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Report Template Version: V03
Report Template Revision Date: Mar.1st, 2017

FCC Test Report

Applicant:	Suzhou Industrial Park IIC Science & Technology Co., Ltd
Address of Applicant:	3/F, unit3, No.35, Hong Feng Road, Suzhou Industrial Park, Suzhou, China
Manufacturer:	Suzhou Industrial Park IIC Science & Technology Co., Ltd
Address of Manufacturer:	3/F, unit3, No.35, Hong Feng Road, Suzhou Industrial Park, Suzhou, China
Factory:	Suzhou Industrial Park IIC Science & Technology Co., Ltd
Address of Factory:	3/F, unit3, No.35, Hong Feng Road, Suzhou Industrial Park, Suzhou, China
Equipment Under Test (EUT):	
Product:	Bluetooth Module
Model No.:	AS776-1
Brand Name:	N/A
FCC ID:	2AM6KAS776-1
Standards:	47 CFR Part 15, Subpart C
Date of Test:	2017-06-05 to 2017-06-15
Date of Issue:	2017-06-15
Report No. :	CQASZ170501360E-01
Test Result :	**PASS***

Tested By: Aaron Ma

(Aaron Ma)

Reviewed By: Owen Zhou

(Owen Zhou)

Approved By:

(Jack Ai)

SHENZHEN HUAXIA TESTING TECHNOLOGY CO.,LTD 华夏准测 APPROVED

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

2 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ170501360E-01	Rev.01	Initial report	2017-06-15

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(3)	ANSI C63.10 2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	ANSI C63.10 2013	PASS
Power Spectral Density	47 CFR Part 15, Subpart C Section 15.247 (e)	ANSI C63.10 2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS

4 Contents

5 General Information

5.1 Client Information

Applicant:	Suzhou Industrial Park IIC Science & Technology Co., Ltd
Address of Applicant:	3/F, unit3, No.35, Hong Feng Road, Suzhou Industrial Park, Suzhou, China
Manufacturer:	Suzhou Industrial Park IIC Science & Technology Co., Ltd
Address of Manufacturer:	3/F, unit3, No.35, Hong Feng Road, Suzhou Industrial Park, Suzhou, China
Factory:	Suzhou Industrial Park IIC Science & Technology Co., Ltd
Address of Factory:	3/F, unit3, No.35, Hong Feng Road, Suzhou Industrial Park, Suzhou, China

5.2 General Description of EUT

Product Name:	Bluetooth Module
Model No.:	AS776-1
Trade Mark:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V4.0 BLE
Modulation Type:	GFSK
Number of Channel:	40
Sample Type:	Portable production
Test Software of EUT:	RF Test (manufacturer declare)
Antenna Type:	PCB Antenna
Antenna Gain:	0dBi
Power Supply:	DC3.3V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

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 (CH0)	2402MHz
The middle channel (CH19)	2440MHz
The highest channel (CH39)	2480MHz

5.3 Test Environment

Operating Environment:	
Temperature:	25.0 °C
Humidity:	53 % RH
Atmospheric Pressure:	1010mbar
Test Mode:	Use test software (RF test) to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT. Note: In the process of transmitting of EUT, the duty cycle ＞98%.

5.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark	FCC certification
Adapter	yczx	Yczx-1256	Provided by lab	FCC Verification

5.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Tongce Testing Lab** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for **TCT** laboratory is reported:

Test	Range	Uncertainty	Notes
Radiated Emission	Below 1GHz	±3.92dB	(1)
Radiated Emission	Above 1GHz	±4.28dB	(1)
Conducted Disturbance	0.15~30MHz	±2.56dB	(1)

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

5.6 Test Location

Shenzhen Tongce Testing Lab,

1F, Leinuo Watch Building, Fuyong Town, Baoan Dist, Shenzhen, China

5.7 Test Facility

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

FCC – Registration No.: 572331

Shenzhen Tongce Testing Lab has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 572331

5.8 Deviation from Standards

None.

5.9 Abnormalities from Standard Conditions

None.

5.10 Other Information Requested by the Customer

None.

5.11 Equipment List

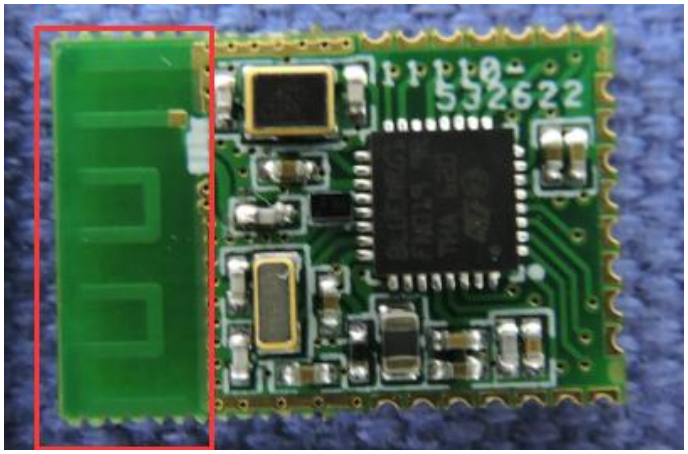
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date
1	EMI Test Receiver	R&S	ESVD	100008	2017/08/11
2	Spectrum Analyzer	R&S	FSEM	848597/001	2017/08/11
3	Spectrum Analyzer	Agilent	N9020A	MY49100060	2017/08/12
4	Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	2017/08/11
5	Pre-amplifier	HP	8447D	2727A05017	2017/08/11
6	Loop antenna	ZHINAN	ZN30900A	12024	2017/08/13
7	Broadband Antenna	R&S	VULB9163	340	2017/08/13
8	Horn Antenna	R&S	BBHA 9120D	631	2017/08/13
9	Horn Antenna	R&S	BBHA 9170	373	2017/08/13
10	Antenna Mast	CCS	CC-A-4M	N/A	N/A
11	Coax cable (9KHz~40GHz)	TCT	RE-low-01	N/A	2017/08/11
12	Coax cable (9KHz~40GHz)	TCT	RE-high-02	N/A	2017/08/11
13	Coax cable (9KHz~40GHz)	TCT	RE-low-02	N/A	2017/08/11
14	Coax cable (9KHz~40GHz)	TCT	RE-high-04	N/A	2017/08/11
15	Spectrum Analyzer	R&S	FSU	200054	2017/08/11
16	Antenna Connector	TCT	RFC-01	N/A	2017/08/12
17	RF cable(9KHz~40GHz)	TCT	RE-06	N/A	2017/08/12

Note:

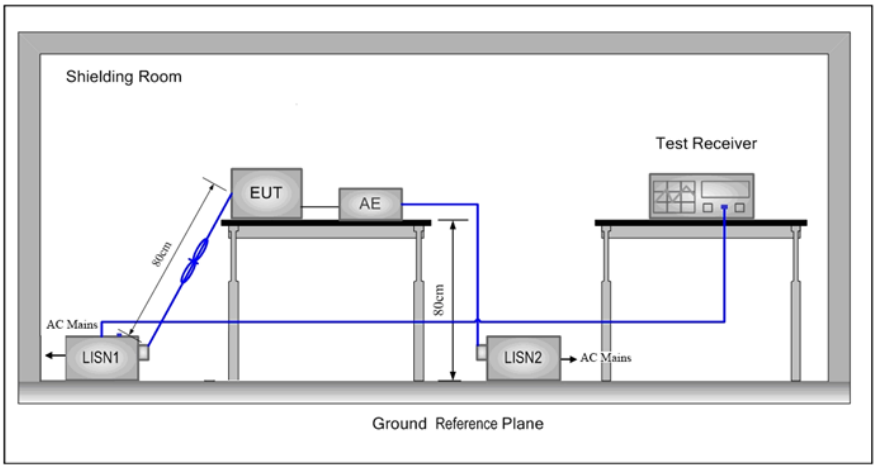
The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

6 Test results and Measurement Data

6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C 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(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 is 0 dBi.	

6.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	150kHz to 30MHz
Limit:	<table><tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr><tr><td>Quasi-peak</td><td>Average</td></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table> * Decreases with the logarithm of the frequency.
Test Procedure:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane. 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.
Test Setup:	
Test Mode:	Transmitting with GFSK modulation. Transmitting mode.
Final Test Mode:	Found the Charge + Transmitting mode（The highest channel:2480MHz）which it is worse case. Only the worst case is recorded in the report.

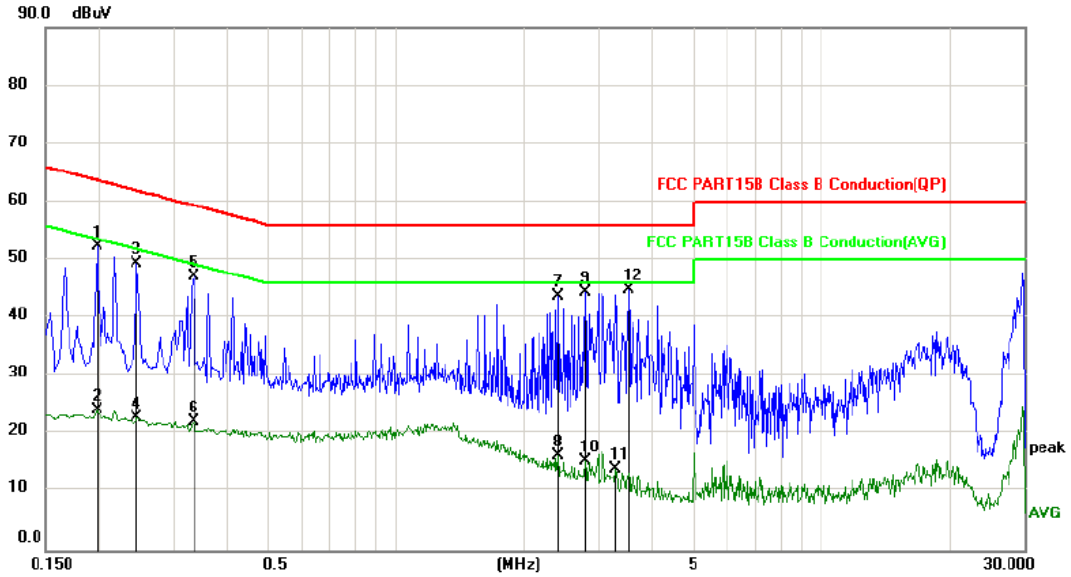
Instruments Used:	Refer to section 5.11 for details.
Test Voltage:	AC 120V/60Hz
Test Results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

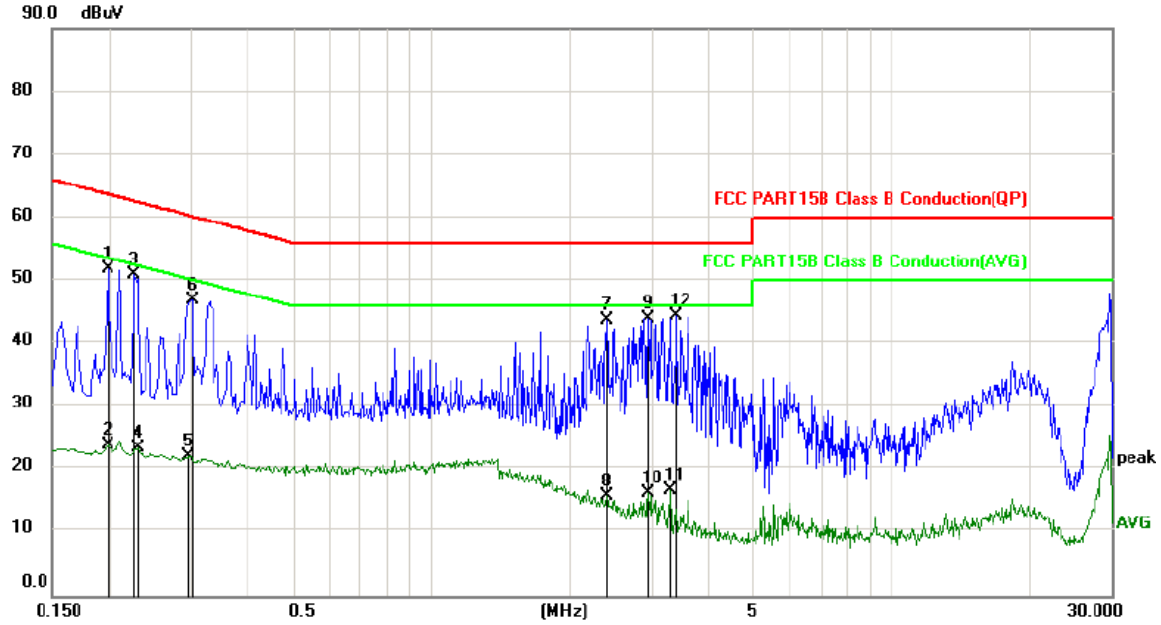
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1980	42.51	9.74	52.25	63.69	-11.44	peak
2		0.1980	14.38	9.74	24.12	53.69	-29.57	AVG
3		0.2460	39.54	9.74	49.28	61.89	-12.61	peak
4		0.2460	13.15	9.74	22.89	51.89	-29.00	AVG
5		0.3339	37.49	9.74	47.23	59.35	-12.12	peak
6		0.3339	12.51	9.74	22.25	49.35	-27.10	AVG
7		2.4020	34.01	9.76	43.77	56.00	-12.23	peak
8		2.4020	6.47	9.76	16.23	46.00	-29.77	AVG
9		2.7860	34.70	9.77	44.47	56.00	-11.53	peak
10		2.7860	5.56	9.77	15.33	46.00	-30.67	AVG
11		3.2900	4.25	9.77	14.02	46.00	-31.98	AVG
12	*	3.5100	35.11	9.78	44.89	56.00	-11.11	peak

Neutral line:



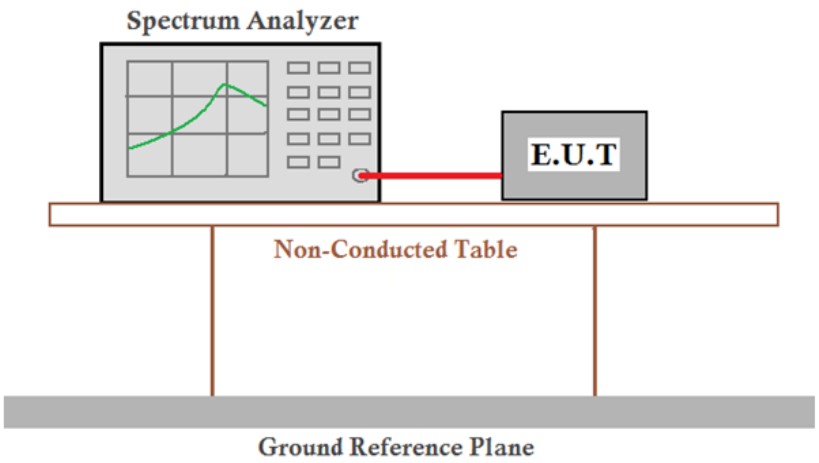
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1980	42.14	9.74	51.88	63.69	-11.81	peak
2		0.1980	14.26	9.74	24.00	53.69	-29.69	AVG
3	*	0.2260	41.29	9.74	51.03	62.60	-11.57	peak
4		0.2300	13.73	9.74	23.47	52.45	-28.98	AVG
5		0.2980	12.47	9.74	22.21	50.30	-28.09	AVG
6		0.3020	37.25	9.74	46.99	60.19	-13.20	peak
7		2.4020	34.11	9.76	43.87	56.00	-12.13	peak
8		2.4020	6.10	9.76	15.86	46.00	-30.14	AVG
9		2.9539	34.31	9.77	44.08	56.00	-11.92	peak
10		2.9539	6.49	9.77	16.26	46.00	-29.74	AVG
11		3.2980	6.93	9.77	16.70	46.00	-29.30	AVG
12		3.4100	34.58	9.77	44.35	56.00	-11.65	peak

