



Test report

Number: T251-0695/20 **Project file:** C20201558
Date: 2021-01-11
Pages: 102

Product: Radio Module

Type reference: PowerFLARM Fusion

Ratings: 12-32 Vdc
Operating frequencies: 902,6 MHz - 927,4 MHz
Protection class: III

Trademark:



Applicant: FLARM Technology Ltd.
Hinterbergstrasse 15 CH-6330 Cham Switzerland

Manufacturer: Placetec AG
Industriestrasse 17, CH-4410 Liestal, Switzerland

Place of manufacture: Placetec AG
Industriestrasse 17, CH-4410 Liestal, Switzerland

Summary of testing

Testing method: 47 CFR Part 15, Subpart C (Clause 15.247) in conjunction with ANSI C63.10:2013

Testing location: SIQ Ljubljana, Mašera-Spasičeva ulica 10, SI-1000 Ljubljana, Slovenia

Remarks: Date of receipt of test items: 2020-06-03
Number of items tested: 1
Date of performance of tests: 2020-07-03 - 2020-08-27
The test results presented in this report relate only to the items tested.
The product complies with the requirements of the testing methods.
/

Tested by: Luka Cvajnar

Approved by: Marjan Mak

The report shall not be reproduced except in full.



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1 GENERAL

History sheet			
Date	Report No.	Change	Revision
2021-01-11	T251-0695/20	Initial Test Report issued.	--

Environmental conditions:

Ambient temperature: 15°C to 35°C

Relative humidity: 30% to 60%

Atmospheric pressure: 860 mbar to 1060 mbar

1.1 Equipment under test

Radio Module

Type: **PowerFLARM Fusion**

FCC ID: **2AXJM-FLAFUS10W**

Tested SIQ sample number: S20204346

Auxiliary equipment used during the testing:

Laptop, LENOVO, L560

1.2 General product information

Supply voltage:	12-32 Vdc
Rated RF output power:	16 dBm
Modulation type:	GFSK
Operating frequency:	902.6 MHz – 927.4 MHz
Number of channels:	64
Number of transmitters	2
Antenna type:	Dipole antenna 915 MHz, Gain: 2.15 dBi

The PowerFLARM Fusion is based on the PowerFLARM OEM suite of modules. The modules integrate the Nordic Semiconductor Single-chip 433/868/915 MHz Transceiver nRF905 using software to implement a frequency hopping spread spectrum (FHSS) radio interface with 63 channels (400 kHz spacing) from 902.6 MHz to 927.4 MHz. The system is designed to allow light aircraft and drones to communicate their locations to each other by continuously streaming their GPS locations. The system is intended to be used in aircraft only.

PowerFLARM Fusion contains three (active) radio modules: The Application Module (AM) being the master (main) module, the Diversity Module (DM) being a slave (auxiliary) module, where both contain one nRF905 transceiver chip. The third module (Espressif ESP32) provides the 2.4 GHz interfaces (Bluetooth and Wi-Fi). Other radio modules contained in PowerFLARM Fusion are passive, i.e., receive-only.

The AM incorporates all of the functionality and software in a standalone form. The DM can only be connected to the AM, to complement the RF functionality, i.e., providing radio diversity. The DM does not contain software.



2 TEST SUMMARY

STANDARD	Tested		Sample	
	yes	no	pass	not pass
FCC 47 CFR Part 15, Subpart C, §15.247				
Note: All tests were conducted using ANSI C63.10-2013	☒	☐	☒	☐

Test	Section within the report	Conclusion
§15.203 Antenna requirements	3.1	PASS
§15.207 Conducted emission	3.2	N/A
§15.247 (a) (1) 20 dB Bandwidth	3.3	PASS
99 % Bandwidth	3.3	PASS
§15.247 (a) (1) Time of Occupancy (Dwell Time)	3.4	PASS
§15.247 (a) (1) Number of Hopping Frequencies	3.5	PASS
§15.247 (a) (1) Carrier Frequency Separation	3.6	PASS
§15.247 (a) (1) Pseudorandom Frequency Hopping Sequence and Equal Hooping Frequency Use	3.7	PASS
§15.247 (b) Peak Power Output	3.8	PASS
§15.247 (d) Spurious RF Conducted Emissions	3.9	PASS
§15.247 Radiated Spurious Emissions	3.10	PASS
§15.247 (d) Band-edge Compliance of RF Conducted Emissions	3.11	PASS
§15.247 (i) RF Exposure Compliance Requirements	3.12	PASS

2.1 Operating voltages/frequencies used for testing

Test	Operating conditions
§15.207 Conducted emission	/
§15.247 (a) (1) 20 dB Bandwidth	12 Vdc
99 % Bandwidth	12 Vdc
§15.247 (a) (1) Time of Occupancy (Dwell Time)	12 Vdc
§15.247 (a) (1) Number of Hopping Frequencies	12 Vdc
§15.247 (a) (1) Carrier Frequency Separation	12 Vdc
§15.247 (b) Peak Power Output	12 Vdc
§15.247 (d) Spurious RF Conducted Emissions	12 Vdc
§15.247 Radiated Spurious Emissions	12 Vdc
§15.247 (d) Band-edge Compliance of RF Conducted Emissions	12 Vdc

3 EMISSION TESTS (Intentional Radiators)

3.1 §15.203 Antenna requirements

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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Conclusion:

PASS

- U.FL connector on the PCB connected with RP-SMA connector outside the housing of the EUT. Designated antenna it is sold in the package with the device.



3.2 §15.207 Conducted emission

Requirement

For an intentional radiator 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, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15–0.5	66 to 56*	56 to 46
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Conclusion: Not applicable. EUT employs only battery power.

3.3 §15.247 (a) (1) 20 dB Bandwidth

Require

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test procedure:

As per Clause 6.9.2 from ANSI C63.10-2013

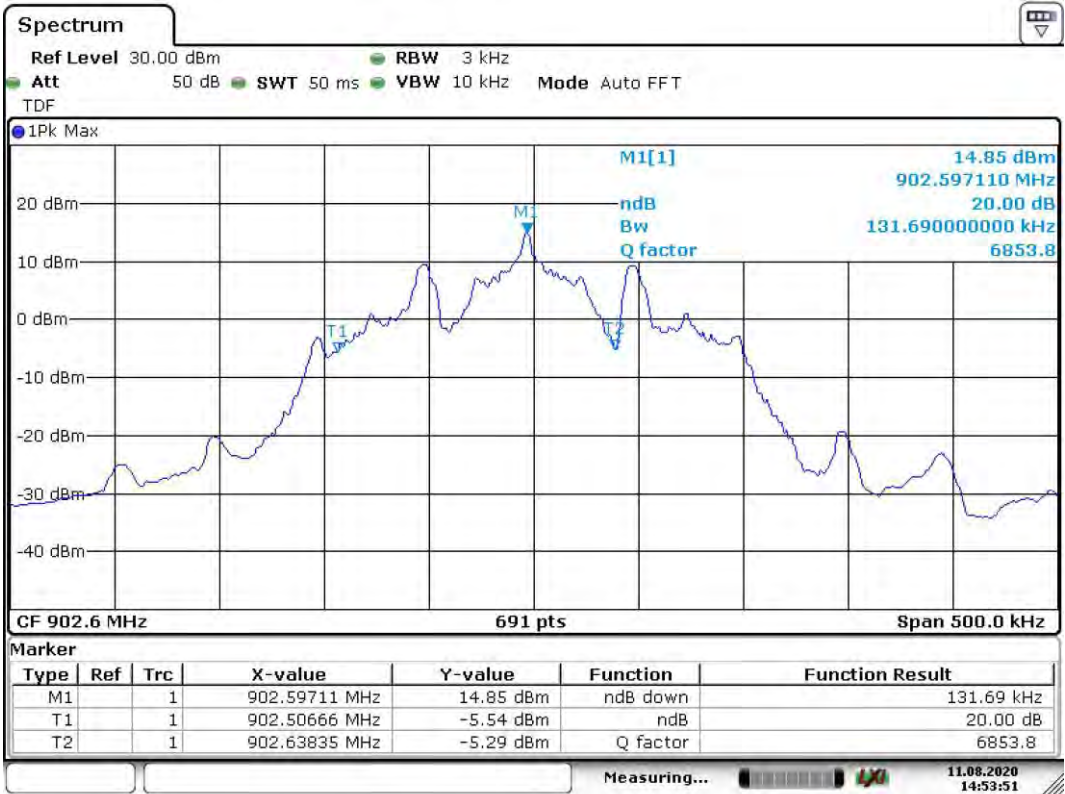
Tabulated test results

Frequency (MHz)	Transmitter	Occupied bandwidth (kHz)	Limit (kHz)	Conclusion
902.6	RFA	131,69	500	PASS
915.0	RFA	198,99	500	PASS
927.4	RFA	196,82	500	PASS
902.6	RFB	209,12	500	PASS
915.0	RFB	206,95	500	PASS
927.4	RFB	194,65	500	PASS

