FCC PART 15.247

TEST REPORT

For

Feitian Technologies Co., Ltd.

Floor 17th, Tower B, Huizhi Mansion,
No.9 Xueqing Road Haidian District, Beijing, P.R China

FCC ID: ZD3FTEPASSFIDOK13
Model: ePass FIDO K13

Report Type:	**Product Name:**
Original Report	ePass FIDO

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Report Number:	RSC160426002C
Report Date:	2016-07-19
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GENERAL INFORMATION

The **Feitian Technologies Co., Ltd.**'s product, model number: **ePass FIDO K13, (FCC ID: ZD3FTEPASSFIDOK13)** or the "EUT" as referred to in this report was the **ePass FIDO,** which has the plastic enclosure. The highest frequency was 2.48 GHz.

Mechanical Description of EUT

The EUT was measured approximately 47 mm L x 28 mm W x 7 mm H.

Rated input voltage: DC 5V from laptop or DC 3.7V battery.

**All measurement and test data in this report was gathered from final production sample, serial number: 160426002/01 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2016-04-25, and EUT conformed to test requirement.*

Objective

This report is prepared on behalf of *Feitian Technologies Co., Ltd.* 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 the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15B JBP submissions with FCC ID: ZD3FTEPASSFIDOK13.

Test Methodology

All measurements contained in this report were conducted 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. (Chengdu). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any radiation on emissions measurement is:

30M~200MHz: ±4.7 dB;
200M~1GHz: ±6.0 dB;
1G-6GHz: ±5.13dB；
6G~25GHz: ±5.47dB；

And the uncertainty will not be taken into consideration for all test data recorded in the report.

Test Facility

The test site used by BACL to collect test data is located in the 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China

Test site at BACL 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 April 24, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 560332. 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

Fcc_ce.uvproj

Equipment Modifications

No modification was made to the EUT by BACL.

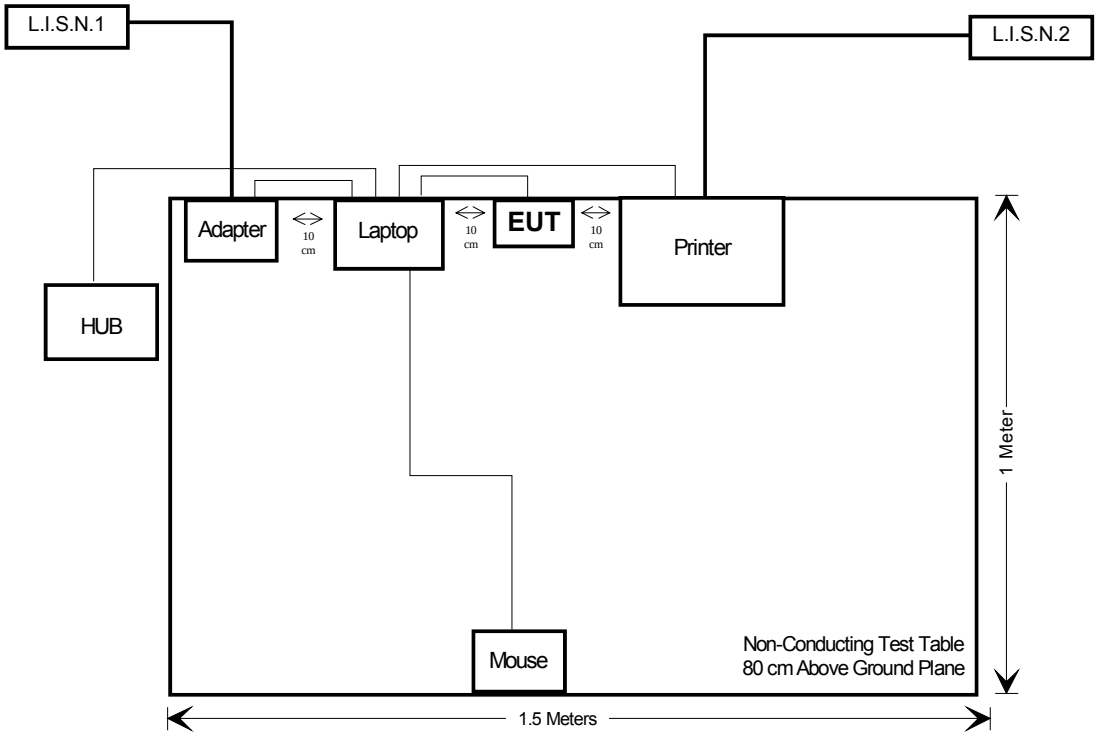
Local Support Equipment List and Details

Manufacturer	Description	Model Number	Serial Number
DELL	Laptop	C640	5P804A00
EPSON	Printer	R230	C62607000W
IBM	Mouse	MO28UO	89P5089

External I/O Cable

Cable Description	Length (m)	From	To
Unshielded RJ45 Cable	3	RJ45 Port/Laptop	HUB
Unshielded USB Cable	1.5	USB Port/Laptop	Printer
Unshielded USB Cable	1	USB Port/Laptop	EUT
Unshielded USB Cable	1	USB Port/Laptop	Mouse

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.247(d)	Conducted Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

FCC §15.247 (i) & §2.1093 – RF EXPOSURE

Applicable Standard

According to§15.247(i) and §1.1310, 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 KDB447498 D01 General RF Exposure Guidance v06:

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

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Measurement Result

The maximum conducted output power=2.16 dBm, maximum tune-up power=2.5 dBm =1.78mW at 2440MHz.
[(max. power of channel, mW)/(min. test separation distance, mm)] · [√f(GHz)] = 1.78/5 x (√2.440) = 0.6< 3.0

Result: No SAR test needed.

