SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

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TEST REPORT

Application No.:	SZEM1810008790CR
Applicant:	FLYSKY RC MODEL TECHNOLOGY CO., LTD
Address of Applicant:	West building 3, Huangjinyuan Ind Park, QIAOLI North Gate Changping Town, Dongguan, China
Manufacturer:	ShenZhen FLYSKY Technology Co., Ltd
Address of Manufacturer:	16F, Huafeng Building, No. 6006 Shennan Road, Futian District, Shenzhen, Guangdong, China
Factory:	FLYSKY RC MODEL TECHNOLOGY CO., LTD
Address of Factory:	West building 3, Huangjinyuan Ind Park, QIAOLI North Gate Changping Town, Dongguan, China
Equipment Under Test (EUT):	
EUT Name:	2.4GHz MODULE
Model No.:	FRM301
FCC ID:	N4ZFRM30100
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2018-10-08
Date of Test:	2018-10-16 to 2018-10-19
Date of Issue:	2018-10-25
Test Result:	**Pass***

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

Keny Xu
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2018-10-25		Original

Authorized for issue by:				
				
		Harry Wu /Project Engineer		
				
		Eric Fu /Reviewer		

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Dwell Time	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	DC 5V, 130mA
Operation Frequency	2402-2480MHz
Modulation Type	CSS, GFSK Two modulations were tested, only the worst case was recorded
Antenna Type	Dedicated Antenna
Antenna Gain	Antenna 1: 0.5dBi; Antenna 2: 0.5dBi Two antennas cannot synchronously transmit.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2427MHz	40	2452MHz	60	2477MHz
1	2404MHz	21	2428MHz	41	2454MHz	61	2478MHz
2	2405MHz	22	2429MHz	42	2455MHz	62	2479MHz
3	2406MHz	23	2430MHz	43	2456MHz	63	2480MHz
4	2407MHz	24	2432MHz	44	2457MHz		
5	2409MHz	25	2433MHz	45	2458MHz		
6	2410MHz	26	2434MHz	46	2460MHz		
7	2411MHz	27	2435MHz	47	2461MHz		
8	2412MHz	28	2437MHz	48	2462MHz		
9	2413MHz	29	2438MHz	49	2463MHz		
10	2415MHz	30	2439MHz	50	2465MHz		
11	2416MHz	31	2440MHz	51	2466MHz		
12	2417MHz	32	2441MHz	52	2467MHz		
13	2418MHz	33	2443MHz	53	2468MHz		
14	2419MHz	34	2445MHz	54	2469MHz		
15	2421MHz	35	2446MHz	55	2471MHz		
16	2422MHz	36	2447MHz	56	2472MHz		
17	2423MHz	37	2449MHz	57	2473MHz		
18	2424MHz	38	2450MHz	58	2474MHz		
19	2426MHz	39	2451MHz	59	2475MHz		

Selected Test Channel	
Channel	Frequency
The lowest channel (CH0)	2402MHz
The middle channel (CH31)	2440MHz
The highest channel (CH62)	2480MHz

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Remote Control	FLYSKY	FT18	N/A

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	± 7.25 x 10^{-8}
2	Duty cycle	± 0.37%
3	Occupied Bandwidth	± 3%
4	RF conducted power	± 0.75dB
5	RF power density	± 2.84dB
6	Conducted Spurious emissions	± 0.75dB
7	RF Radiated power	± 4.5dB (below 1GHz)
		± 4.8dB (above 1GHz)
8	Radiated Spurious emission test	± 4.5dB (Below 1GHz)
		± 4.8dB (Above 1GHz)
9	Temperature test	± 1℃
10	Humidity test	± 3%
11	Supply voltages	± 1.5%
12	Time	± 3%

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC

Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Conducted Peak Output Power					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

20dB Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Carrier Frequencies Separation					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Hopping Channel Number					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26

Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Dwell Time					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Conducted Band Edges Measurement					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Conducted Spurious Emissions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Radiated Emissions which fall in the restricted bands					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2018-07-12	2019-07-11
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2018-04-02	2019-04-01

BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16
Pre-amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2018-09-25	2019-09-24
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2018-09-27	2019-09-26
Pre-amplifier(18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2018-04-02	2019-04-01
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2018-04-02	2019-04-01
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21
Band filter	N/A	N/A	SEM023-01	N/A	N/A

Radiated Emissions (30MHz-1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2018-07-12	2019-07-11
EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2018-09-25	2019-09-24
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018-04-02	2019-04-01

Radiated Spurious Emissions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2018-07-12	2019-07-11
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2018-04-02	2019-04-01
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12

Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16
Pre-amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2018-09-25	2019-09-24
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2018-09-27	2019-09-26
Pre-amplifier(18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2018-04-02	2019-04-01
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2018-04-02	2019-04-01
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21
Band filter	N/A	N/A	SEM023-01	N/A	N/A

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2018-09-27	2019-09-26
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2018-04-08	2019-04-07

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(c)

6.1.2 Conclusion

Standard 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(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna:Antenna1 is 0.5dBi, Antenna 2 is 0.5dBi.

Antenna location: Refer to Appendix(External photos)

6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

6.2.2 Conclusion

Standard Requirement:

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.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

According to Technical Specification, 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: 29 -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.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the RF system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.

7 Radio Spectrum Matter Test Results

7.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)
Test Method: ANSI C63.10 (2013) Section 7.8.5
Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

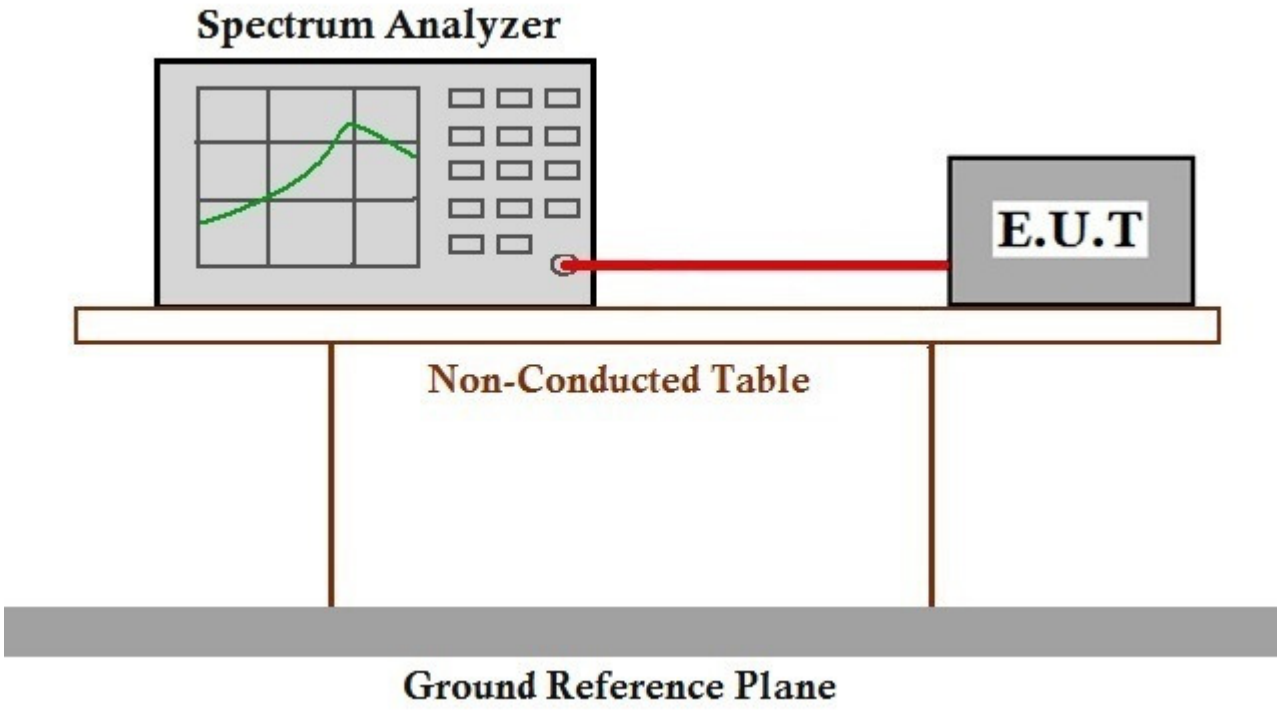
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 50.8 % RH Atmospheric Pressure: 1010 mbar

Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting with modulation mode.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

7.2 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215

Test Method: ANSI C63.10 (2013) Section 6.9

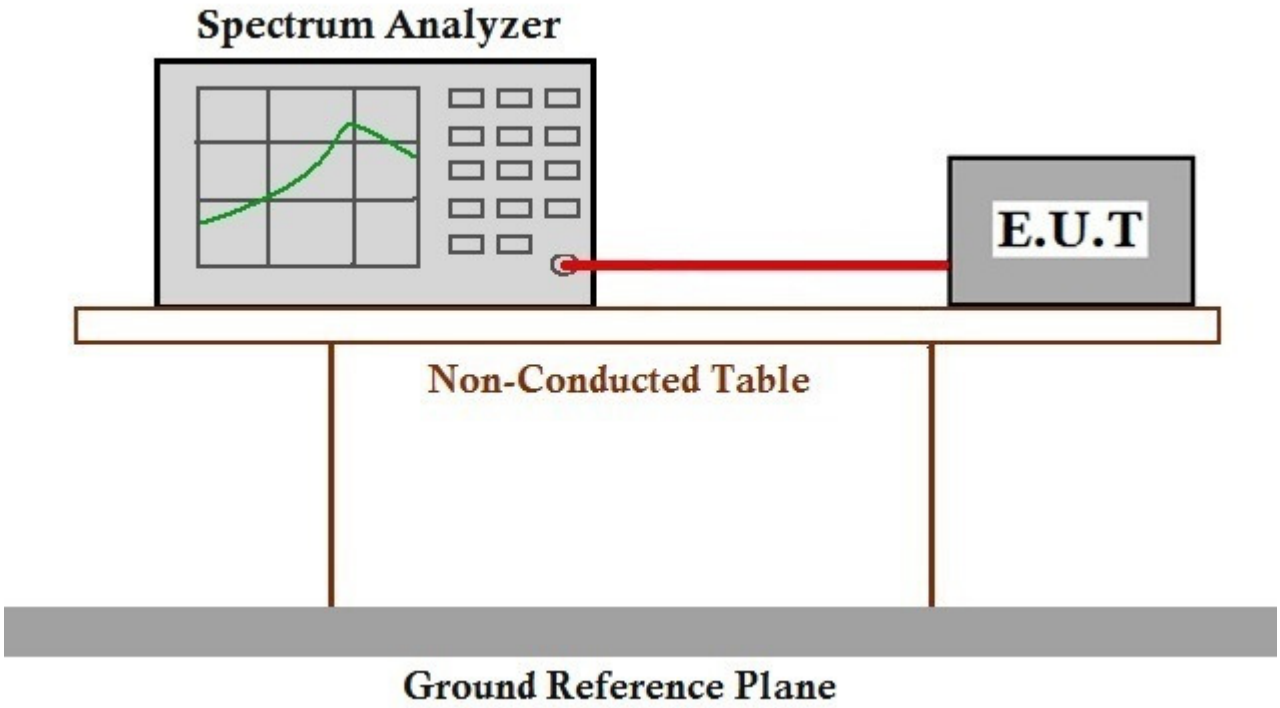
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 50.7 % RH Atmospheric Pressure: 1010 mbar

Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting with modulation mode.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

7.3 Carrier Frequencies Separation

Test Requirement	47 CFR Part 15, Subpart C 15.247a(1)
Test Method:	ANSI C63.10 (2013) Section 7.8.2
Limit:	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W

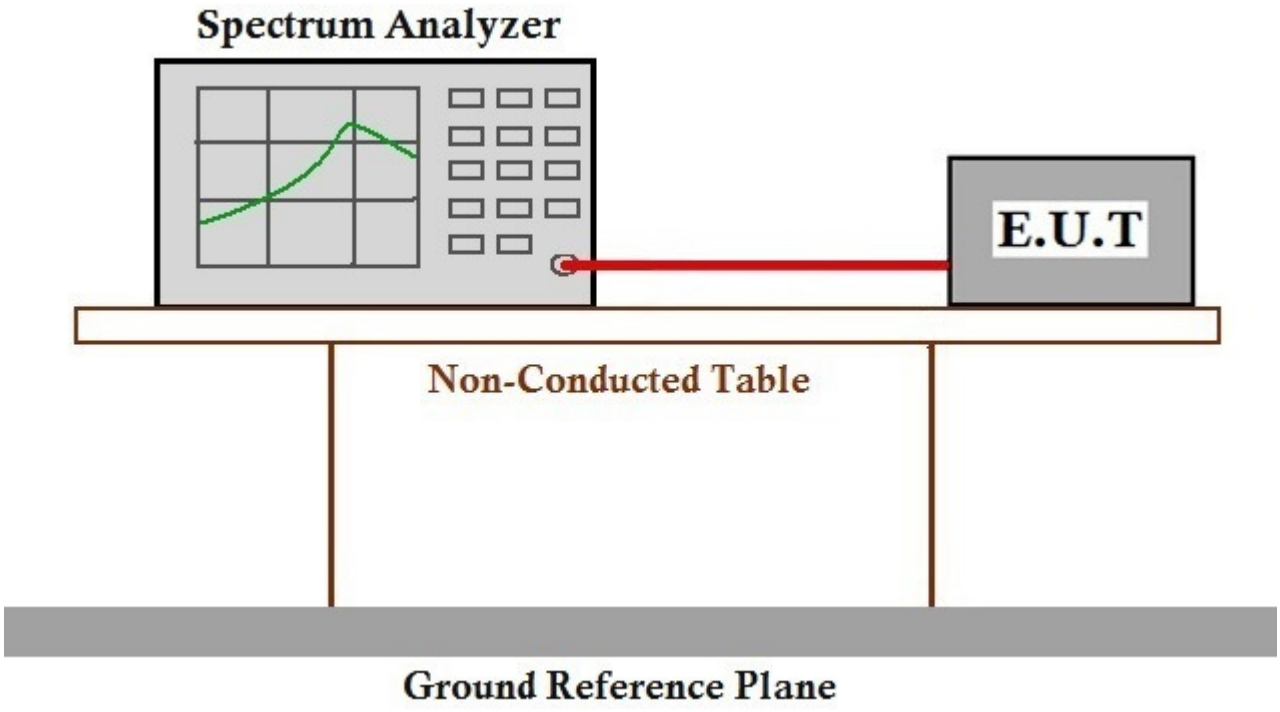
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 50.8 % RH Atmospheric Pressure: 1010 mbar

Test mode a:TX_Hop mode_Keep the EUT in frequency hopping with modulation mode.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

7.4 Hopping Channel Number

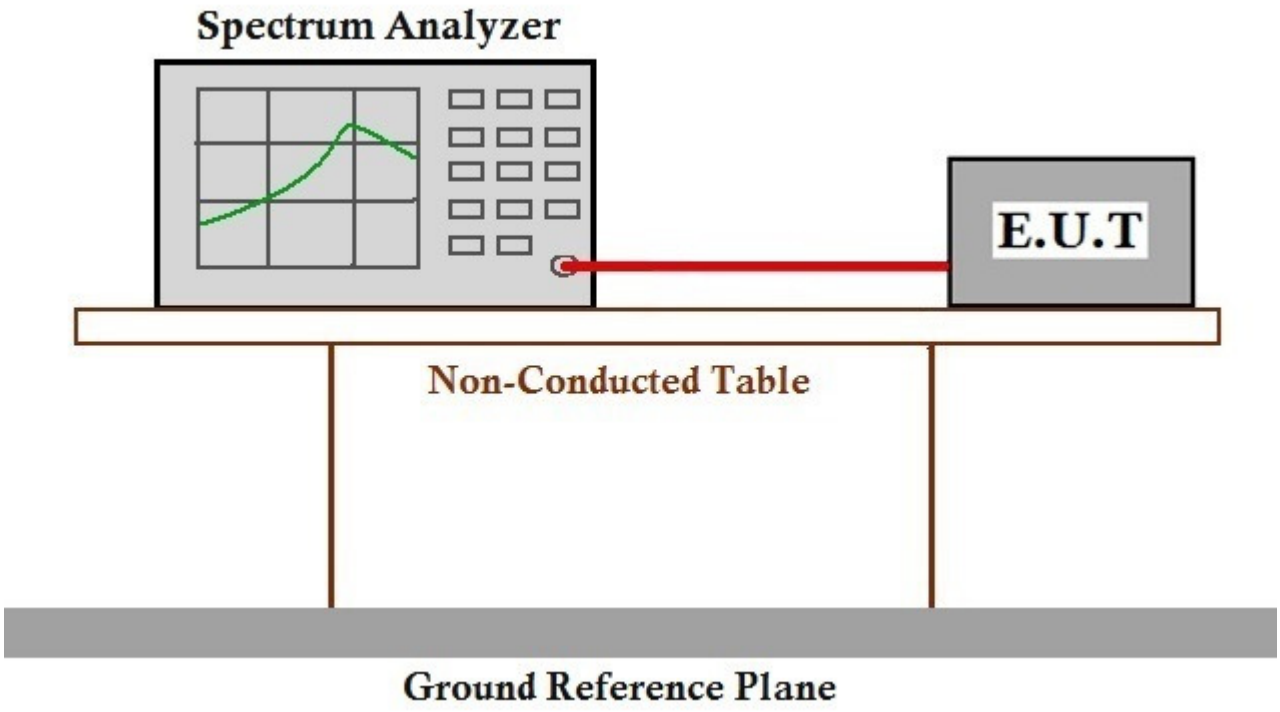
Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10 (2013) Section 7.8.3
Limit:

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 22.4 °C Humidity: 50.9 % RH Atmospheric Pressure: 1010 mbar
Test mode a:TX_Hop mode_Keep the EUT in frequency hopping with modulation mode.