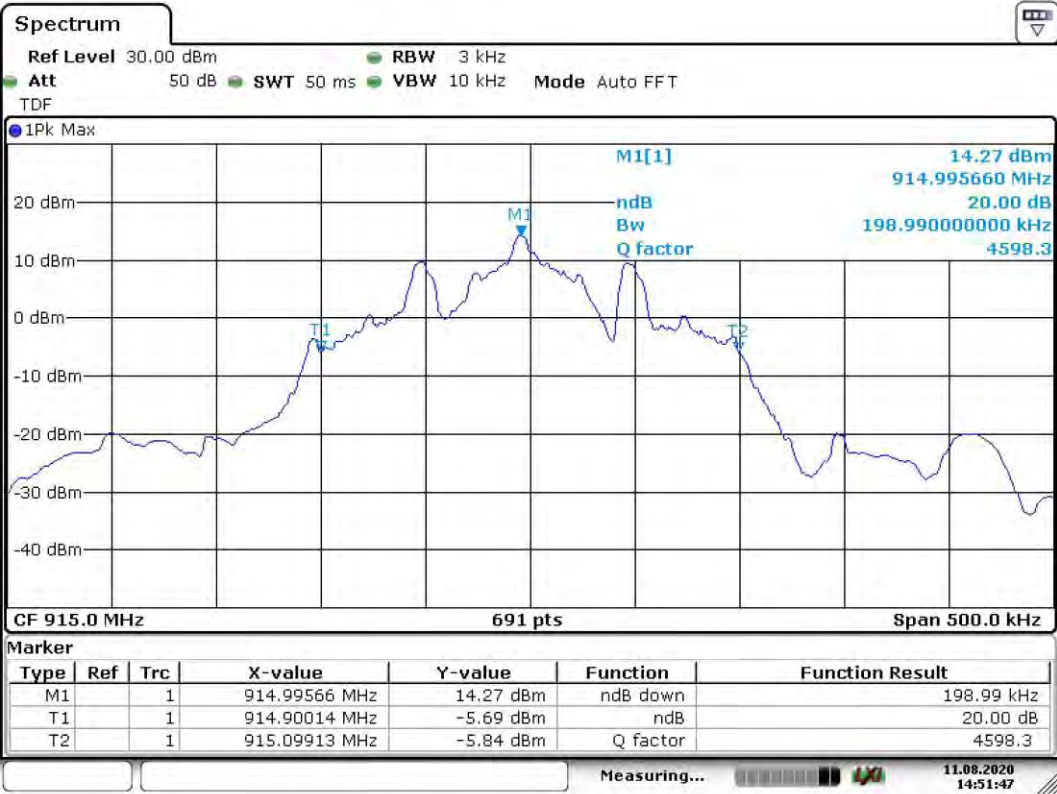
Conclusion: PASS



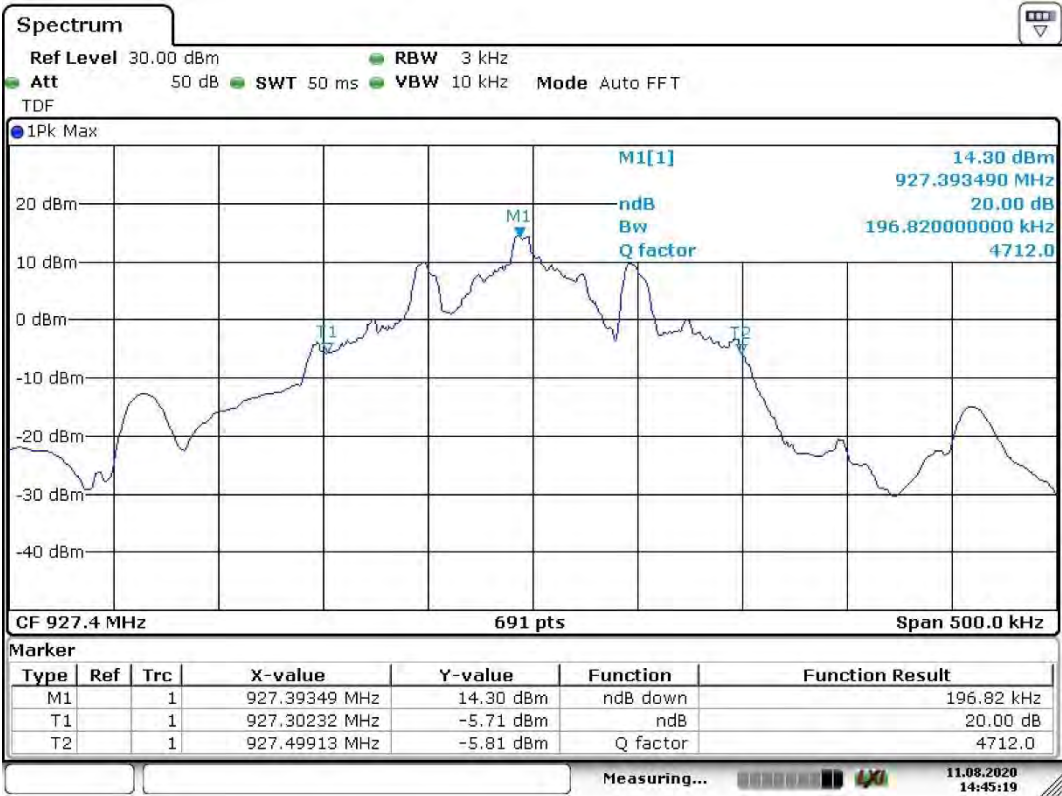
Test results



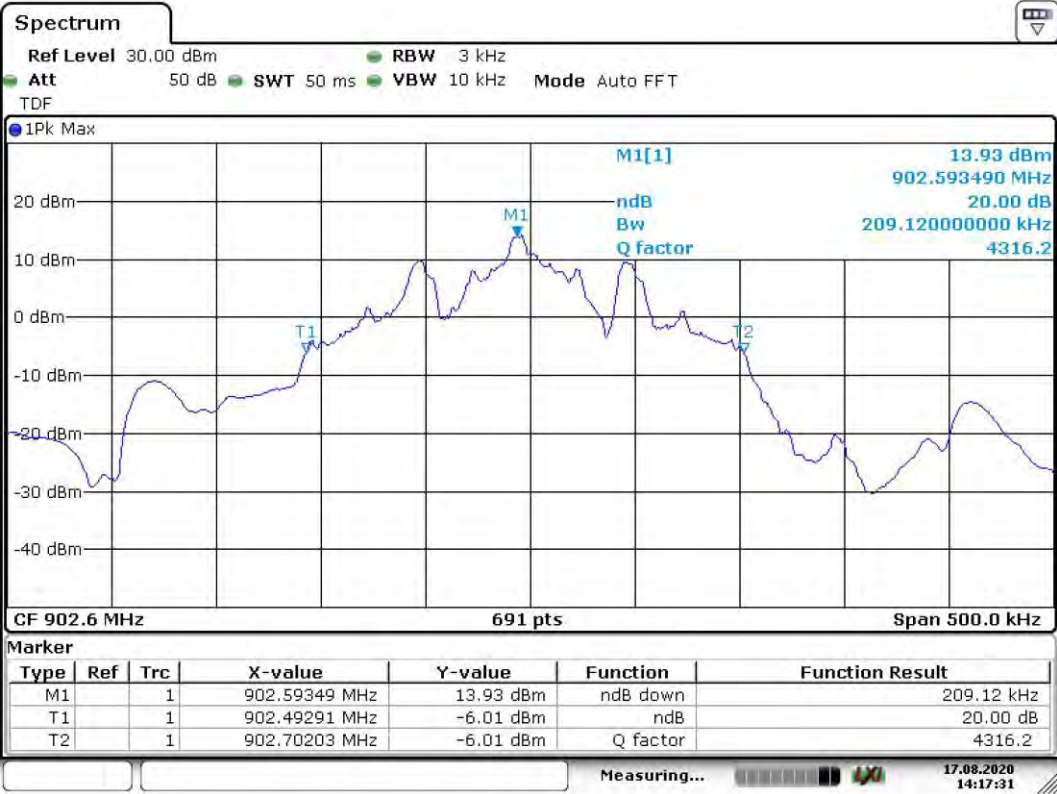
902.6 MHz, RFA

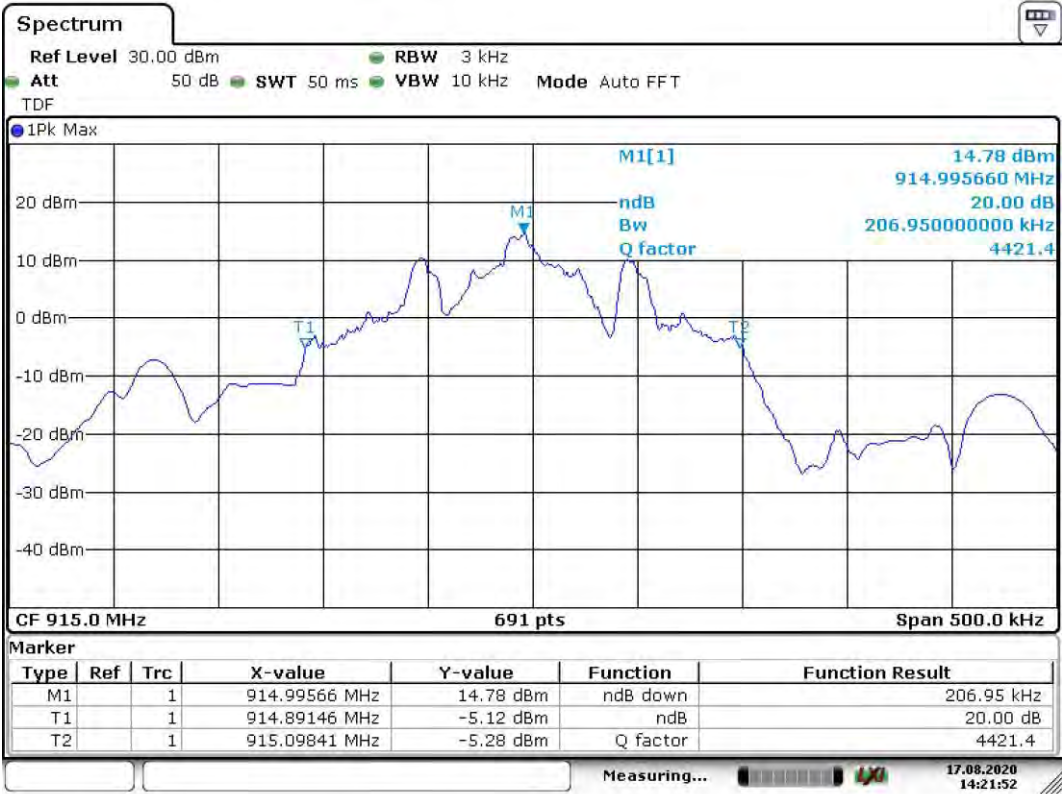


915.0 MHz, RFA

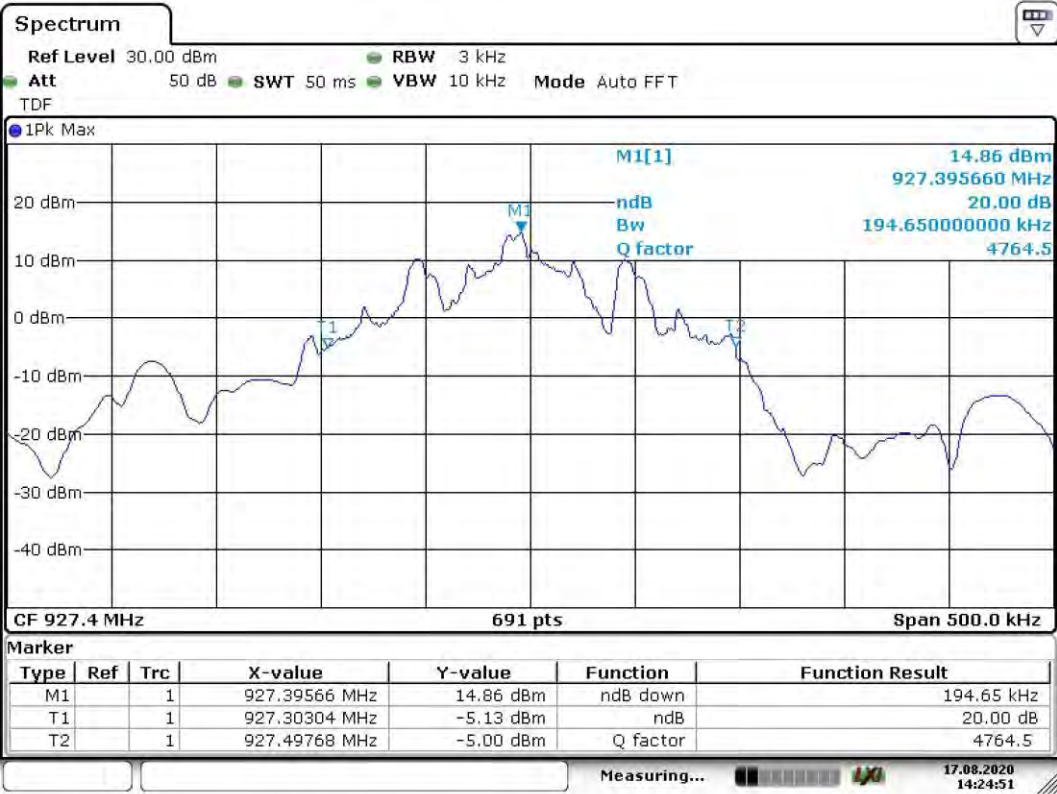


927.4 MHz





915 MHz, RFB



927.4 MHz, RFB



3.4 §15.247 (a) (1) Time of Occupancy (Dwell Time)

