



FCC RADIO TEST REPORT

Applicant : ELITEGROUP COMPUTER SYSTEMS CO., LTD.

Address : No.239, Sec. 2, Tiding Blvd., Neihu Dist, Taipei City 14, Taiwan (R.O.C)

Manufacturer : ELITEGROUP COMPUTER SYSTEMS CO., LTD.

Address : No.239, Sec. 2, Tiding Blvd., Neihu Dist, Taipei City 14, Taiwan (R.O.C)

Equipment : Tablet PC

Model No. : TF10EA2

I HEREBY CERTIFY THAT :

The sample was received on Jul. 29, 2015 and the testing was carried out on Aug. 03, 2015 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Miro Chueh
EMC/RF B.U. Manager

Laboratory Accreditation:

☐ CerpPASS Technology Corporation Test Laboratory

NVLAP LAB Code:	200954-0
TAF LAB Code:	1439

☒ CerpPASS Technology(SuZhou) Co., Ltd.

NVLAP LAB Code:	200814-0
CNAS LAB Code:	L5515



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History of this test report

☒ ORIGINAL

☐ Additional attachment as following record:

Attachment No.	Issue Date	Description



1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.10: 2013

FCC Rules and Regulations Part 15 Subpart C §15.247

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. AC Power Line Conducted Emission	Pass
15.209 15.205	. Spurious Emission(Radiated)	Pass
15.247(d)	. Spurious Emission(Conducted)	Pass
15.247(a)(1)	. Channel Carrier Frequencies Separation	Pass
15.247(a)(1)	. 20dB Bandwidth Measurement	Pass
15.247(a)(1)	. Dwell Time	Pass
15.247(b)	. Number of Hopping Channels	Pass
15.247(b)	. Peak Output Power Measurement Data	Pass

This EUT has been also tested and compiled with the requirement of FCC Part 15, Subpart B, recorded in a separate test report.



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Modulation Type	GFSK, π /4 PSK, 8DPSK
Frequency Range	2.402GHz~2.480GHz
Channel Number	79 channel
RF Output Power	GFSK:3.845dBm 8DPSK:3.727dBm
Antenna Type/ gain	-2.89dBi
Adapter	Model: WB-10E05FB Input: 100-240V~50-60Hz 0.4A max. Output: DC5 V, 2A

Note: 1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.2 Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
*00	2402	20	2422	40	2442	60	2462
01	2403	21	2423	41	2443	61	2463
02	2404	22	2424	42	2444	62	2464
03	2405	23	2425	43	2445	63	2465
04	2406	24	2426	44	2446	64	2466
05	2407	25	2427	45	2447	65	2467
06	2408	26	2428	46	2448	66	2468
07	2409	27	2429	47	2449	67	2469
08	2410	28	2430	48	2450	68	2470
09	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	---	---

Note: Channels remarked * are selected to perform test.



2.3 Test Mode & Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.10
- b. The complete test system included EUT for RF test.
- c. The EUT was executed to keep transmitting and receiving data via Bluetooth.
- d. The following test mode was performed for conduction and radiation test:
GFSK: CH 00: 2402MHz, CH 39: 2441MHz, CH 78: 2480MHz.
8DPSK: CH 00: 2402MHz, CH 39: 2441MHz, CH 78: 2480MHz.

2.4 Description of Test System

No	Device	Manufacturer	Model No.	Description
1	USB Mouse	DELL	OXN967	R41108
2	Notebook	SONY	PCG-71811P	R33021

Use Cable:

No.	Cable	Quantity	Description
A	USB Mouse Cable	1	1.5m Non Shielding
B	Micro USB Cable	1	1.0m Shielding



2.5 General Information of Test

☐	Test Site	Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582
	FCC	TW1079, TW1061,390316, 228391, 641184
	IC	4934B-1, 4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-3428, R-4218 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
☒	Test Site	Cerpass Technology (Suzhou) Co.,Ltd Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China Tel: +86-512-6917-5888 Fax: +86-512-6917-5666
	FCC	916572, 331395
	IC	7290A-1, 7290A-2
	VCCI	T-343 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test G-227 for radiated disturbance above 1GHz
Frequency Range Investigated:		Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 25000MHz
Test Distance:		The test distance of radiated emission from antenna to EUT is 3 M.



3. Test Equipment and Ancillaries Used for Tests

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100564	2015.02.25	2016.02.24
LISN	SCHWARZBECK	NSLK 8127	8127748	2014.10.13	2015.10.12
LISN	SCHWARZBECK	NSLK 8127	8127749	2014.10.13	2015.10.12
Pulse Limiter with 10dB Attenuation	SCHWARZBECK	VTSD 9561-F	9561-F106	2014.10.13	2015.10.12
Temperature/ Humidity Meter	mingle	ETH529	N/A	2015.02.25	2016.02.24
EMI Test Receiver	R&S	ESCI	100853	2015.02.25	2016.02.24
Preamplifier	HP	8447F	3113A05915	2015.02.25	2016.02.24
Preamplifier	FIELD	AFS44-00101800-25-10P-44	1579008	2014.10.14	2015.10.13
Ultra Broadband Antenna	SCHAFFNER	CBL6112D	22241	2015.02.25	2016.02.24
Broad-Band Horn Antenna	Sunol	DRH-118	A072913	2014.10.14	2015.10.13
Spectrum Analyzer	Agilent	E4407B	MY45118947	2015.07.16	2016.07.15
Temperature/ Humidity Meter	mingle	ETH529	N/A	2015.02.25	2016.02.24



4. Antenna Requirements

4.1 Standard Applicable

For intentional device, according to FCC 47 CFR 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.2 Antenna Construction and Directional Gain

Antenna type: PCB Antenna

Antenna Gain: -2.89dBi



5. Test of AC Power Line Conducted Emission

5.1 Test Limit

5.2 Test Procedures

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.10-2013 Section 6.2. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 6.2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

*Decreases with the logarithm of the frequency.

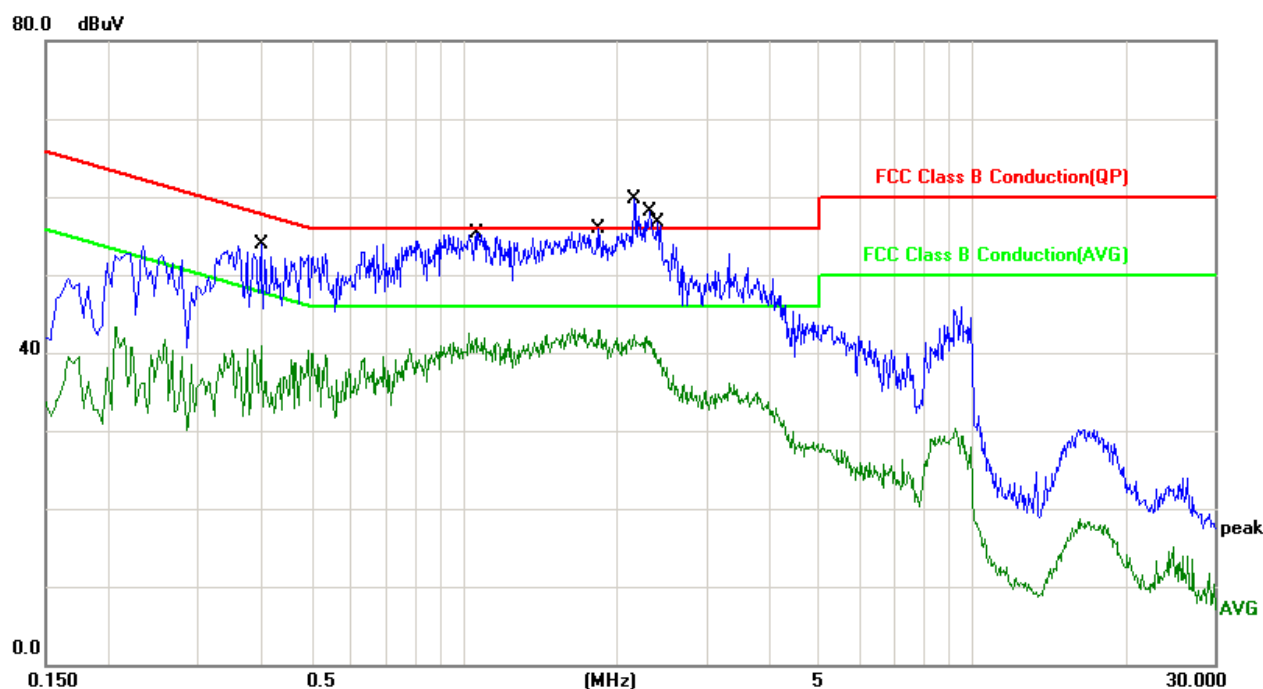
5.3 Test Procedures

The EUT was setup according to ANSI C63.10, 2013 and tested according to DTS test procedure of Oct 2014 KDB558074 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.



5.5 Test Result and Data

Test Mode :	Normal Link	Phase :	Line
Temperature :	20 °C	Humidity:	51%
Pressur(mbar) :	1002	Date:	2015/08/01

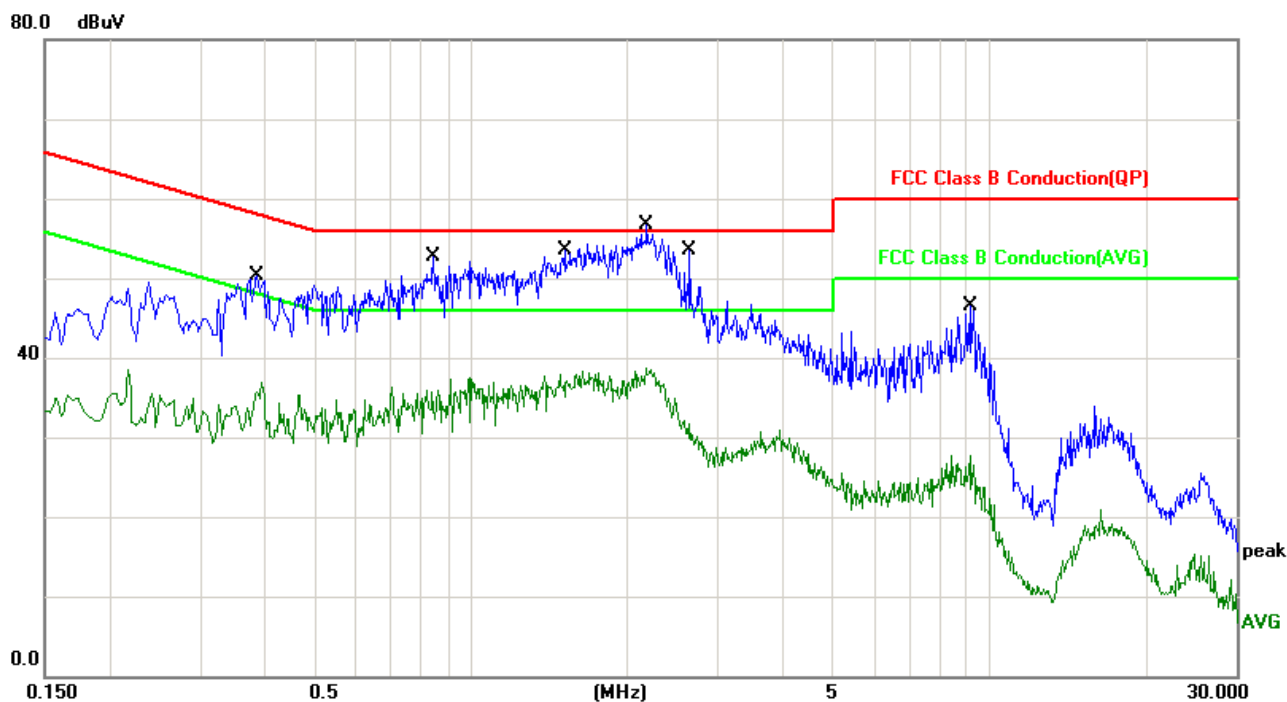


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.3980	10.55	38.30	48.85	57.89	-9.04	QP
2	0.3980	10.55	25.93	36.48	47.89	-11.41	AVG
3	1.0580	10.30	39.45	49.75	56.00	-6.25	QP
4	1.0580	10.30	29.54	39.84	46.00	-6.16	AVG
5	1.8300	10.90	37.60	48.50	56.00	-7.50	QP
6	1.8300	10.90	27.84	38.74	46.00	-7.26	AVG
7	2.1660	10.99	39.65	50.64	56.00	-5.36	QP
8	2.1660	10.99	28.55	39.54	46.00	-6.46	AVG
9	2.3179	10.96	37.69	48.65	56.00	-7.35	QP
10	2.3179	10.96	26.30	37.26	46.00	-8.74	AVG
11	2.4020	10.94	35.56	46.50	56.00	-9.50	QP
12	2.4020	10.94	23.91	34.85	46.00	-11.15	AVG

Note: Measurement Level = Reading Level + Correct Factor+ Attenuator



Test Mode :	Normal Link	Phase :	Neutral
Temperature :	20° C	Humidity :	51%
Pressur(mbar) :	1002	Date :	2015/08/01



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.3860	10.58	35.00	45.58	58.15	-12.57	QP
2	0.3860	10.58	23.54	34.12	48.15	-14.03	AVG
3	0.8460	10.29	36.00	46.29	56.00	-9.71	QP
4	0.8460	10.29	24.38	34.67	46.00	-11.33	AVG
5	1.5140	10.27	37.69	47.96	56.00	-8.04	QP
6	1.5140	10.27	25.15	35.42	46.00	-10.58	AVG
7	2.1820	10.28	40.12	50.40	56.00	-5.60	QP
8	2.1820	10.28	26.21	36.49	46.00	-9.51	AVG
9	2.6460	10.28	32.76	43.04	56.00	-12.96	QP
10	2.6460	10.28	19.39	29.67	46.00	-16.33	AVG
11	9.1740	10.36	23.79	34.15	60.00	-25.85	QP
12	9.1740	10.36	11.71	22.07	50.00	-27.93	AVG

Note: Measurement Level = Reading Level + Correct Factor+ Attenuator



6. Test of Spurious Emission (Radiated)

6.1 Test Limit

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

Frequency (MHz)	Distance Meters	Radiated (μ V / M)	Radiated (dB μ V/ M)
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the above table.

