MEASUREMENT REPORT

(FCC : Part 15 Subpart C (15.247) / ANSI C63.4-2014 /C63.10-2013)
Classification : (DSS) Spread Spectrum Transmitter

Testing Laboratory
1288

Product	:	mVoice G2
Trade Name	:	Martian
Model No.	:	MVS04
Applicant	:	SilverPlus Inc.
Applicant Address	:	2F., No.288, Ruei-Guang Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

Report Number	MLT1711P15002-1
Applicant	SilverPlus Inc.
Product	mVoice G2
Sample Received Date	2017/11/6
Sample Tested Date	2017/11/6 ~ 2018/2/21

Report Prepared By	Jesse Tien
Signature	
Date Prepared	2018/2/22

Report Authorized By	Roger Chen
Signature	
Date Authorized	2018/2/22

Test By

Max Light Technology Co., Ltd.
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History of Test Report

Original Report Issue Date: 2018/2/22

■ No additional attachment

☐ additional attachments were issued as in the following record:

Attachment No.	Issue Date	Description
MLT1711P15002-1	2018/2/22	Original report

1. General

1.1 Introduction:

The following measurement report is submitted on behalf of SilverPlus Inc. In support of a Class B Digital Device certification in accordance with Part2 Subpart J and Part 15 Subpart C of the Commission's and Regulations.

1.2 Customer Details:

Applicant Name	SilverPlus Inc.
Applicant Address	2F., No.288, Ruei-Guang Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)
Manufacturer Name	SilverPlus Inc.
Manufacturer Address	2F., No.288, Ruei-Guang Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

1.3 Technical data of EUT:

Equipment	mVoice G2
Model No	MVS04
FCC ID	X4L-MVS04
Power Type	Battery 3.7V
Type of Modulation	GFSK ; π/4-DQPSK ; 8-DPSK
Transfer rate	Bluetooth :1Mbps(GFSK) Bluetooth EDR2.1 : 2 ; 3 Mbps(π/4-DQPSK , 8-DPSK) Bluetooth EDR3.0 : 2 ; 3 Mbps(π/4-DQPSK , 8-DPSK)
Type of Antenna	Monopole Antenna
Max Antenna Gain	-7.24dBi
Frequency of Channel	See Next page

During testing the EUT was operated at Tx or Rx mode for each emission measured. This was done in order to ensure that maximum emission levels were attained.

Frequency of Each Channel (Working Frequency)

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

1.4 Summary Of Tests

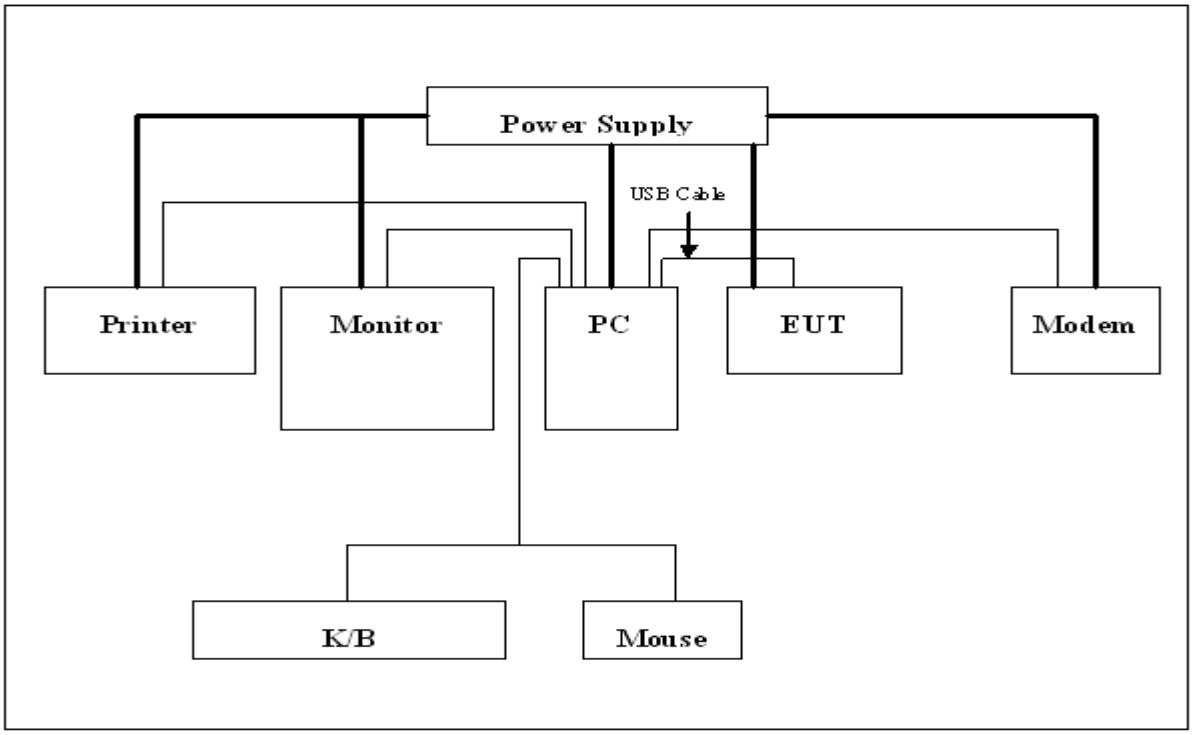
47 CFR Part 15 Subpart C			
Reference	**Test**	**Results**	**Note**
15.207	Conducted Emission	PASS	
15.209	Radiated Emission	PASS	
15.247(a)(1)(i)-(ii)	20dB Bandwidth	PASS	
15.247(a)(1)	Hopping Frequency Separation	PASS	
15.247(a)(1)(iii)	Number of Hopping Channel	PASS	
15.247(a)(1)(iii)	Dwell Time of Each Channel	PASS	
15.247(b)	Max. Output Power	PASS	
15.247(d)	Band Edge Measurement	PASS	
15.247(c)	Out of Band Conducted Spurious Emission	PASS	
15.203	Antenna Requirement	PASS	

C63.10-2013	
Reference	**Test method**
6.2	Power-line Conducted Emission
6.5	Radiated Emission 30MHz to 1000MHz
6.6	Radiated Emission above 1GHz
7.8.7	20dB Bandwidth
7.8.2	Hopping Frequency Separation
7.8.3	Number of Hopping Channel
7.8.4	Dwell Time of Each Channel
7.8.5	Max. Output Power
7.8.6	Band Edge
7.8.8	Out of Band Conducted Spurious Emission

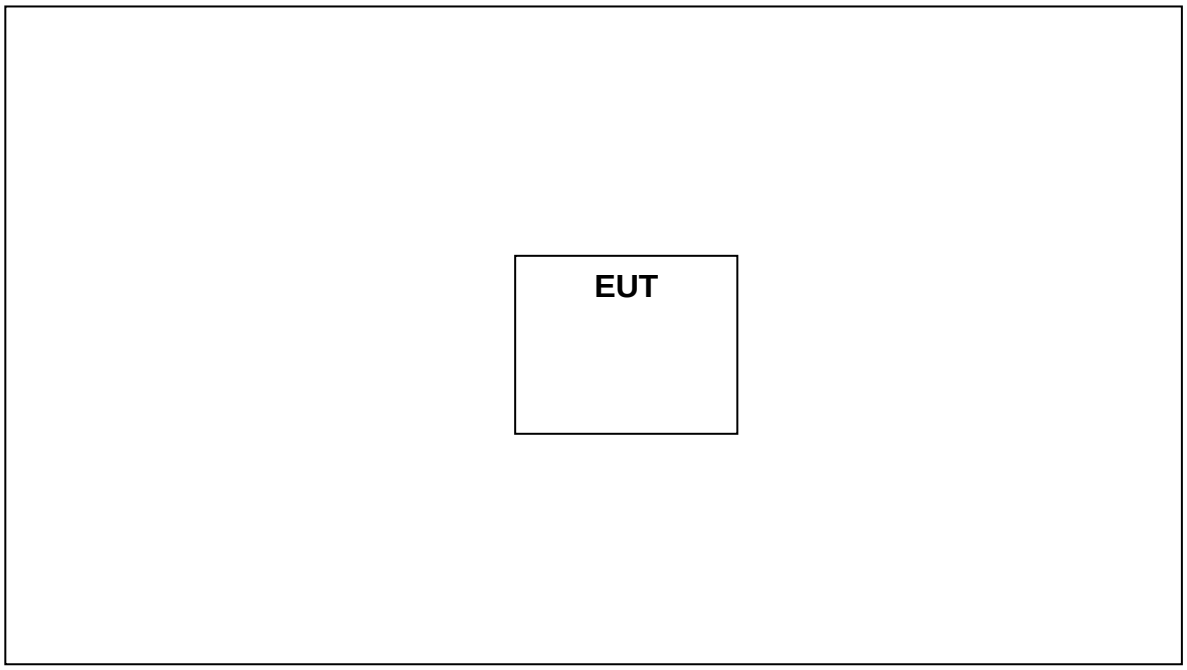
1.5 Description of Support Equipment

In order to construct the minimum system which required by the ANSI C63.4-2014 / C63.10-2013, following equipments were used as the support units.

1.6 Configuration of System Under Test:



Charged by PC



Operate

1.7 Test Procedure:

All measurements contained in this report were performed according to the techniques described in Measurement procedure ANSI C63.4-2014 followed FCC DA 00-75 or ANSI C63.10-2013 for this testing.

1.8 General Test Condition:

The conditions under which the EUT operates were varied to determine their effect on the equipment's emission characteristics. The final configuration of the test system and the mode of operation used during these tests were chosen as that which produced the highest emission levels. However, only those conditions which the EUT was considered likely to encounter in normal use were investigated. The system's radiated and conducted emissions were investigated while the computer alternately transferred data to the EUT as well as to the monitor and printer. Using a test program which sent a continuous data and transferred data to and from the EUT was proven to worst case emissions. The system's physical layout and cabling was randomly arranged to ensure that maximum emission levels were attained.

This assessment of the maximum conducted output power tests is base on the minimum transfer rate will produce a maximum output power.

Note: All conditions have been evaluated and the test result in this report is the worst case

2. Conducted Emissions Requirements

2.1 General & Setup:

The power line conducted emission measurements were performed in a shielded enclosure. The EUT was assembled on a wooden table which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and EMCO Model 3825/2 Line Impedance Stabilization Networks (LISN). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPER quasi-peak detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 2.5.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (6.2) for this testing.

2.2 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	R&S	EMI Receiver	100085	ESPI	2017/12/14	2018/12/14
2.	EMCO	LISN	2658	3825/2	2017/12/11	2018/12/11
3.	EMCO	LISN	2654	3825/2	2018/01/04	2019/01/04

2.3 Test Condition:

EUT tested in accordance with the specifications given by the manufacturer, and exercised in the most unfavorable manner.

2.4 Conducted Emissions Limits:

FCC Part 15

Frequency range (MHz)	Limits (dBuV)			
	Class A		Class B	
	QP	Avg.	QP	Avg.
0.15 to 0.50	79	66	66 to 56	56 to 46
0.50 to 5.0	73	60	56	46
5.0 to 30	73	60	60	50

2.5 Measurement Data Of Conducted Emissions:

2.5.1 Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions to the HOT and NEUTRAL conductor of the EUT power.

Test Mode : PC Charge

Conducted Emissions (Class B)										
Test Port	Freq (MHz)	Read(dBuV)		Factor	Limits (dBuV)		Amplitude (dBuV)		Margin (dBuV)	
		QP	AV		QP	AV	QP	AV	QP	AV
L1	0.1731	41.06	--	0.00	64.81	54.81	41.06	--	-23.75	--
	0.3692	35.65	--	0.00	58.52	48.52	35.65	--	-22.87	--
	0.6936	34.46	--	0.00	56.00	46.00	34.46	--	-21.54	--
	0.9891	34.59	--	0.00	56.00	46.00	34.59	--	-21.41	--
	1.1170	35.75	--	0.00	56.00	46.00	35.75	--	-20.25	--
	15.6350	38.65	--	0.00	60.00	50.00	38.65	--	-21.35	--
	22.8960	38.89	--	0.00	60.00	50.00	38.89	--	-21.11	--
L2	0.1712	43.75	--	0.00	64.90	54.90	43.75	--	-21.15	--
	0.2061	41.59	--	0.00	63.36	53.36	41.59	--	-21.77	--
	0.3339	35.76	--	0.00	59.35	49.35	35.76	--	-23.59	--
	0.7876	34.87	--	0.00	56.00	46.00	34.87	--	-21.13	--
	1.2490	33.78	--	0.00	56.00	46.00	33.78	--	-22.22	--
	15.6350	36.24	--	0.00	60.00	50.00	36.24	--	-23.76	--
	22.0630	40.08	--	0.00	60.00	50.00	40.08	--	-19.92	--

Notes : 1. L1: One end & Ground L2: The other end & Ground

2. Height of table on which the EUT was placed : 0.8 m.
3. The Quasi-Peak Value have already met the Average Value Limit showed on above limits.
4. The above test results are obtained under the normal condition.
5. Amplitude = Read + Factor

3. Radiated Emissions Requirements (Below 1GHz)

3.1 General & Setup:

Prior to open-field testing, the EUT was placed in a shielded enclosure and scanned at a close distance to determine its emission characteristics. The physical arrangement of the EUT was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude, directivity, and frequency. The exact system configuration which produced the highest emissions was noted so it could be reproduced later during the open-field tests. This was done to ensure that the final measurements would demonstrate the worst-case interference potential of the EUT. The radiated emissions test is made at a 10 meters open site from 30MHz to 1GHz. The EUT system was placed on a nonconductive turntable which is 0.8 meters height, top surface 1.0 x 1.5 meter. The spectrum was examined from 30 MHz to 1000 MHz using an Hewlett Packard E7403A Spectrum Analyzer, EMCO Biconilog Antenna (Model 3142C) for 30MHz -1GHz. At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization. Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post-detector video filters were used in the test. The spectrum analyzer's 6 dB bandwidth was set to 120 KHz, and the analyzer was operated in the quasi-peak detection mode. The highest emission amplitudes relative to the appropriate limit were measured and recorded in paragraph 3.5.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (6.5) for this testing.

3.2 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US40240137	E7403A	2017/03/15	2018/03/15
2.	Agilent	Spectrum Analyzer	US39240419	4407B	2017/05/03	2018/05/03
3.	EMCO	Biconilog Antenna	00044568	3142C	2017/11/02	2018/11/02
4.	MLT	Pre Amplifier	20110301	PREAMP6G-02	2017/03/29	2018/03/29
5.	MLT	Pre Amplifier	20110209	PREAMP6G-01	2017/03/29	2018/03/29
6.	EMCO	Biconilog Antenna	00044568	3142C	2017/11/02	2018/11/02

3.3 Test Condition:

EUT tested in accordance with the specifications given by the manufacturer, and exercised in the most unfavorable manner.

3.4 Radiated Emissions Limits:

CISPR 22

Frequency range (MHz)	Limits (dBuV)			
	Class A		Class B	
	Distance (Meter)	Limits (dBuV/m)	Distance (Meter)	Limits (dBuV/m)
30 to 230	10	40	10	30
230 to 1000	10	47	10	37

FCC Part 15

Frequency range (MHz)	Limits (dBuV)			
	Class A		Class B	
	Distance (Meter)	Limits (dBuV/m)	Distance (Meter)	Limits (dBuV/m)
30 to 88	10	39	3	40
88 to 216	10	43.5	3	43.5
216 to 960	10	46.5	3	46
960 to 1000	10	49.5	3	54

3.5 Measurement Data Of Radiated Emissions:

3.5.1 Open Field Radiated Emissions

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : PC Charge

Radiated Emissions (VERTICAL)Class B							
Frequency (MHz)	Read (dBuV/m)	Factor	Ant. (cm)	Table (Degree)	Amplitude (dBuV/m)	Limits (dBuV/m)	Margin (dB)
31.00	56.00	-19.50	100	0	36.50	40	-3.50
142.60	58.69	-30.76	100	10	27.93	43.5	-15.57
160.00	62.60	-29.02	100	60	33.58	43.5	-9.92
200.00	62.11	-27.82	100	0	34.29	43.5	-9.21
299.80	57.30	-24.45	100	100	32.85	46	-13.15
480.00	58.10	-18.09	110	0	40.01	46	-5.99
641.00	51.79	-14.51	110	30	37.28	46	-8.72
780.00	51.60	-10.48	100	50	41.12	46	-4.88
800.00	51.10	-10.46	100	90	40.64	46	-5.36

Radiated Emissions (HORIZONTAL)Class B							
Frequency (MHz)	Read (dBuV/m)	Factor	Ant. (cm)	Table (Degree)	Amplitude (dBuV/m)	Limits (dBuV/m)	Margin (dB)
30.60	52.20	-18.51	400	0	33.69	40	-6.31
99.90	63.10	-29.78	400	60	33.32	43.5	-10.18
142.00	58.41	-30.70	390	90	27.71	43.5	-15.79
160.00	58.30	-29.12	400	30	29.18	43.5	-14.32
200.00	54.51	-28.12	390	0	26.39	43.5	-17.11
480.00	53.10	-18.07	300	60	35.03	46	-10.97
600.00	52.80	-15.39	120	0	37.41	46	-8.59
640.00	52.11	-14.36	110	30	37.75	46	-8.25
720.00	50.30	-11.93	100	100	38.37	46	-7.63

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 0.8 Meter.
4.Amplitude= Reading Amplitude –Amplifier gain+ Cable loss + Antenna factor
5.Pre amplifier Gain :38dB to 42dB

3.5.2 Open Field Radiated Emissions

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : Worst case(X Axis)2402MHz 1M Rate Mode

Radiated Emissions (VERTICAL)Class B							
Frequency (MHz)	Read (dBuV/m)	Factor	Ant. (cm)	Table (Degree)	Amplitude (dBuV/m)	Limits (dBuV/m)	Margin (dB)
30.00	51.30	-18.89	100	0	32.41	40	-7.59
155.60	57.80	-29.38	100	30	28.42	43.5	-15.08
179.40	57.70	-27.92	100	30	29.78	43.5	-13.72
180.30	57.40	-27.85	100	50	29.55	43.5	-13.95
268.40	57.69	-24.61	100	10	33.08	46	-12.92
332.00	59.29	-22.61	100	60	36.68	46	-9.32
500.00	55.29	-18.31	120	0	36.98	46	-9.02
640.30	51.90	-14.54	120	50	37.36	46	-8.64
666.10	54.10	-13.48	110	0	40.62	46	-5.38

Radiated Emissions (HORIZONTAL)Class B							
Frequency (MHz)	Read (dBuV/m)	Factor	Ant. (cm)	Table (Degree)	Amplitude (dBuV/m)	Limits (dBuV/m)	Margin (dB)
93.33	60.40	-30.63	400	20	29.77	43.5	-13.73
168.00	59.30	-28.60	400	100	30.70	43.5	-12.80
177.00	59.70	-28.01	400	90	31.69	43.5	-11.81
213.10	57.80	-27.82	400	70	29.98	43.5	-13.52
268.00	58.40	-24.90	400	0	33.50	46	-12.50
407.00	54.90	-20.83	200	10	34.07	46	-11.93
491.00	53.99	-17.96	160	30	36.03	46	-9.97
517.00	55.51	-17.36	130	40	38.15	46	-7.85
666.00	52.40	-13.27	110	10	39.13	46	-6.87

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 0.8 Meter.
4.Amplitude= Reading Amplitude –Amplifier gain+ Cable loss + Antenna factor
5.Pre amplifier Gain :38dB to 42dB

3.5.3 Open Field Radiated Emissions

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : Worst case(X Axis)2441MHz 1M Rate Mode

Radiated Emissions (VERTICAL)Class B							
Frequency (MHz)	Read (dBuV/m)	Factor	Ant. (cm)	Table (Degree)	Amplitude (dBuV/m)	Limits (dBuV/m)	Margin (dB)
30.00	51.70	-18.89	100	0	32.81	40	-7.19
157.20	60.30	-29.38	100	30	30.92	43.5	-12.58
169.00	59.70	-28.54	100	30	31.16	43.5	-12.34
179.00	60.40	-27.97	100	0	32.43	43.5	-11.07
268.40	58.39	-24.61	100	0	33.78	46	-12.22
306.00	60.19	-24.13	100	50	36.06	46	-9.94
332.00	59.29	-22.61	100	60	36.68	46	-9.32
500.00	54.79	-18.31	120	10	36.48	46	-9.52
664.00	54.80	-13.48	110	0	41.32	46	-4.68

Radiated Emissions (HORIZONTAL)Class B							
Frequency (MHz)	Read (dBuV/m)	Factor	Ant. (cm)	Table (Degree)	Amplitude (dBuV/m)	Limits (dBuV/m)	Margin (dB)
145.00	61.80	-30.42	400	60	31.38	43.5	-12.12
175.00	62.40	-28.01	400	70	34.39	43.5	-9.11
181.00	60.10	-27.76	400	0	32.34	43.5	-11.16
210.10	58.40	-27.82	400	60	30.58	43.5	-12.92
216.60	59.30	-27.59	400	120	31.71	46	-14.29
407.00	55.10	-20.83	200	20	34.27	46	-11.73
500.00	54.49	-17.96	150	60	36.53	46	-9.47
641.00	52.20	-14.26	120	0	37.94	46	-8.06
664.00	52.26	-13.43	110	20	38.83	46	-7.17

Notes : 1.Margin= Amplitude - Limits

2.Distance of Measurement : 3 Meter

3.Height of table for EUT placed: 0.8 Meter.

4.Amplitude= Reading Amplitude –Amplifier gain+ Cable loss + Antenna factor

5.Pre amplifier Gain :38dB to 42dB

3.5.4 Open Field Radiated Emissions

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : Worst case(X Axis)2480MHz 1M Rate Mode

Radiated Emissions (VERTICAL)Class B							
Frequency (MHz)	Read (dBuV/m)	Factor	Ant. (cm)	Table (Degree)	Amplitude (dBuV/m)	Limits (dBuV/m)	Margin (dB)
30.30	52.10	-18.92	100	30	33.18	40	-6.82
42.30	57.40	-25.57	100	0	31.83	40	-8.17
81.30	63.50	-31.46	100	100	32.04	40	-7.96
168.00	59.30	-28.50	100	20	30.80	43.5	-12.70
268.00	58.59	-24.61	100	20	33.98	46	-12.02
332.20	59.69	-22.61	100	60	37.08	46	-8.92
500.00	54.79	-18.31	120	20	36.48	46	-9.52
641.00	52.29	-14.51	120	40	37.78	46	-8.22
664.00	53.90	-13.48	110	0	40.42	46	-5.58

Radiated Emissions (HORIZONTAL)Class B							
Frequency (MHz)	Read (dBuV/m)	Factor	Ant. (cm)	Table (Degree)	Amplitude (dBuV/m)	Limits (dBuV/m)	Margin (dB)
41.10	57.80	-24.40	400	0	33.40	40	-6.60
55.60	60.40	-28.87	400	30	31.53	40	-8.47
168.00	59.80	-28.60	400	90	31.20	43.5	-12.30
178.00	60.50	-28.01	400	110	32.49	43.5	-11.01
267.60	58.30	-24.90	400	30	33.40	46	-12.60
332.00	55.39	-22.68	240	0	32.71	46	-13.29
491.00	52.69	-17.96	180	60	34.73	46	-11.27
640.00	51.51	-14.36	110	0	37.15	46	-8.85
666.00	51.60	-13.27	110	30	38.33	46	-7.67

Notes : 1.Margin= Amplitude - Limits

2.Distance of Measurement : 3 Meter

3.Height of table for EUT placed: 0.8 Meter.

4.Amplitude= Reading Amplitude –Amplifier gain+ Cable loss + Antenna factor

5.Pre amplifier Gain :38dB to 42dB

4. Minimum 20dB RF Bandwidth Requirements

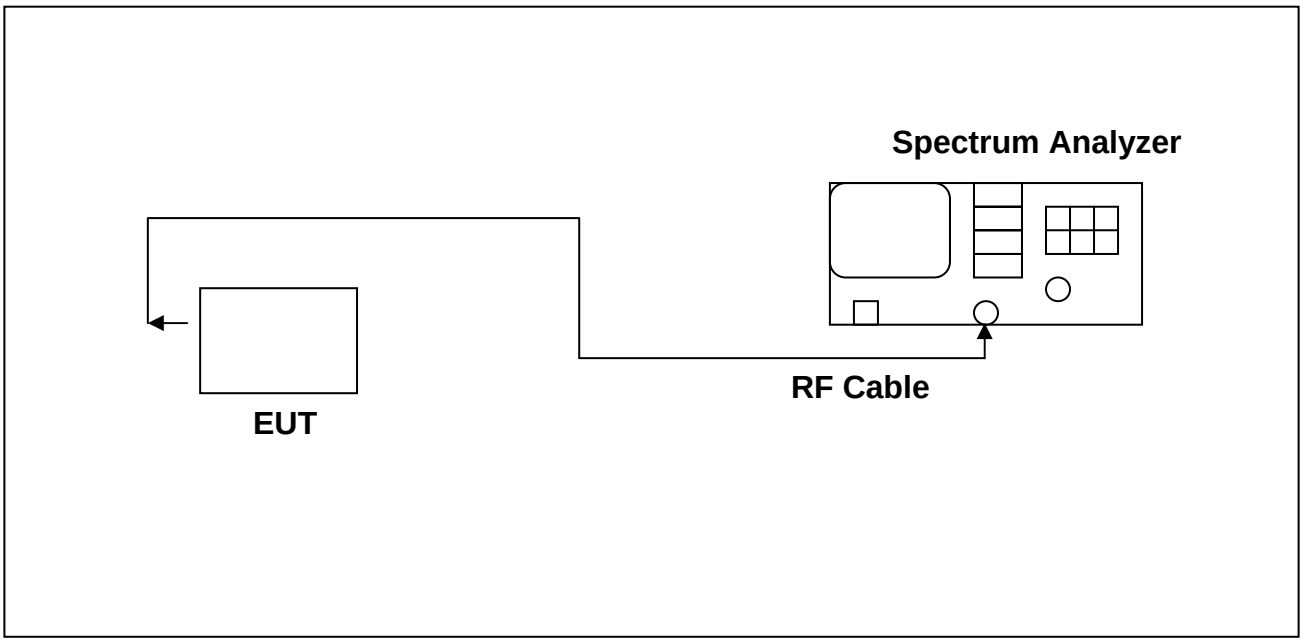
4.1 Test Condition & Setup:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW set to 100 kHz .VBW set to 300kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel or the maximum 20 dB bandwidth of the hopping channel is 1 MHz. A peak output reading was taken, a display line was drawn 20 dB lower than peak level. The 20 dB bandwidth was determined from where the channel output spectrum intersected the display line.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.7) for this testing.

