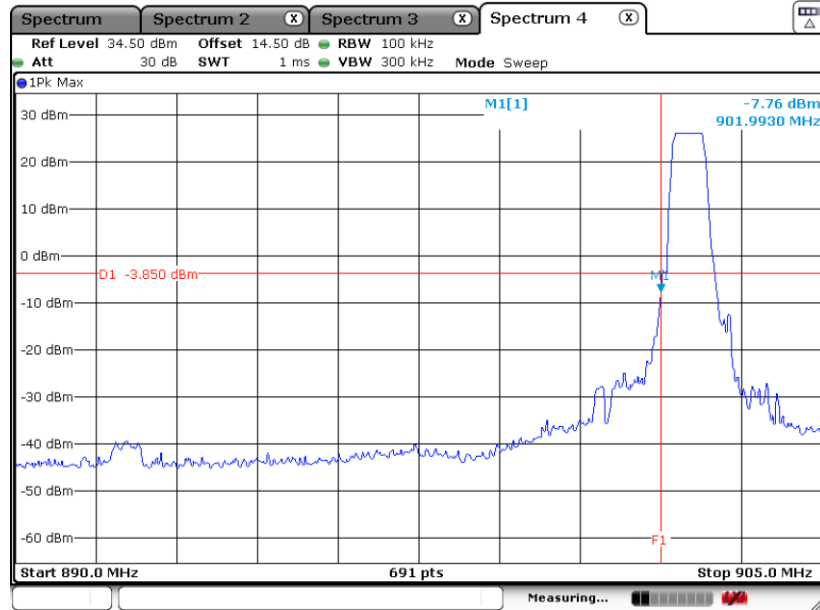




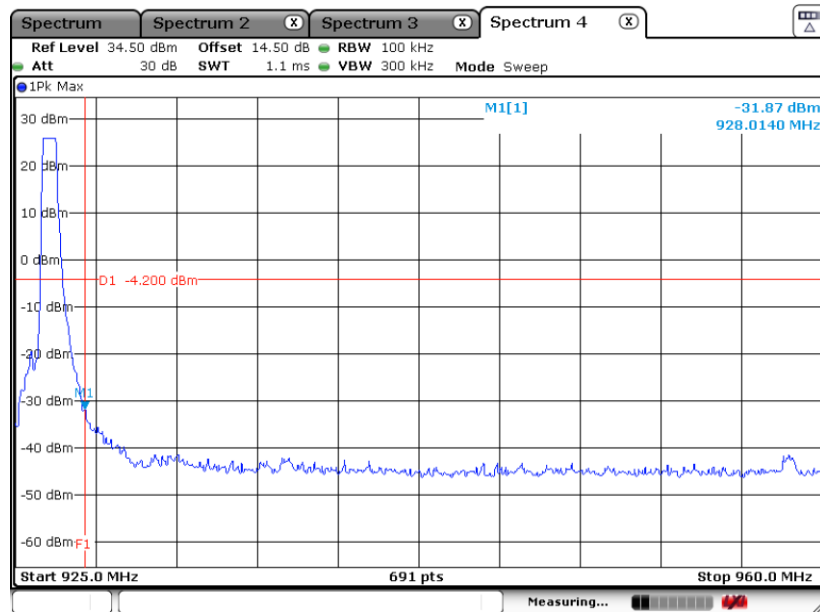
For SF8:

Low Band Edge Plot on 902.5 MHz



Date: 1.MAR.2022 16:21:27

High Band Edge Plot on 926.5 MHz

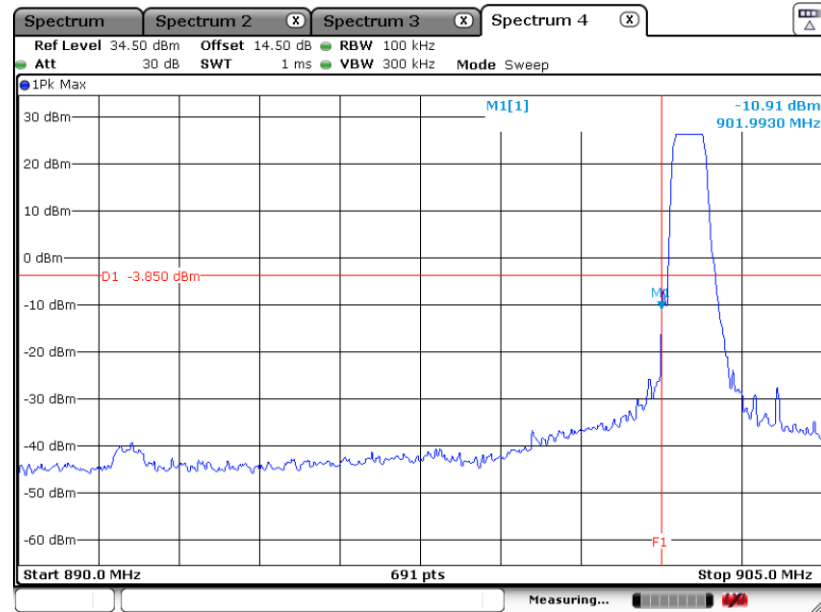


Date: 1.MAR.2022 16:28:01



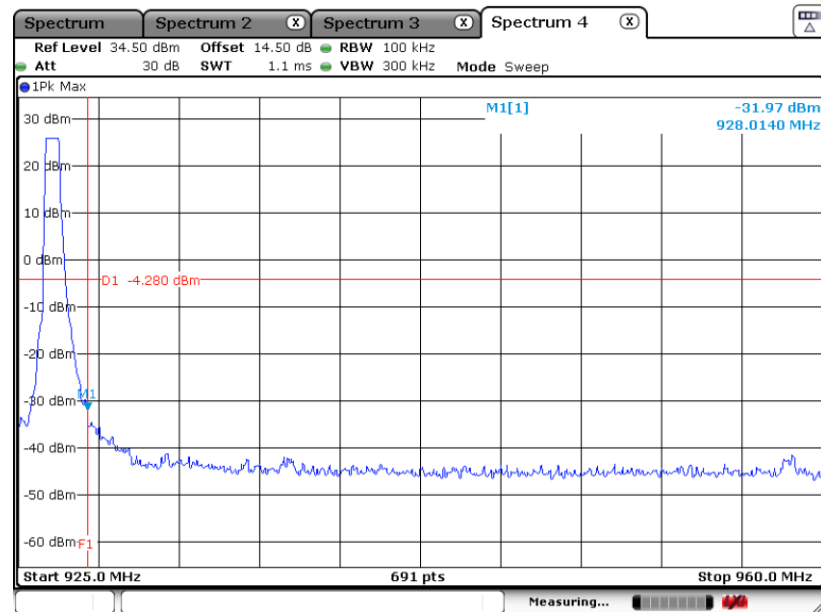
For SF9:

Low Band Edge Plot on 902.5 MHz



Date: 1.MAR.2022 16:32:18

High Band Edge Plot on 926.5 MHz

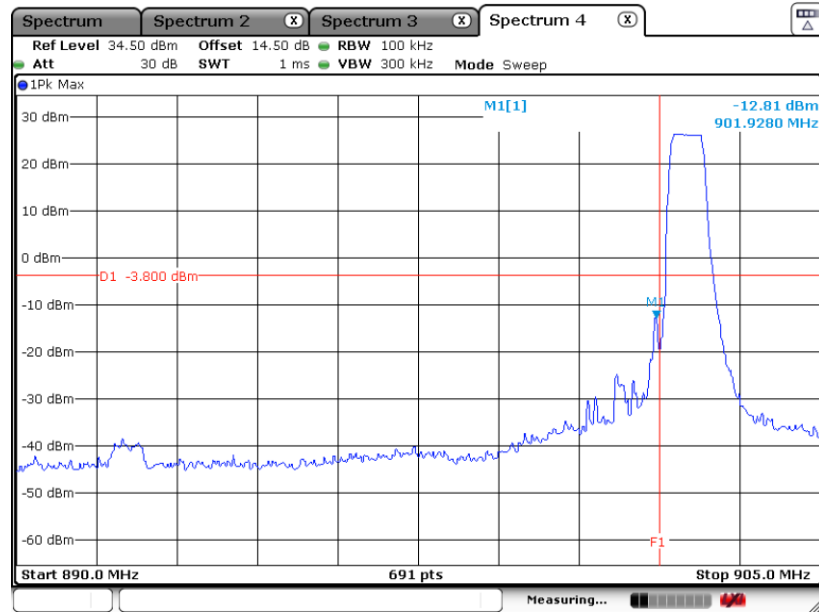


Date: 1.MAR.2022 16:38:29



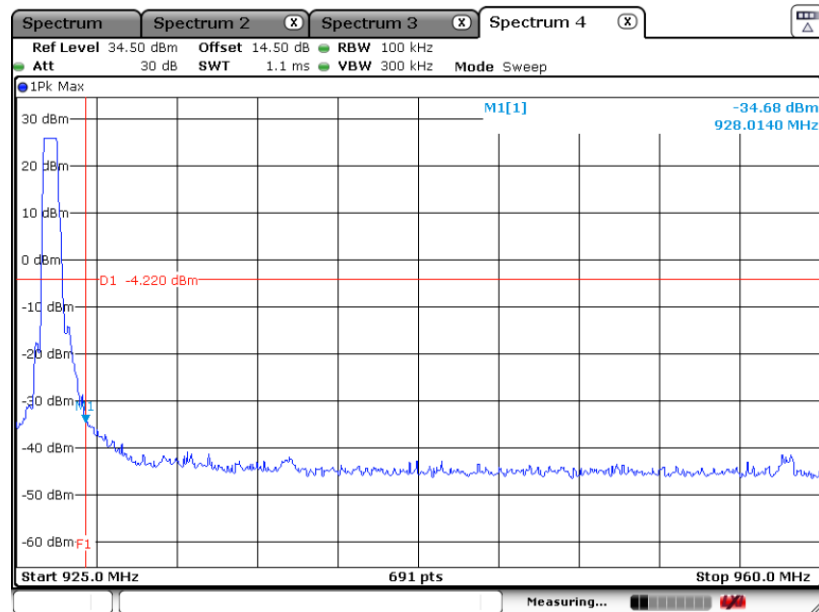
For SF10:

Low Band Edge Plot on 902.5 MHz



Date: 1.MAR.2022 16:43:25

High Band Edge Plot on 926.5 MHz

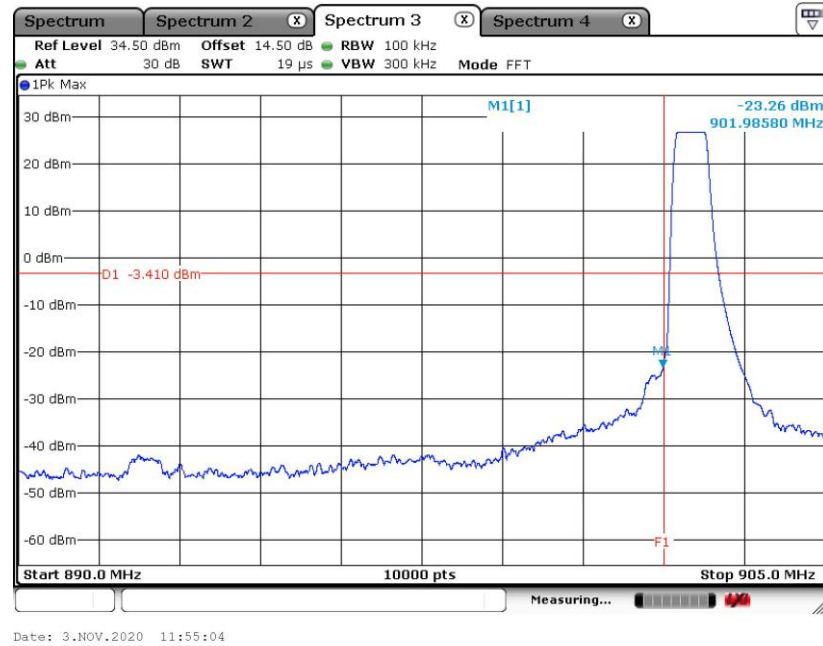


Date: 1.MAR.2022 16:49:02

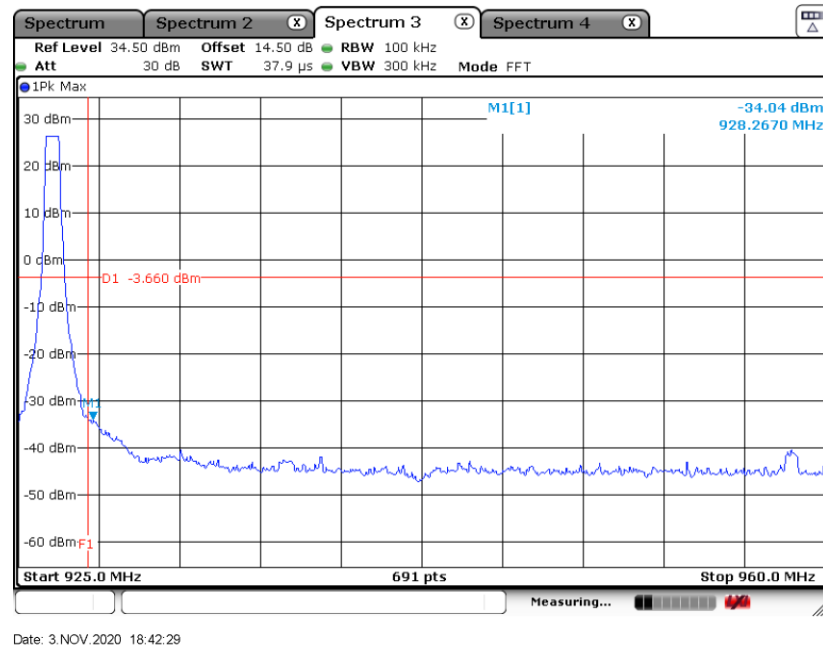


For SF11:

Low Band Edge Plot on 902.5 MHz



High Band Edge Plot on 926.5 MHz

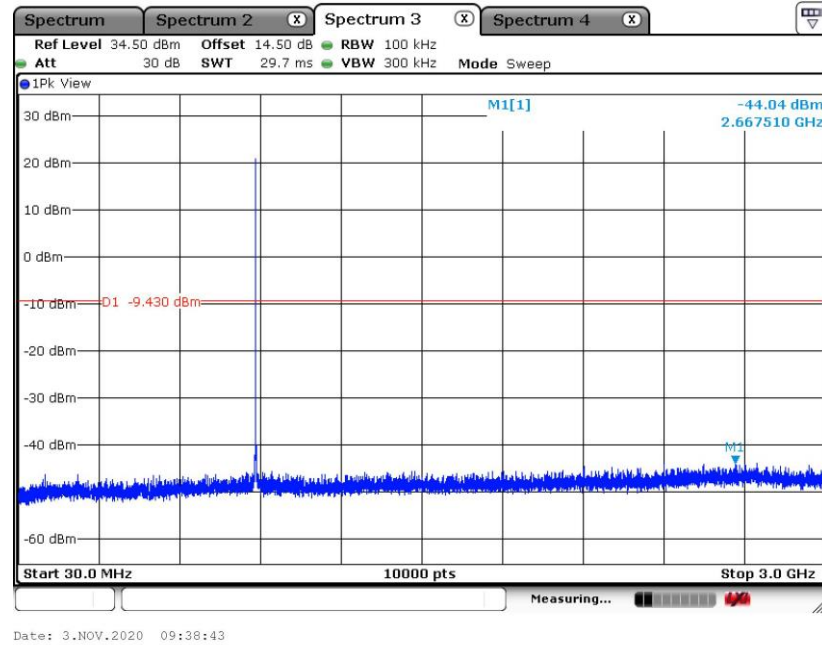




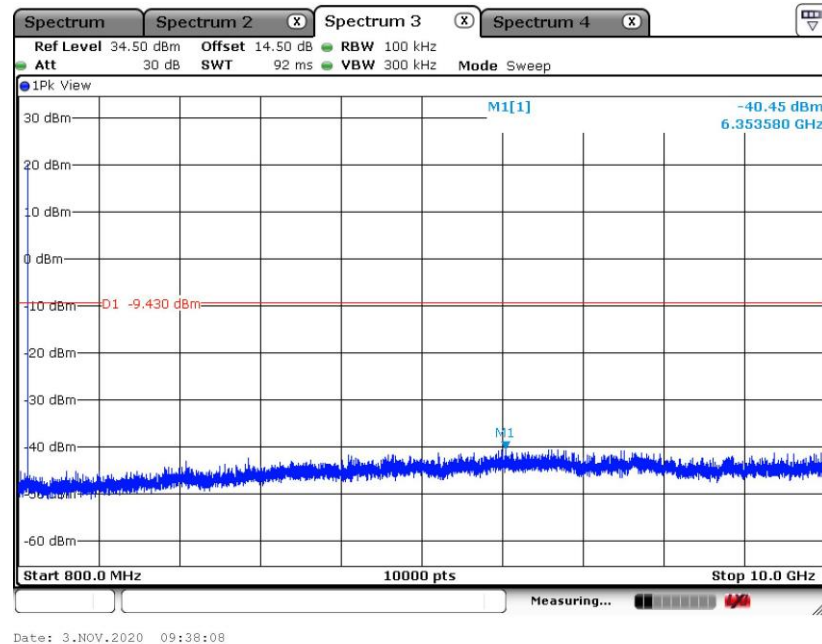
3.4.6 Test Result of Conducted Spurious Emission Plots