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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connector Construction

The EUT has one PCB antenna, which was permanently integrated and the antenna gain is 1 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

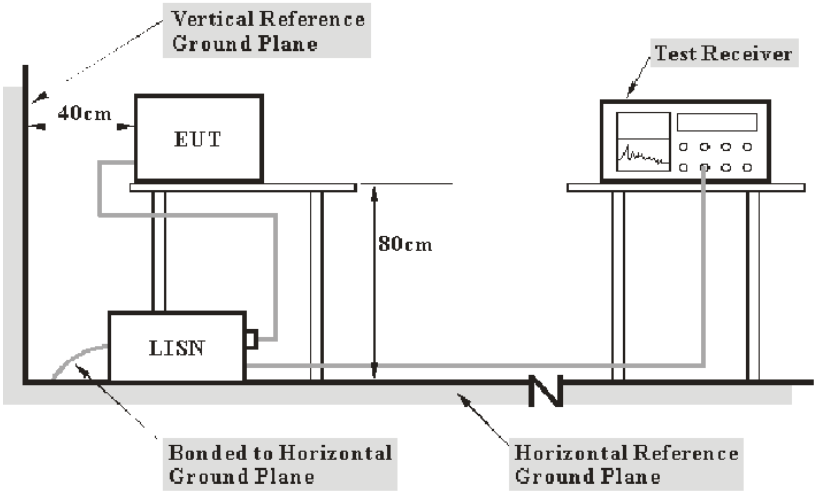
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level, increased by (U_{lab} − U_{cispr}), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by (U_{lab} − U_{cispr}), exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Chengdu) is ±3.17 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement		U_{cispr}
Conducted disturbance at mains port using AMN	(150 kHz to 30 MHz)	3.4 dB

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

The power cables and 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.

DC 5V power source was provided to EUT through Laptop.

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

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,s
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 maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2015-12-02	2016-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.06	2015-12-02	2016-12-01
Rohde & Schwarz	AMN	ENV216	3560.6550.12	None	None
N/A	Conducted Cable	NO.5	N/A	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, 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 Part 15.207, with the worst margin reading of:

7.6 dB at **2.054976 MHz** in the **Neutra**l Phase

Test Data

Environmental Conditions

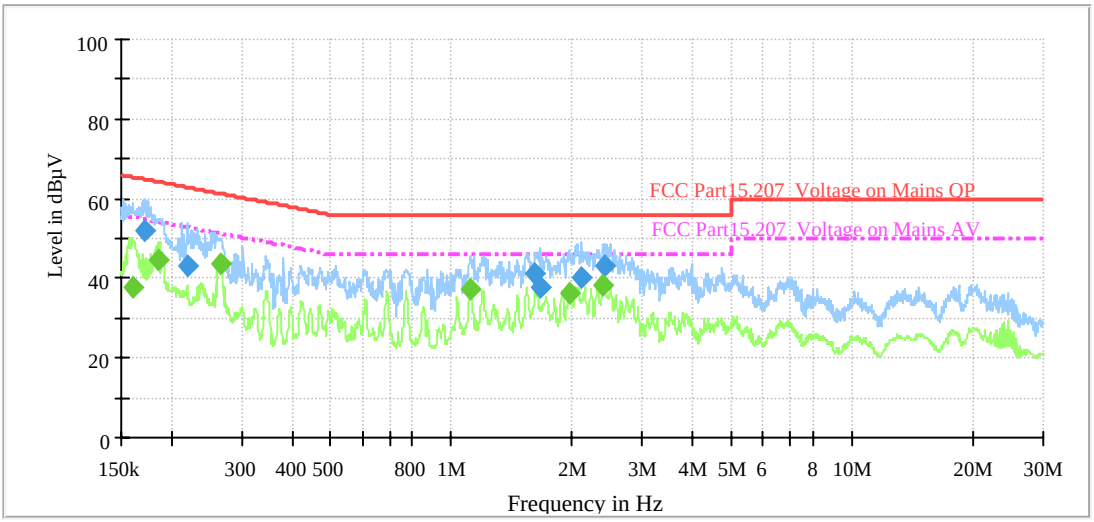
Temperature:	28 °C
Relative Humidity:	64 %
ATM Pressure:	94.3 kPa

The testing was performed by Mill Chen on 2016-07-08.

Test Mode: Transmitting

0.15 MHz – 30 MHz

Line

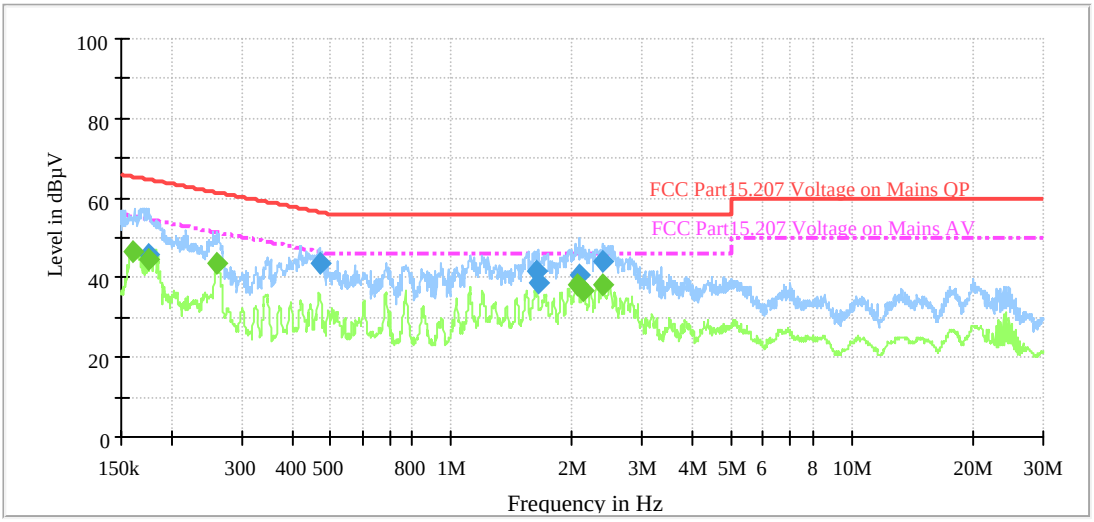


Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.172517	52.0	9.000	L1	18.8	12.8	64.8
0.218385	43.0	9.000	L1	19.0	19.9	62.9
1.620123	41.4	9.000	L1	20.0	14.6	56.0
1.666081	37.8	9.000	L1	20.0	18.2	56.0
2.109051	40.1	9.000	L1	20.1	15.9	56.0
2.411151	43.3	9.000	L1	20.1	12.7	56.0

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.159904	37.6	9.000	L1	18.8	17.9	55.5
0.185754	44.7	9.000	L1	18.9	9.5	54.2
0.265089	43.6	9.000	L1	19.3	7.7	51.3
1.117253	37.2	9.000	L1	20.0	8.8	46.0
1.962678	36.4	9.000	L1	20.1	9.6	46.0
2.387184	38.3	9.000	L1	20.1	7.7	46.0

