

Appendix

Bluetooth BLE

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1 Equipment List

Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Duedate
				(yyyy-mm-dd)	(yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017/5/10	2020/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2018/9/2	2019/9/2
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2018/4/2	2019/4/1
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2018/7/12	2019/7/11
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2019/2/11	2020/2/10
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2018/4/2	2019/4/1

RF conducted test	
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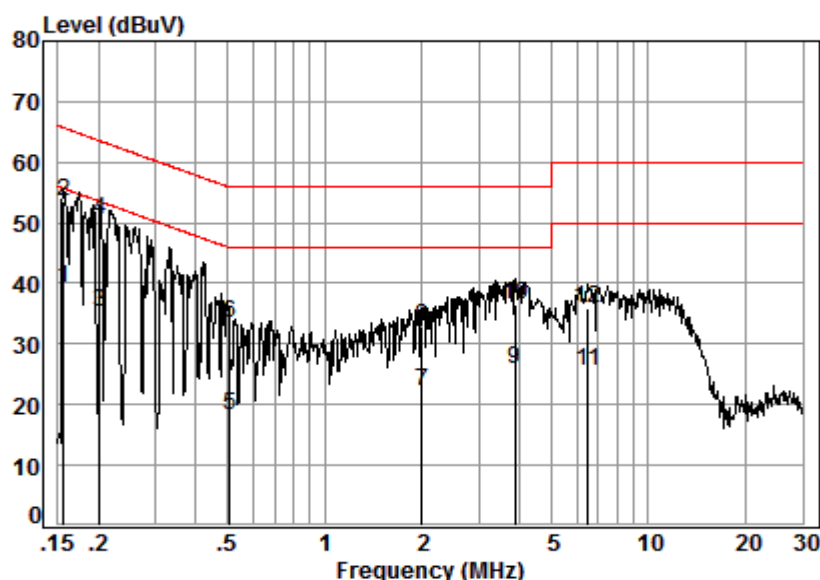
3 AC Power Line Conducted Emissions

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.

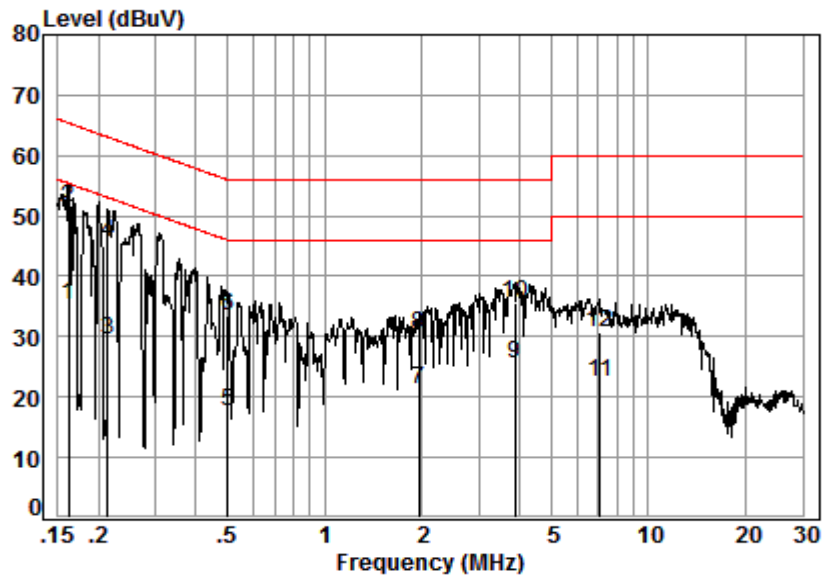
Live line:



Site : Shielding Room
 Condition: Line
 Job No. : 10012
 Test mode: d

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16	0.01						

Neutral line:



Site : Shielding Room
Condition: Neutral
Job No. : 10012
Test mode: d

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16	0.01	9.64	25.64	35.29	55.38	-20.09	Average
2	0.16	0.01	9.64	41.70	51.35	65.38	-14.03	QP
3	0.21	0.02	9.64	19.78	29.44	53.05	-23.61	Average
4	0.2							

