FCC PART 15.247
TEST REPORT

For

Hyundai Corporation

140-2, Kye-dong, Chongro-ku, Seoul, South Korea

FCC ID: RQQHLT-D24FSL

Report Type:	**Product Type:**
Original Report	Mobile Phone

Test Engineer:	Mike Hu
Report Number:	RSZ150908001-00B
Report Date:	2015-09-18
Reviewed By:	Jimmy Xiao RF Engineer
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Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Hyundai Corporation* 's product, model number:*D245 (FCC ID: RQQHLT-D24FSL)* or the "EUT" in this report was a *Mobile Phone,* which was measured approximately: 11.2 cm (L) × 4.7 cm (W) × 1.2 cm (H), rated with input voltage: DC 3.7 V rechargeable Li-ion battery or DC 5.0 V from adapter.

Huiyuda Adapter Information:
Model: UAA-LIJ5-011A1
Input: AC100-240V, 50/60Hz
Output: DC 5.0V, 500mA

Nanbang Adapter Information:
Model: NB-0500500U
Input: AC100-240V, 50/60Hz
Output: DC 5.0V, 500mA

Note: This series products model: D245S and D245 are identical schematics, the difference among them is just the D245 has double SIM card, D245S has single SIM card and model number due to marketing purpose, and model D245 was selected for fully testing, the detailed information can be referred to the attached declaration letter that stated and guaranteed by the applicant.

**All measurement and test data in this report was gathered from production sample serial number: 1506373 (Assigned by Shenzhen BACL).The EUT supplied by the applicant was received on 2015-09-08.*

Objective

This test report is prepared on behalf of *Hyundai Corporation i*n accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 22H &24E PCE and Part 15B JBP submissions with FCC ID: *RQQHLT-D24FSL.*

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz, and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on October 31, 2013. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10-2013.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode.

EUT Exercise Software

No exercise software was made to the EUT tested.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

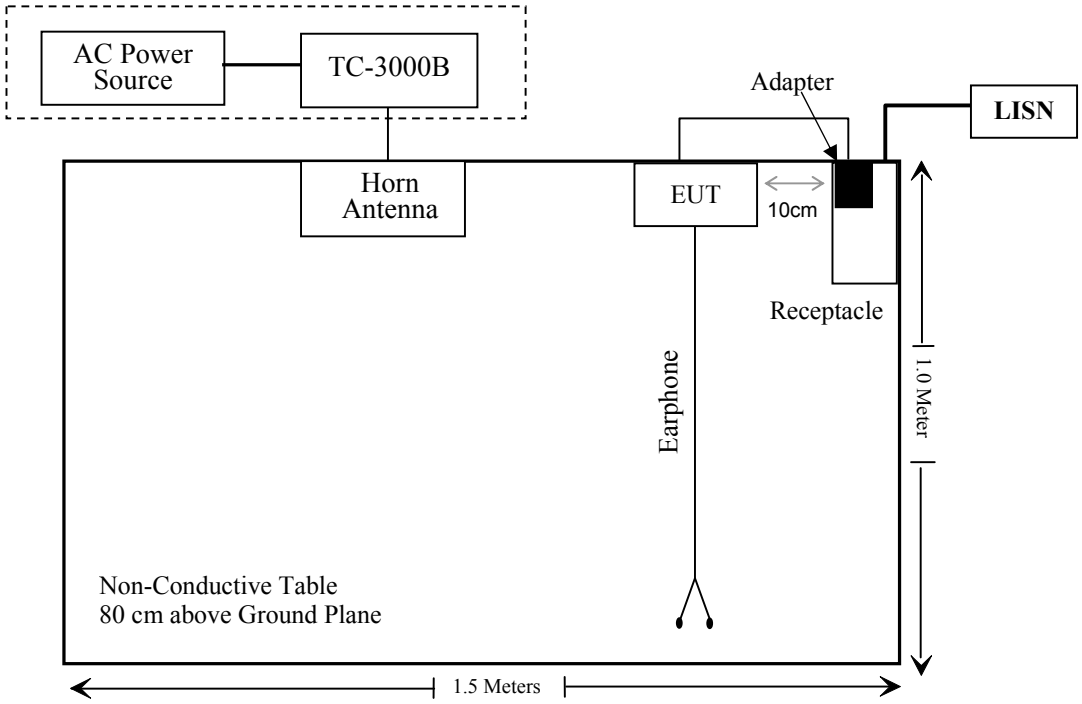
Manufacturer	Description	Model	Serial Number
TESCOM	Bluetooth Tester	TC-3000B	3000B630010

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielding Detachable USB Cable	1.0	EUT	Adapter
Un-shielding Detachable Earphone Cable	1.2	EUT	Earphone

Block Diagram of Test Setup

For conducted emission



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209 & §15.247(d)	Radiated Emissions	Compliance
§15.247(a)(1)	20 dB Emission 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), §1.1307 (b) (1) &§2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

The Max Peak Output Power: 6.43dBm=4.40mW
(4.40/5)* √2.402=1.36<3.0

Result: No SAR test is required

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 bluetooth, which was permanently attached and the antenna gain is 0 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)

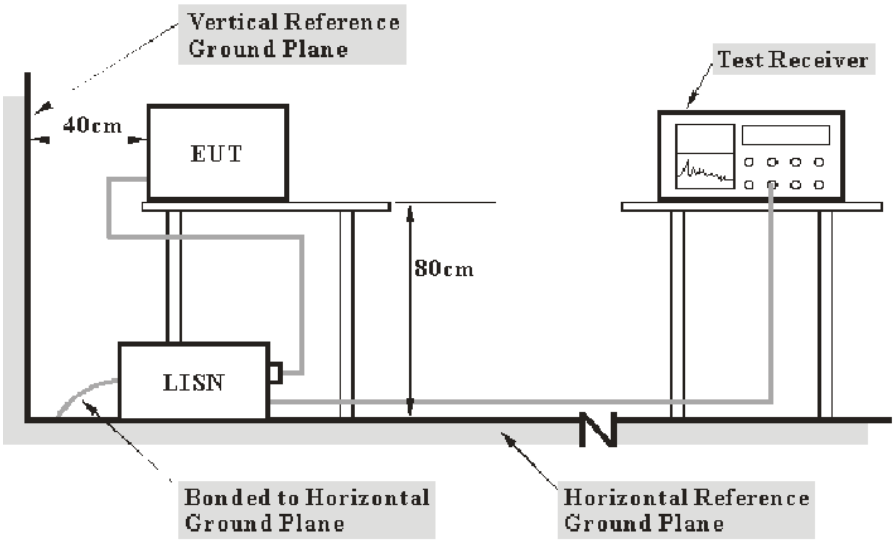
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

Port	Expanded Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz 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 LISN.

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2015-06-03	2016-06-02
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2014-12-01	2015-12-01
Rohde & Schwarz	LISN	ESH3-Z5	100113	NCR	NCR
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2015-05-14	2016-05-13
Rohde & Schwarz	CE Test software	EMC 32	V8.53	NCR	NCR

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

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

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

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, the worst margin reading as below:

9.2 dB at **0.506290 MHz** in the **Line** conducted mode **for Nanbang Adapte**r

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

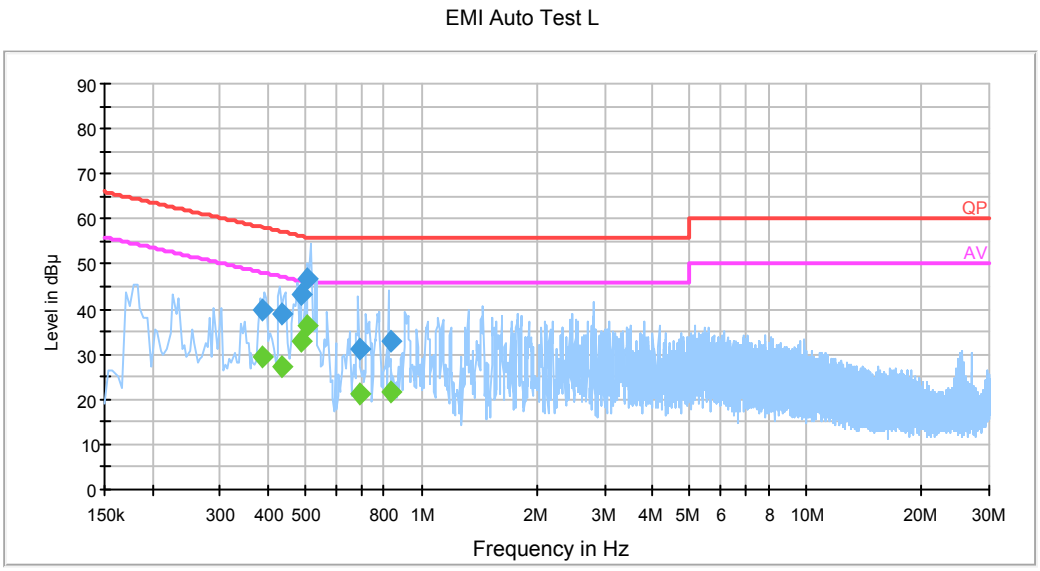
Temperature:	25℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu on 2015-09-15.

EUT operation mode: Transmitting & Charging

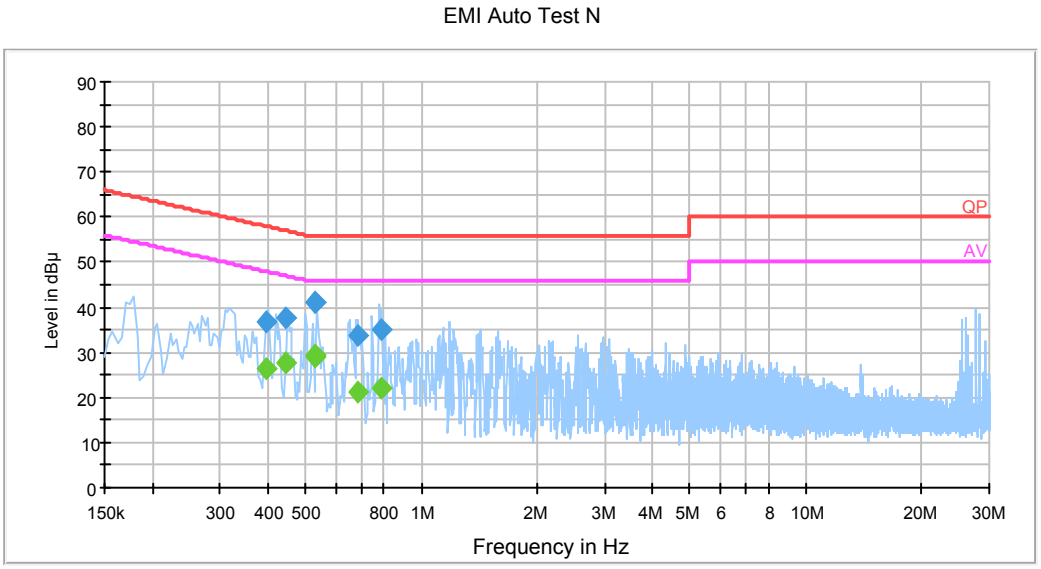
Nanbang Adapter:

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.388150	39.6	19.9	58.1	18.5	QP
0.388150	29.4	19.9	48.1	18.7	Ave.
0.435550	38.8	19.9	57.1	18.3	QP
0.435550	27.5	19.9	47.1	19.7	Ave.
0.485170	43.3	19.9	56.3	13.0	QP
0.485170	33.0	19.9	46.3	13.2	Ave.
0.506290	46.8	19.9	56.0	9.2	QP
0.506290	36.2	19.9	46.0	9.8	Ave.
0.691710	31.3	19.9	56.0	24.7	QP
0.691710	21.4	19.9	46.0	24.6	Ave.
0.833670	33.0	19.9	56.0	23.0	QP
0.833670	21.8	19.9	46.0	24.2	Ave.

AC 120V/60 Hz, Neutral

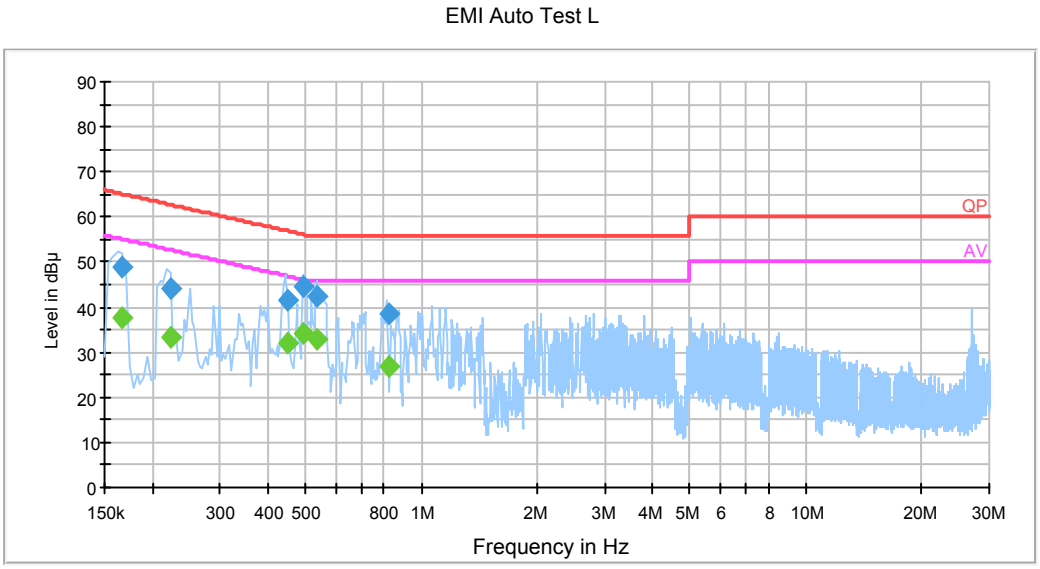


Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.395970	36.8	19.9	57.9	21.1	QP
0.395970	26.4	19.9	47.9	21.6	Ave.
0.443250	37.8	19.9	57.0	19.2	QP
0.443250	27.5	19.9	47.0	19.5	Ave.
0.529930	41.2	19.9	56.0	14.8	QP
0.529930	28.9	19.9	46.0	17.1	Ave.
0.529990	41.3	19.9	56.0	14.7	QP
0.529990	29.5	19.9	46.0	16.5	Ave.
0.683830	33.7	19.9	56.0	22.3	QP
0.683830	21.3	19.9	46.0	24.8	Ave.
0.786270	35.2	19.9	56.0	20.8	QP
0.786270	22.3	19.9	46.0	23.7	Ave.

Note:
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

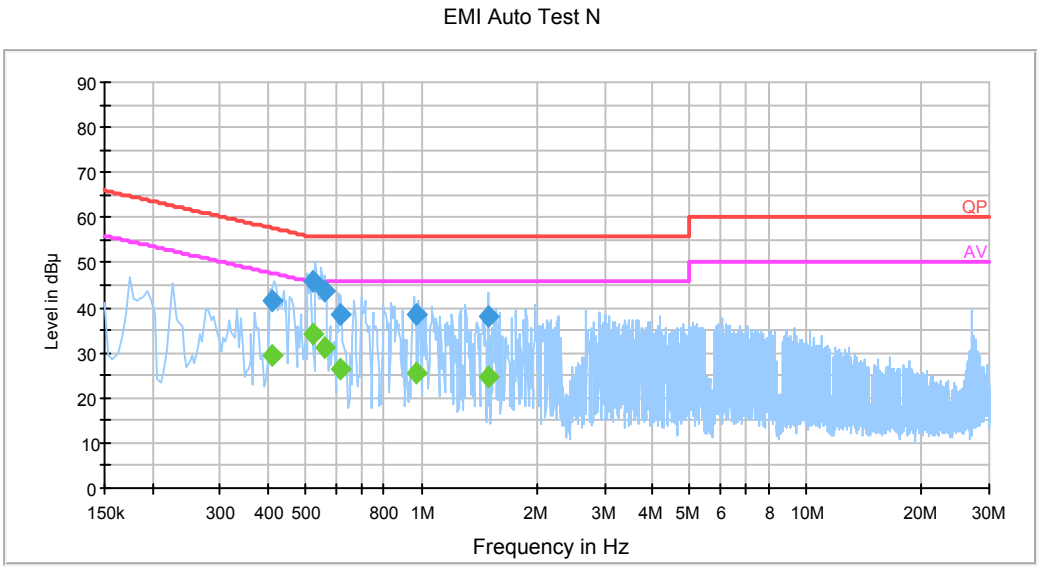
Huiyuda Adapter:

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.166501	48.9	20.0	65.1	16.2	QP
0.166501	37.5	20.0	55.1	17.6	Ave.
0.222500	44.1	20.0	62.7	18.7	QP
0.222500	33.3	20.0	52.7	19.4	Ave.
0.448630	41.5	19.9	56.9	15.4	QP
0.448630	32.2	19.9	46.9	14.7	Ave.
0.494590	44.6	19.9	56.1	11.5	QP
0.494590	34.0	19.9	46.1	12.1	Ave.
0.533930	42.3	19.9	56.0	13.7	QP
0.533930	32.7	19.9	46.0	13.3	Ave.
0.822150	38.5	19.9	56.0	17.5	QP
0.822150	26.8	19.9	46.0	19.2	Ave.

AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.407790	41.7	19.9	57.7	16.0	QP
0.407790	29.5	19.9	47.7	18.2	Ave.
0.522050	45.7	19.9	56.0	10.3	QP
0.522050	34.3	19.9	46.0	11.7	Ave.
0.557750	43.8	19.9	56.0	12.2	QP
0.557750	31.3	19.9	46.0	14.7	Ave.
0.612850	38.7	19.9	56.0	17.3	QP
0.612850	26.6	19.9	46.0	19.4	Ave.
0.972370	38.6	20.0	56.0	17.4	QP
0.972370	25.4	20.0	46.0	20.6	Ave.
1.499590	38.1	20.0	56.0	17.9	QP
1.499590	24.7	20.0	46.0	21.3	Ave.

