

FCC PART 15 SUBPART C MEASUREMENT AND TEST REPORT

For

Guangzhou FiiO Electronics Technology Co., Ltd.

2/F, F Building, Hougang Industrial Zone, Shigang Huangshi West Road,
Baiyun District, Guangzhou City, China

E.U.T.: Portable High Resolution Music Player

Model Name: FX7121

Brand Name: FiiO

FCC ID: R56-FX7121

Report Number: NTC1511042F-1

Test Date(s): November 04, 2015 to November 22, 2015

Report Date(s): November 24, 2015

Prepared by

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Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Dongguan Nore Testing Center Co., Ltd. The test results referenced from this report are relevant only to the sample tested.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

This device is a Portable High Resolution Music Player with BT and Wi-Fi functions, it's powered by DC 5V come from USB port or DC 3.7V li-ion battery. For more details features, please refer to User's Manual.

Manufacturer/ Factory	: Guangzhou FiiO Electronics Technology Co., Ltd.
Address	: 2/F, F Building, Hougang Industrial Zone, Shigang Huangshi West Road, Baiyun District, Guangzhou City, China
Power Supply	: DC 5V Come from USB Port DC 3.7V li-ion battery
Test voltage	: AC 120V 60Hz(Adapter input), DC 3.7V Li-ion battery (Only the worst case was recorded in the report.)
Model name	: FX7121
Model difference	: None
Hardware version	: X7 WIFI_BT V03
Software version	: 001
Serial number	: N/A

Technical parameters

For WIFI Function

Frequency Range : 2412-2462MHz for 802.11b/g/n(HT20)

Modulation : CCK, DQPSK, DBPSK for 802.11b
OFDM for 802.11g/n

Number of Channel : 11 for 802.11b/g/n(HT20)

Channel space : 5MHz

Date Rate : 802.11b:1~11Mbps, 802.11g:6~54Mbps
802.11n: 6.5~72Mbps

Antenna Type : PCB antenna

Antenna Gain : 2 dBi

Note : This report only applies to modulation technology
DTS(BLE).

For BT function

BT Version:

BLE(V4.0) and backward compatible, 2.1+EDR version.

We prepare version BLE(V4.0) and 2.1+EDR for RF test.

Item	BT2.1+EDR	BLE(V4.0)
Frequency	2402-2480MHz	2402-2480MHz
Modulation	GFSK, $\pi/4$ -DQPSK, 8DPSK	GFSK
Number of Channel	79	40
Channel space	1MHz	2MHz
Antenna Type	PCB antenna	PCB antenna
Antenna Gain	2 dBi	2 dBi

BLE(V4.0) Channel List

Channel	Frequency MHz	Channel	Frequency MHz	Channel	Frequency MHz	Channel	Frequency MHz
1	2402	11	2422	21	2442	31	2462
2	2404	12	2424	22	2444	32	2464
3	2406	13	2426	23	2446	33	2466
4	2408	14	2428	24	2448	34	2468
5	2410	15	2430	25	2450	35	2470
6	2412	16	2432	26	2452	36	2472
7	2414	17	2434	27	2454	37	2474
8	2416	18	2436	28	2456	38	2476
9	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480

Note: According to section 15.31(m), regards to the operating frequency range over 10MHz, the Lowest, Middle, and the Highest frequency of channel were selected to perform the test. The selected frequency see below:

Channel	Frequency MHz
1	2402
21	2442
40	2480

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **R56-FX7121** filing to comply with Section 15.247 of the FCC Part 15(2014), Subpart C Rule.

1.3 Test Methodology

AC mains line-conducted, antenna port conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10: 2013. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters. All other measurements were made in accordance with the procedures in 47 CFR part 2.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

Adapter : Manufacturer: iStore
iStore: APA722AUI-50
M/N: APA722
Input: AC100-240V 50/60Hz, 0.5A
Output: DC5.0V 2.1A

1.6 Test Facility and Location

Listed by FCC, August 02, 2011
The Certificate Registration Number is 665078.
Listed by Industry Canada, July 01, 2011
The Certificate Registration Number is 46405-9743.

Dongguan NTC Co., Ltd.
(Full Name: Dongguan Nore Testing Center Co., Ltd.)

Building D, Gaosheng Science and Technology Park, Hongtu Road,
Nancheng District, Dongguan City, Guangdong, China
(Full Name: Building D, Gaosheng Science & Technology Park,
Zhouxi Longxi Road, Nancheng District, Dongguan, Guangdong, China.

1.7 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207 (a)	AC Power Conducted Emission	Compliance
§15.247(b)(3)	Max. Conducted Output Power	Compliance
§15.247(a)(2)	6dB &20dB Bandwidth	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247(d)	Band Edge and Conducted Spurious Emissions	Compliance
§15.247(d),§15.209, §15.205	Radiated Spurious Emissions and Restricted Bands	Compliance
§15.203	Antenna Requirement	Compliance

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 Special Accessories

Not available for this EUT intended for grant.

2.3 Description of test modes

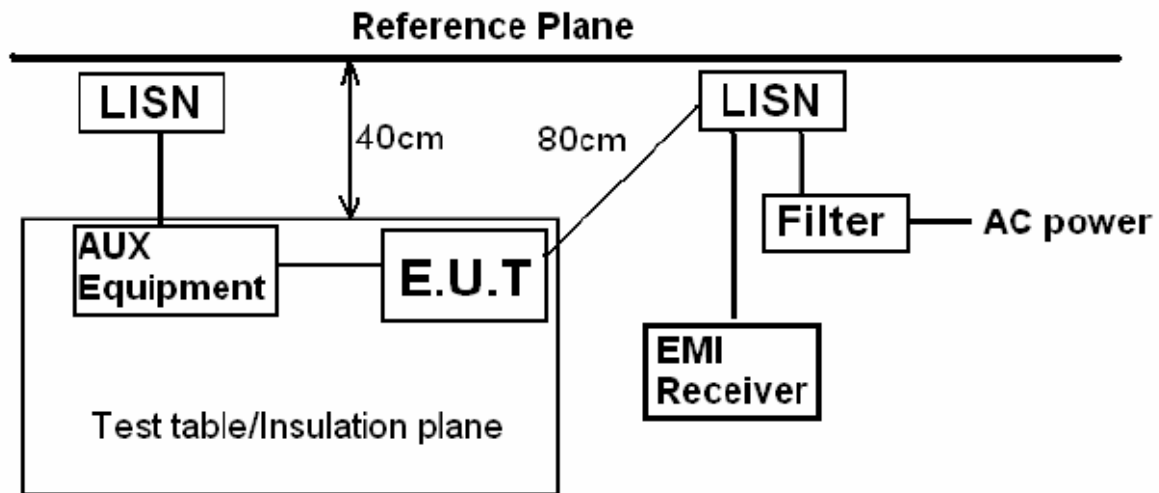
The EUT has been tested under continuous operating condition (The duty cycle >98%). Test program used to control the EUT staying in continuous transmitting mode. The Lowest, Middle and highest channel were chosen for testing, and modulation type GFSK was tested, but only the worst case data is shown in this report.

2.4 EUT Exercise

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

3. Conducted Emissions Test

3.1 Test SET-UP (Block Diagram of Configuration)



3.2 Test Condition

Test Requirement: FCC Part 15.207

Frequency Range: 150KHz ~ 30MHz

Detector: RBW 9KHz, VBW 30KHz

Operation Mode: Charging+BT Mode

3.3 Measurement Results

Please refer to following plots.

