



FCC RADIO TEST REPORT

Applicant : Partner Tech Corp.

Address : 10FL, 233-2, Baoqiao Road, Xindian,
New Taipei City, Taiwan

Equipment : Mobile POS Terminal

Model No. : M3a-2, EM-110, EMC-21X0 (X could be 0-9, -,
A-Z or blank)

Trade Name : PARTNER

FCC ID. : NDPM3A-2

I HEREBY CERTIFY THAT :

The sample was received on Jan. 17, 2019 and the testing was carried out on Mar. 08, 2019 at Cerpass Technology Corp. 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.

Approved by:

Mark Liao / Supervisor

Tested by:

Spree Yeh / Engineer

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory





Contents

1. Summary of Test Procedure and Test Results.....	5
1.1 Applicable Standards	5
2. Test Configuration of Equipment under Test.....	6
2.1 Feature of Equipment under Test.....	6
2.2 Model Difference	6
2.3 Carrier Frequency of Channes.....	7
2.4 Test Mode & Test Software	8
2.5 Description of Test System.....	8
2.6 General Information of Test.....	9
2.7 Measurement Uncertainty	9
3. Test Equipment and Ancillaries Used for Tests	10
4. Antenna Requirements.....	11
4.1 Standard Applicable	11
4.2 Antenna Construction and Directional Gain.....	11
5. Test of AC Power Line Conducted Emission	12
5.1 Test Limit	12
5.2 Test Procedures	12
5.3 Typical Test Setup	13
5.4 Test Result and Data	14
5.5 Test Photographs	16
6. Test of Radiated Spurious Emission.....	17
6.1 Test Limit	17
6.2 Test Procedures.....	17
6.3 Typical Test Setup	18
6.4 Test Result and Data (9kHz ~ 30MHz).....	19
6.5 Test Result and Data (30MHz ~ 1GHz).....	19
6.6 Test Result and Data (1GHz ~ 25GHz).....	21
6.7 Restricted Bands of Operation	33
6.8 Test Photographs (30MHz ~ 1GHz)	34
6.9 Test Photographs (1GHz ~ 25GHz)	35
7. Test of Conducted Spurious Emission	36
7.1 Test Limit	36
7.2 Test Procedure	36
7.3 Test Setup Layout	36
7.4 Test Result and Data	36
8. 20dB Bandwidth Measurement Data.....	44
8.1 Test Limit	44
8.2 Test Procedures	44
8.3 Test Setup Layout	44
8.4 Test Result and Data	44
9. Frequencies Separation	47
9.1 Test Limit	47



9.2	Test Procedures	47
9.3	Test Setup Layout	47
9.4	Test Result and Data	47
10.	Dwell Time on each channel	50
10.1	Test Limit	50
10.2	Test Procedures	50
10.3	Test Setup Layout	50
10.4	Test Result and Data	50
11.	Number of Hopping Channels	53
11.1	Test Limit	53
11.2	Test Procedures	53
11.3	Test Setup Layout	53
11.4	Test Result and Data	53
12.	Maximum Peak Output Power	55
12.1	Test Limit	55
12.2	Test Procedures	55
12.3	Test Setup Layout	55
12.4	Test Result and Data	56

History of this test report

[illegible]



1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.4:2014

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	. Radiated Spurious Emission	PASS
15.247(d)	. Conducted Spurious Emission	PASS
15.247(a)(1)	. Channel Carrier Frequencies Separation	PASS
15.247(a)(1)	. 20dB Bandwidth	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 complied with the requirement of FCC Part 15, Subpart B, recorded in a separate test report (TEFV1901083).



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Frequency Range	BT / BLE: 2400-2483.5MHz 802.11b/g/n: 2400-2483.5MHz 802.11a/n/ac: 5150-5250MHz, 5725-5850MHz
Modulation Type	BT: GFSK, $\pi/4$ -DQPSK, 8DPSK BLE: GFSK 802.11b: CCK, DQPSK, DBPSK 802.11g/n/a: BPSK, QPSK, 16QAM, 64QAM 802.11ac: BPSK, QPSK, 16QAM, 64QAM, 256QAM
Modulation Technology	DSSS, OFDM, FHSS, DTS
Data Rate	BT: GFSK: 1Mbps, $\pi/4$ -DQPSK: 2Mbps, 8DPSK: 3Mbps BLE: GFSK: 1Mbps WLAN: 802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0 – MCS7, HT20/40 802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11ac: MCS0 – MCS9, VHT20/40/80
Antenna Type	Dipole Antenna
Antenna Gain	2400-2483.5MHz: 6.92dBi 5150-5250MHz: 4.12dBi 5725-5850MHz: 5.55dBi
Adapter	EDAC \ EA1024P1 Input: 100-240Vac, 1A, 50-60Hz Output: 12Vdc, 3A

Note:

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

2.2 Model Difference

M3a-2, EM-110, EMC-21X0 (X could be 0-9, -, A-Z or blank) for marketing purpose.



2.3 Carrier Frequency of Channes

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.



2.4 Test Mode & Test Software

- During testing, the interface cables and equipment positions were varied according to ANSI C63.10
- The complete test system included Notebook and EUT for RF test.
- An executive program, "qdart: win.4.8_installer_00039.311-11-17_08_03_48" was executed to transmit and receive data via Bluetooth.
- The following test modes were performed for the test:

AC Power Line Conducted Emission	
Test Mode	Operating Description
1	GFSK (1Mbps), Adapter: EDAC \ EA1024P1
2	$\pi/4$ -DQPSK (2Mbps), Adapter: EDAC \ EA1024P1
3	8DPSK (3Mbps), Adapter: EDAC \ EA1024P1
caused "Test Mode 3" generates the worst case, it was reported as the final data.	
Radiated Spurious Emission (below 1GHz)	
Test Mode	Operating Description
1	GFSK (1Mbps), Adapter: EDAC \ EA1024P1
2	$\pi/4$ -DQPSK (2Mbps), Adapter: EDAC \ EA1024P1
3	8DPSK (3Mbps), Adapter: EDAC \ EA1024P1
caused "Test Mode 3" generates the worst case, it was reported as the final data.	
Radiated Spurious Emission (above 1GHz)	
Test Mode	Operating Description
1	GFSK (1Mbps), Adapter: EDAC \ EA1024P1
2	$\pi/4$ -DQPSK (2Mbps), Adapter: EDAC \ EA1024P1
3	8DPSK (3Mbps), Adapter: EDAC \ EA1024P1
caused "Test Mode 1 & 3" generates the worst case, it was reported as the final data.	
Bandedge, Hopping Bandedge, 20dB Bandwidth, Maximum Peak Output Power, Dwell Time, Frequencies Separation, Number Of Channel	
Test Mode	Operating Description
1	GFSK (1Mbps), Adapter: EDAC \ EA1024P1
2	$\pi/4$ -DQPSK (2Mbps), Adapter: EDAC \ EA1024P1
3	8DPSK (3Mbps), Adapter: EDAC \ EA1024P1
caused "Test Mode 1 ~ 3" generates the worst case, it was reported as the final data.	

2.5 Description of Test System

Device	Manufacturer	Model No.	Description
Notebook	DELL	Latitude E5450	Power Cable, Non-shielded, 1.8m
USB cable	N/A	N/A	Shielding, 1.2m



2.6 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, TW1439
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication test C-4663 for Conducted emission test R-4399, R-4218 for Radiated emission test G-10812, G-10813 for radiated disturbance above 1GHz
Frequency Range Investigated:	Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 25,000MHz	
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.	

2.7 Measurement Uncertainty

Measurement Item	Uncertainty
Radiated Spurious Emission(9KHz~30MHz)	±5.007dB
Radiated Spurious Emission(30MHz~1GHz)	±5.157dB
Radiated Spurious Emission(1GHz~18GHz)	±6.383dB
Radiated Spurious Emission(18GHz~40GHz)	±6.648dB
Conducted Spurious Emission	±1.253dB
6dB Bandwidth	±6.89%
Power Spectral Density	±0.630dB
26 dB Occupied Bandwidth	±6.10%
Frequency Stability	±375KHz
Channel Frequencies Separation	±6.10%
20dB Bandwidth	±6.12%
Dwell Time	±1.34%
Peak Output Power(Conducted Power Meter)	±0.86dB
Temperature	±1.2°C
Humidity	±2.7%
Channel Move Time	±4.53%
Channel Closing Transmission Time	±6.61%
Threshold	±0.631dB
Non occupancy period	±1.17%



3. Test Equipment and Ancillaries Used for Tests

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI3	100821	2018/09/12	2019/09/11
LISN	Schwarzbeck	NSLK 8127	8127-516	2018/09/11	2019/09/10
Pulse Limiter	R&S	ESH3-Z2	101933	2018/09/04	2019/09/03
Bilog Antenna	Schwarzbeck	VULB9168	275	2018/09/17	2019/09/16
Active Loop Antenna	EMCO	6507	40855	2018/05/22	2019/05/21
Horn Antenna	EMCO	3115	31601	2018/09/26	2019/09/25
Horn Antenna	EMCO	3116	31970	2018/03/23	2019/03/22
Preamplifier	EM	EM330	60659	2018/03/20	2019/03/19
Preamplifier	EMC INSTRUMENTS	EMC051845SE	980333	2018/09/18	2019/09/17
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2018/10/31	2019/10/30
MXG MW Analog Signal Generator	KEYSIGHT	N5183A	MY50142931	2018/04/10	2019/04/09
Spectrum Analyzer	R&S	FSP40	100219	2018/07/03	2019/07/02
BLUETOOTH TESTER	R&S	CBT	101133	2018/04/02	2019/04/01
Attenuator	KEYSIGHT	8491B	MY39250705	2018/09/04	2019/09/03
Rotary Attenuator	Agilent	8495B	MY42146680	2018/03/29	2019/03/28
Temp & Humi chamber	T-MACHINE	TMJ-9712	T-12-040111	2018/08/30	2019/08/29
Series Power Meter	Anritsu	ML2495A	1224005	2018/03/23	2019/03/22
Power Sensor	Anritsu	MA2411B	1207295	2018/03/23	2019/03/22
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A
Software	AUDIX	E3	V8.2014-8-6	N/A	N/A
Software	Keysight	N7607B Signal Studio	V3.0.0.0	N/A	N/A
Software	Keysight	Inservice MonitorUtility	N/A	N/A	N/A



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	Dipole Antenna
Antenna Gain	6.92 dBi



5. Test of AC Power Line Conducted Emission

5.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. 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

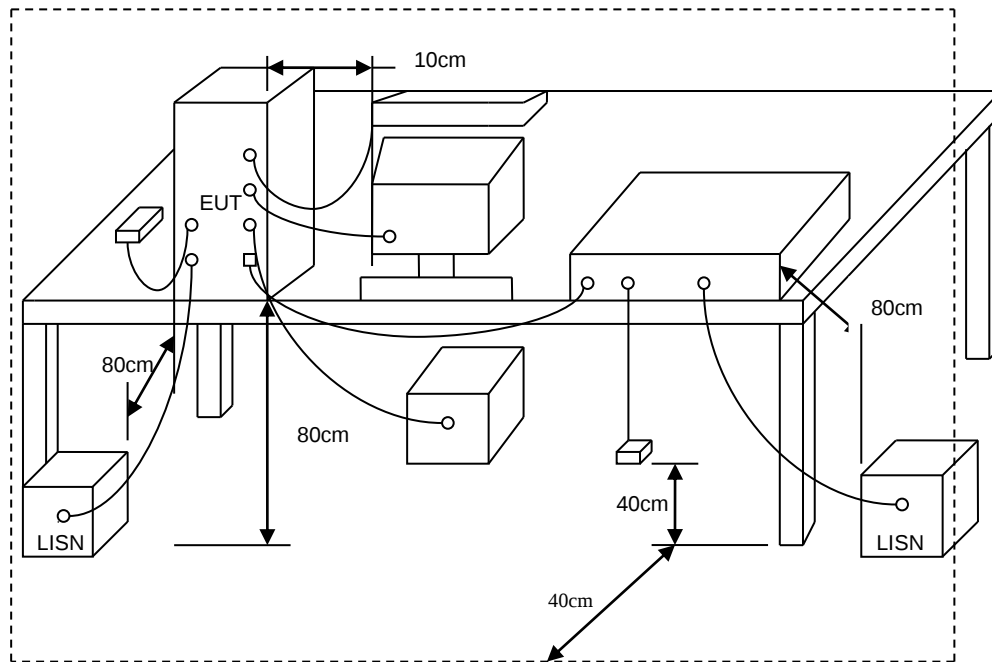
*Decreases with the logarithm of the frequency.