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

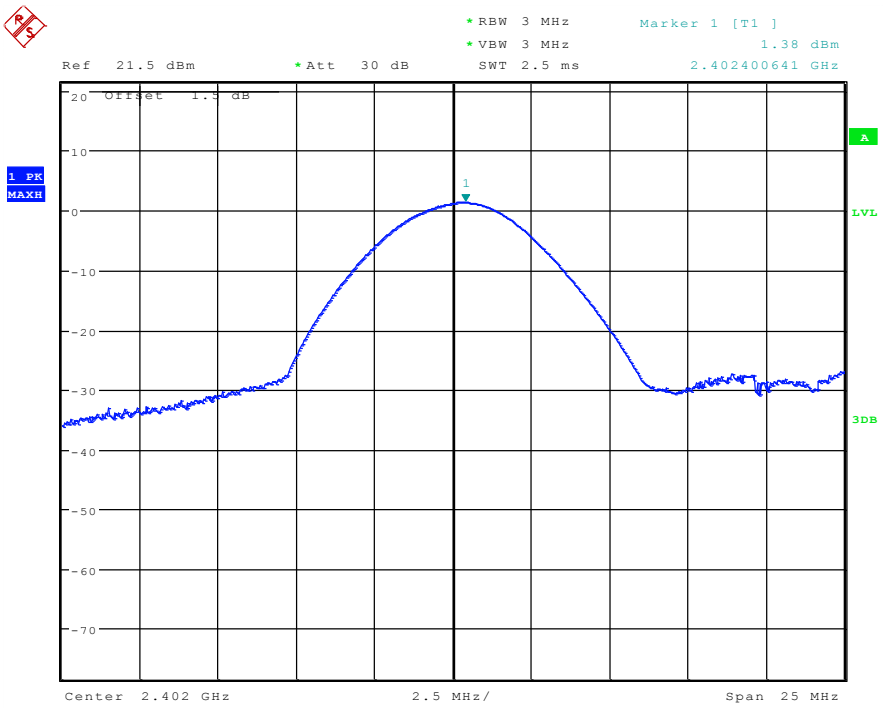
Test Requirement:	47 CFR Part 15C Section 15.247 (b)(1)
Test Method:	ANSI C63.10 2013
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.*
Limit:	30dBm
Test Mode:	Transmitting with GFSK modulation.
Instruments Used:	Refer to section 5.11 for details.
Test Results:	Pass

Measurement Data

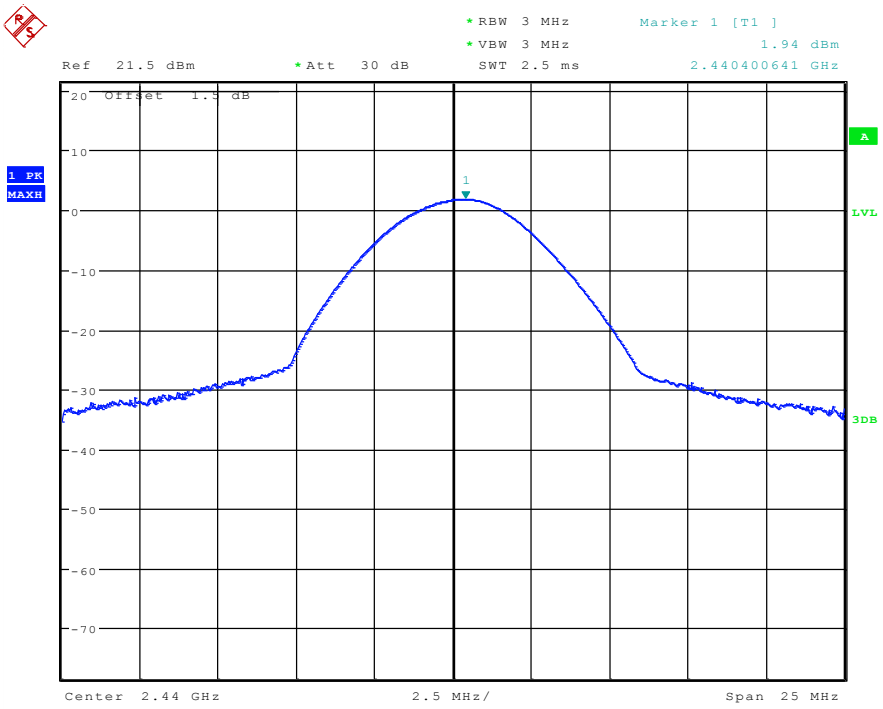
GFSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	1.38	30.00	Pass
Middle	1.94	30.00	Pass
Highest	1.97	30.00	Pass

Test plot as follows:

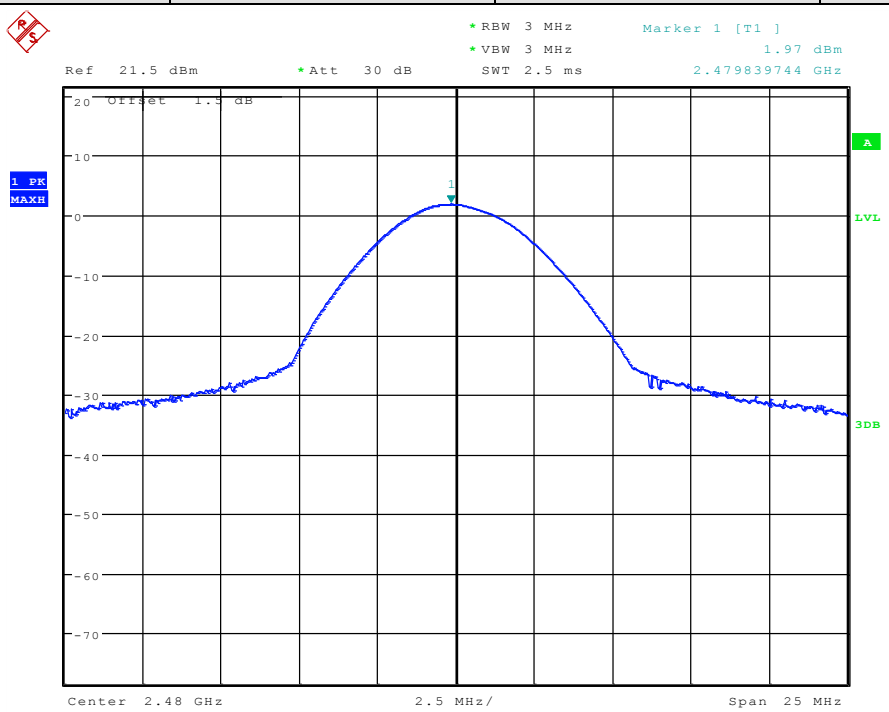
Test mode:	GFSK	Test channel:	Lowest



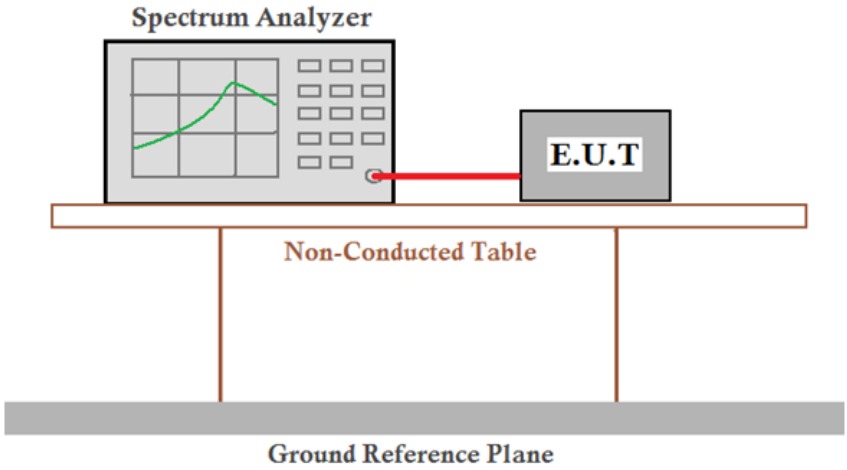
Test mode:	GFSK	Test channel:	Middle



Test mode:	GFSK	Test channel:	Highest



6.4 6dB Occupy Bandwidth

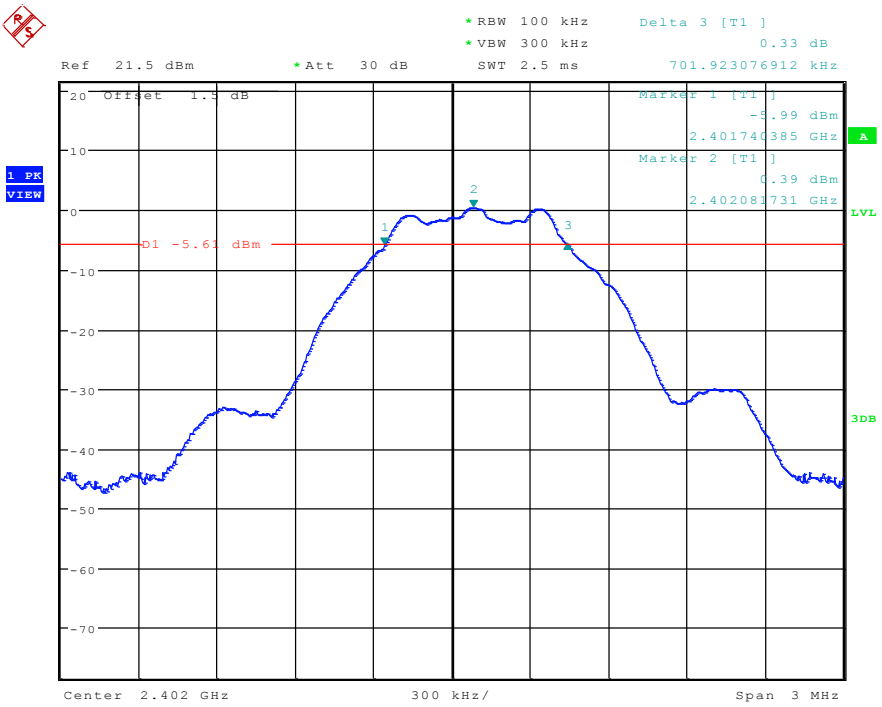
Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10 2013
Test Setup:	
Limit:	≥ 500 kHz
Test Mode:	Transmitting with GFSK modulation.
Instruments Used:	Refer to section 5.11 for details.
Test Results:	Pass

Measurement Data

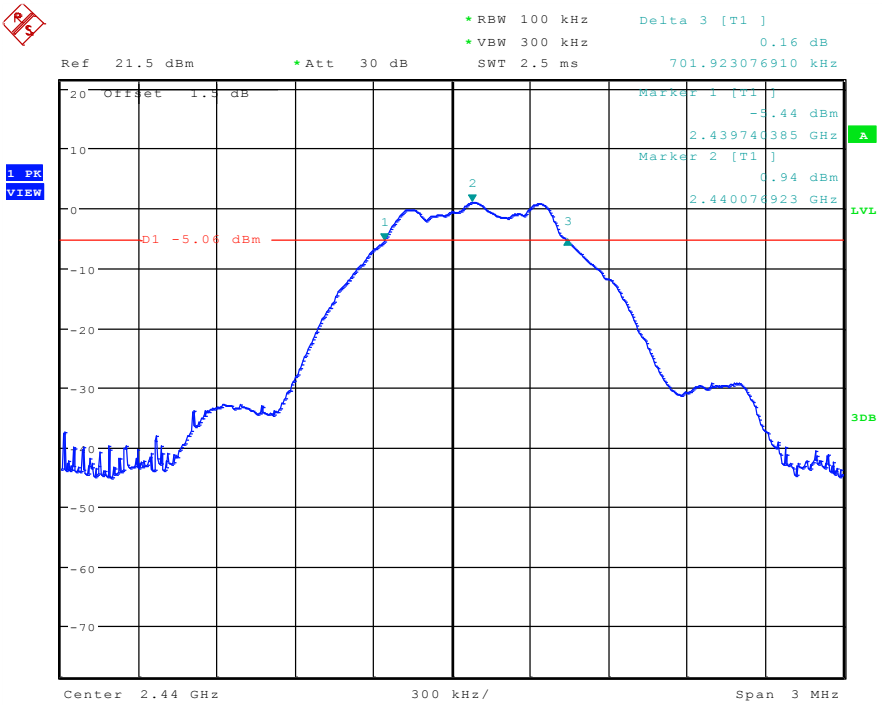
GFSK mode			
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result
Lowest	0.702	≥500	Pass
Middle	0.702	≥500	Pass
Highest	0.702	≥500	Pass

Test plot as follows:

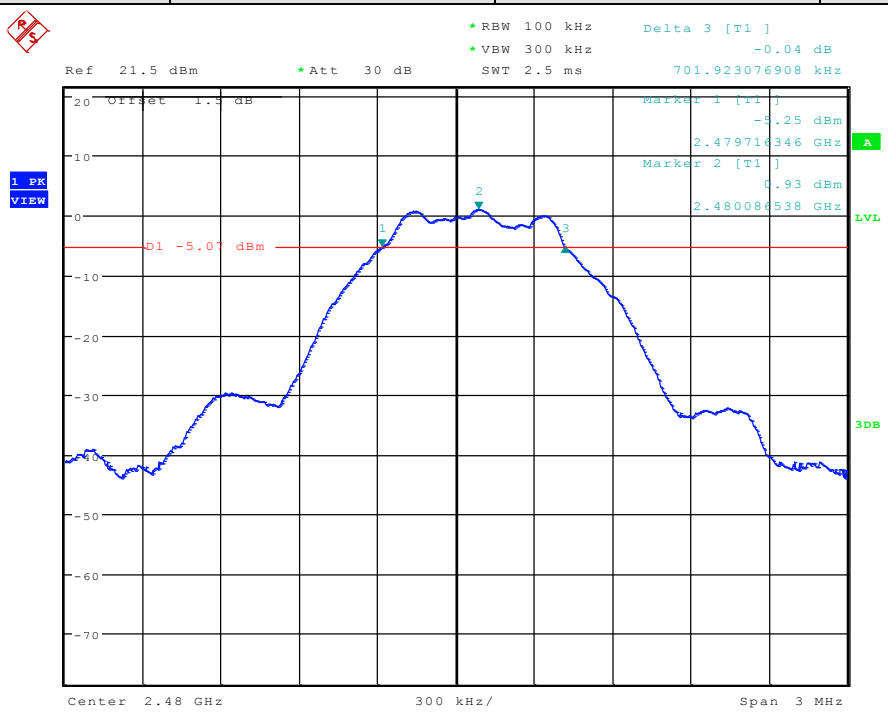
Test mode:	GFSK	Test channel:	Lowest



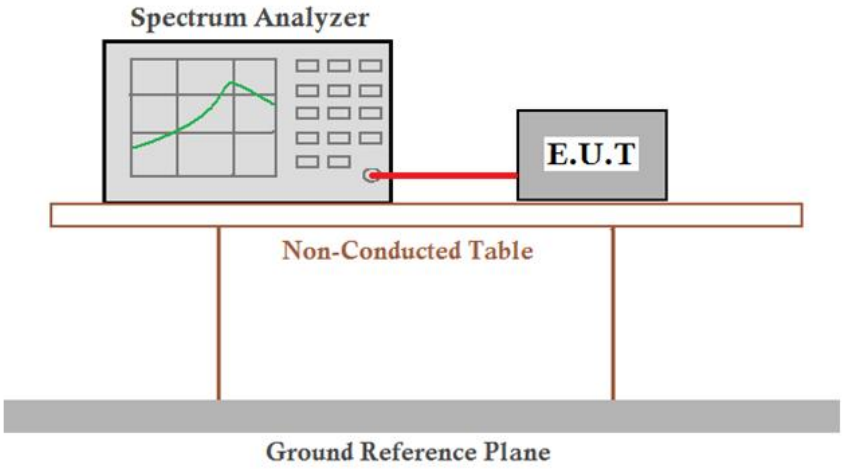
Test mode:	GFSK	Test channel:	Middle



Test mode:	GFSK	Test channel:	Highest



6.5 Power Spectral Density

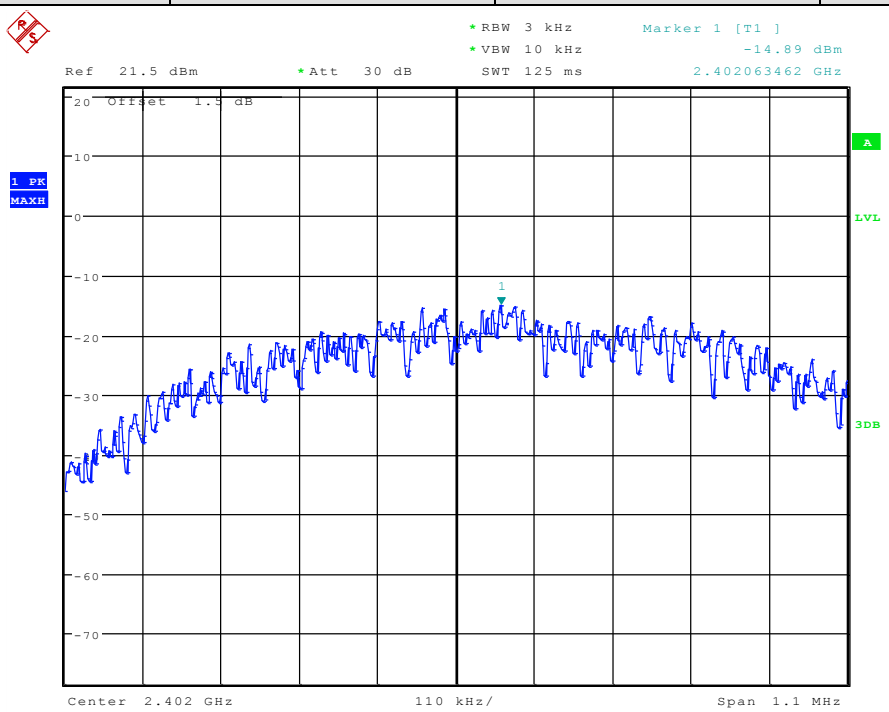
Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10 2013
Test Setup:	
Limit:	≤8.00dBm/3kHz
Test Mode:	Transmitting with GFSK modulation.
Instruments Used:	Refer to section 5.11 for details.
Test Results:	Pass