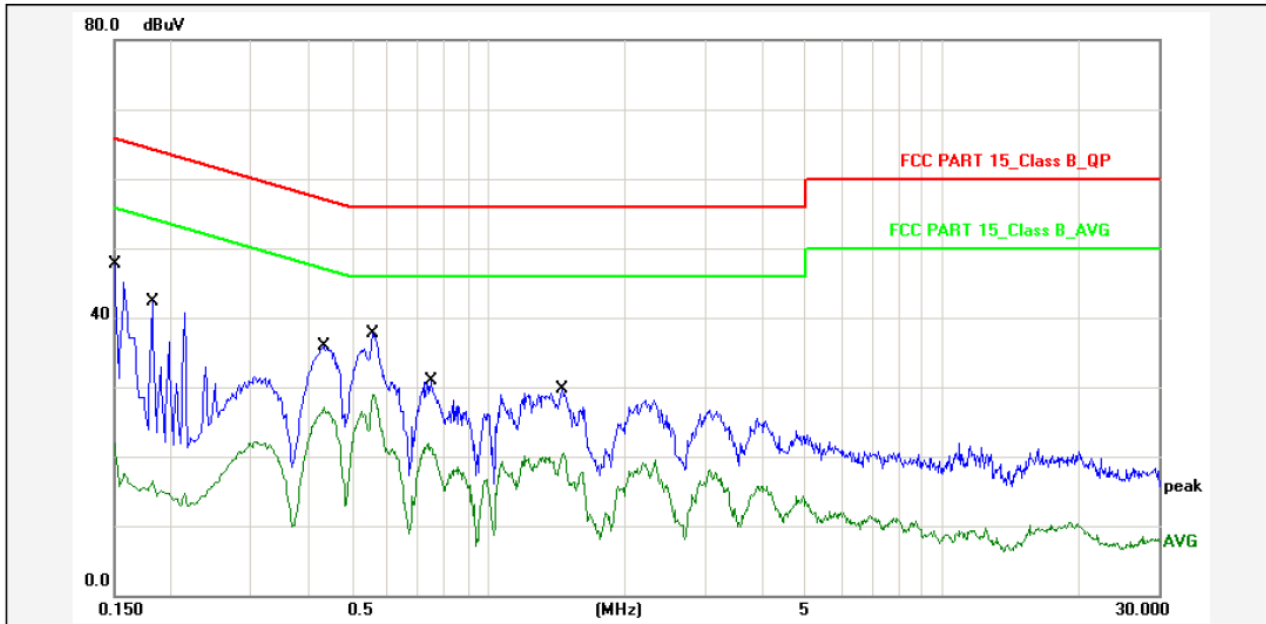
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Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2015-11-7 10:26:57



Report No.: FX7121

Test Standard: FCC PART 15_Class B_QP

Test item: Conducted Emission

Applicant: Fiio

Product: Portable High Resolution Music Player

Model No.: FX7121

Phase: L1

Temp.()/Hum.(%): 26(C) / 40 %

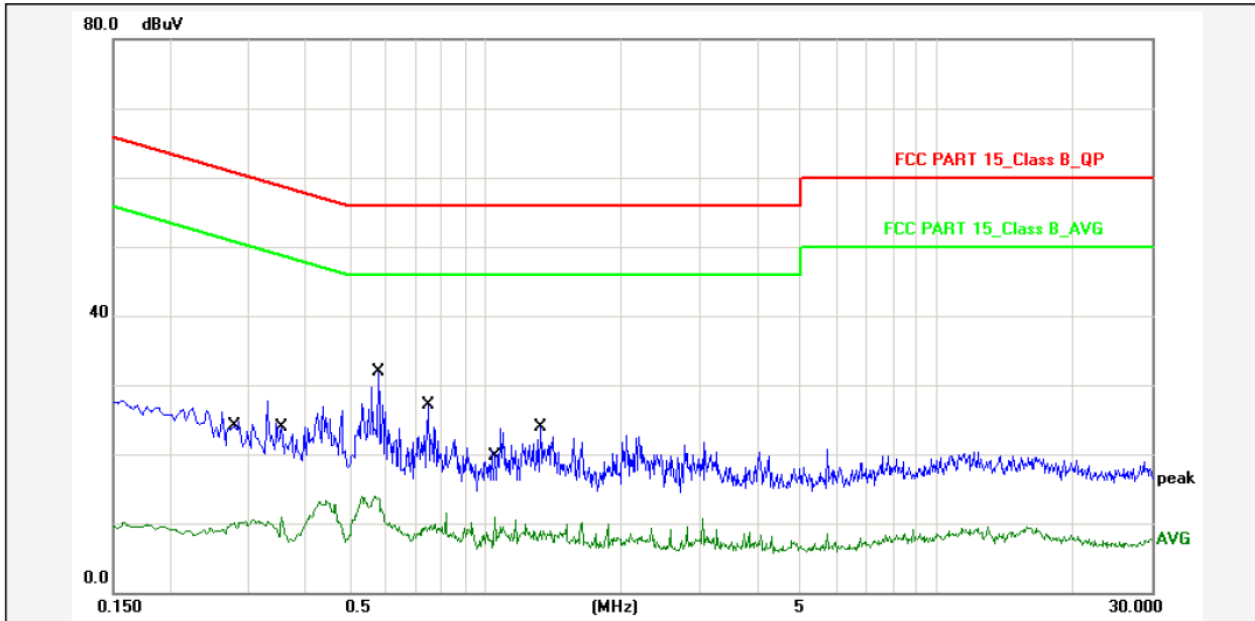
Power Rating: AC 120V 60Hz Adapter input

Test Engineer: Anson

Test Mode: Charging+BT Mode

Remark:

No.	Frequency (MHz)	Factor (dBμV)	Reading (dBμV)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	10.80	24.30	35.10	65.99	-30.89	QP	P	
2	0.1500	10.80	11.09	21.89	55.99	-34.10	AVG	P	
3	0.1819	10.80	19.80	30.60	64.39	-33.79	QP	P	
4	0.1819	10.80	5.67	16.47	54.39	-37.92	AVG	P	
5	0.4340	10.80	19.60	30.40	57.18	-26.78	QP	P	
6	0.4340	10.80	16.31	27.11	47.18	-20.07	AVG	P	
7	0.5620	10.80	21.80	32.60	56.00	-23.40	QP	P	
8	0.5620	10.80	18.12	28.92	46.00	-17.08	AVG	P	
9	0.7420	10.80	14.10	24.90	56.00	-31.10	QP	P	
10	0.7420	10.80	11.01	21.81	46.00	-24.19	AVG	P	
11	1.4660	10.80	12.90	23.70	56.00	-32.30	QP	P	
12	1.4660	10.80	9.64	20.44	46.00	-25.56	AVG	P	



Report No.: FX7121

Test Standard: FCC PART 15_Class B_QP

Test item: Conducted Emission

Applicant: Fiiio

Product: Portable High Resolution Music Player

Model No.: FX7121

Phase: N

Temp.()/Hum.(%): 26(C) / 40 %

Power Rating: AC 120V 60Hz Adapter input

Test Engineer: Anson

Test Mode: Charging+BT Mode

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2779	10.80	4.40	15.20	60.88	-45.68	QP	P	
2	0.2779	10.80	-0.78	10.02	50.88	-40.86	AVG	P	
3	0.3540	10.80	4.50	15.30	58.87	-43.57	QP	P	
4	0.3540	10.80	-1.80	9.00	48.87	-39.87	AVG	P	
5	0.5820	10.80	9.40	20.20	56.00	-35.80	QP	P	
6	0.5820	10.80	2.70	13.50	46.00	-32.50	AVG	P	
7	0.7500	10.80	12.26	23.06	56.00	-32.94	QP	P	
8	0.7500	10.80	-0.98	9.82	46.00	-36.18	AVG	P	
9	1.0540	10.80	10.85	21.65	56.00	-34.35	QP	P	
10	1.0540	10.80	0.04	10.84	46.00	-35.16	AVG	P	
11	1.3260	10.80	8.13	18.93	56.00	-37.07	QP	P	
12	1.3260	10.80	-0.92	9.88	46.00	-36.12	AVG	P	