5.2 Test Procedures

- 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.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



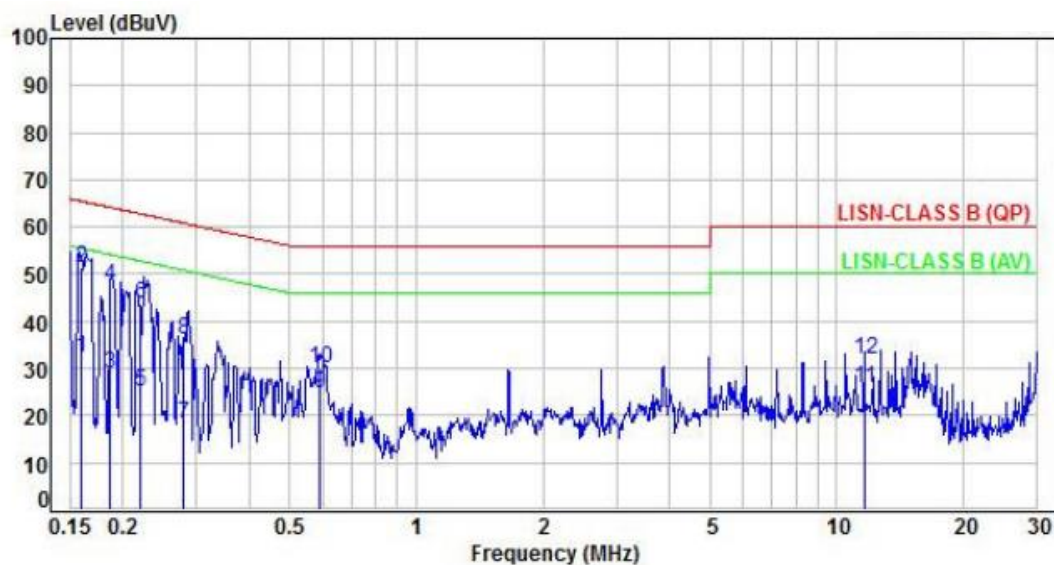
5.3 Typical Test Setup





5.4 Test Result and Data

Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: Mode 3	Temperature	: 22 °C
Test date	: Mar. 05, 2019	Humidity	: 52 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.16	9.94	22.32	32.26	55.48	-23.22	Average	P
2	0.16	9.94	41.54	51.48	65.48	-14.00	QP	P
3	0.19	9.94	18.83	28.77	54.16	-25.39	Average	P
4	0.19	9.94	37.60	47.54	64.16	-16.62	QP	P
5	0.22	9.94	15.15	25.09	52.83	-27.74	Average	P
6	0.22	9.94	33.95	43.89	62.83	-18.94	QP	P
7	0.28	9.94	8.30	18.24	50.88	-32.64	Average	P
8	0.28	9.94	26.08	36.02	60.88	-24.86	QP	P
9	0.59	9.95	14.75	24.70	46.00	-21.30	Average	P
10	0.59	9.95	19.99	29.94	56.00	-26.06	QP	P
11	11.64	10.33	15.49	25.82	50.00	-24.18	Average	P
12	11.64	10.33	21.52	31.85	60.00	-28.15	QP	P

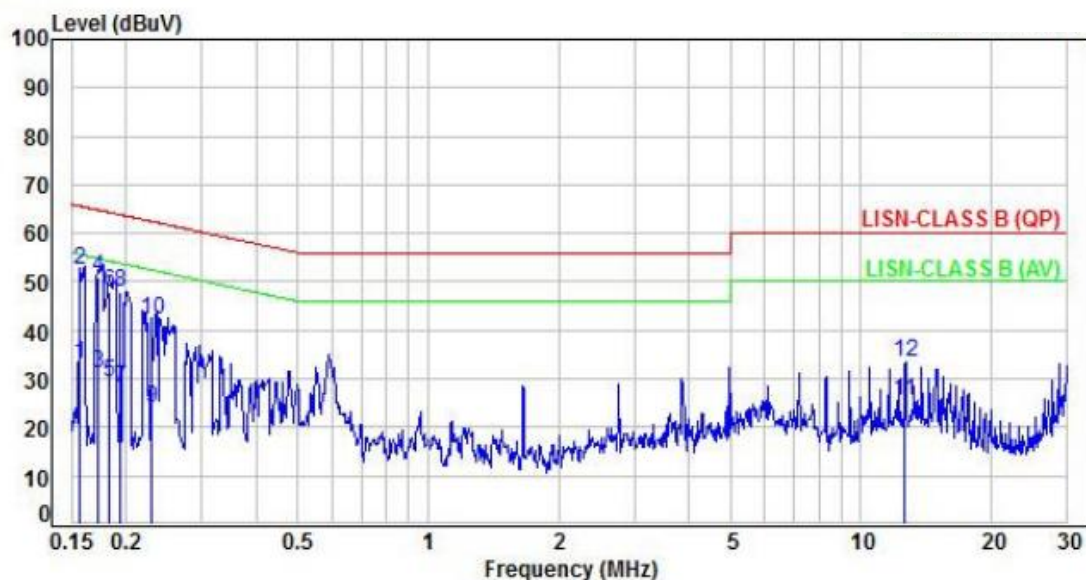
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 3	Temperature	: 22 °C
Test date	: Mar. 05, 2019	Humidity	: 52 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.16	9.94	23.31	33.25	55.66	-22.41	Average	P
2	0.16	9.94	42.50	52.44	65.66	-13.22	QP	P
3	0.17	9.94	21.28	31.22	54.83	-23.61	Average	P
4	0.17	9.94	40.97	50.91	64.83	-13.92	QP	P
5	0.18	9.94	19.19	29.13	54.38	-25.25	Average	P
6	0.18	9.94	38.16	48.10	64.38	-16.28	QP	P
7	0.19	9.94	18.32	28.26	53.83	-25.57	Average	P
8	0.19	9.94	37.98	47.92	63.83	-15.91	QP	P
9	0.23	9.94	13.97	23.91	52.44	-28.53	Average	P
10	0.23	9.94	32.35	42.29	62.44	-20.15	QP	P
11	12.63	10.33	15.21	25.54	50.00	-24.46	Average	P
12	12.63	10.33	23.25	33.58	60.00	-26.42	QP	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



6. Test of Radiated Spurious Emission

6.1 Test Limit

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2014. 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 (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

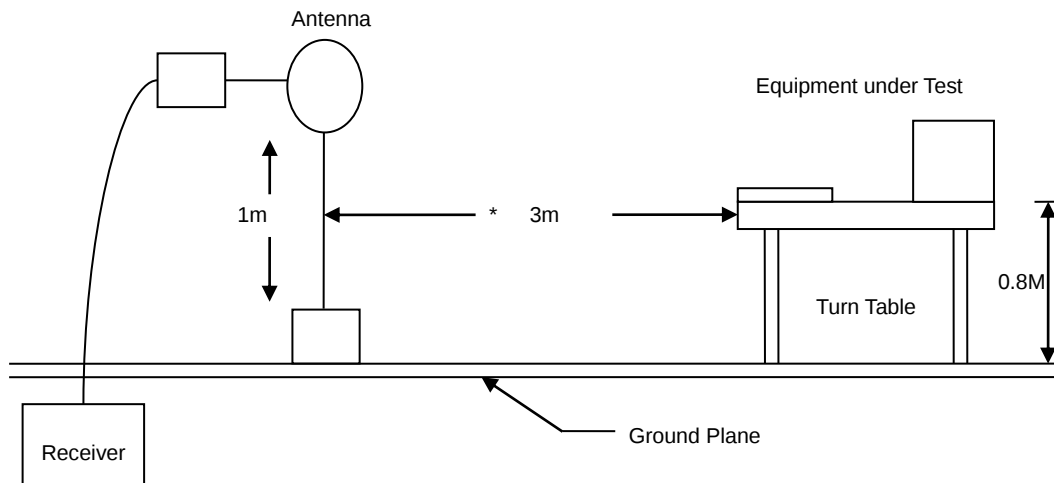
6.2 Test Procedures

- 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.

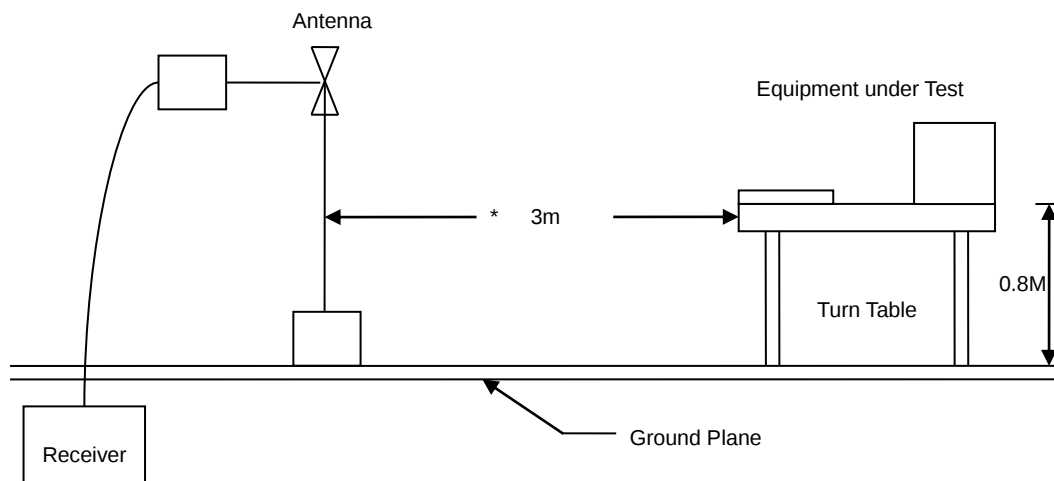


6.3 Typical Test Setup

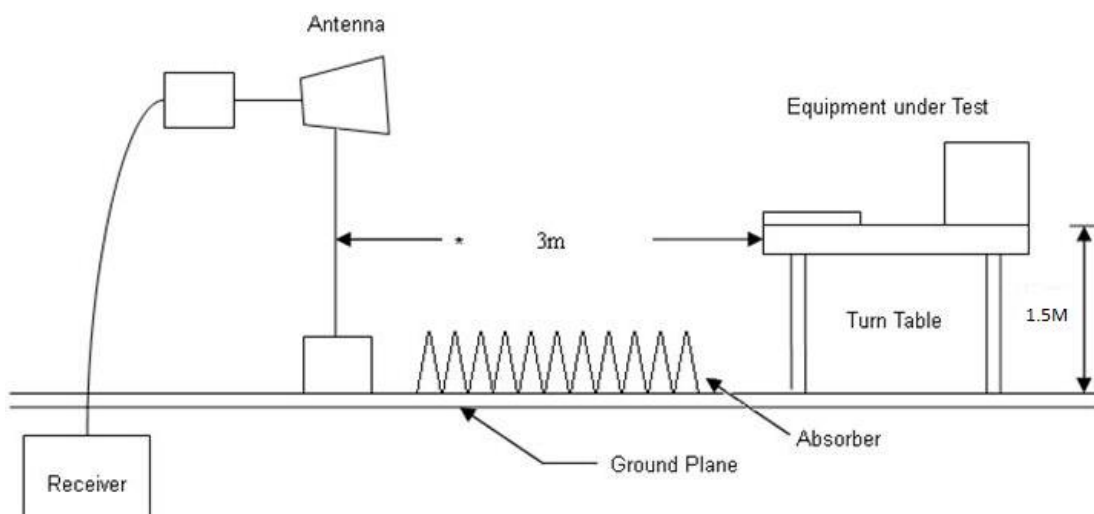
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



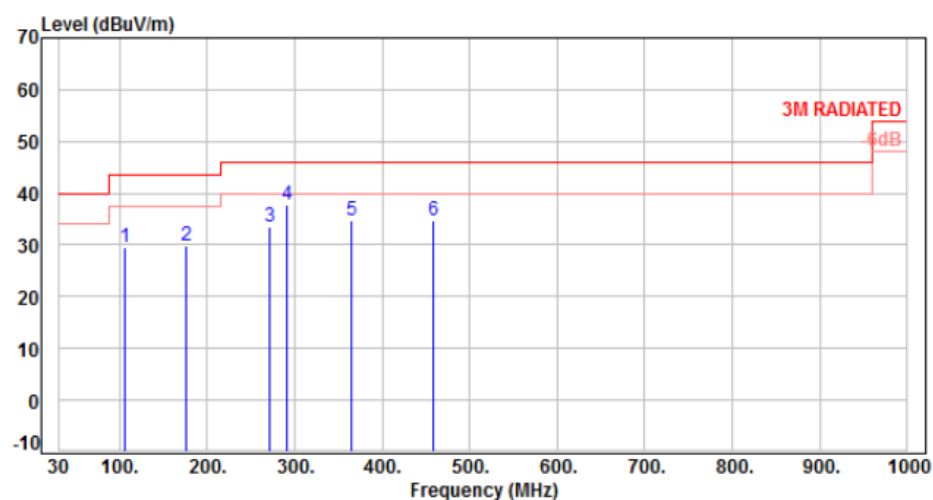


6.4 Test Result and Data (9kHz ~ 30MHz)

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

6.5 Test Result and Data (30MHz ~ 1GHz)

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	106.63	-13.26	42.92	29.66	43.50	-13.84	Peak	400	0	P
2	175.50	-10.26	40.06	29.80	43.50	-13.70	Peak	400	0	P
3	270.56	-9.42	43.03	33.61	46.00	-12.39	Peak	400	0	P
4	291.90	-8.79	46.47	37.68	46.00	-8.32	Peak	400	0	P
5	365.62	-6.68	41.51	34.83	46.00	-11.17	Peak	400	0	P
6	458.74	-4.54	39.20	34.66	46.00	-11.34	Peak	400	0	P

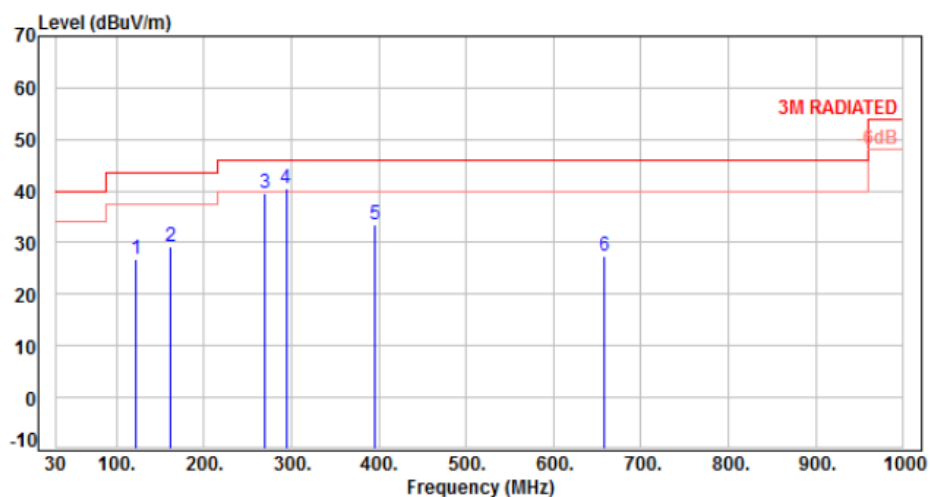
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	122.15	-11.53	38.26	26.73	43.50	-16.77	Peak	100	0	P
2	161.92	-9.23	38.34	29.11	43.50	-14.39	Peak	100	0	P
3	269.59	-9.46	49.06	39.60	46.00	-6.40	Peak	100	0	P
4	293.84	-8.76	49.14	40.38	46.00	-5.62	Peak	100	0	P
5	395.69	-5.87	39.25	33.38	46.00	-12.62	Peak	100	0	P
6	658.56	-0.91	28.25	27.34	46.00	-18.66	Peak	100	0	P