Note:
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

FCC §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS

Applicable Standard

FCC §15.205; §15.209; §15.247(d)

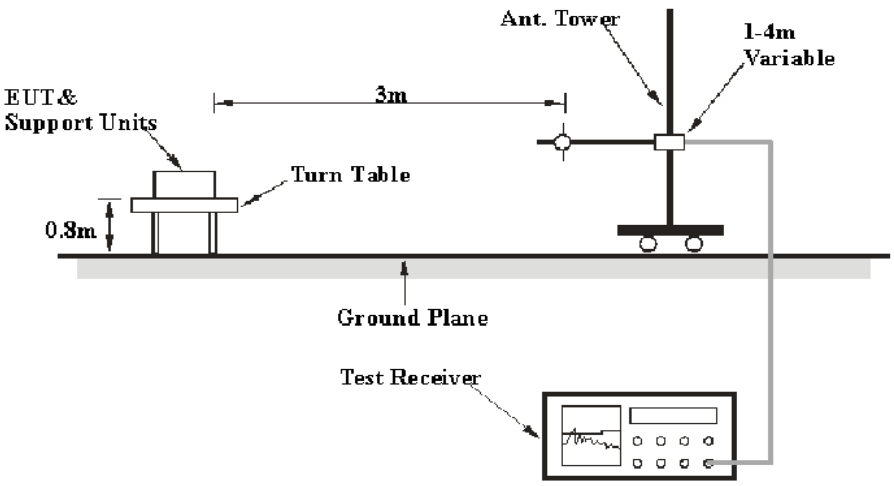
Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is 5.91 dB for 30MHz-1GHz, and 4.92 dB for above 1GHz. And this uncertainty will not be taken into consideration for the test data recorded in the report.

EUT Setup

Below 1 GHz:



The radiated emission tests were performed in the 3 meters, using the setup accordance with the ANSI ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.247 limits.

The adapter was connected to a 120 VAC/60 Hz power source.

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	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Ave.

Test Procedure

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

All final data was recorded in Quasi-peak detection mode for frequency range of 30 MHz -1 GHz and peak and Average detection modes for frequencies above 1 GHz.

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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2015-05-06	2016-05-05
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2014-11-03	2015-11-03
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
Mini	Amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-22
A.H. System	Horn Antenna	SAS-200/571	135	2015-02-10	2016-02-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2014-12-11	2015-12-11
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13
TDK	Chamber	Chamber A	2#	2012-10-15	2015-10-15
TDK	Chamber	Chamber B	1#	2015-07-22	2016-07-22
DUCOMMUN	Pre-amplifier	ALN-22093530-01	991373-01	2015-08-03	2016-08-03
R&S	Auto test Software	EMC32	V9.10	NCR	NCR

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

3.66 dB at **299.98 MHz** in the **Horizontal** polarization for **Low Channel**

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + + \ U_{(Lm)} \leq \ L_{lim} + + \ U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than + U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu on 2015-09-15.

EUT operation mode: Transmitting

30 MHz -25 GHz: (*Scan with GFSK, π/4-DQPSK, 8-DPSK mode, the worst case is BDR Mode (GFSK)*)

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2402 MHz)									
299.98	54.64	QP	34	1.4	H	-12.3	42.34	46	3.66
2402.00	94.24	PK	281	1.1	H	4.97	99.21	/	/
2402.00	79.31	Ave	281	1.1	H	4.97	84.28	/	/
2402.00	92.75	PK	34	1.1	V	4.97	97.72	/	/
2402.00	78.58	Ave	34	1.1	V	4.97	83.55	/	/
2378.54	36.22	PK	324	1.0	V	4.97	41.19	74	32.81
2378.54	19.12	Ave	324	1.0	V	4.97	24.09	54	29.91
2388.41	38.55	PK	268	2.4	H	4.97	43.52	74	30.48
2388.41	20.78	Ave	268	2.4	H	4.97	25.75	54	28.25
2486.88	35.68	PK	355	2.3	H	6.29	41.97	74	32.03
2498.88	17.18	Ave	355	2.3	H	6.29	23.47	54	30.53
4804.00	44.23	PK	315	2.1	V	16.92	61.15	74	12.85
4804.00	30.24	Ave	315	2.1	V	16.92	47.16	54	6.84
7206.00	37.32	PK	244	1.7	H	19.08	56.40	74	17.60
7206.00	20.76	Ave	244	1.7	H	19.08	39.84	54	14.16
9608.0	35.38	PK	233	2.3	V	22.72	58.10	74	15.90
9608.0	20.01	Ave	233	2.3	V	22.72	42.73	54	11.27

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2441 MHz)									
299.98	54.25	QP	341	1.6	H	-12.3	41.95	46	4.05
2441.00	92.88	PK	199	2.4	H	4.97	97.85	/	/
2441.00	77.61	Ave	199	2.4	H	4.97	82.58	/	/
2441.00	91.13	PK	335	2.3	V	4.97	96.10	/	/
2441.00	76.39	Ave	335	2.3	V	4.97	81.36	/	/
2386.12	38.48	PK	348	1.4	V	4.97	43.45	74	30.55
2386.12	18.66	Ave	348	1.4	V	4.97	23.63	54	30.37
2484.80	35.79	PK	91	2.1	H	6.29	42.08	74	31.92
2484.80	18.16	Ave	91	2.1	H	6.29	24.45	54	29.55
2488.90	37.34	PK	310	1.9	H	6.29	43.63	74	30.37
2488.90	18.56	Ave	310	1.9	H	6.29	24.85	54	29.15
4882.00	43.53	PK	145	1.9	V	16.91	60.44	74	13.56
4882.00	29.12	Ave	145	1.9	V	16.91	46.03	54	7.97
7323.00	35.23	PK	300	1.2	V	19.40	54.63	74	19.37
7323.00	18.44	Ave	300	1.2	V	19.40	37.84	54	16.16
9764.00	37.36	PK	334	1.7	H	23.79	61.15	74	12.85
9764.00	19.68	Ave	334	1.7	H	23.79	43.47	54	10.53
High Channel (2480 MHz)									
299.98	54.50	QP	230	1.6	H	-12.3	42.20	46	3.80
2480.00	91.54	PK	47	2.3	H	6.29	97.83	/	/
2480.00	77.22	Ave	47	2.3	H	6.29	83.51	/	/
2480.00	89.34	PK	251	2.3	V	6.29	95.63	/	/
2480.00	75.05	Ave	251	2.3	V	6.29	81.34	/	/
2386.43	34.41	PK	252	1.9	V	4.97	39.38	74	34.62
2386.43	18.45	Ave	252	1.9	H	4.97	23.42	54	30.58
2483.66	39.38	PK	238	1.9	H	6.29	45.67	74	28.33
2483.66	23.54	Ave	238	1.9	V	6.29	29.83	54	24.17
2484.78	41.43	PK	312	1.6	H	6.29	47.72	74	26.28
2484.78	24.20	Ave	312	1.6	H	6.29	30.49	54	23.51
4960.00	41.32	PK	344	1.8	V	17.91	59.23	74	14.77
4960.00	24.64	Ave	344	1.8	V	17.91	42.55	54	11.45
7440.00	35.53	PK	244	1.3	H	18.34	53.87	74	20.13
7440.00	18.31	Ave	244	1.3	H	18.34	36.65	54	17.35
9920.00	35.14	PK	359	1.7	V	23.79	58.93	74	15.07
9920.00	19.10	Ave	359	1.7	V	23.79	42.89	54	11.11

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

FCC §15.247(a) (1)-CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems shall have hoping 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.

Test Procedure

1. Set the EUT in transmitting mode, maxhold the channel.
2. Set the adjacent channel of the EUT and maxhold another trace.
3. Measure the channel separation.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2015-06-13	2016-06-13

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

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu on 2015-09-18.

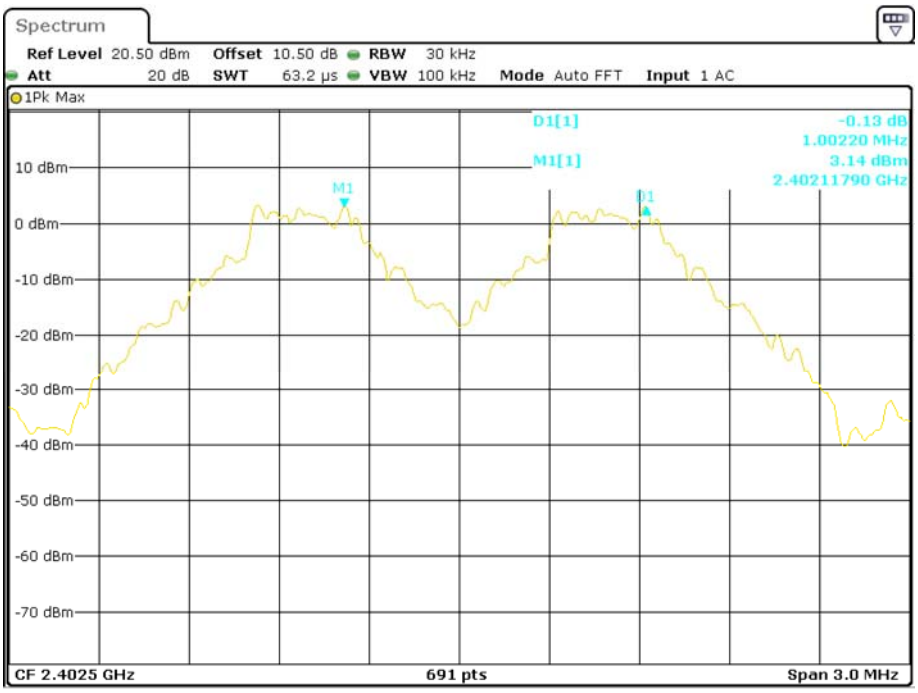
EUT operation mode: Transmitting

Test Result: Compliance. Please refer to following tables and plots

Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	≥Limit (MHz)	Result
BDR (GFSK)	Low	2402	1.002	0.631	Pass
	Adjacent	2403			
	Middle	2441	1.003	0.631	Pass
	Adjacent	2442			
	High	2480	1.003	0.631	Pass
	Adjacent	2479			
EDR (π/4-DQPSK)	Low	2402	1.003	0.851	Pass
	Adjacent	2403			
	Middle	2441	1.003	0.857	Pass
	Adjacent	2442			
	High	2480	1.003	0.859	Pass
	Adjacent	2479			
EDR (8DPSK)	Low	2402	1.003	0.839	Pass
	Adjacent	2403			
	Middle	2441	1.003	0.839	Pass
	Adjacent	2442			
	High	2480	1.003	0.845	Pass
	Adjacent	2479			