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

7.5 Dwell Time

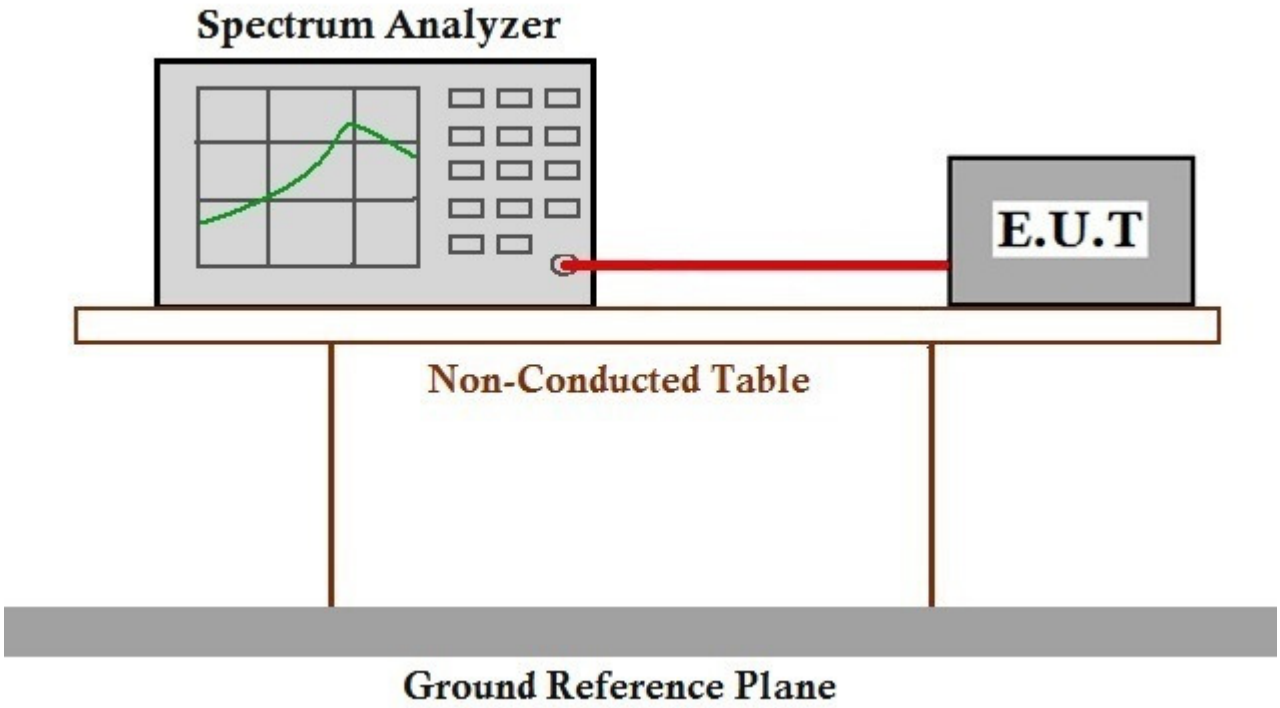
Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10 (2013) Section 7.8.4
Limit:

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4S multiplied by the number of hopping channels
5725-5850	0.4S within a 30S period

7.5.1 E.U.T. Operation

Operating Environment:
Temperature: 22.4 °C Humidity: 50.9 % RH Atmospheric Pressure: 1010 mbar
Test mode a:TX_Hop mode_Keep the EUT in frequency hopping with modulation mode.

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

7.6 Conducted Band Edges Measurement

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 7.8.6
Limit:	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)

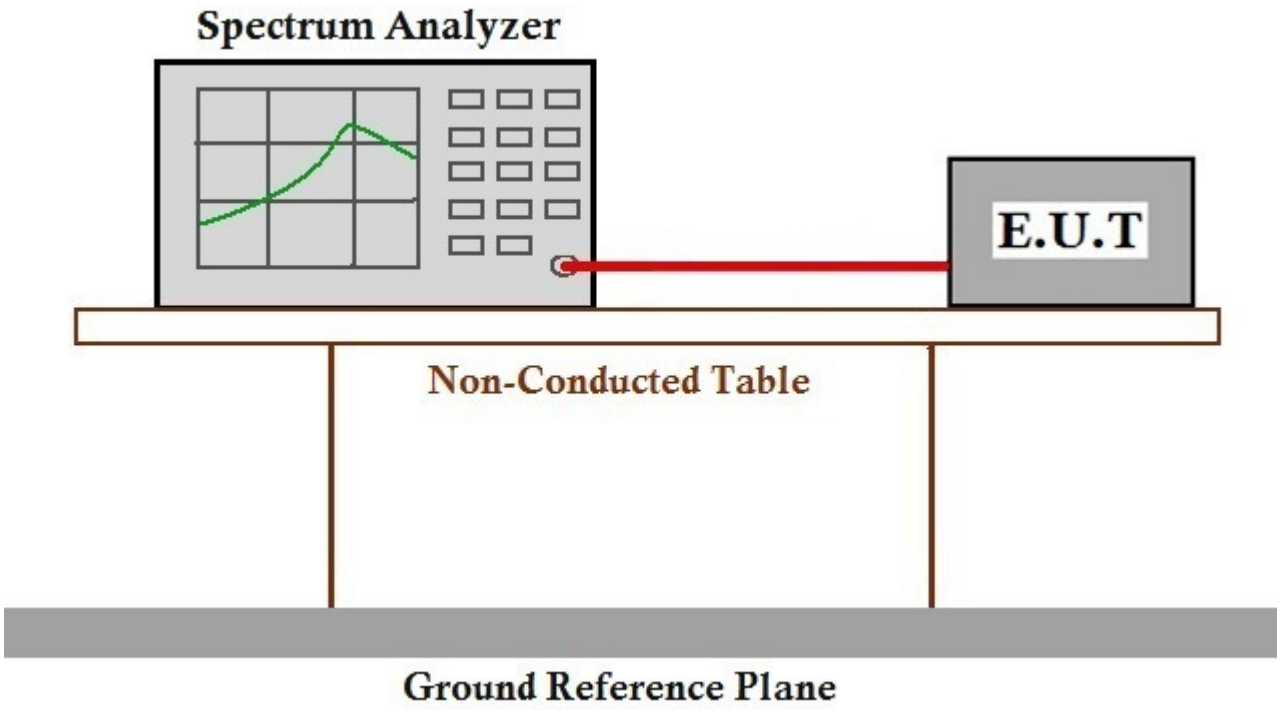
7.6.1 E.U.T. Operation

Operating Environment:

Temperature:	22.4 °C		Humidity:	51	% RH	Atmospheric Pressure:	1010	mbar

Pretest these modes to find the worst case:	a:TX_Hop mode_Keep the EUT in frequency hopping with modulation mode. b:TX_non-Hop mode_Keep the EUT in continuously transmitting with modulation mode.
The worst case for final test:	a:TX_Hop mode_Keep the EUT in frequency hopping with modulation mode. b:TX_non-Hop mode_Keep the EUT in continuously transmitting with modulation mode.

7.6.2 Test Setup Diagram



7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

7.7 Conducted Spurious Emissions

Test Requirement: 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 7.8.8

Limit: 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)

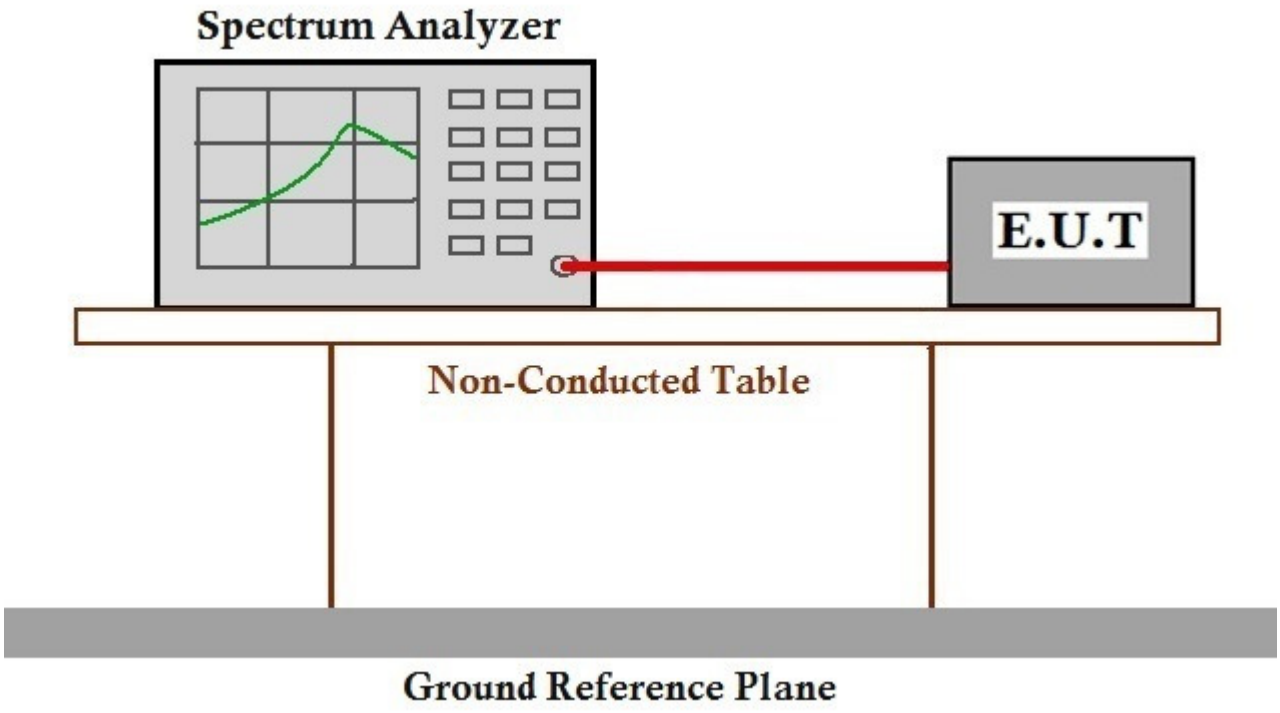
7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C Humidity: 50.9 % RH Atmospheric Pressure: 1010 mbar

Test mode: b:TX_non-Hop mode_Keep the EUT in continuously transmitting with modulation mode.

7.7.2 Test Setup Diagram



7.7.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

7.8 Radiated Emissions which fall in the restricted bands

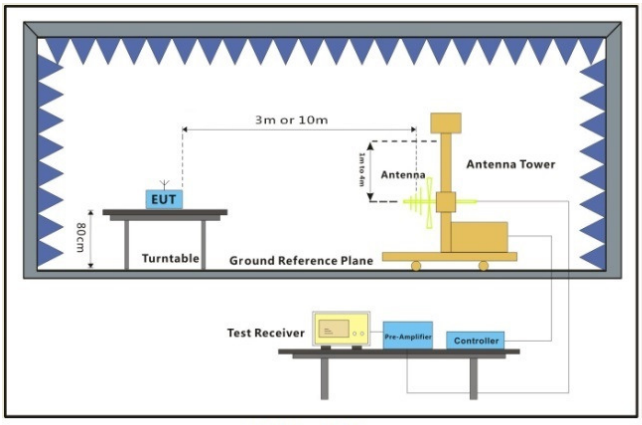
Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)
Test Method: ANSI C63.10 (2013) Section 6.10.5
Measurement Distance: 3m
Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

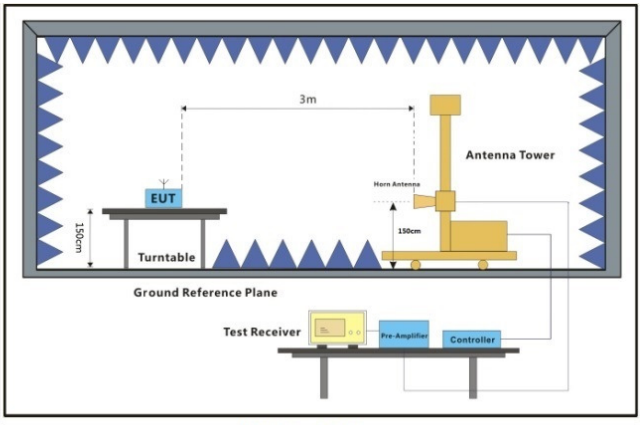
7.8.1 E.U.T. Operation

Operating Environment:
Temperature: 21.5 °C Humidity: 63.2 % RH Atmospheric Pressure: 1010 mbar
Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting with modulation mode.

7.8.2 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.8.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. 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.

e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. 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.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

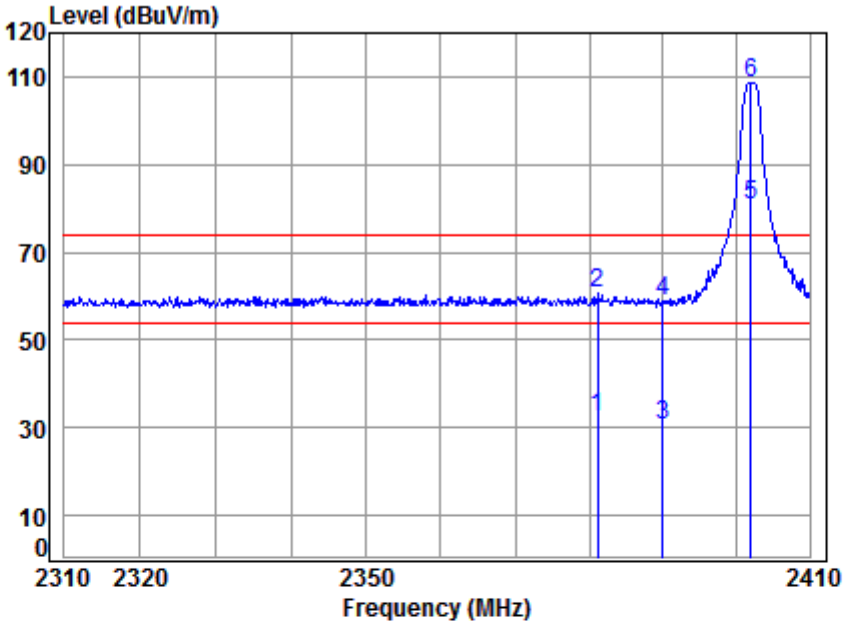
Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Pretest the EUT at antenna 1 and antenna 2 and found the antenna 1 which is worst case, So, Only the antenna 1 test data is recorded in the report.