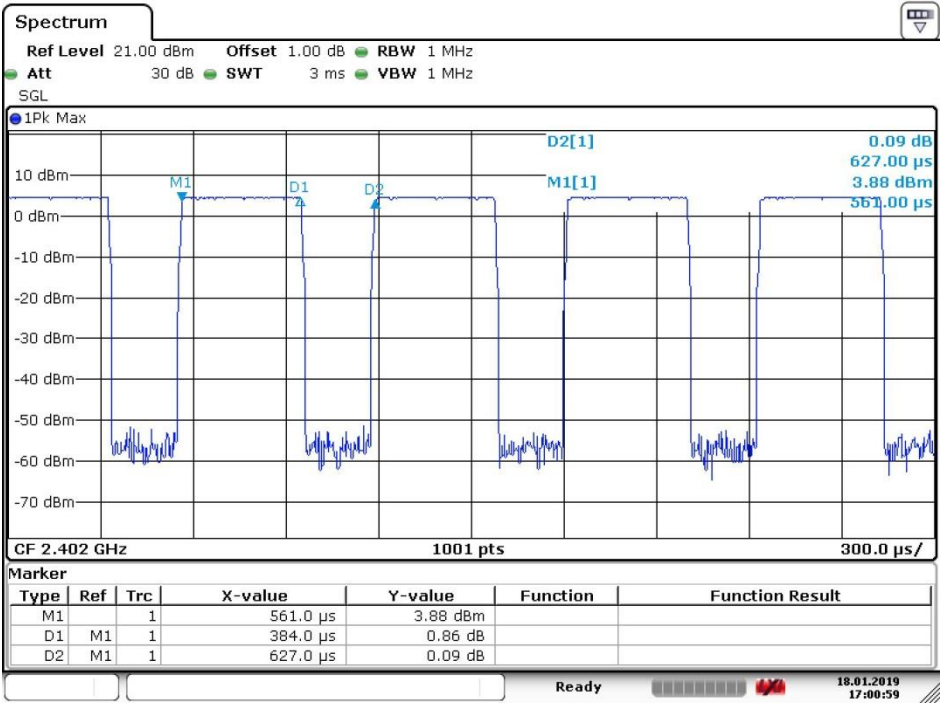
4 Duty Cycle

4.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
BLE	CH0	61.24

4.2 Test Plots

BLE



5 Conducted Output Power

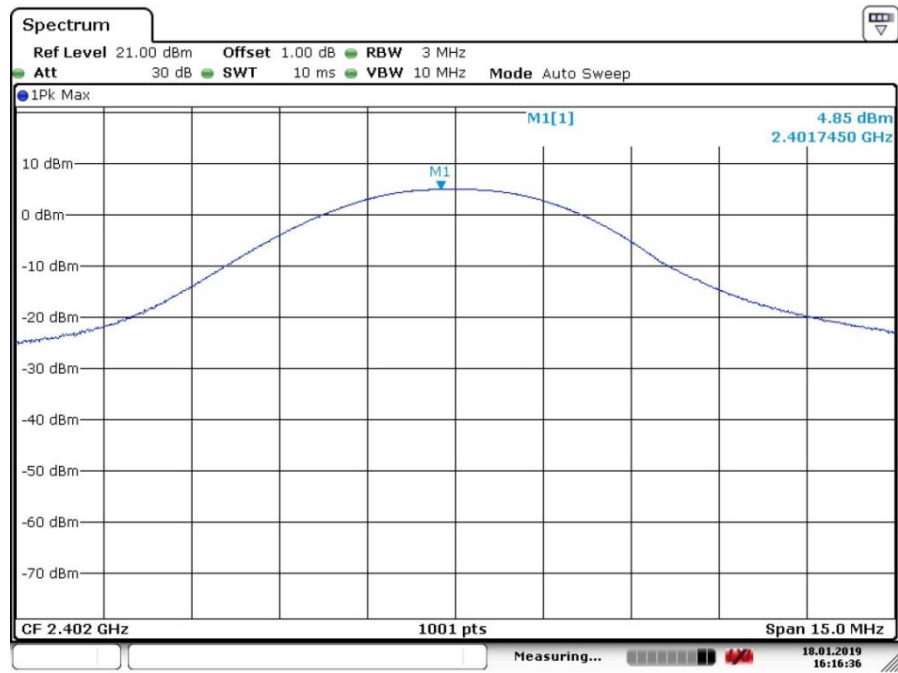
5.1 Test Results

Measurement Data of Peak Power :

GFSK mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	4.85	30.00	Pass
Middle	5.12	30.00	Pass
Highest	5.44	30.00	Pass

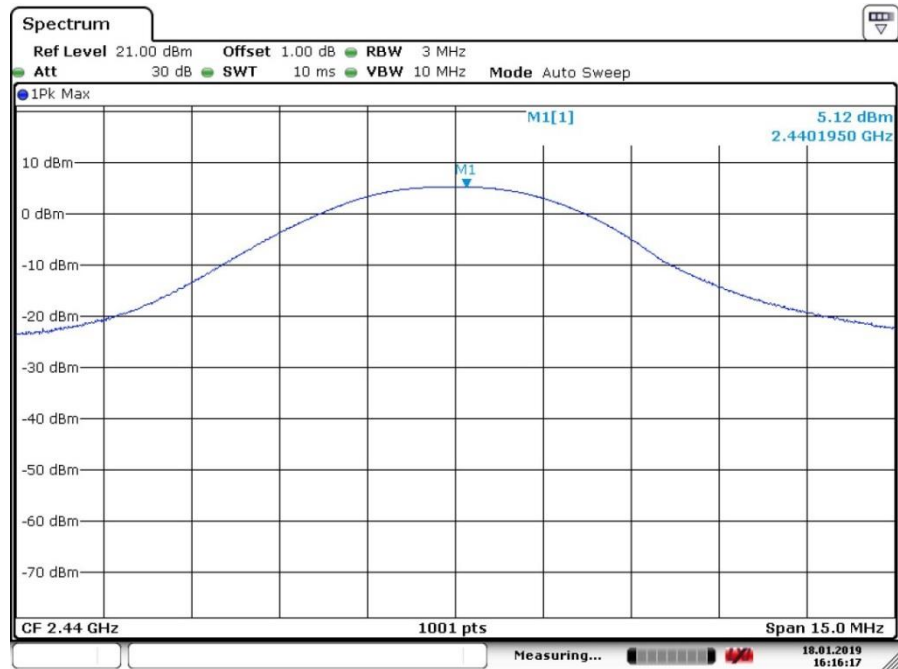
5.2 Test plots:

GFSK_Lowest Channel

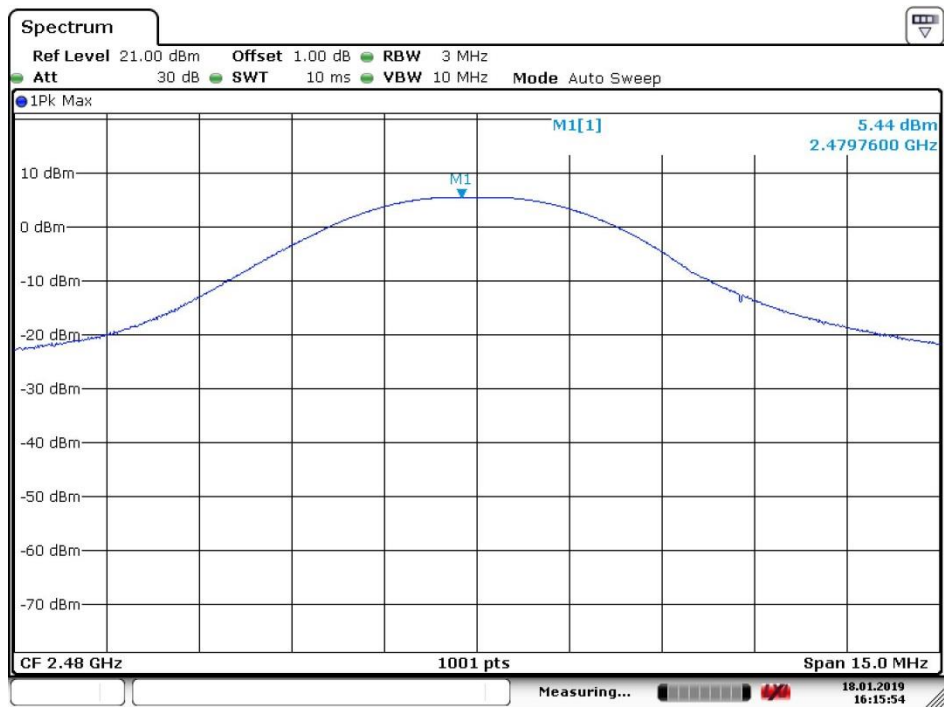


Date: 18.JAN.2019 16:16:37

GFSK_Middle Channel



GFSK_Highest Channel



Date: 18. JAN.2019 16:15:54

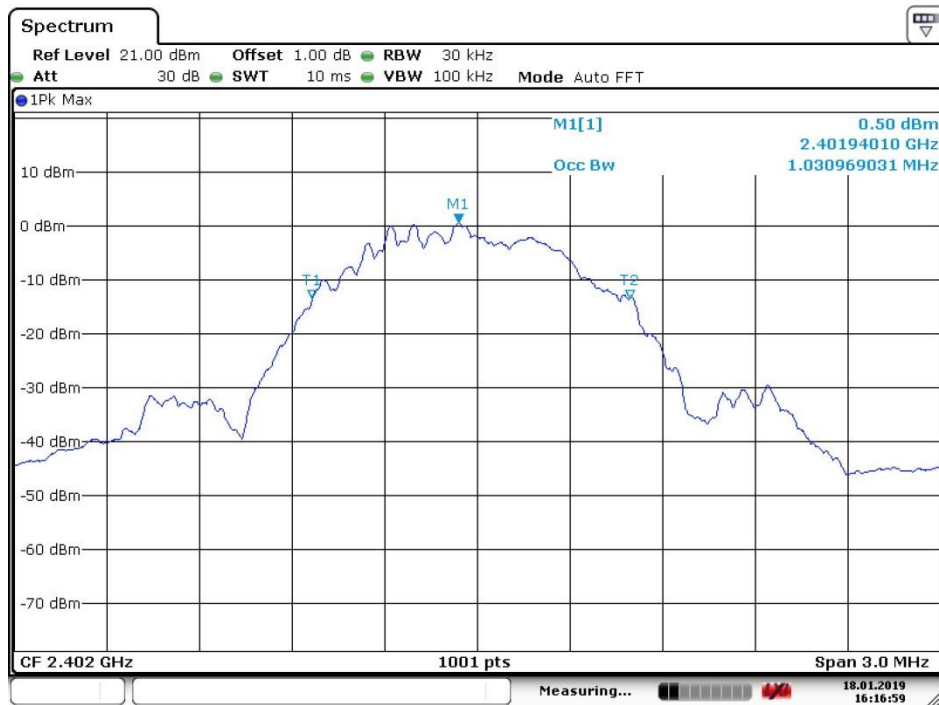
6 DTS (6 dB) Bandwidth & 99% Occupied Bandwidth

6.1 Test Results

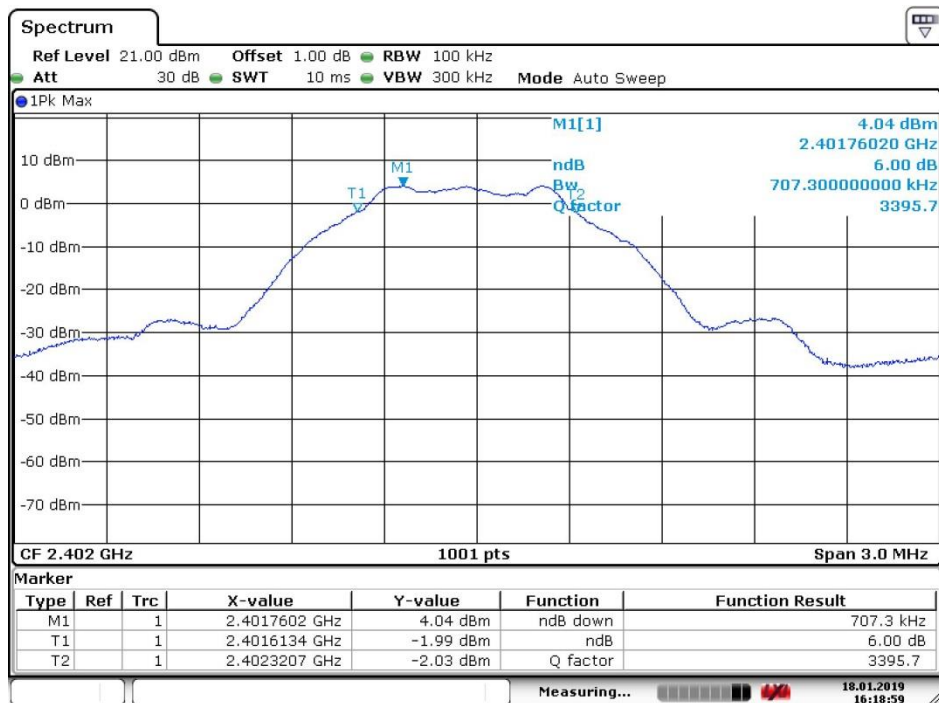
Mode	Test Channel	99% Occupied Bandwidth (MHz)	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
GFSK	Lowest	1.03	0.707	≥500	Pass
	Middle	1.03	0.704	≥500	Pass
	Highest	1.03	0.713	≥500	Pass