For SF5:

Conducted Spurious Emission Plot on 902.5 MHz

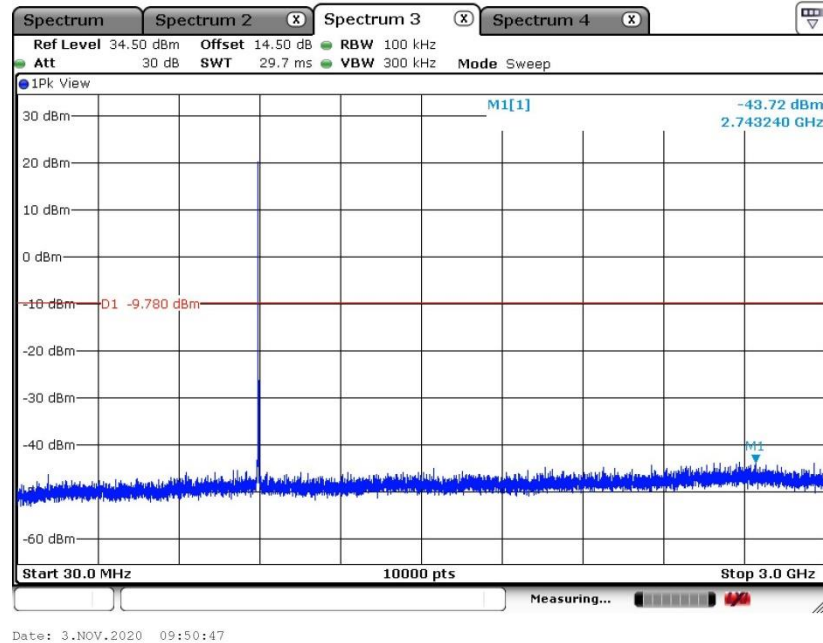


Conducted Spurious Emission Plot on 902.5 MHz

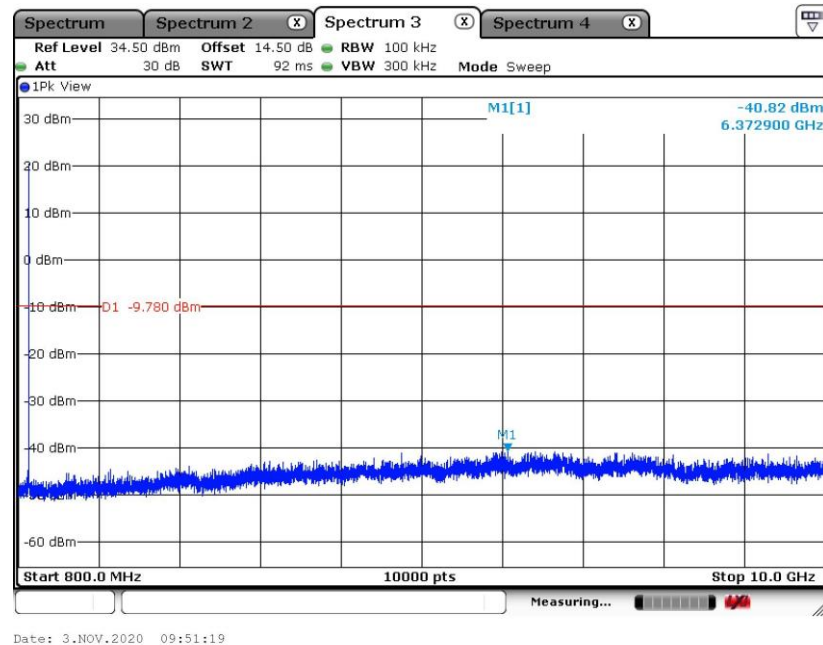




Conducted Spurious Emission Plot on 914.5 MHz

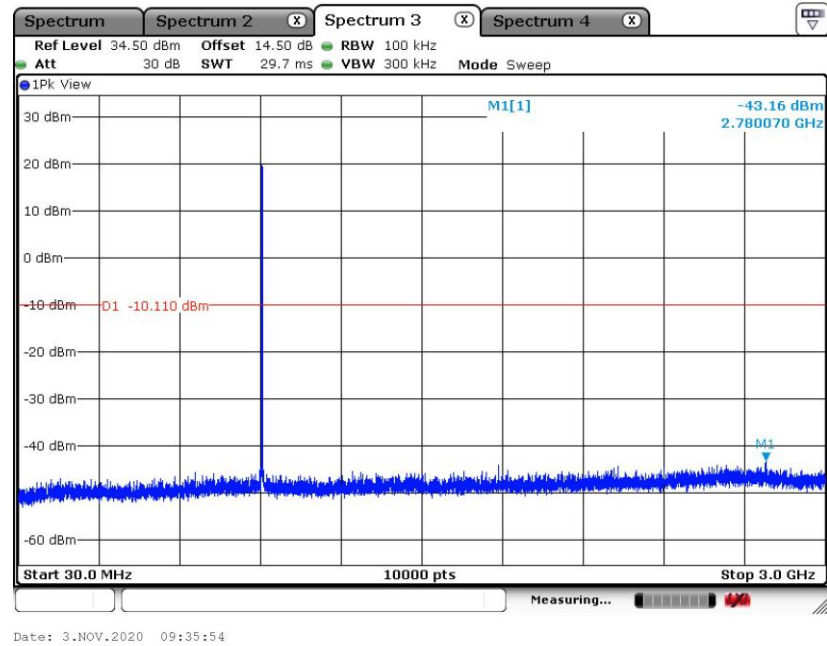


Conducted Spurious Emission Plot on 914.5 MHz

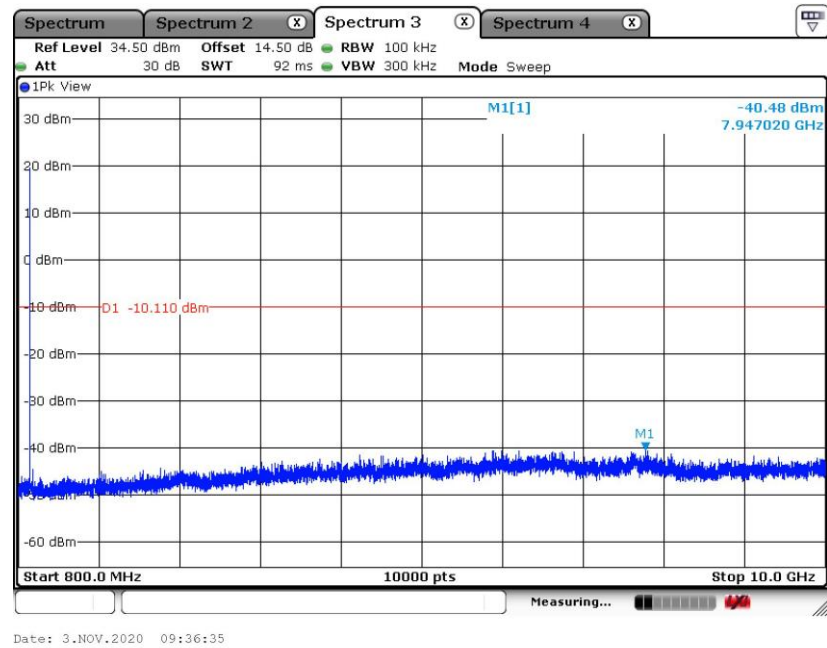




Conducted Spurious Emission Plot on 926.5 MHz



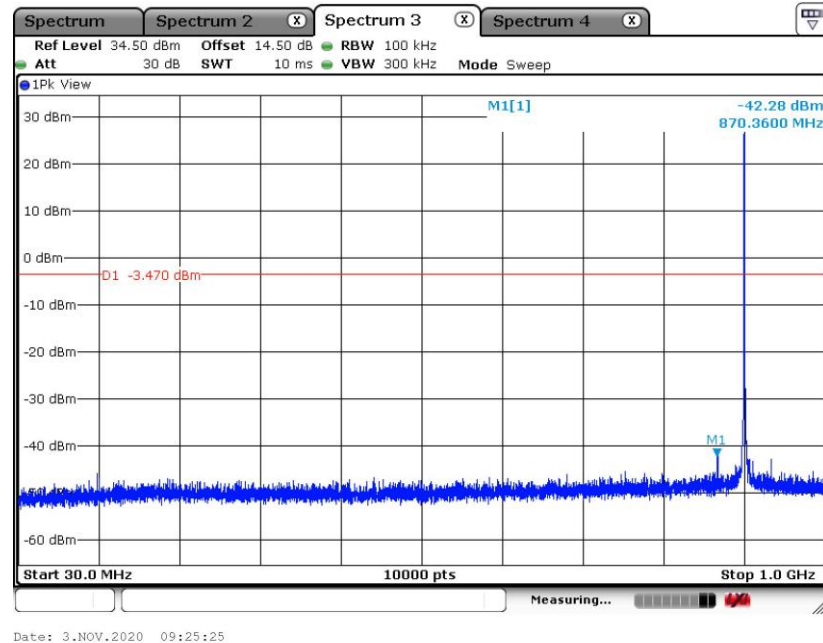
Conducted Spurious Emission Plot on 926.5 MHz



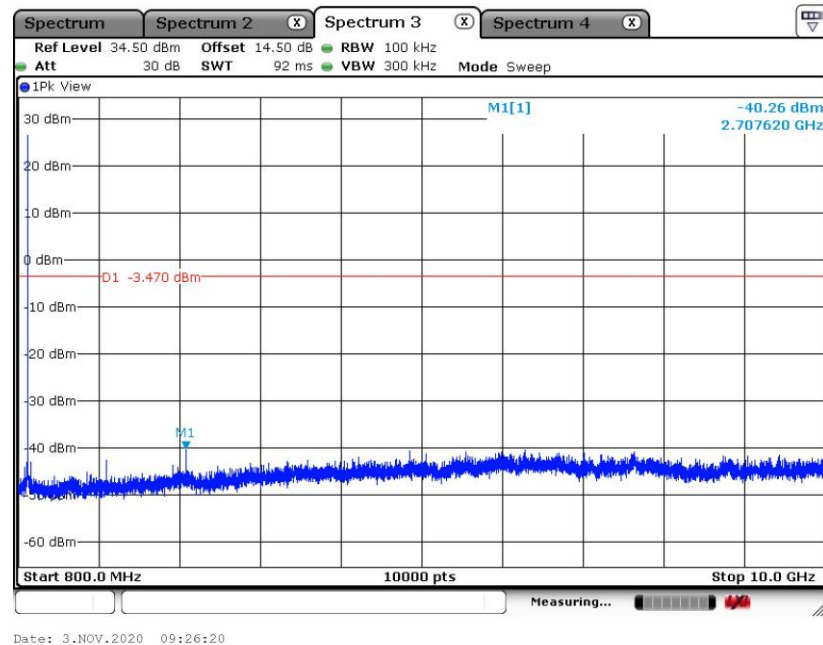


For SF7:

Conducted Spurious Emission Plot on 902.5 MHz

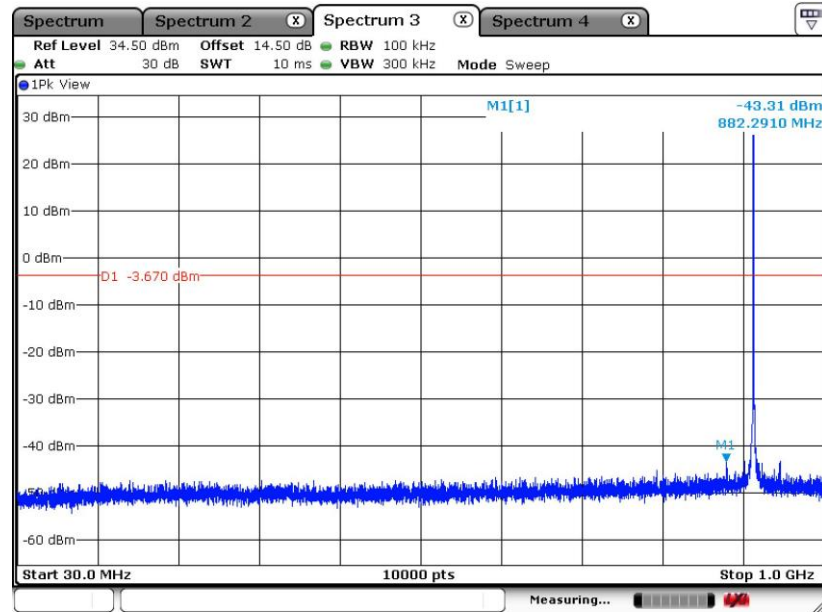


Conducted Spurious Emission Plot on 902.5 MHz



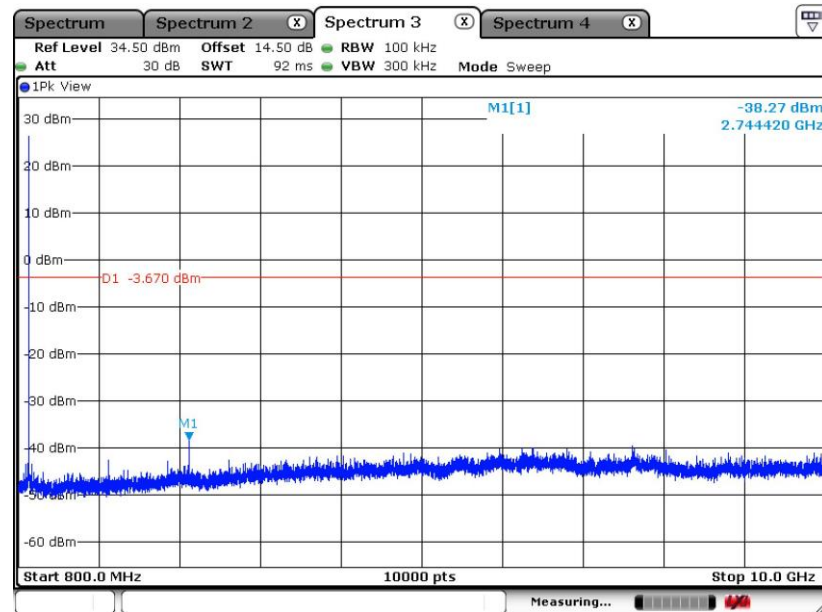


Conducted Spurious Emission Plot on 914.5 MHz



Date: 3.NOV.2020 09:23:13

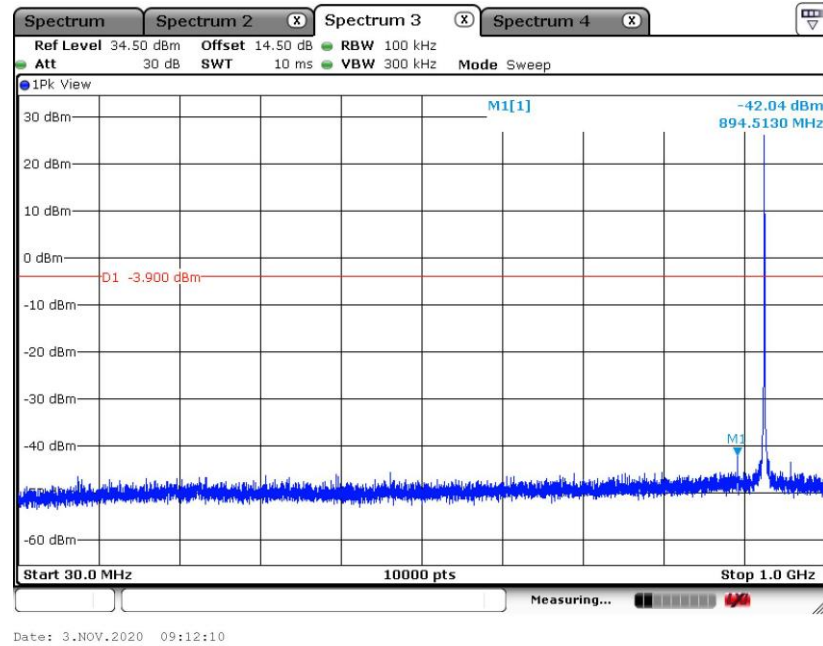
Conducted Spurious Emission Plot on 914.5 MHz



