BACL
Bay Area Compliance Labs Corp.

FCC PART 15.247

TEST REPORT

For

Fujian LANDI Commercial Equipment Co., Ltd.

Building 17, Section A, Software Park, No. 89 Software Road, Gulou District, Fuzhou Municipality, Fujian Province, P.R. China.

FCC ID: 2AG6N-C10-BLWF

Report Type:	Product Name:
Original Report	AECR C10

Report Number:	RXM171225067-00B
Report Date:	2018-04-04
Reviewed By:	Jerry Zhang EMC Manager *Jerry Zhang*
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		AECR C10
EUT Model [Note]**:**		AECR C10 configuration 1: C10-S197A1-0001(LED touch screen) configuration 2: C10-S39B1-0001(LED digital tube)
FCC ID:		2AG6N-C10-BLWF
Rated Input Voltage:		DC 19/19.5V from Adapter
Adapter #1 Information	**Model:**	PA-1650-90
	Input:	AC 100-240V~50/60Hz ,1.6A
	Output:	DC 19V, 3.42A
Adapter #2 Information	**Model:**	HKA06519034-6J
	Input:	AC 100-240V~50/60Hz ,1.5A
	Output:	DC 19V, 3.42A
Adapter #3 Information	**Model:**	A14-065N1A
	Input:	AC 100-240V~50/60Hz ,1.7A
	Output:	DC 19.5V, 3.33A
External Dimension:		LED touch screen:Length (403mm)*Width (225mm)*High (390mm) LED digital tube: Length (403mm)*Width (225mm)*High (380mm)
Serial Number:		171225067-1(C10-S197A1-0001), 171225067-2(C10-S39B1-0001)
EUT Received Date:		2017.12.25

Note: this model of device has two different configurations, 15.6-inch LED touch screen and LED digital tube. Both configurations have identical circuit board and software, and the only difference is the customer display, we selected 15.6'' Dual Monitor for fully testing. The difference between them was explained in the declaration letter.

Objective

This report is prepared on behalf of ***Fujian LANDI Commercial Equipment Co., Ltd.*** in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the Bluetooth BDR and EDR mode of EUT compliance with FCC Rules Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: 2AG6N-C10-BLWF.
FCC Part 15E NII submissions with FCC ID: 2AG6N-C10-BLWF.

Test Methodology

All measurements detailed in this Test Report were performed in accordance with ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices".

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218,the FCC Designation No. : CN1220.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode.

EUT Exercise Software

The test software 'QRCT ' configured the maximum power level as below setting:

Test Software Version	QRCT		
Test Frequency	2402MHz	2441MHz	2480MHz
GFSK	9	9	9
π/4-DQPSK	9	9	9
8DPSK	9	9	9

Equipment Modifications

No modification was made to the EUT.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
HUAWEI	Earphone	/	/
TOSHIBA	USB HDD	v63700-A	V123212
Sandisk	U-DISK	4GB	S4766
Tenda	Router	D301	/
MAKEN	Cash Drawer	MT-350T	MT-350T
YD	PIN Pad	YD511DA-RJ	YD511DA-RJ
Sandisk	TF Card	4GB	2142231

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	No	No	0.45	EUT USB Port	USB HDD
RJ45 Cable	No	No	2.00	Router	EUT
RJ11 Cable	No	No	2.00	EUT	Cash Drawer
RS232 Cable	No	No	2.00	EUT	PIN Pad
Earphone Cable	No	No	1.5	EUT	Earphone
DC Power Cable	No	No	1.2	Adapter	EUT

Block Diagram of Test Setup
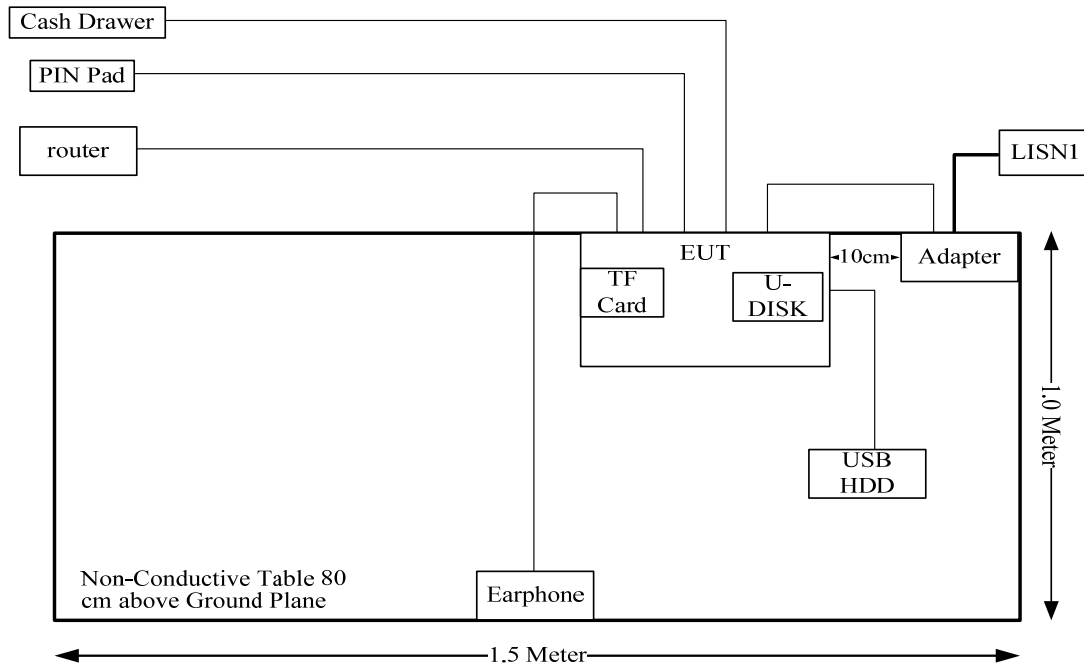
SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
§15.247 (i), §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(1)	20 dB Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

FCC §15.247 (i) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f^2)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Prediction of power density at the distance of the applicable MPE limit:
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Frequency Range (MHz)	Antenna Gain		Maximum Power Including Tolerance		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
2402-2480	3.8	2.40	12	15.85	20.00	0.008	1.0

Note: The Maximum Power Including Tolerance was declared by manufacturer.
Bluetooth and WLAN can`t transmit simultaneously.

Result: Compliance, The device meet FCC MPE at 20 cm distance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has one internal antenna arrangement for BT, and the antenna gain is 3.8 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207(a)

EUT Setup

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to the main LISN with a 120 V/60 Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$

Herein,
V_C: corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN or ISN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-11	2018-12-11
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
N/A	Coaxial Cable	C-NJNJ-50	C-0200-01	2017-09-05	2018-09-05

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24.3 °C
Relative Humidity:	42 %
ATM Pressure:	101.2 kPa

The testing was performed by Alex You on 2018-01-26.

Test Mode: Transmitting

Adapter#1(C10-S197A1-0001):

AC120 V, 60 Hz, Line:
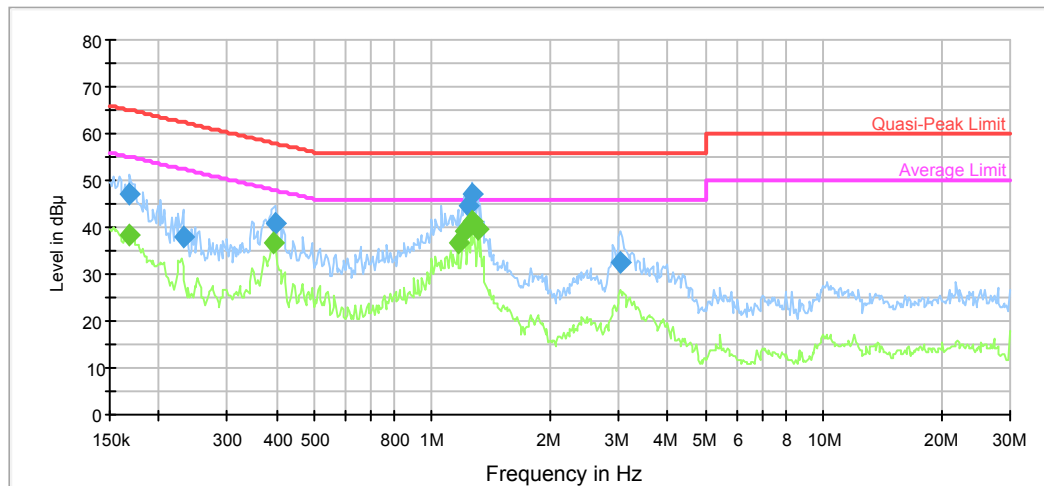
Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.169044	47.0	9.000	L1	10.9	18.0	65.0	Compliance
0.230654	37.7	9.000	L1	10.4	24.7	62.4	Compliance
0.399703	40.8	9.000	L1	10.0	17.1	57.9	Compliance
1.239175	44.7	9.000	L1	9.8	11.3	56.0	Compliance
1.259081	47.2	9.000	L1	9.8	8.8	56.0	Compliance
3.024908	32.7	9.000	L1	9.8	23.3	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.169044	38.5	9.000	L1	10.9	16.5	55.0	Compliance
0.393383	36.7	9.000	L1	10.0	11.3	48.0	Compliance
1.162648	36.9	9.000	L1	9.8	9.1	46.0	Compliance
1.209904	39.4	9.000	L1	9.8	6.6	46.0	Compliance
1.259081	41.3	9.000	L1	9.8	4.7	46.0	Compliance
1.310256	39.6	9.000	L1	9.8	6.4	46.0	Compliance

AC120 V, 60 Hz, Neutral:
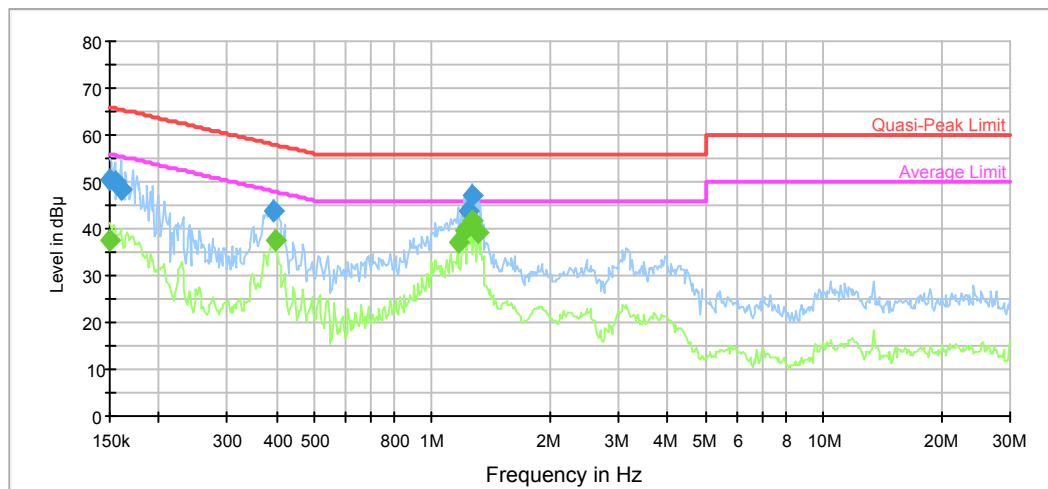
Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	50.5	9.000	N	11.2	15.5	66.0	Compliance
0.154858	50.1	9.000	N	11.1	15.6	65.7	Compliance
0.159873	48.2	9.000	N	11.0	17.3	65.5	Compliance
0.393383	43.9	9.000	N	10.0	14.1	58.0	Compliance
1.239175	43.6	9.000	N	9.8	12.4	56.0	Compliance
1.259081	47.3	9.000	N	9.8	8.7	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	37.3	9.000	N	11.2	18.7	56.0	Compliance
0.396530	37.3	9.000	N	10.0	10.6	47.9	Compliance
1.162648	37.2	9.000	N	9.8	8.8	46.0	Compliance
1.209904	39.6	9.000	N	9.8	6.4	46.0	Compliance
1.259081	41.6	9.000	N	9.8	4.4	46.0	Compliance
1.310256	39.2	9.000	N	9.8	6.8	46.0	Compliance

Adapter#1(C10-S397B1-0001):

AC120 V, 60 Hz, Line:
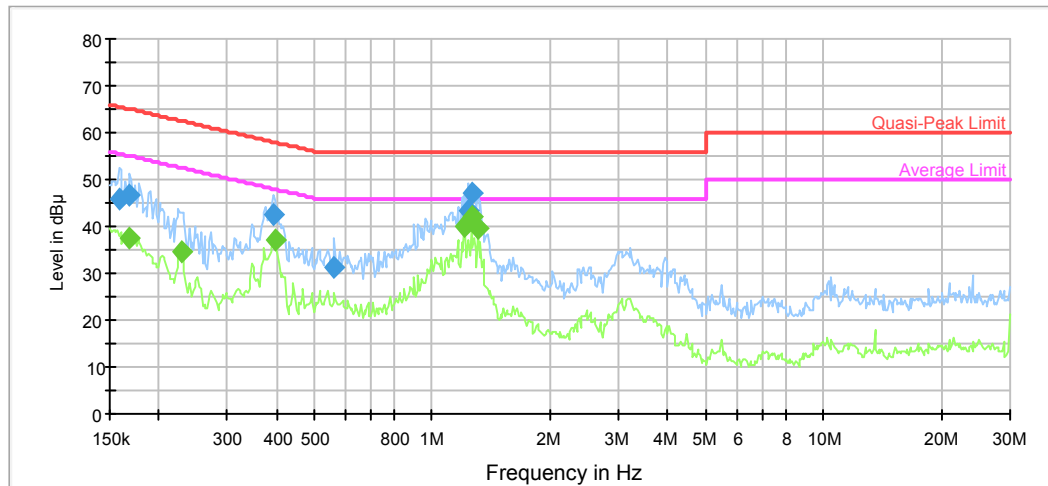
Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.158604	46.0	9.000	L1	11.1	19.5	65.5	Compliance
0.169044	46.7	9.000	L1	10.9	18.3	65.0	Compliance
0.393383	42.6	9.000	L1	10.0	15.4	58.0	Compliance
0.563041	31.3	9.000	L1	9.9	24.7	56.0	Compliance
1.239175	43.2	9.000	L1	9.8	12.8	56.0	Compliance
1.259081	47.0	9.000	L1	9.8	9.0	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.167702	37.6	9.000	L1	10.9	17.5	55.1	Compliance
0.228823	34.5	9.000	L1	10.4	18.0	52.5	Compliance
0.396530	37.2	9.000	L1	10.0	10.7	47.9	Compliance
1.209904	39.9	9.000	L1	9.8	6.1	46.0	Compliance
1.259081	42.0	9.000	L1	9.8	4.0	46.0	Compliance
1.310256	39.7	9.000	L1	9.8	6.3	46.0	Compliance

AC120 V, 60 Hz, Neutral:
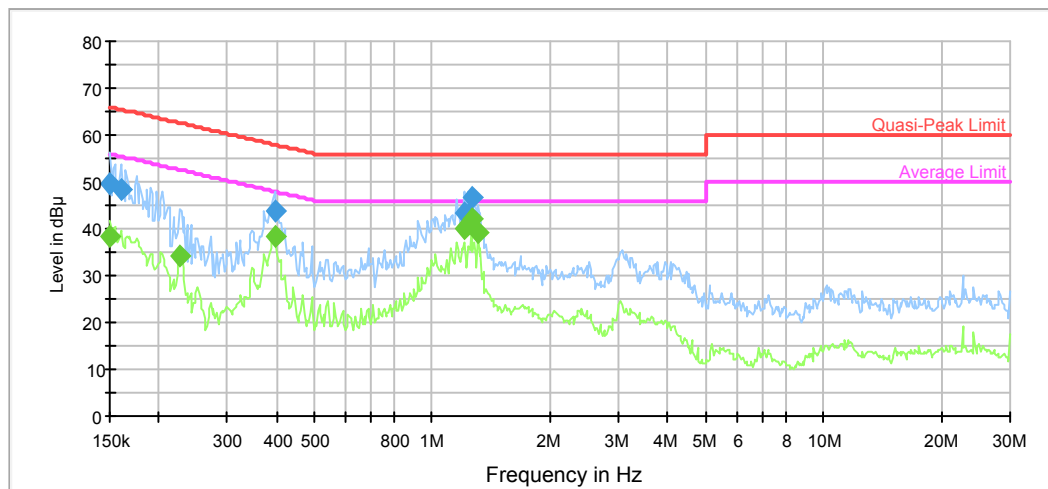
Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	49.7	9.000	N	11.2	16.3	66.0	Compliance
0.159873	48.1	9.000	N	11.0	17.4	65.5	Compliance
0.396530	43.6	9.000	N	10.0	14.3	57.9	Compliance
1.209904	43.5	9.000	N	9.8	12.5	56.0	Compliance
1.239175	42.9	9.000	N	9.8	13.1	56.0	Compliance
1.259081	46.5	9.000	N	9.8	9.5	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	38.2	9.000	N	11.2	17.8	56.0	Compliance
0.227007	34.2	9.000	N	10.5	18.4	52.6	Compliance
0.396530	38.4	9.000	N	10.0	9.5	47.9	Compliance
1.209904	40.2	9.000	N	9.8	5.8	46.0	Compliance
1.259081	42.0	9.000	N	9.8	4.0	46.0	Compliance
1.310256	39.3	9.000	N	9.8	6.7	46.0	Compliance

Adapter#2(C10-S197A1-0001):

AC120 V, 60 Hz, Line:
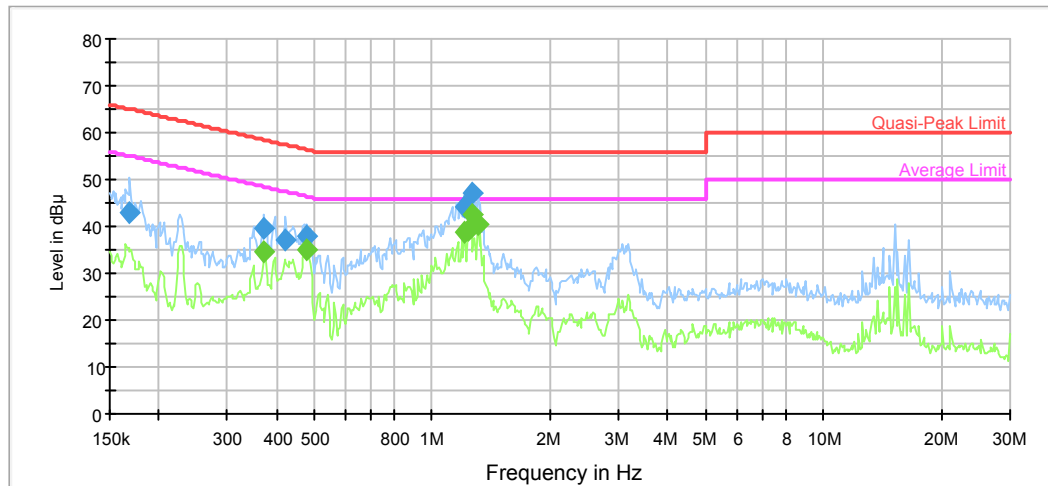
Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.169044	43.1	9.000	L1	10.9	21.9	65.0	Compliance
0.372042	39.8	9.000	L1	10.0	18.7	58.5	Compliance
0.422630	37.3	9.000	L1	10.0	20.1	57.4	Compliance
0.480097	38.0	9.000	L1	9.9	18.3	56.3	Compliance
1.209904	44.4	9.000	L1	9.8	11.6	56.0	Compliance
1.259081	47.0	9.000	L1	9.8	9.0	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.372042	34.6	9.000	L1	10.0	13.9	48.5	Compliance
0.476287	35.1	9.000	L1	9.9	11.3	46.4	Compliance
1.209904	38.7	9.000	L1	9.8	7.3	46.0	Compliance
1.239175	39.0	9.000	L1	9.8	7.0	46.0	Compliance
1.259081	42.4	9.000	L1	9.8	3.6	46.0	Compliance
1.310256	40.2	9.000	L1	9.8	5.8	46.0	Compliance

AC120 V, 60 Hz, Neutral:
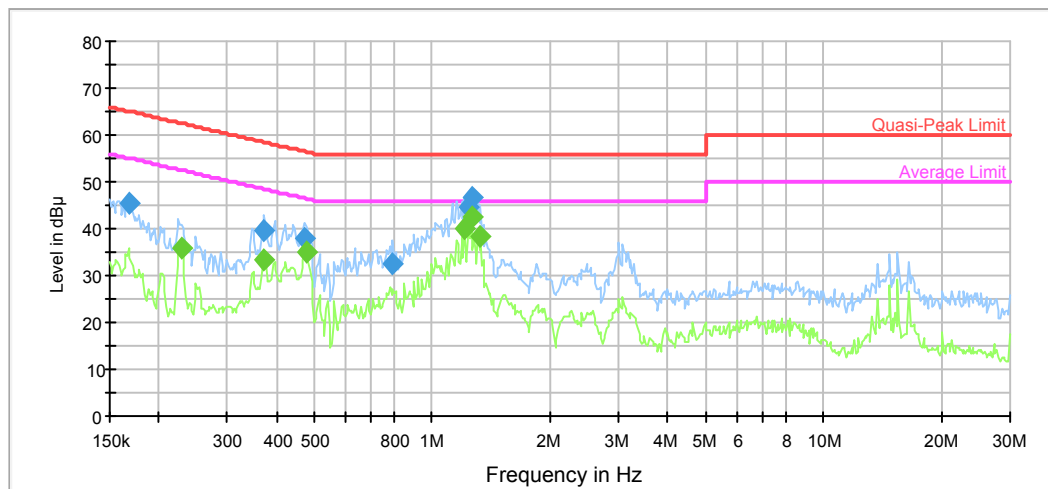
Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.167702	45.2	9.000	N	10.9	19.9	65.1	Compliance
0.372042	39.5	9.000	N	10.0	19.0	58.5	Compliance
0.472507	37.8	9.000	N	9.9	18.7	56.5	Compliance
0.793127	32.3	9.000	N	9.8	23.7	56.0	Compliance
1.239175	44.5	9.000	N	9.8	11.5	56.0	Compliance
1.259081	46.8	9.000	N	9.8	9.2	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.228823	36.0	9.000	N	10.4	16.5	52.5	Compliance
0.372042	33.5	9.000	N	10.0	15.0	48.5	Compliance
0.476287	35.1	9.000	N	9.9	11.3	46.4	Compliance
1.209904	40.1	9.000	N	9.8	5.9	46.0	Compliance
1.259081	42.3	9.000	N	9.8	3.7	46.0	Compliance
1.331304	38.4	9.000	N	9.7	7.6	46.0	Compliance