Measurement Data

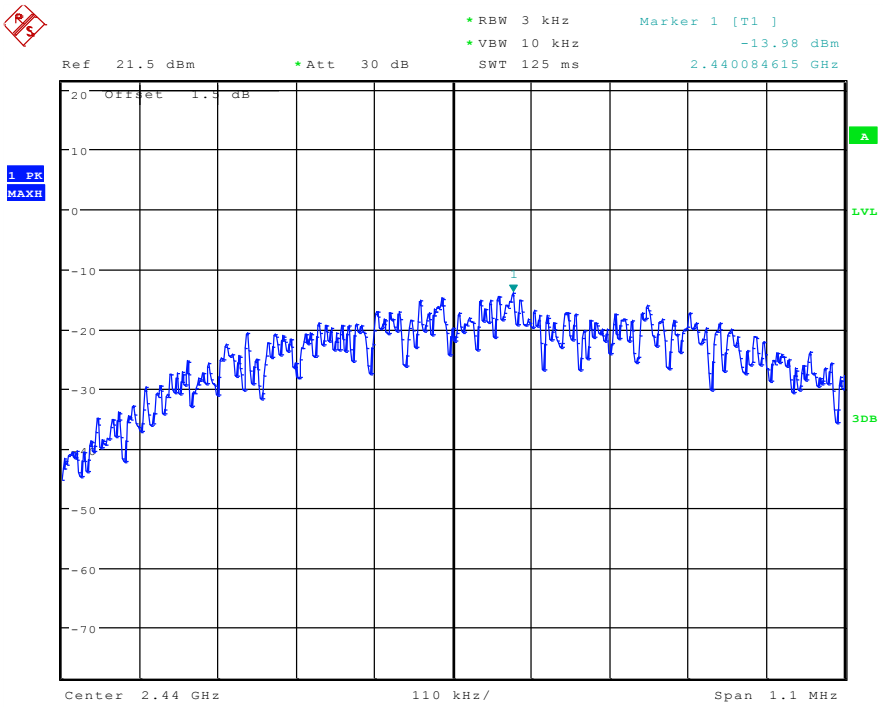
GFSK mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-14.89	≤8.00	Pass
Middle	-13.98	≤8.00	Pass
Highest	-14.19	≤8.00	Pass

Test plot as follows:

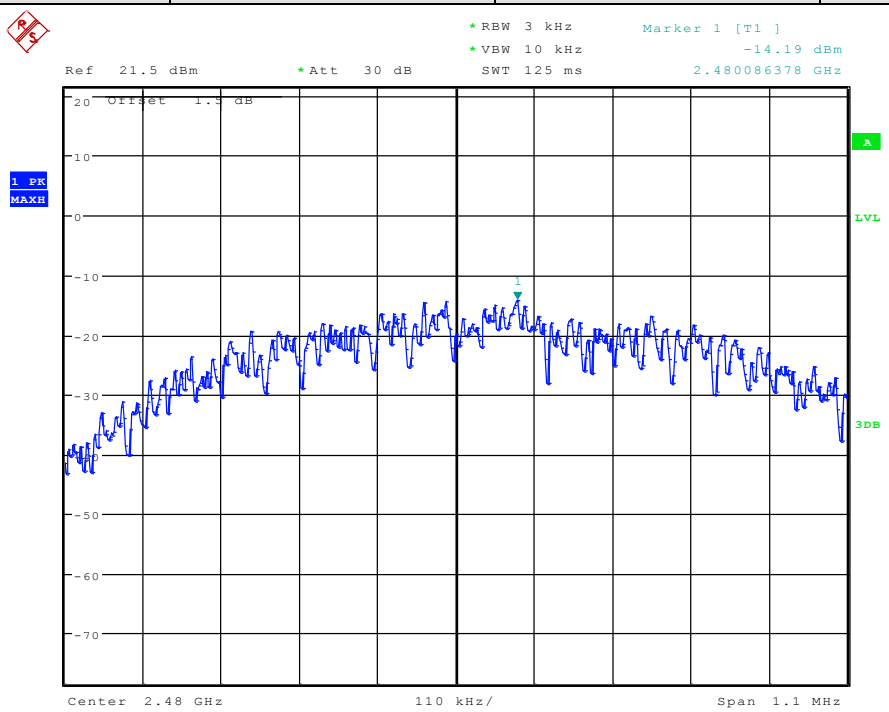
Test mode:	GFSK	Test channel:	Lowest



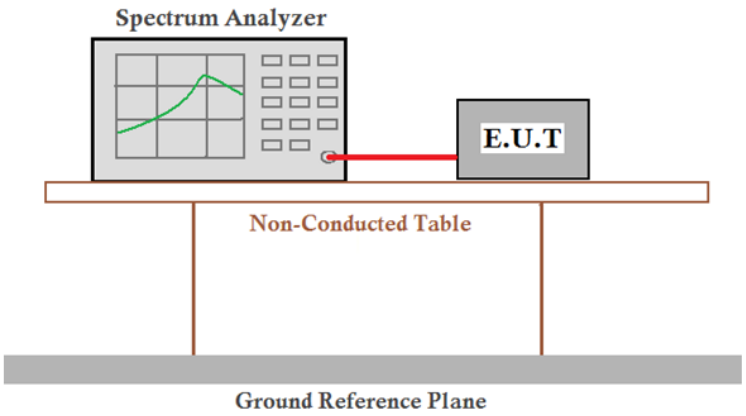
Test mode:	GFSK	Test channel:	Middle



Test mode:	GFSK	Test channel:	Highest



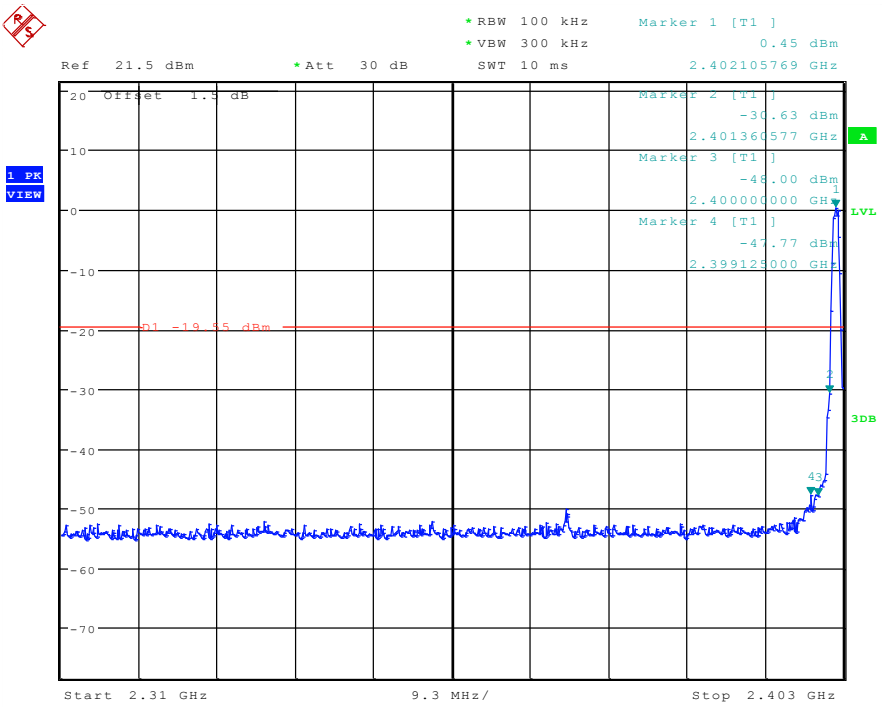
6.6 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10 2013
Test Setup:	 Remark: Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.
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 Mode:	Transmitting with GFSK modulation.
Instruments Used:	Refer to section 5.11 for details.
Test Results:	Pass

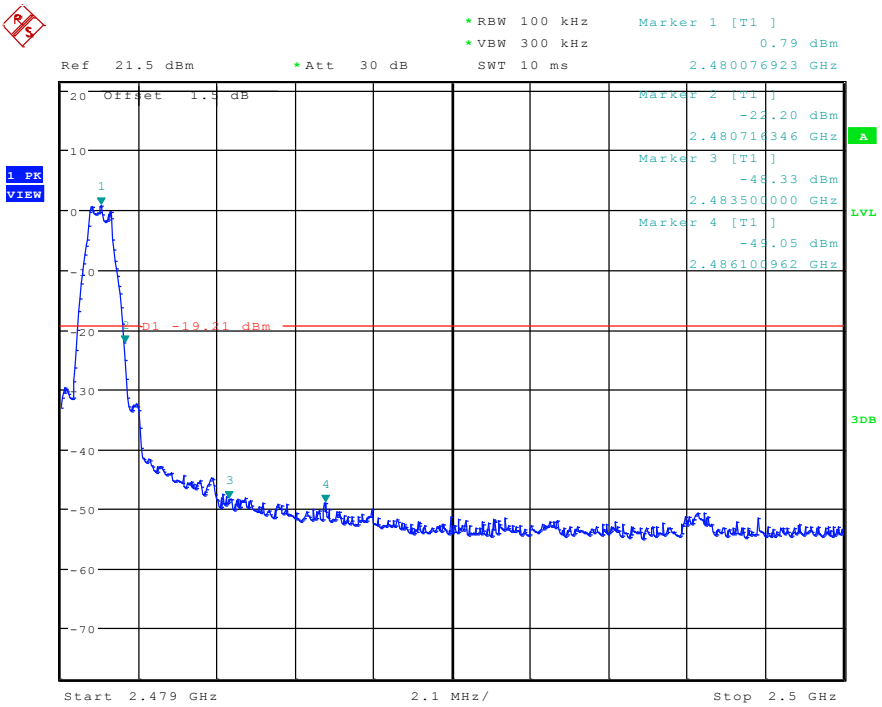
GFSK mode				
Test channel	Frequency(MHz)	Emission Level(dBm)	Limit(dBm)	Result
Lowest	2400	-48.00	-19.55	Pass
Highest	2483.5	-48.33	-19.21	Pass

Test plot as follows:

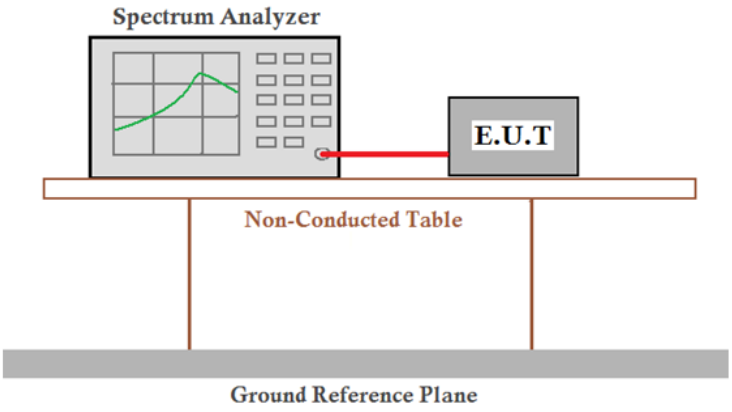
Test mode:	GFSK	Test channel:	Lowest



Test mode:	GFSK	Test channel:	Highest

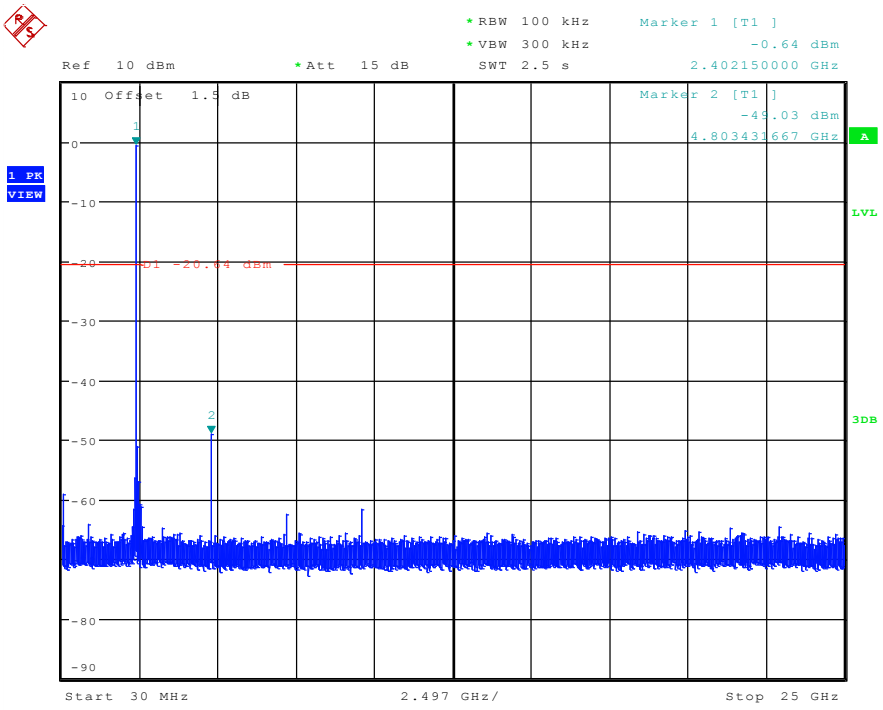


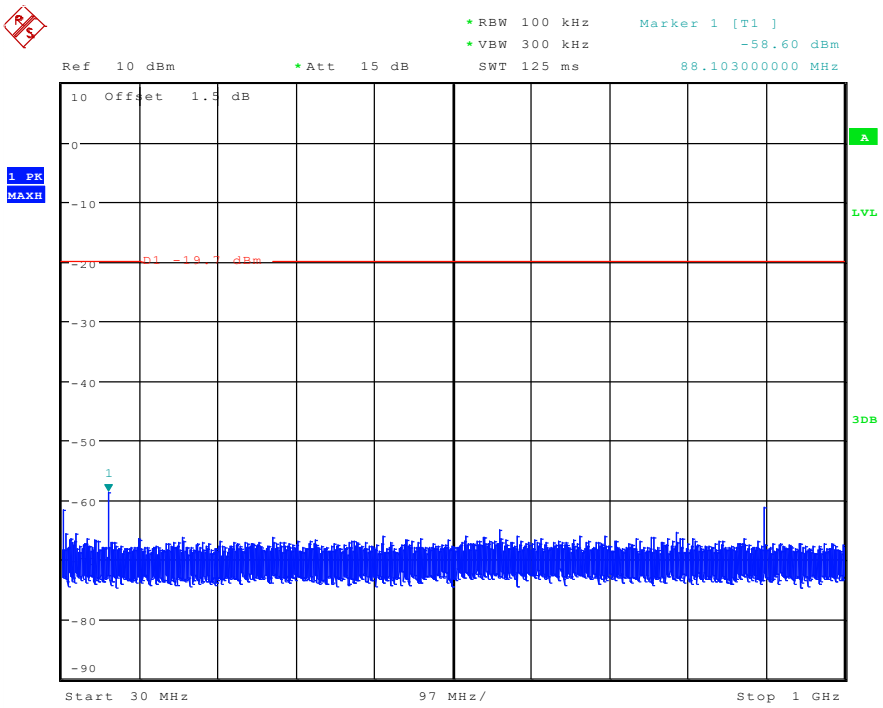
6.7 Spurious RF Conducted Emissions

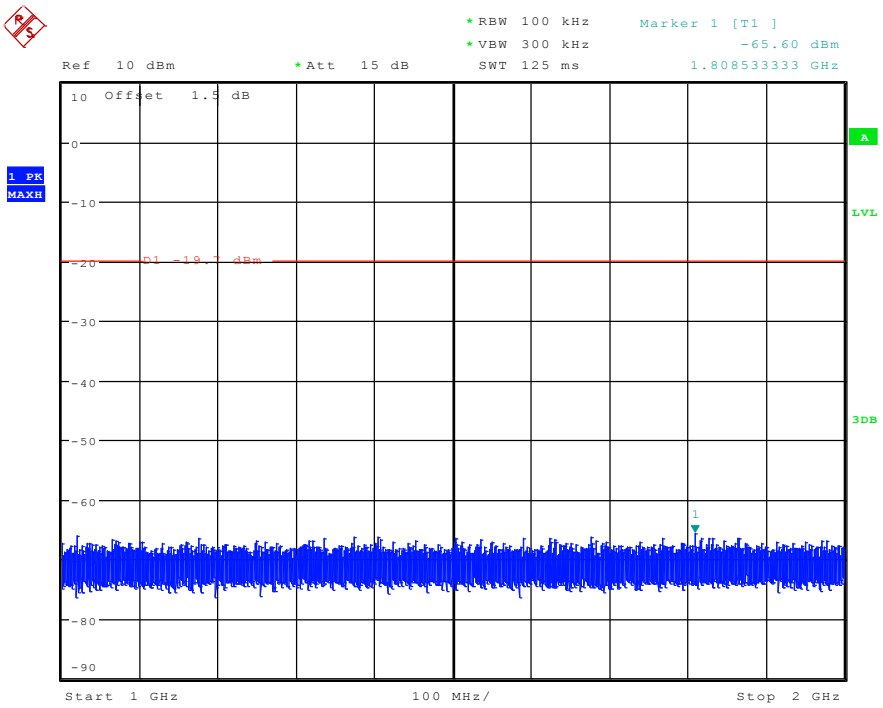
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10 2013
Test Setup:	 Remark: Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio 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 Mode:	Transmitting with GFSK modulation.
Instruments Used:	Refer to section 5.11 for details.
Test Results:	Pass

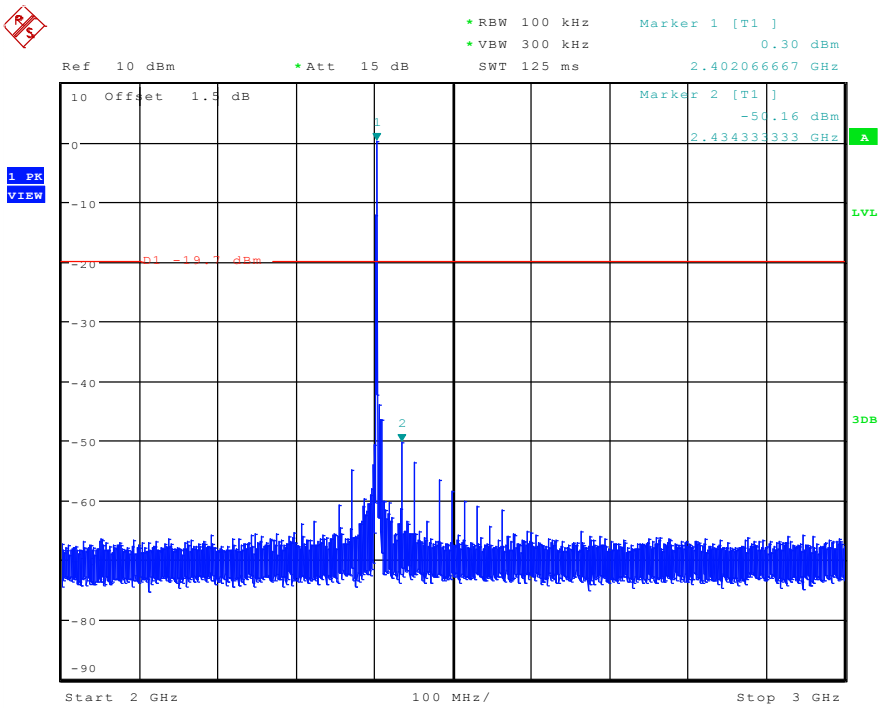
Test plot as follows:

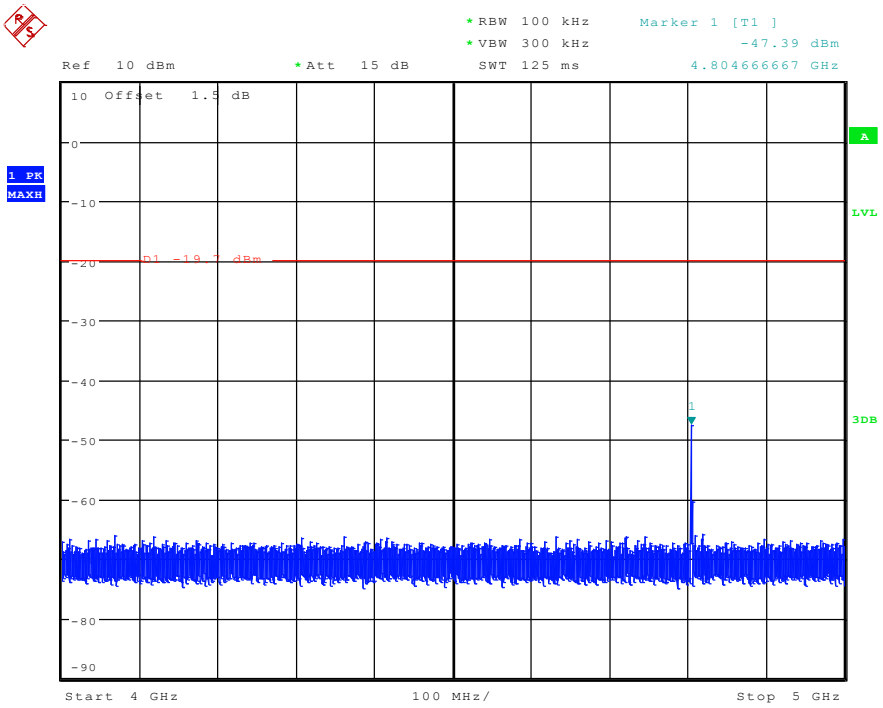
Test mode:	GFSK	Test channel:	Lowest

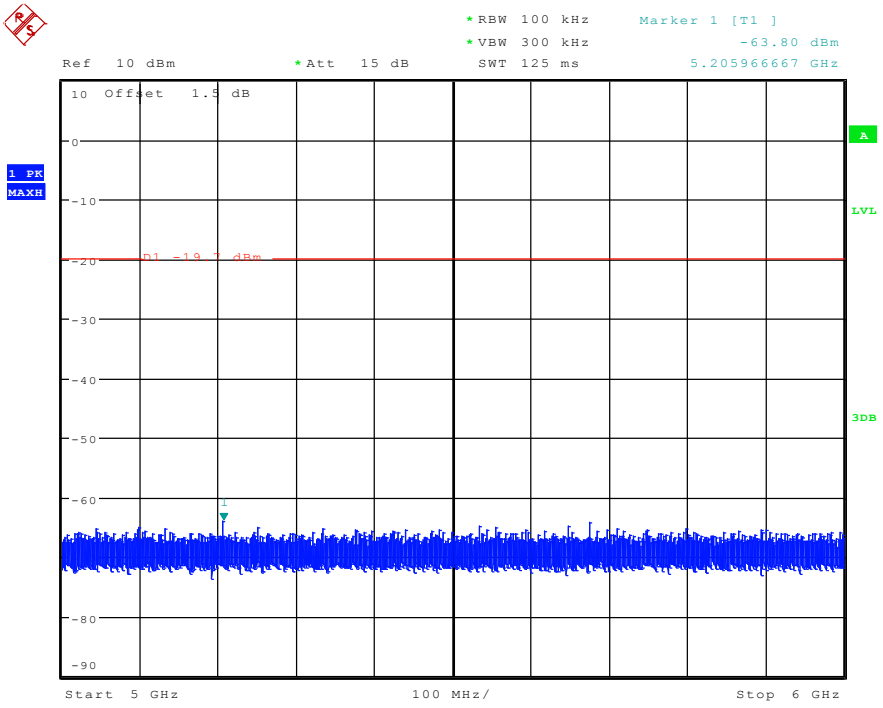


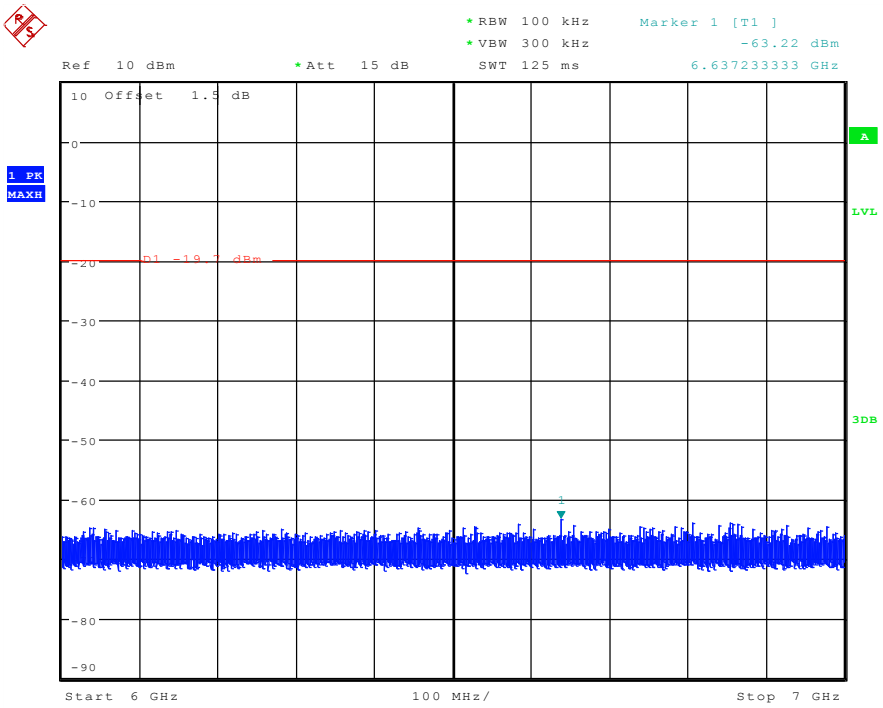


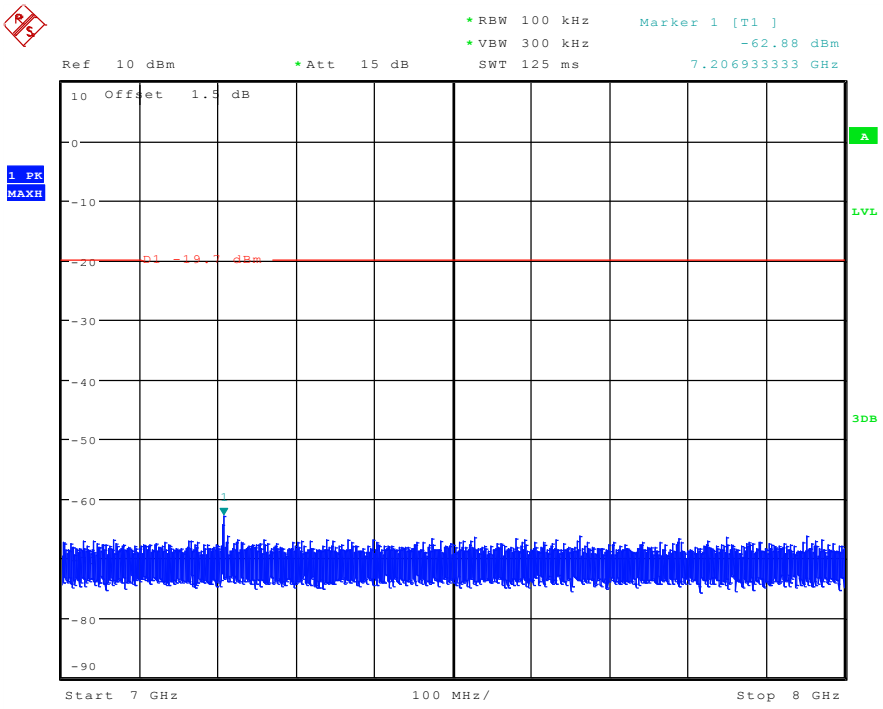

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-65.60 dBm
1.808533333 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -19.7 dBm
Start 1 GHz
100 MHz/
Stop 2 GHz

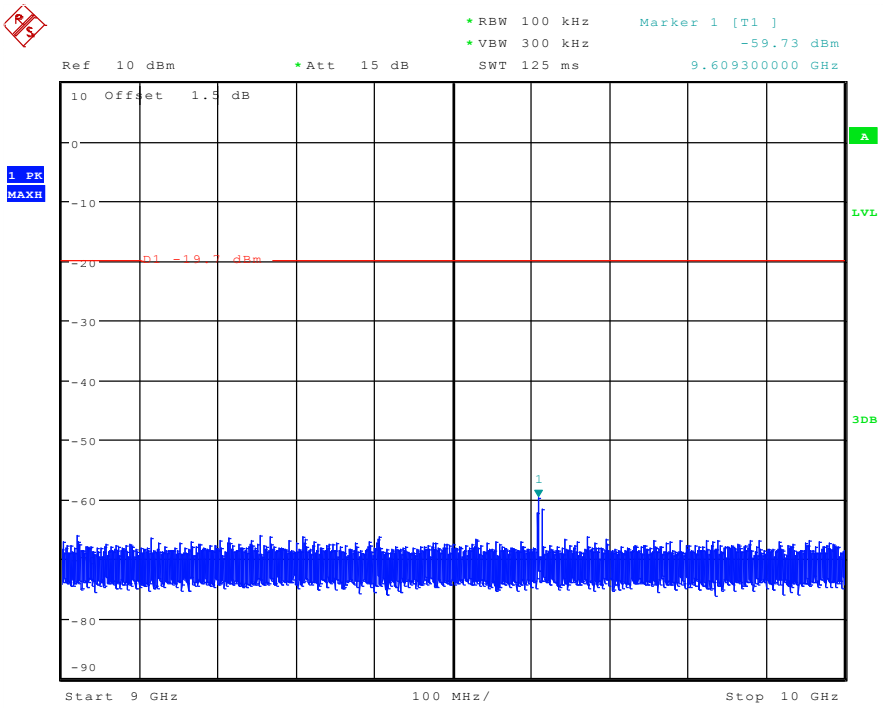

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
0.30 dBm
2.402066667 GHz
Marker 2 [T1]
-50.16 dBm
2.434333333 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -19.7 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-47.39 dBm
4.804666667 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -19.7 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