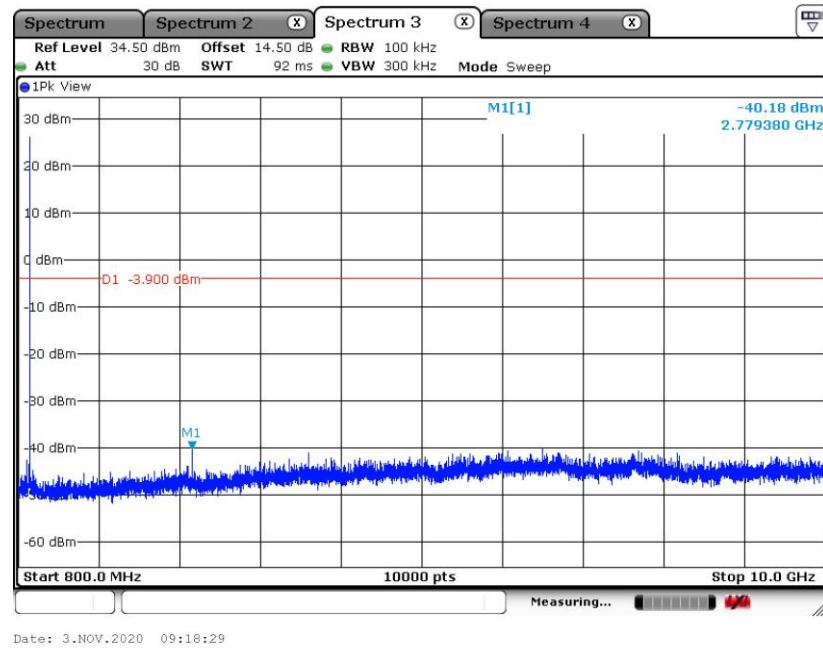
Date: 3.NOV.2020 09:22:37



Conducted Spurious Emission Plot on 926.5 MHz



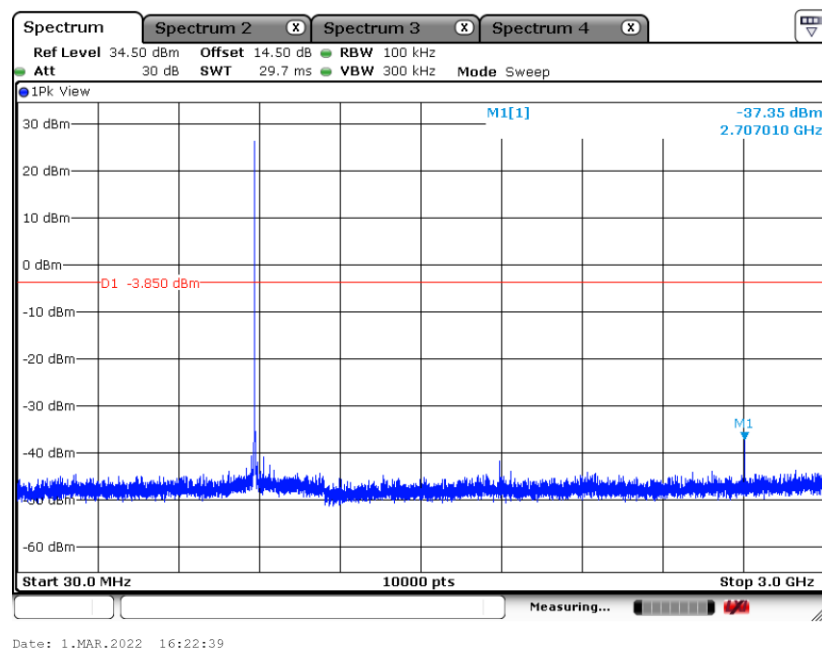
Conducted Spurious Emission Plot on 926.5 MHz



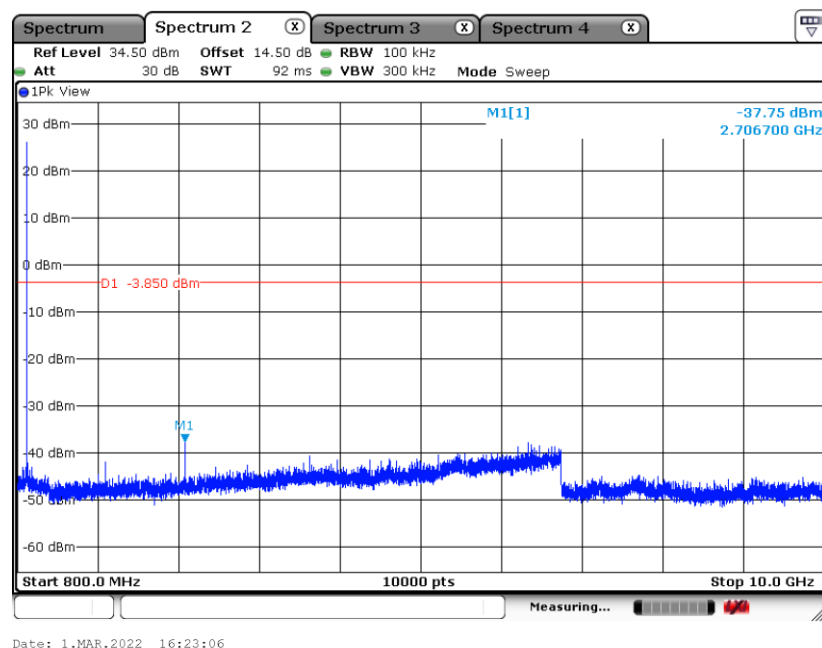


For SF8:

Conducted Spurious Emission Plot on 902.5 MHz

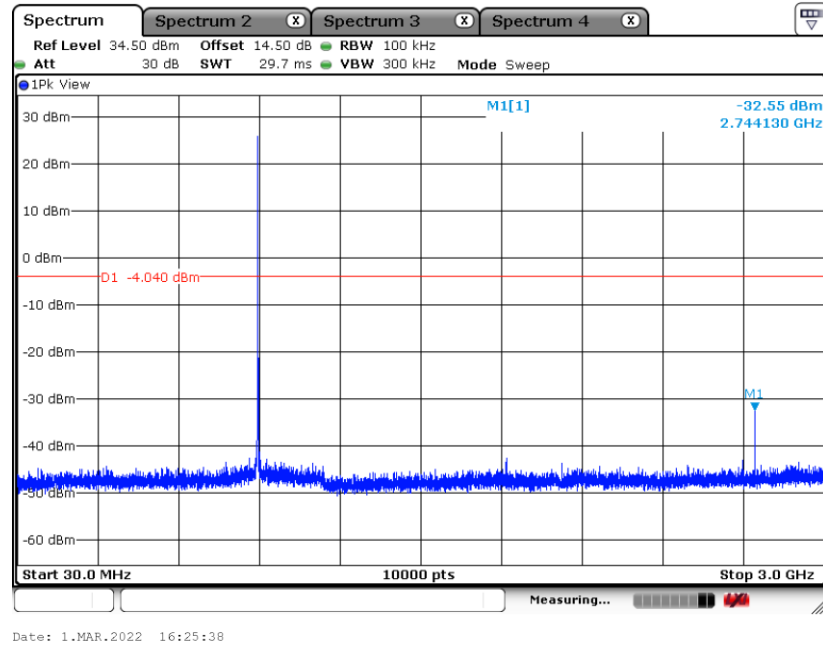


Conducted Spurious Emission Plot on 902.5 MHz

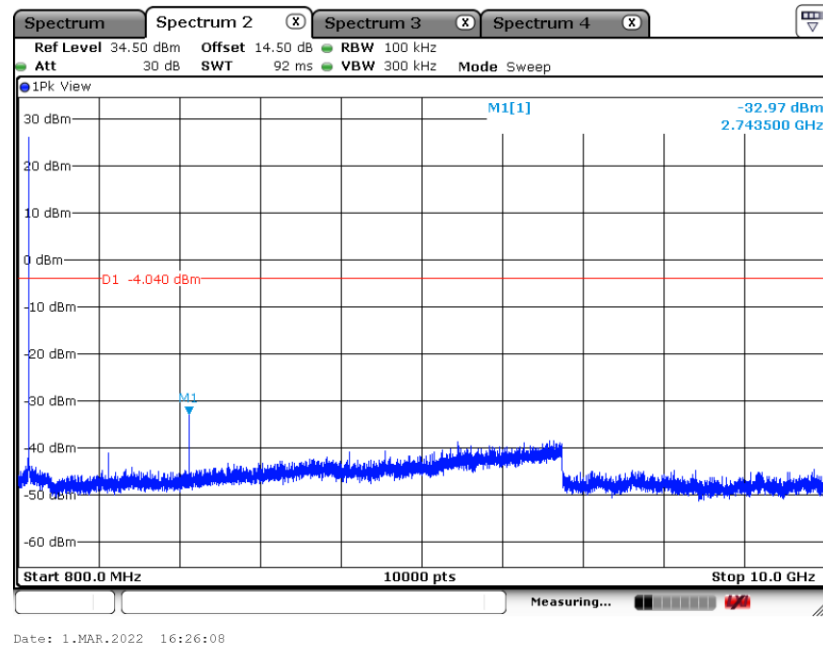




Conducted Spurious Emission Plot on 914.5 MHz

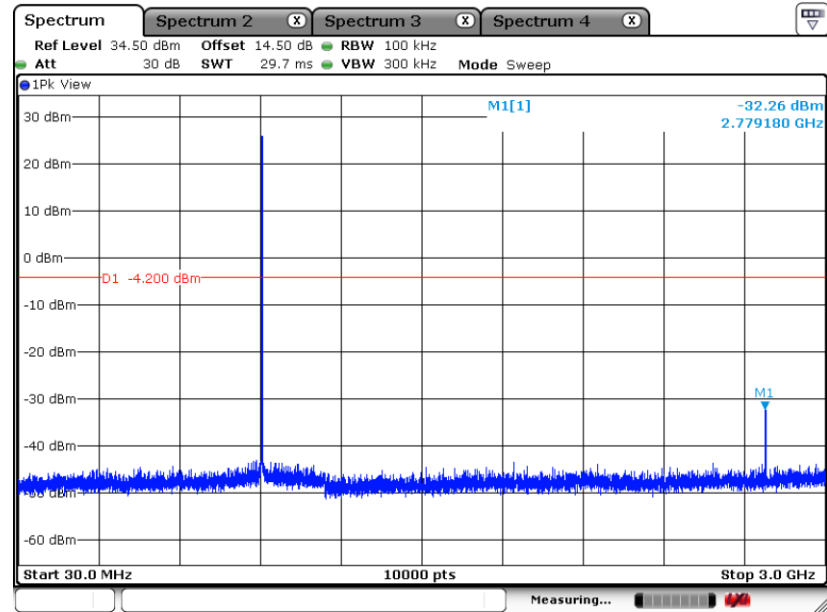


Conducted Spurious Emission Plot on 914.5 MHz



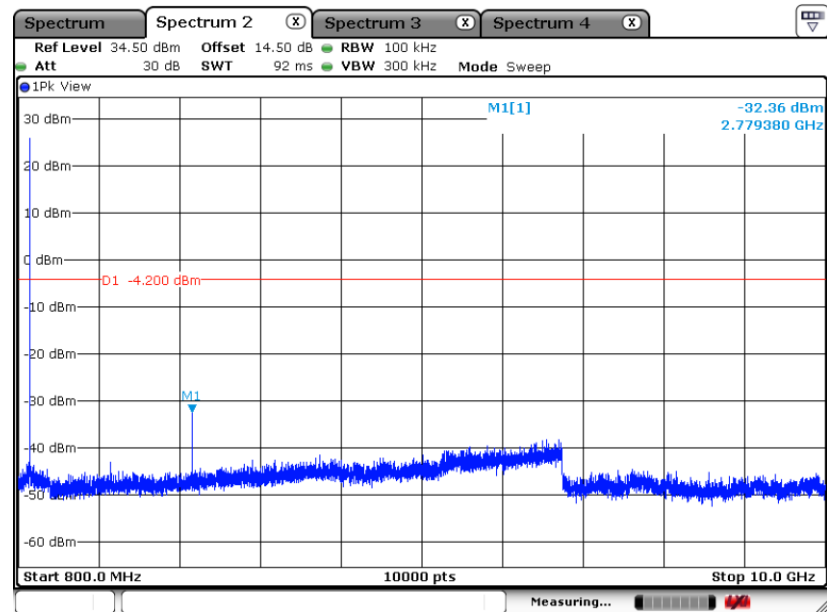


Conducted Spurious Emission Plot on 926.5 MHz



Date: 1.MAR.2022 16:29:04

Conducted Spurious Emission Plot on 926.5 MHz

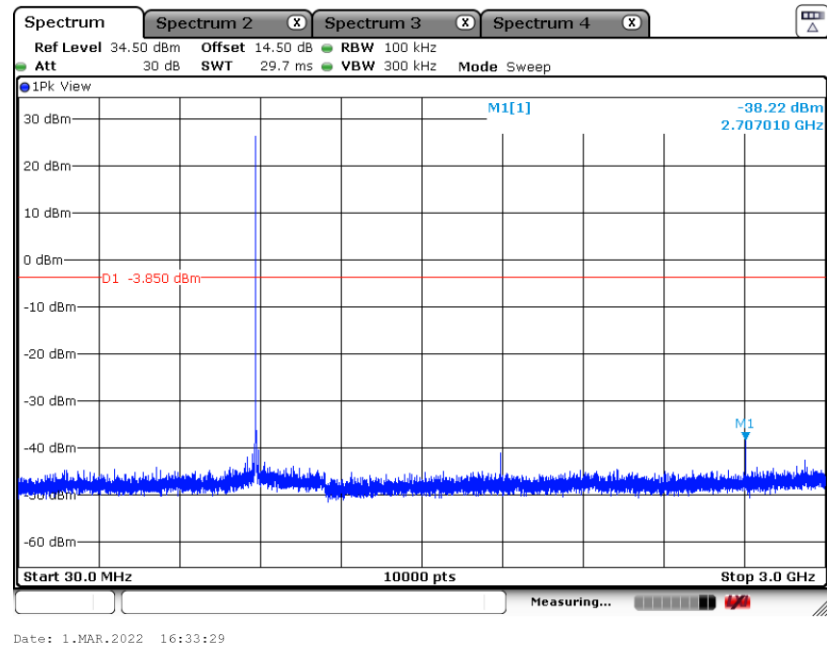


Date: 1.MAR.2022 16:29:29

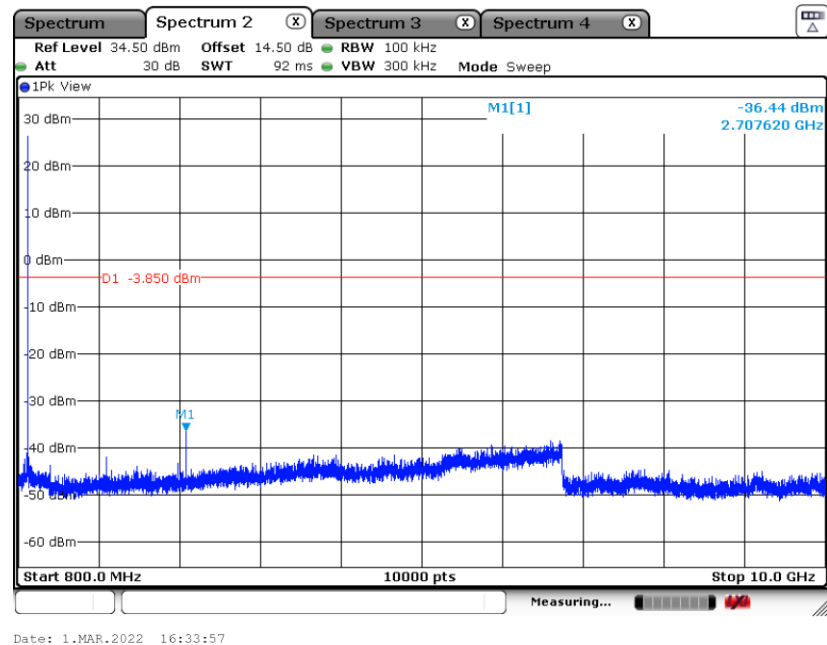


For SF9:

Conducted Spurious Emission Plot on 902.5 MHz

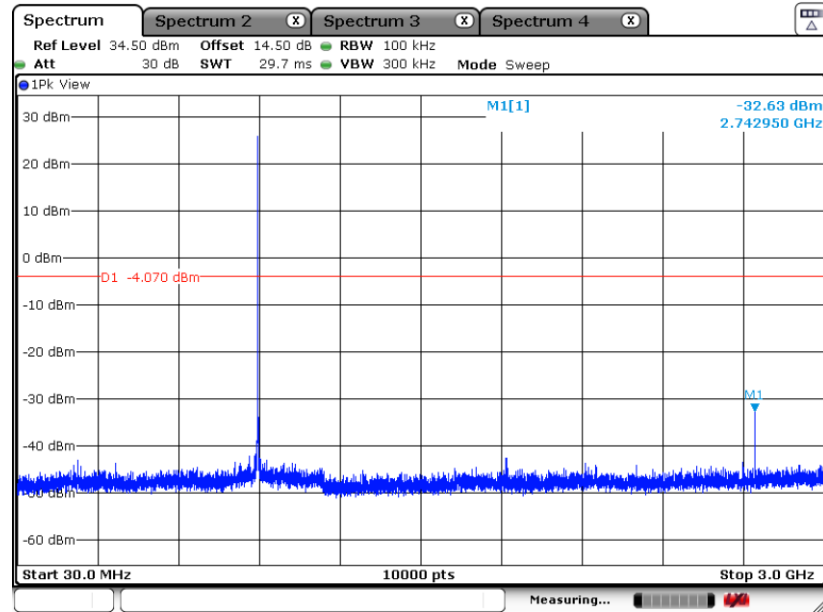


Conducted Spurious Emission Plot on 902.5 MHz



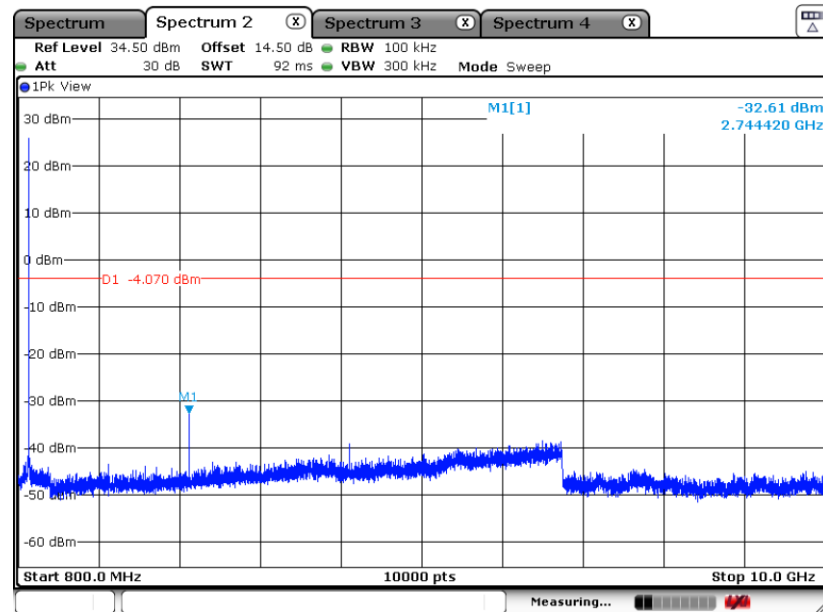


Conducted Spurious Emission Plot on 914.5 MHz



Date: 1.MAR.2022 16:36:18

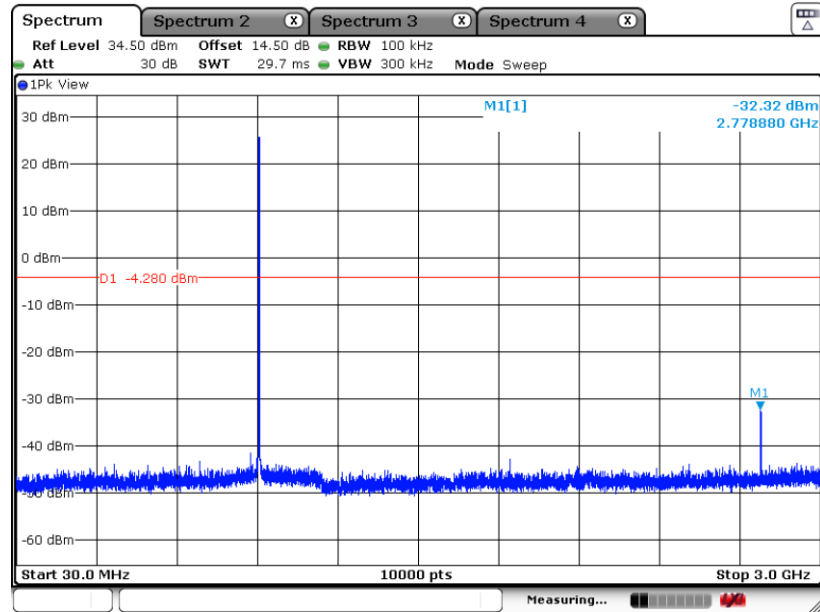
Conducted Spurious Emission Plot on 914.5 MHz



Date: 1.MAR.2022 16:36:46

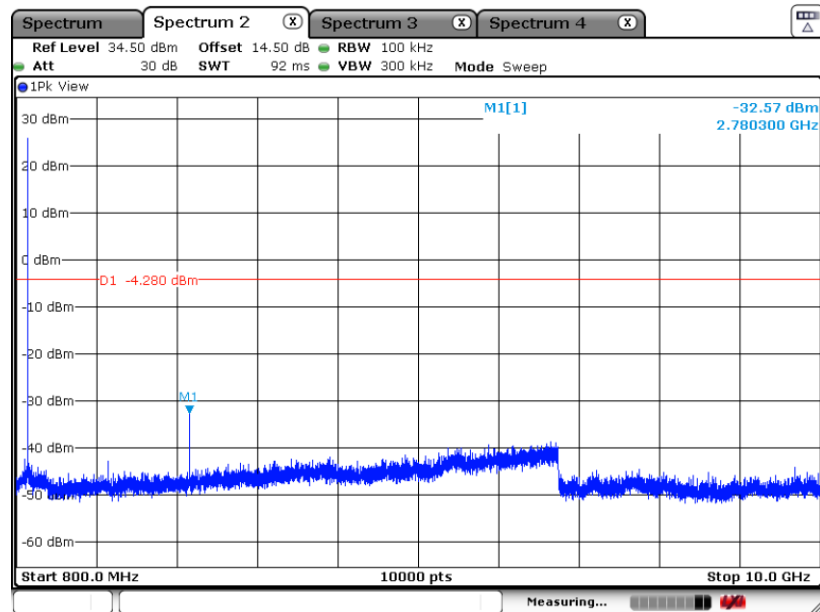


Conducted Spurious Emission Plot on 926.5 MHz



Date: 1.MAR.2022 16:40:19

Conducted Spurious Emission Plot on 926.5 MHz

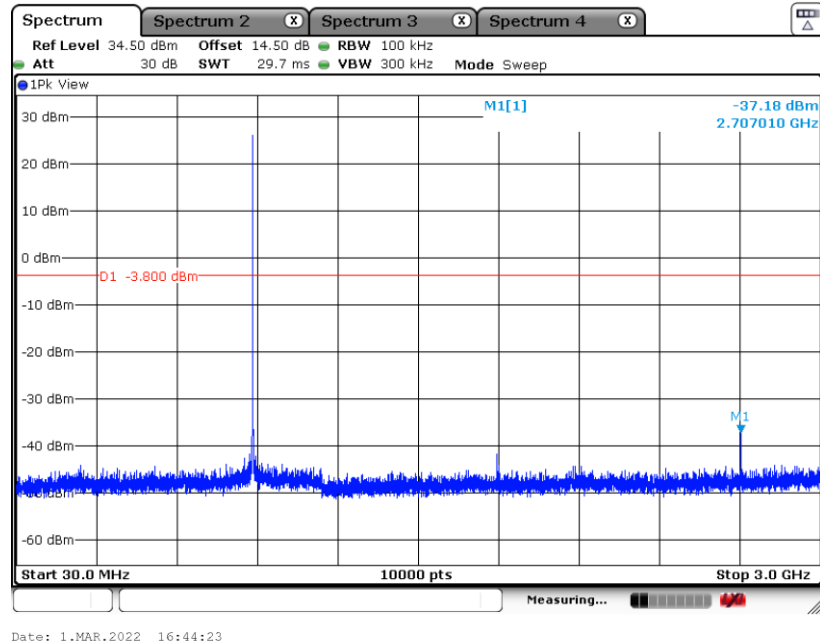


Date: 1.MAR.2022 16:40:42

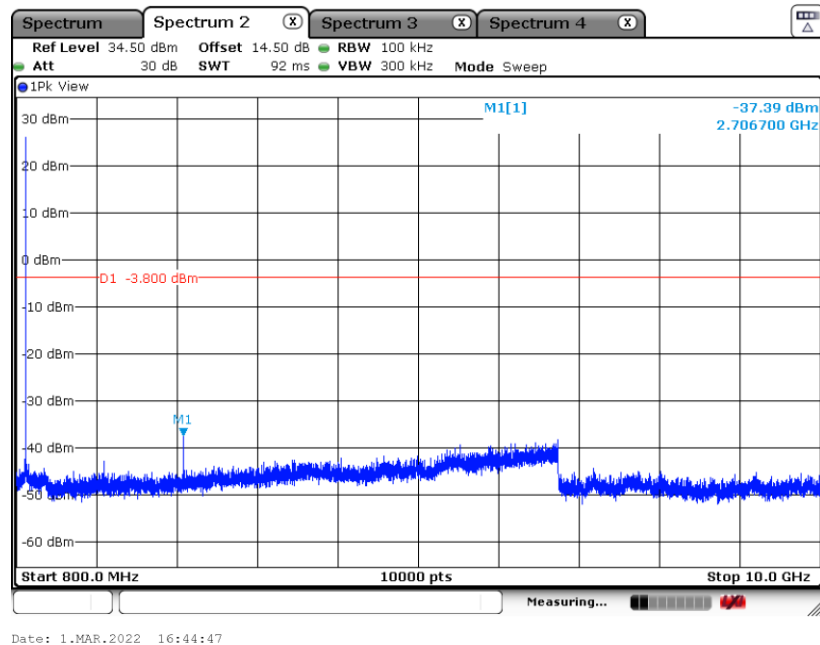


For SF10:

Conducted Spurious Emission Plot on 902.5 MHz

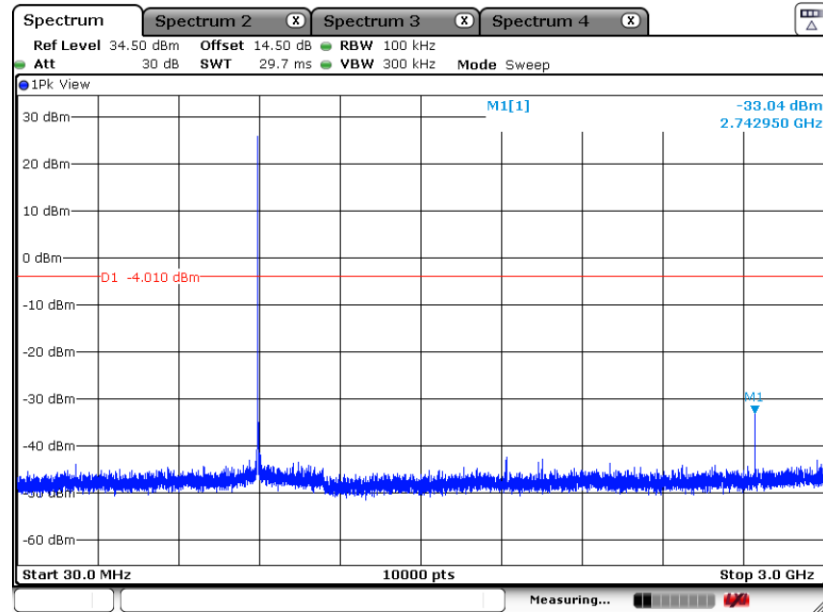


Conducted Spurious Emission Plot on 902.5 MHz



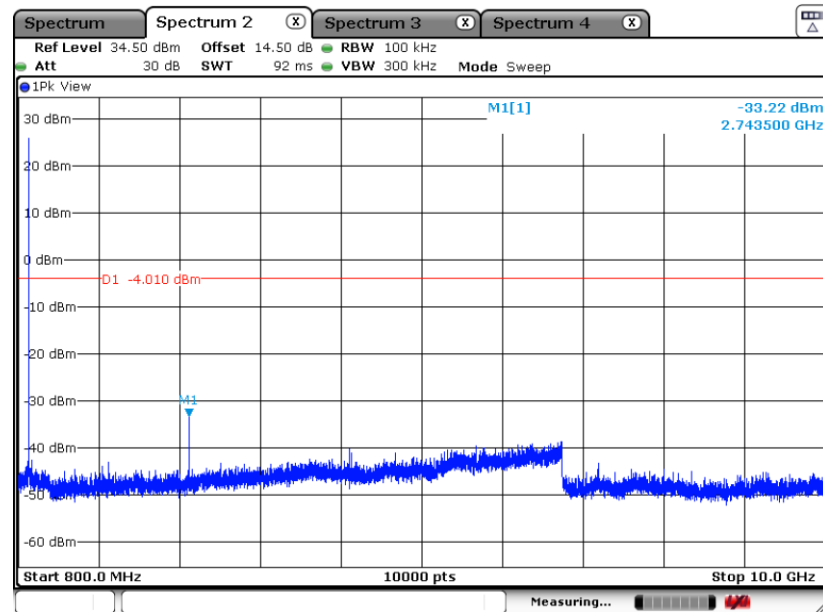


Conducted Spurious Emission Plot on 914.5 MHz



Date: 1.MAR.2022 16:46:52

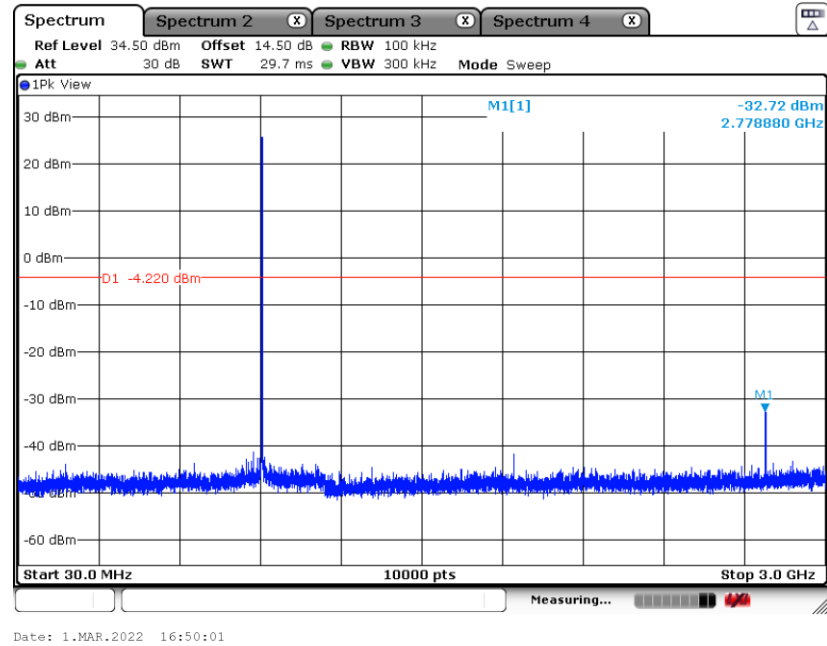
Conducted Spurious Emission Plot on 914.5 MHz



