FCC REPORT

Applicant: Archos SA

Address of Applicant: 12 Rue Ampere lgny France 91430

Equipment Under Test (EUT)

Product Name: A80H

Model No.: 9081

Trade mark: Archos

FCC ID: SOV9081

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247:2010

Date of sample receipt: Aug. 26, 2011

Date of Test: Aug. 29-Sep. 27, 2011

Date of report issued: Sep. 28, 2011

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Kavin Yu
Laboratory Manager

2 Version

Version No.	Date	Description
00	*Sep. 28, 2011*	*Original*

Prepared By: Collin. He *Date:* Sep. 28, 2011

Project Engineer

Check By: Hans. Hu *Date:* Sep. 28, 2011

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203/15.247 (c)	PASS
AC Power Line Conducted Emission	15.207	PASS
Conducted Peak Output Power	15.247 (b)(1)	PASS
20dB Occupied Bandwidth	15.247 (a)(1)	PASS
Carrier Frequencies Separation	15.247 (a)(1)	PASS
Hopping Channel Number	15.247 (a)(1)	PASS
Dwell Time	15.247 (a)(1)	PASS
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)&TCB Exclusion List (7 July 2002)	PASS
Radiated Emission	15.205/15.209	PASS
Band Edge	15.247(d)	PASS

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	Archos SA
Address of Applicant:	12 Rue Ampere lgny France 91430
Manufacturer:	Archos SA
Address of Manufacturer:	12 Rue Ampere lgny France 91430
Factory:	Excelsior Electronics
Address of Factory:	Sam Tuen Management Zone, Houjie, Dongguan Guangdong PRC

5.2 General Description of E.U.T.

Product Name:	A80H
Model No.:	9081
Trade mark:	Archos
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	79
Channel separation:	1MHz
Modulation type:	Frequency Hopping Spread Spectrum (FHSS)
Modulation Technology:	GFSK, Pi/4QPSK, 8DPSK
Antenna Type:	Integral
Antenna gain:	2dBi (declare by manufacturer)
Power supply:	Model:MD-TRC0620DC Input: AC 100-240V 0.3A(MAX)50/60Hz Output: DC 5.0V1.5A

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz
4	2405MHz	24	2425MHz	44	2445MHz	64	2465MHz
5	2406MHz	25	2426MHz	45	2446MHz	65	2466MHz
6	2407MHz	26	2427MHz	46	2447MHz	66	2467MHz
7	2408MHz	27	2428MHz	47	2448MHz	67	2468MHz
8	2409MHz	28	2429MHz	48	2449MHz	68	2469MHz
9	2410MHz	29	2430MHz	49	2450MHz	69	2470MHz
10	2411MHz	30	2431MHz	50	2451MHz	70	2471MHz
11	2412MHz	31	2432MHz	51	2452MHz	71	2472MHz
12	2413MHz	32	2433MHz	52	2453MHz	72	2473MHz
13	2414MHz	33	2434MHz	53	2454MHz	73	2474MHz
14	2415MHz	34	2435MHz	54	2455MHz	74	2475MHz
15	2416MHz	35	2436MHz	55	2456MHz	75	2476MHz
16	2417MHz	36	2437MHz	56	2457MHz	76	2477MHz
17	2418MHz	37	2438MHz	57	2458MHz	77	2478MHz
18	2419MHz	38	2439MHz	58	2459MHz	78	2479MHz
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz
20	2421MHz	40	2441MHz	60	2461MHz		

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The Highest channel	2480MHz

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1008 mbar
Test mode:	
Transmitting mode	Keep the EUT in transmitting continuously mode.

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, July 20, 2010.

● **Industry Canada (IC)**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-1.

5.5 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China Tel: 0755-27798480 Fax: 0755-27798960

5.6 Other Information Requested by the Customer

None.

5.7 Test Instruments list

Radiated Emission:

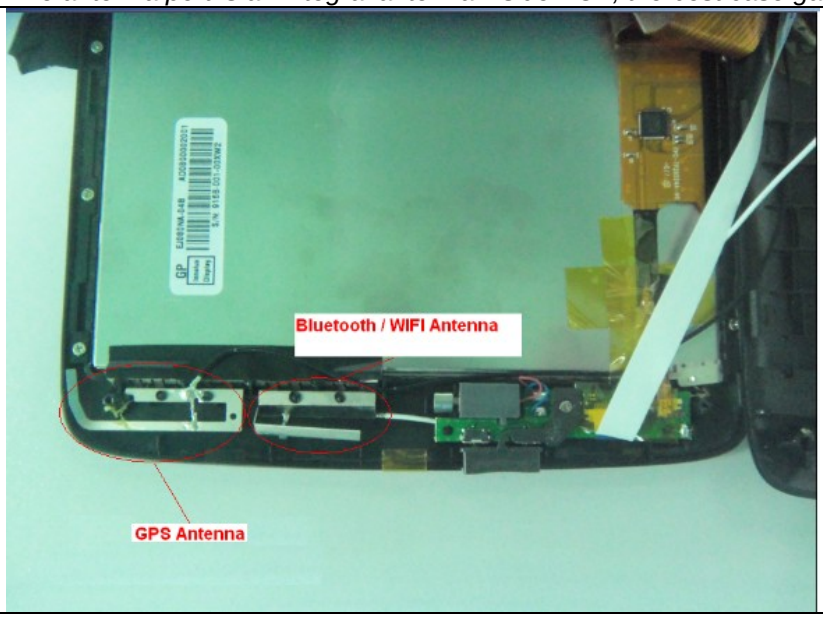
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 30 2011	Mar. 29 2012
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 04 2011	Jul. 03 2012
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 26 2011	Feb. 25 2012
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 30 2011	June 29 2012
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 30 2011	Mar. 29 2012
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	Apr. 01 2011	Mar. 31 2012
9	Coaxial Cable	GTS	N/A	GTS211	Apr. 01 2011	Mar. 31 2012
9	Coaxial cable	GTS	N/A	GTS210	Apr. 01 2011	Mar. 31 2012
11	Coaxial Cable	GTS	N/A	GTS212	Apr. 01 2011	Mar. 31 2012
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 04 2011	Jul. 03 2012
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 04 2011	Jul. 03 2012
14	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 30 2011	June 29 2012
15	Band filter	Amindeon	82346	GTS219	June 30 2011	June 29 2012

Conducted Emission:

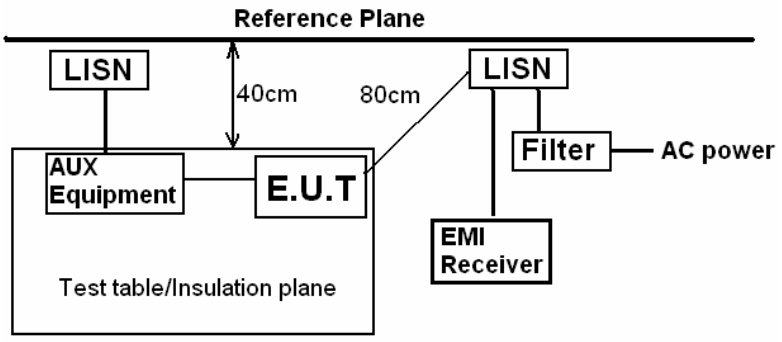
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS252	Jul. 04 2011	Jul. 03 2012
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jul. 04 2011	Jul. 03 2012
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jul. 04 2011	Jul. 03 2012
4	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jul. 04 2011	Jul. 03 2012
5	Coaxial Cable	GTS	N/A	GTS227	Apr. 01 2011	Mar. 31 2012
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement:

Standard requirement:	**FCC Part15 C Section 15.203 /247(c)**
15.203 requirement: *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.* *15.247(c) (1)(i) requirement:* *(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.*	
E.U.T Antenna:	
The antenna port is an integral antenna inside EUT, the best case gain of the antenna is 2.0dBi.	
	

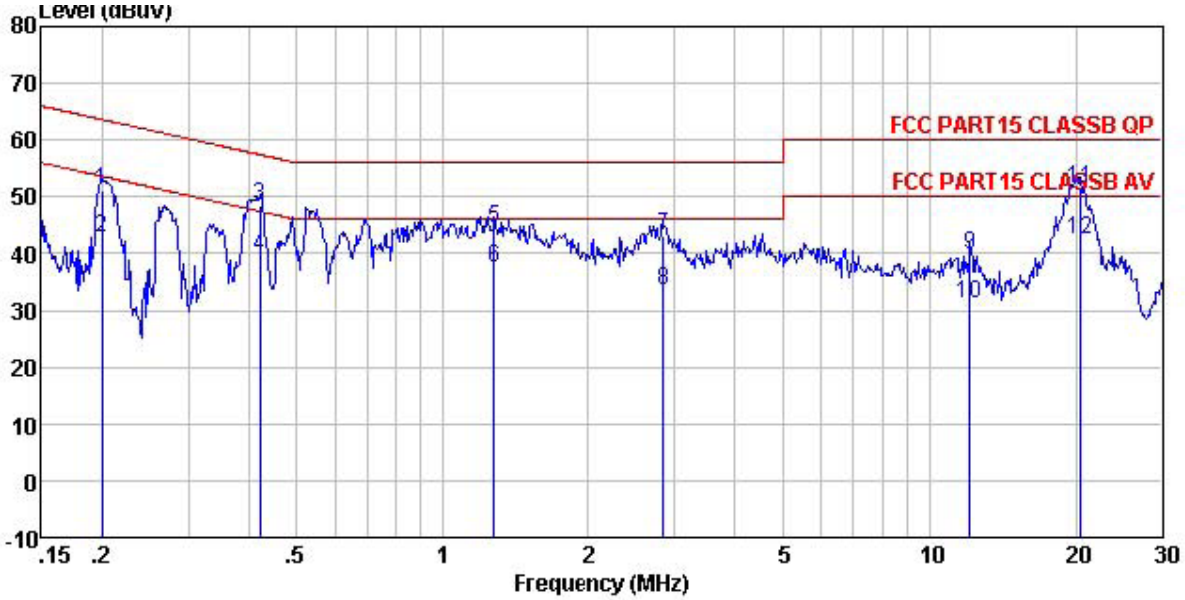
6.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.4:2009
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test procedure	The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

