



# FCC TEST REPORT

According to

## FCC Rules and Regulations Part 15 Subpart C

Applicant	: Partner Tech Corp.
Address	: 10FL, 233-2, Baoqiao Road, Xindian, New Taipei City, Taiwan
Equipment	: Enterprise Tablet
Model No.	: EM-70
Trade Name	: PARTNER
FCC ID	: NDPEM-70

- The test result refers exclusively to the test presented test model / sample.,
- Without written approval of **Cerpass Technology Corp.** the test report shall not be reproduced except in full.
- The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

Laboratory Accreditation





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History of this test report

■ ORIGINAL.

Additional attachment as following record:

Attachment No.	Issue Date	Description
TEFB1406213	Oct. 03, 2014	Original.



# CERTIFICATE OF COMPLIANCE

According to

## FCC Rules and Regulations Part 15 Subpart C

Applicant : Partner Tech Corp.  
Address : 10FL, 233-2, Baoqiao Road, Xindian, New Taipei City, Taiwan  
Equipment : Enterprise Tablet  
Model No. : EM-70  
FCC ID : NDPEM-70

### I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4** The equipment was **passed** the test performed according to **FCC Rules and Regulations Part 15 Subpart C (2010)**.

The sample was received on Sep. 17, 2014 and the testing was carried out on Sep. 24, 2014 at **Cerpass Technology Corp.**

Approval by :

Hill Chen  
EMC/RF B.U. Assistant Manager

Test Engineer:

Aiden Lu  
Engineer



## 1. Report of Measurements and Examinations

### 1.1 List of Measurements and Examinations

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. Conducted Emission	Pass
15.209	. Radiated Emission	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
15.247(d)	. Band Edges Measurement Data	Pass



## 2. Test Configuration of Equipment under Test

### 2.1 Feature of Equipment under Test

Item	Specification
CPU	Freescale i.MX 6 1G Dual Lite
OS	Android 4.2.x or above , need CTS, GMS
Memory	DDR 1G (up to 2G), NAND flash 8GB (eMMC/8G/KE4CN3K6A/FBGA169)
Display	Type: High Brightness TFT Color LCD 天馬, Capacitive multi touch SILEAD GSL1688 Size: 7";Resolution: 1024 x 600;Brightness 350nits
Back Camera	5.0 Mega Pixels, Flash Light, Auto Focus, MIPI interface ( <b>Sensor Type OV5640</b> )
I/O Interface	1 x SIM ( Internal );1 x Micro SD;1 x DC Jack;1 x Earphone Jack 1 x Micro USB Female type, OTG & Charging function 1 x Power button;2 x Volume button;1 x Internal Host USB for MSR 1 x Internal RS232 for 1D & 2D barcode scanner
NFC	<b>NFC Controller/NXP PN544 C3</b>
SENSOR	3-Axis Gyroscope/MPU-3050 Acceleration sensor/KXTI9-1001 Compass Sensor/AMI306/SMD LGA10 Vibrator
Storage	Support MicroSD card (SDHC) with Eject function, Max. 32GB
LED	1 x Red/Green LED for Power & System
Weight	630g (approx.) with battery
Others	1 x Audio speaker
Dimension	219.4(L) x 41.3(W) x 22.3(H) mm
Battery	Li-polymer, 3.7V, 6000mAh
Sealing	IP54
Drop Specification	1.2M (w/o MSR/Scanner)
Temperature	Operation Temperature 0 to 40 degrees °C Storage Temperature -20 to 60 degrees °C
Humidity	Operation Temperature 5% to 95% Storage Temperature 5% to 95%
EMC & Safety	CE/FCC/VCCI/BSMI/NCC
Accessory	Power adapter Rating: AC Input: 100-240V~, 0.5A, 50-60Hz DC Output: 5.0V, 3.0A MAX. USB-Cable



## 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	---	---





### 2.3 Test Mode & Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4
- b. The complete test system included Notebook and EUT for RF test.
- c. The test program “USI BCM FCC CE REG Tool 1.4.10r8” under WIN 7 was executed to keep transmit and receive 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.
  - $\pi/4$ -DQPSK: 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

Device	Manufacturer	Model No.	Description
Notebook	SONY	PCG-71218P	Power Cable, Unshielding, 1.8m

Used cable

Cable	Quantity	Description
USB	1	Shielding, 0.9m



## 2.5 General Information of Test

Test Site :	CerpPASS Technology Corporation Test Laboratory No.10, Lane 2, Lianfu Street, Luzhu Township, Taoyuan County 33848, Taiwan(R.O.C.)
Test Site Location :	2F-11, No. 3, Yuan Qu St., (Nankang Software Park), Taipei, Taiwan 115, R.O.C.
Test Site Location :	No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C.
FCC Registration Number :	TW1079, TW1061, 488071, 390316, 228391, 641184
IC Registration Number :	4934B-1, 4934D-1, 4934E-1, 4934E-2
VCCI Registration Number:	T-1173 for Telecommunication Test C-4139 for Conducted emission test R-3428 for Radiated emission test G-97 for Radiated emission test 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. Antenna Requirements

#### 3.1 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.

#### 3.2 Antenna Construction and Directional Gain

WIFI/ Bluetooth

Antenna Type: PIFA Antenna

Antenna Gain: 3.03 dBi@ 2.4GHz,  
0.88dBi@ 5.15GHz  
5.74dBi@ 5.8GHz

NFC

Antenna Type: PCB Antenna



## 4. Test of Conducted Emission

### 4.1 Test Limit

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 C63.4-2009 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 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 $\mu$ V)	Average (dB $\mu$ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

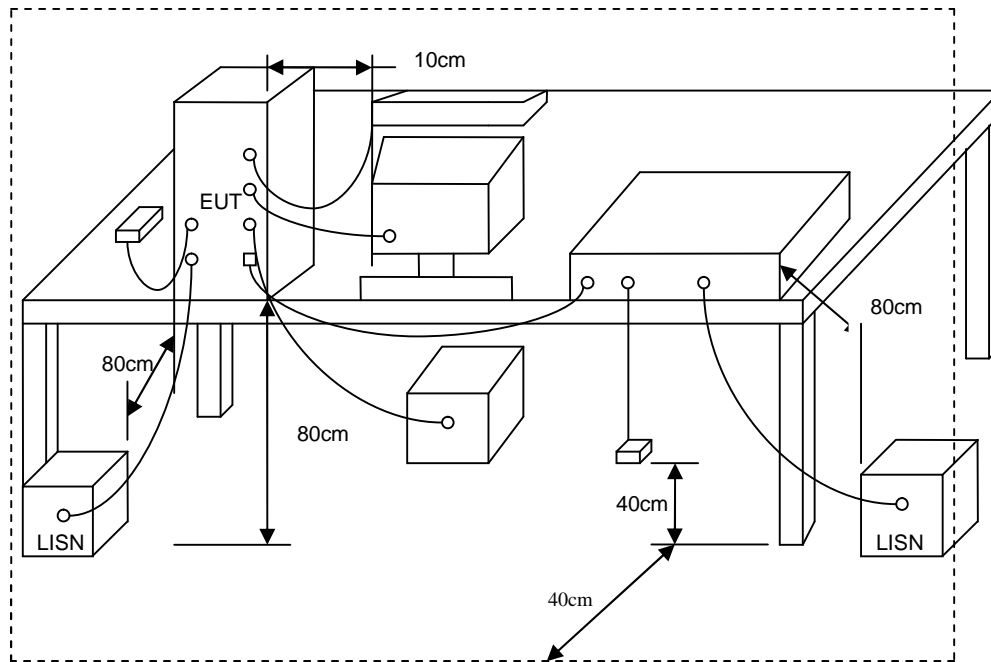
\*Decreases with the logarithm of the frequency.

### 4.2 Test Procedures

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connecting to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



### 4.3 Typical Test Setup



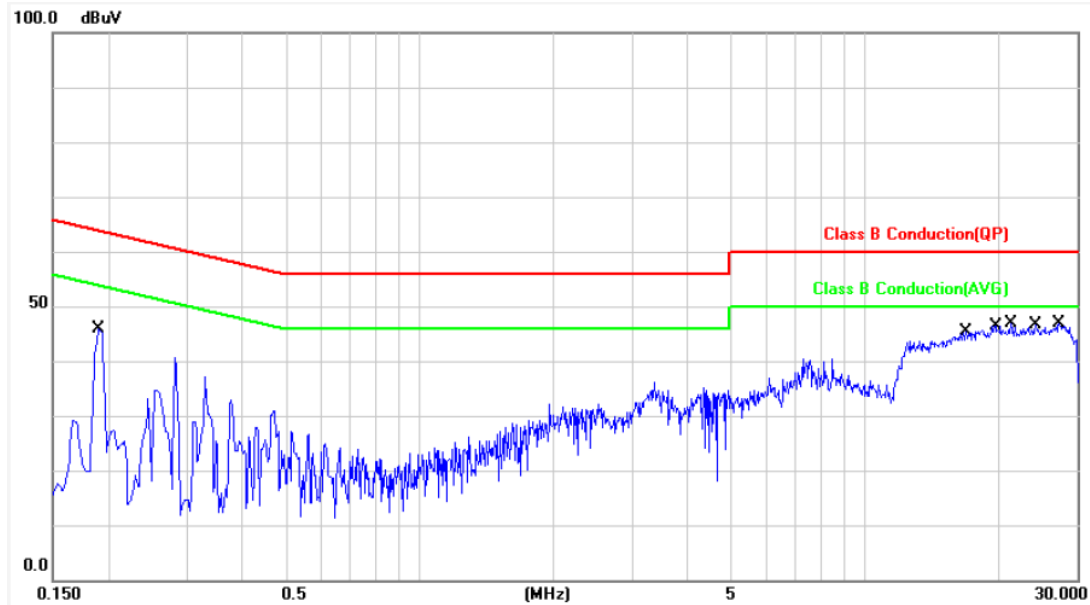
### 4.4 Measurement Equipment

Instrument	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI	101423	2014/06/05	2015/06/04
LISN	Schwarzbeck	NSLK 8127	8127-740	2014/08/14	2015/08/13
LISN	Schwarzbeck	NSLK 8127	8127-516	2014/03/10	2015/03/09
Pulse Limiter	R&S	ESH3-Z2	101933	2014/08/12	2015/08/11
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A



### 4.5 Test Result and Data

Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: GFSK CH0(1Mbps)	Temperature	: 25 °C
		Humidity	: 45 %
Test date	: Sep. 22, 2014	Atmospheric Pressure	: 1008 hpa

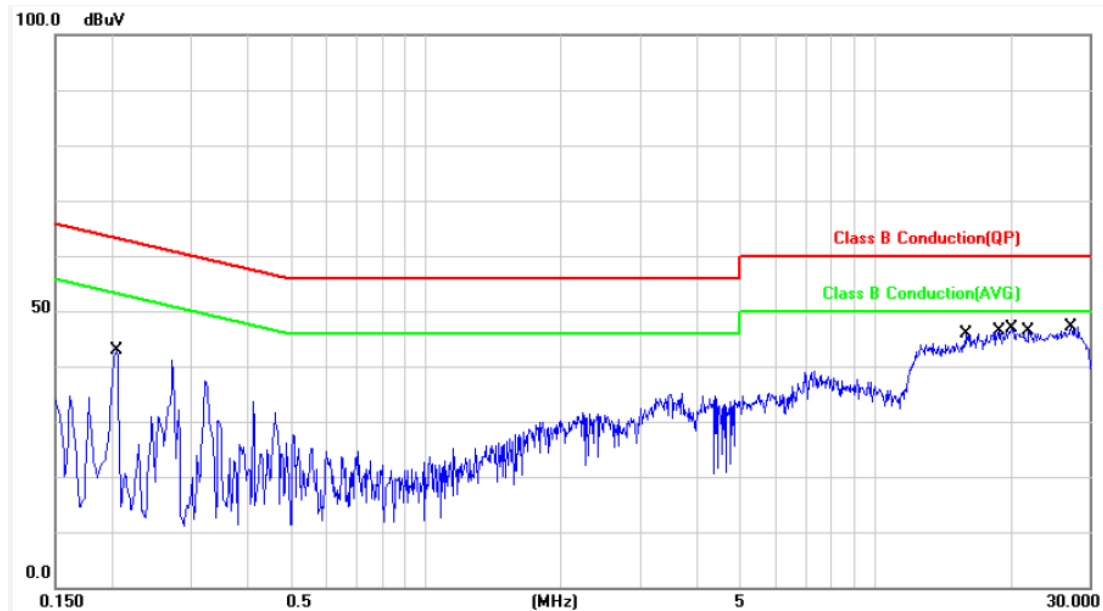


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1900	9.92	33.13	43.05	64.03	-20.98	QP	P
2	0.1900	9.92	16.87	26.79	54.03	-27.24	AVG	P
3	16.9179	10.42	30.33	40.75	60.00	-19.25	QP	P
4	16.9179	10.42	21.30	31.72	50.00	-18.28	AVG	P
5	19.6858	10.48	32.15	42.63	60.00	-17.37	QP	P
6	19.6858	10.48	23.55	34.03	50.00	-15.97	AVG	P
7	21.2740	10.50	31.28	41.78	60.00	-18.22	QP	P
8	21.2740	10.50	22.99	33.49	50.00	-16.51	AVG	P
9	24.2260	10.53	31.51	42.04	60.00	-17.96	QP	P
10	24.2260	10.53	21.57	32.10	50.00	-17.90	AVG	P
11	27.3420	10.54	32.06	42.60	60.00	-17.40	QP	P
12	27.3420	10.54	23.22	33.76	50.00	-16.24	AVG	P

Note: Level = Reading + Factor  
Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: GFSK CH0(1Mbps)	Temperature	: 25 °C
		Humidity	: 45 %
Test date	: Sep. 22, 2014	Atmospheric Pressure	: 1008 hpa

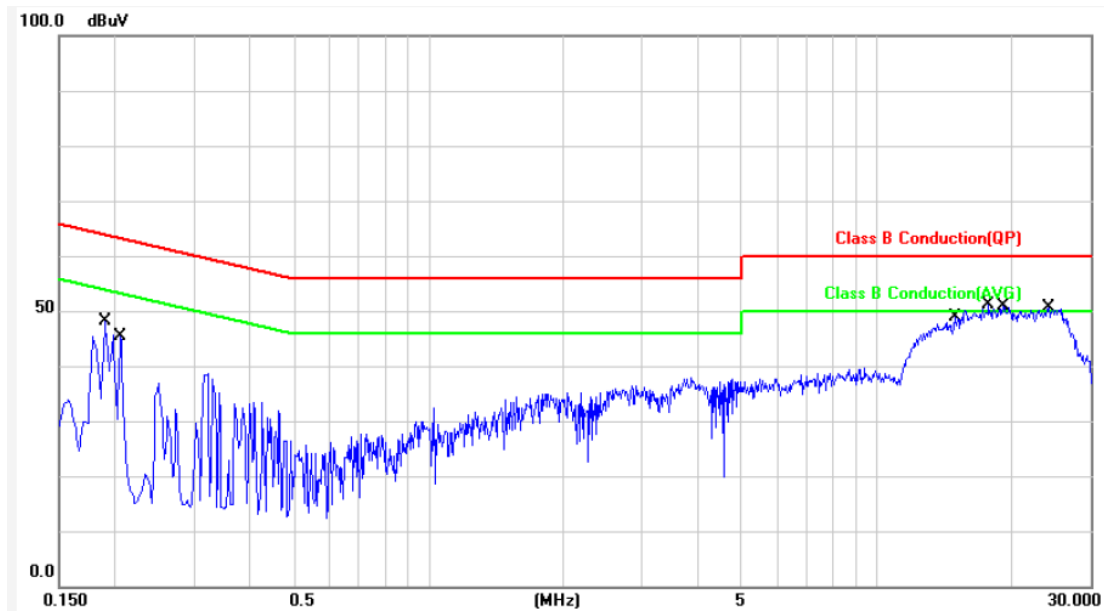


No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV)	Limit (dBUV)	Margin (dB)	Detector	P/F
1	0.2060	9.91	30.39	40.30	63.36	-23.06	QP	P
2	0.2060	9.91	13.30	23.21	53.36	-30.15	AVG	P
3	15.9379	10.38	30.72	41.10	60.00	-18.90	QP	P
4	15.9379	10.38	22.51	32.89	50.00	-17.11	AVG	P
5	18.9419	10.43	32.95	43.38	60.00	-16.62	QP	P
6	18.9419	10.43	27.36	37.79	50.00	-12.21	AVG	P
7	20.2300	10.45	31.79	42.24	60.00	-17.76	QP	P
8	20.2300	10.45	24.42	34.87	50.00	-15.13	AVG	P
9	22.1180	10.47	32.42	42.89	60.00	-17.11	QP	P
10	22.1180	10.47	24.07	34.54	50.00	-15.46	AVG	P
11	27.3820	10.53	32.20	42.73	60.00	-17.27	QP	P
12	27.3820	10.53	24.76	35.29	50.00	-14.71	AVG	P

Note: Level = Reading + Factor  
Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: $\pi/4$ -DQPSK CH0 (2Mbps)	Temperature	: 25 °C
		Humidity	: 45 %
Test date	: Sep. 22, 2014	Atmospheric Pressure	: 1008 hpa



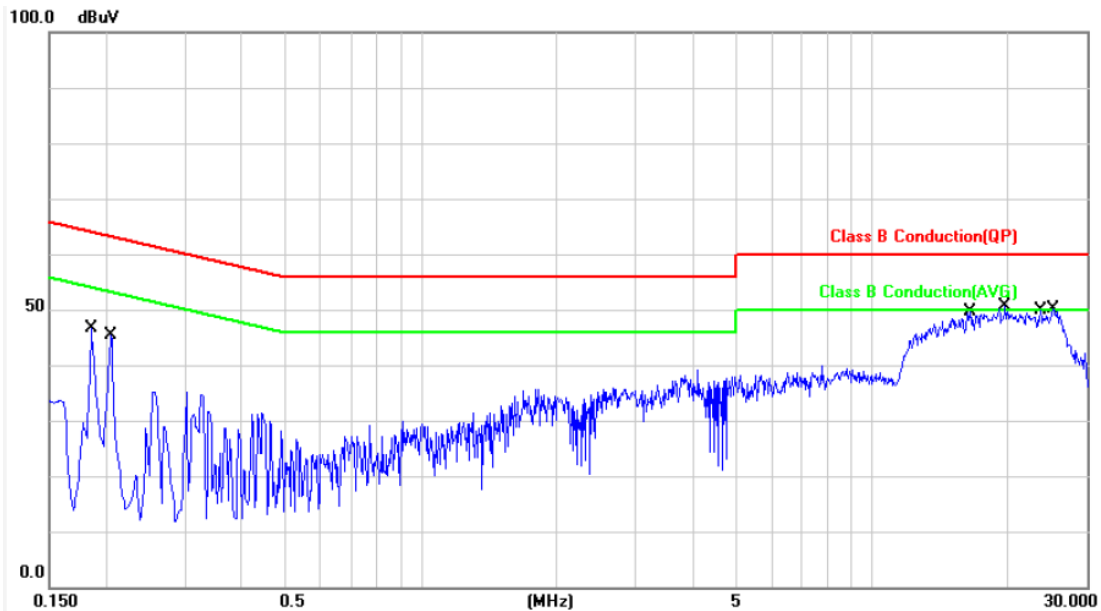
No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1900	9.92	0.58	10.50	64.03	-53.53	QP	P
2	0.1900	9.92	-2.68	7.24	54.03	-46.79	AVG	P
3	0.2060	9.92	0.29	10.21	63.36	-53.15	QP	P
4	0.2060	9.92	-2.84	7.08	53.36	-46.28	AVG	P
5	14.9379	10.38	-0.60	9.78	60.00	-50.22	QP	P
6	14.9379	10.38	-5.19	5.19	50.00	-44.81	AVG	P
7	17.7698	10.44	-0.55	9.89	60.00	-50.11	QP	P
8	17.7698	10.44	-5.11	5.33	50.00	-44.67	AVG	P
9	19.2059	10.47	-0.56	9.91	60.00	-50.09	QP	P
10	19.2059	10.47	-5.10	5.37	50.00	-44.63	AVG	P
11	24.1460	10.52	-0.28	10.24	60.00	-49.76	QP	P
12	24.1460	10.52	-4.86	5.66	50.00	-44.34	AVG	P

Note: Level = Reading + Factor  
Margin = Level – Limit





Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: $\pi/4$ -DQPSK CH0 (2Mbps)	Temperature	: 25 °C
		Humidity	: 45 %
Test date	: Sep. 22, 2014	Atmospheric Pressure	: 1008 hpa

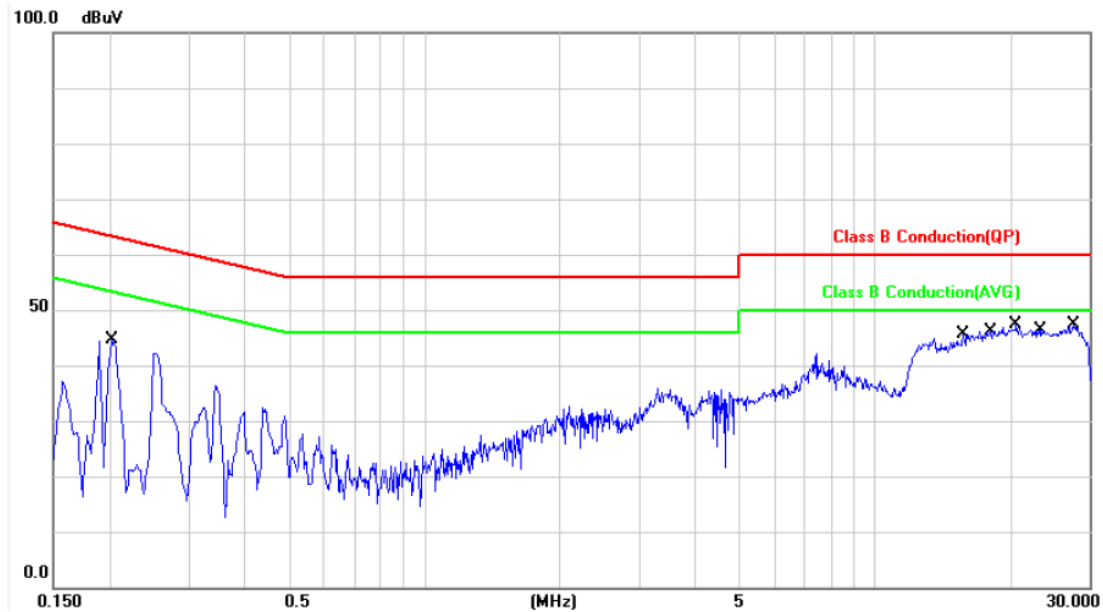


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1860	9.91	34.69	44.60	64.21	-19.61	QP	P
2	0.1860	9.91	20.41	30.32	54.21	-23.89	AVG	P
3	0.2060	9.91	31.25	41.16	63.36	-22.20	QP	P
4	0.2060	9.91	12.60	22.51	53.36	-30.85	AVG	P
5	16.5299	10.39	35.18	45.57	60.00	-14.43	QP	P
6	16.5299	10.39	26.13	36.52	50.00	-13.48	AVG	P
7	19.8299	10.45	35.42	45.87	60.00	-14.13	QP	P
8	19.8299	10.45	26.36	36.81	50.00	-13.19	AVG	P
9	23.7380	10.49	35.17	45.66	60.00	-14.34	QP	P
10	23.7380	10.49	26.64	37.13	50.00	-12.87	AVG	P
11	25.1900	10.51	35.11	45.62	60.00	-14.38	QP	P
12	25.1900	10.51	26.95	37.46	50.00	-12.54	AVG	P

Note: Level = Reading + Factor  
Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: 8DPSK CH0 (3Mbps)	Temperature	: 25 °C
		Humidity	: 45 %
Test date	: Sep. 22, 2014	Atmospheric Pressure	: 1008 hpa

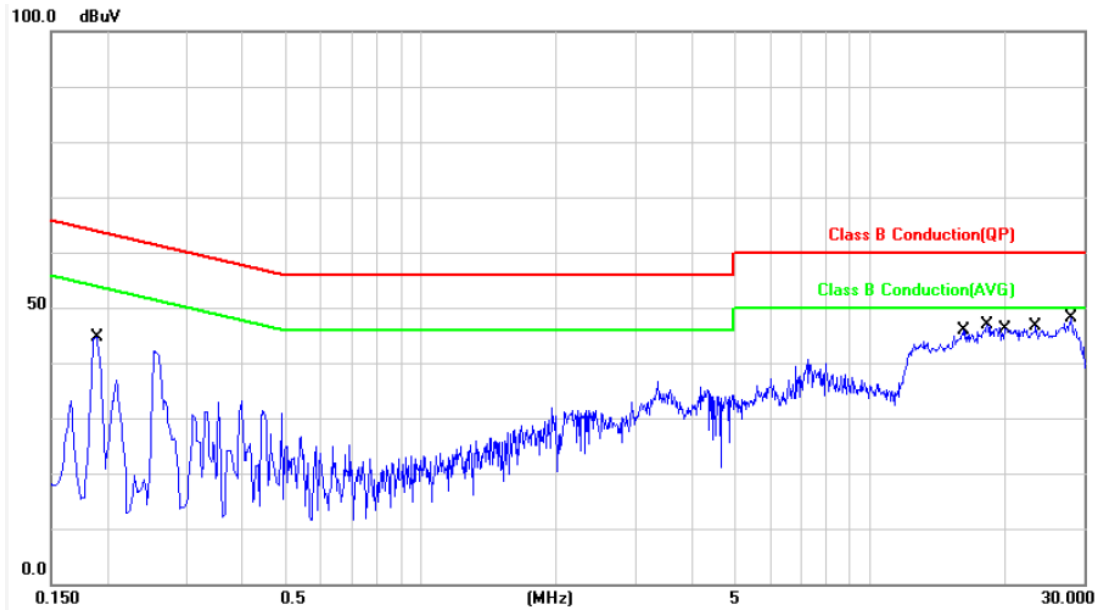


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2020	9.92	32.02	41.94	63.52	-21.58	QP	P
2	0.2020	9.92	16.06	25.98	53.52	-27.54	AVG	P
3	15.7979	10.39	31.60	41.99	60.00	-18.01	QP	P
4	15.7979	10.39	21.95	32.34	50.00	-17.66	AVG	P
5	18.0499	10.44	32.27	42.71	60.00	-17.29	QP	P
6	18.0499	10.44	21.68	32.12	50.00	-17.88	AVG	P
7	20.6460	10.48	33.56	44.04	60.00	-15.96	QP	P
8	20.6460	10.48	25.39	35.87	50.00	-14.13	AVG	P
9	23.4860	10.51	32.14	42.65	60.00	-17.35	QP	P
10	23.4860	10.51	25.51	36.02	50.00	-13.98	AVG	P
11	27.5940	10.55	32.82	43.37	60.00	-16.63	QP	P
12	27.5940	10.55	23.89	34.44	50.00	-15.56	AVG	P

Note: Level = Reading + Factor  
Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: 8DPSK CH0 (3Mbps)	Temperature	: 25 °C
		Humidity	: 45 %
Test date	: Sep. 22, 2014	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1900	9.91	33.34	43.25	64.03	-20.78	QP	P
2	0.1900	9.91	17.05	26.96	54.03	-27.07	AVG	P
3	16.2219	10.38	32.72	43.10	60.00	-16.90	QP	P
4	16.2219	10.38	24.81	35.19	50.00	-14.81	AVG	P
5	18.2579	10.42	32.86	43.28	60.00	-16.72	QP	P
6	18.2579	10.42	23.34	33.76	50.00	-16.24	AVG	P
7	20.0300	10.45	32.81	43.26	60.00	-16.74	QP	P
8	20.0300	10.45	25.51	35.96	50.00	-14.04	AVG	P
9	23.4500	10.49	31.53	42.02	60.00	-17.98	QP	P
10	23.4500	10.49	21.82	32.31	50.00	-17.69	AVG	P
11	28.0180	10.55	32.86	43.41	60.00	-16.59	QP	P
12	28.0180	10.55	24.39	34.94	50.00	-15.06	AVG	P

Note: Level = Reading + Factor  
Margin = Level – Limit



## 5. Test of Radiated Emission

### 5.1 Test Limit

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2009. The EUT was placed, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

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

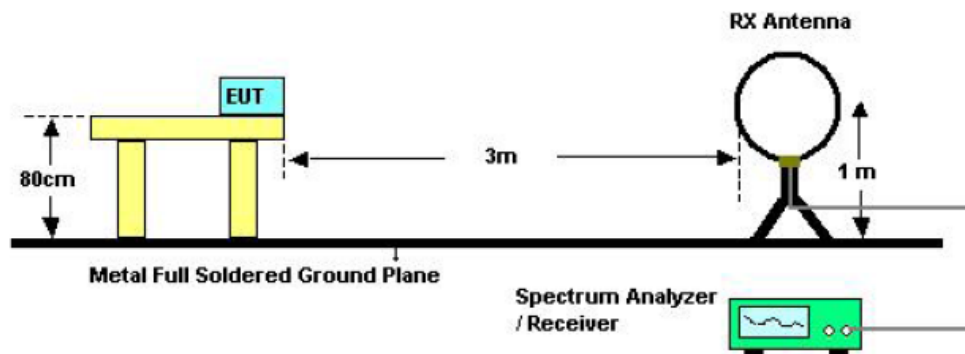
### 5.2 Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- 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.
- 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.