Adapter#2(C10-S397B1-0001):

AC120 V, 60 Hz, Line:
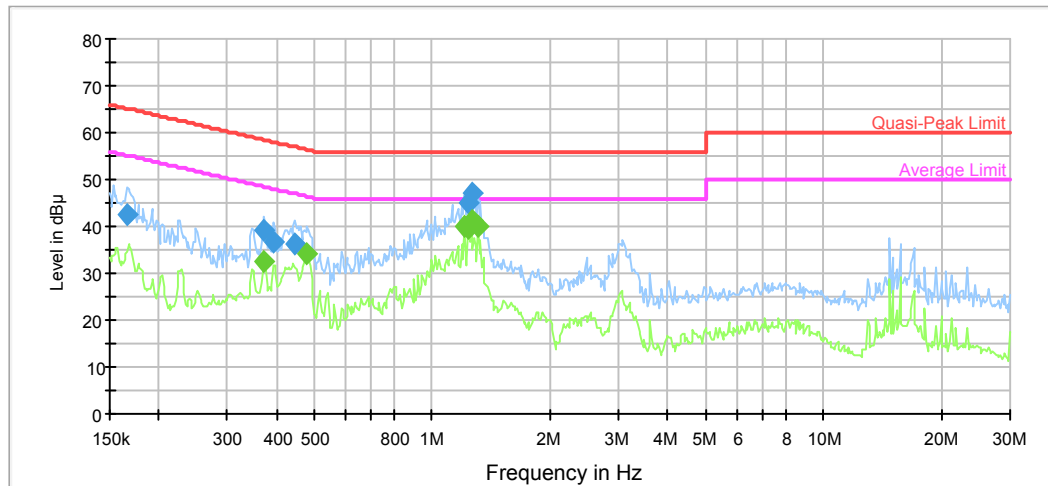
Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.166371	42.7	9.000	L1	11.0	22.4	65.1	Compliance
0.372042	39.1	9.000	L1	10.0	19.4	58.5	Compliance
0.393383	36.7	9.000	L1	10.0	21.3	58.0	Compliance
0.446873	36.1	9.000	L1	9.9	20.8	56.9	Compliance
1.239175	45.1	9.000	L1	9.8	10.9	56.0	Compliance
1.259081	47.1	9.000	L1	9.8	8.9	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.372042	32.4	9.000	L1	10.0	16.1	48.5	Compliance
0.480097	34.3	9.000	L1	9.9	12.0	46.3	Compliance
1.209904	40.0	9.000	L1	9.8	6.0	46.0	Compliance
1.239175	39.5	9.000	L1	9.8	6.5	46.0	Compliance
1.259081	41.2	9.000	L1	9.8	4.8	46.0	Compliance
1.310256	39.9	9.000	L1	9.8	6.1	46.0	Compliance

AC120 V, 60 Hz, Neutral:
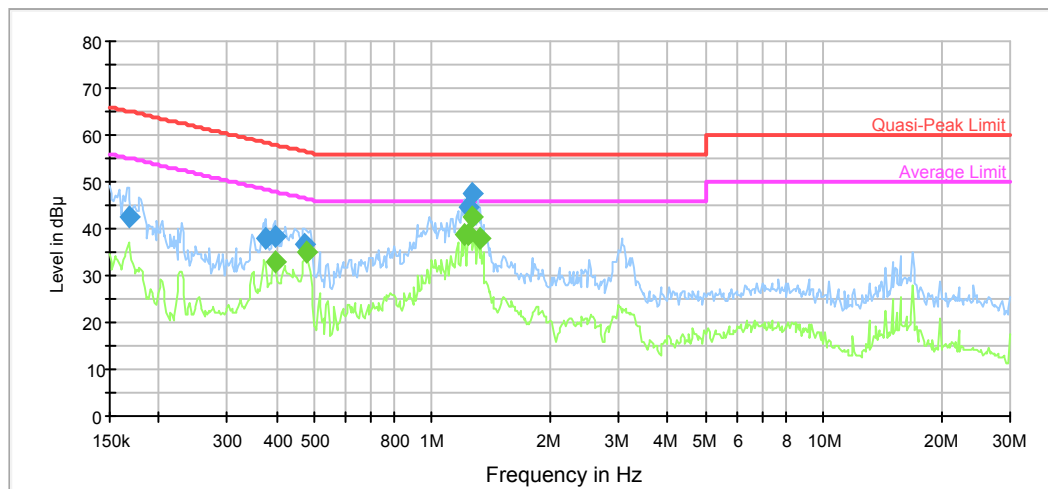
Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.167702	42.6	9.000	N	10.9	22.5	65.1	Compliance
0.375019	37.8	9.000	N	10.0	20.6	58.4	Compliance
0.396530	38.2	9.000	N	10.0	19.7	57.9	Compliance
0.472507	36.8	9.000	N	9.9	19.7	56.5	Compliance
1.239175	44.6	9.000	N	9.8	11.4	56.0	Compliance
1.259081	47.3	9.000	N	9.8	8.7	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.396530	32.8	9.000	N	10.0	15.1	47.9	Compliance
0.476287	34.9	9.000	N	9.9	11.5	46.4	Compliance
1.209904	38.8	9.000	N	9.8	7.2	46.0	Compliance
1.239175	38.8	9.000	N	9.8	7.2	46.0	Compliance
1.259081	42.5	9.000	N	9.8	3.5	46.0	Compliance
1.331304	37.9	9.000	N	9.7	8.1	46.0	Compliance

Adapter#3(C10-S197A1-0001):

AC120 V, 60 Hz, Line:
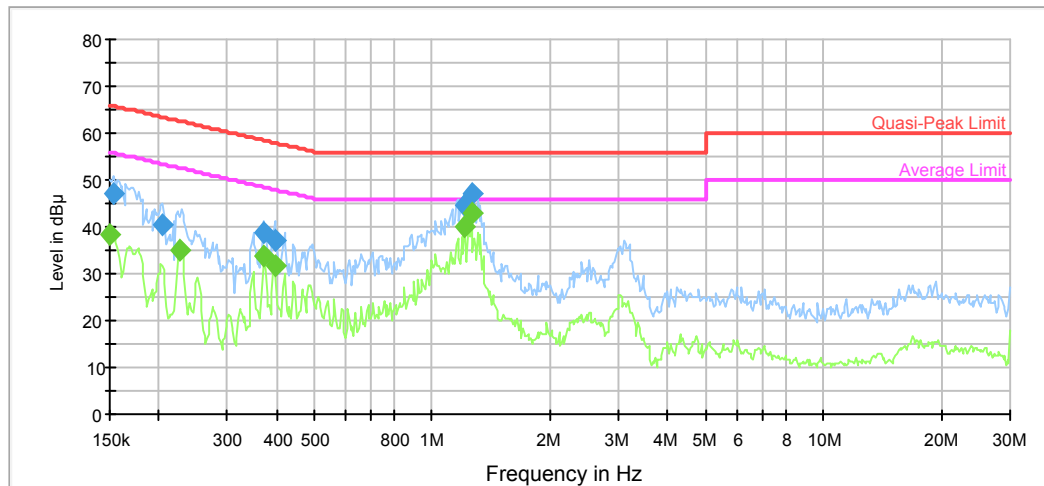
Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.153629	47.0	9.000	L1	11.1	18.8	65.8	Compliance
0.204669	40.4	9.000	L1	10.6	23.0	63.4	Compliance
0.372042	38.8	9.000	L1	10.0	19.7	58.5	Compliance
0.396530	37.2	9.000	L1	10.0	20.7	57.9	Compliance
1.209904	44.7	9.000	L1	9.8	11.3	56.0	Compliance
1.259081	47.1	9.000	L1	9.8	8.9	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.150000	38.4	9.000	L1	11.2	17.6	56.0	Compliance
0.227007	35.2	9.000	L1	10.5	17.4	52.6	Compliance
0.372042	33.6	9.000	L1	10.0	14.9	48.5	Compliance
0.396530	31.9	9.000	L1	10.0	16.0	47.9	Compliance
1.209904	40.0	9.000	L1	9.8	6.0	46.0	Compliance
1.259081	42.9	9.000	L1	9.8	3.1	46.0	Compliance

AC120 V, 60 Hz, Neutral:
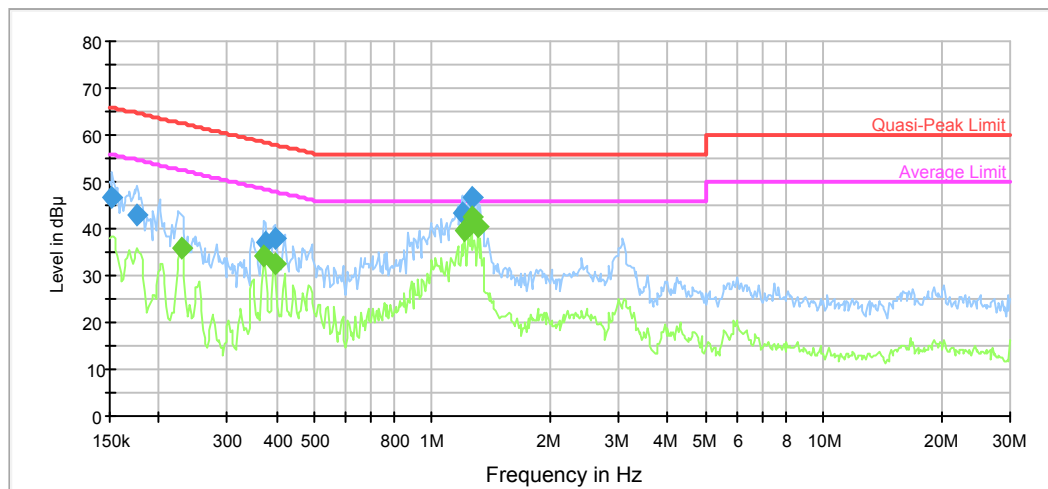
Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.152410	46.9	9.000	N	11.1	19.0	65.9	Compliance
0.175915	43.0	9.000	N	10.8	21.7	64.7	Compliance
0.375019	37.0	9.000	N	10.0	21.4	58.4	Compliance
0.396530	37.9	9.000	N	10.0	20.0	57.9	Compliance
1.190776	43.2	9.000	N	9.8	12.8	56.0	Compliance
1.259081	46.7	9.000	N	9.8	9.3	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.228823	36.0	9.000	N	10.4	16.5	52.5	Compliance
0.372042	34.1	9.000	N	10.0	14.4	48.5	Compliance
0.396530	32.4	9.000	N	10.0	15.5	47.9	Compliance
1.209904	39.5	9.000	N	9.8	6.5	46.0	Compliance
1.259081	42.4	9.000	N	9.8	3.6	46.0	Compliance
1.310256	40.2	9.000	N	9.8	5.8	46.0	Compliance

Adapter#3(C10-S397B1-0001):

AC120 V, 60 Hz, Line:
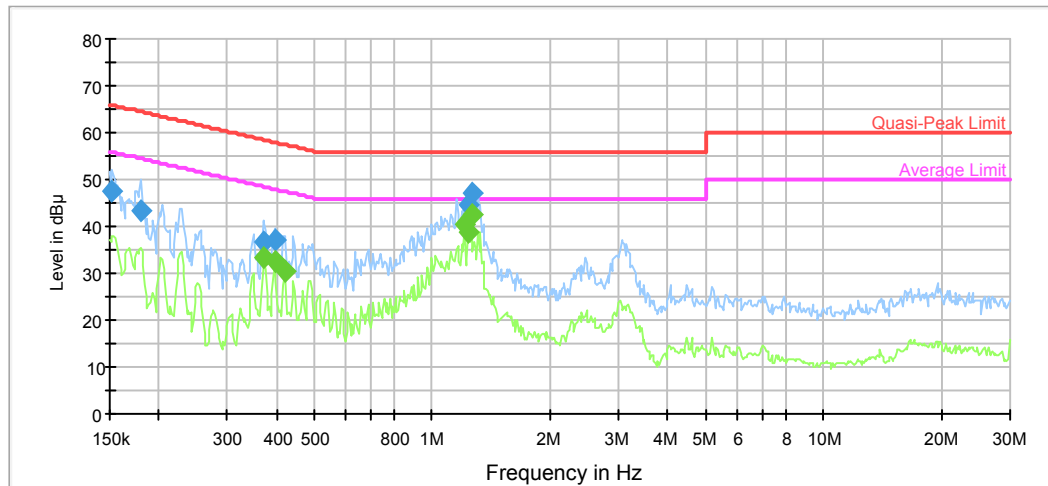
Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.152410	47.6	9.000	L1	11.2	18.3	65.9	Compliance
0.180171	43.2	9.000	L1	10.8	21.3	64.5	Compliance
0.369089	36.6	9.000	L1	10.0	21.9	58.5	Compliance
0.396530	37.2	9.000	L1	10.0	20.7	57.9	Compliance
1.239175	44.7	9.000	L1	9.8	11.3	56.0	Compliance
1.259081	46.9	9.000	L1	9.8	9.1	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.372042	33.5	9.000	L1	10.0	15.0	48.5	Compliance
0.396530	32.5	9.000	L1	10.0	15.4	47.9	Compliance
0.419276	30.5	9.000	L1	10.0	17.0	47.5	Compliance
1.209904	40.3	9.000	L1	9.8	5.7	46.0	Compliance
1.239175	38.8	9.000	L1	9.8	7.2	46.0	Compliance
1.259081	42.4	9.000	L1	9.8	3.6	46.0	Compliance

AC120 V, 60 Hz, Neutral:
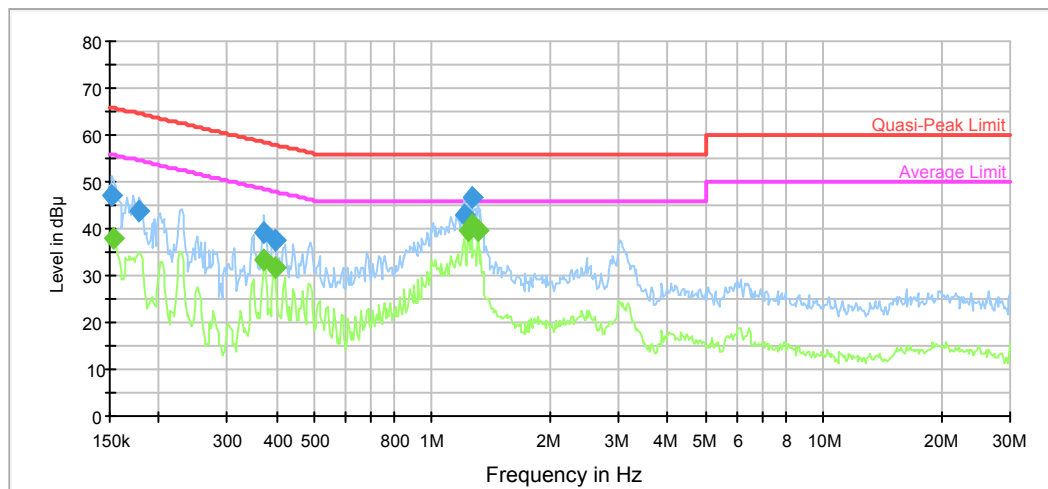
Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.152410	47.3	9.000	N	11.1	18.6	65.9	Compliance
0.178741	43.7	9.000	N	10.8	20.8	64.5	Compliance
0.372042	39.0	9.000	N	10.0	19.5	58.5	Compliance
0.396530	37.6	9.000	N	10.0	20.3	57.9	Compliance
1.209904	42.7	9.000	N	9.8	13.3	56.0	Compliance
1.259081	46.8	9.000	N	9.8	9.2	56.0	Compliance

| Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.153629	37.9	9.000	N	11.1	17.9	55.8	Compliance
0.372042	33.5	9.000	N	10.0	15.0	48.5	Compliance
0.396530	31.7	9.000	N	10.0	16.2	47.9	Compliance
1.239175	39.4	9.000	N	9.8	6.6	46.0	Compliance
1.259081	40.9	9.000	N	9.8	5.1	46.0	Compliance
1.310256	39.7	9.000	N	9.8	6.3	46.0	Compliance

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.247 (d); §15.209; §15.205

EUT Setup

Below 1GHz:
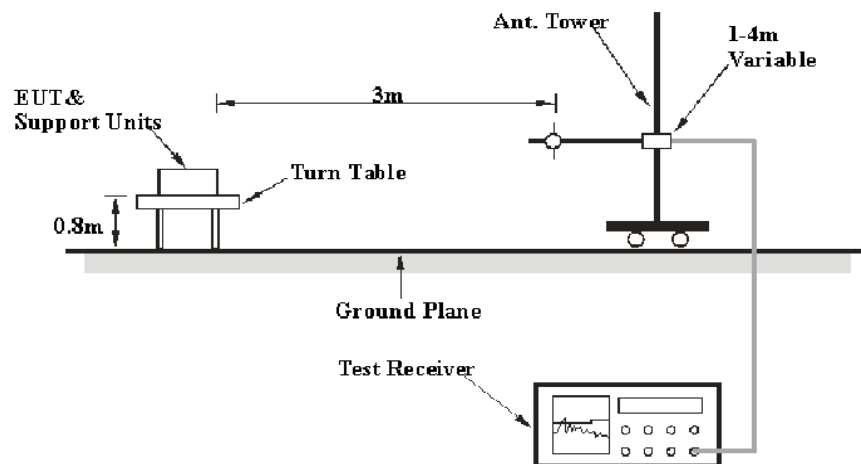
Above 1GHz:
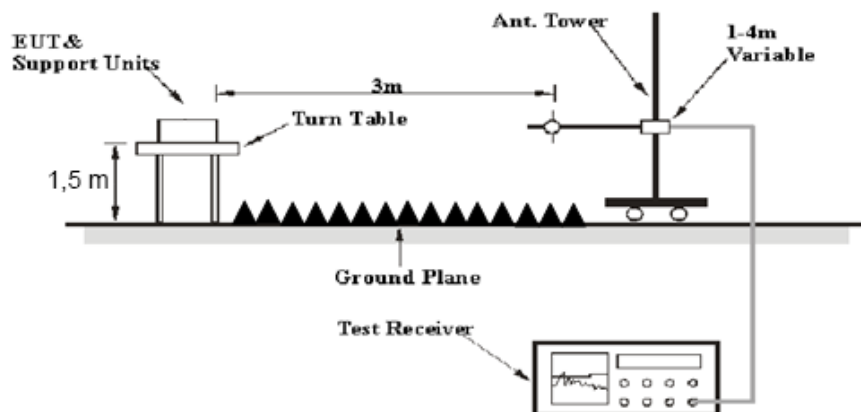
The radiated emission below 1GHz tests were performed in the 3 meters chamber test site A, above 1GHz tests were performed in the 3 meters chamber test site B, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	AV

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz - 1 GHz, peak and average detection modes for frequencies above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	2018-09-01
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2018-11-10
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
R&S	Spectrum Analyzer	E4440A	SG43360054	2017-12-08	2018-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2016-11-18	2019-11-18
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2017-06-27	2018-06-27
N/A	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Chengdu Ouli	Band Rejection Filter	2400-2483.5	002	2017-09-05	2018-09-05

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data

Environmental Conditions

Temperature:	22.1 °C
Relative Humidity:	45 %
ATM Pressure:	101.3 kPa

* The testing was performed by Sunny Cen & Kakaxi Chen on 2018-01-19.