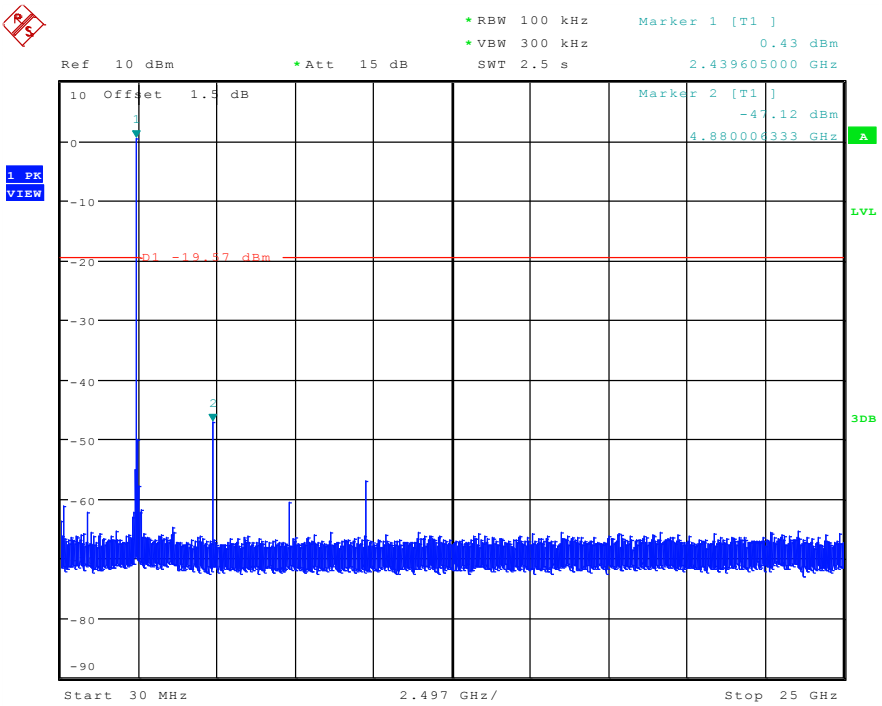

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-63.80 dBm
5.205966667 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -19.7 dBm
Start 5 GHz
100 MHz/
Stop 6 GHz

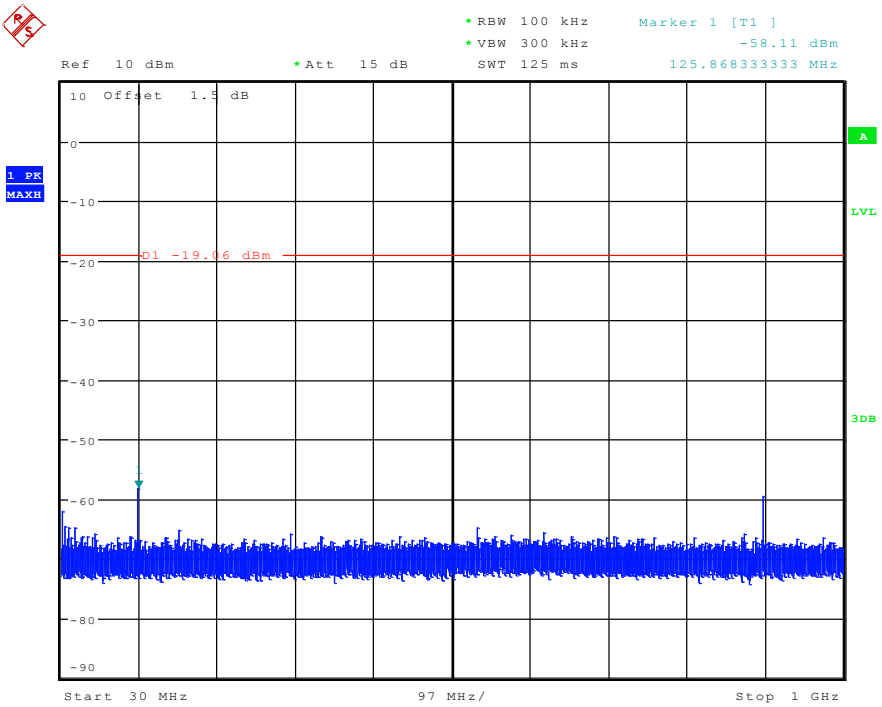

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-63.22 dBm
6.637233333 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -19.7 dBm
Start 6 GHz
100 MHz/
Stop 7 GHz

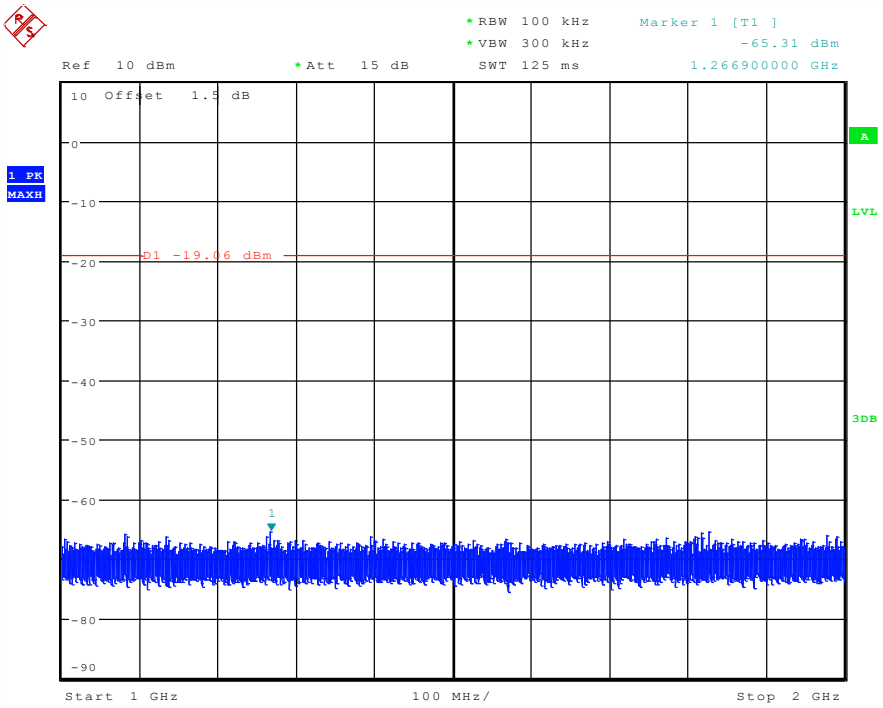

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-62.88 dBm
7.206933333 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -19.7 dBm
Start 7 GHz
100 MHz/
Stop 8 GHz

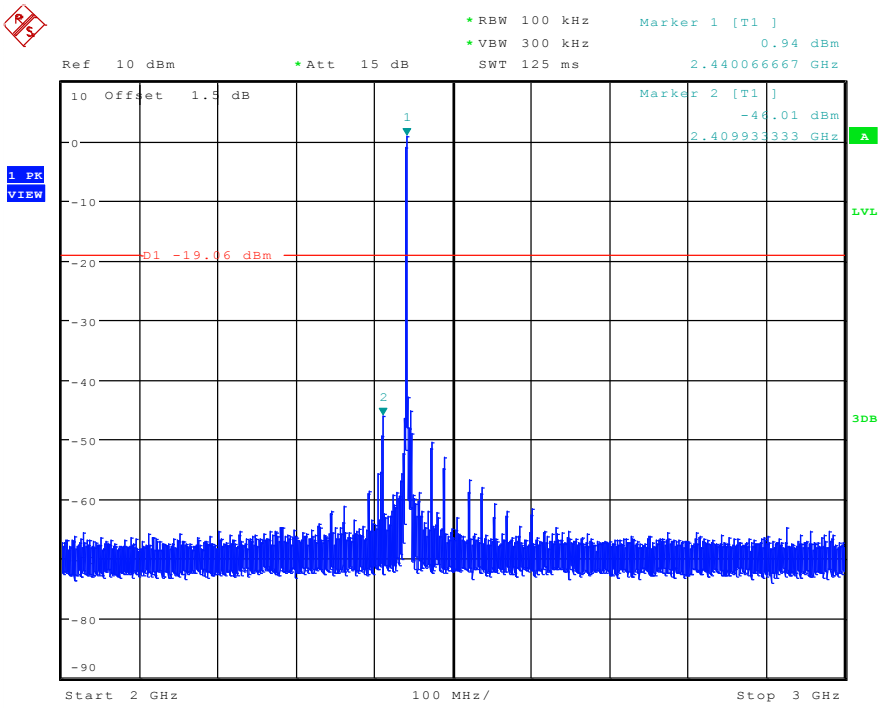

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-59.73 dBm
9.609300000 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -19.7 dBm
Start 9 GHz
100 MHz/
Stop 10 GHz

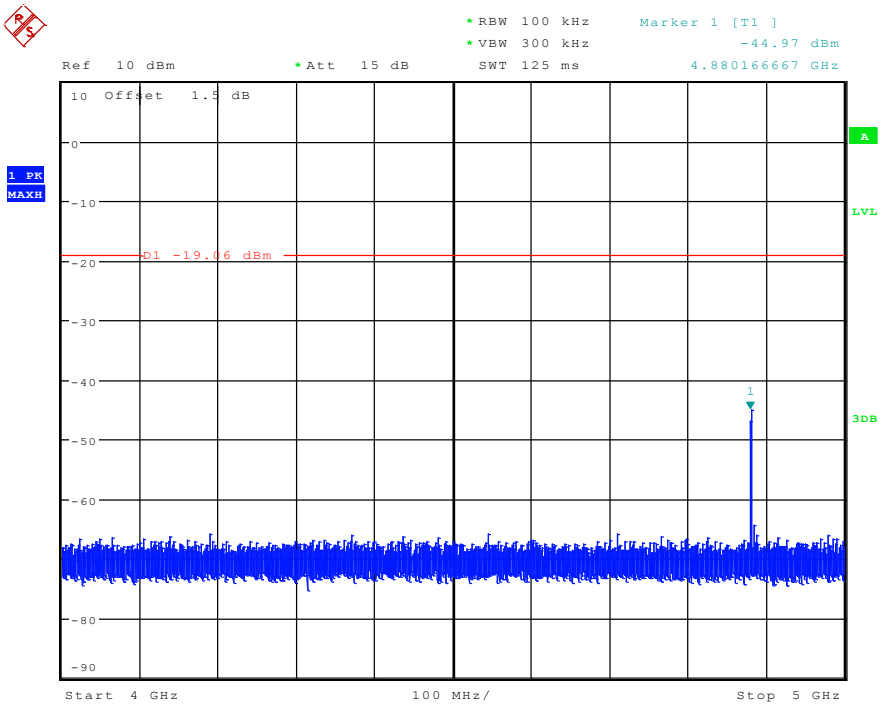
Test mode:	GFSK	Test channel:	Middle

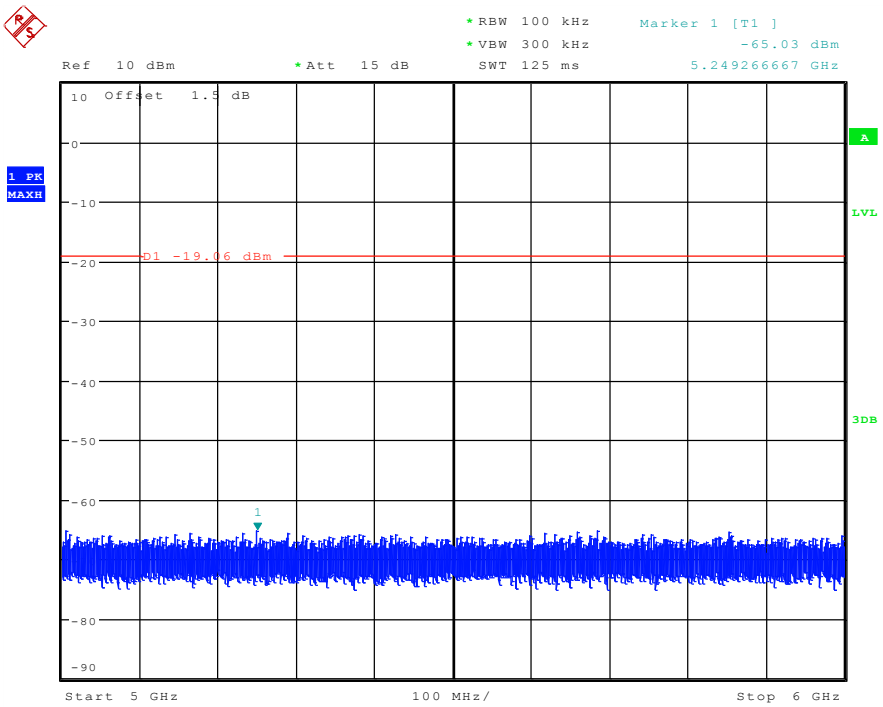


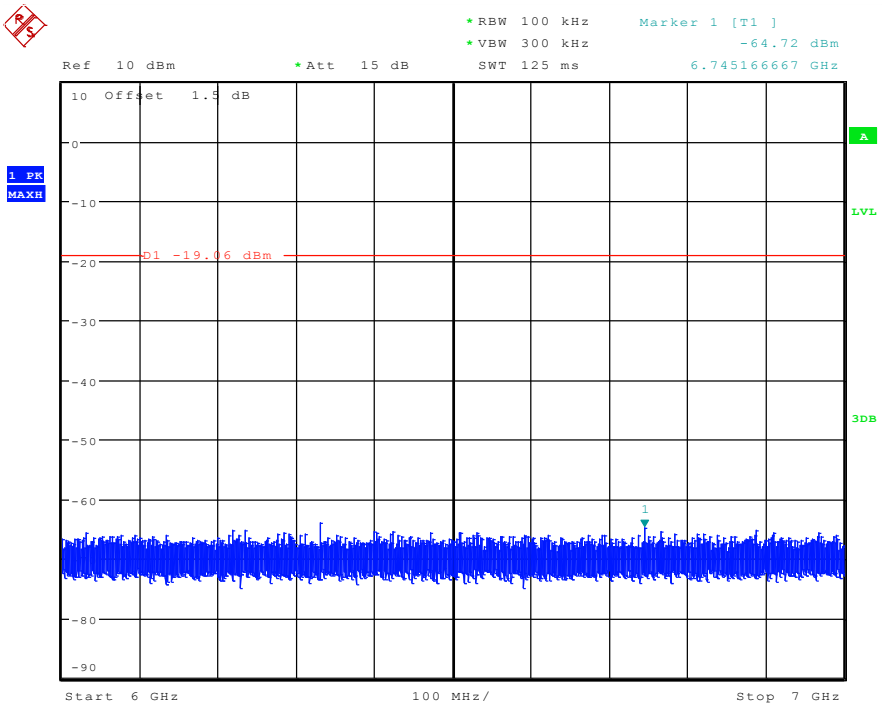


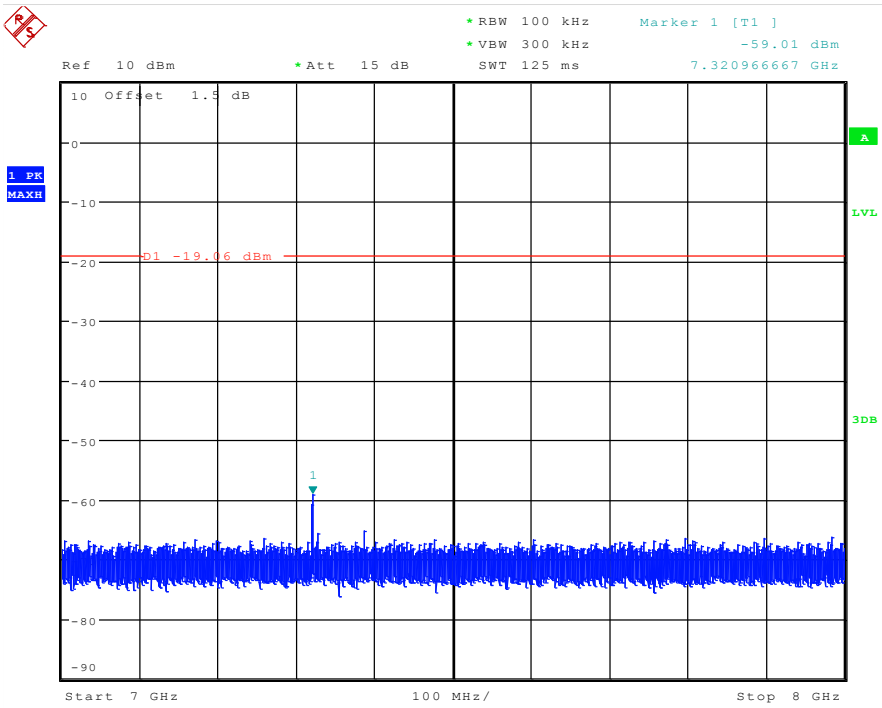

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-65.31 dBm
1.266900000 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
D1 -19.06 dBm
A
LVL
3DB
Start 1 GHz
100 MHz/
Stop 2 GHz