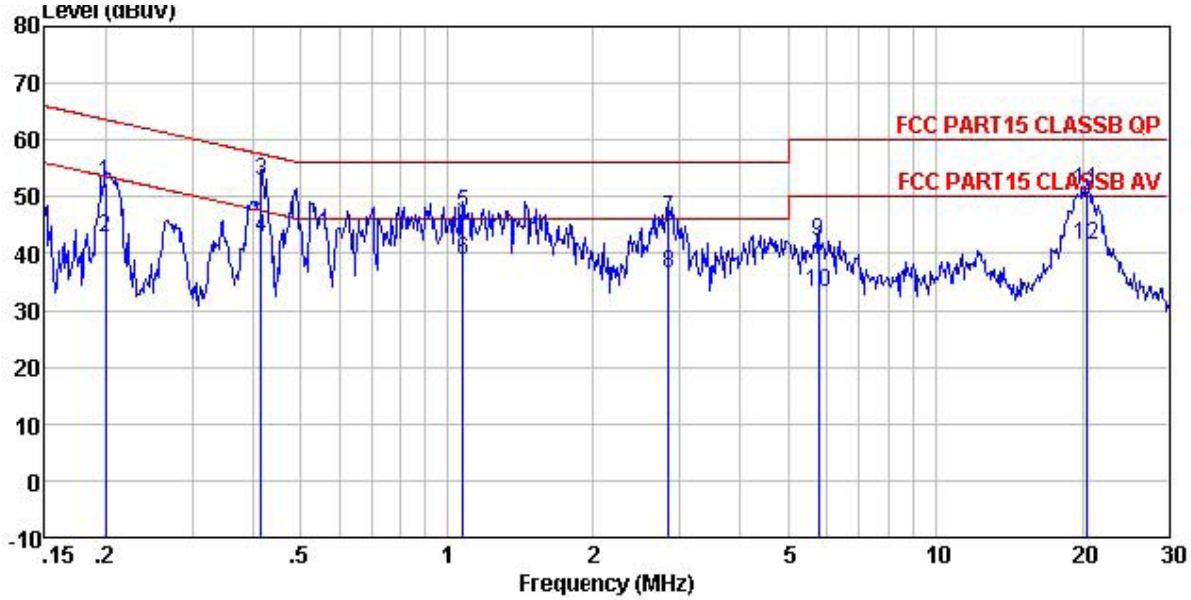
Line:



Condition : FCC PART15 CLASSB QP LISN(2011) LINE
Job No. : 732IT
Test Mode : Bluetooth mode
Test Engineer: Collin

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.200	50.29	0.66	0.10	51.05	63.62	-12.57	QP
2	0.200	42.18	0.66	0.10	42.94	53.62	-10.68	Average
3	0.421	47.63	0.57	0.10	48.30	57.42	-9.12	QP
4	0.421	38.65	0.57	0.10	39.32	47.42	-8.10	Average
5	1.269	44.01	0.45	0.10	44.56	56.00	-11.44	QP
6	1.269	36.94	0.45	0.10	37.49	46.00	-8.51	Average
7	2.854	42.70	0.36	0.10	43.16	56.00	-12.84	QP
8	2.854	33.19	0.36	0.10	33.65	46.00	-12.35	Average
9	12.124	39.37	0.20	0.20	39.77	60.00	-20.23	QP
10	12.124	30.83	0.20	0.20	31.23	50.00	-18.77	Average
11	20.486	51.20	0.14	0.21	51.55	60.00	-8.45	QP
12	20.486	42.18	0.14	0.21	42.53	50.00	-7.47	Average

Neutral:



Condition : FCC PART15 CLASSB QP LISN(2011) NEUTRAL
Job No. : 732IT
Test Mode : Bluetooth mode
Test Engineer: Collin

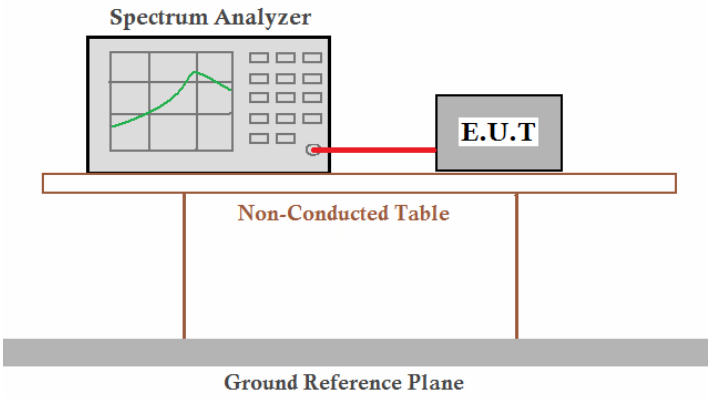
	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.200	51.63	0.66	0.10	52.39	63.62	-11.23	QP
2	0.200	42.19	0.66	0.10	42.95	53.62	-10.67	Average
3	0.415	52.03	0.58	0.10	52.71	57.55	-4.84	QP
4	0.415	42.11	0.58	0.10	42.79	47.55	-4.76	Average
5	1.071	46.45	0.47	0.10	47.02	56.00	-8.98	QP
6	1.071	38.19	0.47	0.10	38.76	46.00	-7.24	Average
7	2.854	45.69	0.36	0.10	46.15	56.00	-9.85	QP
8	2.854	36.19	0.36	0.10	36.65	46.00	-9.35	Average
9	5.774	41.79	0.28	0.11	42.18	60.00	-17.82	QP
10	5.774	32.77	0.28	0.11	33.16	50.00	-16.84	Average
11	20.486	50.65	0.14	0.21	51.00	60.00	-9.00	QP
12	20.486	40.99	0.14	0.21	41.34	50.00	-8.66	Average

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

6.3 Conducted Peak Output Power

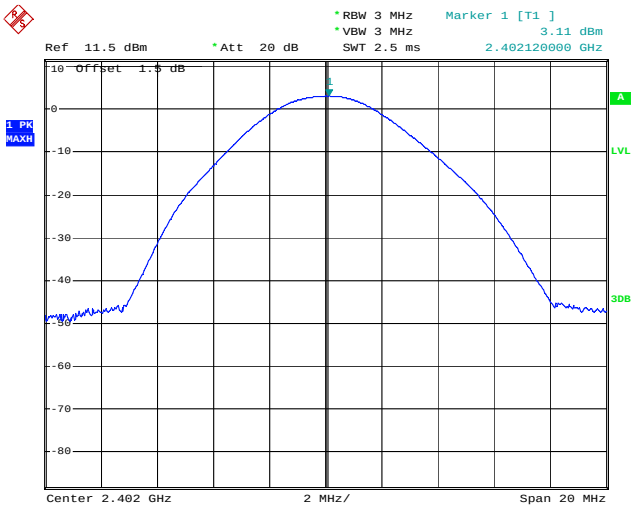
Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.4:2009 and KDB DA00-705
Receiver setup:	RBW=3MHz, VBW=3MHz, Detector=Peak
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

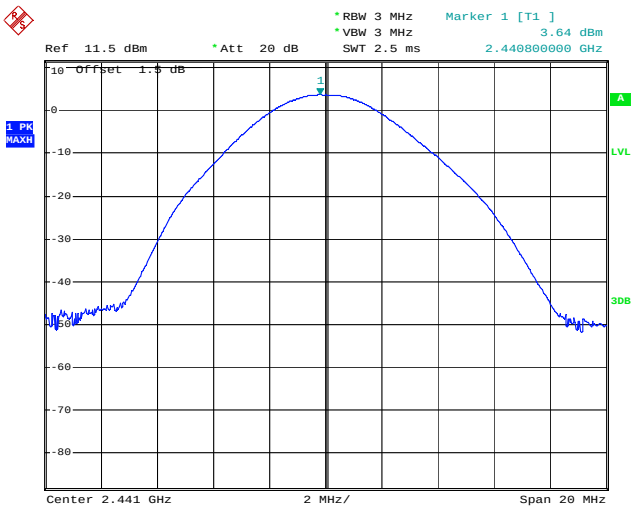
GFSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	3.11	30.00	Pass
Middle	3.64	30.00	Pass
Highest	2.11	30.00	Pass
Pi/4QPSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	2.13	30.00	Pass
Middle	2.62	30.00	Pass
Highest	0.84	30.00	Pass
8DPSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	2.23	30.00	Pass
Middle	2.75	30.00	Pass
Highest	1.05	30.00	Pass

Test plot as follows:

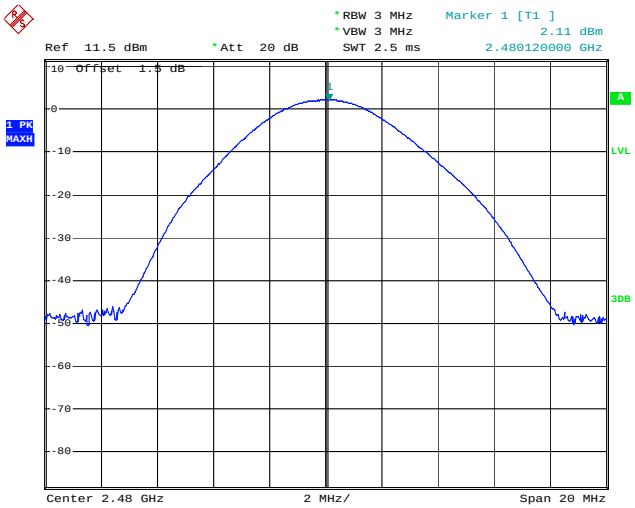
Test mode:	GFSK	Test channel:	Lowest



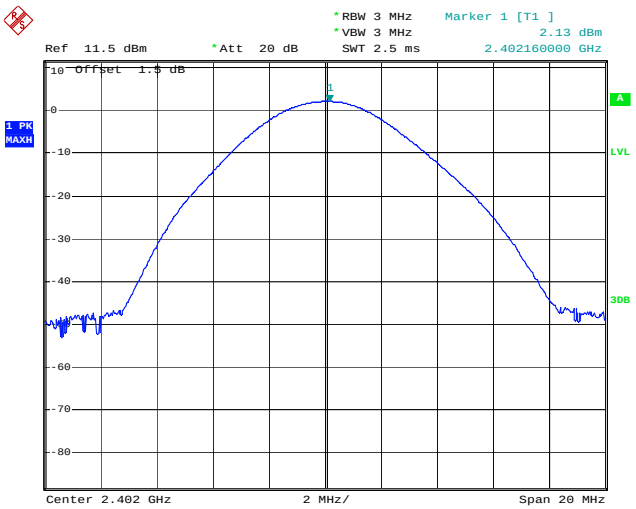
Test mode:	GFSK	Test channel:	Middle



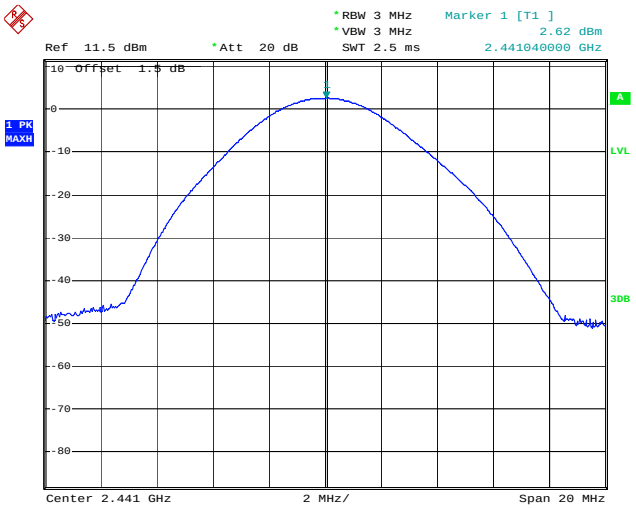
Test mode:	GFSK	Test channel:	Highest



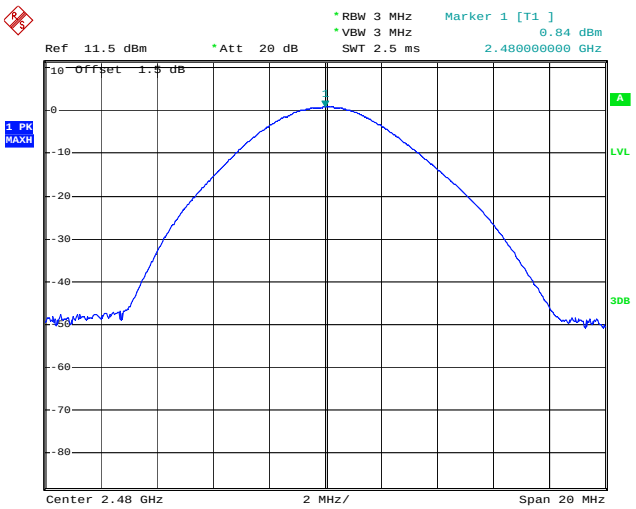
Test mode:	Pi/4QPSK	Test channel:	Lowest