0.15 MHz – 30 MHz

Neutral



Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.175297	45.6	9.000	N	18.8	19.1	64.7
0.468482	43.8	9.000	N	19.9	12.7	56.5
1.623363	41.6	9.000	N	20.0	14.4	56.0
1.652818	38.5	9.000	N	20.0	17.5	56.0
2.083919	40.5	9.000	N	20.1	15.5	56.0
2.377664	43.9	9.000	N	20.1	12.1	56.0

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.160544	46.5	9.000	N	18.8	8.9	55.4
0.175297	44.6	9.000	N	18.8	10.1	54.7
0.260886	43.7	9.000	N	19.3	7.7	51.4
2.054976	38.4	9.000	N	20.1	**7.6**	46.0
2.138756	36.8	9.000	N	20.1	9.2	46.0
2.396742	38.4	9.000	N	20.1	7.6	46.0

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 2, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 2, then:
–compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

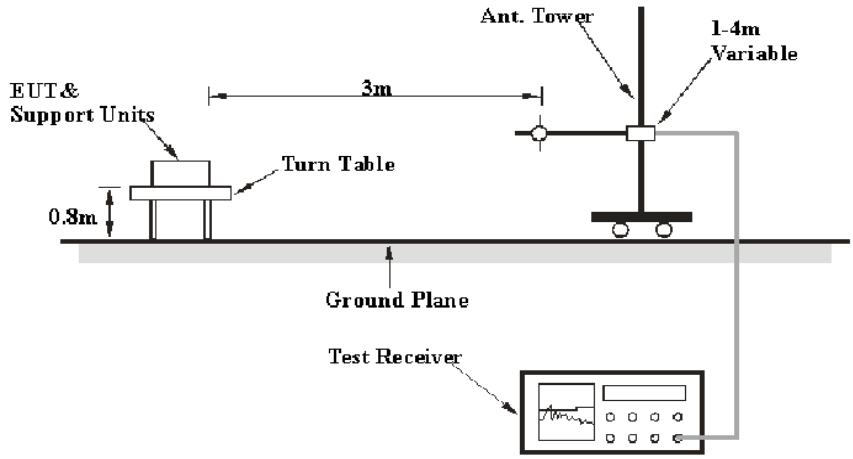
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Chengdu) is:
30M~200MHz: ±4.7 dB ;
200M~1GHz: ±6.0 dB ;
1G-6GHz: ±5.13dB;
6G~25GHz: ±5.47 dB;

Table 2 – Values of U_{cispr}

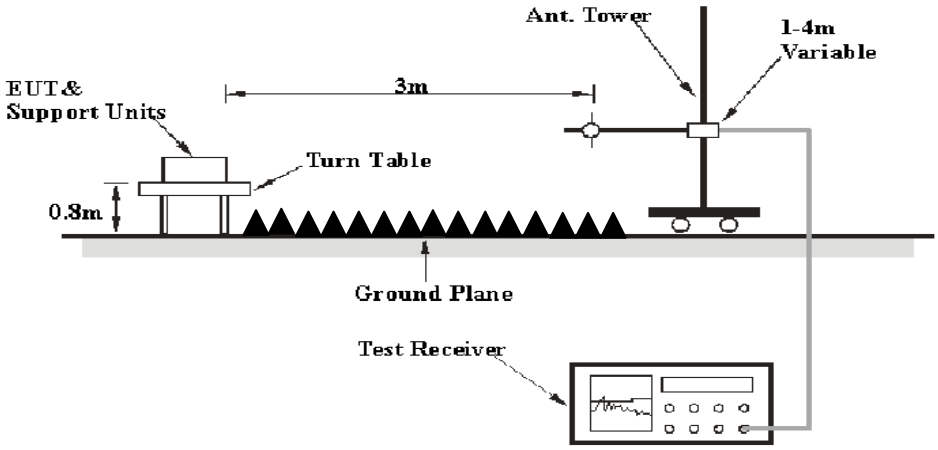
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters Semi-Anechoic Chamber, using the setup in 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.

DC 5V power source was provided to EUT through Laptop.

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	120 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.

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.

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 = Receiver Reading + Cable loss + Antenna Factor – 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 Number	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2015-12-02	2016-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2015-12-02	2016-12-01
Sunol Sciences	Broadband Antenna	JB3	A101808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2015-12-02	2016-12-01
EM TEST	Horn Antenna	3115	003-6076	2015-12-02	2016-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
HP	Amplifier	8449B	3008A00277	2016-04-09	2019-04-08
EMCT	Semi-Anechoic Chamber	966	N/A	2015-04-24	2018-04-23
N/A	RF Cable (below 1GHz)	NO.1	N/A	2015-11-10	2016-11-09
N/A	RF Cable (below 1GHz)	NO.4	N/A	2015-11-10	2016-11-09
N/A	RF Cable (above 1GHz)	NO.2	N/A	2015-11-10	2016-11-09
WEINSCHEL ENGINEERING	Attenuator	1A10dB	AA4135	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, 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, Section 15.205, 15.209 and 15.247, with the worst margin reading of:

5.99 dB at **2390 MHz** in the **Vertical** polarization

Test Data

Environmental Conditions

Temperature:	30 °C
Relative Humidity:	38 %
ATM Pressure:	94.5 kPa

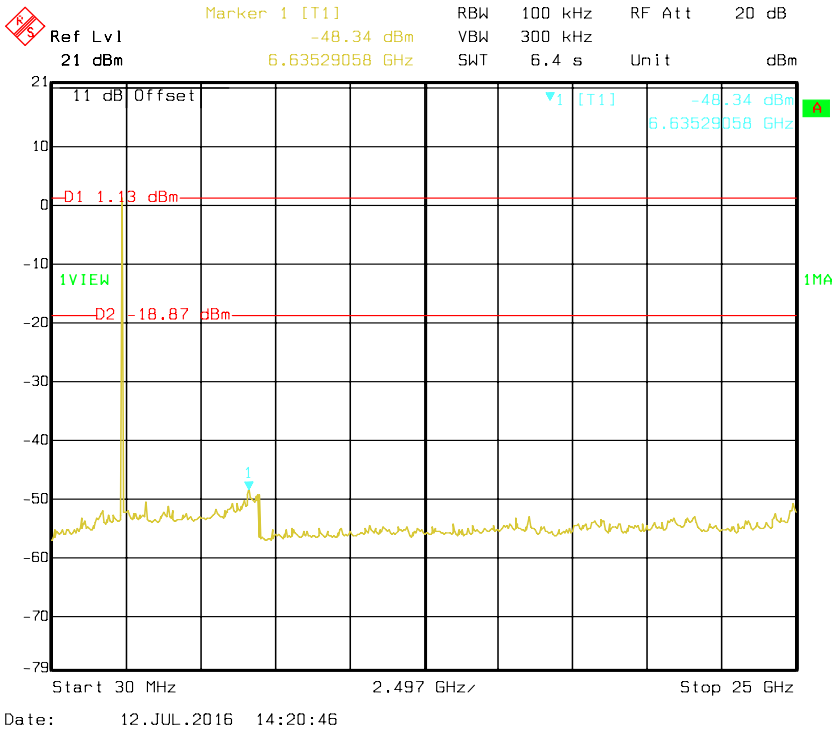
The testing was performed by Mill Chen on 2016-07-12.