Note: Level=Reading+Factor

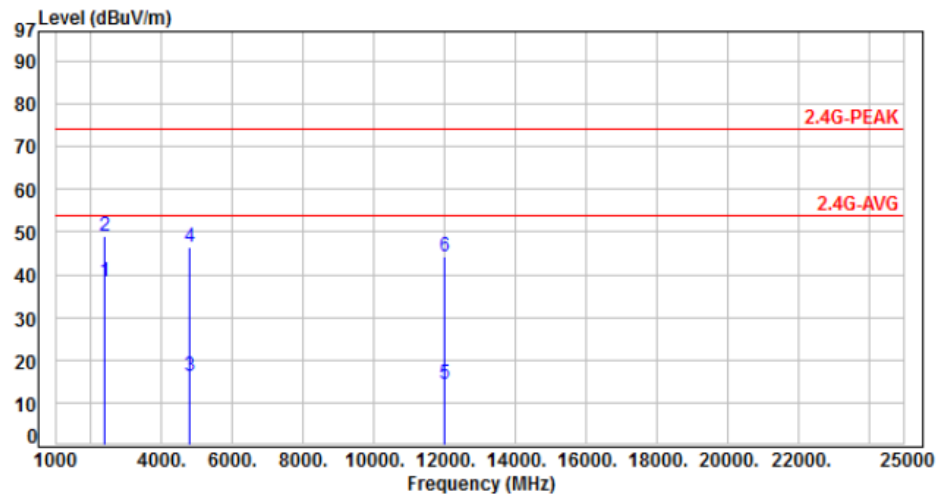
Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



6.6 Test Result and Data (1GHz ~ 25GHz)

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH00	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.68	54.20	38.52	54.00	-15.48	Average	160	297	P
2	2390.00	-15.68	64.80	49.12	74.00	-24.88	Peak	160	297	P
3	4804.00	-8.53	24.80	16.27	54.00	-37.73	Average	100	290	P
4	4804.00	-8.53	54.90	46.37	74.00	-27.63	Peak	100	290	P
5	12010.00	1.77	12.50	14.27	54.00	-39.73	Average	100	67	P
6	12010.00	1.77	42.60	44.37	74.00	-29.63	Peak	100	67	P

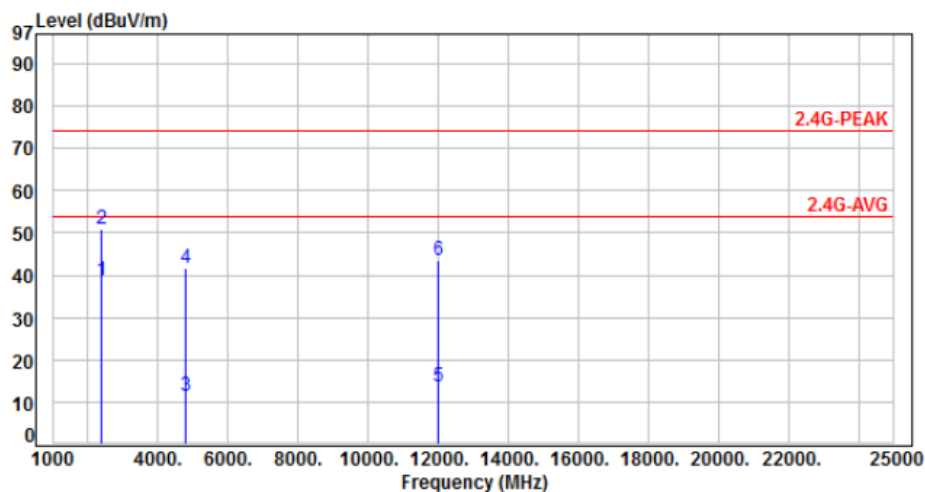
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH00	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.68	54.39	38.71	54.00	-15.29	Average	100	271	P
2	2390.00	-15.68	66.60	50.92	74.00	-23.08	Peak	100	271	P
3	4804.00	-8.53	20.10	11.57	54.00	-42.43	Average	100	48	P
4	4804.00	-8.53	50.20	41.67	74.00	-32.33	Peak	100	48	P
5	12010.00	1.77	11.70	13.47	54.00	-40.53	Average	100	326	P
6	12010.00	1.77	41.80	43.57	74.00	-30.43	Peak	100	326	P

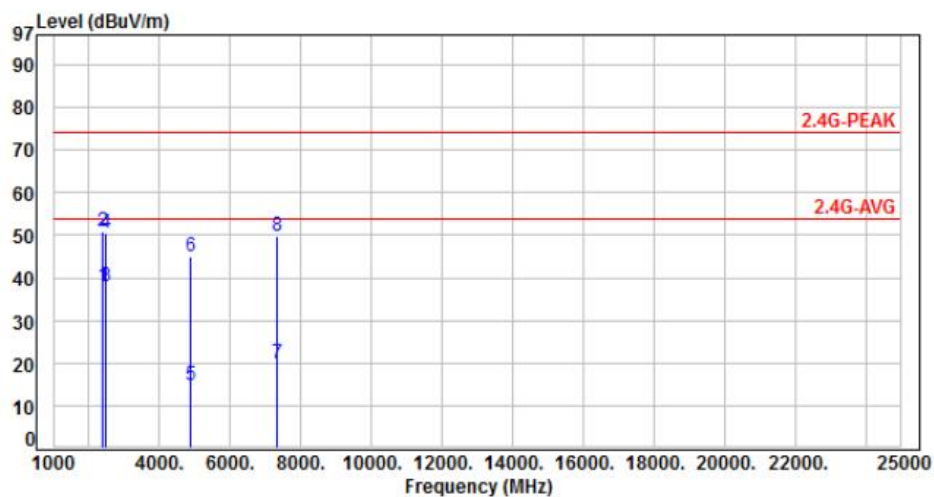
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH39	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.68	53.68	38.00	54.00	-16.00	Average	160	285	P
2	2390.00	-15.68	66.60	50.92	74.00	-23.08	Peak	160	285	P
3	2483.50	-15.36	53.51	38.15	54.00	-15.85	Average	160	285	P
4	2483.50	-15.36	65.90	50.54	74.00	-23.46	Peak	160	285	P
5	4882.00	-8.30	23.20	14.90	54.00	-39.10	Average	100	290	P
6	4882.00	-8.30	53.30	45.00	74.00	-29.00	Peak	100	290	P
7	7323.00	-3.83	23.70	19.87	54.00	-34.13	Average	100	356	P
8	7323.00	-3.83	53.80	49.97	74.00	-24.03	Peak	100	356	P

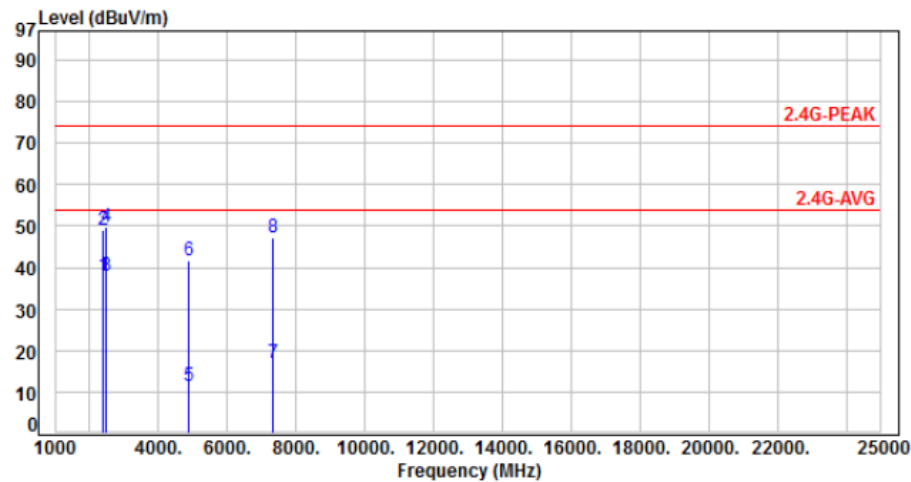
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH39	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.68	53.60	37.92	54.00	-16.08	Average	100	270	P
2	2390.00	-15.68	64.70	49.02	74.00	-24.98	Peak	100	270	P
3	2483.50	-15.36	53.19	37.83	54.00	-16.17	Average	100	270	P
4	2483.50	-15.36	65.30	49.94	74.00	-24.06	Peak	100	270	P
5	4882.00	-8.30	19.70	11.40	54.00	-42.60	Average	100	108	P
6	4882.00	-8.30	49.80	41.50	74.00	-32.50	Peak	100	108	P
7	7323.00	-3.83	20.80	16.97	54.00	-37.03	Average	100	273	P
8	7323.00	-3.83	50.90	47.07	74.00	-26.93	Peak	100	273	P

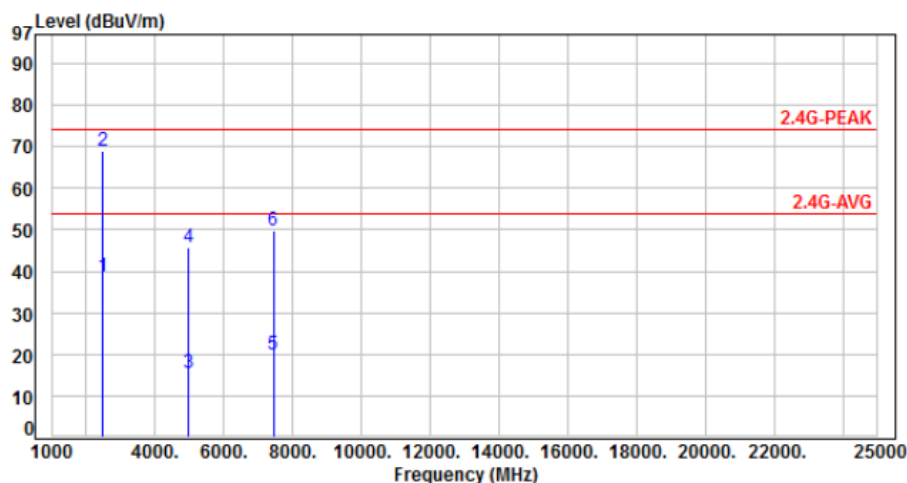
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH78	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.36	54.20	38.84	54.00	-15.16	Average	164	295	P
2	2483.50	-15.36	84.30	68.94	74.00	-5.06	Peak	164	295	P
3	4960.00	-8.07	23.56	15.49	54.00	-38.51	Average	100	285	P
4	4960.00	-8.07	53.66	45.59	74.00	-28.41	Peak	100	285	P
5	7440.00	-3.52	23.34	19.82	54.00	-34.18	Average	100	357	P
6	7440.00	-3.52	53.44	49.92	74.00	-24.08	Peak	100	357	P

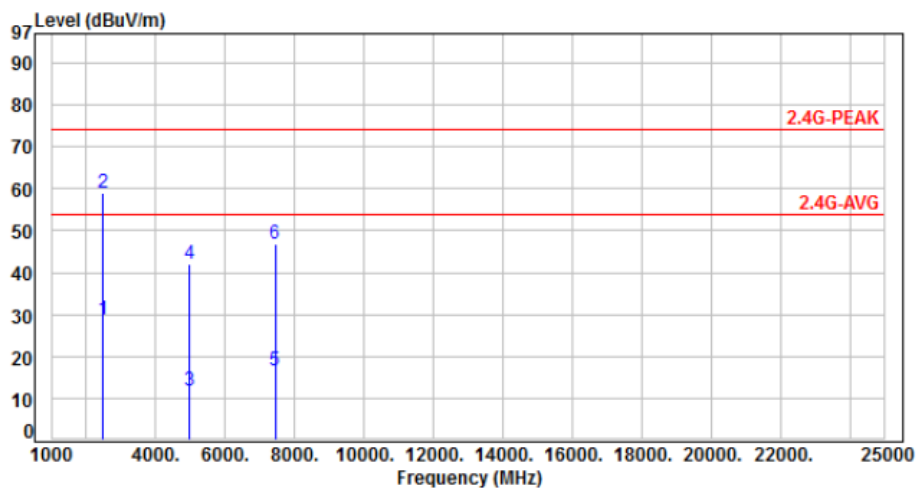
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH78	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.36	44.10	28.74	54.00	-25.26	Average	100	272	P
2	2483.50	-15.36	74.20	58.84	74.00	-15.16	Peak	100	272	P
3	4960.00	-8.07	19.99	11.92	54.00	-42.08	Average	100	105	P
4	4960.00	-8.07	50.09	42.02	74.00	-31.98	Peak	100	105	P
5	7440.00	-3.52	20.22	16.70	54.00	-37.30	Average	100	276	P
6	7440.00	-3.52	50.32	46.80	74.00	-27.20	Peak	100	276	P

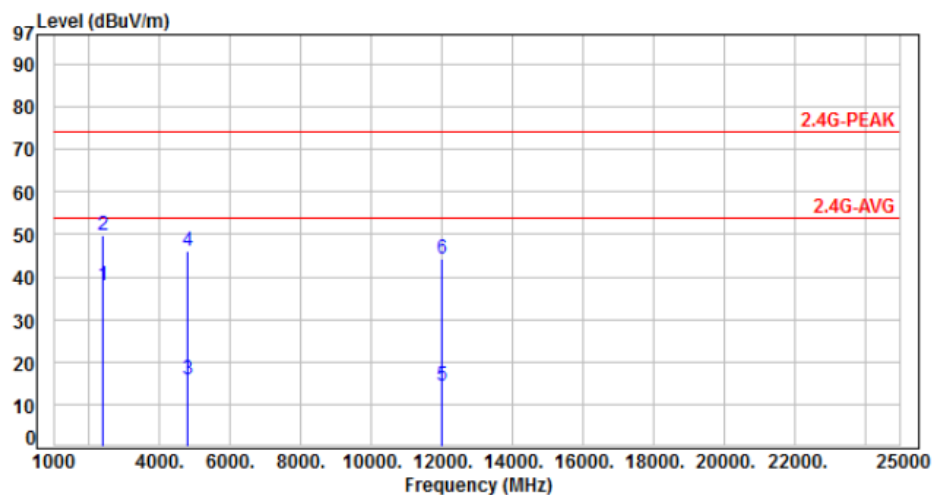
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH00	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.68	53.80	38.12	54.00	-15.88	Average	162	300	P
2	2390.00	-15.68	65.60	49.92	74.00	-24.08	Peak	162	300	P
3	4804.00	-8.53	24.40	15.87	54.00	-38.13	Average	100	299	P
4	4804.00	-8.53	54.50	45.97	74.00	-28.03	Peak	100	299	P
5	12010.00	1.77	12.53	14.30	54.00	-39.70	Average	100	76	P
6	12010.00	1.77	42.63	44.40	74.00	-29.60	Peak	100	76	P