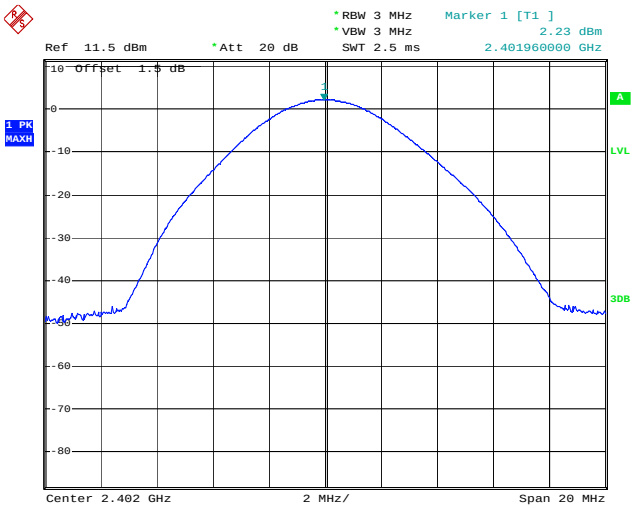
Test mode:	Pi/4QPSK	Test channel:	Middle



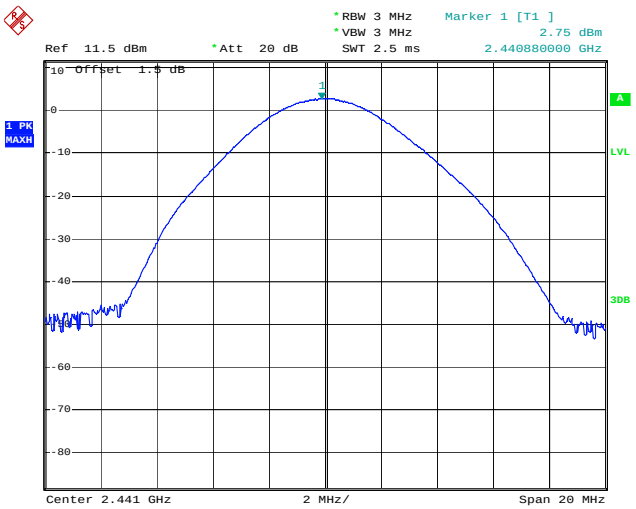
Test mode:	Pi/4QPSK	Test channel:	Highest



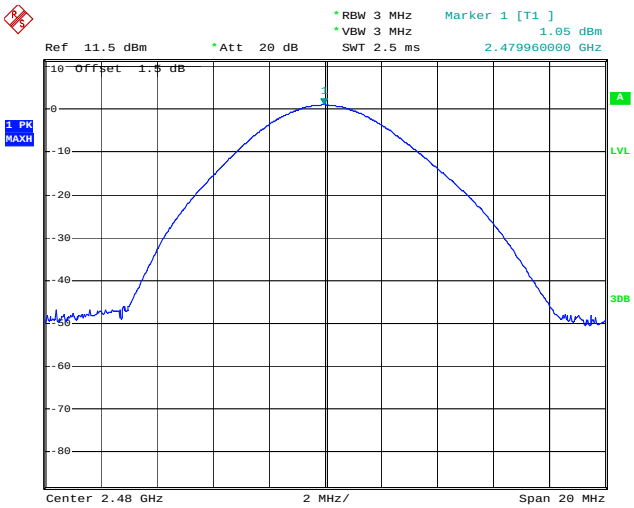
Test mode:	8DPSK	Test channel:	Lowest



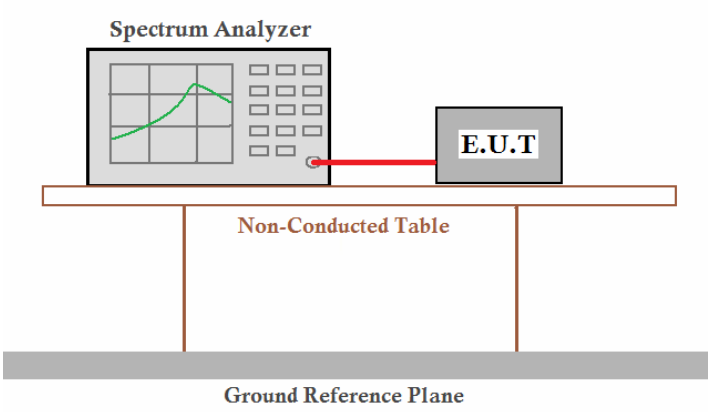
Test mode:	8DPSK	Test channel:	Middle



Test mode:	8DPSK	Test channel:	Highest



6.4 20dB Occupy Bandwidth

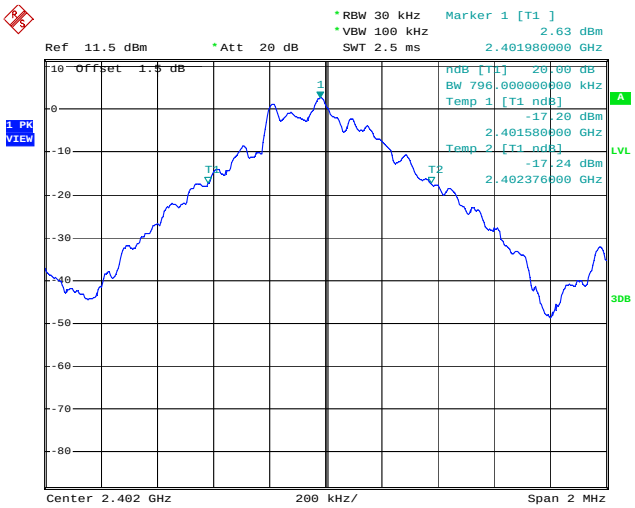
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.4:2009 and KDB DA00-705
Receiver setup:	RBW=30KHz, VBW=100KHz,detector=Peak
Limit:	NA
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

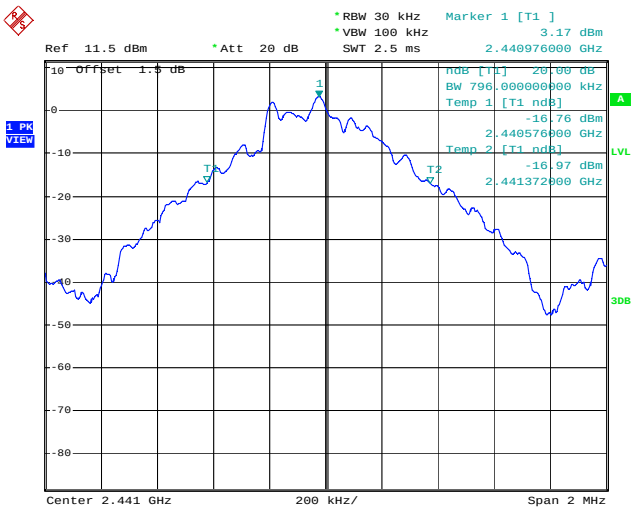
Test channel	20dB Occupy Bandwidth (KHz)		
	GFSK	Pi/4QPSK	8DPSK
Lowest	796	1380	1208
Middle	796	1376	1204
Highest	792	1204	1204

Test plot as follows:

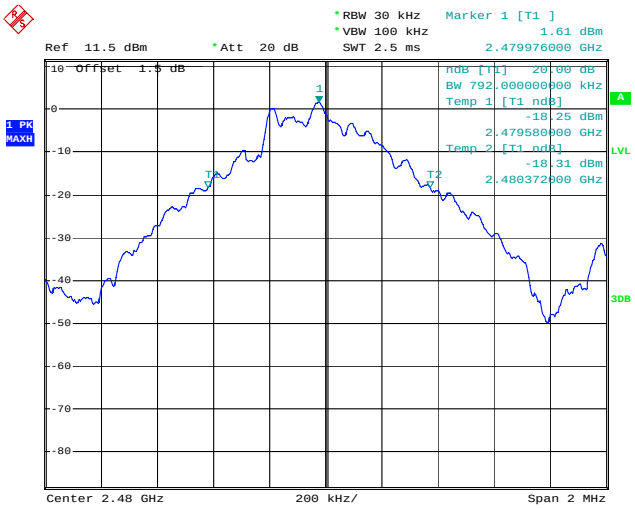
Test mode:	GFSK	Test channel:	Lowest



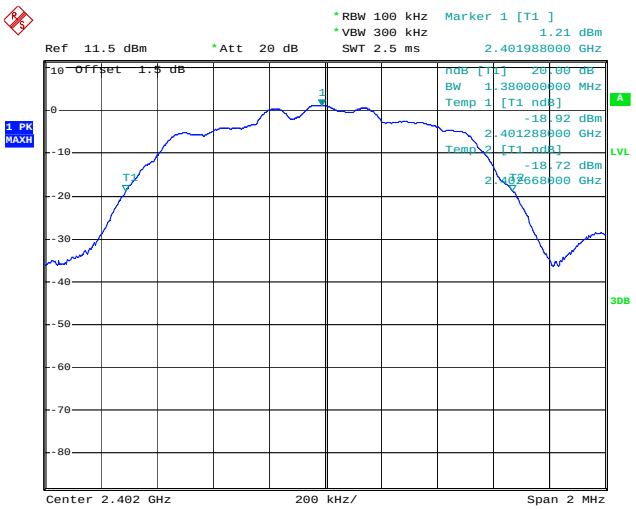
Test mode:	GFSK	Test channel:	Middle



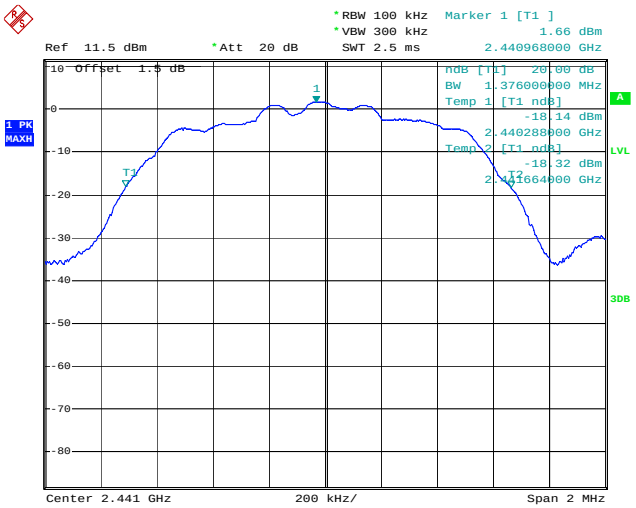
Test mode:	GFSK	Test channel:	Highest



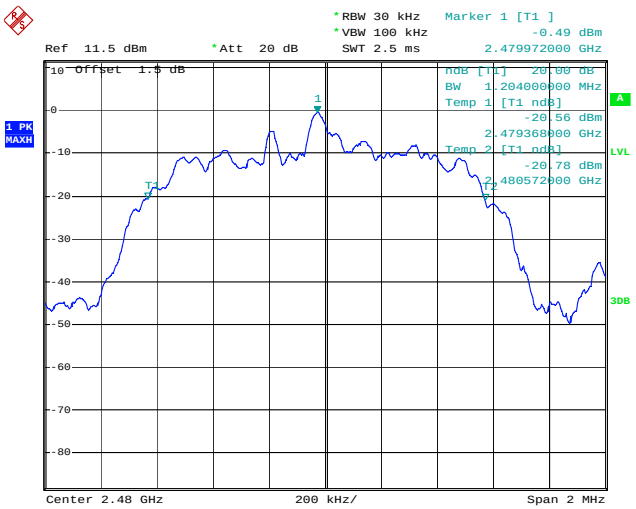
Test mode:	Pi/4QPSK	Test channel:	Lowest



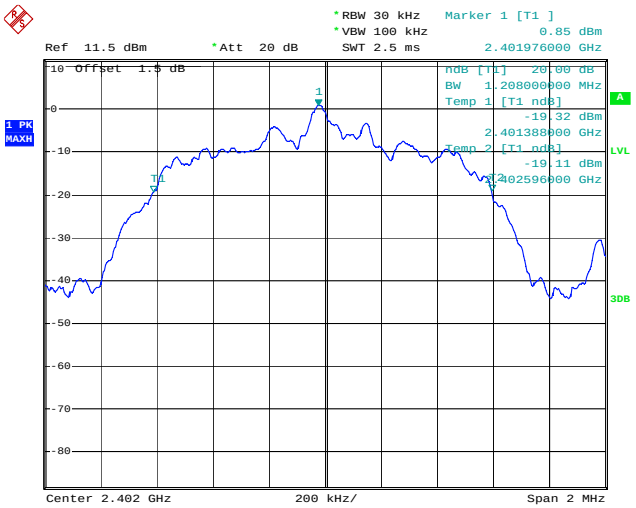
Test mode:	Pi/4QPSK	Test channel:	Middle



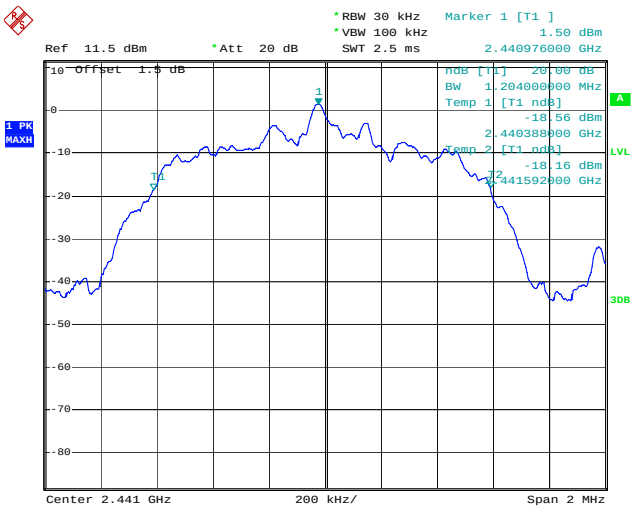
Test mode:	Pi/4QPSK	Test channel:	Highest



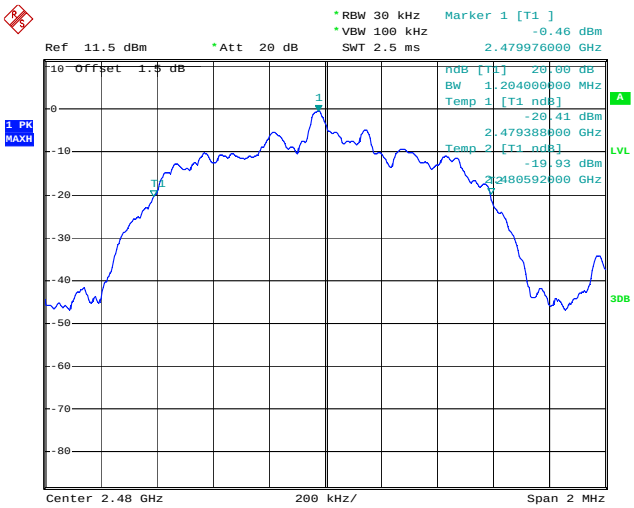
Test mode:	8DPSK	Test channel:	Lowest



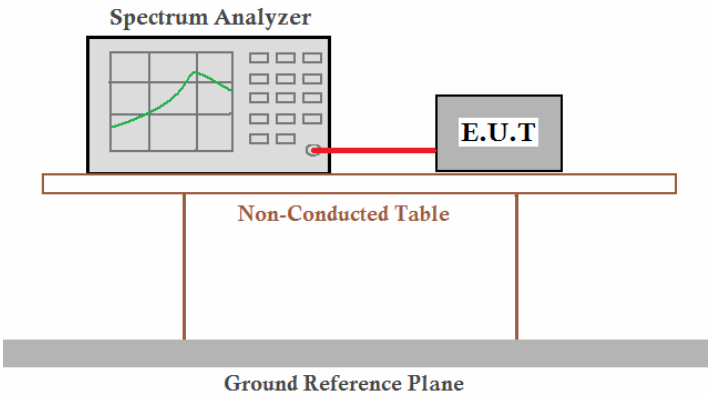
Test mode:	8DPSK	Test channel:	Middle



Test mode:	8DPSK	Test channel:	Highest



6.5 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.4:2009 and KDB DA00-705
Receiver setup:	RBW=100KHz, VBW=300KHz, detector=Peak
Limit:	0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

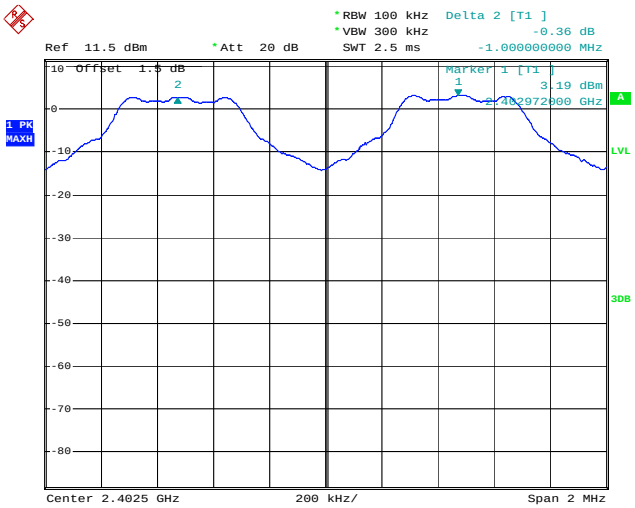
Measurement Data			
GFSK mode			
Test channel	Carrier Frequencies Separation (KHz)	Limit (KHz)	Result
Lowest	1000	*531*	Pass
Middle	1004	*531*	Pass
Highest	1000	*531*	Pass
Pi/4QPSK mode			
Test channel	Carrier Frequencies Separation (KHz)	Limit (KHz)	Result
Lowest	1004	920	Pass
Middle	1000	920	Pass
Highest	1004	920	Pass
8DPSK mode			
Test channel	Carrier Frequencies Separation (KHz)	Limit (KHz)	Result
Lowest	1004	*805*	Pass
Middle	1008	*805*	Pass
Highest	1004	*805*	Pass

Note: According to section 6.4,

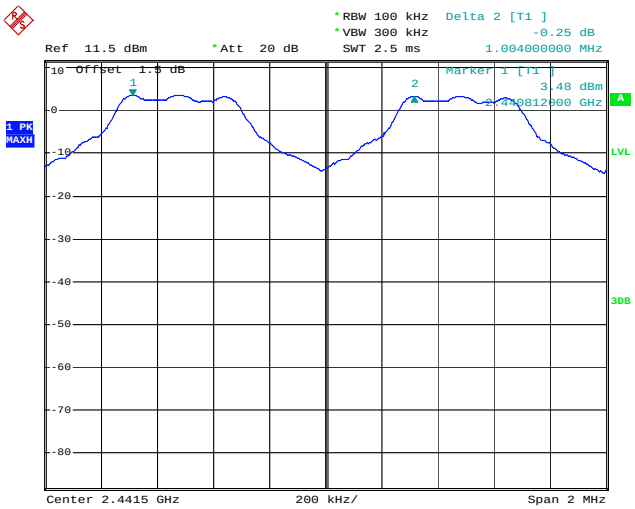
Mode	*20dB bandwidth (KHz) (worse case)*	*Limit (KHz) (Carrier Frequencies Separation)*
GFSK	796	*531*
PI/4QPSK	1380	*920*
8DPSK	1208	*805*

Test plot as follows:

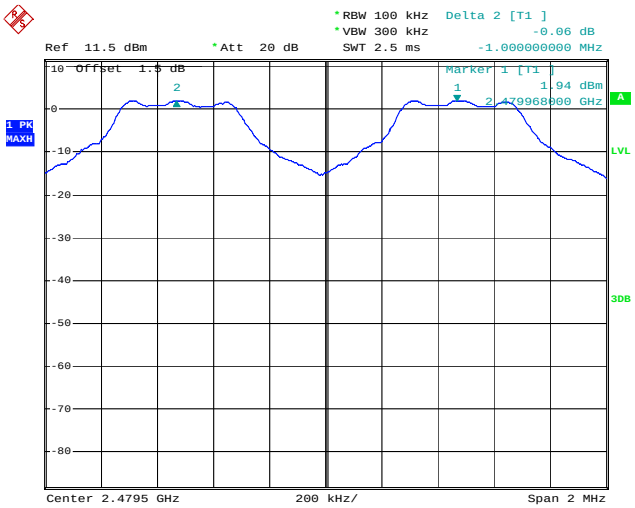
Test mode:	GFSK	Test channel:	Lowest



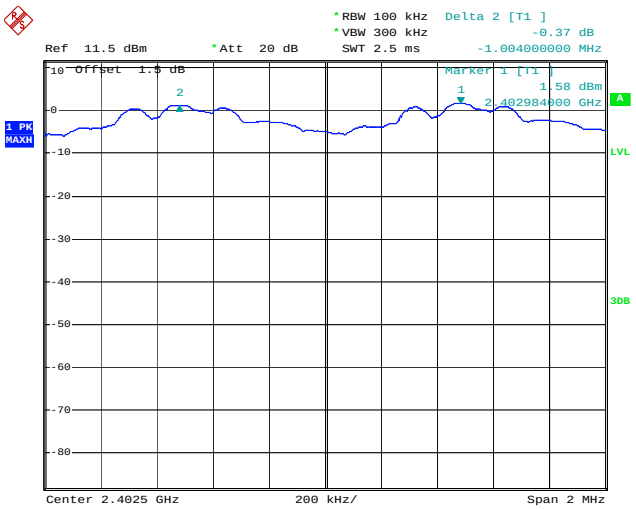
Test mode:	GFSK	Test channel:	Middle



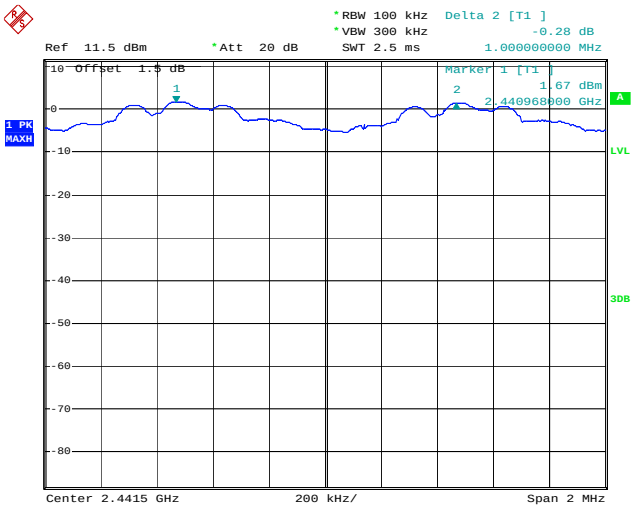
Test mode:	GFSK	Test channel:	Highest



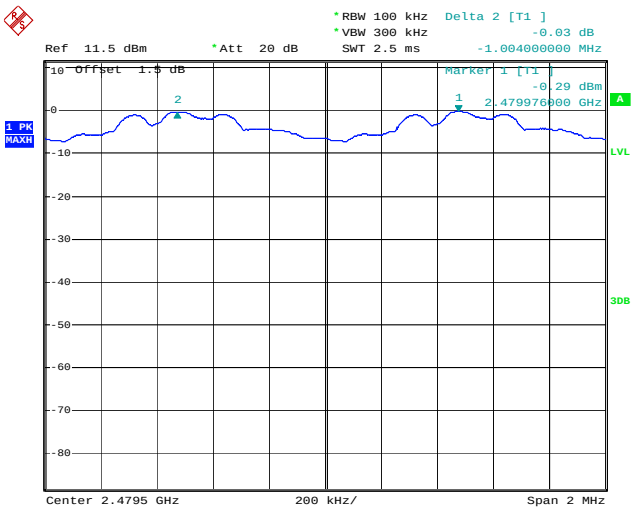
Test mode:	Pi/4QPSK	Test channel:	Lowest



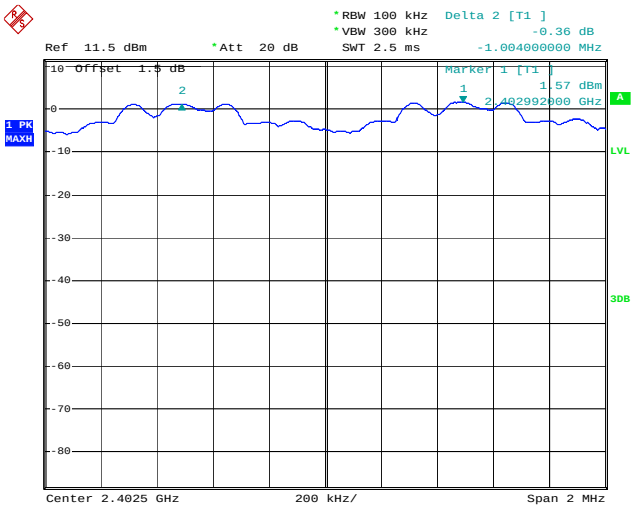
Test mode:	Pi/4QPSK	Test channel:	Middle



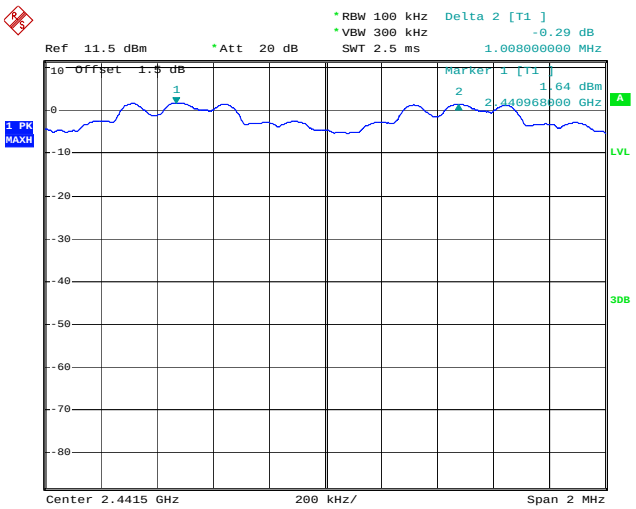
Test mode:	Pi/4QPSK	Test channel:	Highest



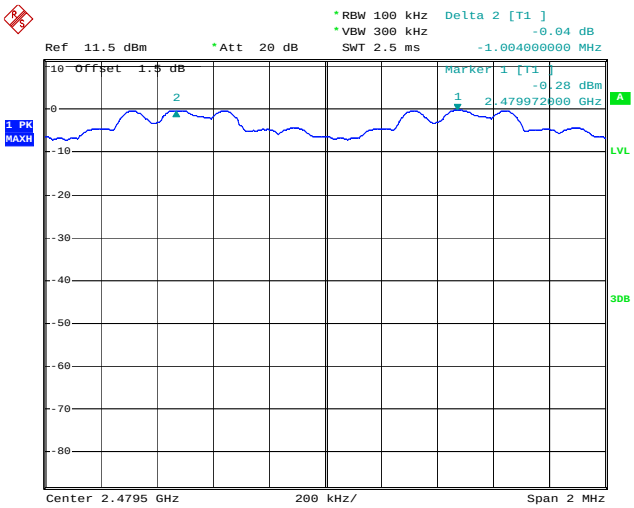
Test mode:	8DPSK	Test channel:	Lowest



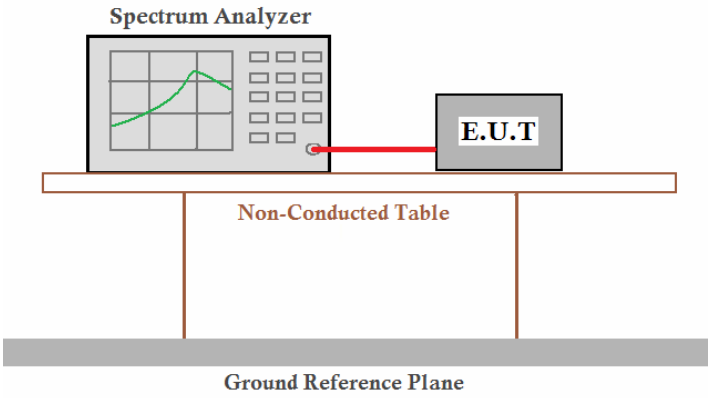
Test mode:	8DPSK	Test channel:	Middle



Test mode:	8DPSK	Test channel:	Highest



6.6 Hopping Channel Number

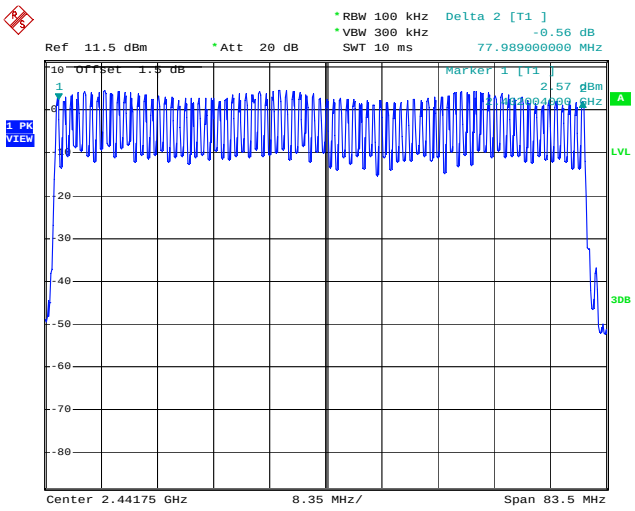
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.4:2009 and KDB DA00-705
Receiver setup:	RBW=100KHz, VBW=300KHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15channels
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

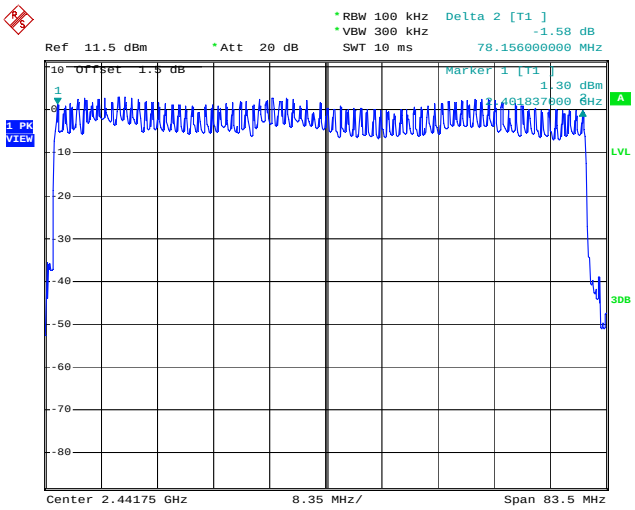
Mode	Hopping channel numbers	Limit
GFSK	79	75
Pi/4QPSK	79	75
8DPSK	79	75