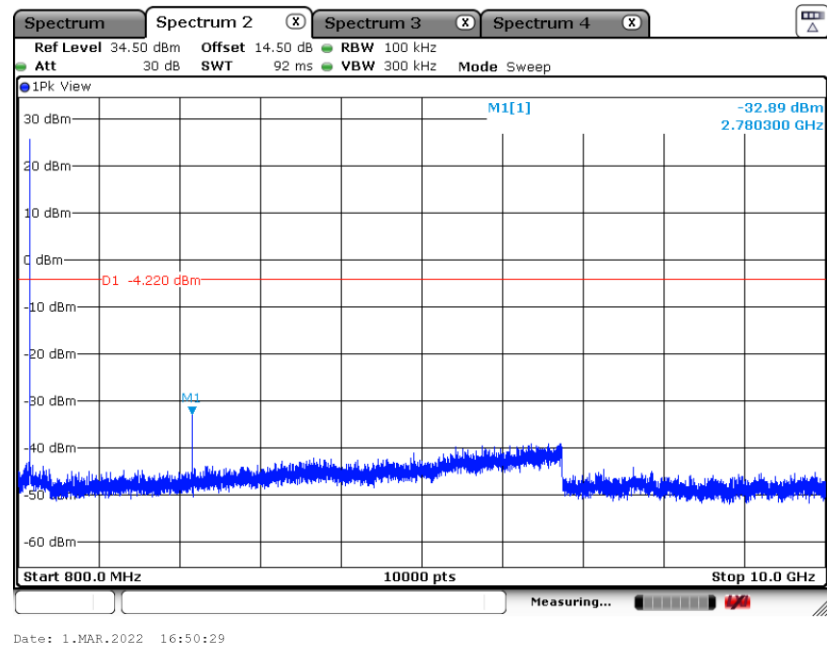
Date: 1.MAR.2022 16:47:16



Conducted Spurious Emission Plot on 926.5 MHz



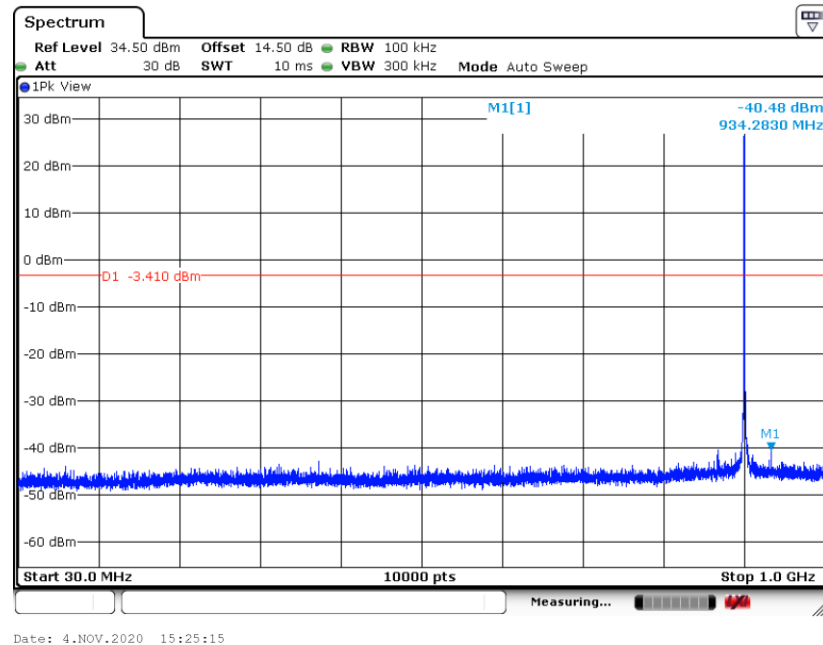
Conducted Spurious Emission Plot on 926.5 MHz



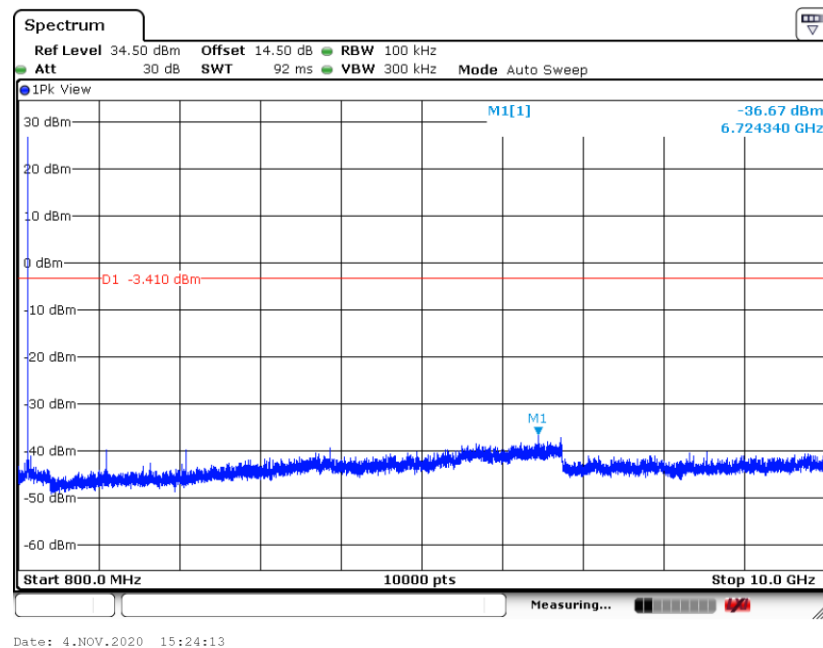


For SF11:

Conducted Spurious Emission Plot on 902.5 MHz

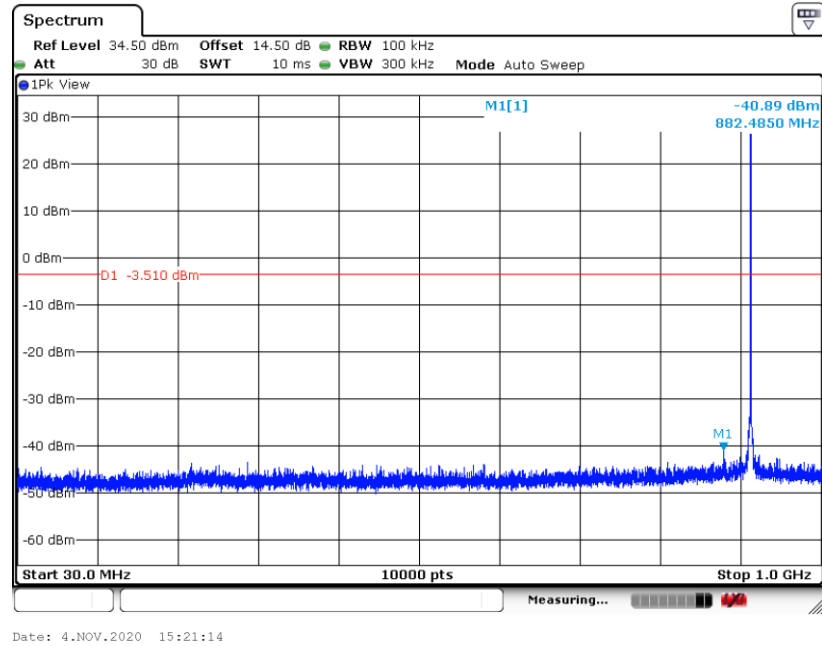


Conducted Spurious Emission Plot on 902.5 MHz

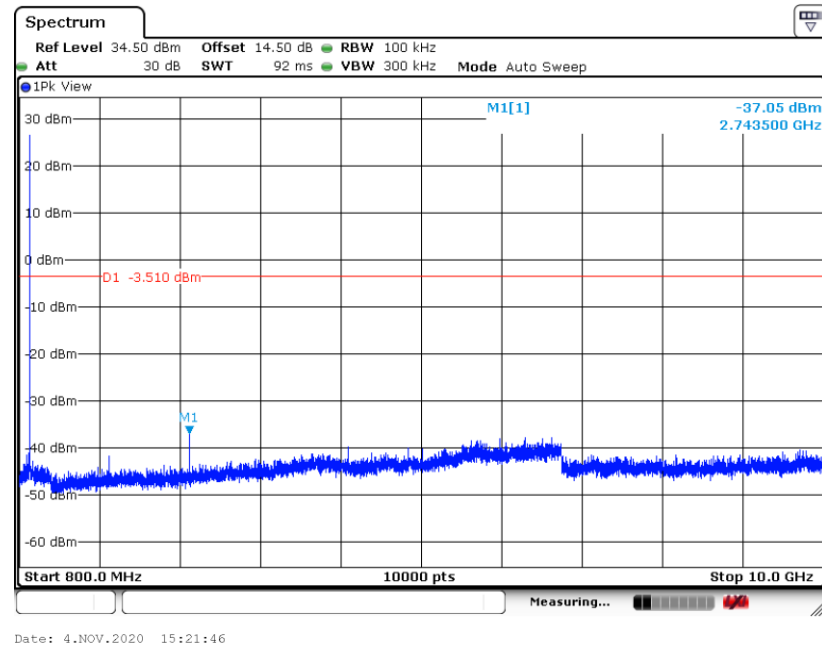




Conducted Spurious Emission Plot on 914.5 MHz

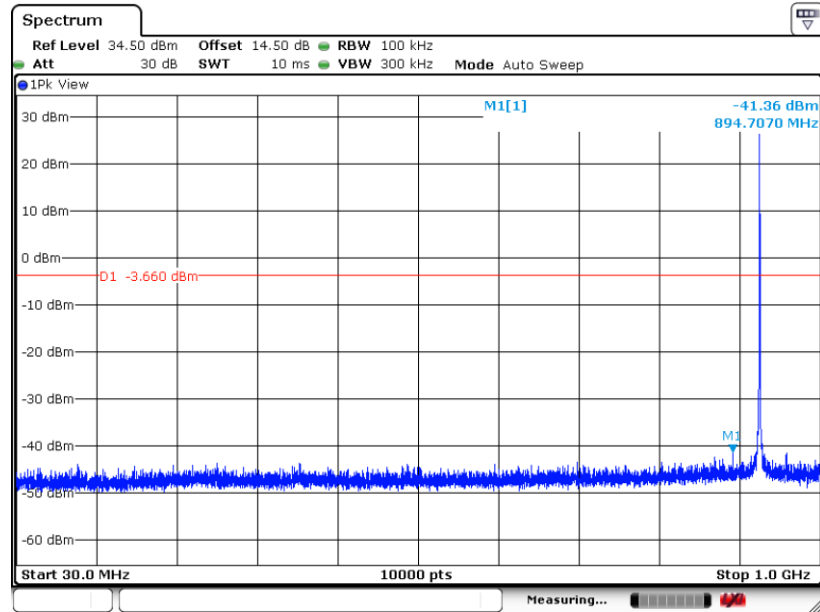


Conducted Spurious Emission Plot on 914.5 MHz



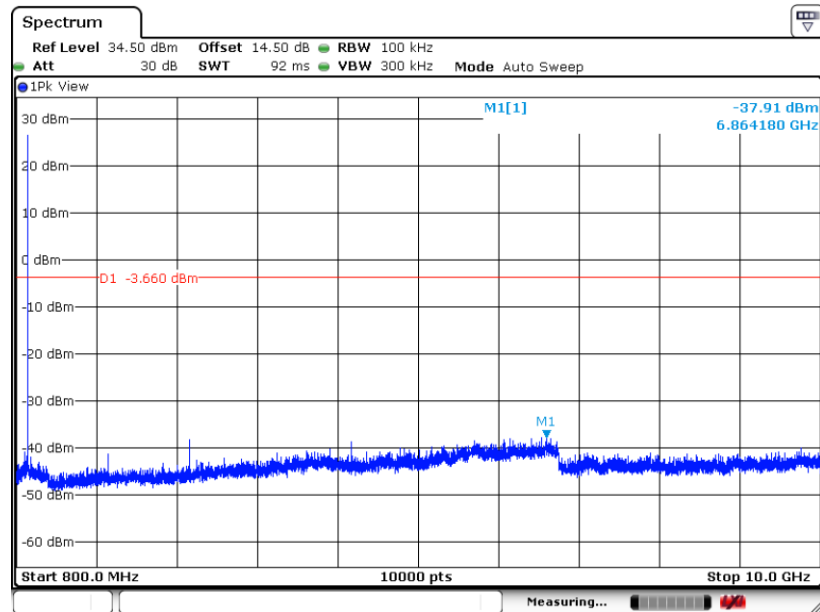


Conducted Spurious Emission Plot on 926.5 MHz



Date: 4.NOV.2020 15:14:31

Conducted Spurious Emission Plot on 926.5 MHz



Date: 4.NOV.2020 15:11:36

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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

3.5.2 Measuring Instruments

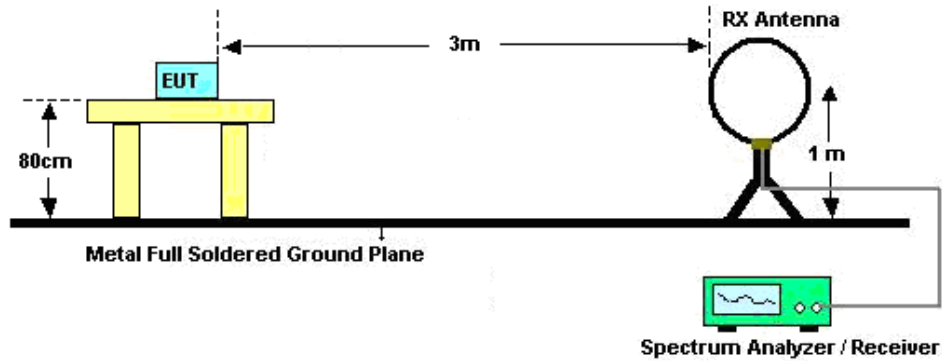
The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.5.3 Test Procedures

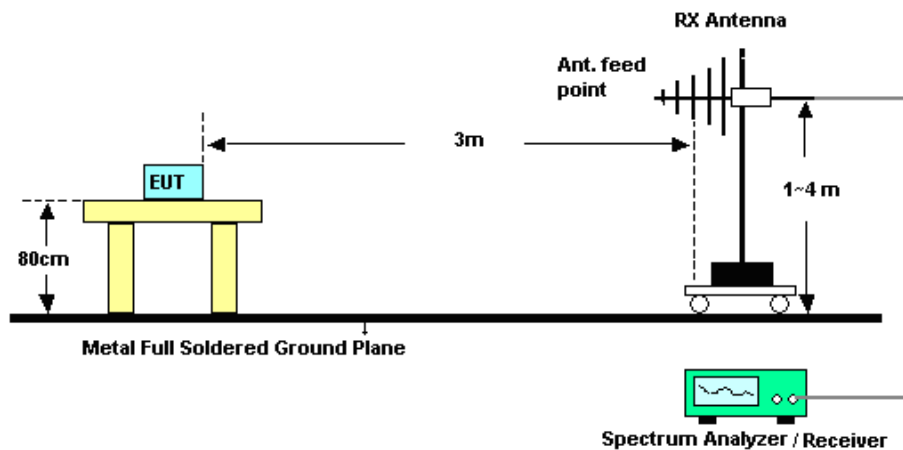
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - $VBW = 10$ Hz, when duty cycle is no less than 98 percent.
 - $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

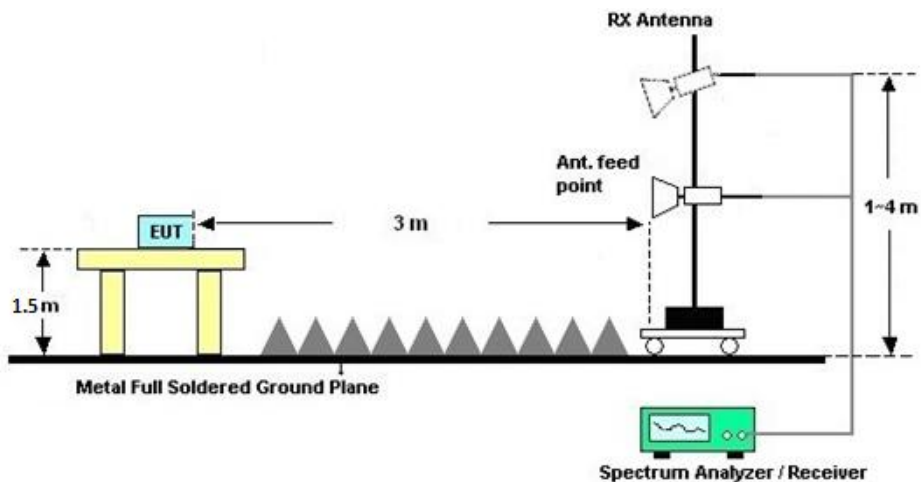
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.5.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Duty Cycle