Frequency (MHz)	Distance Meters	Radiated (dB μ V/ M)
30-230	10	30
230-1000	10	37



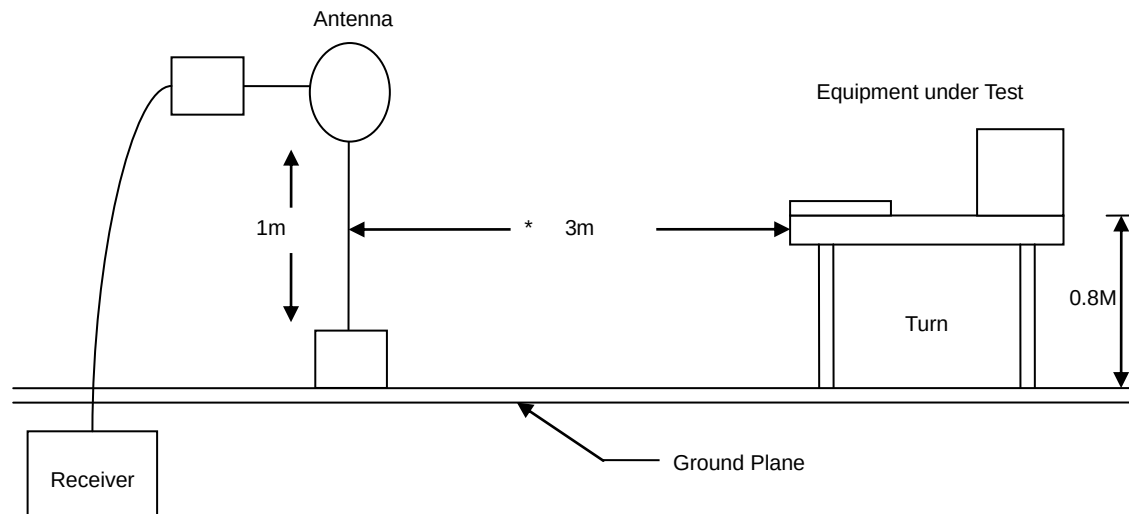
6.2 Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter for frequency below 1GHz and 1.5meter for frequency above 1GHz above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. 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.

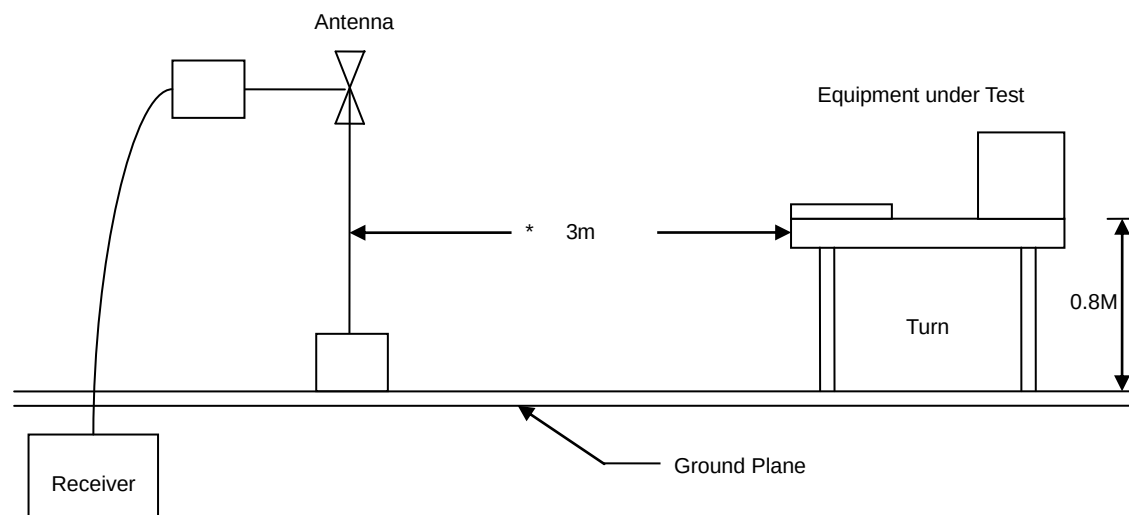


6.3 Typical Test Setup

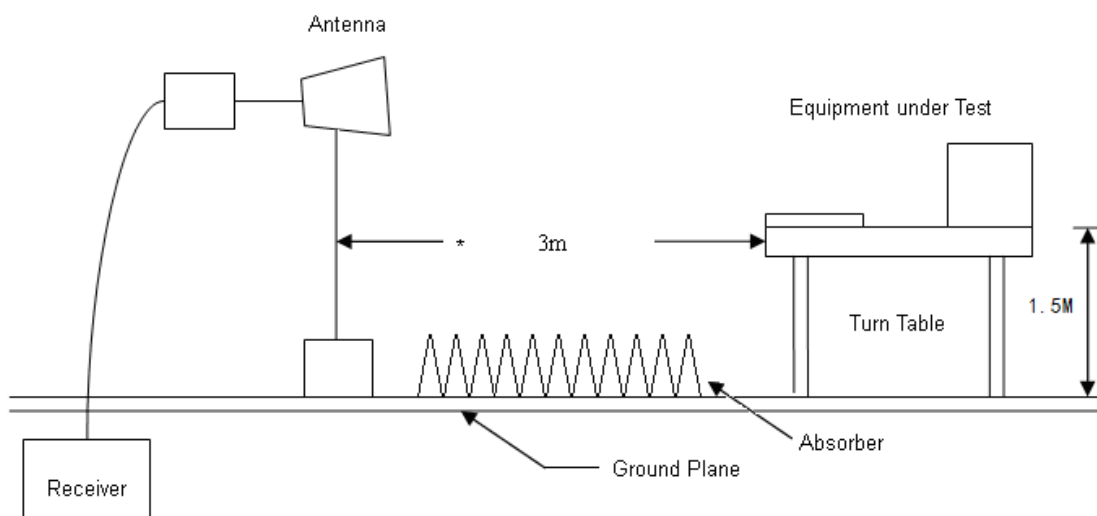
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup





6.4 Test Result and Data

The 9kHz-30MHz spurious emission is under limit 20dB more.

6.4.1 Test Result and Data of Transmitter

Below 1GHz

Engineer :Amos	
Site : EMC Lab AC 102	Time : 2015/08/01
Limit : FCC_CLASS_B_03M_QP	Margin : 6
EUT : TF10EA2	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	Note : Normal Link

Frequency (MHz)	AntPol. H/V	Correct Factor (dB)	Reading level (dBuV)	Measure Level (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)	Detector mode (PK/QP)
188.1100	H	-10.49	44.24	33.75	43.50	-9.75	QP
441.2800	H	-3.94	35.74	31.80	46.00	-14.20	QP
469.4100	H	-1.62	32.11	30.49	46.00	-15.51	QP
504.3300	H	-2.30	32.50	30.20	46.00	-15.80	QP
601.3300	H	-1.09	33.07	31.98	46.00	-14.02	QP
800.1800	H	0.37	34.53	34.90	46.00	-11.10	QP
33.8800	V	-5.41	37.26	31.85	40.00	-8.15	QP
51.3400	V	-14.25	46.29	32.04	40.00	-7.96	QP
133.7899	V	-9.38	44.51	35.13	43.50	-8.37	QP
189.0800	V	-10.38	40.03	29.65	43.50	-13.85	QP
469.4100	V	-1.62	34.95	33.33	46.00	-12.67	QP
601.3300	V	-1.09	34.40	33.31	46.00	-12.69	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

**Above 1GHz**

Site : EMC Lab AC 102	Time : 2015-08-02
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Test mode: Transmit by GFSK(1M) 2402MHz	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	

VERTICAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1637.500	-6.82	54.53	47.71	74.00	-26.29	peak
2	2190.000	-3.91	51.65	47.74	74.00	-26.26	peak
3	3167.500	1.65	45.58	47.23	74.00	-26.77	peak
4	5037.500	8.63	39.30	47.93	74.00	-26.07	peak
5	5802.500	9.77	36.41	46.18	74.00	-27.82	peak
6	7120.000	12.55	37.84	50.39	74.00	-23.61	peak

HORIZONTAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1170.000	-10.62	52.52	41.90	74.00	-32.10	peak
2	1637.500	-6.82	50.58	43.76	74.00	-30.24	peak
3	2445.000	-2.82	48.77	45.95	74.00	-28.05	peak
4	3762.500	4.30	38.63	42.93	74.00	-31.07	peak
5	4655.000	7.95	37.72	45.67	74.00	-28.33	peak
6	5632.500	9.35	35.29	44.64	74.00	-29.36	peak

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



Site : EMC Lab AC 102	Time : 2015-08-02
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Test mode: Transmit by GFSK(1M) 2441MHz	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	

VERTICAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1127.500	-11.01	50.75	39.74	74.00	-34.26	peak
2	1850.000	-5.59	52.08	46.49	74.00	-27.51	peak
3	2870.000	-0.10	45.18	45.08	74.00	-28.92	peak
4	4527.500	7.71	38.46	46.17	74.00	-27.83	peak
5	4697.500	8.03	39.58	47.61	74.00	-26.39	peak
6	6270.000	10.37	38.36	48.73	74.00	-25.27	peak

HORIZONTAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1637.500	-6.82	53.89	47.07	74.00	-26.93	peak
2	2912.500	0.18	46.99	47.17	74.00	-26.83	peak
3	3550.000	3.57	41.18	44.75	74.00	-29.25	peak
4	4485.000	7.58	37.23	44.81	74.00	-29.19	peak
5	5037.500	8.63	39.00	47.63	74.00	-26.37	peak
6	5845.000	9.88	38.57	48.45	74.00	-25.55	peak

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



Site : EMC Lab AC 102	Time : 2015-08-02
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Test mode: Transmit by GFSK(1M) 2480MHz	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	

VERTICAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1510.000	-7.55	49.36	41.81	74.00	-32.19	peak
2	1637.500	-6.82	51.65	44.83	74.00	-29.17	peak
3	2020.000	-4.64	50.65	46.01	74.00	-27.99	peak
4	2147.500	-4.10	50.07	45.97	74.00	-28.03	peak
5	3805.000	4.44	40.81	45.25	74.00	-28.75	peak
6	4952.500	8.51	39.57	48.08	74.00	-25.92	peak

HORIZONTAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2020.000	-4.64	49.65	45.01	74.00	-28.99	peak
2	2275.000	-3.55	48.35	44.80	74.00	-29.20	peak
3	2870.000	-0.10	44.77	44.67	74.00	-29.33	peak
4	3762.500	4.30	38.48	42.78	74.00	-31.22	peak
5	5037.500	8.63	39.13	47.76	74.00	-26.24	peak
6	6227.500	10.35	38.36	48.71	74.00	-25.29	peak

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



Site : EMC Lab AC 102	Time : 2015-08-02
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Test mode: Transmit by 8DPSK(3M) 2402MHz	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	

VERTICAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1595.000	-7.06	51.12	44.06	74.00	-29.94	peak
2	2487.500	-2.63	46.04	43.41	74.00	-30.59	peak
3	3465.000	3.22	42.32	45.54	74.00	-28.46	peak
4	4145.000	5.85	41.59	47.44	74.00	-26.56	peak
5	4867.500	8.35	39.19	47.54	74.00	-26.46	peak
6	5802.500	9.77	36.53	46.30	74.00	-27.70	peak

HORIZONTAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1637.500	-6.82	53.20	46.38	74.00	-27.62	peak
2	2232.500	-3.73	52.40	48.67	74.00	-25.33	peak
3	2955.000	0.47	43.28	43.75	74.00	-30.25	peak
4	3847.500	4.59	39.28	43.87	74.00	-30.13	peak
5	4612.500	7.87	38.17	46.04	74.00	-27.96	peak
6	5250.000	8.81	39.06	47.87	74.00	-26.13	peak

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



Site : EMC Lab AC 102	Time : 2015-08-02
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Test mode: Transmit by 8DPSK(3M) 2441MHz	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	

VERTICAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1467.500	-7.91	47.63	39.72	74.00	-34.28	peak
2	2105.000	-4.28	48.78	44.50	74.00	-29.50	peak
3	2955.000	0.47	45.31	45.78	74.00	-28.22	peak
4	3635.000	3.86	42.57	46.43	74.00	-27.57	peak
5	4187.500	6.07	40.53	46.60	74.00	-27.40	peak
6	5717.500	9.56	36.72	46.28	74.00	-27.72	peak

HORIZONTAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1637.500	-6.82	51.02	44.20	74.00	-29.80	peak
2	2232.500	-3.73	49.03	45.30	74.00	-28.70	peak
3	2572.500	-2.09	46.58	44.49	74.00	-29.51	peak
4	3592.500	3.72	42.78	46.50	74.00	-27.50	peak
5	4570.000	7.79	37.12	44.91	74.00	-29.09	peak
6	5717.500	9.56	36.41	45.97	74.00	-28.03	peak

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



Site : EMC Lab AC 102	Time : 2015-08-02
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Test mode: Transmit by 8DPSK(3M) 2480MHz	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	

VERTICAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1382.500	-8.68	53.91	45.23	74.00	-28.77	peak
2	1765.000	-6.08	51.61	45.53	74.00	-28.47	peak
3	2232.500	-3.73	51.07	47.34	74.00	-26.66	peak
4	3082.500	1.20	43.71	44.91	74.00	-29.09	peak
5	4315.000	6.72	35.82	42.54	74.00	-31.46	peak
6	5207.500	8.77	38.02	46.79	74.00	-27.21	peak

HORIZONTAL

No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	1637.500	-6.82	53.34	46.52	74.00	-27.48	peak
2	2232.500	-3.73	50.47	46.74	74.00	-27.26	peak
3	2870.000	-0.10	47.66	47.56	74.00	-26.44	peak
4	4187.500	6.07	42.07	48.14	74.00	-25.86	peak
5	4442.500	7.37	40.04	47.41	74.00	-26.59	peak
6	5547.500	9.14	38.34	47.48	74.00	-26.52	peak

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



6.5 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz



6.6 Restrict band emission Measurement Data

Test Date : Aug. 02, 2015

Temperature : 25°C

Humidity : 55%

Atmospheric Pressure : 1020 hPa

Modulation Standard: GFSK

Channel 0 Fundamental Frequency: 2402 MHz

VERTICAL

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2390.000	-3.05	45.13	42.08	74.00	-31.92	peak
2	2390.000	-3.05	33.15	30.10	54.00	-23.90	AVG

