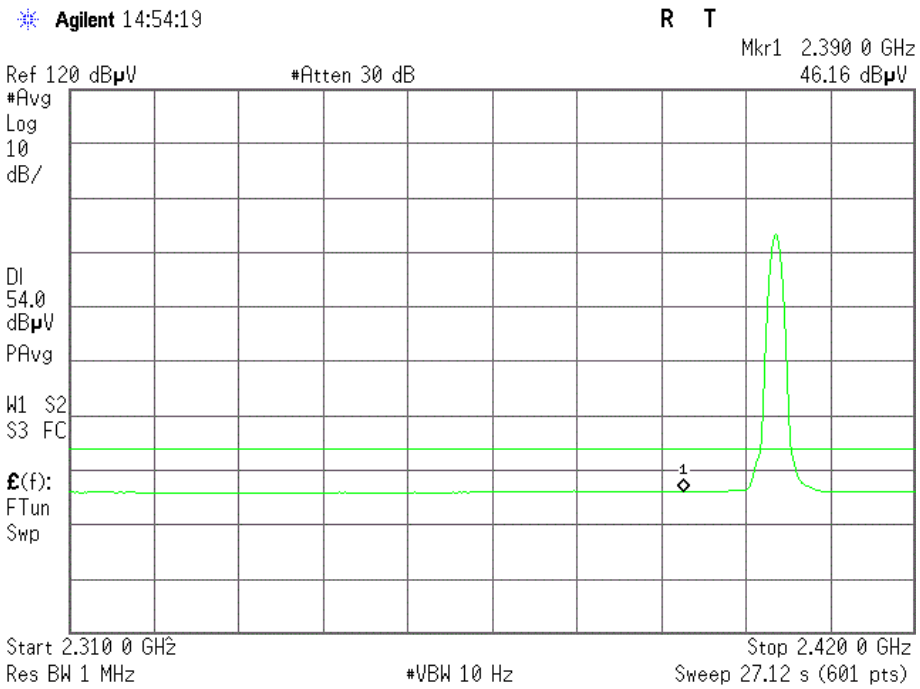
11.4 Test Result

Test mode	Frequency MHz	Limit dBuV /dB	Result
Lowest	2390.00	<54dBuv	PASS
	2400.00	>20dB	PASS
Highest	2483.50	<54DBUV	PASS

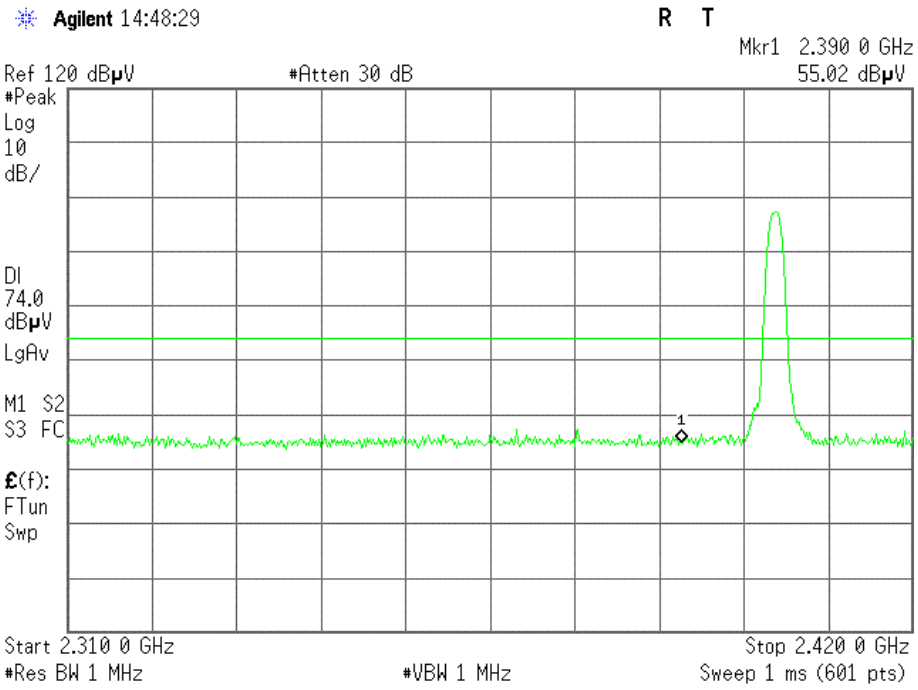
The edge emissions are below the FCC 15.209 Limits. Please refer to the test plots below.