Please refer to Appendix D.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

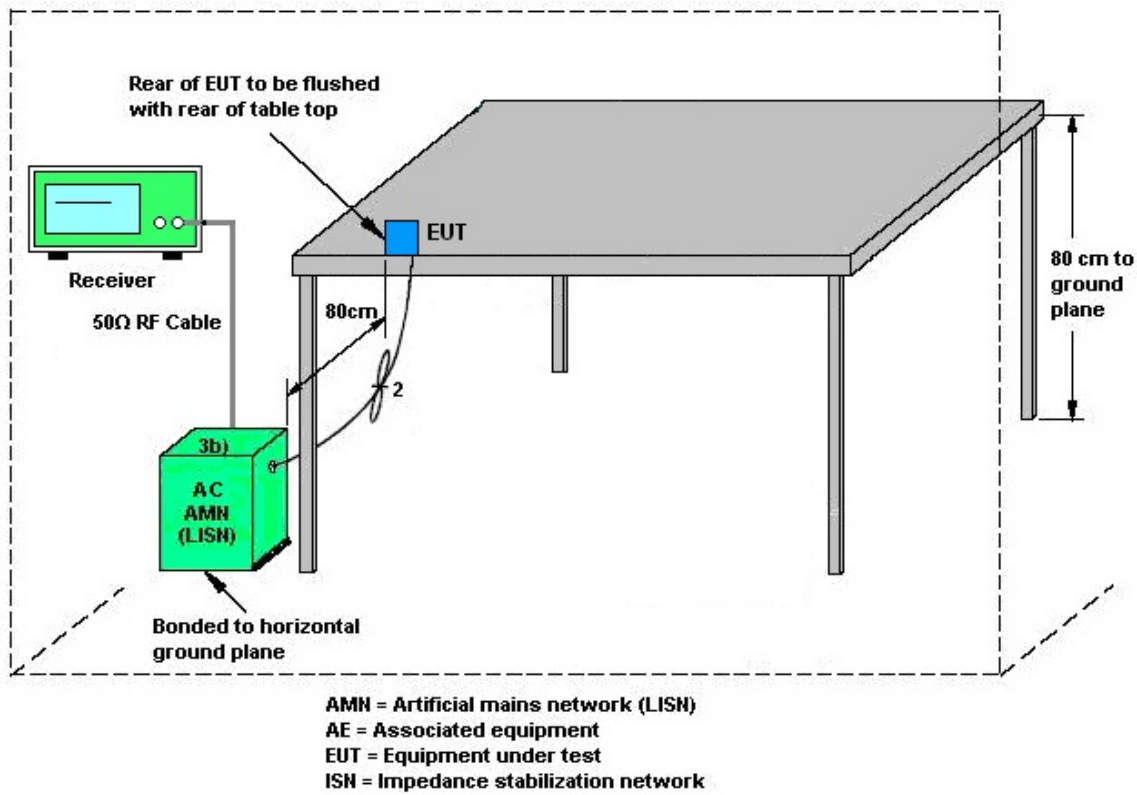
3.6.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Nov. 01, 2020	Nov. 03, 2020~Nov. 06, 2020	Oct. 31, 2021	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 08, 2020	Nov. 03, 2020~Nov. 06, 2020	Jan. 07, 2021	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 08, 2020	Nov. 03, 2020~Nov. 06, 2020	Jan. 07, 2021	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 14, 2021	Feb. 25, 2022~Mar. 01, 2022	Oct. 13, 2022	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 05, 2022	Feb. 25, 2022~Mar. 01, 2022	Jan. 04, 2023	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 05, 2022	Feb. 25, 2022~Mar. 01, 2022	Jan. 04, 2023	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz; Max 30dBm	Oct. 17, 2020	May 27, 2021	Oct. 16, 2021	Radiation (03CH04-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz	Apr. 12, 2021	May 27, 2021	Apr. 11, 2022	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 01, 2020	May 27, 2021	Oct. 31, 2021	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz~1GHz	May 29, 2020	May 27, 2021	May 28, 2021	Radiation (03CH04-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 25, 2021	May 27, 2021	Apr. 24, 2022	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Apr. 12, 2021	May 27, 2021	Apr. 11, 2022	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1Ghz-18Ghz	Jan. 06, 2021	May 27, 2021	Jan. 05, 2022	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 13, 2021	May 27, 2021	Apr. 12, 2022	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	May 27, 2021	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	May 27, 2021	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	May 27, 2021	NCR	Radiation (03CH04-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz; Max 30dBm	Oct. 16, 2021	Mar. 21, 2022	Oct. 15, 2022	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz	Apr. 12, 2021	Mar. 21, 2022	Apr. 11, 2022	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Mar. 21, 2022	Oct. 29, 2022	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz~1GHz	May 27, 2021	Mar. 21, 2022	May 26, 2022	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 25, 2021	Mar. 21, 2022	Apr. 24, 2022	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Apr. 12, 2021	Mar. 21, 2022	Apr. 11, 2022	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1Ghz-18Ghz	Jul. 30, 2021	Mar. 21, 2022	Jul. 29, 2022	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 13, 2021	Mar. 21, 2022	Apr. 12, 2022	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 21, 2022	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 21, 2022	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 21, 2022	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESC17	100768	9kHz~7GHz;	Apr. 21, 2021	Jan. 05, 2022	Apr. 20, 2022	Conduction (CO01-KS)



AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 14, 2021	Jan. 05, 2022	Oct. 13, 2022	Conduction (CO01-KS)
AC LISN	R&S	ENV216	100334	9kHz~30MHz	Oct. 14, 2021	Jan. 05, 2022	Oct. 13, 2022	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 14, 2021	Jan. 05, 2022	Oct. 13, 2022	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage $K=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.94dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)<03CH04-KS>

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)<03CH04-KS>

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)<03CH06-KS>

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)<03CH06-KS>

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Appendix A. Conducted Test Results

LoRa-DTS-Spreading Factor 5

Test Engineer:	Aly Cao	Temperature:	20~26	°C
Test Date:	2020/11/3~2020/11/6	Relative Humidity:	40~51	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Channel	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
SF5	1	902.5Mhz	0.50	0.59	0.50	Pass
SF5	16	914.5Mhz	0.51	0.59	0.50	Pass
SF5	31	926.5Mhz	0.51	0.59	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Channel	Freq. (MHz)	Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
SF5	1	902.5Mhz	20.16	30.00	-1.20	18.96	36.00	Pass
SF5	16	914.5Mhz	20.03	30.00	-1.20	18.83	36.00	Pass
SF5	31	926.5Mhz	19.84	30.00	-1.20	18.64	36.00	Pass

TEST RESULTS DATA
Average Power Table
 (Duty Factor)

Mod.	Channel	Freq. (MHz)	Duty Factor (dB)
SF5	1	902.5Mhz	0.58
SF5	16	914.5Mhz	0.58
SF5	31	926.5Mhz	0.58

TEST RESULTS DATA
Power Density

Mod.	Channel	Freq. (MHz)	Peak PSD (dBm /100kHz)	PSD (dBm /3kHz)	DG (dBi)	PSD Limit (dBm /3kHz)	Pass/Fail
SF5	1	902.5Mhz	20.57	7.80	-1.20	8.00	Pass
SF5	16	914.5Mhz	20.22	7.82	-1.20	8.00	Pass
SF5	31	926.5Mhz	19.89	7.92	-1.20	8.00	Pass

Note:

1. PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.
2. Power Density (dBm) = Measured value+ Duty Factor

LoRa-DTS-Spreading Factor 7

Test Engineer:	Aly Cao	Temperature:	20~26	°C
Test Date:	2020/11/3~2020/11/6	Relative Humidity:	40~51	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Channel	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
SF7	1	902.5Mhz	0.52	0.63	0.50	Pass
SF7	16	914.5Mhz	0.52	0.63	0.50	Pass
SF7	31	926.5Mhz	0.53	0.62	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Channel	Freq. (MHz)	Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
SF7	1	902.5Mhz	26.57	30.00	-1.20	25.37	36.00	Pass
SF7	16	914.5Mhz	26.58	30.00	-1.20	25.38	36.00	Pass
SF7	31	926.5Mhz	26.59	30.00	-1.20	25.39	36.00	Pass

TEST RESULTS DATA
Average Power Table
 (Duty Factor)

Mod.	Channel	Freq. (MHz)	Duty Factor (dB)
SF7	1	902.5Mhz	0.16
SF7	16	914.5Mhz	0.16
SF7	31	926.5Mhz	0.16

TEST RESULTS DATA
Power Density

Mod.	Channel	Freq. (MHz)	Peak PSD (dBm /100kHz)	PSD (dBm /3kHz)	DG (dBi)	PSD Limit (dBm /3kHz)	Pass/Fail
SF7	1	902.5Mhz	26.53	7.49	-1.20	8.00	Pass
SF7	16	914.5Mhz	26.33	7.25	-1.20	8.00	Pass
SF7	31	926.5Mhz	26.10	7.70	-1.20	8.00	Pass

Note:

1. PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.
2. Power Density (dBm) = Measured value+ Duty Factor

LoRa-DTS-Spreading Factor 8

Test Engineer:	Long Wu	Temperature:	20~26	°C
Test Date:	2022/2/25~2022/3/1	Relative Humidity:	40~51	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Channel	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
SF8	1	902.5Mhz	0.50	0.63	0.50	Pass
SF8	16	914.5Mhz	0.52	0.63	0.50	Pass
SF8	31	926.5Mhz	0.52	0.63	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Channel	Freq. (MHz)	Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
SF8	1	902.5Mhz	26.18	30.00	-1.20	24.98	36.00	Pass
SF8	16	914.5Mhz	26.06	30.00	-1.20	24.86	36.00	Pass
SF8	31	926.5Mhz	25.85	30.00	-1.20	24.65	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Duty Fctor)

Mod.	Channel	Freq. (MHz)	Duty Factor (dB)
SF8	1	902.5Mhz	0.07
SF8	16	914.5Mhz	0.07
SF8	31	926.5Mhz	0.07

TEST RESULTS DATA
Power Density

Mod.	Channel	Freq. (MHz)	Peak PSD (dBm /100kHz)	PSD (dBm /3kHz)	DG (dBi)	PSD Limit (dBm /3kHz)	Pass/Fail
SF8	1	902.5Mhz	26.15	6.74	-1.20	8.00	Pass
SF8	16	914.5Mhz	25.96	5.64	-1.20	8.00	Pass
SF8	31	926.5Mhz	25.80	4.53	-1.20	8.00	Pass

Note:

1. PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.
2. Power Density (dBm) = Measured value+ Duty Factor

LoRa-DTS-Spreading Factor 9

Test Engineer:	Long Wu	Temperature:	20~26	°C
Test Date:	2022/2/25~2022/3/1	Relative Humidity:	40~51	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Channel	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
SF9	1	902.5Mhz	0.51	0.63	0.50	Pass
SF9	16	914.5Mhz	0.52	0.64	0.50	Pass
SF9	31	926.5Mhz	0.52	0.64	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Channel	Freq. (MHz)	Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
SF9	1	902.5Mhz	26.25	30.00	-1.20	25.05	36.00	Pass
SF9	16	914.5Mhz	26.06	30.00	-1.20	24.86	36.00	Pass
SF9	31	926.5Mhz	25.84	30.00	-1.20	24.64	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Duty Factor)

Mod.	Channel	Freq. (MHz)	Duty Factor (dB)
SF9	1	902.5Mhz	0.04
SF9	16	914.5Mhz	0.04
SF9	31	926.5Mhz	0.04

TEST RESULTS DATA
Power Density

Mod.	Channel	Freq. (MHz)	Peak PSD (dBm /100kHz)	PSD (dBm /3kHz)	DG (dBi)	PSD Limit (dBm /3kHz)	Pass/Fail
SF9	1	902.5Mhz	26.15	6.03	-1.20	8.00	Pass
SF9	16	914.5Mhz	25.93	5.66	-1.20	8.00	Pass
SF9	31	926.5Mhz	25.72	5.47	-1.20	8.00	Pass

Note:

1. PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.
2. Power Density (dBm) = Measured value+ Duty Factor

LoRa-DTS-Spreading Factor 10

Test Engineer:	Long Wu	Temperature:	20~26	°C
Test Date:	2022/2/25~2022/3/1	Relative Humidity:	40~51	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Channel	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
SF10	1	902.5Mhz	0.52	0.64	0.50	Pass
SF10	16	914.5Mhz	0.52	0.64	0.50	Pass
SF10	31	926.5Mhz	0.52	0.64	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Channel	Freq. (MHz)	Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
SF10	1	902.5Mhz	26.21	30.00	-1.20	25.01	36.00	Pass
SF10	16	914.5Mhz	26.03	30.00	-1.20	24.83	36.00	Pass
SF10	31	926.5Mhz	25.79	30.00	-1.20	24.59	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Duty Factor)

Mod.	Channel	Freq. (MHz)	Duty Factor (dB)
SF10	1	902.5Mhz	0.00
SF10	16	914.5Mhz	0.00
SF10	31	926.5Mhz	0.00

TEST RESULTS DATA
Power Density

Mod.	Channel	Freq. (MHz)	Peak PSD (dBm /100kHz)	PSD (dBm /3kHz)	DG (dBi)	PSD Limit (dBm /3kHz)	Pass/Fail
SF10	1	902.5Mhz	26.20	6.53	-1.20	8.00	Pass
SF10	16	914.5Mhz	25.99	5.88	-1.20	8.00	Pass
SF10	31	926.5Mhz	25.78	5.41	-1.20	8.00	Pass

Note:

1. PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.
2. Power Density (dBm) = Measured value+ Duty Factor

LoRa-DTS-Spreading Factor 11

Test Engineer:	Aly Cao	Temperature:	20~26	°C
Test Date:	2020/11/3~2020/11/6	Relative Humidity:	40~51	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Channel	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
SF11	1	902.5Mhz	0.54	0.64	0.50	Pass
SF11	16	914.5Mhz	0.54	0.64	0.50	Pass
SF11	31	926.5Mhz	0.54	0.64	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Channel	Freq. (MHz)	Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
SF11	1	902.5Mhz	26.48	30.00	-1.20	25.28	36.00	Pass
SF11	16	914.5Mhz	26.50	30.00	-1.20	25.30	36.00	Pass
SF11	31	926.5Mhz	26.39	30.00	-1.20	25.19	36.00	Pass

TEST RESULTS DATA
Average Power Table
 (Duty Factor)

Mod.	Channel	Freq. (MHz)	Duty Factor (dB)
SF11	1	902.5Mhz	0.00
SF11	16	914.5Mhz	0.00
SF11	31	926.5Mhz	0.00

TEST RESULTS DATA
Power Density

Mod.	Channel	Freq. (MHz)	Peak PSD (dBm /100kHz)	PSD (dBm /3kHz)	DG (dBi)	PSD Limit (dBm /3kHz)	Pass/Fail
SF11	1	902.5Mhz	26.59	7.28	-1.20	8.00	Pass
SF11	16	914.5Mhz	26.49	7.82	-1.20	8.00	Pass
SF11	31	926.5Mhz	26.34	7.20	-1.20	8.00	Pass

Note:

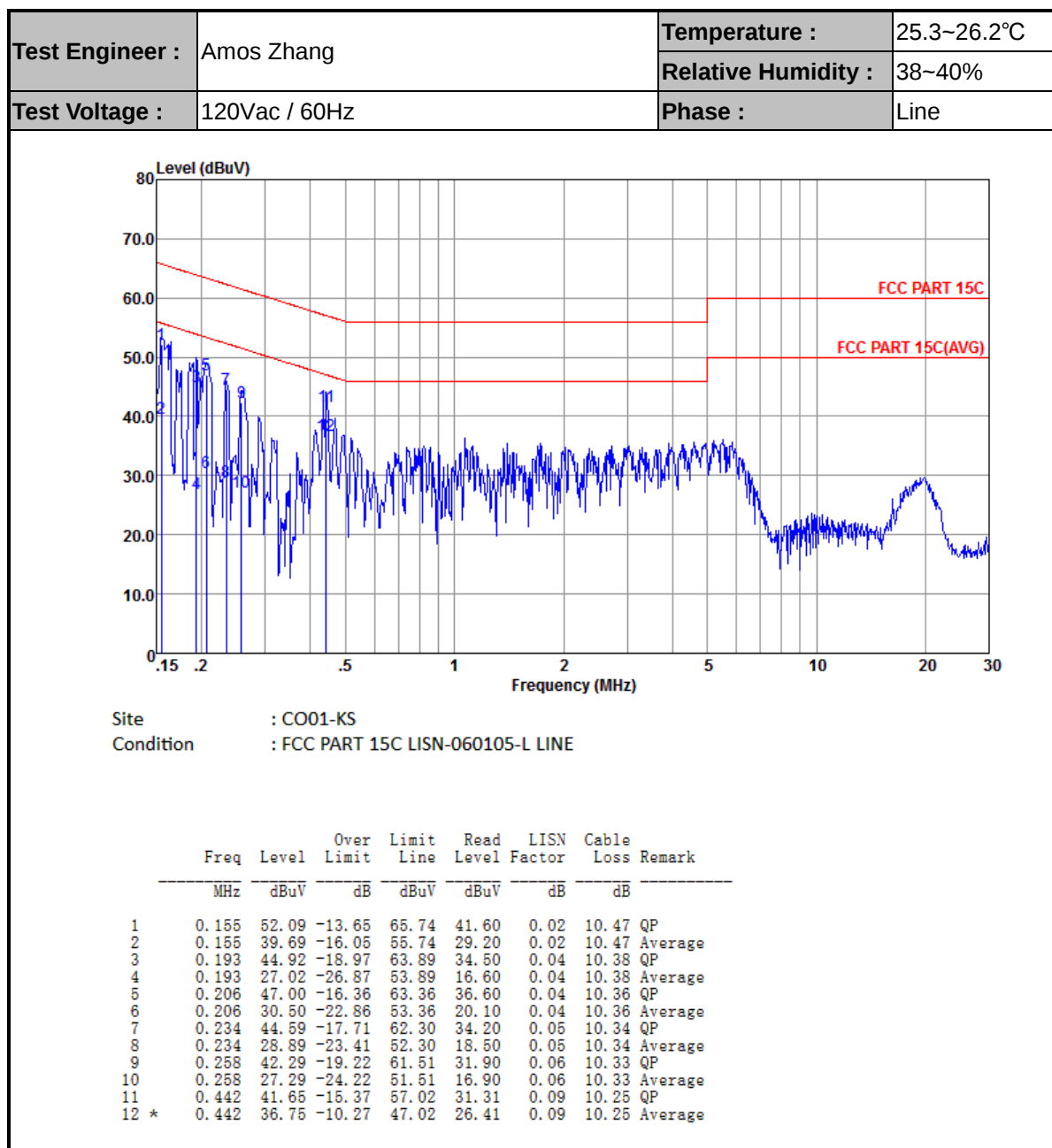
1. PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.
2. Power Density (dBm) = Measured value+ Duty Factor