HORIZONTAL

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2390.000	-3.05	43.98	40.93	74.00	-33.07	peak
2	2390.000	-3.05	34.25	31.20	54.00	-22.80	AVG

Channel 78 Fundamental Frequency: 2480 MHz

VERTICAL

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2483.500	-2.65	61.00	58.35	74.00	-15.65	peak
2	2483.500	-2.65	51.88	49.23	54.00	-4.77	AVG

HORIZONTAL

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2483.500	-2.65	56.28	53.63	74.00	-20.37	peak
2	2483.500	-2.65	46.59	43.94	54.00	-10.06	AVG



Modulation Standard: 8DPSK

Channel 0 Fundamental Frequency: 2402 MHz

VERTICAL

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2390.000	-3.05	44.13	41.08	74.00	-32.92	peak
2	2390.000	-3.05	31.69	28.64	54.00	-25.36	AVG

HORIZONTAL

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2390.000	-3.05	43.98	40.93	74.00	-33.07	peak
2	2390.000	-3.05	31.06	28.01	54.00	-25.99	AVG

Channel 78 Fundamental Frequency: 2480 MHz

VERTICAL

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2483.500	-2.65	62.00	59.35	74.00	-14.65	peak
2	2483.500	-2.65	53.26	50.61	54.00	-3.39	AVG

HORIZONTAL

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
1	2483.500	-2.65	56.28	53.63	74.00	-20.37	peak
2	2483.500	-2.65	43.26	40.61	54.00	-13.39	AVG

Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz



7. Test of Spurious Emission (Conducted)

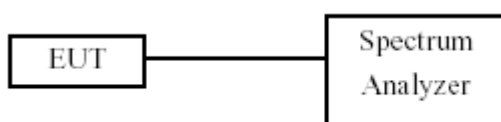
7.1 Test Limit

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

7.2 Test Procedure

- The transmitter output was connected to the spectrum analyzer via a low lose cable.
- Set both RBW and VBW of spectrum analyzer to 100 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
- The band edges was measured and recorded.

7.3 Test Setup Layout



7.4 Test Result and Data

Test Date: Aug. 02, 2015

Temperature: 25°C

Atmospheric pressure: 1020 hPa

Humidity: 55%

1M

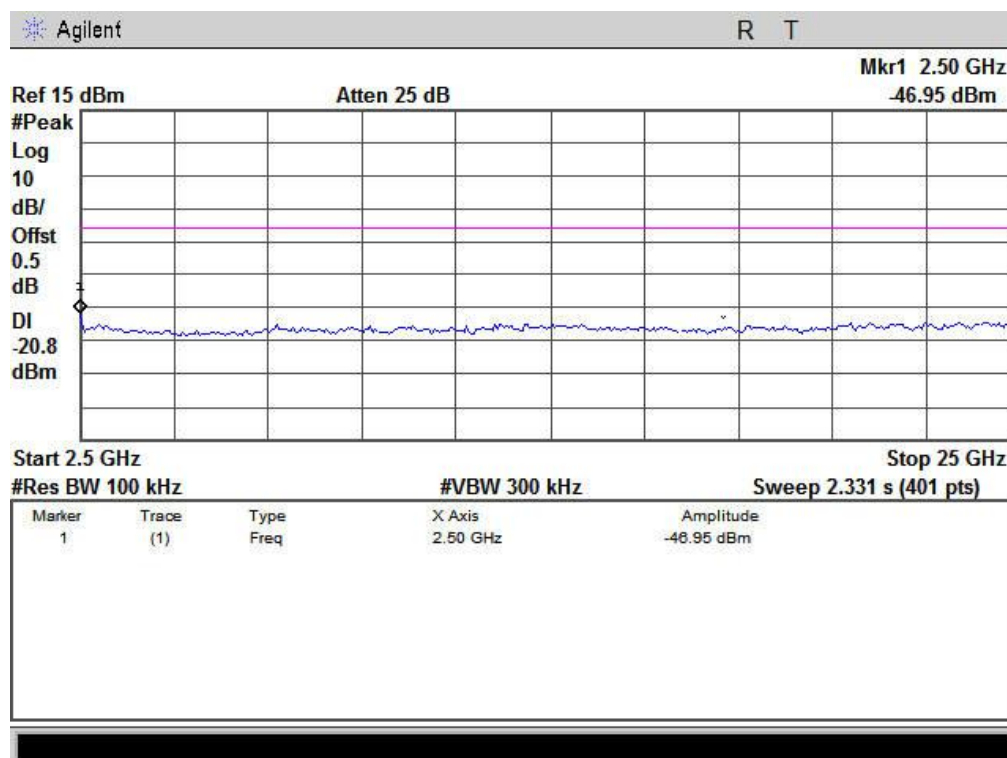
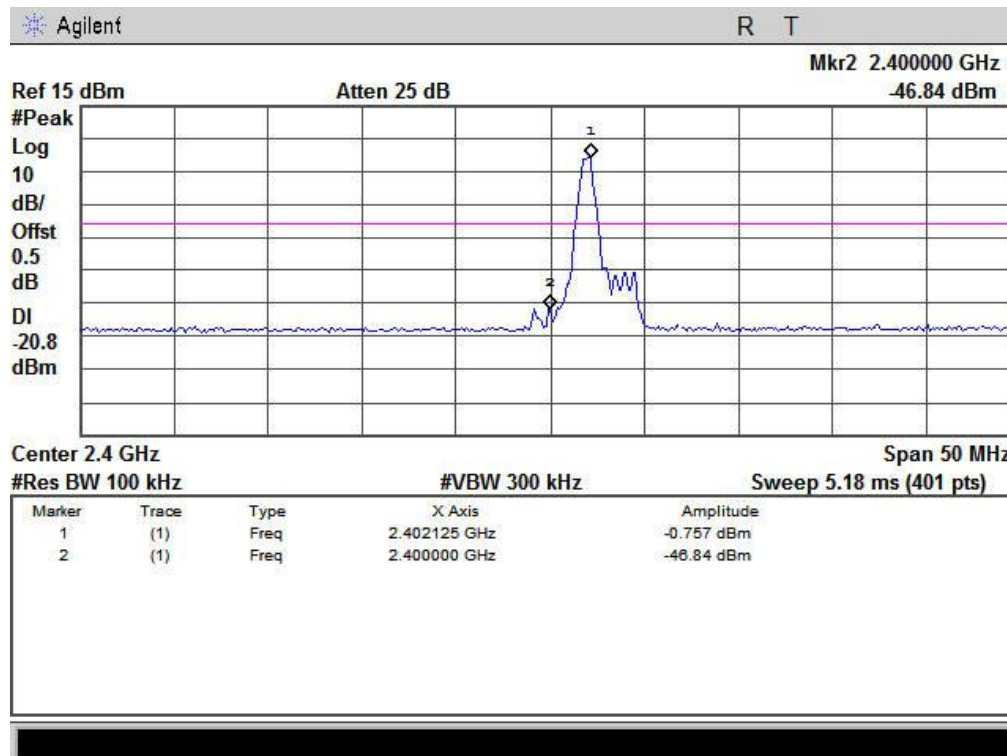
Channel	Frequency	maximum value in frequency (MHz)	maximum value is (dBm)
00	2402	2400.00	-46.84
78	2480	4592.00	-45.92

3M

Channel	Frequency	maximum value in frequency (MHz)	maximum value is (dBm)
00	2402	2370.00	-49.85
78	2480	2620.00	-48.27

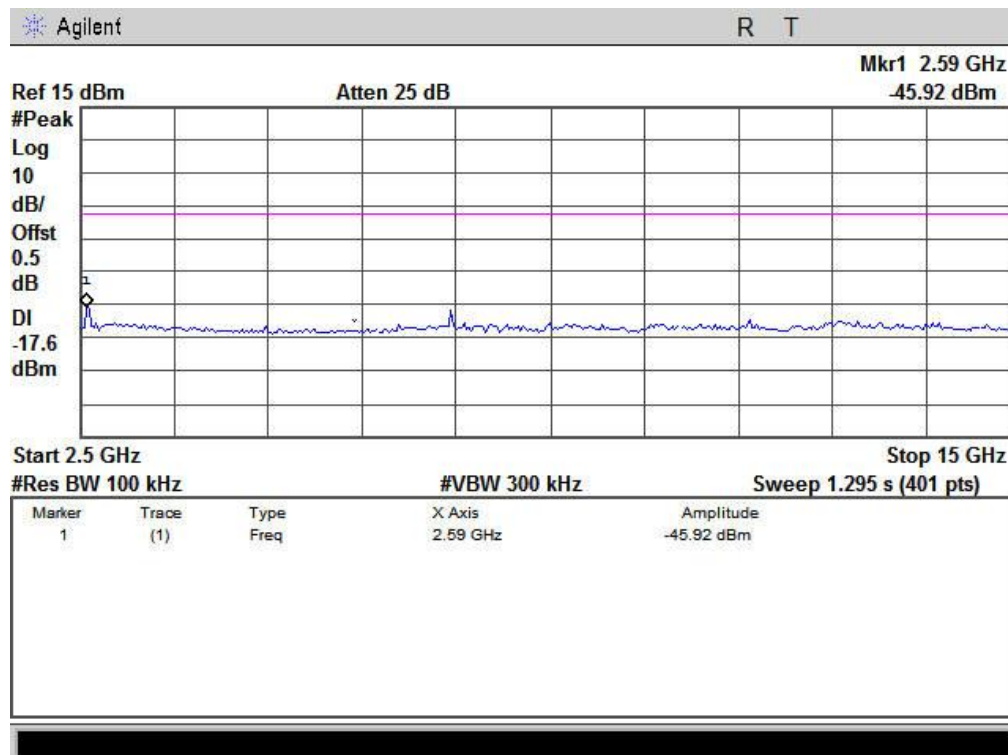
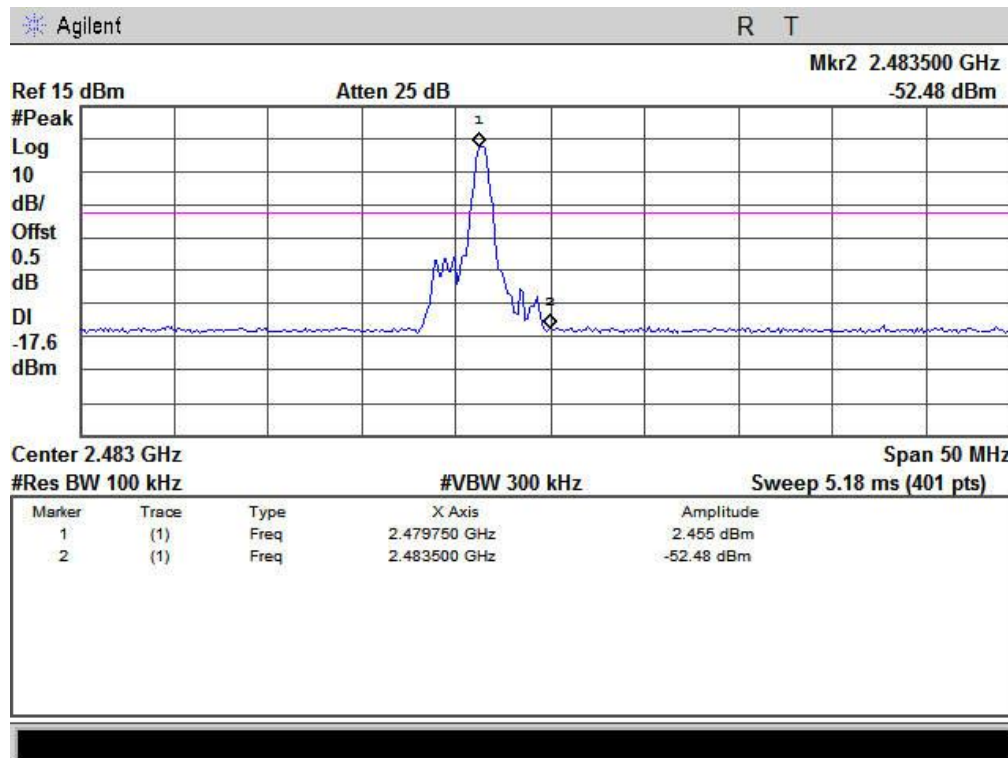


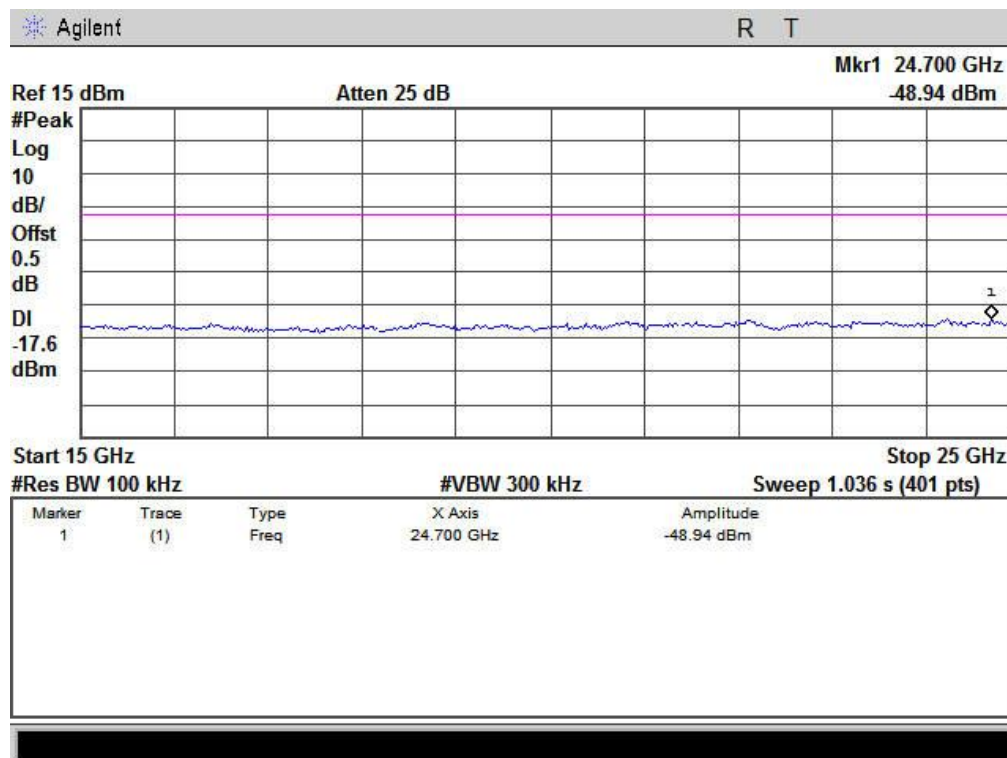
Modulation Standard: GFSK (1Mbps)
Channel: 00