The test was performed at 3 channels (Channel 0, 39, 78)

4.2 Test Instruments Configuration:



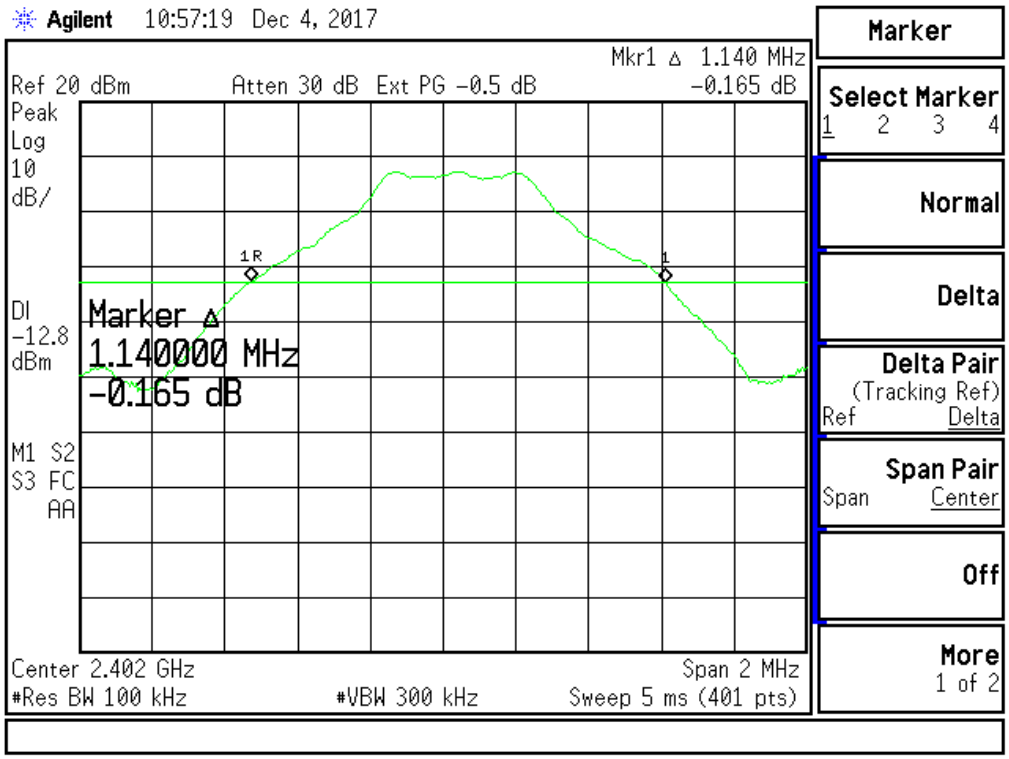
4.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2017/05/03	2018/05/03

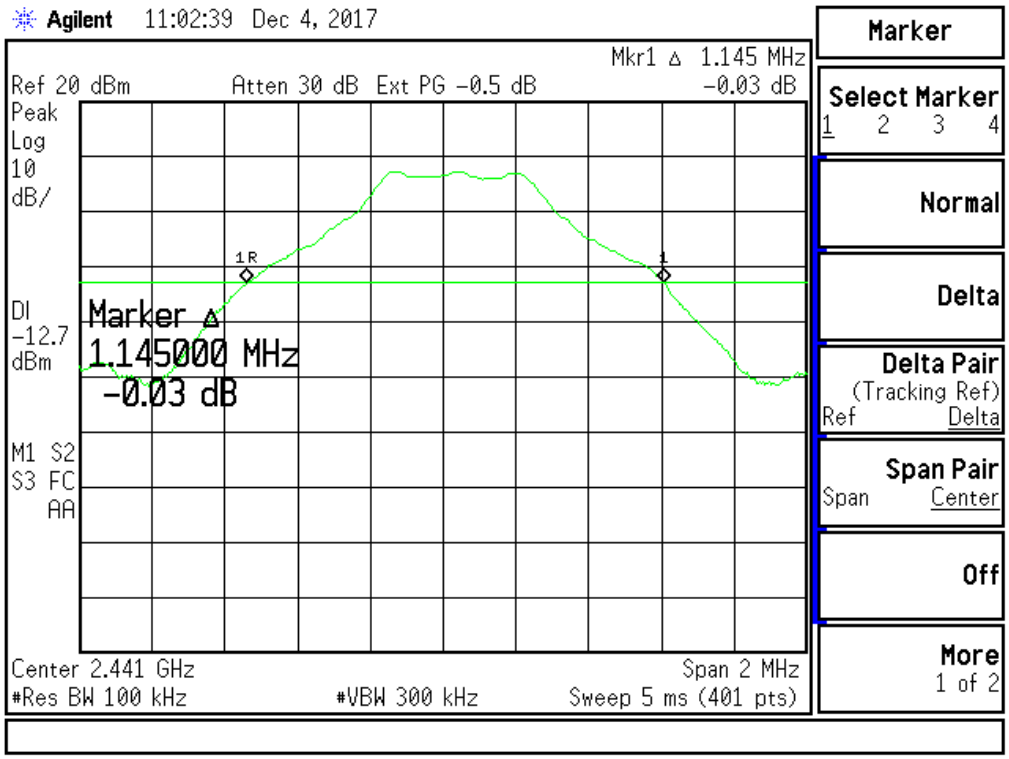
4.4 Test Result:

Channel	Data Rate (Mbps)	Frequency (MHz)	Results (MHz)	Limit
0	1M	2402	1.14000	>25kHz
		2441	1.14500	>25kHz
		2480	1.15000	>25kHz
39	2M	2402	1.40000	>25kHz
		2441	1.41000	>25kHz
		2480	1.41000	>25kHz
78	3M	2402	1.40500	>25kHz
		2441	1.40000	>25kHz
		2480	1.41500	>25kHz

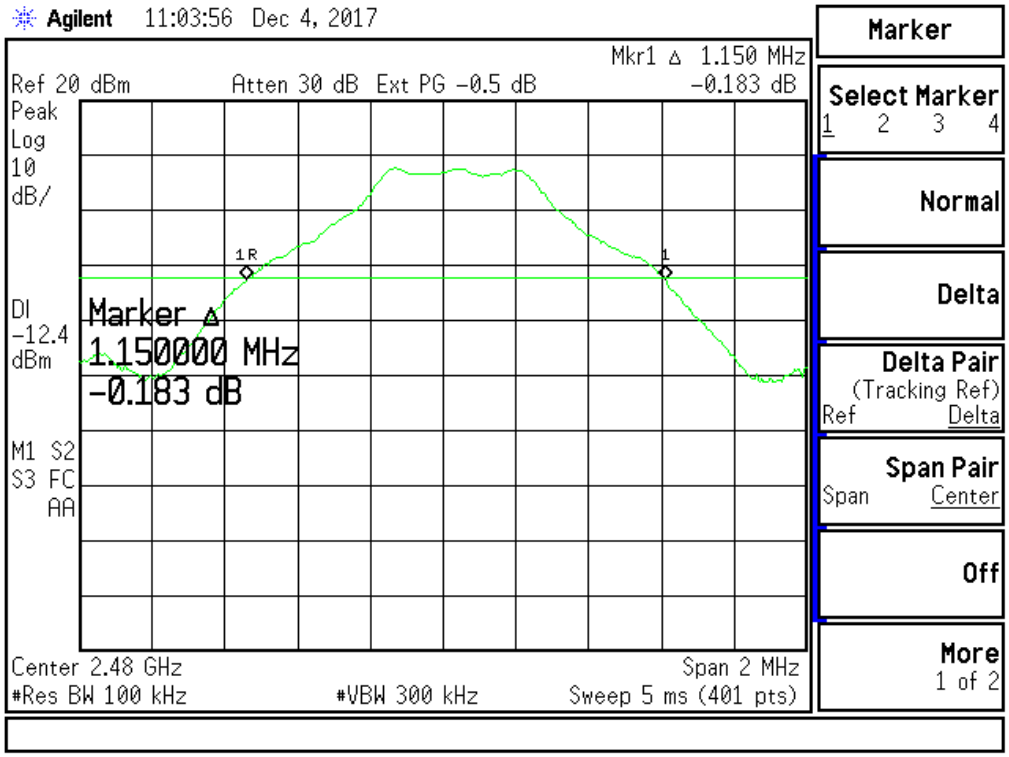
Data Rate : 1Mbps
(2402MHz)



(2441MHz)

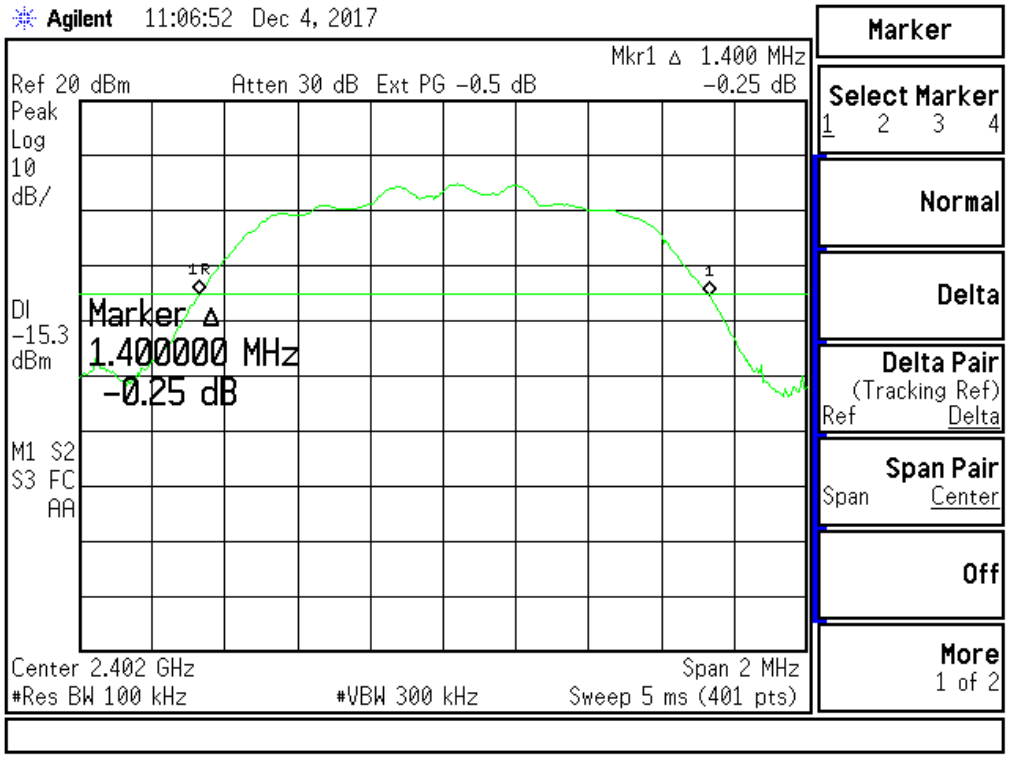


(2480MHz)

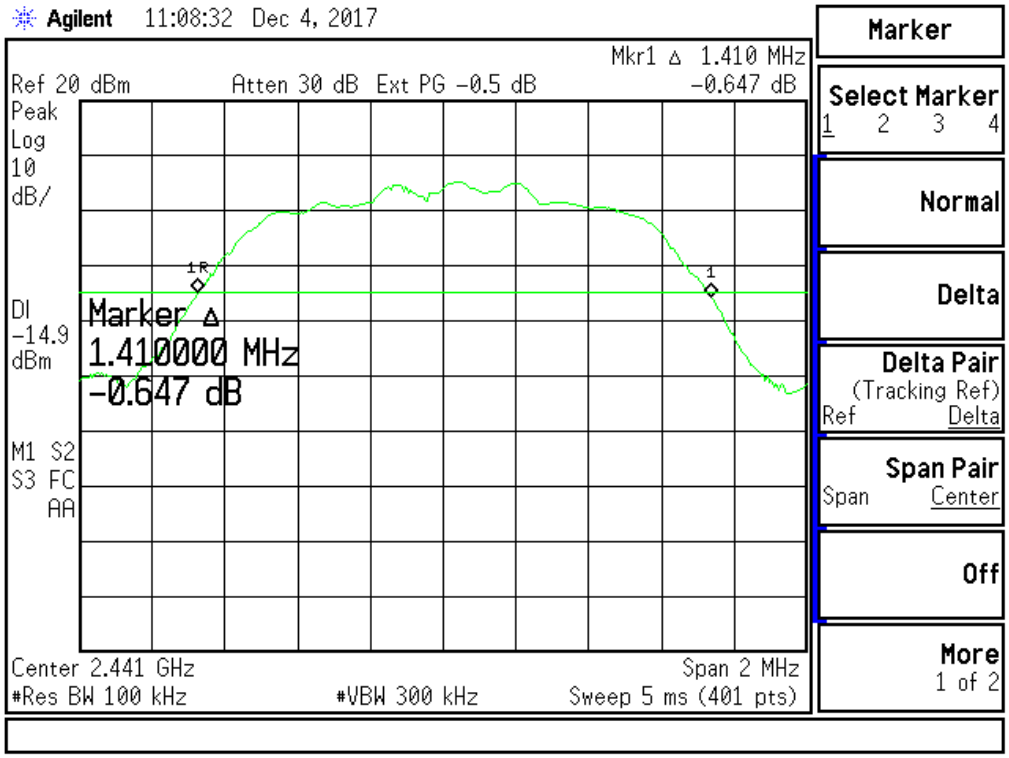


Data Rate : 2Mbps

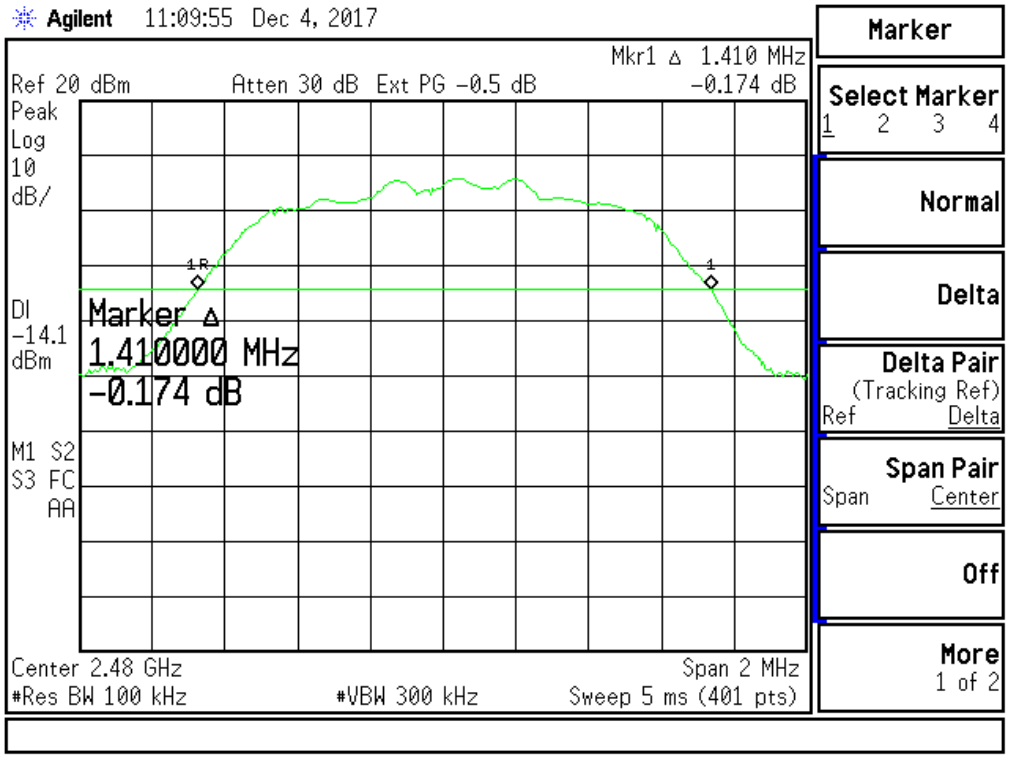
(2402MHz)



(2441MHz)

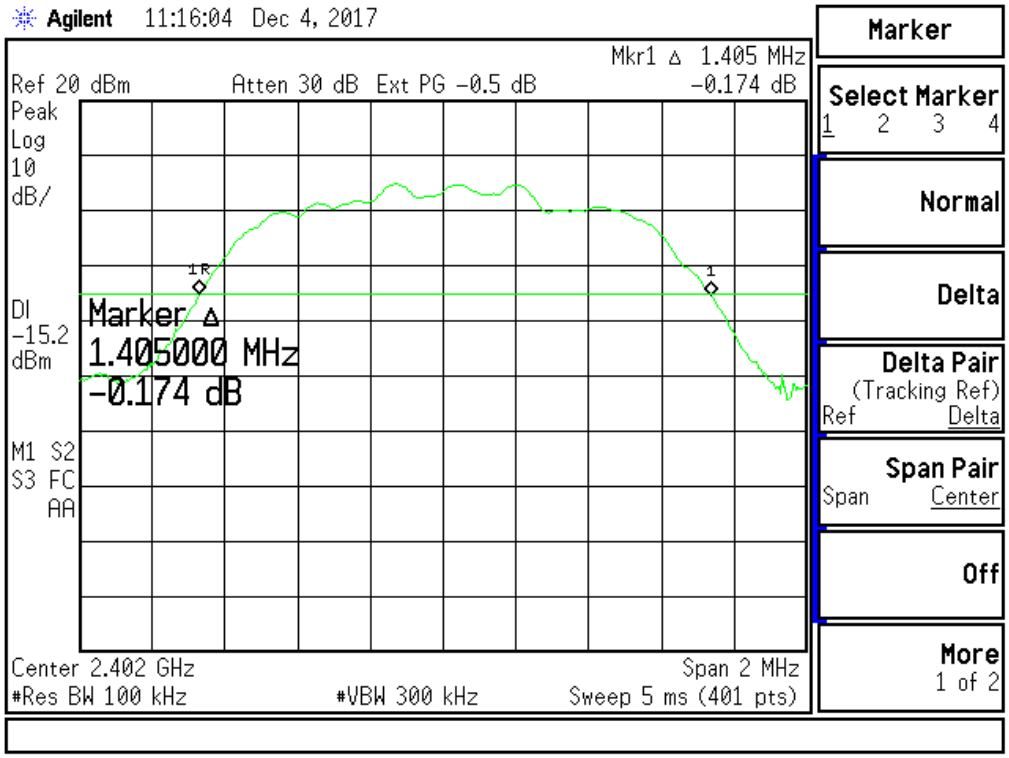


(2480MHz)

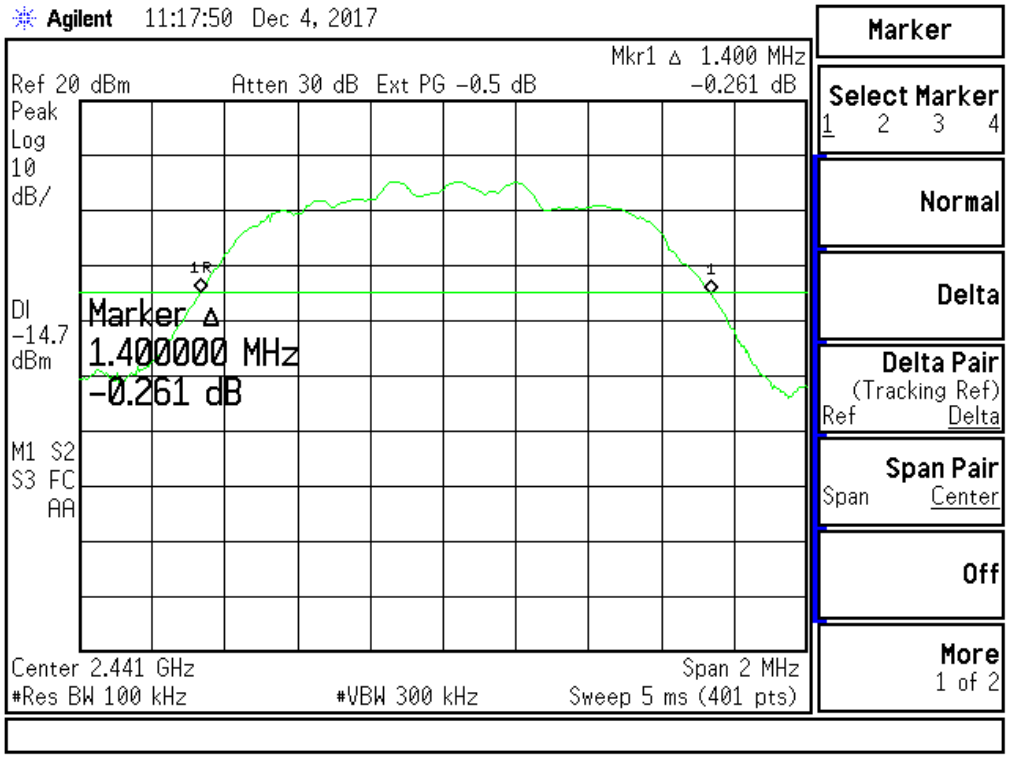


Data Rate : 3Mbps

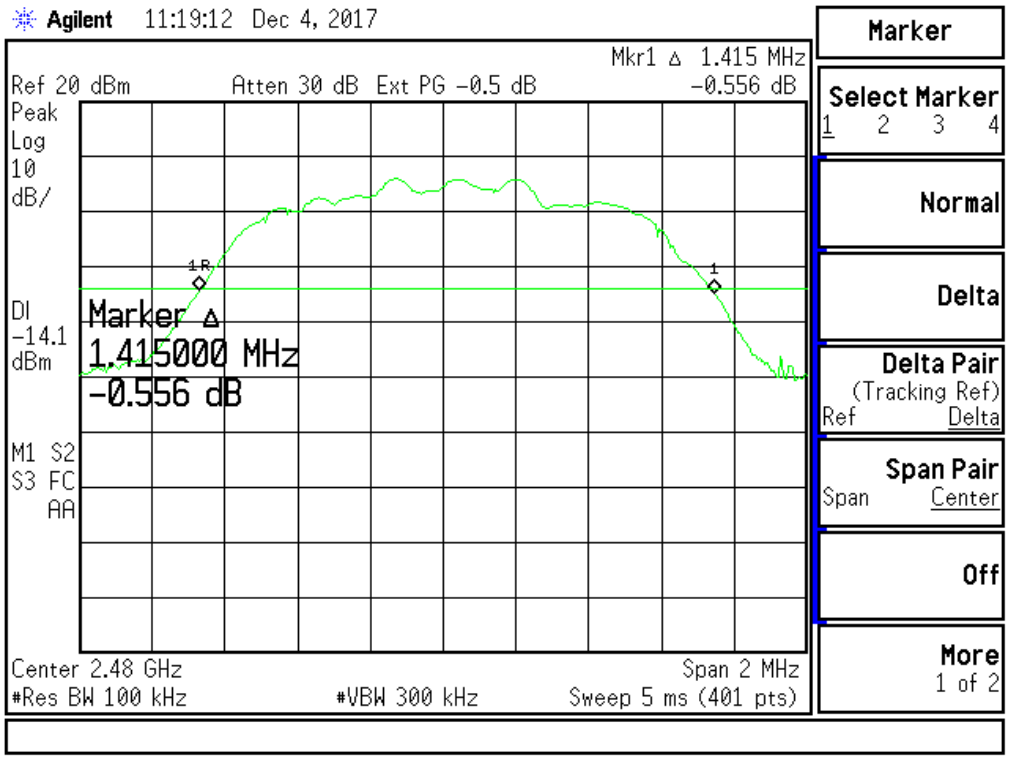
(2402MHz)



(2441MHz)



(2480MHz)



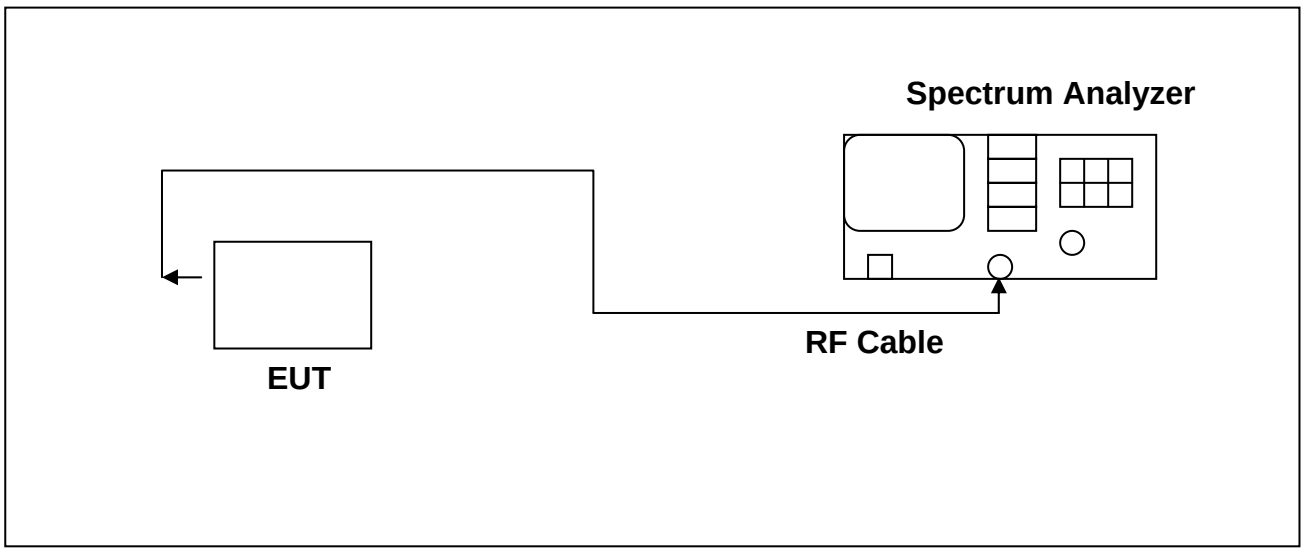
5. Hopping Frequency Separation Requirements

5.1 Test Condition & Setup:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW set to 100 kHz .VBW set to 300kHz. The 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.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.2) for this testing.