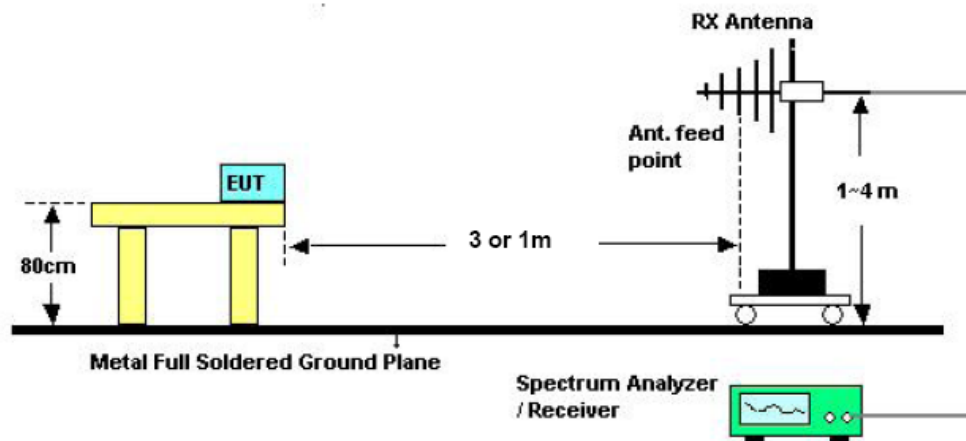


### 5.3 Typical Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor =  $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$  (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

### 5.4 Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI	100443	2014/04/09	2015/04/08
Bilog Antenna	Schwarzbeck	VULB 9168	275	2014/09/18	2015/09/17
Amplifier	QuieTek	AP/0100A	CHM0906075	2014/09/17	2015/09/16
SPECTRUM ANALYZER	R&S	FSP40	100219	2014/09/03	2015/09/02
HORN ANTENNA	EMCO	3115	31601	2014/07/09	2015/07/08
PREAMPLIFIER	AGILENT	8449B	3008A01954	2014/03/28	2015/03/27
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A

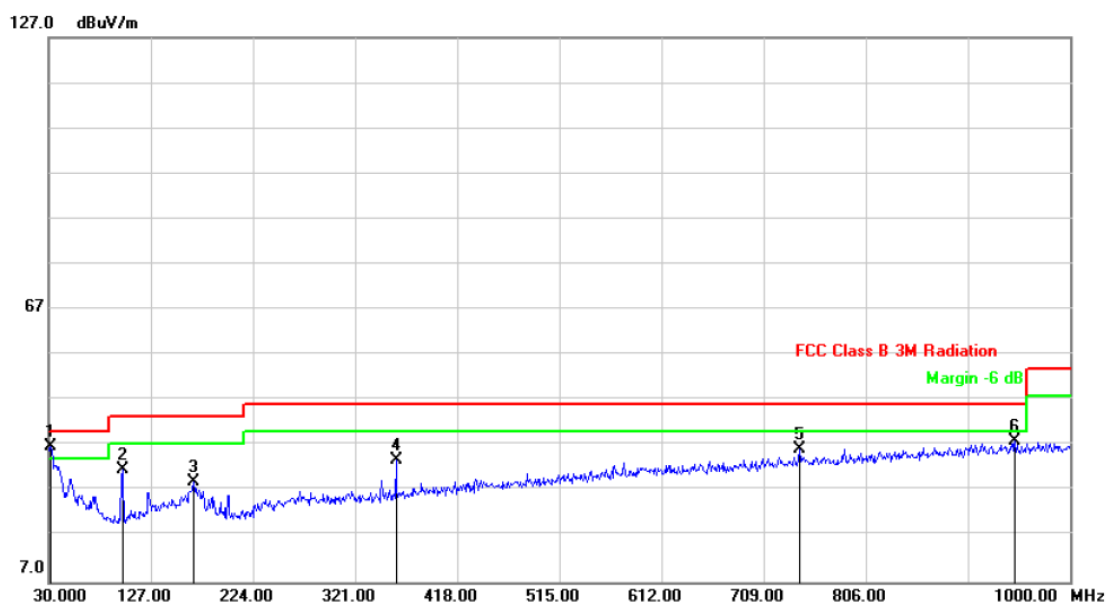


### 5.5 Test Result and Data (9kHz ~ 30MHz)

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

### 5.6 Test Result and Data (30MHz ~ 1GHz)

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive GFSK CH0 (1Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 23, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	31.9400	-8.85	45.63	36.78	40.00	-3.22	peak	102	177
2	99.8400	-13.09	44.90	31.81	43.50	-11.69	peak	102	177
3	167.7400	-8.48	37.59	29.11	43.50	-14.39	peak	102	177
4	359.8000	-5.88	39.76	33.88	46.00	-12.12	peak	102	177
5	742.9500	1.64	34.53	36.17	46.00	-9.83	peak	102	177
6	947.6200	4.39	33.64	38.03	46.00	-7.97	peak	102	177

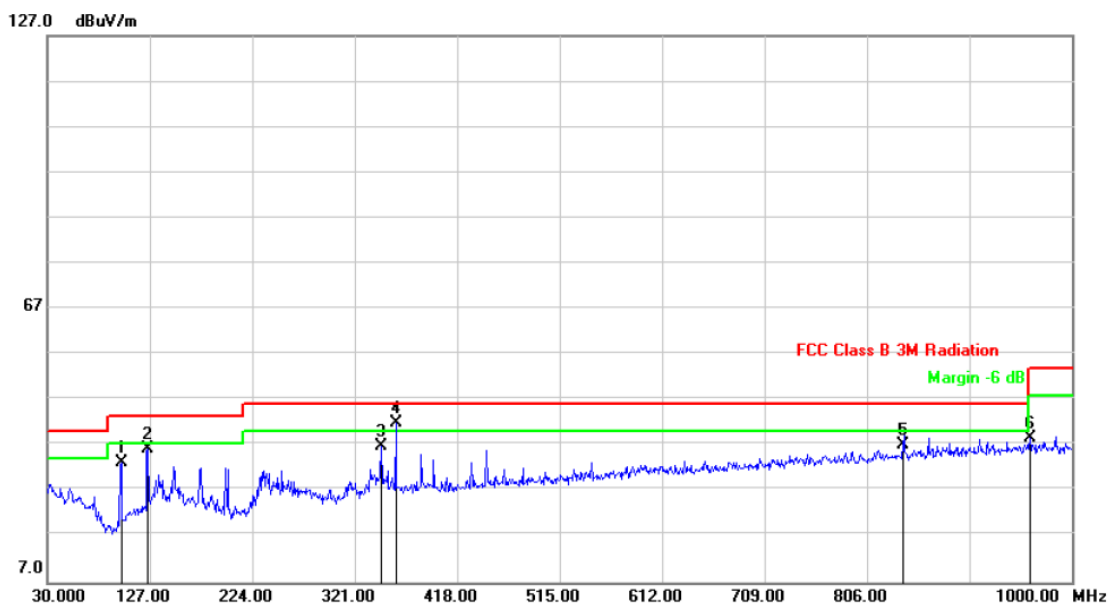
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive GFSK CH0 (1Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 23, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	99.8400	-13.09	46.47	33.38	43.50	-10.12	peak	105	169
2	125.0600	-10.19	46.57	36.38	43.50	-7.12	peak	105	169
3	346.2200	-6.26	43.19	36.93	46.00	-9.07	peak	105	169
4	359.8000	-5.88	47.83	41.95	46.00	-4.05	peak	105	169
5	839.9500	2.83	34.20	37.03	46.00	-8.97	peak	105	169
6	960.2300	4.47	34.07	38.54	54.00	-15.46	peak	105	169

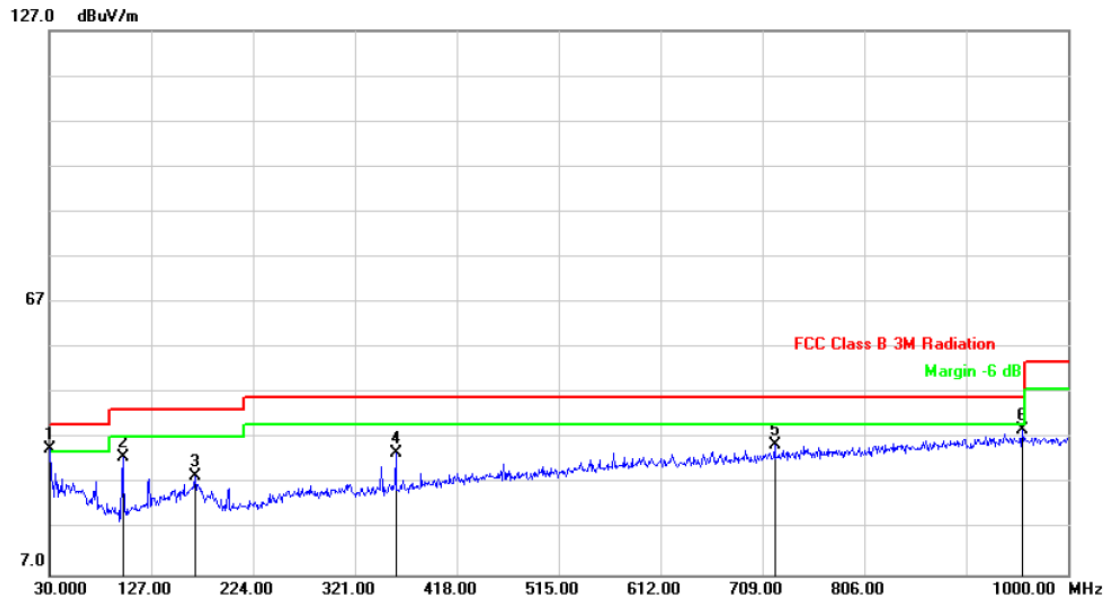
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive $\pi/4$ -DQPSK, CH0 (2Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 23, 2014	Atmospheric Pressure	: 1010 hpa



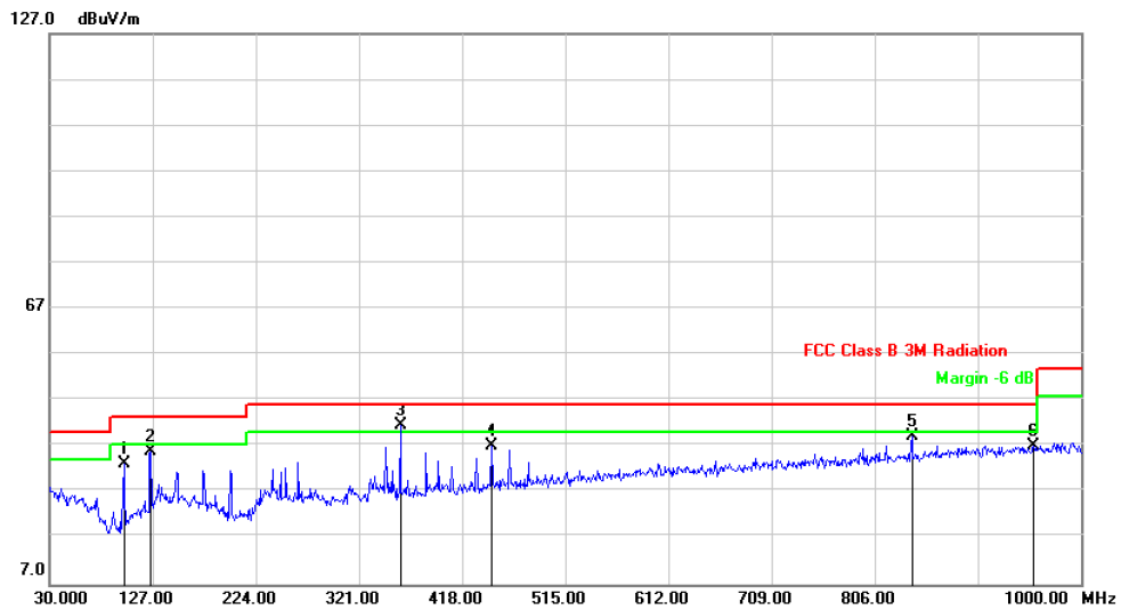
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	30.0000	-8.97	43.80	34.83	40.00	-5.17	peak	100	185
2	99.8400	-13.09	46.01	32.92	43.50	-10.58	peak	100	185
3	168.7100	-8.52	37.13	28.61	43.50	-14.89	peak	100	185
4	359.8000	-5.88	39.64	33.76	46.00	-12.24	peak	100	185
5	720.6400	1.28	34.32	35.60	46.00	-10.40	peak	100	185
6	956.3500	4.45	34.62	39.07	46.00	-6.93	peak	100	185

Note: Level = Reading + Factor  
Margin = Level – Limit  
Factor= Antenna Factor + Cable Loss - Amplifier Factor





Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive $\pi/4$ -DQPSK, CH0 (2Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 23, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	99.8400	-13.09	46.42	33.33	43.50	-10.17	peak	104	177
2	125.0600	-10.19	46.17	35.98	43.50	-7.52	peak	104	177
3	359.8000	-5.88	47.42	41.54	46.00	-4.46	peak	104	177
4	445.1600	-3.54	40.58	37.04	46.00	-8.96	peak	104	177
5	840.9200	2.84	36.27	39.11	46.00	-6.89	peak	104	177
6	955.3800	4.45	32.82	37.27	46.00	-8.73	peak	104	177

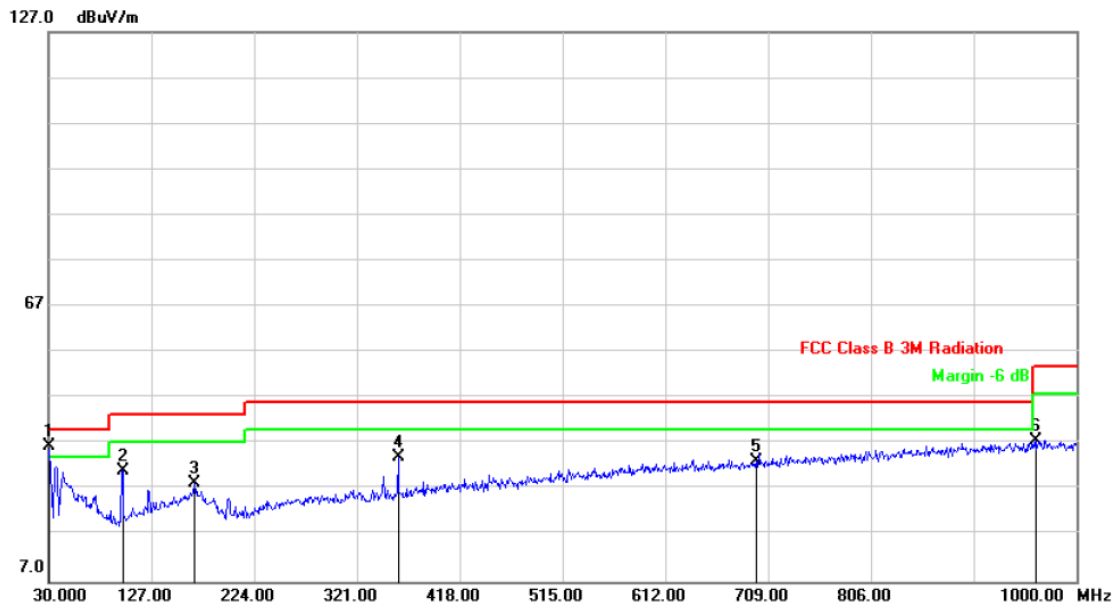
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive 8DPSK, CH0 (3Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 23, 2014	Atmospheric Pressure	: 1010 hpa

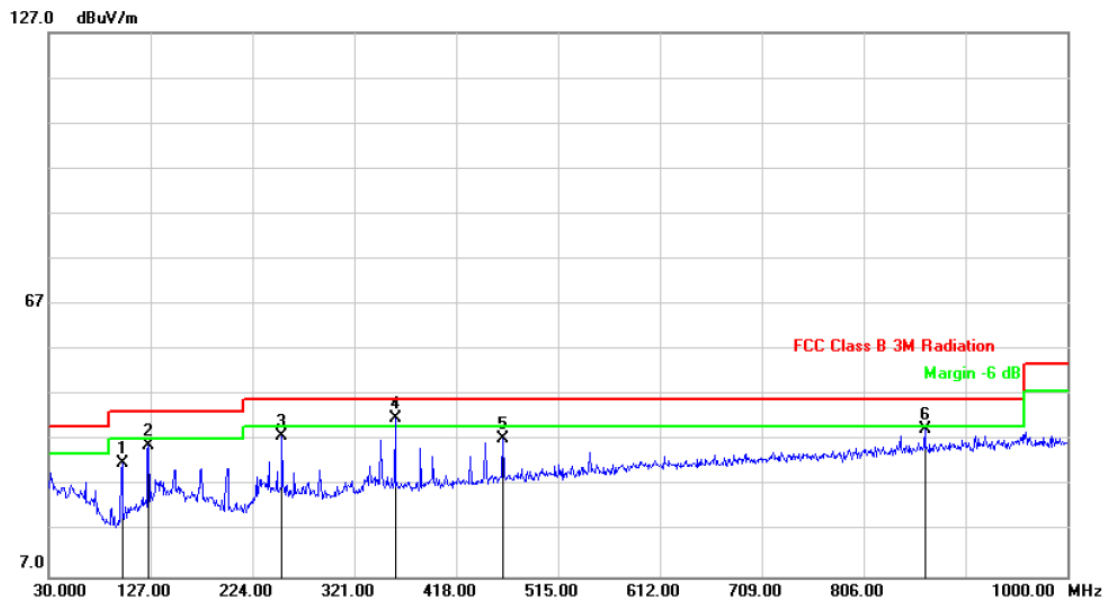


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	30.9700	-8.90	45.36	36.46	40.00	-3.54	peak	103	174
2	99.8400	-13.09	44.19	31.10	43.50	-12.40	peak	103	174
3	167.7400	-8.48	36.80	28.32	43.50	-15.18	peak	103	174
4	359.8000	-5.88	39.99	34.11	46.00	-11.89	peak	103	174
5	697.3600	0.90	32.43	33.33	46.00	-12.67	peak	103	174
6	962.1700	4.47	33.16	37.63	54.00	-16.37	peak	103	174

Note: Level = Reading + Factor  
Margin = Level – Limit  
Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive 8DPSK, CH0 (3Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 23, 2014	Atmospheric Pressure	: 1010 hpa



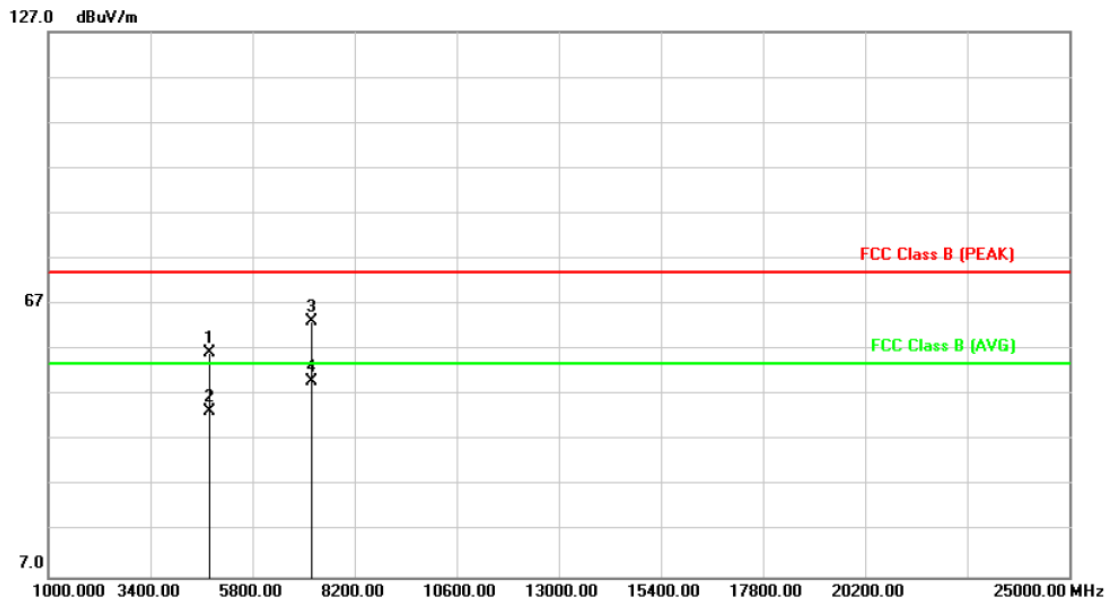
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	99.8400	-13.09	45.06	31.97	43.50	-11.53	peak	101	178
2	125.0600	-10.19	46.22	36.03	43.50	-7.47	peak	101	178
3	252.1300	-9.18	47.19	38.01	46.00	-7.99	peak	101	178
4	359.8000	-5.88	47.83	41.95	46.00	-4.05	peak	101	178
5	462.6200	-3.19	40.56	37.37	46.00	-8.63	peak	101	178
6	864.2000	3.17	36.34	39.51	46.00	-6.49	peak	101	178

Note: Level = Reading + Factor  
Margin = Level – Limit  
Factor= Antenna Factor + Cable Loss - Amplifier Factor



### 5.7 Test Result and Data (1GHz ~ 25GHz)

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive GFSK, CH0 (1Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa

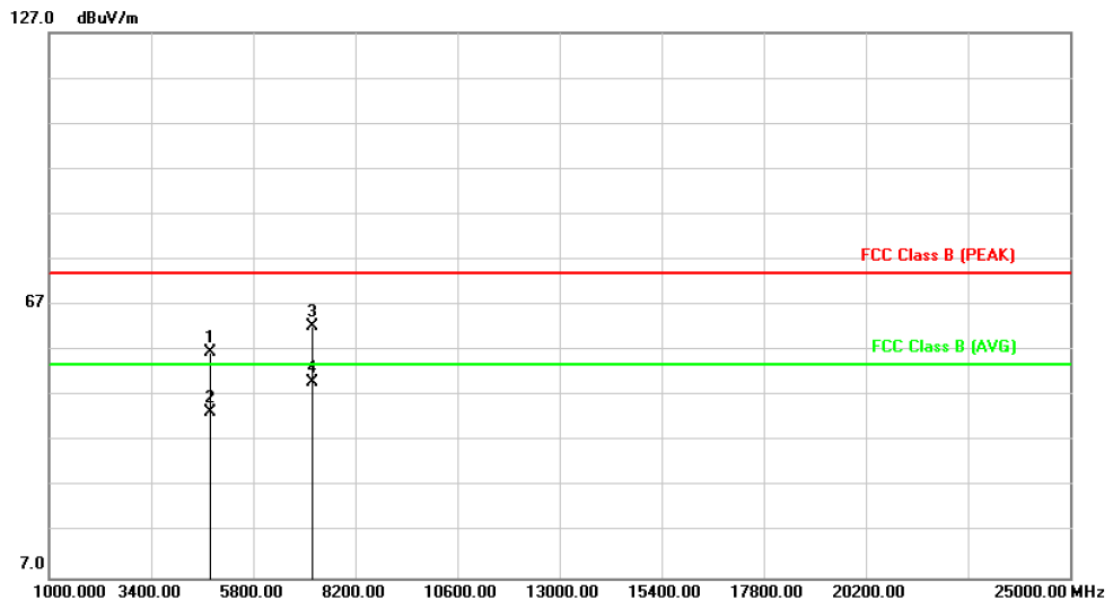


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4804.000	7.26	48.97	56.23	74.00	-17.77	peak	104	162
2	4804.000	7.26	36.19	43.45	54.00	-10.55	AVG	104	162
3	7206.000	12.18	51.14	63.32	74.00	-10.68	peak	104	162
4	7206.000	12.18	37.79	49.97	54.00	-4.03	AVG	104	162

Note: Level = Reading + Factor  
Margin = Level – Limit  
Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive GFSK, CH0 (1Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa

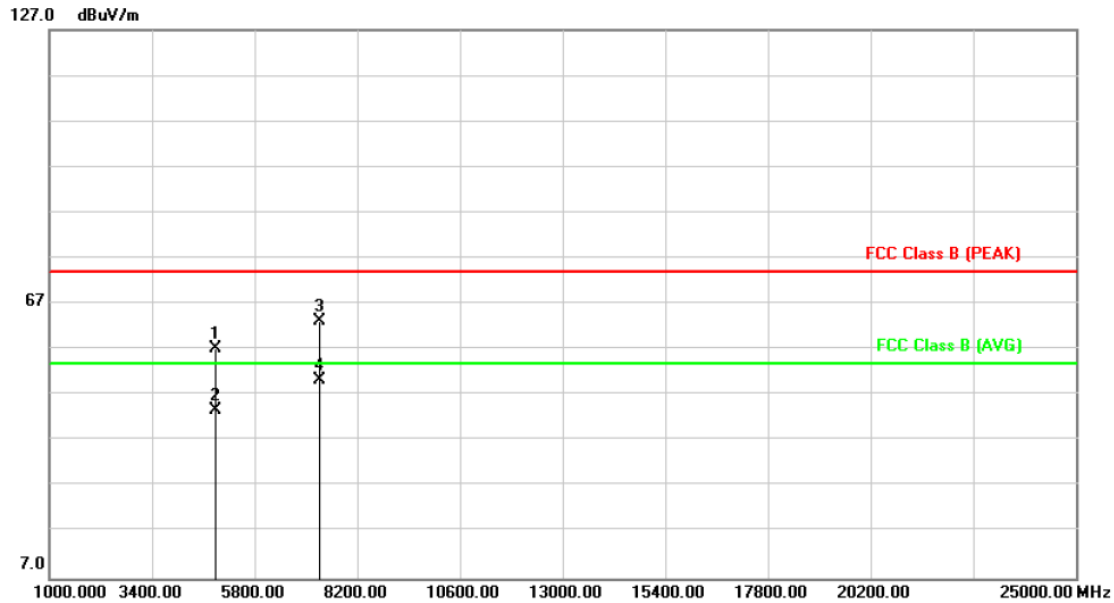


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4804.000	7.26	49.48	56.74	74.00	-17.26	peak	102	173
2	4804.000	7.26	36.17	43.43	54.00	-10.57	AVG	102	173
3	7206.000	12.18	50.30	62.48	74.00	-11.52	peak	102	173
4	7206.000	12.18	37.74	49.92	54.00	-4.08	AVG	102	173

Note: Level = Reading + Factor  
 Margin = Level – Limit  
 Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive GFSK, CH39 (1Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4882.000	7.51	49.63	57.14	74.00	-16.86	peak	105	178
2	4882.000	7.51	36.13	43.64	54.00	-10.36	AVG	105	178
3	7323.000	12.66	50.69	63.35	74.00	-10.65	peak	105	178
4	7323.000	12.66	37.62	50.28	54.00	-3.72	AVG	105	178

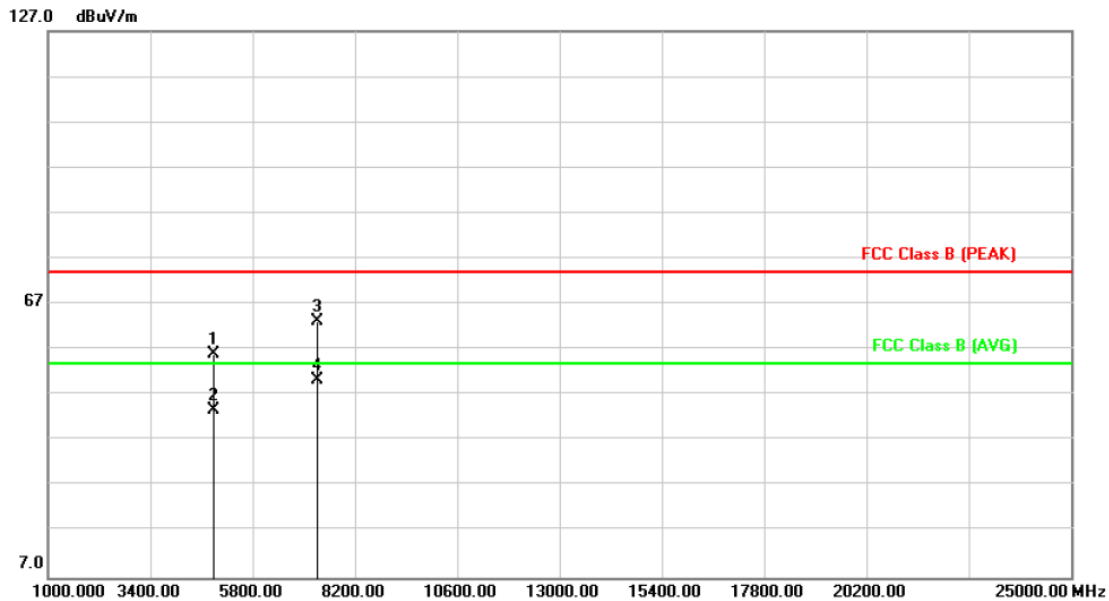
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive GFSK, CH39 (1Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa

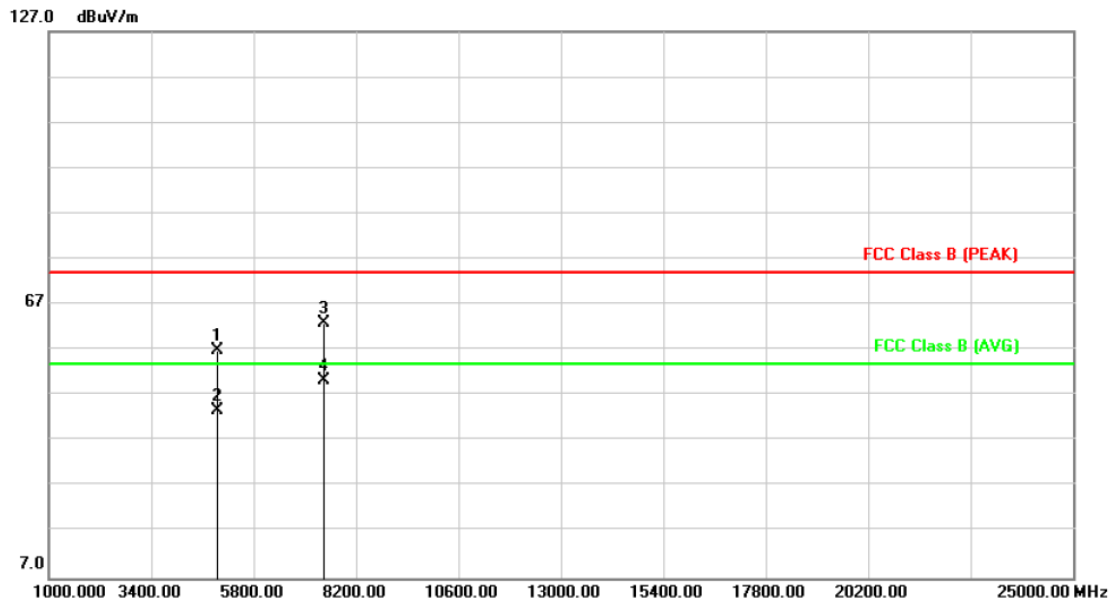


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4882.000	7.51	48.63	56.14	74.00	-17.86	peak	101	165
2	4882.000	7.51	36.14	43.65	54.00	-10.35	AVG	101	165
3	7323.000	12.66	50.48	63.14	74.00	-10.86	peak	101	165
4	7323.000	12.66	37.64	50.30	54.00	-3.70	AVG	101	165