Power Setting Table Summary(for reference only)

Modulation type	LR1110 power setting
LoRa DTS 500kHz SF5	-11
LoRa DTS 500kHz SF7	0
LoRa DTS 500kHz SF8	0
LoRa DTS 500kHz SF9	0
LoRa DTS 500kHz SF10	0
LoRa DTS 500kHz SF11	0
LoRa FHSS 125kHz SF7	0
LoRa FHSS 125kHz SF8	0
LoRa FHSS 125kHz SF9	0
LoRa FHSS 125kHz SF10	0
FSK 50kbps	0
FSK 150kbps	0
FSK 250kbps	0

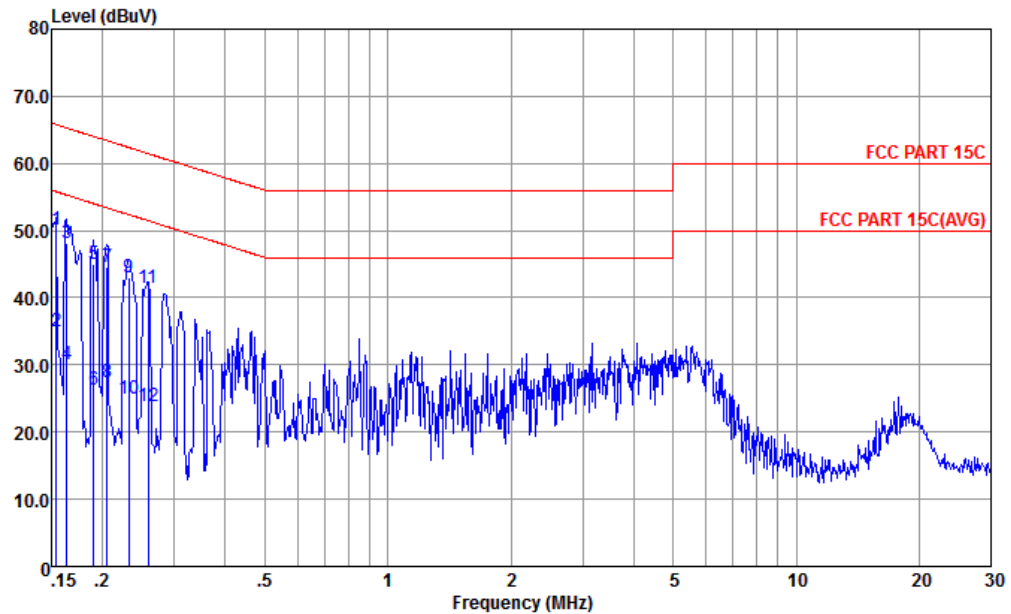


Appendix B. AC Conducted Emission Test Results





Test Engineer :	Amos Zhang	Temperature :	25.3~26.2°C
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral



Site : CO01-KS
Condition : FCC PART 15C LISN-060105-N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1 *	0.154	50.08	-15.70	65.78	39.50	0.11	10.47	QP
2	0.154	34.88	-20.90	55.78	24.30	0.11	10.47	Average
3	0.163	48.15	-17.15	65.30	37.59	0.11	10.45	QP
4	0.163	30.15	-25.15	55.30	19.59	0.11	10.45	Average
5	0.190	44.99	-19.03	64.02	34.51	0.10	10.38	QP
6	0.190	26.39	-27.63	54.02	15.91	0.10	10.38	Average
7	0.205	44.56	-18.84	63.40	34.10	0.10	10.36	QP
8	0.205	27.36	-26.04	53.40	16.90	0.10	10.36	Average
9	0.232	42.94	-19.45	62.39	32.50	0.10	10.34	QP
10	0.232	24.94	-27.45	52.39	14.50	0.10	10.34	Average
11	0.259	41.53	-19.94	61.47	31.10	0.10	10.33	QP
12	0.259	23.93	-27.54	51.47	13.50	0.10	10.33	Average

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)



Appendix C. Radiated Spurious Emission

LoRa DTS SF=5 (Band Edge @ 3m)

LoRa DTS	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		903	104.1	-	-	102.51	29.39	4.39	32.19	169	299	P	H
		934.04	38.02	-36.08	74.1	35.35	30.33	4.47	32.13	169	299	P	H
		903	105.17	-	-	103.58	29.39	4.39	32.19	170	300	P	V
		934.04	39.04	-36.13	75.17	36.37	30.33	4.47	32.13	170	300	P	V
914.5MHz		914.64	101.87	-	-	99.88	29.74	4.42	32.17	115	108	P	H
		914.64	103.91	-	-	101.92	29.74	4.42	32.17	267	309	P	V
926.5MHz		894.27	38.44	-42.75	81.19	36.99	29.29	4.37	32.21	172	130	P	H
		926.28	111.19	-	-	108.8	30.09	4.45	32.15	172	130	P	H
		958.29	40.02	-41.17	81.19	36.8	30.77	4.53	32.08	172	130	P	H
		894.27	36.66	-51.01	77.67	35.21	29.29	4.37	32.21	164	130	P	V
		926.28	107.67	-	-	105.28	30.09	4.45	32.15	164	130	P	V
		958.29	40.6	-47.07	77.67	37.38	30.77	4.53	32.08	164	130	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF=5 (Harmonic @ 3m)

LoRa DTS	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		1801	41.9	-32.2	74.1	71.3	27.98	6.27	63.65	300	360	P	H
		1801	38.83	-36.34	75.17	68.23	27.98	6.27	63.65	100	360	P	V
914.5MHz		1828	44.98	-26.89	71.87	74.16	28.15	6.31	63.64	300	0	P	H
		1828	38.73	-35.18	73.91	67.91	28.15	6.31	63.64	100	0	P	V
926.5MHz		1855	47.23	-30.44	77.67	76.29	28.23	6.34	63.63	300	0	P	H
		1855	42.01	-35.66	77.67	71.07	28.23	6.34	63.63	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF= 7 (Band Edge @ 3m)

LoRa DTS	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		870.02	35.23	-40.81	76.04	33.93	29.24	4.32	32.26	174	285	P	H
		903	106.04	-	-	104.45	29.39	4.39	32.19	174	285	P	H
		935.01	36.45	-39.59	76.04	33.75	30.36	4.47	32.13	174	285	P	H
		870.02	34.51	-41.86	76.37	33.21	29.24	4.32	32.26	170	290	P	V
		903	106.37	-	-	104.78	29.39	4.39	32.19	170	290	P	V
		935.01	36.17	-40.2	76.37	33.47	30.36	4.47	32.13	170	290	P	V
914.5MHz		882.63	39.14	-47.07	86.21	37.76	29.27	4.34	32.23	169	351	P	H
		914.64	116.21	-	-	114.22	29.74	4.42	32.17	169	351	P	H
		946.65	45.11	-41.1	86.21	42.01	30.71	4.5	32.11	169	351	P	H
		882.63	34.09	-44.16	78.25	32.71	29.27	4.34	32.23	160	134	P	V
		914.64	108.25	-	-	106.26	29.74	4.42	32.17	160	134	P	V
		946.65	42	-36.25	78.25	38.9	30.71	4.5	32.11	160	134	P	V
926.5MHz		894.27	42.67	-44.88	87.55	41.22	29.29	4.37	32.21	100	186	P	H
		926.28	117.55	-	-	115.16	30.09	4.45	32.15	100	186	P	H
		958.29	45.14	-42.41	87.55	41.92	30.77	4.53	32.08	100	186	P	H
		894.27	37.83	-43.23	81.06	36.38	29.29	4.37	32.21	159	291	P	V
		926.28	111.06	-	-	108.67	30.09	4.45	32.15	159	291	P	V
		958.29	44.87	-36.19	81.06	41.65	30.77	4.53	32.08	159	291	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF= 7 (Harmonic @ 3m)

LoRa DTS	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		1801	47.97	-28.07	76.04	77.37	27.98	6.27	63.65	300	0	P	H
		2710	42.34	-31.66	74	64.56	32.54	7.71	62.47	300	0	P	H
		1810	40.33	-36.04	76.37	69.61	28.07	6.29	63.64	100	0	P	V
914.5MHz		1828	54.93	-31.28	86.21	84.11	28.15	6.31	63.64	300	0	P	H
		1828	47.64	-30.61	78.25	76.82	28.15	6.31	63.64	100	0	P	V
926.5MHz		1855	60.85	-26.7	87.55	89.91	28.23	6.34	63.63	300	0	P	H
		2782	43.9	-30.1	74	65.93	32.59	7.83	62.45	300	0	P	H
		8335	47.41	-26.59	74	60.9	36.54	13.63	63.66	300	0	P	H
		1855	54.76	-26.3	81.06	83.82	28.23	6.34	63.63	100	0	P	V
		8335	47.07	-26.93	74	60.56	36.54	13.63	63.66	100	0	P	V
		9262	47.6	-33.46	81.06	59.7	37.55	14.38	64.03	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												


LoRa DTS SF=8 (Band Edge @ 3m)

	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		608.12	32.02	-13.98	46	36.52	25.13	3.65	33.28	100	360	P	H
		902.03	109.59	-	-	110.75	26.72	4.49	32.37	100	360	P	H
		611.03	31.7	-14.3	46	35.73	25.59	3.66	33.28	100	43	P	V
		902.03	109.29	-	-	109.75	27.42	4.49	32.37	100	43	P	V
914.5MHz		613.94	31.67	-14.33	46	36.14	25.15	3.67	33.29	100	0	P	H
		914.64	111.63	-	-	112.5	26.85	4.51	32.23	100	0	P	H
		613.94	32.19	-13.81	46	36.2	25.61	3.67	33.29	100	360	P	V
		914.64	101.45	-	-	101.62	27.55	4.51	32.23	100	360	P	V
926.5MHz		608.12	31.65	-14.35	46	36.15	25.13	3.65	33.28	100	0	P	H
		926.28	110.65	-	-	111.26	26.96	4.54	32.11	100	0	P	H
		613.94	32.09	-13.91	46	36.1	25.61	3.67	33.29	100	360	P	V
		926.28	109.28	-	-	109.19	27.66	4.54	32.11	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF=8 (Harmonic @ 3m)

	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		1801	53.77	-25.82	79.59	81.55	30.6	6.34	64.72	300	0	P	H
		2710	46.26	-27.74	74	71.17	32.3	7.89	65.1	300	0	P	H
		1801	46.55	-32.74	79.29	74.33	30.6	6.34	64.72	300	0	P	V
		2707.5	49.48	-24.52	74	74.41	32.3	7.86	65.09	300	0	P	V
914.5MHz		1828	60.82	-29.81	81.63	88.36	30.78	6.4	64.72	100	0	P	H
		2746	45.52	-28.48	74	70.37	32.3	7.96	65.11	100	0	P	H
		9145	50.22	-23.78	74	64.52	36.58	15.2	66.08	100	0	P	H
		1828	52.2	-19.25	71.45	79.74	30.78	6.4	64.72	300	0	P	V
		2743.5	40.86	-33.14	74	65.71	32.3	7.96	65.11	300	0	P	V
		9145	50.71	-23.29	74	65.01	36.58	15.2	66.08	300	0	P	V
926.5MHz		1850	67.61	-12.94	80.65	95.02	30.88	6.43	64.72	300	0	P	H
		2776.5	48.65	-25.35	74	73.48	32.3	7.99	65.12	300	0	P	H
		8335.5	46.23	-27.77	74	61.88	35.79	14.54	65.98	300	0	P	H
		9270.5	47.31	-33.34	80.65	61.32	36.66	15.43	66.1	300	0	P	H
		1855	54.48	-24.8	79.28	81.89	30.88	6.43	64.72	100	0	P	V
		2782	46.12	-27.88	74	70.92	32.3	8.02	65.12	100	0	P	V
		8335	45.12	-28.88	74	60.76	35.8	14.55	65.99	100	0	P	V
		9262	50.62	-28.66	79.28	64.63	36.66	15.43	66.1	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF=9 (Band Edge @ 3m)

	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		612.97	31.26	-14.74	46	35.74	25.15	3.66	33.29	100	0	P	H
		903	109.45	-	-	110.59	26.73	4.49	32.36	100	0	P	H
		609.09	32.07	-13.93	46	36.12	25.57	3.66	33.28	100	360	P	V
		903	98.14	-	-	98.58	27.43	4.49	32.36	100	360	P	V
914.5MHz		612	31.12	-14.88	46	35.59	25.15	3.66	33.28	100	0	P	H
		914.64	111.57	-	-	112.44	26.85	4.51	32.23	100	0	P	H
		608.12	31.92	-14.08	46	35.99	25.56	3.65	33.28	100	360	P	V
		914.64	102.04	-	-	102.21	27.55	4.51	32.23	100	360	P	V
926.5MHz		612.97	31.36	-14.64	46	35.84	25.15	3.66	33.29	100	360	P	H
		926.28	110.15	-	-	110.76	26.96	4.54	32.11	100	360	P	H
		611.03	31.93	-14.07	46	35.96	25.59	3.66	33.28	100	0	P	V
		926.28	109.29	-	-	109.2	27.66	4.54	32.11	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF=9 (Harmonic @ 3m)

	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		1801	56.32	-23.13	79.45	84.1	30.6	6.34	64.72	300	0	P	H
		2710	45.98	-28.02	74	70.89	32.3	7.89	65.1	300	0	P	H
		9028	47.6	-26.4	74	62.25	36.51	14.89	66.05	300	0	P	H
		1801	47.84	-20.3	68.14	75.62	30.6	6.34	64.72	100	338	P	V
		2710	40.55	-33.45	74	65.46	32.3	7.89	65.1	100	338	P	V
		9019	48	-26	74	62.65	36.51	14.89	66.05	100	338	P	V
914.5MHz		1824.5	60.83	-19.74	80.57	88.49	30.69	6.37	64.72	100	0	P	H
		2742.5	45.43	-28.57	74	70.3	32.3	7.93	65.1	100	0	P	H
		9143	50.49	-23.51	74	64.79	36.58	15.2	66.08	100	0	P	H
		1828	49.37	-22.67	72.04	76.91	30.78	6.4	64.72	300	360	P	V
		2746	49.69	-24.31	74	74.54	32.3	7.96	65.11	300	360	P	V
		9145	50.46	-23.54	74	64.76	36.58	15.2	66.08	300	360	P	V
926.5MHz		1855	66.62	-13.53	80.15	94.03	30.88	6.43	64.72	100	0	P	H
		2782	46.63	-27.37	74	71.43	32.3	8.02	65.12	100	0	P	H
		9262	47.32	-32.83	80.15	61.33	36.66	15.43	66.1	100	0	P	H
		1855	56.7	-22.59	79.29	84.11	30.88	6.43	64.72	300	360	P	V
		2782	42.44	-31.56	74	67.24	32.3	8.02	65.12	300	360	P	V
		9262	47.4	-31.89	79.29	61.41	36.66	15.43	66.1	300	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF=10 (Band Edge @ 3m)