Long ANT:

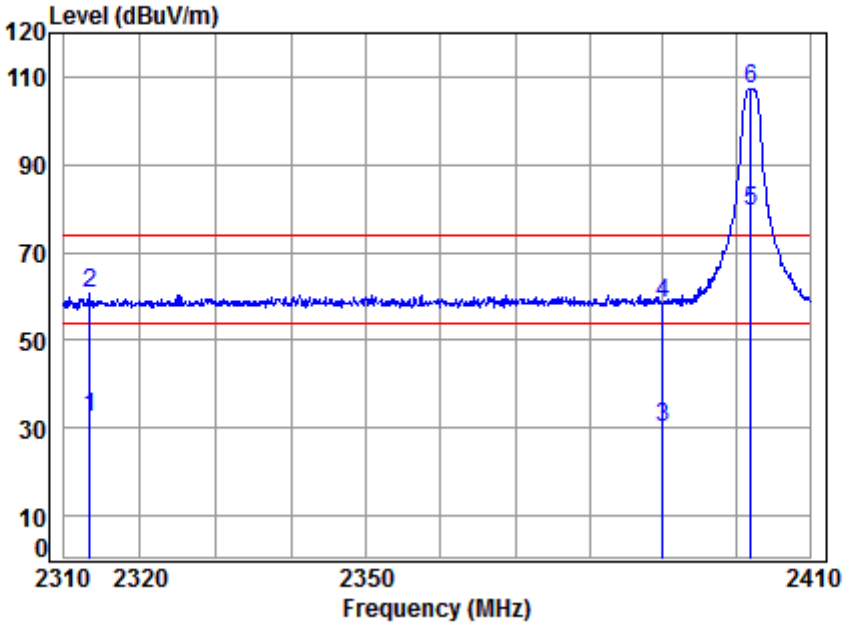
Mode:b; Polarization:Horizontal; Modulation:GFSK; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 08790CR
Mode : 2402 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2381.168	5.46	28.50	41.87	40.30	32.39	54.00	-21.61	Average
2	2381.168	5.46	28.50	41.87	68.40	60.49	74.00	-13.51	peak
3	2390.000	5.47	28.52	41.87	38.53	30.65	54.00	-23.35	Average
4	2390.000	5.47	28.52	41.87	66.64	58.76	74.00	-15.24	peak
5 *	2402.000	5.49	28.54	41.88	88.55	80.70	54.00	26.70	Average
6 *	2402.000	5.49	28.54	41.88	116.66	108.81	74.00	34.81	peak

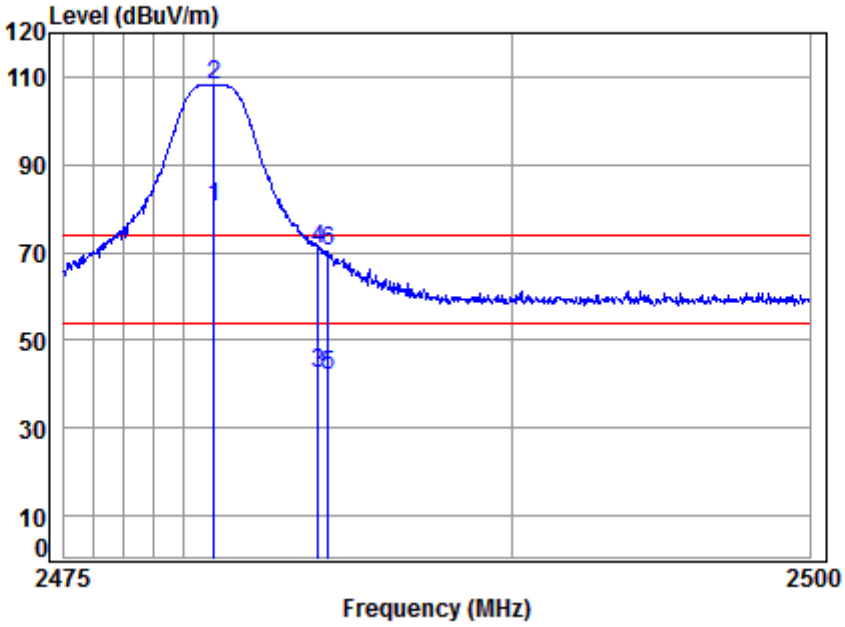
Mode:b; Polarization:Vertical; Modulation:GFSK; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 08790CR
Mode : 2402 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2313.429	5.37	28.39	41.84	40.43	32.35	54.00	-21.65	Average
2	2313.429	5.37	28.39	41.84	68.54	60.46	74.00	-13.54	peak
3	2390.000	5.47	28.52	41.87	38.17	30.29	54.00	-23.71	Average
4	2390.000	5.47	28.52	41.87	66.28	58.40	74.00	-15.60	peak
5 *	2402.000	5.49	28.54	41.88	87.02	79.17	54.00	25.17	Average
6 *	2402.000	5.49	28.54	41.88	115.13	107.28	74.00	33.28	peak

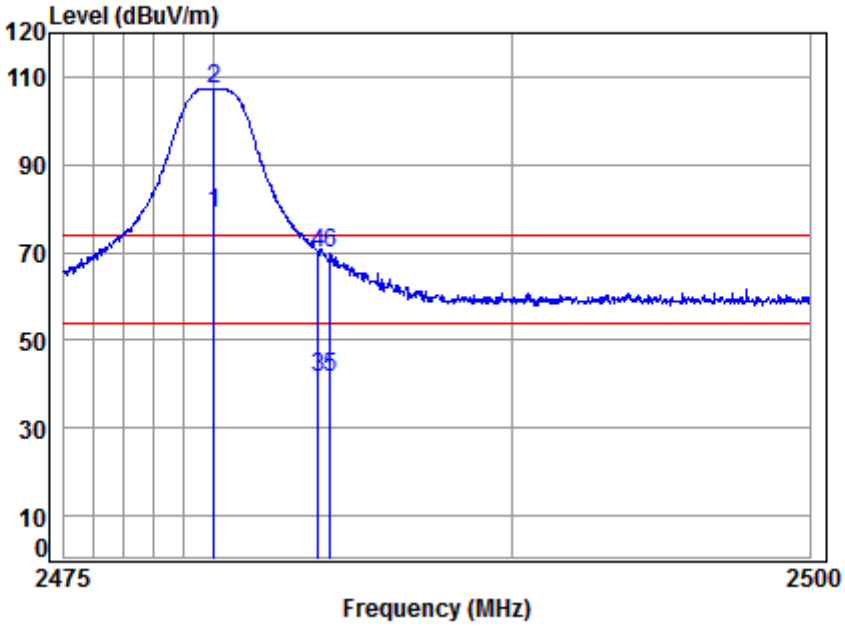
Mode:b; Polarization:Horizontal; Modulation:GFSK; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 08790CR
Mode : 2480 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	* 2480.000	5.59	28.67	41.91	87.83	80.18	54.00	26.18	Average
2	* 2480.000	5.59	28.67	41.91	115.94	108.29	74.00	34.29	peak
3	2483.500	5.60	28.67	41.91	50.25	42.61	54.00	-11.39	Average
4	2483.500	5.60	28.67	41.91	78.36	70.72	74.00	-3.28	peak
5	2483.821	5.60	28.67	41.91	49.59	41.95	54.00	-12.05	Average
6	2483.821	5.60	28.67	41.91	77.70	70.06	74.00	-3.94	peak

Mode:b; Polarization:Vertical; Modulation:GFSK; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 08790CR
Mode : 2480 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 *	2480.000	5.59	28.67	41.91	86.76	79.11	54.00	25.11	Average
2 *	2480.000	5.59	28.67	41.91	114.87	107.22	74.00	33.22	peak
3	2483.500	5.60	28.67	41.91	49.20	41.56	54.00	-12.44	Average
4	2483.500	5.60	28.67	41.91	77.31	69.67	74.00	-4.33	peak
5	2483.896	5.60	28.67	41.91	49.26	41.62	54.00	-12.38	Average
6	2483.896	5.60	28.67	41.91	77.37	69.73	74.00	-4.27	peak

Remark:

The duty cycle is simply the on-time divided by the period:

Hopping number in 100ms = 1
Effective period of the cycle = 3.929ms

DC = 3.929ms x 1 /100= 0.04

Therefore, the averaging factor is found by 20 $\log_{10}$ 0.04 = -28.11 dB

For this test item, Average = Peak value + averaging factor.

7.9 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)
Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6
Measurement Distance: 3m
Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

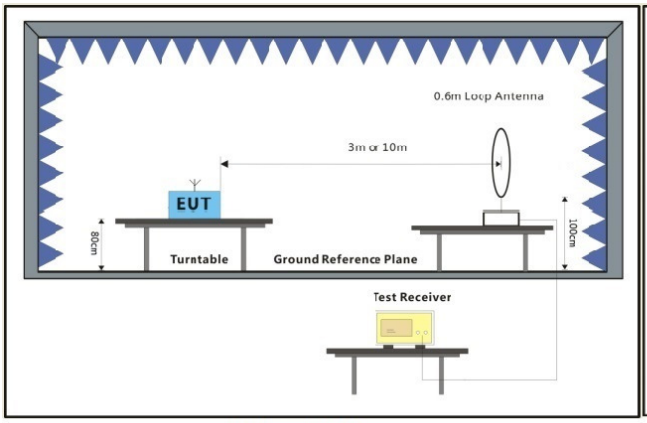
7.9.1 E.U.T. Operation

Operating Environment:

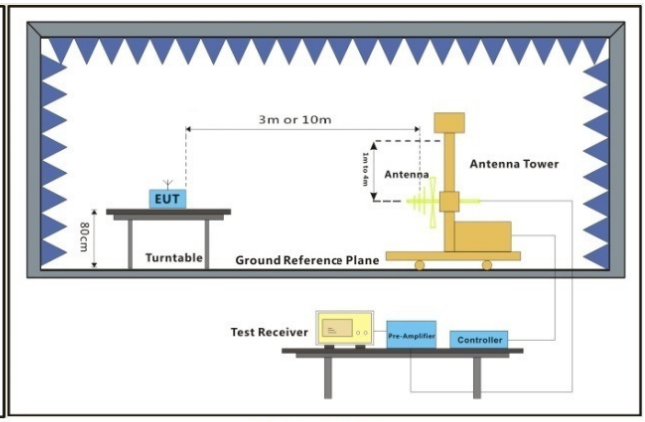
Temperature: 23.6 °C Humidity: 62.2 % RH Atmospheric Pressure: 1010 mbar

Test mode b:TX_non-Hop mode_Keep the EUT in continuously transmitting with modulation mode.

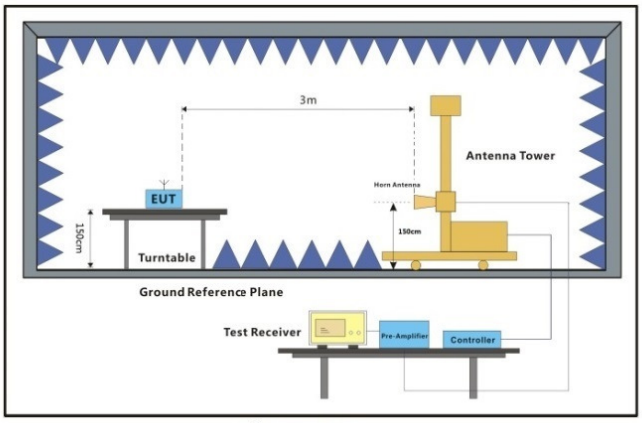
7.9.2 Test Setup Diagram



Below 30MHz



30MHz-1GHz



Above 1GHz

7.9.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. 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.

e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. 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.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark:

1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) 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

3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

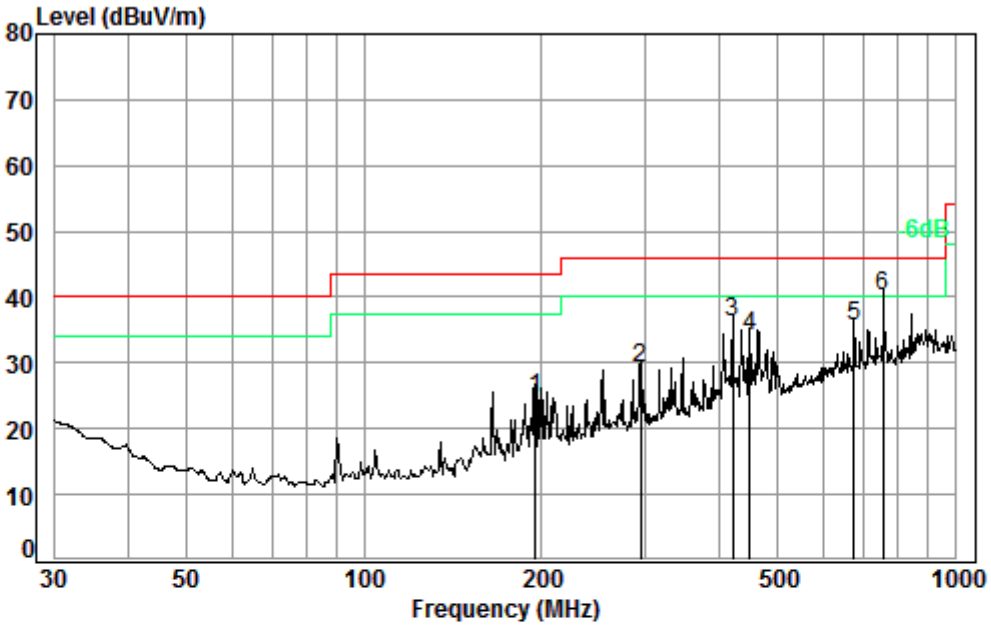
Pretest the EUT at antenna 1 and antenna 2 and found the antenna 1 which is worst case, So, Only the antenna 1 test data is recorded in the report.

Worst Case:

30MHz~1GHz

QP value:

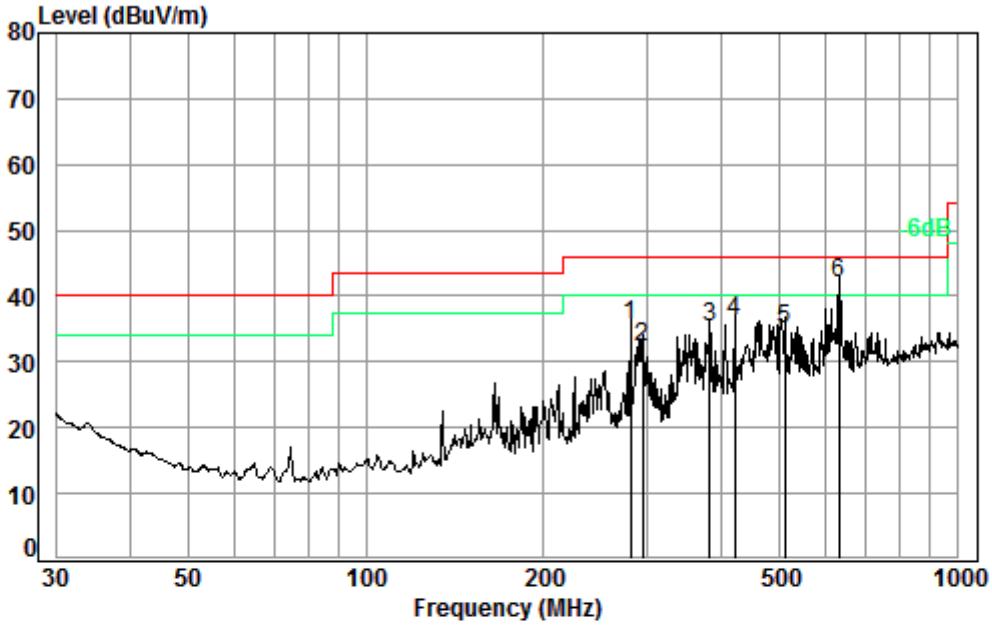
Mode: b; Polarization: Horizontal; GFSK



Condition: 3m HORIZONTAL
Job No. : 08790CR
Test mode: b

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	195.14	1.39	16.36	26.71	33.72	24.76	43.50	-18.74
2	294.11	1.87	19.37	26.42	34.30	29.12	46.00	-16.88
3	420.58	2.29	22.89	27.25	38.31	36.24	46.00	-9.76
4	449.56	2.41	23.55	27.44	35.63	34.15	46.00	-11.85
5	672.84	2.85	27.57	27.45	32.56	35.53	46.00	-10.47
6 pp	755.39	3.07	28.24	27.35	36.20	40.16	46.00	-5.84