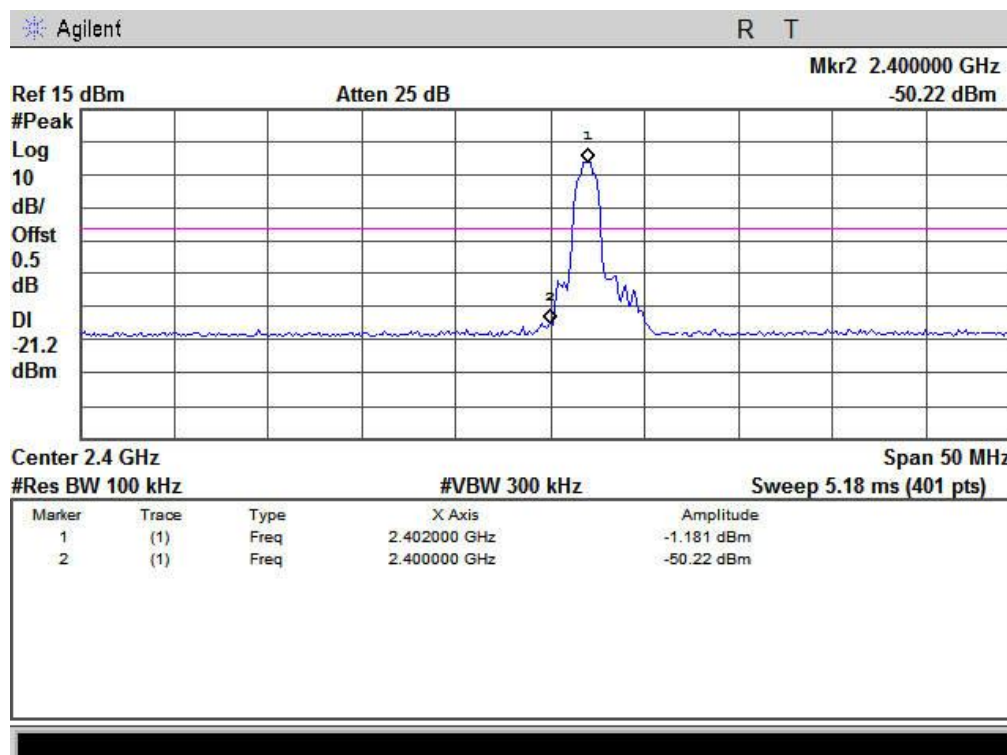
Modulation Standard: GFSK (1Mbps)
Channel: 78

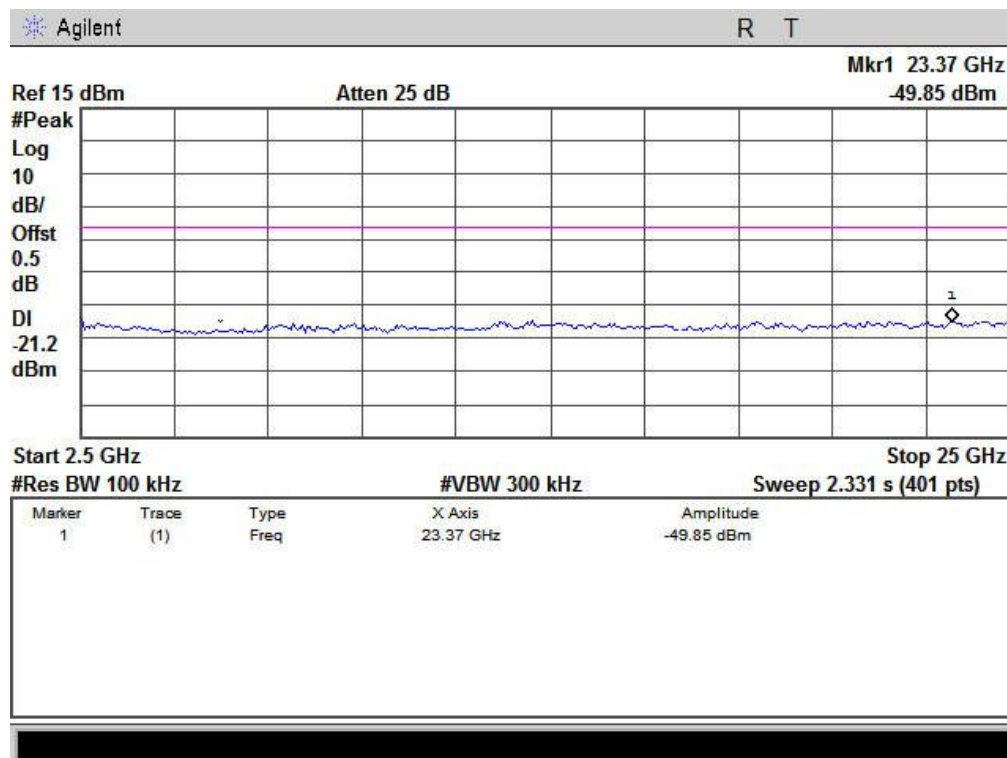




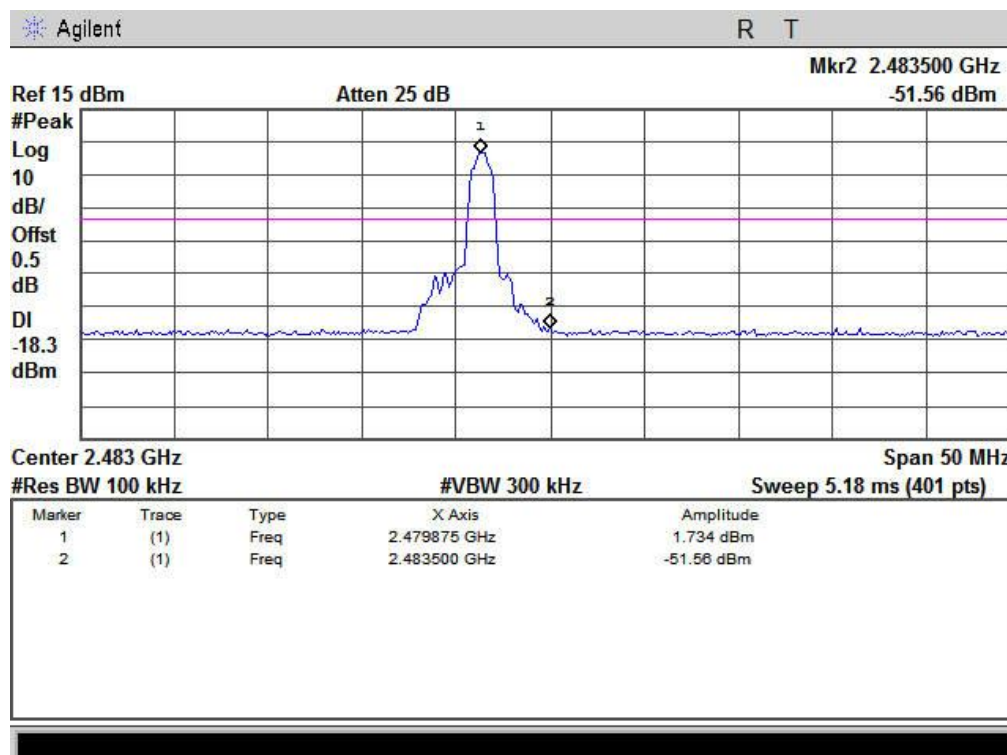
Modulation Standard: 8DPSK (3Mbps)

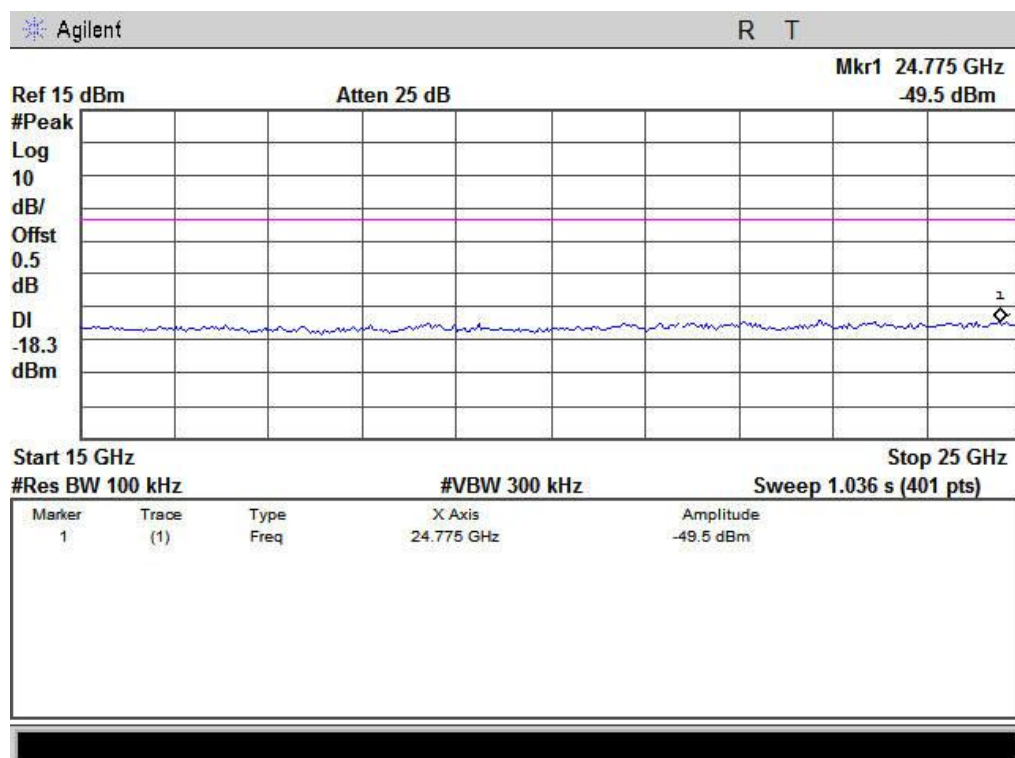
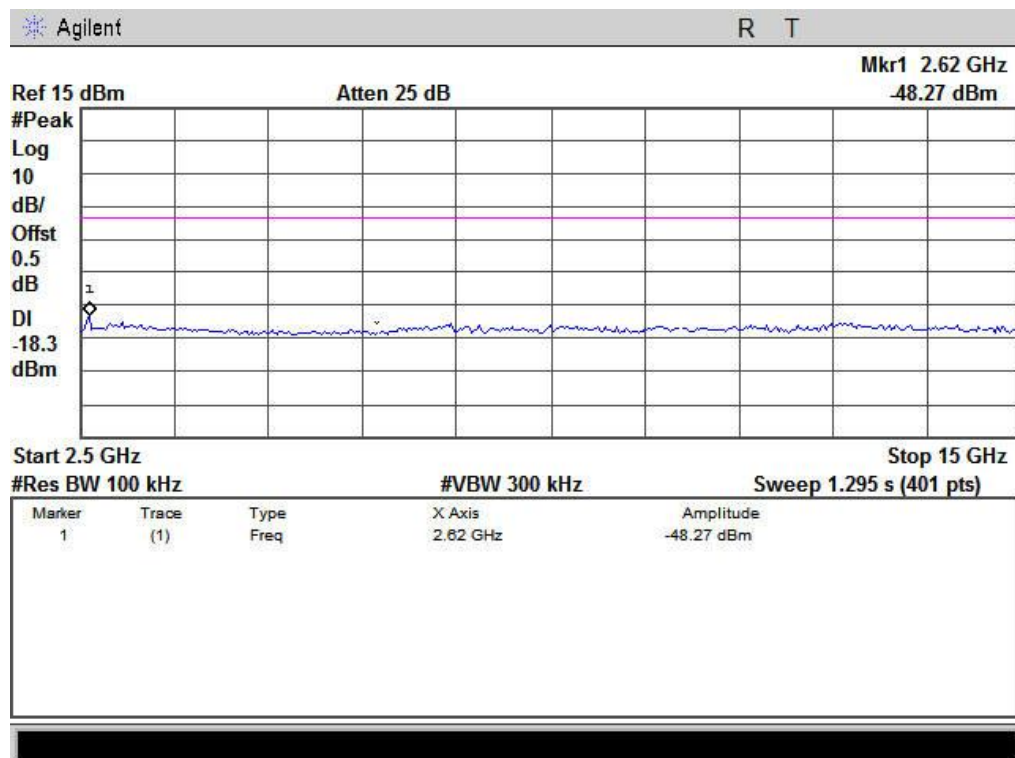
Channel: 00





Modulation Standard: 8DPSK (3Mbps)
Channel: 78







8. 20dB Bandwidth Measurement Data

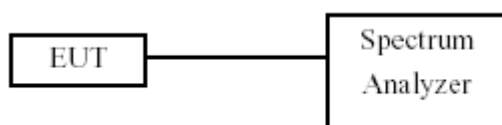
8.1 Test Limit

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

8.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 30 KHz and VBW to 100 KHz.
- The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

8.3 Test Setup Layout



8.4 Test Result and Data

Test Date: Aug. 02, 2015

Temperature: 25°C

Atmospheric pressure: 1020 hPa

Humidity: 55%

1M

Channel	Frequency (MHz)	20dB Bandwidth (KHz)	2/3 20dB Bandwidth(KHz)
00	2402	925.595	617.063
39	2441	892.824	595.216
78	2480	890.775	593.85