5.2 Test Instruments Configuration:



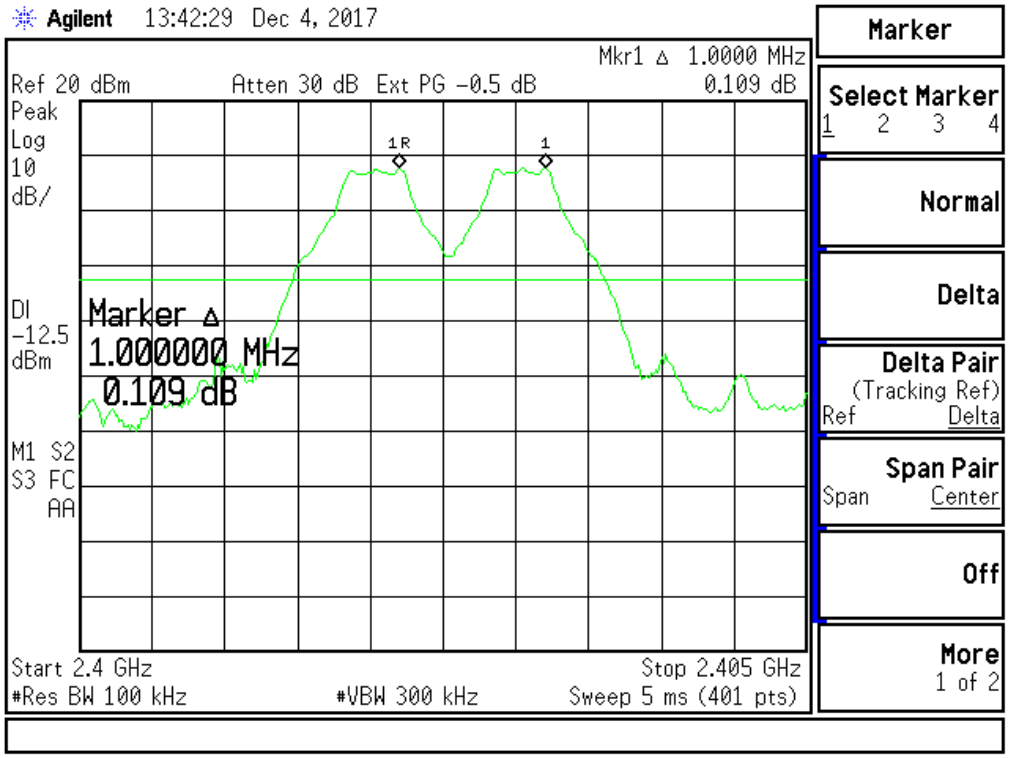
5.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2017/05/03	2018/05/03

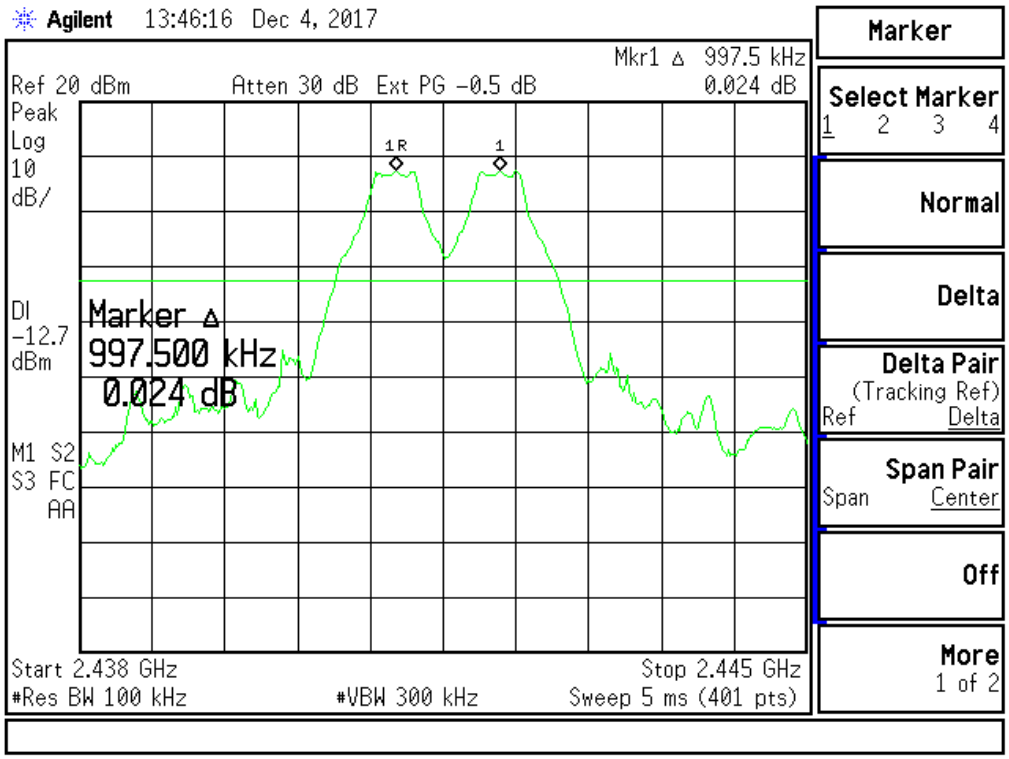
5.4 Test Result:

Data Rate (Mbps)	Channel	Frequency (MHz)	Results (kHz)	Limit
1	0	2402	1000.0	separated by 25 kHz or two-thirds of the 20 dB bandwidth
	39	2441	997.5	
	78	2480	1025.0	
2	0	2402	987.5	
	39	2441	1015.0	
	78	2480	1012.5	
3	0	2402	1000.0	
	39	2441	997.5	
	78	2480	1000.0	

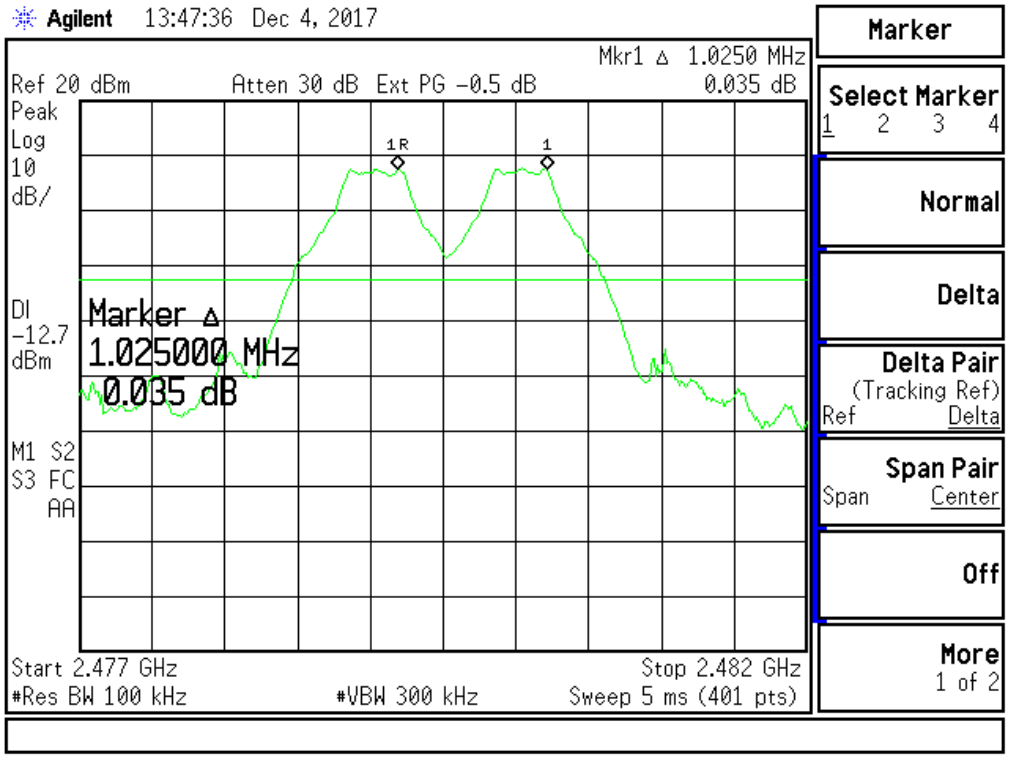
Data Rate : 1Mbps
(2402MHz)



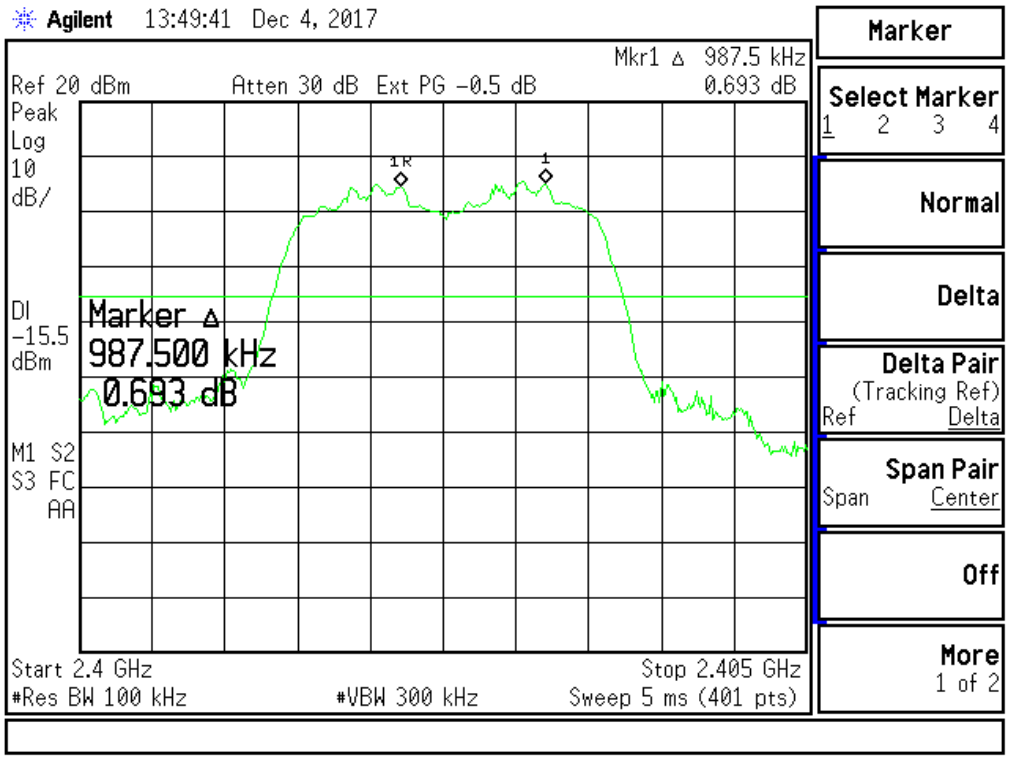
(2441MHz)



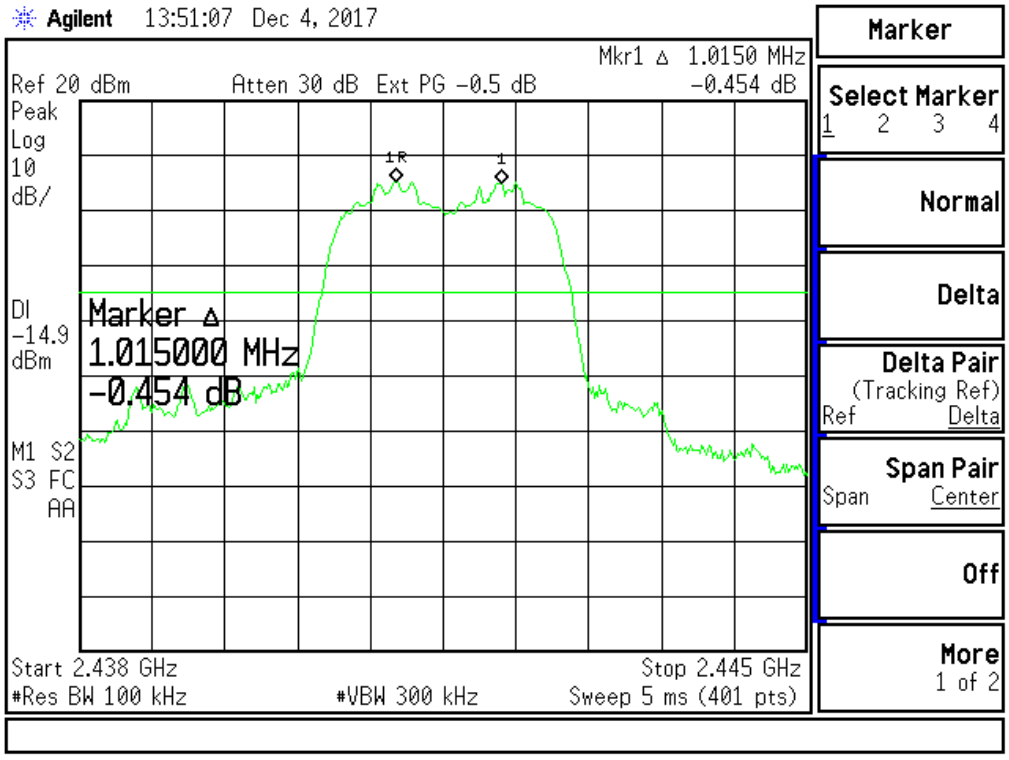
(2480MHz)



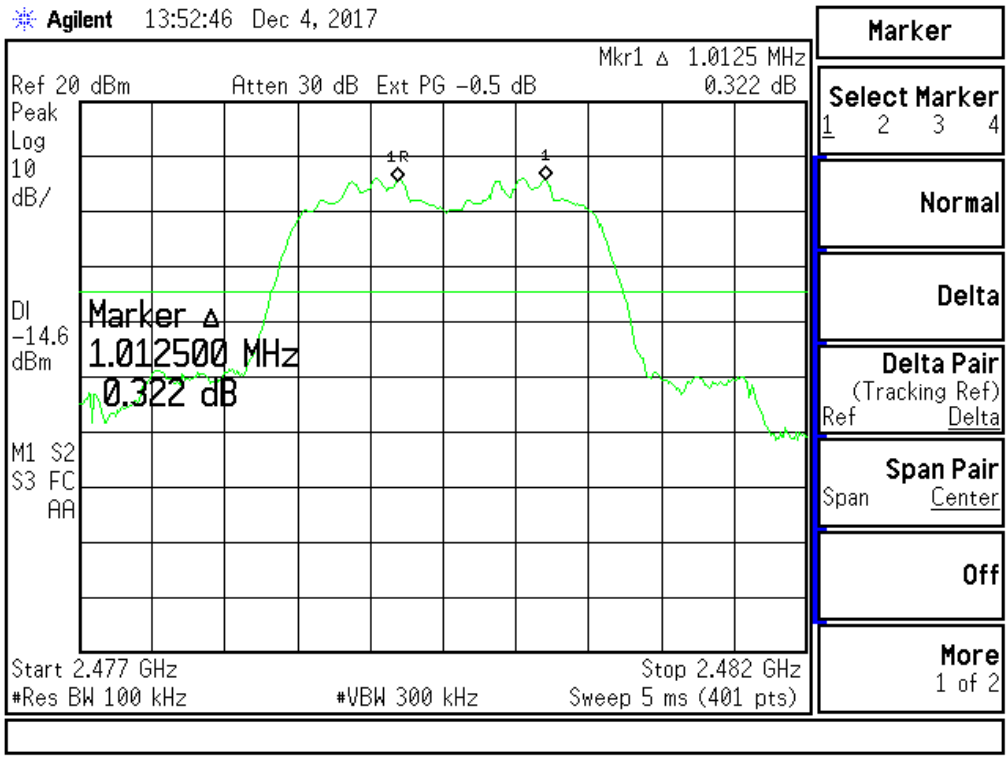
Data Rate : 2Mbps
(2402MHz)



(2441MHz)

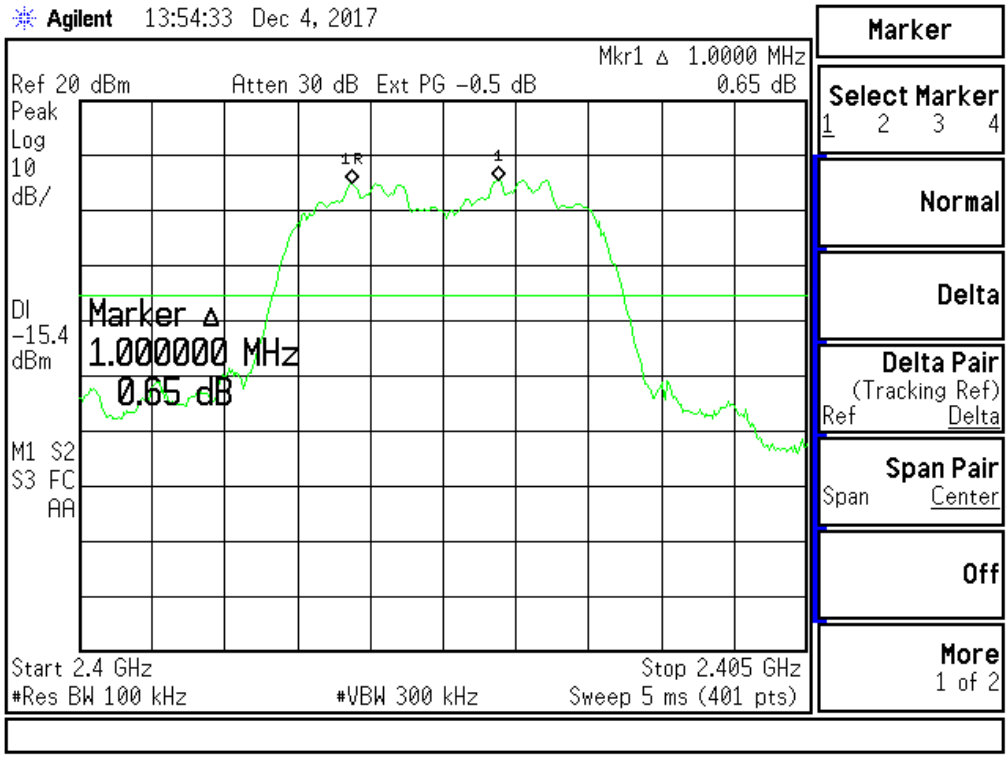


(2480MHz)

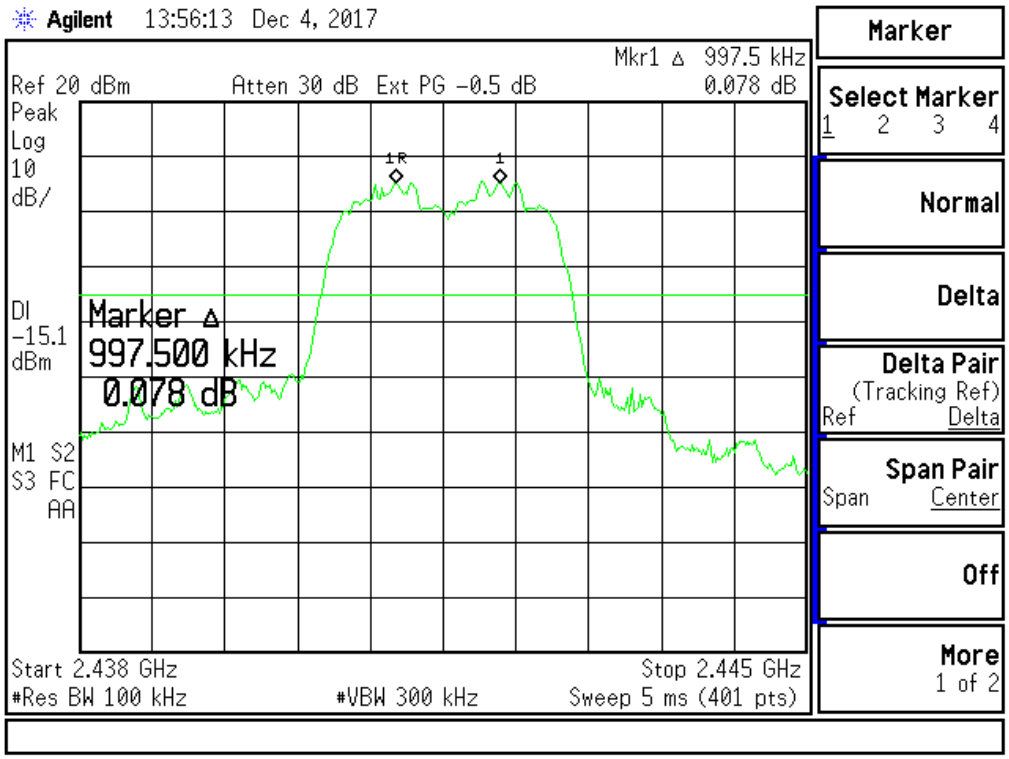


Data Rate : 3Mbps

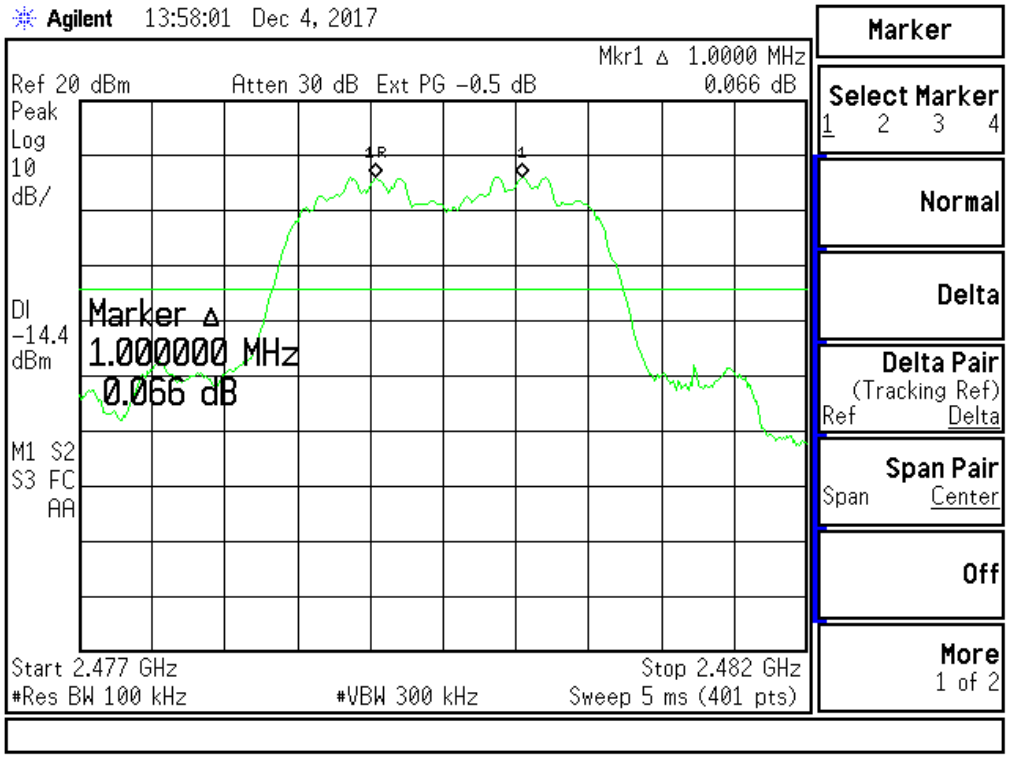
(2402MHz)



(2441MHz)



(2480MHz)



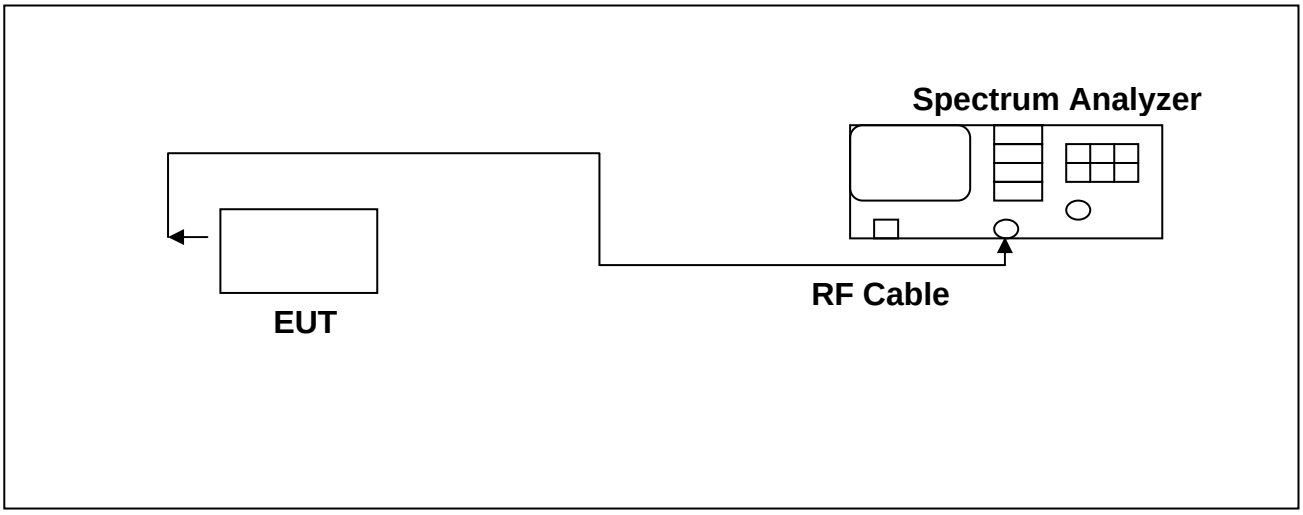
6. Number of Hopping Channels Requirements

6.1 Test Condition & Setup:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW set to 100 kHz and VBW set to 300 kHz. The hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.3) for this testing.