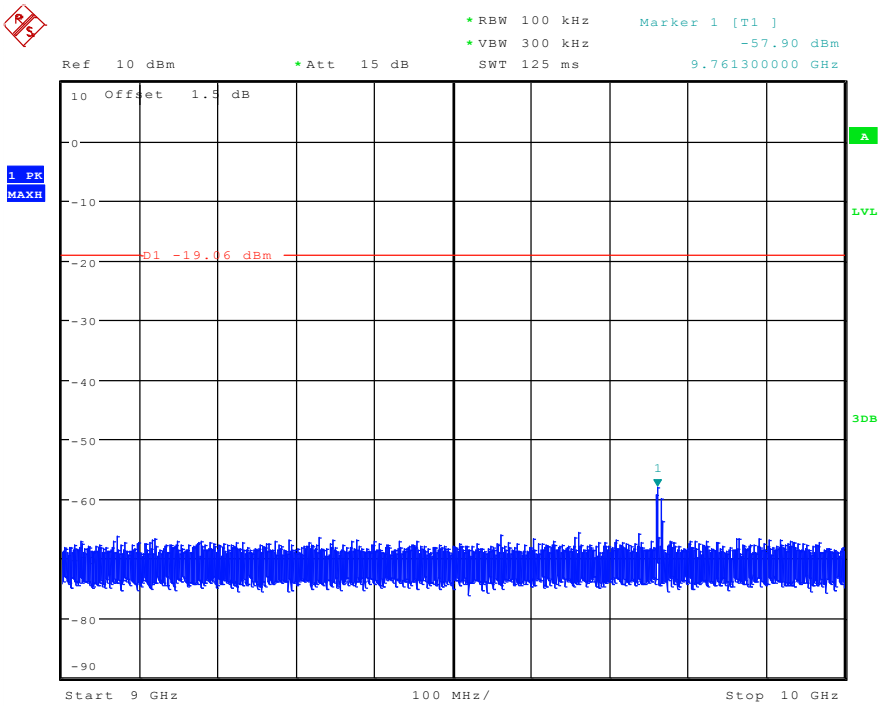

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
0.94 dBm
2.440066667 GHz
Marker 2 [T1]
-46.01 dBm
2.409933333 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
VIEW
D1 -19.06 dBm
A
LVL
3DB
Start 2 GHz
100 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-44.97 dBm
4.880166667 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
D1 -19.06 dBm
A
LVL
3DB
Start 4 GHz
100 MHz/
Stop 5 GHz

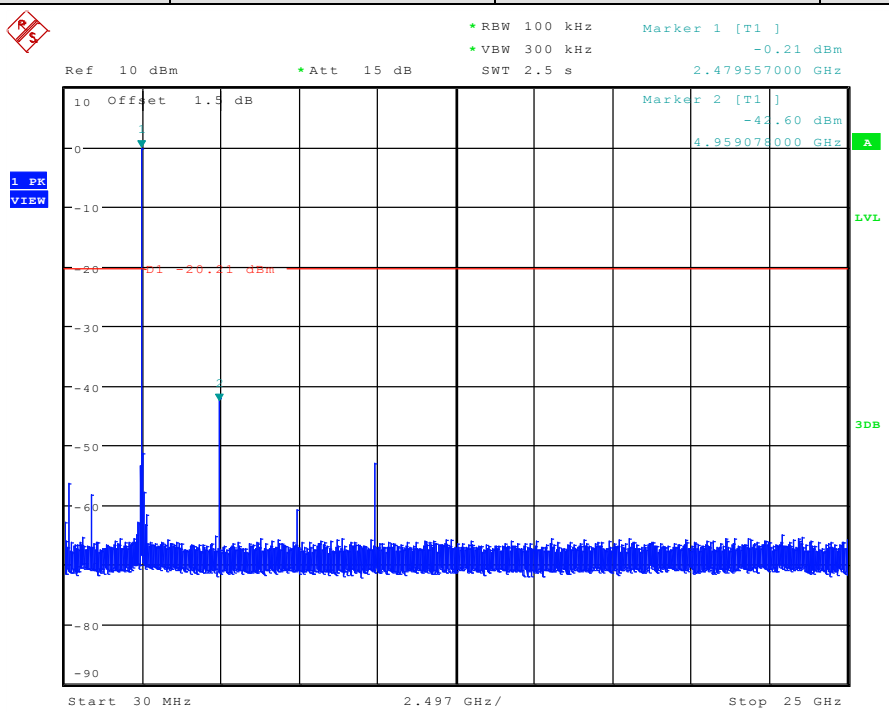

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-65.03 dBm
5.249266667 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
D1 -19.06 dBm
A
LVL
3DB
Start 5 GHz
100 MHz/
Stop 6 GHz

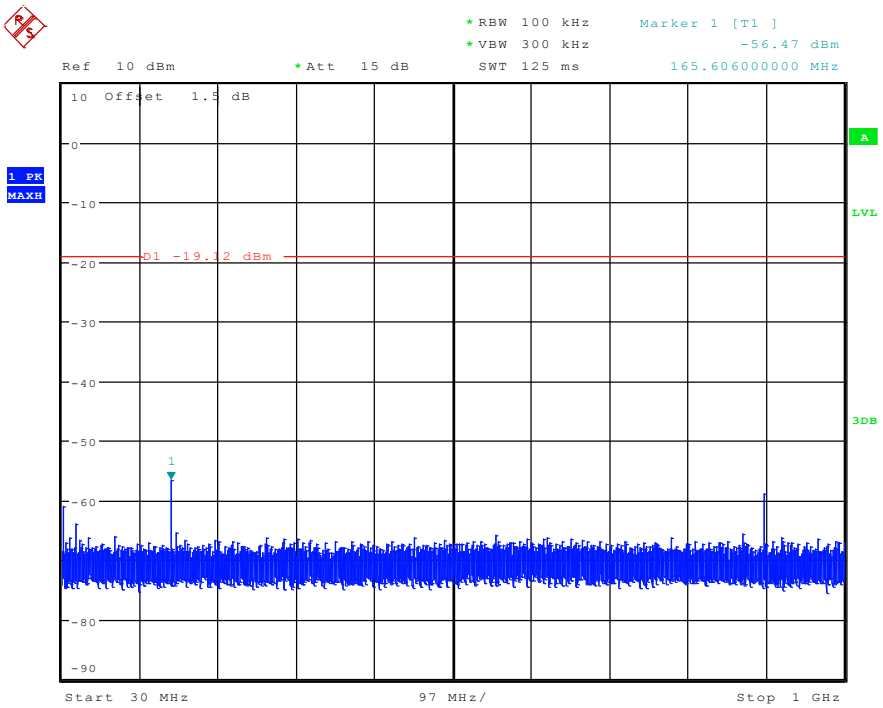

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-64.72 dBm
6.745166667 GHz
Ref 10 dBm
Att 15 dB
10 Offset 1.5 dB
1 PK
MAXH
D1 -19.06 dBm
A
LVL
3DB
Start 6 GHz
100 MHz/
Stop 7 GHz

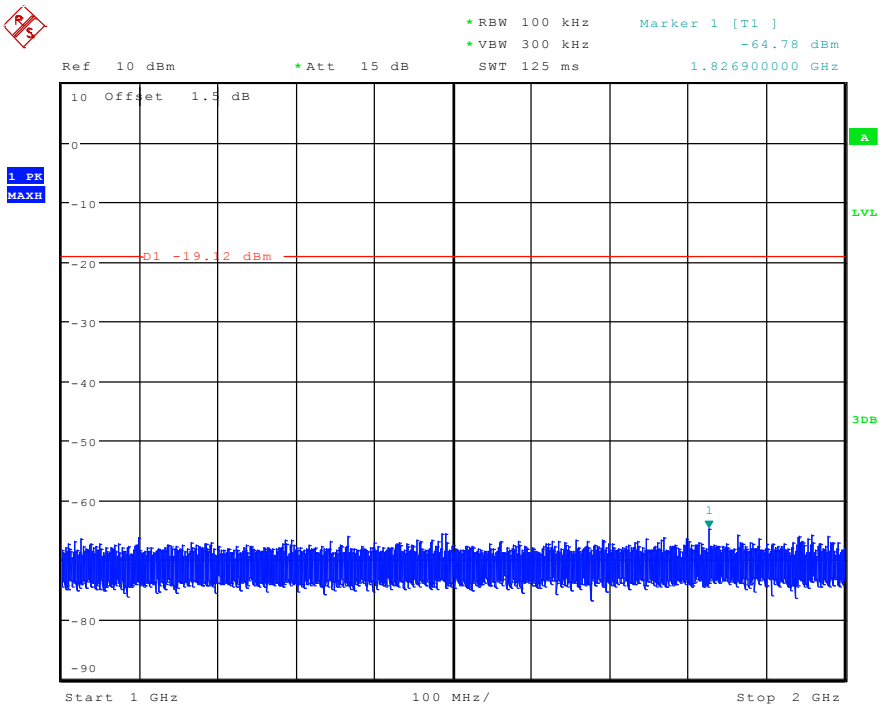

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-59.01 dBm
7.320966667 GHz
Ref 10 dBm
Att 15 dB
10 Offset 1.5 dB
1 PK
MAXH
D1 -19.06 dBm
A
LVL
3DB
Start 7 GHz
100 MHz/
Stop 8 GHz

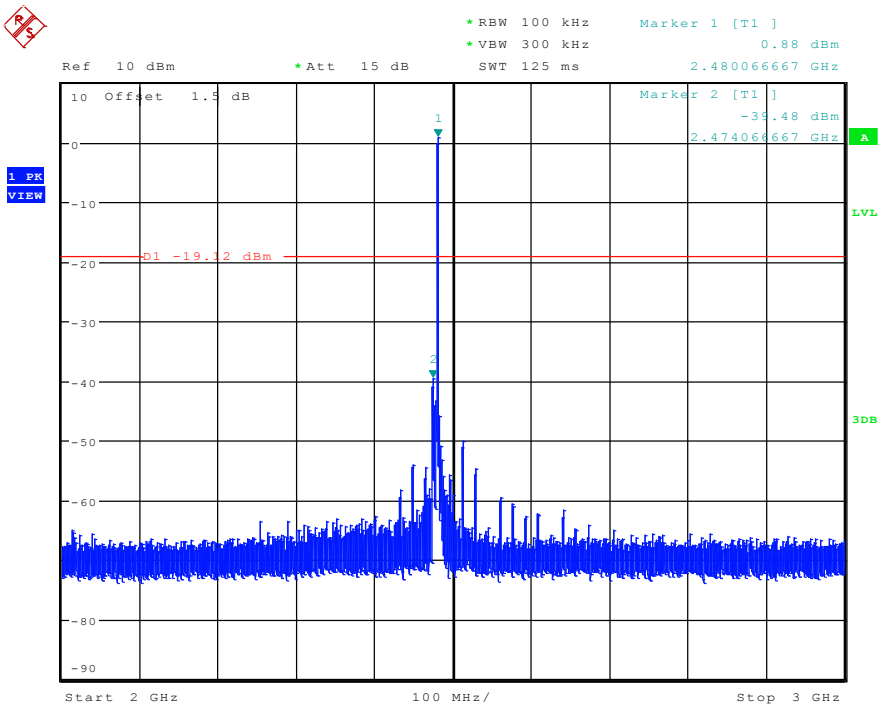

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-57.90 dBm
9.761300000 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -19.06 dBm
Start 9 GHz
100 MHz/
Stop 10 GHz