4. Max. Conducted Output Power

4.1 Measurement Procedure

Maximum Conducted Output power at Antenna Terminals, FCC Rules 15.247(b)(3):

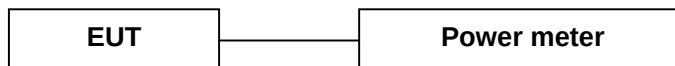
One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

$RBW \geq DTS \text{ bandwidth}$

This procedure shall be used when the measurement instrument has available a resolution bandwidth than is greater than the DTS bandwidth.

1. Set the $RBW \geq DTS \text{ bandwidth}$;
2. Set $VBW \geq 3 * RBW$;
3. Set $span \geq 3 * RBW$;
4. Sweep time = auto couple
5. Detector = peak
6. Trace mode = max hold;
7. Allow trace to fully stabilize;
8. Use peak marker function to determine the peak amplitude level.

4.2 Test SET-UP (Block Diagram of Configuration)



4.3 Measurement Results

Please refer to following table.

Modulation:	GFSK	Humidity :	50 %
Temperature :	24 °C	Test Date :	November 14, 2015
Test By:	Sance		
Test Result:	PASS		

Frequency MHz	Data Rate Mbps	Peak Output Power dBm	Limit dBm
Low Channel: 2402	1	7.33	30
Middle Channel: 2442	1	6.73	30
High Channel: 2480	1	6.84	30

5. 6dB & 20dB Bandwidth

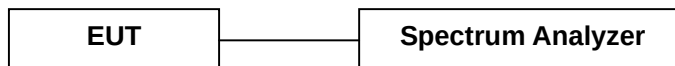
5.1 Measurement Procedure

DTS 6dB & 20dB Channel Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to FCC KDB558074(v03r03):

1. For 6dB bandwidth, Set the RBW = 100KHz.
For 20dB bandwidth, Set the RBW=1-5% of the OBW, not to exceed 1MHz.
2. Set the VBW $\geq 3 \times$ RBW
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB & 20dB relative to the maximum level measured in the fundamental emission.

5.2 Test SET-UP (Block Diagram of Configuration)



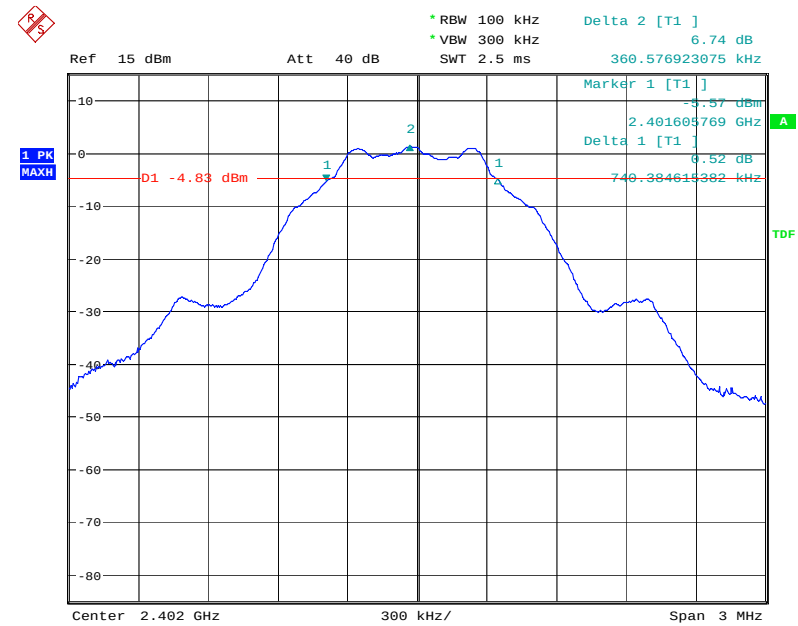
5.3 Measurement Results

Please refer to following table and plots.

Modulation:	GFSK		
Temperature :	24 °C	Humidity :	50 %
Test By:	Sance	Test Date :	November 14, 2015
Test Result:	PASS		

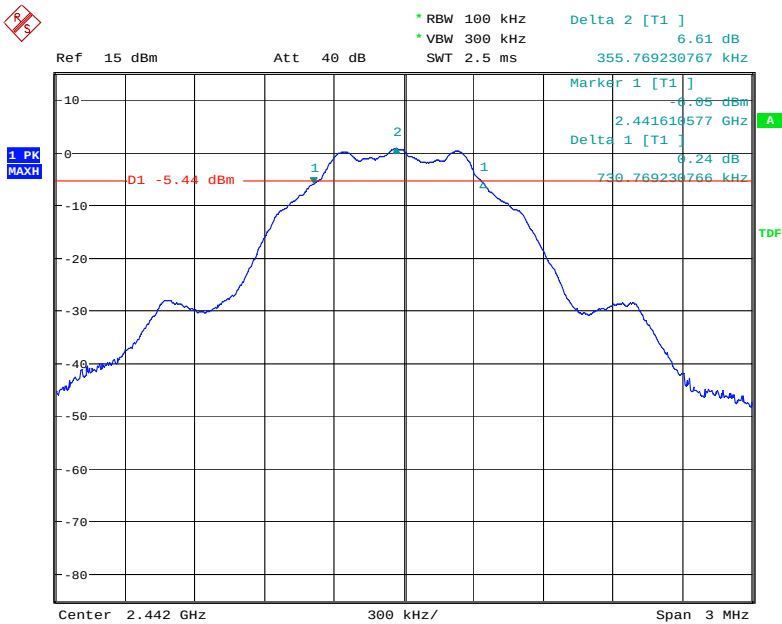
Frequency MHz	Data Rate Mbps	6dB Bandwidth KHz	20dB Bandwidth KHz	Limit
Low Channel: 2402	1	740	1125	>500KHz
Middle Channel: 2442	1	731	1125	>500KHz
High Channel: 2480	1	736	1120	>500KHz