6.2 Test plots

GFSK_Lowest Channel

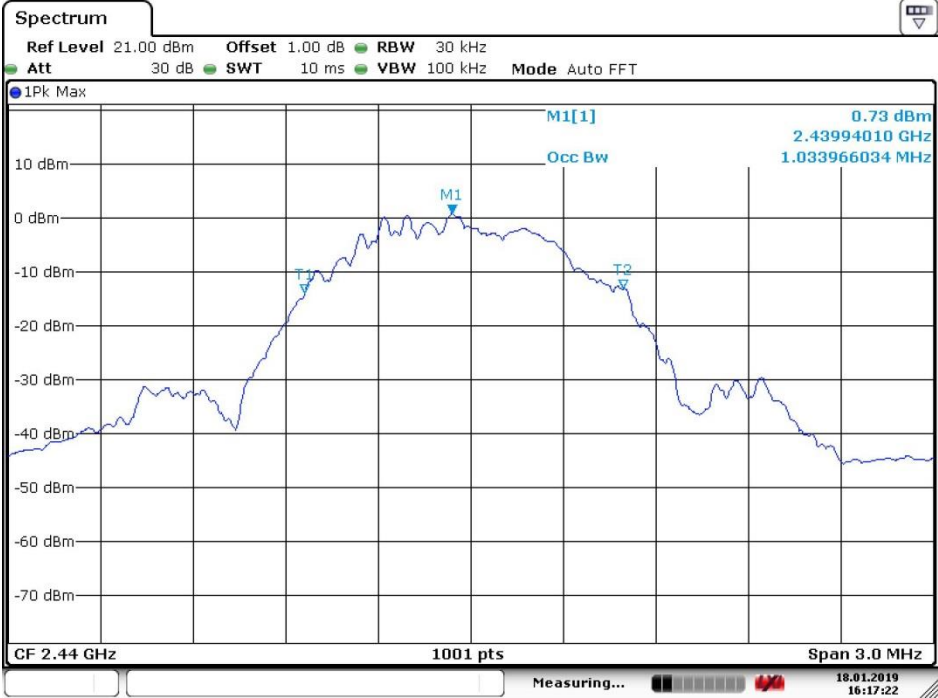


Date: 18. JAN.2019 16:16:59

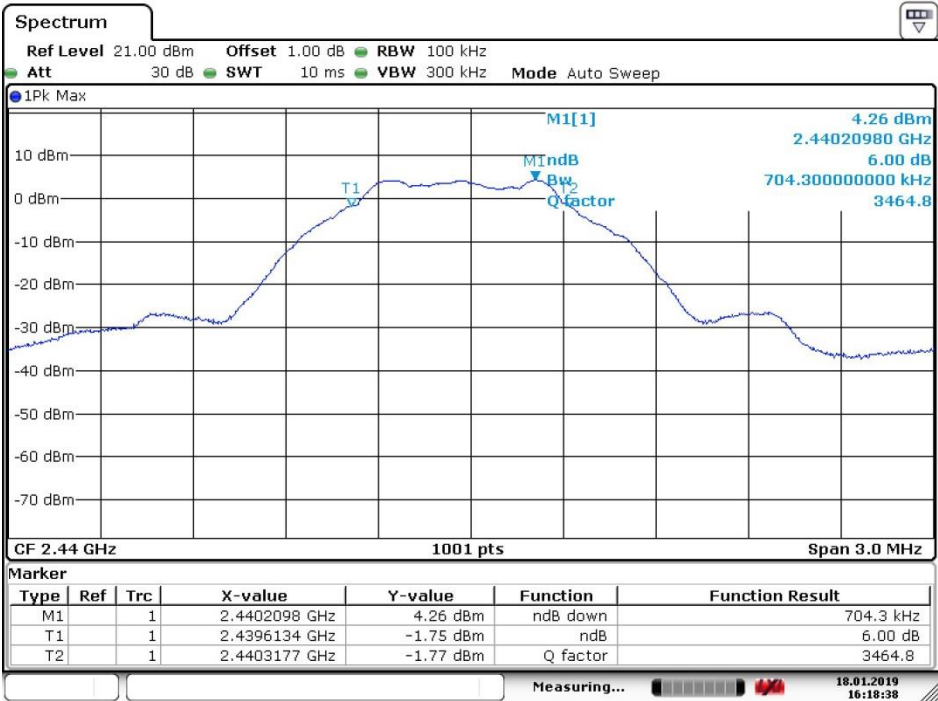


Date: 18. JAN.2019 16:19:00

GFSK_Middle Channel

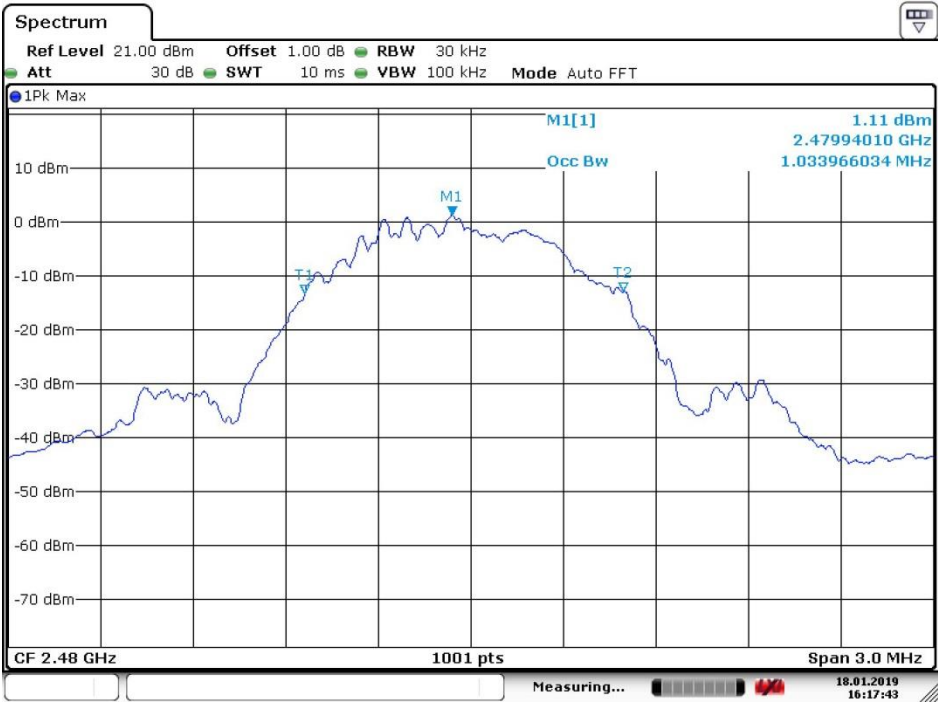


Date: 18.JAN.2019 16:17:23

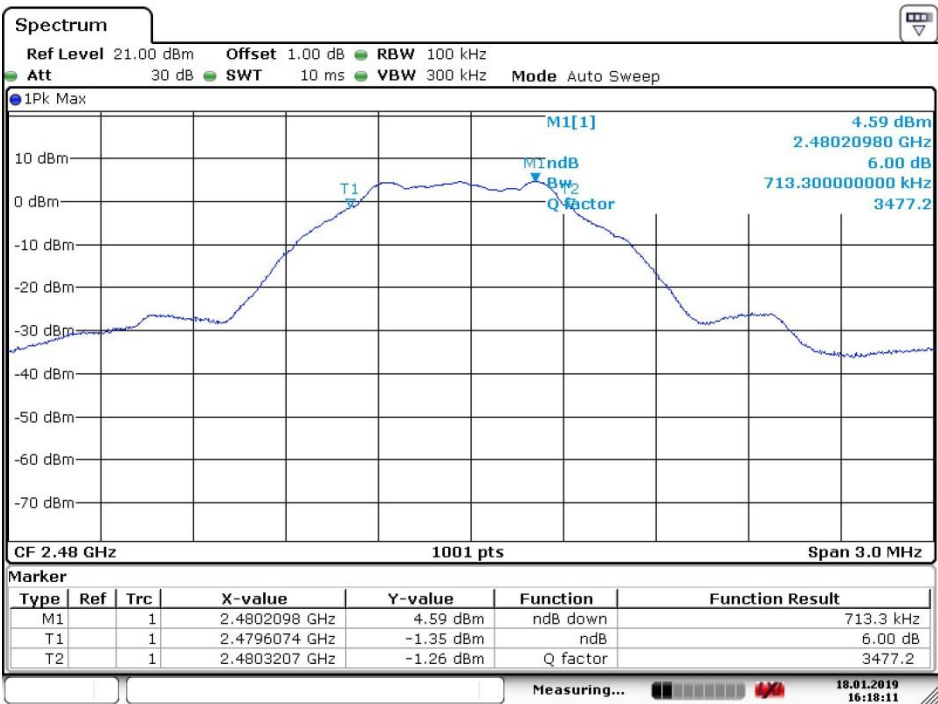