Test Mode: Transmitting

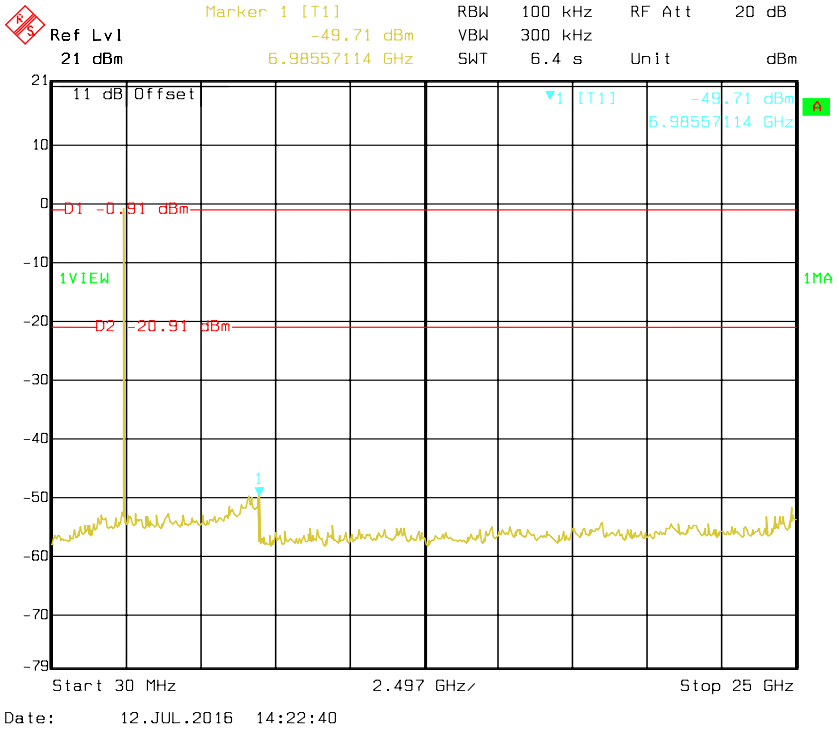
Frequency (MHz)	Receiver		Rx Antenna		Cable Loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2402 MHz									
2402	71.22	PK	V	23.14	5.75	0.00	100.11	N/A	N/A
2402	64.87	AV	V	23.14	5.75	0.00	93.76	N/A	N/A
2402	68.42	PK	H	23.14	5.75	0.00	97.31	N/A	N/A
2402	55.36	AV	H	23.14	5.75	0.00	84.25	N/A	N/A
2390	28.54	PK	V	23.08	5.68	0.00	57.30	74.00	16.70
2390	19.25	AV	V	23.08	5.68	0.00	48.01	54.00	**5.99**
4804	32.19	PK	V	30.76	7.86	26.81	44.00	74.00	30.00
4804	24.51	AV	V	30.76	7.86	26.81	36.32	54.00	17.68
121.35	33.69	QP	V	14.86	0.76	28.02	21.29	40.00	18.71
Middle Channel: 2440 MHz									
2440	69.81	PK	V	25.74	5.79	0.00	101.34	N/A	N/A
2440	58.84	AV	V	25.74	5.79	0.00	90.37	N/A	N/A
2440	65.34	PK	H	25.74	5.79	0.00	96.87	N/A	N/A
2440	53.75	AV	H	25.74	5.79	0.00	85.28	N/A	N/A
4880	43.04	PK	V	30.79	7.90	26.78	54.95	74.00	19.05
4880	29.75	AV	V	30.79	7.90	26.78	41.66	54.00	12.34
121.35	35.42	QP	V	14.86	0.76	28.02	23.02	40.00	16.98
High Channel: 2480 MHz									
2480	66.78	PK	V	25.85	3.82	0.00	96.45	N/A	N/A
2480	55.64	AV	V	25.85	3.82	0.00	85.31	N/A	N/A
2480	64.29	PK	H	25.85	3.82	0.00	93.96	N/A	N/A
2480	51.82	AV	H	25.85	3.82	0.00	81.49	N/A	N/A
2483.5	26.88	PK	V	25.86	3.80	0.00	56.54	74.00	17.46
2483.5	17.35	AV	V	25.86	3.80	0.00	47.01	54.00	6.99
4960	41.38	PK	V	31.00	4.70	26.71	50.37	74.00	23.63
4960	29.63	AV	V	31.00	4.70	26.71	38.62	54.00	15.38
121.35	34.82	QP	V	14.86	0.76	28.02	22.42	40.00	17.58