6dB bandwidth Low Channel



Date: 14.NOV.2015 19:18:50

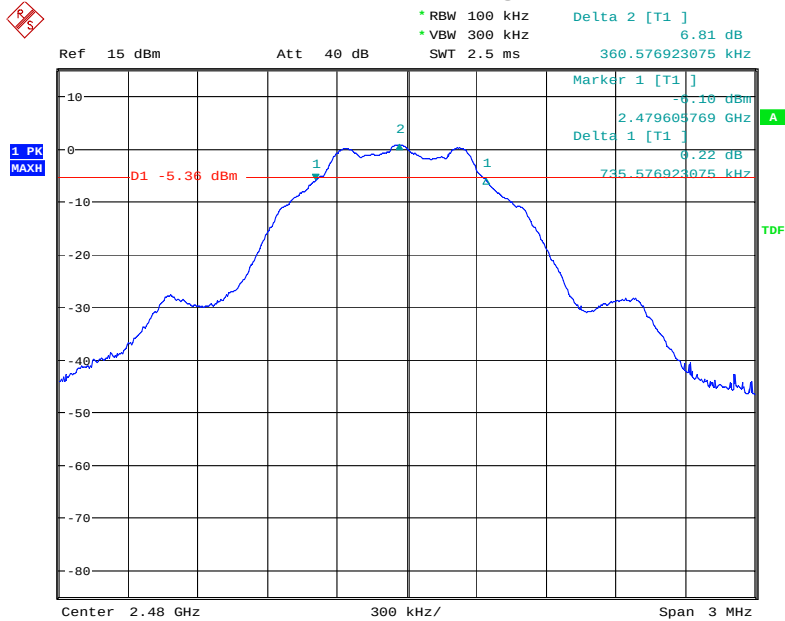
6dB bandwidth Middle Channel



Date: 14.NOV.2015 19:20:30

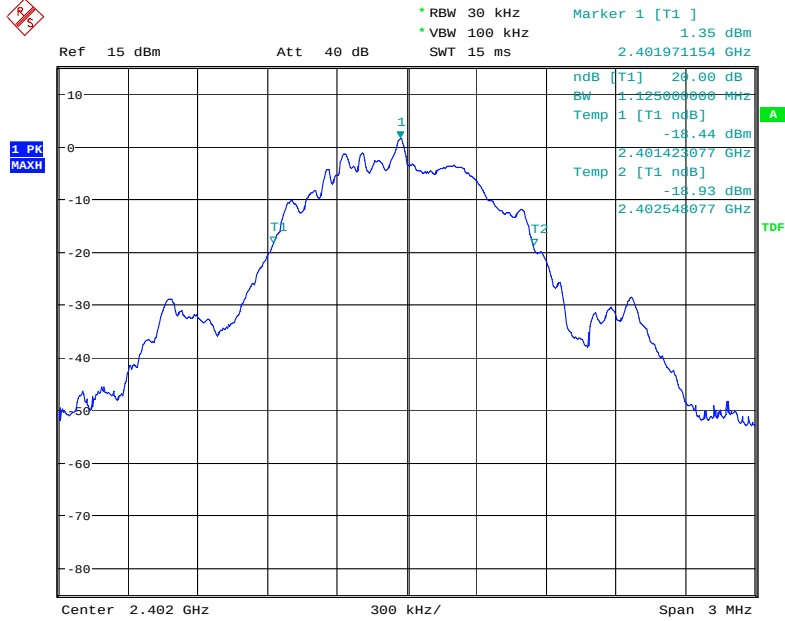


6dB bandwidth High Channel



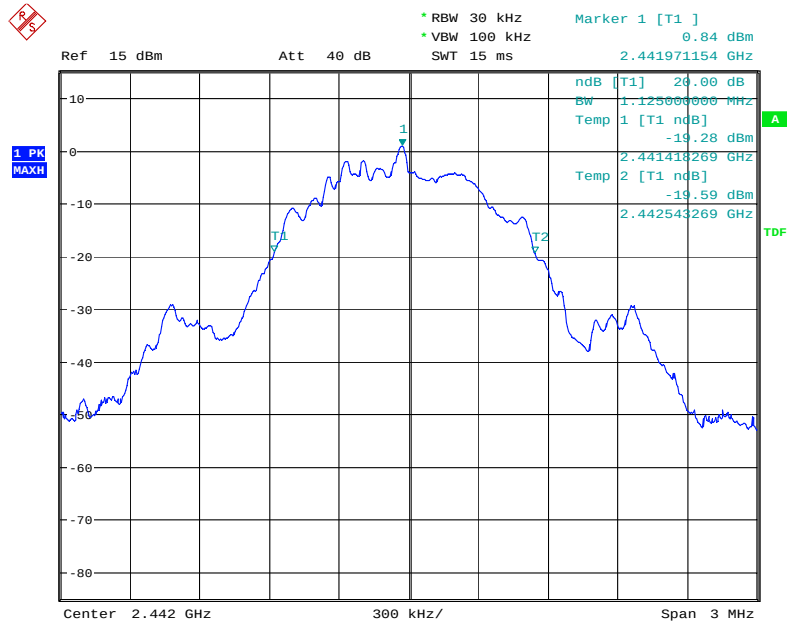
Date: 14.NOV.2015 17:26:28

20dB bandwidth Low Channel



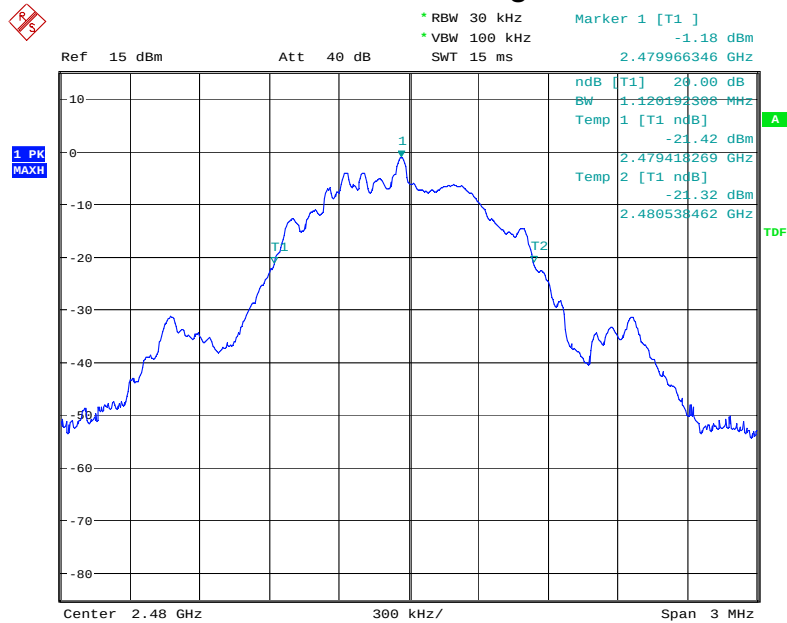
Date: 14.NOV.2015 17:32:07

20dB bandwidth Middle Channel



Date: 14.NOV.2015 17:33:07

20dB bandwidth High Channel



Date: 14.NOV.2015 17:34:02

6. Power Spectral Density

6.1 Measurement Procedure

DTS 6dB Channel Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to FCC KDB558074(v03r03):

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

6.2 Test SET-UP (Block Diagram of Configuration)



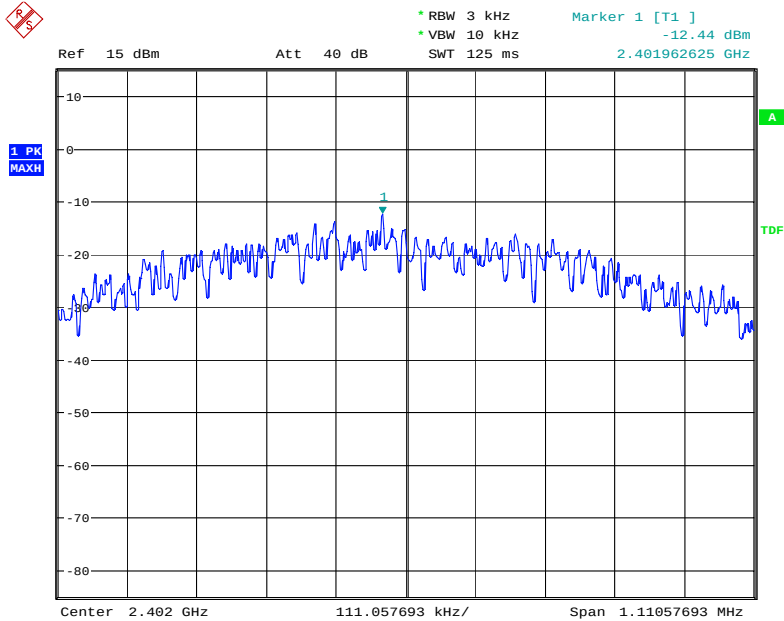
6.3 Measurement Results

Please refer to following table and plots.