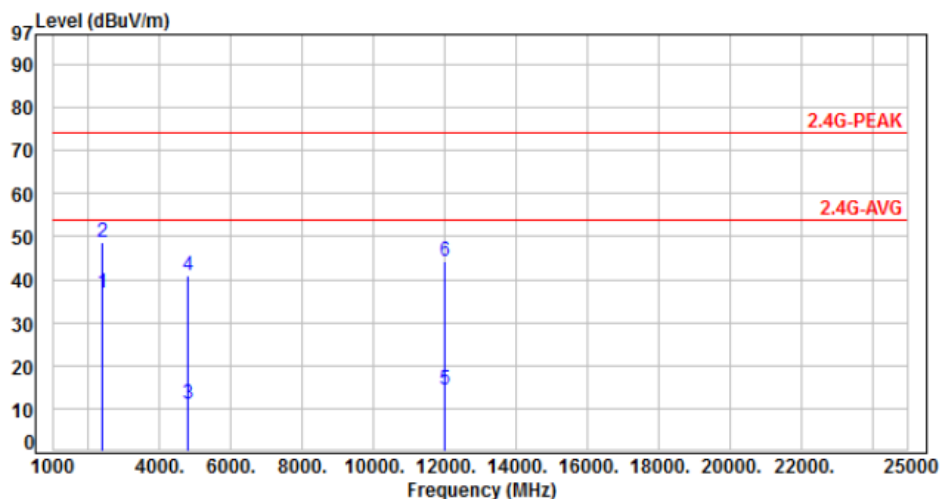
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH00	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.68	52.60	36.92	54.00	-17.08	Average	100	308	P
2	2390.00	-15.68	64.50	48.82	74.00	-25.18	Peak	100	308	P
3	4804.00	-8.53	19.53	11.00	54.00	-43.00	Average	100	103	P
4	4804.00	-8.53	49.63	41.10	74.00	-32.90	Peak	100	103	P
5	12010.00	1.77	12.45	14.22	54.00	-39.78	Average	100	302	P
6	12010.00	1.77	42.55	44.32	74.00	-29.68	Peak	100	302	P

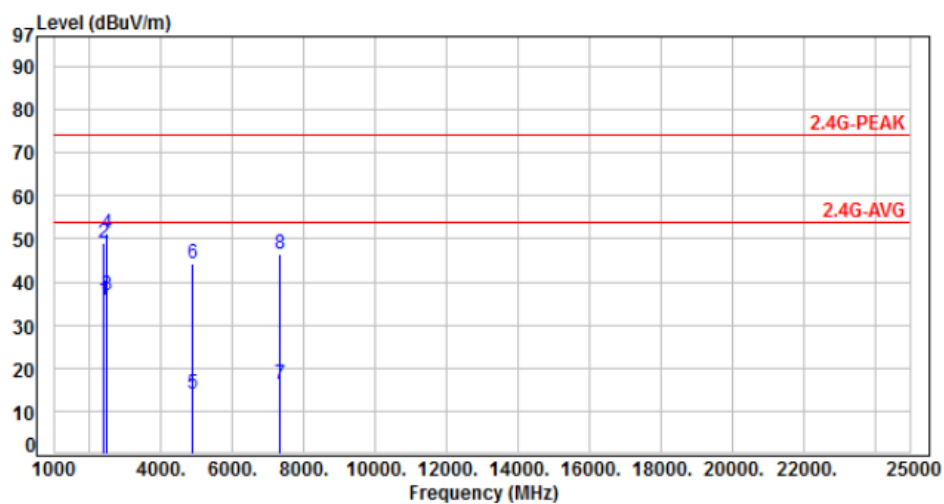
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH39	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.68	51.60	35.92	54.00	-18.08	Average	166	298	P
2	2390.00	-15.68	64.70	49.02	74.00	-24.98	Peak	166	298	P
3	2483.50	-15.36	52.30	36.94	54.00	-17.06	Average	166	298	P
4	2483.50	-15.36	66.60	51.24	74.00	-22.76	Peak	166	298	P
5	4882.00	-8.30	22.40	14.10	54.00	-39.90	Average	100	290	P
6	4882.00	-8.30	52.50	44.20	74.00	-29.80	Peak	100	290	P
7	7323.00	-3.83	20.13	16.30	54.00	-37.70	Average	100	343	P
8	7323.00	-3.83	50.23	46.40	74.00	-27.60	Peak	100	343	P

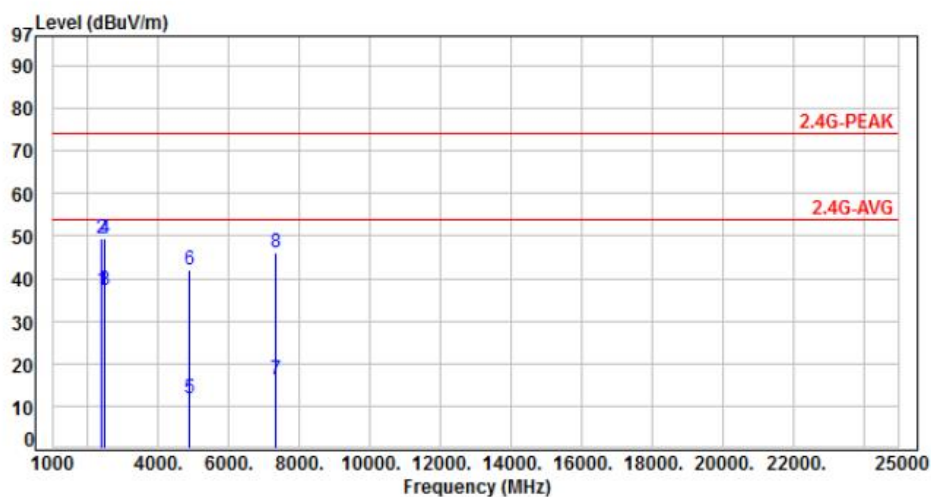
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH39	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.68	52.90	37.22	54.00	-16.78	Average	100	303	P
2	2390.00	-15.68	65.20	49.52	74.00	-24.48	Peak	100	303	P
3	2483.50	-15.36	52.50	37.14	54.00	-16.86	Average	100	303	P
4	2483.50	-15.36	64.60	49.24	74.00	-24.76	Peak	100	303	P
5	4882.00	-8.30	20.07	11.77	54.00	-42.23	Average	100	109	P
6	4882.00	-8.30	50.17	41.87	74.00	-32.13	Peak	100	109	P
7	7323.00	-3.83	20.01	16.18	54.00	-37.82	Average	100	293	P
8	7323.00	-3.83	50.11	46.28	74.00	-27.72	Peak	100	293	P

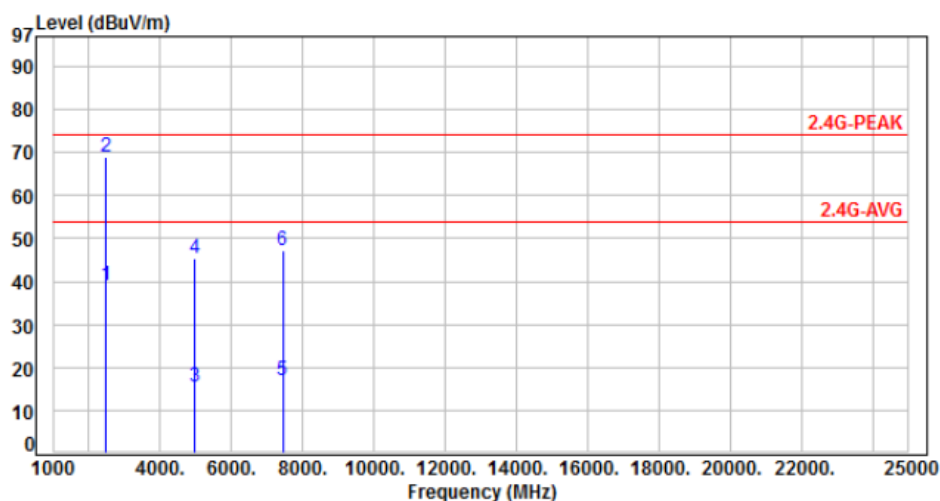
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH78	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.36	54.40	39.04	54.00	-14.96	Average	159	296	P
2	2483.50	-15.36	84.50	69.14	74.00	-4.86	Peak	159	296	P
3	4960.00	-8.07	23.39	15.32	54.00	-38.68	Average	100	294	P
4	4960.00	-8.07	53.49	45.42	74.00	-28.58	Peak	100	294	P
5	7440.00	-3.52	20.50	16.98	54.00	-37.02	Average	100	352	P
6	7440.00	-3.52	50.60	47.08	74.00	-26.92	Peak	100	352	P

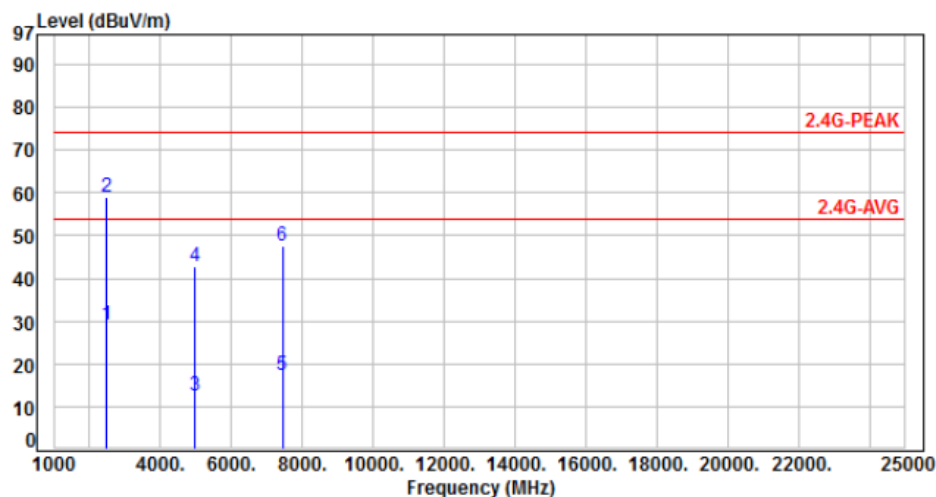
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH78	Temperature	: 23 °C
Test Date	: Feb. 19, 2019	Humidity	: 61 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.36	44.40	29.04	54.00	-24.96	Average	100	302	P
2	2483.50	-15.36	74.50	59.14	74.00	-14.86	Peak	100	302	P
3	4960.00	-8.07	20.71	12.64	54.00	-41.36	Average	100	120	P
4	4960.00	-8.07	50.81	42.74	74.00	-31.26	Peak	100	120	P
5	7440.00	-3.52	20.90	17.38	54.00	-36.62	Average	100	309	P
6	7440.00	-3.52	51.00	47.48	74.00	-26.52	Peak	100	309	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



6.7 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



7. Test of Conducted Spurious Emission

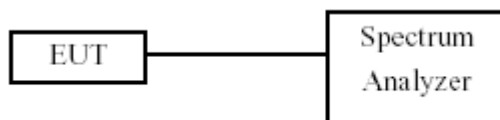
7.1 Test Limit

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 loss 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 Result : PASS

Temperature : 22°C

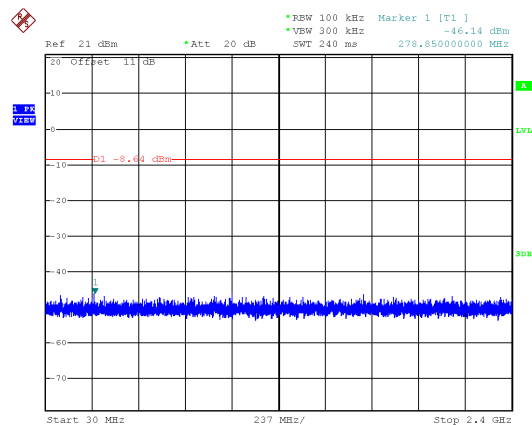
Test Date : Mar. 05, 2019

Humidity : 52%

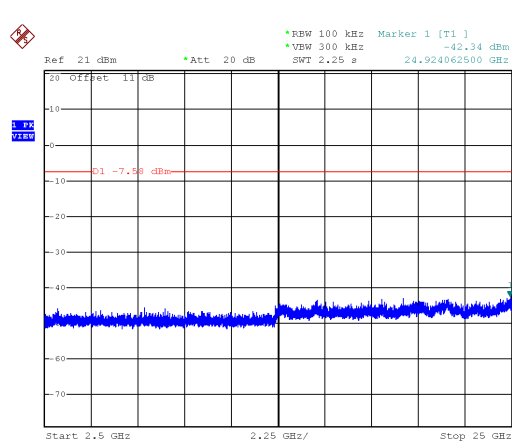
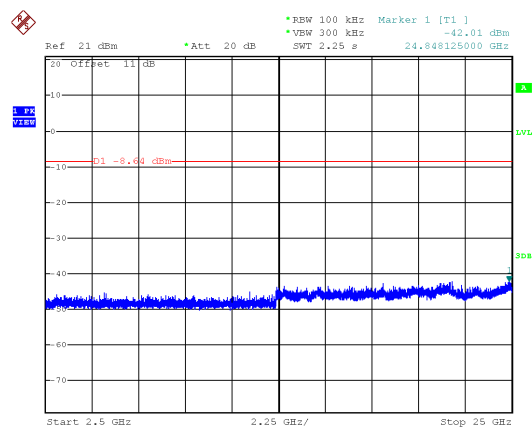
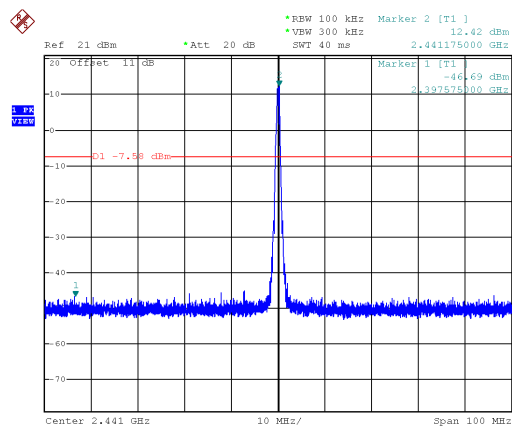
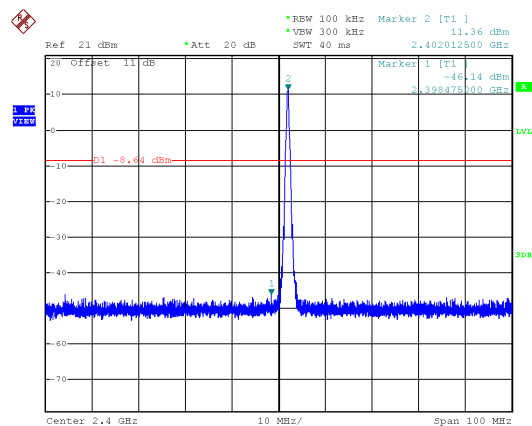
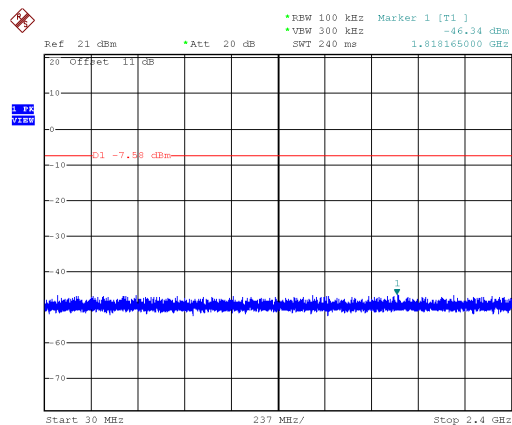
Note: Test plots refer to the following pages.