Date: 18.JAN.2019 16:18:39

GFSK_Highest Channel



Date: 18.JAN.2019 16:17:44



Date: 18.JAN.2019 16:18:11

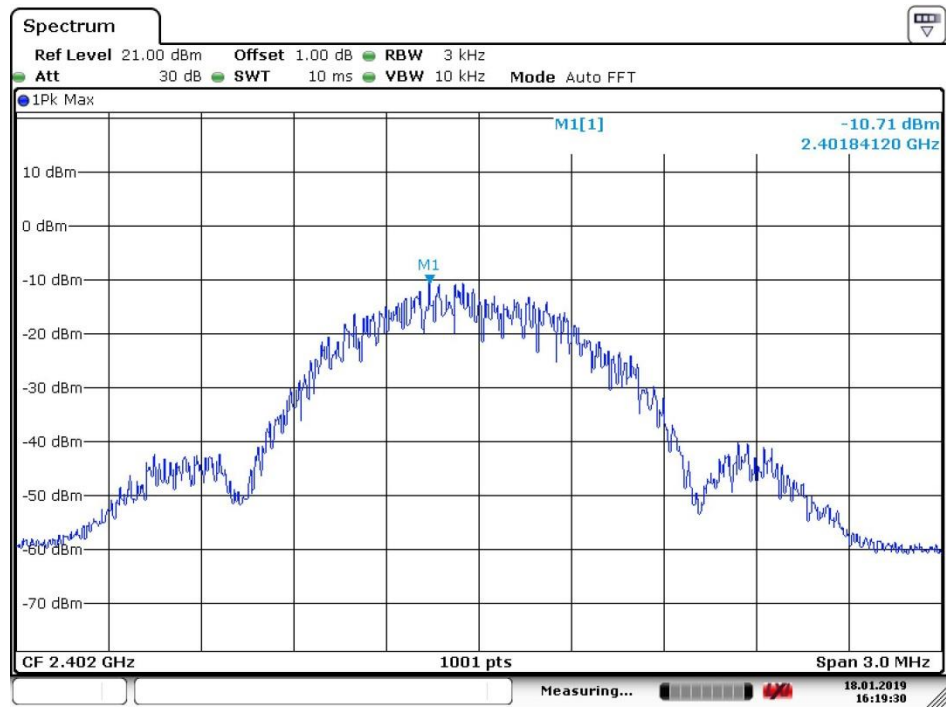
7 Power Spectral Density

7.1 Test Results

Mode	Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
GFSK	Lowest	-10.71	≤8.00	Pass
	Middle	-10.44	≤8.00	Pass
	Highest	-9.97	≤8.00	Pass