Modulation:	GFSK		
Temperature :	24 °C	Humidity :	50 %
Test By:	Sance	Test Date :	November 14, 2015
Test Result:	PASS		

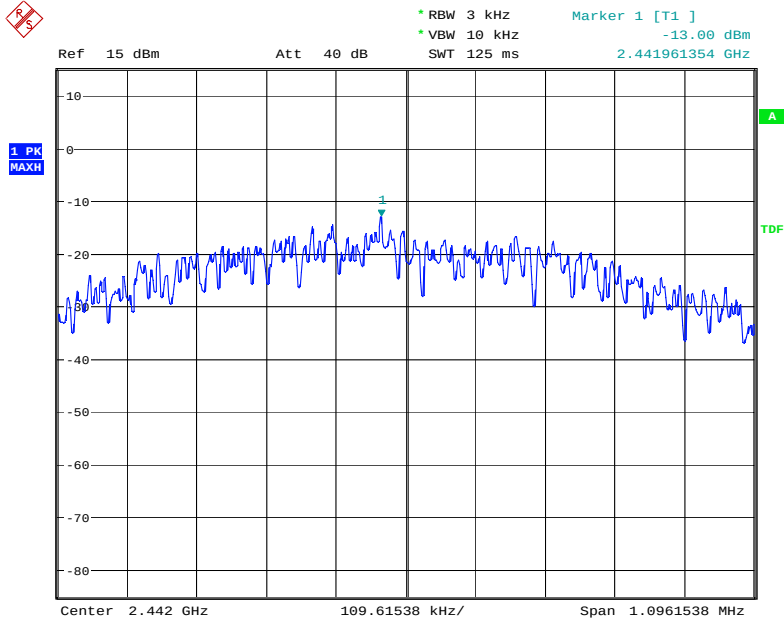
Frequency MHz	Data Rate Mbps	PSD dBm/3kHz	Limit dBm/3kHz
Low Channel: 2402	1	-12.44	8
Middle Channel: 2442	1	-13.00	8
High Channel: 2480	1	-12.89	8

Low Channel



Date: 14.NOV.2015 19:22:08

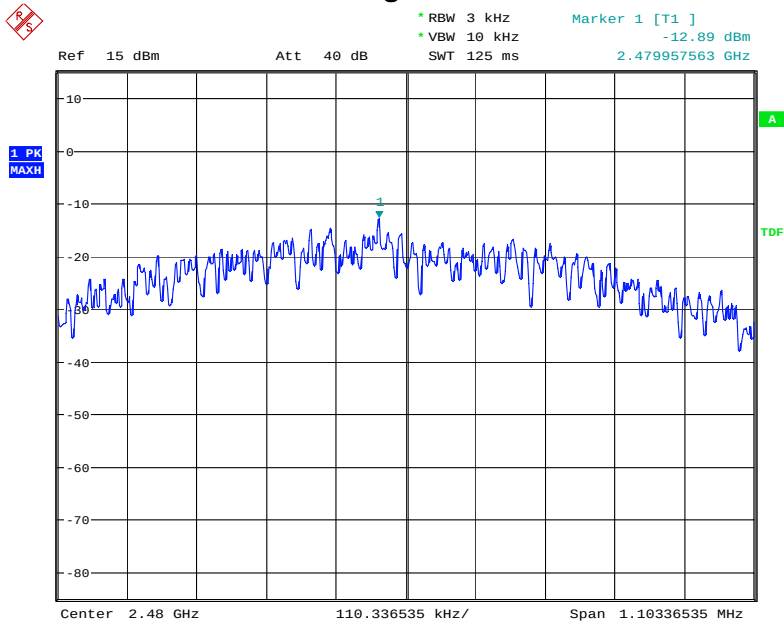
Middle Channel



Date: 14.NOV.2015 19:21:29



High Channel



Date: 14.NOV.2015 17:29:24

7. Band Edge and Conducted Spurious Emissions

7.1 Requirement and Measurement Procedure

In any 100KHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set according to FCC KDB558074(v03r03) clause 11.3.

A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

For 30MHz to 1GHz:

Set the spectrum analyzer as: RBW=120kHz, VBW=300kHz, Detector=Quasi-Peak

For Above 1GHz:

Set the spectrum analyzer as: RBW=1MHz, VBW=3MHz, Detector=Peak.

Set the spectrum analyzer as: RBW=1MHz, VBW=10Hz, Detector=Peak.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Level	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Results

The test plots and table showed all spurious emission and up to the tenth harmonic was measured and they were found to be at least 20dB below the highest level of the desired power in the passband. Please refer to below plots.

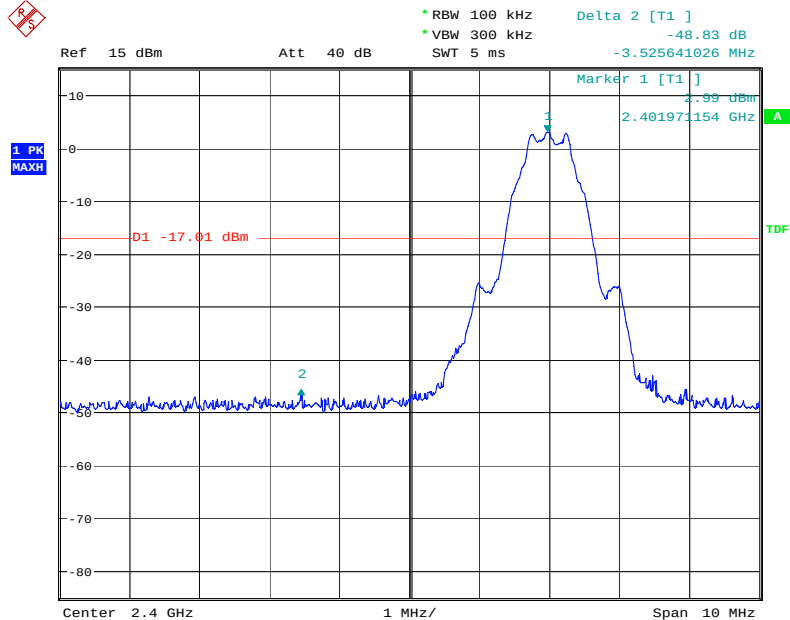
Hopping-on mode

Freq. (MHz)	Ant.Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
2390.000	H	38.60	25.83	8.06	46.66	33.89	74.00	54.00	-27.34	-20.11
2390.000	V	39.57	26.83	8.06	47.63	34.89	74.00	54.00	-26.37	-19.11
2483.500	H	44.43	33.83	8.36	52.79	42.19	74.00	54.00	-21.21	-11.81
2483.500	V	46.59	35.10	8.36	54.95	43.46	74.00	54.00	-19.05	-10.54

Note: (1) All Readings are Peak Value and AV.
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss
 (3) Measurement uncertainty : ± 3.7 dB