Note: Level = Reading + Factor  
 Margin = Level – Limit  
 Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive GFSK, CH78 (1Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa



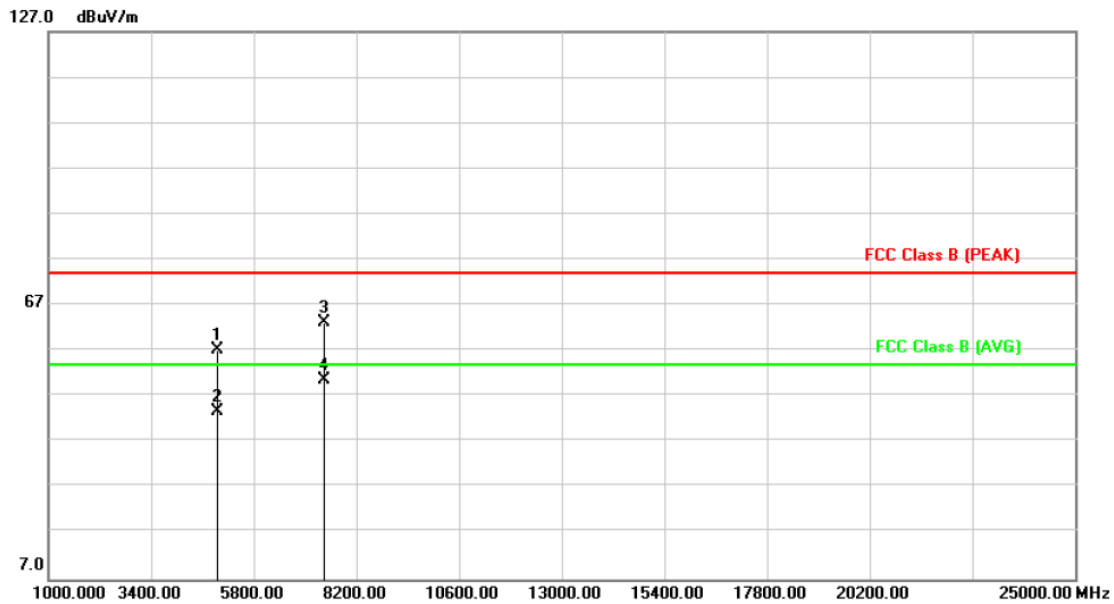
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4960.000	7.76	49.13	56.89	74.00	-17.11	peak	107	161
2	4960.000	7.76	36.08	43.84	54.00	-10.16	AVG	107	161
3	7440.000	13.16	49.90	63.06	74.00	-10.94	peak	107	161
4	7440.000	13.16	37.27	50.43	54.00	-3.57	AVG	107	161

Note: Level = Reading + Factor  
Margin = Level – Limit  
Factor= Antenna Factor + Cable Loss - Amplifier Factor





Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive GFSK, CH78 (1Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa

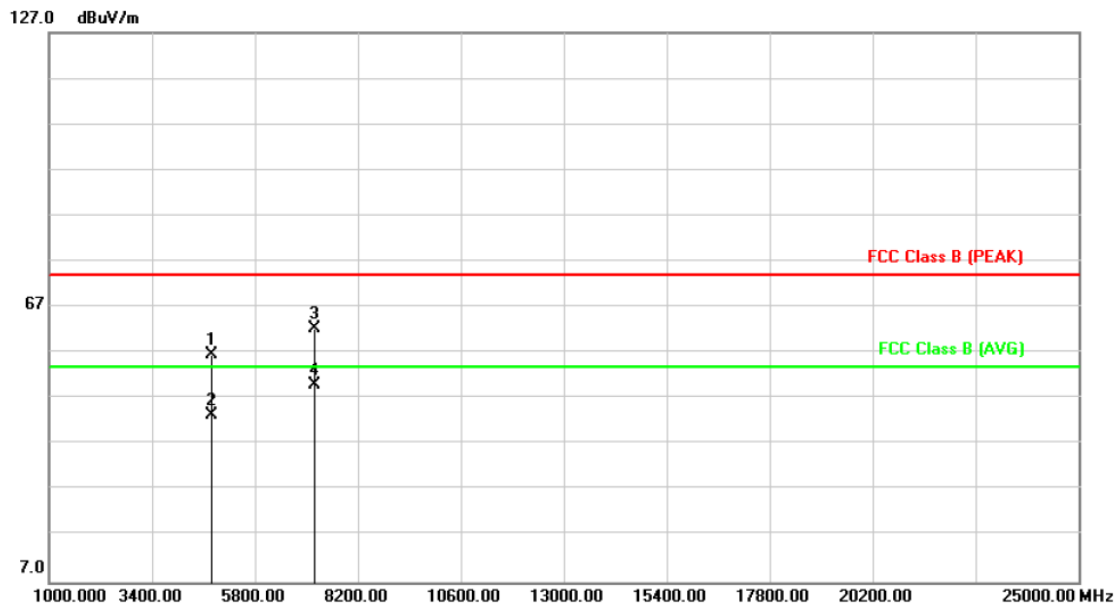


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4960.000	7.76	49.46	57.22	74.00	-16.78	peak	103	166
2	4960.000	7.76	36.13	43.89	54.00	-10.11	AVG	103	166
3	7440.000	13.16	50.20	63.36	74.00	-10.64	peak	103	166
4	7440.000	13.16	37.54	50.70	54.00	-3.30	AVG	103	166

Note: Level = Reading + Factor  
 Margin = Level – Limit  
 Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive π/4-DQPSK, CH0 (2Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4804.000	7.26	49.39	56.65	74.00	-17.35	peak	106	175
2	4804.000	7.26	36.13	43.39	54.00	-10.61	AVG	106	175
3	7206.000	12.18	50.16	62.34	74.00	-11.66	peak	106	175
4	7206.000	12.18	37.76	49.94	54.00	-4.06	AVG	106	175

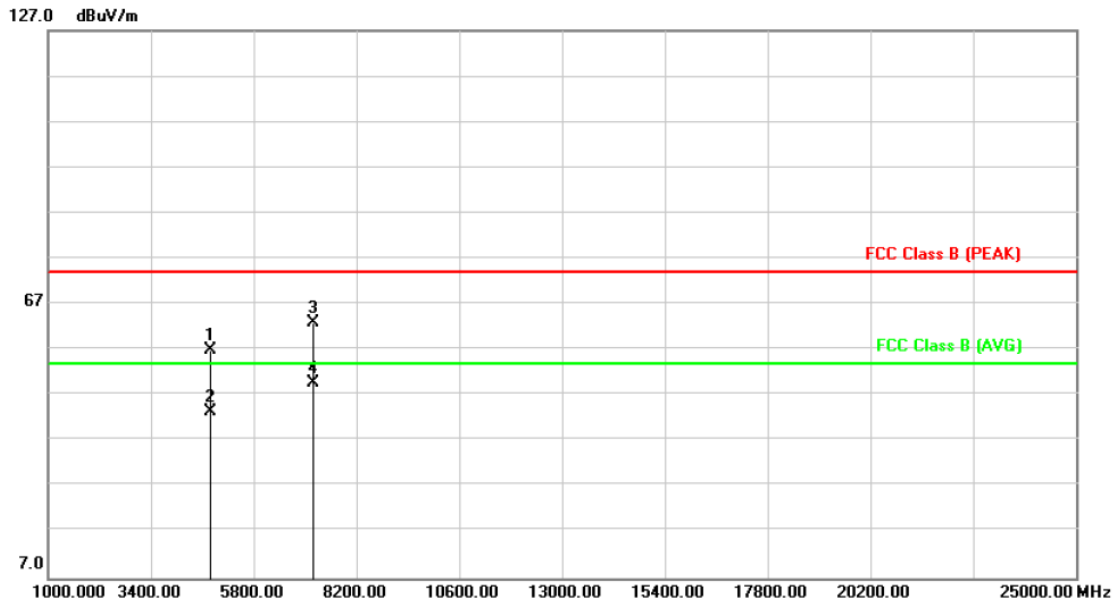
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive $\pi/4$ -DQPSK, CH0 (2Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa

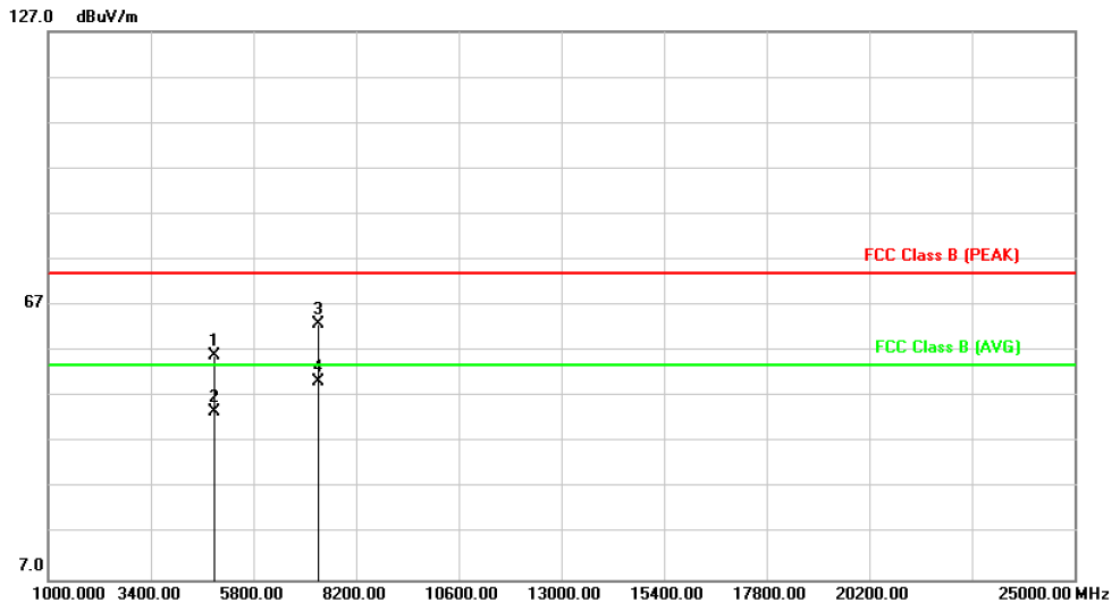


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4804.000	7.26	49.62	56.88	74.00	-17.12	peak	102	173
2	4804.000	7.26	36.12	43.38	54.00	-10.62	AVG	102	173
3	7206.000	12.18	50.64	62.82	74.00	-11.18	peak	102	173
4	7206.000	12.18	37.68	49.86	54.00	-4.14	AVG	102	173

Note: Level = Reading + Factor  
Margin = Level – Limit  
Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive π/4-DQPSK, CH39 (2Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4882.000	7.51	48.62	56.13	74.00	-17.87	peak	100	174
2	4882.000	7.51	36.12	43.63	54.00	-10.37	AVG	100	174
3	7323.000	12.66	50.42	63.08	74.00	-10.92	peak	100	174
4	7323.000	12.66	37.55	50.21	54.00	-3.79	AVG	100	174

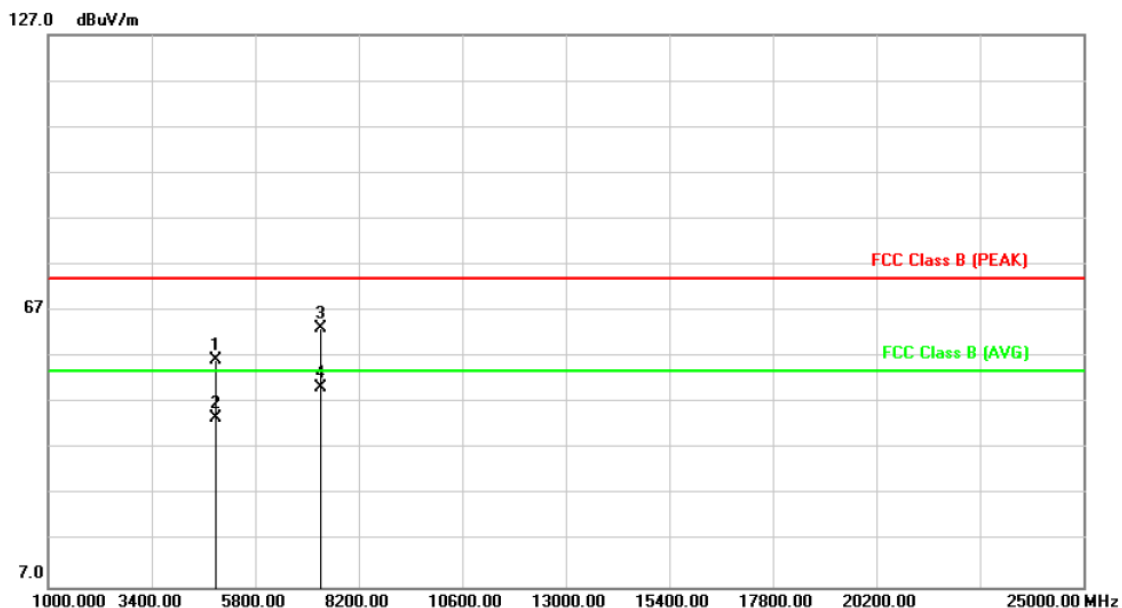
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive $\pi/4$ -DQPSK, CH39 (2Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4882.000	7.51	48.96	56.47	74.00	-17.53	peak	104	168
2	4882.000	7.51	36.13	43.64	54.00	-10.36	AVG	104	168
3	7323.000	12.66	50.48	63.14	74.00	-10.86	peak	104	168
4	7323.000	12.66	37.58	50.24	54.00	-3.76	AVG	104	168

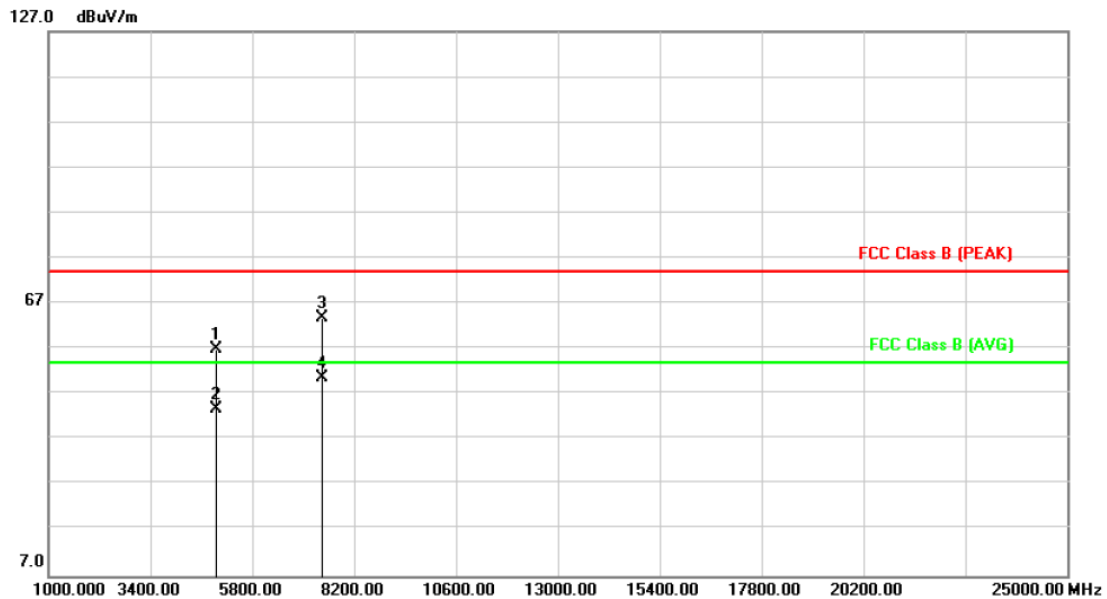
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive π/4-DQPSK, CH39 (2Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa

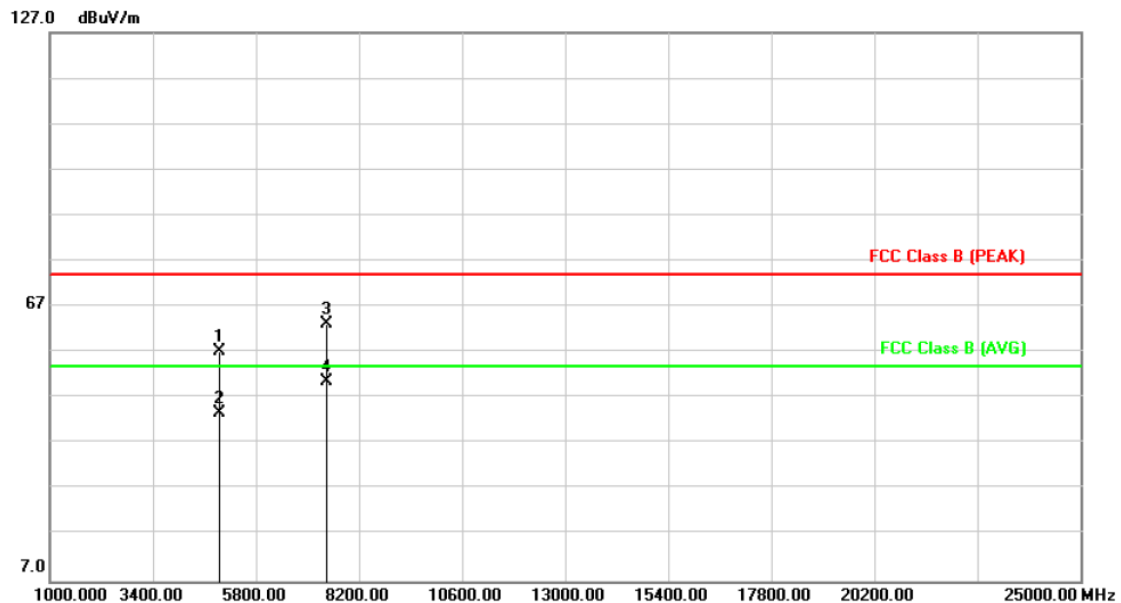


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4960.000	7.76	49.29	57.05	74.00	-16.95	peak	105	163
2	4960.000	7.76	36.10	43.86	54.00	-10.14	AVG	105	163
3	7440.000	13.16	50.58	63.74	74.00	-10.26	peak	105	163
4	7440.000	13.16	37.53	50.69	54.00	-3.31	AVG	105	163

Note: Level = Reading + Factor  
 Margin = Level – Limit  
 Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive GFSK, CH78 (3Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa

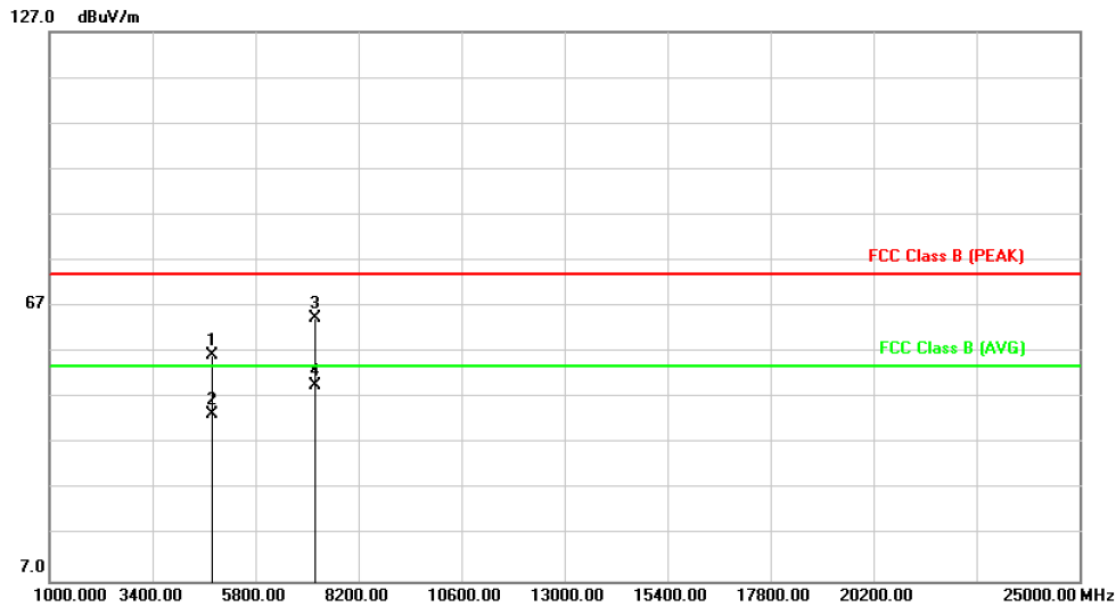


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4960.000	7.76	49.54	57.30	74.00	-16.70	peak	110	162
2	4960.000	7.76	36.09	43.85	54.00	-10.15	AVG	110	162
3	7440.000	13.16	50.12	63.28	74.00	-10.72	peak	110	162
4	7440.000	13.16	37.56	50.72	54.00	-3.28	AVG	110	162

Note: Level = Reading + Factor  
 Margin = Level – Limit  
 Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive 8DPSK, CH0 (3Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa



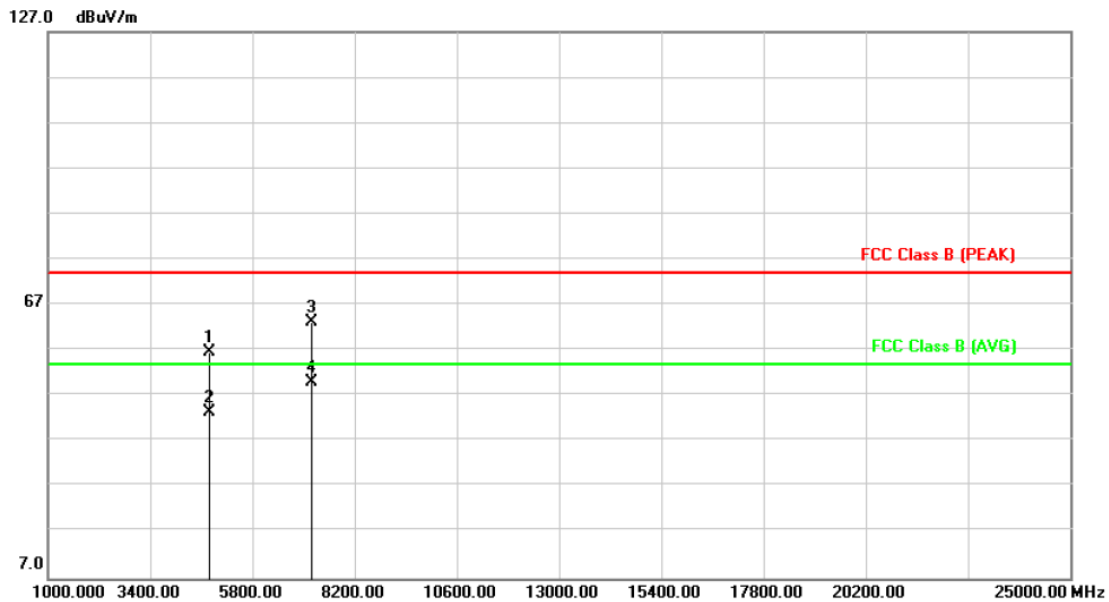
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4804.000	7.26	49.04	56.30	74.00	-17.70	peak	102	170
2	4804.000	7.26	36.08	43.34	54.00	-10.66	AVG	102	170
3	7206.000	12.18	52.14	64.32	74.00	-9.68	peak	102	170
4	7206.000	12.18	37.67	49.85	54.00	-4.15	AVG	102	170

Note: Level = Reading + Factor  
Margin = Level – Limit  
Factor= Antenna Factor + Cable Loss - Amplifier Factor





Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive 8DPSK, CH0 (3Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4804.000	7.26	49.50	56.76	74.00	-17.24	peak	103	165
2	4804.000	7.26	36.11	43.37	54.00	-10.63	AVG	103	165
3	7206.000	12.18	51.20	63.38	74.00	-10.62	peak	103	165
4	7206.000	12.18	37.74	49.92	54.00	-4.08	AVG	103	165

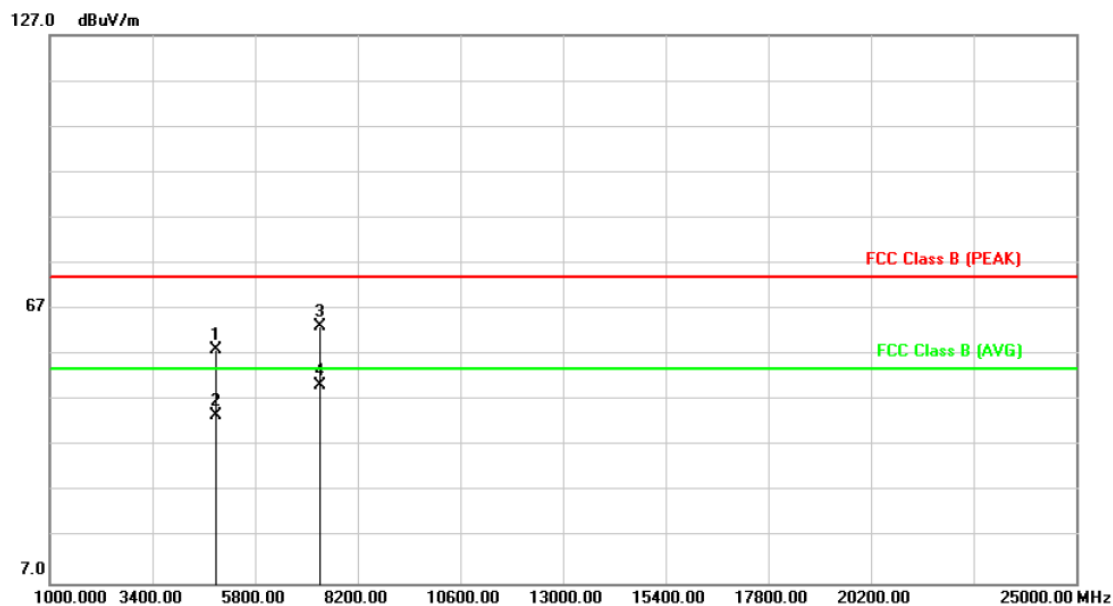
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive 8DPSK, CH39 (3Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4882.000	7.51	50.69	58.20	74.00	-15.80	peak	106	164
2	4882.000	7.51	36.12	43.63	54.00	-10.37	AVG	106	164
3	7323.000	12.66	50.56	63.22	74.00	-10.78	peak	106	164
4	7323.000	12.66	37.63	50.29	54.00	-3.71	AVG	106	164

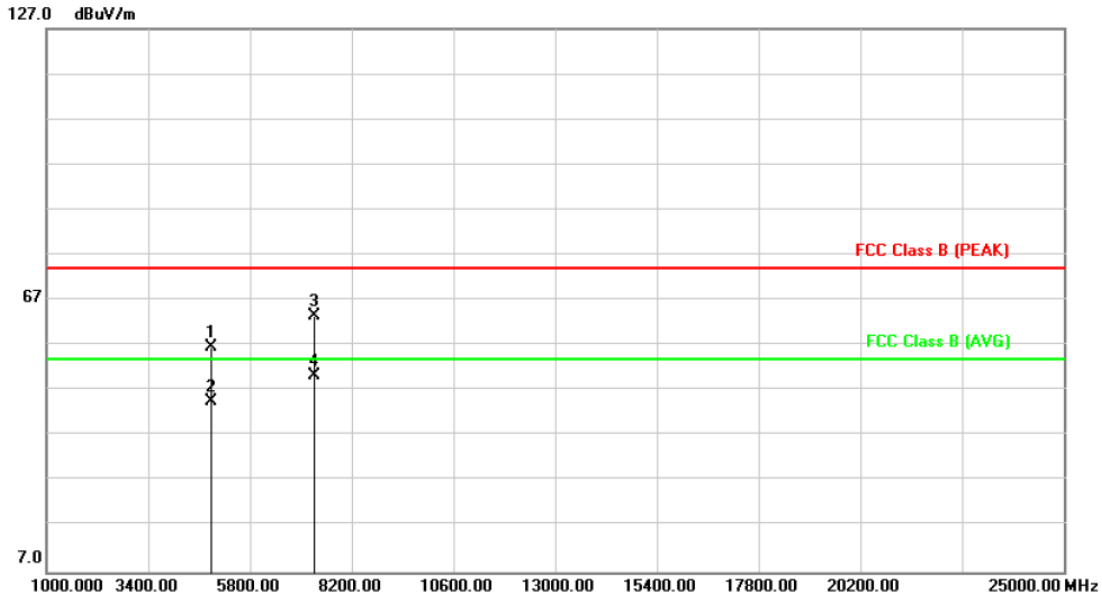
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive 8DPSK, CH39 (3Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa

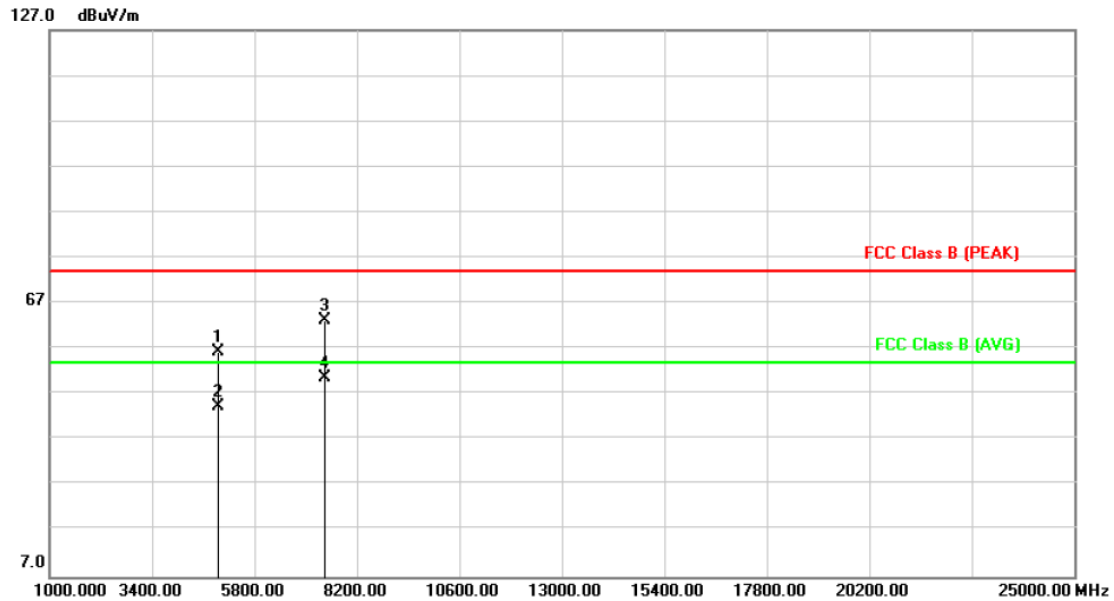


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4882.000	7.51	49.10	56.61	74.00	-17.39	peak	101	176
2	4882.000	7.51	37.13	44.64	54.00	-9.36	AVG	101	176
3	7323.000	12.66	51.01	63.67	74.00	-10.33	peak	101	176
4	7323.000	12.66	37.57	50.23	54.00	-3.77	AVG	101	176