Conducted Spurious Emissions at Antenna Port

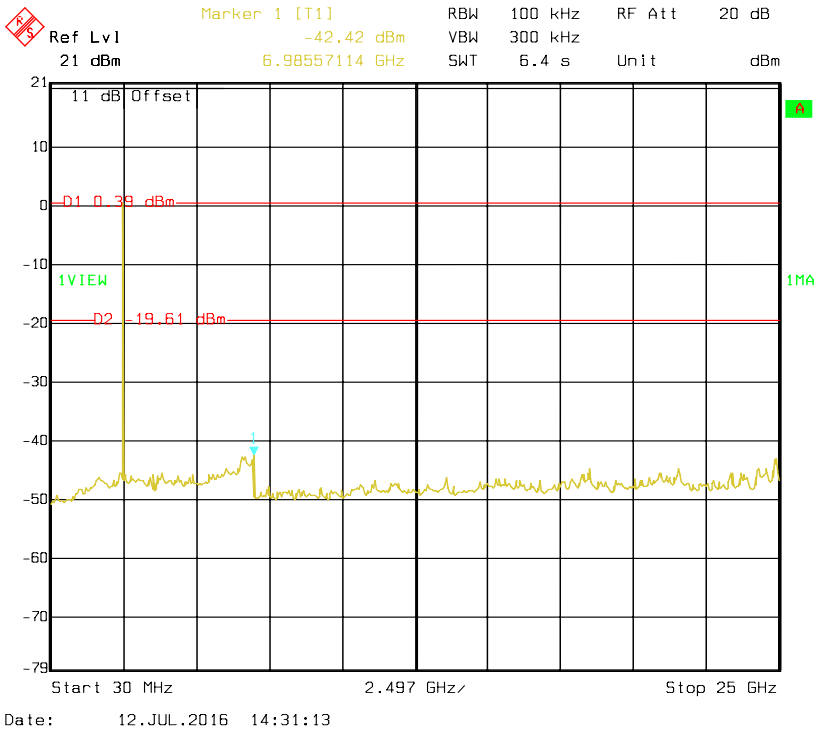
Low Channel



Middle Channel



High Channel



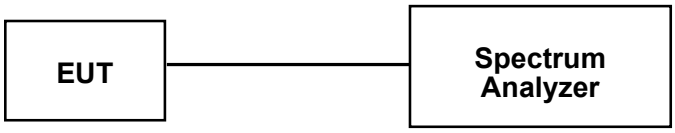
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

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 6 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	Spectrum Analyzer	FSL18	100180	2015-12-02	2016-12-01
N/A	SMA Cable	L-E-001-2	N/A	2015-11-10	2016-11-09
WEINSCHEL ENGINEERING	Attenuator	1A10dB	AA4135	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	54 %
ATM Pressure:	100.2 kPa

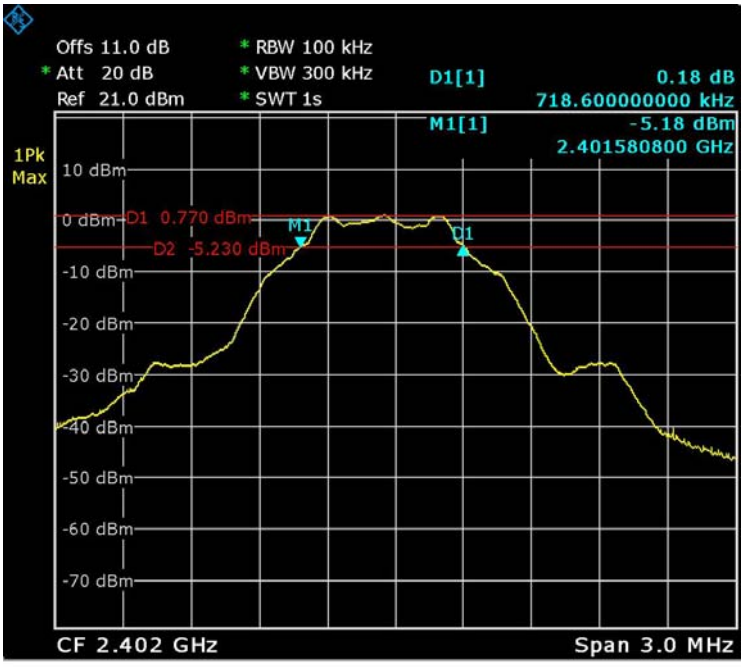
The testing was performed by Mill Chen on 2016-05-04.

Test Mode: Transmitting

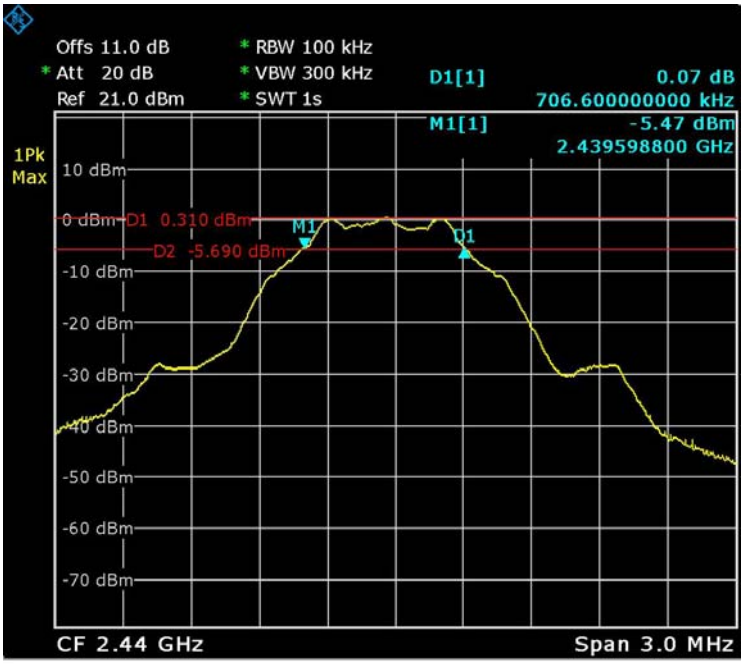
Mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC Limit (kHz)
GFSK	Low	2402	0.718	> 500
	Middle	2440	0.706	> 500
	High	2480	0.712	> 500

Please refer to the following plots:

Low Channel

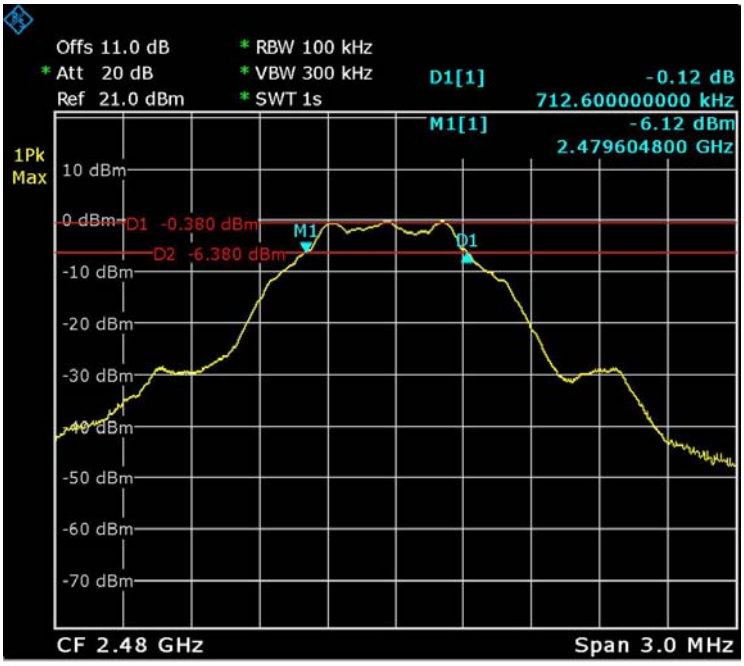


Middle Channel



Date: 4.MAY.2016 09:28:04

High Channel



Date: 4.MAY.2016 09:29:04

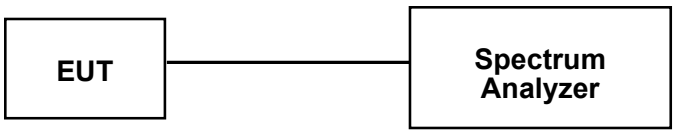
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2015-12-02	2016-12-01
N/A	SMA Cable	L-E-001-2	N/A	2015-11-10	2016-11-09
WEINSCHEL ENGINEERING	Attenuator	1A10dB	AA4135	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	68 %
ATM Pressure:	101.8 kPa

The testing was performed by Mill Chen on 2016-07-12.

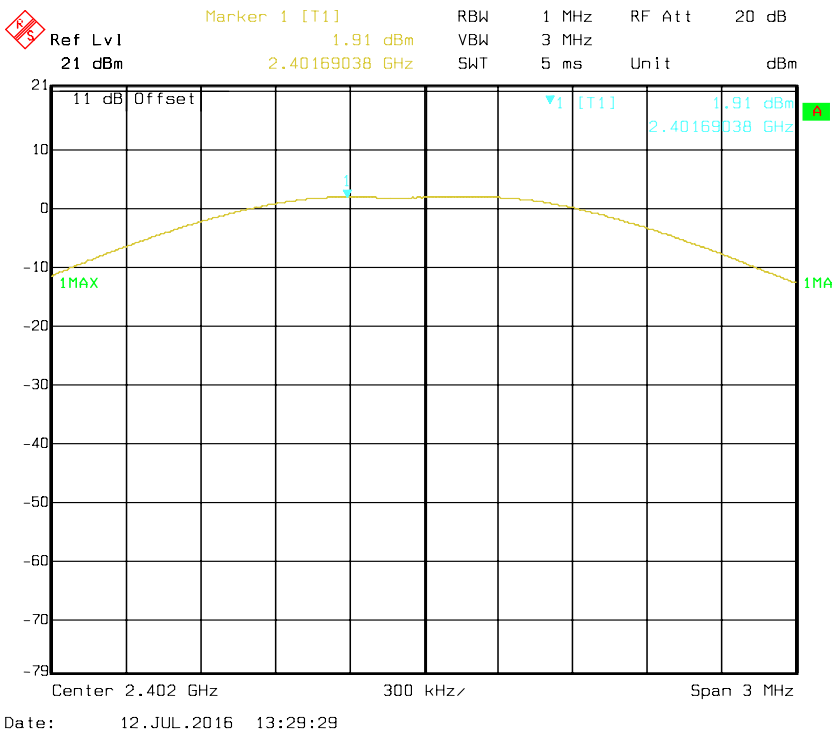
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Result
GFSK	Low	2402	1.91	30	Pass
	Middle	2440	2.16	30	Pass
	High	2480	1.20	30	Pass

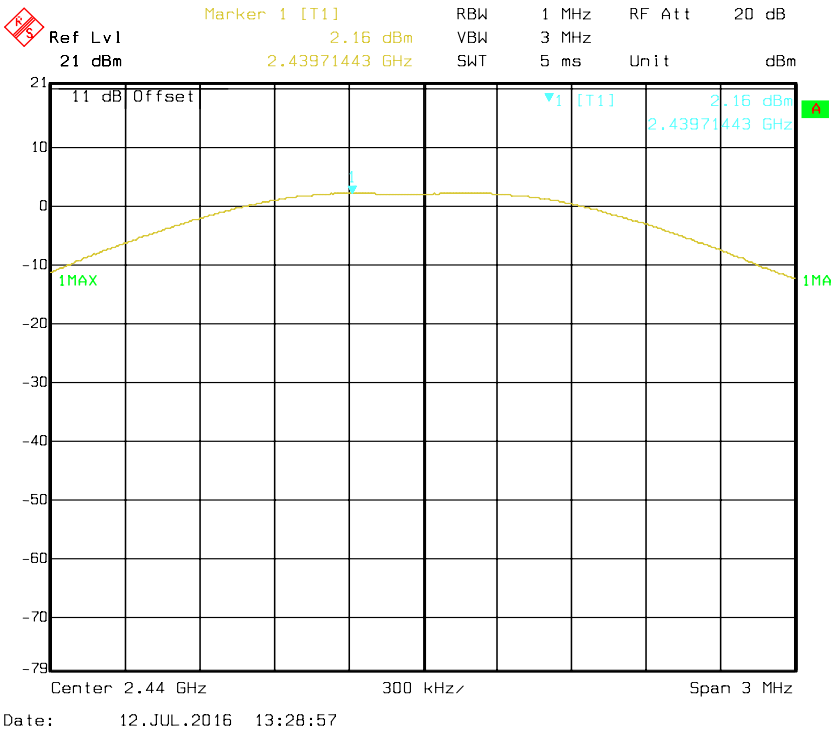
Note: Duty cycle is more than 98%.