Test plot as follows

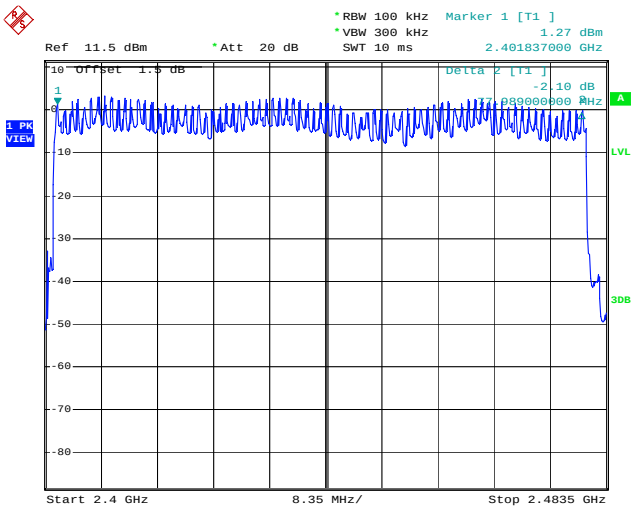
Test mode:	GFSK	



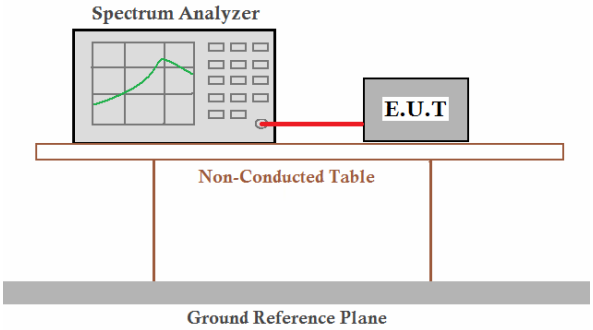
Test mode:	Pi/4QPSK	



Test mode:	8DPSK	



6.7 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.4:2009 and KDB DA00-705
Receiver setup:	RBW=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
Test mode:	Hopping transmitting with all kind of modulation.
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

Mode	Packet	Dwell time (second)	Limit (second)
GFSK	DH1	0.1696	0.4
	DH3	0.2864	0.4
	DH5	0.3264	0.4
Pi/4QPSK	2-DH1	0.1696	0.4
	2-DH3	0.2864	0.4
	2-DH5	0.3264	0.4
8DPSK	3-DH1	0.1696	0.4
	3-DH3	0.2864	0.4
	3-DH5	0.3264	0.4

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

The lowest channel (2402MHz), middle channel (2441MHz), highest channel (2480MHz) as blow

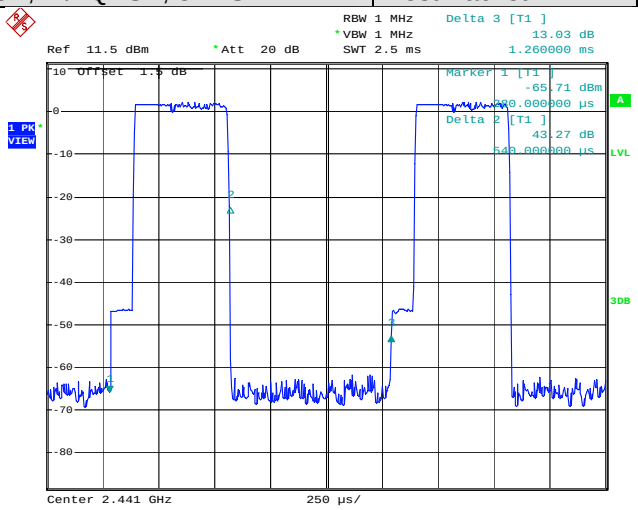
DH1 time slot= 0.53(ms)*(1600/ (2*79))*31.6=169.60ms

DH3 time slot= 1.79(ms)*(1600/ (4*79))*31.6=286.40ms

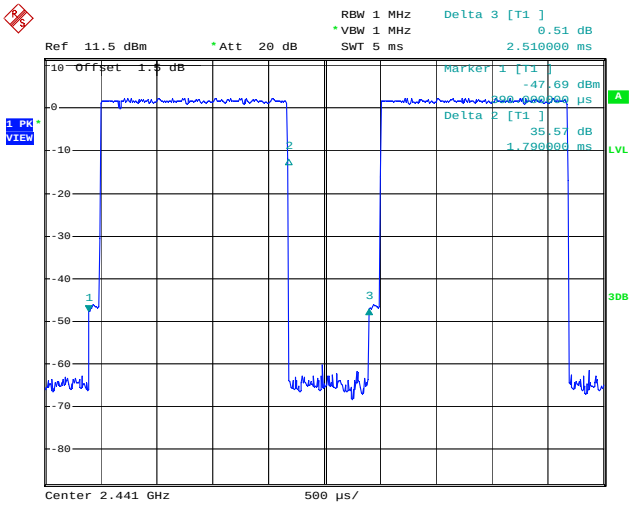
DH5 time slot= 3.06(ms)*(1600/ (6*79))*31.6=326.40ms

Test plot as follows

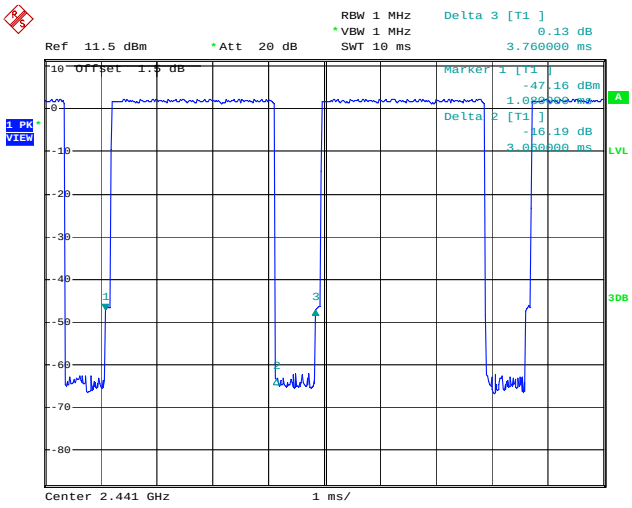
Test mode:	GFSK, Pi/4QPSK, 8DPSK	Test Packet:	DH1, 2-DH1, 3-DH1



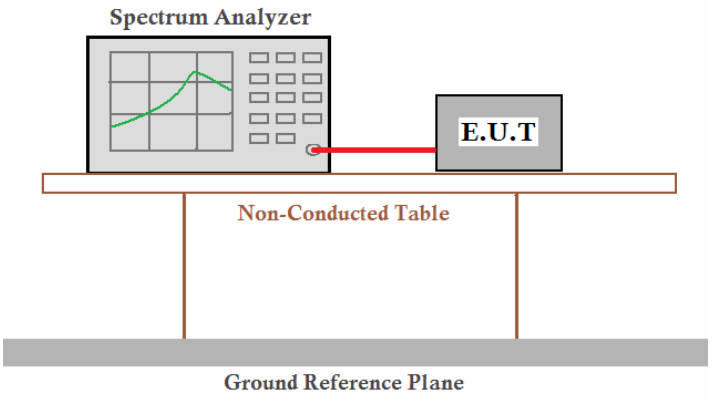
Test mode:	GFSK, Pi/4QPSK, 8DPSK	Test Packet:	DH3, 2-DH3, 3-DH3



Test mode:	GFSK, Pi/4QPSK, 8DPSK	Test Packet:	DH5, 2-DH5, 3-DH5



6.8 Band Edge

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2009 and KDB DA00-705
Receiver setup:	RBW=100KHz, VBW=300KHz, Detector=Peak
Limit:	In any 100 kHz 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 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.
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

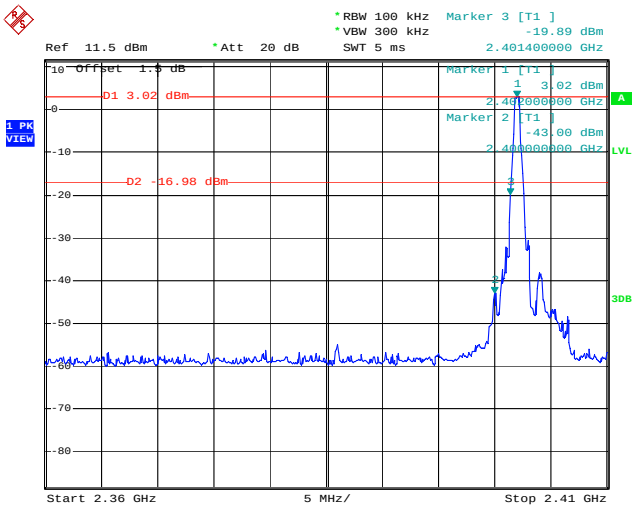
Remark:

During test the item, Pre-scan the GFSK, Pi/4QPSK, 8DPSK modulation, and found the GFSK modulation which it is worse case.

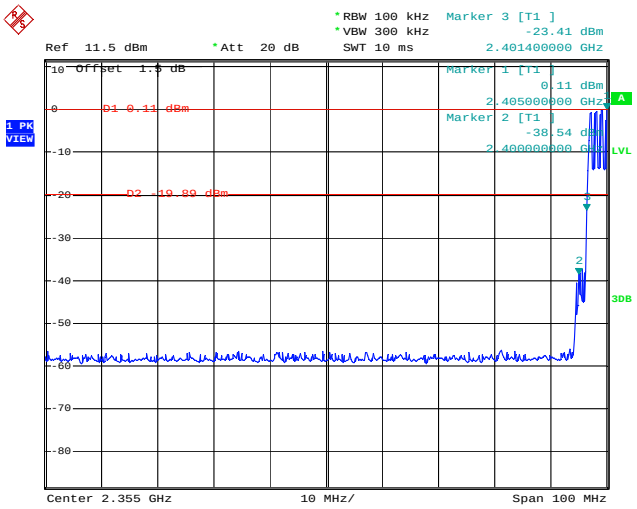
Test plot as follows:

Worse case mode:	GFSK	Test channel:	Lowest

No-hopping mode:

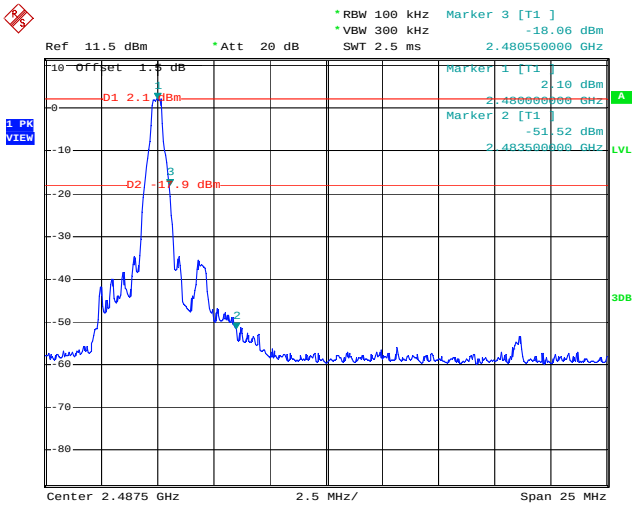


Hopping mode:

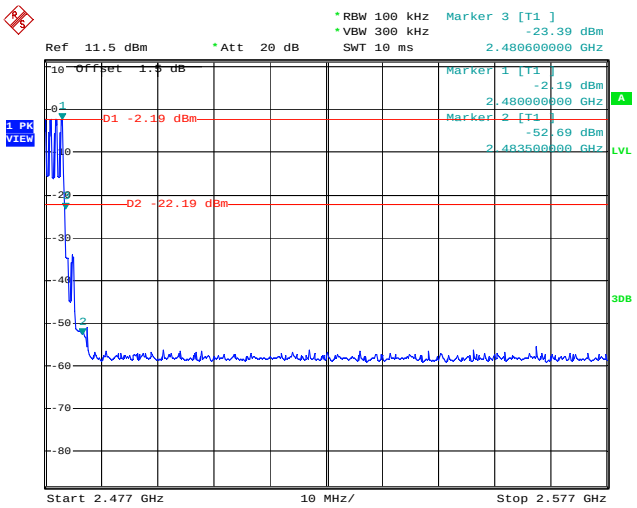


Worse case mode:	GFSK	Test channel:	Highest

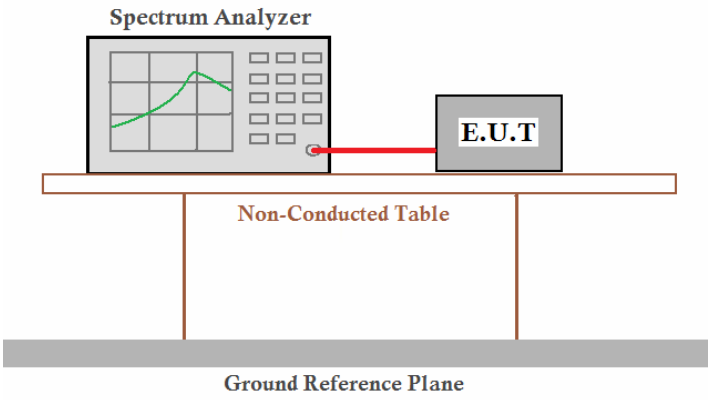
No-hopping mode:



Hopping mode:



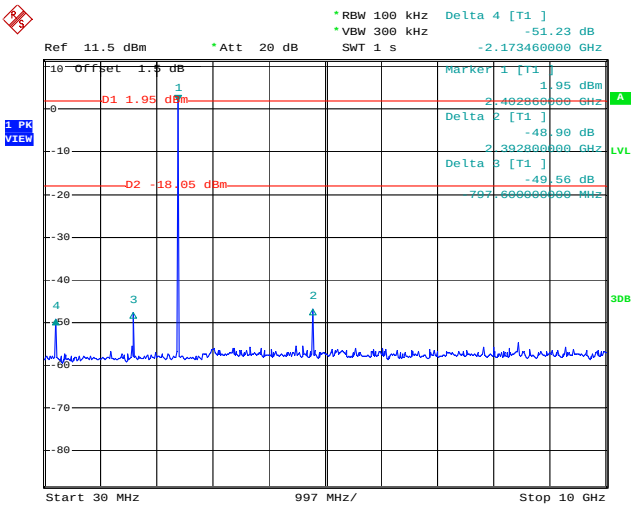
6.9 RF Antenna Conducted spurious emissions

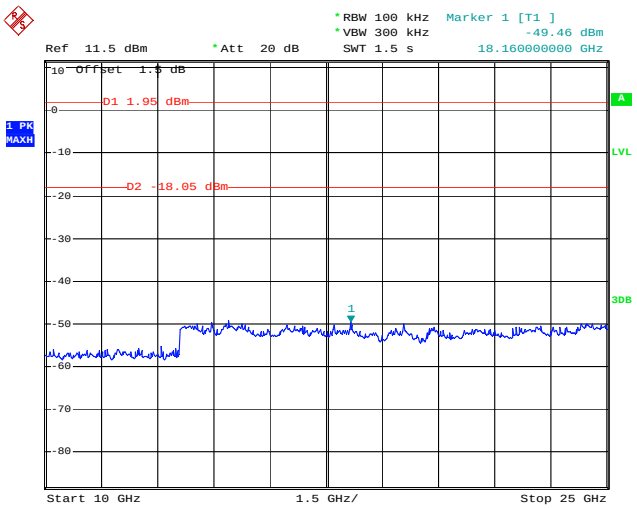
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2009 and KDB DA00-705
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 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.
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Remark:

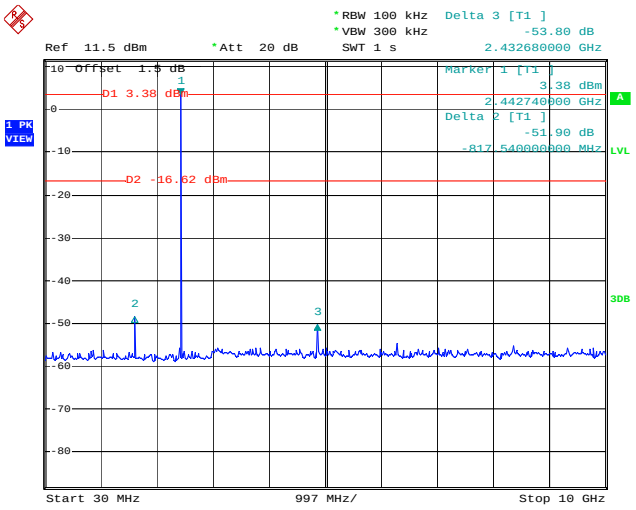
During test the item, Pre-scan the GFSK, Pi/4QPSK, 8DPSK modulation, and found the GFSK modulation which it is worse case.

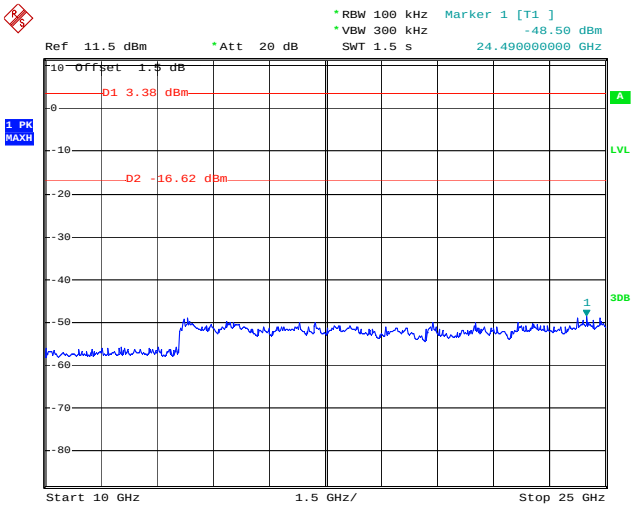
Worse case mode:	GFSK	Test channel:	Lowest



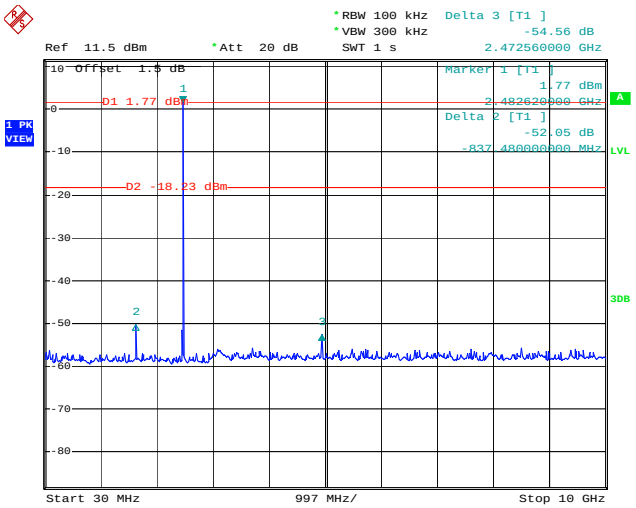


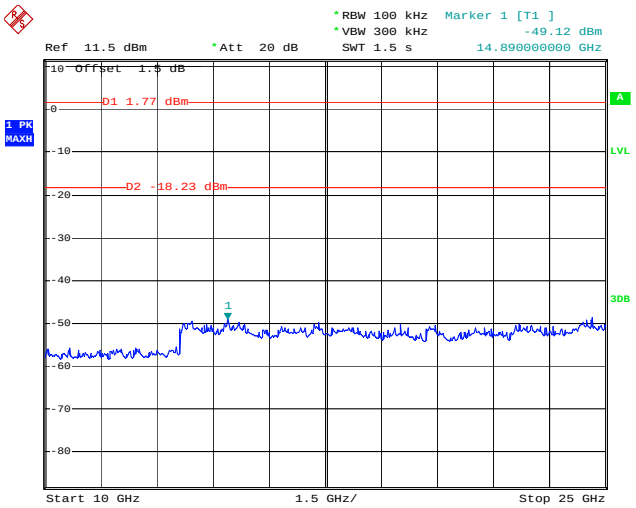
Worse case mode:	GFSK	Test channel:	Middle





Worse case mode:	GFSK	Test channel:	Highest





6.10 Pseudorandom Frequency Hopping Sequence

Test Requirement:	FCC Part15 C Section 15.247 (a)(1) requirement:

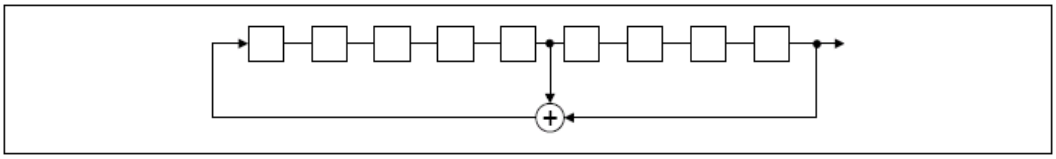
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively. Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence

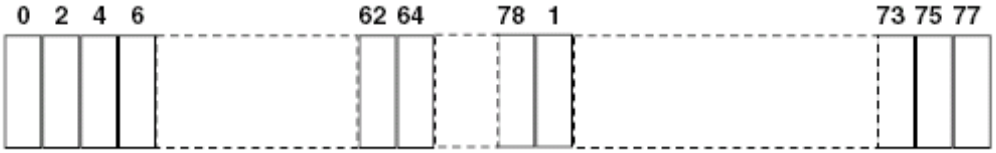
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- *Number of shift register stages: 9*
- *Length of pseudo-random sequence: 2^9 -1 = 511 bits*
- *Longest sequence of zeros: 8 (non-inverted signal)*