Modulation Type: GFSK, CH00

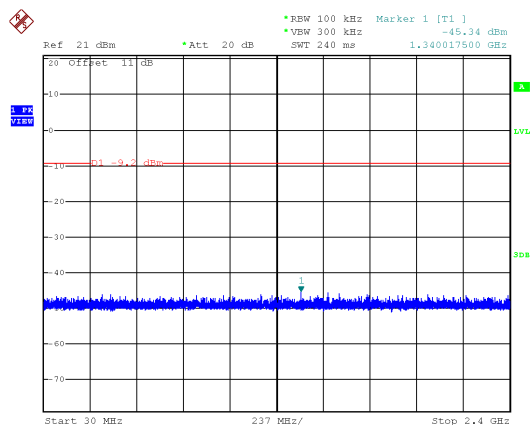
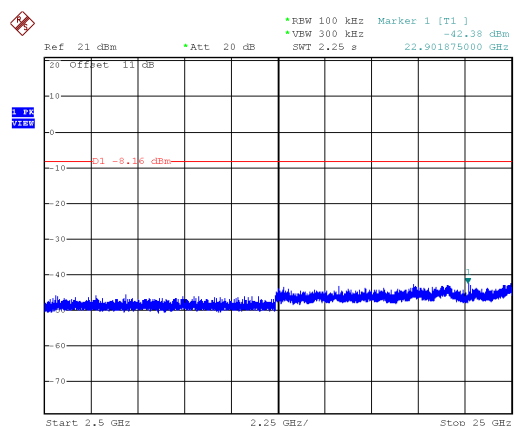
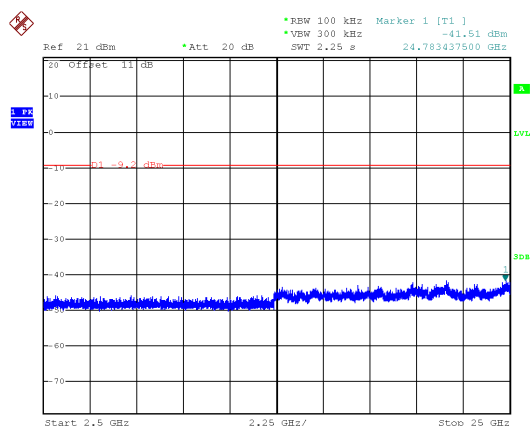
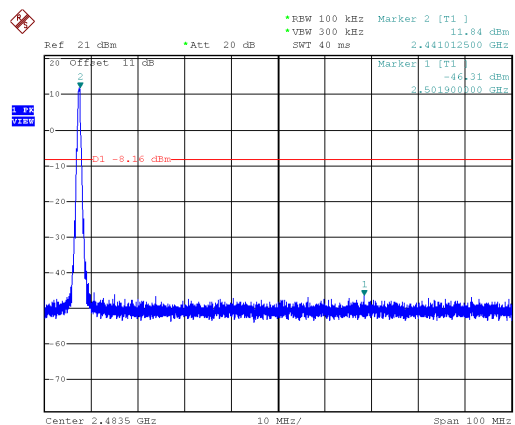
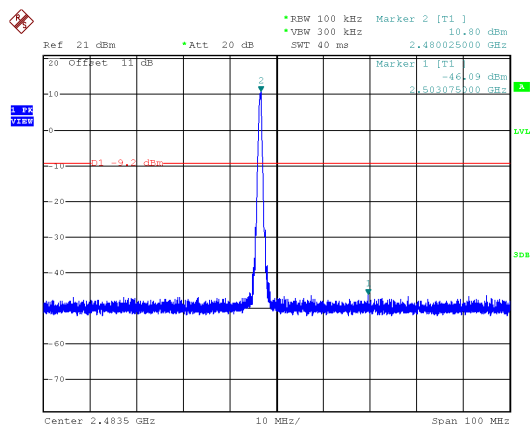
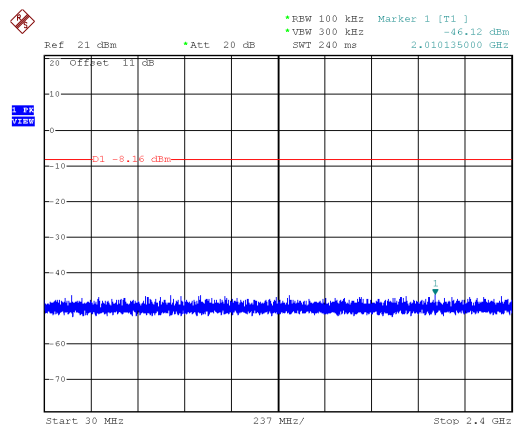


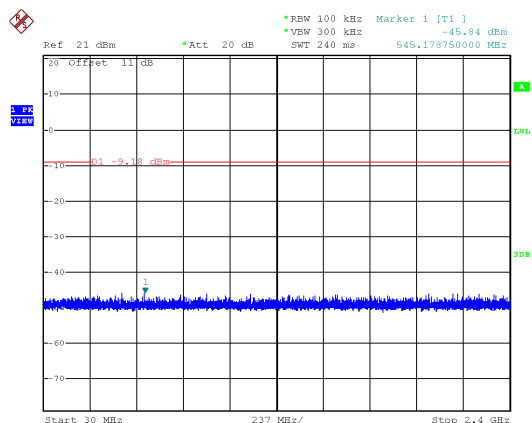
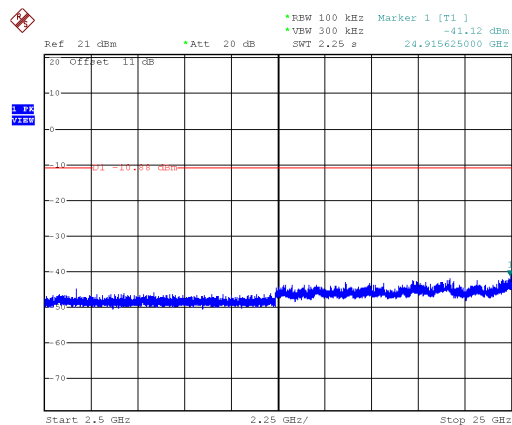
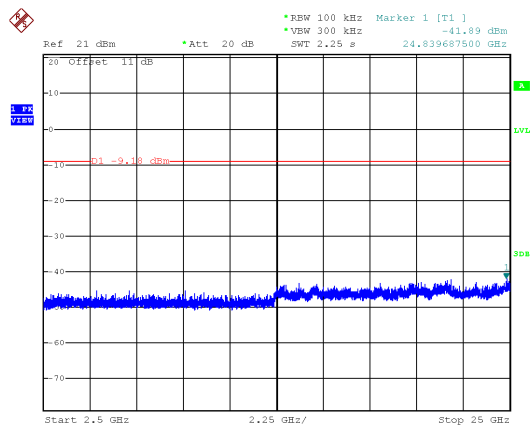
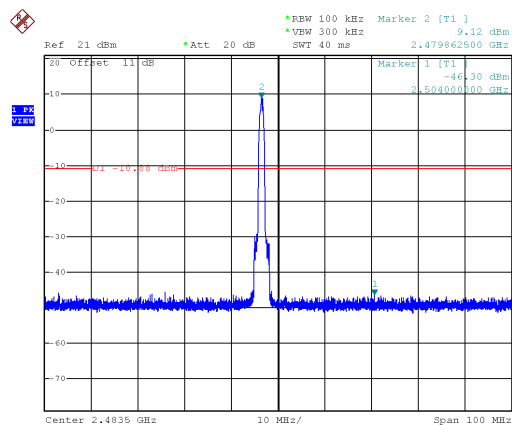
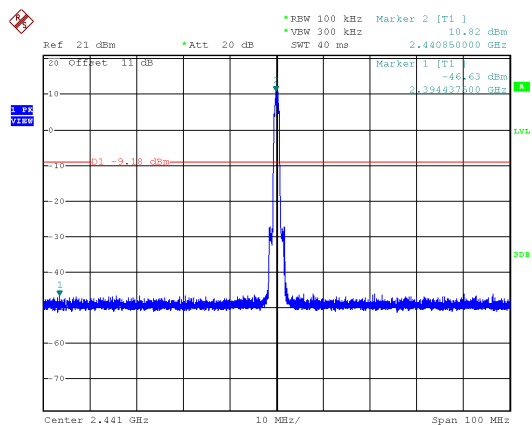
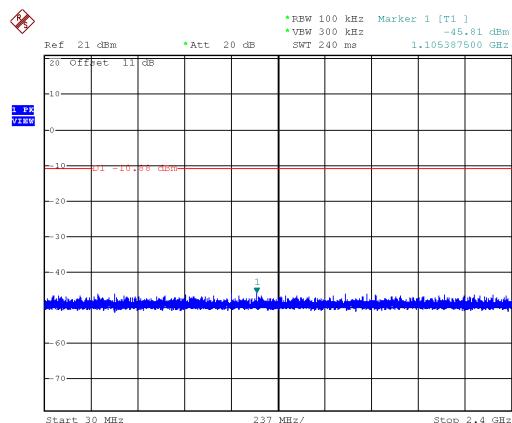
Modulation Type: GFSK, CH39





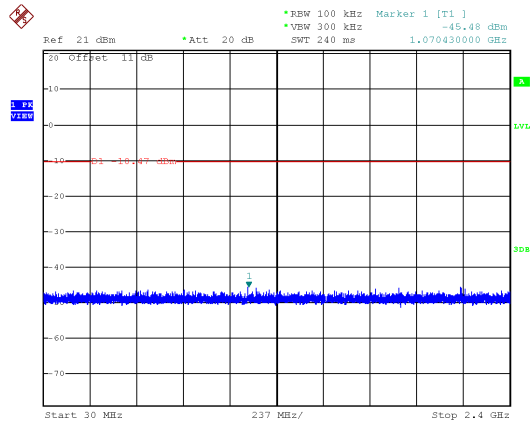
Modulation Type: GFSK, CH78

Modulation Type: $\pi/4$ -DQPSK, CH00

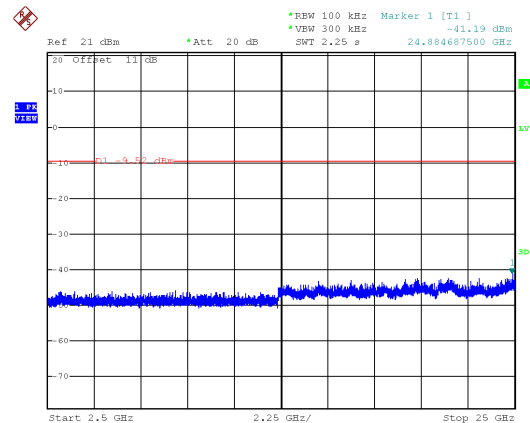
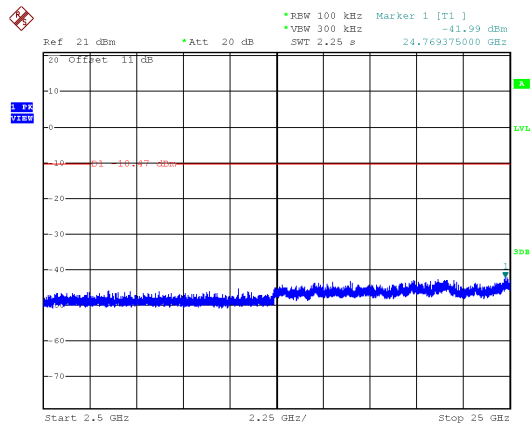
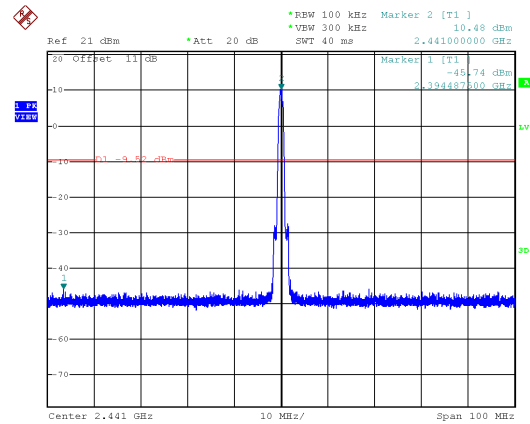
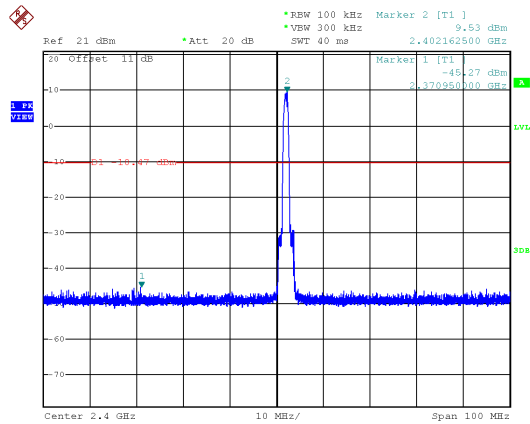
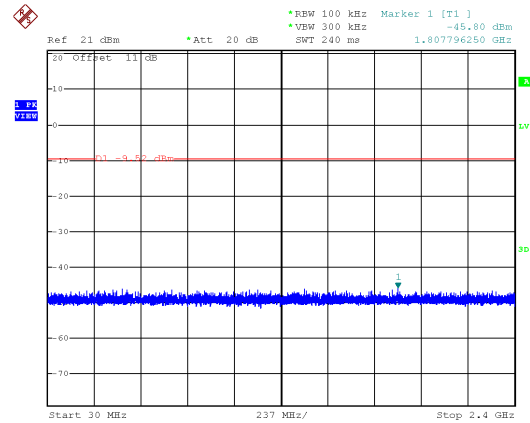
Modulation Type: $\pi/4$ -DQPSK, CH39Modulation Type: $\pi/4$ -DQPSK, CH78