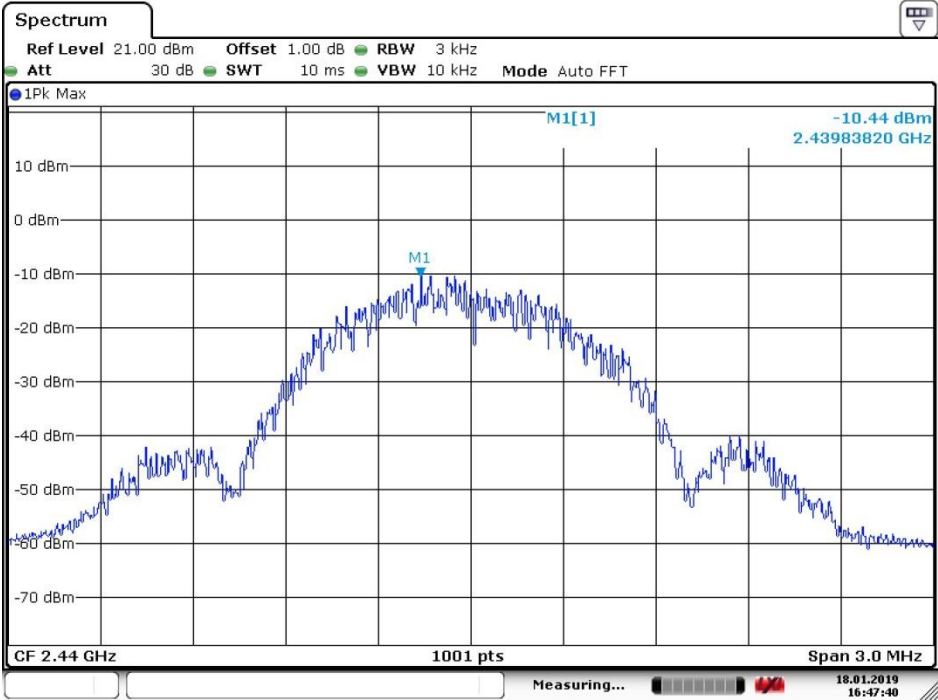
7.2 Test plots

GFSK_Lowest Channel



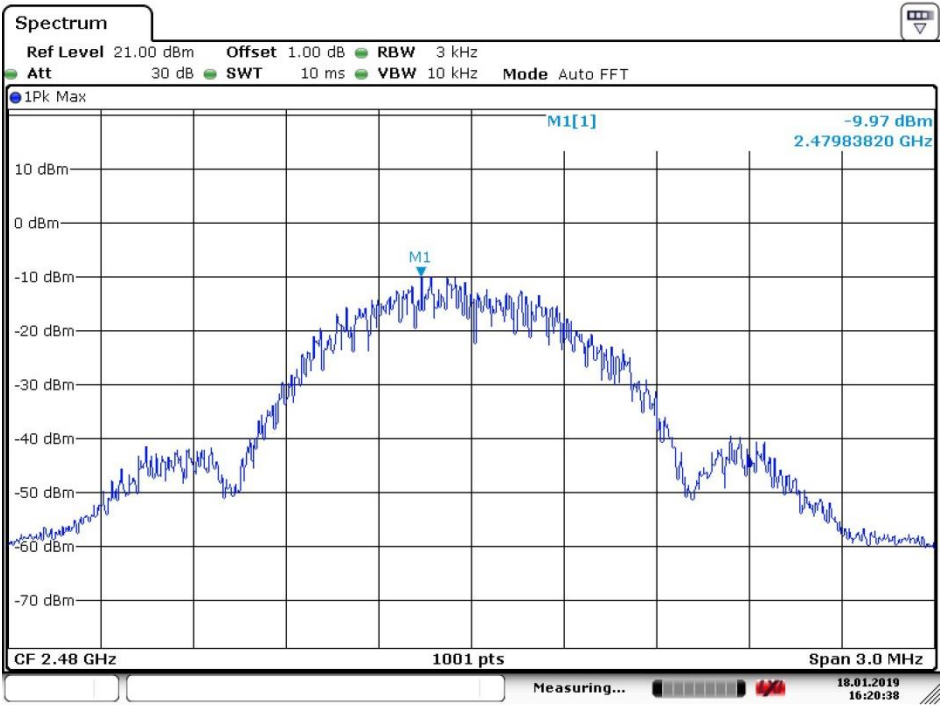
Date: 18. JAN.2019 16:19:31

GFSK_Middle Channel



Date: 18. JAN.2019 16:47:41

GFSK_Highest Channel

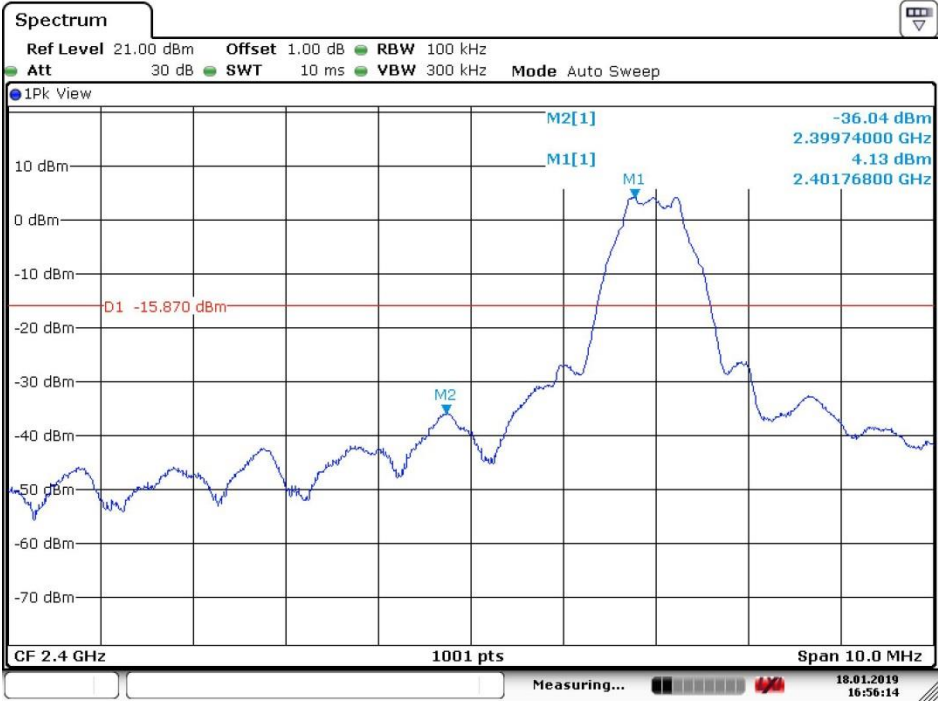


Date: 18.JAN.2019 16:20:38