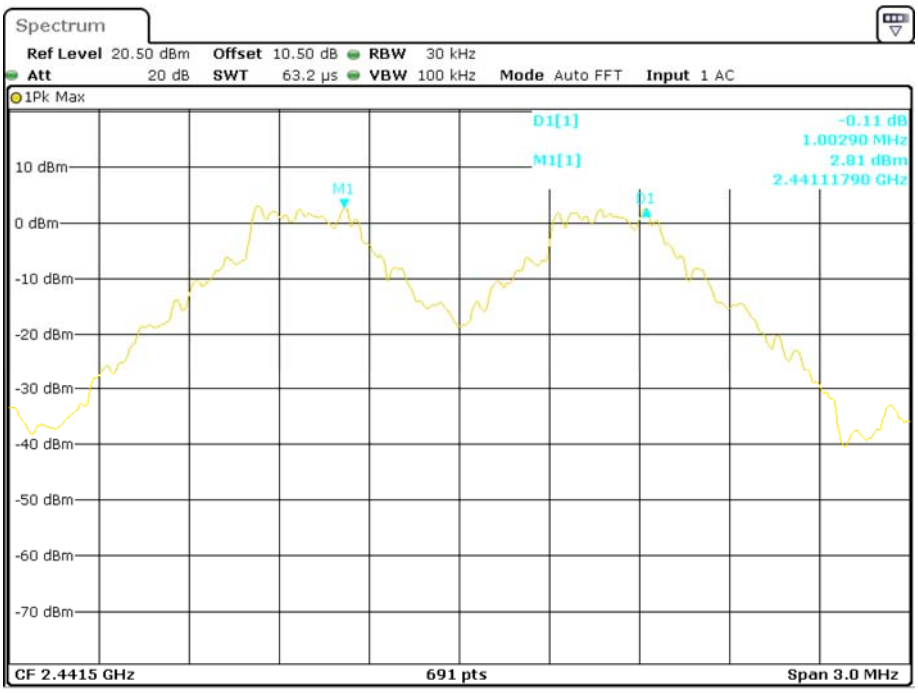
Note: Limit = 20 dB bandwidth *2/3

BDR (GFSK): Low Channel



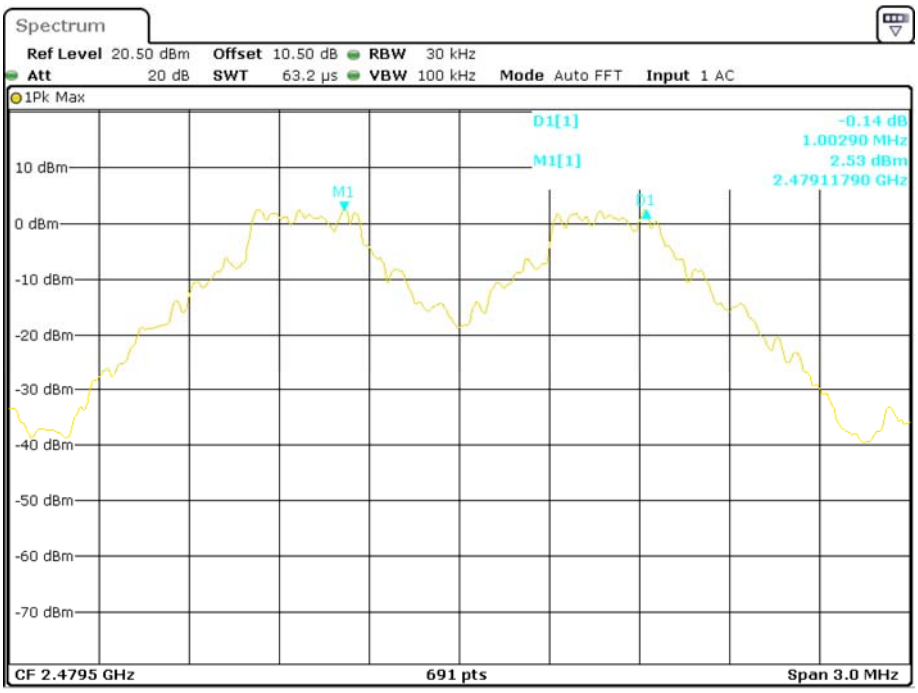
Date: 18.SEP.2015 09:49:42

BDR (GFSK): Middle Channel

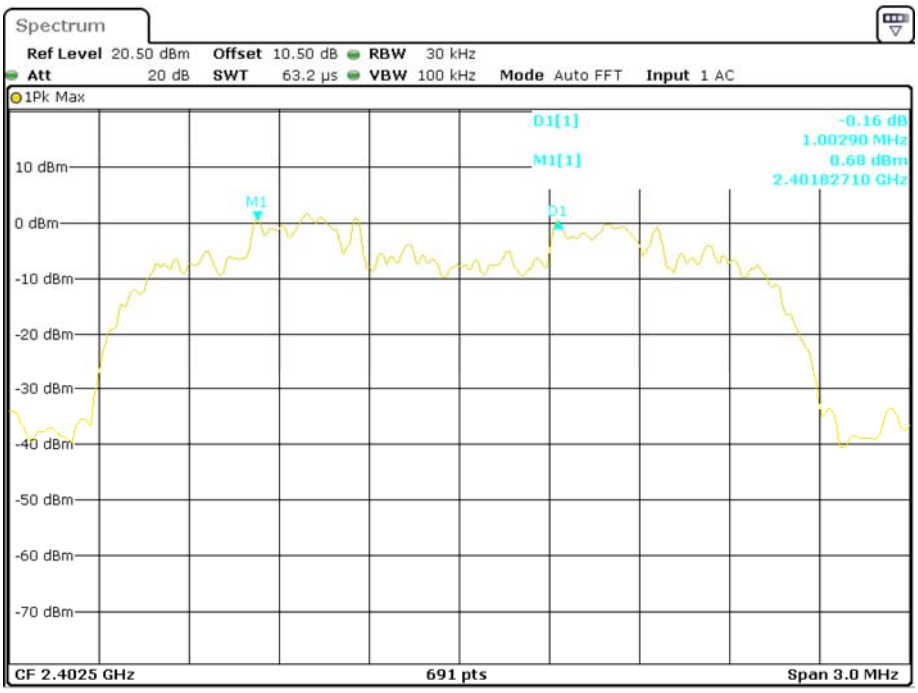


Date: 18.SEP.2015 09:50:32

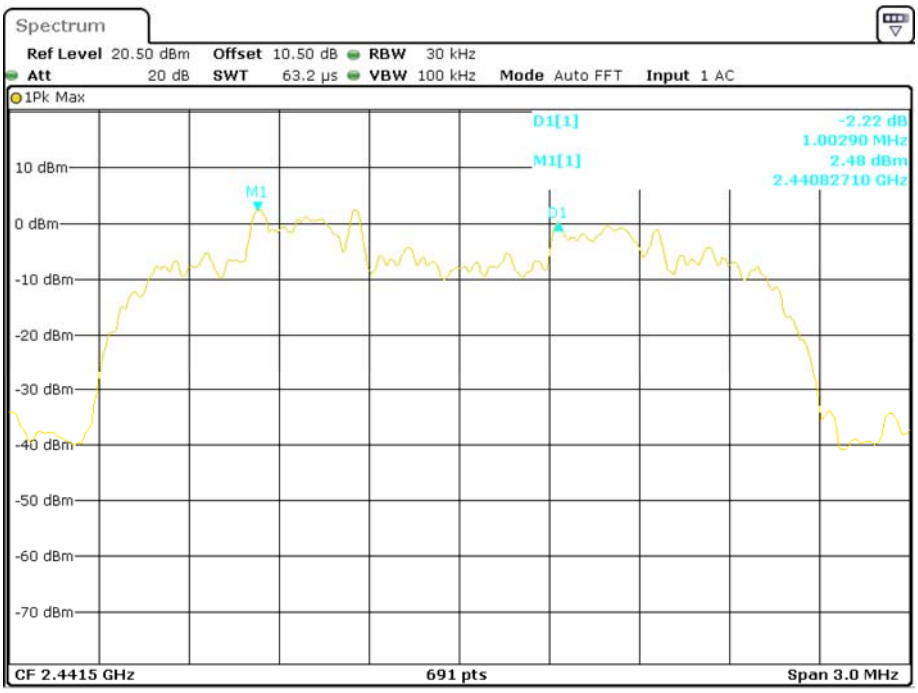
BDR (GFSK): High Channel



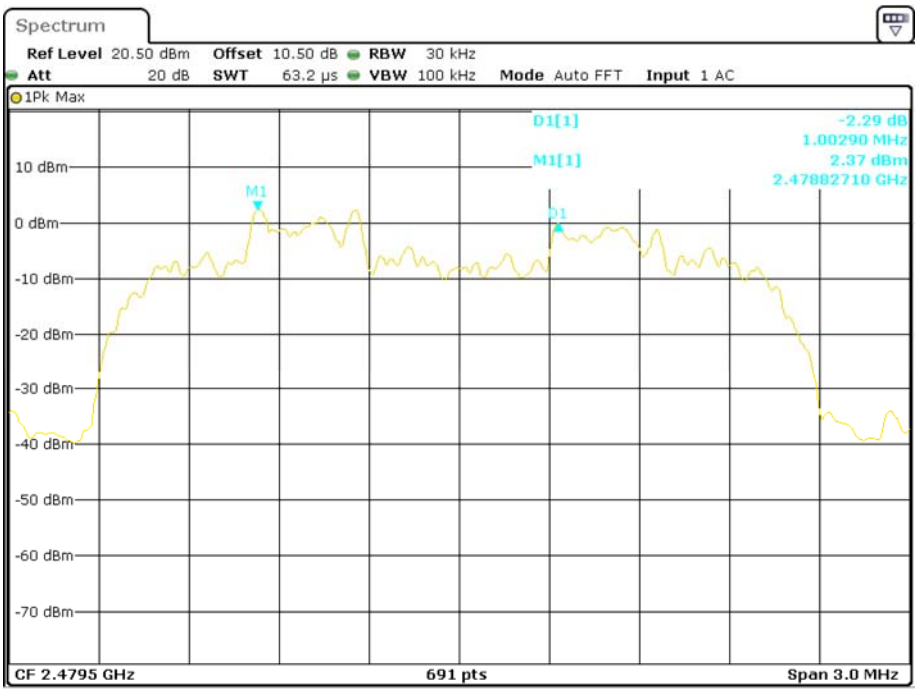
EDR (π/4-DQPSK): Low Channel



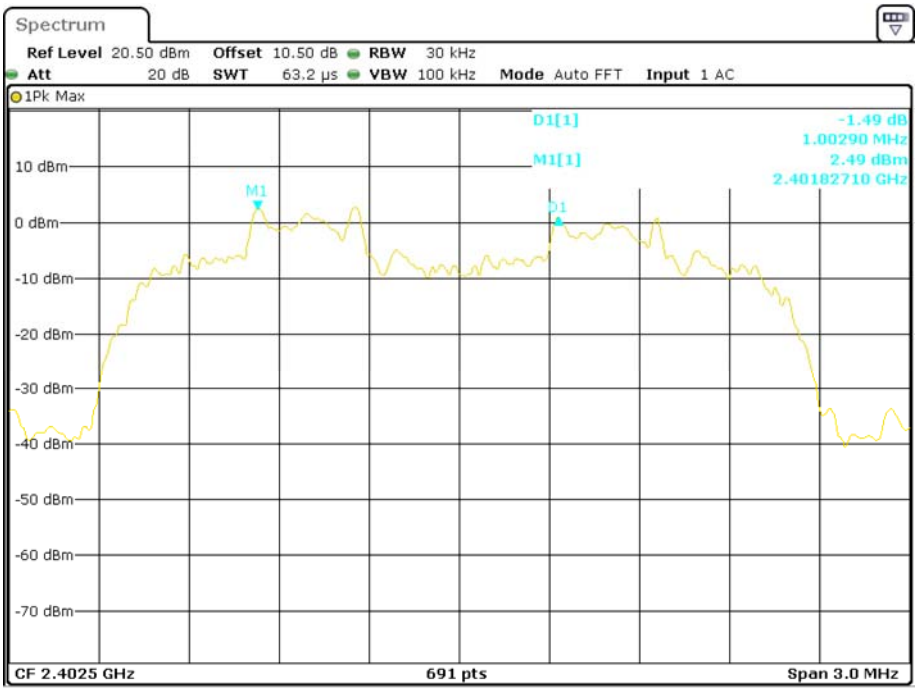
EDR (π/4-DQPSK): Middle Channel



EDR (π/4-DQPSK): High Channel

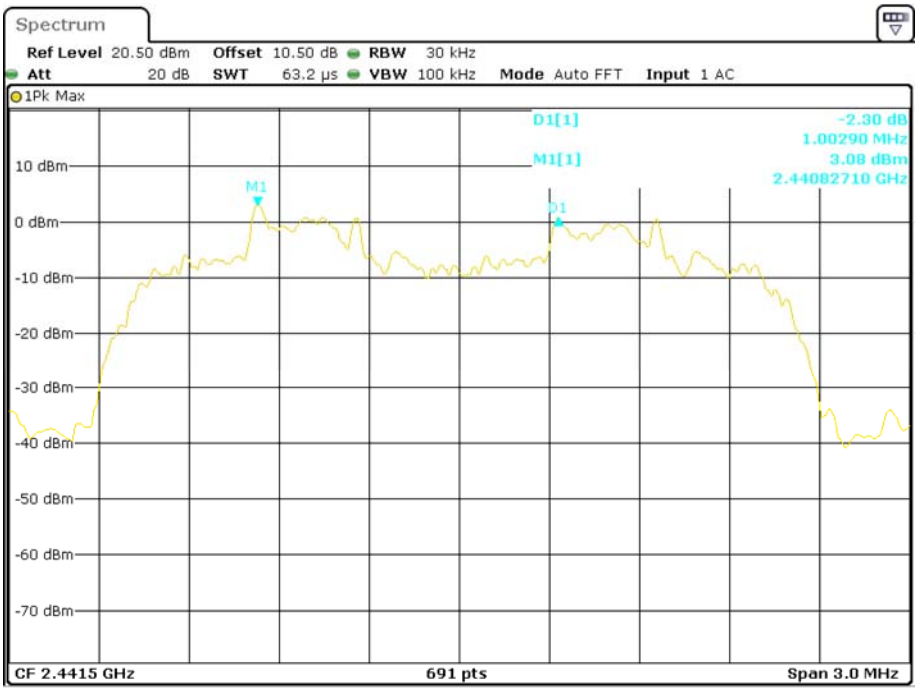


EDR (8DPSK): Low Channel



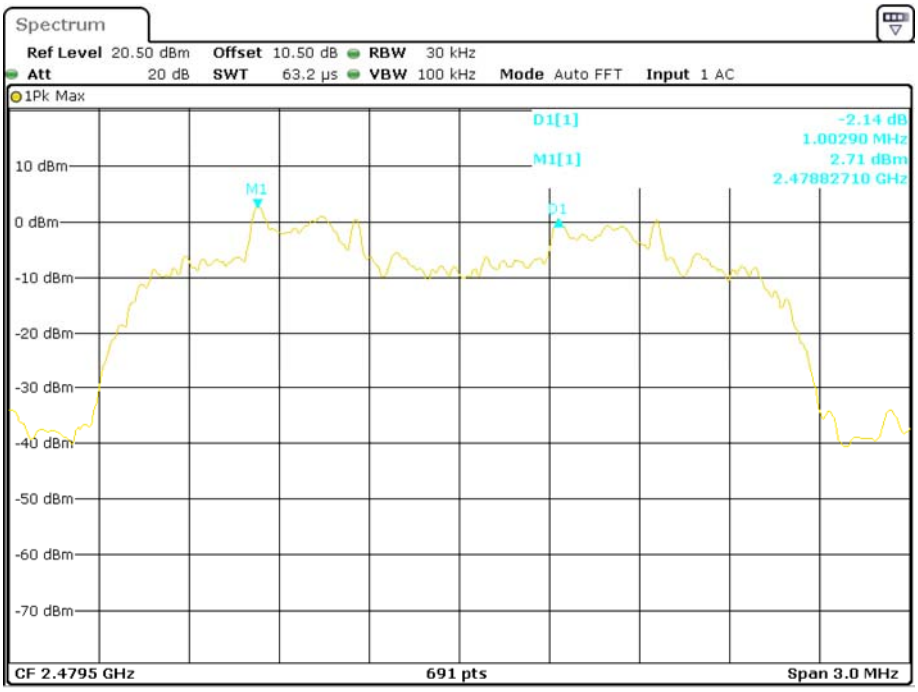
Date: 18.SEP.2015 09:54:33

EDR (8DPSK): Middle Channel



Date: 18.SEP.2015 09:55:15

EDR (8DPSK): High Channel



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

Applicable Standard

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 without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. 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. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2015-06-13	2016-06-13

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

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

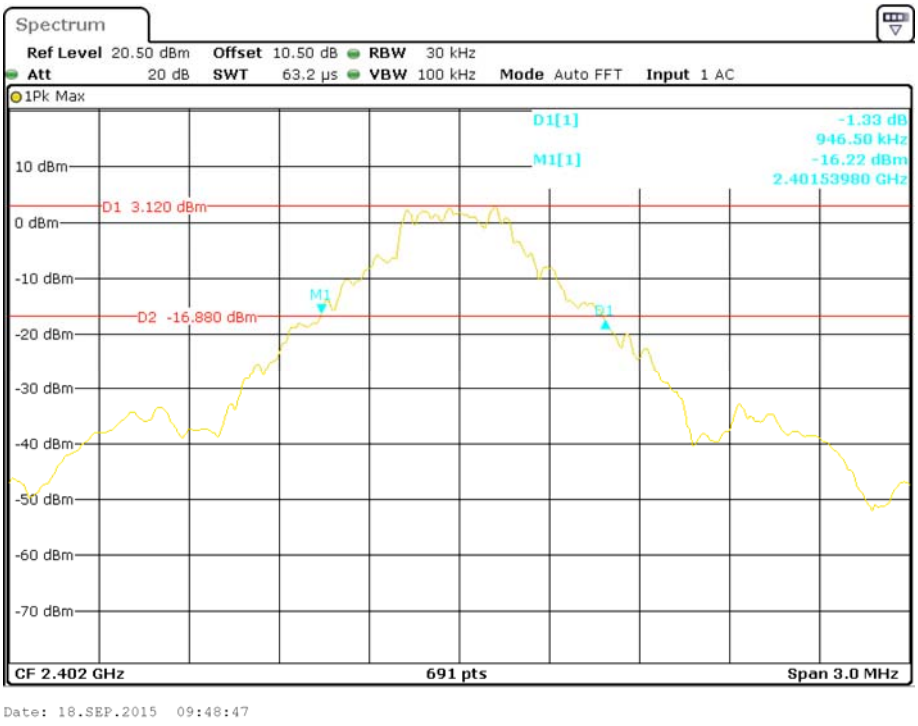
The testing was performed by Mike Hu on 2015-09-18.

EUT operation mode: Transmitting

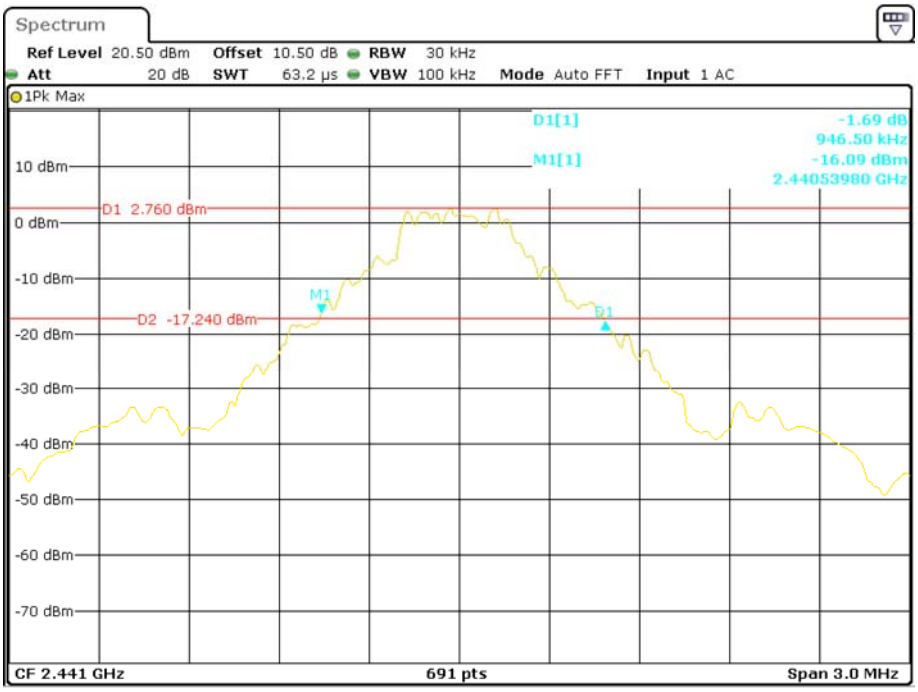
Test Result: Compliance. Please refer to following tables and plots

Mode	Channel	Frequency (MHz)	20 dB Emission Bandwidth (MHz)
BDR (GFSK)	Low	2402	0.947
	Middle	2441	0.947
	High	2480	0.947
EDR (π/4-DQPSK)	Low	2402	1.276
	Middle	2441	1.285
	High	2480	1.289
EDR (8DPSK)	Low	2402	1.259
	Middle	2441	1.259
	High	2480	1.268