Please refer to the following plots

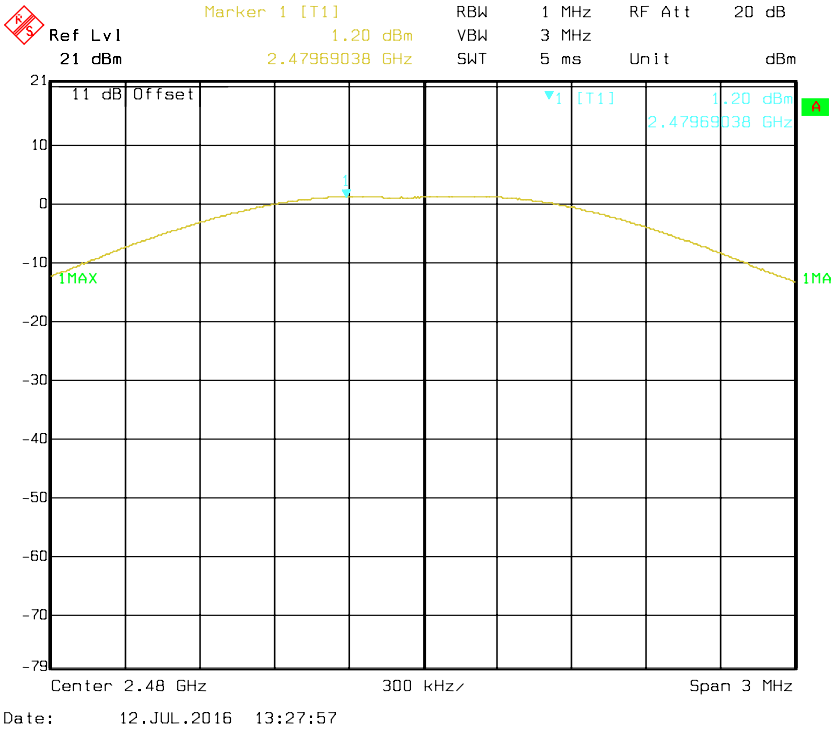
Low Channel



Middle Channel



High Channel



FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

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. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 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
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2015-12-02	2016-12-01
N/A	SMA Cable	L-E-001-2	N/A	2015-11-10	2016-11-09
WEINSCHEL ENGINEERING	Attenuator	1A10dB	AA4135	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

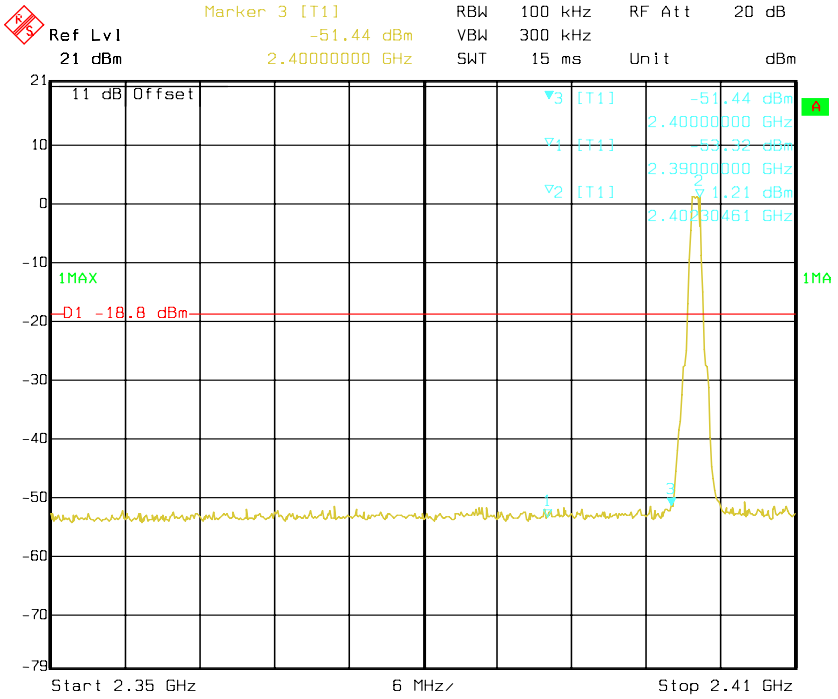
Temperature:	30 °C
Relative Humidity:	68 %
ATM Pressure:	94.5 kPa

The testing was performed by Mill Chen on 2016-07-12.

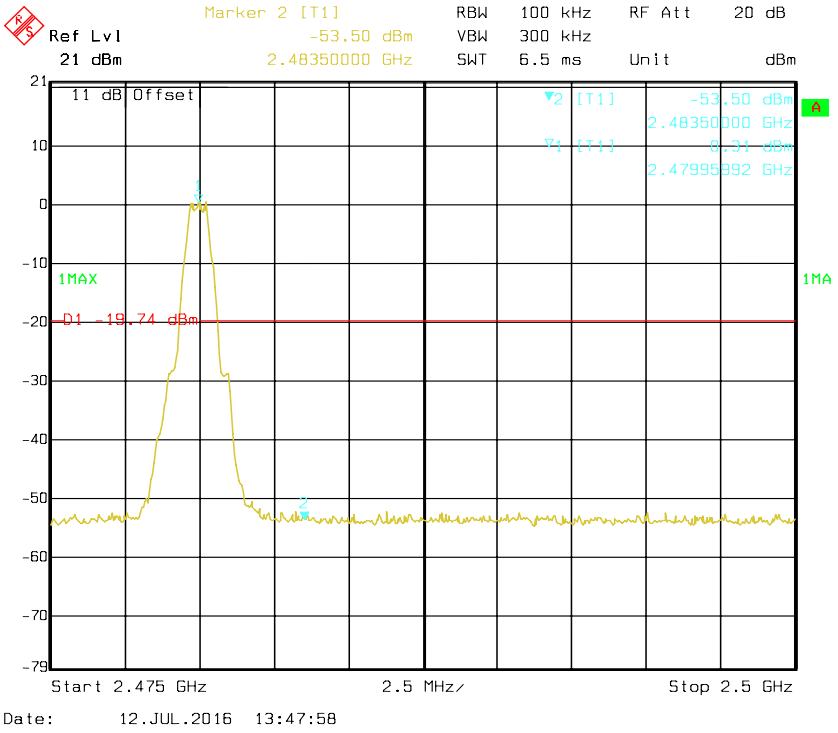
Test Mode: Transmitting

Test Result: Compliance, Please refer to following plots.

Band Edge, Left Side



Band Edge, Right Side



FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

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 was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. According to KDB 558074 D01 DTS Meas Guidance v03r05, set the RBW = 3 kHz, VBW = 10 kHz, Set the span to 1.5 times the DTS channel bandwidth.
4. Use the peak marker function to determine the maximum power level in any 3 kHz band segment within the fundamental EBW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2015-12-02	2016-12-01
N/A	SMA Cable	L-E-001-2	N/A	2015-11-10	2016-11-09
WEINSCHEL ENGINEERING	Attenuator	1A10dB	AA4135	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	30 °C
Relative Humidity:	68 %
ATM Pressure:	94.5 kPa

The testing was performed by Mill Chen on 2016-07-12.