Note: Level = Reading + Factor  
 Margin = Level – Limit  
 Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Transmit/ Receive 8DPSK, CH78 (3Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4960.000	7.76	48.46	56.22	74.00	-17.78	peak	104	170
2	4960.000	7.76	36.60	44.36	54.00	-9.64	AVG	104	170
3	7440.000	13.16	50.10	63.26	74.00	-10.74	peak	104	170
4	7440.000	13.16	37.52	50.68	54.00	-3.32	AVG	104	170

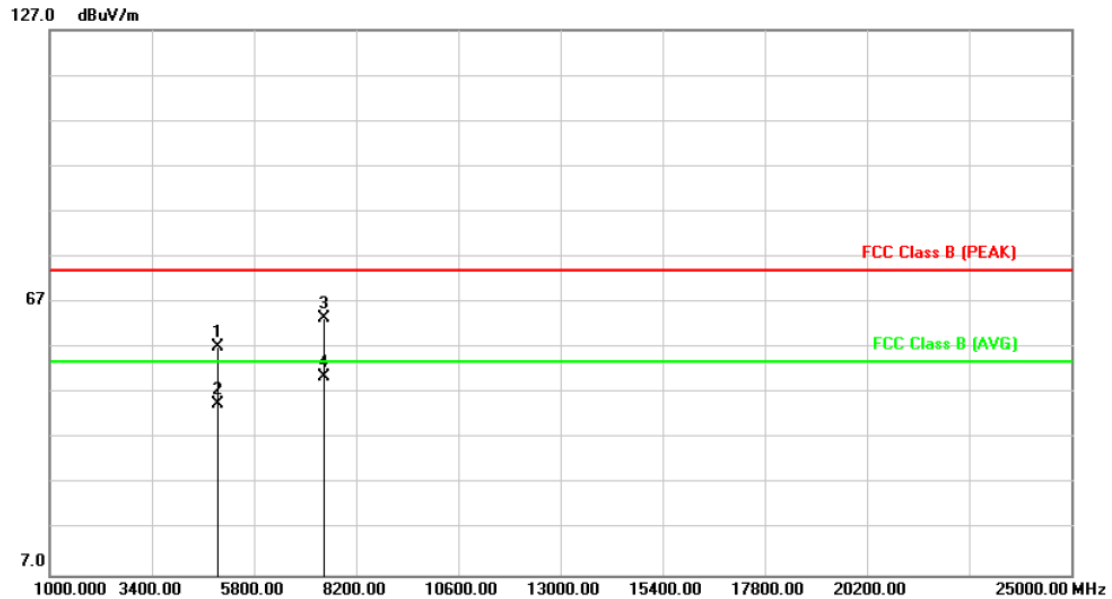
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit/ Receive 8DPSK, CH78 (3Mbps)	Temperature	: 24 °C
		Humidity	: 54 %
Test date	: Sep. 24, 2014	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	4960.000	7.76	49.57	57.33	74.00	-16.67	peak	102	162
2	4960.000	7.76	36.90	44.66	54.00	-9.34	AVG	102	162
3	7440.000	13.16	50.50	63.66	74.00	-10.34	peak	102	162
4	7440.000	13.16	37.42	50.58	54.00	-3.42	AVG	102	162

Note: Level = Reading + Factor  
Margin = Level – Limit  
Factor= Antenna Factor + Cable Loss - Amplifier Factor



## 6. 20dB Bandwidth Measurement Data

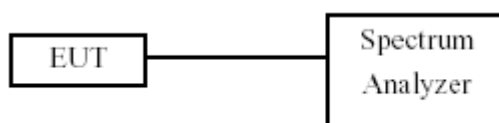
### 6.1 Test Limit

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.

### 6.2 Test Procedures

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

### 6.3 Test Setup Layout



### 6.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2014/03/27	2015/03/26



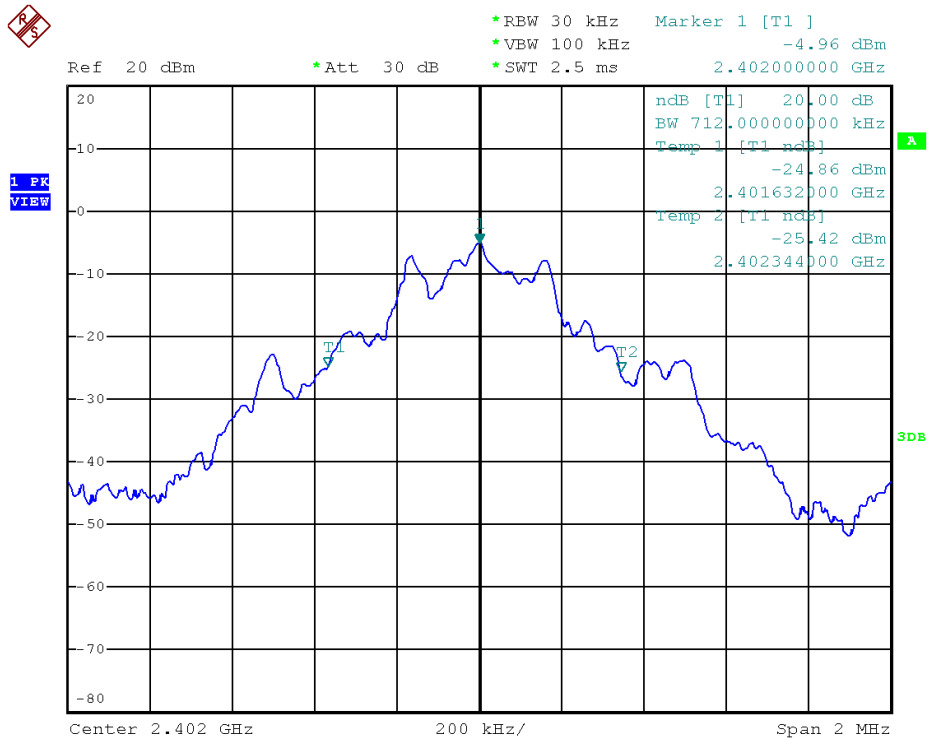
### 6.5 Test Result and Data

Test Date : Sep. 17, 2014      Temperature : 23°C  
Atmospheric pressure : 1087 hPa      Humidity : 54%

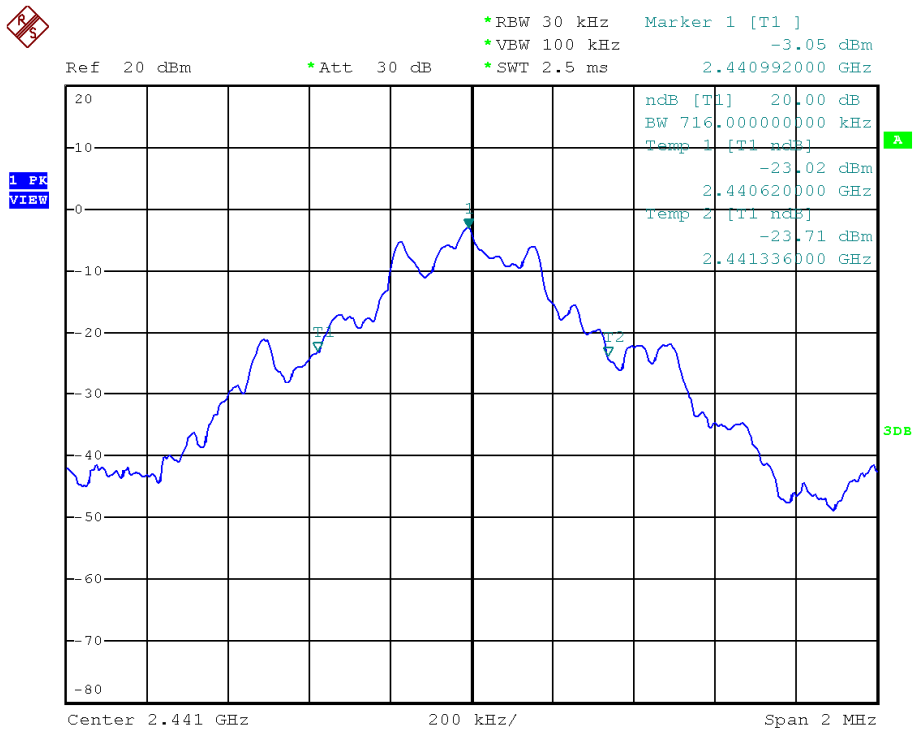
Modulation Type	Channel	Frequency (MHz)	20dB Bandwidth (KHz)	2/3 20dB Bandwidth(KHz)
GFSK (1Mbps)	00	2402	712.0	474.667
	39	2441	716.0	477.333
	78	2480	712.0	474.667
$\pi/4$ -DQPSK (2Mbps)	00	2402	1.320	880.000
	39	2441	1.340	893.333
	78	2480	1.336	890.667
8DPSK (3Mbps)	00	2402	1.344	896.000
	39	2441	1.324	882.667
	78	2480	1.312	874.667



Modulation Standard: GFSK (1Mbps)  
Channel: 00



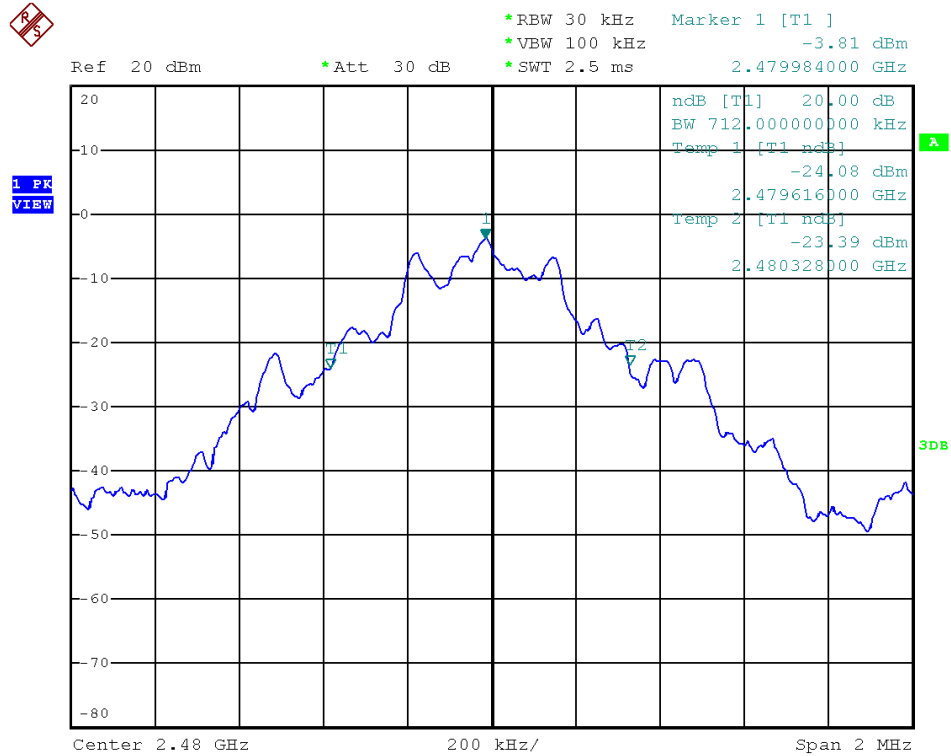
Modulation Standard: GFSK (1Mbps)  
Channel: 39



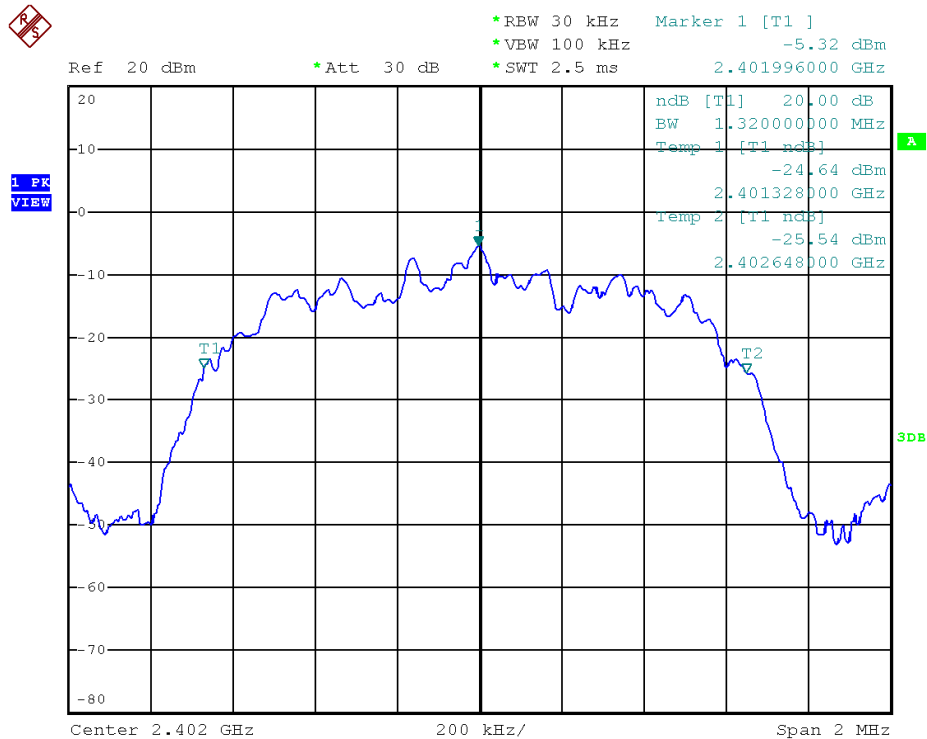




Modulation Standard: GFSK (1Mbps)  
Channel: 78

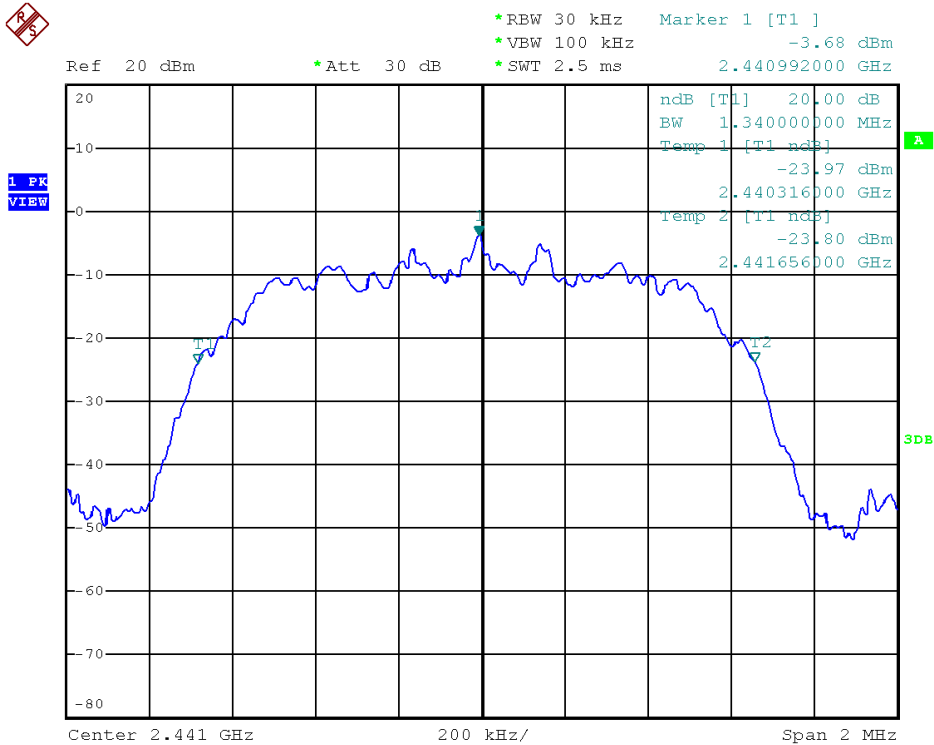


Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 00

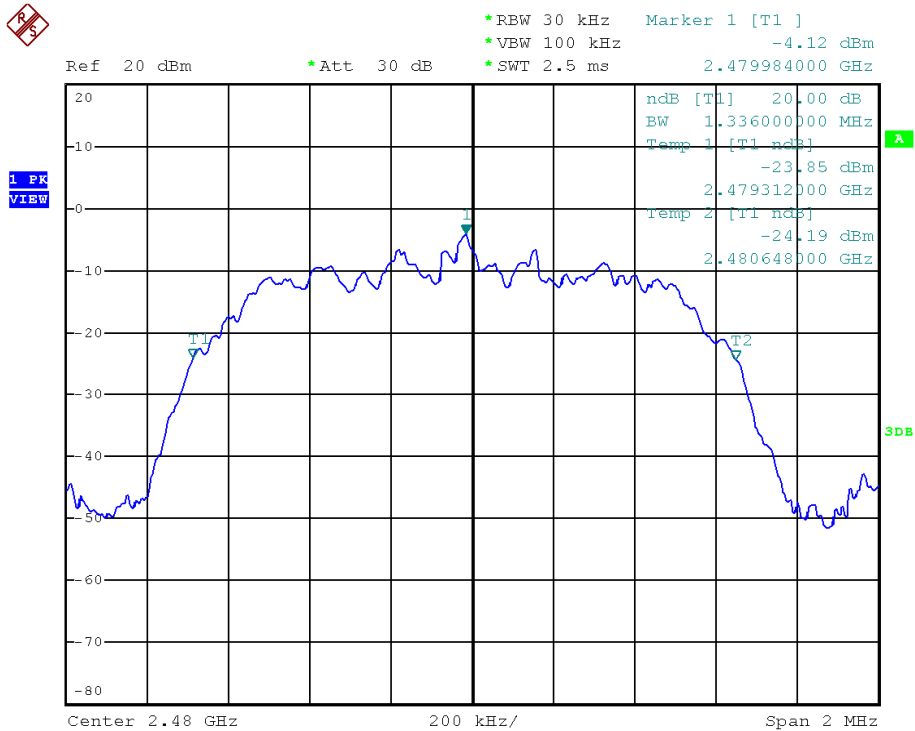




Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 39

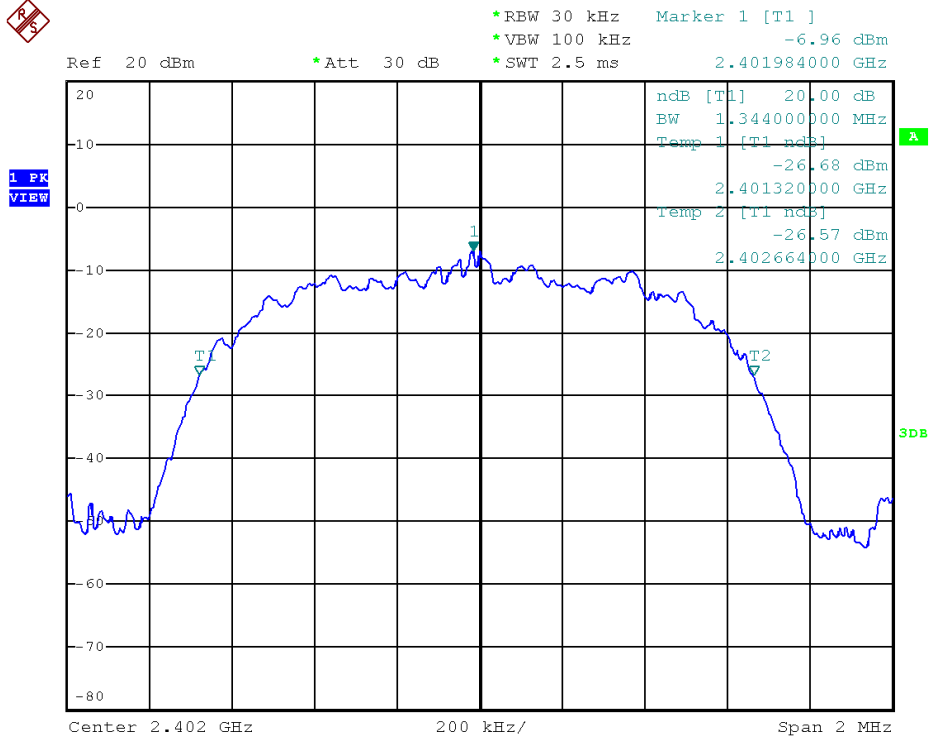


Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 78

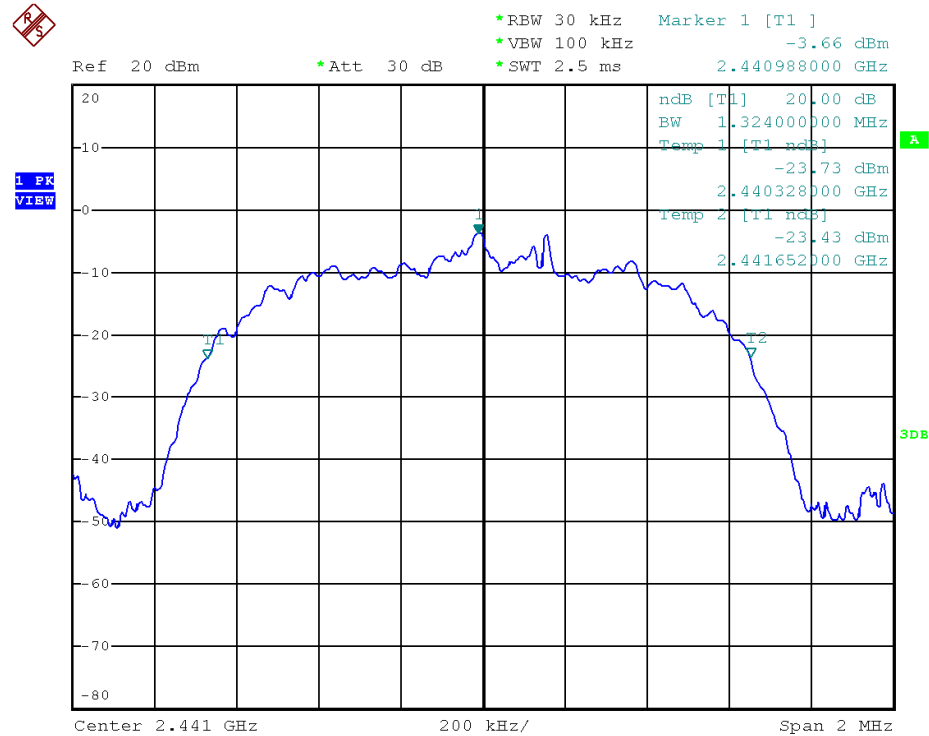




Modulation Standard: 8DPSK (3Mbps)  
Channel: 00

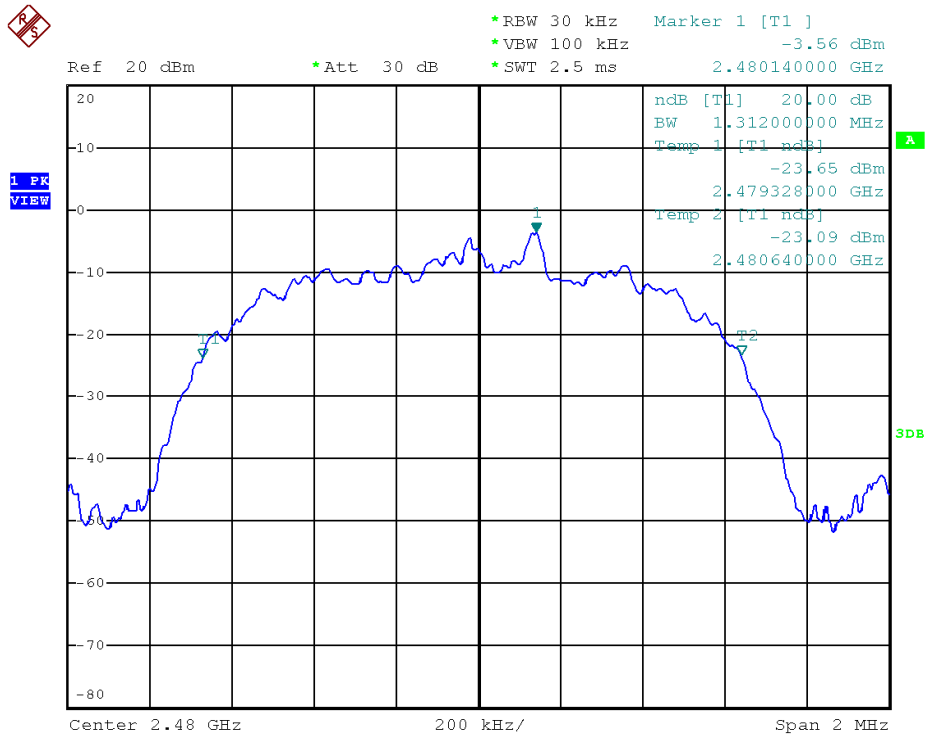


Modulation Standard: 8DPSK (3Mbps)  
Channel: 39





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





## 7. Frequencies Separation

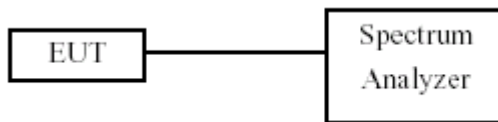
### 7.1 Test Limit

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.