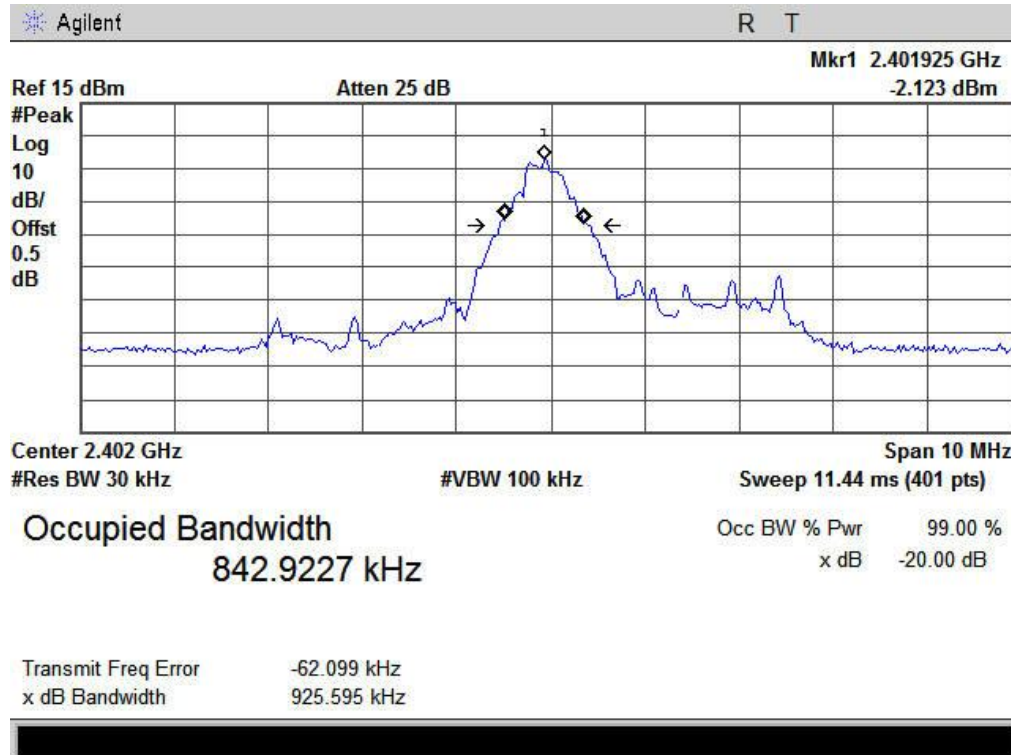
3M

Channel	Frequency (MHz)	20dB Bandwidth (KHz)	2/3 20dB Bandwidth(KHz)
00	2402	1236.00	824.00
39	2441	1250.00	833.33
78	2480	1285.00	856.67



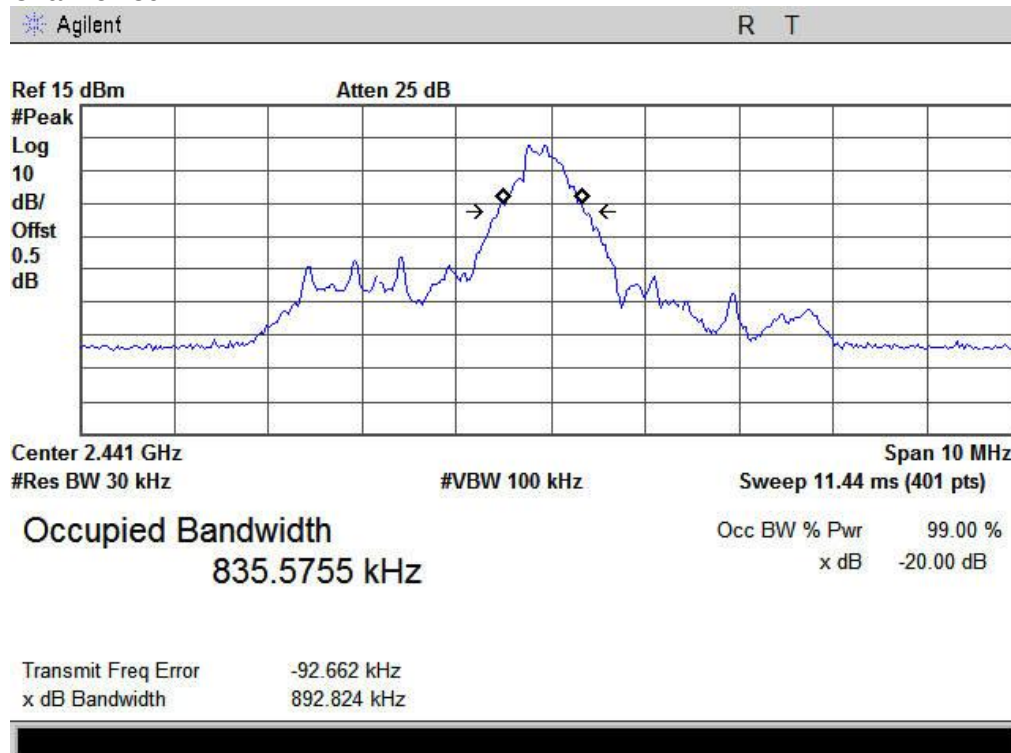
Modulation Standard: GFSK (1Mbps)

Channel: 00



Modulation Standard: GFSK (1Mbps)

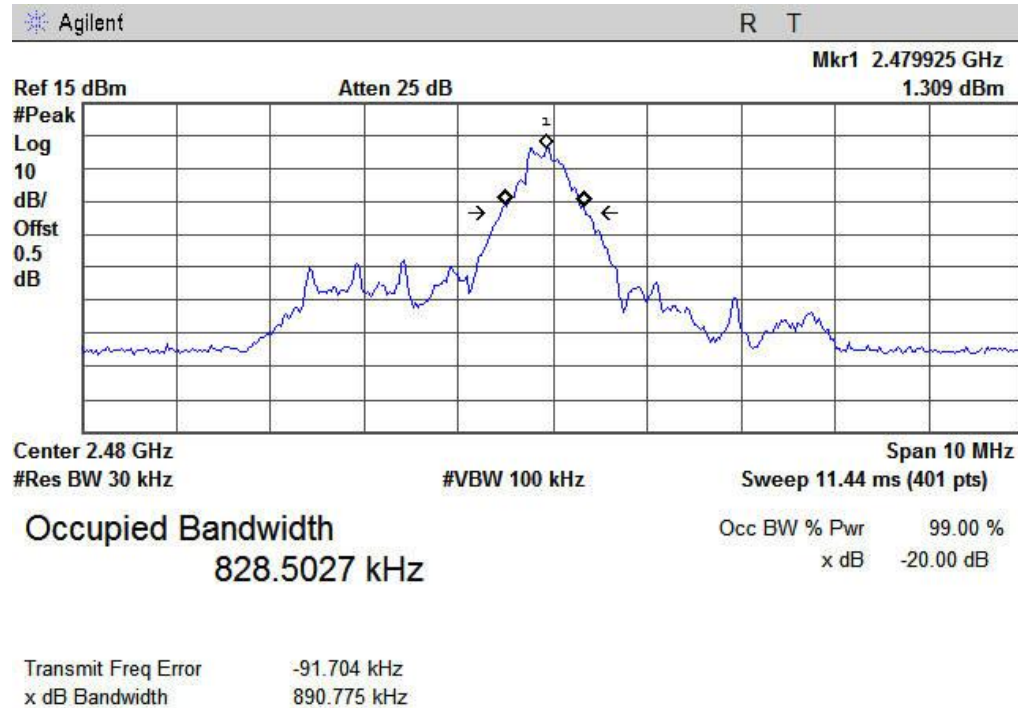
Channel: 39





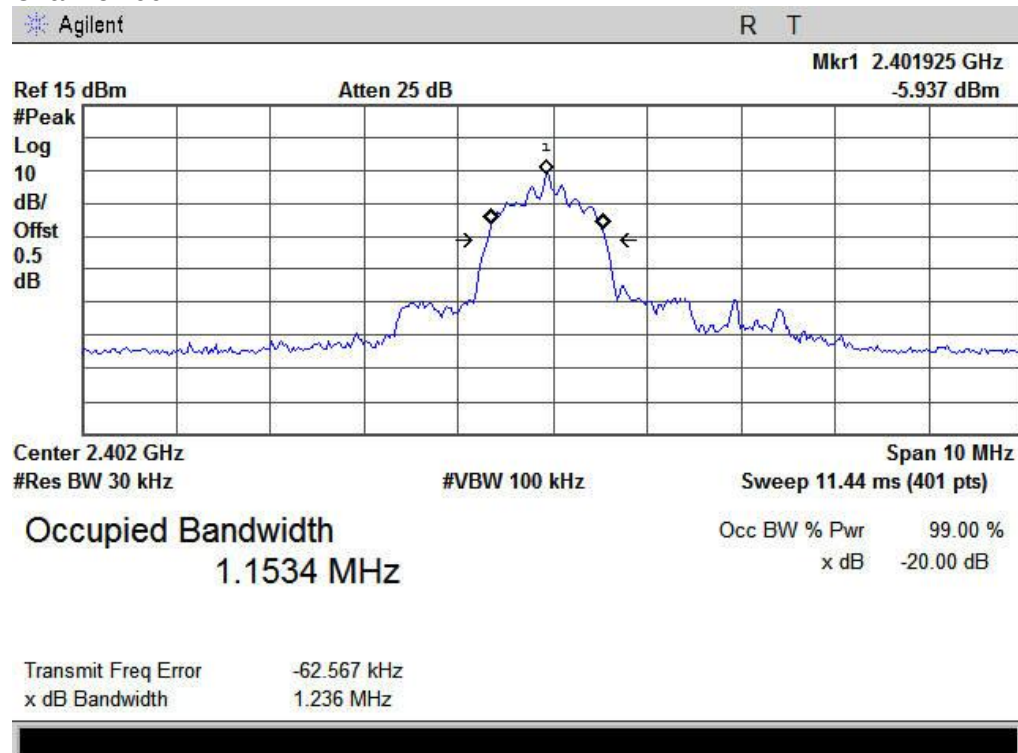
Modulation Standard: GFSK (1Mbps)

Channel: 78



Modulation Standard: 8DPSK (3Mbps)

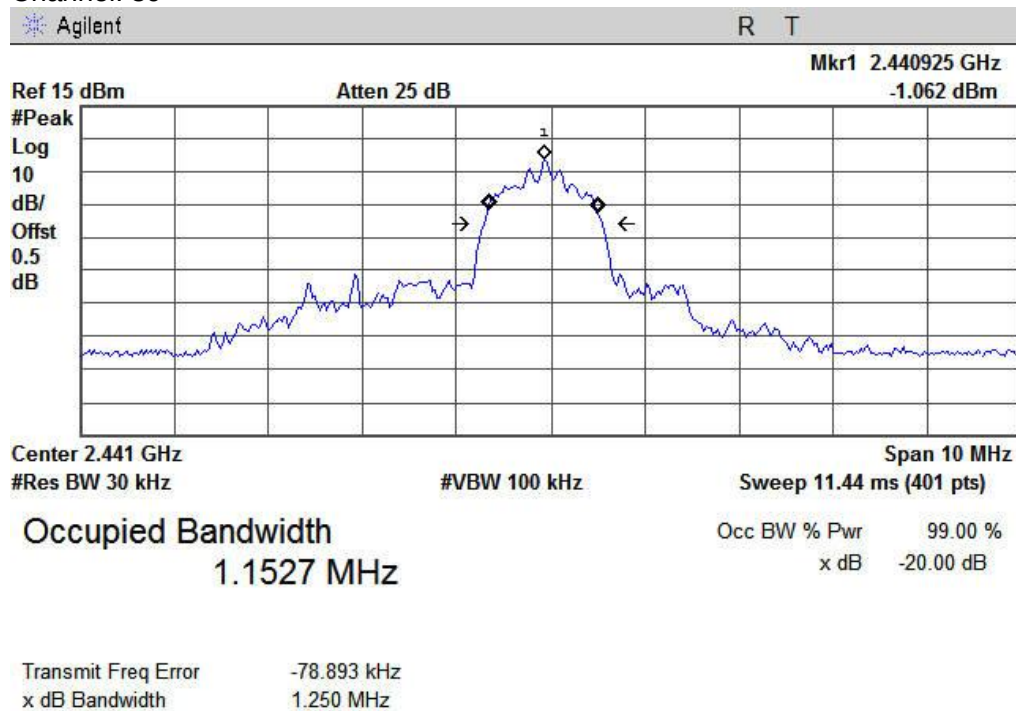
Channel: 00





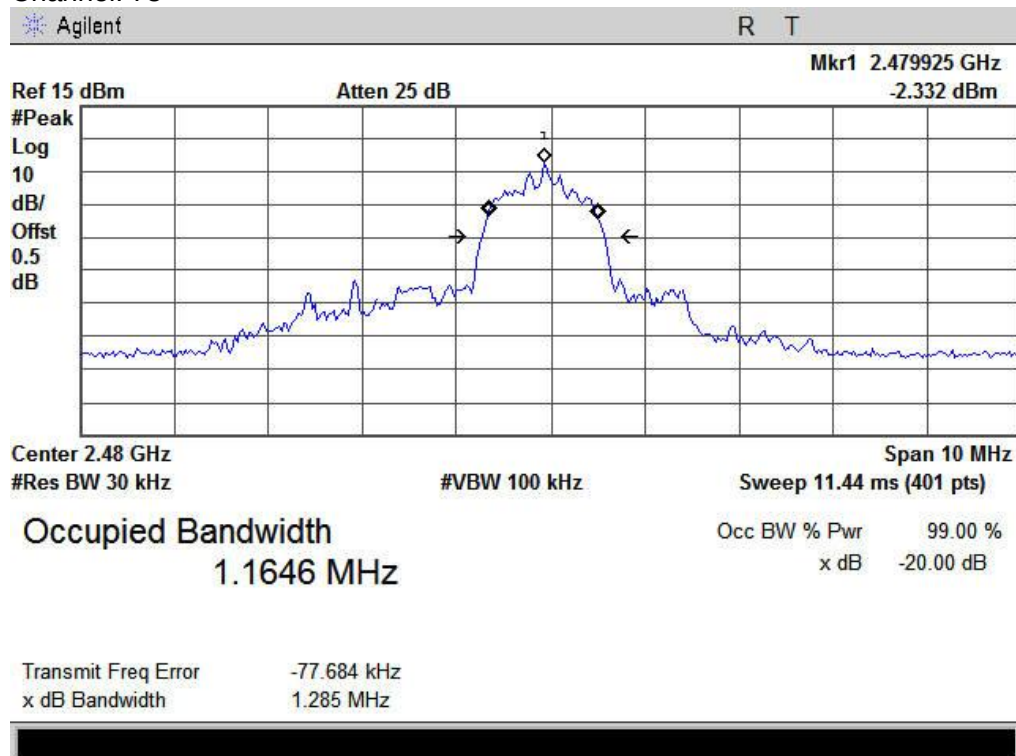
Modulation Standard: 8DPSK (3Mbps)

Channel: 39



Modulation Standard: 8DPSK (3Mbps)

Channel: 78





9. Frequencies Separation

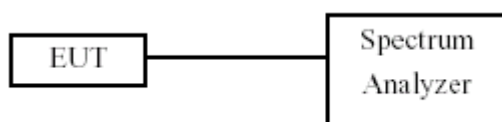
9.1 Test Limit

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

9.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 30 KHz and VBW to 100 KHz.
- By using the MaxHold function record the separation of two adjacent channels.
- Measure the frequency difference of these two adjacent channels.