Modulation Type: 8DPSK, CH00

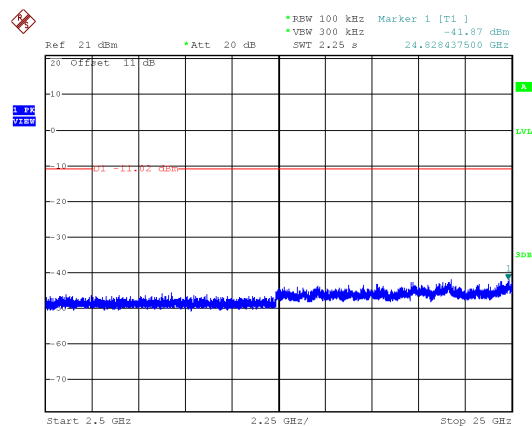
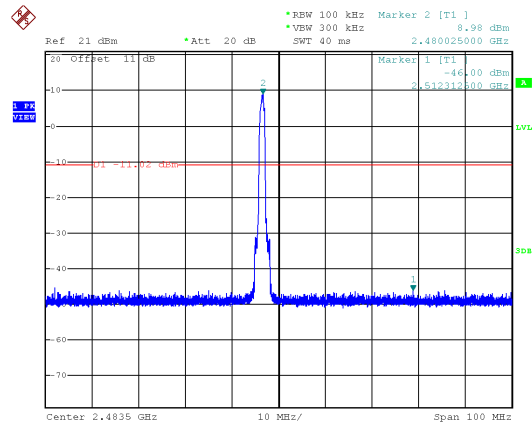
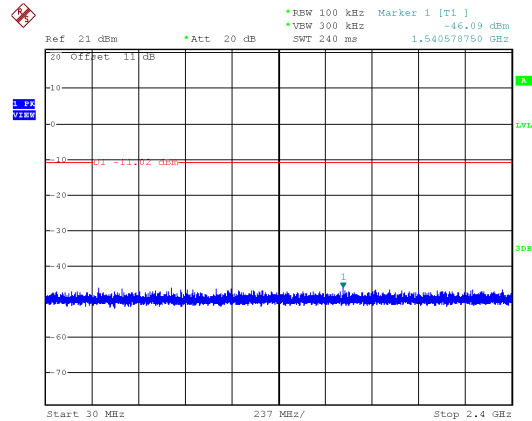


Modulation Type: 8DPSK, CH39



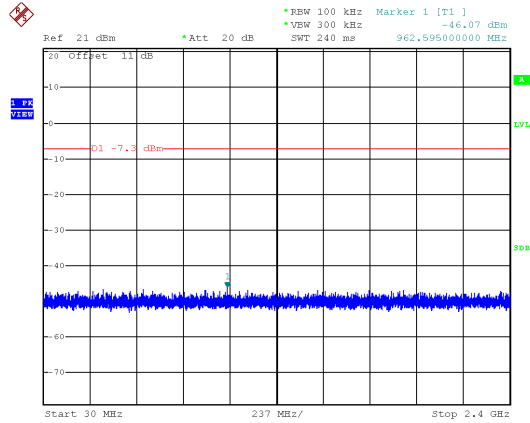


Modulation Type: 8DPSK, CH78

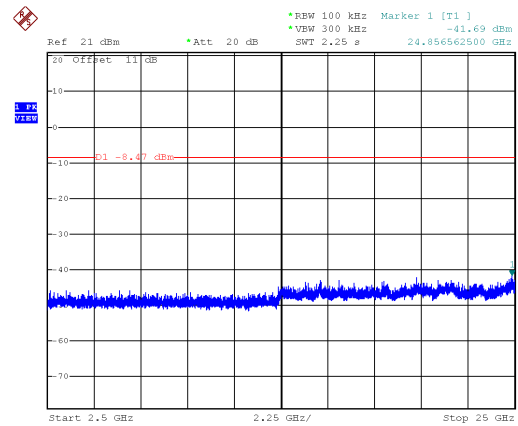
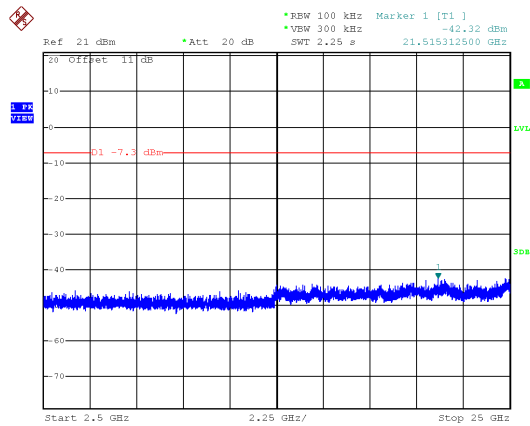
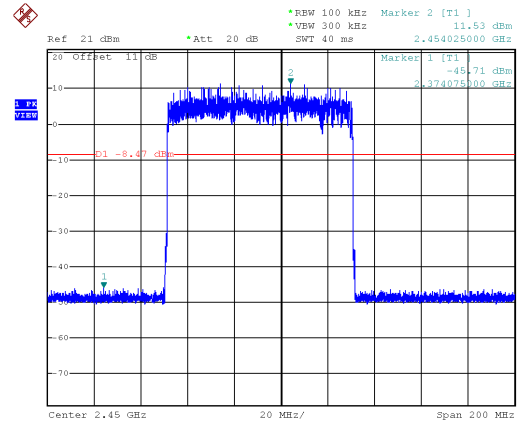
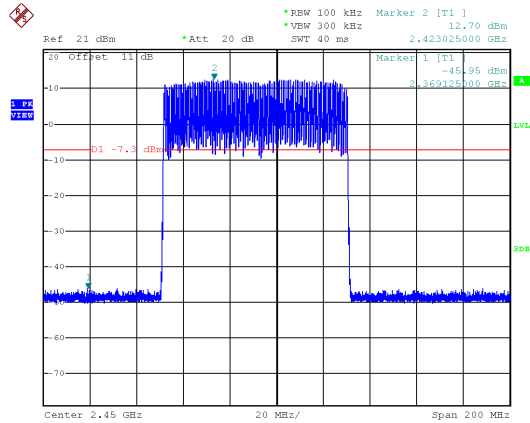
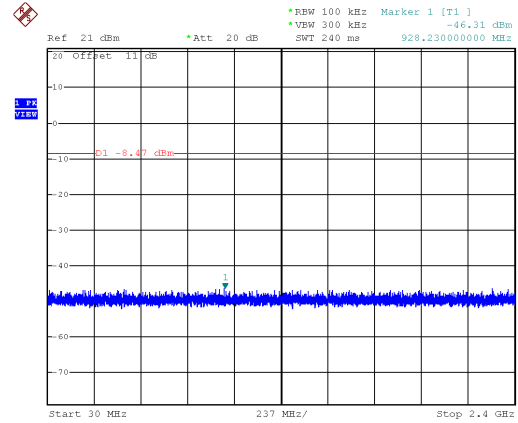




Hopping Mode:
Modulation Type: GFSK

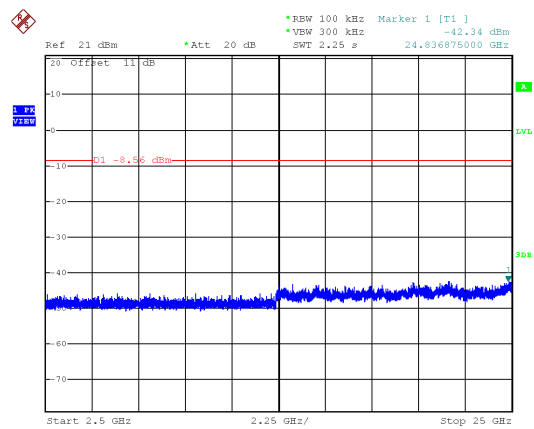
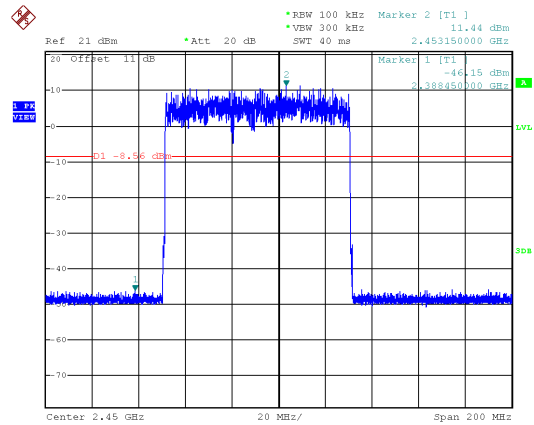
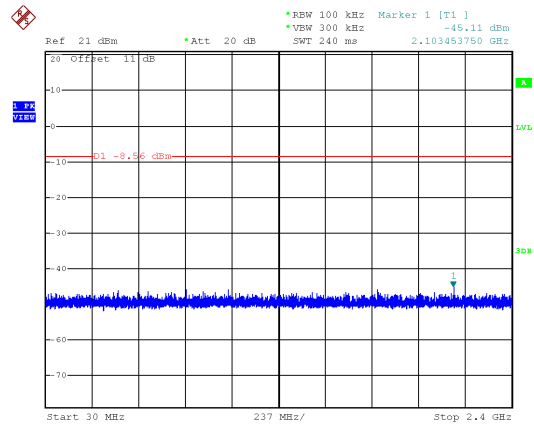


Modulation Type: $\pi/4$ -DQPSK





Modulation Type: 8DPSK





8. 20dB Bandwidth Measurement Data

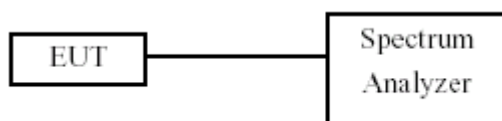
8.1 Test Limit

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



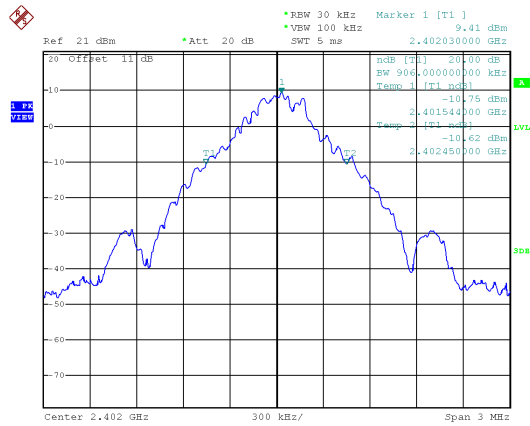
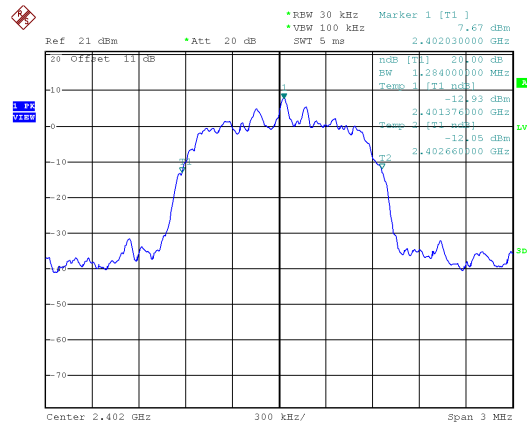
8.4 Test Result and Data

Test Date : Mar. 08, 2019

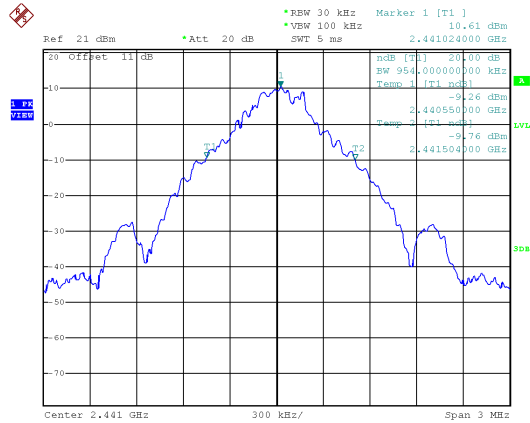
Temperature : 22°C

Humidity : 58%

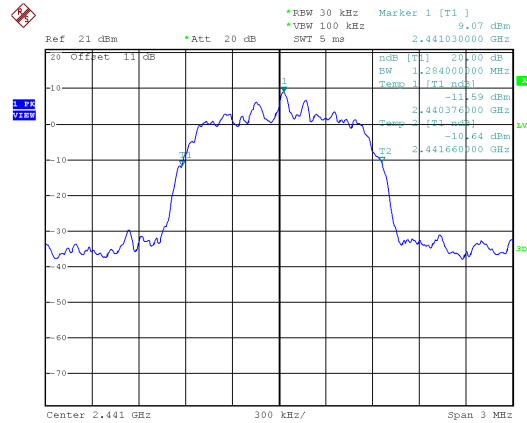
Modulation Type	Channel	Frequency (MHz)	20dB Bandwidth (MHz)	2/3 20dB Bandwidth (MHz)
GFSK	00	2402	0.906	0.604
	39	2441	0.954	0.636
	78	2480	0.960	0.640
$\pi/4$ -DQPSK	00	2402	1.284	0.856
	39	2441	1.284	0.856
	78	2480	1.284	0.856
8DPSK	00	2402	1.296	0.864
	39	2441	1.296	0.864
	78	2480	1.290	0.860