Mode :b; Polarization: Vertical, GFSK

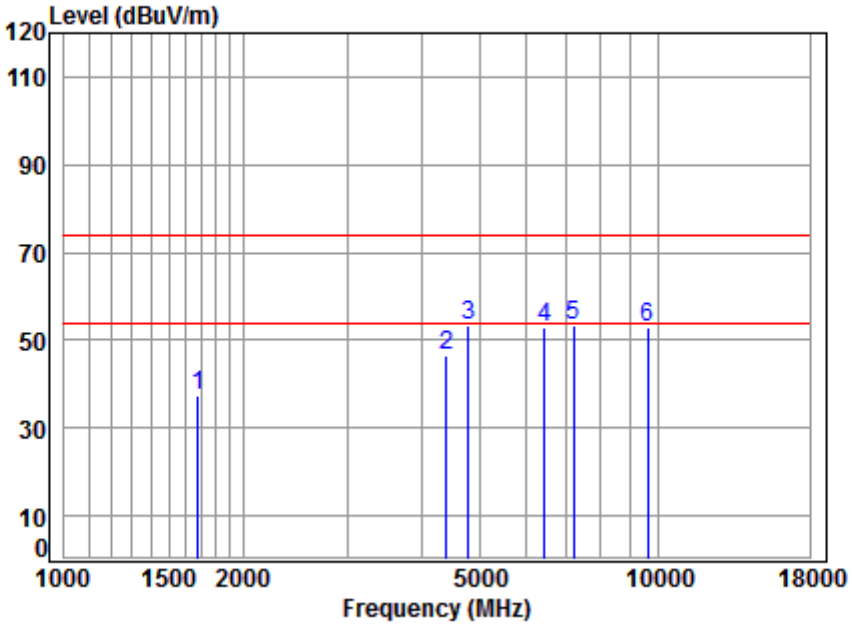


Condition: 3m VERTICAL
Job No. : 08790CR
Test mode: b

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	280.02	1.81	18.80	26.45	41.38	35.54	46.00	-10.46
2	294.11	1.87	19.37	26.42	37.33	32.15	46.00	-13.85
3	381.25	2.15	21.93	27.01	38.22	35.29	46.00	-10.71
4	420.58	2.29	22.89	27.25	38.21	36.14	46.00	-9.86
5	510.04	2.61	24.82	27.68	35.13	34.88	46.00	-11.12
6 pp	629.48	2.76	27.00	27.50	39.64	41.90	46.00	-4.10

Above 1GHz

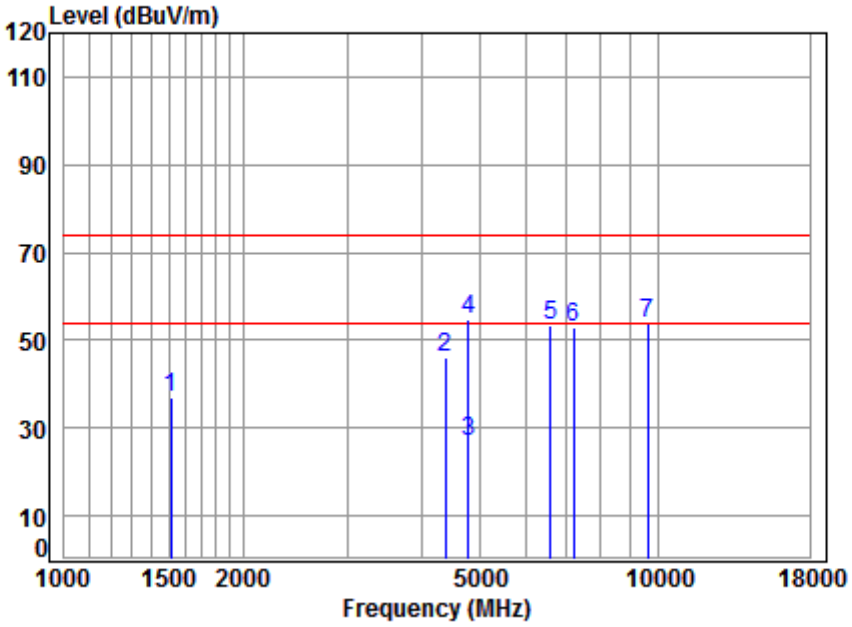
Mode:b; Polarization:Horizontal; Modulation:GFSK; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 08790CR
Mode : 2402 TX SE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1682.477	5.25	26.60	41.52	47.09	37.42	74.00	-36.58	peak
2	4405.090	7.46	33.44	42.40	47.85	46.35	74.00	-27.65	peak
3	4804.000	7.89	33.97	42.47	53.92	53.31	74.00	-20.69	peak
4	6432.732	11.41	35.54	41.27	47.36	53.04	74.00	-20.96	peak
5	7206.000	10.08	36.07	40.71	48.13	53.57	74.00	-20.43	peak
6	9608.000	10.75	37.67	37.74	42.19	52.87	74.00	-21.13	peak

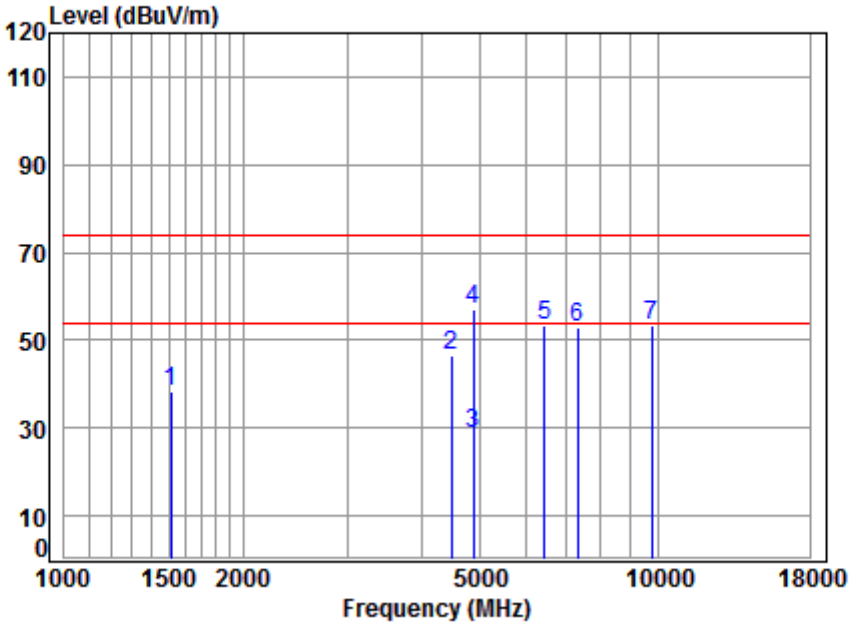
Mode:b; Polarization:Vertical; Modulation:GFSK; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 08790CR
Mode : 2402 TX SE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1511.833	5.46	25.85	41.41	46.85	36.75	74.00	-37.25	peak
2	4392.376	7.44	33.42	42.40	47.78	46.24	74.00	-27.76	peak
3	4804.000	7.89	33.97	42.47	27.34	26.73	54.00	-27.27	Average
4	4804.000	7.89	33.97	42.47	55.45	54.84	74.00	-19.16	peak
5	6602.265	11.24	35.66	41.14	47.51	53.27	74.00	-20.73	peak
6	7206.000	10.08	36.07	40.71	47.71	53.15	74.00	-20.85	peak
7	9608.000	10.75	37.67	37.74	43.02	53.70	74.00	-20.30	peak

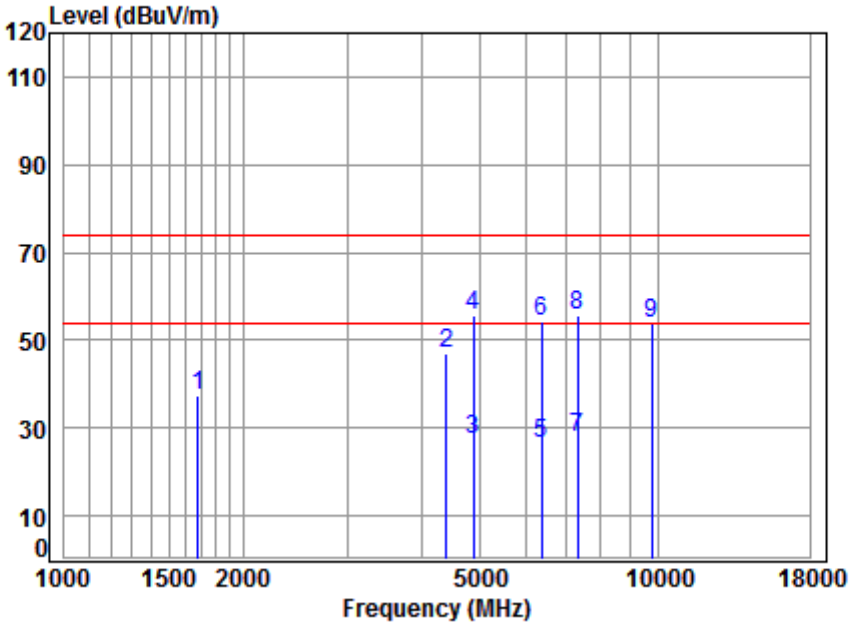
Mode:b; Polarization:Horizontal; Modulation:GFSK; Channel:middle



Site : chamber
Condition: 3m HORIZONTAL
Job No : 08790CR
Mode : 2440 TX SE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1511.833	5.46	25.85	41.41	48.47	38.37	74.00	-35.63	peak
2	4482.150	7.54	33.57	42.41	47.81	46.51	74.00	-27.49	peak
3	4880.000	7.97	34.06	42.48	29.27	28.82	54.00	-25.18	Average
4	4880.000	7.97	34.06	42.48	57.38	56.93	74.00	-17.07	peak
5	6451.353	11.45	35.55	41.25	47.53	53.28	74.00	-20.72	peak
6	7320.000	10.05	36.16	40.63	47.49	53.07	74.00	-20.93	peak
7	9760.000	10.82	37.76	37.53	42.41	53.46	74.00	-20.54	peak

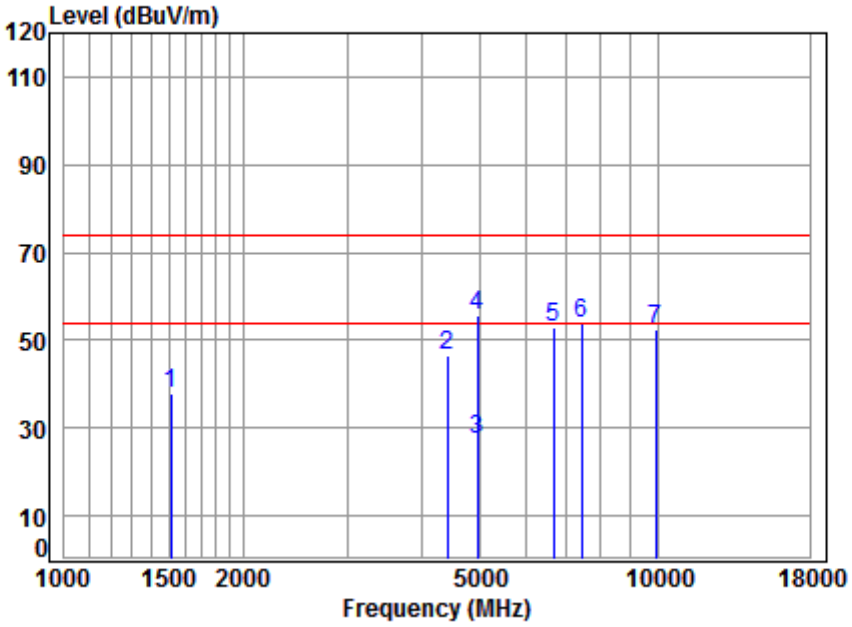
Mode:b; Polarization:Vertical; Modulation:GFSK; Channel:middle



Site : chamber
Condition: 3m VERTICAL
Job No : 08790CR
Mode : 2440 TX SE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1677.621	5.25	26.58	41.52	47.07	37.38	74.00	-36.62	peak
2	4405.090	7.46	33.44	42.40	48.65	47.15	74.00	-26.85	peak
3	4880.000	7.97	34.06	42.48	27.99	27.54	54.00	-26.46	Average
4	4880.000	7.97	34.06	42.48	56.10	55.65	74.00	-18.35	peak
5	6377.195	11.31	35.48	41.31	20.78	26.26	54.00	-27.74	Average
6	6377.195	11.31	35.48	41.31	48.89	54.37	74.00	-19.63	peak
7	7320.000	10.05	36.16	40.63	22.11	27.69	54.00	-26.31	Average
8	7320.000	10.05	36.16	40.63	50.23	55.81	74.00	-18.19	peak
9	9760.000	10.82	37.76	37.53	42.69	53.74	74.00	-20.26	peak

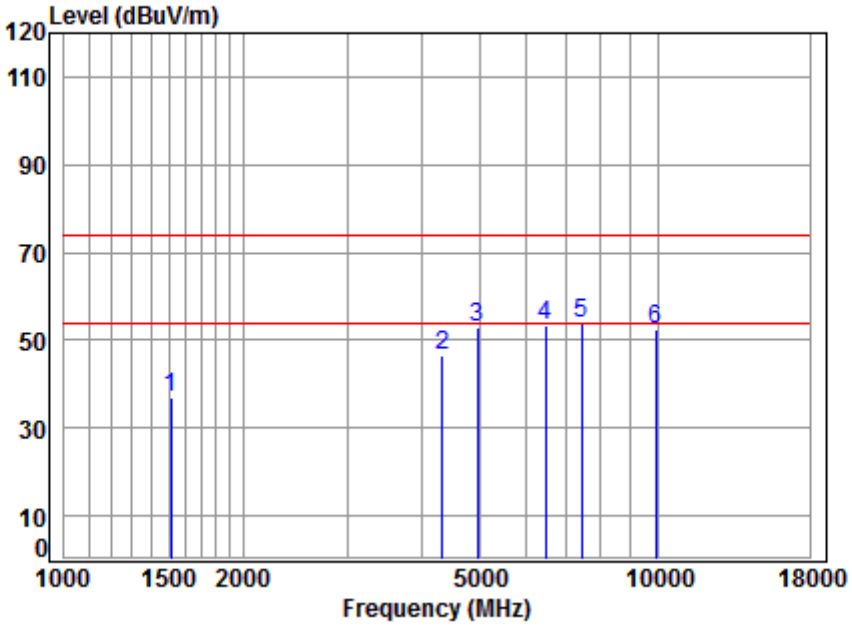
Mode:b; Polarization:Horizontal; Modulation:GFSK; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 08790CR
Mode : 2480 TX SE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1511.833	5.46	25.85	41.41	48.06	37.96	74.00	-36.04	peak
2	4417.841	7.47	33.46	42.40	47.84	46.37	74.00	-27.63	peak
3	4960.000	8.05	34.15	42.49	27.63	27.34	54.00	-26.66	Average
4	4960.000	8.05	34.15	42.49	55.74	55.45	74.00	-18.55	peak
5	6659.763	11.08	35.70	41.10	47.47	53.15	74.00	-20.85	peak
6	7440.000	10.02	36.25	40.56	47.99	53.70	74.00	-20.30	peak
7	9920.000	10.90	37.85	37.31	41.09	52.53	74.00	-21.47	peak

Mode:b; Polarization:Vertical; Modulation:GFSK; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 08790CR
Mode : 2480 TX SE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1511.833	5.46	25.85	41.41	46.92	36.82	74.00	-37.18	peak
2	4341.886	7.38	33.33	42.39	48.10	46.42	74.00	-27.58	peak
3	4960.000	8.05	34.15	42.49	53.01	52.72	74.00	-21.28	peak
4	6470.026	11.48	35.57	41.24	47.79	53.60	74.00	-20.40	peak
5	7440.000	10.02	36.25	40.56	48.26	53.97	74.00	-20.03	peak
6	9920.000	10.90	37.85	37.31	40.82	52.26	74.00	-21.74	peak

Remark:

The duty cycle is simply the on-time divided by the period:

Hopping number in 100ms = 1
Effective period of the cycle = 3.929ms

DC = 3.929ms x 1 /100 = 0.04

Therefore, the averaging factor is found by 20 $\log_{10}$ 0.04 = -28.11 dB

For this test item, Average = Peak value + averaging factor.