9.3 Test Setup Layout



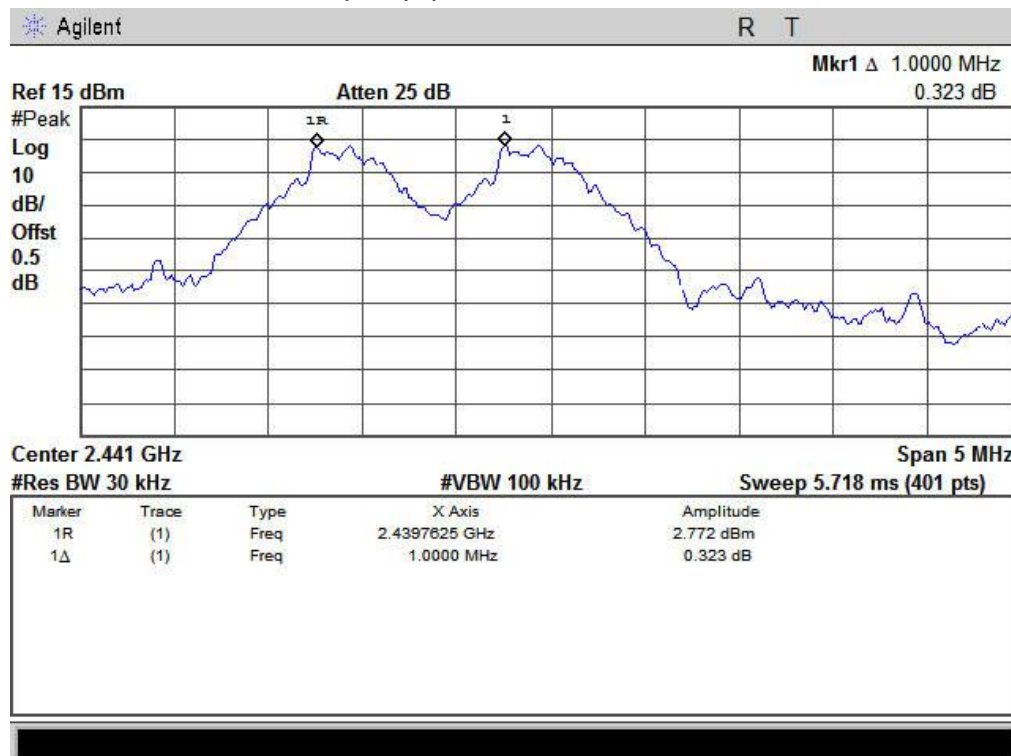
9.4 Test Result and Data

Test Date : Aug. 01, 2015 Temperature : 23°C
Atmospheric pressure : 1087 hPa Humidity : 54%

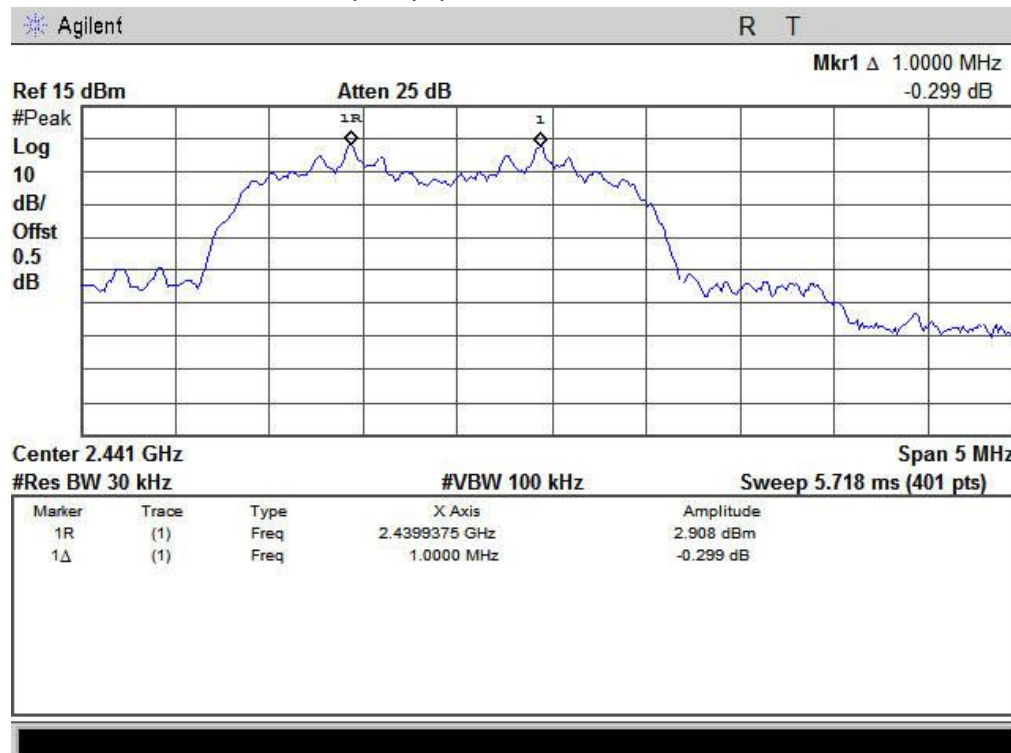
Modulation Type	Channel	Frequency (MHz)	Channel Separation (MHz)
GFSK	00	2402	1.000
	39	2441	1.000
	78	2480	1.000
8DPSK	00	2402	1.000
	39	2441	1.000
	78	2480	1.000



Modulation Standard: GFSK (1Mbps)



Modulation Standard: 8DPSK (3Mbps)





10. Dwell Time on each channel

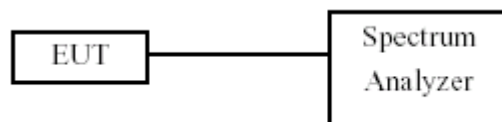
10.1 Test Limit

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

10.2 Test Procedures

1. The transmitter output was connected to the spectrum analyzer.
2. Adjust the center frequency to measure frequency, then set zero span mode.
2. Set RBW of spectrum analyzer to 1 MHz and VBW to 1 MHz.
4. Measure the time duration of one transmission on the measured frequency.

10.3 Test Setup Layout





10.4 Test Result and Data

Test Date: Aug. 01, 2015

Temperature: 25°C

Atmospheric pressure: 1020 hPa

Humidity: 55%

GFSK

DH 1

$0.39 * (1600/2)/79 * 31.6 = 124.80 \text{ (ms)}$

Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
0.39	124.80	31.60	400	PASS

DH 3

$1.64 * (1600/4)/79 * 31.6 = 262.40 \text{ (ms)}$

Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
1.64	262.40	31.60	400	PASS

DH 5

$2.90 * (1600/6)/79 * 31.6 = 309.33 \text{ (ms)}$

Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
0.16	309.33	31.60	400	PASS



8DPSK

DH 1

$$0.41 * (1600/2)/79 * 31.6 = 131.20 \text{ (ms)}$$

Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
0.41	131.20	31.60	400	PASS

DH 3

$$1.66 * (1600/4)/79 * 31.6 = 265.60 \text{ (ms)}$$

Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
1.66	265.60	31.60	400	PASS

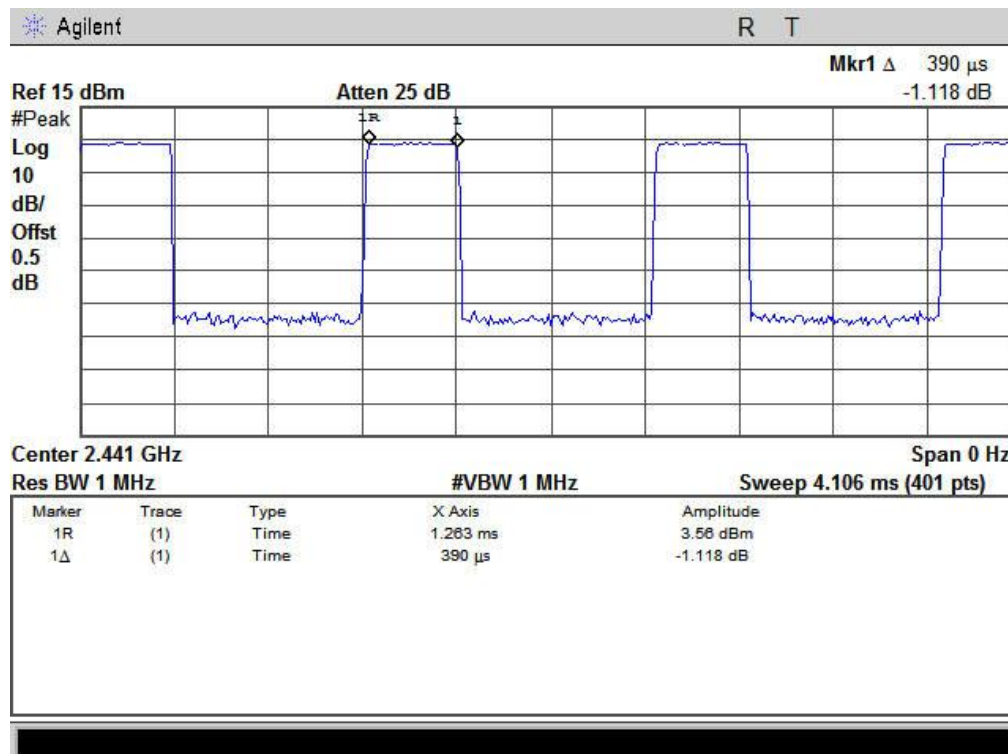
DH 5

$$2.89 * (1600/6)/79 * 31.6 = 308.27 \text{ (ms)}$$

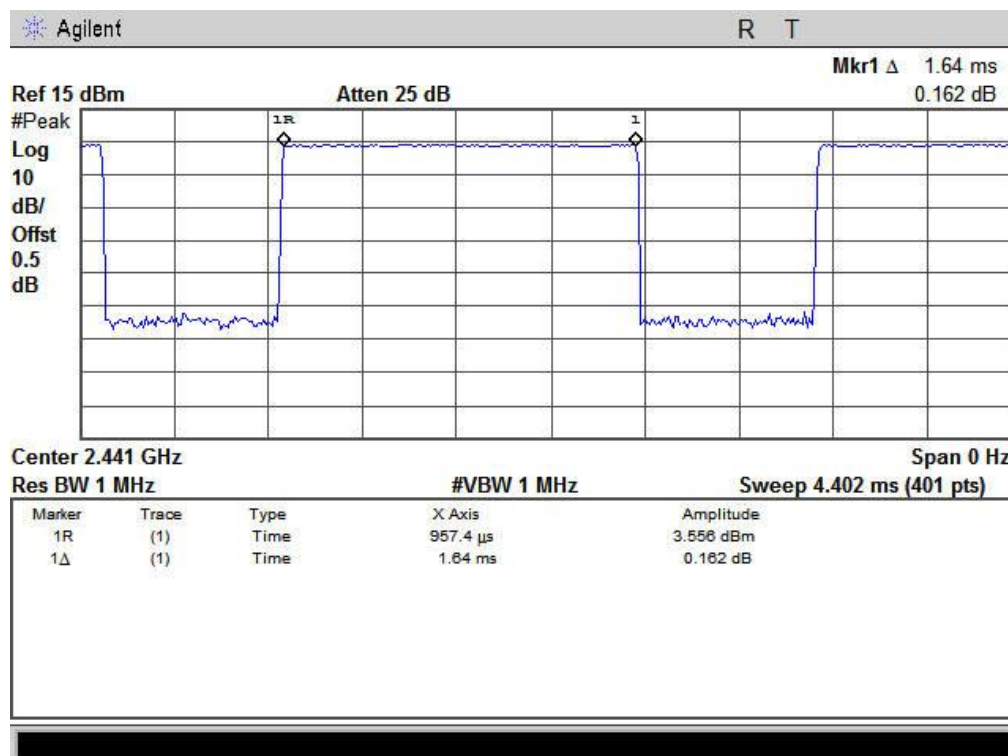
Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2.89	308.27	31.60	400	PASS