Test Mode: Transmitting(per pretest, C10-S197A1-0001+Adapter #1 was the worst)

1) 30MHz-1GHz(GFSK Middle channel was the worst)
Horizontal:
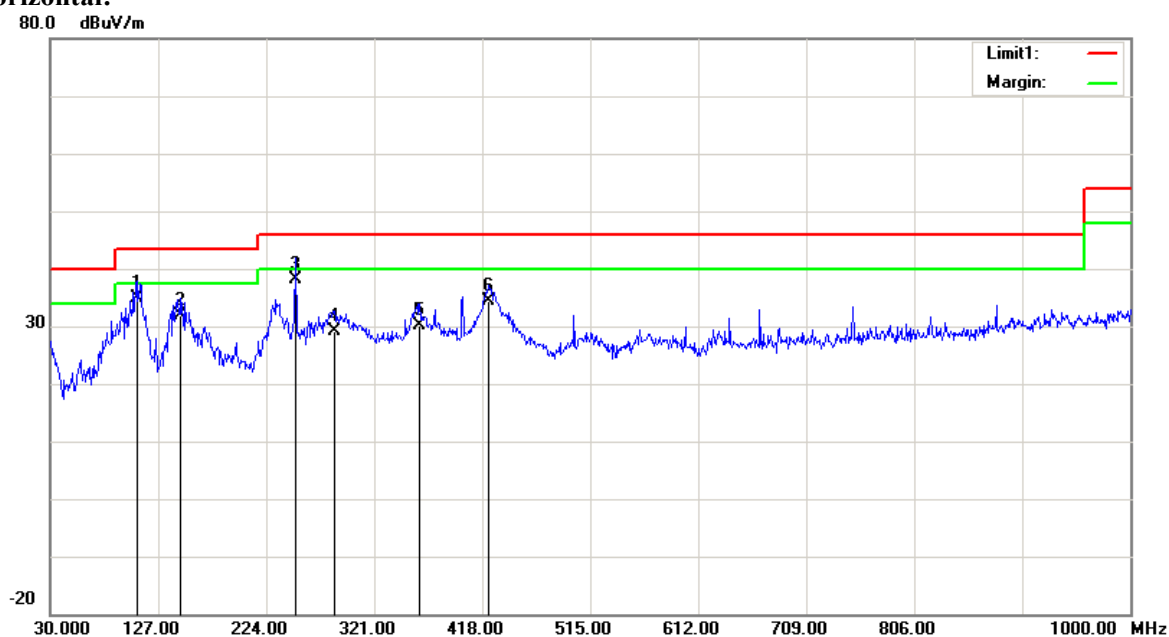
Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
108.5700	41.28	QP	-6.38	34.90	43.50	8.60
147.3700	38.39	QP	-6.49	31.90	43.50	11.60
250.1900	44.52	QP	-6.42	38.10	46.00	7.90
285.1100	33.00	QP	-3.80	29.20	46.00	16.80
361.7400	33.00	QP	-2.90	30.10	46.00	15.90
423.8200	36.45	QP	-1.95	34.50	46.00	11.50

Vertical:
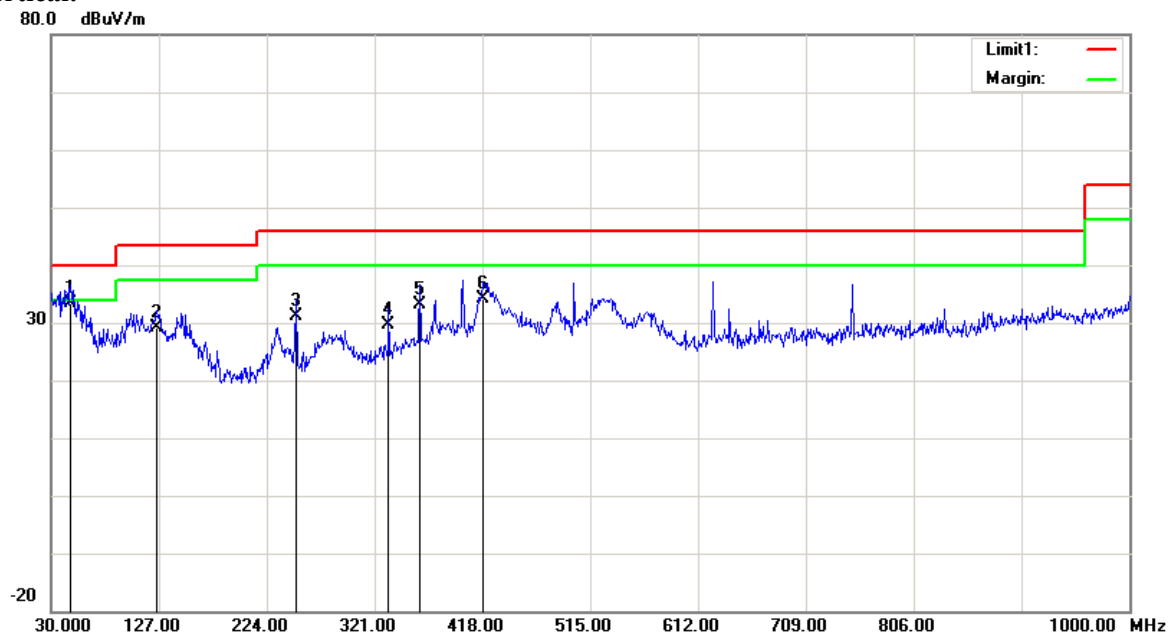
Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
47.4600	44.20	QP	-10.70	33.50	40.00	6.50
125.0600	34.03	QP	-4.83	29.20	43.50	14.30
250.1900	37.62	QP	-6.42	31.20	46.00	14.80
333.6100	33.22	QP	-3.62	29.60	46.00	16.40
361.7400	36.00	QP	-2.90	33.10	46.00	12.90
418.9700	36.24	QP	-2.04	34.20	46.00	11.80

2)1GHz-25GHz:

BDR Mode (GFSK):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	77.95	PK	H	28.10	1.80	0.00	107.85	N/A	N/A
2402.00	71.52	AV	H	28.10	1.80	0.00	101.42	N/A	N/A
2402.00	68.32	PK	V	28.10	1.80	0.00	98.22	N/A	N/A
2402.00	62.27	AV	V	28.10	1.80	0.00	92.17	N/A	N/A
2390.00	25.49	PK	H	28.08	1.80	0.00	55.37	74.00	18.63
2390.00	16.90	AV	H	28.08	1.80	0.00	46.78	54.00	7.22
4804.00	48.62	PK	H	32.91	3.17	37.20	47.50	74.00	26.50
4804.00	38.75	AV	H	32.91	3.17	37.20	37.63	54.00	16.37
7206.00	46.55	PK	H	35.74	4.82	37.23	49.88	74.00	24.12
7206.00	36.34	AV	H	35.74	4.82	37.23	39.67	54.00	14.33
Middle Channel: 2441 MHz									
2441.00	77.77	PK	H	28.18	1.82	0.00	107.77	N/A	N/A
2441.00	71.25	AV	H	28.18	1.82	0.00	101.25	N/A	N/A
2441.00	68.37	PK	V	28.18	1.82	0.00	98.37	N/A	N/A
2441.00	62.22	AV	V	28.18	1.82	0.00	92.22	N/A	N/A
4882.00	48.82	PK	H	33.06	3.27	37.21	47.94	74.00	26.06
4882.00	38.55	AV	H	33.06	3.27	37.21	37.67	54.00	16.33
7323.00	45.88	PK	H	36.04	4.62	37.38	49.16	74.00	24.84
7323.00	35.40	AV	H	36.04	4.62	37.38	38.68	54.00	15.32
High Channel: 2480 MHz									
2480.00	77.72	PK	H	28.26	1.84	0.00	107.82	N/A	N/A
2480.00	71.23	AV	H	28.26	1.84	0.00	101.33	N/A	N/A
2480.00	67.70	PK	V	28.26	1.84	0.00	97.80	N/A	N/A
2480.00	61.75	AV	V	28.26	1.84	0.00	91.85	N/A	N/A
2483.50	27.82	PK	H	28.27	1.84	0.00	57.93	74.00	16.07
2483.50	15.66	AV	H	28.27	1.84	0.00	45.77	54.00	8.23
4960.00	48.20	PK	H	33.22	3.23	37.25	47.40	74.00	26.60
4960.00	37.36	AV	H	33.22	3.23	37.25	36.56	54.00	17.44
7440.00	45.22	PK	H	36.34	4.41	37.52	48.45	74.00	25.55
7440.00	35.59	AV	H	36.34	4.41	37.52	38.82	54.00	15.18

EDR Mode (π/4-DQPSK):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	76.71	PK	H	28.10	1.80	0.00	106.61	N/A	N/A
2402.00	67.20	AV	H	28.10	1.80	0.00	97.10	N/A	N/A
2402.00	67.85	PK	V	28.10	1.80	0.00	97.75	N/A	N/A
2402.00	58.19	AV	V	28.10	1.80	0.00	88.09	N/A	N/A
2390.00	24.34	PK	H	28.08	1.80	0.00	54.22	74.00	19.78
2390.00	14.02	AV	H	28.08	1.80	0.00	43.90	54.00	10.10
4804.00	47.40	PK	H	32.91	3.17	37.20	46.28	74.00	27.72
4804.00	38.33	AV	H	32.91	3.17	37.20	37.21	54.00	16.79
7206.00	46.47	PK	H	35.74	4.82	37.23	49.80	74.00	24.20
7206.00	35.79	AV	H	35.74	4.82	37.23	39.12	54.00	14.88
Middle Channel: 2441 MHz									
2441.00	77.80	PK	H	28.18	1.82	0.00	107.80	N/A	N/A
2441.00	66.05	AV	H	28.18	1.82	0.00	96.05	N/A	N/A
2441.00	67.34	PK	V	28.18	1.82	0.00	97.34	N/A	N/A
2441.00	57.04	AV	V	28.18	1.82	0.00	87.04	N/A	N/A
4882.00	48.82	PK	H	33.06	3.27	37.21	47.94	74.00	26.06
4882.00	38.75	AV	H	33.06	3.27	37.21	37.87	54.00	16.13
7323.00	45.64	PK	H	36.04	4.62	37.38	48.92	74.00	25.08
7323.00	35.13	AV	H	36.04	4.62	37.38	38.41	54.00	15.59
High Channel: 2480 MHz									
2480.00	76.68	PK	H	28.26	1.84	0.00	106.78	N/A	N/A
2480.00	66.90	AV	H	28.26	1.84	0.00	97.00	N/A	N/A
2480.00	69.55	PK	V	28.26	1.84	0.00	99.65	N/A	N/A
2480.00	57.21	AV	V	28.26	1.84	0.00	87.31	N/A	N/A
2483.50	26.57	PK	H	28.27	1.84	0.00	56.68	74.00	17.32
2483.50	15.39	AV	H	28.27	1.84	0.00	45.50	54.00	8.50
4960.00	48.43	PK	H	33.22	3.23	37.25	47.63	74.00	26.37
4960.00	36.14	AV	H	33.22	3.23	37.25	35.34	54.00	18.66
7440.00	43.97	PK	H	36.34	4.41	37.52	47.20	74.00	26.80
7440.00	34.88	AV	H	36.34	4.41	37.52	38.11	54.00	15.89

EDR Mode (8-DPSK):

| Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	77.66	PK	H	28.10	1.80	0.00	107.56	N/A	N/A
2402.00	66.05	AV	H	28.10	1.80	0.00	95.95	N/A	N/A
2402.00	66.99	PK	V	28.10	1.80	0.00	96.89	N/A	N/A
2402.00	58.17	AV	V	28.10	1.80	0.00	88.07	N/A	N/A
2390.00	23.07	PK	H	28.08	1.80	0.00	52.95	74.00	21.05
2390.00	13.12	AV	H	28.08	1.80	0.00	43.00	54.00	11.00
4804.00	47.12	PK	H	32.91	3.17	37.20	46.00	74.00	28.00
4804.00	37.73	AV	H	32.91	3.17	37.20	36.61	54.00	17.39
7206.00	46.43	PK	H	35.74	4.82	37.23	49.76	74.00	24.24
7206.00	35.73	AV	H	35.74	4.82	37.23	39.06	54.00	14.94
Middle Channel: 2441 MHz									
2441.00	76.01	PK	H	28.18	1.82	0.00	106.01	N/A	N/A
2441.00	65.95	AV	H	28.18	1.82	0.00	95.95	N/A	N/A
2441.00	66.20	PK	V	28.18	1.82	0.00	96.20	N/A	N/A
2441.00	57.34	AV	V	28.18	1.82	0.00	87.34	N/A	N/A
4882.00	47.98	PK	H	33.06	3.27	37.21	47.10	74.00	26.90
4882.00	38.67	AV	H	33.06	3.27	37.21	37.79	54.00	16.21
7323.00	45.00	PK	H	36.04	4.62	37.38	48.28	74.00	25.72
7323.00	34.33	AV	H	36.04	4.62	37.38	37.61	54.00	16.39
High Channel: 2480 MHz									
2480.00	76.70	PK	H	28.26	1.84	0.00	106.80	N/A	N/A
2480.00	66.10	AV	H	28.26	1.84	0.00	96.20	N/A	N/A
2480.00	67.53	PK	V	28.26	1.84	0.00	97.63	N/A	N/A
2480.00	56.71	AV	V	28.26	1.84	0.00	86.81	N/A	N/A
2483.50	26.57	PK	H	28.27	1.84	0.00	56.68	74.00	17.32
2483.50	14.12	AV	H	28.27	1.84	0.00	44.23	54.00	9.77
4960.00	47.23	PK	H	33.22	3.23	37.25	46.43	74.00	27.57
4960.00	34.95	AV	H	33.22	3.23	37.25	34.15	54.00	19.85
7440.00	42.71	PK	H	36.34	4.41	37.52	45.94	74.00	28.06
7440.00	34.15	AV	H	36.34	4.41	37.52	37.38	54.00	16.62

Worst plots(GFSK Low channel)
Horizontal

Fundamental
Test with Band
Rejection Filter
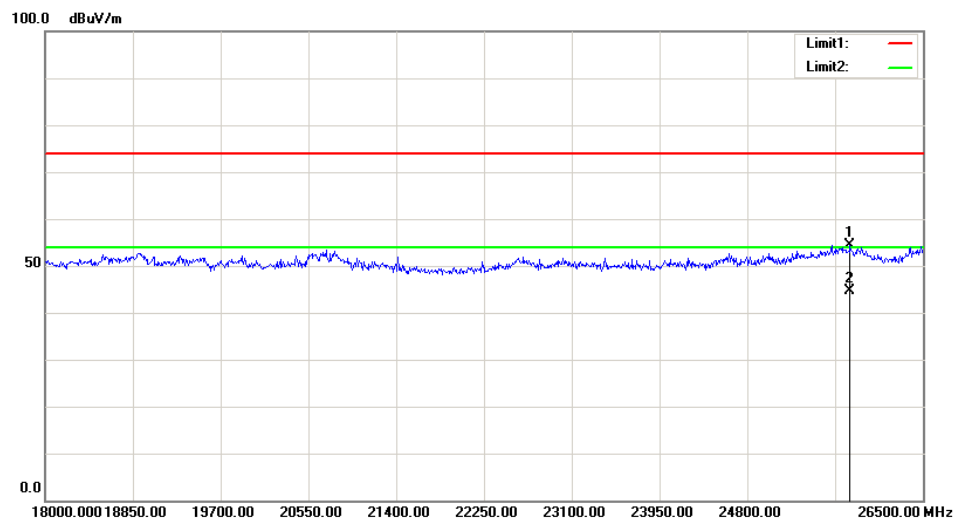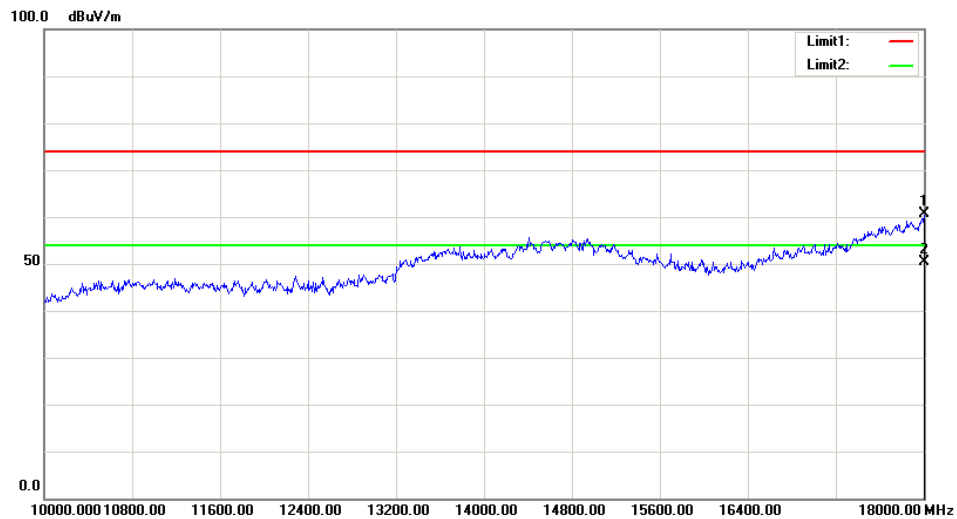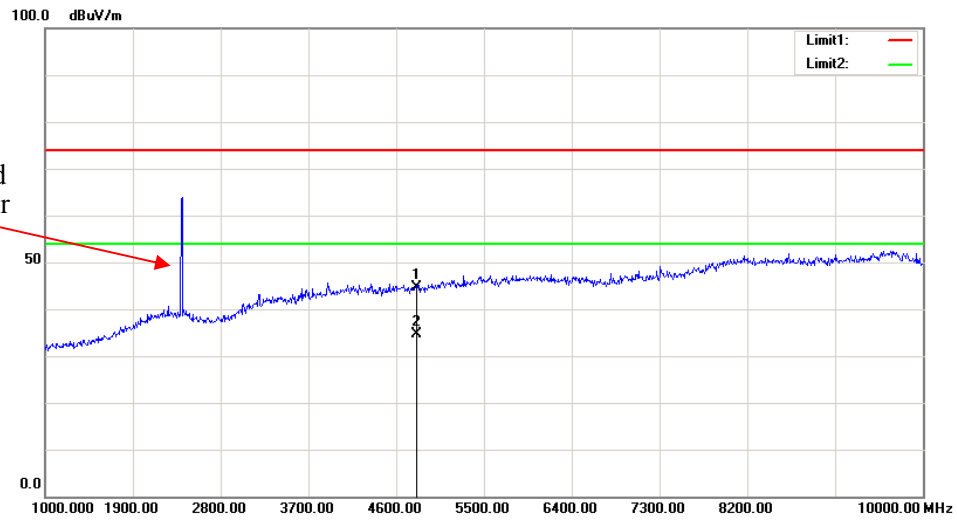
Vertical

Fundamental
Test with Band
Rejection Filter
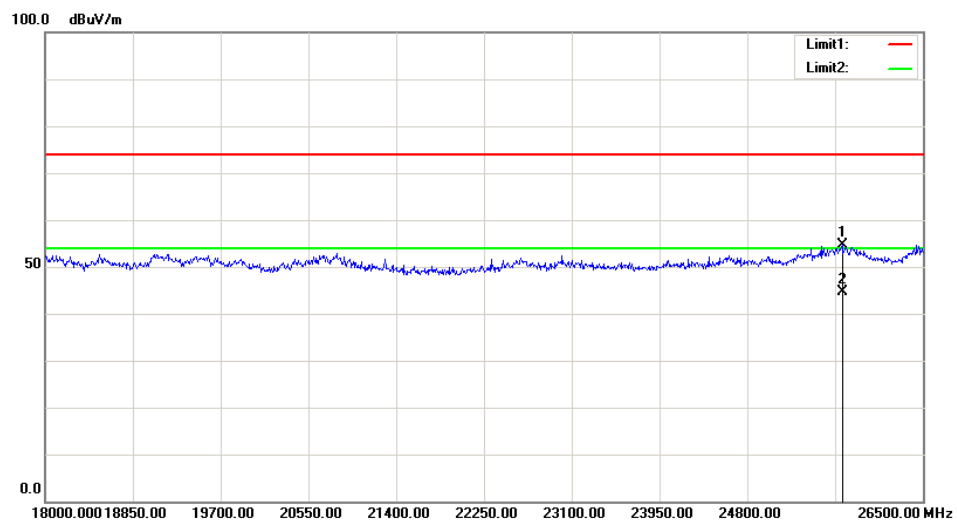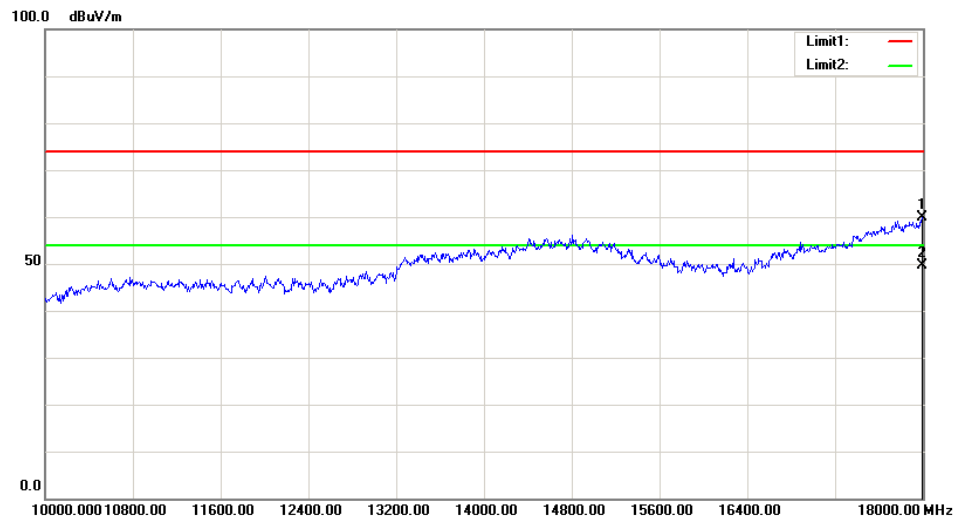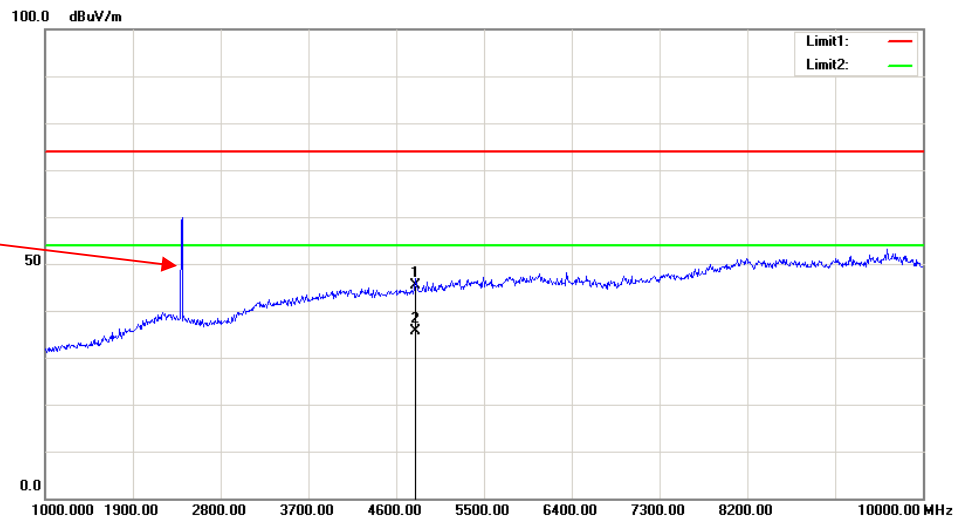
FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

Applicable Standard

According to FCC §15.247(a) (1)

Frequency hopping systems shall have hoping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.50 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
N/A	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	/

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 30 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace.
3. Measure the channel separation.