8 Band-edge for RF Conducted Emissions

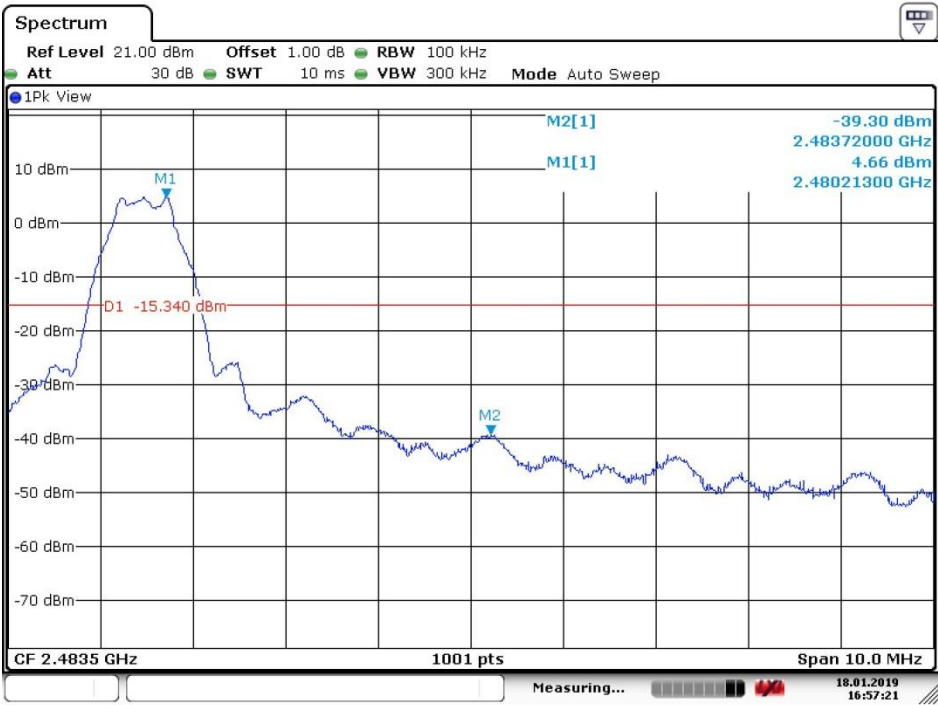
8.1 Test plots

GFSK _Lowest Channel



Date: 18.JAN.2019 16:56:14

GFSK_Highest Channel

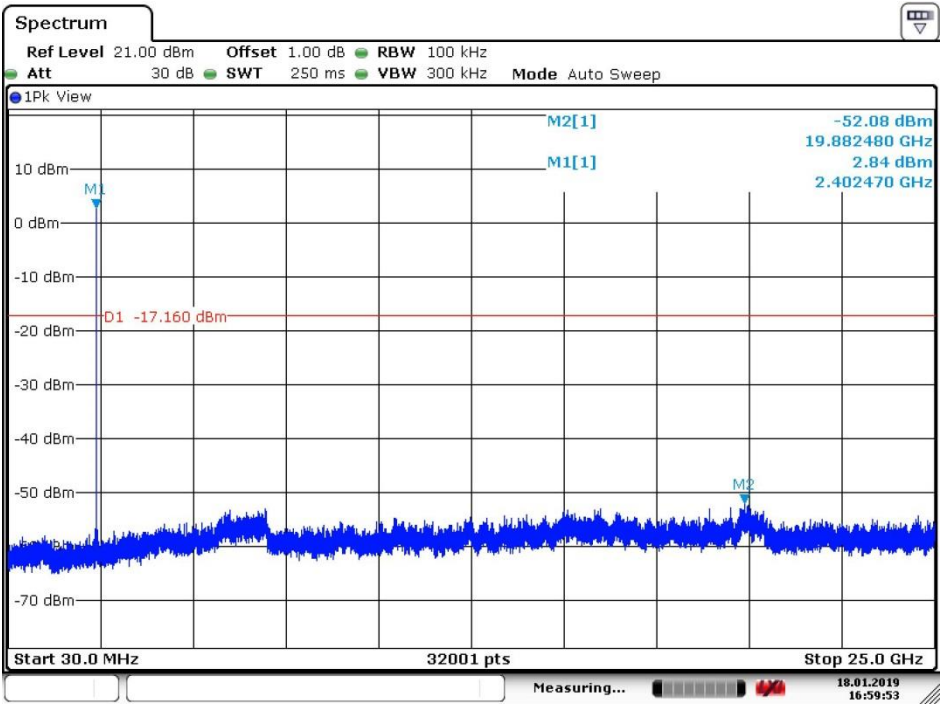


Date: 18.JAN.2019 16:57:21

9 Spurious RF Conducted Emissions