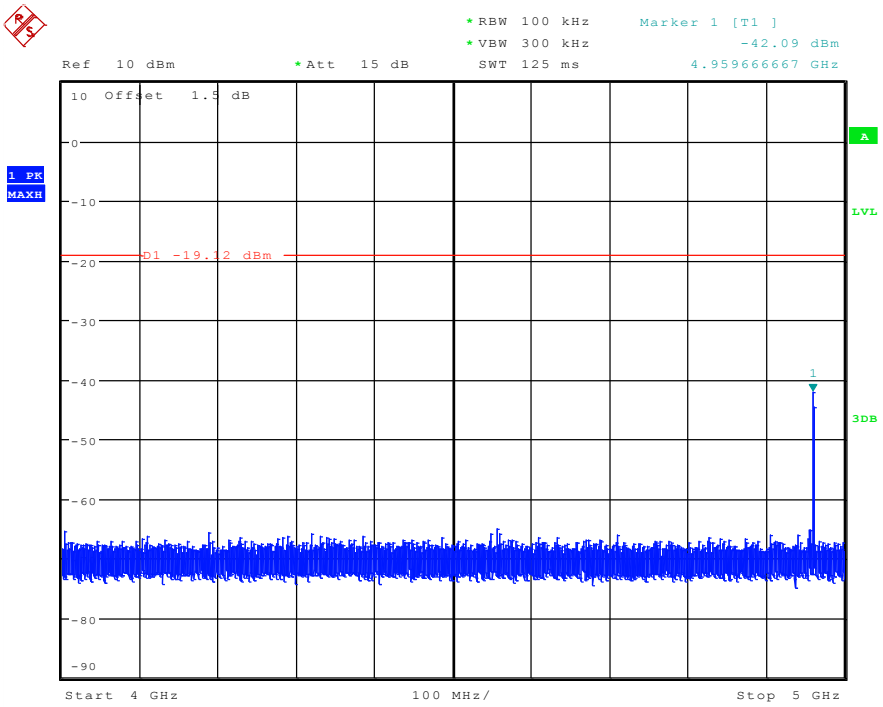
Test mode:	GFSK	Test channel:	Highest

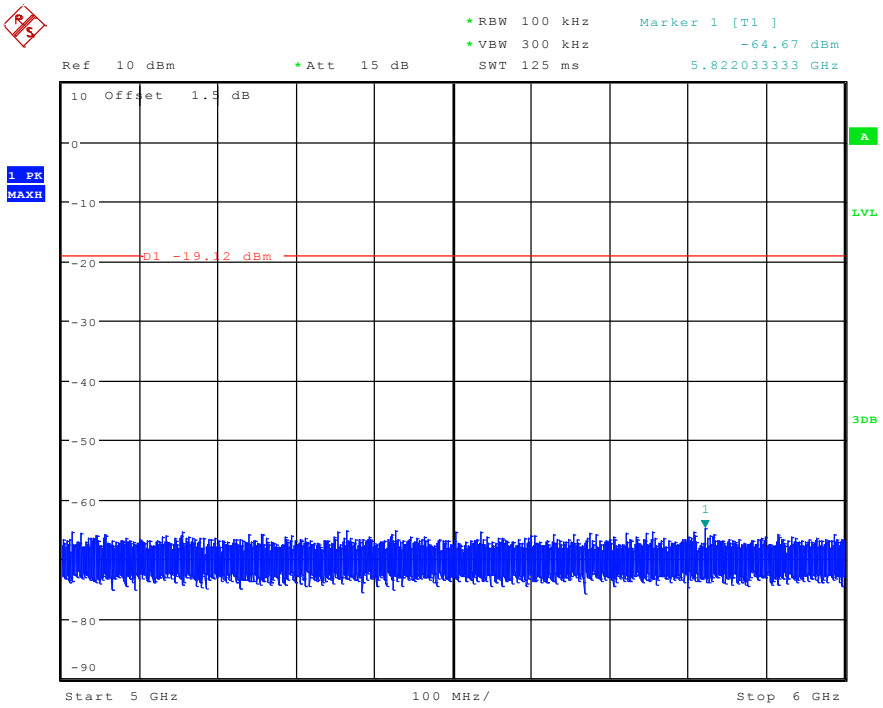


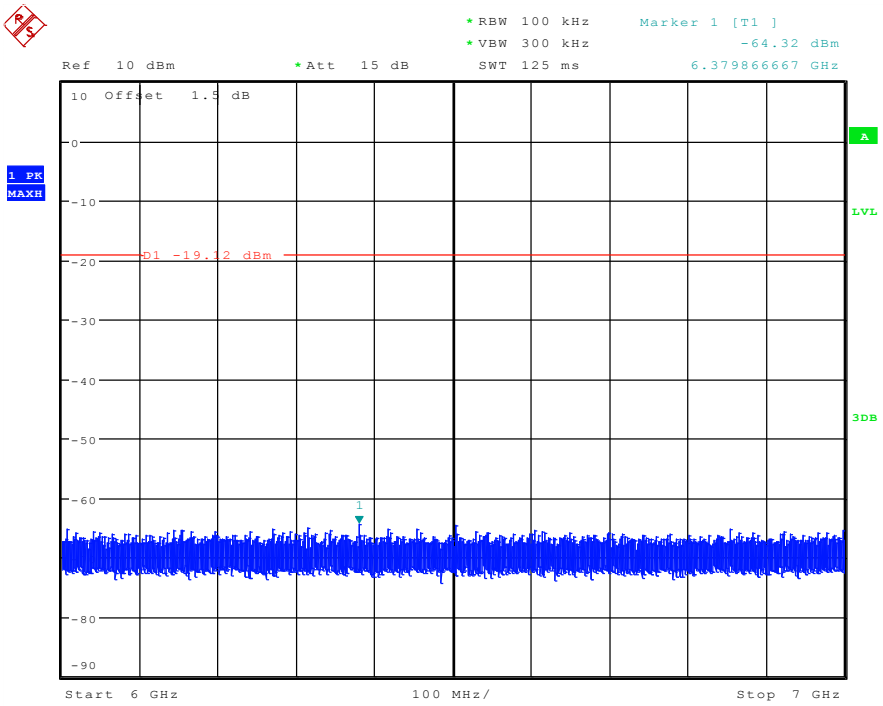


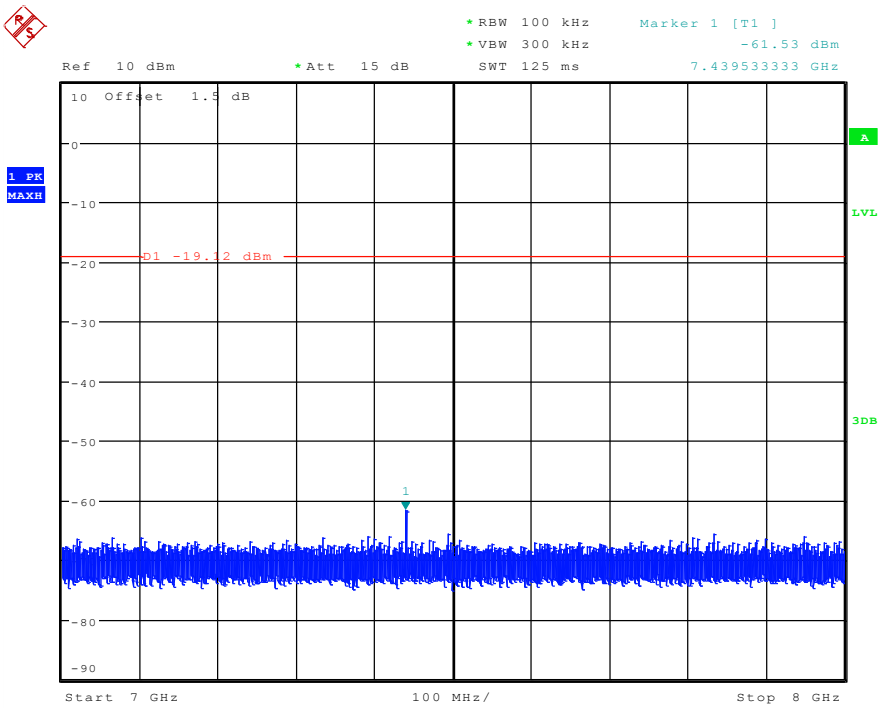

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-64.78 dBm
1.826900000 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -19.12 dBm
Start 1 GHz
100 MHz/
Stop 2 GHz

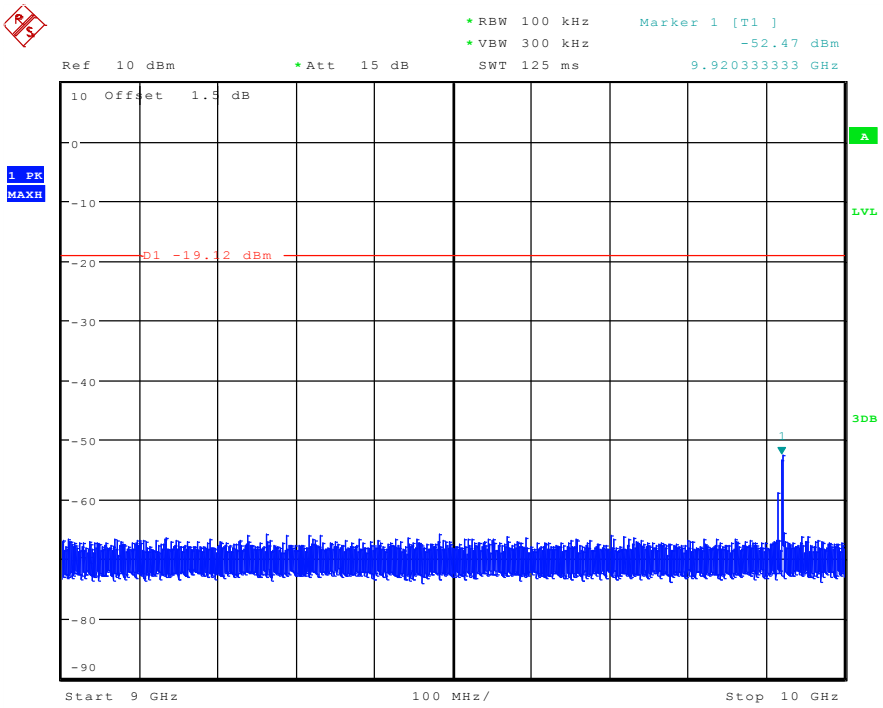

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
0.88 dBm
2.480066667 GHz
Marker 2 [T1]
-39.48 dBm
2.474066667 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -19.12 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-42.09 dBm
4.959666667 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
D1 -19.12 dBm
A
LVL
3DB
Start 4 GHz
100 MHz/
Stop 5 GHz


RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-64.67 dBm
5.822033333 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
D1 -19.12 dBm
A
LVL
3DB
Start 5 GHz
100 MHz/
Stop 6 GHz


RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-64.32 dBm
6.379866667 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
D1 -19.12 dBm
A
LVL
3DB
Start 6 GHz
100 MHz/
Stop 7 GHz


RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-61.53 dBm
7.439533333 GHz
Ref 10 dBm
Att 15 dB
Offset 1.5 dB
1 PK
MAXH
D1 -19.12 dBm
A
LVL
3DB
Start 7 GHz
100 MHz/
Stop 8 GHz



Remark:

Pretest 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report. Per FCC Part 15.33 (a) and 15.31 (o) ,The amplitude of spurious emissions from intentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

6.8 Radiated Spurious Emission & Restricted bands

6.8.1 Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205
Test Method:	ANSI C63.10 2013
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Setup:	

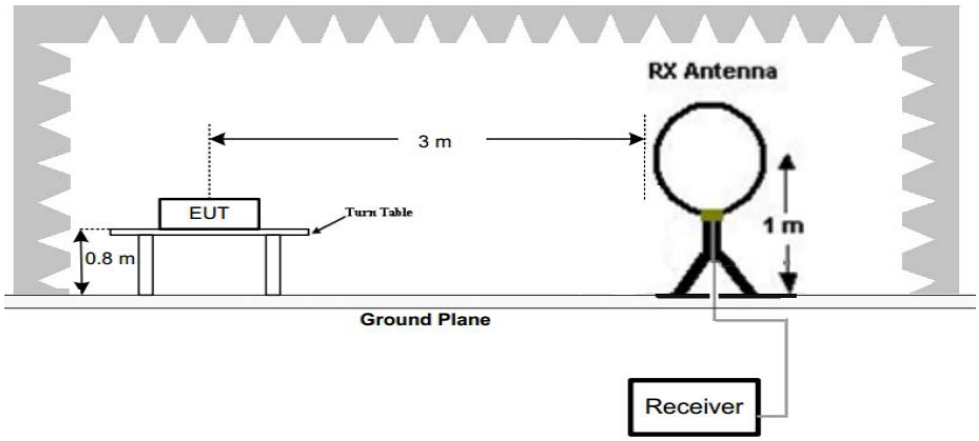


Figure 1. Below 30MHz

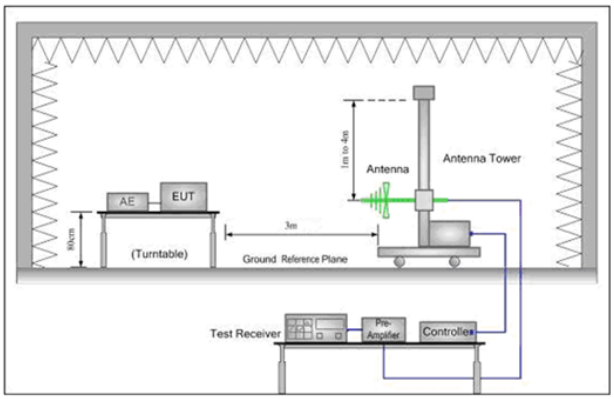


Figure 2. 30MHz to 1GHz

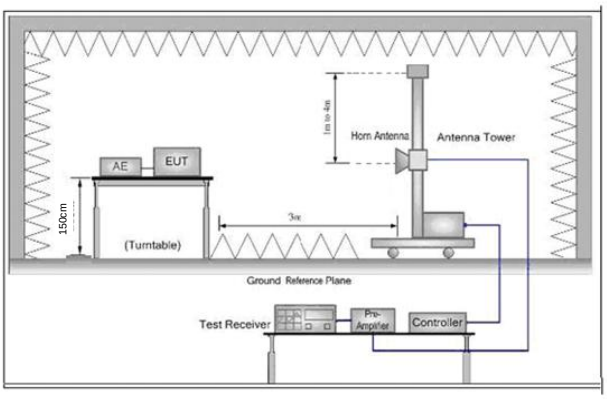
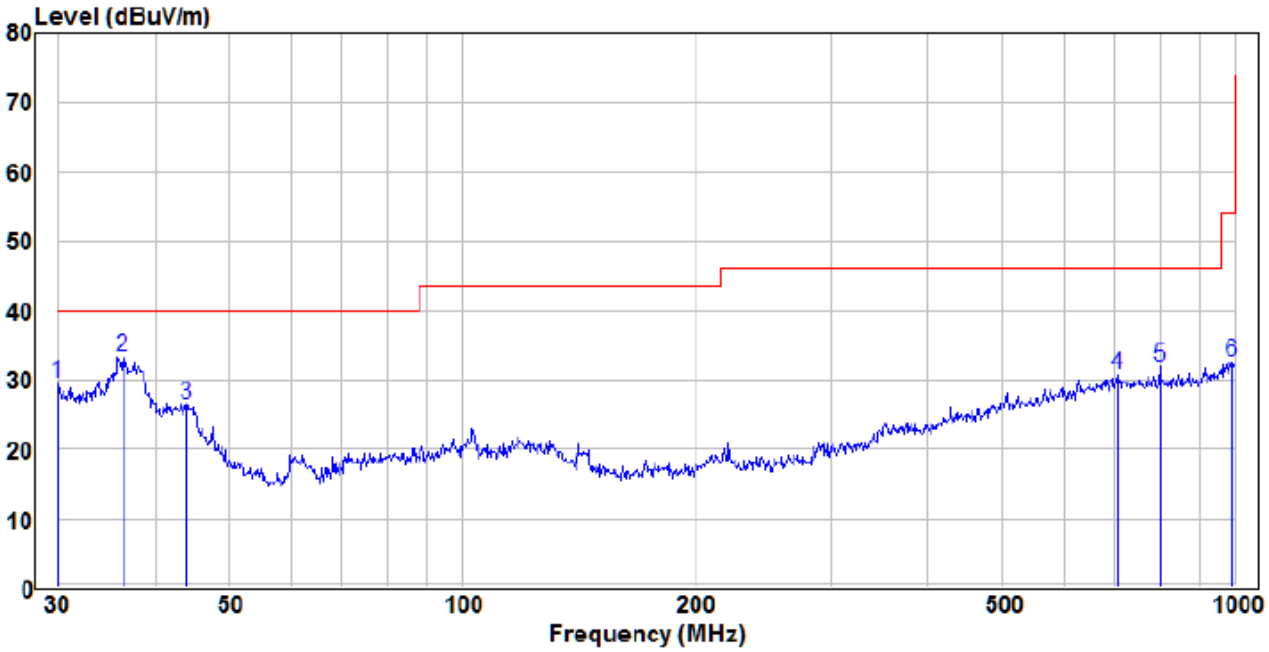


Figure 3. Above 1 GHz

Test Procedure:	a. 1) Below 1G: 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. 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 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. Note: For the radiated emission test above 1GHz: Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. 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

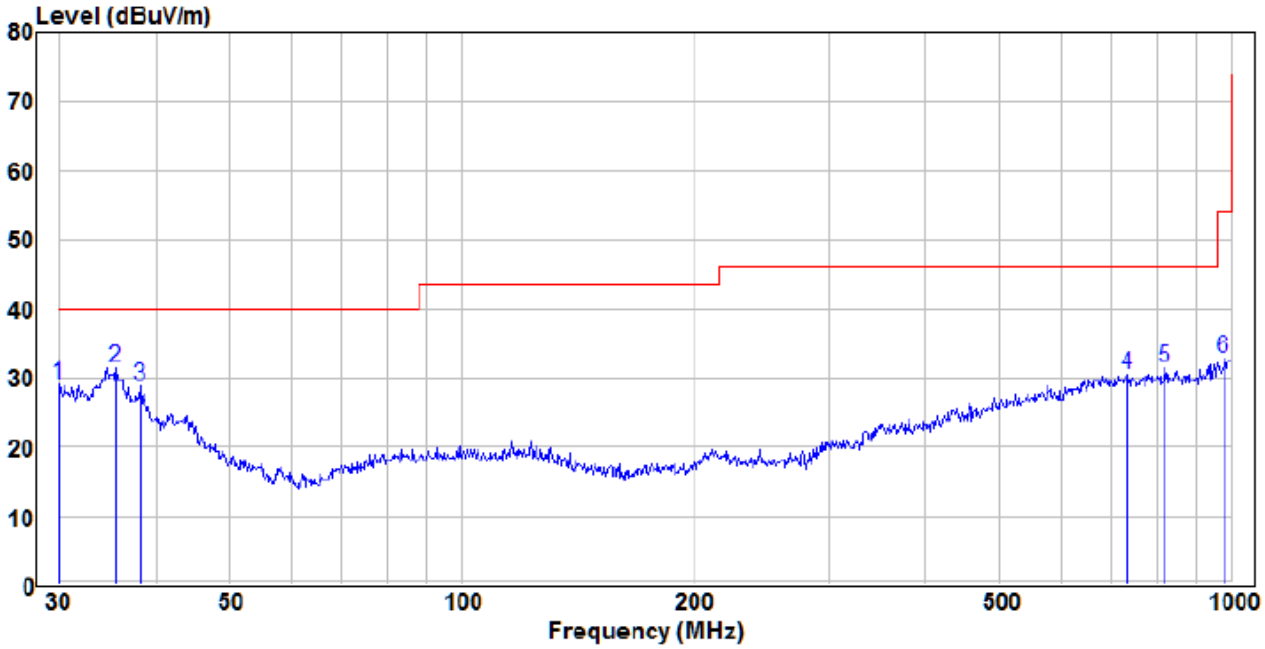
	and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function 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. Test the EUT in the lowest channel (2402MHz),the middle channel (2440MHz),the Highest channel (2480MHz) h. 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. i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with GFSK modulation. Transmitting mode.
Final Test Mode:	Transmitting with GFSK modulation. Pretest the EUT at Transmitting mode, found the Transmitting mode which it is worse case. For below 1GHz part, through pre-scan, the worst case is the lowest channel. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.11 for details.
Test Results:	Pass