### 7.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 100 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.

### 7.3 Test Setup Layout



### 7.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2014/03/27	2015/03/26

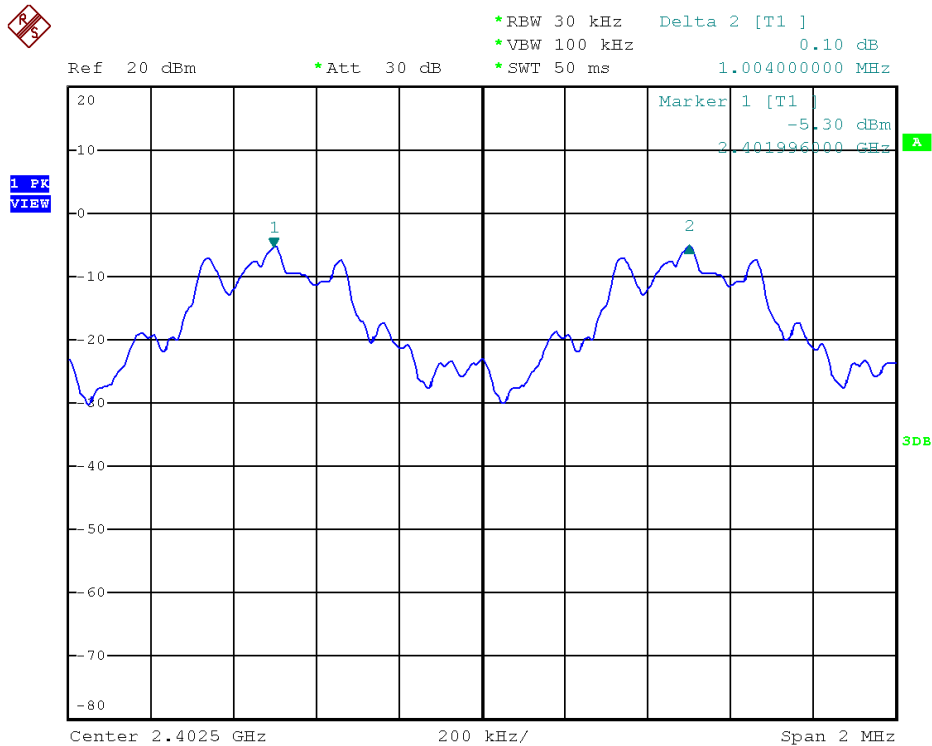
### 7.5 Test Result and Data

Test Date : Sep. 17, 2014      Temperature : 23°C  
 Atmospheric pressure : 1087 hPa      Humidity : 54%

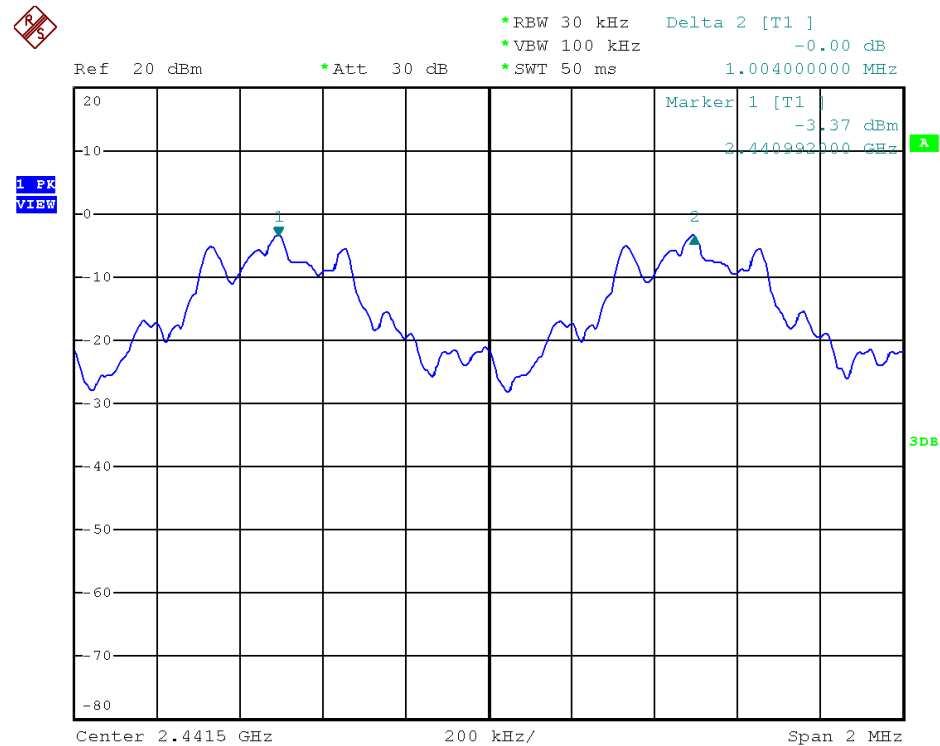
Modulation Type	Channel	Frequency (MHz)	Channel Separation (MHz)
GFSK (1Mbps)	00	2402	1.004
	39	2441	1.004
	78	2480	1.004
$\pi/4$ -DQPSK (2Mbps)	00	2402	1.004
	39	2441	1.004
	78	2480	1.004
8DPSK (3Mbps)	00	2402	1.160
	39	2441	1.004
	78	2480	1.004



Modulation Standard: GFSK (1Mbps)  
Channel: 00

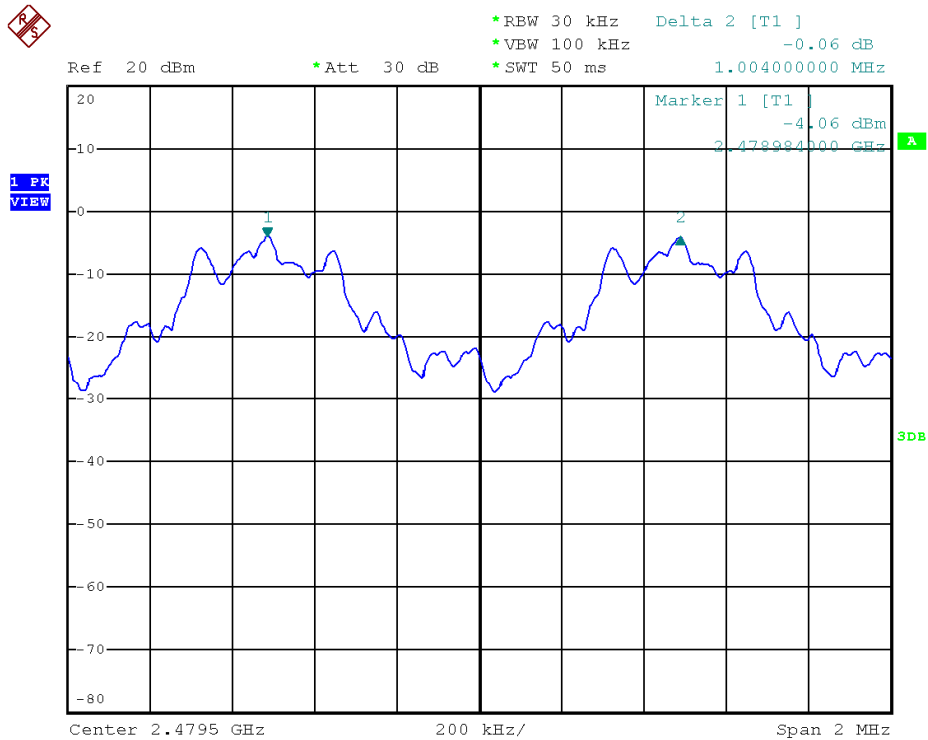


Modulation Standard: GFSK (1Mbps)  
Channel: 39

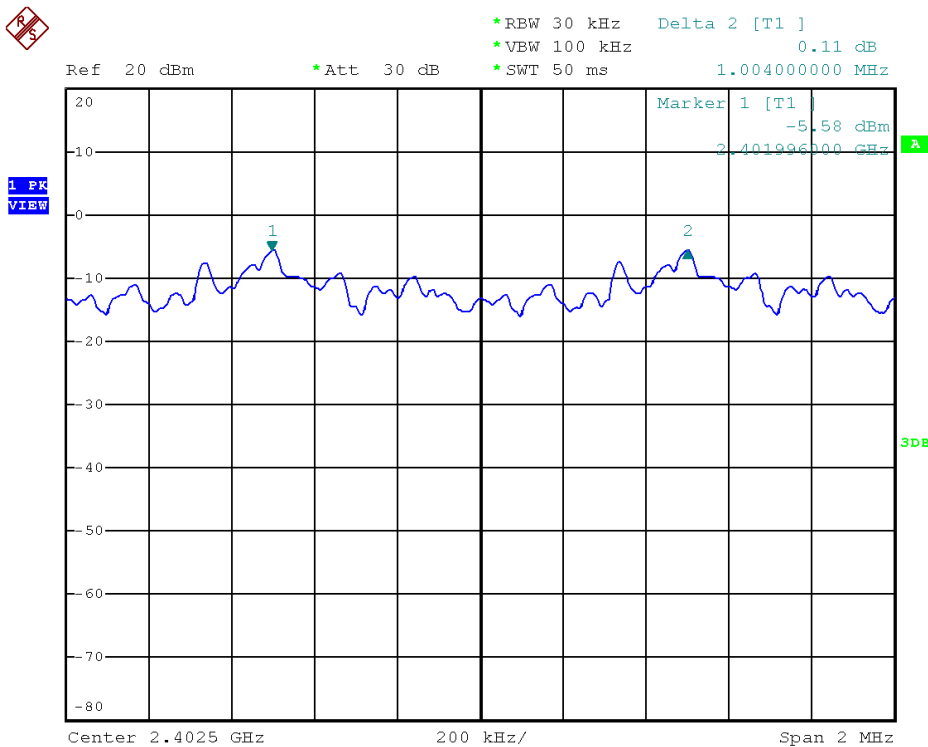




Modulation Standard: GFSK (1Mbps)  
Channel: 78

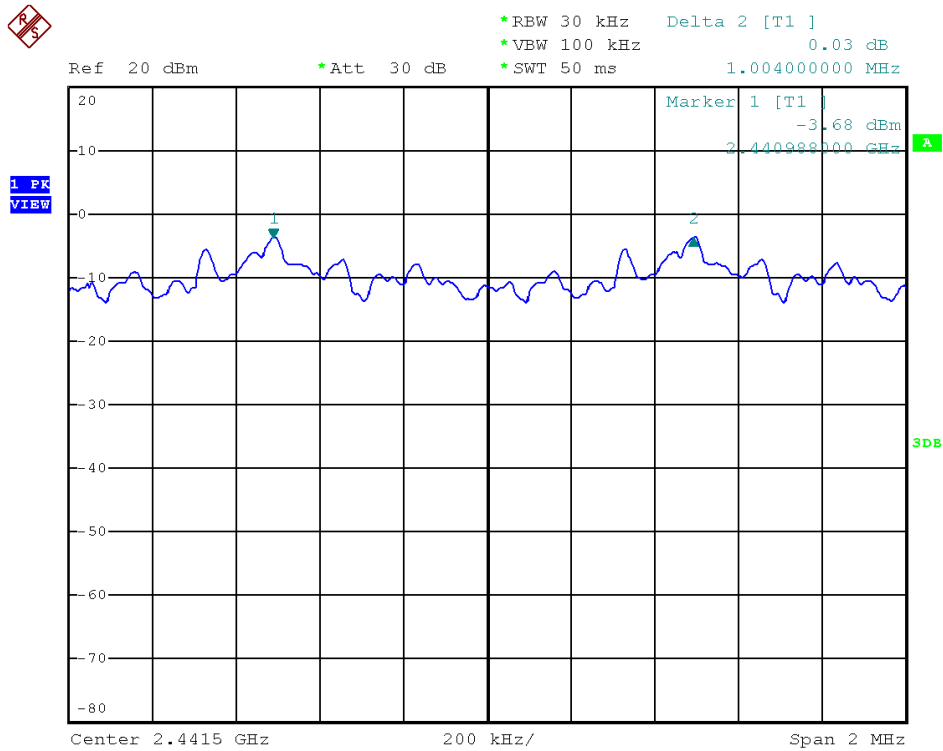


Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 00

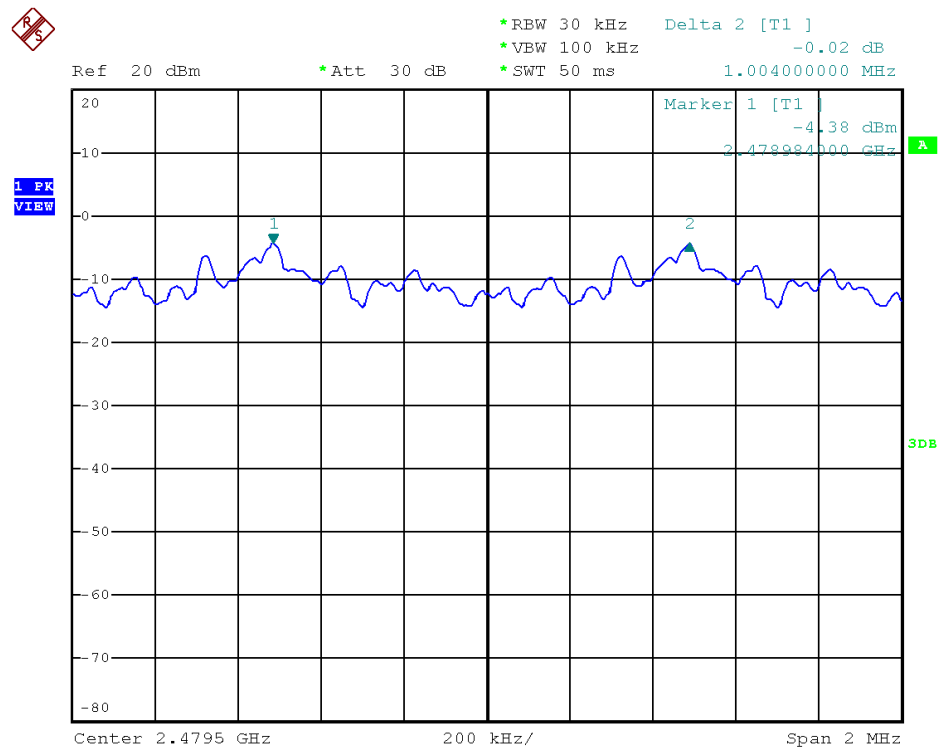




Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 39



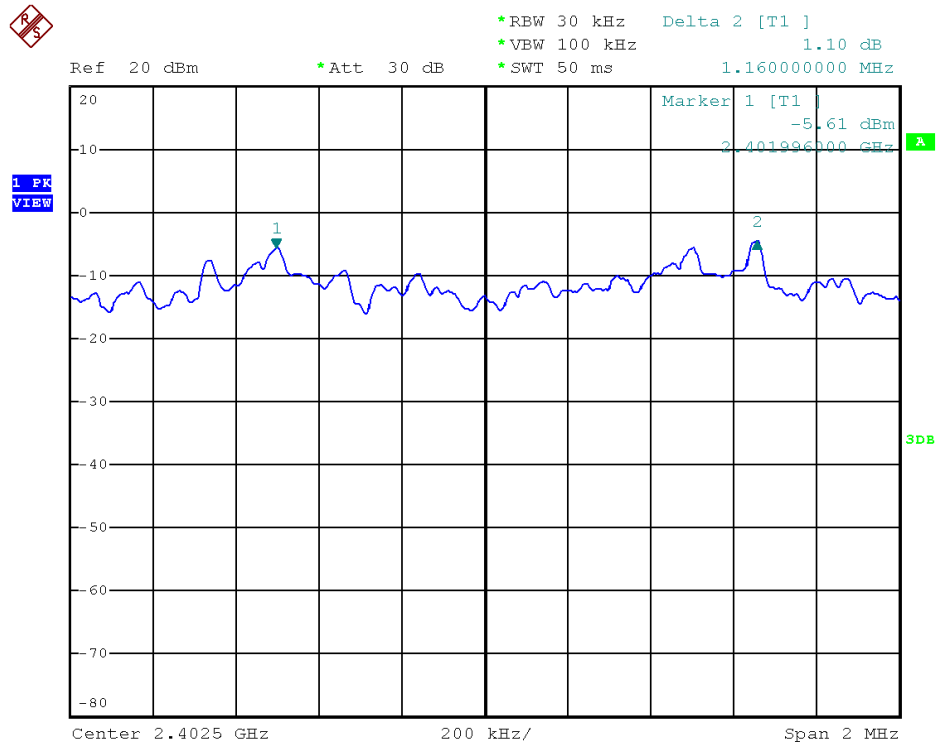
Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 78



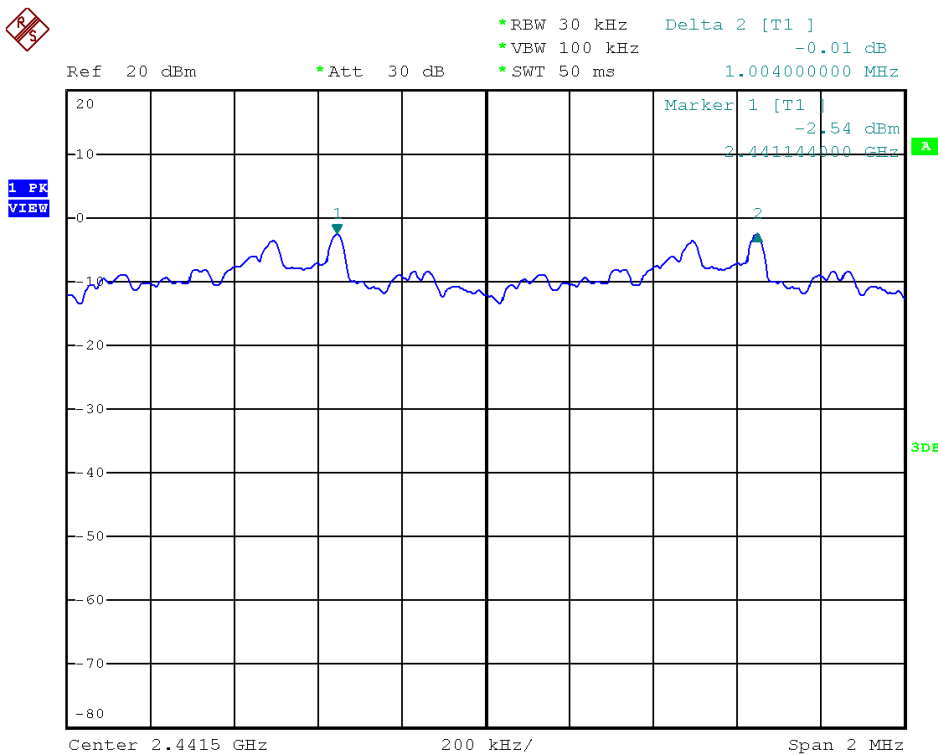




Modulation Standard: 8DQPSK (3Mbps)  
Channel: 00

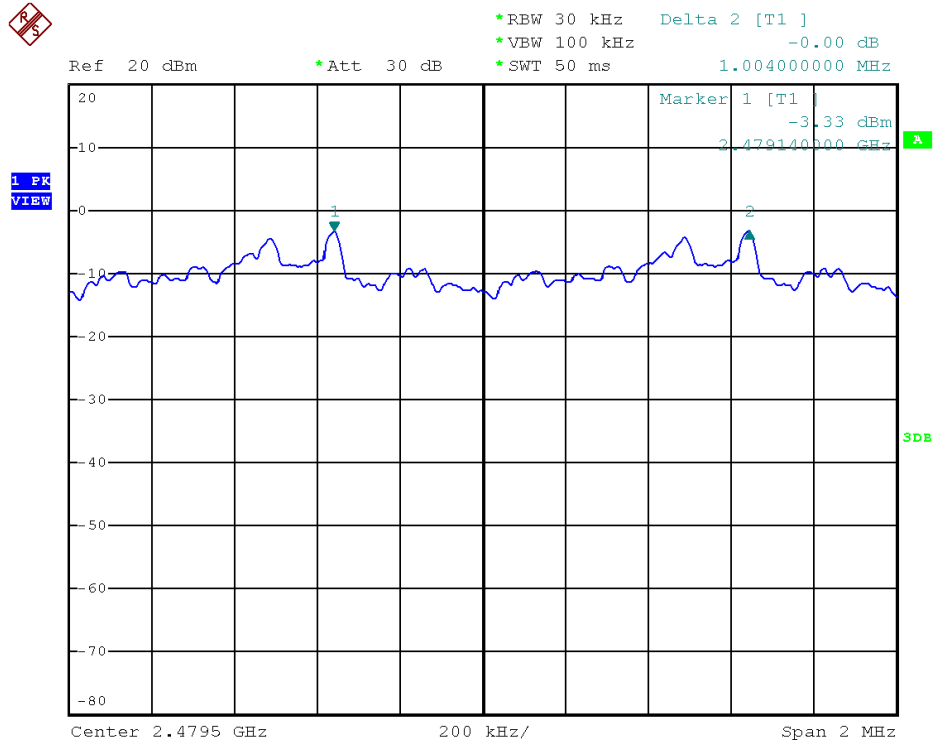


Modulation Standard: 8DQPSK (3Mbps)  
Channel: 39





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





## 8. Dwell Time on each channel

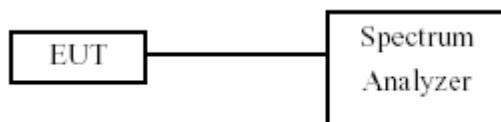
### 8.1 Test Limit

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.

### 8.2 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.

### 8.3 Test Setup Layout



### 8.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2014/03/27	2015/03/26



## 8.5 Test Result and Data

Test Date : Sep. 17, 2014      Temperature : 23°C  
Atmospheric pressure : 1087 hPa      Humidity : 54%  
Test Period = 0.4 (second/ channel) x 79 Channel = 31.6 sec

Modulation Type	Channel	Frequency (MHz)	Dwell Time (ms)
GFSK (DH1)	00	2402	124.80
	39	2441	124.80
	78	2480	124.80
GFSK (DH3)	00	2402	264.00
	39	2441	264.00
	78	2480	264.00
GFSK (DH5)	00	2402	309.87
	39	2441	309.87
	78	2480	309.87
$\pi/4$ -DQPSK (2DH5)	00	2402	309.87
	39	2441	309.87
	78	2480	309.87
8DPSK (3DH5)	00	2402	309.87
	39	2441	309.87
	78	2480	309.87

Test period: 0.4(second/ channel) x 79 channel=31.6 second

Example:

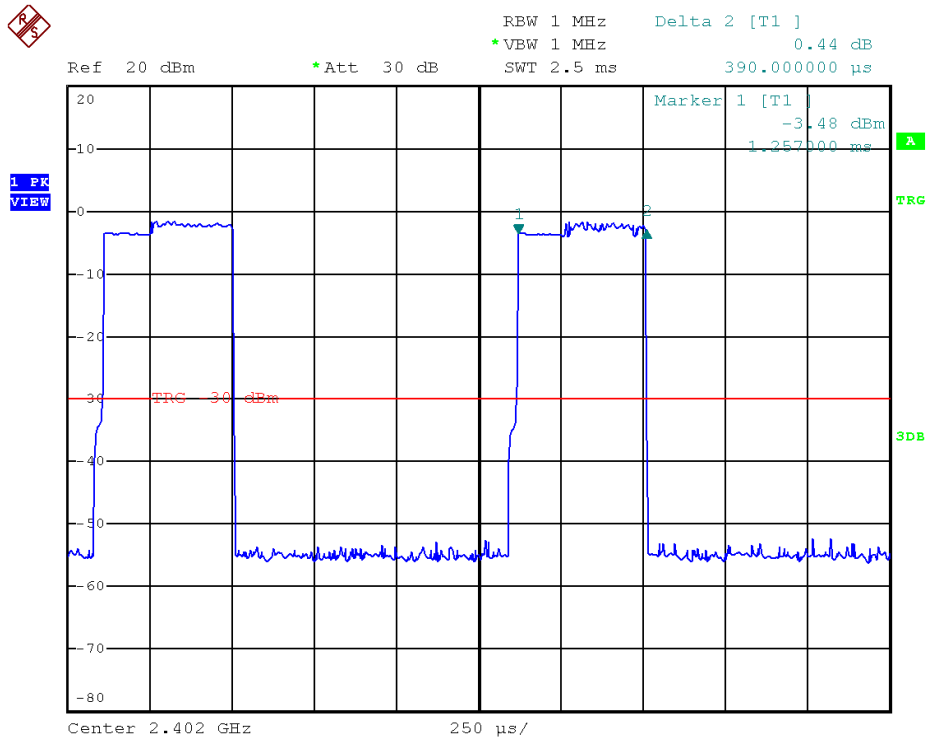
CH0,DH1 mode=  $0.390 \text{ (ms)} \times (1600/2)/79 \times 31.6 = 124.8 \text{ (ms)}$

CH0,DH3 mode =  $1.650 \text{ (ms)} \times (1600/4)/79 \times 31.6 = 264.00 \text{ (ms)}$

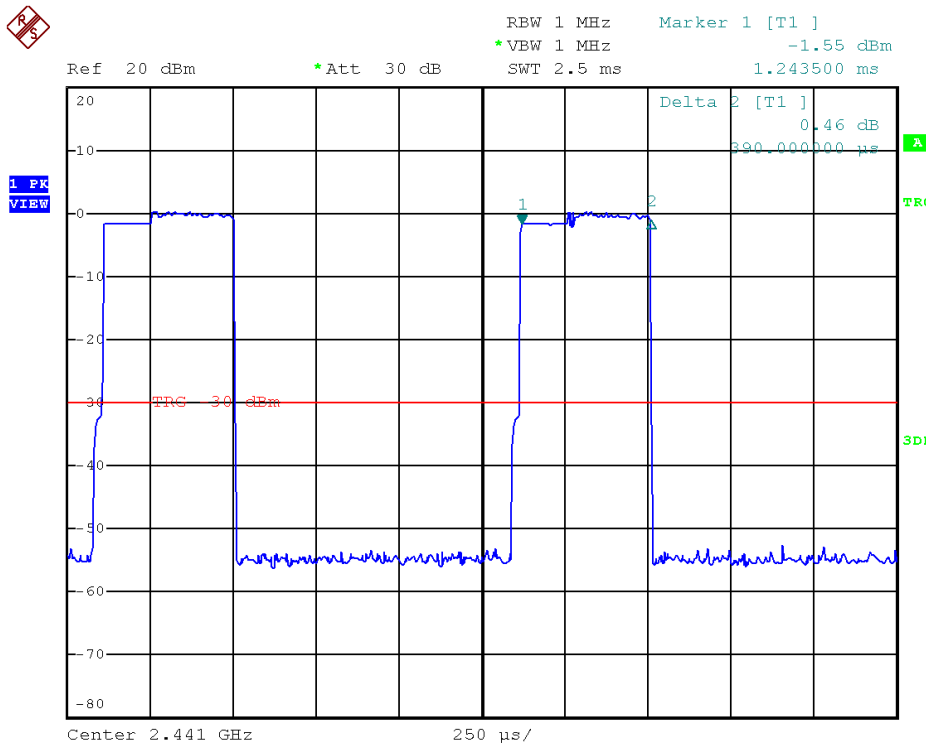
CH0,DH5 mode =  $2.905 \text{ (ms)} \times (1600/6)/79 \times 31.6 = 309.87 \text{ (ms)}$