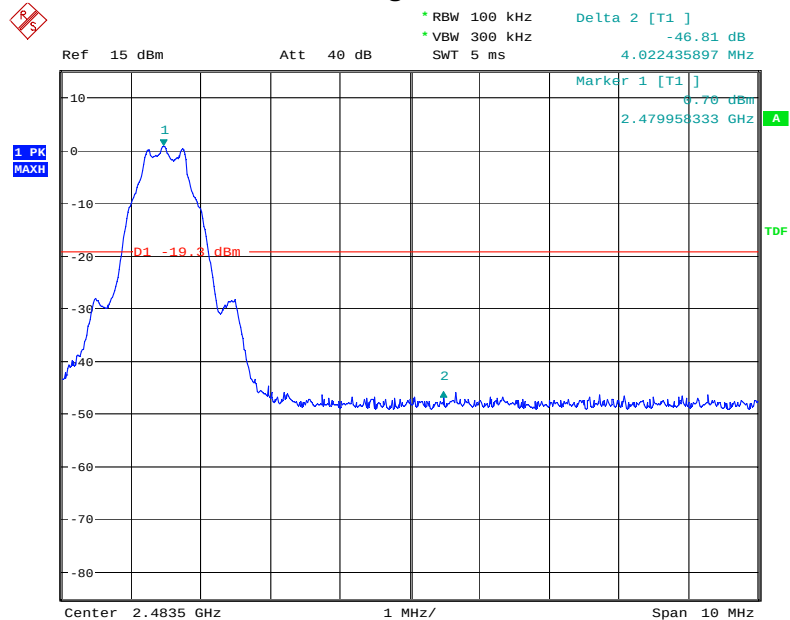


Band Edge
Low Channel



Date: 14.NOV.2015 17:30:20

High Channel



Date: 14.NOV.2015 17:31:14

Ref 15 dBm Att 40 dB RBW 1 MHz VBW 3 MHz SWT 145 ms

Marker 2 [T1] -26.22 dBm 1.742109667 GHz

Marker 1 [T1] -1.56 dBm 2.401317667 GHz

D1 -18.44 dBm

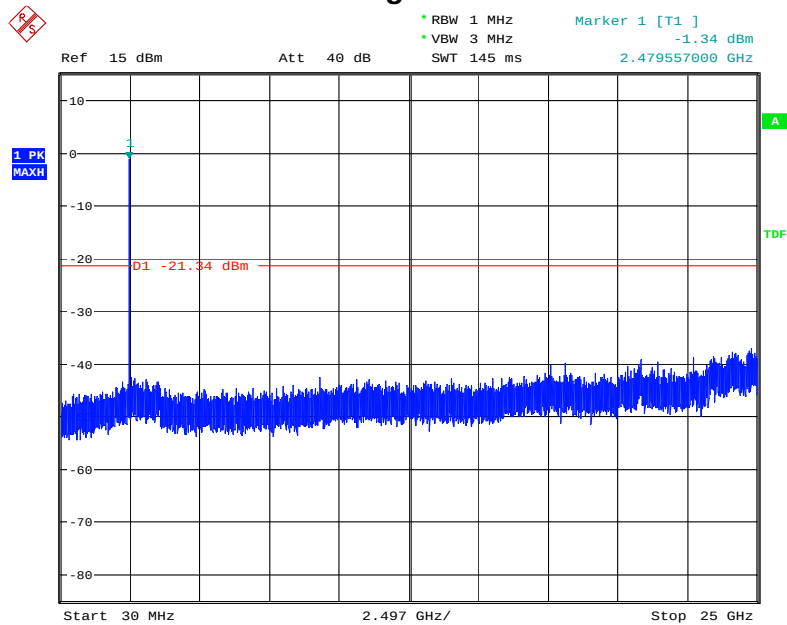
1 PK MAXH

Start 30 MHz 2.497 GHz/ Stop 25 GHz

Middle Channel

Date: 14.NOV.2015 17:43:08

High Channel



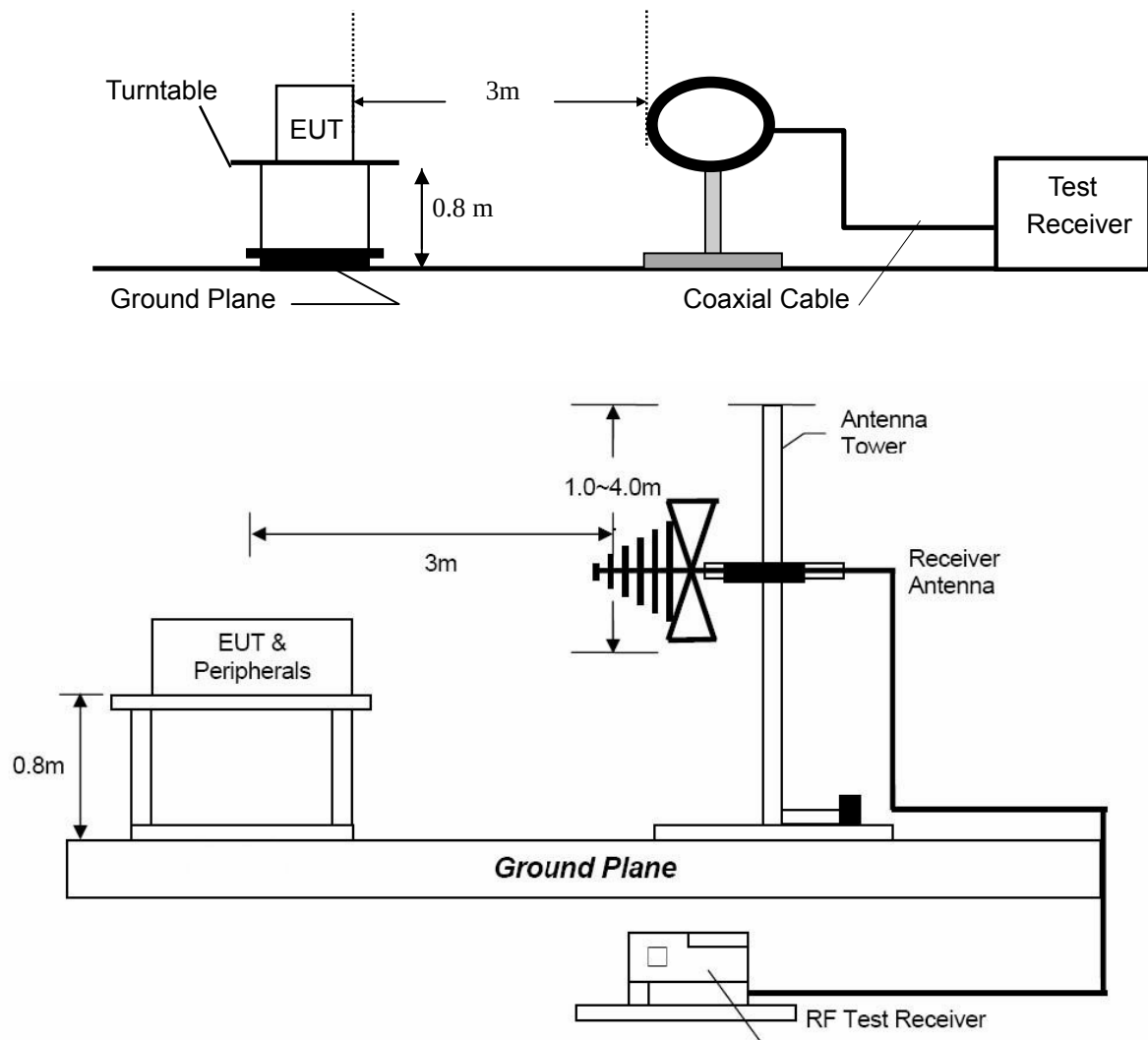
Date: 14.NOV.2015 17:42:19

Note: Sweep points=30001pts

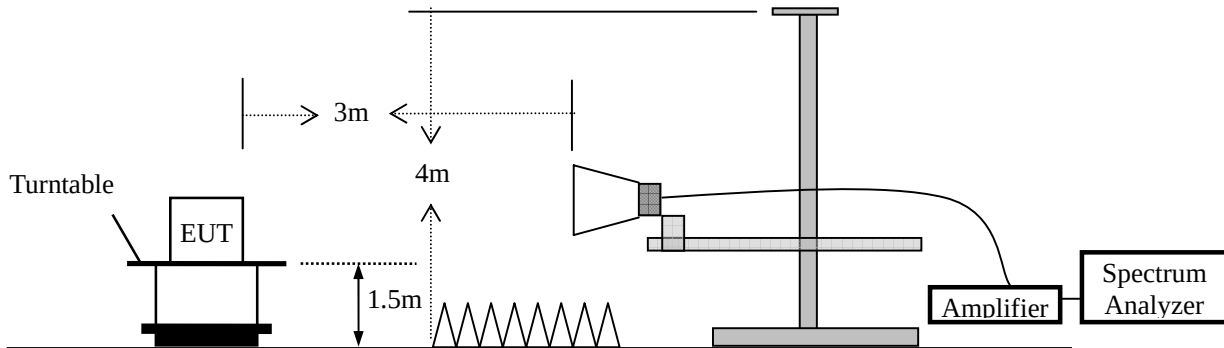
8. Radiated Spurious Emissions and Restricted Bands

8.1 Test SET-UP (Block Diagram of Configuration)

8.1.1 Radiated Emission Test Set-Up, Frequency Below 30MHz



8.1.2 Radiated Emission Test Set-Up, Frequency above 1GHz



8.2 Measurement Procedure

- Below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room. Above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
- A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

For 30MHz to 1GHz:

Set the spectrum analyzer as: RBW=120kHz, VBW=300kHz, Detector=Quasi-Peak

For Above 1GHz:

Set the spectrum analyzer as: RBW=1MHz, VBW=3MHz, Detector=Peak.

Set the spectrum analyzer as: RBW=1MHz, VBW=10Hz, Detector=Peak.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Level	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

8.3 Limit

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209)