Radiated Emission below 1GHz		
30MHz~1GHz (QP)		
Test mode:	Transmitting mode	Vertical



		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1		30.00	10.65	18.91	29.56	40.00	-10.44	Peak	VERTICAL
2	pp	36.38	15.77	17.53	33.30	40.00	-6.70	Peak	VERTICAL
3		43.97	13.99	12.54	26.53	40.00	-13.47	Peak	VERTICAL
4		704.23	10.88	19.73	30.61	46.00	-15.39	Peak	VERTICAL
5		798.98	11.26	20.71	31.97	46.00	-14.03	Peak	VERTICAL
6		993.01	9.84	22.72	32.56	54.00	-21.44	Peak	VERTICAL

Test mode:	Transmitting mode	Horizontal



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	30.00	10.19	18.91	29.10	40.00	-10.90	Peak	HORIZONTAL
2 pp	35.50	13.35	18.15	31.50	40.00	-8.50	Peak	HORIZONTAL
3	38.21	12.45	16.25	28.70	40.00	-11.30	Peak	HORIZONTAL
4	731.92	10.49	20.03	30.52	46.00	-15.48	Peak	HORIZONTAL
5	818.83	10.79	20.62	31.41	46.00	-14.59	Peak	HORIZONTAL
6	979.18	10.41	22.30	32.71	54.00	-21.29	Peak	HORIZONTAL

Transmitter Emission above 1GHz

Worse case mode:	GFSK	Test channel:	Lowest

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4804	49.57	-5.18	44.39	74	-29.61	peak	H
4804	38.56	-5.18	33.38	54	-20.62	AVG	H
7206	48.30	-6.45	41.85	74	-32.15	peak	H
7206	35.87	-6.45	29.42	54	-24.58	AVG	H
4804	49.21	-5.18	44.03	74	-29.97	peak	V
4804	37.51	-5.18	32.33	54	-21.67	AVG	V
7206	49.90	-6.45	43.45	74	-30.55	peak	V
7206	36.02	-6.45	29.57	54	-24.43	AVG	V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2390	48.68	-4.36	44.32	74	-29.68	peak	H
2390	35.15	-4.36	30.79	54	-23.21	AVG	H
2400	53.61	-4.36	49.25	74	-24.75	peak	H
2400	40.76	-4.36	36.40	54	-17.60	AVG	H
2390	46.54	-4.36	42.18	74	-31.82	peak	V
2390	35.15	-4.36	30.79	54	-23.21	AVG	V
2400	54.18	-4.36	49.82	74	-24.18	peak	V
2400	41.53	-4.36	37.17	54	-16.83	AVG	V

Worse case mode:	GFSK	Test channel:	Middle

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4880	49.56	-5.19	44.37	74	-29.63	peak	H
4880	37.82	-5.19	32.63	54	-21.37	AVG	H
7320	49.65	-6.47	43.18	74	-30.82	peak	H
7320	36.01	-6.47	29.54	54	-24.46	AVG	H
4880	49.18	-5.19	43.99	74	-30.01	peak	V
4880	36.46	-5.19	31.27	54	-22.73	AVG	V
7320	48.90	-6.47	42.43	74	-31.57	peak	V
7320	34.98	-6.47	28.51	54	-25.49	AVG	V

Worse case mode:	GFSK	Test channel:	Highest

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4960	50.98	-5.2	45.78	74	-28.22	peak	H
4960	38.05	-5.2	32.85	54	-21.15	AVG	H
7440	50.92	-6.47	44.45	74	-29.55	peak	H
7440	37.20	-6.47	30.73	54	-23.27	AVG	H
4960	49.91	-5.2	44.71	74	-29.29	peak	V
4960	38.93	-5.2	33.73	54	-20.27	AVG	V
7440	50.59	-6.47	44.12	74	-29.88	peak	V
7440	37.41	-6.47	30.94	54	-23.06	AVG	V

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2483.5	60.28	-4.22	56.06	74	-17.94	peak	H
2483.5	47.38	-4.22	43.16	54	-10.84	AVG	H
2483.5	59.74	-4.22	55.52	74	-18.48	peak	V
2483.5	46.59	-4.22	42.37	54	-11.63	AVG	V

Remark:

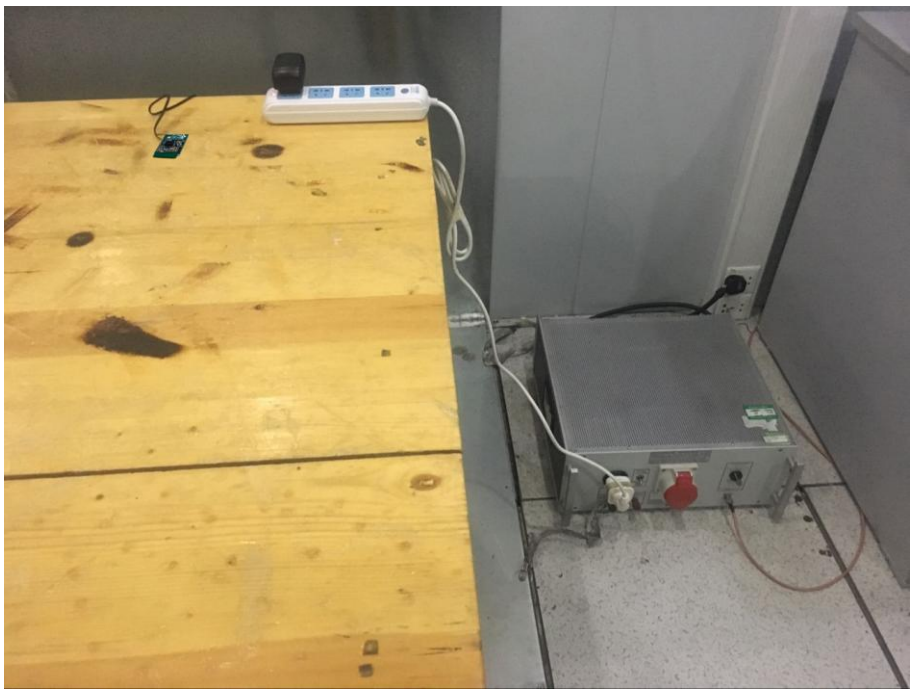
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

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

2) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

7 Photographs - EUT Test Setup

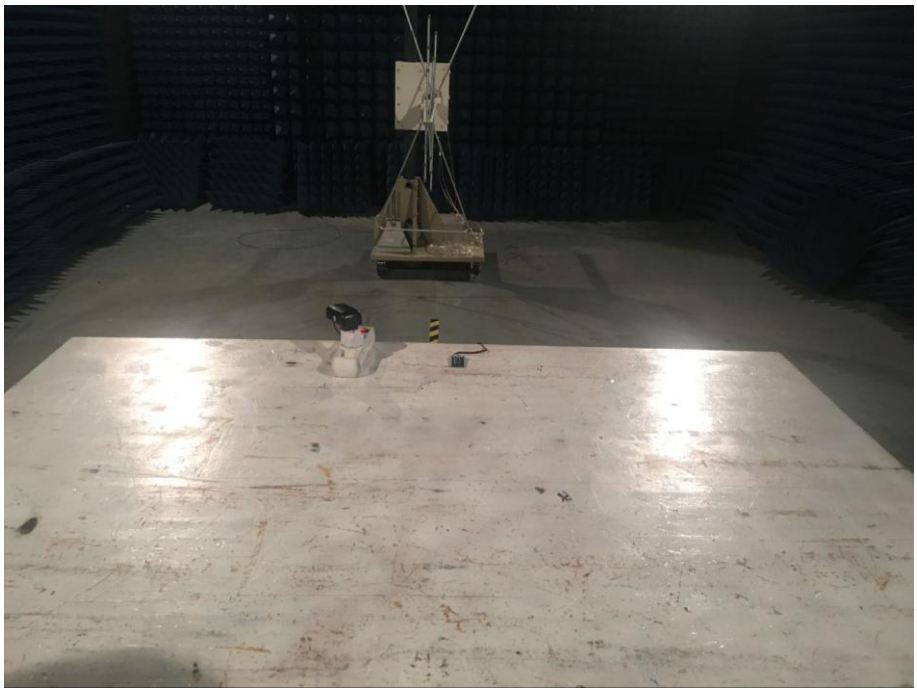
7.1 Conducted Emission



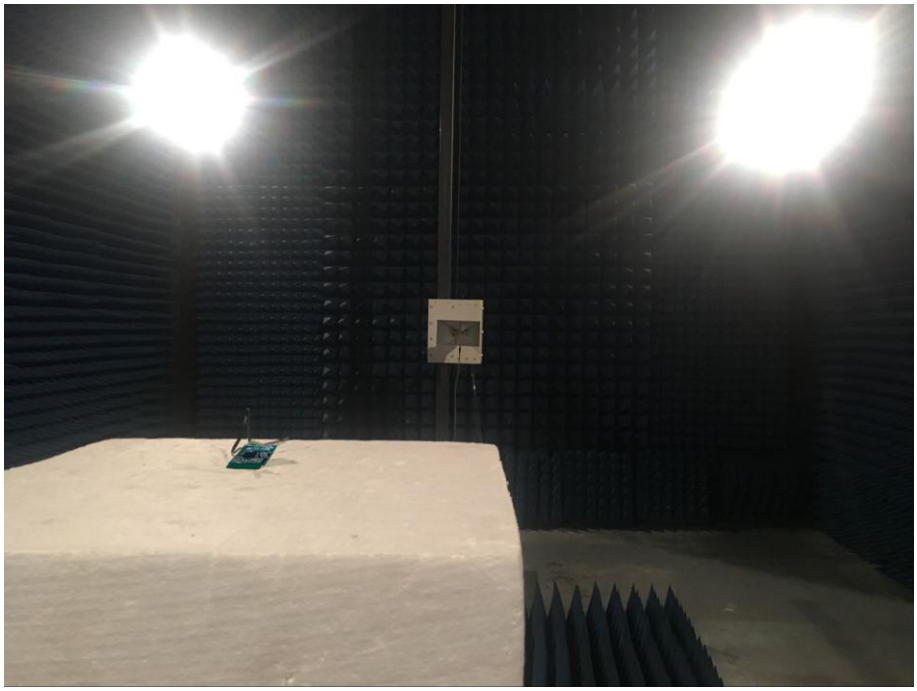
7.2 Radiated Spurious Emission

9KHz~30MHz:

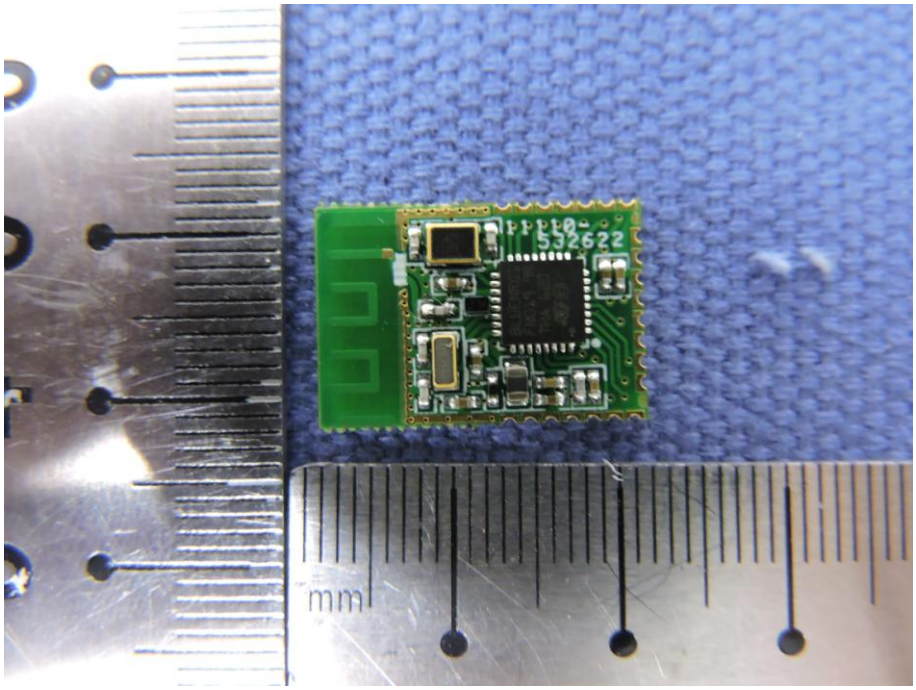
30MHz~1GHz:

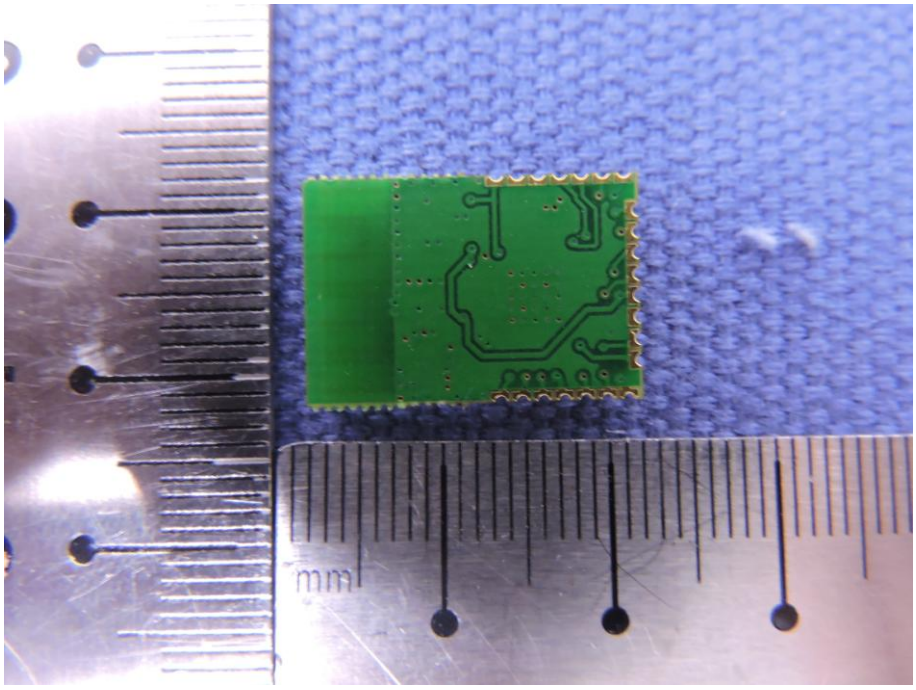


Above 1GHz:



8 Photographs - EUT Constructional Details





END OF THE REPORT