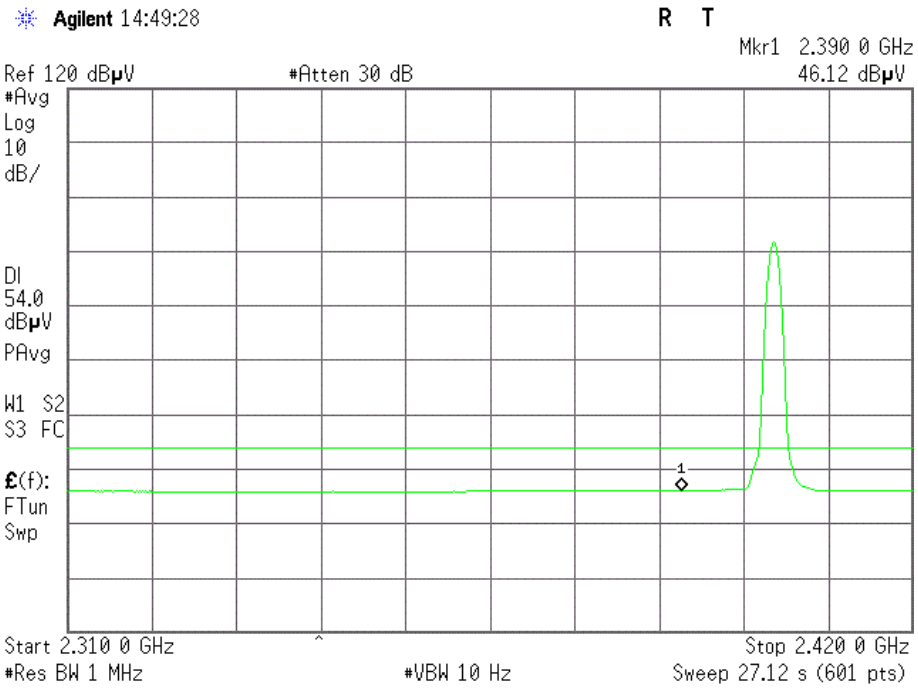
Lowest Bandedge-Horizontal



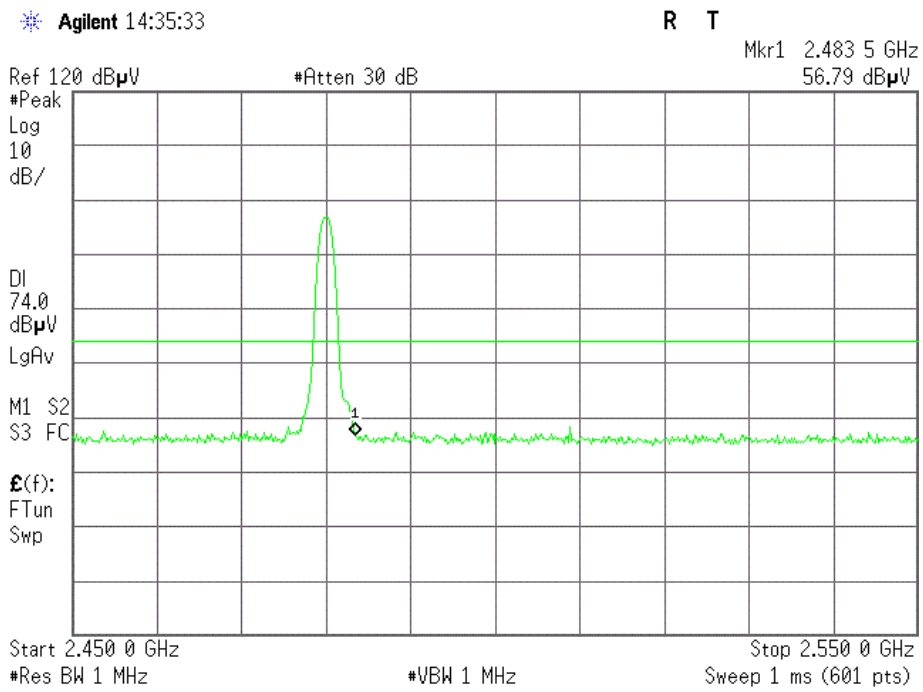


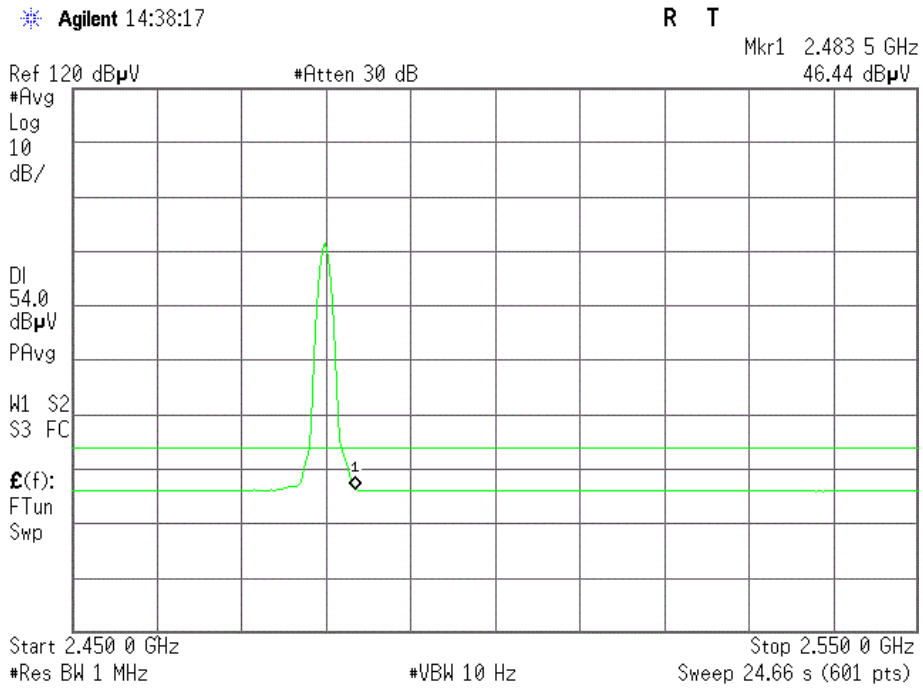
Lowest Bandedge- Vertical





High Bandedge-Horizontal





High Bandedge-Vertical