Linear Feedback Shift Register for Generation of the PRBS sequence

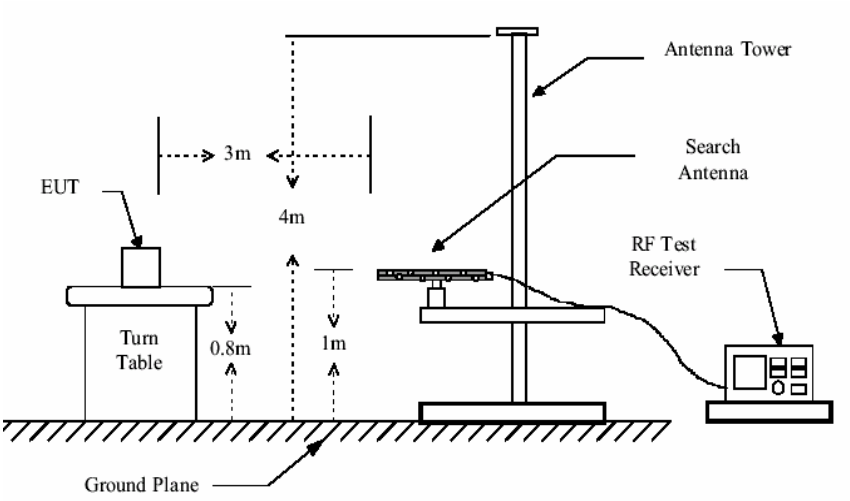
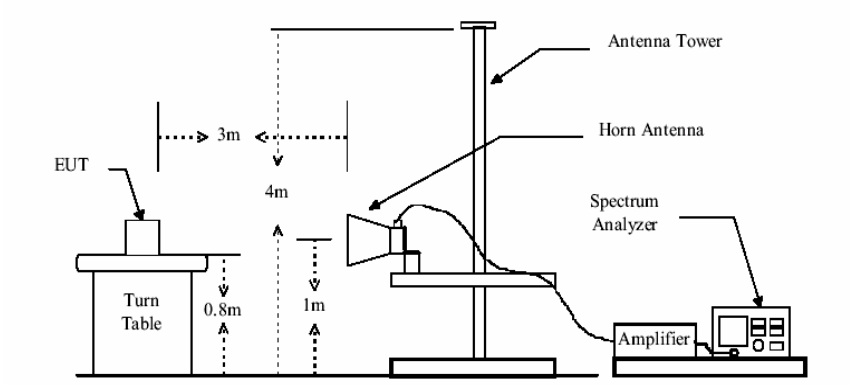
An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.
The system receivers have input bandwidths that match the hopping channel bandwidths of their ***corresponding transmitters and shift frequencies in synchronization with the transmitted signals.***

6.11 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2003</td></tr>
<tr><td>Test Frequency Range:</td><td>30MHz to 25GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Average</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>74.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height 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.
d. 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 rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
g. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
</td></tr>
</table>

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.7 for details
Test mode:	**Refer to section 5.3 for details**
Test results:	Pass

Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

6.11.1 Below 1GHz

Test in Bluetooth mode.

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Frequency (MHz)
33.07	0.61	14.60	32.23	46.41	29.39	40.00	-10.61	Vertical
72.33	0.86	13.23	31.87	44.05	26.27	40.00	-13.73	Vertical
158.46	1.56	10.02	32.01	48.90	28.47	43.50	-15.03	Vertical
234.91	1.90	10.86	32.28	46.75	27.23	46.00	-18.77	Vertical
407.43	2.26	14.22	32.32	50.18	34.34	46.00	-11.66	Vertical
691.31	2.94	20.27	31.70	46.64	38.15	46.00	-7.85	Vertical
45.71	0.67	14.80	32.01	37.87	21.33	40.00	-18.67	Horizontal
186.65	1.61	11.53	32.08	50.92	31.98	43.50	-11.52	Horizontal
252.53	1.91	11.98	32.28	52.37	33.98	46.00	-12.02	Horizontal
359.25	2.17	13.84	32.31	53.78	37.48	46.00	-8.52	Horizontal
420.43	2.26	15.64	32.32	53.54	39.12	46.00	-6.88	Horizontal
731.76	2.94	23.19	31.69	46.24	40.68	46.00	-5.32	Horizontal

6.11.2 Above 1GHz

Worse case mode:	GFSK	Test channel:	Lowest	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	9.36	34.25	41.53	49.07	51.15	74.00	-22.85	Vertical
7206.00	11.42	35.84	39.48	44.09	51.87	74.00	-22.13	Vertical
9608.00	13.39	37.99	37.56	40.62	54.44	74.00	-19.56	Vertical
12010.00	16.45	39.10	39.09	38.69	55.15	74.00	-18.85	Vertical
14412.00				---		74.00		Vertical
16814.00				---		74.00		Vertical
4804.00	9.36	34.25	41.53	47.38	49.46	74.00	-24.54	Horizontal
7206.00	11.42	35.84	39.48	42.53	50.31	74.00	-23.69	Horizontal
9608.00	13.39	37.99	37.56	39.19	53.01	74.00	-20.99	Horizontal
12010.00	16.45	39.10	39.09	37.39	53.85	74.00	-20.15	Horizontal
14412.00				---		74.00		Horizontal
16814.00				---		74.00		Horizontal

Worse case mode:	GFSK	Test channel:	Lowest	Remark:	Average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	9.36	34.25	41.53	28.54	30.62	54.00	-23.38	Vertical
7206.00	11.42	35.84	39.48	25.21	32.99	54.00	-21.01	Vertical
9608.00	13.39	37.99	37.56	23.27	37.09	54.00	-16.91	Vertical
12010.00	16.45	39.10	39.09	22.81	39.27	54.00	-14.73	Vertical
14412.00				---		54.00		Vertical
16814.00				---		54.00		Vertical
4804.00	9.36	34.25	41.53	26.95	29.03	54.00	-24.97	Horizontal
7206.00	11.42	35.84	39.48	23.75	31.53	54.00	-22.47	Horizontal
9608.00	13.39	37.99	37.56	21.94	35.76	54.00	-18.24	Horizontal
12010.00	16.45	39.10	39.09	21.61	38.07	54.00	-15.93	Horizontal
14412.00				---		54.00		Horizontal
16814.00				---		54.00		Horizontal

Remark

”---“ means that the emission level is too low to be measured

Worse case mode:	GFSK	Test channel:	Middle	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4882.00	10.57	34.35	40.33	45.94	50.53	74.00	-23.47	Vertical
7323.00	11.85	36.12	39.18	43.15	51.94	74.00	-22.06	Vertical
9764.00	13.89	38.03	37.94	39.17	53.15	74.00	-20.85	Vertical
12205.00	17.95	39.23	39.30	36.46	54.34	74.00	-19.66	Vertical
14646.00				---		74.00		Vertical
17087.00				---		74.00		Vertical
4882.00	10.57	34.35	40.33	44.59	49.18	74.00	-24.82	Horizontal
7323.00	11.85	36.12	39.18	42.07	50.86	74.00	-23.14	Horizontal
9764.00	13.89	38.03	37.94	38.36	52.34	74.00	-21.66	Horizontal
12205.00	17.95	39.23	39.30	36.92	54.80	74.00	-19.20	Horizontal
14646.00				---		74.00		Horizontal
17087.00				---		74.00		Horizontal

Worse case mode:	GFSK	Test channel:	Middle	Remark:	Average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4882.00	10.57	34.35	40.33	27.85	32.44	54.00	-21.56	Vertical
7323.00	11.85	36.12	39.18	25.27	34.06	54.00	-19.94	Vertical
9764.00	13.89	38.03	37.94	23.45	37.43	54.00	-16.57	Vertical
12205.00	17.95	39.23	39.30	21.22	39.10	54.00	-14.90	Vertical
14646.00				---		54.00		Vertical
17087.00				---		54.00		Vertical
4882.00	10.57	34.35	40.33	26.64	31.23	54.00	-22.77	Horizontal
7323.00	11.85	36.12	39.18	24.30	33.09	54.00	-20.91	Horizontal
9764.00	13.89	38.03	37.94	22.72	36.70	54.00	-17.30	Horizontal
12205.00	17.95	39.23	39.30	20.73	38.61	54.00	-15.39	Horizontal
14646.00				---		54.00		Horizontal
17087.00				---		54.00		Horizontal

Remark

”---“ means that the emission level is too low to be measured

Worse case mode:	GFSK	Test channel:	Highest	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960.00	10.73	34.45	40.18	43.63	48.63	74.00	-25.37	Vertical
7440.00	12.35	36.68	38.85	42.37	52.55	74.00	-21.45	Vertical
9920.00	14.24	38.08	37.78	39.14	53.68	74.00	-20.32	Vertical
12400.00	17.55	39.34	37.48	35.78	55.19	74.00	-18.81	Vertical
14880.00				---		74.00		Vertical
17360.00				---		74.00		Vertical
4960.00	10.73	34.45	40.18	42.08	47.08	74.00	-26.92	Horizontal
7440.00	12.35	36.68	38.85	40.95	51.13	74.00	-22.87	Horizontal
9920.00	14.24	38.08	37.78	37.85	52.39	74.00	-21.61	Horizontal
12400.00	17.55	39.34	37.48	36.31	55.72	74.00	-18.28	Horizontal
14880.00				---		74.00		Horizontal
17360.00				---		74.00		Horizontal

Worse case mode:	GFSK	Test channel:	Highest	Remark:	Average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960.00	10.43	34.45	41.03	29.97	33.82	54.00	-20.18	Vertical
7440.00	12.72	37.37	40.01	24.34	34.42	54.00	-19.58	Vertical
9920.00	14.24	38.08	37.78	22.78	37.32	54.00	-16.68	Vertical
12400.00	17.55	39.34	37.48	20.08	39.49	54.00	-14.51	Vertical
14880.00				---		54.00		Vertical
17360.00				---		54.00		Vertical
4960.00	10.43	34.45	41.03	28.48	32.33	54.00	-21.67	Horizontal
7440.00	12.72	37.37	40.01	22.93	33.01	54.00	-20.99	Horizontal
9920.00	14.24	38.08	37.78	21.45	35.99	54.00	-18.01	Horizontal
12400.00	17.55	39.34	37.48	18.83	38.24	54.00	-15.76	Horizontal
14880.00				---		54.00		Horizontal
17360.00				---		54.00		Horizontal

Remark

”---“ means that the emission level is too low to be measured

6.11.3 Band edge (Radiated Emission)

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	6.02	29.76	39.75	49.29	45.32	74.00	-27.58	Horizontal
2400.00	6.34	30.03	38.87	50.76	48.26	74.00	-24.54	Horizontal
2390.00	6.02	29.76	39.75	50.44	46.47	74.00	-26.33	Vertical
2400.00	6.34	30.03	38.87	52.18	49.68	74.00	-23.22	Vertical

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	6.02	29.76	39.75	28.78	24.81	54.00	-28.09	Horizontal
2400.00	6.34	30.03	38.87	32.10	29.60	54.00	-23.20	Horizontal
2390.00	6.02	29.76	39.75	29.83	25.86	54.00	-26.94	Vertical
2400.00	6.34	30.03	38.87	33.42	30.92	54.00	-21.98	Vertical

Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	6.22	30.32	39.53	51.50	48.51	74.00	-24.39	Horizontal
2500.00	6.36	30.37	39.65	48.09	45.17	74.00	-27.63	Horizontal
2483.50	6.22	30.32	39.53	52.51	49.52	74.00	-23.28	Vertical
2500.00	6.36	30.37	39.65	49.37	46.45	74.00	-26.45	Vertical

Test mode:	Transmitting	Test channel:	Highest	Remark:	Average

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	6.22	30.32	39.53	33.89	30.90	54.00	-22.00	Horizontal
2500.00	6.36	30.37	39.65	30.21	27.29	54.00	-25.51	Horizontal
2483.50	6.22	30.32	39.53	34.74	31.75	54.00	-21.05	Vertical
2500.00	6.36	30.37	39.65	31.38	28.46	54.00	-24.44	Vertical