Test Data

Environmental Conditions

Temperature:	24.8 °C
Relative Humidity:	37 %
ATM Pressure:	101.6 kPa

** The testing was performed by Mark Pan on 2018-01-16.*

Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
BDR (GFSK)	Low	2402	1.004	0.62
	Middle	2441	1.000	0.62
	High	2480	1.004	0.63
EDR (π/4-DQPSK)	Low	2402	1.004	0.84
	Middle	2441	1.004	0.84
	High	2480	1.004	0.83
EDR (8-DPSK)	Low	2402	1.004	0.81
	Middle	2441	1.004	0.82
	High	2480	1.004	0.83

Note: Limit= (2/3) × 20dB bandwidth
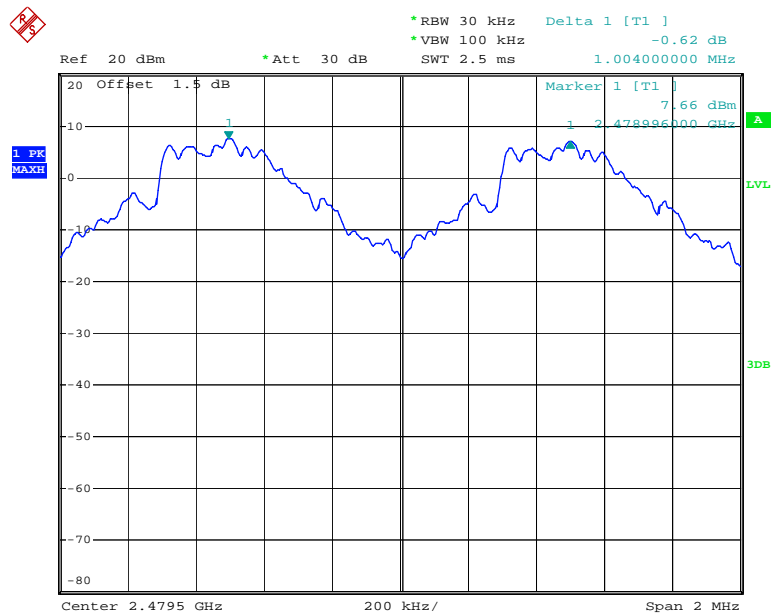
BDR Mode (GFSK):
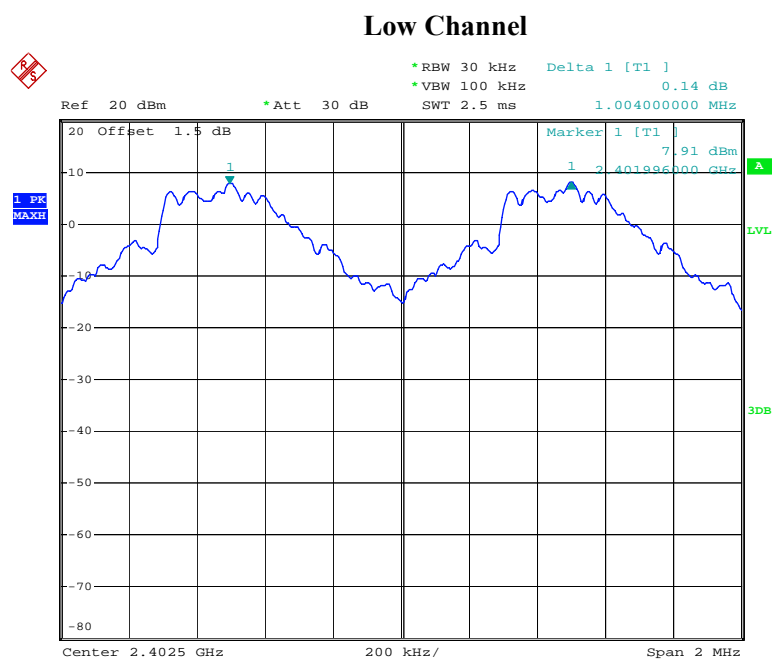
Low Channel

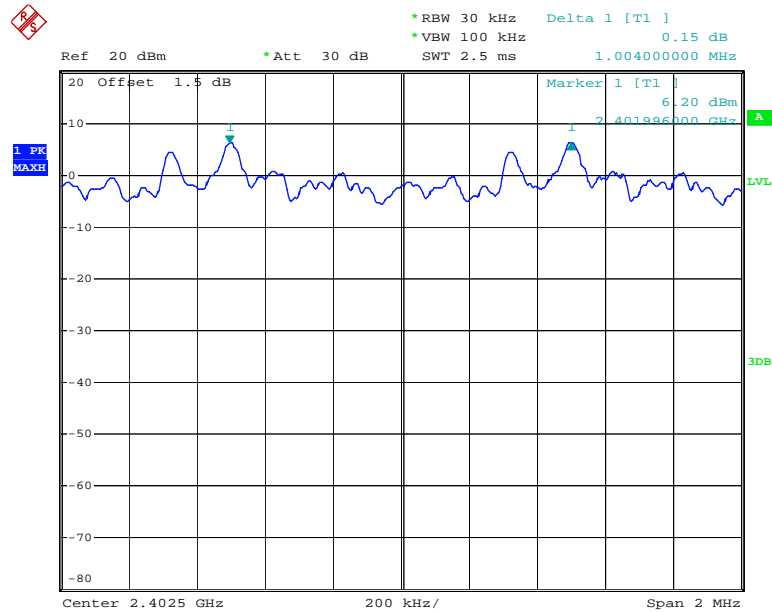

Date: 16.JAN.2018 10:48:23

Middle Channel
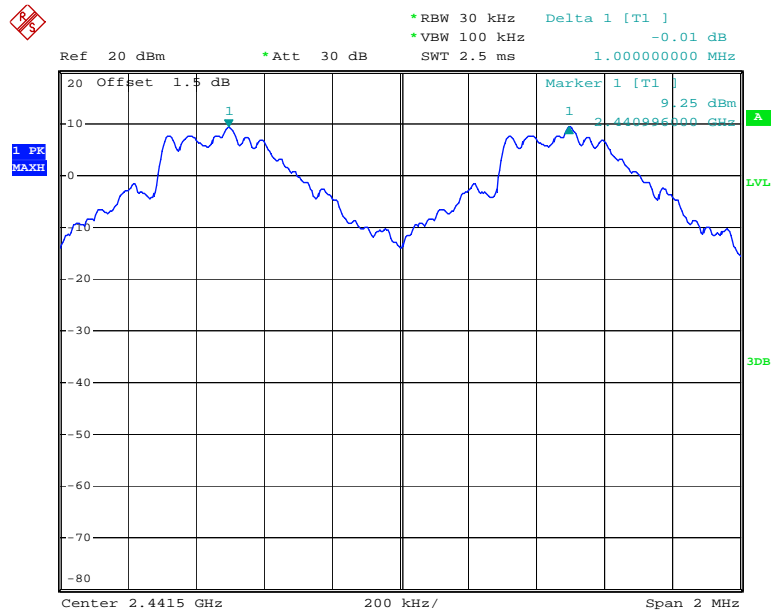
Date: 16.JAN.2018 10:49:51

High Channel

Date: 16.JAN.2018 10:51:03

EDR Mode (π/4-DQPSK):

Low Channel


```
                                    *RBW 30 kHz   Delta 1 [T1 ]
                                    *VBW 100 kHz              0.15 dB
        Ref  20 dBm        *Att  30 dB   SWT 2.5 ms      1.004000000 MHz
```

Date: 16.JAN.2018 10:59:07

Middle Channel


```
                                    *RBW 30 kHz   Delta 1 [T1 ]
                                    *VBW 100 kHz             -0.01 dB
        Ref  20 dBm        *Att  30 dB   SWT 2.5 ms      1.004000000 MHz
```

Date: 16.JAN.2018 10:54:29

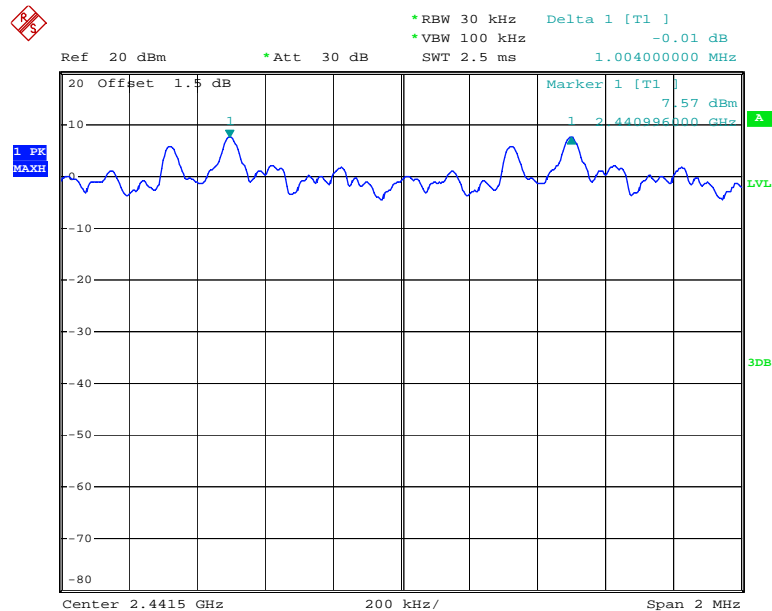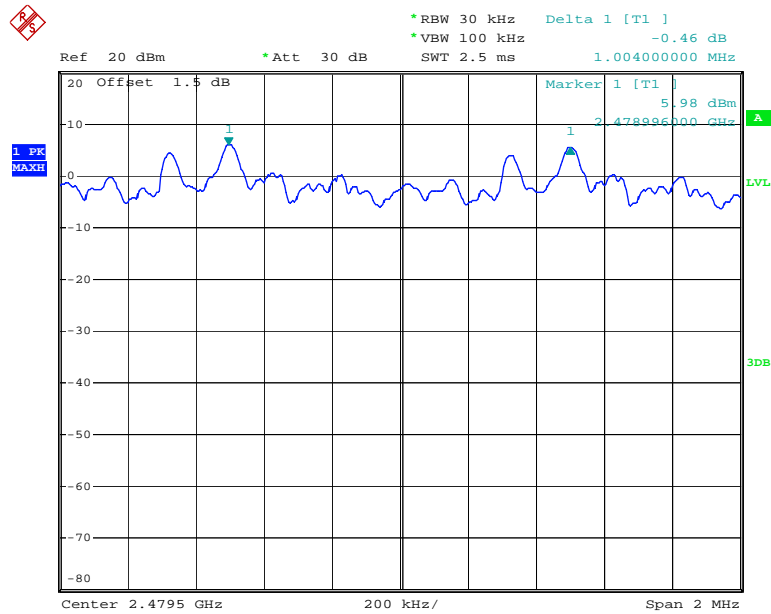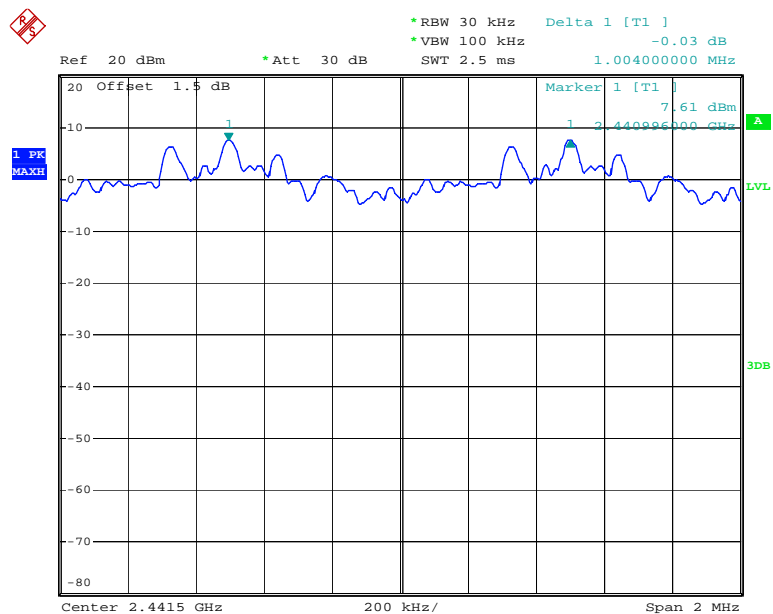## High Channel

Date: 16.JAN.2018 10:52:21

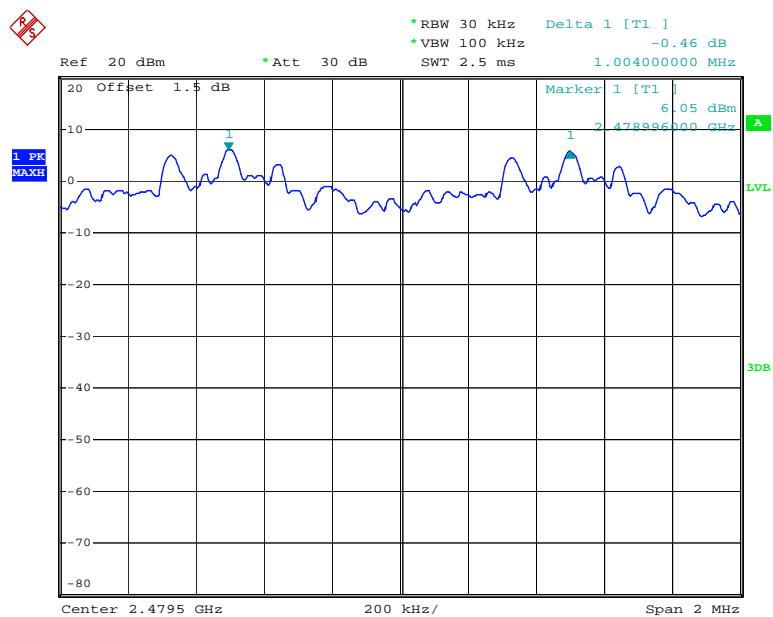*EDR Mode (8-DPSK):*

Low Channel
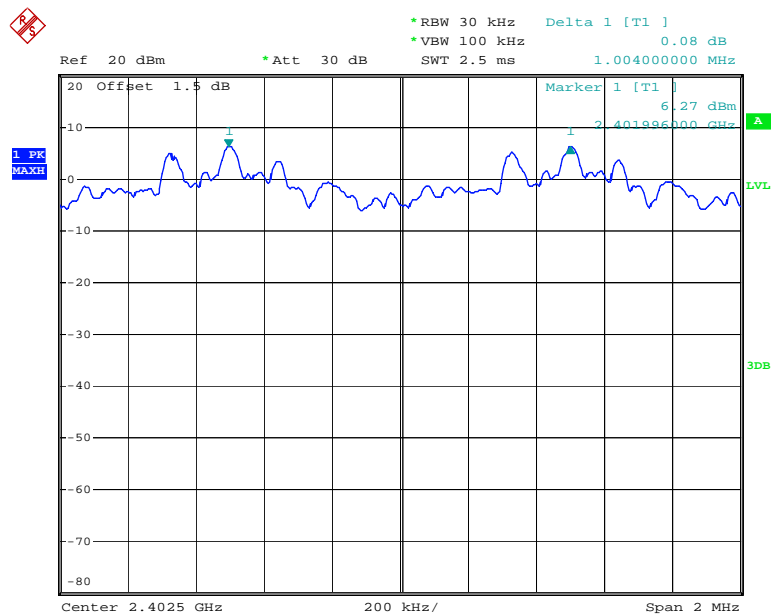
Date: 16.JAN.2018 10:43:38

Middle Channel

Date: 16.JAN.2018 10:45:12

High Channel

Date: 16.JAN.2018 10:46:40

FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING

Applicable Standard

According to FCC §15.247(a) (1):

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.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Use Occupied bandwidth test function, measure the 99% Occupied bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
N/A	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	/

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24.8 °C
Relative Humidity:	37 %
ATM Pressure:	101.6 kPa

* The testing was performed by Mark Pan on 2018-01-16.

Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
BDR Mode (GFSK)	Low	2402	0.93
	Middle	2441	0.93
	High	2480	0.94
EDR Mode (π/4-DQPSK)	Low	2402	1.26
	Middle	2441	1.26
	High	2480	1.25
EDR Mode (8-DPSK)	Low	2402	1.22
	Middle	2441	1.23
	High	2480	1.25

BDR Mode (GFSK):

Low Channel
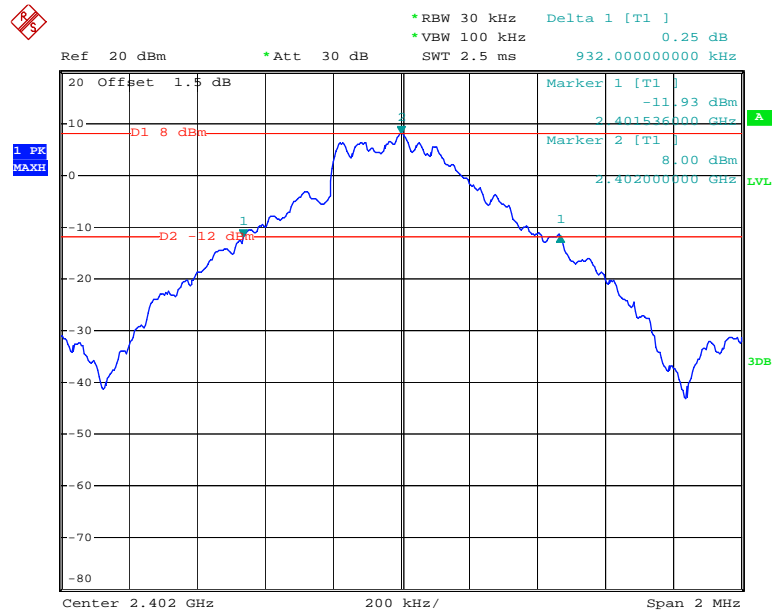
Date: 16.JAN.2018 10:12:34

Middle Channel
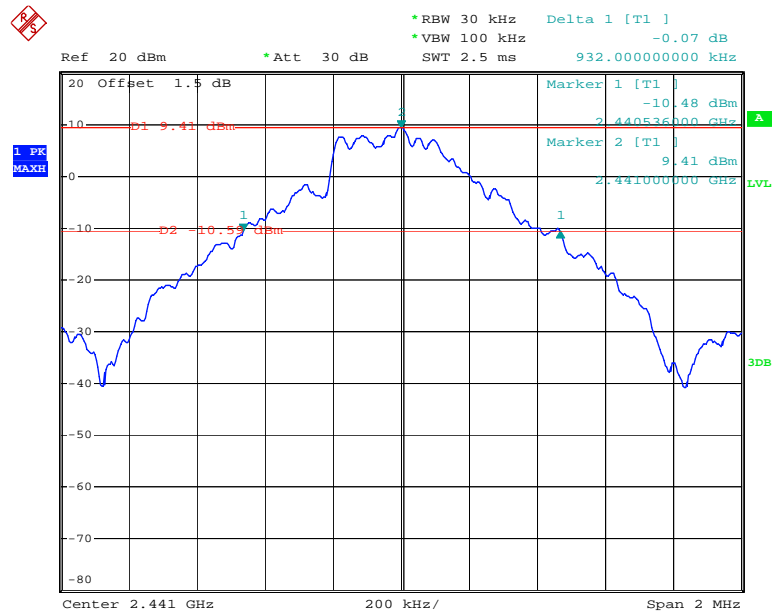
Date: 16.JAN.2018 10:16:26

High Channel
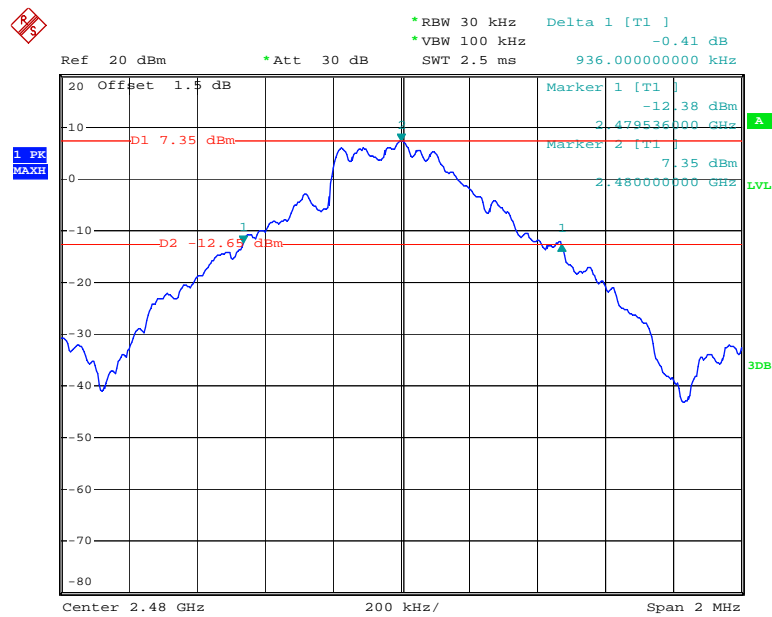
Date: 16.JAN.2018 10:18:16

EDR Mode (π/4-DQPSK):