6.2 Test Instruments Configuration:



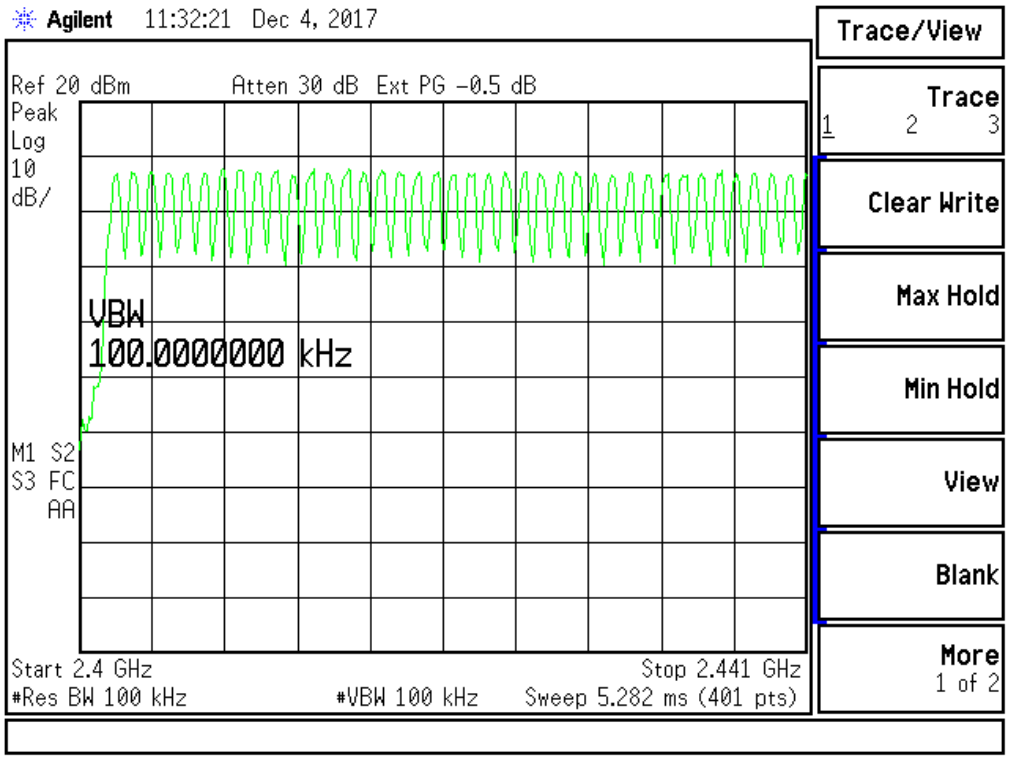
6.3 Test Equipment List:

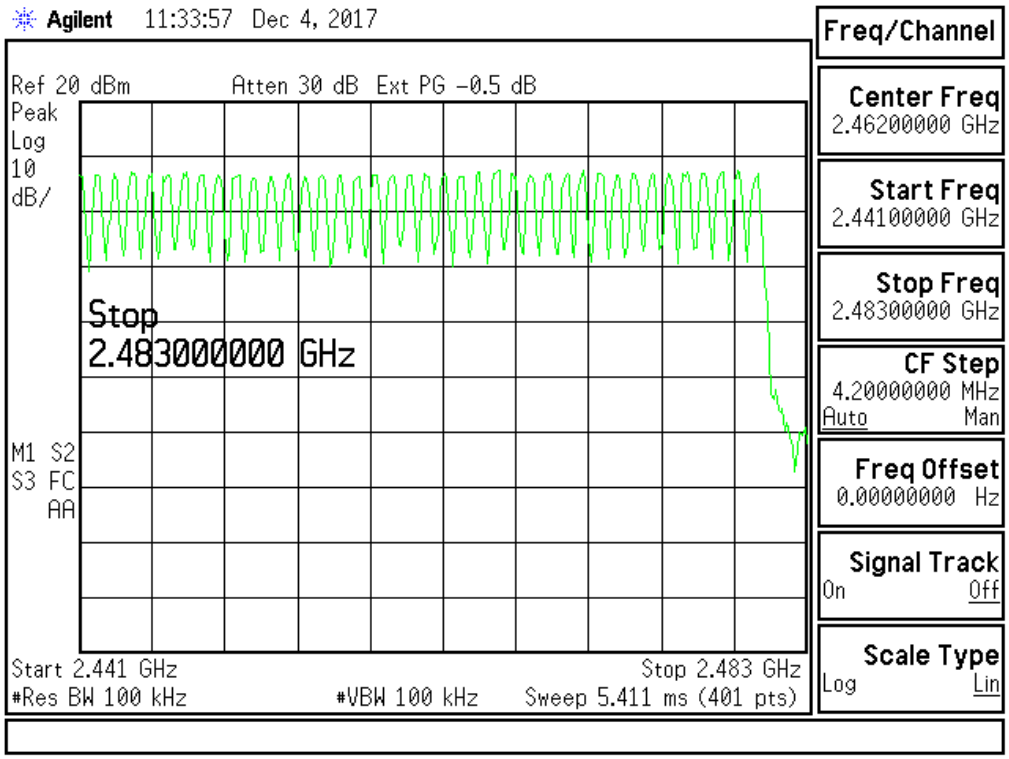
Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2017/05/03	2018/05/03

6.4 Test Result:

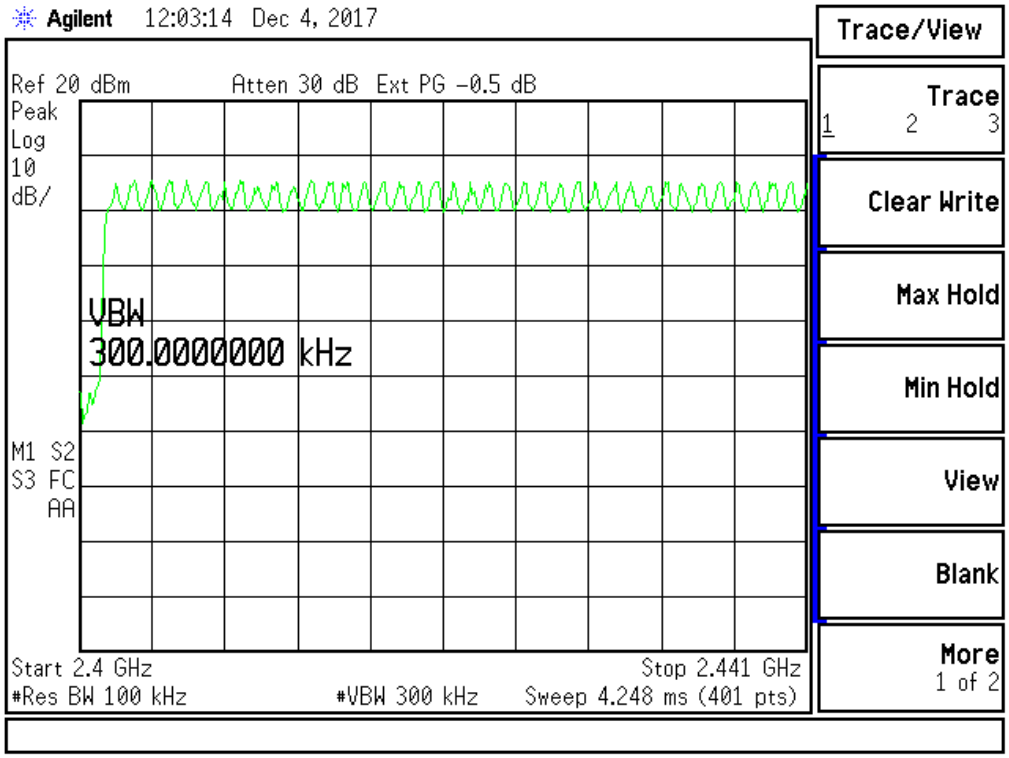
Result (Channel)	Limit (Channel)	Pass / Fail
79	≧15	Pass

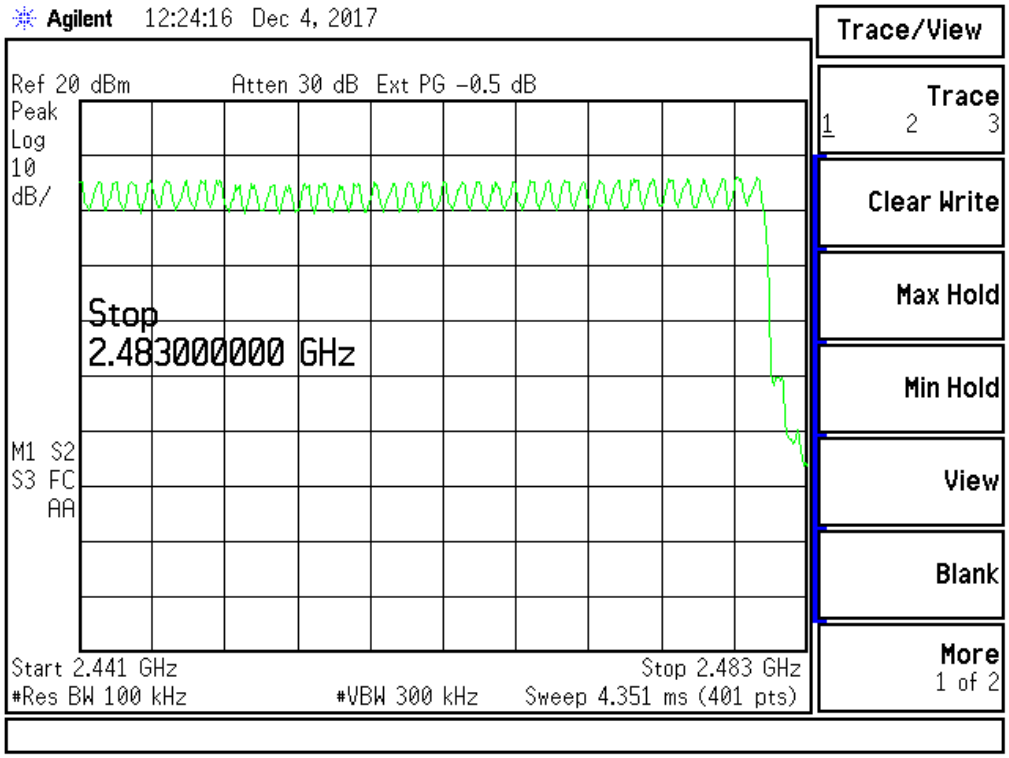
Data Rate : 1Mbps



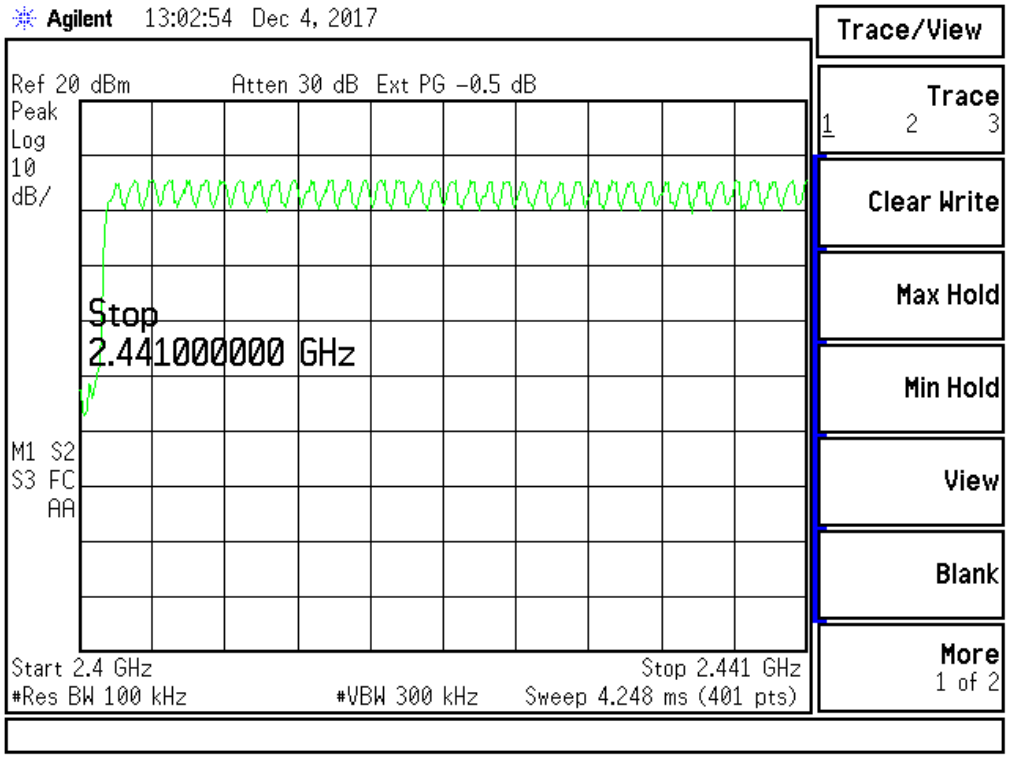


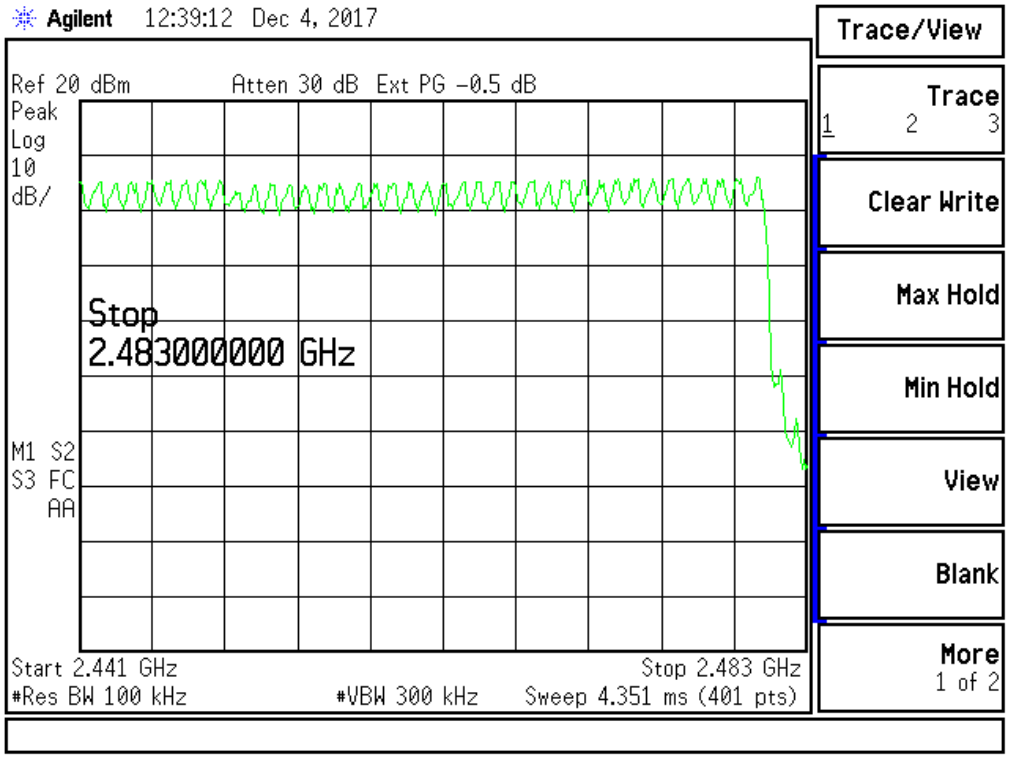
Data Rate : 2Mbps





Data Rate : 3Mbps





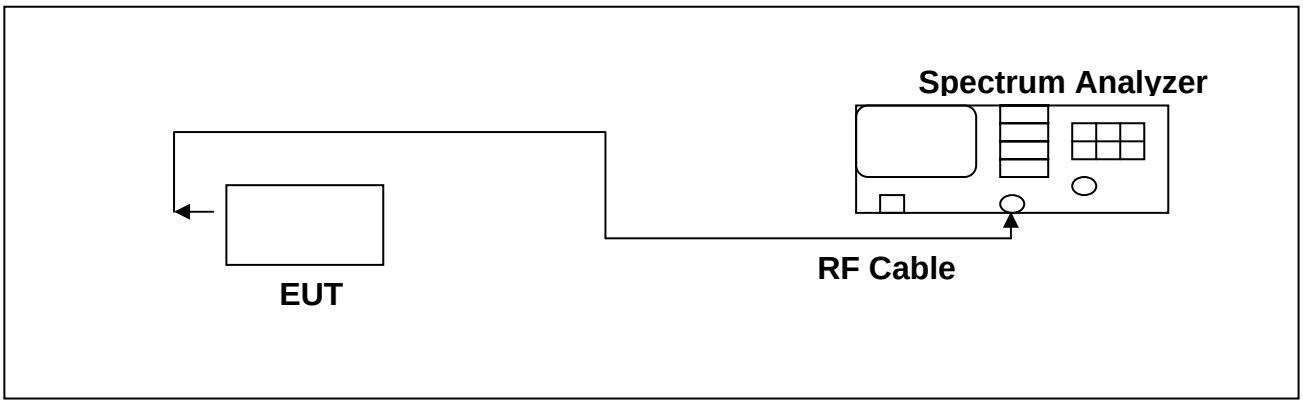
7. Dwell Time of Each Channel Requirements

7.1 Test Condition & Setup:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW set to 100kHz and VBW set to 300 kHz. The 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.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.4) for this testing.

7.2 Test Instruments Configuration:



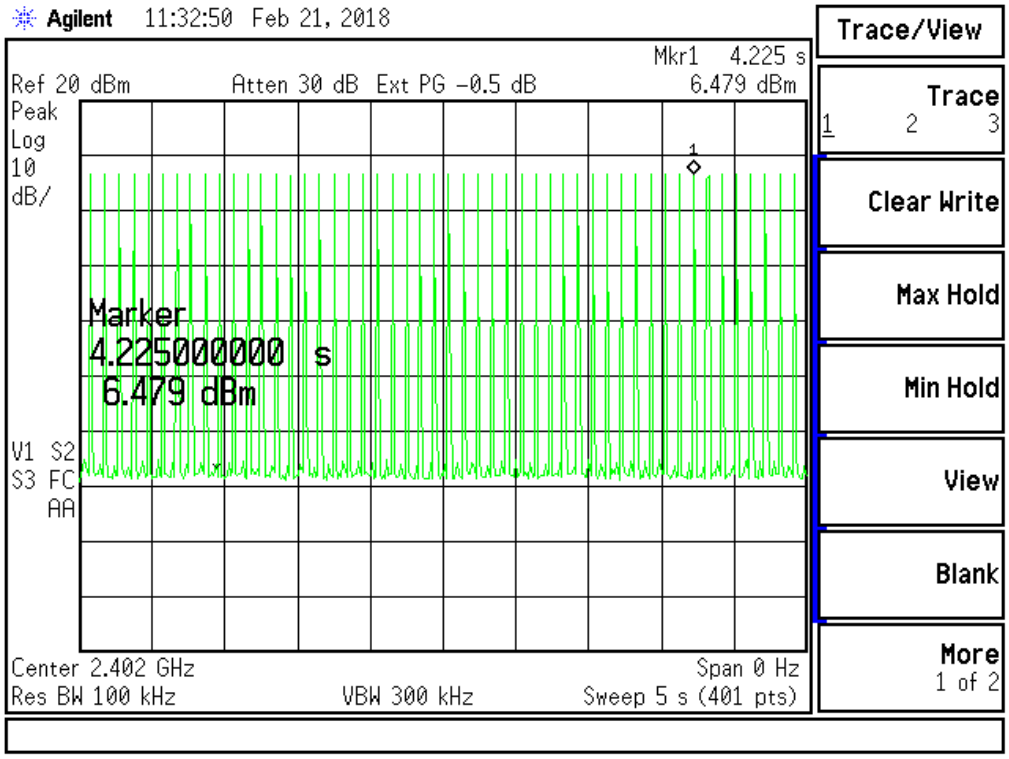
7.3 Test Equipment List:

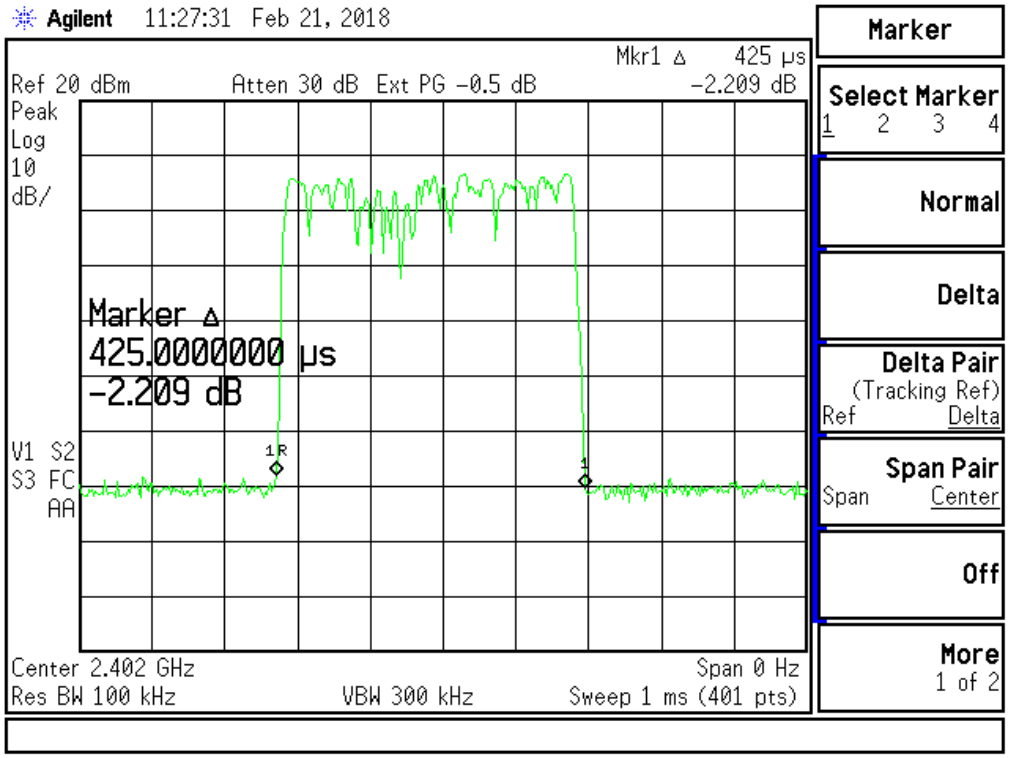
Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2017/05/03	2018/05/03

7.4 Test Result:

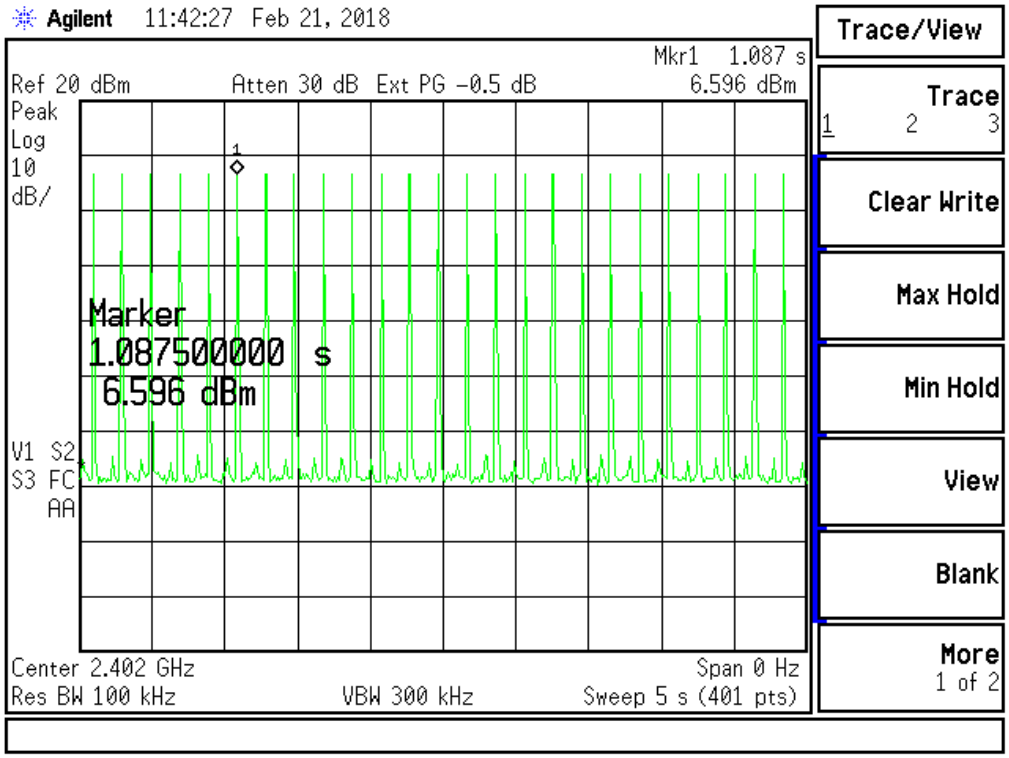
Mode	Number of transmission in a 31.6 (79Hopping * 0.4) times time	Length of transmission m sec	Result m sec	Limit m sec
DH1	50 x 6.32	0.425	134.3	400
DH3	25 x 6.32	1.7	268.6	400
DH5	17 x 6.32	2.98	320.2	400

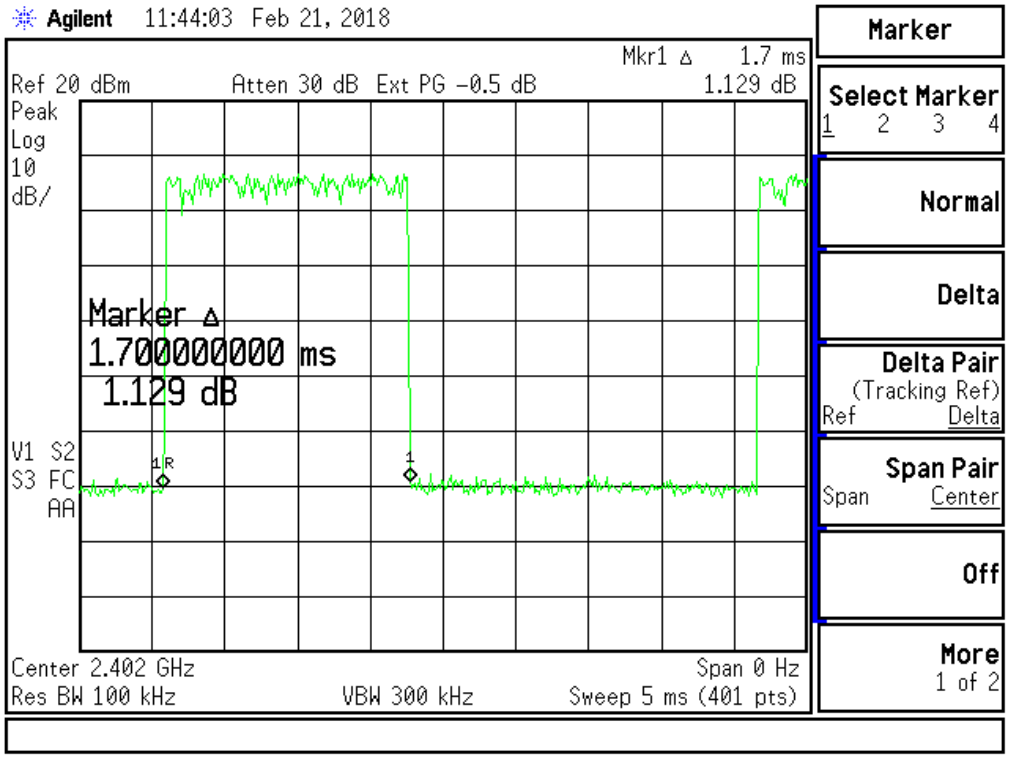
DH1



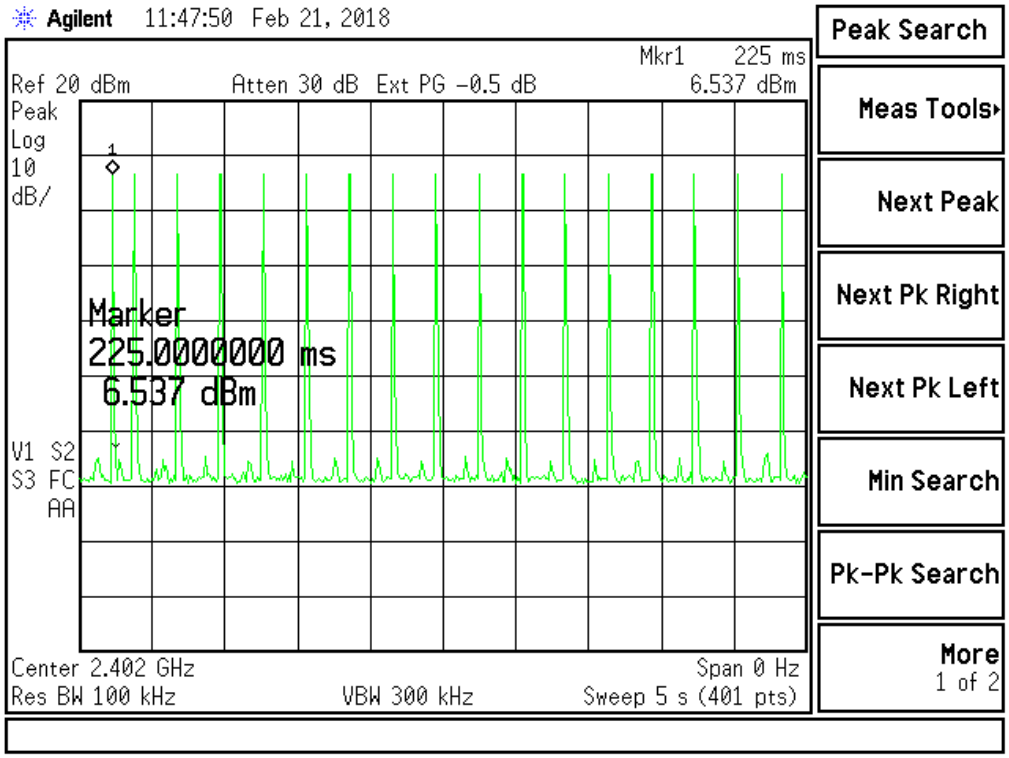

Agilent 11:27:31 Feb 21, 2018
Mkr1 Δ 425 µs
Ref 20 dBm Atten 30 dB Ext PG -0.5 dB -2.209 dB
Peak
Log
10
dB/
Marker Δ
425.0000000 µs
-2.209 dB
V1 S2
S3 FC
AA
Center 2.402 GHz
Res BW 100 kHz
VBW 300 kHz
Span 0 Hz
Sweep 1 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