Modulation Standard: GFSK (1Mbps)
DH1



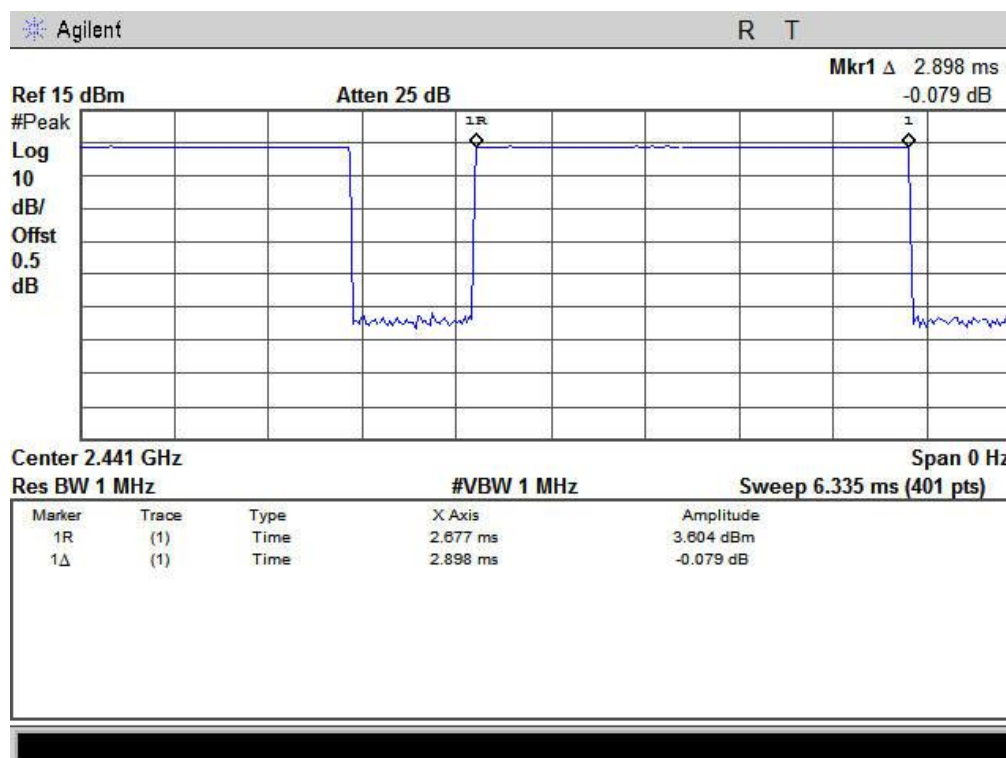
Modulation Standard: GFSK (1Mbps)
DH3





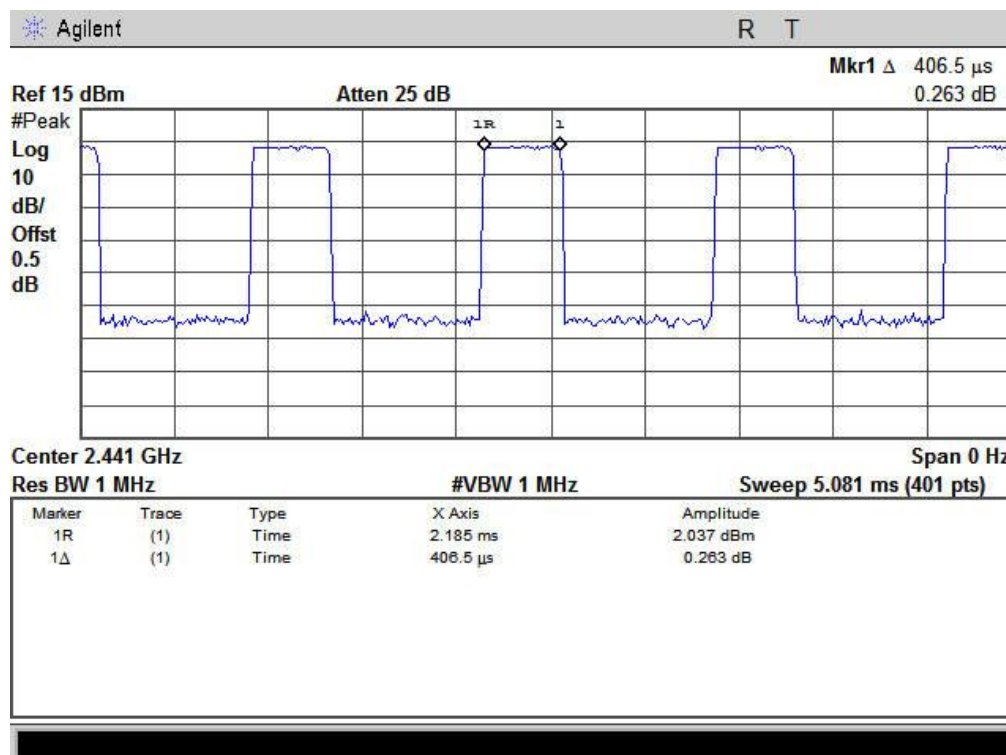
Modulation Standard: GFSK (1Mbps)

DH5



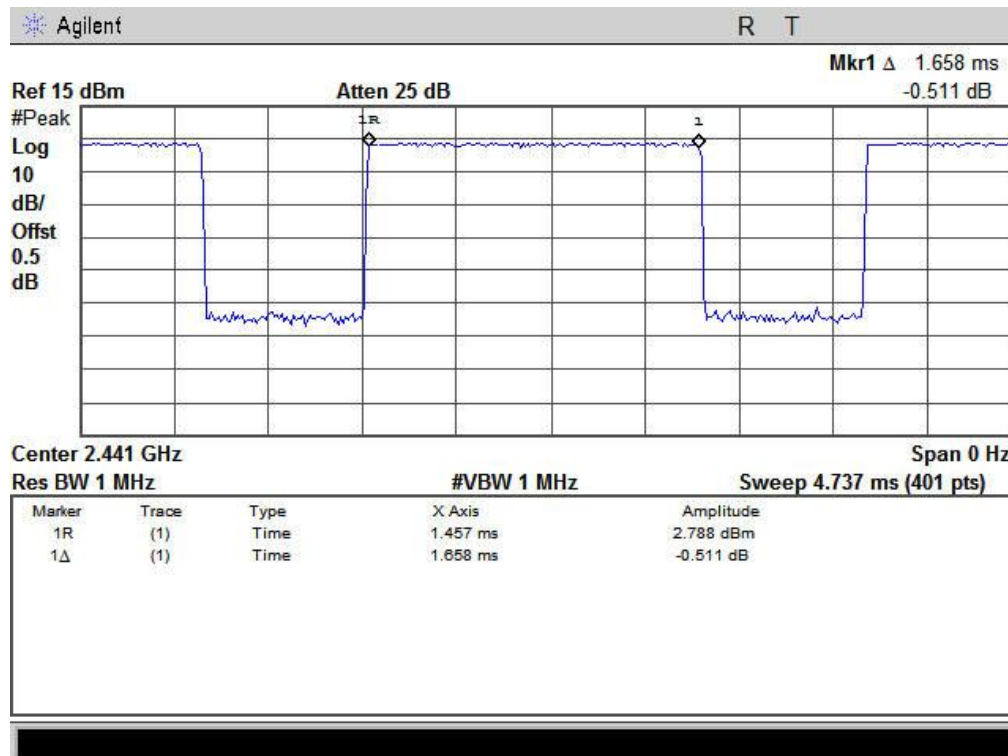
Modulation Standard: 8DPSK (3Mbps)

DH1

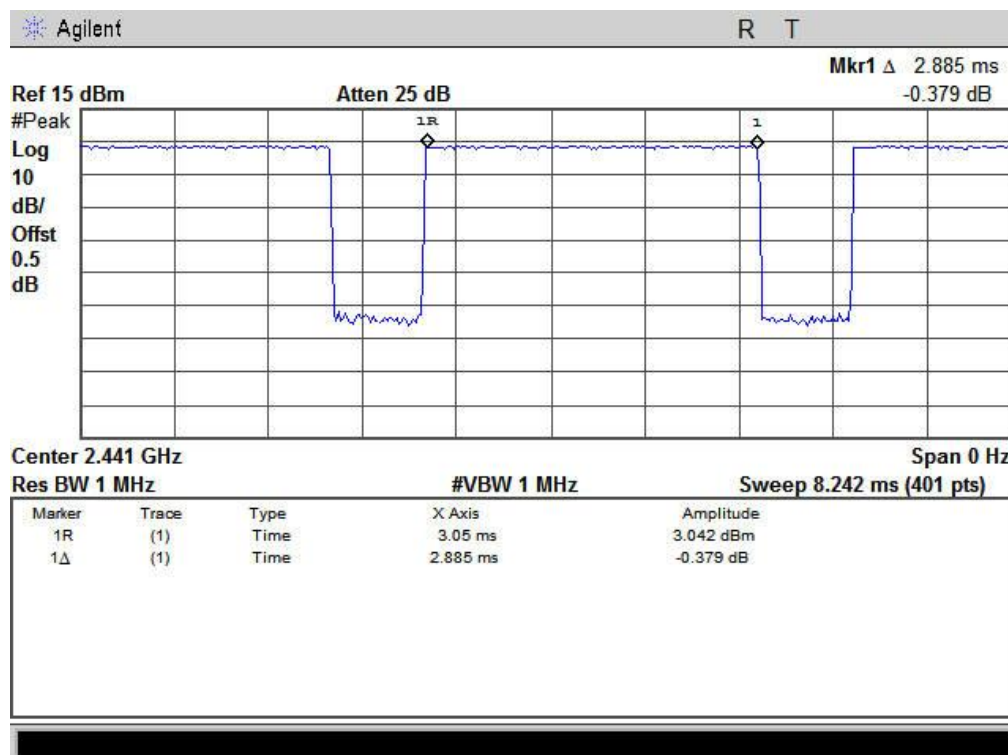




Modulation Standard: 8DPSK (3Mbps)
DH3



Modulation Standard: 8DPSK (3Mbps)
DH5





11. Number of Hopping Channels

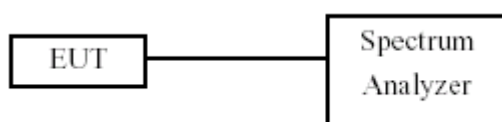
11.1 Test Limit

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

11.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 300 KHz and VBW to 300 KHz.
3. Set the MaxHold function, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been record.

11.3 Test Setup Layout



11.4 Test Result and Data

Test Date: Aug. 01, 2015

Temperature: 25°C

Atmospheric pressure: 1020 hPa

Humidity: 55%

Modulation Standard: GFSK (1Mbps)

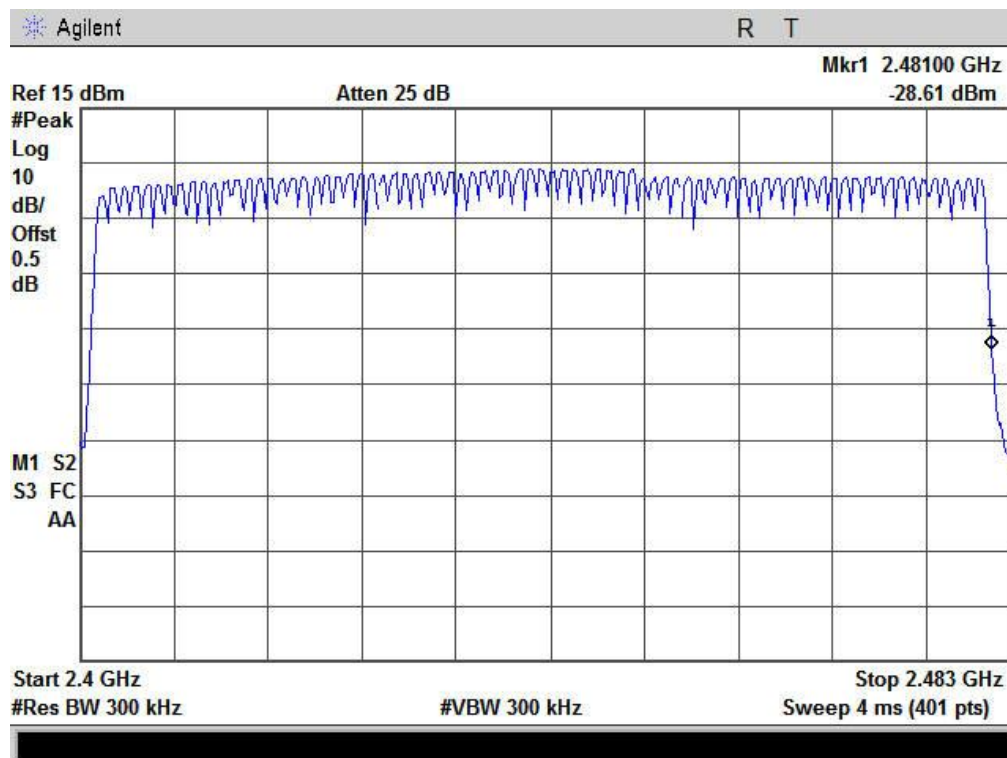
Number of hopping channels:	79	Channels
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Modulation Standard: 8DPSK (3Mbps)

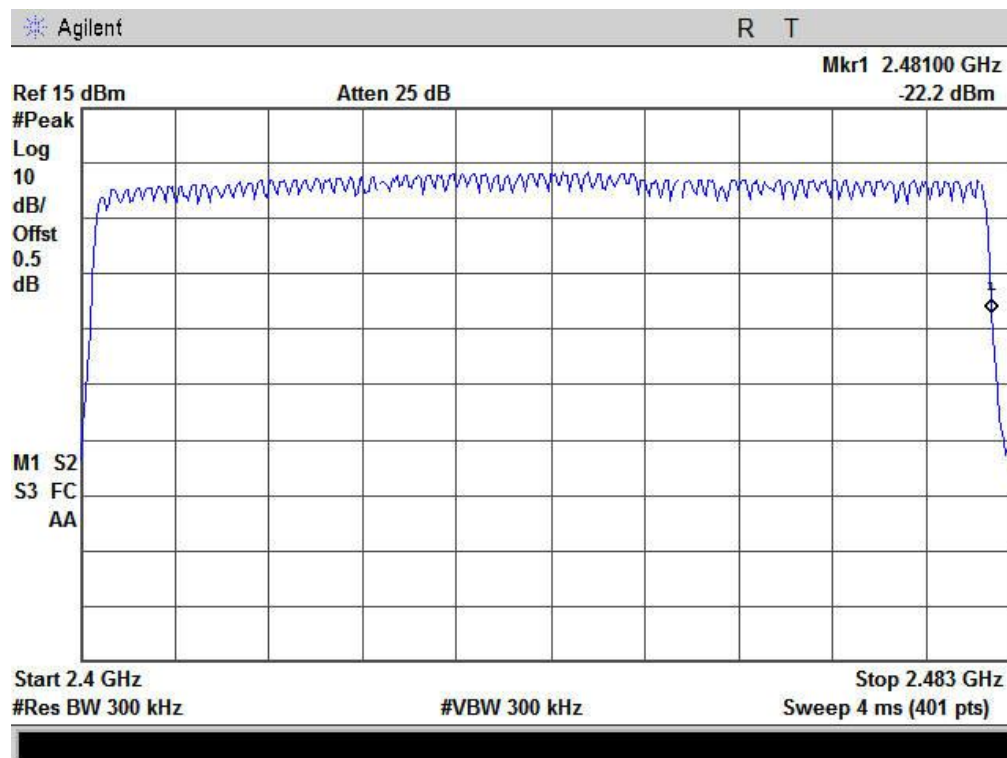
Number of hopping channels:	79	Channels
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Modulation Standard: GFSK (1Mbps)



Modulation Standard: 8DPSK (3Mbps)





12. Maximum Peak Output Power

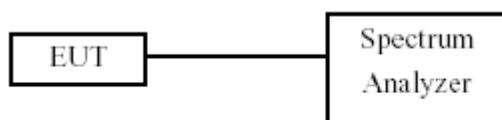
12.1 Test Limit

The Maximum Peak Output Power Measurement is 30dBm.