Low Channel

Date: 16.JAN.2018 10:28:45

Middle Channel
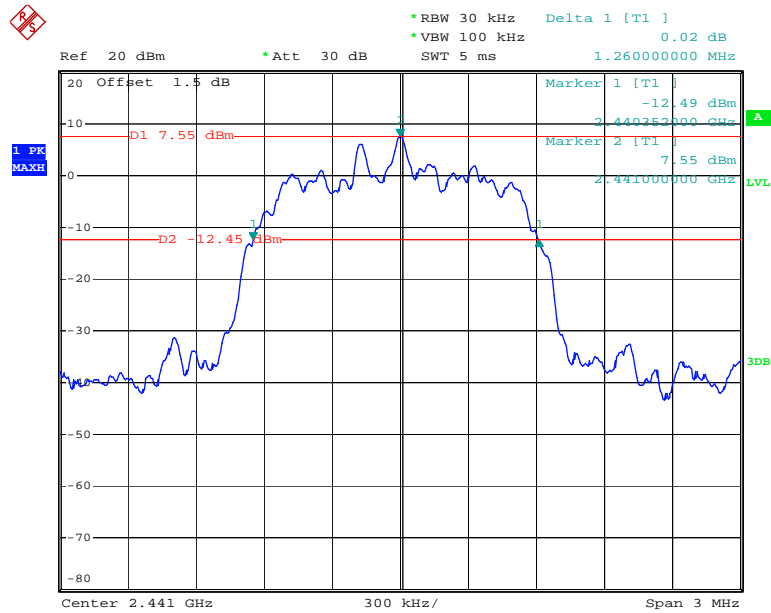
Date: 16.JAN.2018 10:26:47

High Channel
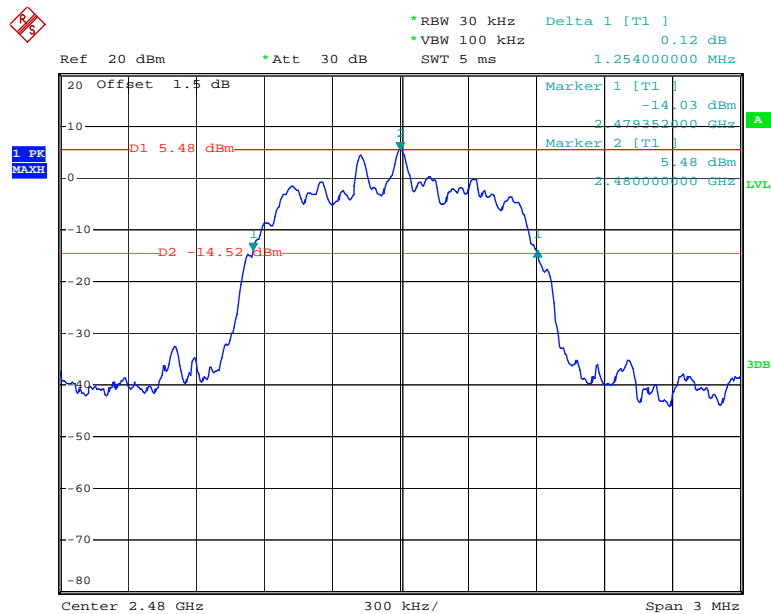
Date: 16.JAN.2018 10:31:32

EDR Mode (8-DPSK):

Low Channel
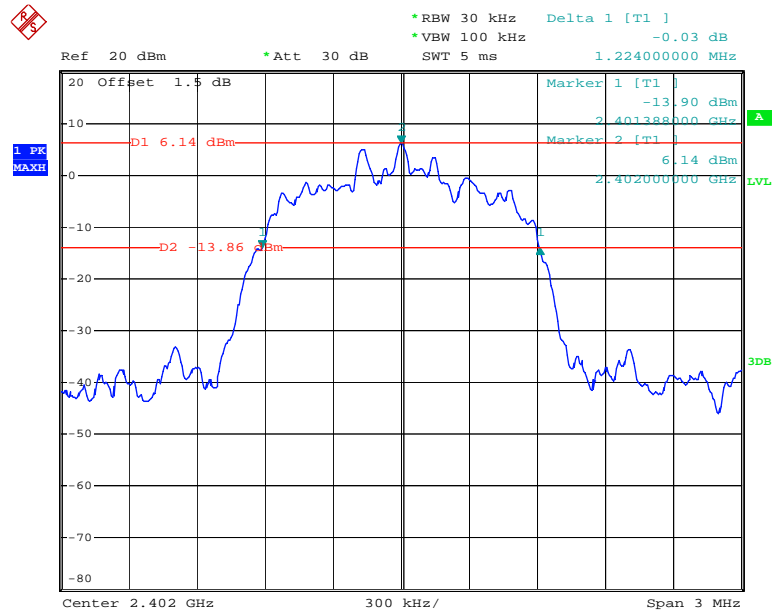
Date: 16.JAN.2018 10:40:26

Middle Channel
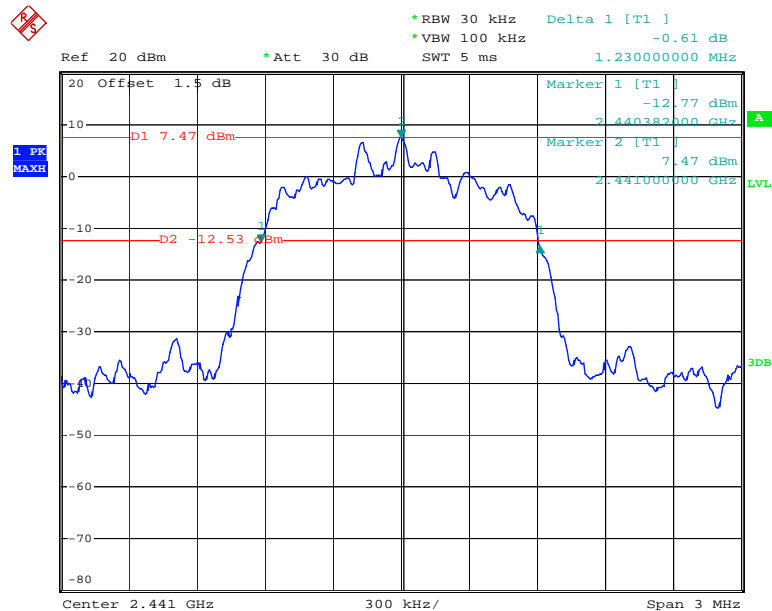
Date: 16.JAN.2018 10:38:19

High Channel

```
                              *RBW 30 kHz    Delta 1 [T1 ]
                              *VBW 100 kHz              -0.83 dB
        Ref  20 dBm    *Att  30 dB    SWT 5 ms      1.254000000 MHz
     20  Offset  1.5 dB                       Marker 1 [T1 ]
                                                       -14.55 dBm
      10                                       2.479358000 GHz    A
     D1 5.51 dBm                               Marker 2 [T1 ]
                                                        5.51 dBm
      0                                        2.480000000 GHz   LVL
     -10
     D2 -14.49 dBm
     -20
     -30
                                                                 3DB
     -40
     -50
     -60
     -70
     -80
     Center 2.48 GHz           300 kHz/                Span 3 MHz
```
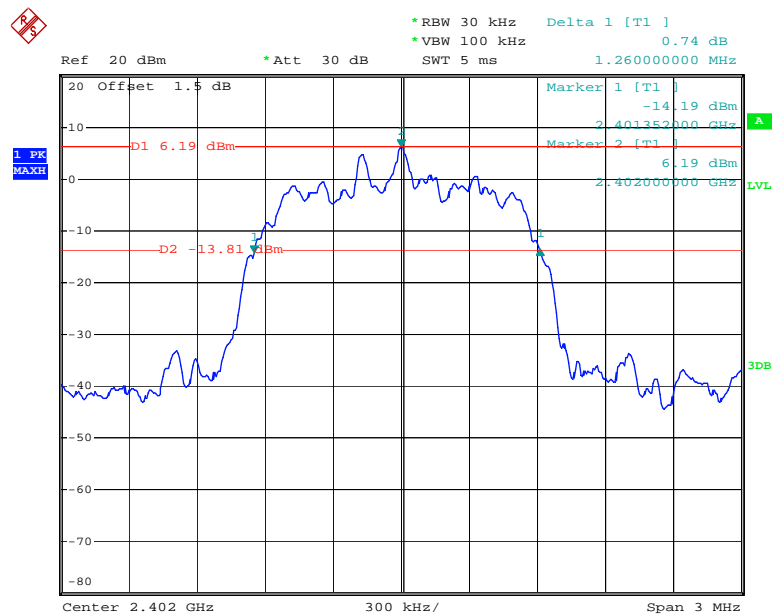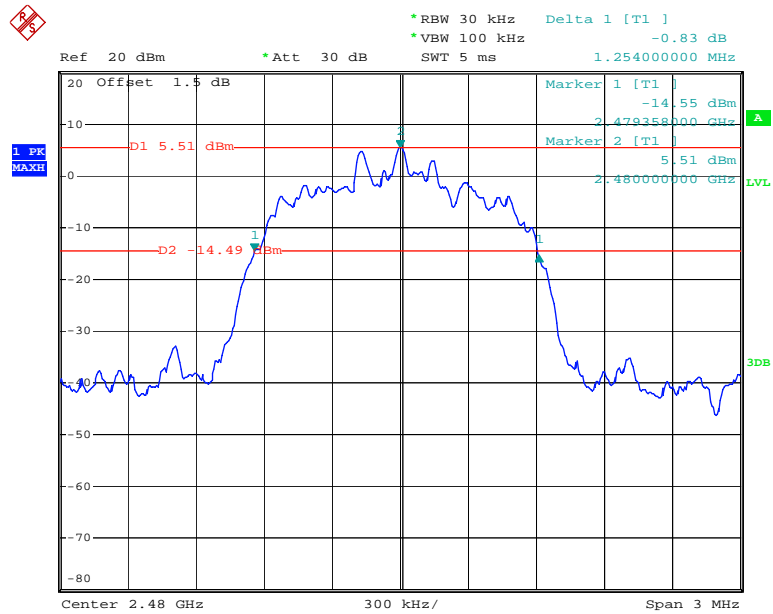
Date: 16.JAN.2018 10:33:48

FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

According to FCC §15.247(a) (1) (iii)

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

2. Set the EUT in hopping mode from first channel to last.

3. By using the Max-Hold function record the Quantity of the channel.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
N/A	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	/

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24.8 °C
Relative Humidity:	37 %
ATM Pressure:	101.6 kPa

* The testing was performed by Mark Pan on 2018-01-16.

Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

BDR Mode (GFSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	≥15

Number of Hopping Channels
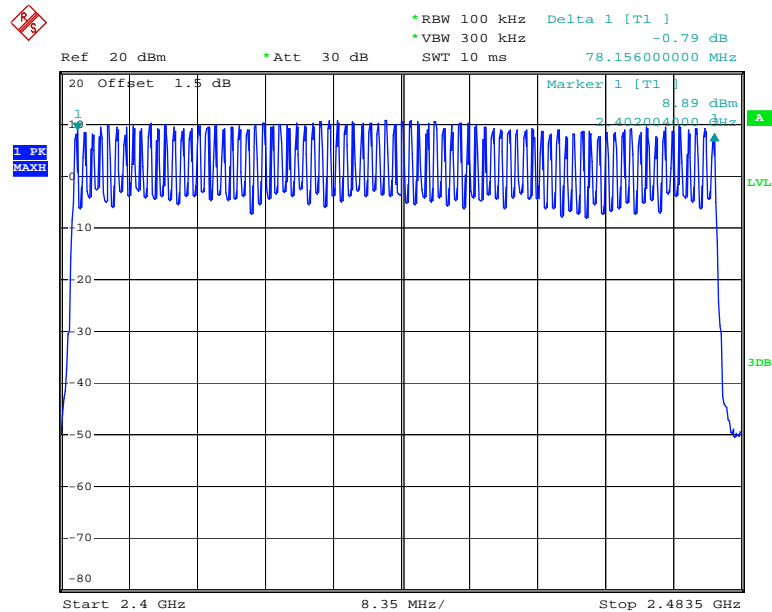
Date: 16.JAN.2018 11:02:29

EDR Mode (π/4-DQPSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	≥15

Number of Hopping Channels
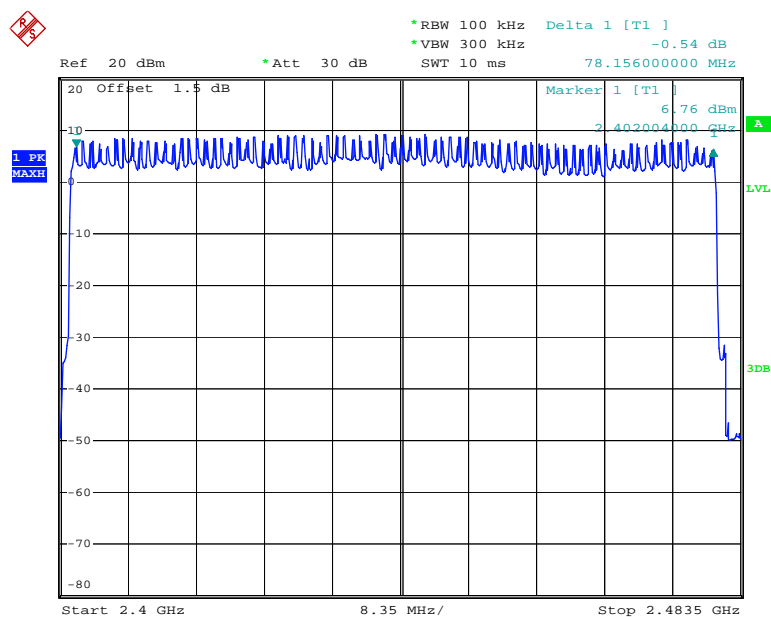
Date: 16.JAN.2018 11:09:00

EDR Mode (8-DPSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	≥15

Number of Hopping Channels


```
                                     *RBW 100 kHz   Delta 1 [T1 ]
                                     *VBW 300 kHz            -1.01 dB
        Ref  20 dBm       *Att  30 dB   SWT 10 ms      78.156000000 MHz
        20  Offset  1.5 dB                        Marker 1 [T1 ]
                                                          7.69 dBm
                                                   2.401670000 GHz    A
1 PK
MAXH
                                                                     LVL

        -10

        -20

        -30

        -40                                                          3DB

        -50

        -60

        -70

        -80
        Start 2.4 GHz          8.35 MHz/            Stop 2.4835 GHz
```
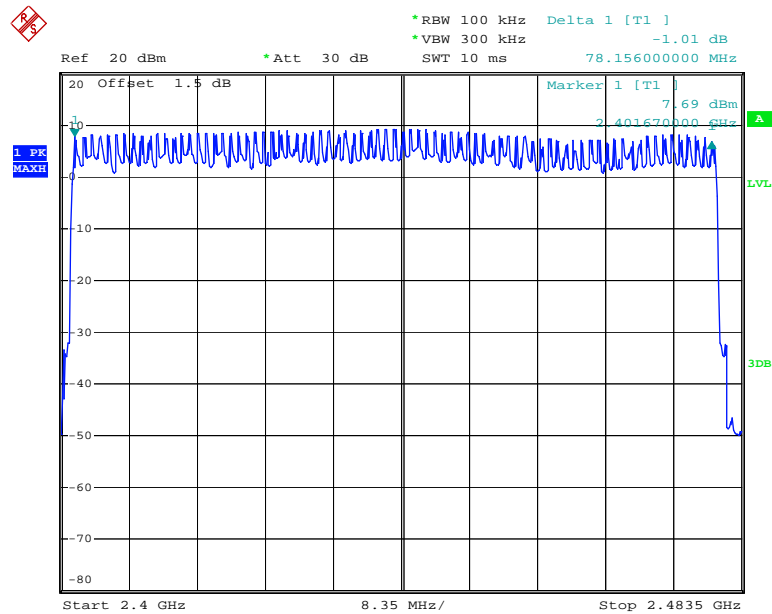
Date: 16.JAN.2018 11:34:13

FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

According to FCC §15.247(a) (1) (iii)

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Procedure

The EUT was worked in channel hopping; the time of single pulses was tested.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
N/A	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	/

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24.8 °C
Relative Humidity:	37 %
ATM Pressure:	101.6 kPa

* The testing was performed by Mark Pan on 2018-01-16.
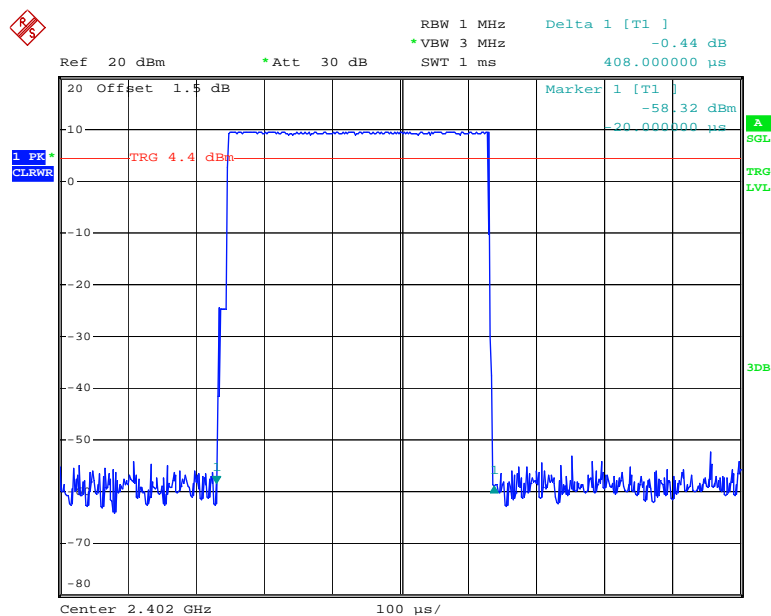
Test Result: Compliance.

 Please refer to following tables and plots

Test Mode: Transmitting

BDR Mode (GFSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
DH1	Low	0.408	0.131	0.4	Compliance
	Middle	0.408	0.131	0.4	Compliance
	High	0.406	0.130	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s				
DH3	Low	1.68	0.269	0.4	Compliance
	Middle	1.68	0.269	0.4	Compliance
	High	1.68	0.269	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s				
DH5	Low	2.93	0.313	0.4	Compliance
	Middle	2.93	0.313	0.4	Compliance
	High	2.93	0.313	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s				

DH1: Low Channel

Date: 16.JAN.2018 11:44:06

DH1: Middle Channel

		RBW 1 MHz	Delta 1 [T1]
		*VBW 3 MHz	-5.35 dB
Ref 20 dBm	*Att 30 dB	SWT 1 ms	408.000000 µs

20 Offset 1.5 dB

Marker 1 [T1]
-56.72 dBm
18.000000 µs

1 PK*
CLRWR

TRG 4.2 dBm

A SGL
TRG LVL
3DB

Center 2.441 GHz   100 µs/
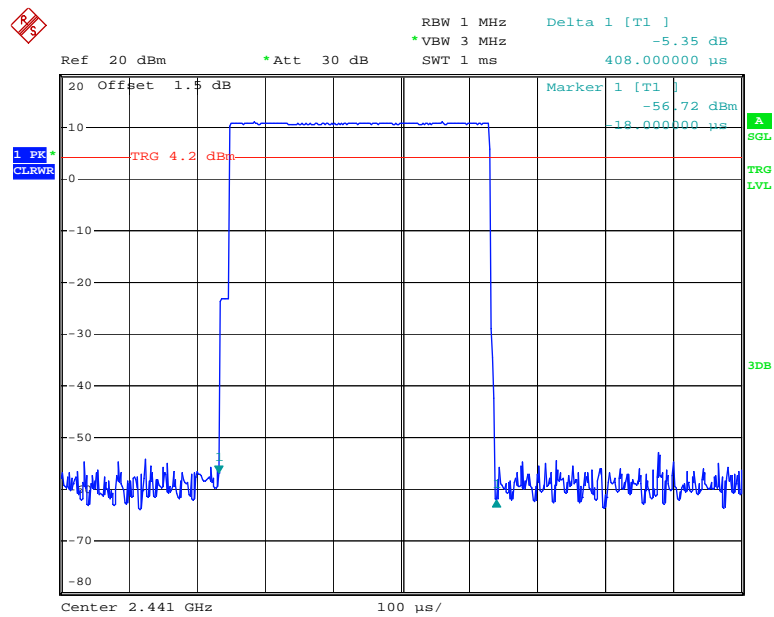
Date: 16.JAN.2018 11:44:16

DH1: High Channel

		RBW 1 MHz	Delta 1 [T1]
		*VBW 3 MHz	15.65 dB
Ref 20 dBm	*Att 30 dB	SWT 1 ms	406.000000 µs

20 Offset 1.5 dB

Marker 1 [T1]
-60.41 dBm
18.000000 µs

1 PK*
CLRWR

TRG 3.4 dBm

A SGL
TRG LVL
3DB

Center 2.48 GHz   100 µs/
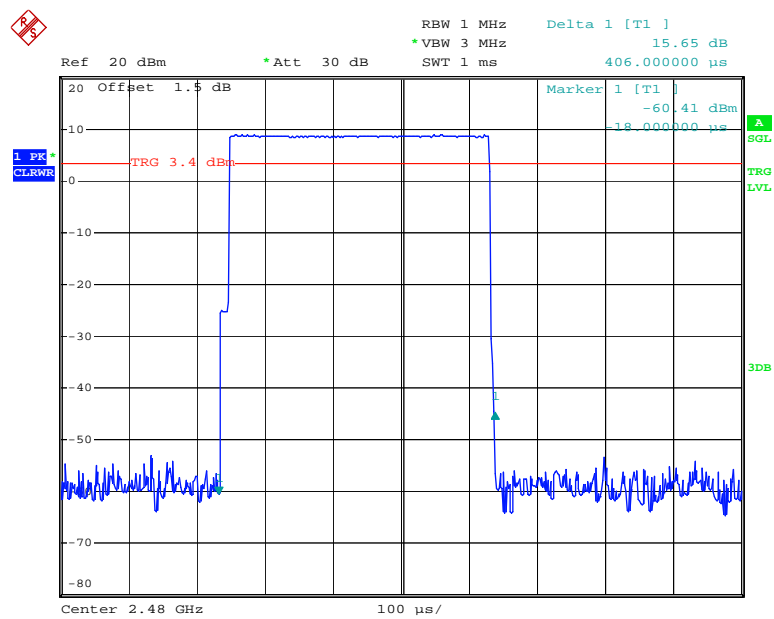
Date: 16.JAN.2018 11:44:26