Requirement

If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

Test procedure:

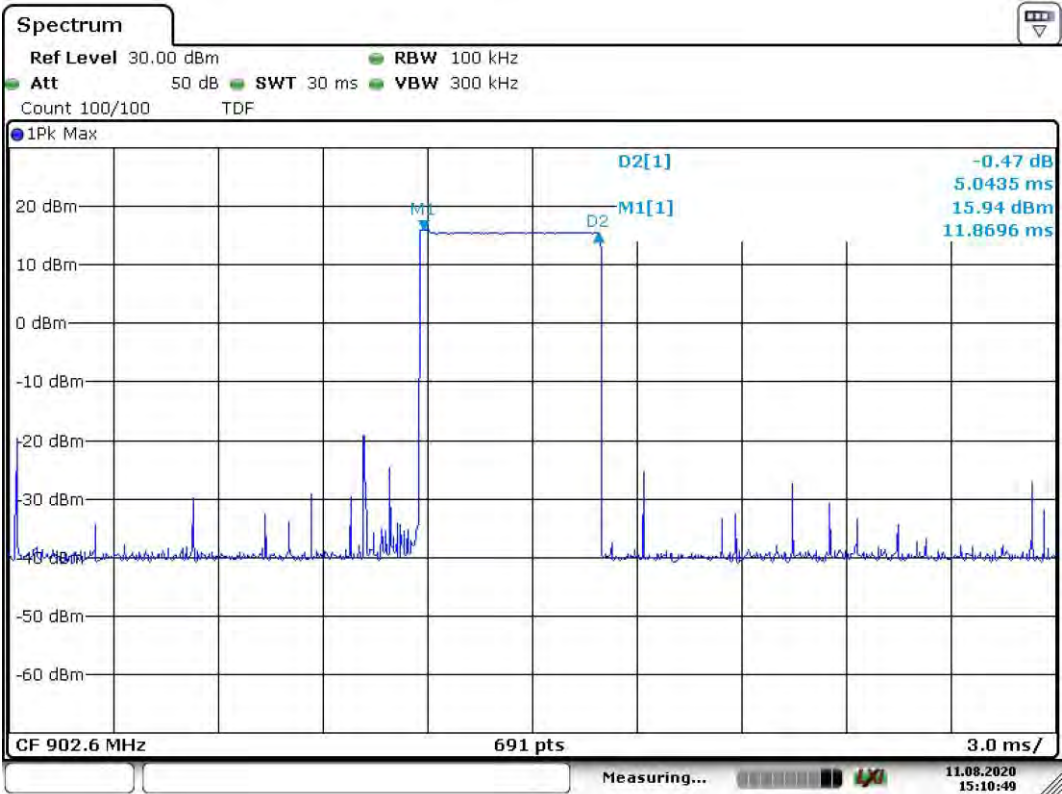
As per Clause 7.8.4 from ANSI C63.10-2013

Conclusion: PASS

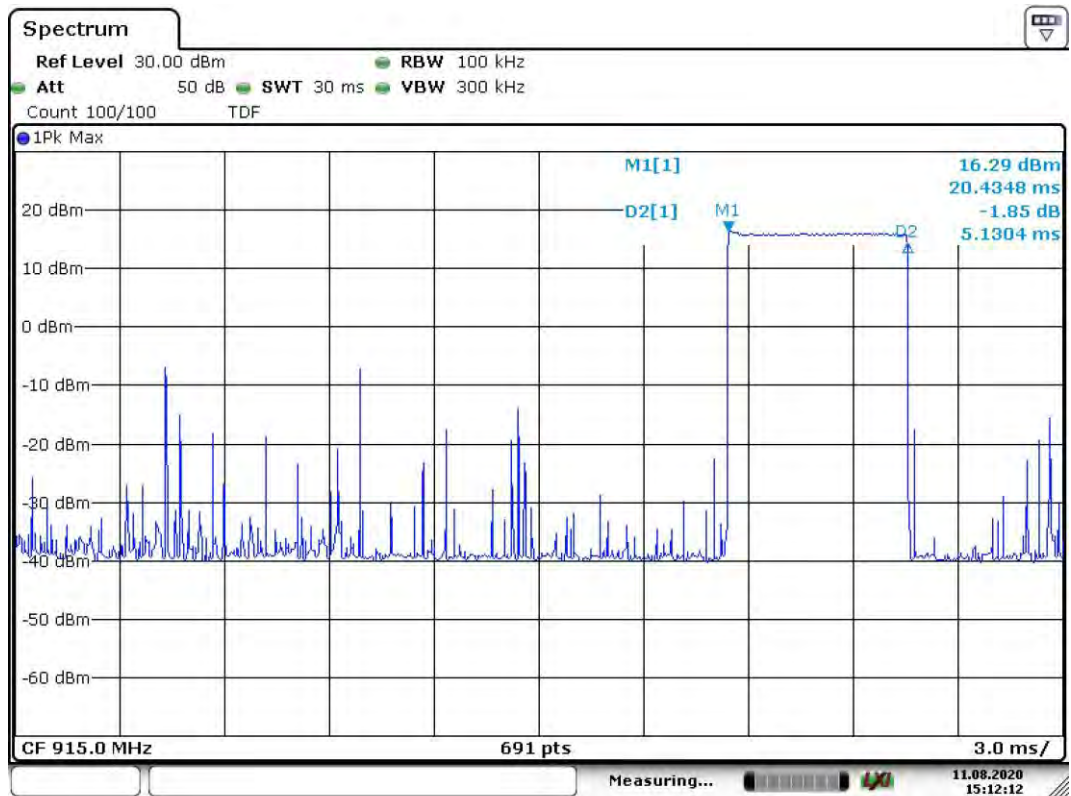
Tabulated test results

Frequency (MHz)	Transmitter	Measured Dwell time (ms)	Maximum occupied dwell time of each frequency (ms)	Limit	Conclusion
902.6	RFA	5.0	100	400 ms in 20 s period	PASS
915.0	RFA	5.1	102	400 ms in 20 s period	PASS
927.4	RFA	5.1	102	400 ms in 20 s period	PASS
902.6	RFB	5.0	100	400 ms in 20 s period	PASS
915.0	RFB	5.1	102	400 ms in 20 s period	PASS
927.4	RFB	5.1	102	400 ms in 20 s period	PASS

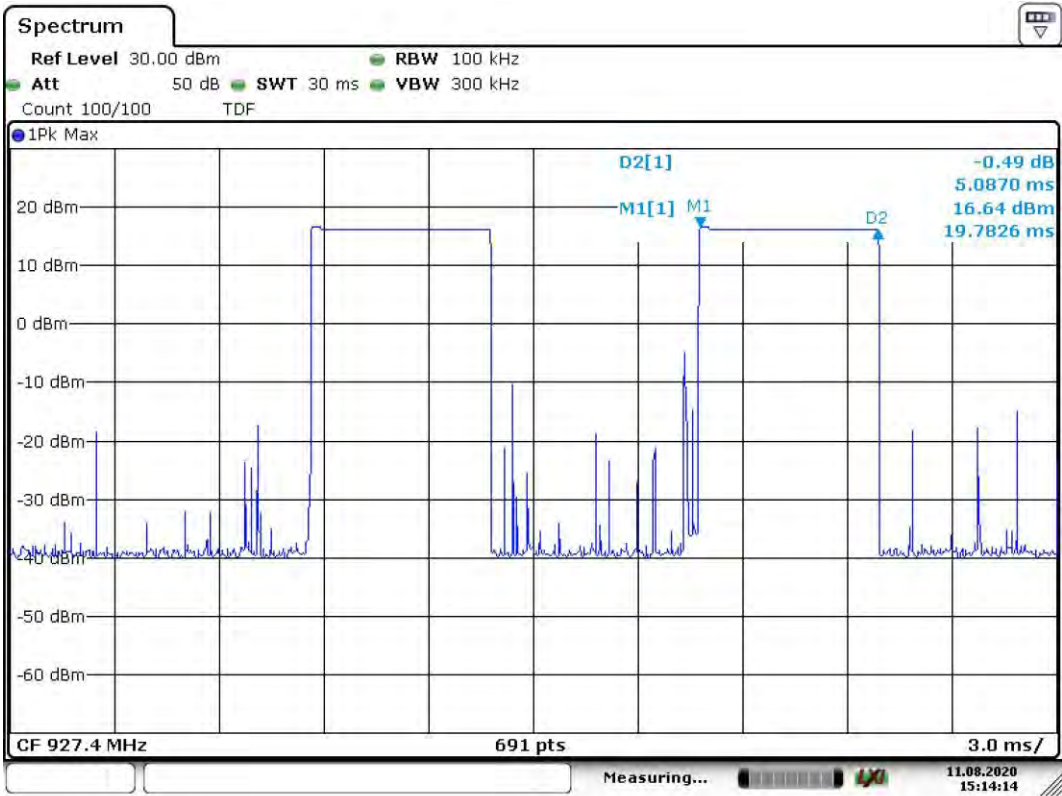
Result:



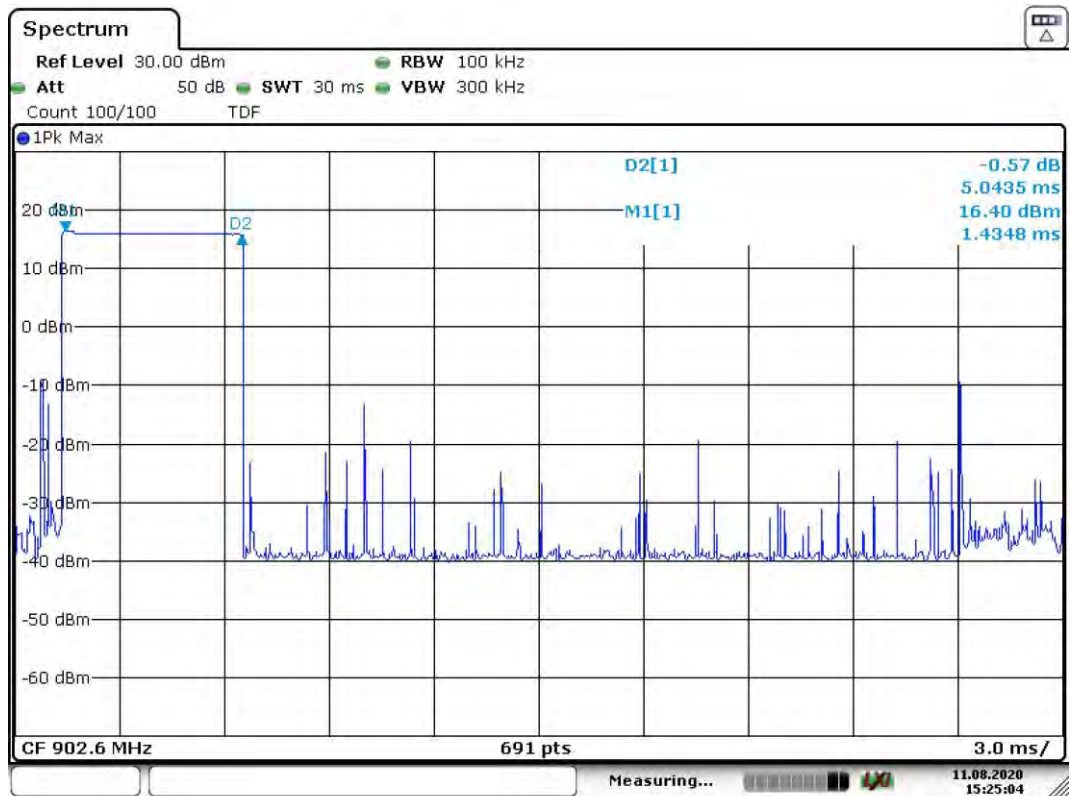
902.6 MHz, RFA



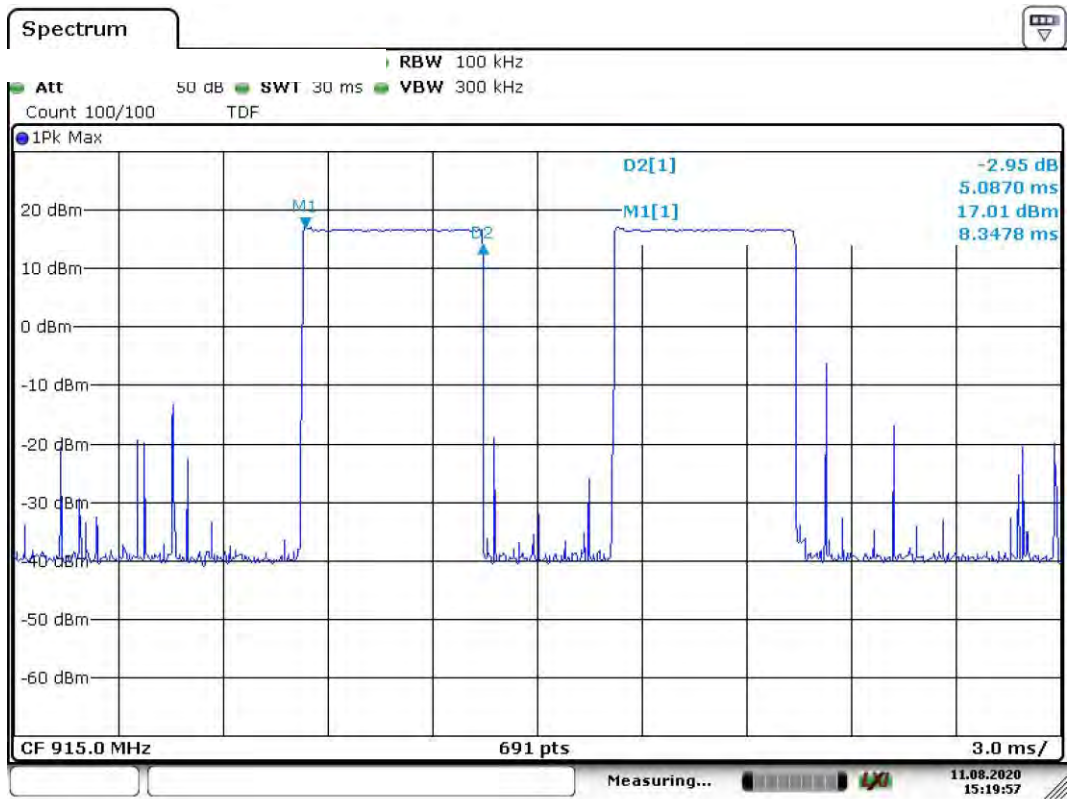
915.0 MHz, RFA



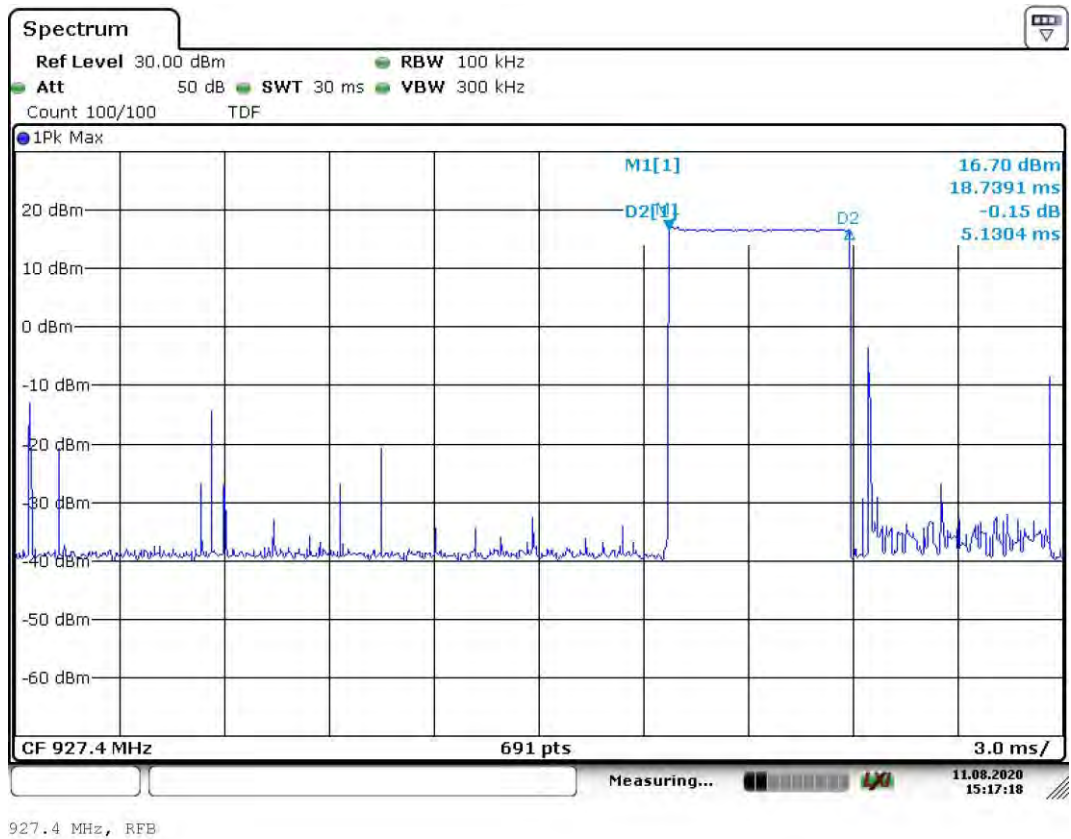
927.4 MHz, RFA



902.6 MHz, RFB



915.0 MHz, RFB



3.5 §15.247 (a) (1) Number of Hopping Frequencies

Requirement

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies

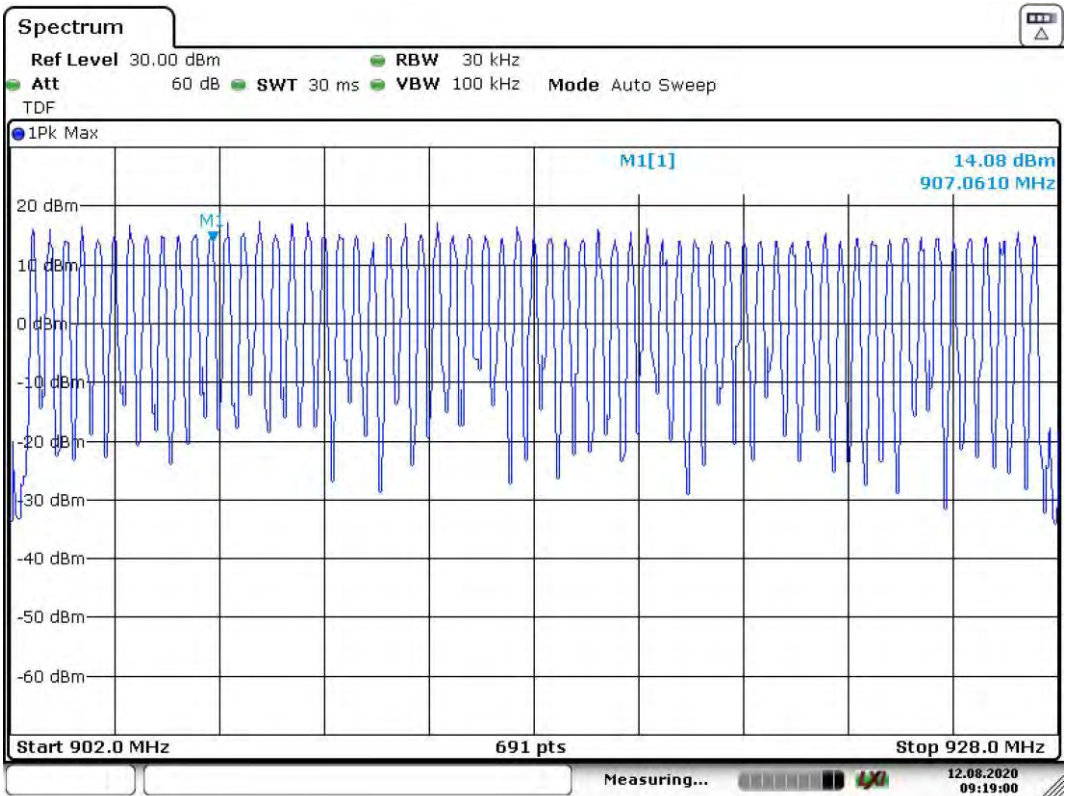
Test procedure:

As per Clause 7.8.3 from ANSI C63.10-2013

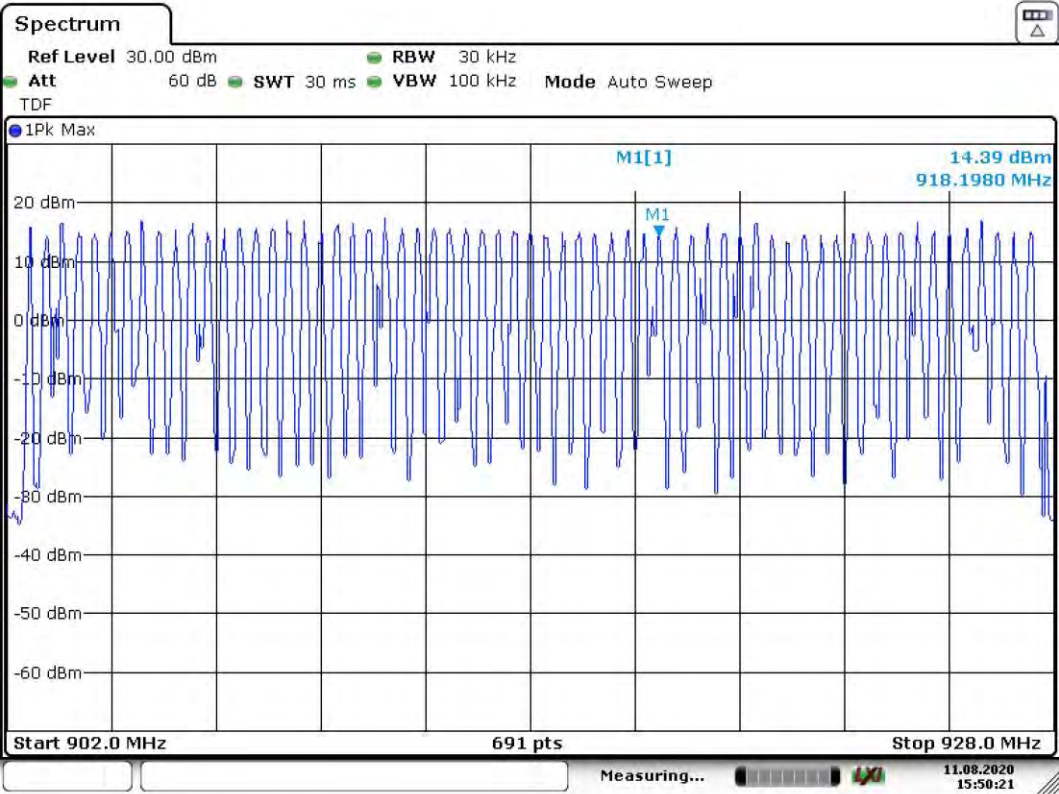
Conclusion: PASS



Test results



RFA Number of hopping channels



RFB Number of hopping channels



3.6 §15.247 (a) (1) Carrier Frequency Separation

Requirement

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

Procedure

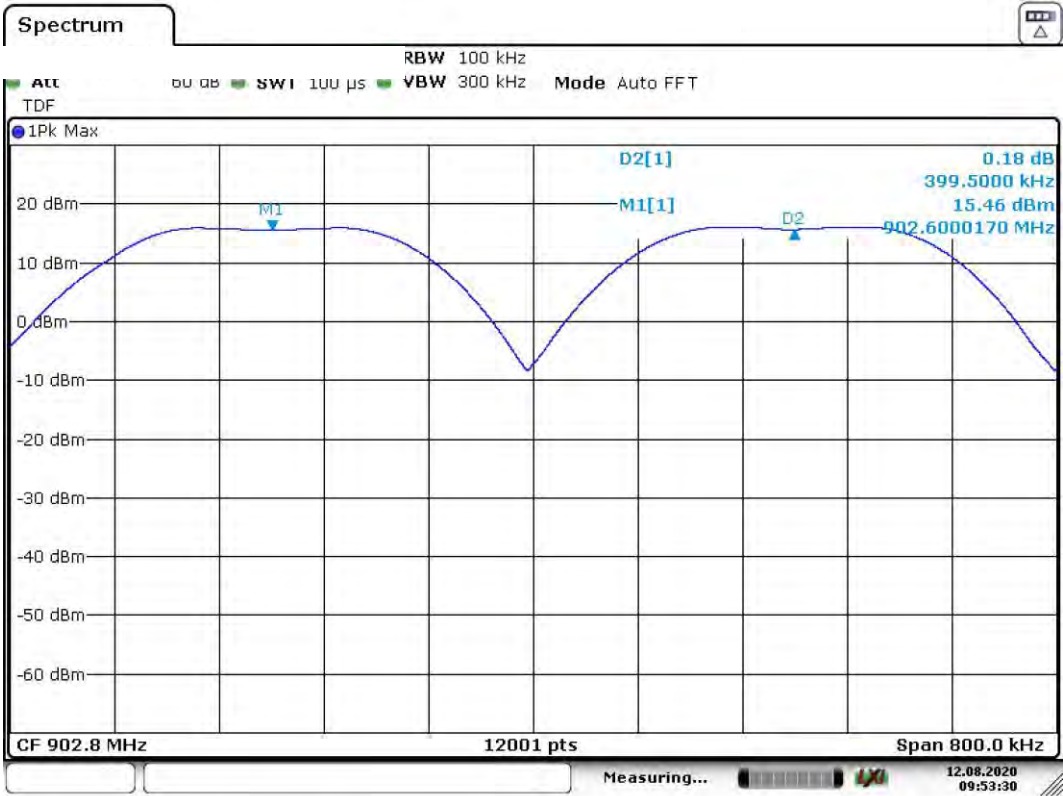
As per Clause 7.8.2 from ANSI C63.10-2013

Conclusion: PASS

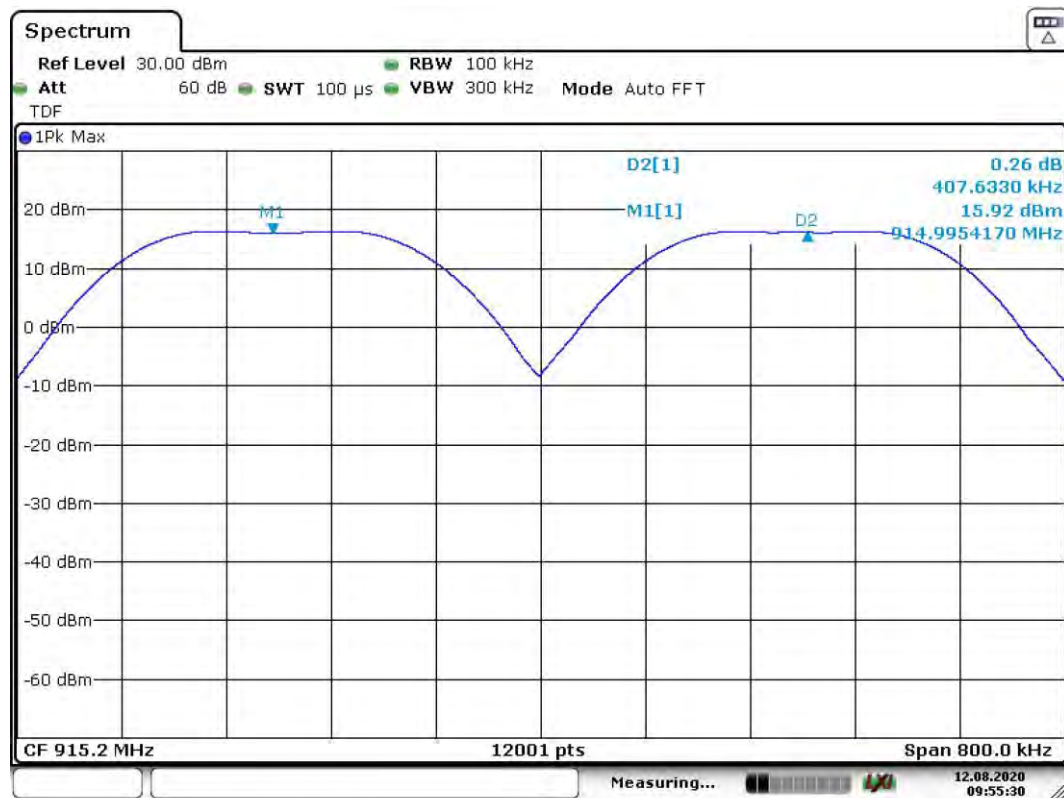
Tabulated test results

Frequency (MHz)	Transmitter	Channel separation (kHz)	Limit (kHz)	Conclusion
902.6	RFA	399,50	210	PASS
915.0	RFA	407,63	210	PASS
927.4	RFA	409,00	210	PASS
902.6	RFB	407,86	210	PASS
915.0	RFB	402,03	210	PASS
927.4	RFB	400,03	210	PASS