		$\mu\text{V/m}$
0.009 ~ 0.490	300	$2400/F(\text{kHz})$
0.490 ~ 1.705	30	$24000/F(\text{kHz})$
1.705 ~ 30	30	30
30 ~ 88	3	100
88 ~ 216	3	150
216 ~ 960	3	200
Above 960	3	500

- Remark : (1) Emission level (dB) μV = 20 log Emission level $\mu\text{V/m}$
 (2) The smaller limit shall apply at the cross point between two frequency bands.
 (3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 (4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.
 (5) §15.247(d) specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

8.4 Measurement Results

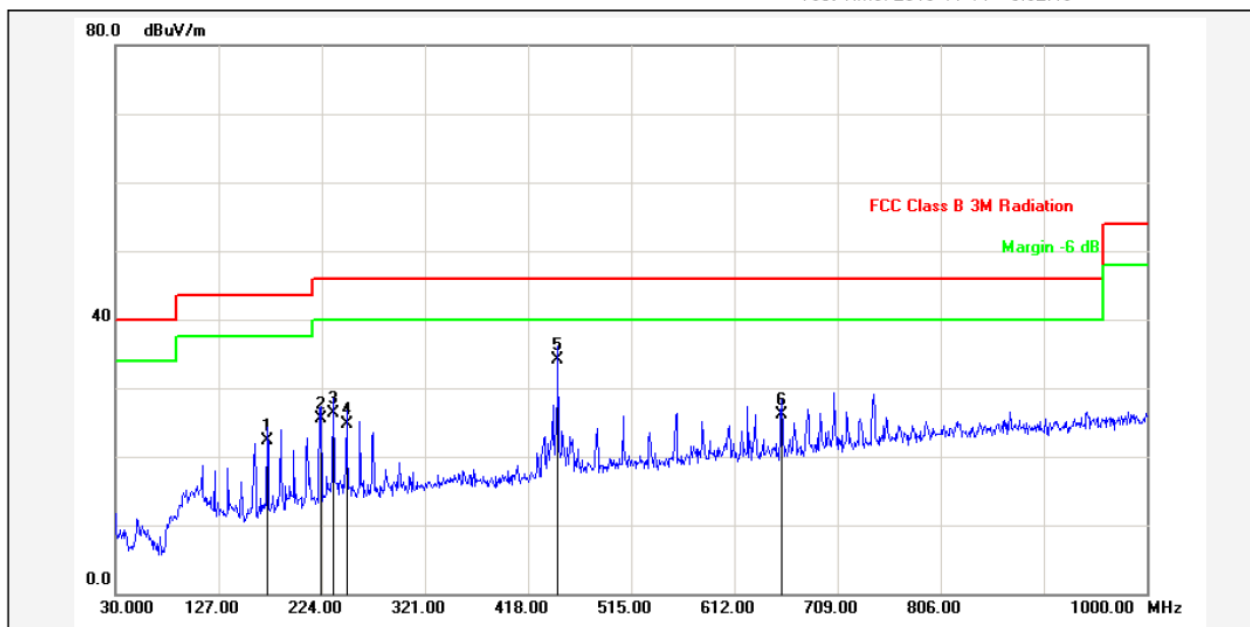
Please refer to following plots.



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

Site: Radiation

Test Time: 2015-11-14 8:52:15



Report No.: FX7121

Test Standard: FCC Class B 3M Radiation

Test item: Radiation Emission

Applicant: FiiO

Product: Portable High Resolution Music Player

Model No.: FX7121

Test Distance:

Ant. Polarization: Horizontal

Temp.(C)/Hum.(%): 21(C) / 55 %

Power Rating: DC 3.7V

Test Engineer: Jerry

Test Mode: BT Mode

Remark: GFSK Lowest channel BLE

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	172.5900	-14.65	37.05	22.40	43.50	-21.10	QP			P	
2	223.0300	-12.81	38.41	25.60	46.00	-20.40	QP			P	
3	234.6700	-12.26	38.66	26.40	46.00	-19.60	QP			P	
4	247.2800	-11.79	36.59	24.80	46.00	-21.20	QP			P	
5	446.1300	-8.06	42.26	34.20	46.00	-11.80	QP			P	
6	656.6200	-4.97	31.17	26.20	46.00	-19.80	QP			P	