DH3:　Low Channel

		RBW 1 MHz	Delta 1 [T1]
		*VBW 3 MHz	-0.97 dB
Ref　20 dBm	*Att　30 dB	SWT 3 ms	1.680000 ms

20 Offset 1.5 dB

Marker 1 [T1]
-55.60 dBm
18.000000 µs

A SGL

1 PK*
CLRWR

TRG 3.1 dBm

TRG LVL

3DB

Center 2.402 GHz　　　　300 µs/

Date: 16.JAN.2018　11:45:20

DH3:　Middle Channel

		RBW 1 MHz	Delta 1 [T1]
		*VBW 3 MHz	2.26 dB
Ref　20 dBm	*Att　30 dB	SWT 3 ms	1.680000 ms

20 Offset 1.5 dB

Marker 1 [T1]
-57.50 dBm
18.000000 µs

A SGL

1 PK*
CLRWR

TRG 4.1 dBm

TRG LVL

3DB

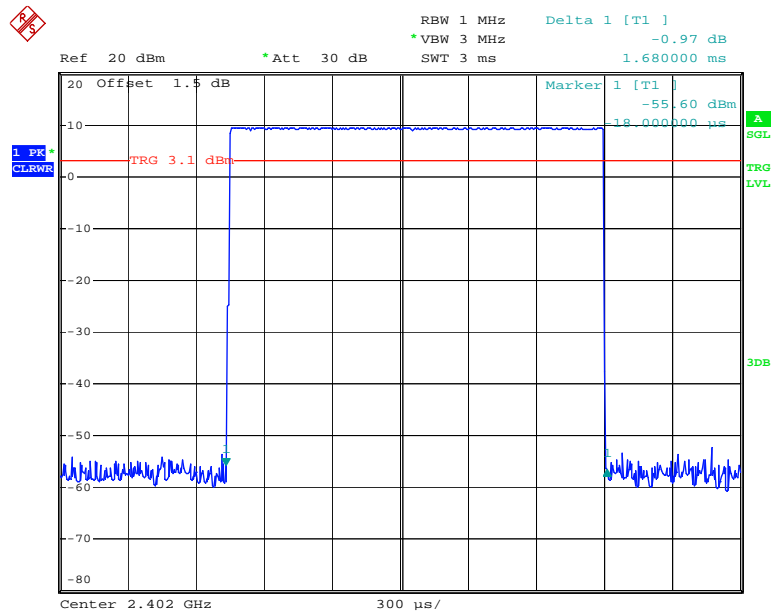Center 2.441 GHz　　　　300 µs/
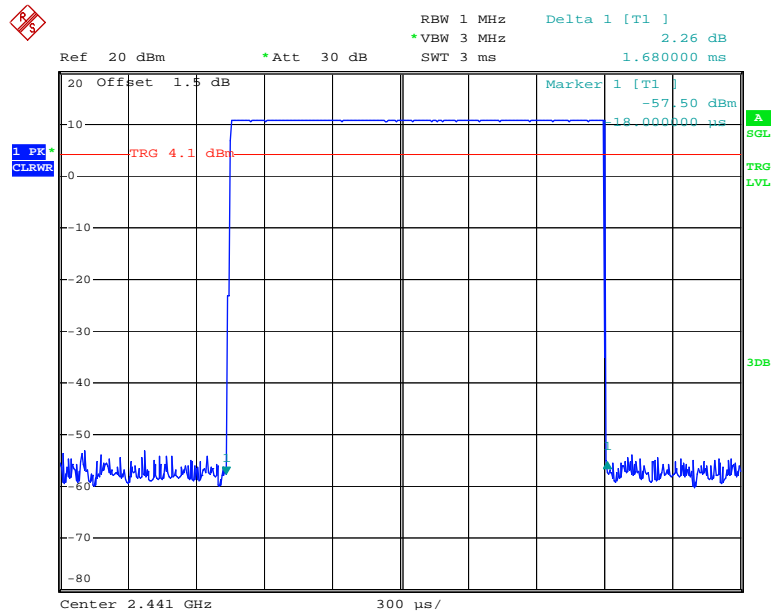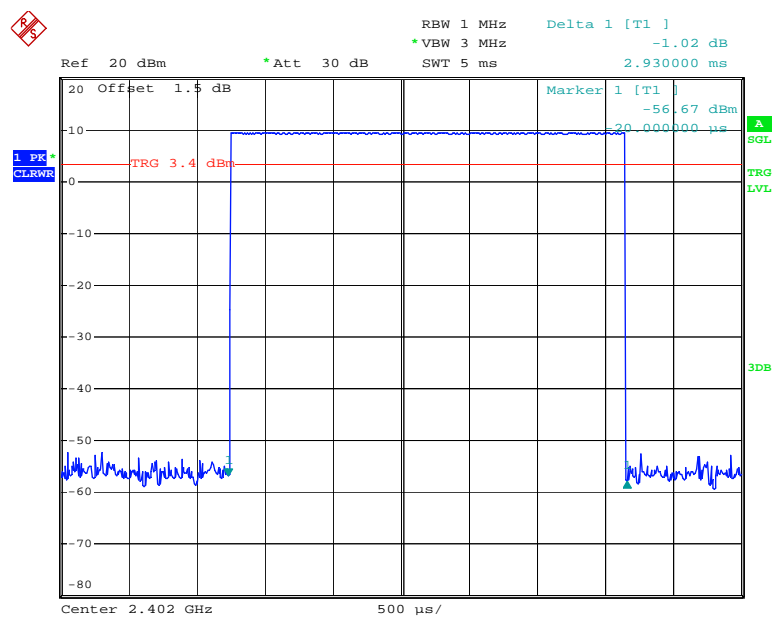
Date: 16.JAN.2018　11:45:31

DH3: High Channel
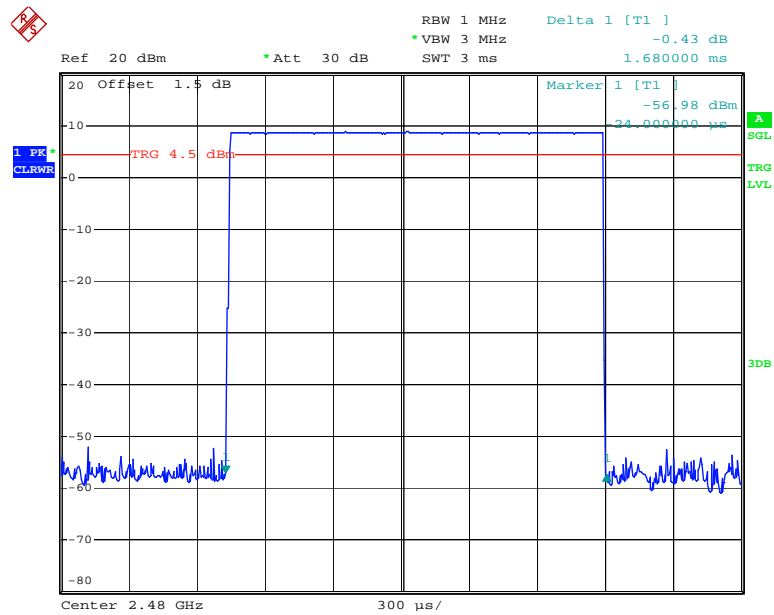
Date: 16.JAN.2018 11:45:42

DH5: Low Channel

Date: 16.JAN.2018 11:46:56

DH5: Middle Channel

		RBW 1 MHz	Delta 1 [T1]
		*VBW 3 MHz	0.31 dB
	Ref 20 dBm	*Att 30 dB SWT 5 ms	2.930000 ms

20 Offset 1.5 dB

Marker 1 [T1]
-56.19 dBm
20.000000 µs

A SGL

1 PK *
CLRWR

TRG 4.3 dBm

TRG LVL

3DB

Center 2.441 GHz　　　　　　500 µs/
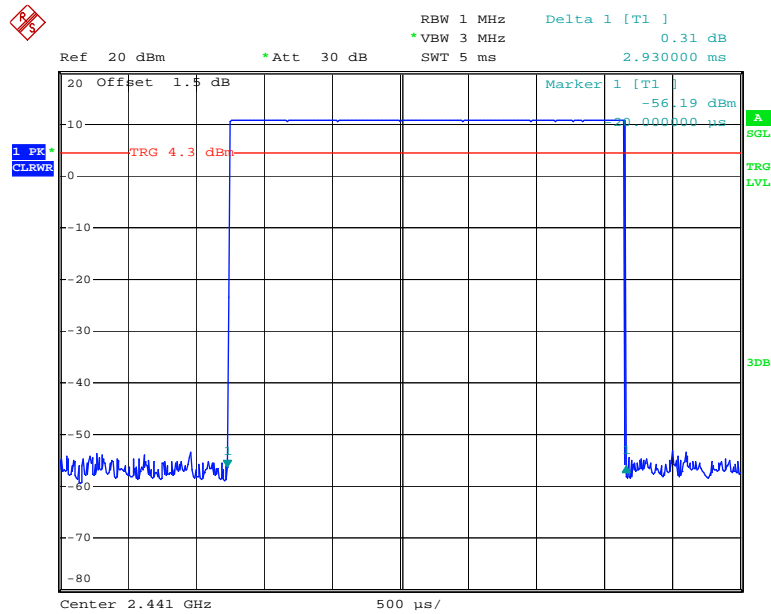
Date: 16.JAN.2018 11:47:06

DH5: High Channel

		RBW 1 MHz	Delta 1 [T1]
		*VBW 3 MHz	2.13 dB
	Ref 20 dBm	*Att 30 dB SWT 5 ms	2.930000 ms

20 Offset 1.5 dB

Marker 1 [T1]
-58.01 dBm
20.000000 µs

A SGL

1 PK *
CLRWR

TRG 2.6 dBm

TRG LVL

3DB

Center 2.48 GHz　　　　　　500 µs/
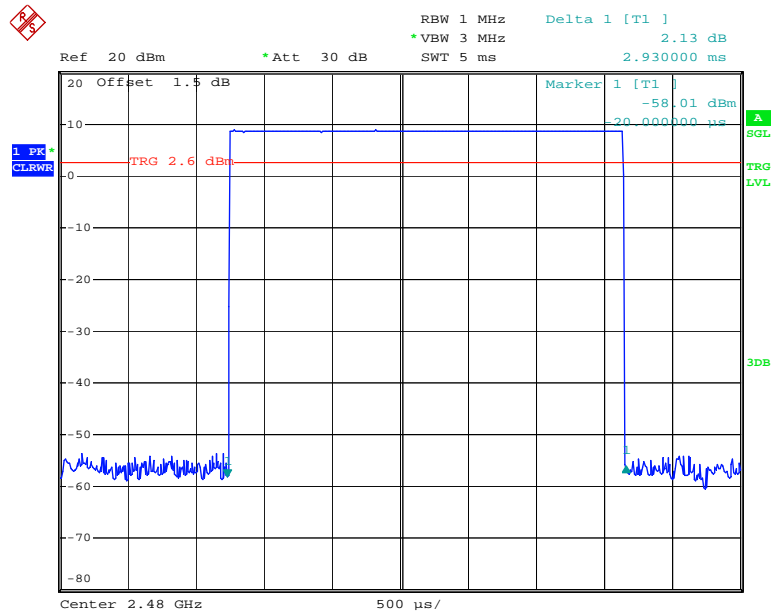
Date: 16.JAN.2018 11:47:16

EDR Mode (π/4-DQPSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
2DH1	Low	0.414	0.132	0.4	Compliance
	Middle	0.414	0.132	0.4	Compliance
	High	0.412	0.132	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s					
2DH3	Low	1.68	0.269	0.4	Compliance
	Middle	1.68	0.269	0.4	Compliance
	High	1.68	0.269	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s					
2DH5	Low	2.94	0.314	0.4	Compliance
	Middle	2.94	0.314	0.4	Compliance
	High	2.93	0.313	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s					

2DH1: Low Channel
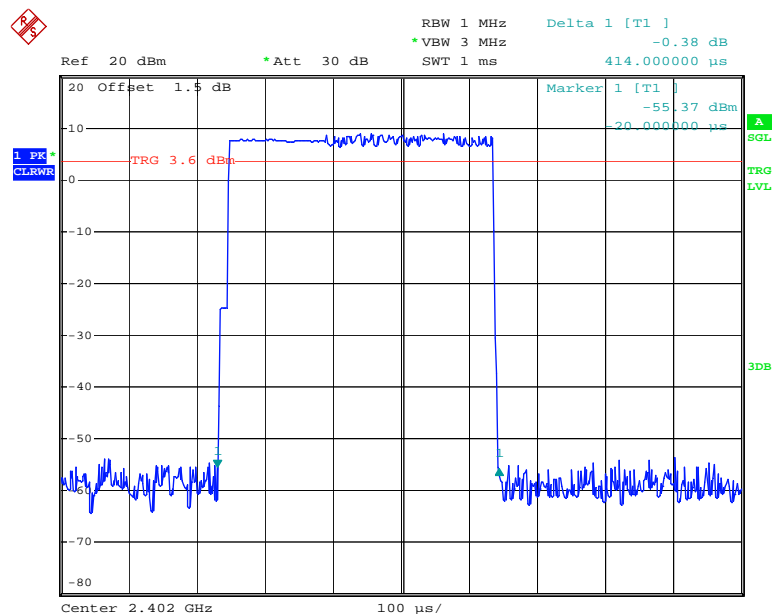
Date: 16.JAN.2018 11:47:50
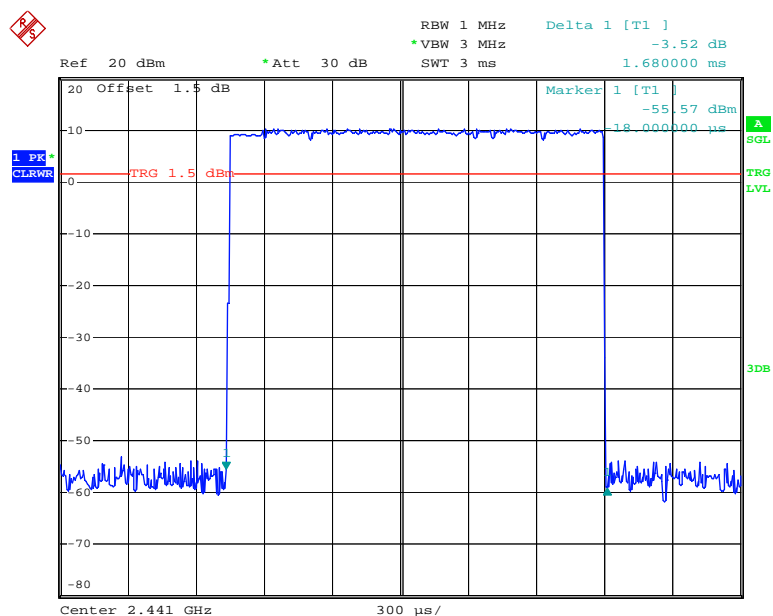
2DH1: Middle Channel


```
                                          RBW 1 MHz    Delta 1 [T1 ]
                                         *VBW 3 MHz            3.24 dB
         Ref  20 dBm          *Att  30 dB  SWT 1 ms      414.000000 µs
         20  Offset  1.5 dB                Marker 1 [T1 ]
                                                        -57.74 dBm
         -10                                             20.000000 µs    A
                                                                         SGL
  1 PK*
  CLRWR        TRG 1.8 dBm                                               TRG
         -0                                                              LVL

         -10

         -20

         -30                                                            3DB

         -40

         -50

         -70

         -80
         Center 2.441 GHz                  100 µs/
```
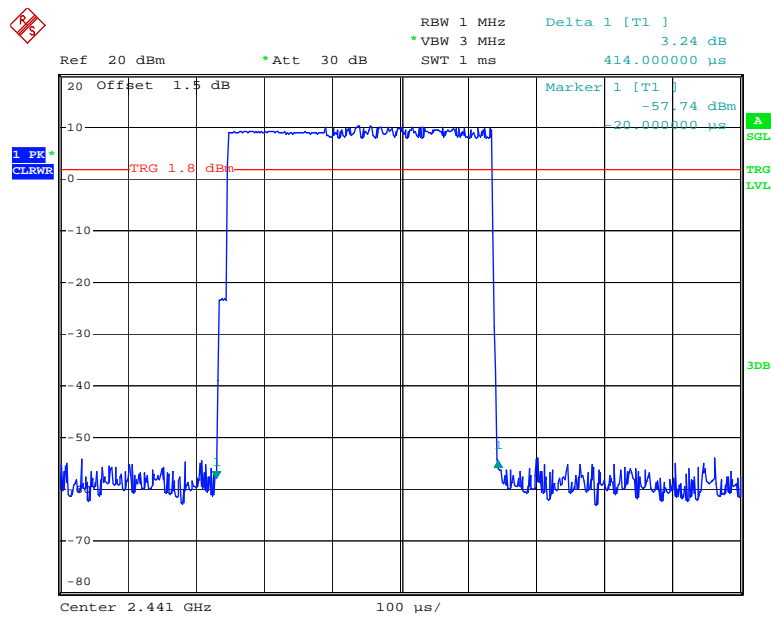
Date: 16.JAN.2018 11:48:01

2DH1: High Channel


```
                                          RBW 1 MHz    Delta 1 [T1 ]
                                         *VBW 3 MHz           -8.99 dB
         Ref  20 dBm          *Att  30 dB  SWT 1 ms      412.000000 µs
         20  Offset  1.5 dB                Marker 1 [T1 ]
                                                        -45.80 dBm
         -10                                             18.000000 µs    A
                                                                         SGL
  1 PK*
  CLRWR        TRG 2.3 dBm                                               TRG
         -0                                                              LVL

         -10

         -20

         -30

         -40                                                            3DB

         -50

         -70

         -80
         Center 2.48 GHz                   100 µs/
```
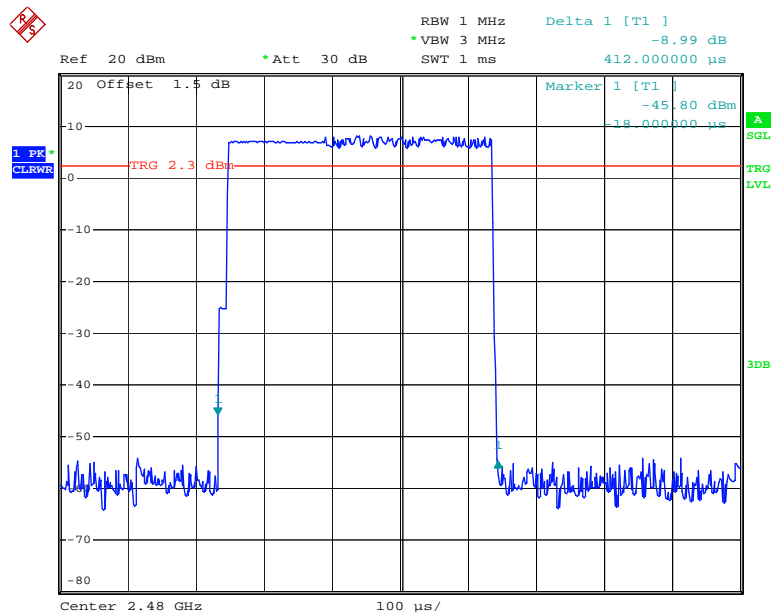
Date: 16.JAN.2018 11:48:11

2DH3:　Low Channel


```
                                          RBW 1 MHz    Delta 1 [T1 ]
                                        * VBW 3 MHz              1.42 dB
        Ref  20 dBm        * Att  30 dB   SWT 3 ms         1.680000 ms
        20  Offset  1.5 dB                      Marker 1 [T1 ]
                                                         -56.33 dBm
     -10                                               18.000000 µs
                                         TRG 3.6 dBm
       0
     -10
     -20
     -30
     -40
     -50
     -60
     -70
     -80
        Center 2.402 GHz                  300 µs/
```
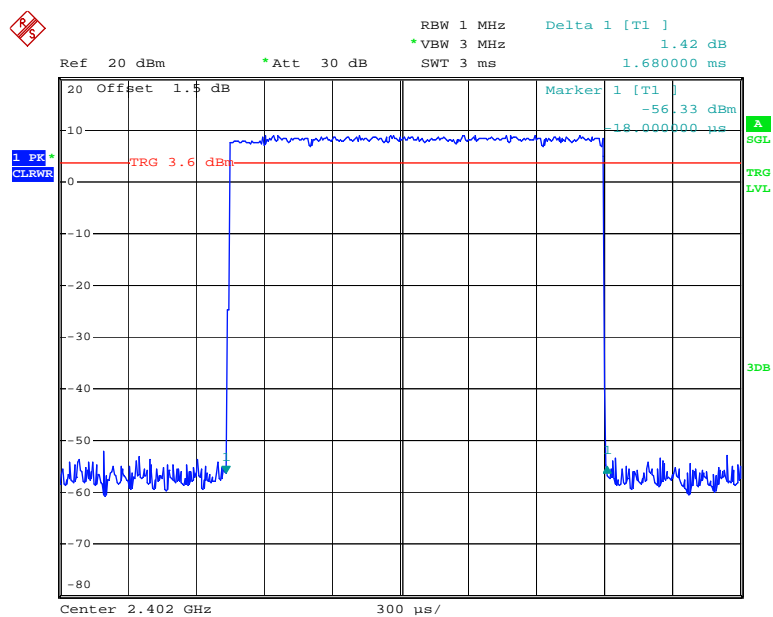
Date: 16.JAN.2018 11:50:45

2DH3:　Middle Channel


```
                                          RBW 1 MHz    Delta 1 [T1 ]
                                        * VBW 3 MHz             -3.52 dB
        Ref  20 dBm        * Att  30 dB   SWT 3 ms         1.680000 ms
        20  Offset  1.5 dB                      Marker 1 [T1 ]
                                                         -55.57 dBm
     -10                                               18.000000 µs
                                         TRG 1.5 dBm
       0
     -10
     -20
     -30
     -40
     -50
     -60
     -70
     -80
        Center 2.441 GHz                  300 µs/
```