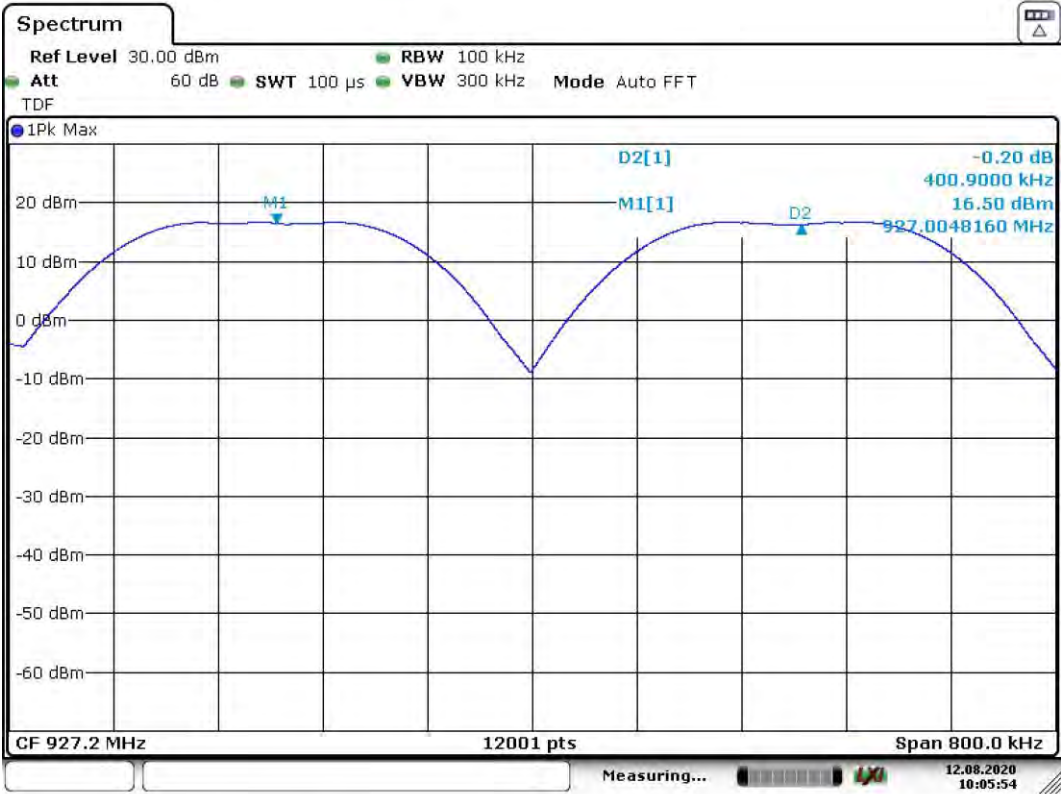
Test results



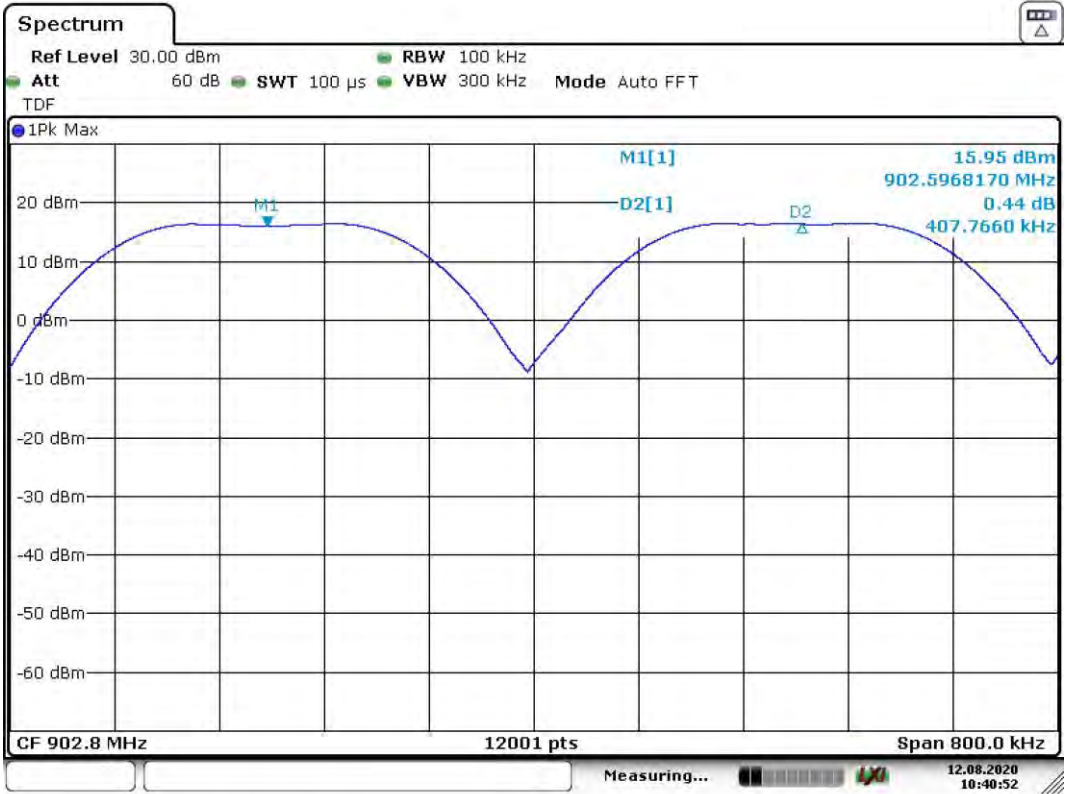
RFA Channel frequency separation



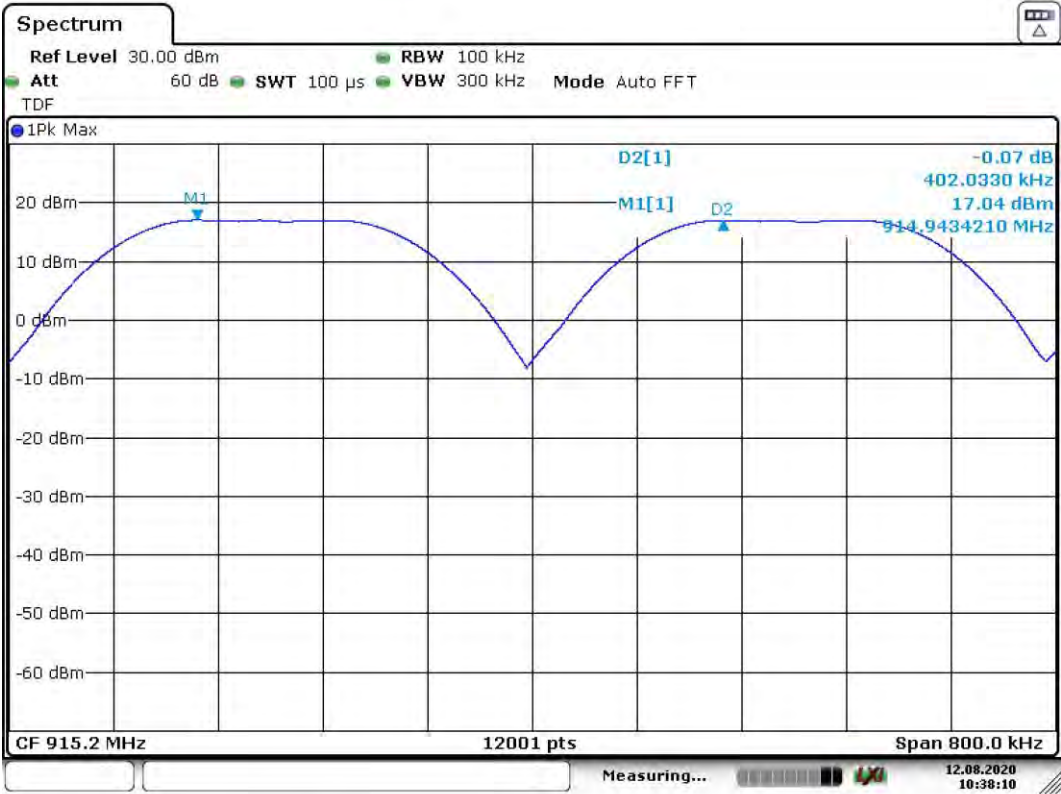
RFA Channel frequency separation



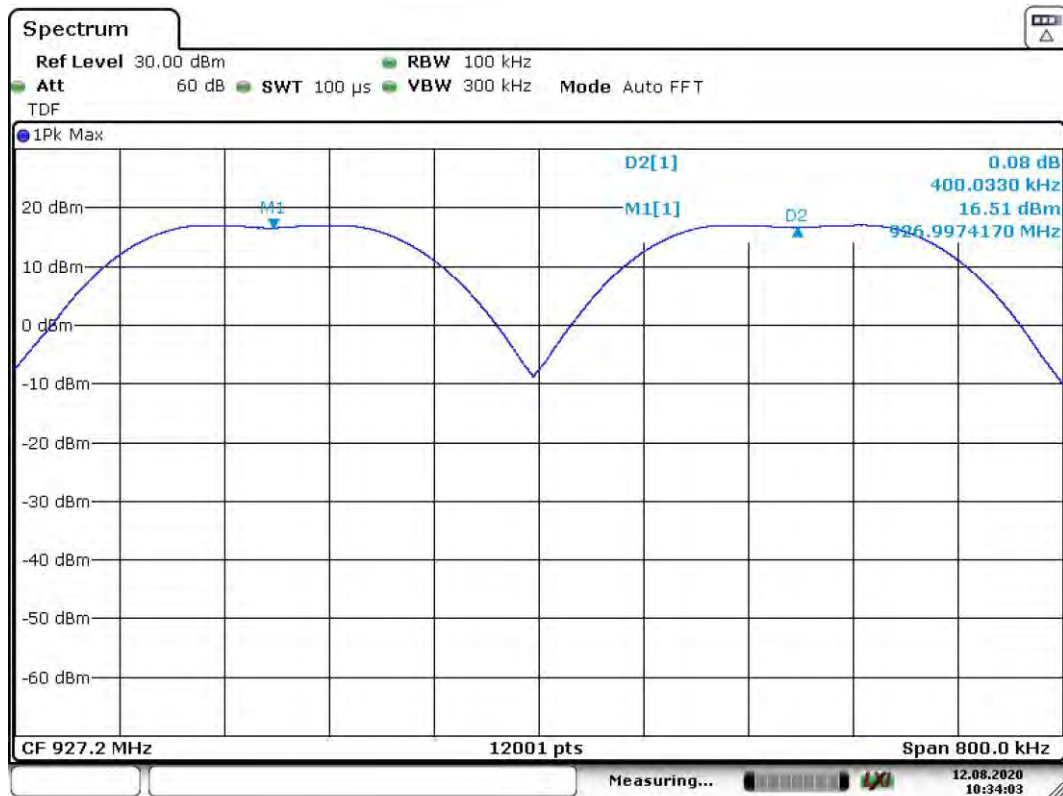
RFA Channel frequency separation



RFB Channel frequency separation



RFB Channel frequency separation



RFB Channel frequency separation

3.7 §15.247 (a) (1) Pseudorandom Frequency Hopping Sequence and Equal Hooping Frequency Use

Declared by manufacturer:

Pseudorandom frequency hopping sequence:

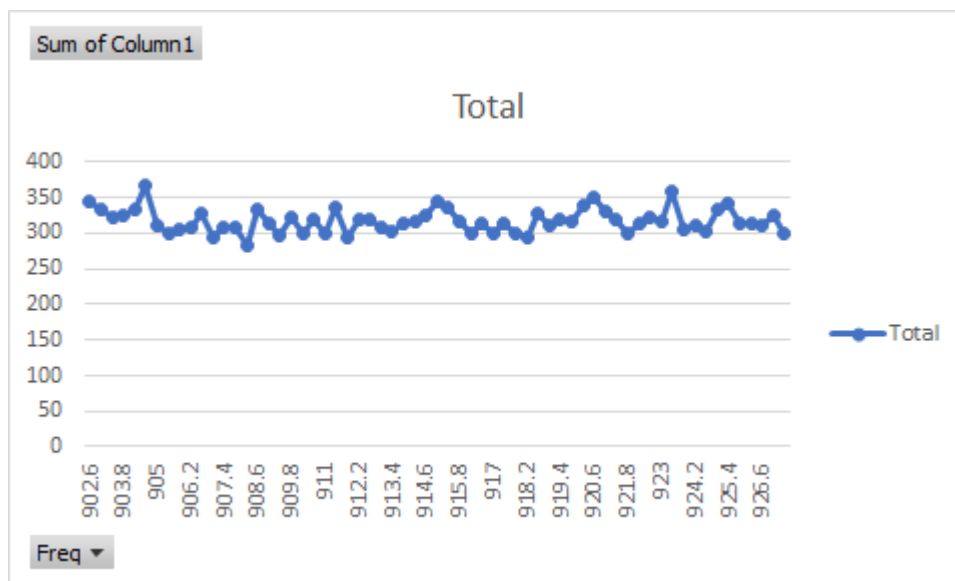
Describe how the hopping sequence is generated. Provide an example of the hopping sequence channels, to demonstrate that the sequence meets the requirement specified in the definition of an FHSS system, found in Section 2.1(c). Per the definition in Section 2.1(c), the hop set shall appear as random in the near term, shall appear as evenly distributed in the long term, and sequential hops shall be randomly distributed in both direction and magnitude of change.

The hopping sequence is generated from a pseudo-random source, based on the current GPS time. Two frequencies are used per second.

Equal hopping frequency use:

Describe how each individual EUT meets the requirement that each of its hopping channels is used equally on average (e.g., that each new transmission event begins on the next channel in the hopping sequence after the final channel used in the previous transmission event).

The figure shows the number of times a particular frequency was used over 10.000 s:



Since the frequency selection is pseudo-random based on the timestamp, and since every frequency slot is used for exactly one transmission, it is clear that on average you get uniform usage also.

System receiver input bandwidth:

Describe how the associated receiver(s) complies with the requirement that the input bandwidth (either RF or IF) matches the bandwidth of the transmitted signal.

This can be derived from the datasheet of the transceiver: http://infocenter.nordicsemi.com/pdf/nRF905_PS_v1.5.pdf, page 11.

System receiver hopping capability:

Describe how the associated receiver(s) has the ability to shift frequencies in synchronization with the transmitted signals.

This is not applicable as all participants are strictly synchronized by GPS time / UTC.

3.8 §15.247 (b) Peak Power Output

Requirement

The maximum peak conducted output power of the intentional radiator shall not exceed the following:
For frequency hopping systems operating in the 902-928 MHz band: 1 watt (30 dBm) for systems employing at least 50 hopping channels.