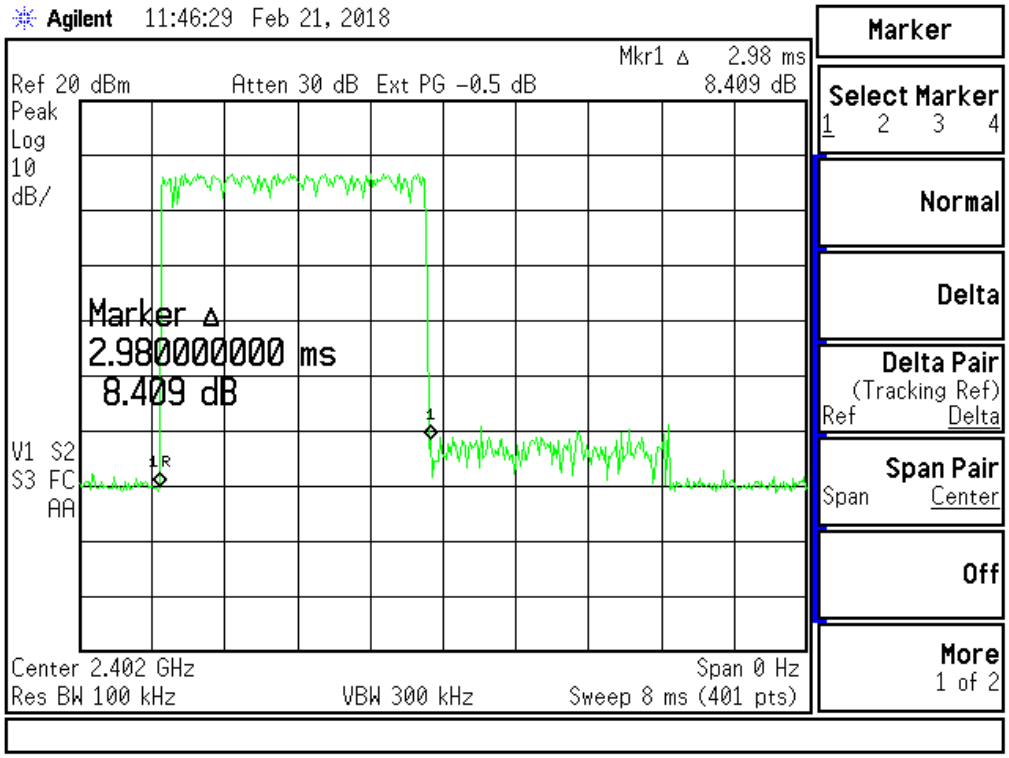
DH3


Agilent 11:42:27 Feb 21, 2018
Mkr1 1.087 s
Ref 20 dBm Atten 30 dB Ext PG -0.5 dB 6.596 dBm
Peak
Log
10
dB/
Marker
1.087500000 s
6.596 dBm
V1 S2
S3 FC
AA
Center 2.402 GHz
Res BW 100 kHz
VBW 300 kHz
Span 0 Hz
Sweep 5 s (401 pts)
Trace/View
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2


Agilent 11:44:03 Feb 21, 2018
Mkr1 Δ 1.7 ms
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
1.129 dB
Peak
Log
10
dB/
Marker Δ
1.700000000 ms
1.129 dB
V1 S2
S3 FC
AA
Center 2.402 GHz
Res BW 100 kHz
VBW 300 kHz
Span 0 Hz
Sweep 5 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

DH5


Agilent 11:47:50 Feb 21, 2018
Mkr1 225 ms
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
6.537 dBm
Peak
Log
10
dB/
Marker
225.0000000 ms
6.537 dBm
V1 S2
S3 FC
AA
Center 2.402 GHz
Res BW 100 kHz
VBW 300 kHz
Span 0 Hz
Sweep 5 s (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2


Agilent 11:46:29 Feb 21, 2018
Mkr1 Δ 2.98 ms
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
8.409 dB
Peak
Log
10
dB/
Marker Δ
2.980000000 ms
8.409 dB
V1 S2
S3 FC
AA
Center 2.402 GHz
Res BW 100 kHz
VBW 300 kHz
Span 0 Hz
Sweep 8 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

8. Out of Band Conducted Spurious Emissions Requirements

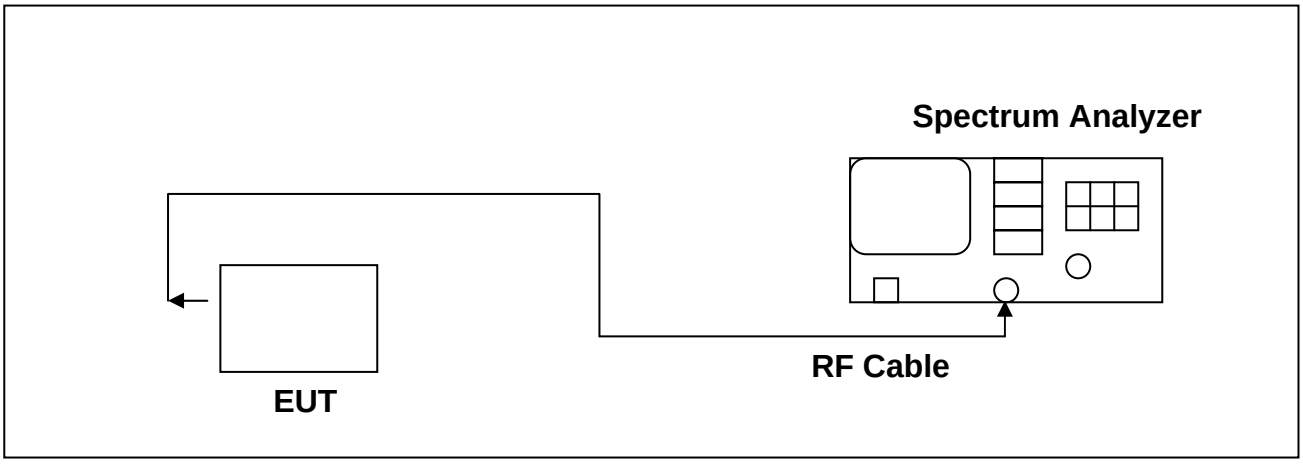
8.1 Test Condition & Setup:

In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band. The test was performed at 3 channels (Channel 0, 39, 78)

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.8) for this testing.

8.2 Test Instruments Configuration:



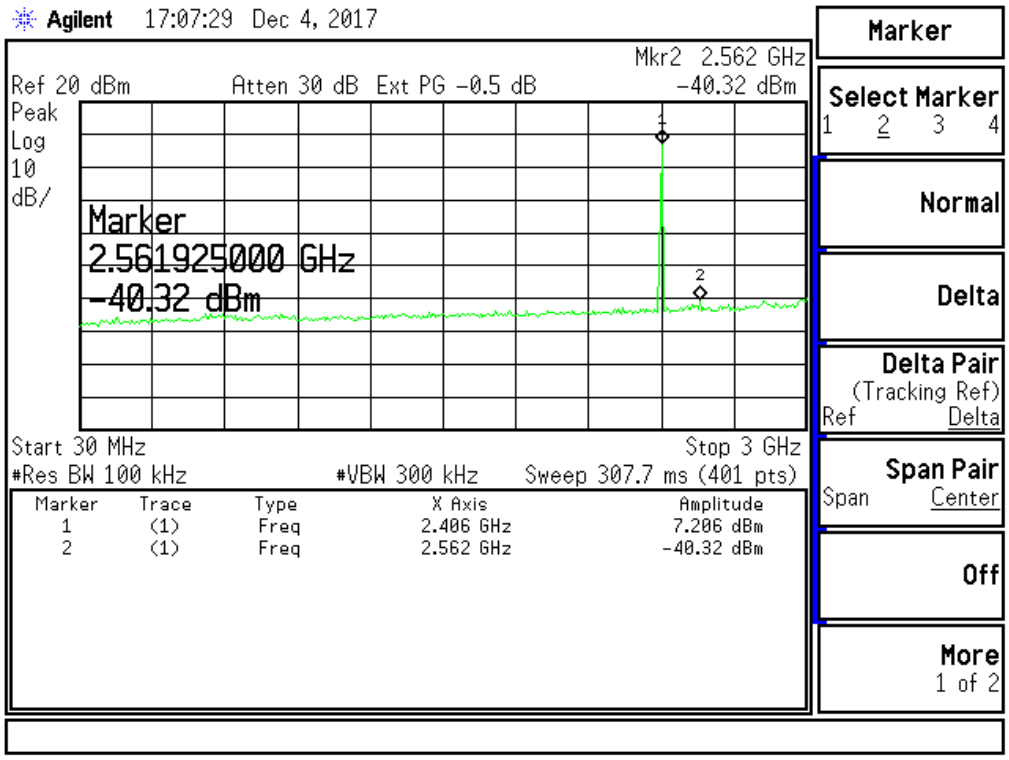
8.3 Test Equipment List:

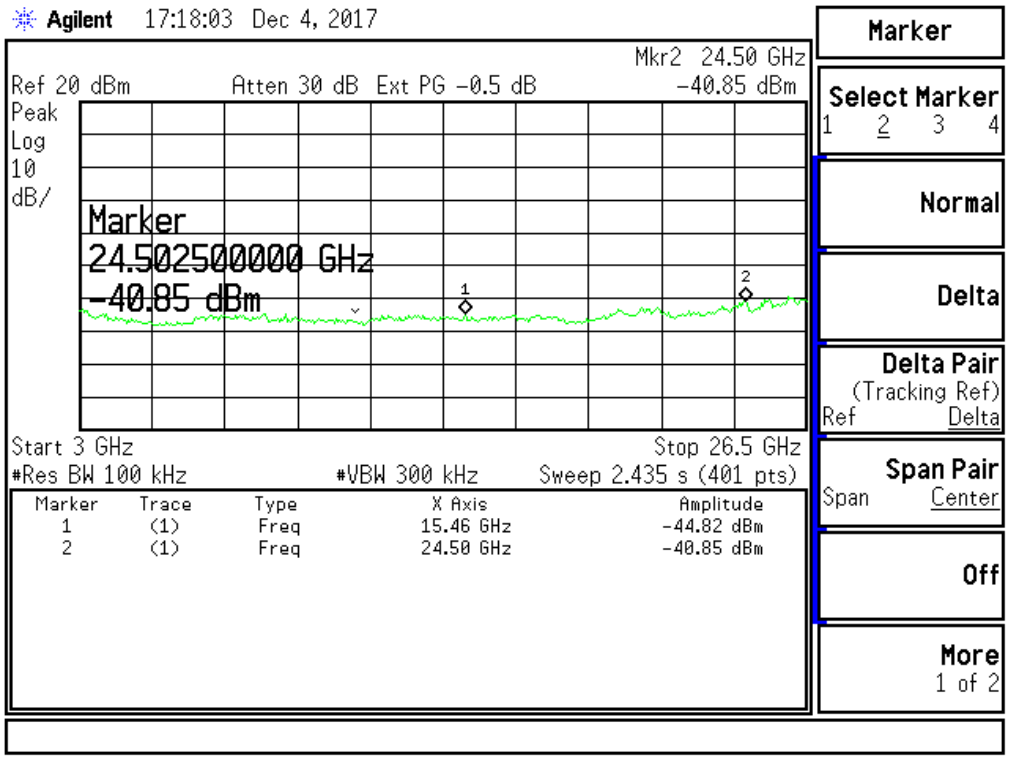
Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2017/05/03	2018/05/03

8.4 Test Result:

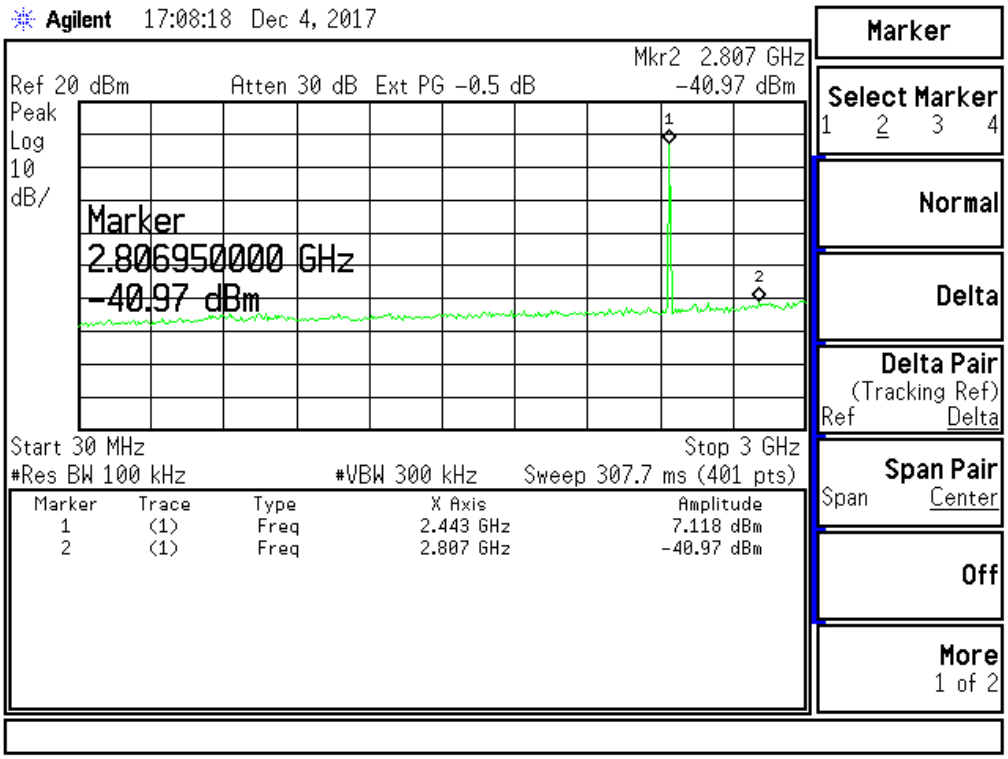
Refer to attached data sheets. Data shows out of band emissions are suppressed well below the -20 dB minimum required by the Rules.

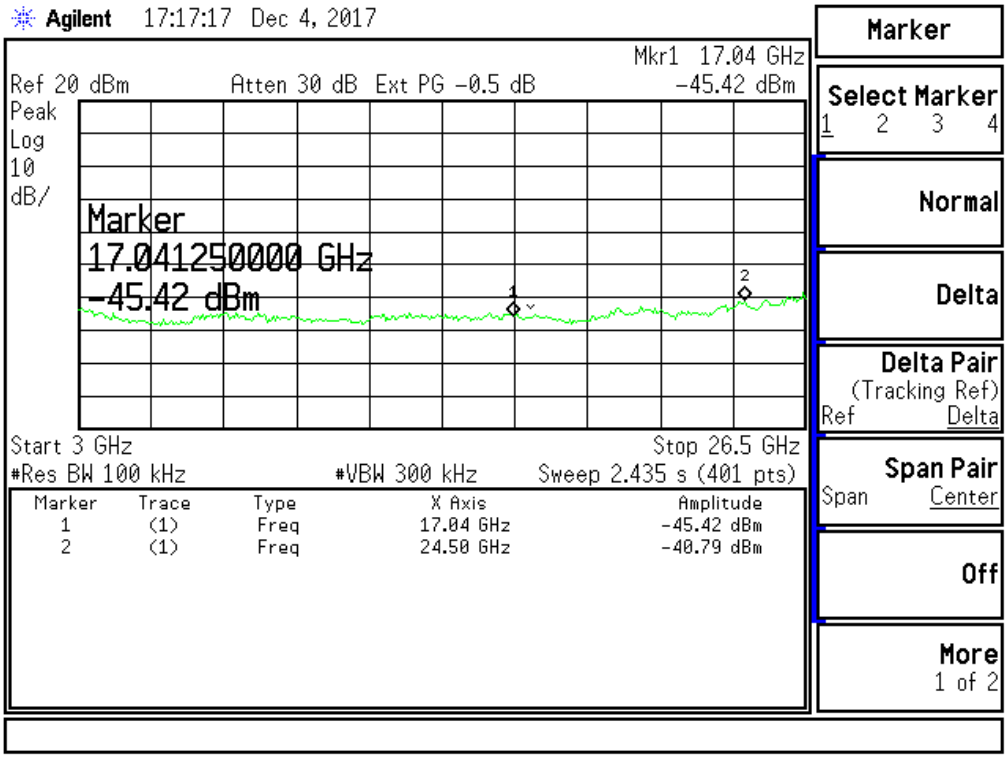
Data Rate : 1Mbps
(2402MHz)



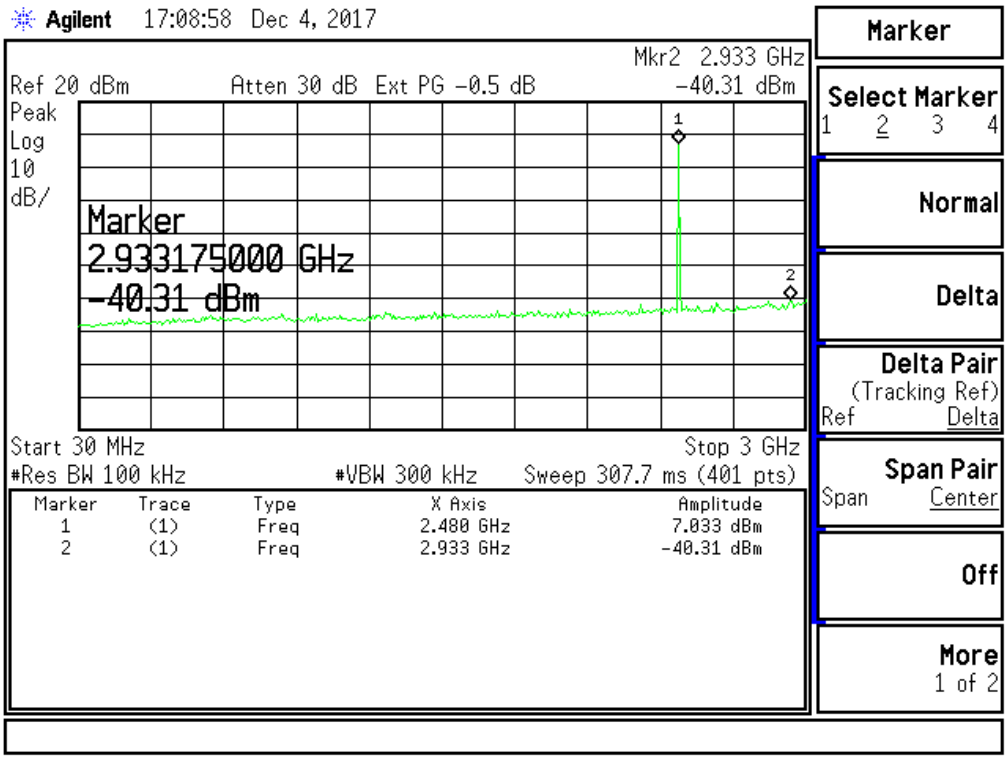


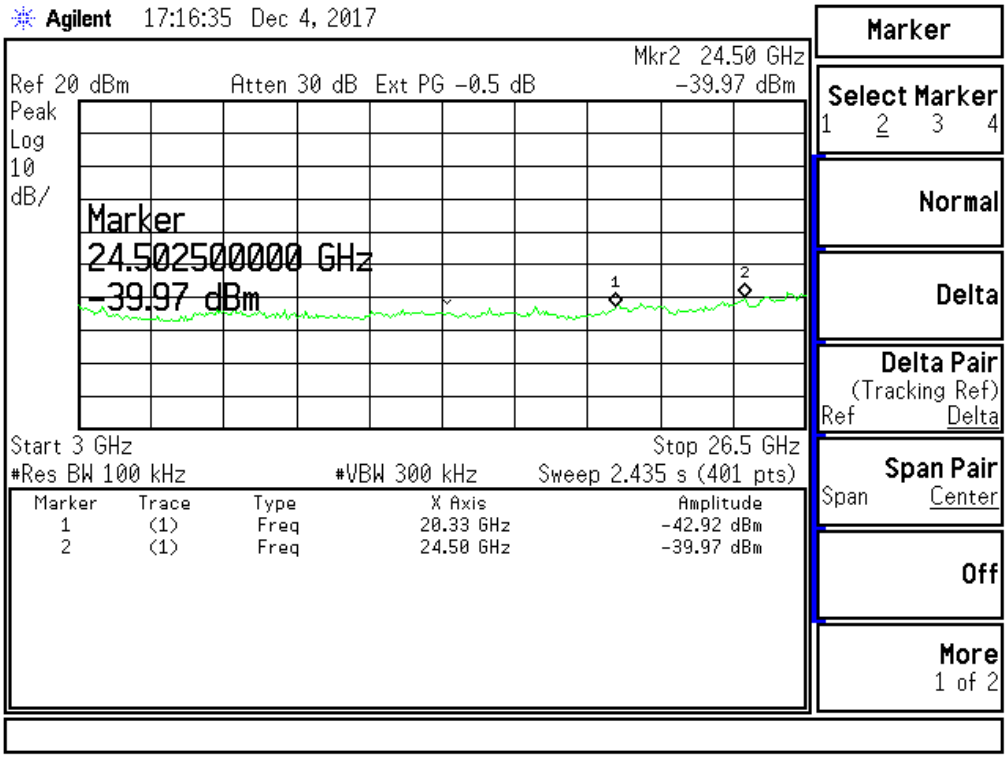
(2441MHz)


Agilent 17:08:18 Dec 4, 2017
Mkr2 2.807 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-40.97 dBm
Peak
Log
10
dB/
Marker
2.806950000 GHz
-40.97 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 3 GHz
Sweep 307.7 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.443 GHz 7.118 dBm
2 (1) Freq 2.807 GHz -40.97 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

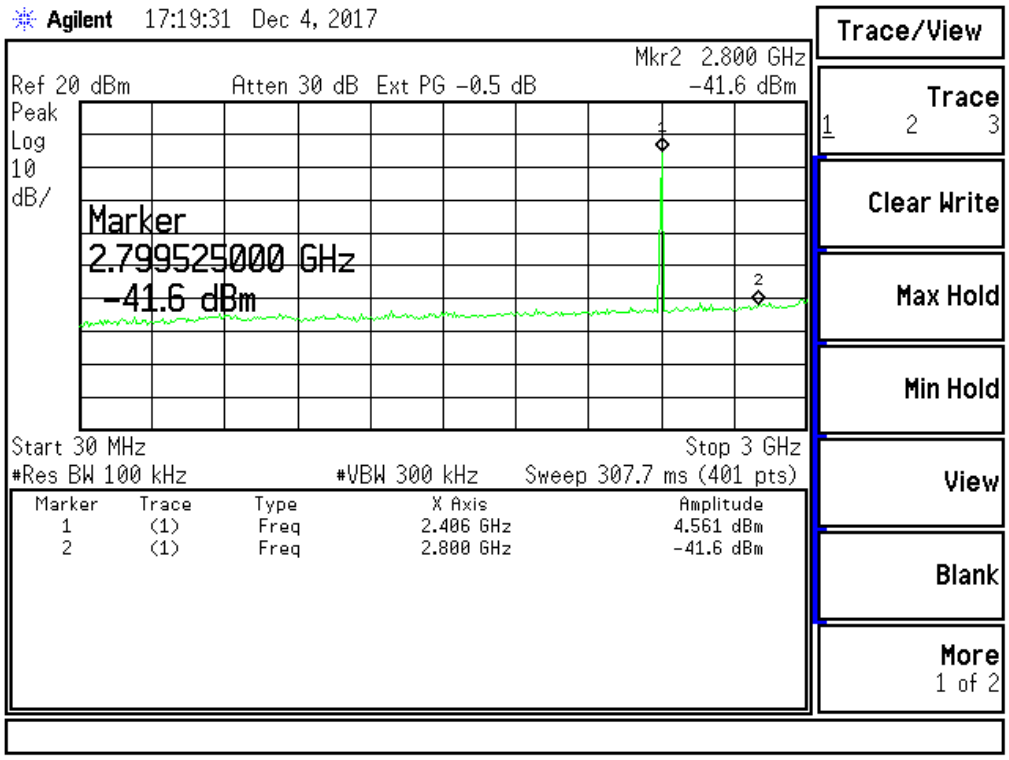

Agilent 17:17:17 Dec 4, 2017
Mkr1 17.04 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-45.42 dBm
Peak
Log
10
dB/
Marker
17.041250000 GHz
-45.42 dBm
Start 3 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.5 GHz
Sweep 2.435 s (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 17.04 GHz -45.42 dBm
2 (1) Freq 24.50 GHz -40.79 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

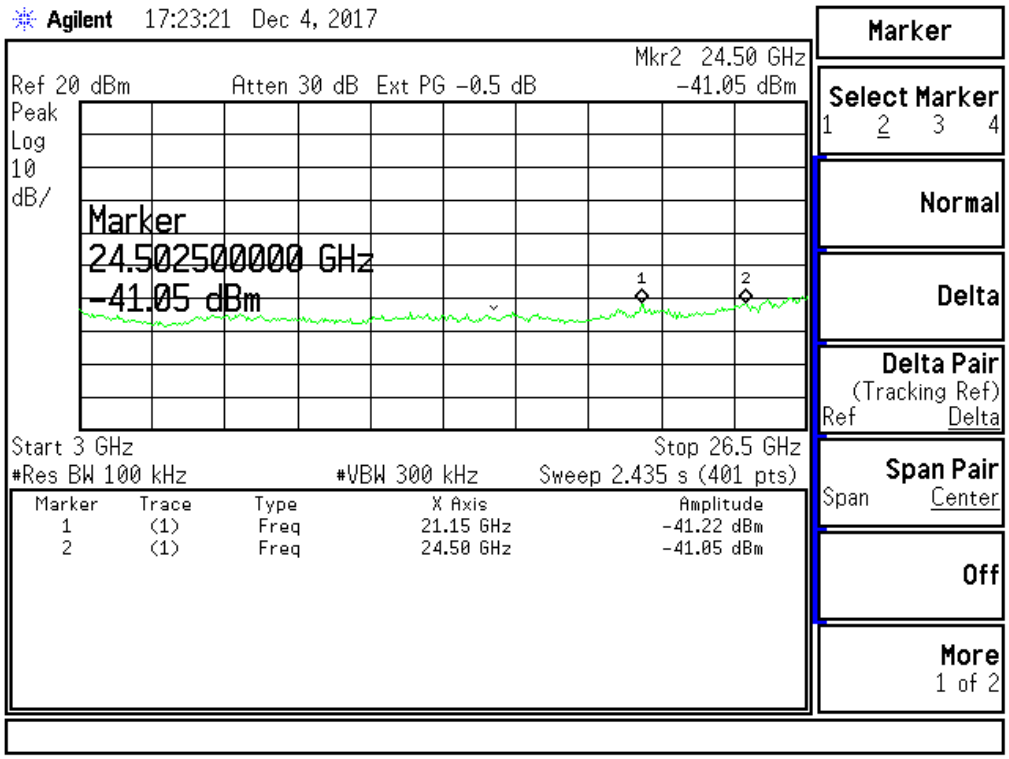
(2480MHz)


Agilent 17:08:58 Dec 4, 2017
Mkr2 2.933 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-40.31 dBm
Peak
Log
10
dB/
Marker
2.933175000 GHz
-40.31 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 3 GHz
Sweep 307.7 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.480 GHz 7.033 dBm
2 (1) Freq 2.933 GHz -40.31 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