Date: 16.JAN.2018 11:49:36

2DH3: High Channel
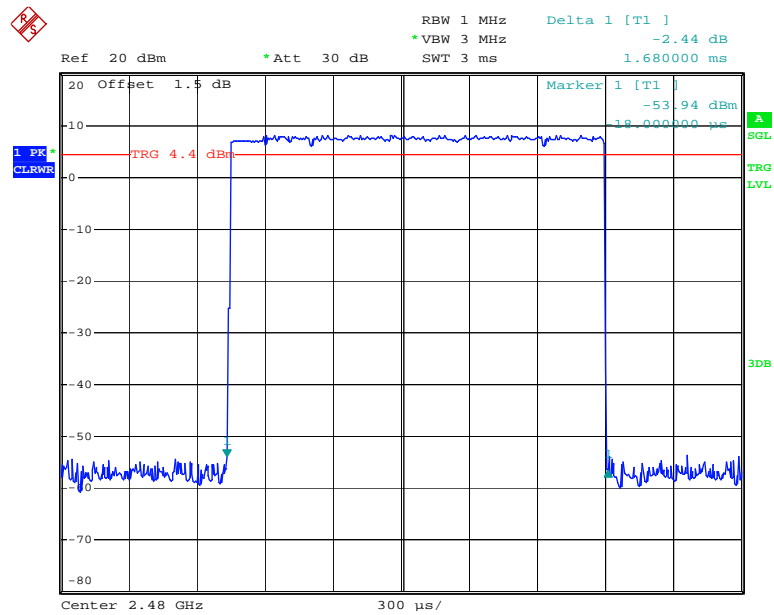
Date: 16.JAN.2018 11:51:06
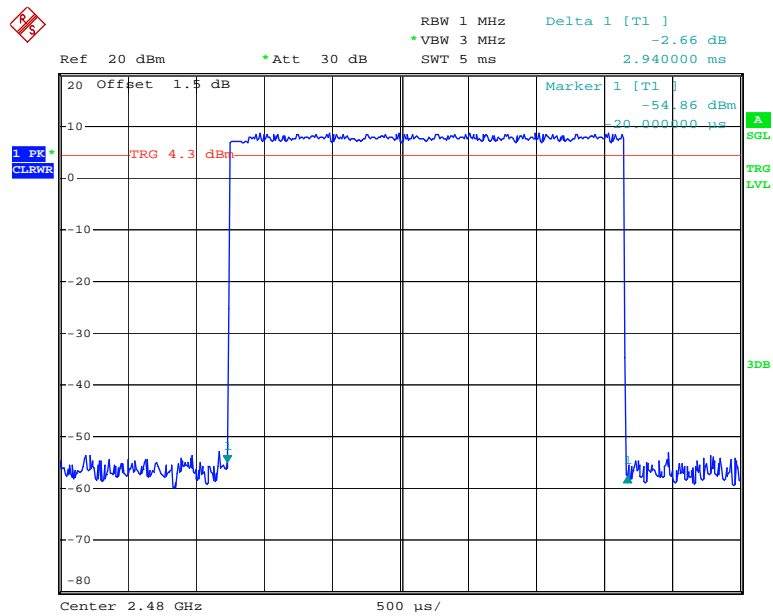
2DH5: Low Channel
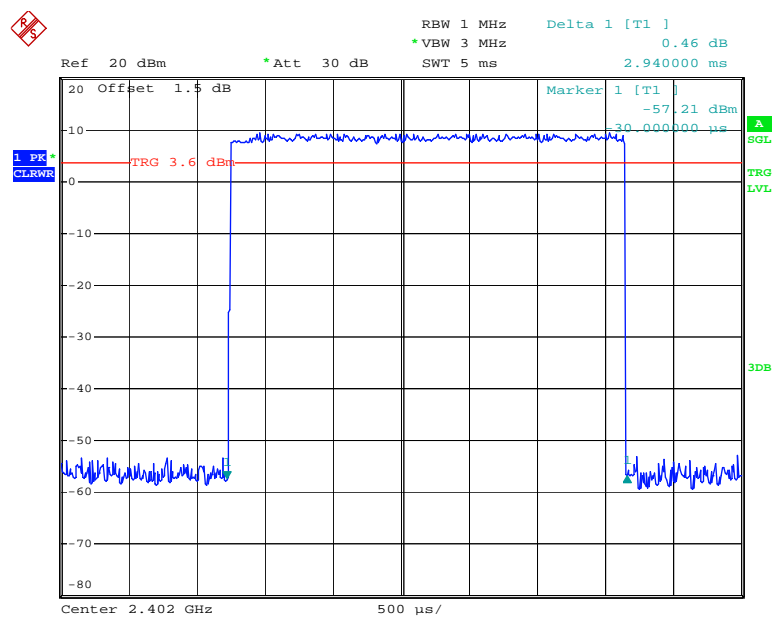
Date: 16.JAN.2018 11:57:59
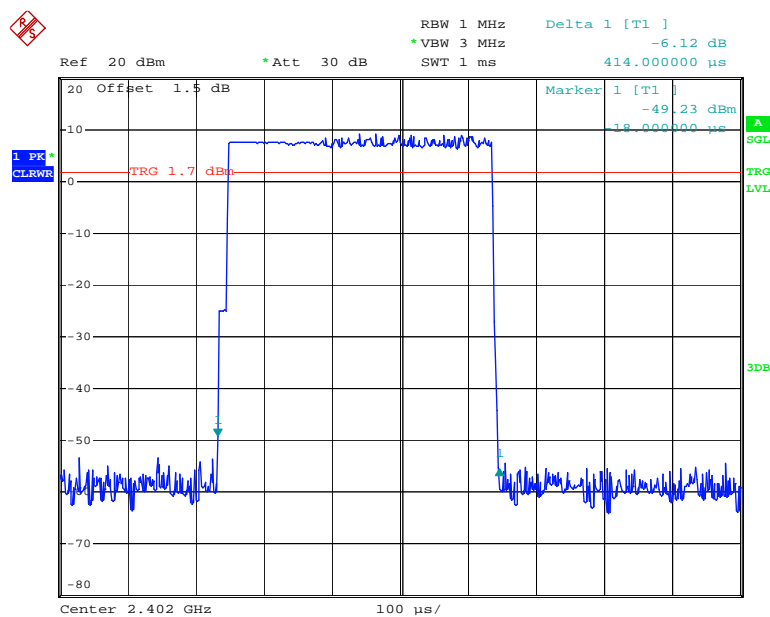
2DH5: Middle Channel
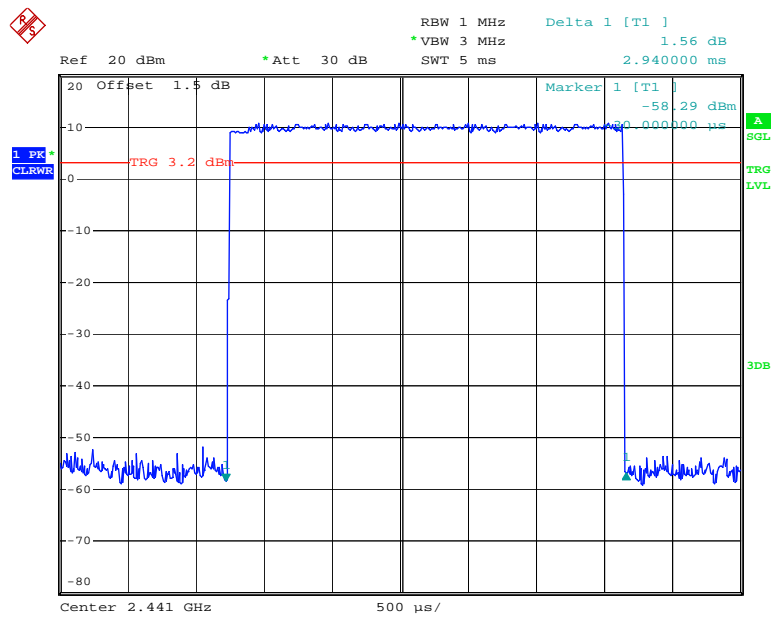
Date: 16.JAN.2018 11:58:09
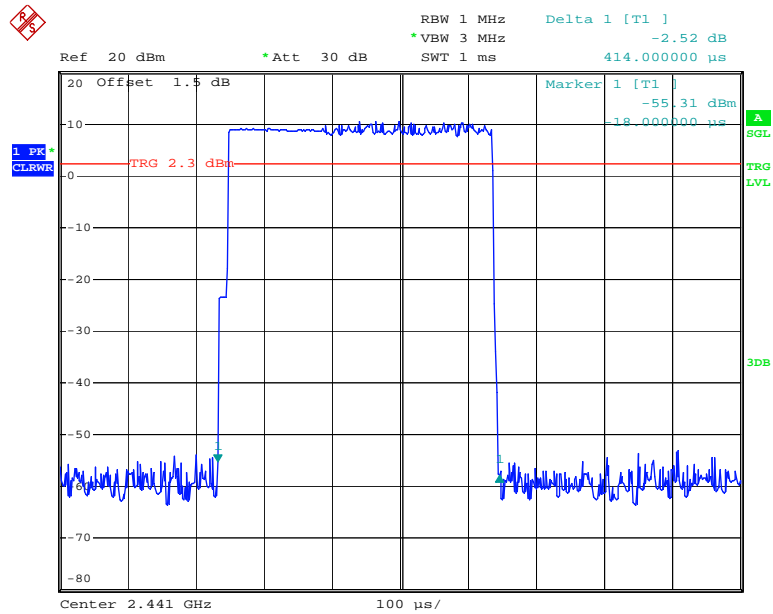
2DH5: High Channel

Date: 16.JAN.2018 11:58:20

EDR Mode (8-DPSK):

Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
3DH1	Low	0.414	0.132	0.4	Compliance
	Middle	0.414	0.132	0.4	Compliance
	High	0.414	0.132	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/2/79) ×31.6 s				
3DH3	Low	1.68	0.269	0.4	Compliance
	Middle	1.67	0.267	0.4	Compliance
	High	1.68	0.269	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/4/79) ×31.6 s				
3DH5	Low	2.93	0.313	0.4	Compliance
	Middle	2.93	0.313	0.4	Compliance
	High	2.93	0.313	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × (1600/6/79) ×31.6 s				

3DH1: Low Channel

Date: 16.JAN.2018 13:29:19

3DH1: Middle Channel

RBW 1 MHz   Delta 1 [T1]
* VBW 3 MHz   -2.52 dB
Ref 20 dBm   * Att 30 dB   SWT 1 ms   414.000000 µs

20 Offset 1.5 dB   Marker 1 [T1]
                                              -55.31 dBm
                                              18.000000 µs

TRG 2.3 dBm

Center 2.441 GHz   100 µs/

Date: 16.JAN.2018 13:29:31

3DH1: High Channel

RBW 1 MHz   Delta 1 [T1]
* VBW 3 MHz   0.71 dB
Ref 20 dBm   * Att 30 dB   SWT 1 ms   414.000000 µs

20 Offset 1.5 dB   Marker 1 [T1]
                                              -60.78 dBm
                                              18.000000 µs

TRG 2.6 dBm

Center 2.48 GHz   100 µs/
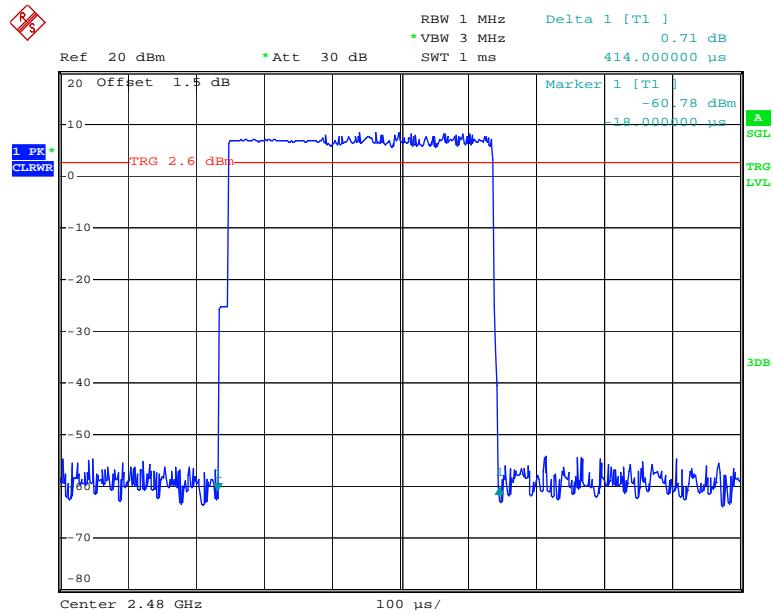
Date: 16.JAN.2018 13:29:41

3DH3: Low Channel
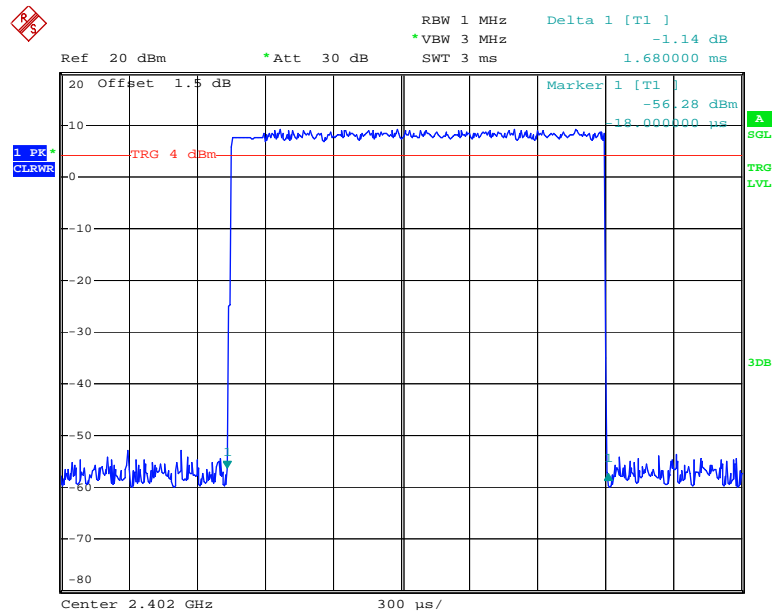
Date: 16.JAN.2018 13:31:01

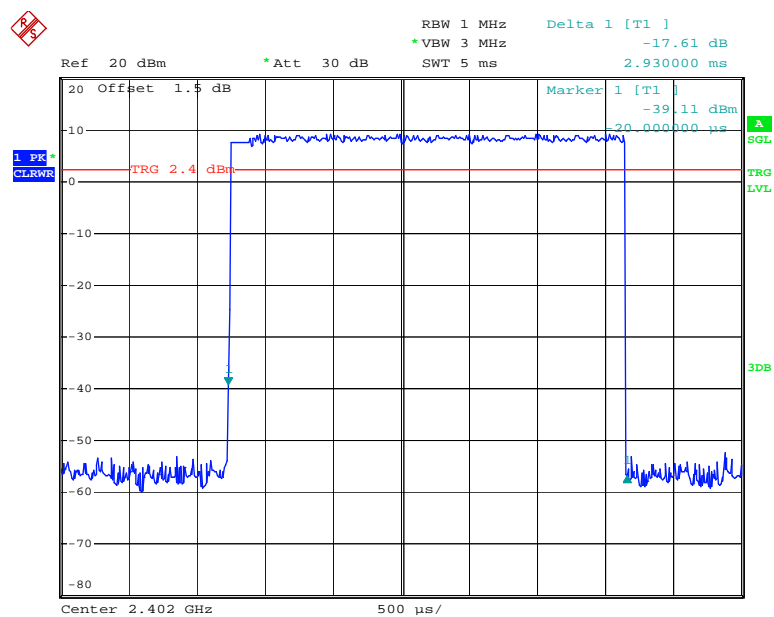## 3DH3: Middle Channel
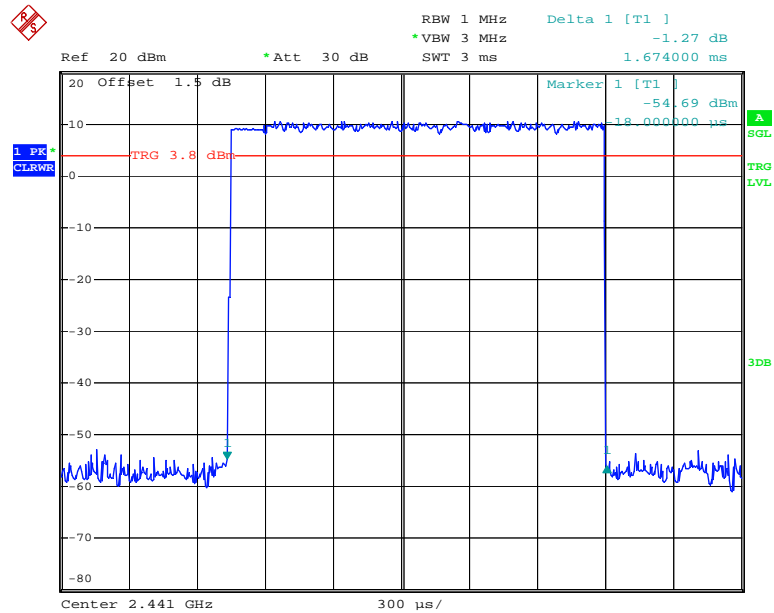
Date: 16.JAN.2018 13:31:11

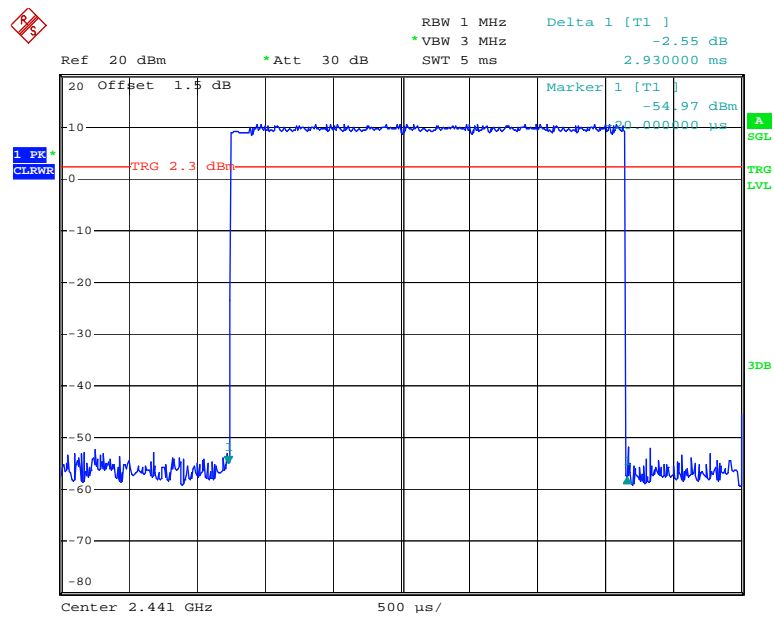### 3DH3: High Channel
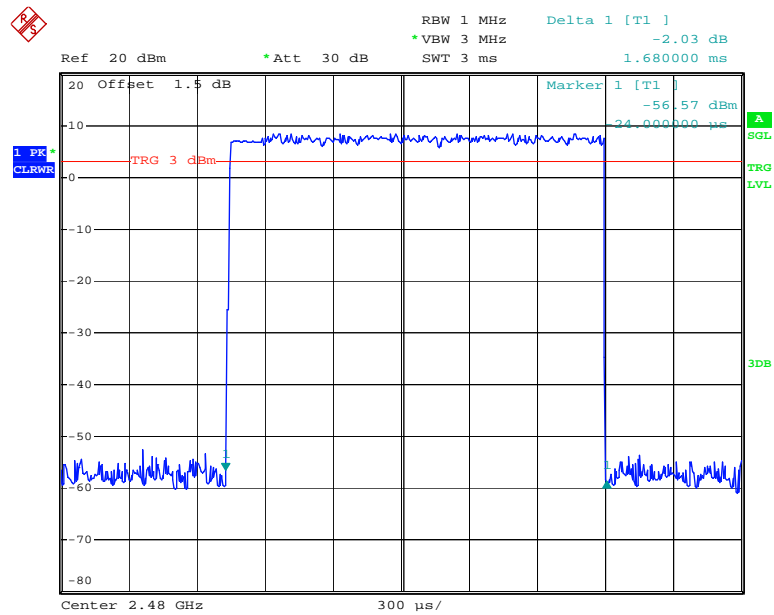
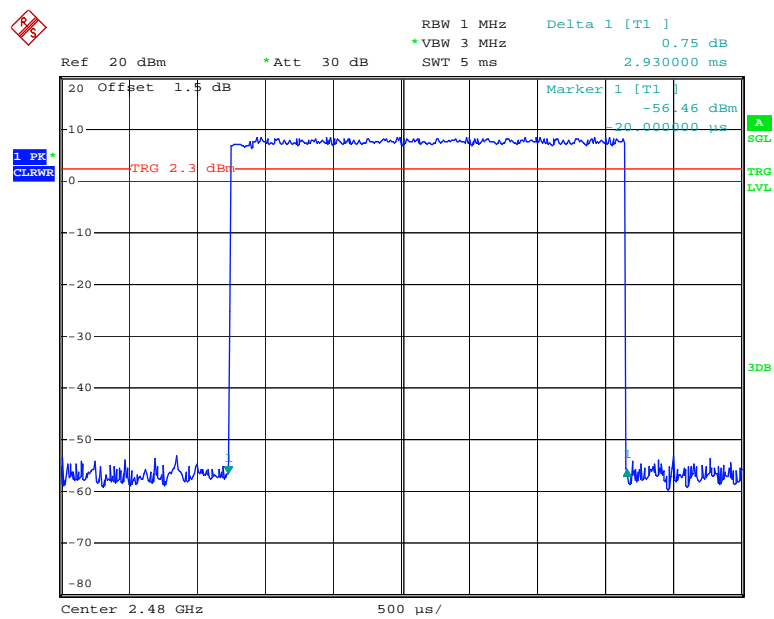Date: 16.JAN.2018 13:31:22

3DH5: Low Channel

Date: 16.JAN.2018 13:32:31

3DH5: Middle Channel

Date: 16.JAN.2018 13:32:40

3DH5: High Channel

Date: 16.JAN.2018 13:32:50

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to FCC §15.247(b) (1)

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

Test Procedure

1. Place the EUT on a bench and set in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
N/A	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	/

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24.8 °C
Relative Humidity:	37 %
ATM Pressure:	101.6 kPa

* The testing was performed by Mark Pan on 2018-01-16.