8 Photographs

8.1 Radiated Spurious Emissions Test Setup

Please refer to setup photos.

8.2 EUT Constructional Details (EUT Photos)

Please refer to external and internal photos for details.

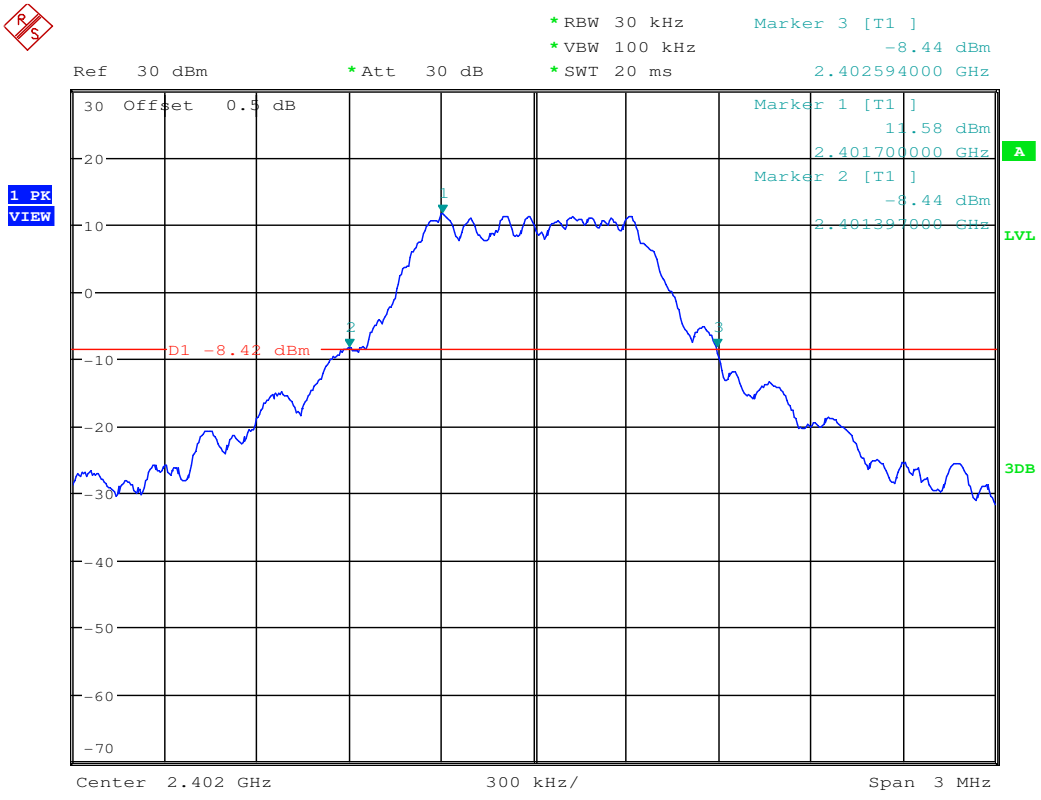
9 Appendix

9.1 Appendix 15.247

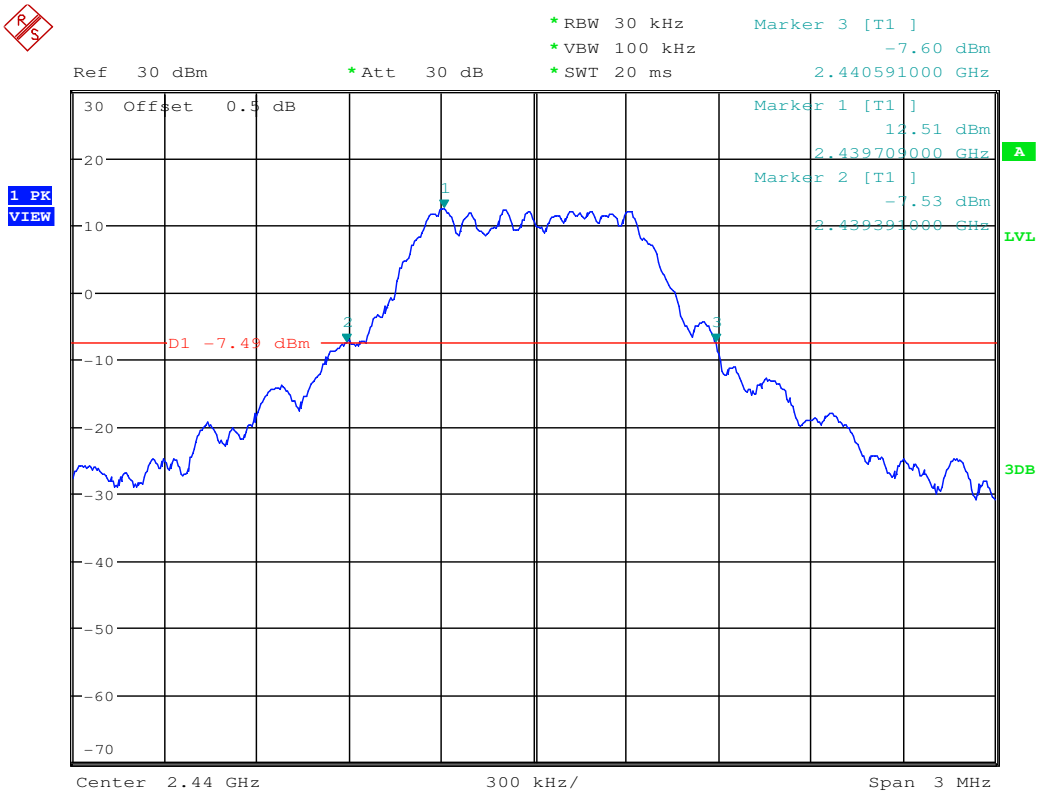
1.20 dB Bandwidth

Test Mode	Test Channel	EBW[MHz]	Limit[MHz]	Verdict
Mode a	2402	1.197	---	PASS
Mode a	2440	1.200	---	PASS
Mode a	2480	1.203	---	PASS

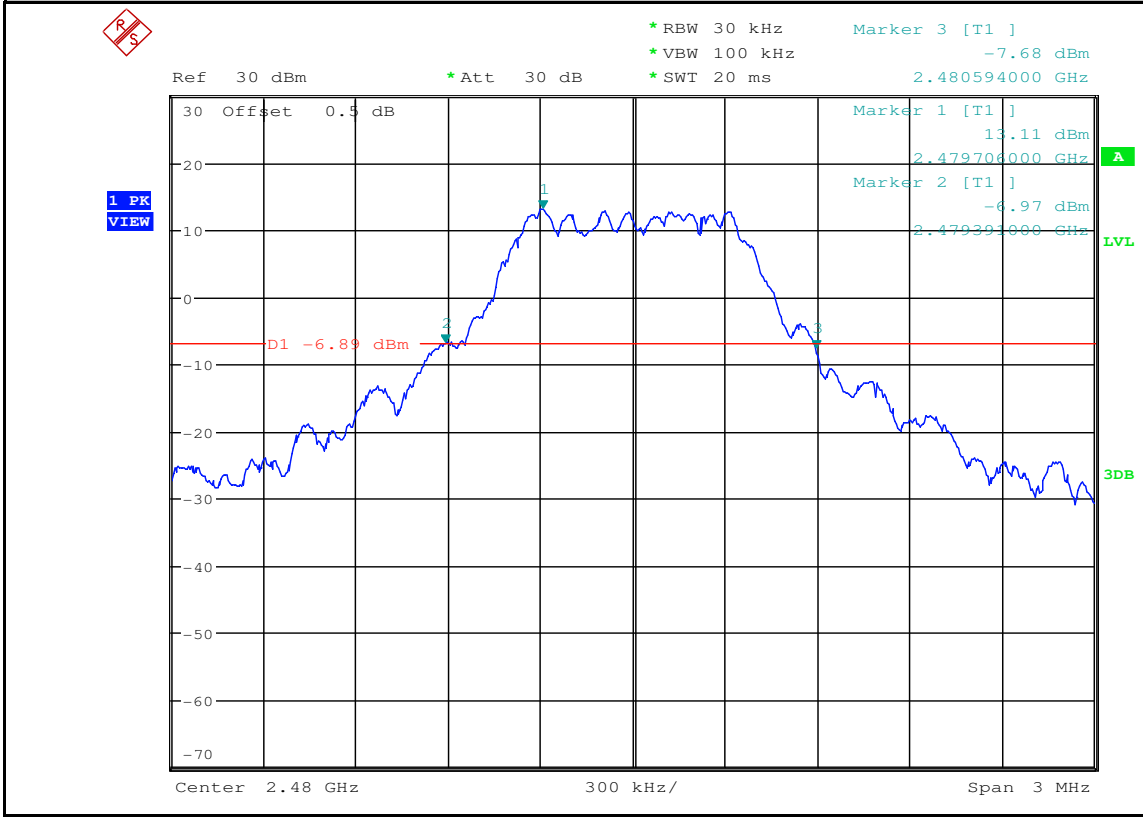
20 dB Bandwidth_Mode a_2402



20 dB Bandwidth_Mode a_2440



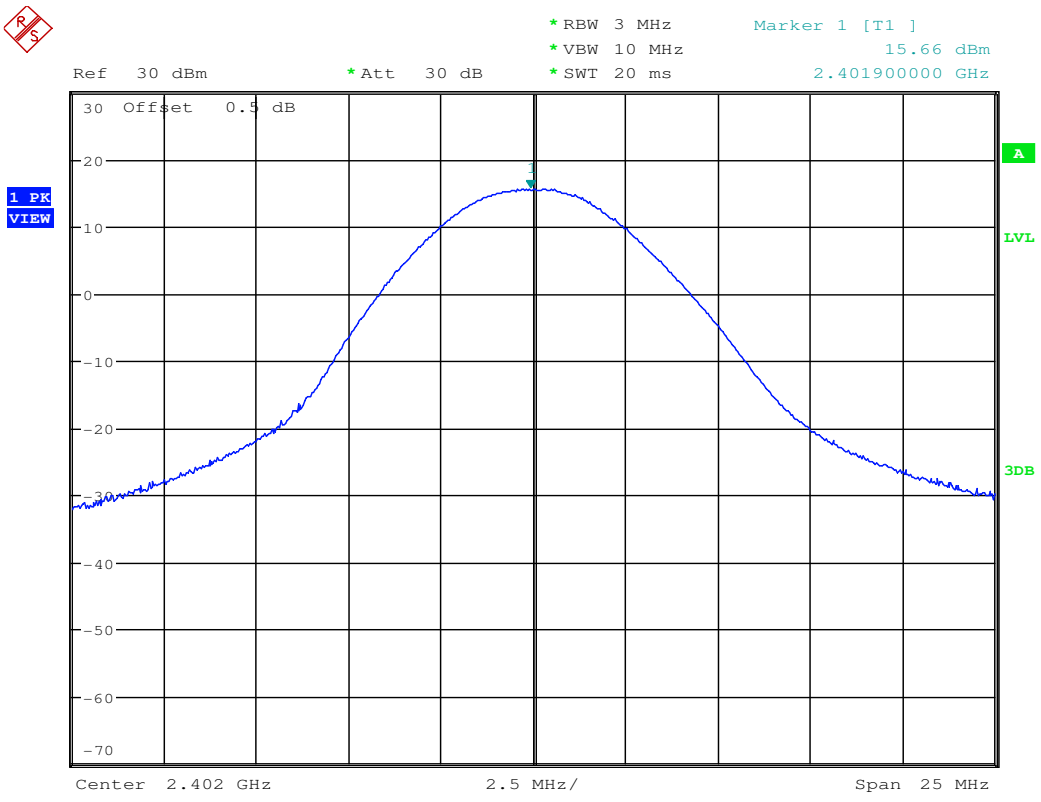
20 dB Bandwidth_Mode a_2480



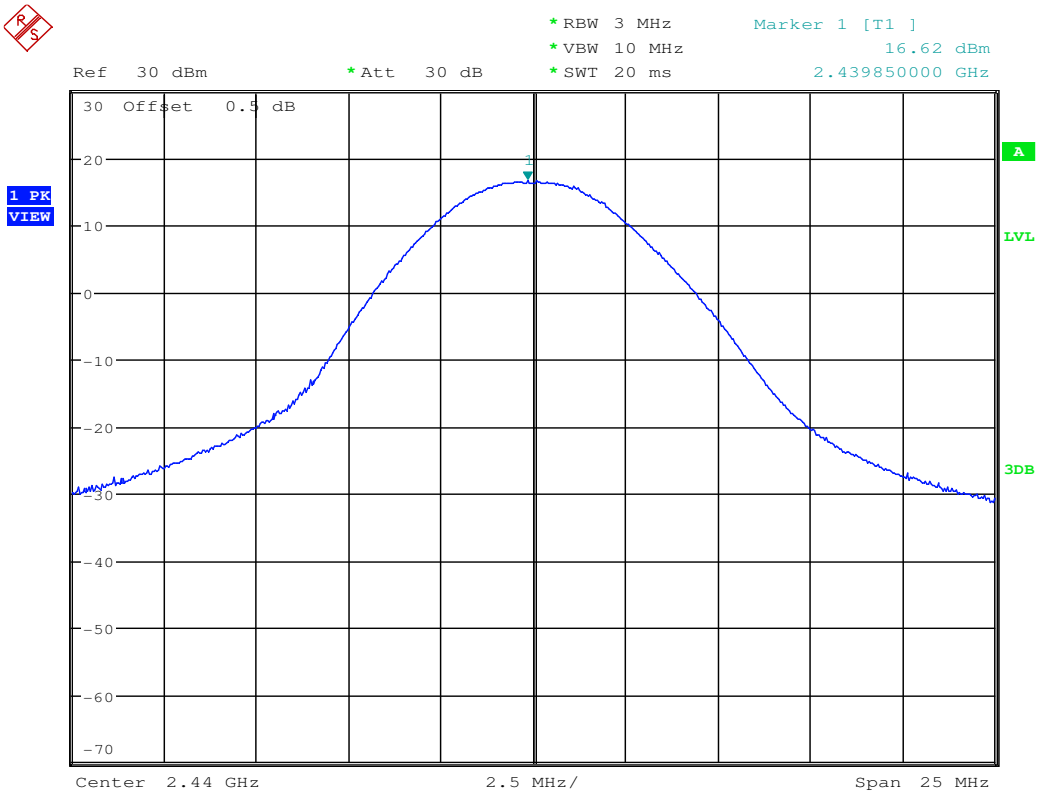
2.Conducted Peak Output Power

Test Mode	Test Channel	Power[dBm]	Limit[dBm]	Verdict
Mode a	2402	15.66	<=20.97	PASS
Mode a	2440	16.62	<=20.97	PASS
Mode a	2480	16.35	<=20.97	PASS