Test Procedure

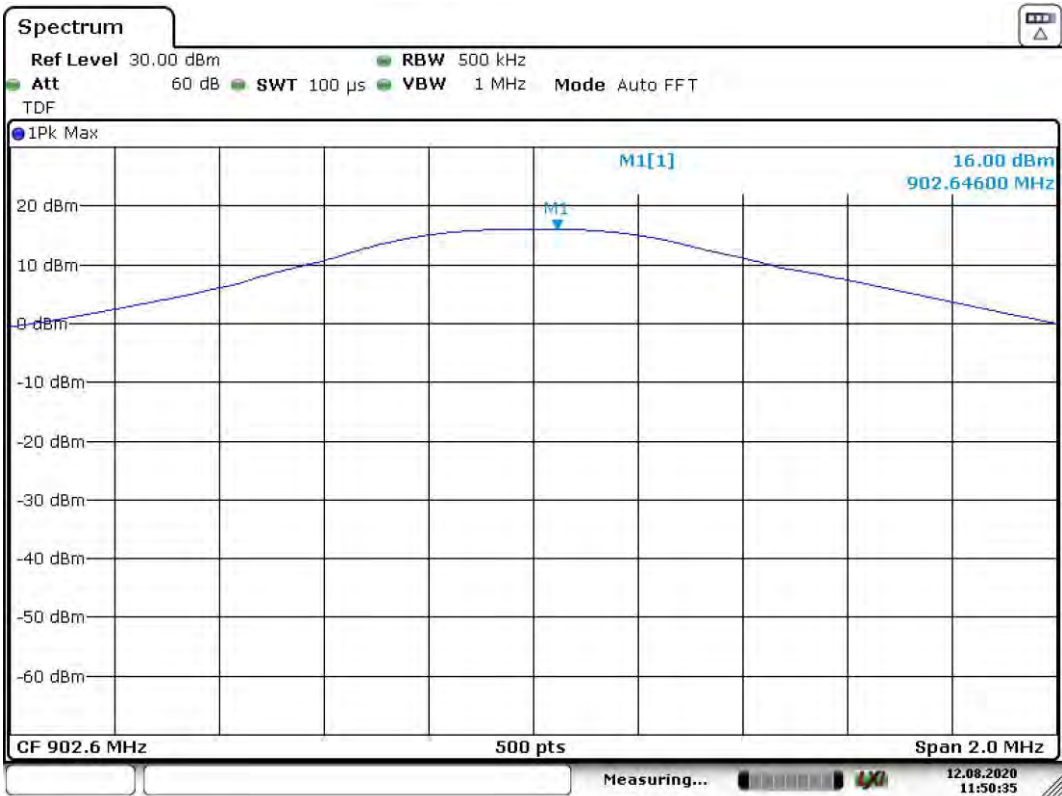
As per Clause 7.8.5 from ANSI C63.10-2013

Conclusion: PASS

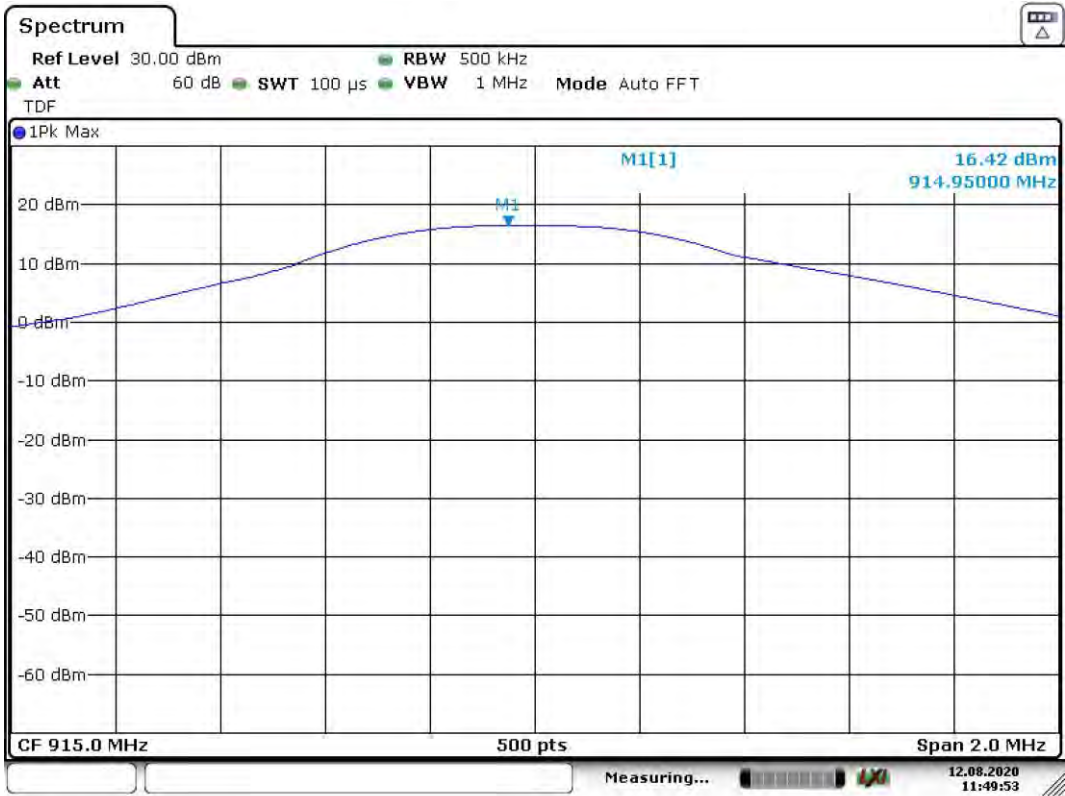
Tabulated test results

Frequency (MHz)	Antenna	Receiver reading (dBm)	Peak conducted output power (W)	Limit (W)	Conclusion
902.6	RFA	16.00	0.0398	1	PASS
915.0	RFA	16.42	0.0438	1	PASS
927.8	RFA	16.67	0.0464	1	PASS
902.6	RFB	16,46	0.0442	1	PASS
915.0	RFB	17,14	0.0517	1	PASS
927.8	RFB	17,05	0.0507	1	PASS