BDR (GFSK): Low Channel

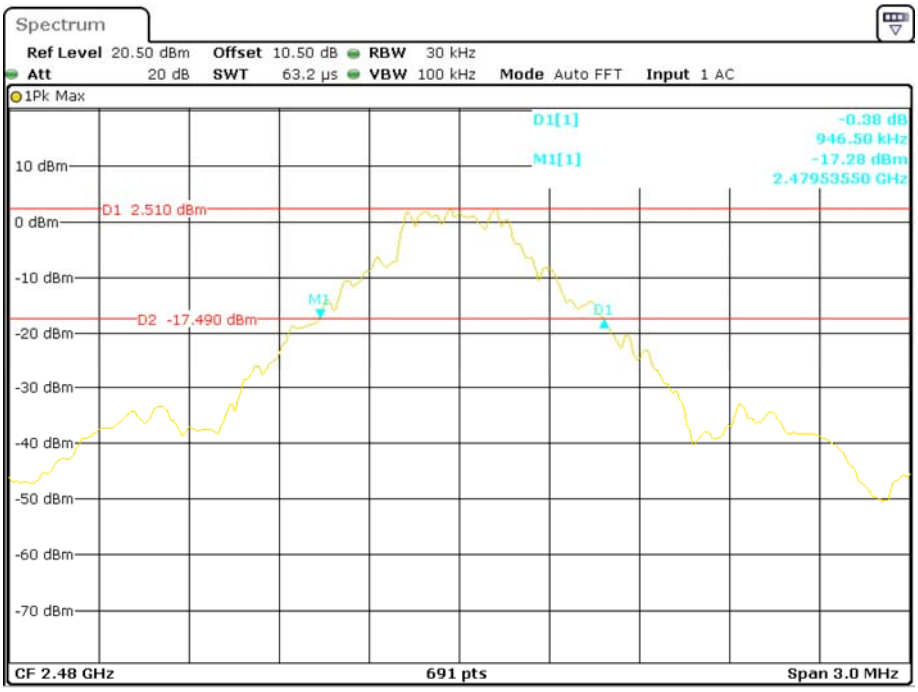


BDR (GFSK): Middle Channel



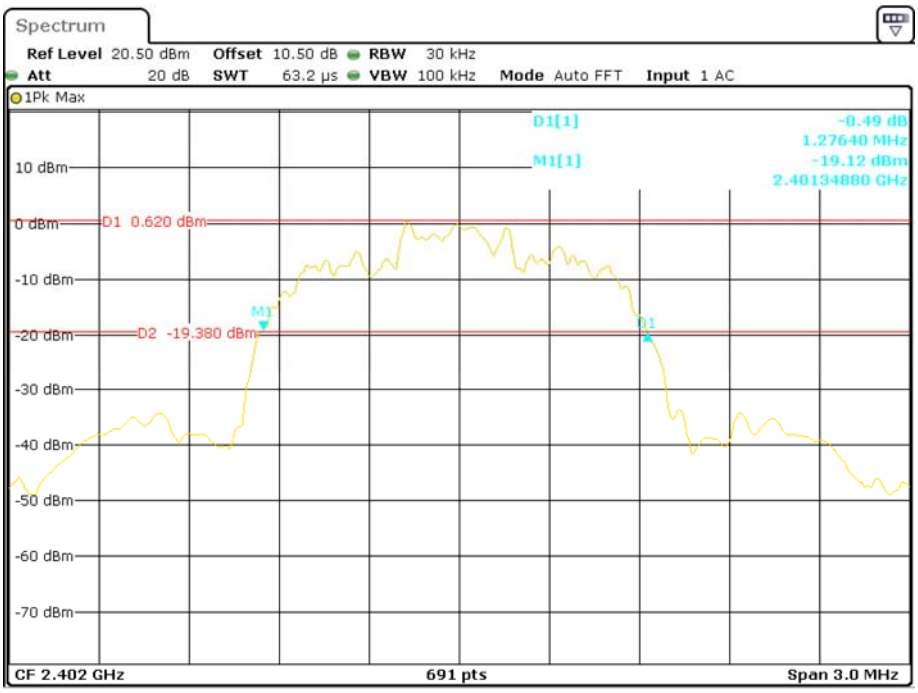
Date: 18.SEP.2015 09:45:33

BDR (GFSK): High Channel



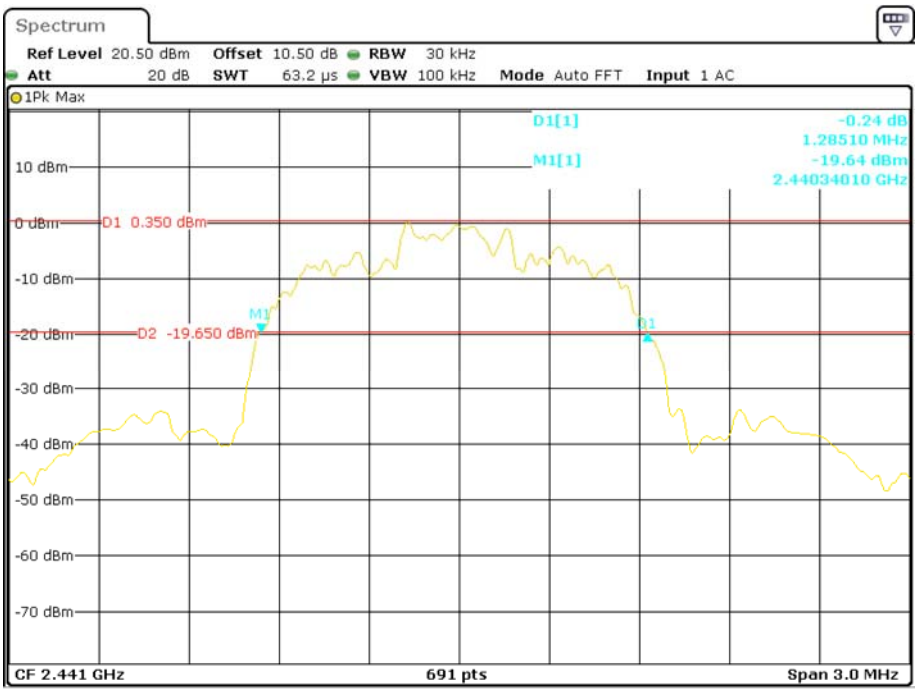
Date: 18.SEP.2015 09:43:41

EDR (π/4-DQPSK): Low Channel



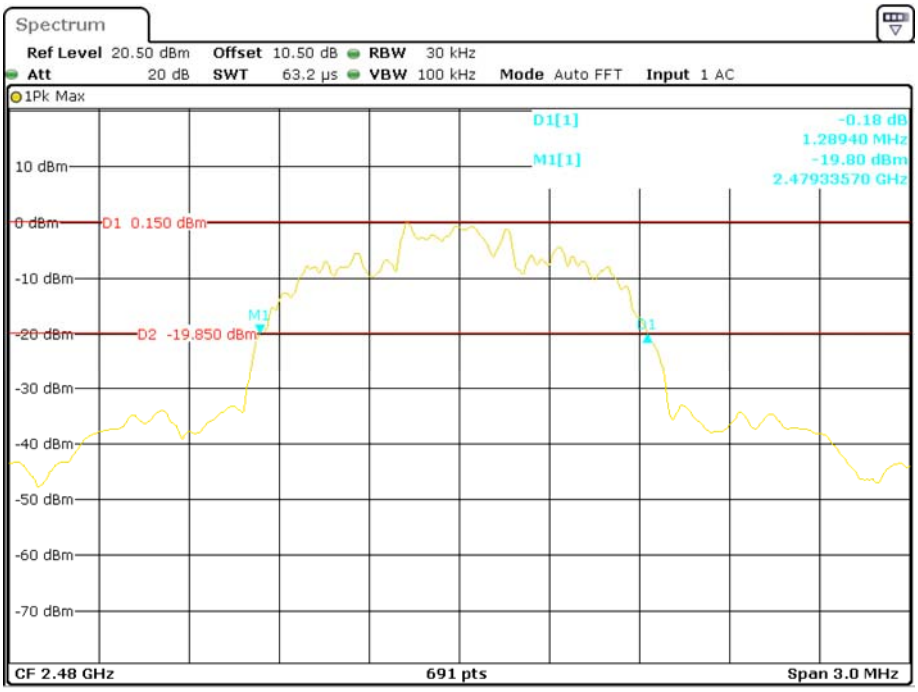
Date: 18.SEP.2015 09:40:53

EDR (π/4-DQPSK): Middle Channel



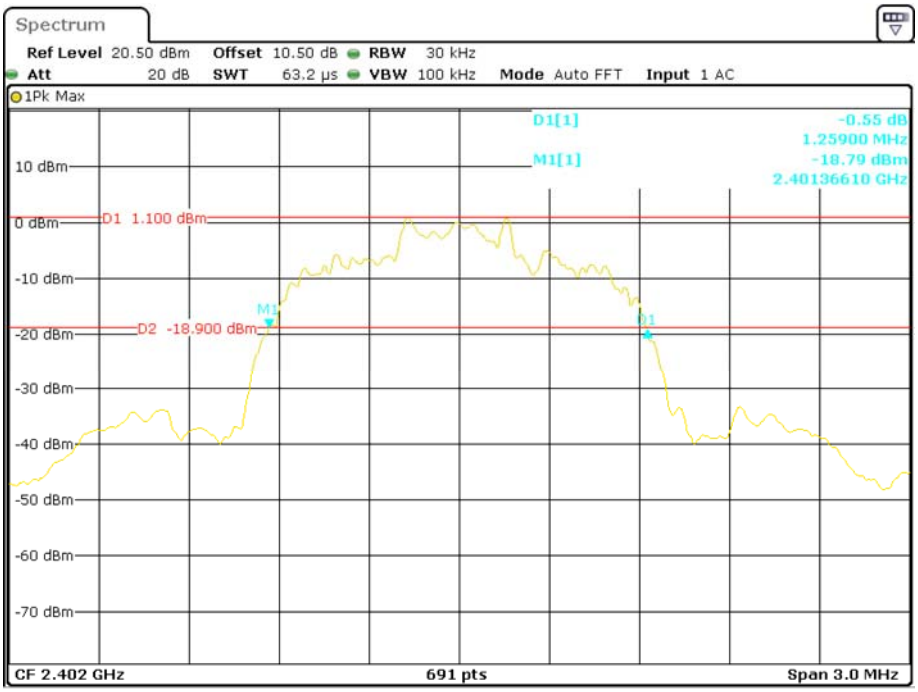
Date: 18.SEP.2015 09:38:52

EDR (π/4-DQPSK): High Channel



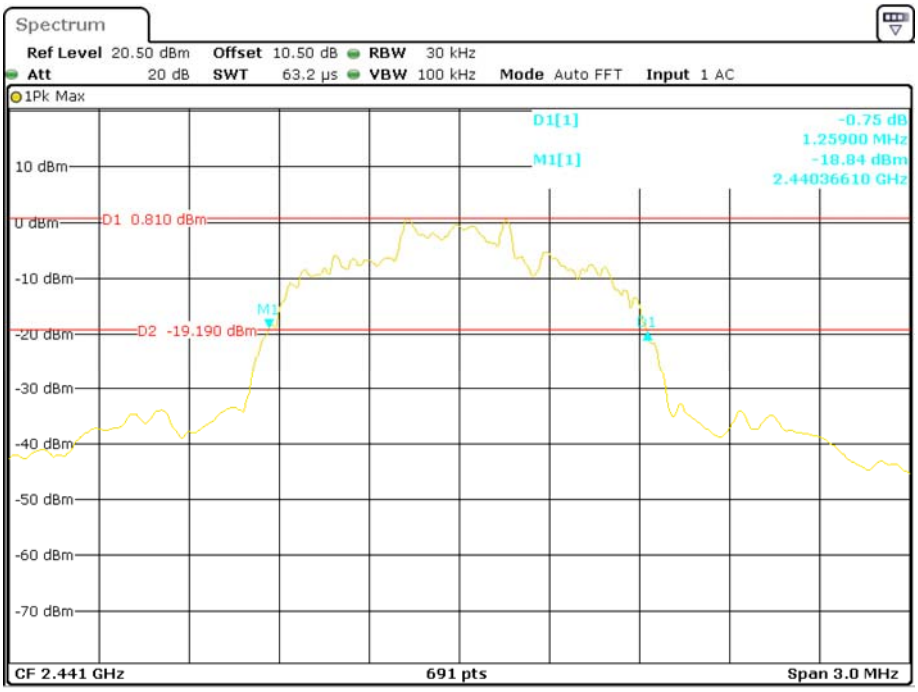
Date: 18.SEP.2015 09:37:56

EDR (8DPSK): Low Channel



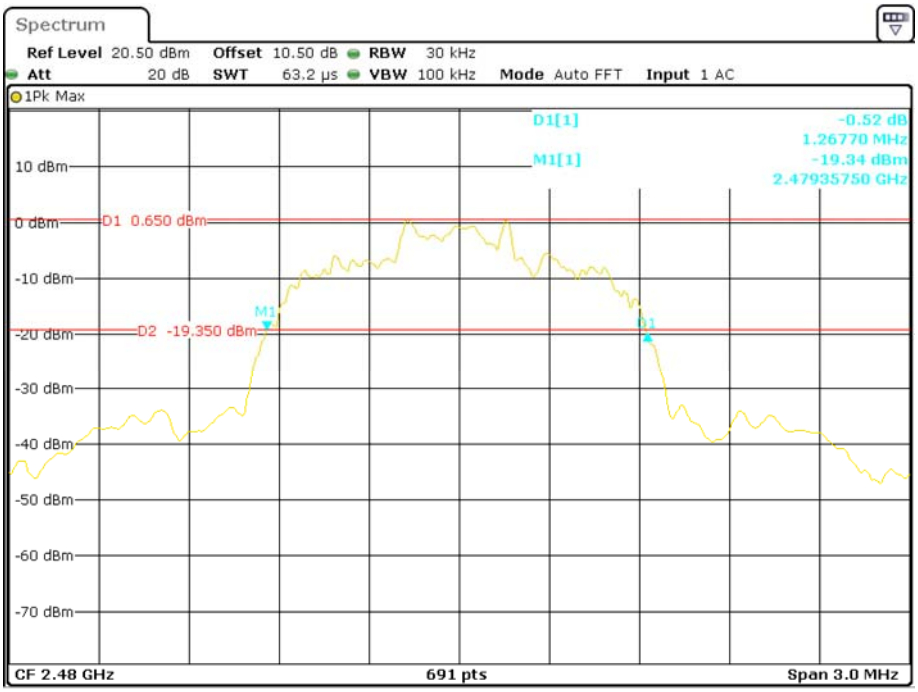
Date: 18.SEP.2015 09:36:07

EDR (8DPSK): Middle Channel



Date: 18.SEP.2015 09:34:51

EDR (8DPSK): High Channel



Date: 18.SEP.2015 09:33:27

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

Applicable Standard

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
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2015-06-13	2016-06-13

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

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

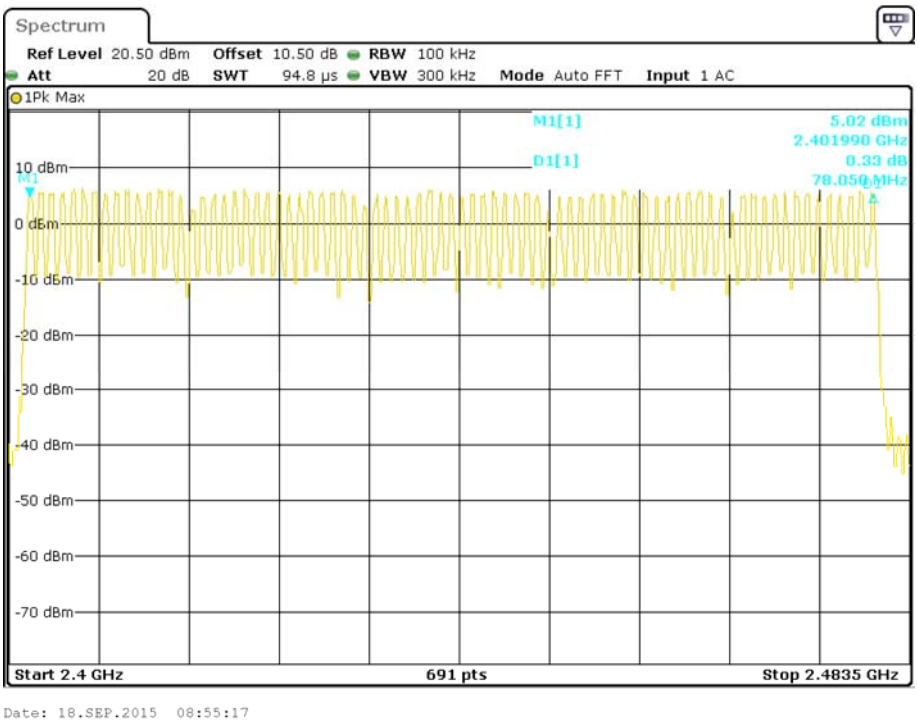
The testing was performed by Mike Hu on 2015-09-18.

EUT operation mode: Transmitting

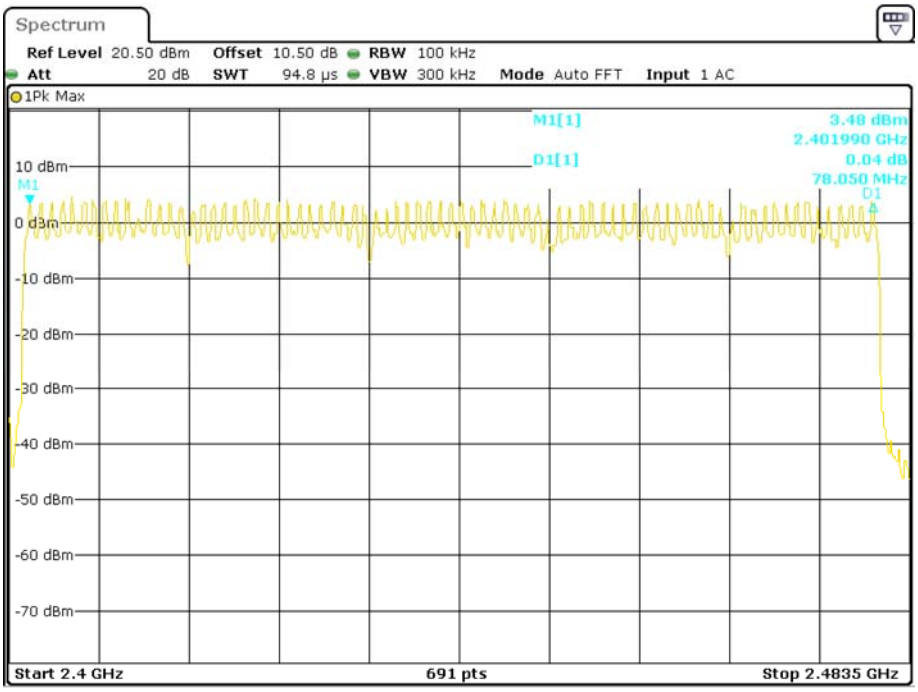
Test Result: Compliance. Please refer to following tables and plots

Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
BDR (GFSK)	2400-2483.5	79	≥15
EDR (π/4-DQPSK)	2400-2483.5	79	≥15
EDR (8DPSK)	2400-2483.5	79	≥15

BDR (GFSK): Number of Hopping Channels

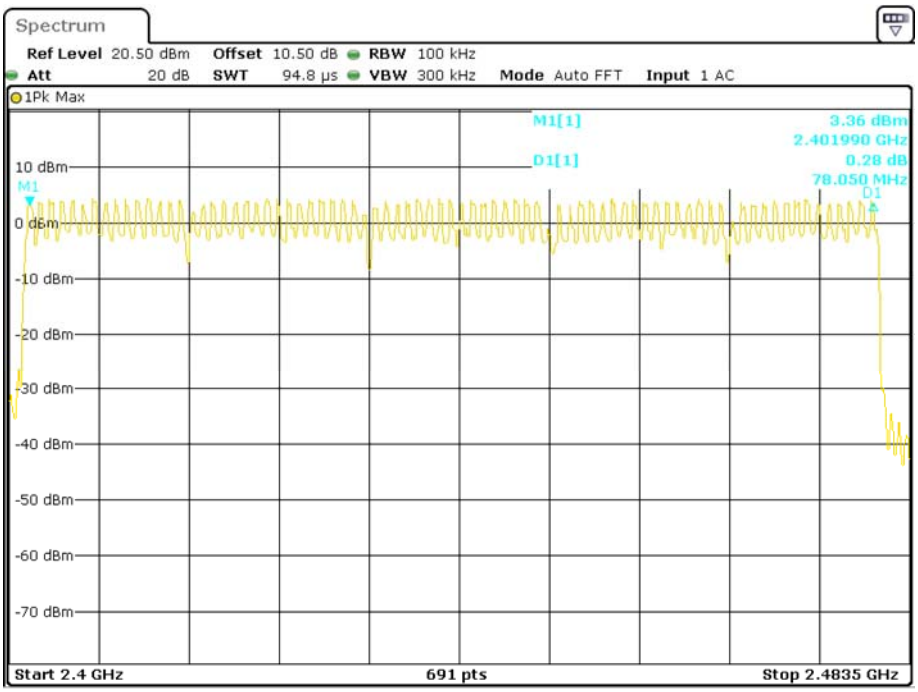


EDR (π/4-DQPSK): Number of Hopping Channels



Date: 18.SEP.2015 08:57:55

EDR (8DPSK): Number of Hopping Channels



Date: 18.SEP.2015 09:00:26

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

Applicable Standard

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; Spectrum SPAN was set as 0. Sweep was set as 0.4 X channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2015-06-13	2016-06-13