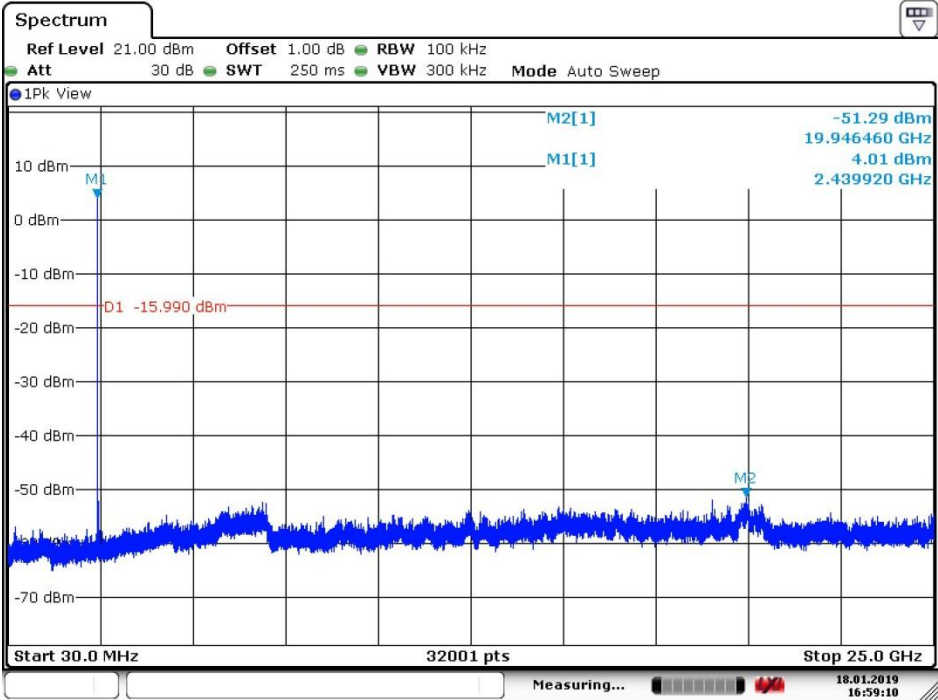
9.1 Test plots:

GFSK _Lowest Channel



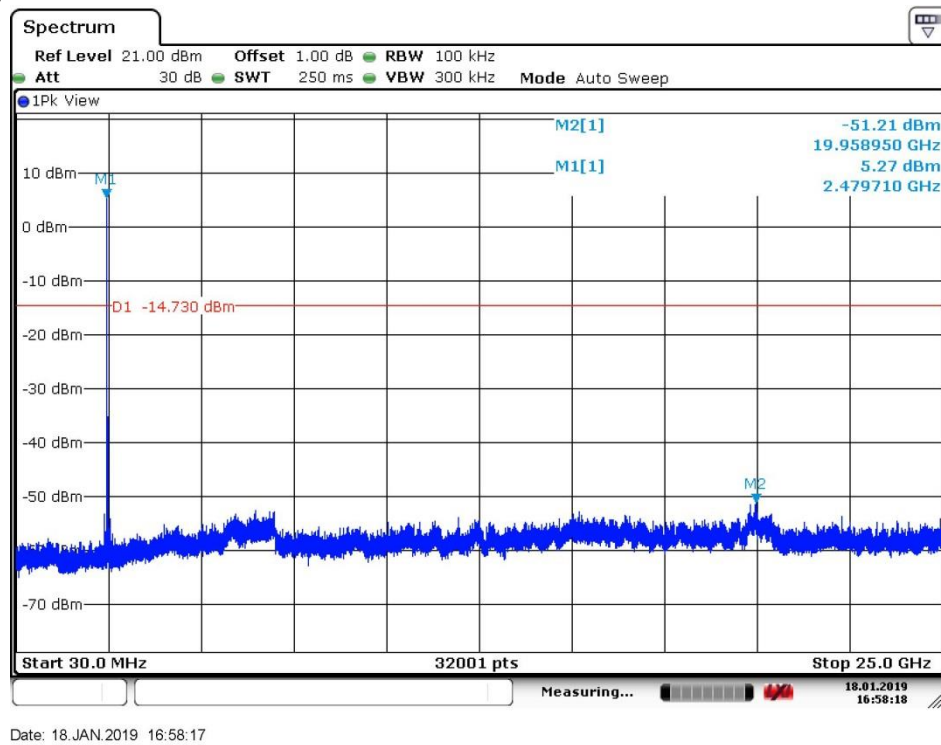
Date: 18 JAN.2019 16:59:53

GFSK_Middle Channel



Date: 18. JAN.2019 16:59:10

GFSK _Highest Channel



Remark:

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

The End