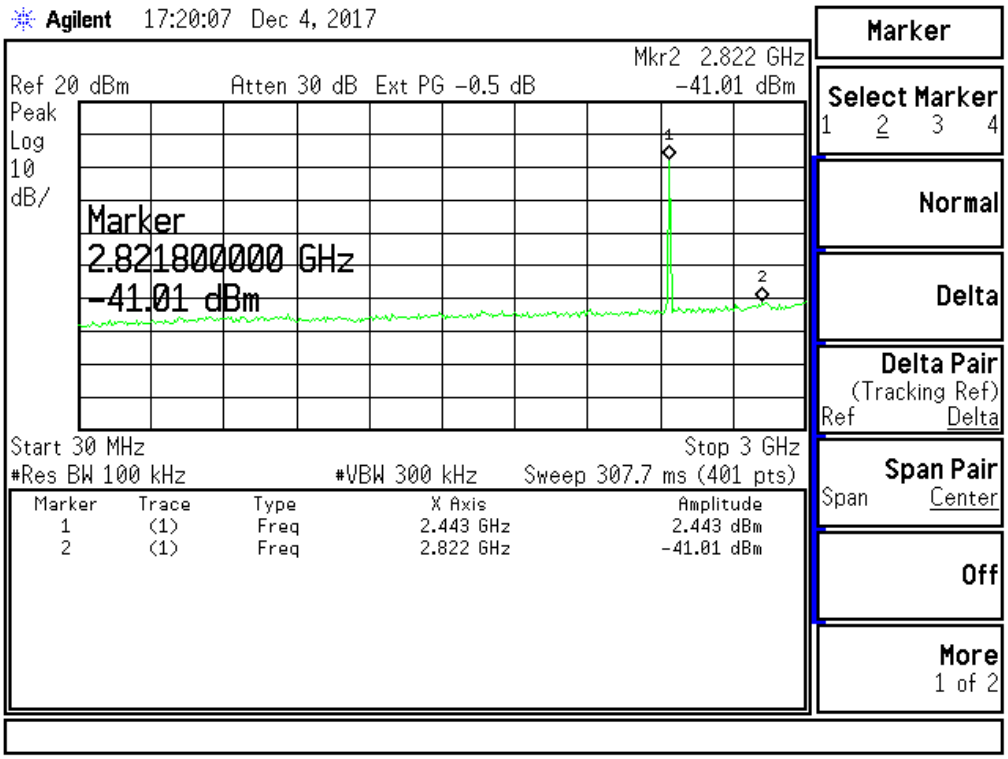

Agilent 17:16:35 Dec 4, 2017
Mkr2 24.50 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-39.97 dBm
Peak
Log
10
dB/
Marker
24.502500000 GHz
-39.97 dBm
Start 3 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.5 GHz
Sweep 2.435 s (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 20.33 GHz -42.92 dBm
2 (1) Freq 24.50 GHz -39.97 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

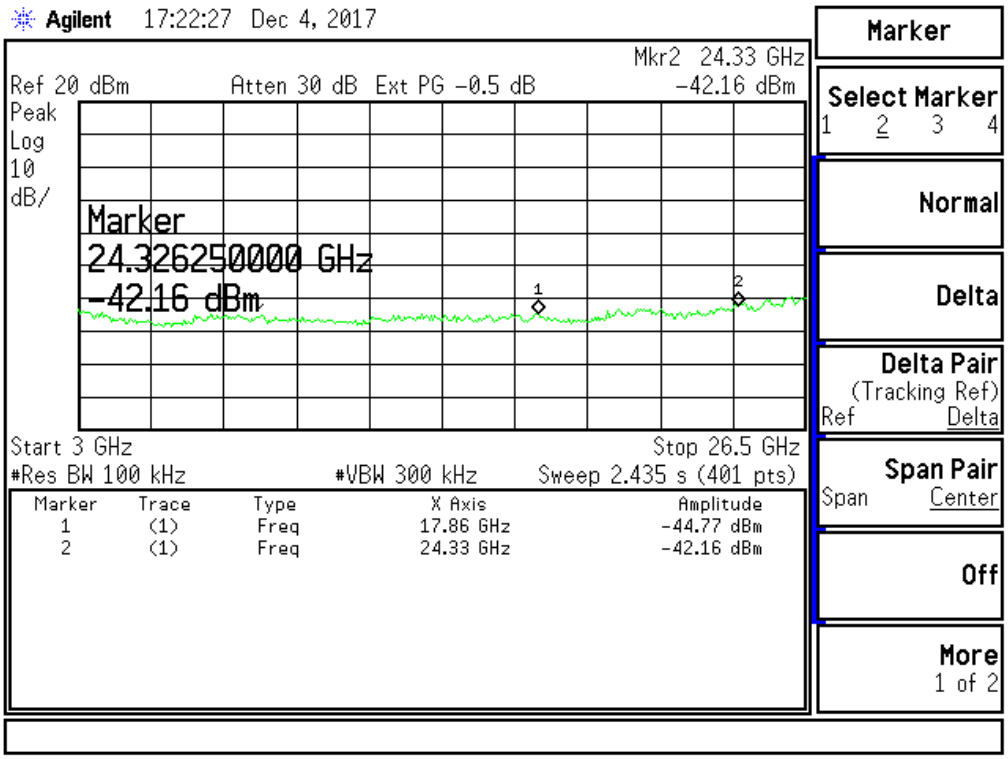
Data Rate : 2Mbps
(2402MHz)



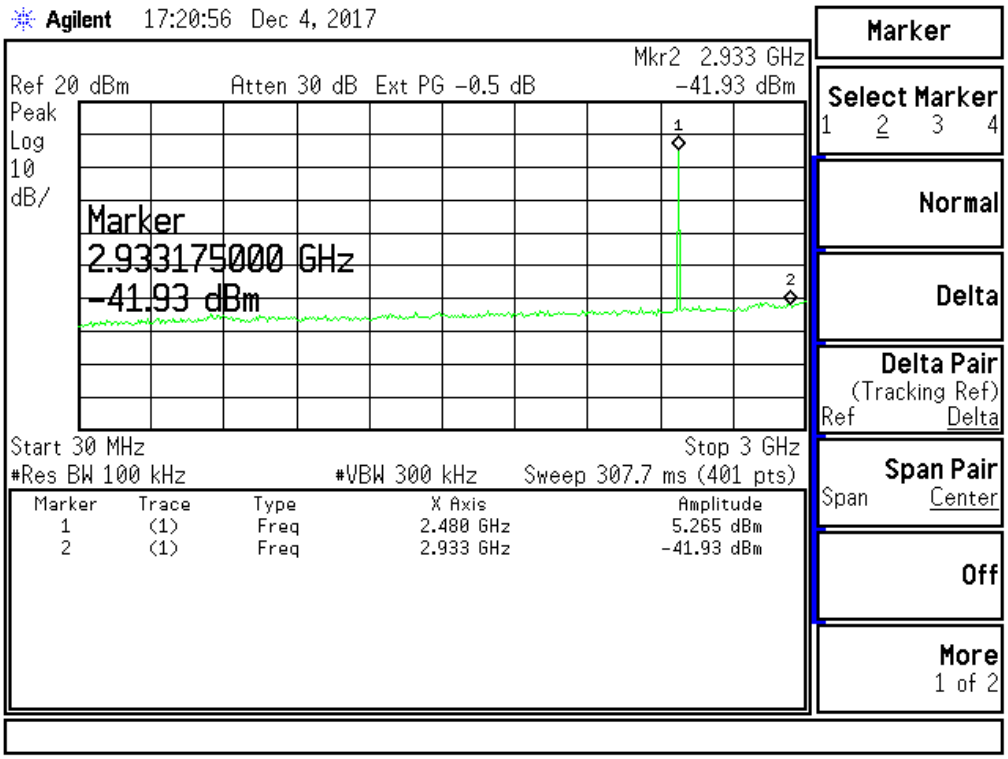


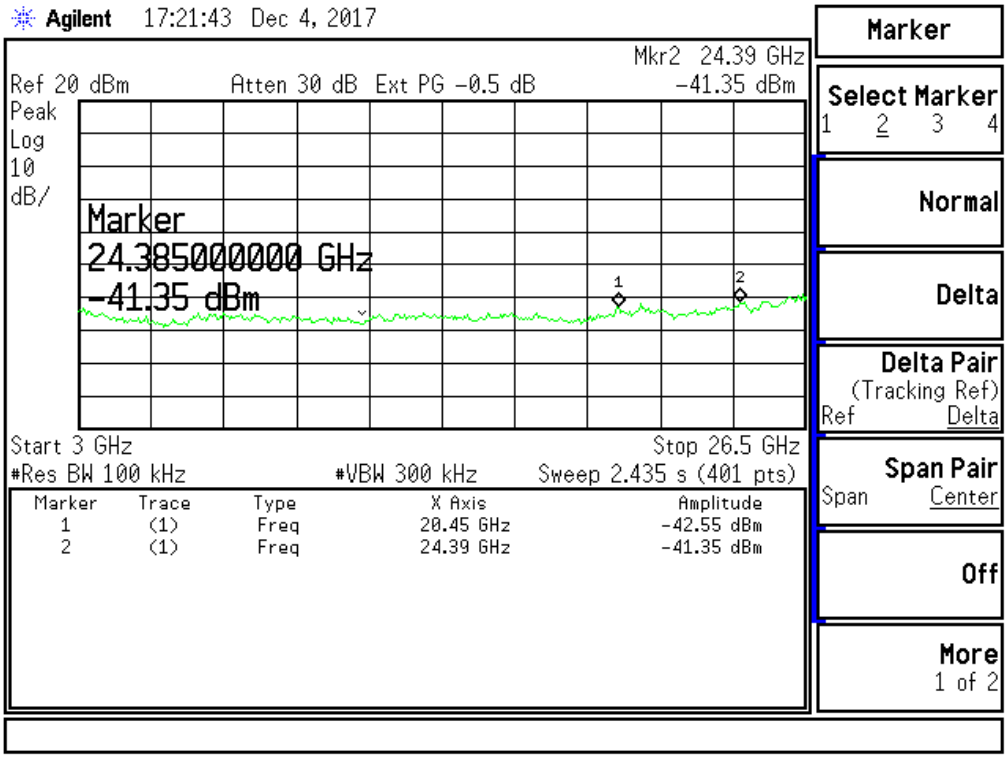
(2441MHz)


Agilent 17:20:07 Dec 4, 2017
Mkr2 2.822 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-41.01 dBm
Peak
Log
10
dB/
Marker
2.821800000 GHz
-41.01 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 3 GHz
Sweep 307.7 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.443 GHz 2.443 dBm
2 (1) Freq 2.822 GHz -41.01 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

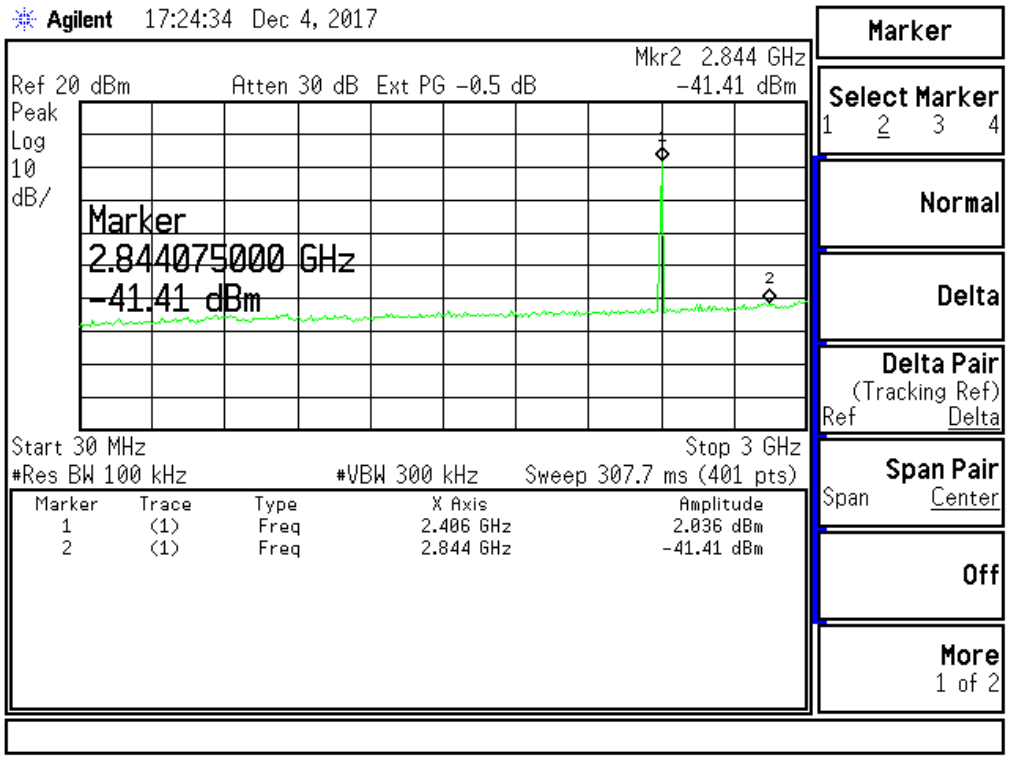

Agilent 17:22:27 Dec 4, 2017
Mkr2 24.33 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-42.16 dBm
Peak
Log
10
dB/
Marker
24.326250000 GHz
-42.16 dBm
Start 3 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.5 GHz
Sweep 2.435 s (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 17.86 GHz -44.77 dBm
2 (1) Freq 24.33 GHz -42.16 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

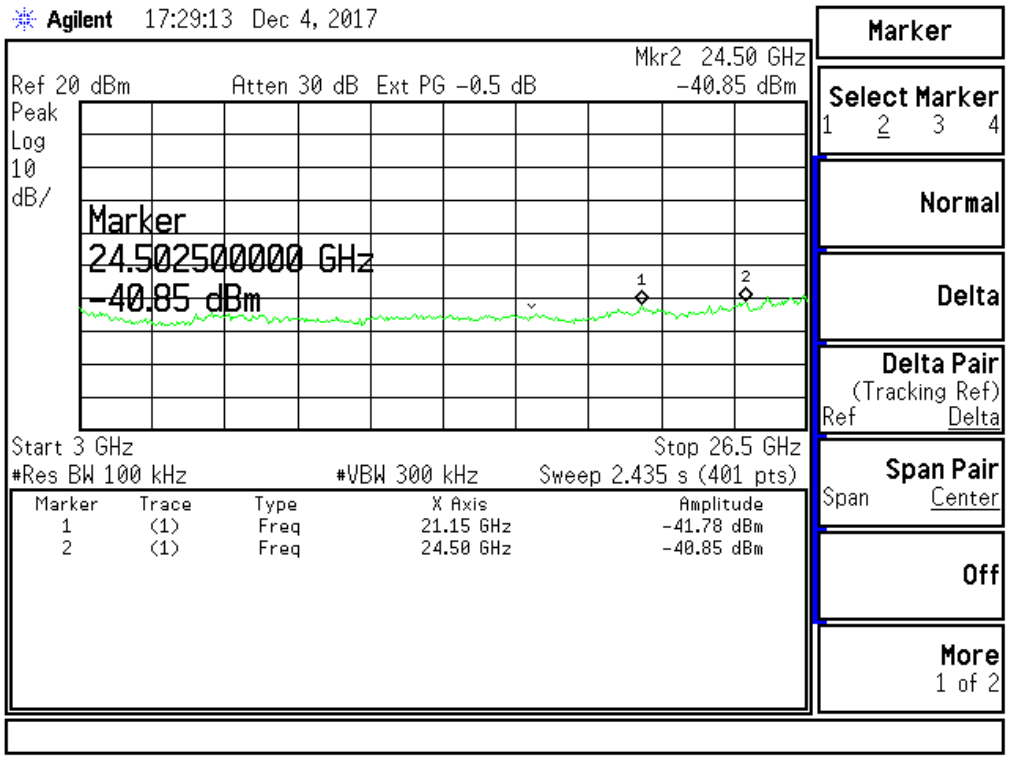
(2480MHz)


Agilent 17:20:56 Dec 4, 2017
Mkr2 2.933 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-41.93 dBm
Peak
Log
10
dB/
Marker
2.933175000 GHz
-41.93 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 3 GHz
Sweep 307.7 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.480 GHz 5.265 dBm
2 (1) Freq 2.933 GHz -41.93 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

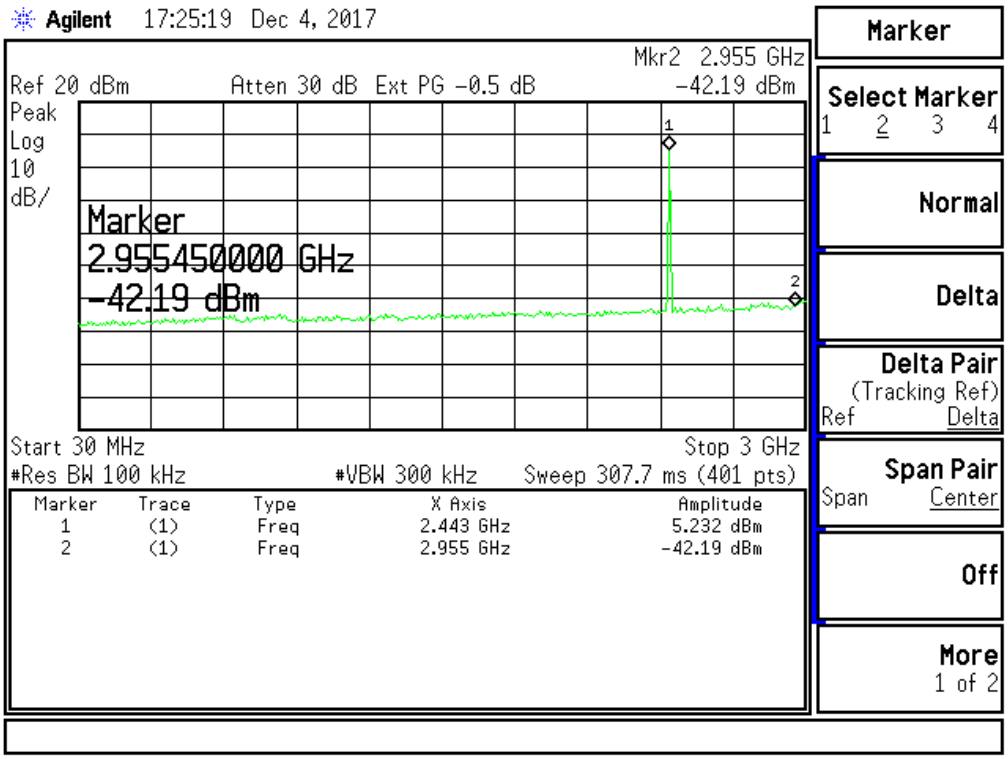

Agilent 17:21:43 Dec 4, 2017
Mkr2 24.39 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-41.35 dBm
Peak
Log
10
dB/
Marker
24.385000000 GHz
-41.35 dBm
Start 3 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.5 GHz
Sweep 2.435 s (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 20.45 GHz -42.55 dBm
2 (1) Freq 24.39 GHz -41.35 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

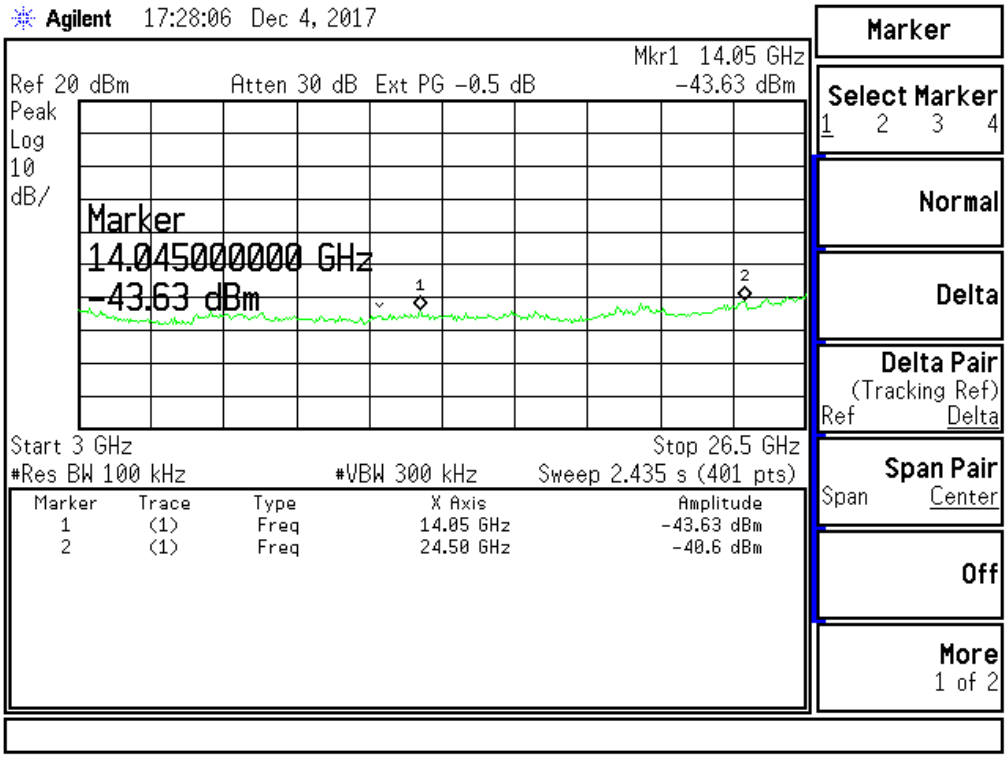
Data Rate : 3Mbps
(2402MHz)



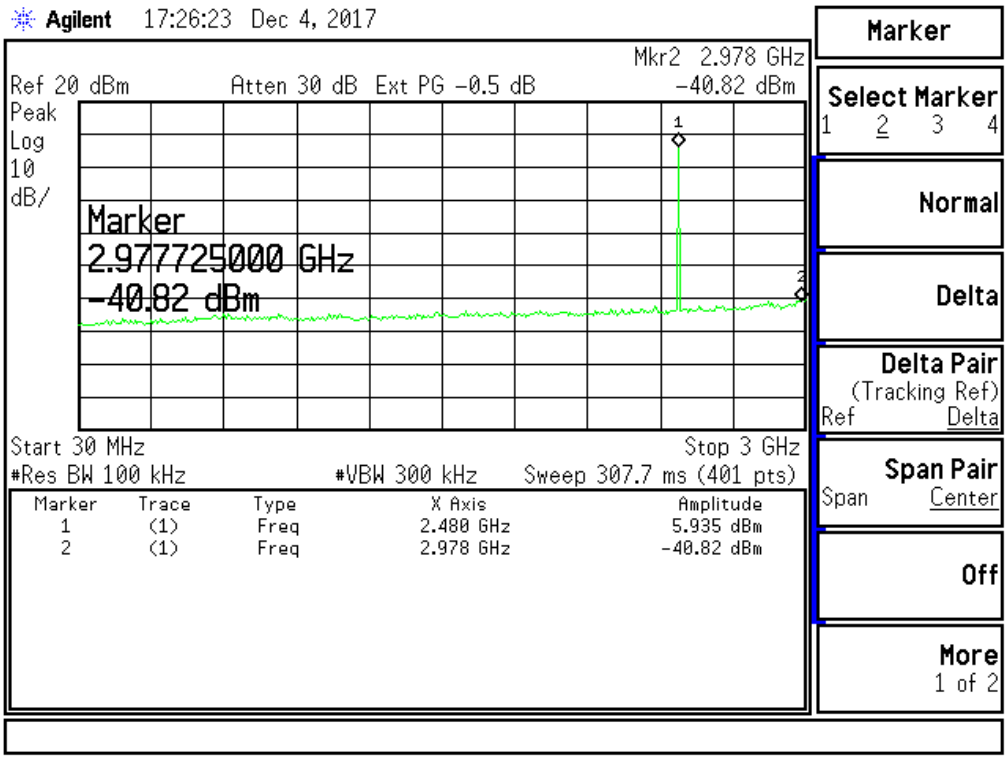


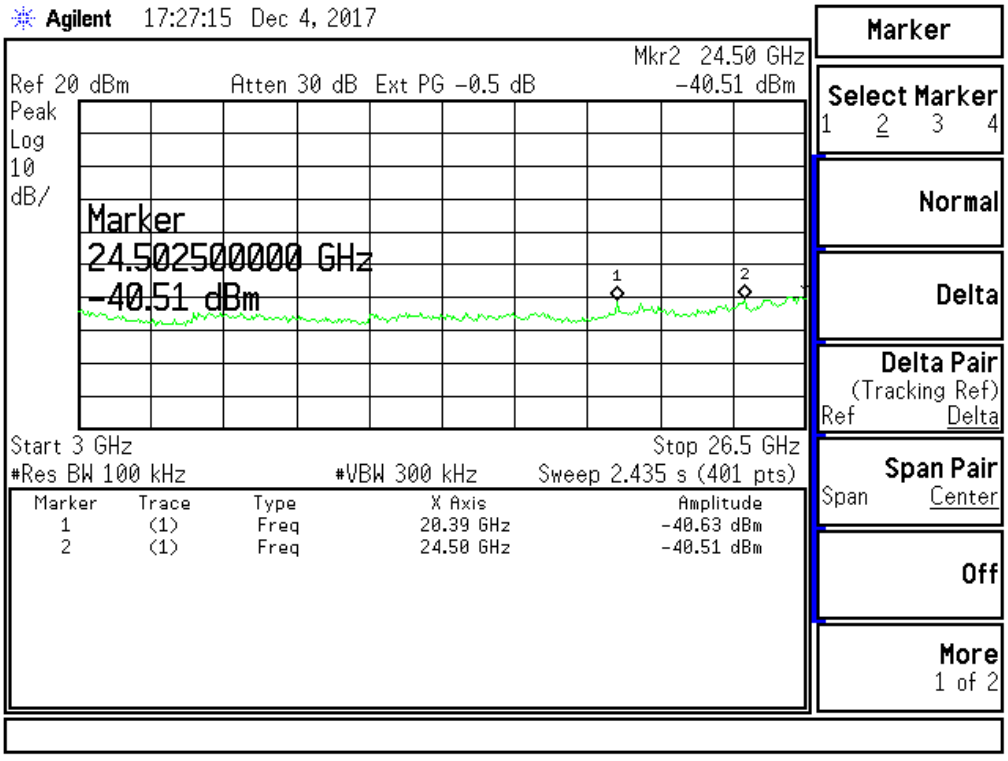
(2441MHz)


Agilent 17:25:19 Dec 4, 2017
Mkr2 2.955 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-42.19 dBm
Peak
Log
10
dB/
Marker
2.955450000 GHz
-42.19 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 3 GHz
Sweep 307.7 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.443 GHz 5.232 dBm
2 (1) Freq 2.955 GHz -42.19 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent 17:28:06 Dec 4, 2017
Mkr1 14.05 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-43.63 dBm
Peak
Log
10
dB/
Marker
14.045000000 GHz
-43.63 dBm
Start 3 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.5 GHz
Sweep 2.435 s (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 14.05 GHz -43.63 dBm
2 (1) Freq 24.50 GHz -40.6 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

(2480MHz)


Agilent 17:26:23 Dec 4, 2017
Mkr2 2.978 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-40.82 dBm
Peak
Log
10
dB/
Marker
2.977725000 GHz
-40.82 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 3 GHz
Sweep 307.7 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.480 GHz 5.935 dBm
2 (1) Freq 2.978 GHz -40.82 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent 17:27:15 Dec 4, 2017
Mkr2 24.50 GHz
Ref 20 dBm
Atten 30 dB Ext PG -0.5 dB
-40.51 dBm
Peak
Log
10
dB/
Marker
24.502500000 GHz
-40.51 dBm
Start 3 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.5 GHz
Sweep 2.435 s (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 20.39 GHz -40.63 dBm
2 (1) Freq 24.50 GHz -40.51 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

9. Maximum Conducted Output Power Requirements

9.1 Test Condition & Setup:

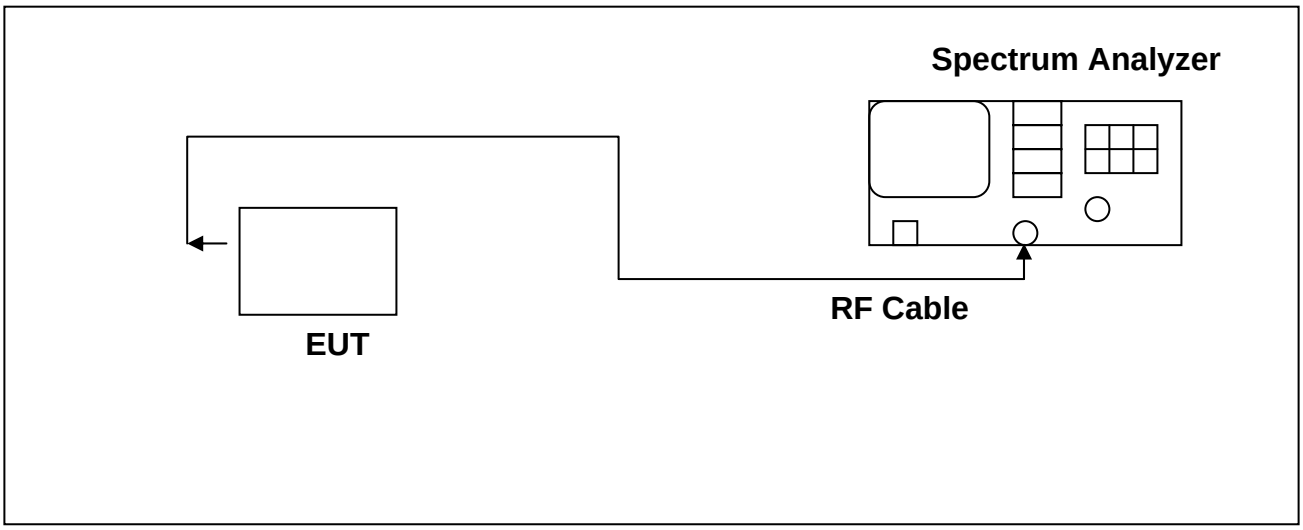
While testing, EUT was set to transmit continuously. Remove the Subjective device's antenna and connect the RF output port to spectrum analyzer. The maximum peak output power shall not exceed 1 watt.