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

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

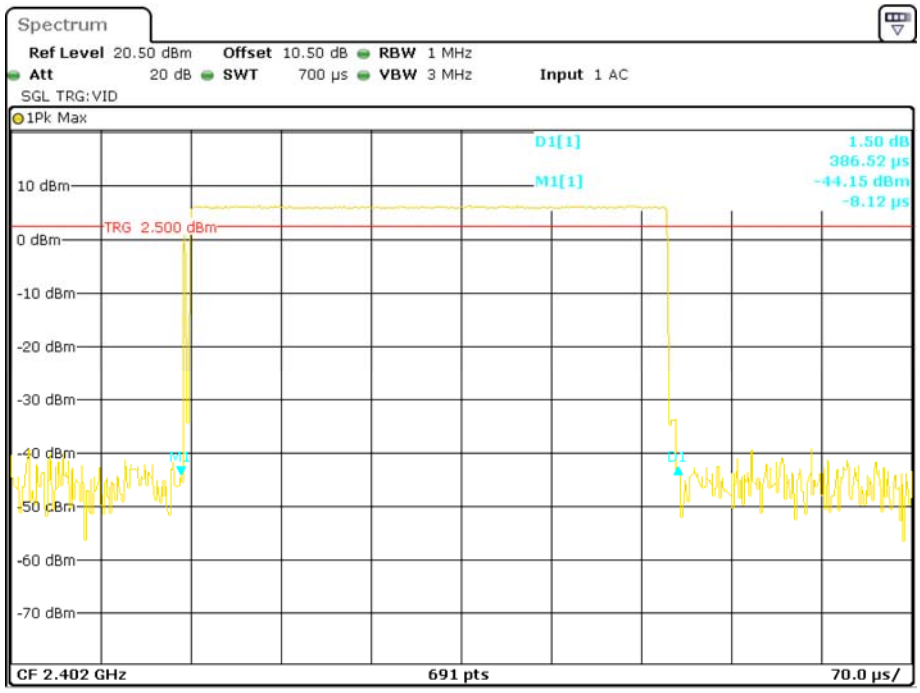
The testing was performed by Mike Hu on 2015-09-18.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to following tables and plots

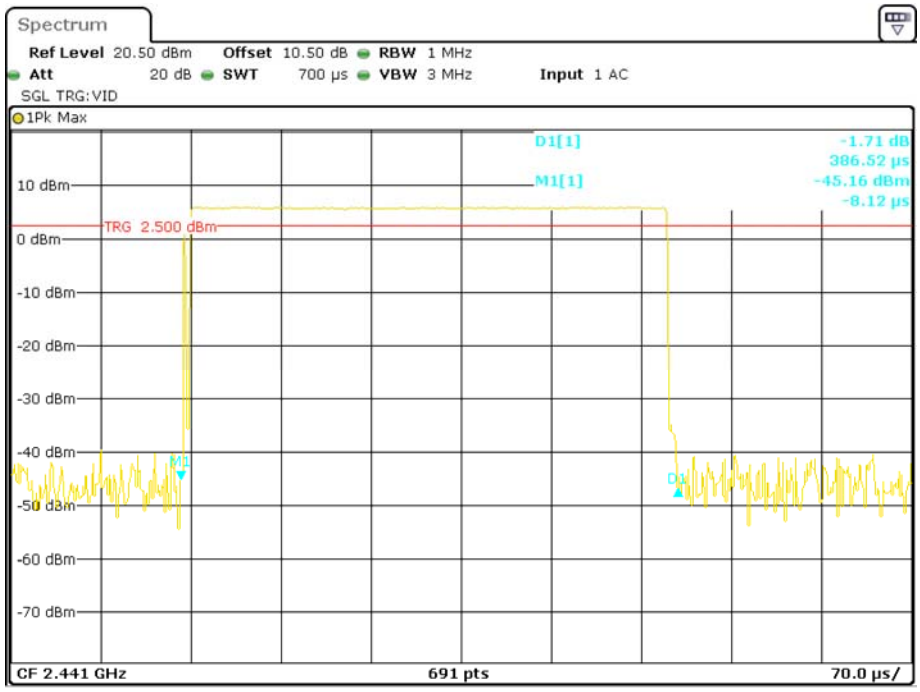
Mode		Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
BDR (GFSK)	DH 1	Low	0.387	0.124	0.4	Pass
		Middle	0.387	0.124	0.4	Pass
		High	0.387	0.124	0.4	Pass
		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	DH 3	Low	1.652	0.264	0.4	Pass
		Middle	1.652	0.264	0.4	Pass
		High	1.652	0.264	0.4	Pass
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	DH 5	Low	2.913	0.311	0.4	Pass
		Middle	2.913	0.311	0.4	Pass
		High	2.913	0.311	0.4	Pass
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR (π/4-DQPSK)	2DH 1	Low	0.393	0.126	0.4	Pass
		Middle	0.393	0.126	0.4	Pass
		High	0.393	0.126	0.4	Pass
		Note: 2DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	2DH 3	Low	1.652	0.264	0.4	Pass
		Middle	1.652	0.264	0.4	Pass
		High	1.652	0.264	0.4	Pass
		Note: 2DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	2DH 5	Low	2.913	0.311	0.4	Pass
		Middle	2.913	0.311	0.4	Pass
		High	2.913	0.311	0.4	Pass
		Note:2DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				
EDR (8DPSK)	3DH 1	Low	0.393	0.126	0.4	Pass
		Middle	0.393	0.126	0.4	Pass
		High	0.393	0.126	0.4	Pass
		Note: 3DH1:Dwell time = Pulse time*(1600/2/79)*31.6S				
	3DH 3	Low	1.652	0.264	0.4	Pass
		Middle	1.652	0.264	0.4	Pass
		High	1.652	0.264	0.4	Pass
		Note: 3DH3:Dwell time = Pulse time*(1600/4/79)*31.6S				
	3DH 5	Low	2.913	0.311	0.4	Pass
		Middle	2.913	0.311	0.4	Pass
		High	2.913	0.311	0.4	Pass
		Note: 3DH5:Dwell time = Pulse time*(1600/6/79)*31.6S				