Modulation Standard: GFSK (DH1)  
Channel: 00

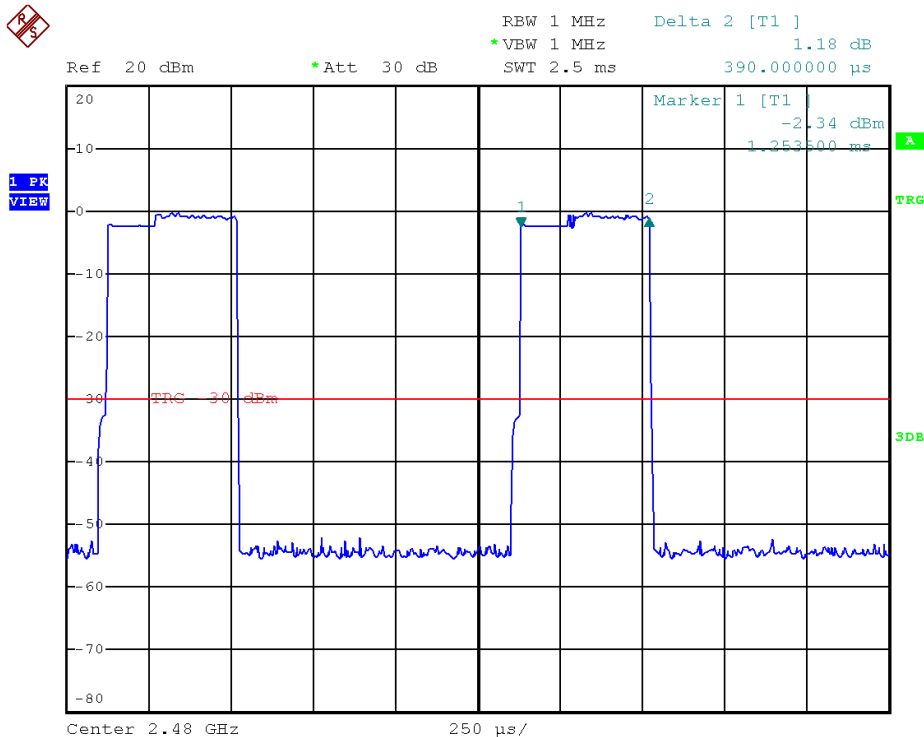


Modulation Standard: GFSK (DH1)  
Channel: 39

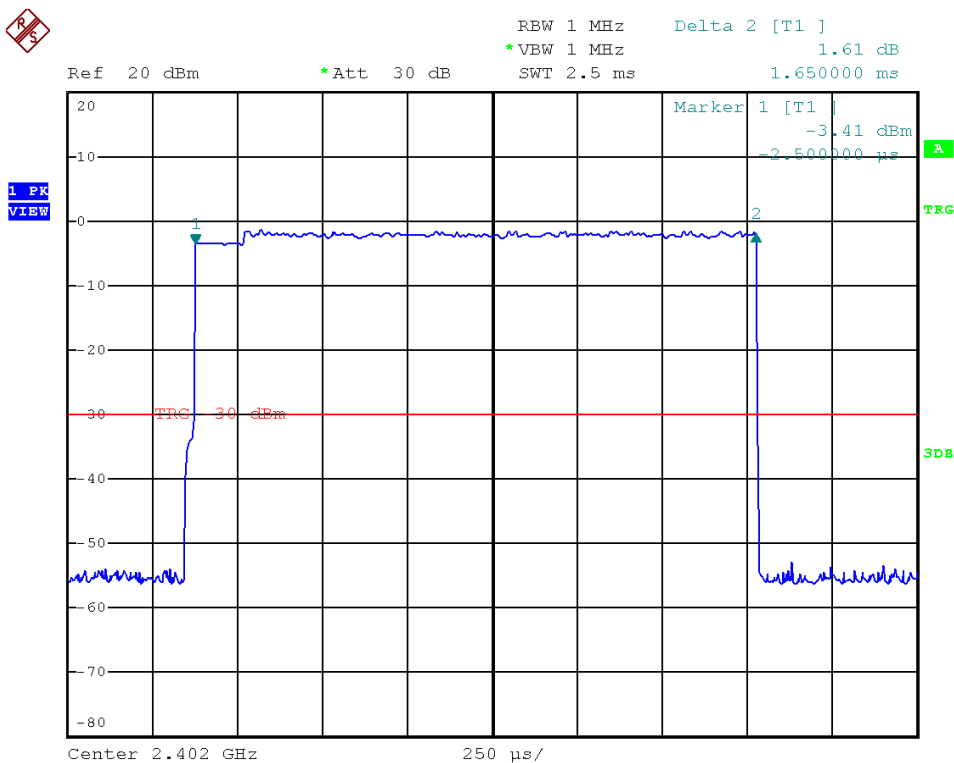




Modulation Standard: GFSK (DH1)  
Channel: 78

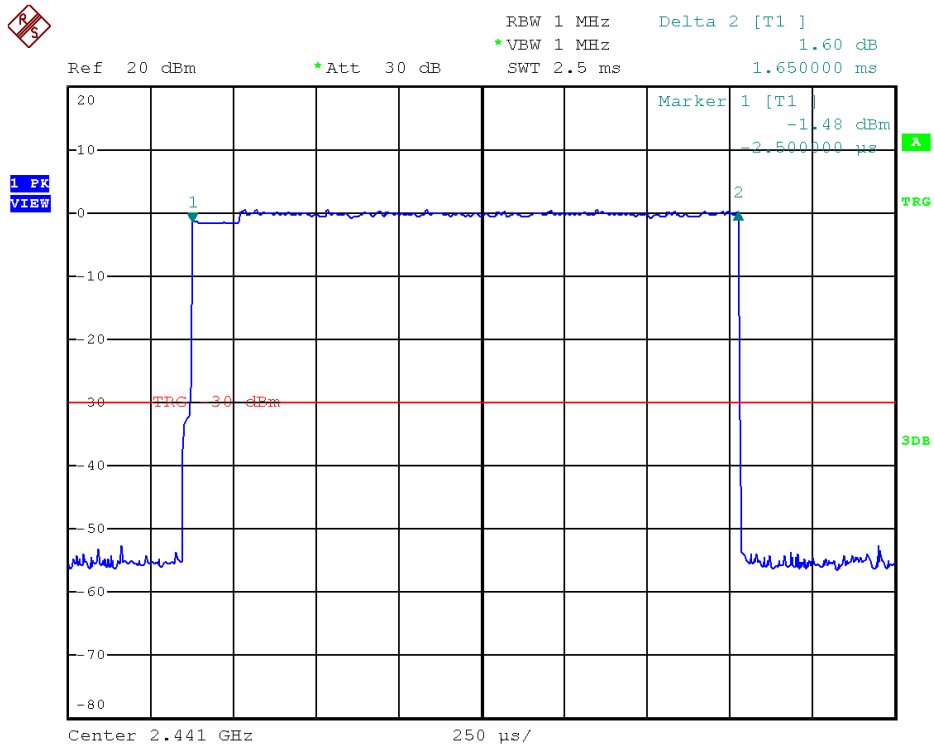


Modulation Standard: GFSK (DH3)  
Channel: 00

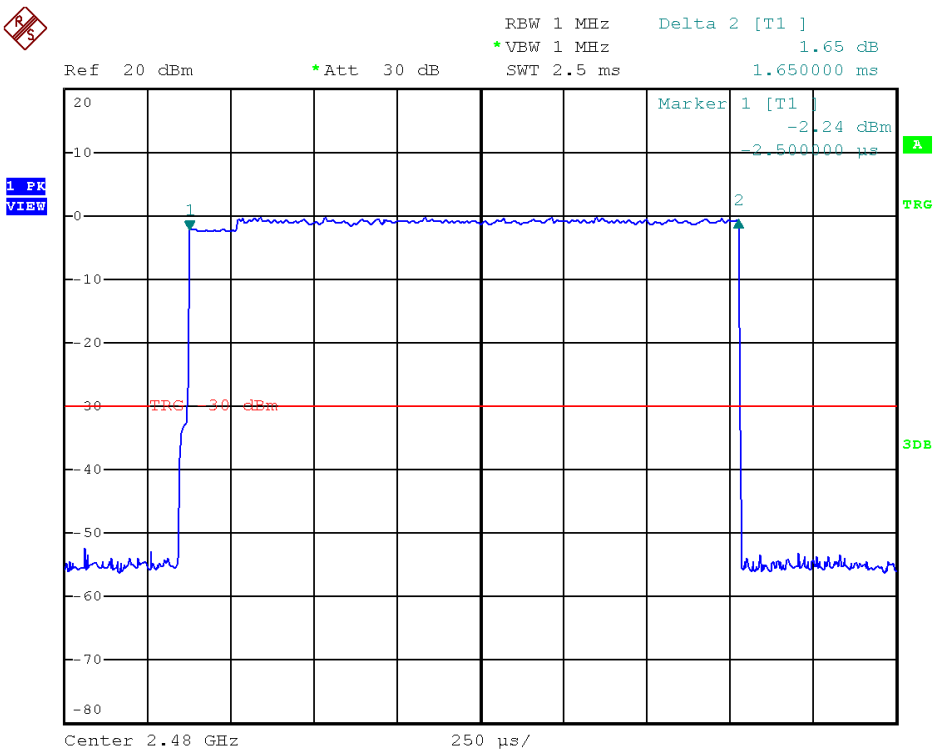




Modulation Standard: GFSK (DH3)  
Channel: 39

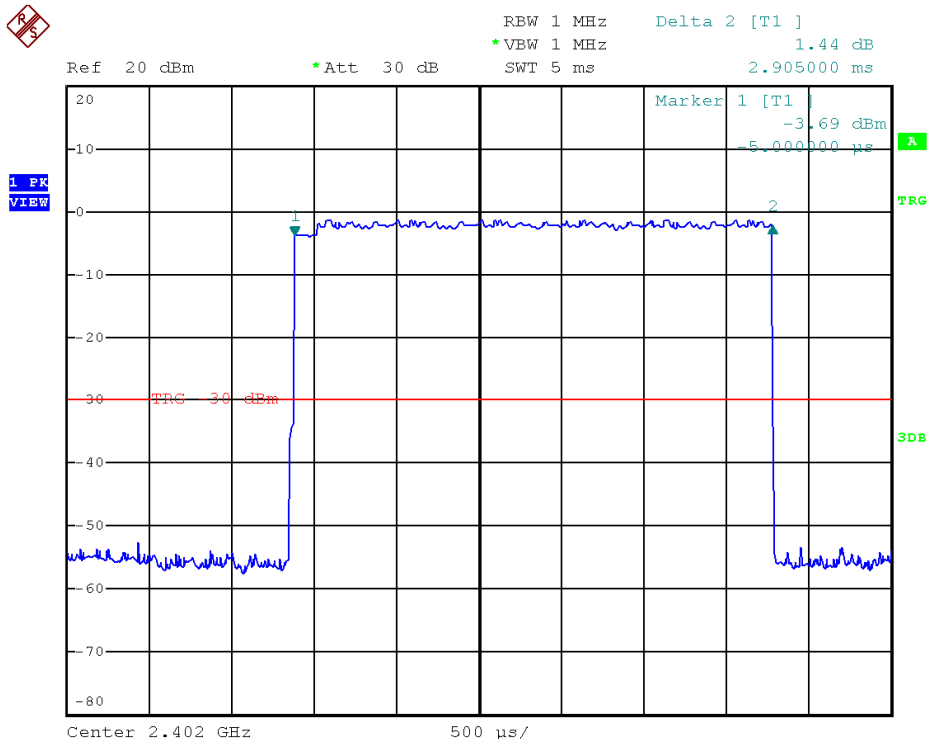


Modulation Standard: GFSK (DH3)  
Channel: 78

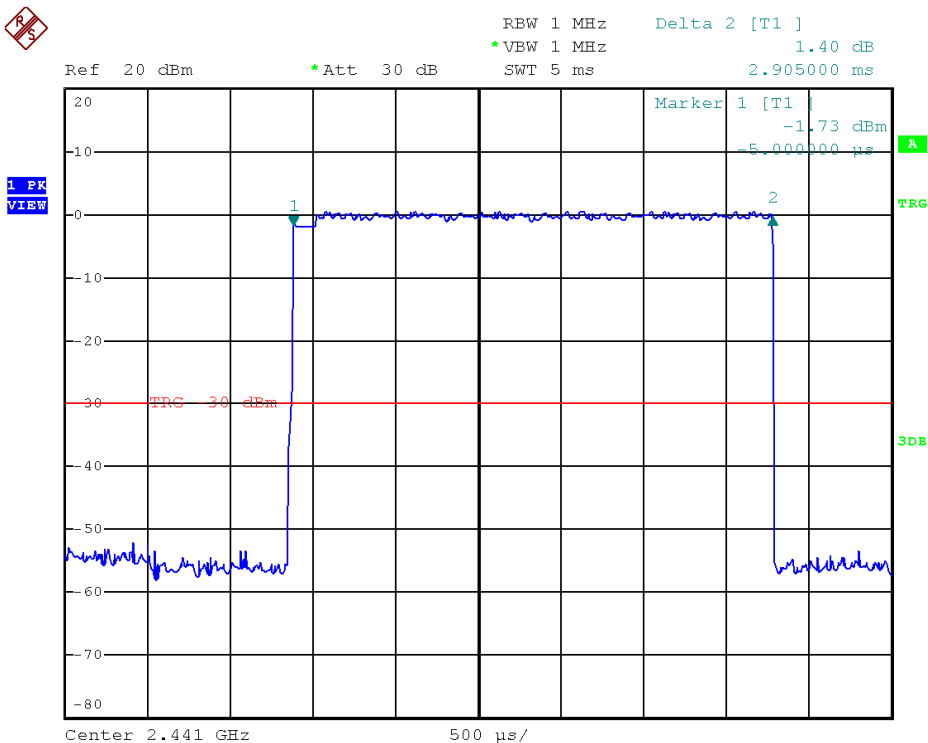




Modulation Standard: GFSK (DH5)  
Channel: 00



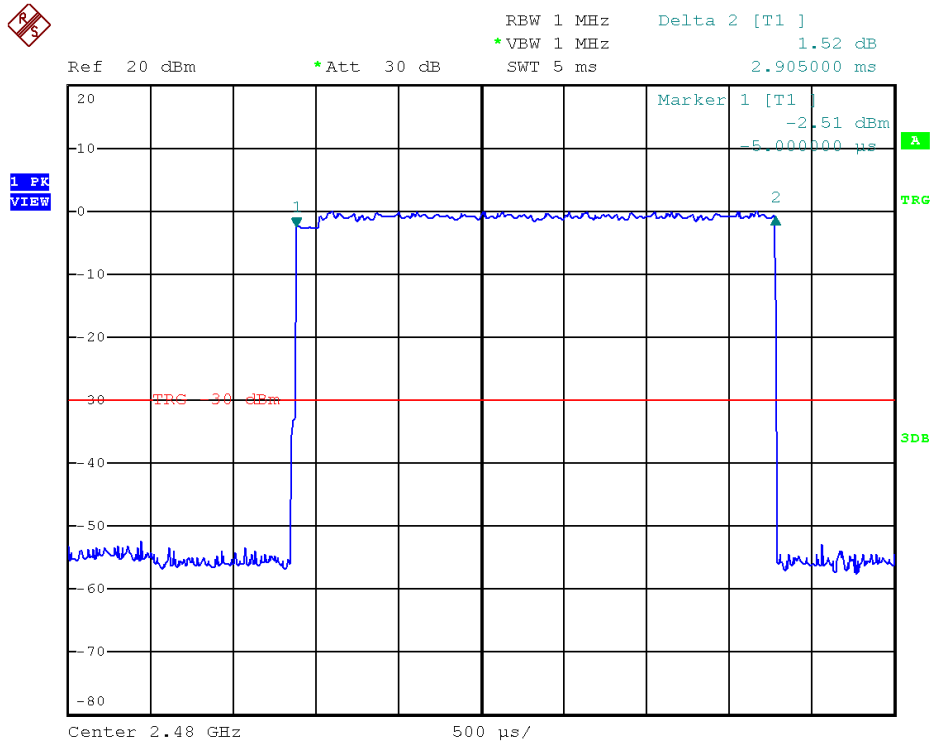
Modulation Standard: GFSK (DH5)  
Channel: 39



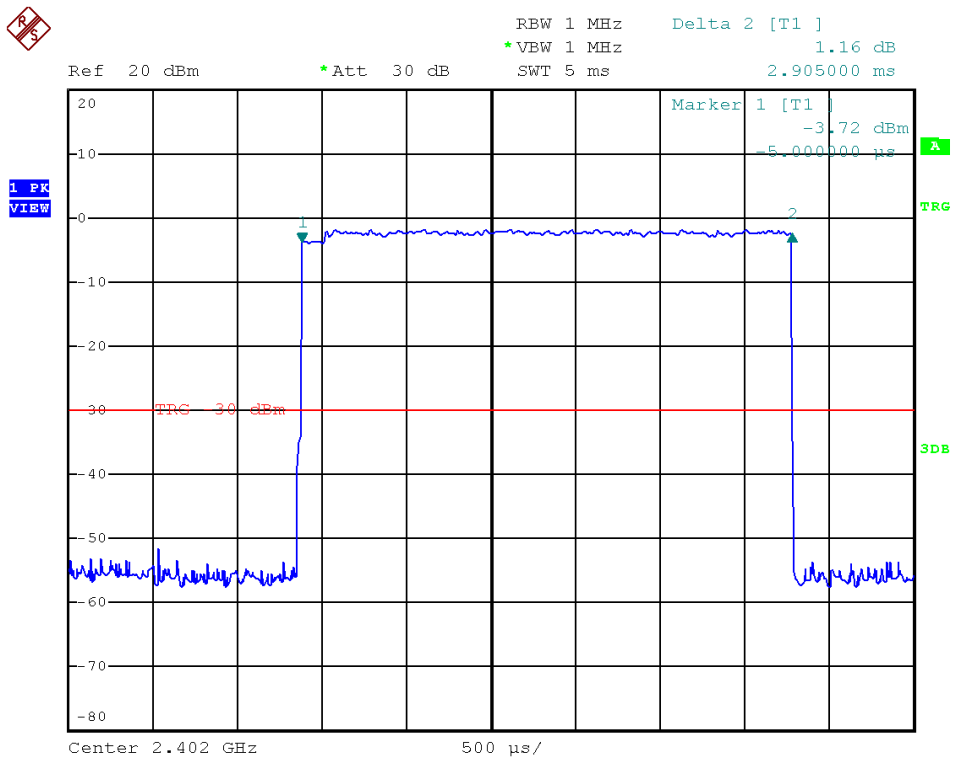




Modulation Standard: GFSK (DH5)  
Channel: 78

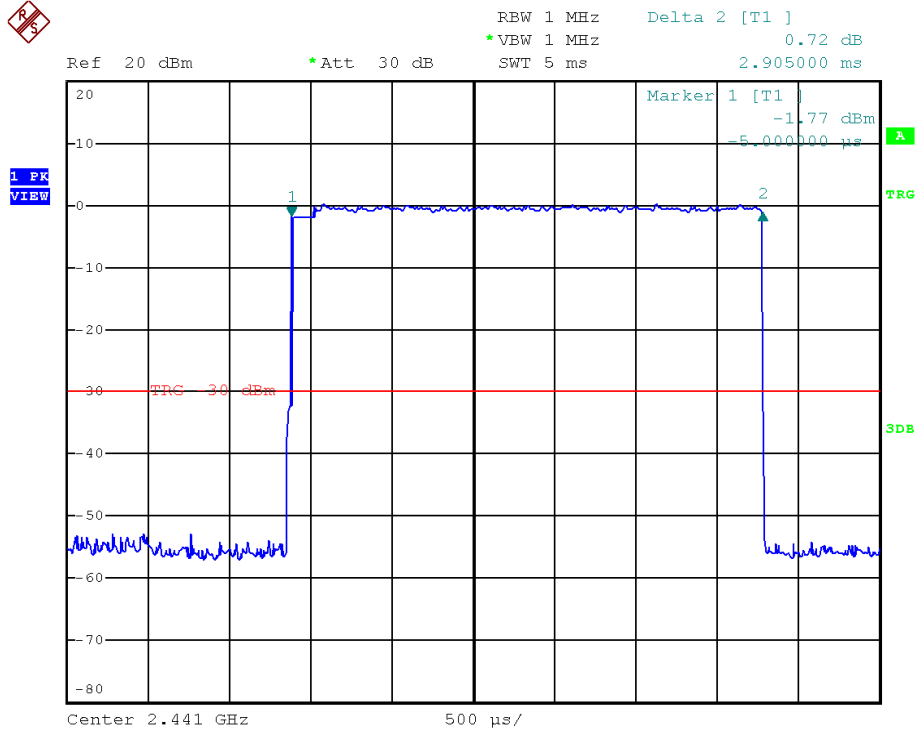


Modulation Standard:  $\pi/4$ -DQPSK (2DH5)  
Channel: 00

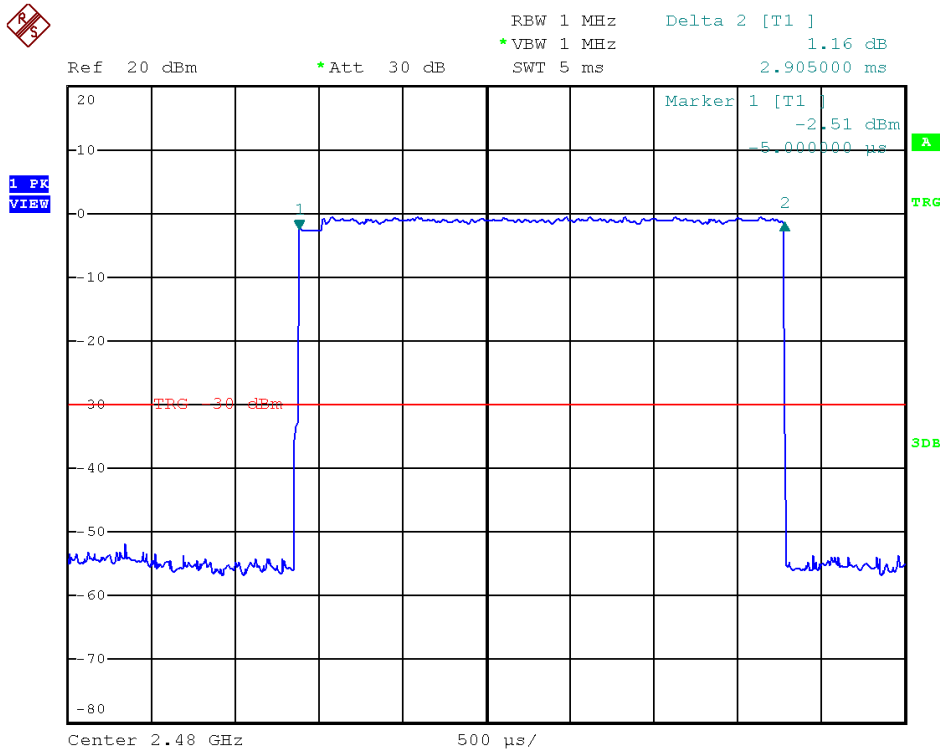




Modulation Standard:  $\pi/4$ -DQPSK (2DH5)  
Channel: 39

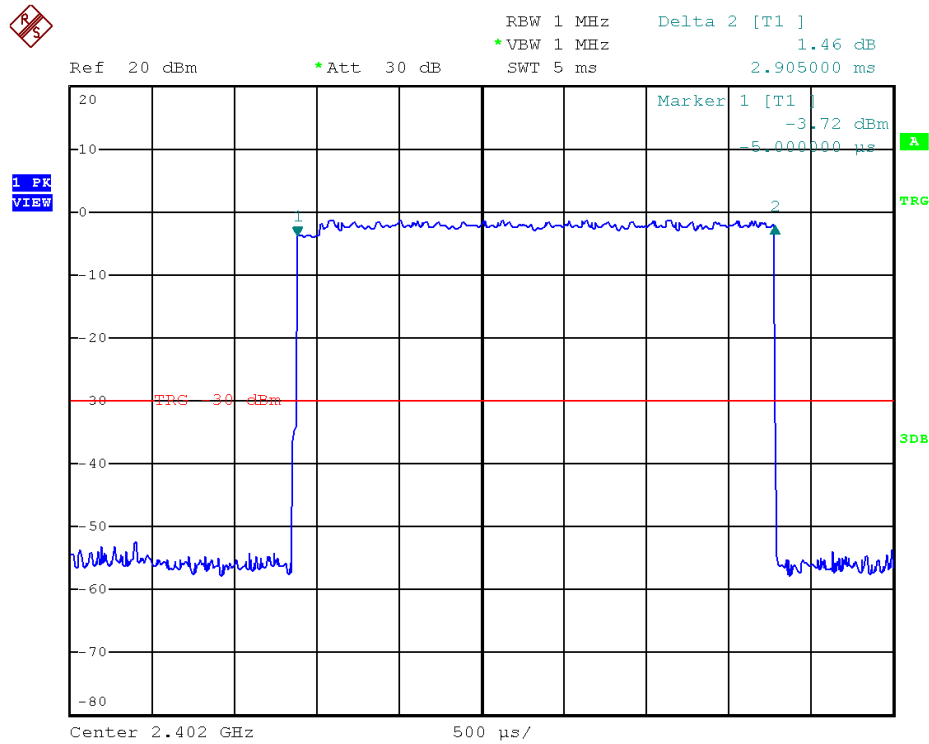


Modulation Standard:  $\pi/4$ -DQPSK (2DH5)  
Channel: 78

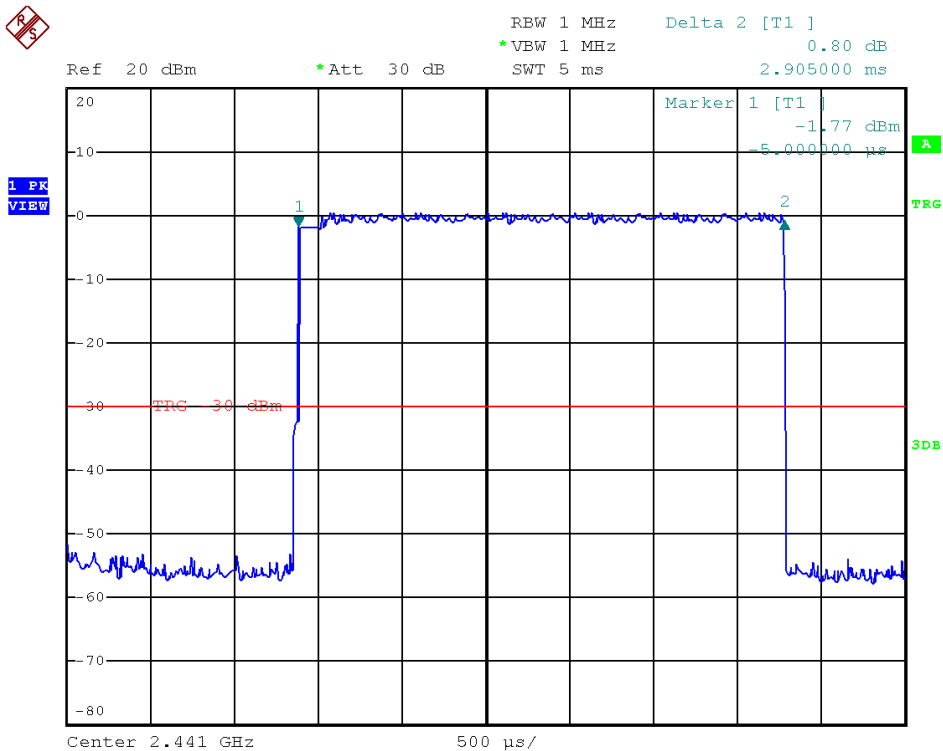




Modulation Standard: 8DPSK (3DH5)  
Channel: 00

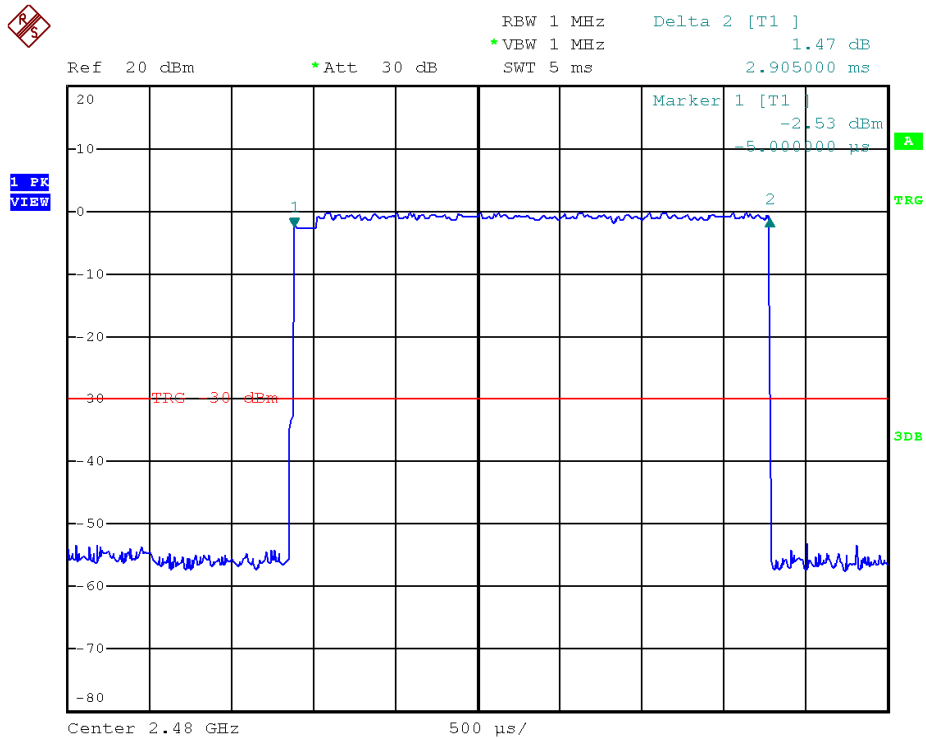


Modulation Standard: 8DPSK (3DH5)  
Channel: 39





Modulation Standard: 8DPSK (3DH5)  
Channel: 78





## 9. Number of Hopping Channels

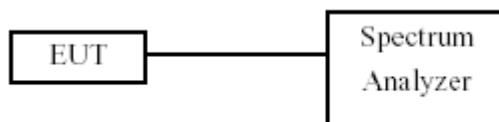
### 9.1 Test Limit

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

### 9.2 Test Procedures

- a. The transmitter output was connected to the spectrum analyzer.
- b. 2. Set RBW of spectrum analyzer to 100 KHz and VBW to 100 KHz.
- c. 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.

### 9.3 Test Setup Layout



### 9.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2014/03/27	2015/03/26

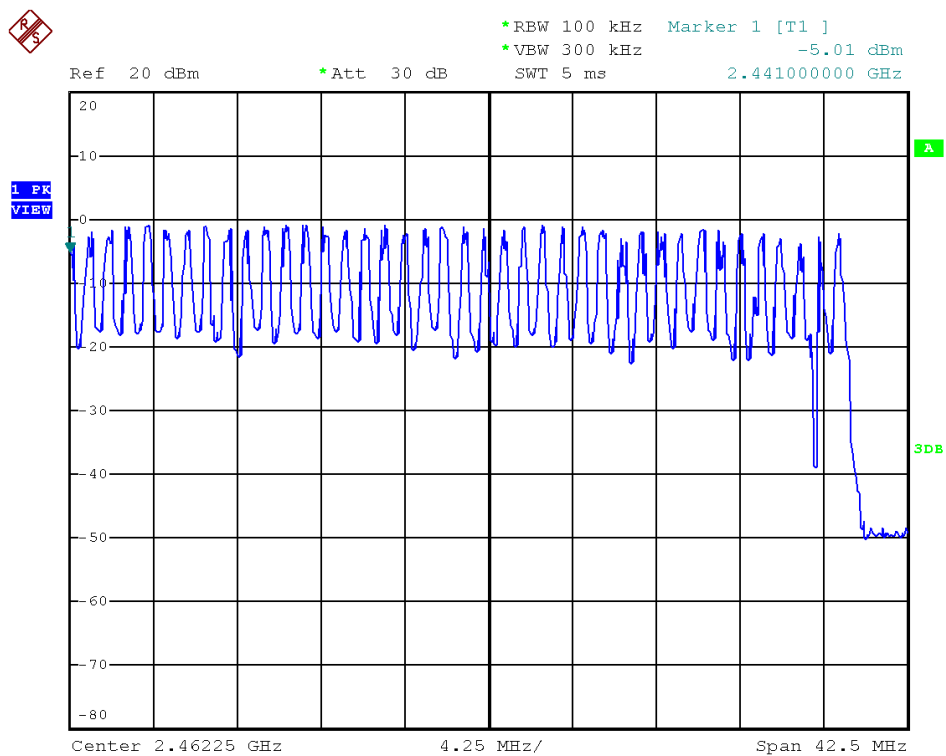
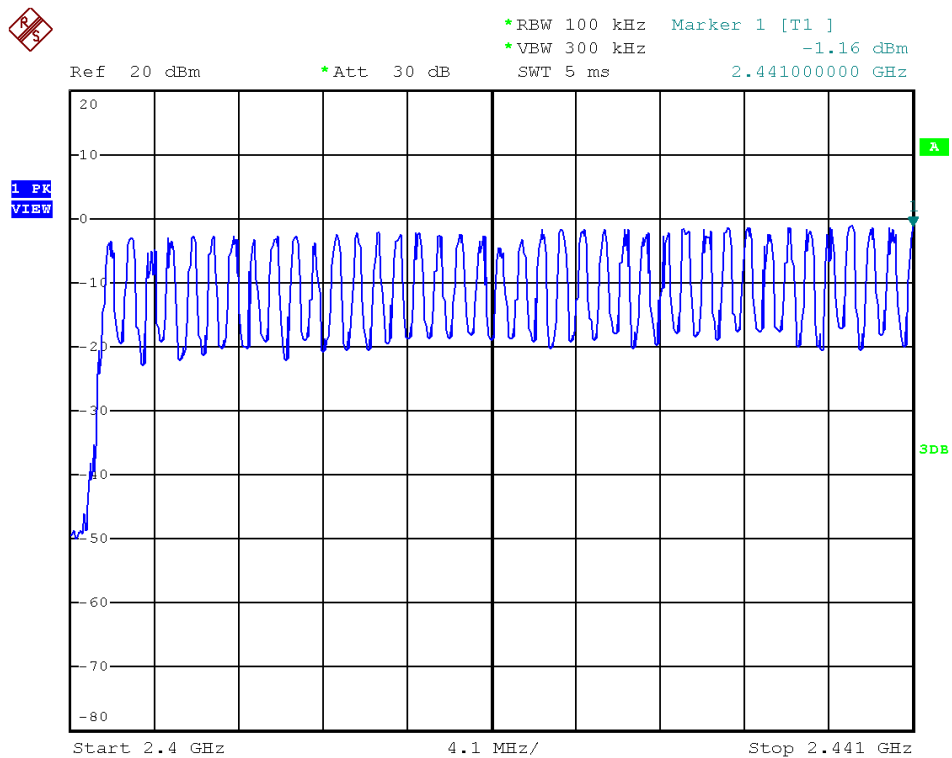
### 9.5 Test Result and Data

Test Date : Sep. 17, 2014      Temperature : 23°C  
 Atmospheric pressure : 1087 hPa      Humidity : 54%

Modulation Type	Hopping Channels
GFSK (1Mbps)	79
$\pi/4$ -DQPSK (2Mbps)	79
8DPSK (3Mbps)	79