Modulation Type: GFSK
CH00Modulation Type: $\pi/4$ -DQPSK
CH00

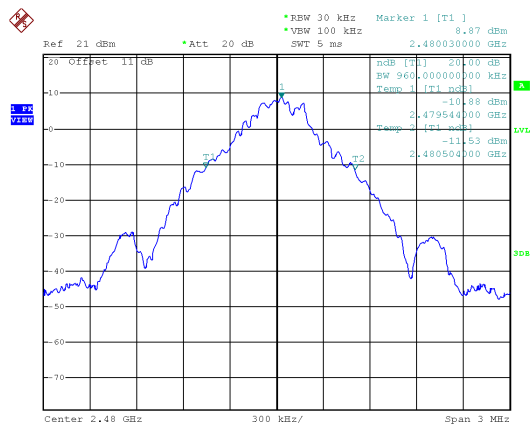
CH39



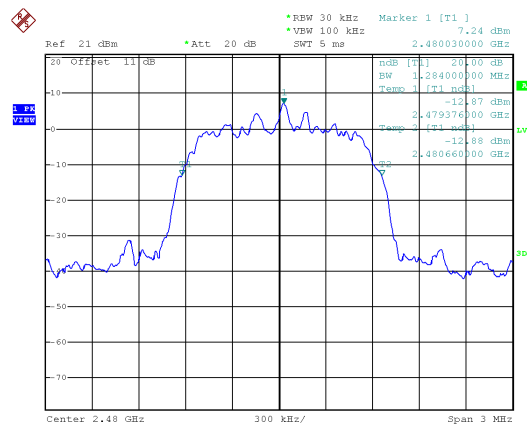
CH39



CH78

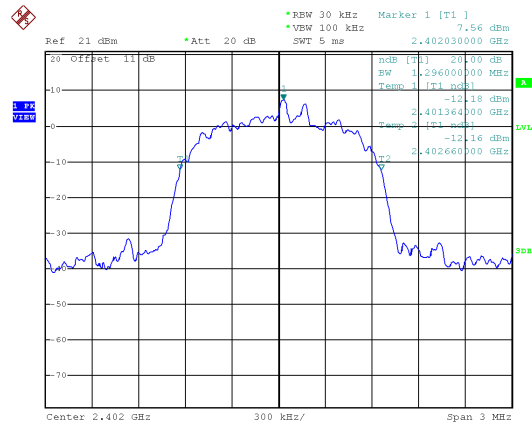


CH78

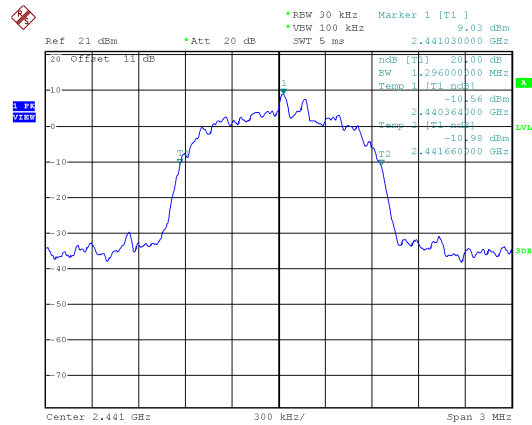




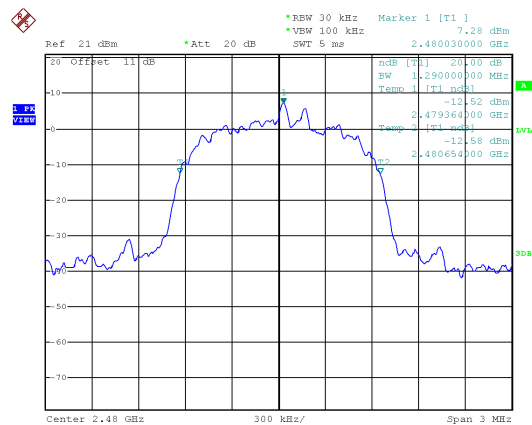
Modulation Type: 8DSPK
CH00



CH39



CH78





9. Frequencies Separation

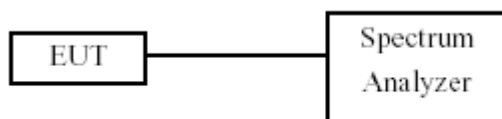
9.1 Test Limit

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

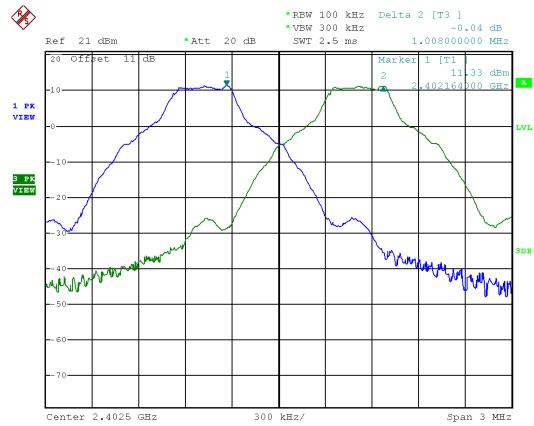
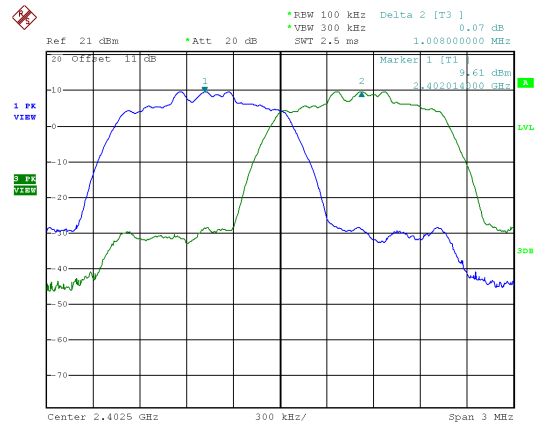
Test Date : Mar. 08, 2019

Temperature : 22°C

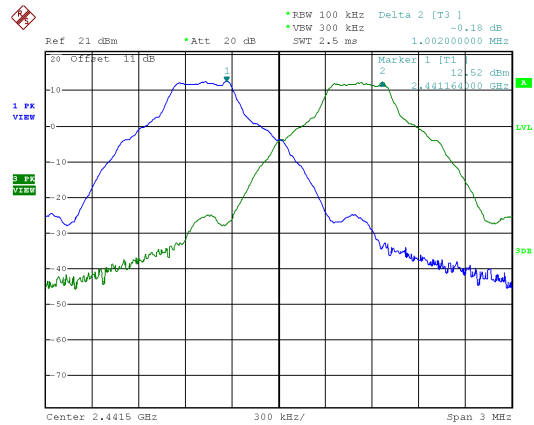
Humidity : 58%

ANSI 63.10-2014 7.8.2 Carrier frequency separation

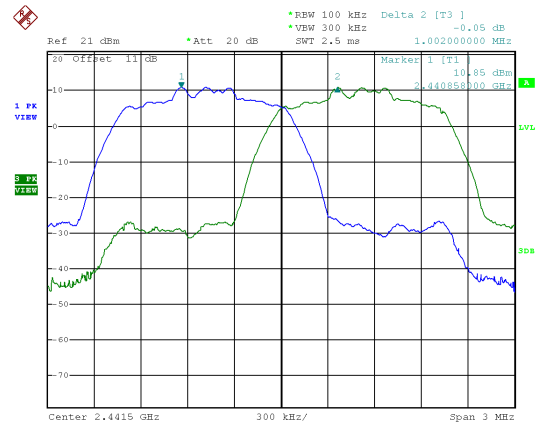
Modulation Type	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
GFSK	00	2402	1.008	0.604
	39	2441	1.002	0.636
	78	2480	1.002	0.64
$\pi/4$ -DQPSK	00	2402	1.008	0.856
	39	2441	1.002	0.856
	78	2480	1.002	0.856
8DPSK	00	2402	1.002	0.864
	39	2441	1.002	0.864
	78	2480	1.002	0.86

Modulation Type: GFSK
CH00Modulation Type: $\pi/4$ -DQPSK
CH00

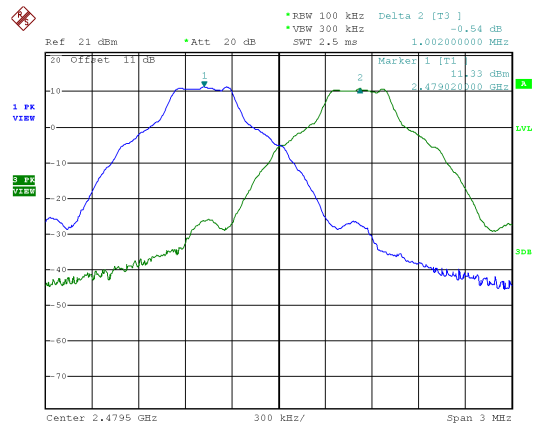
CH39



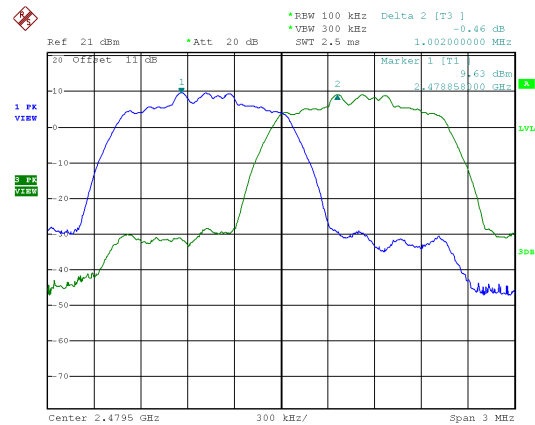
CH39



CH78

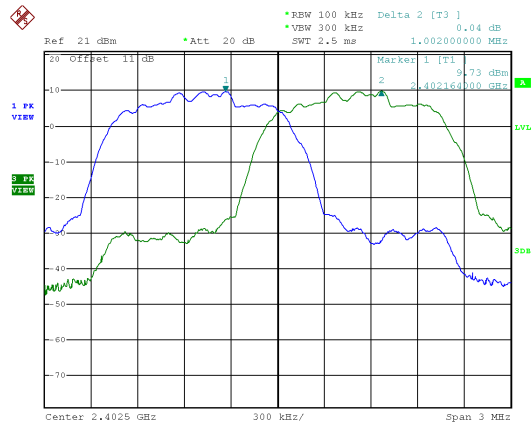


CH78



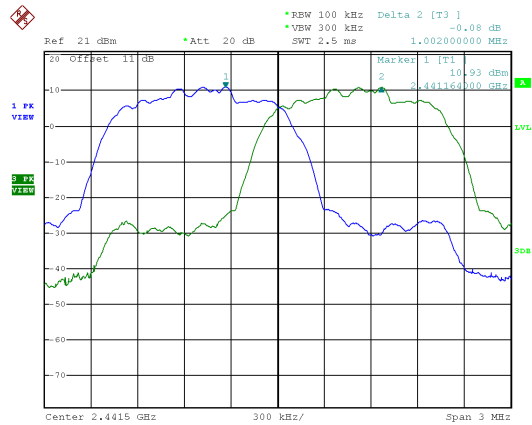


Modulation Type: 8DSPK
CH00



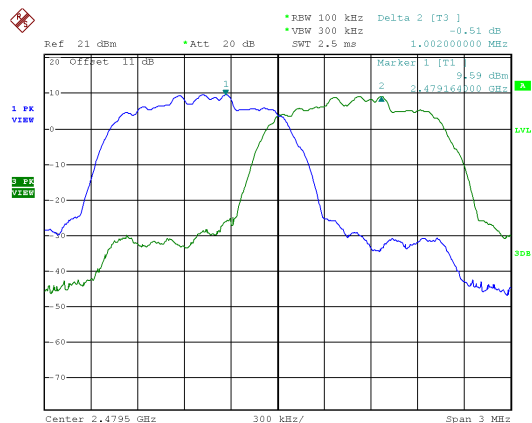
L

CH39



L

CH78



L



10. Dwell Time on each channel

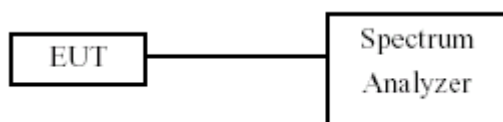
10.1 Test Limit

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 : Mar. 08, 2019

Temperature : 22°C

Humidity : 58%

Test Period = 0.4 (second/ channel) x 79 Channel = 31.6 sec

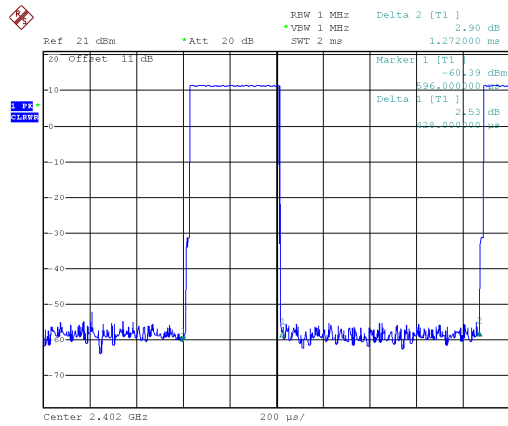
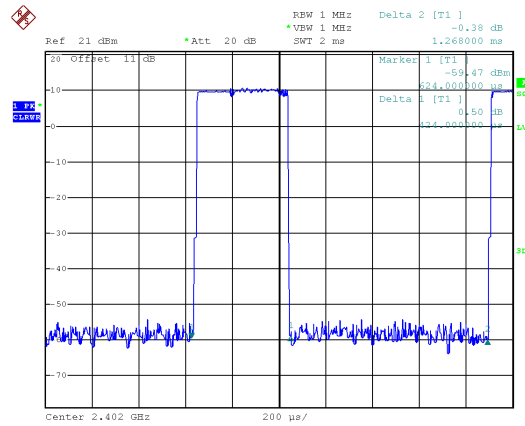
Modulation Type	Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 31.6 (79 Hopping*0.4)	Dwell Time (ms)	Limit (ms)
GFSK-DH1	2402	0.428	320.10	137.00	400
GFSK-DH3	2402	1.694	159.90	270.87	400
GFSK-DH5	2402	2.954	106.81	315.52	400
$\pi/4$ -DQPSK-DH1	2402	0.424	320.10	135.72	400
$\pi/4$ -DQPSK-DH3	2402	1.684	159.90	269.27	400
$\pi/4$ -DQPSK-DH5	2402	2.984	106.81	318.72	400
8DPSK-DH1	2402	0.416	320.10	133.16	400
8DPSK-DH3	2402	1.686	159.90	269.59	400
8DPSK-DH5	2402	2.986	106.81	318.93	400