BDR (GFSK):
Pulse time, Low Channel, DH1



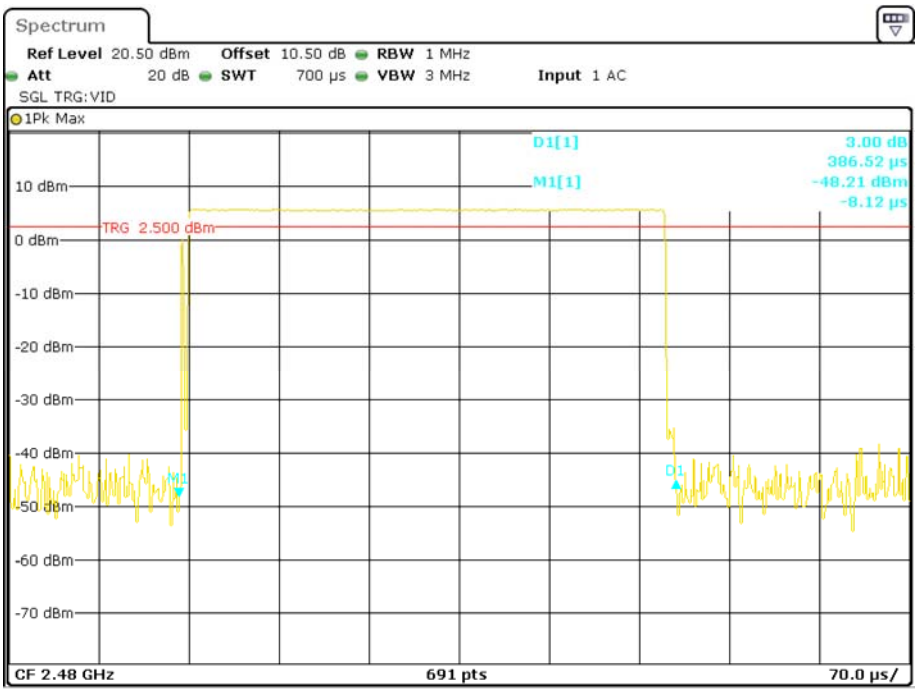
Date: 18.SEP.2015 09:05:30

Pulse time, Middle Channel, DH1



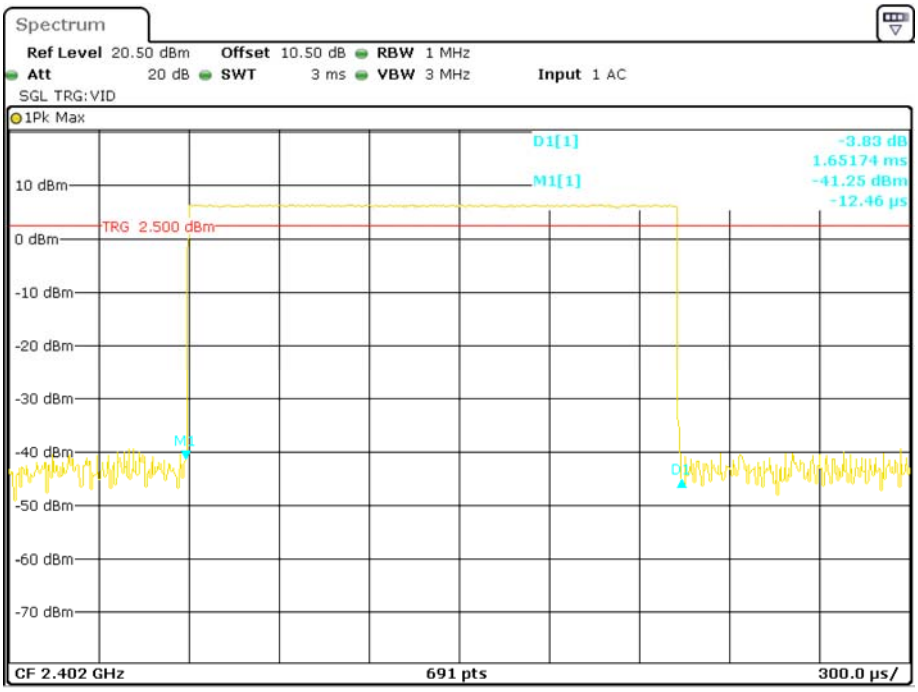
Date: 18.SEP.2015 09:06:00

Pulse time, High Channel, DH1



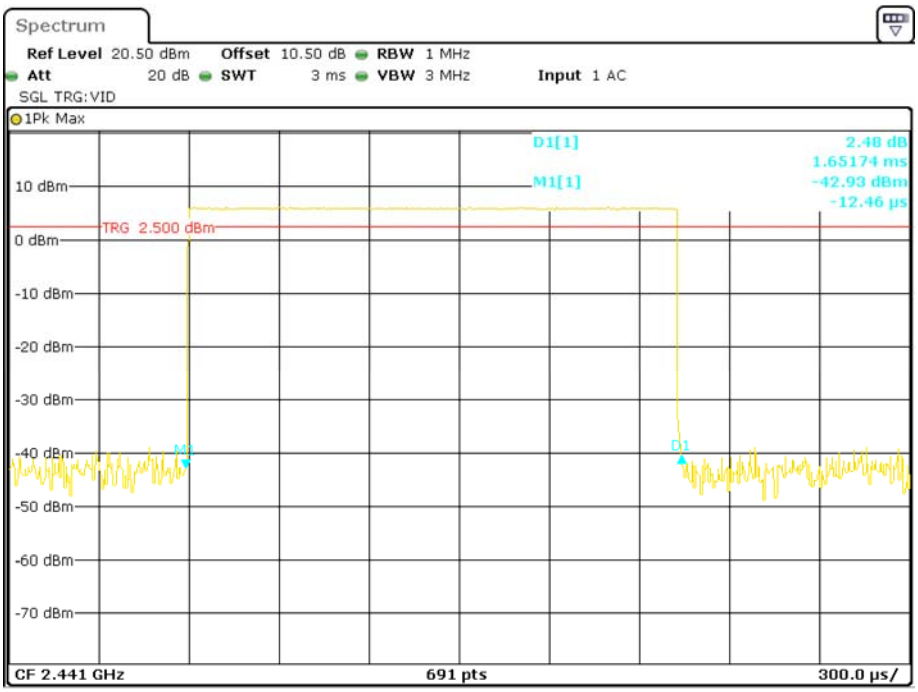
Date: 18.SEP.2015 09:06:26

Pulse time, Low Channel, DH3

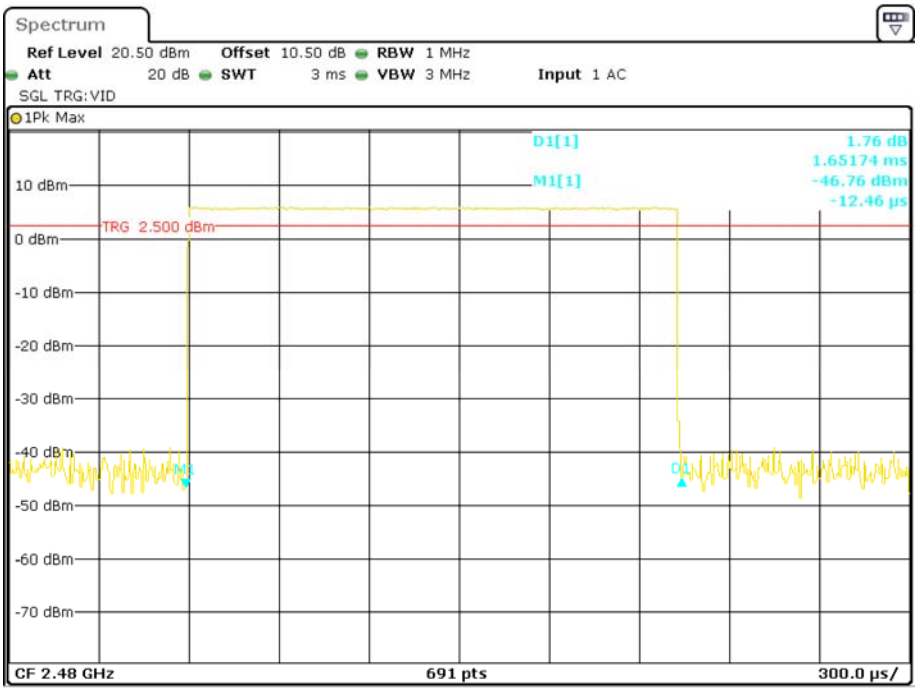


Date: 18.SEP.2015 09:08:20

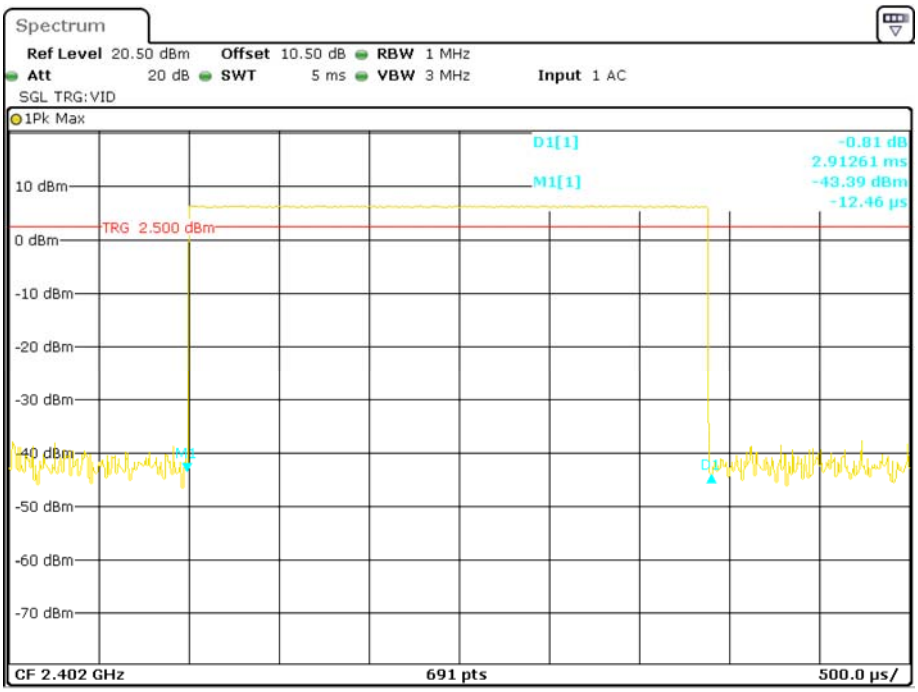
Pulse time, Middle Channel, DH3



Pulse time, High Channel, DH3

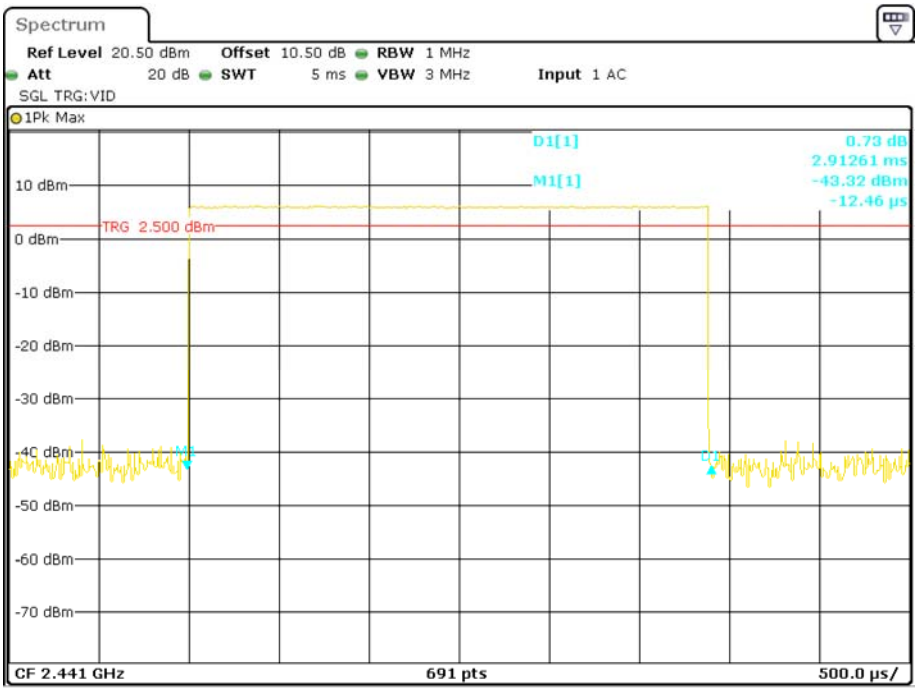


Pulse time, Low Channel, DH5



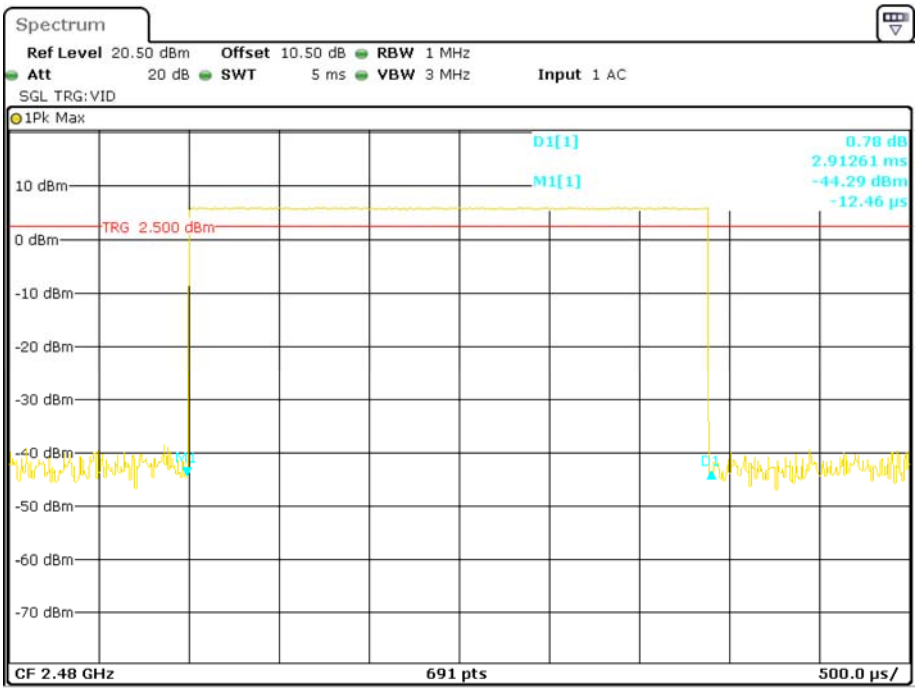
Date: 18.SEP.2015 09:19:53

Pulse time, Middle Channel, DH5



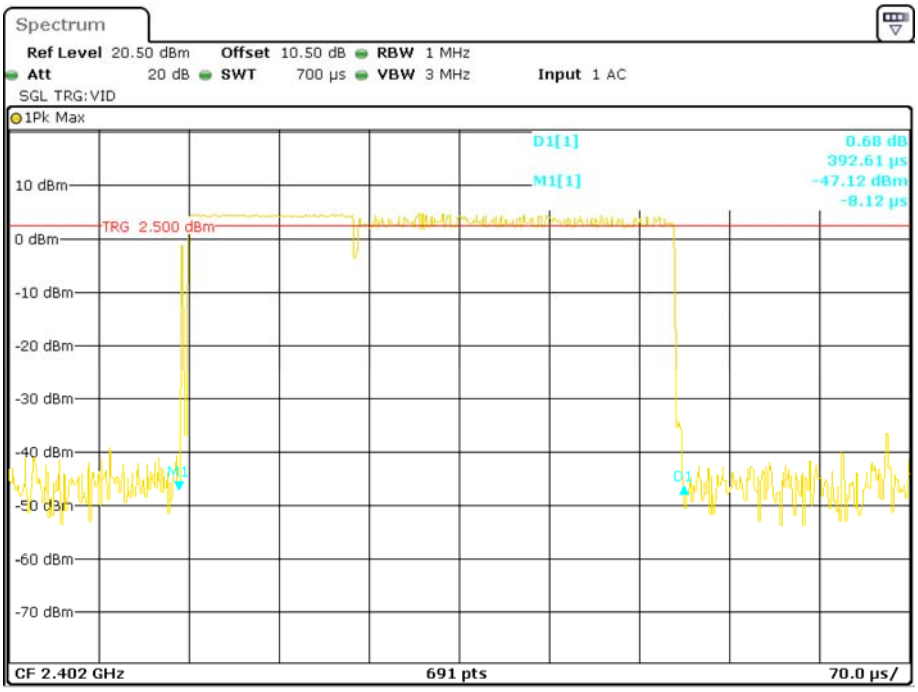
Date: 18.SEP.2015 09:20:52

Pulse time, High Channel, DH5



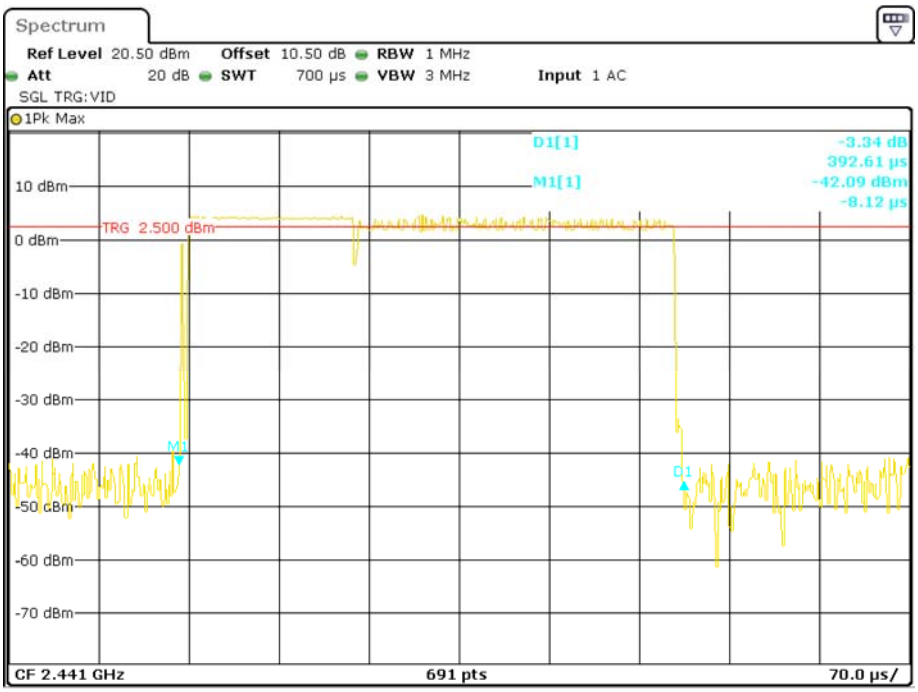
Date: 18.SEP.2015 09:21:16

EDR (π/4-DQPSK):
Pulse time, Low Channel, 2DH1



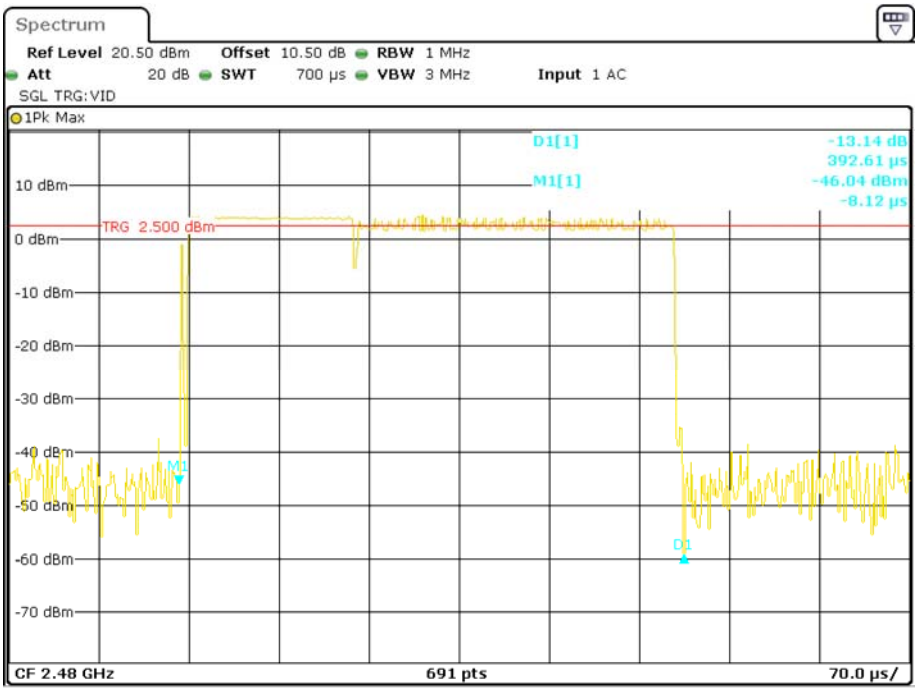
Date: 18.SEP.2015 09:04:58

Pulse time, Middle Channel, 2DH1



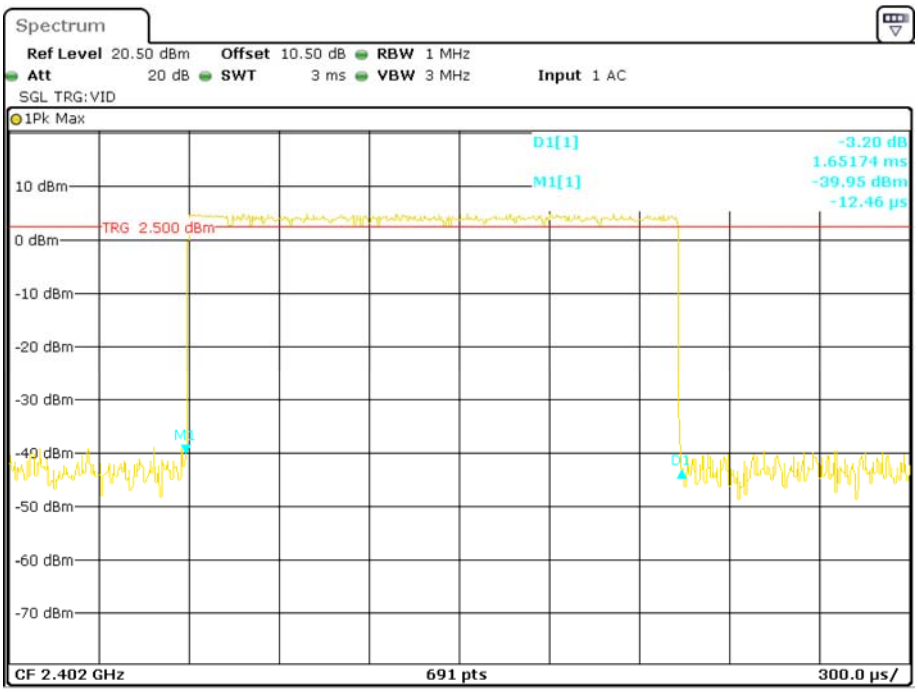
Date: 18.SEP.2015 09:04:34

Pulse time, High Channel, 2DH1



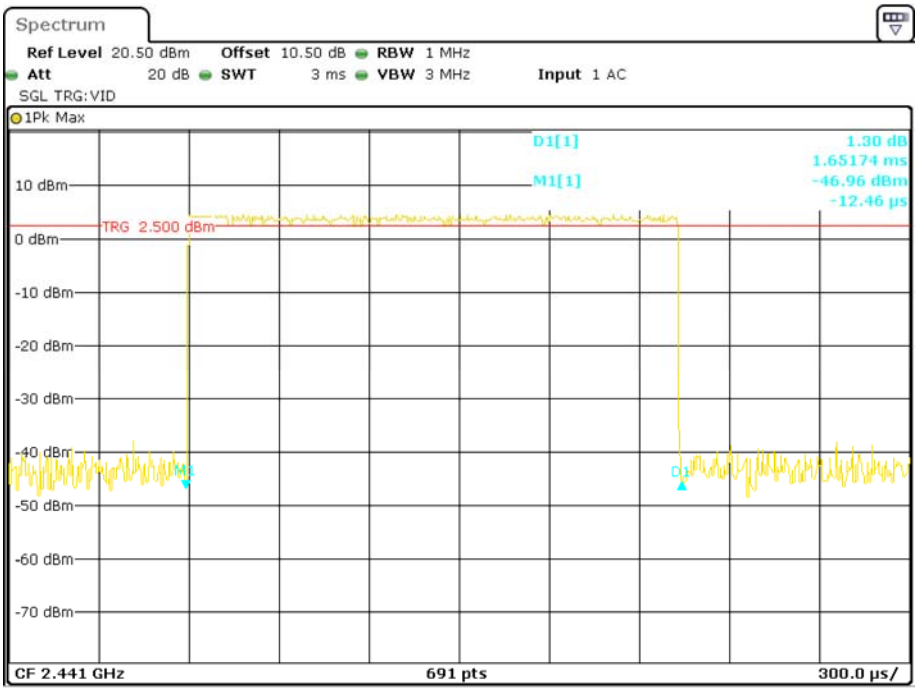
Date: 18.SEP.2015 09:04:06

Pulse time, Low Channel, 2DH3



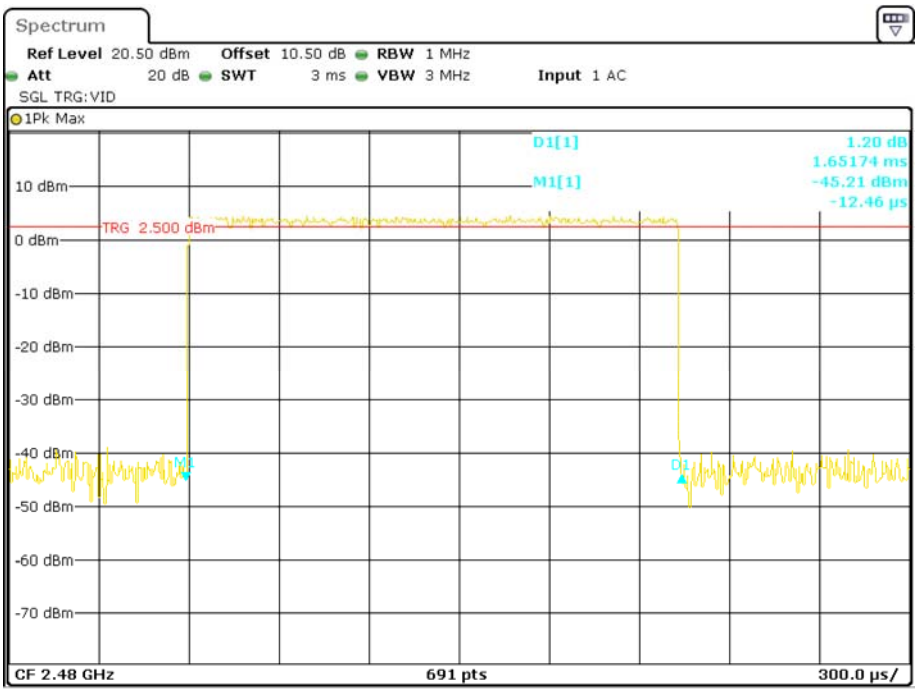
Date: 18.SEP.2015 09:09:33

Pulse time, Middle Channel, 2DH3



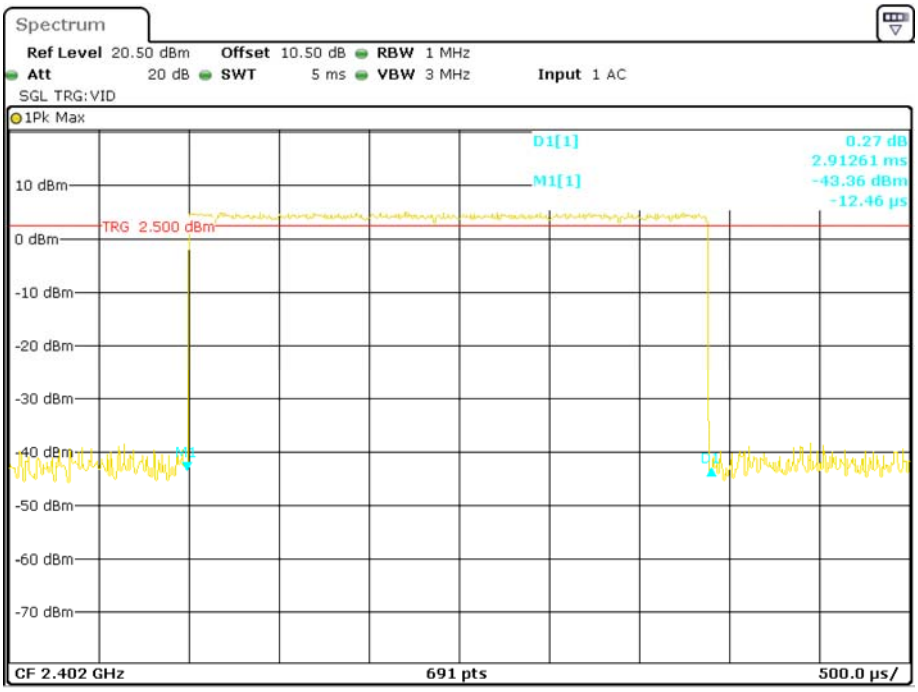
Date: 18.SEP.2015 09:09:57

Pulse time, High Channel, 2DH3



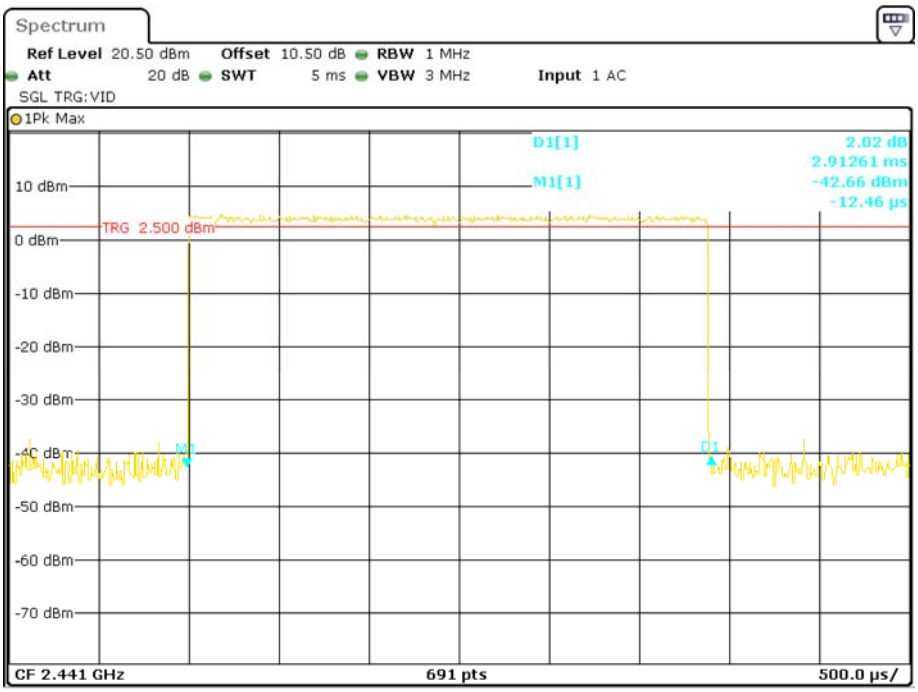
Date: 18.SEP.2015 09:10:24

Pulse time, Low Channel, 2DH5



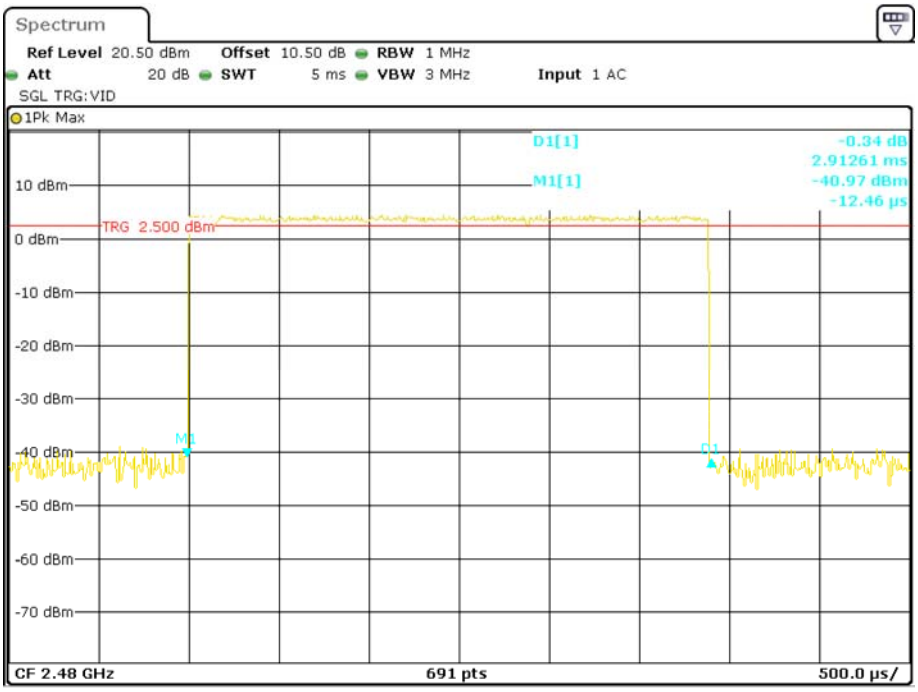
Date: 18.SEP.2015 09:18:25

Pulse time, Middle Channel, 2DH5



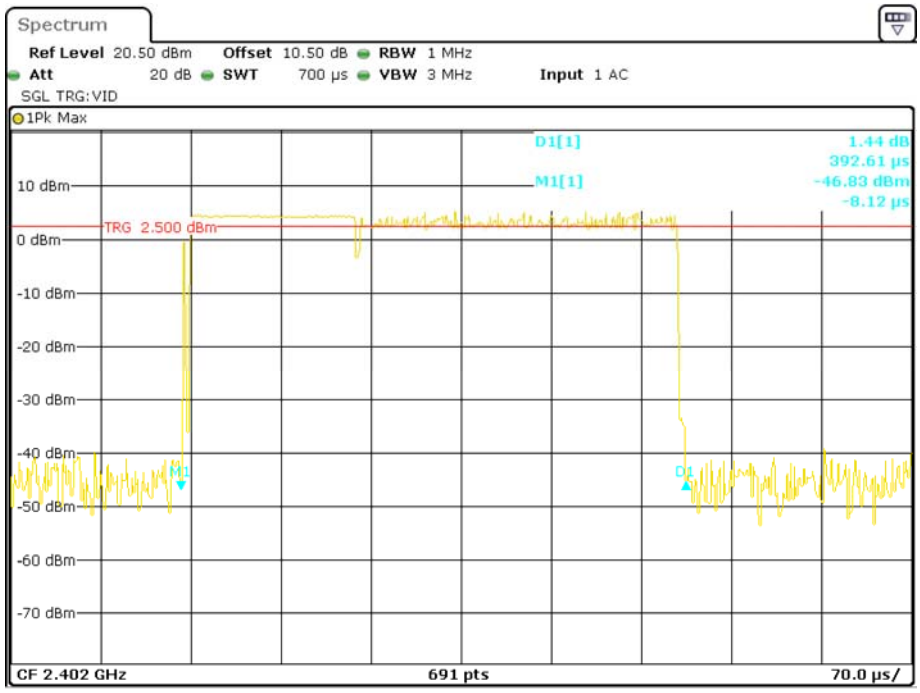
Date: 18.SEP.2015 09:17:51

Pulse time, High Channel, 2DH5



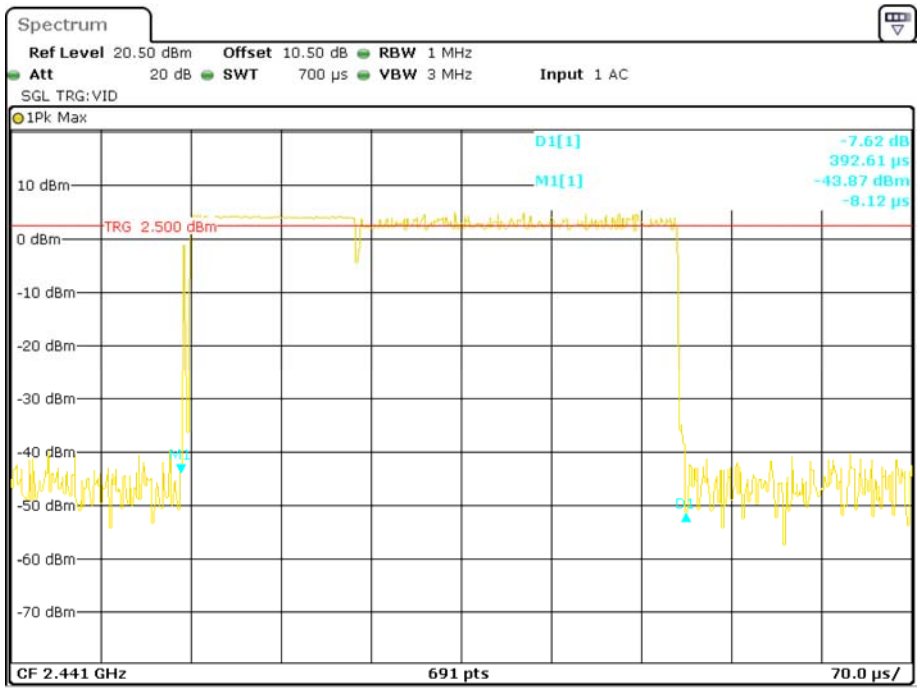
Date: 18.SEP.2015 09:17:24

EDR (8DPSK):
Pulse time, Low Channel, 3DH1