12.2 Test Procedures

The antenna port(RF output)of the EUT was connected to the input(RF input)of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

12.3 Test Setup Layout



12.4 Test Result and Data

Test Date: Aug. 02, 2015

Temperature: 25°C

Atmospheric pressure: 1020 hPa

Humidity: 55%

1M

Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)
00	2402	-0.875	0.81752
39	2441	3.845	2.42382
78	2480	2.396	1.73620

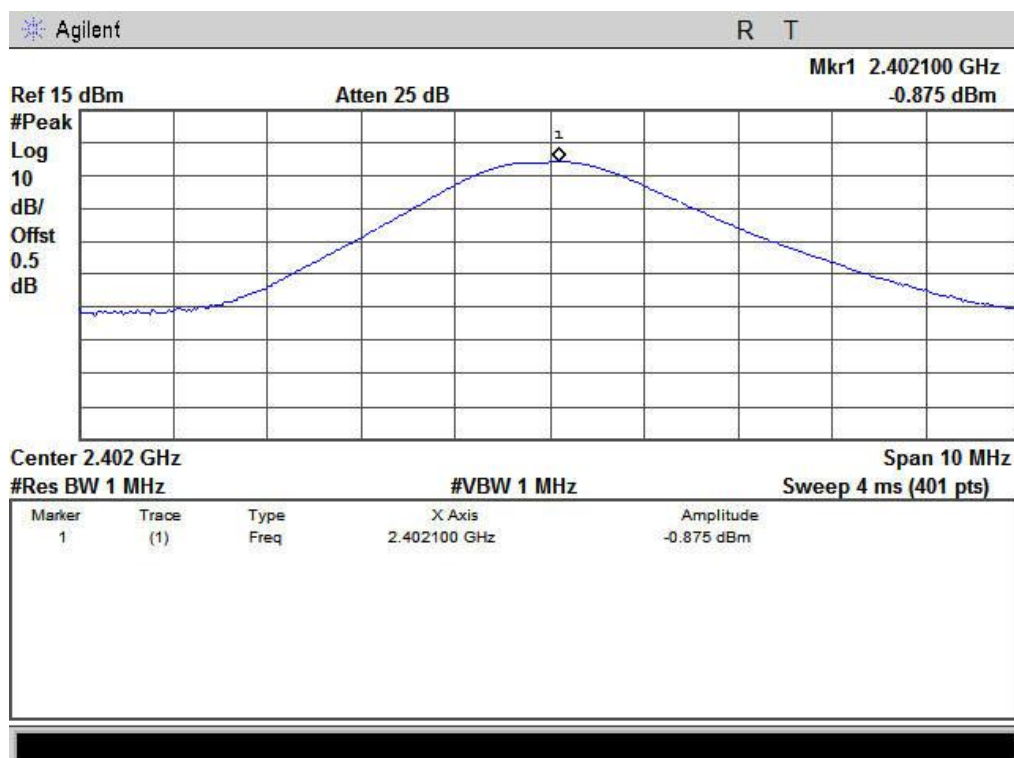
3M

Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)
00	2402	-0.325	1.99526
39	2441	3.727	2.35885
78	2480	2.478	1.76929



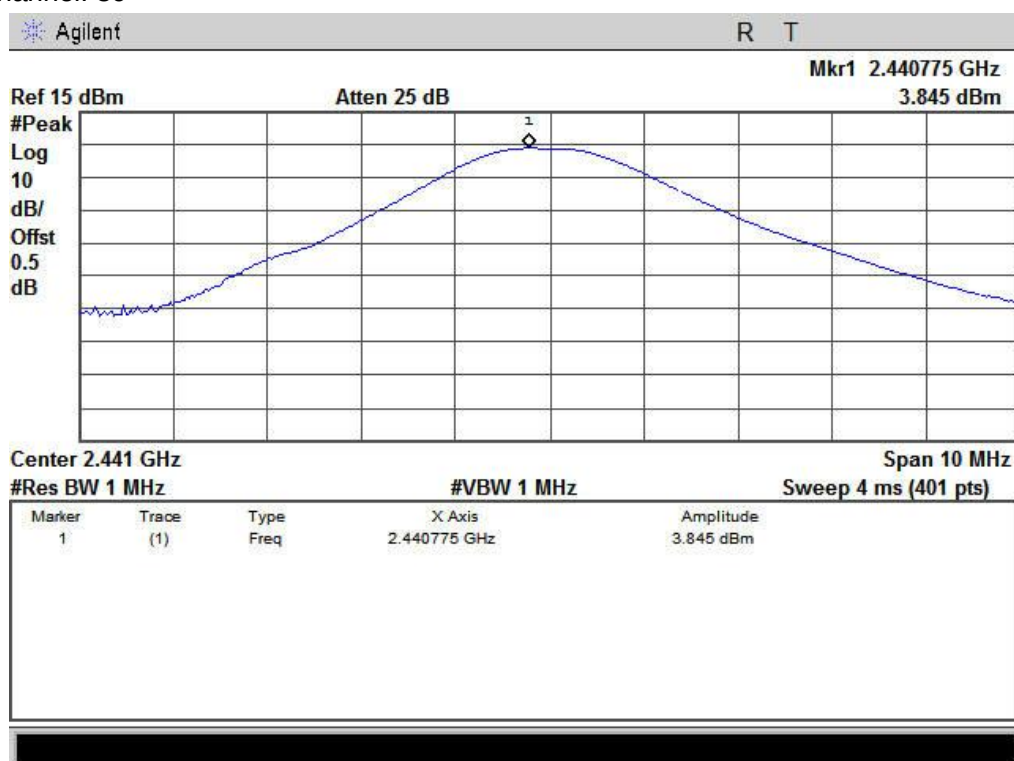
Modulation Standard: GFSK (1Mbps)

Channel: 00



Modulation Standard: GFSK (1Mbps)

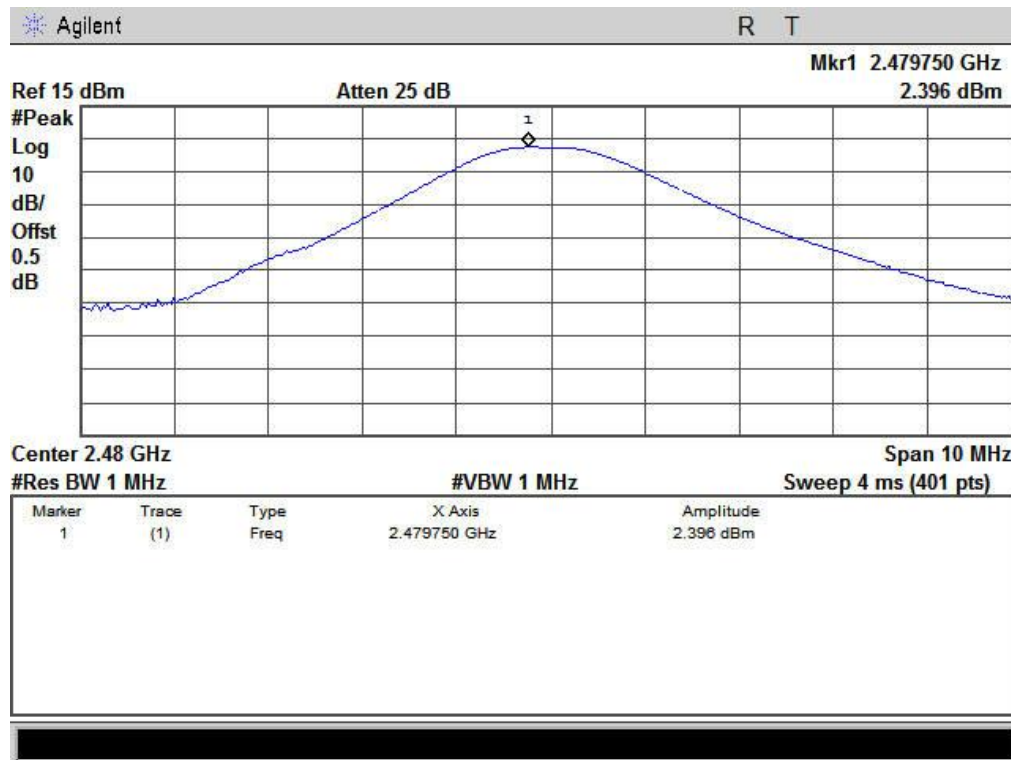
Channel: 39





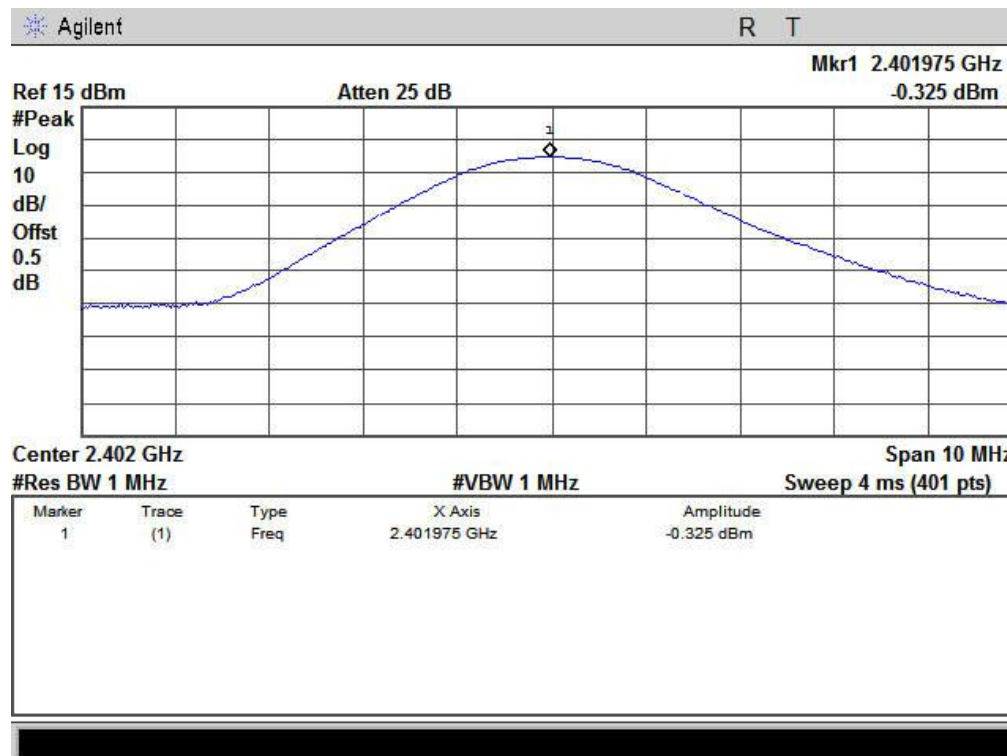
Modulation Standard: GFSK (1Mbps)

Channel: 78



Modulation Standard: 8DPSK (3Mbps)

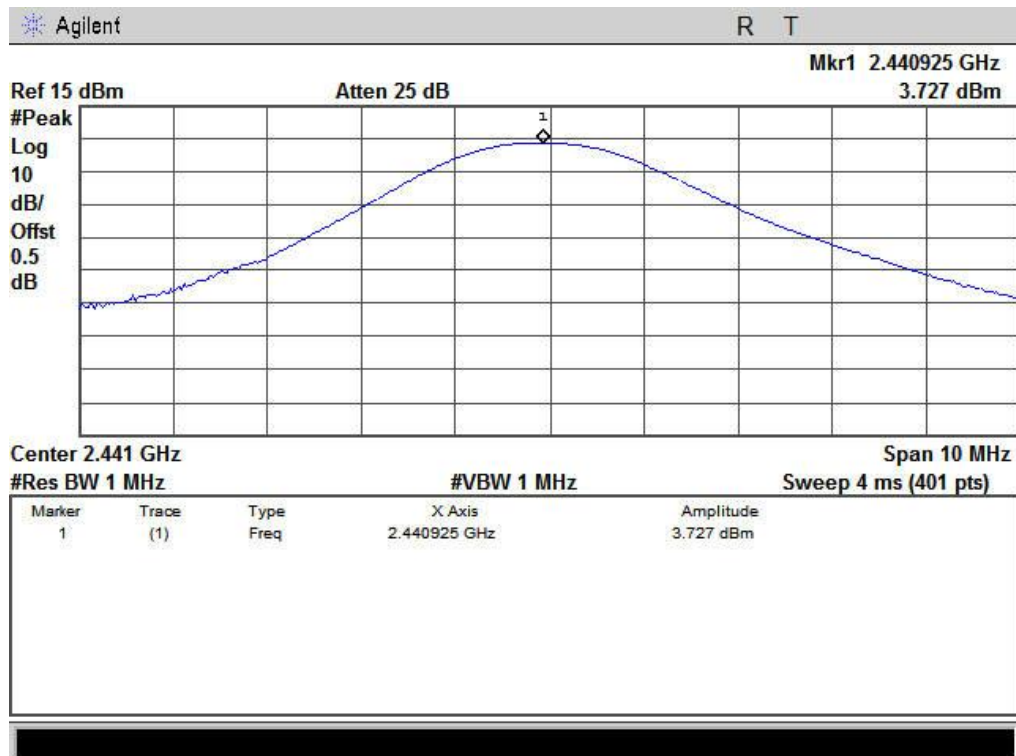
Channel: 00





Modulation Standard: 8DPSK (3Mbps)

Channel: 39



Modulation Standard: 8DPSK (3Mbps)

Channel: 78