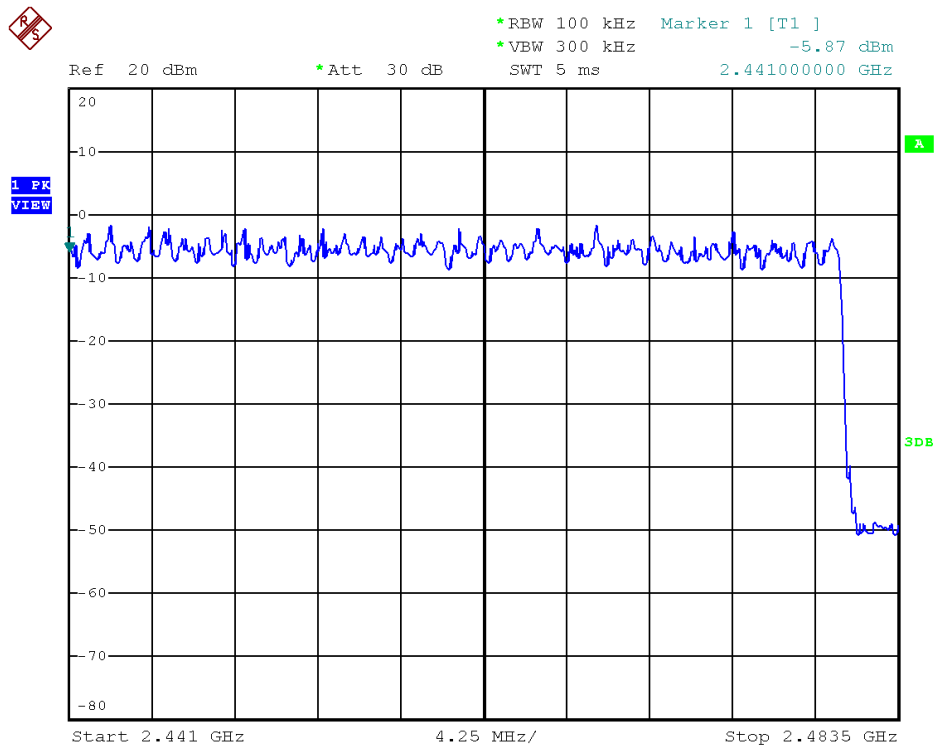
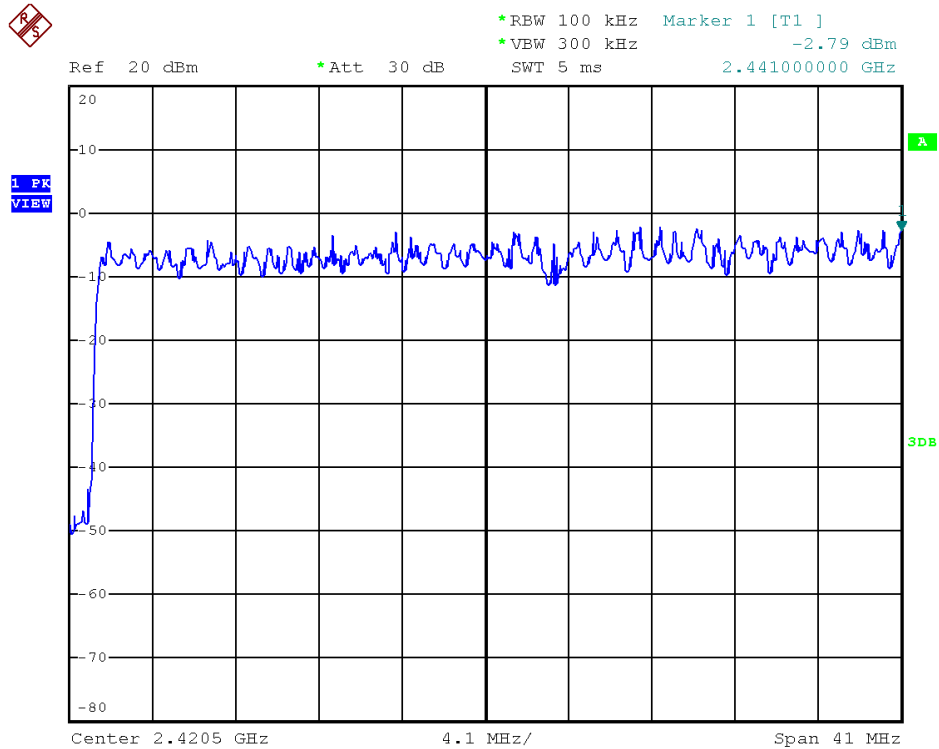


Modulation Standard: GFSK (1Mbps)



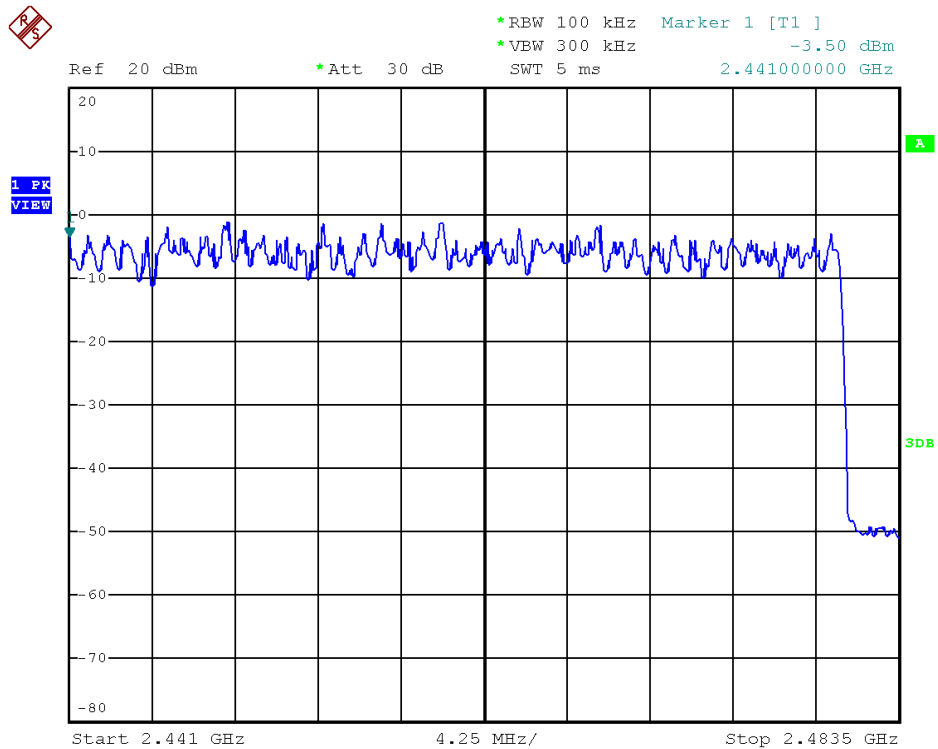
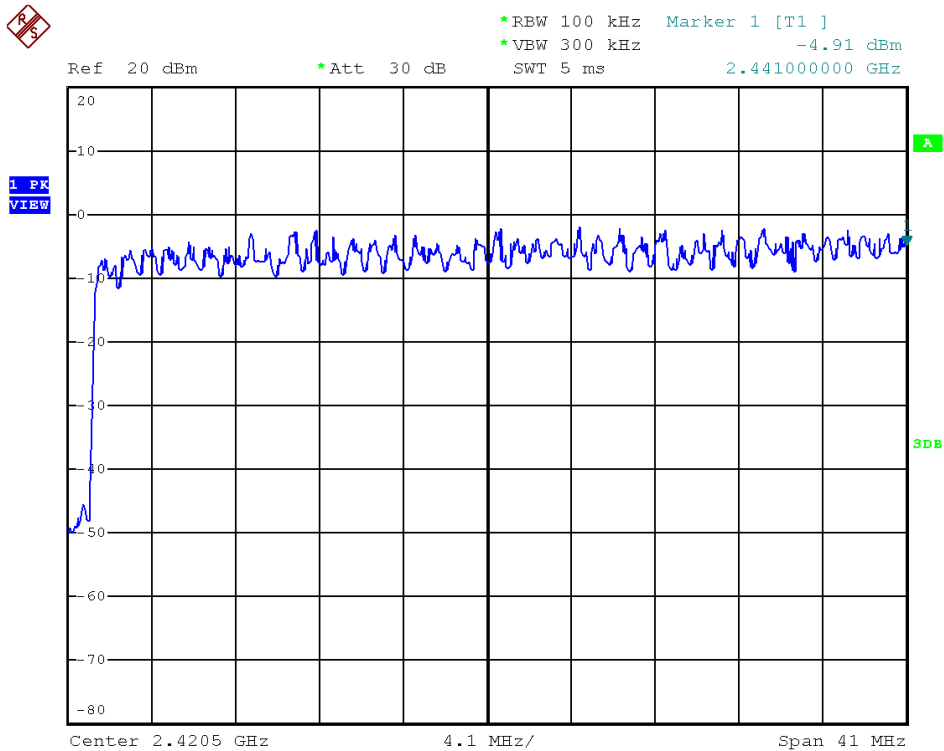


Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)





Modulation Standard: 8DPSK (3Mbps)







## 10. Maximum Peak Output Power

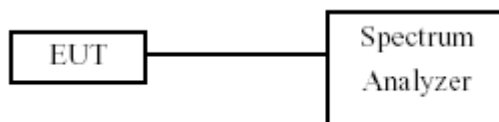
### 10.1 Test Limit

The Maximum Peak Output Power Measurement is 30dBm.

### 10.2 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.

### 10.3 Test Setup Layout



### 10.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2014/03/27	2015/03/26

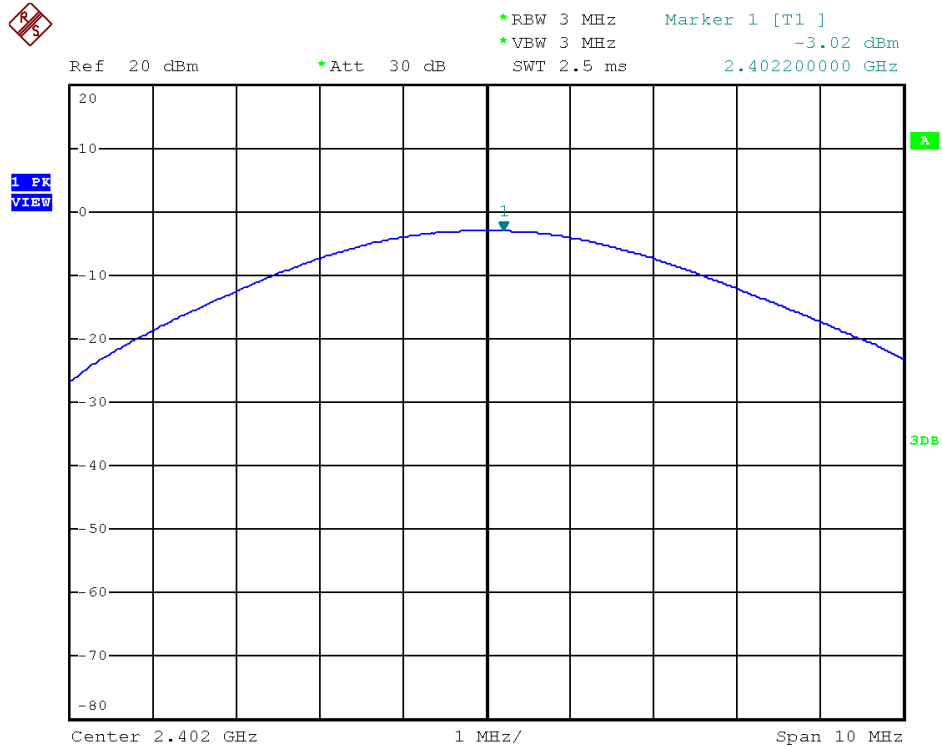
### 10.5 Test Result and Data

Test Date : Sep. 17, 2014      Temperature : 23°C  
 Atmospheric pressure : 1087 hPa      Humidity : 54%

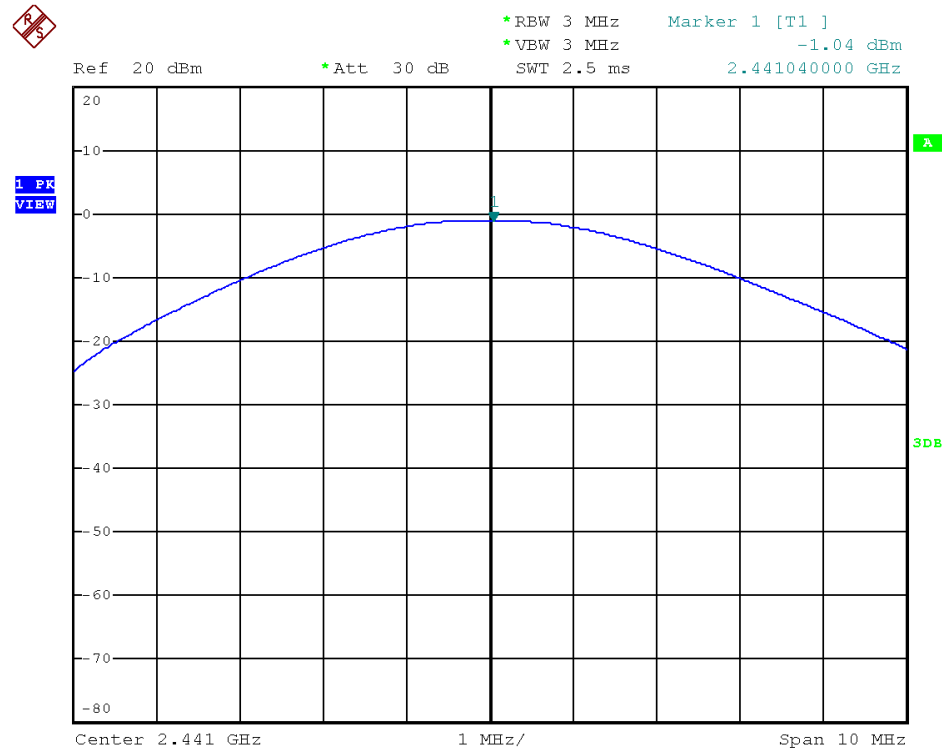
Modulation Type	Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
GFSK (1Mbps)	00	2402	-3.02	0.499
	39	2441	-1.04	0.787
	78	2480	-1.69	0.678
$\pi/4$ -DQPSK (2Mbps)	00	2402	-0.66	0.859
	39	2441	1.34	1.361
	78	2480	0.63	1.156
8DPSK (3Mbps)	00	2402	-0.24	1.057
	39	2441	1.80	1.514
	78	2480	1.04	1.271



Modulation Standard: GFSK (1Mbps)  
Channel: 00

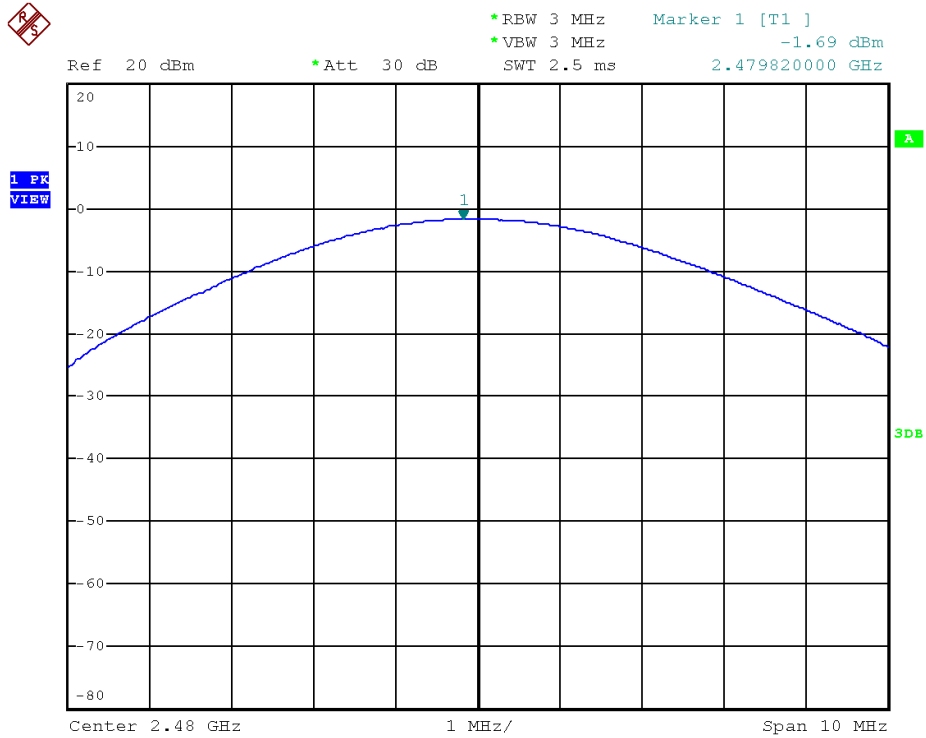


Modulation Standard: GFSK (1Mbps)  
Channel: 39

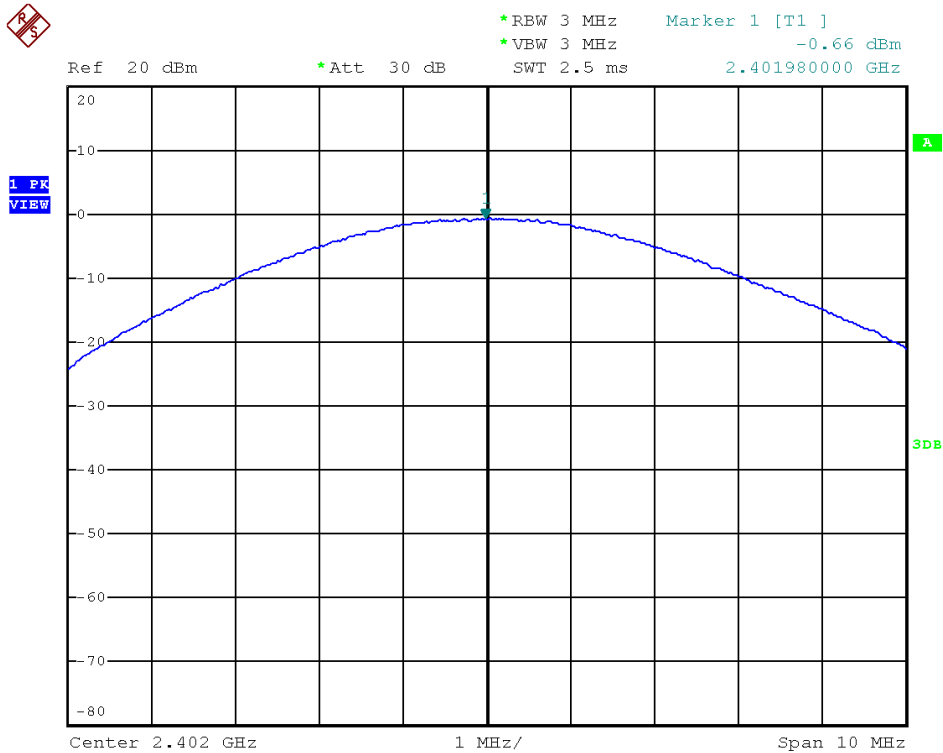




Modulation Standard: GFSK (1Mbps)  
Channel: 78

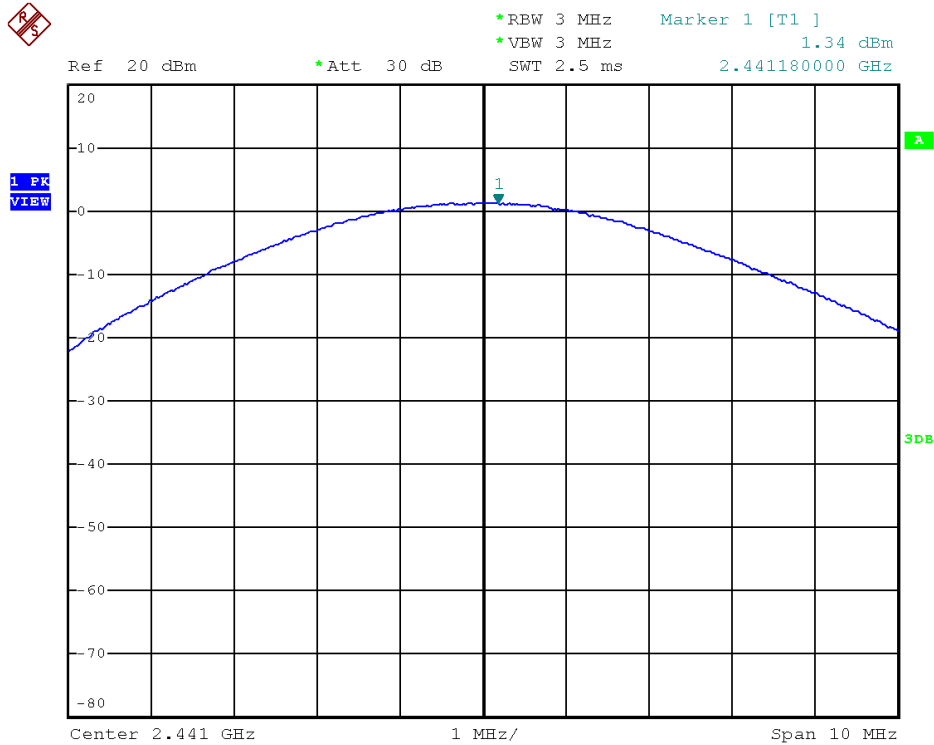


Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 00

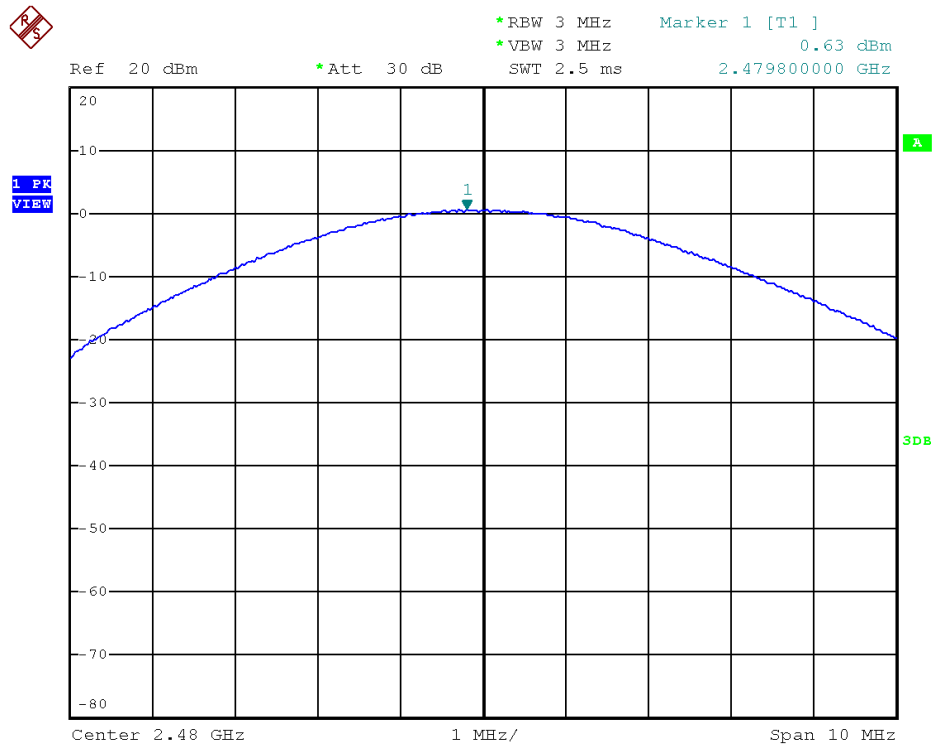




Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 39

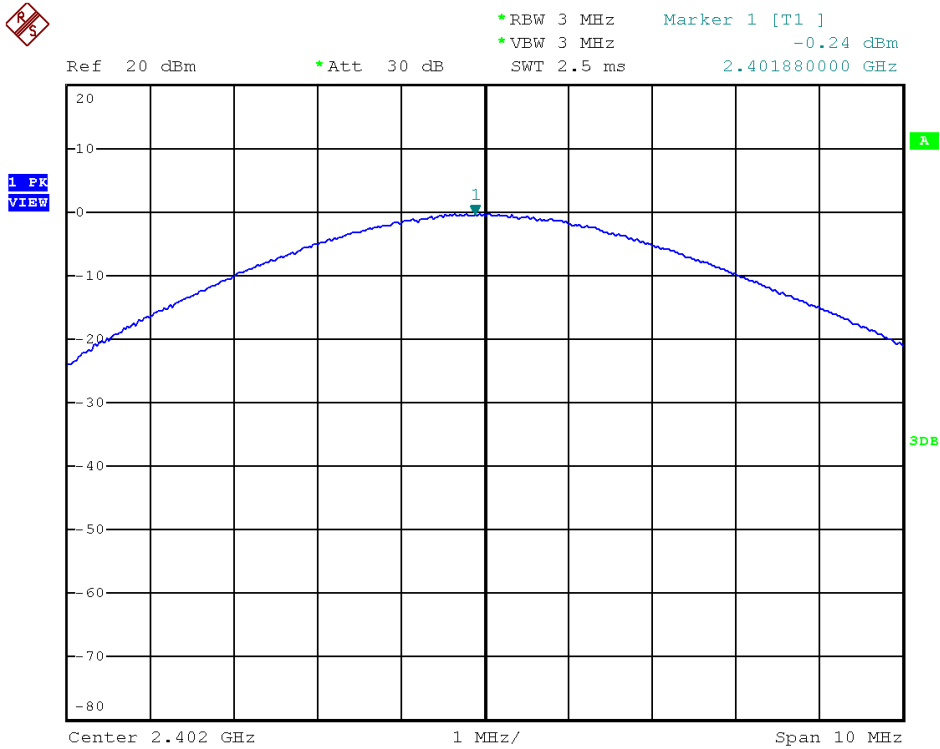


Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 78

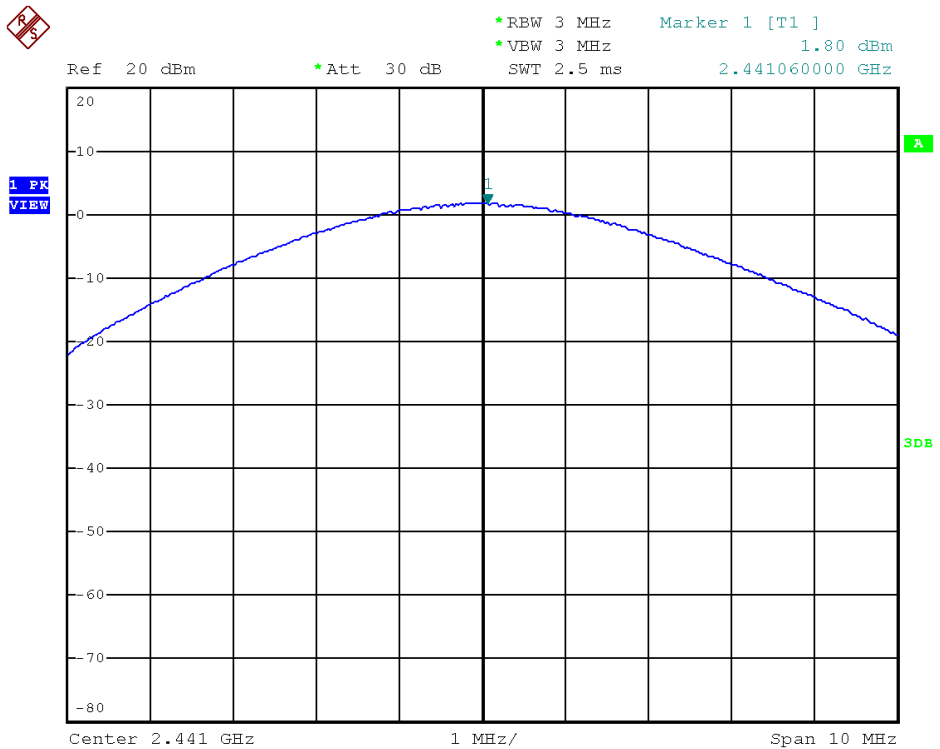




Modulation Standard: 8DQPSK (3Mbps)  
Channel: 00



Modulation Standard: 8DQPSK (3Mbps)  
Channel: 39

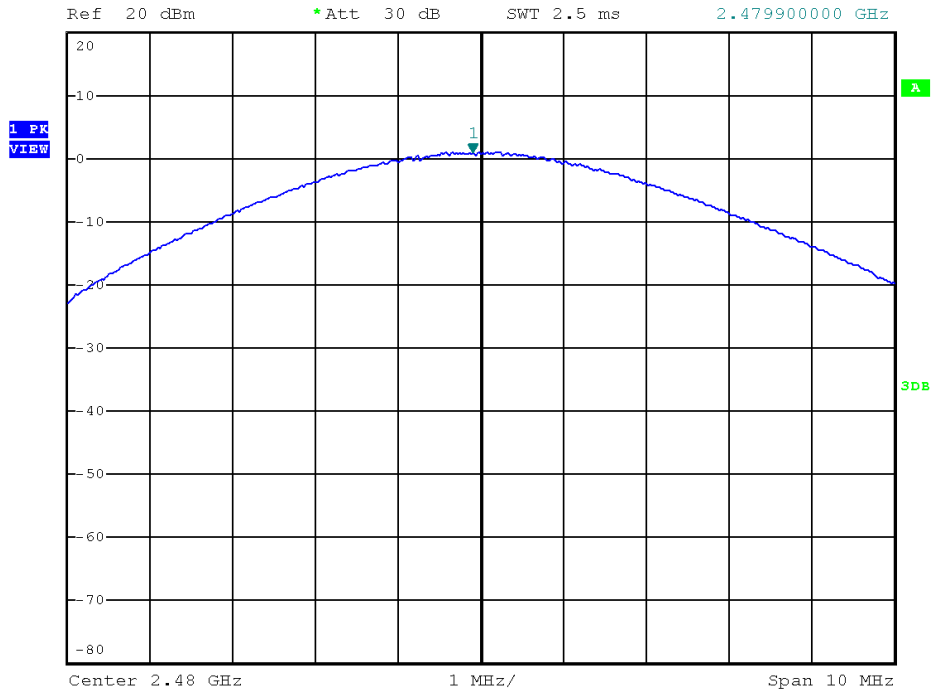




Modulation Standard: 8DQPSK (3Mbps)  
Channel: 78



\*RBW 3 MHz    Marker 1 [T1 ]  
\*VEW 3 MHz    1.04 dBm  
SWT 2.5 ms    2.479900000 GHz





## 11. Band Edges Measurement

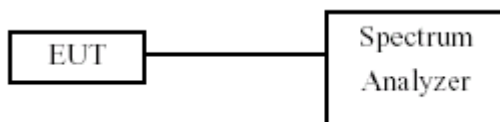
### 11.1 Test Limit

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 11.2 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.