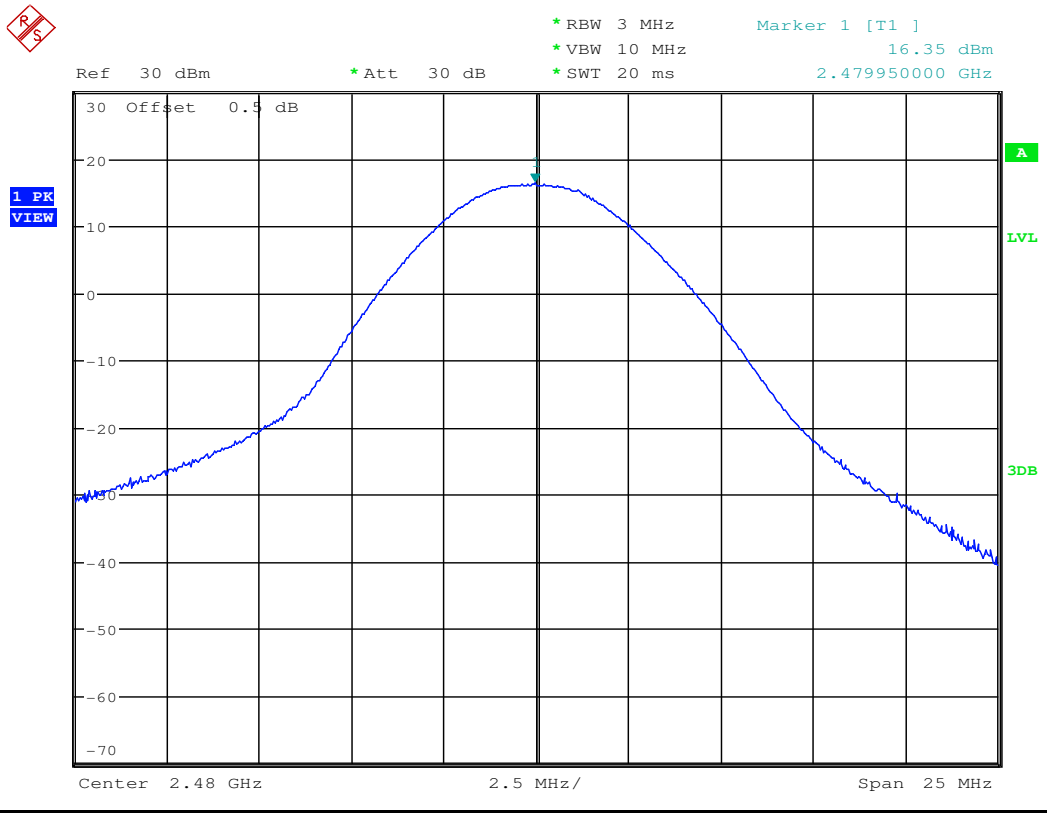
Conducted Peak Output Power_Mode a_2402



Conducted Peak Output Power_Mode a_2440



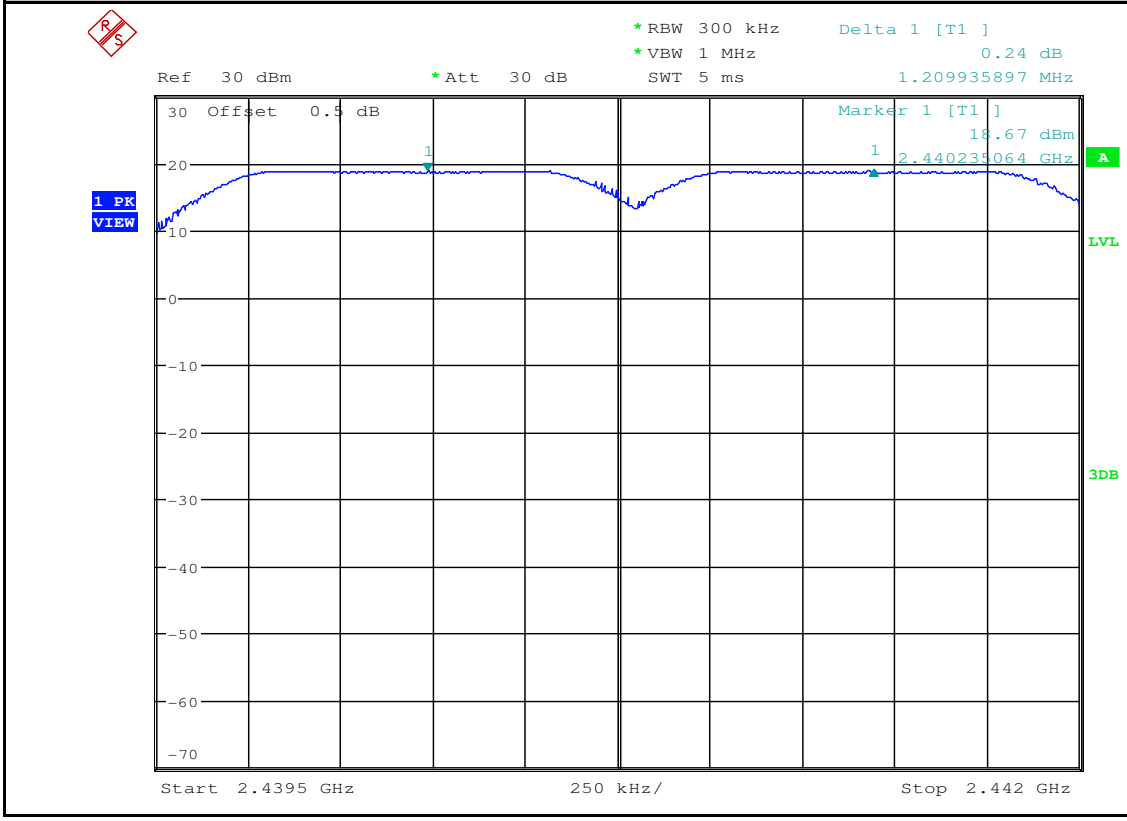
Conducted Peak Output Power_Mode a_2480



3.Carrier Frequency Separation

Test Mode	Test Channel	Result[MHz]	Limit[MHz]	Verdict
Mode b	2440	1.210	>=0.802	PASS

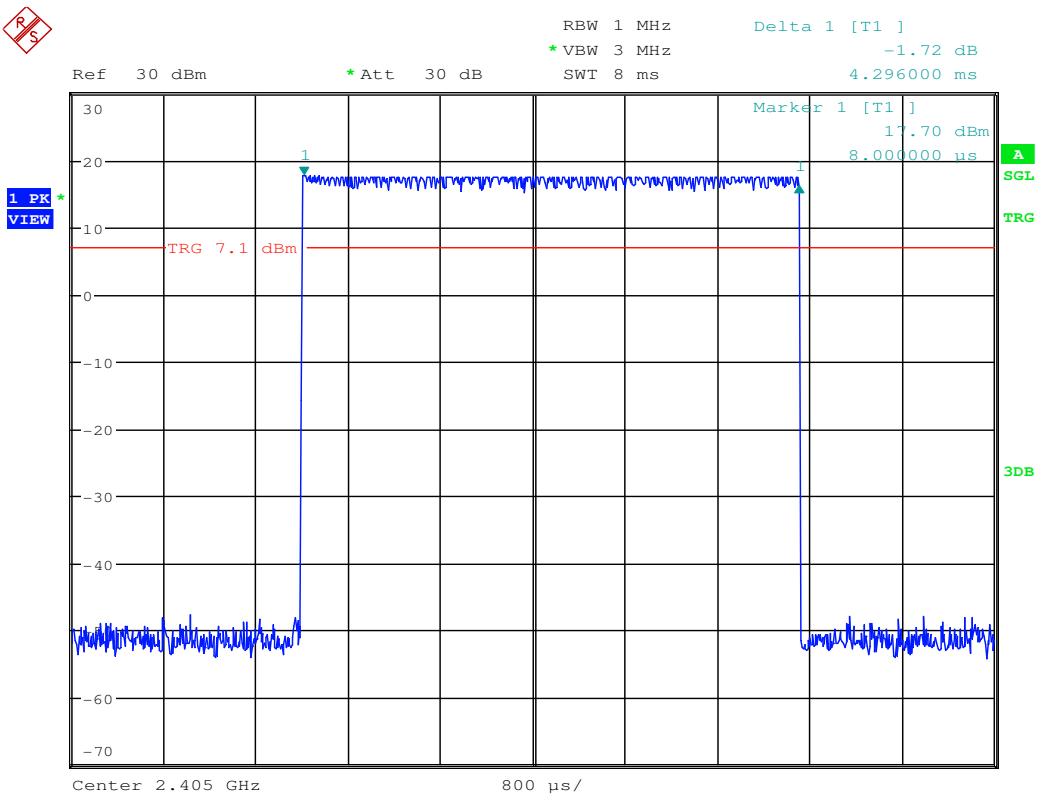
Carrier Frequency Separation_Mode b_2440

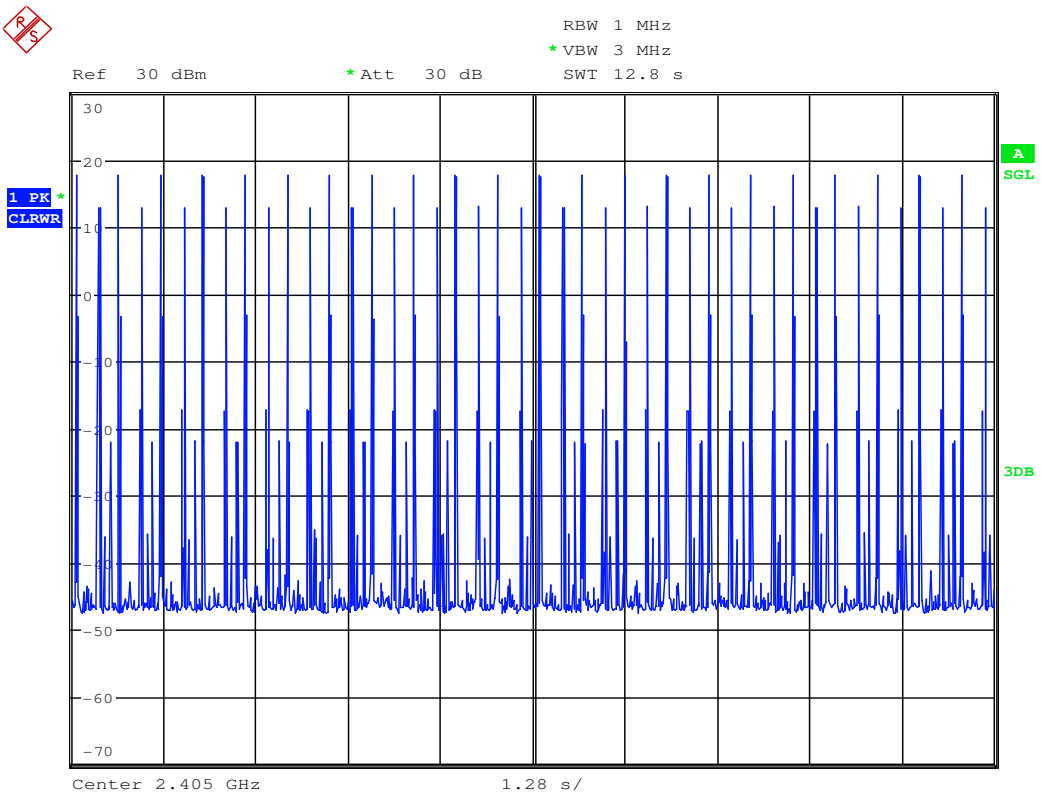


4.Dwell Time

Test Mode	Test Channel	Burst Width[ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit[s]	Verdict
Mode b	2405	4.3	22	0.0946	<0.4	PASS

Dwell Time_Mode b_2405

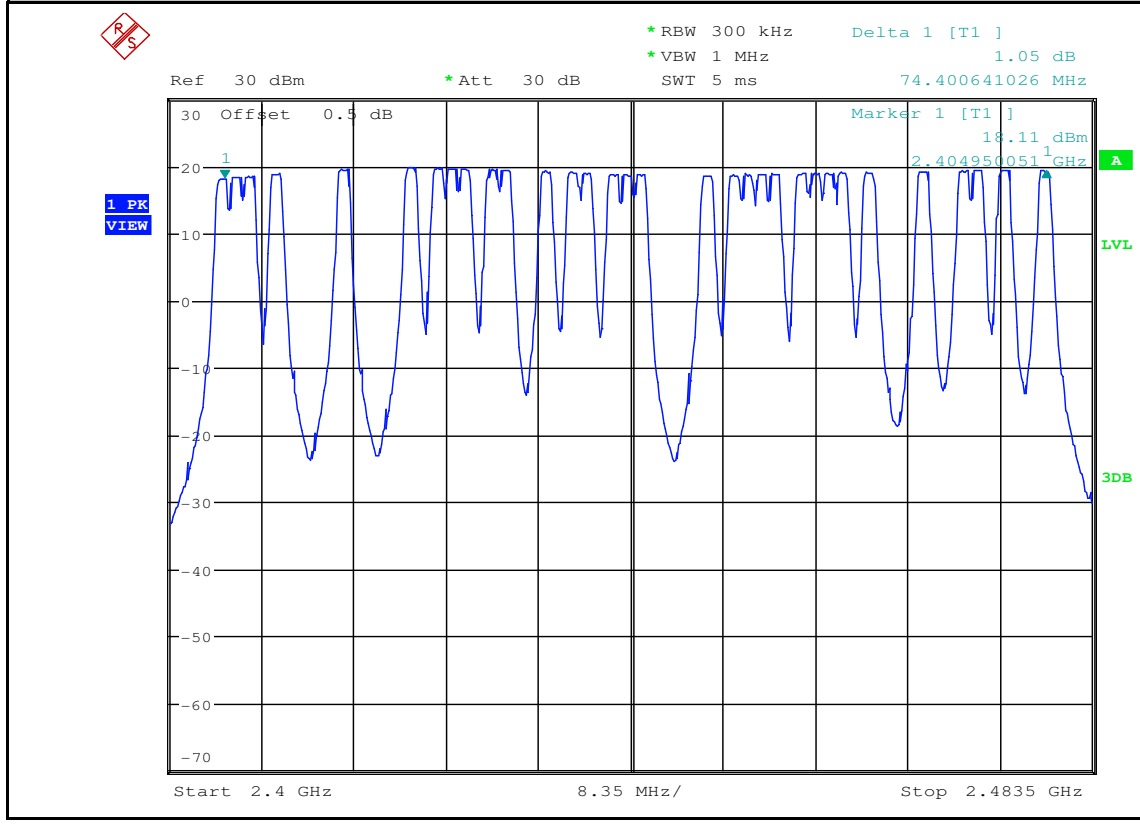




5.Hopping Channel Number

Test Mode	Test Channel	Number of Hopping Channel[N]	Limit[N]	Verdict
Mode b	2405	32	>=15	PASS