The antenna port of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm). For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6)/3 dBm.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.5) for this testing.

9.2 Test Instruments Configuration:



9.3 Test Equipment List:

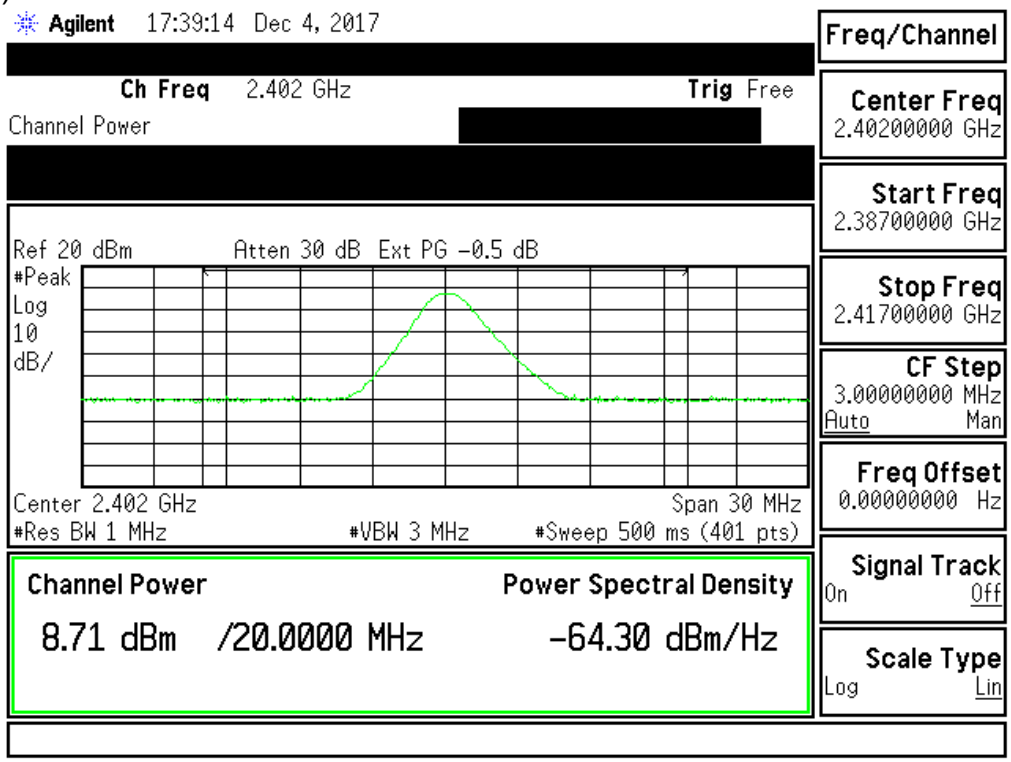
Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US39240419	E4407B	2017/05/03	2018/05/03

9.4 Test Result:

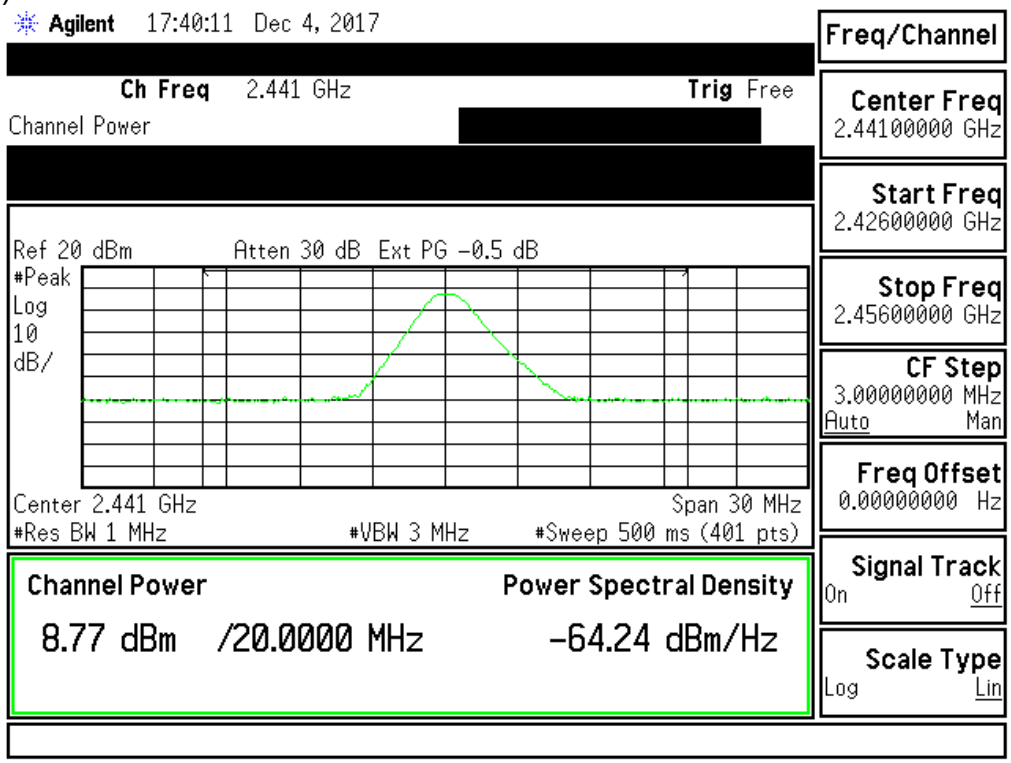
Channel	Frequency (MHz)	Data Rate (Mbps)	Results (dBm)	Limit (dBm)
0	2402	1	8.71	<30
		2	7.18	<30
		3	7.27	<30
39	2441	1	8.77	<30
		2	7.54	<30
		3	7.57	<30
78	2480	1	8.96	<30
		2	8.19	<30
		3	8.20	<30

Note : 1. Cable Loss = 0.5dB.
2. Result= Instrument reading value + Cable Loss.

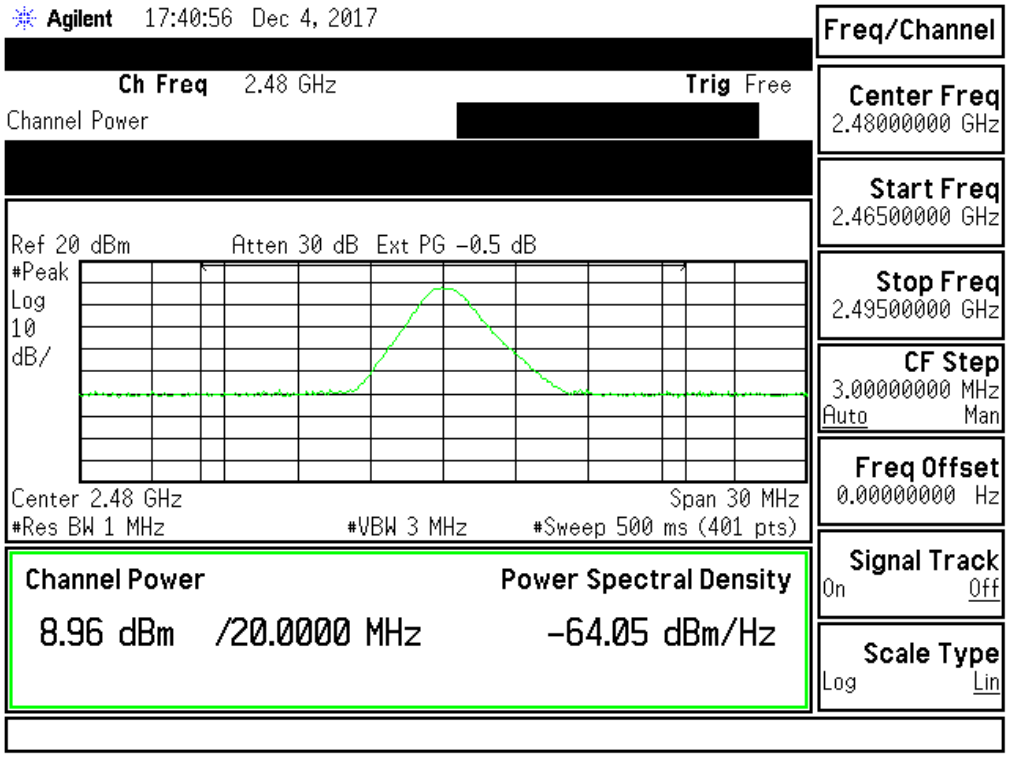
Data Rate : 1Mbps
(2402MHz)



(2441MHz)

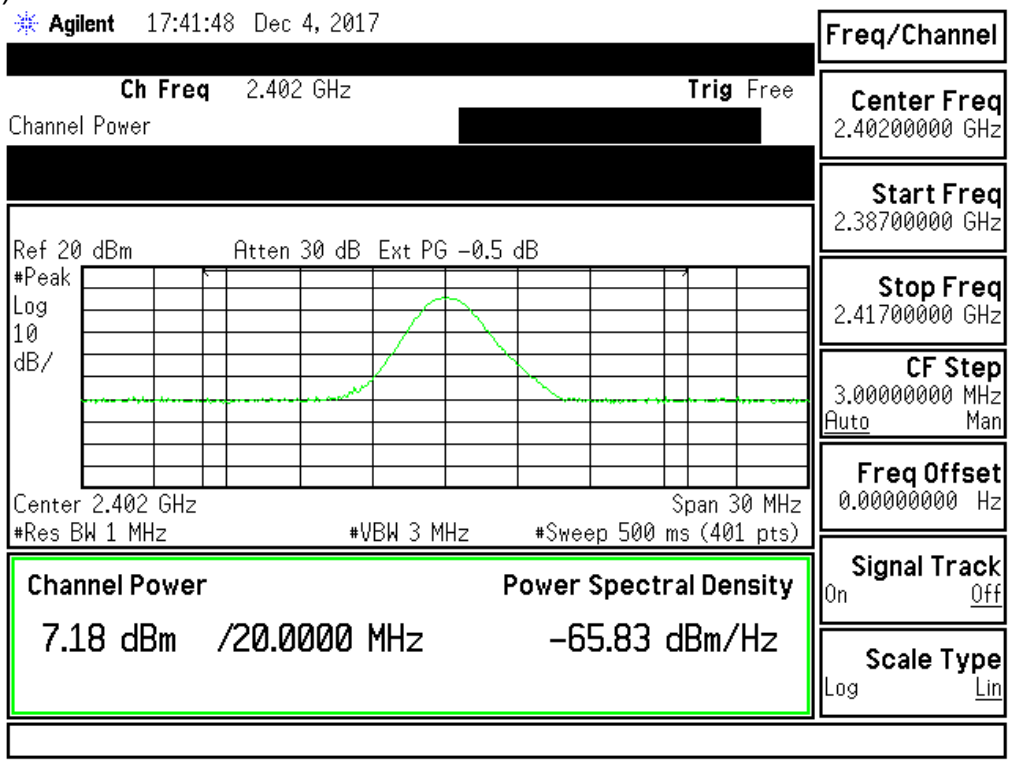


(2480MHz)

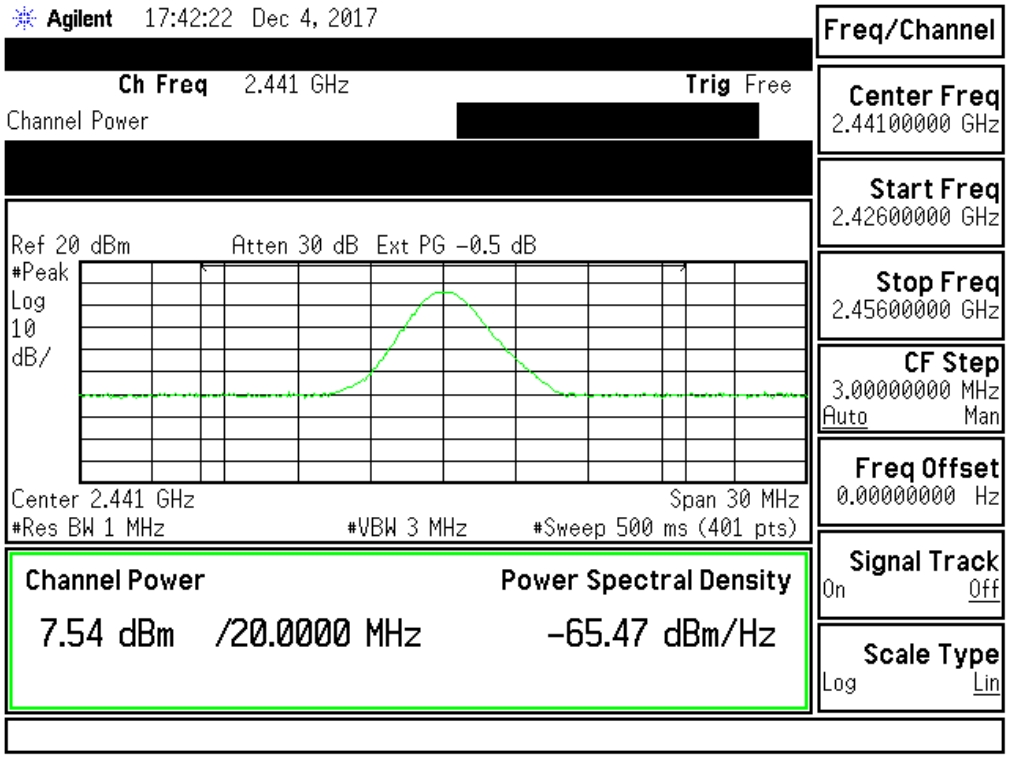


Data Rate : 2Mbps

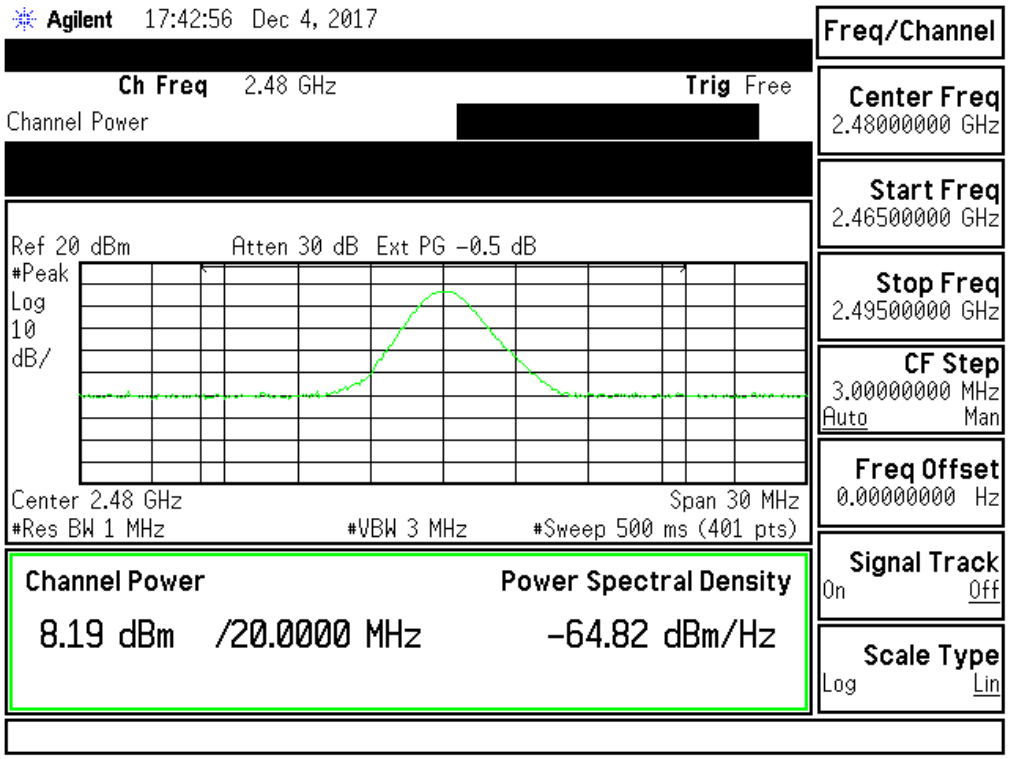
(2402MHz)



(2441MHz)

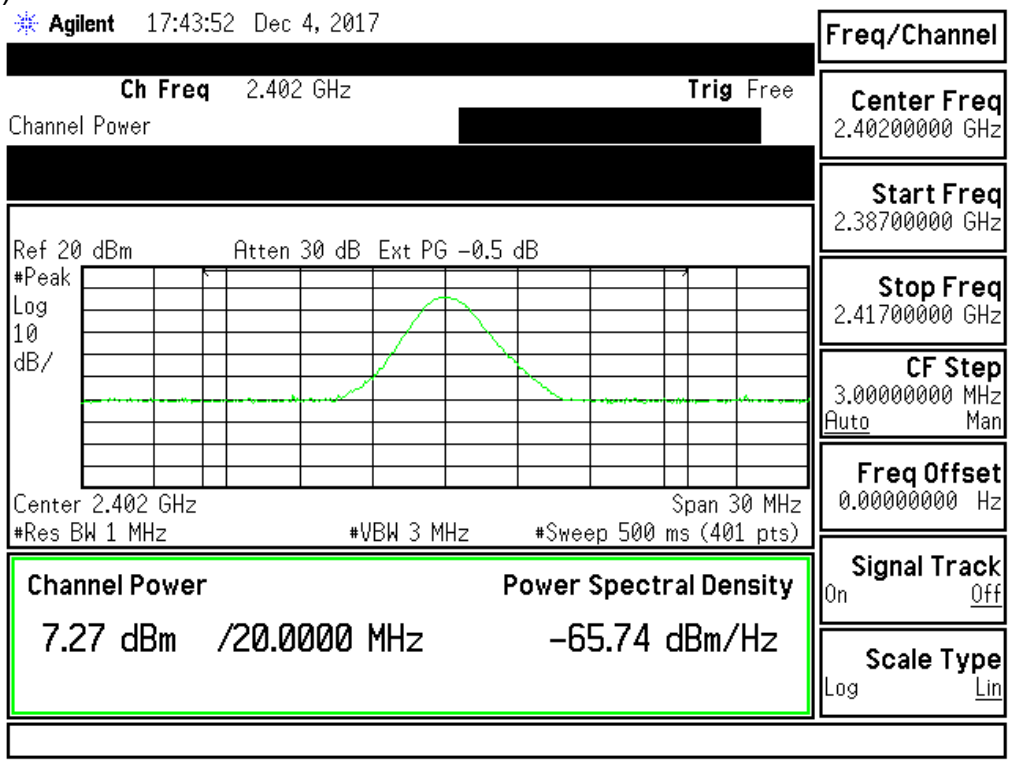


(2480MHz)

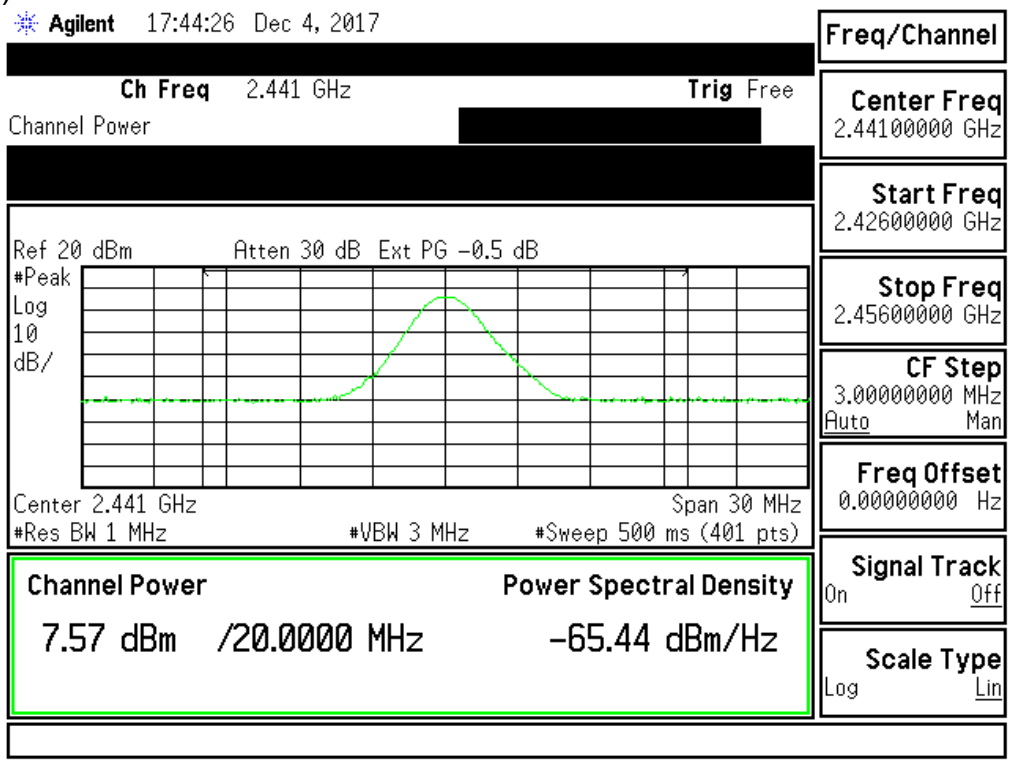


Data Rate : 3Mbps

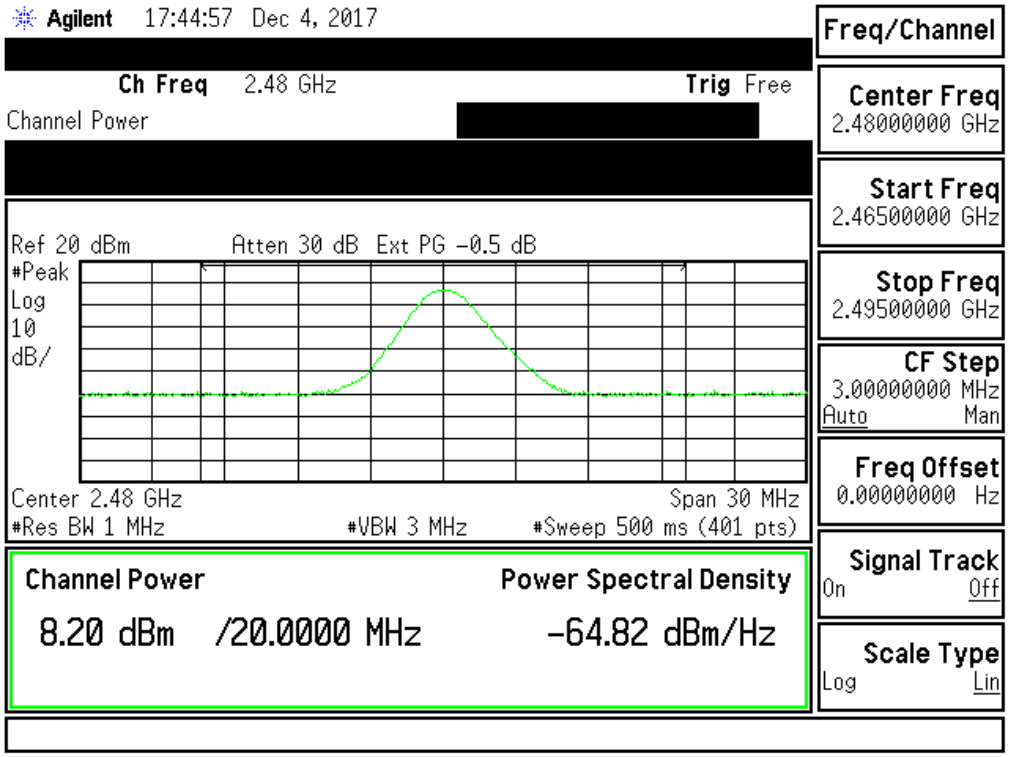
(2402MHz)



(2441MHz)



(2480MHz)



10. Band Edge Requirements

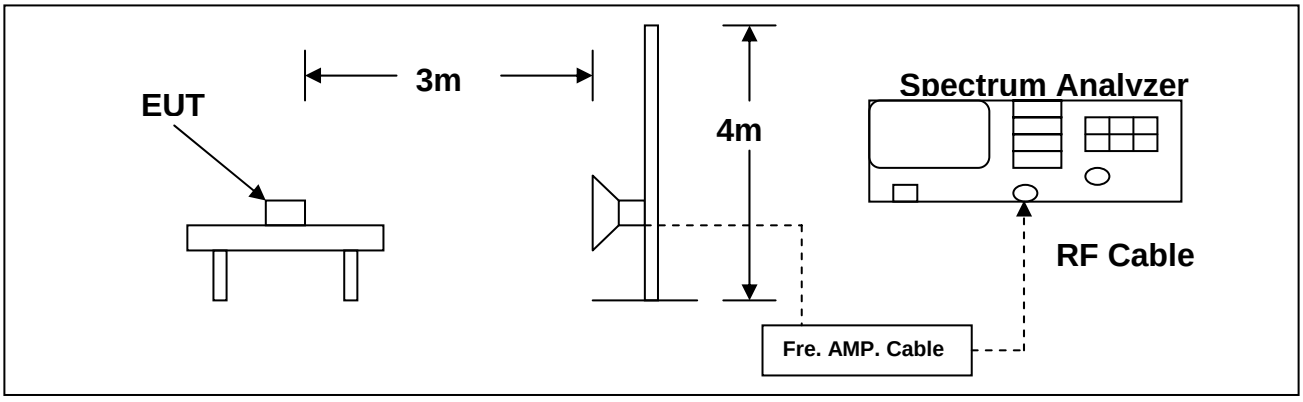
10.1 Test Condition & Setup:

The emissions on the harmonics frequencies, the limits, and the margin of compliance are presented. These tests were made when the transmitter was in full radiated power. The additional test was performed to show compliance with the requirement at the band edge frequency 2400 MHz and up to 2483.5 MHz.