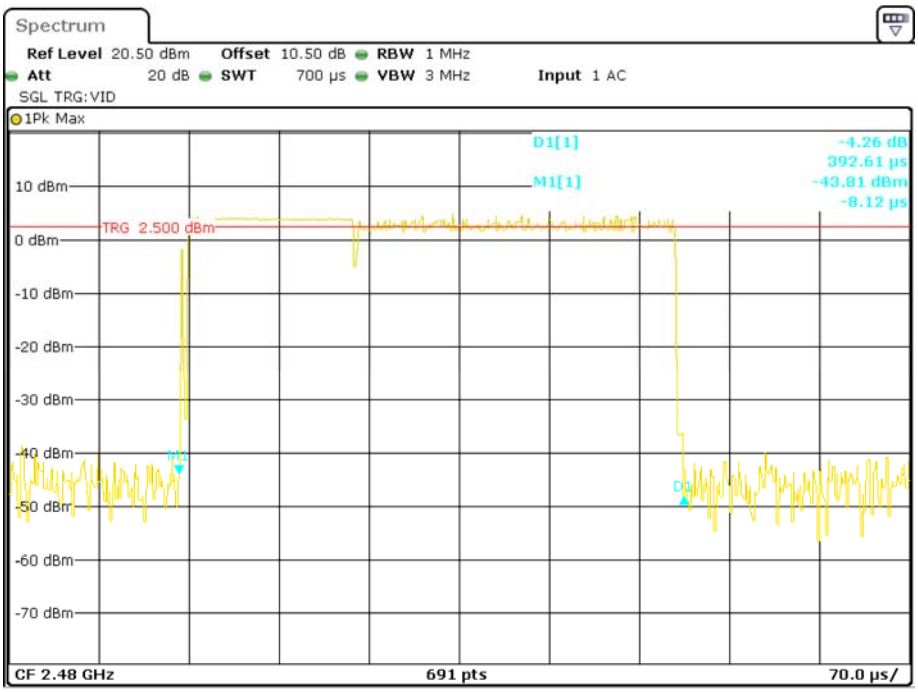
Date: 18.SEP.2015 09:02:54

Pulse time, Middle Channel, 3DH1



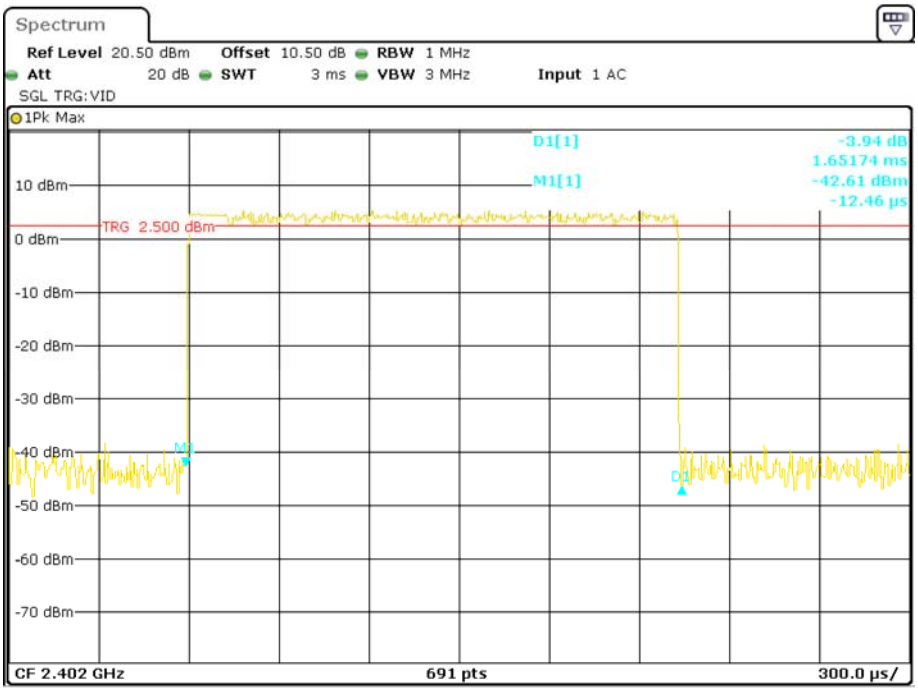
Date: 18.SEP.2015 09:03:26

Pulse time, High Channel, 3DH1



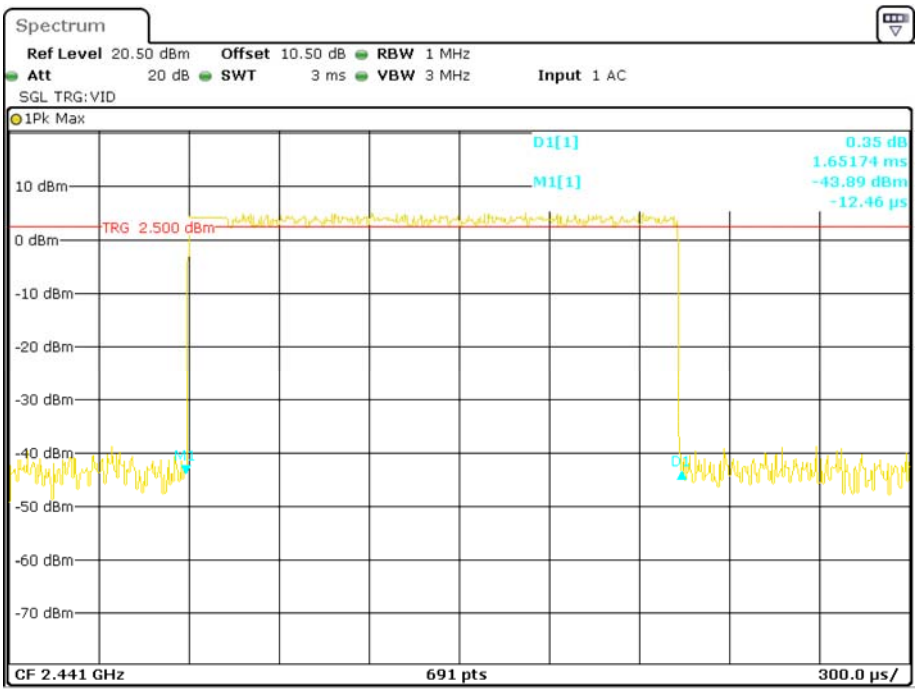
Date: 18.SEP.2015 09:03:48

Pulse time, Low Channel, 3DH3



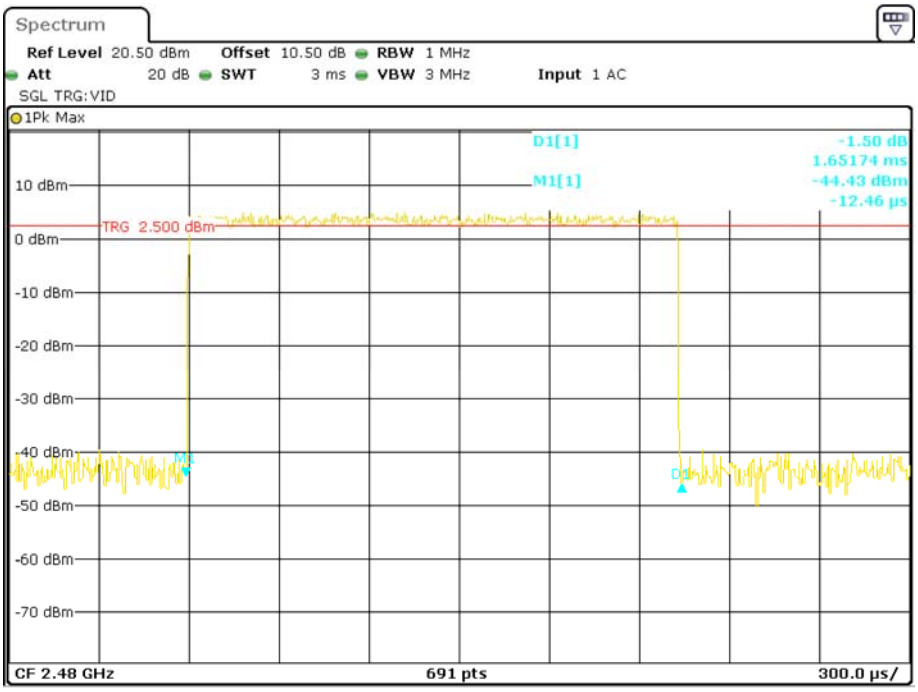
Date: 18.SEP.2015 09:15:19

Pulse time, Middle Channel, 3DH3



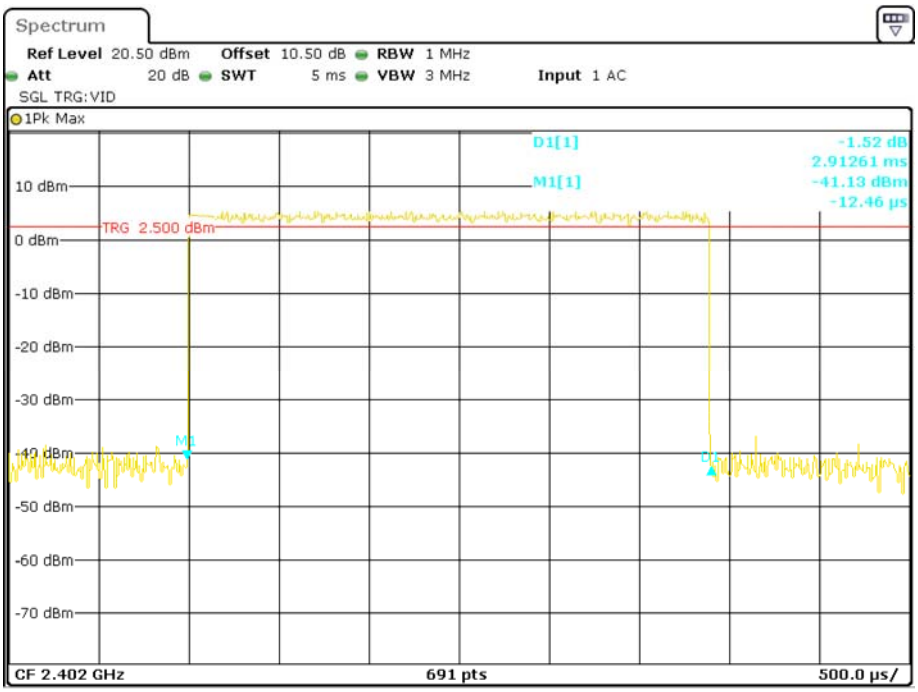
Date: 18.SEP.2015 09:14:50

Pulse time, High Channel, 3DH3



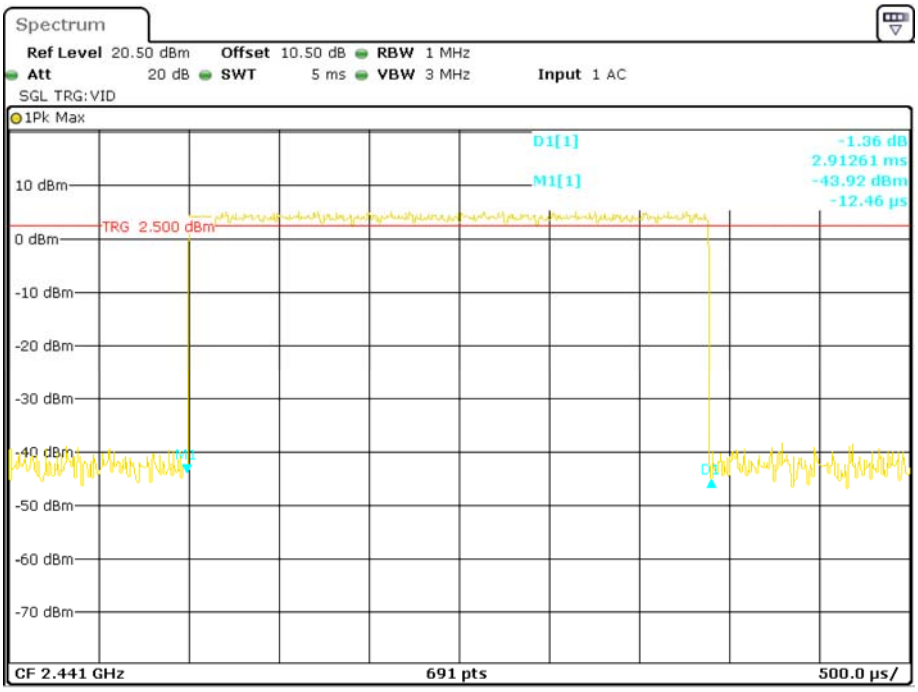
Date: 18.SEP.2015 09:14:25

Pulse time, Low Channel, 3DH5



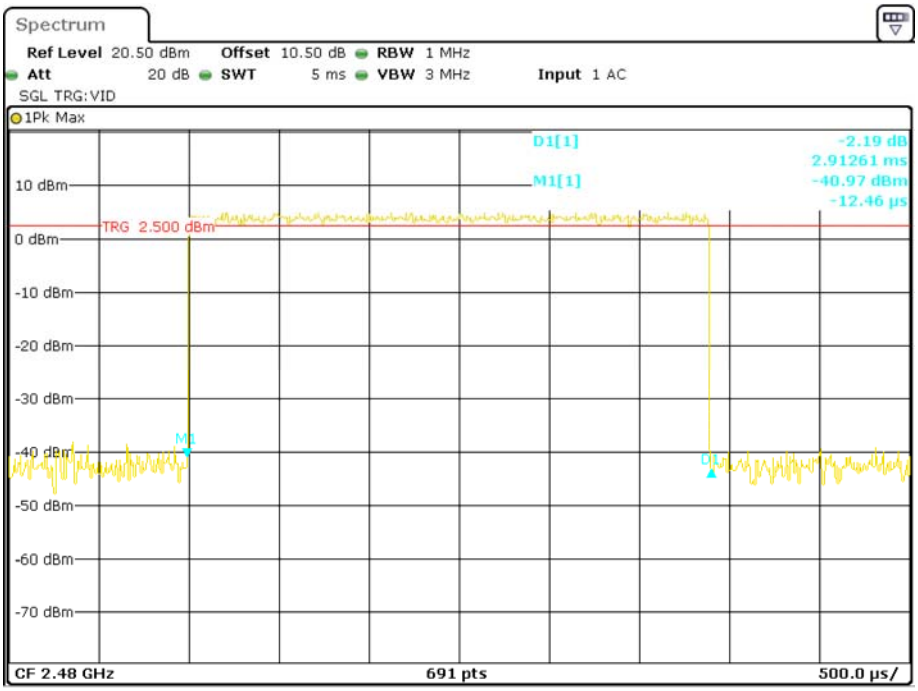
Date: 18.SEP.2015 09:16:00

Pulse time, Middle Channel, 3DH5



Date: 18.SEP.2015 09:16:36

Pulse time, High Channel, 3DH5



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

Applicable Standard

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. And 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
HP	Power Meter	N1912A	MY5000448	2014-11-03	2015-11-03
HP	Power Sensor	N1921A	MY54210016	2014-11-03	2015-11-03

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

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu on 2015-09-04.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to following tables

Mode	Channel	Frequency (MHz)	Peak Output Power		Limit (mW)
			(dBm)	(mW)	
BDR (GFSK)	Low	2402	6.43	4.40	1000
	Middle	2441	6.16	4.13	1000
	High	2480	5.97	3.95	1000
EDR (π/4-DQPSK)	Low	2402	5.71	3.72	1000
	Middle	2441	5.48	3.53	1000
	High	2480	4.76	2.99	1000
EDR (8DPSK)	Low	2402	5.83	3.83	1000
	Middle	2441	5.82	3.82	1000
	High	2480	5.37	3.44	1000

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

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 of spectrum analyzer to 100 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
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2015-06-13	2016-06-13