### 11.3 Test Setup Layout



### 11.4 List of Measuring Equipment Used

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2014/03/27	2015/03/26

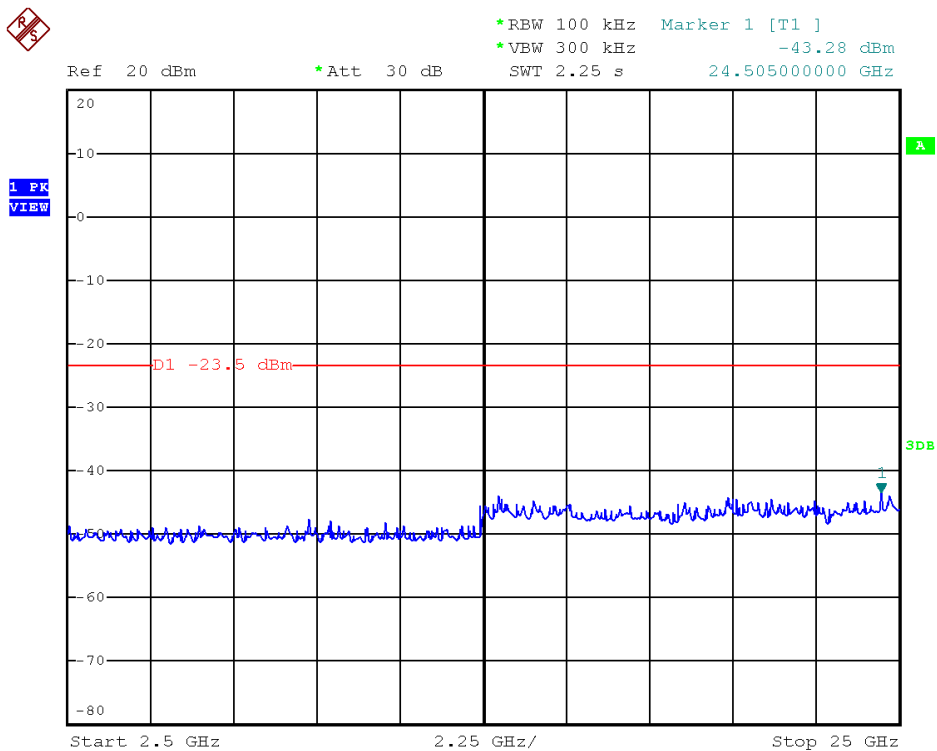
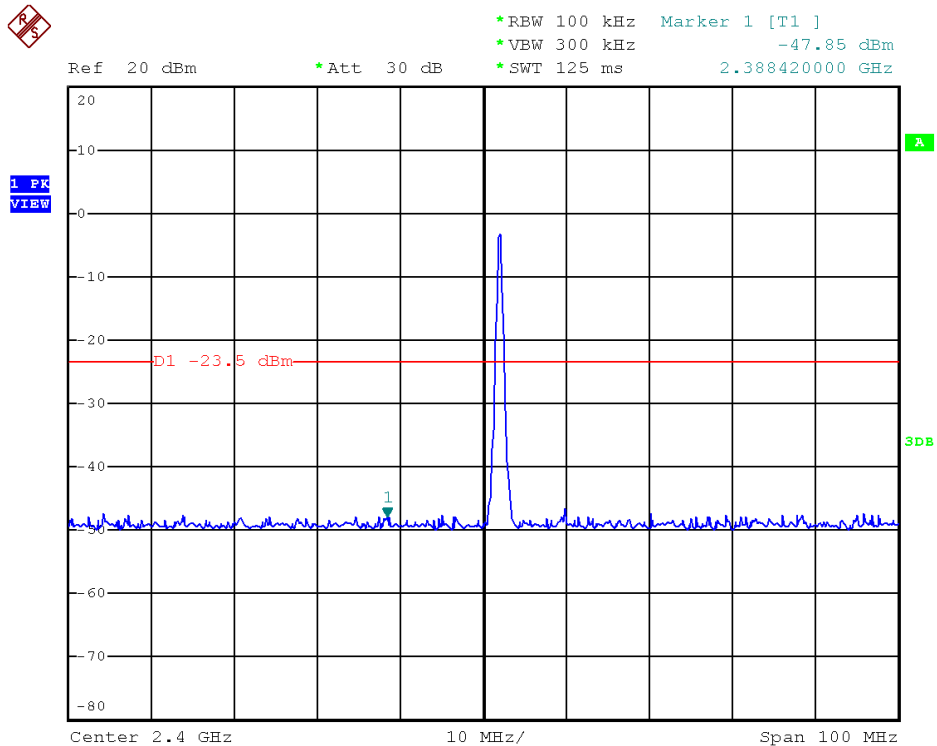
### 11.5 Test Result and Data

Test Date : Sep. 17, 2014      Temperature :  $23^{\circ}\text{C}$   
 Atmospheric pressure : 1087 hPa      Humidity : 54%

Modulation Type	Channel	Frequency (MHz)	maximum value in frequency (MHz)	maximum value (dBm)
GFSK (1Mbps)	00	2402	24505.0	-43.28
	78	2480	21580.0	-43.62
$\pi/4$ -DQPSK (2Mbps)	00	2402	23830.0	-43.77
	78	2480	24730.0	-43.91
8DPSK (3Mbps)	00	2402	21625.0	-43.69
	78	2480	24055.0	-43.46



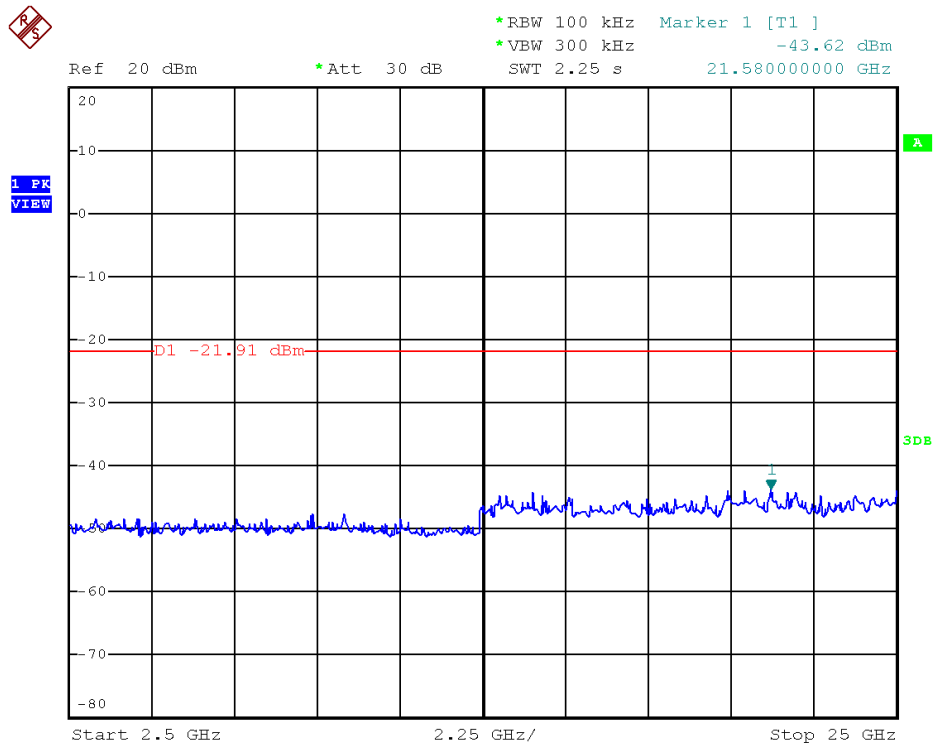
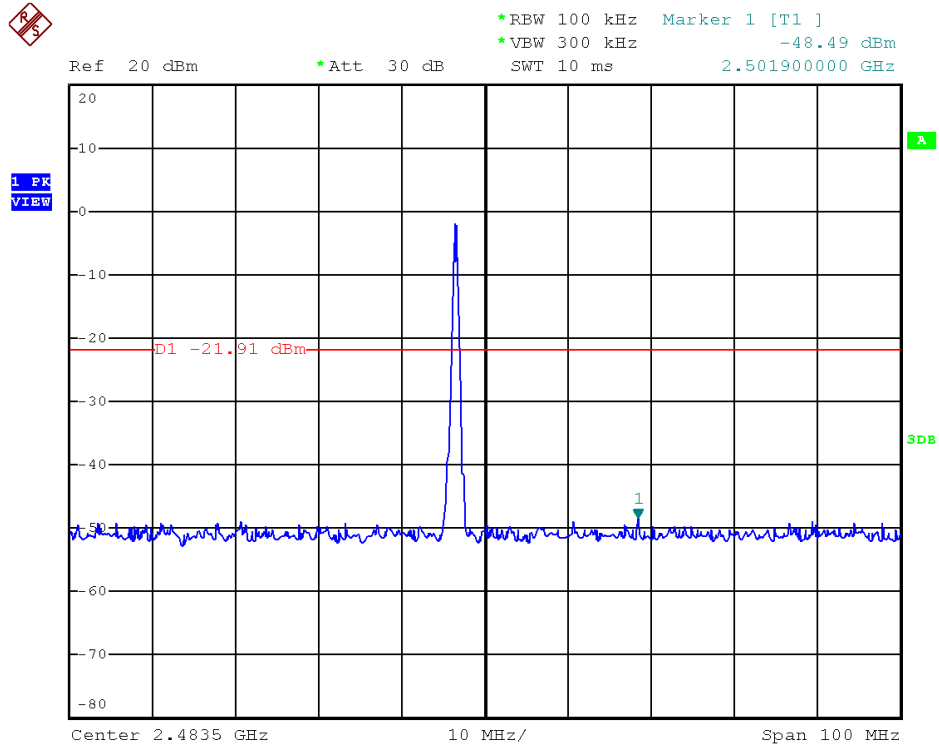
Modulation Standard: GFSK (1Mbps)  
Channel: 00





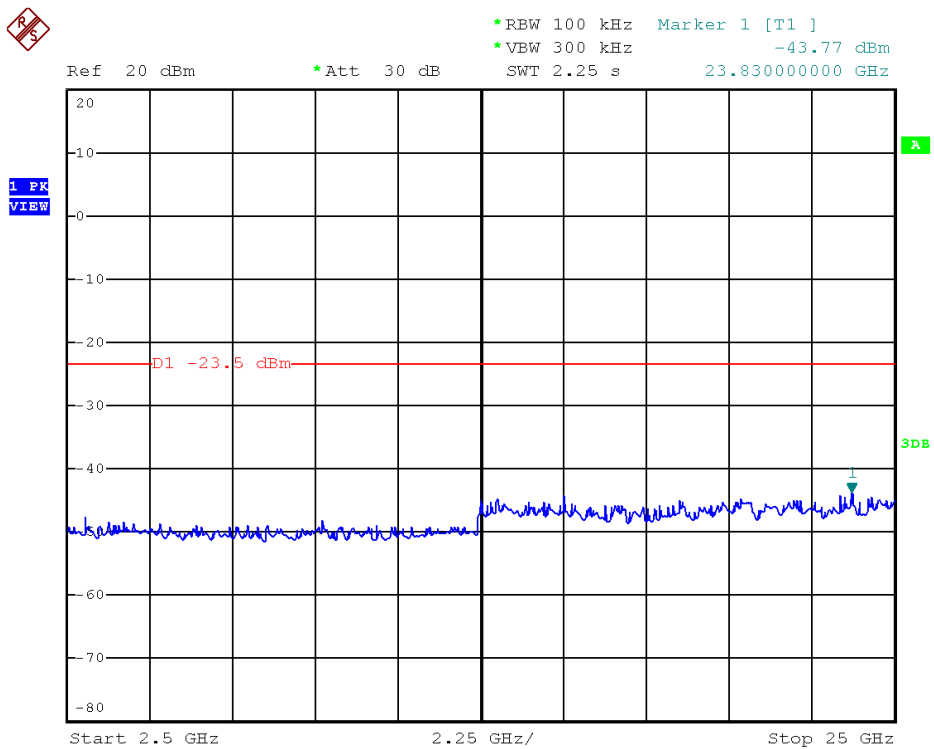
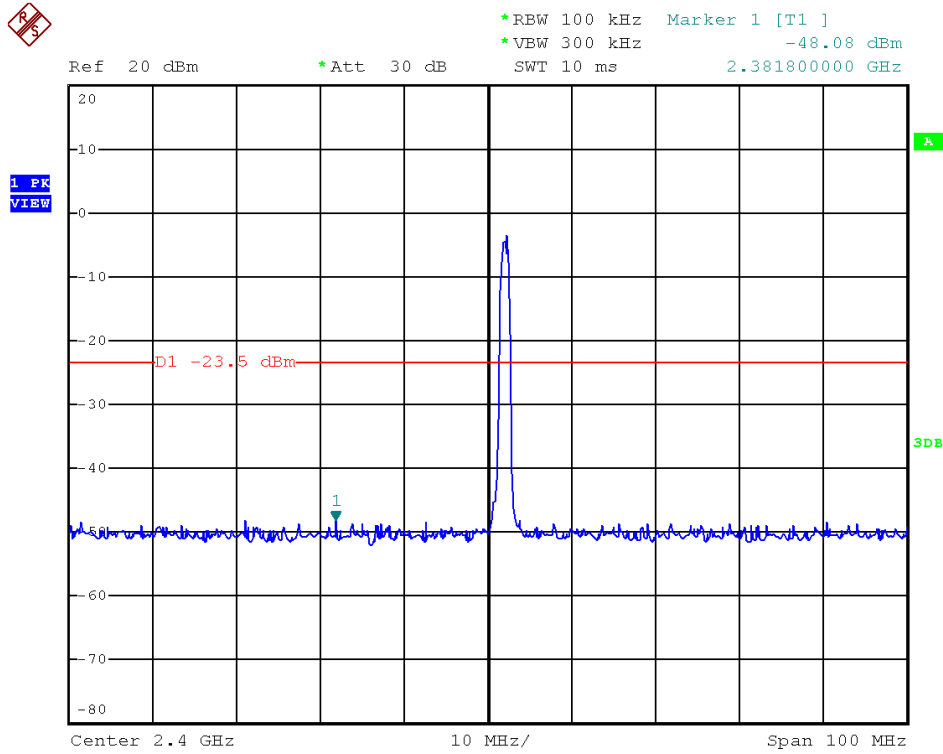


Modulation Standard: GFSK (1Mbps)  
Channel: 78



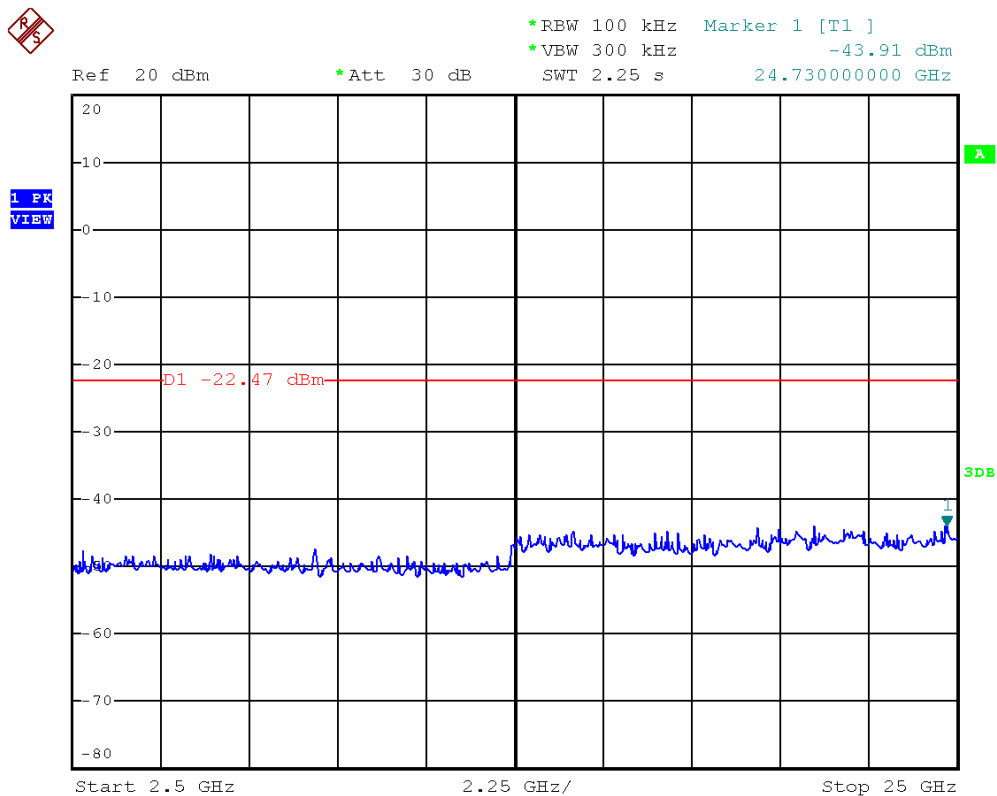
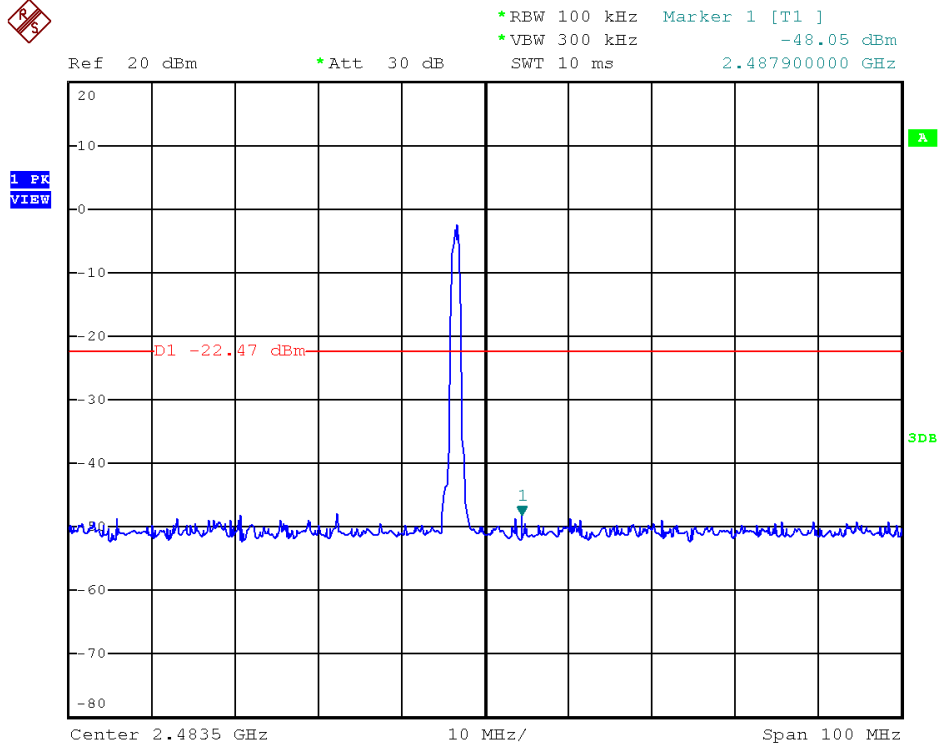


Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 00



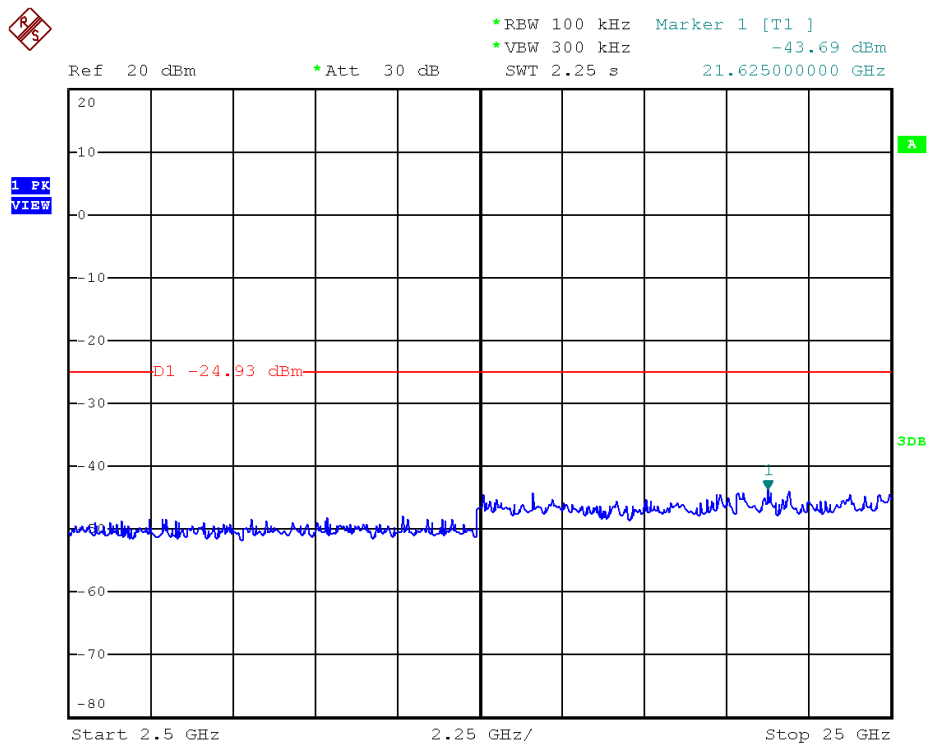
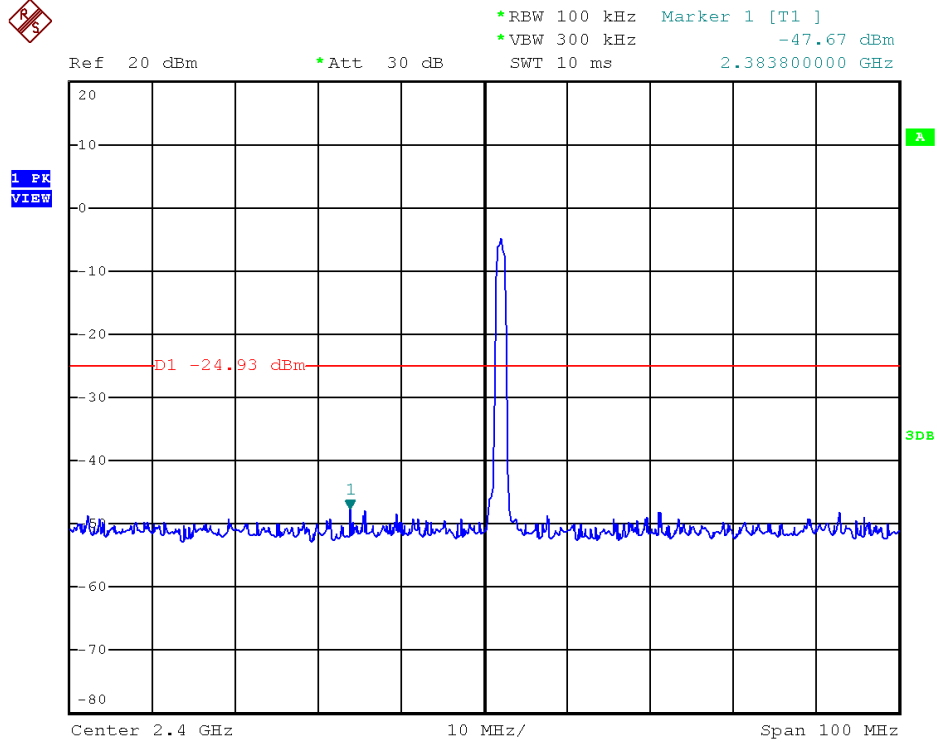


Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)  
Channel: 78



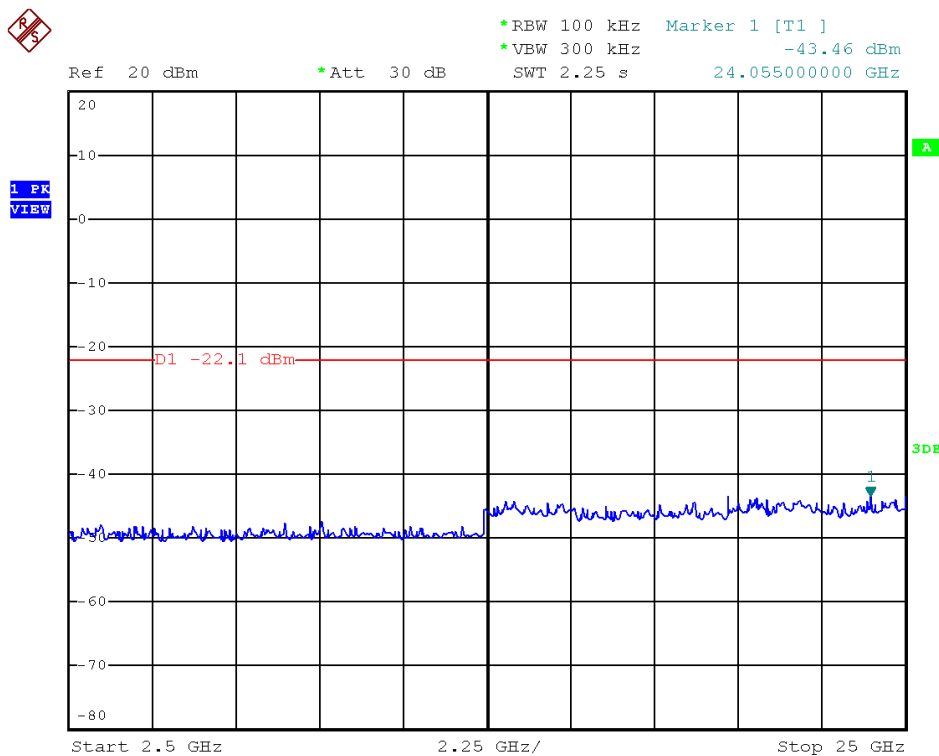
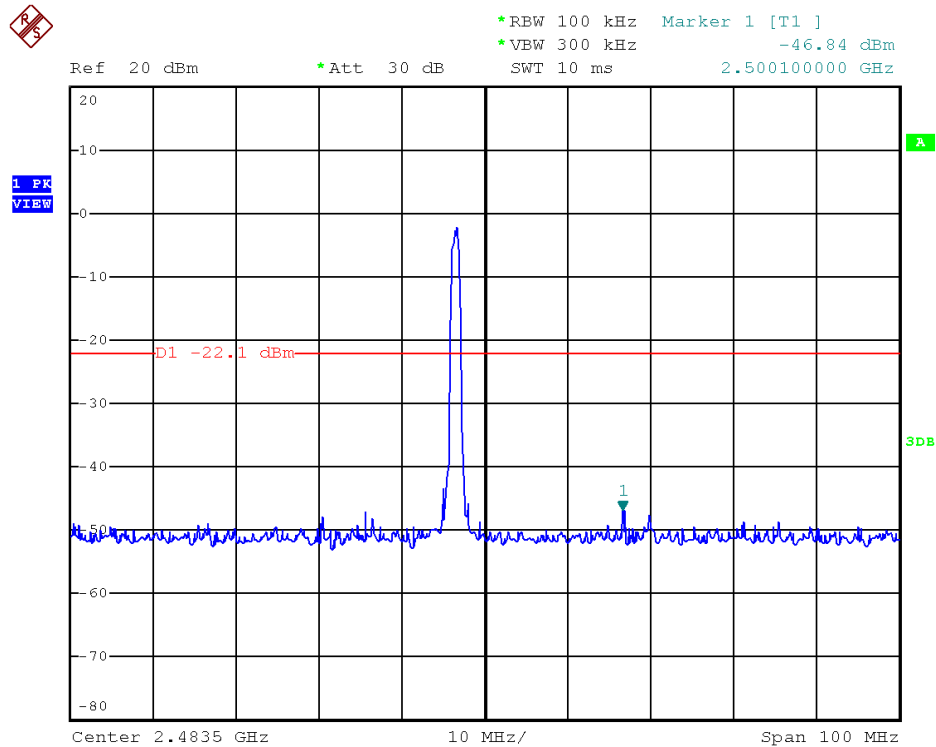


Modulation Standard: 8DPSK (3Mbps)  
Channel: 00





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



**11.6 Restrict band emission Measurement Data**

Test Date: Sep. 24, 2014

Temperature: 24 °C

Atmospheric pressure: 1010 hPa

Humidity: 54 %

Modulation Standard: GFSK (1Mbps)

Channel 0						Fundamental Frequency: 2402 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2356.79	H	42.48	-1.30	41.18	Peak	74	54	-32.82	166	1.05
---	H	---	---	---	Ave	74	54	---	---	---
2388.585	V	41.69	-1.19	40.50	Peak	74	54	-33.50	168	1.02
---	V	---	---	---	Ave	74	54	---	---	---
Channel 78						Fundamental Frequency: 2480 MHz				
2494.609	H	41.28	-0.78	40.50	Peak	74	54	-33.50	168	1.00
---	H	---	---	---	Ave	74	54	---	---	---
2493.157	V	41.36	-0.79	40.57	Peak	74	54	-33.43	172	1.04
---	V	---	---	---	Ave	74	54	---	---	---

## 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



Test Date: Sep. 24, 2014

Temperature: 24 °C

Atmospheric pressure: 1010 hPa

Humidity: 54 %

Modulation Standard:  $\pi/4$ -DQPSK (2Mbps)

Channel 0						Fundamental Frequency: 2402 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2357.802	H	42.25	-1.30	40.95	Peak	74	54	-33.05	167	1.04
---	H	---	---	---	Ave	74	54	---	---	---
2389.98	V	42.09	-1.18	40.90	Peak	74	54	-33.09	163	1.06
---	V	---	---	---	Ave	74	54	---	---	---
Channel 78						Fundamental Frequency: 2480 MHz				
2486.502	H	41.85	-0.81	41.04	Peak	74	54	-32.96	171	1.05
---	H	---	---	---	Ave	74	54	---	---	---
2486.018	V	41.44	-0.81	40.63	Peak	74	54	-33.37	177	1.03
---	V	---	---	---	Ave	74	54	---	---	---

## 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



Test Date: Sep. 24, 2014

Temperature: 24 °C

Atmospheric pressure: 1010 hPa

Humidity: 54 %

Modulation Standard: 8DPSK (3Mbps)

Channel 0						Fundamental Frequency: 2402 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2382.912	H	41.77	-1.21	40.56	Peak	74	54	-33.44	169	1.03
---	H	---	---	---	Ave	74	54	---	---	---
2387.19	V	41.27	-1.19	40.08	Peak	74	54	-33.92	177	1.01
---	V	---	---	---	Ave	74	54	---	---	---
Channel 78						Fundamental Frequency: 2480 MHz				
2492.915	H	41.59	-0.79	40.80	Peak	74	54	-33.20	173	1.05
---	H	---	---	---	Ave	74	54	---	---	---
2497.876	V	41.71	-0.77	40.94	Peak	74	54	-33.06	165	1.02
---	V	---	---	---	Ave	74	54	---	---	---

## 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





## 12. 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

### 12.1 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.