Test Result: Compliance.

Test Mode: Transmitting

Mode	Frequency (MHz)	Peak Conducted Output power (dBm)	Limit (dBm)
BDR Mode (GFSK)	2402	9.87	21
	2441	11.24	21
	2480	9.41	21
EDR Mode (π/4-DQPSK)	2402	9.75	21
	2441	11.06	21
	2480	9.13	21
EDR Mode (8-DPSK)	2402	9.96	21
	2441	11.33	21
	2480	9.41	21

Note: The data above was tested in conducted mode.

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

According to FCC §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW/ VBW of spectrum analyzer to 100/300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
N/A	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	/

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	20.7~24.8 °C
Relative Humidity:	28~37 %
ATM Pressure:	101.6~102.1 kPa

* The testing was performed by Mark Pan on 2018-01-16 and 2018-02-06.
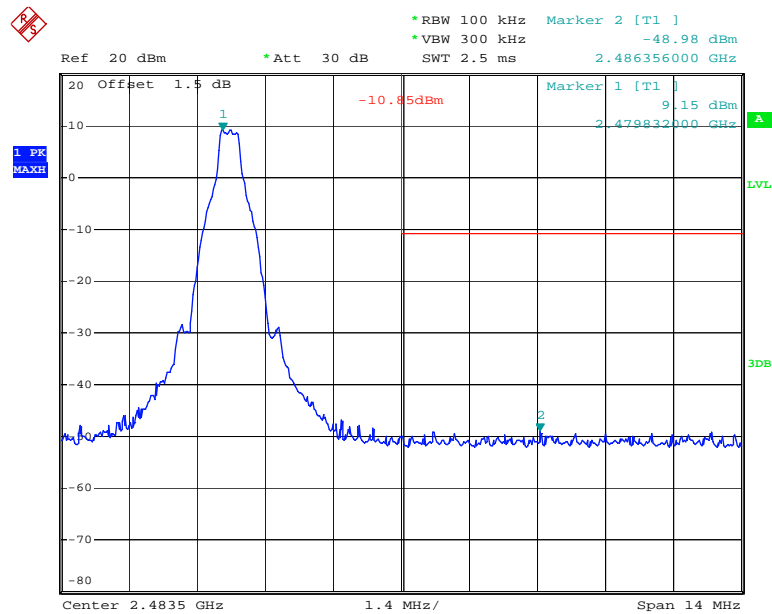
Test Result: Compliance

Single Channel:
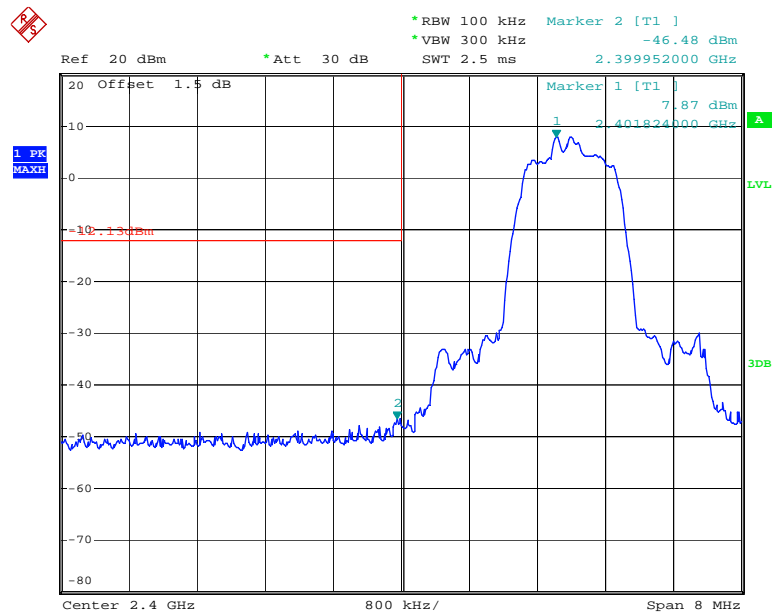*BDR Mode (GFSK):*

Band Edge, Left Side
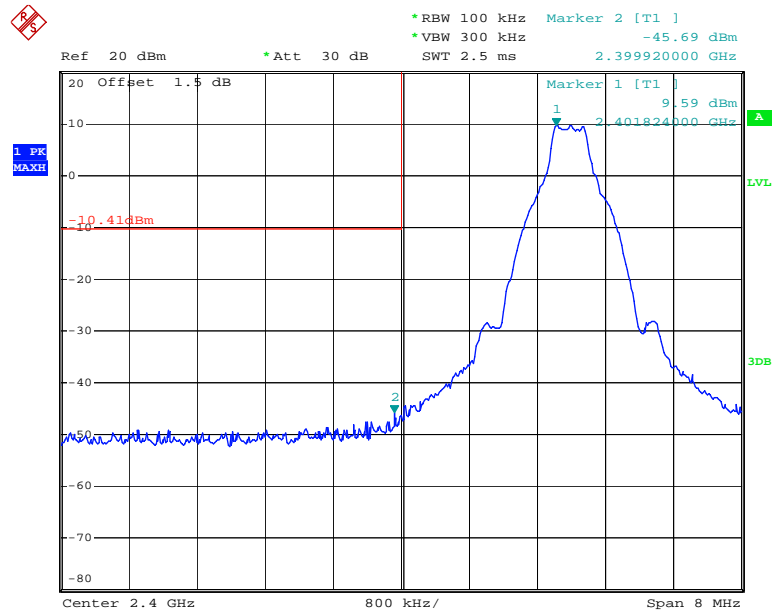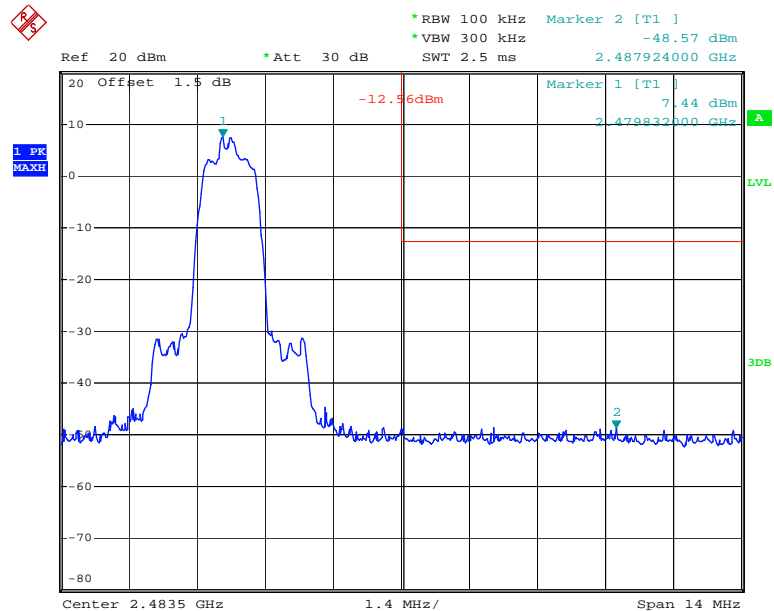

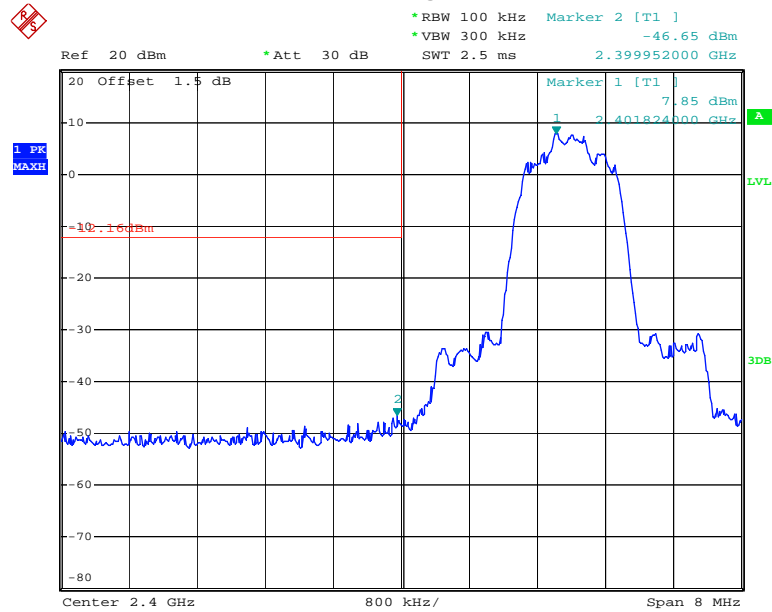Date: 16.JAN.2018 10:14:03

Band Edge, Right Side

Date: 16.JAN.2018 10:19:44

EDR Mode (π/4-DQPSK):

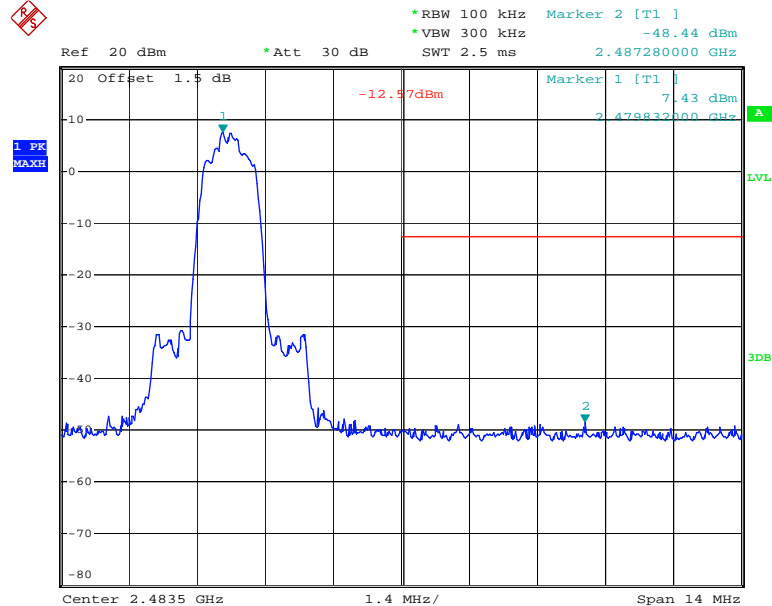## Band Edge, Left Side

Date: 16.JAN.2018 10:30:36

Band Edge, Right Side

Date: 16.JAN.2018 10:32:57

EDR Mode (8-DPSK):

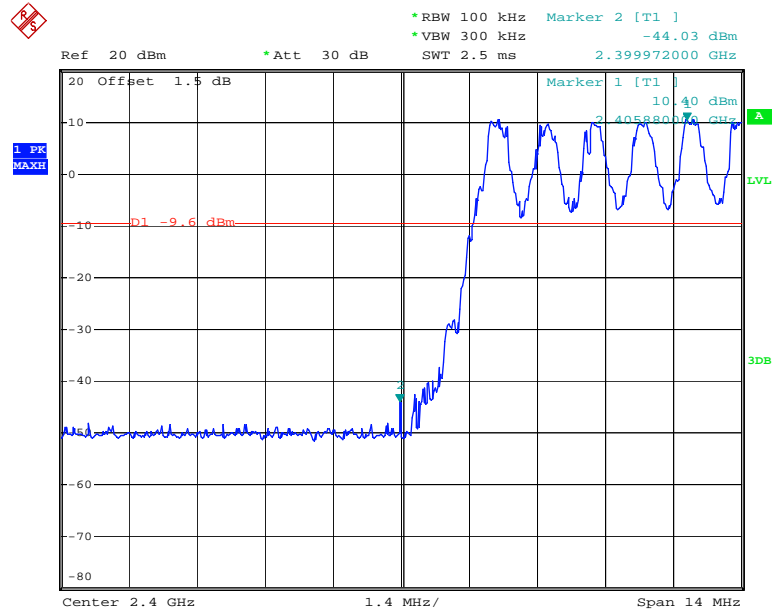**Band Edge, Left Side**

Date: 16.JAN.2018 10:41:40

Band Edge, Right Side

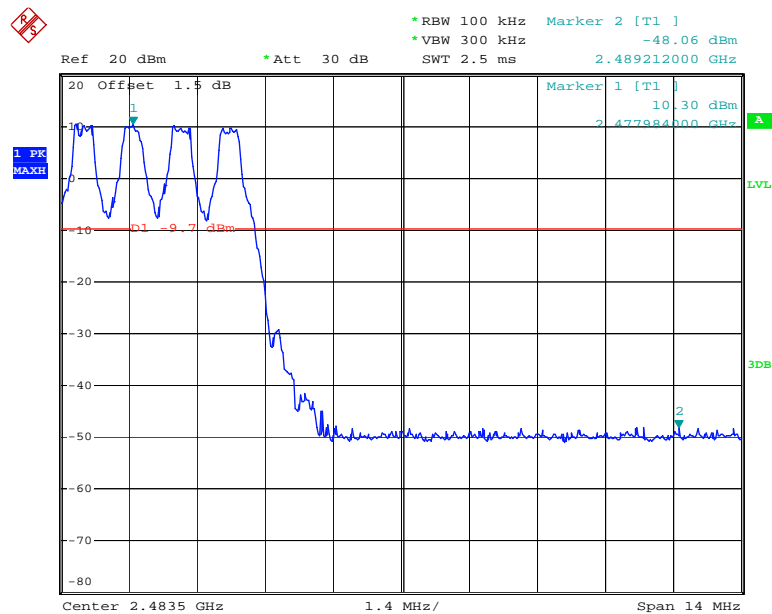Date: 16.JAN.2018 10:35:07

Frequency Hopping:
BDR Mode (GFSK):
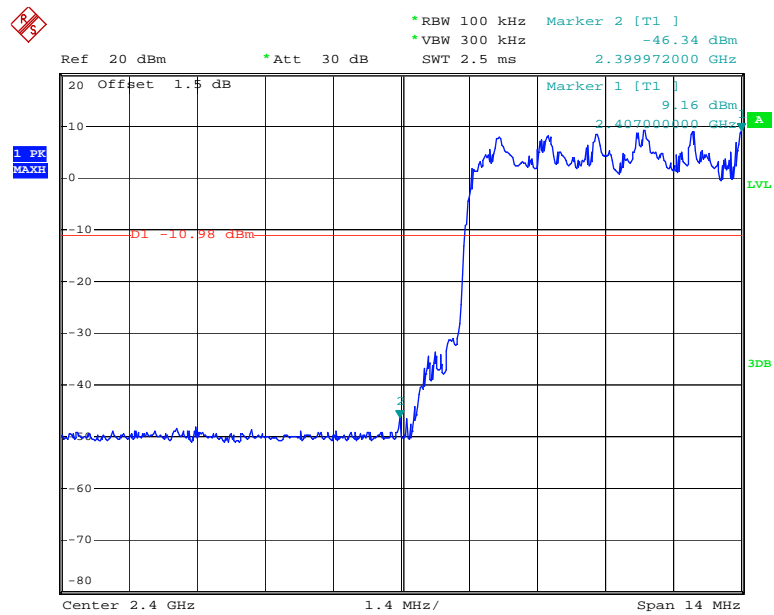
Band Edge, Left Side

Date: 6.FEB.2018 16:24:55

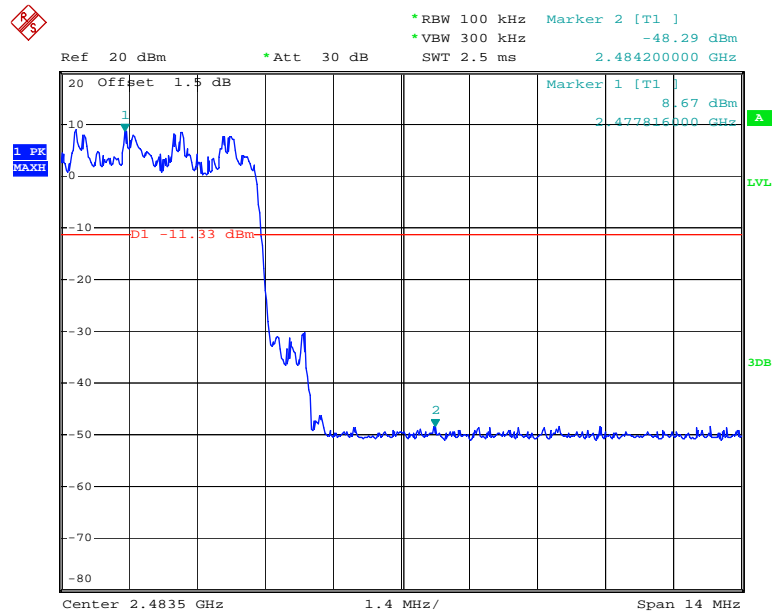## Band Edge, Right Side

Date: 6.FEB.2018 16:23:25

EDR Mode (π/4-DQPSK):

Band Edge, Left Side
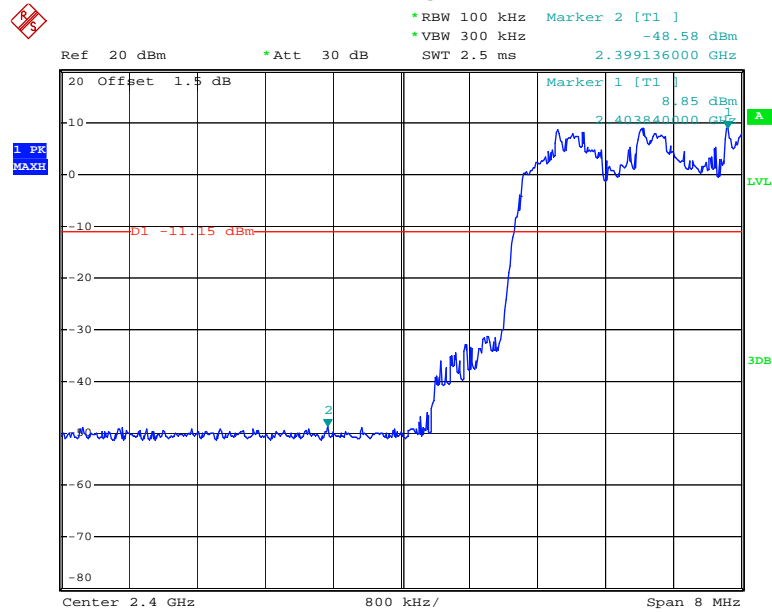

Date: 6.FEB.2018 16:27:27

Band Edge, Right Side
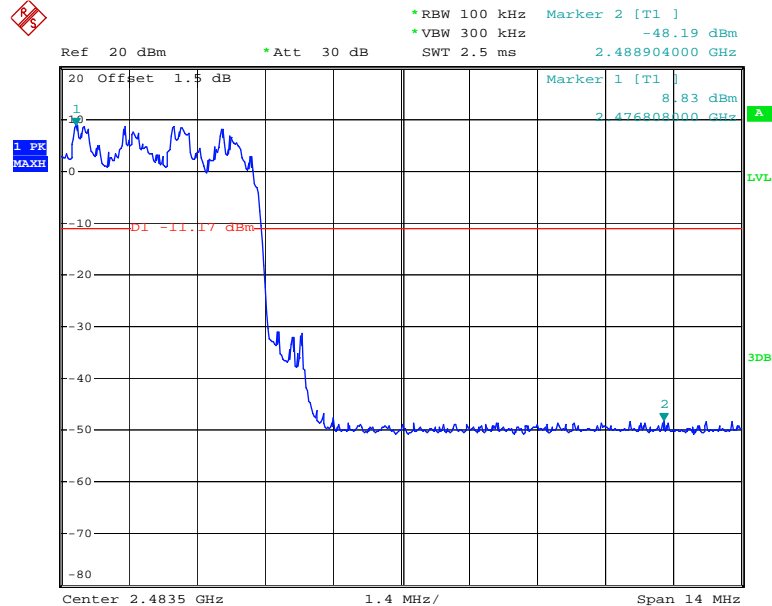

Date: 6.FEB.2018 16:30:01

EDR Mode (8-DPSK):

Band Edge, Left Side

```
                                    *RBW  100 kHz   Marker 2 [T1 ]
                                    *VBW  300 kHz          -48.58 dBm
        Ref  20 dBm      *Att  30 dB   SWT 2.5 ms      2.399136000 GHz
        20 Offset  1.5 dB                 Marker 1 [T1 ]
                                                        8.85 dBm
      -10                                          2.403840000 GHz   A

   1 PK  0
   MAXH
      -10      D1 -11.15 dBm                                          LVL

      -20

      -30

      -40                                                            3DB
            2
      -50

      -60

      -70

      -80
        Center 2.4 GHz          800 kHz/            Span 8 MHz
```

Date: 6.FEB.2018 16:36:27

Band Edge, Right Side

```
                                    *RBW  100 kHz   Marker 2 [T1 ]
                                    *VBW  300 kHz          -48.19 dBm
        Ref  20 dBm      *Att  30 dB   SWT 2.5 ms      2.488904000 GHz
        20 Offset  1.5 dB                 Marker 1 [T1 ]
      1                                                 8.83 dBm
                                                   2.476808000 GHz   A

   1 PK  0
   MAXH
      -10      D1 -11.17 dBm                                          LVL

      -20

      -30

      -40                                                            3DB
                                                2
      -50

      -60

      -70

      -80
        Center 2.4835 GHz       1.4 MHz/            Span 14 MHz
```

Date: 6.FEB.2018 16:34:04

***** END OF REPORT *****