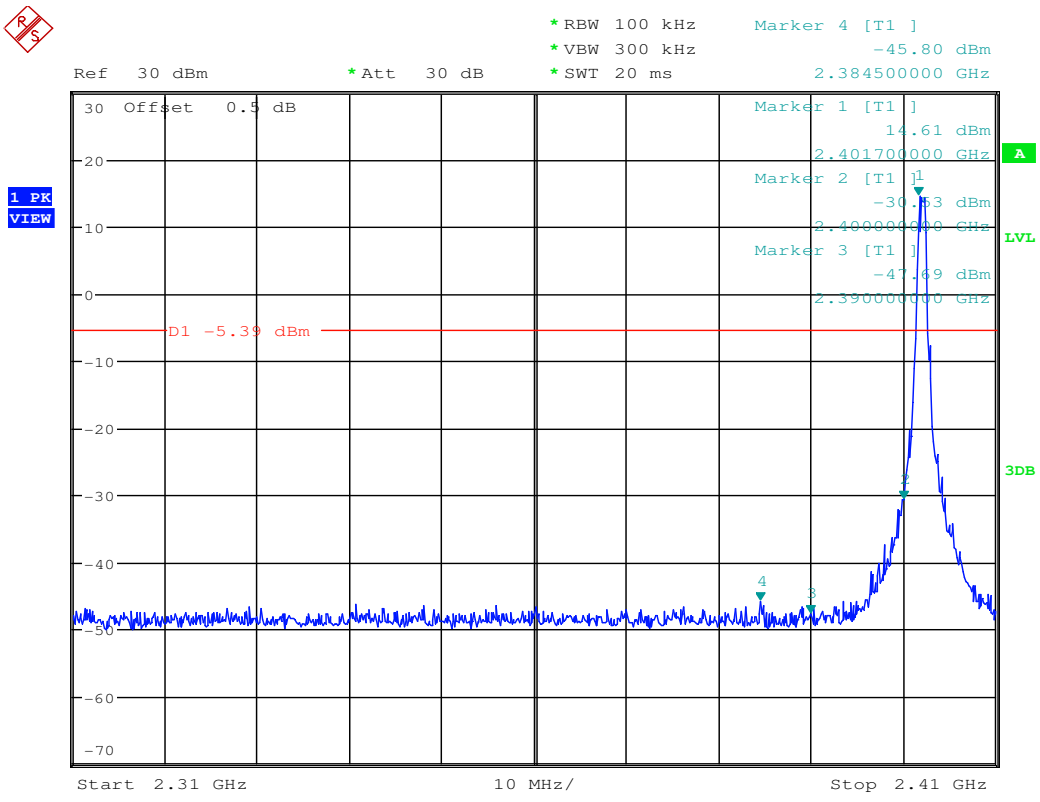
Hopping Channel Number_Mode b_2405



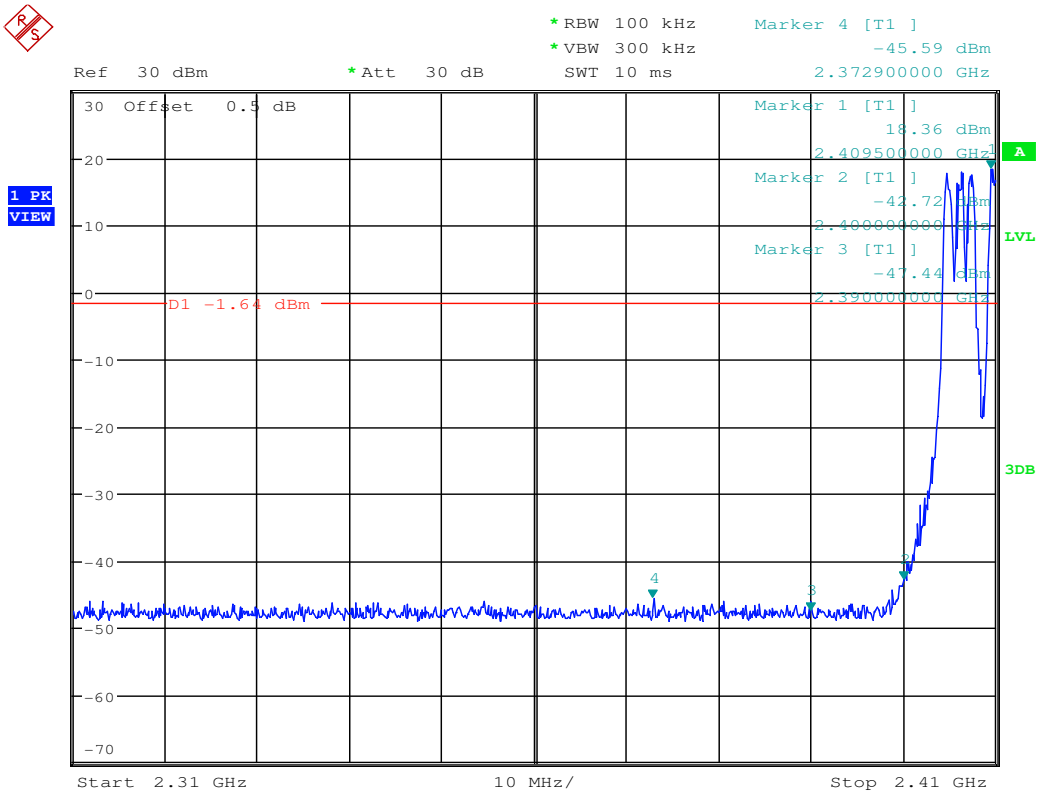
6.Band-edge for RF Conducted Emissions

Test Mode	Test Channel	Hopping	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit[dBm]	Verdict
Mode a &b	2402	Off	14.610	-45.798	<-5.39	PASS
Mode a &b	2405	On	18.360	-45.585	<-1.64	PASS
Mode a &b	2480	On	18.760	-37.792	<-1.24	PASS
Mode a &b	2480	Off	15.570	-36.795	<-4.43	PASS

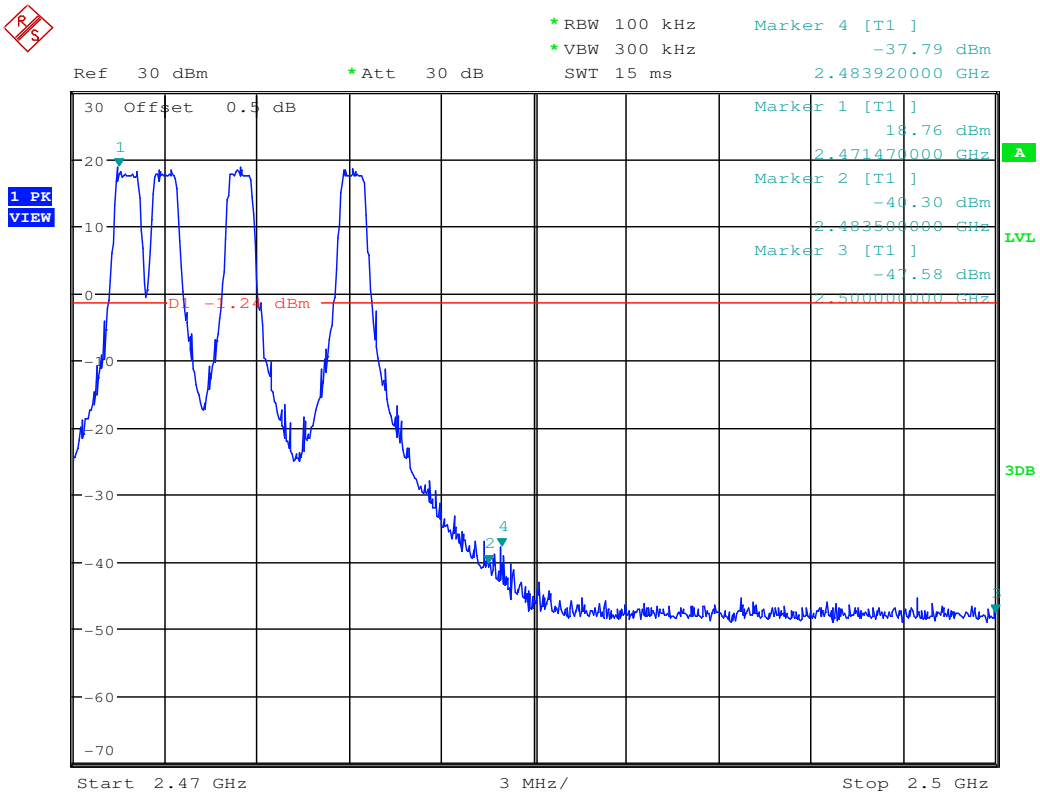
Band-edge for RF Conducted Emissions_Mode a & b_2402_Hopping Off



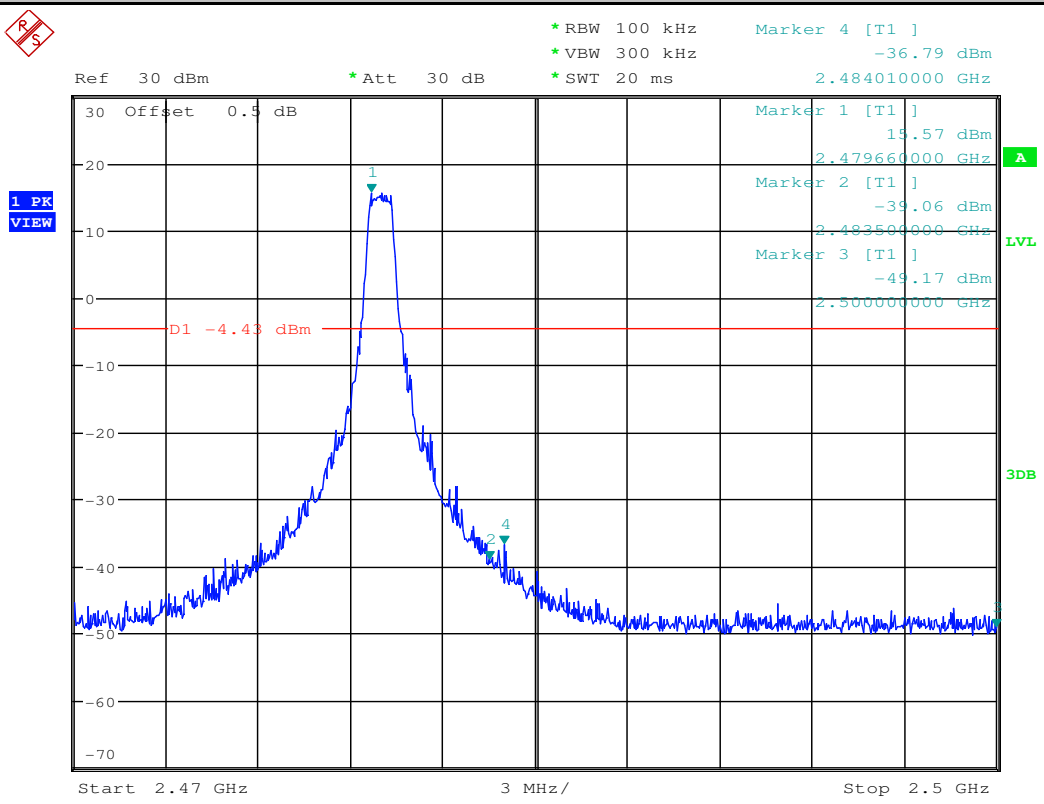
Band-edge for RF Conducted Emissions_Mode a & b_2405_Hopping On



Band-edge for RF Conducted Emissions_Mode a & b_2480_Hopping On

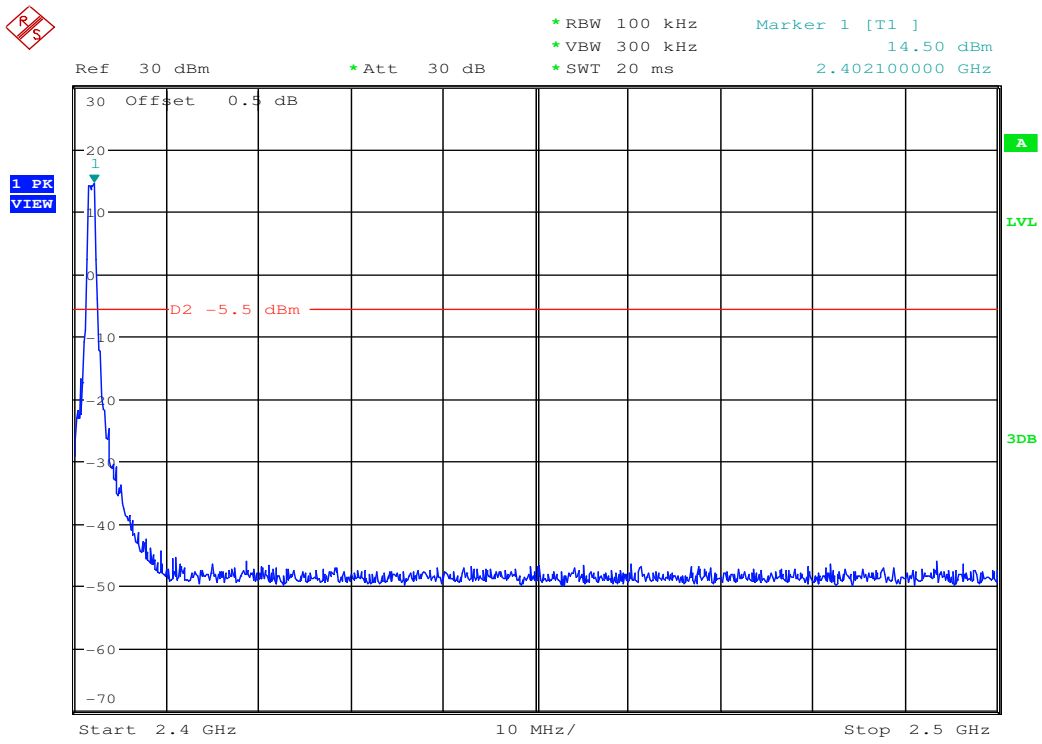
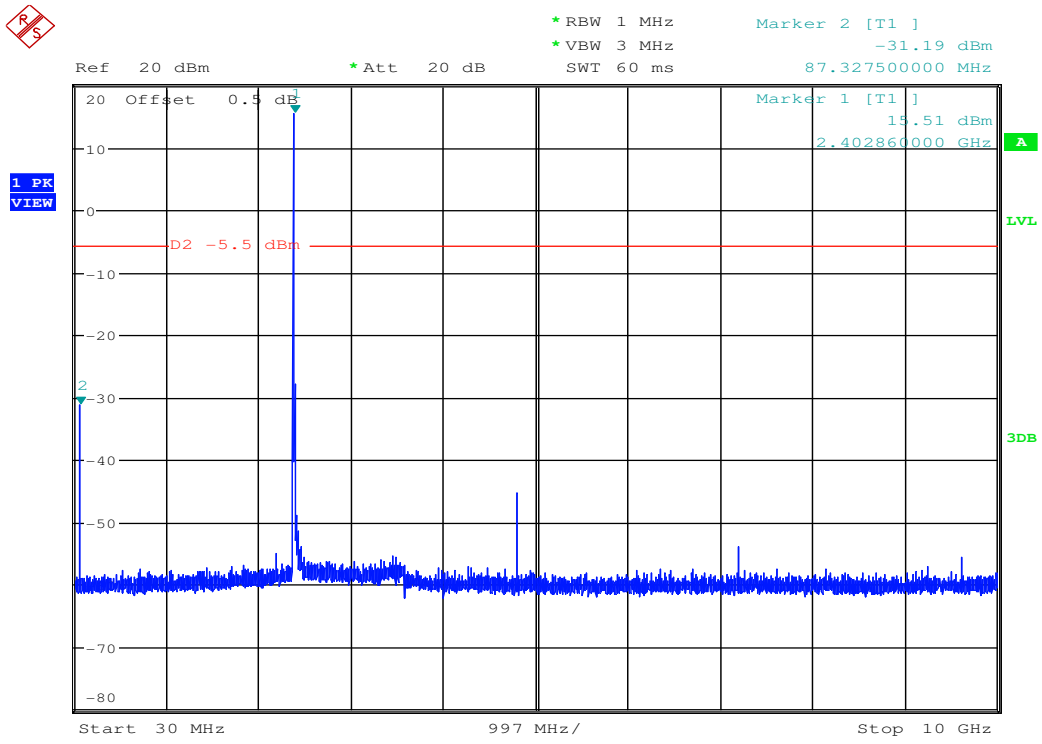


Band-edge for RF Conducted Emissions_Mode a & b_2480_Hopping Off

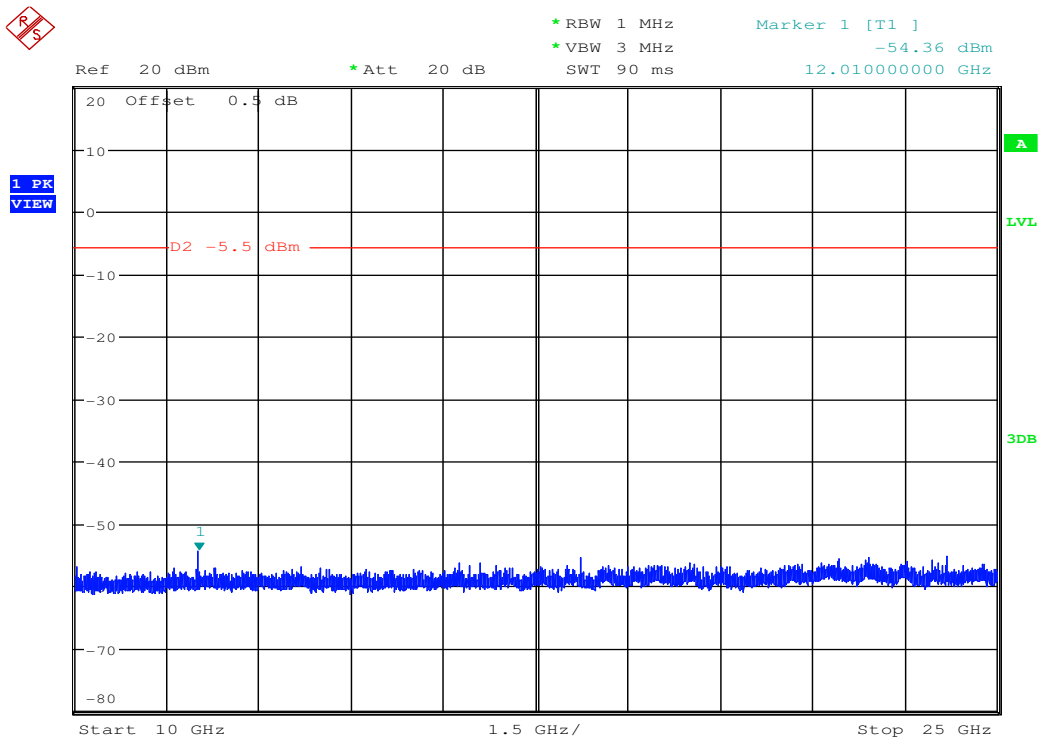


7.RF Conducted Spurious Emissions

Test Mode	Test Channel	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
Mode a	2402	30	10000	1000	3000	14.5	-31.190	<-5.5	PASS
Mode a	2402	10000	25000	1000	3000	14.5	-54.360	<-5.5	PASS
Mode a	2440	30	10000	1000	3000	15.26	-29.830	<-4.74	PASS
Mode a	2440	10000	25000	1000	3000	15.26	-52.510	<-4.74	PASS
Mode a	2480	30	10000	1000	3000	15.44	-29.740	<-4.56	PASS
Mode a	2480	10000	25000	1000	3000	15.44	-54.750	<-4.56	PASS