	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		610.06	31.71	-14.29	46	36.19	25.14	3.66	33.28	100	360	P	H
		903	110.1	-	-	111.24	26.73	4.49	32.36	100	360	P	H
		609.09	32.34	-13.66	46	36.39	25.57	3.66	33.28	100	0	P	V
		903	98.14	-	-	98.58	27.43	4.49	32.36	100	0	P	V
914.5MHz		612.97	31.46	-14.54	46	35.94	25.15	3.66	33.29	100	360	P	H
		914.64	111.59	-	-	112.46	26.85	4.51	32.23	100	360	P	H
		612.97	32.41	-13.59	46	36.44	25.6	3.66	33.29	100	0	P	V
		914.64	101.15	-	-	101.32	27.55	4.51	32.23	100	0	P	V
926.5MHz		612	32.07	-13.93	46	36.54	25.15	3.66	33.28	100	0	P	H
		926.28	110.14	-	-	110.75	26.96	4.54	32.11	100	0	P	H
		611.03	32.75	-13.25	46	36.78	25.59	3.66	33.28	100	360	P	V
		926.28	109.05	-	-	108.96	27.66	4.54	32.11	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF=10 (Harmonic @ 3m)

	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		1801	54.34	-25.76	80.1	82.12	30.6	6.34	64.72	300	0	P	H
		2710	45.98	-28.02	74	70.89	32.3	7.89	65.1	300	0	P	H
		1801	46.98	-21.16	68.14	74.76	30.6	6.34	64.72	300	0	P	V
		2710	42.92	-31.08	74	67.83	32.3	7.89	65.1	300	0	P	V
914.5MHz		1828	60.42	-21.17	81.59	87.96	30.78	6.4	64.72	100	360	P	H
		2746	45.06	-28.94	74	69.91	32.3	7.96	65.11	100	360	P	H
		9145	50.7	-23.3	74	65	36.58	15.2	66.08	100	360	P	H
		1828	51.77	-19.38	71.15	79.31	30.78	6.4	64.72	300	360	P	V
		2746	41.42	-32.58	74	66.27	32.3	7.96	65.11	300	360	P	V
		9145	50.81	-23.19	74	65.11	36.58	15.2	66.08	300	360	P	V
926.5MHz		1855	66.09	-14.05	80.14	93.5	30.88	6.43	64.72	300	360	P	H
		2782	47.51	-26.49	74	72.31	32.3	8.02	65.12	300	360	P	H
		9262	49.86	-30.28	80.14	63.87	36.66	15.43	66.1	300	360	P	H
		1855	58.22	-20.83	79.05	85.63	30.88	6.43	64.72	100	360	P	V
		2782	43.25	-30.75	74	68.05	32.3	8.02	65.12	100	360	P	V
		9262	48.17	-30.88	79.05	62.18	36.66	15.43	66.1	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF=11 (Band Edge @ 3m)

LoRa DTS	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		870.02	42.84	-42.1	84.94	41.54	29.24	4.32	32.26	100	185	P	H
		903	114.94	-	-	113.35	29.39	4.39	32.19	100	185	P	H
		935.01	46.25	-38.69	84.94	43.55	30.36	4.47	32.13	100	185	P	H
		903	107.55	-	-	105.96	29.39	4.39	32.19	174	111	P	V
		934.04	39.67	-37.88	77.55	37	30.33	4.47	32.13	174	111	P	V
914.5MHz		914.64	115.88	-	-	113.89	29.74	4.42	32.17	162	181	P	H
		914.64	108.35	-	-	106.36	29.74	4.42	32.17	169	129	P	V
926.5MHz		894.27	42.28	-45.1	87.38	40.83	29.29	4.37	32.21	100	180	P	H
		926.28	117.38	-	-	114.99	30.09	4.45	32.15	100	180	P	H
		958.29	44.88	-42.5	87.38	41.66	30.77	4.53	32.08	100	180	P	H
		911.73	40.16	-40.2	80.36	38.28	29.65	4.41	32.18	151	129	P	V
		926.28	110.36	-	-	107.97	30.09	4.45	32.15	151	129	P	V
		958.29	44.1	-36.26	80.36	40.88	30.77	4.53	32.08	151	129	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF=11 (Harmonic @ 3m)

LoRa DTS	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
902.5MHz		1810	50.48	-34.46	84.94	79.76	28.07	6.29	63.64	300	0	P	H
		2710	43.73	-30.27	74	65.95	32.54	7.71	62.47	300	0	P	H
		1810	44.11	-33.44	77.55	73.39	28.07	6.29	63.64	100	0	P	V
914.5MHz		1828	54.5	-31.38	85.88	83.68	28.15	6.31	63.64	300	0	P	H
		1828	47.17	-31.18	78.35	76.35	28.15	6.31	63.64	100	0	P	V
926.5MHz		1828	54.5	-32.88	87.38	83.68	28.15	6.31	63.64	300	0	P	H
		1828	47.17	-33.19	80.36	76.35	28.15	6.31	63.64	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



For co-location:

LoRa DTS SF=8 + BLE (BE @ 3m)

	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH39		2485.54	56.7	-17.3	74	47.97	32.12	7.28	30.67	128	51	P	H
		2489.08	46.57	-7.43	54	37.77	32.15	7.32	30.67	128	51	A	H
		2480	95.2	-	-	86.47	32.12	7.28	30.67	128	51	P	H
		2480	92.95	-	-	84.22	32.12	7.28	30.67	128	51	A	H
		2488	56.65	-17.35	74	47.85	32.15	7.32	30.67	300	26	P	V
		2492.68	46.44	-7.56	54	37.57	32.15	7.32	30.6	300	26	A	V
		2480	93.59	-	-	84.86	32.12	7.28	30.67	300	26	P	V
		2480	92.36	-	-	83.63	32.12	7.28	30.67	300	26	A	V
DTS SF=8 926.5Mhz		608.12	31.65	-14.35	46	34.37	25.91	3.65	32.28	100	0	P	H
		926.28	116.9	-	-	114.45	30.11	4.54	32.2	100	0	P	H
		609.09	32.02	-13.98	46	34.72	25.92	3.66	32.28	300	0	P	V
		927.25	114.82	-	-	112.34	30.14	4.54	32.2	300	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



LoRa DTS SF=8 + BLE (Harmonic@ 3m)

	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH39		4960	42.23	-31.77	74	62.69	34.1	10.89	65.45	300	360	P	H
		7440	44.93	-29.07	74	60.91	35.8	13.55	65.33	300	360	P	H
		4965	41.26	-32.74	74	61.72	34.1	10.89	65.45	100	0	P	V
		7440	44.06	-29.94	74	60.04	35.8	13.55	65.33	100	0	P	V
DTS SF=8 926.5Mhz		1855	59.59	-27.31	86.9	87	30.88	6.43	64.72	100	0	P	H
		2780	50.96	-23.04	74	75.76	32.3	8.02	65.12	100	0	P	H
		1855	43.37	-41.45	84.82	70.78	30.88	6.43	64.72	100	0	P	V
		2782	40.37	-33.63	74	65.17	32.3	8.02	65.12	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Non-restricted band limit is 100kHz-PSD down 30dB.												



Emission below 1GHz

LoRa DTS SF=8 (LF)

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
LoRa DTS SF=8 LF		31.94	23.45	-16.55	40	33.31	22.48	0.72	33.06	-	-	P	H
		158.04	19.34	-24.16	43.5	33.54	16.95	1.83	32.98	-	-	P	H
		382.11	25.56	-20.44	46	33.74	21.44	2.86	32.48	-	-	P	H
		471.35	28.78	-17.22	46	34.4	23.52	3.19	32.33	-	-	P	H
		682.81	33.48	-12.52	46	35.49	26.67	3.85	32.53	-	-	P	H
		778.84	36.07	-9.93	46	35.95	28.34	4.09	32.31	100	186	P	H
		31.94	21.73	-18.27	40	31.59	22.48	0.72	33.06	-	-	P	V
		185.2	17.15	-26.35	43.5	32.34	15.75	1.99	32.93	-	-	P	V
		294.81	20.8	-25.2	46	31.76	19.23	2.52	32.71	-	-	P	V
		453.89	26.99	-19.01	46	32.9	23.18	3.13	32.22	-	-	P	V
		669.23	31.26	-14.74	46	33.37	26.64	3.81	32.56	-	-	P	V
		817.64	32.54	-13.46	46	31.9	28.62	4.19	32.17	159	291	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	P eak or A verage
H/V	H orizontal or V ertical



A calculation example for radiated spurious emission is shown as below:

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)

2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

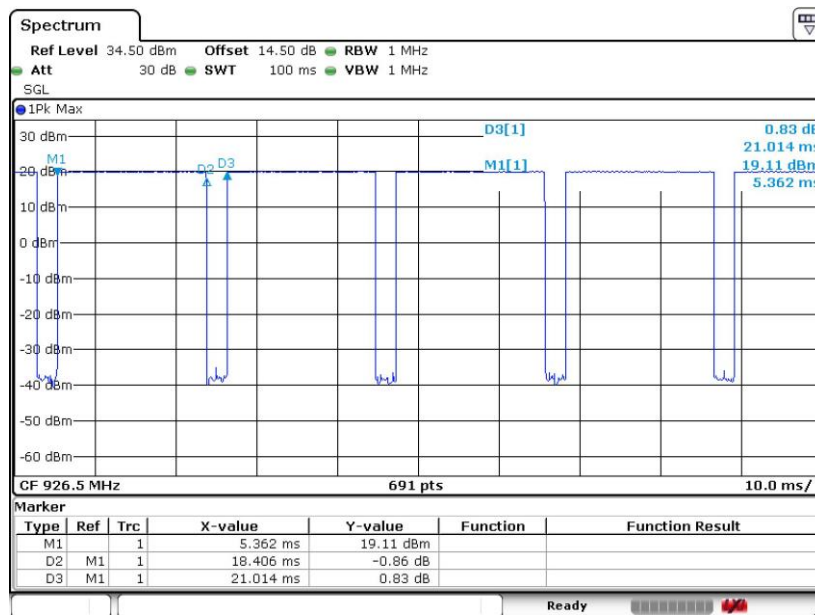
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix D. Duty Cycle Plots

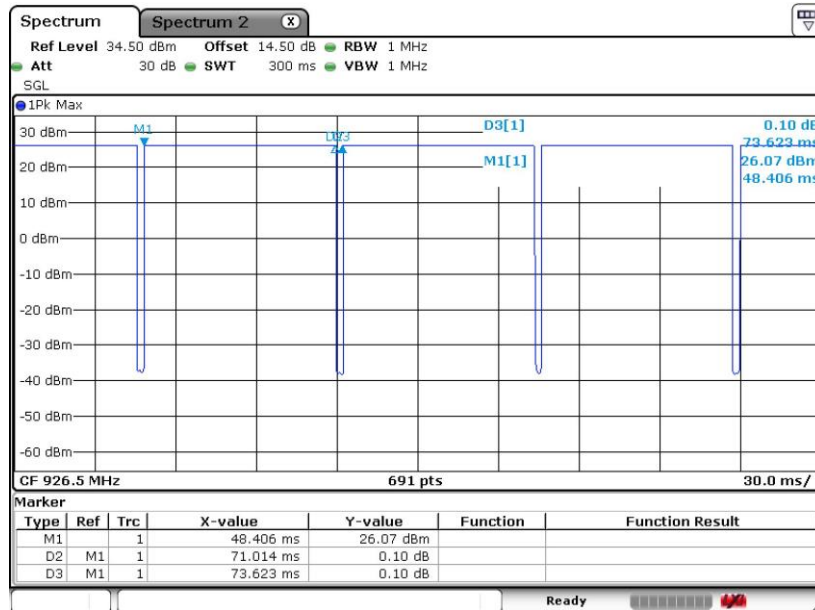
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
LoRa DTS SF5	87.59	18.406	0.054	0.13kHz
LoRa DTS SF7	96.46	71.014	0.014	0.13kHz
LoRa DTS SF8	98.37	-	-	10Hz
LoRa DTS SF9	99.09	-	-	10Hz
LoRa DTS SF10	100	-	-	10Hz
LoRa DTS SF11	100	-	-	10Hz

LoRa DTS SF5

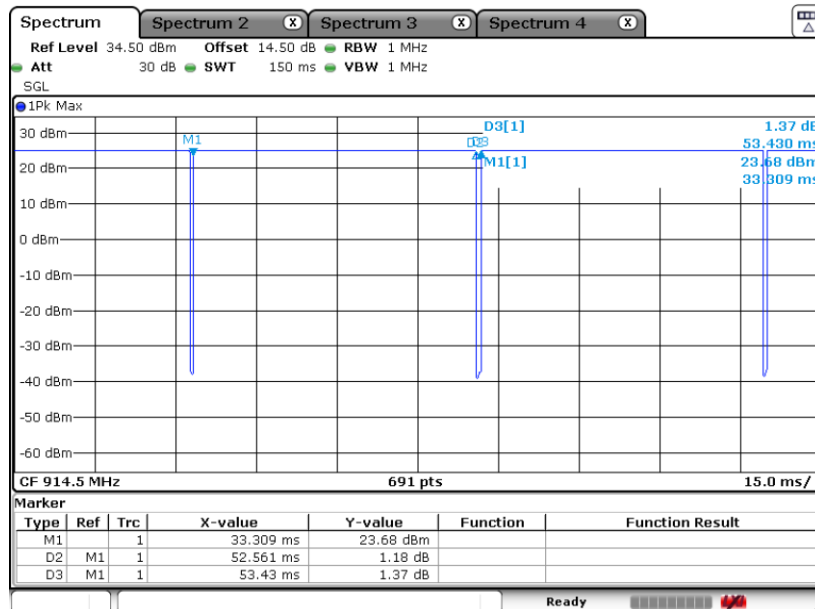




LoRa DTS SF7

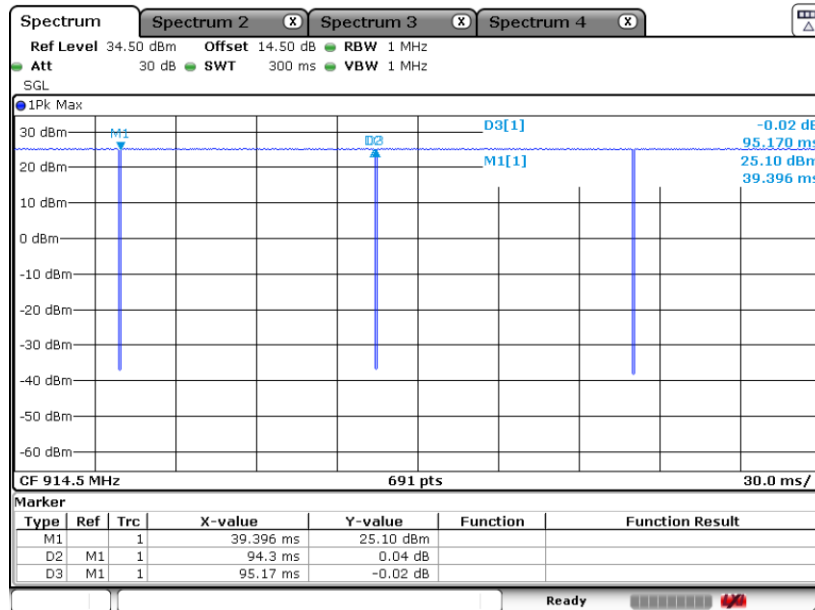


LoRa DTS SF8

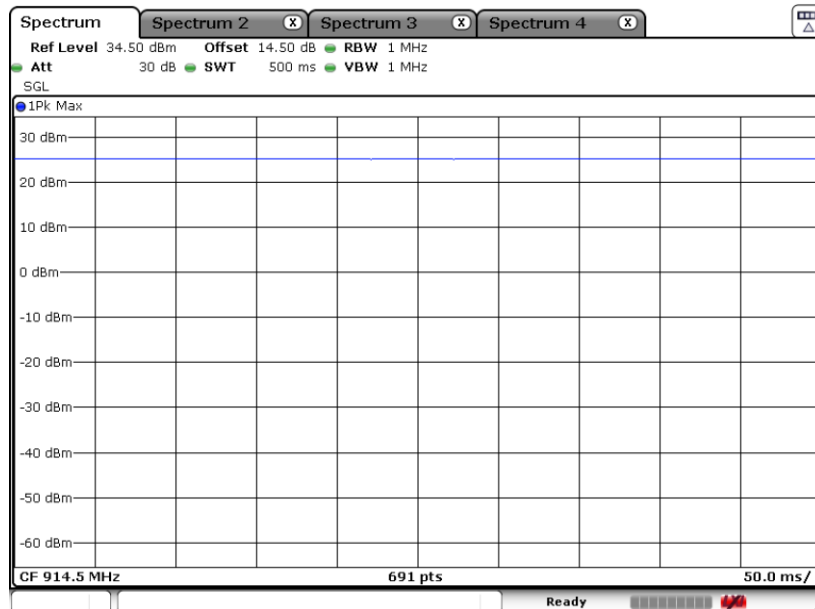




LoRa DTS SF9



LoRa DTS SF10





LoRa DTS SF11