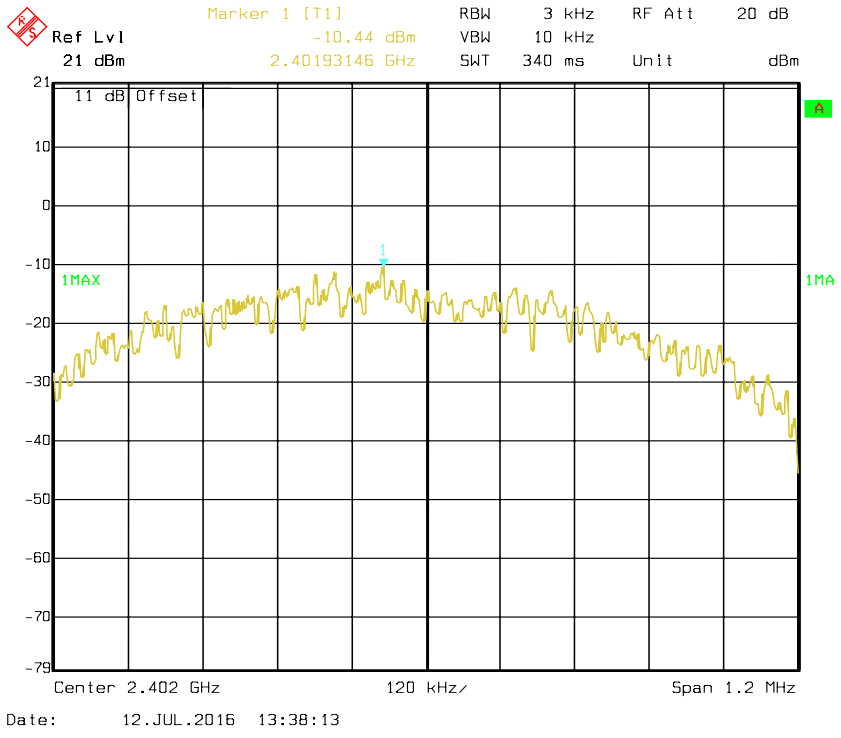
Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Result
GFSK	Low	2402	-10.44	8	Pass
	Middle	2440	-11.49	8	Pass
	High	2480	-12.36	8	Pass

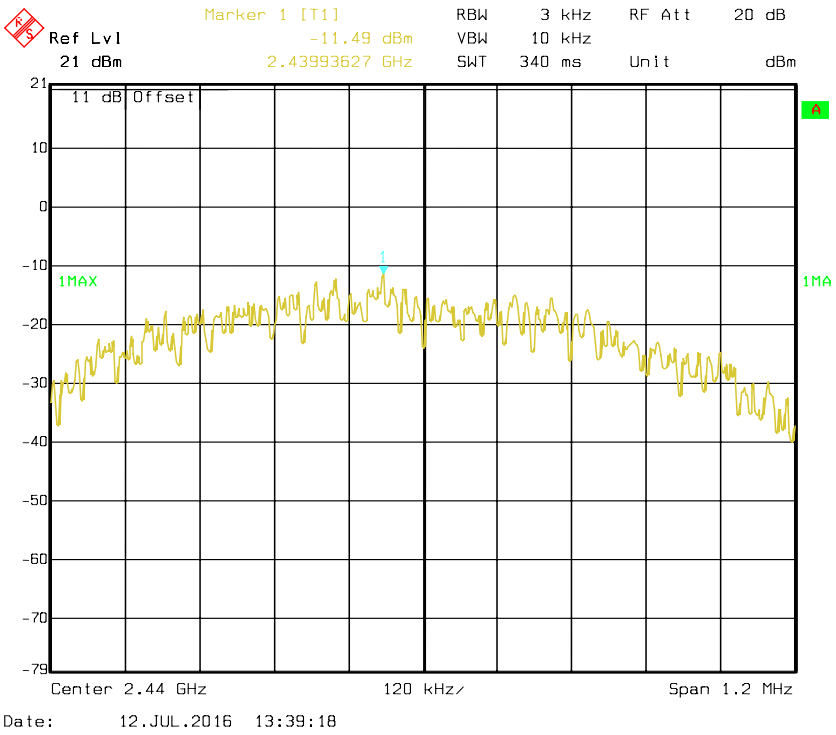
Note: Duty cycle is more than 98%.

Please refer to the following plots.

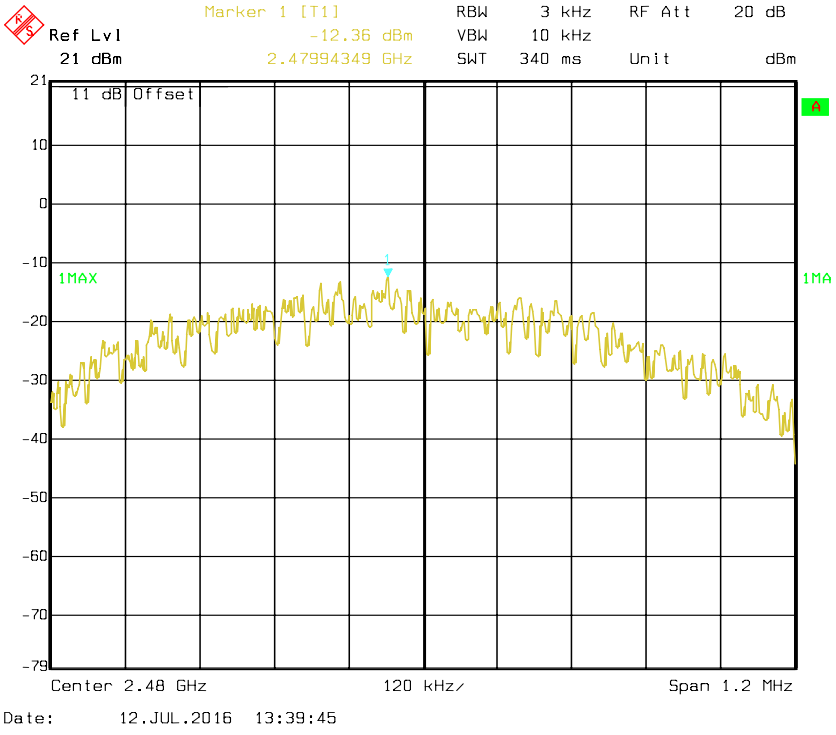
Power Spectral Density, Low Channel



Power Spectral Density, Middle Channel



Power Spectral Density, High Channel



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