Test Period = 0.4 (second/ channel) x 20 Channel = 8 sec

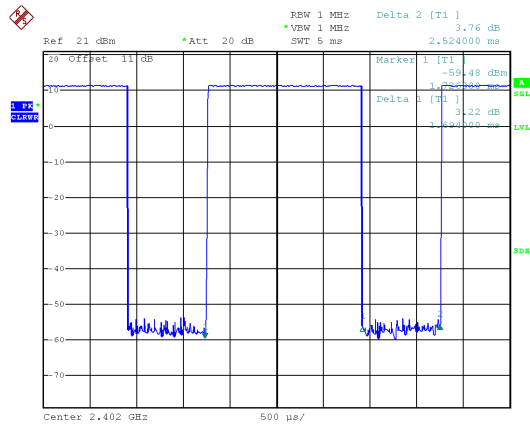
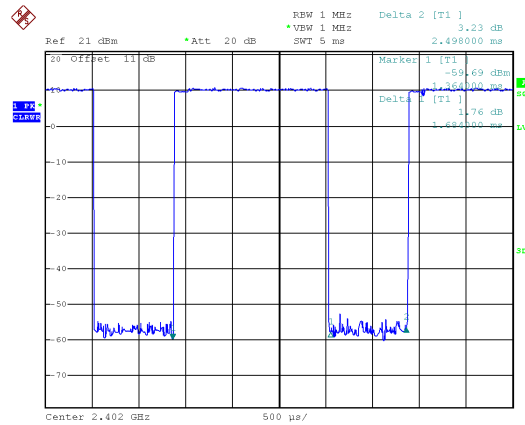
Modulation Type	Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 8 (20 Hopping*0.4)	Dwell Time (ms)	Limit (ms)
AFH-DH1	2402-2421	0.428	160.00	68.48	400
AFH-DH3	2402-2421	1.694	80.00	135.52	400
AFH-DH5	2402-2421	2.954	53.33	157.54	400



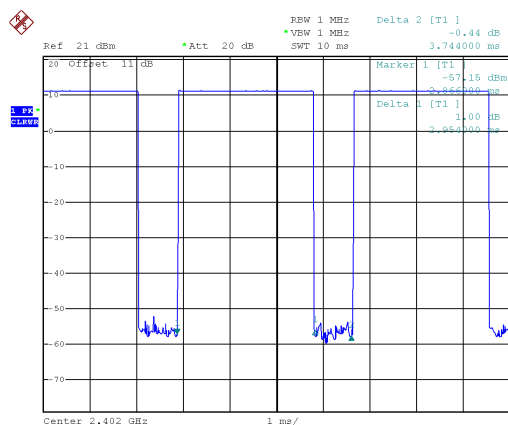
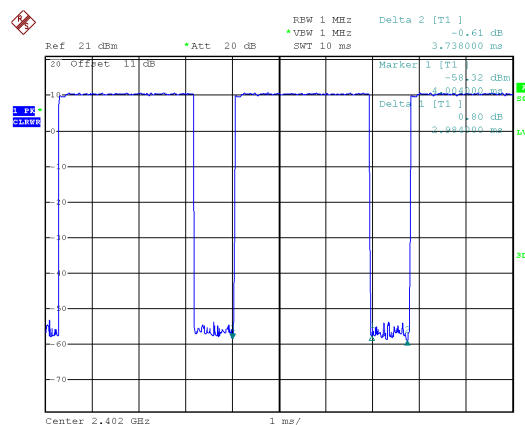
Modulation Type: GFSK(DH1)

Modulation Type: $\pi/4$ -DQPSK (DH1)

Modulation Type: GFSK(DH3)

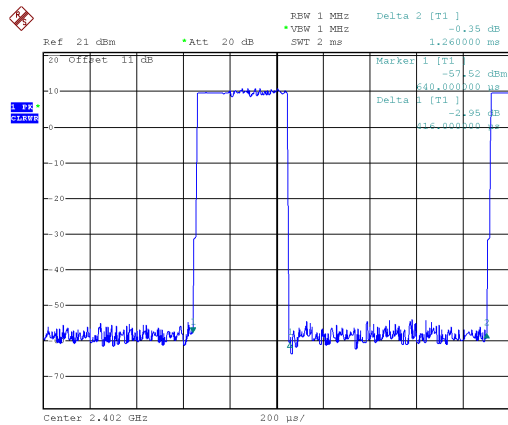
Modulation Type: $\pi/4$ -DQPSK (DH3)

Modulation Type: GFSK(DH5)

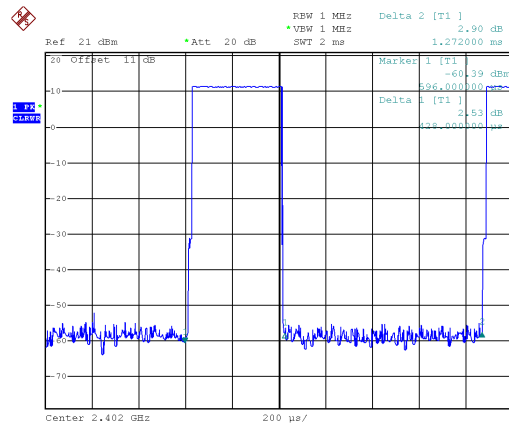
Modulation Type: $\pi/4$ -DQPSK (DH5)



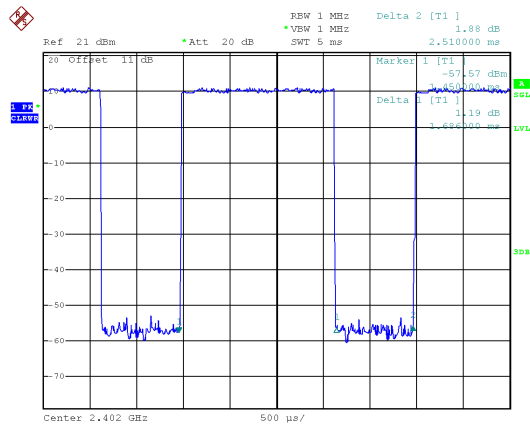
Modulation Type: 8DSPK (DH1)



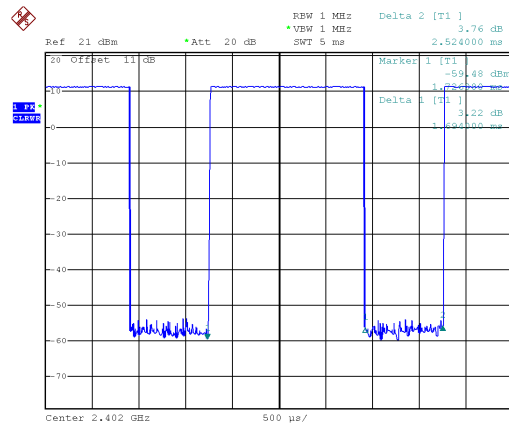
Modulation Type: AFH (DH1)



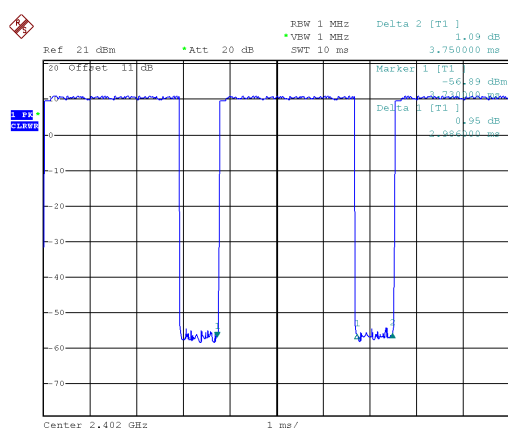
Modulation Type: 8DSPK (DH3)



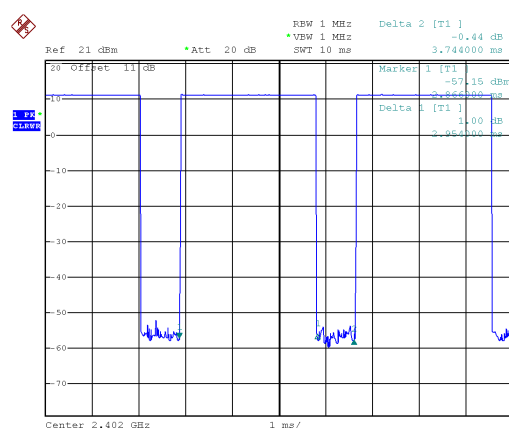
Modulation Type: AFH (DH3)



Modulation Type: 8DSPK (DH5)



Modulation Type: AFH (DH5)





11. Number of Hopping Channels

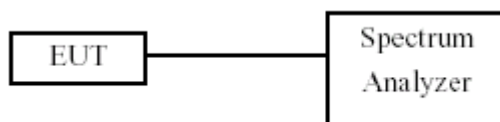
11.1 Test Limit

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

11.2 Test Procedures

- 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.

11.3 Test Setup Layout



11.4 Test Result and Data

Test Date : Mar. 08, 2019

Temperature : 22°C

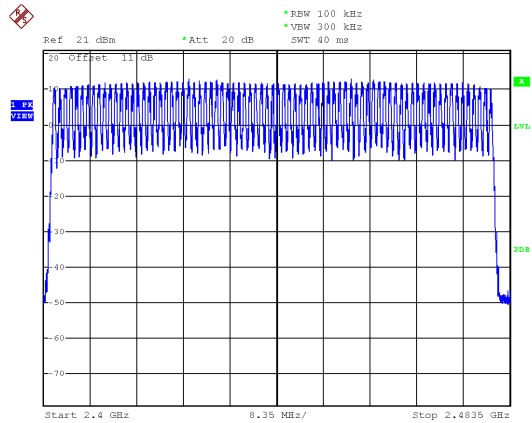
Humidity : 58%

ANSI 63.10-2014 7.8.3 Number of hopping frequencies

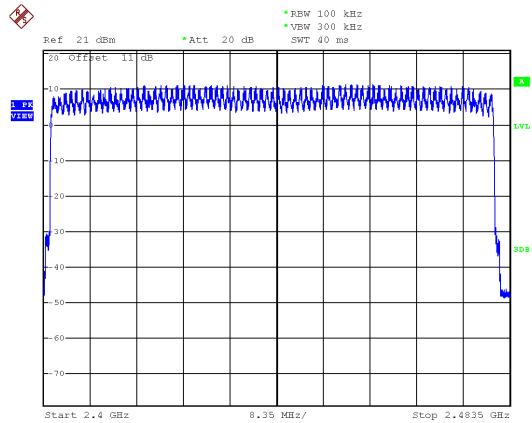
Modulation Type	Hopping Channels
GFSK	79
$\pi/4$ -DQPSK	79
8DPSK	79



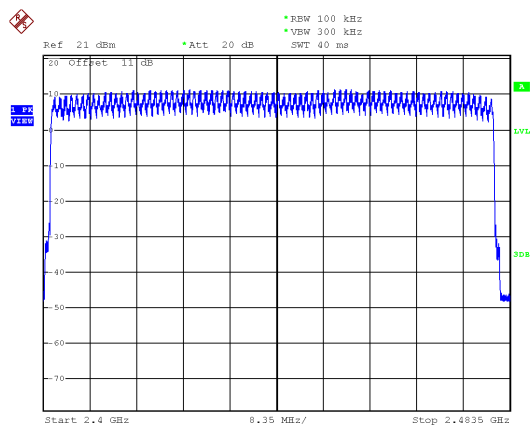
Modulation Type: GFSK



Modulation Type: $\pi/4$ -DQPSK



Modulation Type: 8DPSK





12. Maximum Peak Output Power

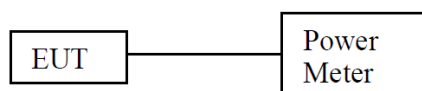
12.1 Test Limit

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 : Mar. 08, 2019

Temperature : 22°C

Humidity : 58%

ANSI 63.10-2014 7.8.5 Output power test procedure for frequency-hopping spread-spectrum (FHSS)

Modulation Type	Channel	Frequency (MHz)	PK Output Power (dBm)	PK Output Power (mW)
GFSK	0	2402	10.88	12.246
	39	2441	11.97	15.740
	78	2480	10.48	11.169
$\pi/4$ -DQPSK	0	2402	11.00	12.589
	39	2441	12.02	15.922
	78	2480	10.50	11.220
8DPSK	0	2402	11.11	12.912
	39	2441	12.15	16.406
	78	2480	10.66	11.641

Modulation Type	Channel	Frequency (MHz)	AV Output Power (dBm)	AV Output Power (mW)
GFSK	0	2402	10.70	11.749
	39	2441	11.78	15.066
	78	2480	10.22	10.520
$\pi/4$ -DQPSK	0	2402	8.82	7.621
	39	2441	9.95	9.886
	78	2480	8.28	6.730
8DPSK	0	2402	8.80	7.586
	39	2441	9.94	9.863
	78	2480	8.31	6.776

*Average power is reference only

AFH Mode

Modulation Type	Channel	Frequency (MHz)	PK Output Power (dBm)	PK Output Power (mW)
GFSK	0-19	2402-2421	12.48	17.701
$\pi/4$ -DQPSK	0-19	2402-2421	12.57	18.072
8DPSK	0-19	2402-2421	12.62	18.281

Modulation Type	Channel	Frequency (MHz)	AV Output Power (dBm)	AV Output Power (mW)
GFSK	0-19	2402-2421	12.31	17.022
$\pi/4$ -DQPSK	0-19	2402-2421	10.39	10.940
8DPSK	0-19	2402-2421	10.38	10.914

*Average power is reference only