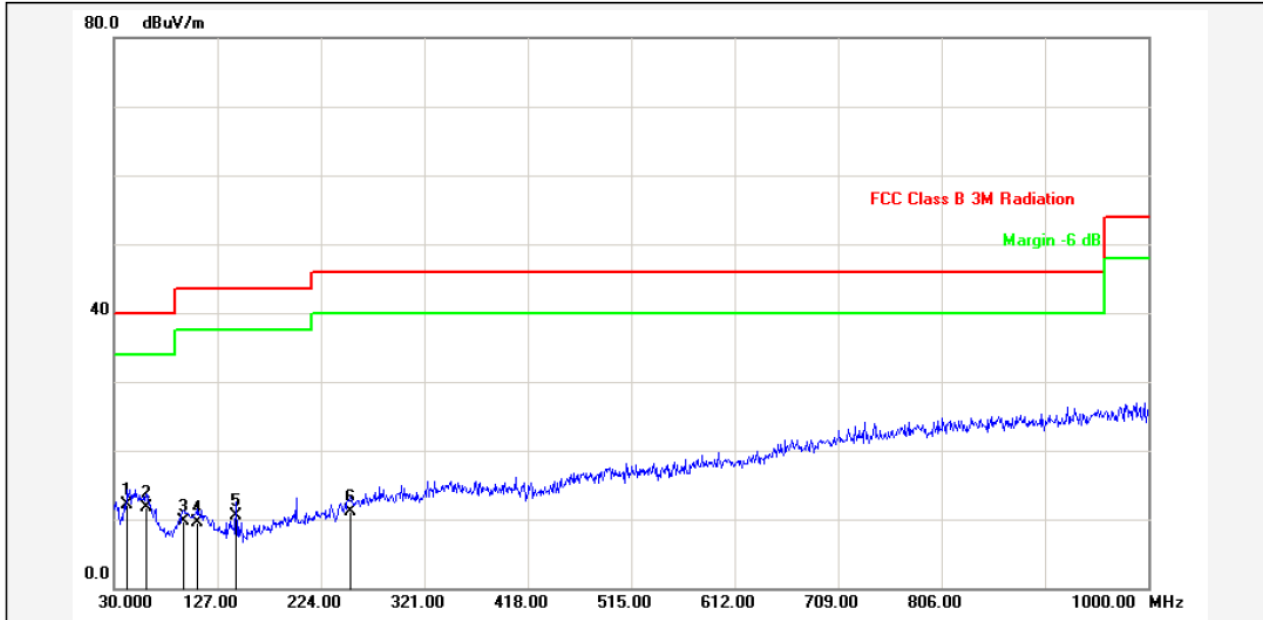
Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

Site: Radiation

Test Time: 2015-11-14 8:57:18



Report No.: FX7121

Test Standard: FCC Class B 3M Radiation

Test item: Radiation Emission

Applicant: FiiO

Product: Portable High Resolution Music Player

Model No.: FX7121

Test Distance:

Ant. Polarization: Vertical

Temp.(C)/Hum.(%): 21(C) / 55 %

Power Rating: DC 3.7V

Test Engineer: Jerry

Test Mode: BT Mode

Remark: GFSK Lowest channel BLE

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	42.6100	-14.28	26.48	12.20	40.00	-27.80	QP			P	
2	60.0700	-14.38	26.08	11.70	40.00	-28.30	QP			P	
3	94.9900	-15.77	25.57	9.80	43.50	-33.70	QP			P	
4	107.6000	-16.06	25.56	9.50	43.50	-34.00	QP			P	
5	144.4600	-18.60	29.10	10.50	43.50	-33.00	QP			P	
6	251.1600	-13.67	24.87	11.20	46.00	-34.80	QP			P	

Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

Modulation:	GFSK	Test Date :	November 19, 2015
Frequency Range:	1-25GHz	Temperature :	24 °C
Test Result:	PASS	Humidity :	50 %
Measured Distance:	3m		
Test By:	Sance		

Freq. (MHz)	Ant.Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: TX Mode (Low)										
4804	V	40.06	25.46	14.63	54.69	40.09	74.00	54.00	-19.31	-13.91
7206	V	37.18	23.41	20.68	57.86	44.09	74.00	54.00	-16.14	-9.91

4804	H	39.45	25.69	14.63	54.08	40.32	74.00	54.00	-19.92	-13.68
7206	H	37.02	23.48	20.68	57.70	44.16	74.00	54.00	-16.30	-9.84

Operation Mode: TX Mode (Mid)										
4884	V	39.80	25.45	14.98	54.78	40.43	74.00	54.00	-19.22	-13.57
7326	V	37.05	23.86	20.93	57.98	44.79	74.00	54.00	-16.02	-9.21

4884	H	39.40	26.15	14.98	54.38	41.13	74.00	54.00	-19.62	-12.87
7326	H	37.30	23.86	20.93	58.23	44.79	74.00	54.00	-15.77	-9.21

Operation Mode: TX Mode (High)										
4960	V	39.98	25.31	15.30	55.28	40.61	74.00	54.00	-18.72	-13.39
7440	V	37.74	24.00	21.16	58.90	45.16	74.00	54.00	-15.10	-8.84

4960	H	39.74	25.34	15.30	55.04	40.64	74.00	54.00	-18.96	-13.36
7440	H	38.47	24.01	21.16	59.63	45.17	74.00	54.00	-14.37	-8.83

Other harmonics emissions are lower than 10dB below the allowable limit.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level + Factor
 - (3) Factor= Antenna Gain + Cable Loss – Amplifier Gain
 - (4) Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.
 - (5) Measurement uncertainty : $\pm 3.7\text{dB}$.
 - (6) Horn antenna used for the emission over 1000MHz.

9. Antenna Application

9.1 Antenna requirement

According to of FCC part 15C section 15.203 and 15.240:

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, 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.

Systems operating in the 2400-2483.5MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

9.2 Measurement Results

The antenna is PCB antenna and no consideration of replacement, and the best case gain of the antenna is 2.0dBi. So, the antenna is consider meet the requirement.

10. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Characteristics	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	9KHz~7GHz	Nov. 24, 2014	Nov. 23, 2015
Antenna	Schwarzbeck	VULB9162	9162-010	30MHz~7GHz	Nov. 27, 2014	Nov. 26, 2015
Positioning Controller	UC	UC 3000	N/A	0~360° , 1-4m	N/A	N/A
Color Monitor	SUNSP0	SP-140A	N/A	N/A	N/A	N/A
Single Phase Power Line Filter	SAEMC	PF201A-32	110210	32A	N/A	N/A
3 Phase Power Line Filter	SAEMC	PF401A-200	110318	200A	N/A	N/A
DC Power Filter	SAEMC	PF301A-200	110245	200A	N/A	N/A
Cable	Huber+Suhner	CBL2-NN-1M	22390001	9KHz~7GHz	Nov. 07, 2015	Nov. 06, 2016
Cable	Huber+Suhner	CIL02	N/A	9KHz~7GHz	Nov. 07, 2015	Nov. 06, 2016
RF Cable	Huber+Suhner	SF-104	MY16559/4	9KHz~25GHz	Mar. 07, 2015	Mar. 06, 2016
Power Amplifier	HP	HP 8447D	1145A00203	100KHz~1.3GHz	Nov. 07, 2015	Nov. 06, 2016
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	15GHz~26.5GHz	Oct.23, 2015	Oct.22, 2016
Horn Antenna	Com-Power	AH-118	071078	1GHz~18GHz	Nov. 05, 2015	Nov. 04, 2016
Loop antenna	Daze	ZA30900A	0708	9KHz~30MHz	Oct.10, 2015	Oct.09, 2016
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	20Hz~26.5GHz	Sep. 01, 2015	Aug. 31, 2016
Pre-Amplifier	Agilent	8449B	3008A02964	1GHz~26.5GHz	Nov. 03, 2015	Nov. 02, 2016
L.I.S.N.	Rohde & Schwarz	ENV 216	101317	9KHz~30MHz	Nov. 07, 2015	Nov. 06, 2016
Temporary antenna connector	TESCOM	SS402	N/A	1G-18GHz	N/A	N/A
Power Meter	Anritsu	ML2495A	1139001	100k-65GHz	Nov. 05, 2015	Nov. 04, 2016
Power Sensor	Anritsu	MA2411B	100345	300M-40GHz	Nov. 05, 2015	Nov. 04, 2016

---End---