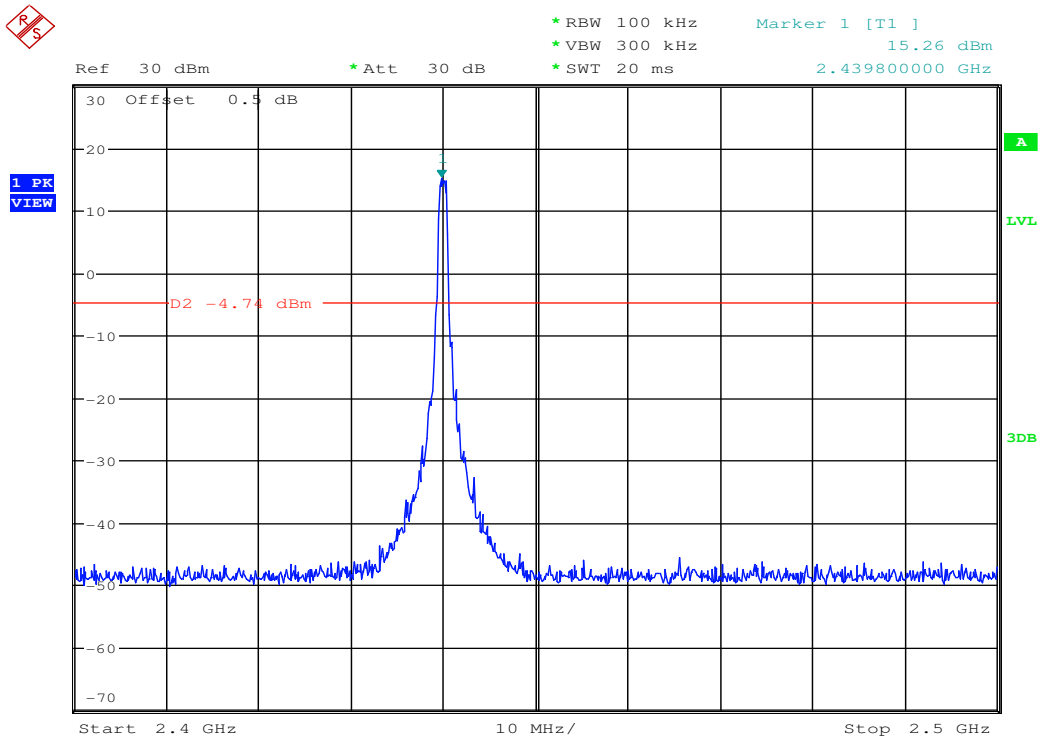
RF Conducted Spurious Emissions_Mode a_2402	
Pref	
CSE_1	

CSE_2

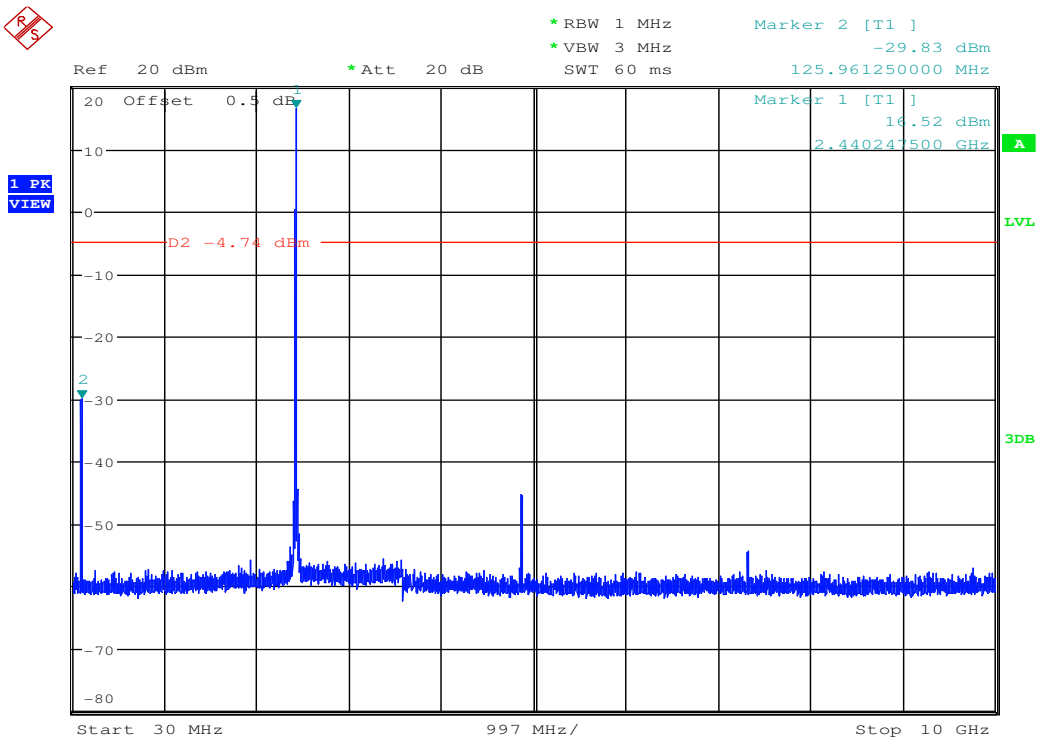


RF Conducted Spurious Emissions_Mode a_2440

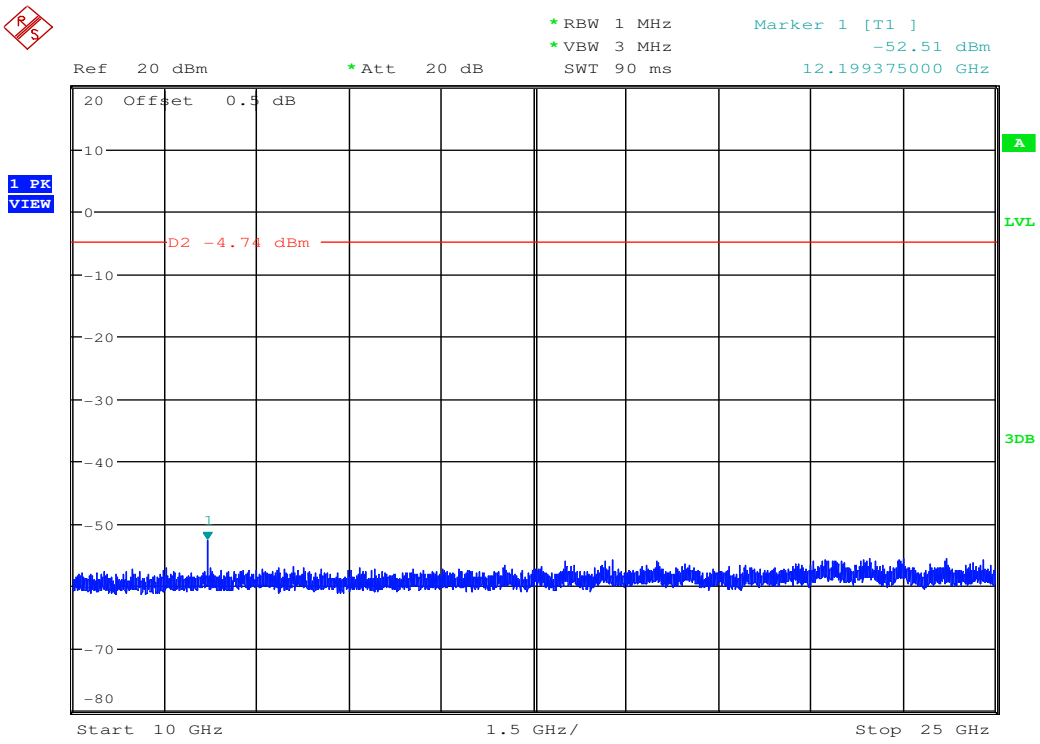
Pref

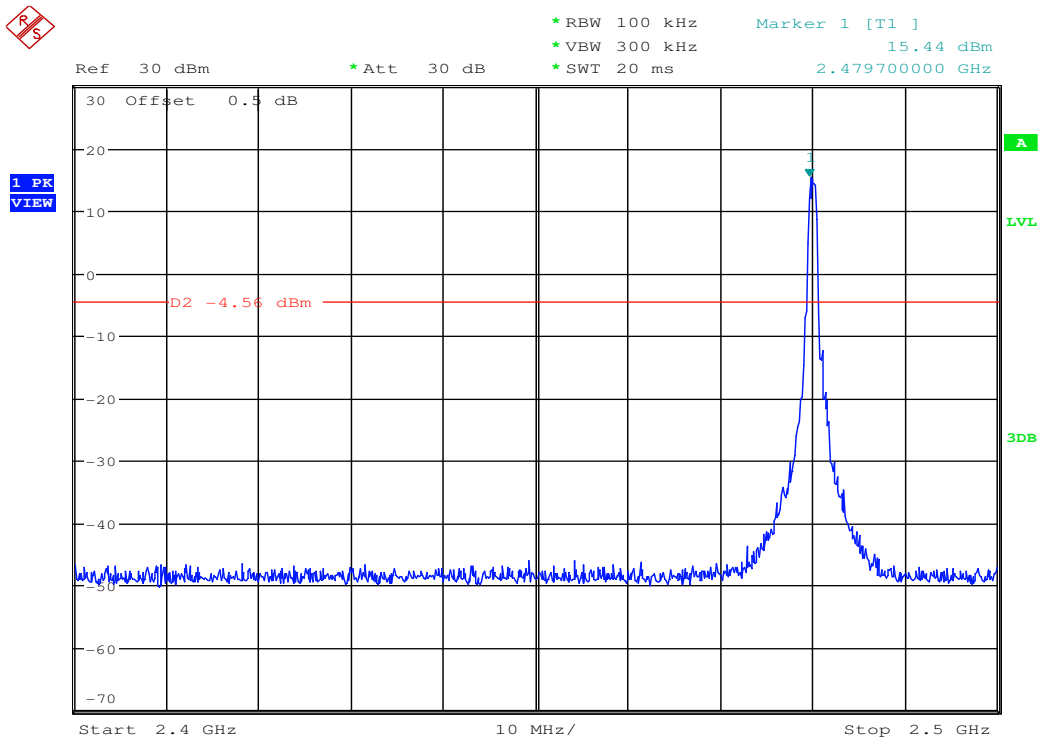
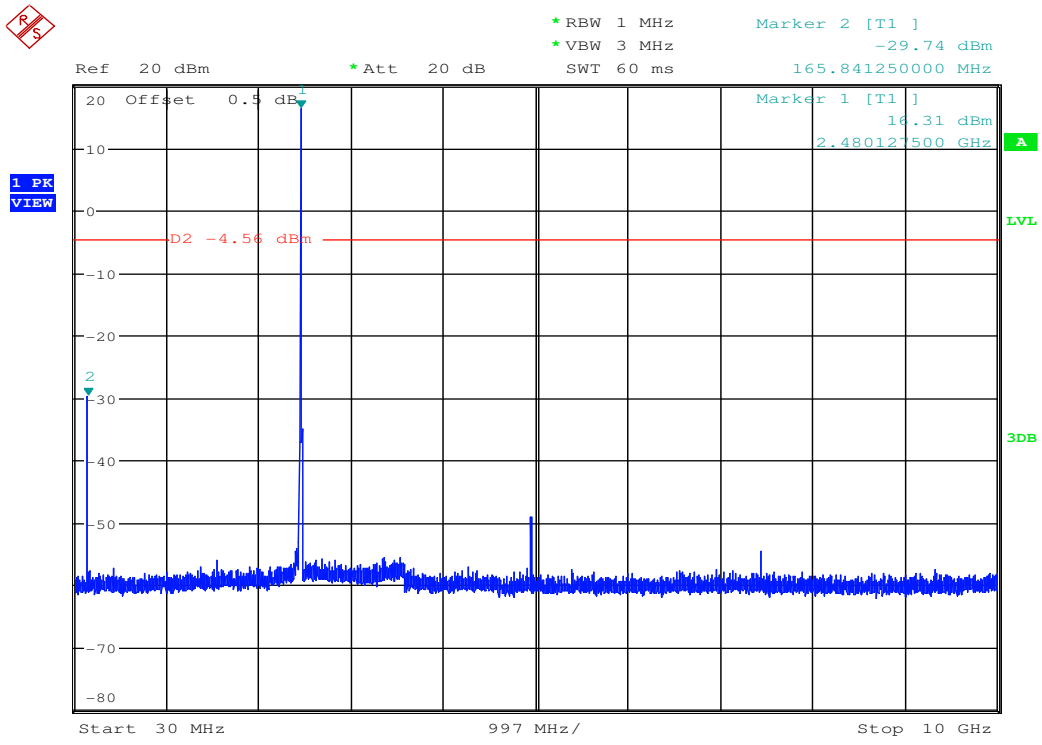


CSE_1

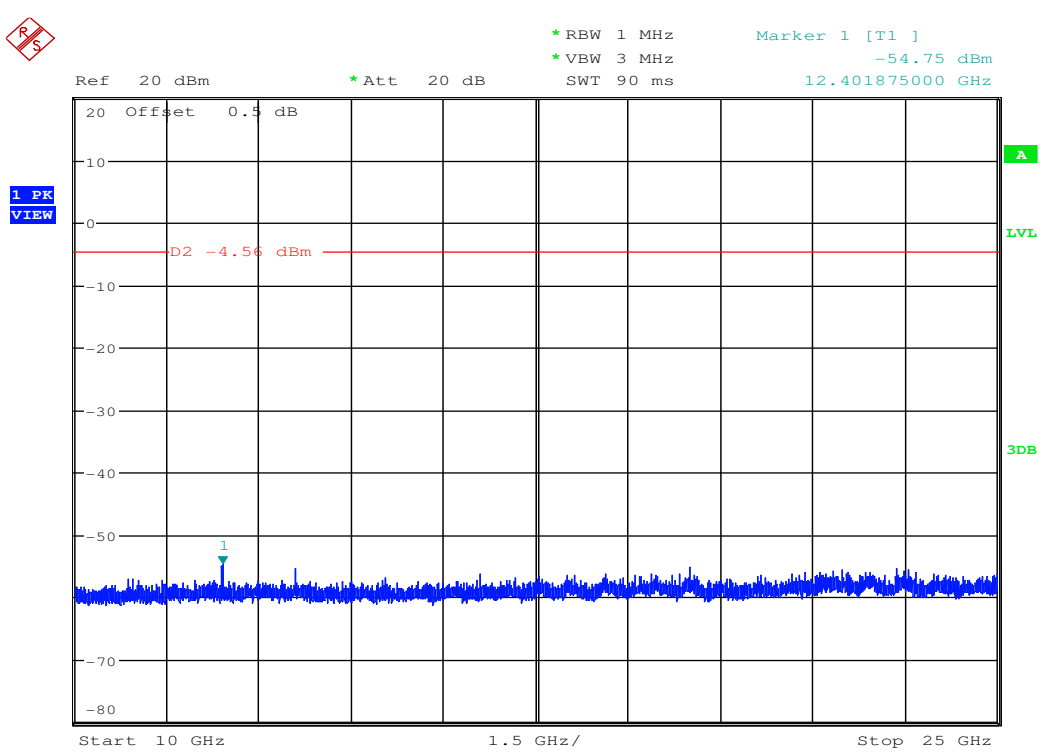


CSE_2



RF Conducted Spurious Emissions_Mode a_2480	
Pref	
CSE_1	

CSE_2



- End of the Report -