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

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

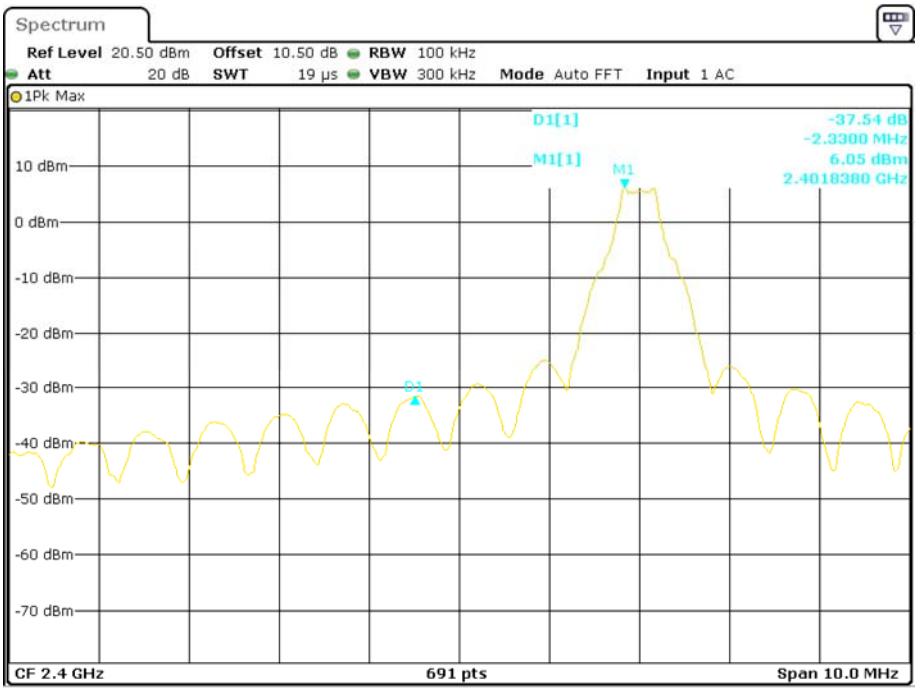
The testing was performed by Mike Hu on 2015-09-18.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to following tables and plots.

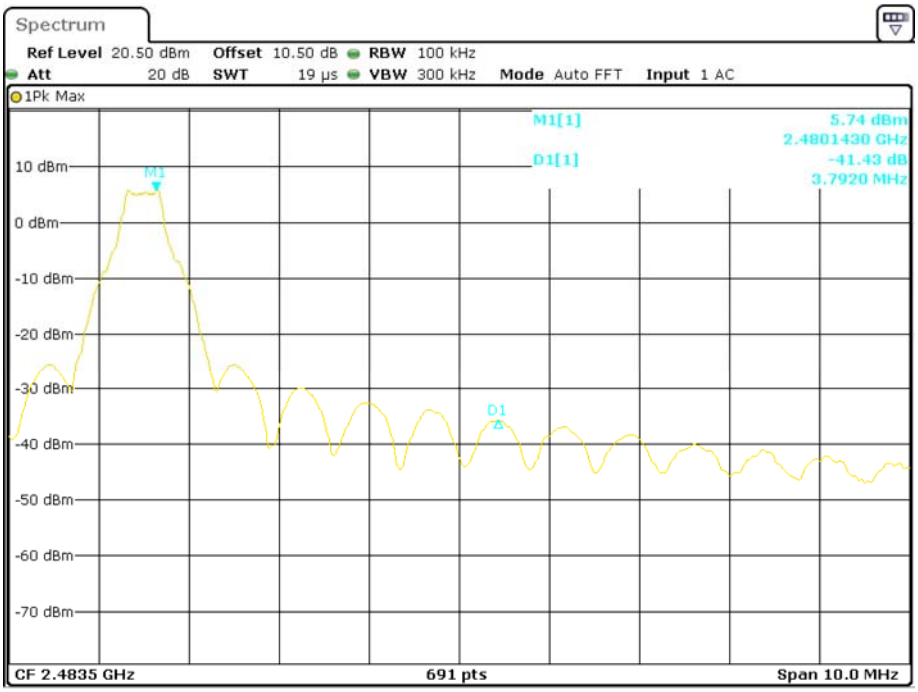
Mode	Band edges	Delta Peak to band emission (dBc)	Limit (dBc)
GFSK	L	37.54	20
	R	41.43	20
π/4-DQPSK	L	36.34	20
	R	40.24	20
8-DPSK	L	35.80	20
	R	39.88	20

BDR (GFSK): Band Edge-Left Side



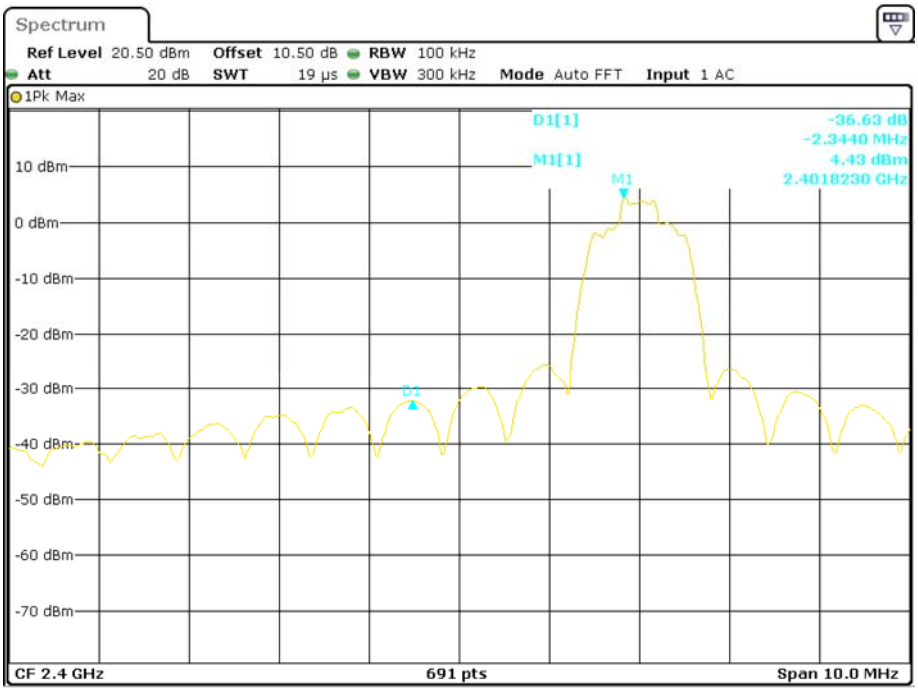
Date: 18.SEP.2015 09:24:18

BDR (GFSK): Band Edge-Right Side

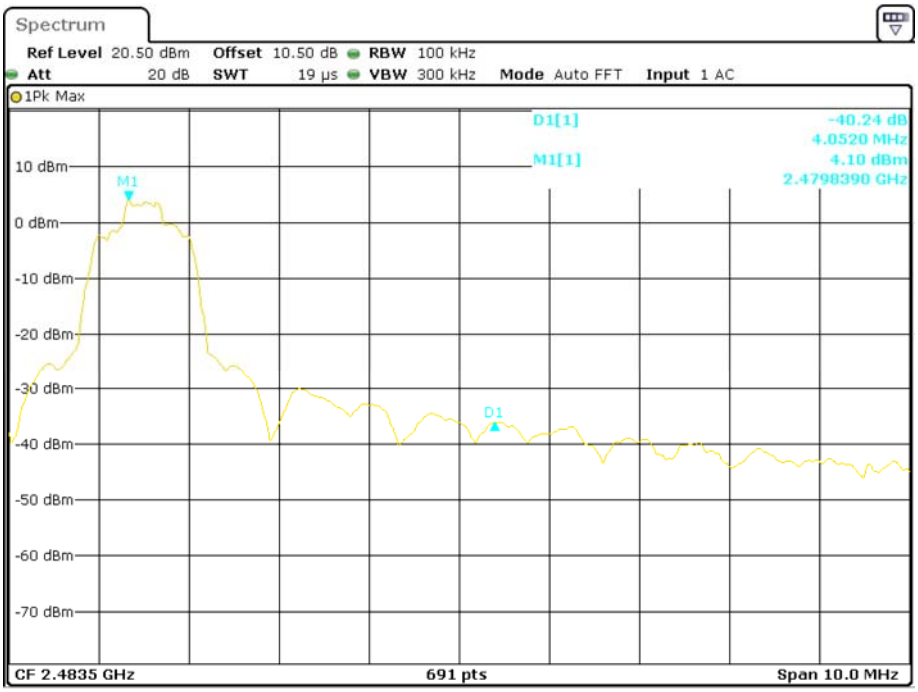


Date: 18.SEP.2015 09:25:44

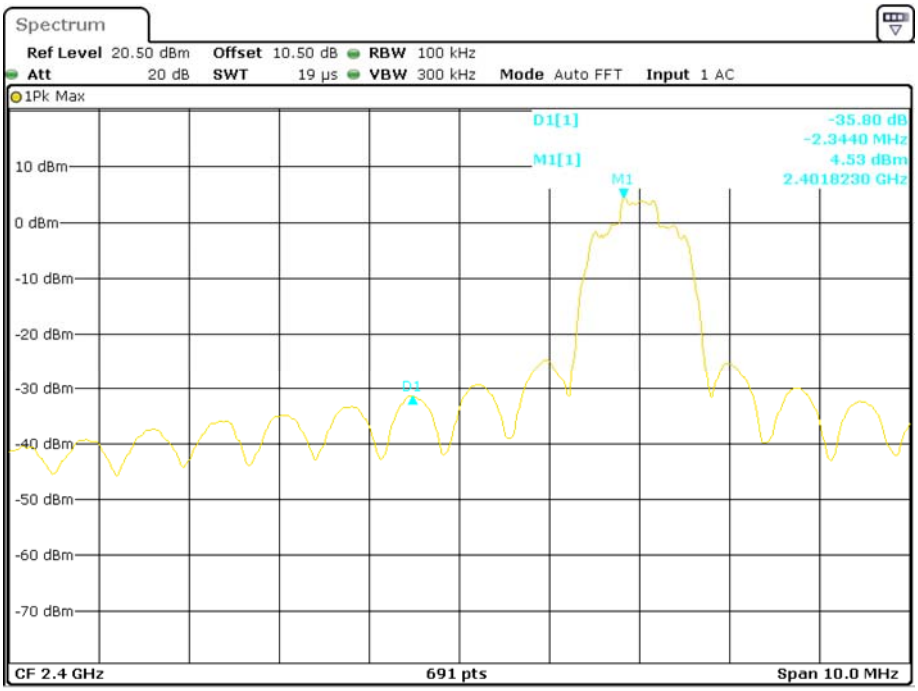
EDR (π/4-DQPSK): Band Edge-Left Side



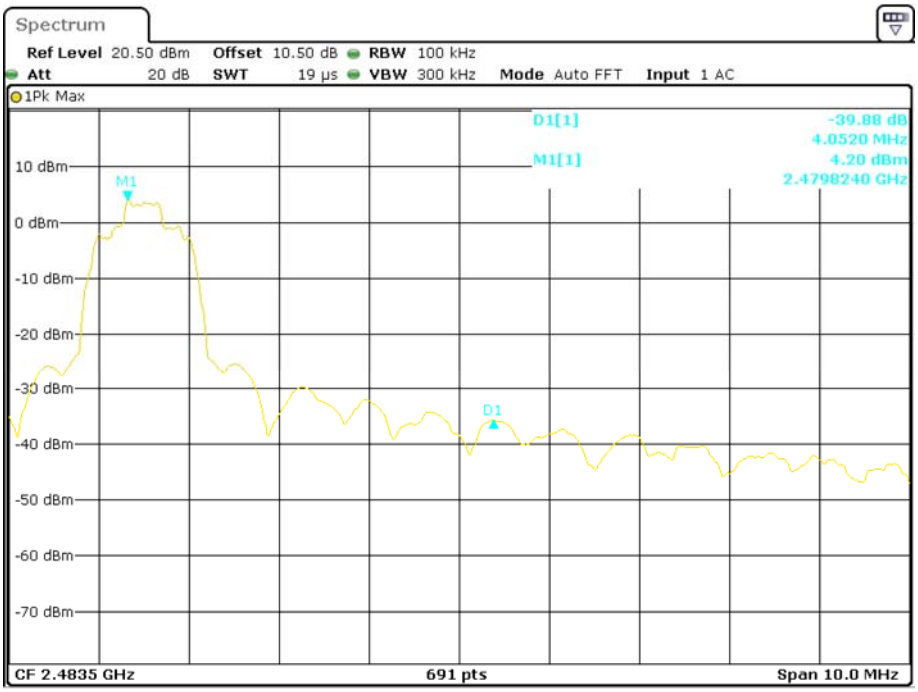
EDR (π/4-DQPSK): Band Edge-Right Side



EDR (8DPSK): Band Edge-Left Side



BDR (8DPSK): Band Edge-Right Side



PRODUCT SIMILARITY DECLARATION LETTER

Hyundai Corporation
Address : 140-2, Kye-dong, Chongro-ku, Seoul, South Korea
Tel : 82-2-746-1395 Fax: 82-2-746-1051

Product Similarity Declaration

September 21, 2015

To Whom It May Concern,

We, Hyundai Corporation, hereby declare that we have a product named as Mobile Phone (Model number: D245) was tested by BACL, meanwhile, for our marketing purpose, we would like to list a series models (D245S) on reports and certificate, all the models are identical schematics, except for the differences as below :

1 : Model D245 has double SIM card, Model D245S has single SIM card.
No other changes are made to them

We confirm that all information above is true, and we'll be responsible for all the consequences. Please contact me if you have any question.

Sincerely,

Signature

Kyunghee Kim

Sales assistant

Kyunghee Kim

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