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. For measurements the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurement.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (6.10.5) for this testing.

10.2 Test Instruments Configuration:



10.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US44300422	E4446A	2017/02/16	2018/02/16
2.	TA	Pre Amplifier	RF01	0.10~19.1GHz 60dBm	2017/03/02	2018/03/02
3.	SCHWARZBECK	Horn Antenna	304	BBHA 9120 D	2017/12/13	2018/12/13
4.	Agilent	Spectrum Analyzer	US39240419	E4407B	2017/05/03	2018/05/03
5.	MLT	Pre Amplifier	20110209	PREAMP6G-01	2017/03/29	2018/03/29

10.4 Test Result : Worst case (X Axis)

Data Rate : 1Mbps

Radiated Emissions (HORIZONTAL) CH00						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.2	36.0 (PK)	1	193	0	74.0(PK)	-38.0
2399.2	22.3 (AV)	1	193	0	54.0(AV)	-31.7

Radiated Emissions (VERTICAL) CH00						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.4	34.4 (PK)	1	260	0	74.0(PK)	-39.6
2399.4	21.5 (AV)	1	260	0	54.0(AV)	-32.5

Radiated Emissions (HORIZONTAL) CH78						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2484.9	34.2 (PK)	1	97	0	74.0(PK)	-39.8
2484.9	19.8 (AV)	1	97	0	54.0(AV)	-34.2

Radiated Emissions (VERTICAL) CH78						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2485.5	33.3 (PK)	1	323	0	74.0(PK)	-40.8
2485.5	20.0 (AV)	1	323	0	54.0(AV)	-34.0

Notes : 1. Margin= Amplitude - Limits

2. Height of table for EUT placed: 0.8 Meter.
3. ANT= Antenna height.
4. Duty= Duty cycle correction factor.
5. Amplitude= Reading Amplitude – Amplifier gain+ Cable loss+ Antenna factor (Auto calculate in spectrum analyzer)
6. Peak Value =>RBW set 1MHz ; VBW set 1MHz
7. average Value=> RBW set 1MHz ; VBW set 10Hz

Data Rate : 2Mbps

Radiated Emissions (HORIZONTAL) CH00						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.6	37.0 (PK)	1	316	0	74.0(PK)	-37.0
2399.6	22.7 (AV)	1	316	0	54.0(AV)	-31.3

Radiated Emissions (VERTICAL) CH00						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.5	40.5 (PK)	1	332	0	74.0(PK)	-33.5
2399.5	25.4 (AV)	1	332	0	54.0(AV)	-28.6

Radiated Emissions (HORIZONTAL) CH78						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2487.1	33.3 (PK)	1	71	0	74.0(PK)	-40.7
2487.1	20.0 (AV)	1	71	0	54.0(AV)	-34.0

Radiated Emissions (VERTICAL) CH78						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2484.4	33.4 (PK)	1	246	0	74.0(PK)	-40.6
2484.4	20.1 (AV)	1	246	0	54.0(AV)	-34.0

Notes : 1. Margin= Amplitude - Limits

2. Height of table for EUT placed: 0.8 Meter.
3. ANT= Antenna height.
4. Duty= Duty cycle correction factor.
5. Amplitude= Reading Amplitude – Amplifier gain+ Cable loss+ Antenna factor (Auto calculate in spectrum analyzer)
6. Peak Value =>RBW set 1MHz ; VBW set 1MHz
7. average Value=> RBW set 1MHz ; VBW set 10Hz

Data Rate : 3Mbps

Radiated Emissions (HORIZONTAL) CH00						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.6	34.9 (PK)	1	62	0	74.0(PK)	-39.1
2399.6	22.1 (AV)	1	62	0	54.0(AV)	-31.9

Radiated Emissions (VERTICAL) CH00						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2399.5	38.6 (PK)	1	242	0	74.0(PK)	-35.4
2399.5	19.4 (AV)	1	242	0	54.0(AV)	-34.6

Radiated Emissions (HORIZONTAL) CH78						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2486.7	33.7 (PK)	1	717	0	74.0(PK)	-40.3
2486.7	20.0 (AV)	1	717	0	54.0(AV)	-34.0

Radiated Emissions (VERTICAL) CH78						
Frequency (MHz)	Amplitude (dBuV/m)	Ant. (m)	Table (Degree)	Duty (dB)	Limit (dBuV/m)	Margin (dB)
2487.3	33.5 (PK)	1	245	0	74.0(PK)	-40.5
2487.3	20.0 (AV)	1	245	0	54.0(AV)	-34.0

Notes : 1. Margin= Amplitude - Limits

2. Height of table for EUT placed: 0.8 Meter.
3. ANT= Antenna height.
4. Duty= Duty cycle correction factor.
5. Amplitude= Reading Amplitude – Amplifier gain+ Cable loss+ Antenna factor (Auto calculate in spectrum analyzer)
6. Peak Value =>RBW set 1MHz ; VBW set 1MHz
7. average Value=> RBW set 1MHz ; VBW set 10Hz

11. Radiated Emissions Requirements (Above 1GHz)

11.1 General and setup:

Prior to open-field testing, the EUT was placed in a shielded enclosure and scanned at a close distance to determine its emission characteristics. The physical arrangement of the EUT was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude, directivity, and frequency. The exact system configuration which produced the highest emissions was noted so it could be reproduced later during the open field tests. This was done to ensure that the final measurements would demonstrate the worst-case interference potential of the EUT.

Final radiation measurements were made on a three-meter, open-field test site. The EUT system was placed on a nonconductive turntable which was 1.5 meters height, top surface 1.0 x 1.5 meter. During the test, EUT was set to transmit continuously & measurements spectrum range from 30 MHz to 26.5 GHz is investigated.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

A nonconductive material surrounded the EUT to supporting the EUT for standing on tree orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer’s 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvlt (dBuV) into field intensity in microvolts pre meter(uV/m).

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (6.6) for this testing.

The actual field is intensity in decibels referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

Amplitude (dBuV/m)= FI(dBuV)+AF(dBuV)+CL(dBuV)-Gain(dB)

FI= Reading of the field intensity.
AF= Antenna factor.
CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:

(1) For fundamental frequency : Transmitter Output < +30dBm

(2) For spurious frequency : Spurious emission limits = fundamental emission limit /10

11.2 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	US44300422	E4446A	2017/02/16	2018/02/16
2.	TA	Pre Amplifier	RF01	0.10~19.1GHz 60dBm	2017/03/02	2018/03/02
3.	Herotek	Pre Amplifier	30690	A402-417	2017/12/15	2018/12/15
4.	SCHWARZBECK	Horn Antenna	181	BBHA 9170	2017/04/27	2018/04/27
5.	SCHWARZBECK	Horn Antenna	304	BBHA 9120 D	2017/12/13	2018/12/13
6.	Agilent	Spectrum Analyzer	US39240419	E4407B	2017/05/03	2018/05/03
7.	MLT	Pre Amplifier	TA010-190-30	RF03	2017/08/02	2018/08/02

11.3 Test Condition:

EUT tested in accordance with the specifications given by the manufacturer, and exercised in the most unfavorable manner.

Peak Measurement RBW set to 1MHz , VBW set to 1MHz

Average Measurement RBW set to 1MHz , VBW set to 10Hz

The X axial at Pre-test procedure is the worst case, the final result shown on this report is based on this condition.

11.4 Radiated Emissions Limits:

Frequency range (MHz)	Peak (dBuV/m)	Average (dBuV/m)
Above 1000	74	54

11.5 Measurement Data Of Radiated Emissions:

11.5.1 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : **Worst case (X Axis)**(Rate:1M) 2402MHz

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4800.0	78.33	70.52	-28.09	50.24	42.43	74.00	54.00	-23.76	-11.57
7200.0	69.54	58.82	-21.27	48.27	37.55	74.00	54.00	-25.73	-16.45
9615.0	62.18	53.68	-14.90	47.28	38.78	74.00	54.00	-26.72	-15.22

Radiated Emissions (HORIZONTAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4800.0	82.97	74.26	-28.09	54.88	46.17	74.00	54.00	-19.12	-7.83
7200.0	65.46	57.99	-21.27	44.19	36.72	74.00	54.00	-29.81	-17.28
9615.0	62.54	57.12	-14.90	47.64	42.22	74.00	54.00	-26.36	-11.78

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 1.5 Meter.
4.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor
(Auto calculate in spectrum analyzer)
5.The other emission levels were very low against the limit.
6. Pre Amplifier (RF01) Gain :63dB to 69dB
7. Pre Amplifier (30690) Gain :38dB to 50dB

11.5.2 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : (Rate:1M) 2441MHz

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4875.0	76.78	68.12	-28.14	48.64	39.98	74.00	54.00	-25.36	-14.02
7320.0	66.04	56.55	-21.44	44.60	35.11	74.00	54.00	-29.40	-18.89
9765.0	61.71	55.68	-14.63	47.08	41.05	74.00	54.00	-26.92	-12.95

Radiated Emissions (HORIZONTAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4875.0	79.83	70.58	-28.14	51.69	42.44	74.00	54.00	-22.31	-11.56
7320.0	68.03	59.14	-21.44	46.59	37.70	74.00	54.00	-27.41	-16.30
9765.0	58.62	53.60	-14.63	43.99	38.97	74.00	54.00	-30.01	-15.03

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 1.5 Meter.
4.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor
(Auto calculate in spectrum analyzer)
5.The other emission levels were very low against the limit.
6. Pre Amplifier (RF01) Gain :63dB to 69dB
7. Pre Amplifier (30690) Gain :38dB to 50dB

11.5.3 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : (Rate:1M) 2480MHz

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4965.0	68.47	61.43	-28.07	40.40	33.36	74.00	54.00	-33.60	-20.64
7440.0	63.77	54.39	-20.90	42.87	33.49	74.00	54.00	-31.13	-20.51
9915.0	60.58	52.67	-13.63	46.95	39.04	74.00	54.00	-27.05	-14.96

Radiated Emissions (HORIZONTAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4965.0	70.55	61.30	-28.07	42.48	33.23	74.00	54.00	-31.52	-20.77
7440.0	63.57	54.84	-20.90	42.67	33.94	74.00	54.00	-31.33	-20.06
9915.0	58.30	51.83	-13.63	44.67	38.20	74.00	54.00	-29.33	-15.80

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 1.5 Meter.
4.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor
(Auto calculate in spectrum analyzer)
5.The other emission levels were very low against the limit.
6. Pre Amplifier (RF01) Gain :63dB to 69dB
7. Pre Amplifier (30690) Gain :38dB to 50dB

11.5.4 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : **Worst case (X Axis)**(Rate:2M) 2402MHz

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
1064.0	43.49	37.41	-4.92	38.57	32.49	74.00	54.00	-35.43	-21.51
4800.0	72.99	69.57	-28.09	44.90	41.48	74.00	54.00	-29.10	-12.52
10350.0	53.16	48.63	-12.23	40.93	36.40	74.00	54.00	-33.07	-17.60

Radiated Emissions (HORIZONTAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4800.0	76.73	74.52	-28.09	48.64	46.43	74.00	54.00	-25.36	-7.57
7200.0	58.66	53.88	-21.27	37.39	32.61	74.00	54.00	-36.61	-21.39
9600.0	55.82	53.65	-15.03	40.79	38.62	74.00	54.00	-33.21	-15.38

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 1.5 Meter.
4.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor
(Auto calculate in spectrum analyzer)
5.The other emission levels were very low against the limit.
6. Pre Amplifier (RF01) Gain :63dB to 69dB
7. Pre Amplifier (30690) Gain :38dB to 50dB

11.5.5 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : (Rate:2M) 2441MHz

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4875.0	71.42	68.16	-28.14	43.28	40.02	74.00	54.00	-30.72	-13.98
7320.0	62.01	55.48	-21.44	40.57	34.04	74.00	54.00	-33.43	-19.96
9765.0	57.88	53.05	-14.63	43.25	38.42	74.00	54.00	-30.75	-15.58

Radiated Emissions (HORIZONTAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4890.0	76.52	72.69	-28.09	48.43	44.60	74.00	54.00	-25.57	-9.40
7320.0	58.87	56.25	-21.44	37.43	34.81	74.00	54.00	-36.57	-19.19
9765.0	57.44	54.37	-14.63	42.81	39.74	74.00	54.00	-31.19	-14.26

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 1.5 Meter.
4.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor (Auto calculate in spectrum analyzer)
5.The other emission levels were very low against the limit.
6. Pre Amplifier (RF01) Gain :63dB to 69dB
7. Pre Amplifier (30690) Gain :38dB to 50dB

11.5.6 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : (Rate:2M) 2480MHz

Radiated Emissions (VERTICAL)									
Frequency (MHz)	**Read (dBuV/m)**		**Factor**	**Amplitude (dBuV/m)**		**Limits (dBuV/m)**		**Margin (dB)**	
	PK	**AV**		**PK**	**AV**	**PK**	**AV**	**PK**	**AV**
1064.0	43.65	36.95	-4.92	38.73	32.03	74.00	54.00	-35.27	-21.97
4965.0	69.42	64.35	-28.07	41.35	36.28	74.00	54.00	-32.65	-17.72
9915.0	58.18	53.21	-13.63	44.55	39.58	74.00	54.00	-29.45	-14.42

Radiated Emissions (HORIZONTAL)									
Frequency (MHz)	**Read (dBuV/m)**		**Factor**	**Amplitude (dBuV/m)**		**Limits (dBuV/m)**		**Margin (dB)**	
	PK	**AV**		**PK**	**AV**	**PK**	**AV**	**PK**	**AV**
4965.0	72.26	68.58	-28.07	44.19	40.51	74.00	54.00	-29.81	-13.49
7440.0	60.20	57.86	-20.90	39.30	36.96	74.00	54.00	-34.70	-17.04
9915.0	55.99	54.15	-13.63	42.36	40.52	74.00	54.00	-31.64	-13.48

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 1.5 Meter.
4.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor (Auto calculate in spectrum analyzer)
5.The other emission levels were very low against the limit.
6. Pre Amplifier (RF01) Gain :63dB to 69dB
7. Pre Amplifier (30690) Gain :38dB to 50dB

11.5.7 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : **Worst case (X Axis)**(Rate:3M) 2402MHz

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
1064.0	44.53	36.89	-4.92	39.61	31.97	74.00	54.00	-34.39	-22.03
4800.0	75.39	69.26	-28.09	47.30	41.17	74.00	54.00	-26.70	-12.83
9600.0	54.47	52.62	-15.03	39.44	37.59	74.00	54.00	-34.56	-16.41

Radiated Emissions (HORIZONTAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4800.0	78.70	74.97	-28.09	50.61	46.88	74.00	54.00	-23.39	-7.12
7200.0	58.06	53.59	-21.27	36.79	32.32	74.00	54.00	-37.21	-21.68
9615.0	55.27	53.14	-14.90	40.37	38.24	74.00	54.00	-33.63	-15.76

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 1.5 Meter.
4.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor (Auto calculate in spectrum analyzer)
5.The other emission levels were very low against the limit.
6. Pre Amplifier (RF01) Gain :63dB to 69dB
7. Pre Amplifier (30690) Gain :38dB to 50dB

11.5.8 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : (Rate:3M) 2441MHz

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
1062.0	47.03	37.85	-4.92	42.11	32.93	74.00	54.00	-31.89	-21.07
4875.0	71.46	68.22	-28.14	43.32	40.08	74.00	54.00	-30.68	-13.92
9765.0	56.89	52.58	-14.63	42.26	37.95	74.00	54.00	-31.74	-16.05

Radiated Emissions (HORIZONTAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4875.0	75.86	71.52	-28.14	47.72	43.38	74.00	54.00	-26.28	-10.62
7320.0	61.58	55.14	-21.44	40.14	33.70	74.00	54.00	-33.86	-20.30
9765.0	57.54	51.72	-14.63	42.91	37.09	74.00	74.00	-31.09	-36.91

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 1.5 Meter.
4.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor (Auto calculate in spectrum analyzer)
5.The other emission levels were very low against the limit.
6. Pre Amplifier (RF01) Gain :63dB to 69dB
7. Pre Amplifier (30690) Gain :38dB to 50dB

11.5.9 Open Field Radiated Emissions (Subpart C)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following

Test Mode : (Rate:3M) 2480MHz

Radiated Emissions (VERTICAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
1062.0	44.57	37.96	-4.92	39.65	33.04	74.00	54.00	-34.35	-20.96
4965.0	69.95	64.55	-28.07	41.88	36.48	74.00	54.00	-32.12	-17.52
9915.0	57.48	52.30	-13.63	43.85	38.67	74.00	54.00	-30.15	-15.33

Radiated Emissions (HORIZONTAL)									
Frequency (MHz)	Read (dBuV/m)		Factor	Amplitude (dBuV/m)		Limits (dBuV/m)		Margin (dB)	
	PK	AV		PK	AV	PK	AV	PK	AV
4965.0	70.97	69.31	-28.07	42.90	41.24	74.00	54.00	-31.10	-12.76
7440.0	58.50	53.47	-20.90	37.60	32.57	74.00	54.00	-36.40	-21.43
9915.0	55.28	51.40	-13.63	41.65	37.77	74.00	54.00	-32.35	-16.23

Notes : 1.Margin= Amplitude - Limits
2.Distance of Measurement : 3 Meter
3.Height of table for EUT placed: 1.5 Meter.
4.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor (Auto calculate in spectrum analyzer)
5.The other emission levels were very low against the limit.
6. Pre Amplifier (RF01) Gain :63dB to 69dB
7. Pre Amplifier (30690) Gain :38dB to 50dB

12. Antenna Requirements

12.1 Standard Applicable:

For intentional device, according to 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.

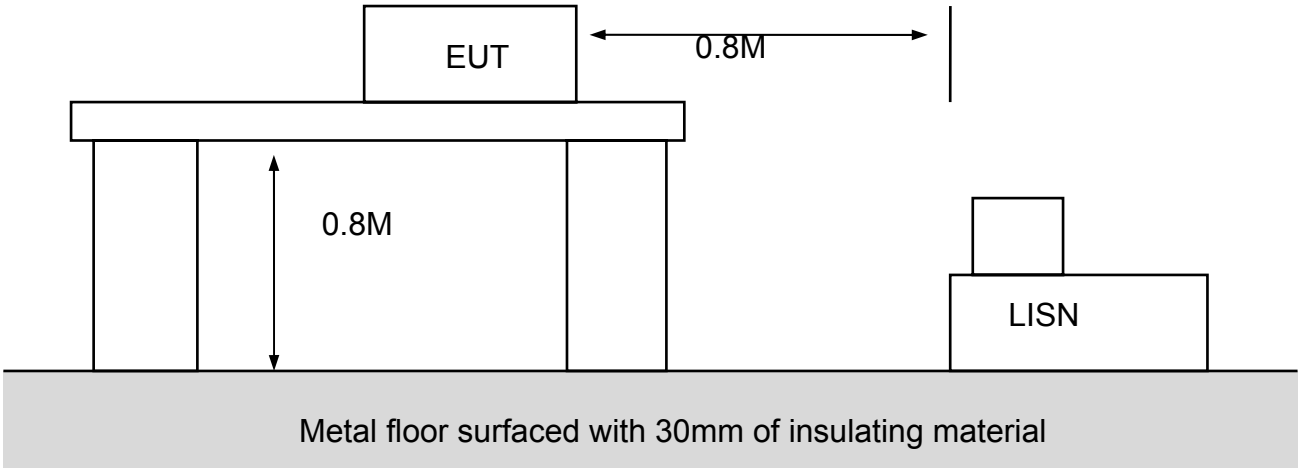
And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

12.2 Antenna Construction:

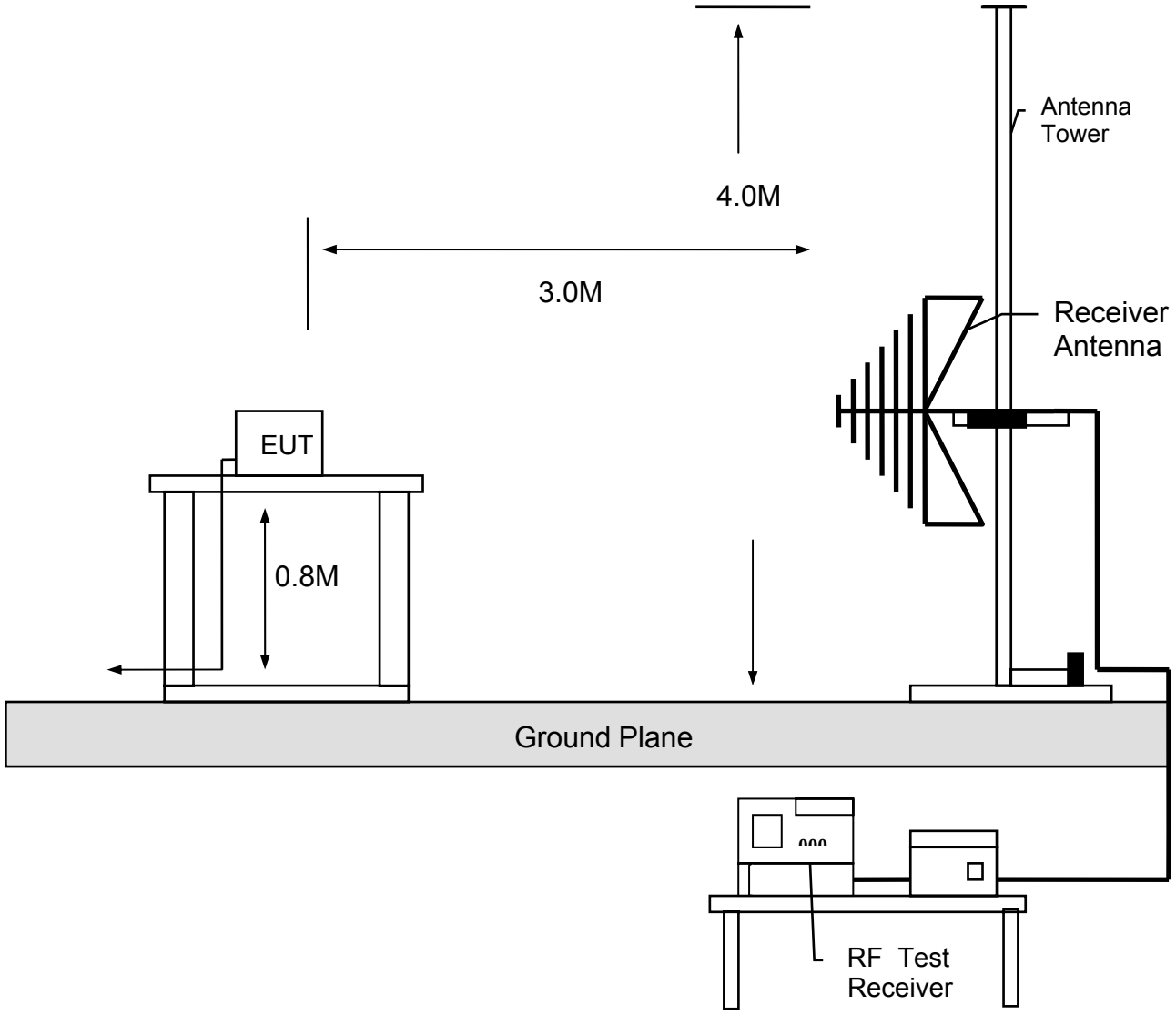
Ant. TYPE	Gain	type of connector
Monopole antenna	-7.24 dBi	Chip

Appendix I - EUT Test Setup

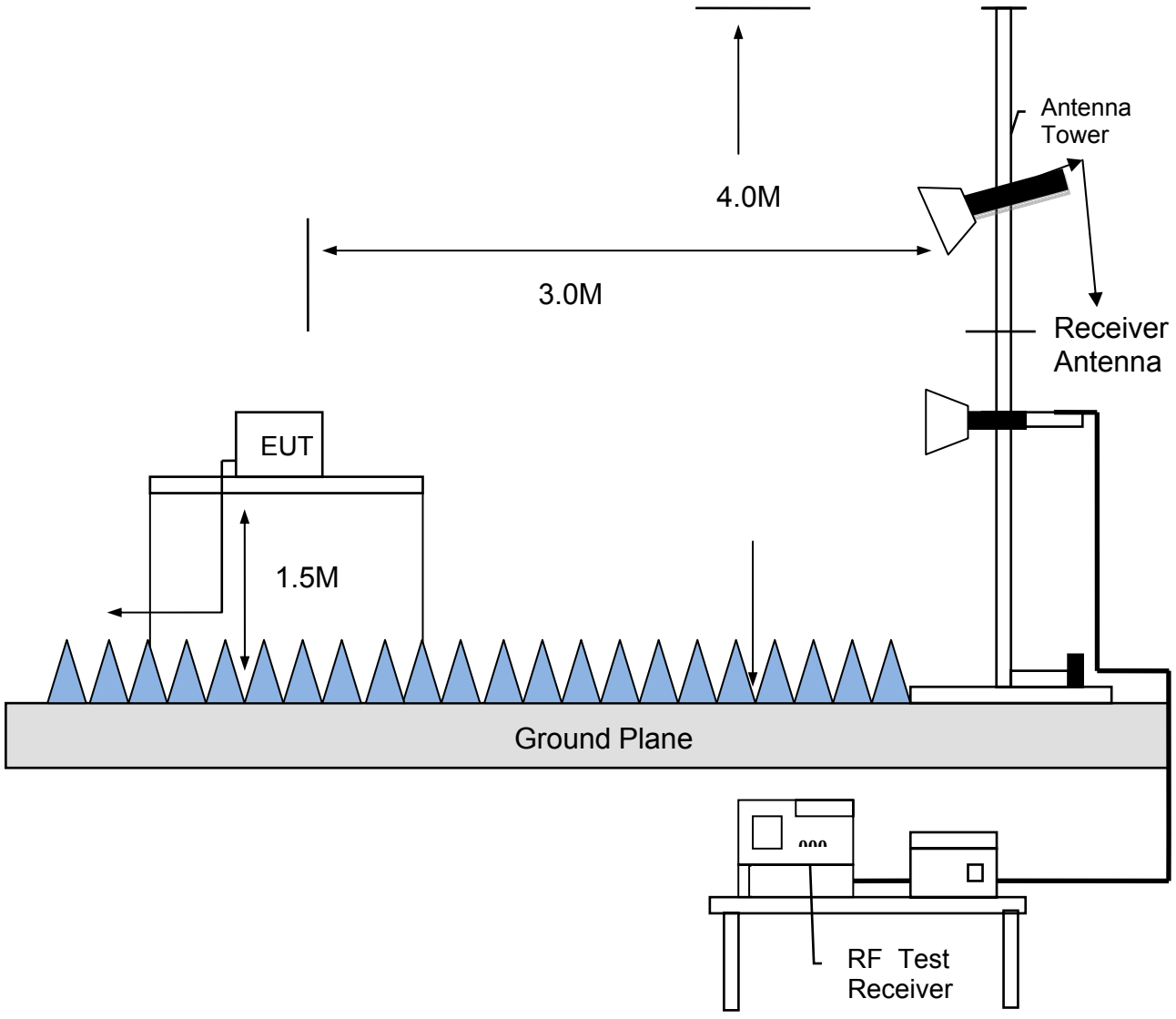
MEASUREMENT OF POWER LINE CONDUCTED RFI VOLTAGE



MEASUREMENT OF RADIATED EMISSION (Below 1GHz)



MEASUREMENT OF RADIATED EMISSION (above > 1GHz)



Appendix II - Brand / Trade Name & Model No. Multiple Listee

Model No.	Trade Name
N/A	N/A