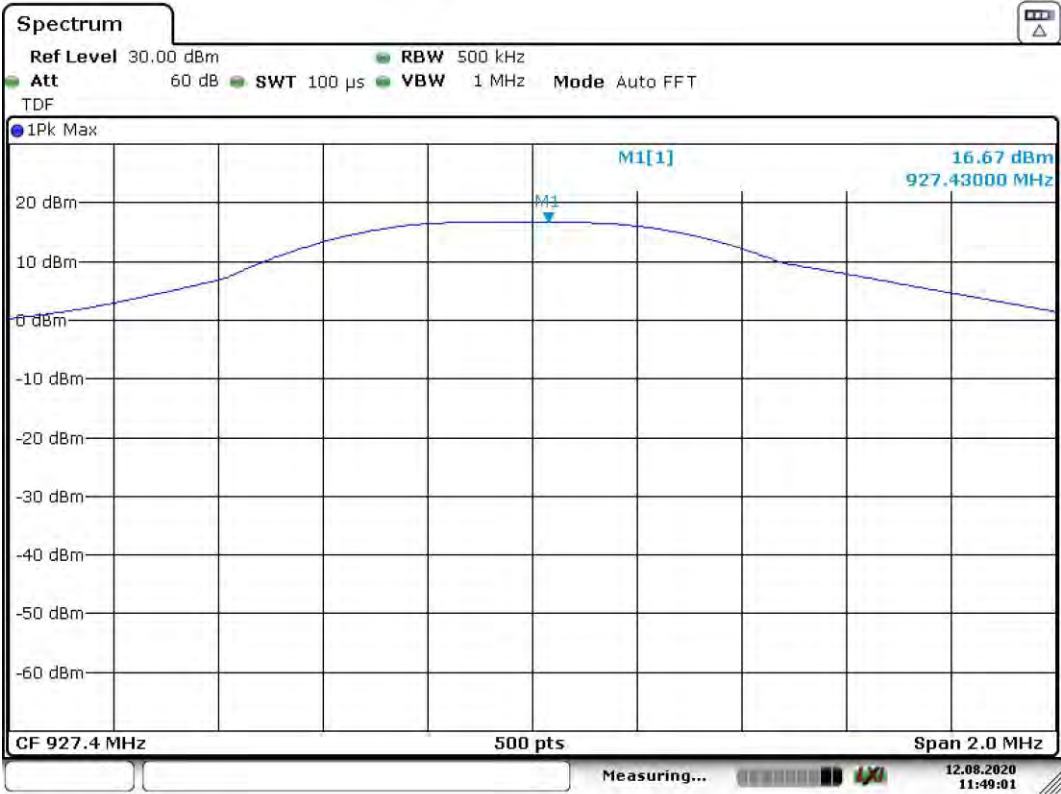
Test results



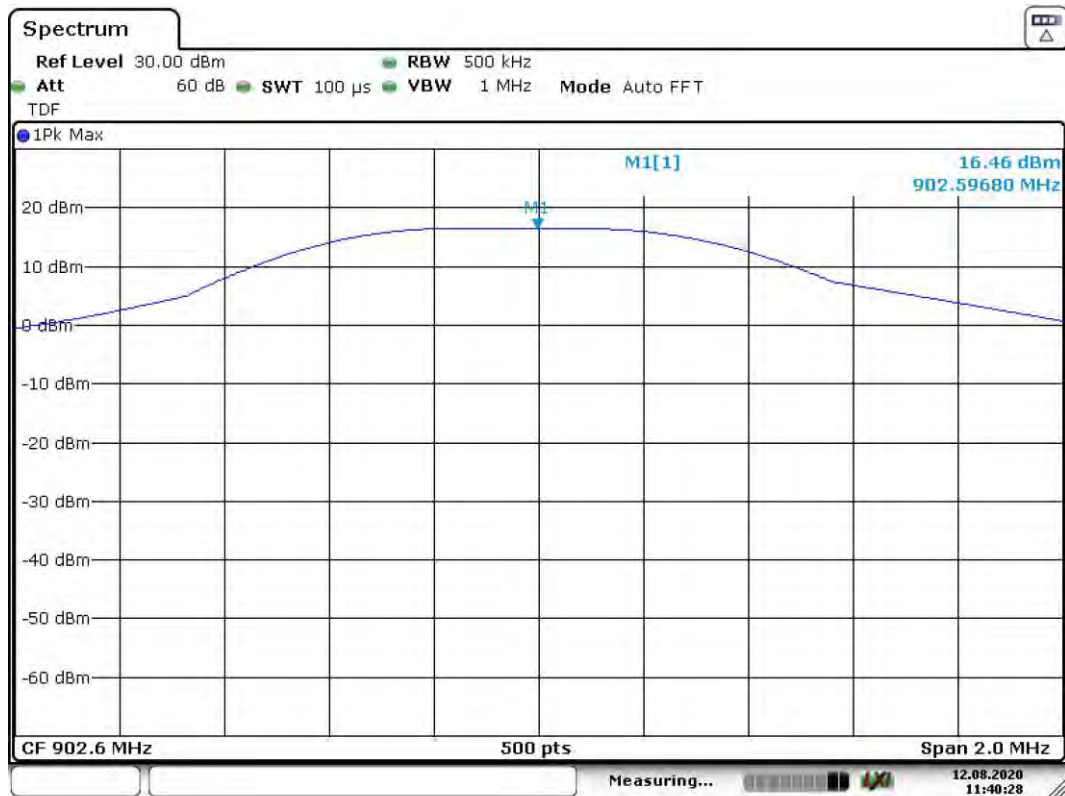
RFA Peak Output Power



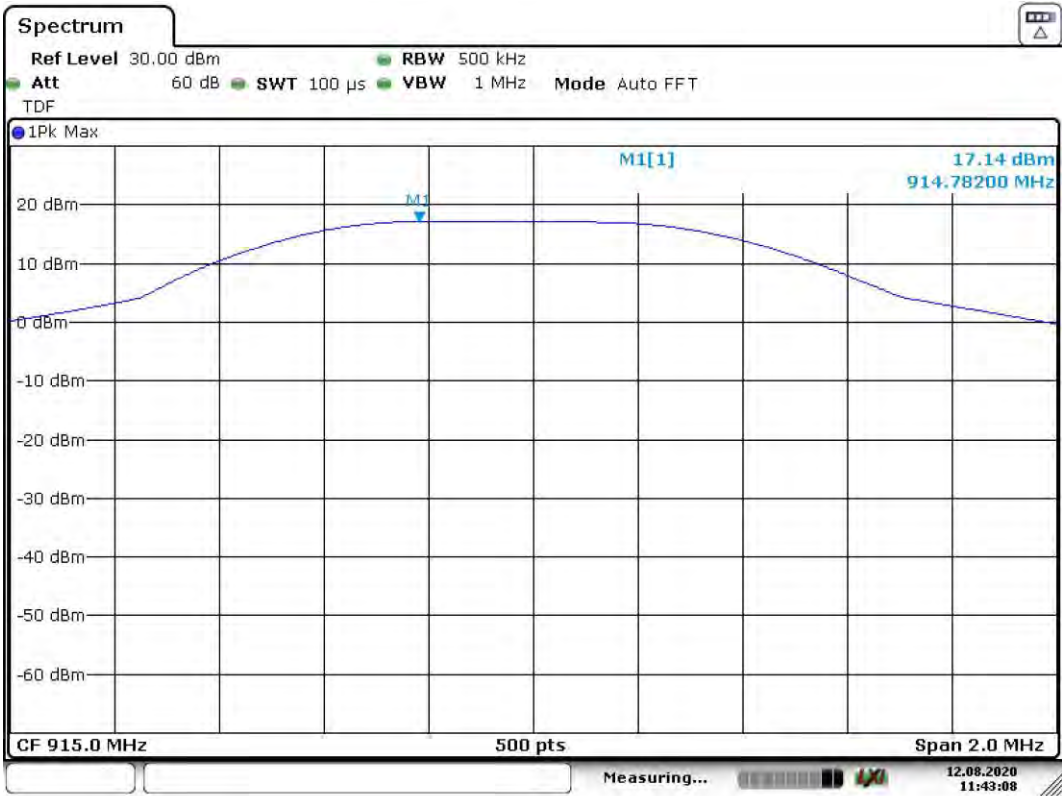
RFA Peak Output Power



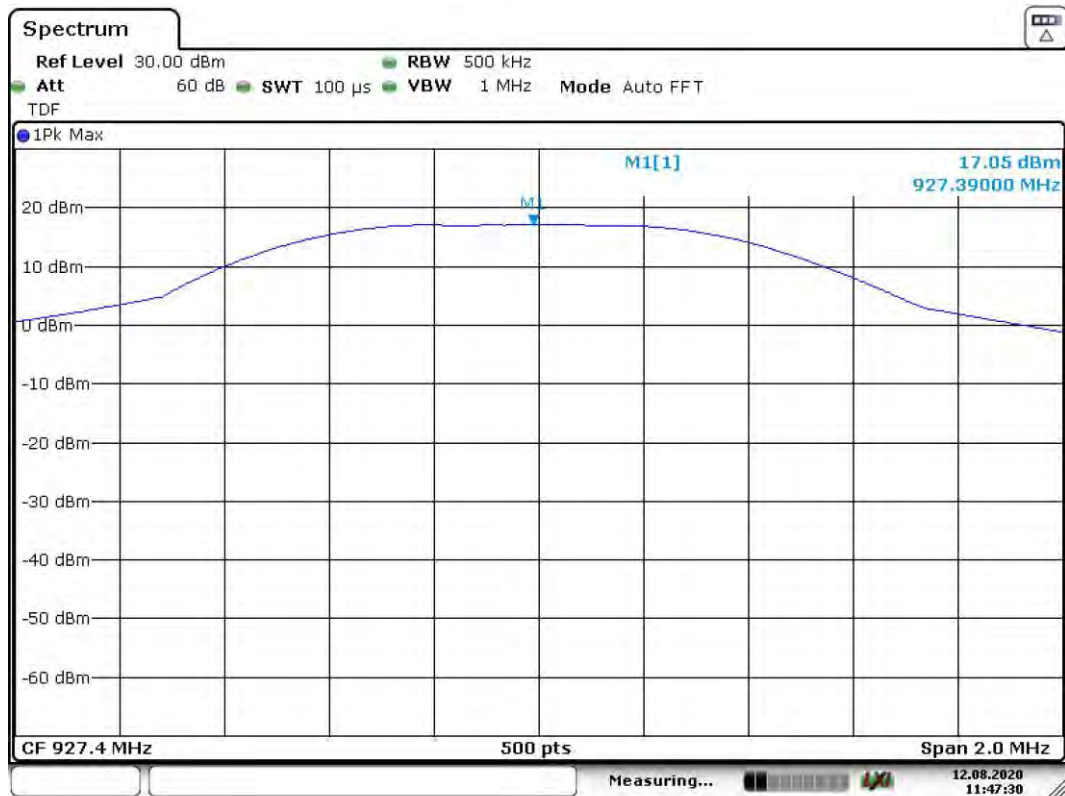
RFA Peak Output Power



RFB Peak Output Power



RFB Peak Output Power



RFB Peak Output Power

3.9 §15.247 (c) Spurious RF Conducted Emissions

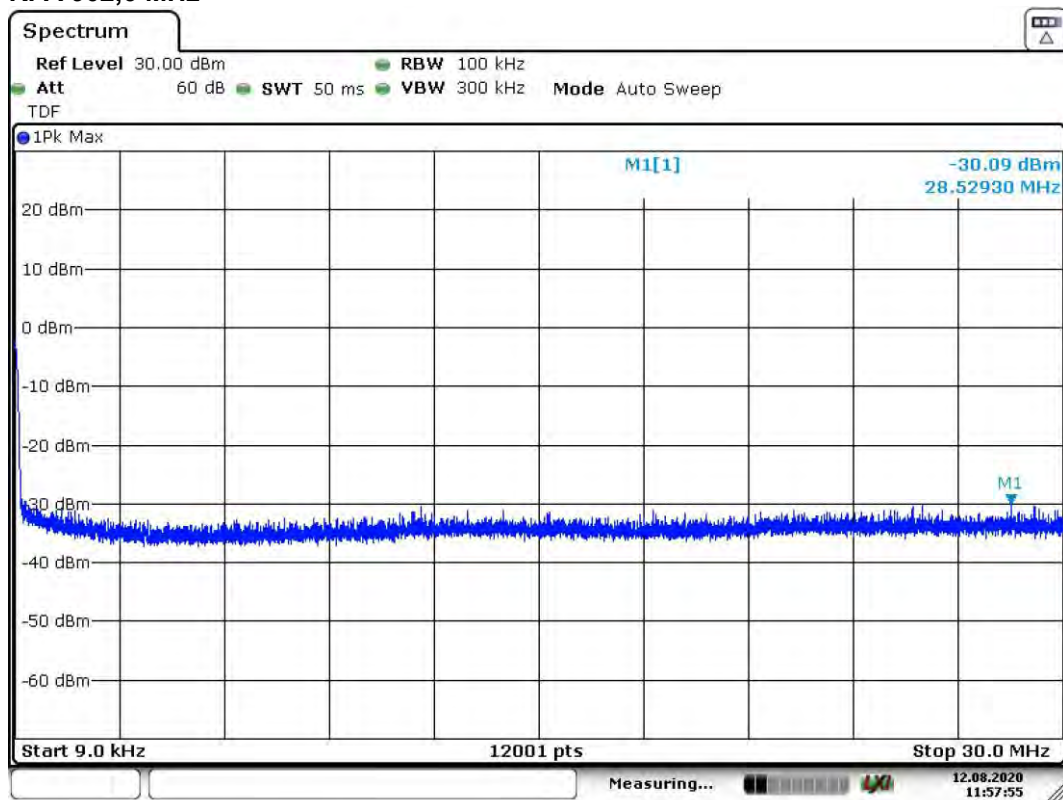
Requirement:

In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

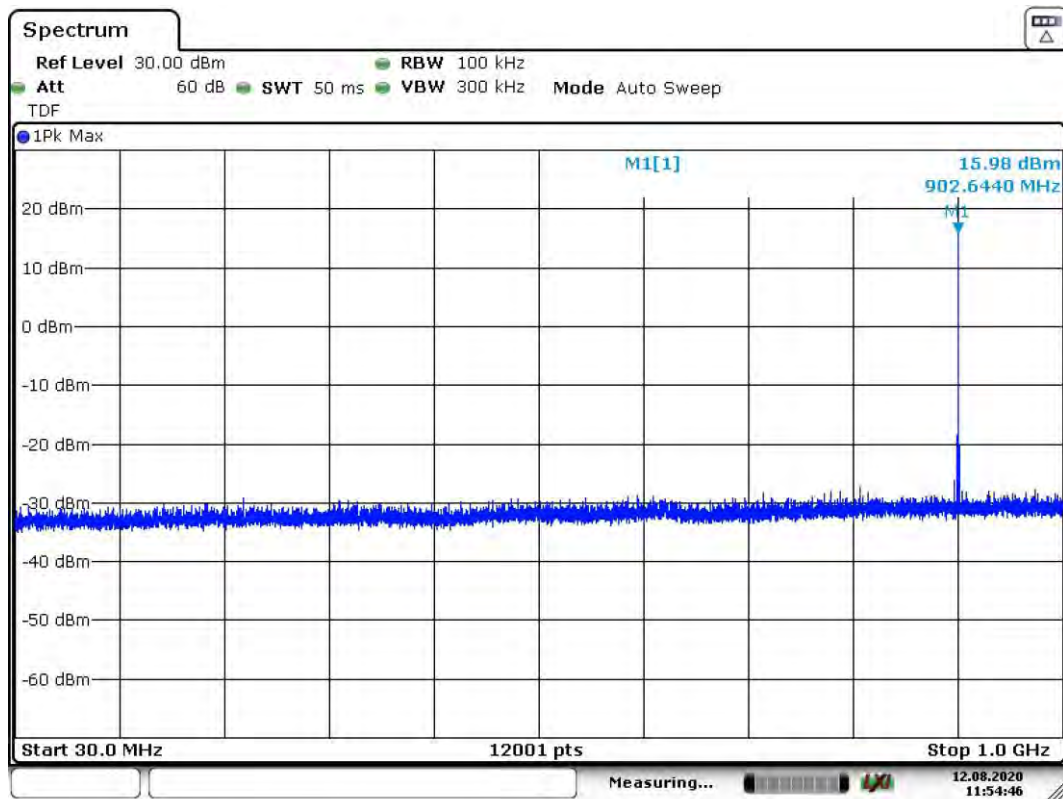
Test Procedure

As per Clause 7.8.8 from ANSI C63.10-2013

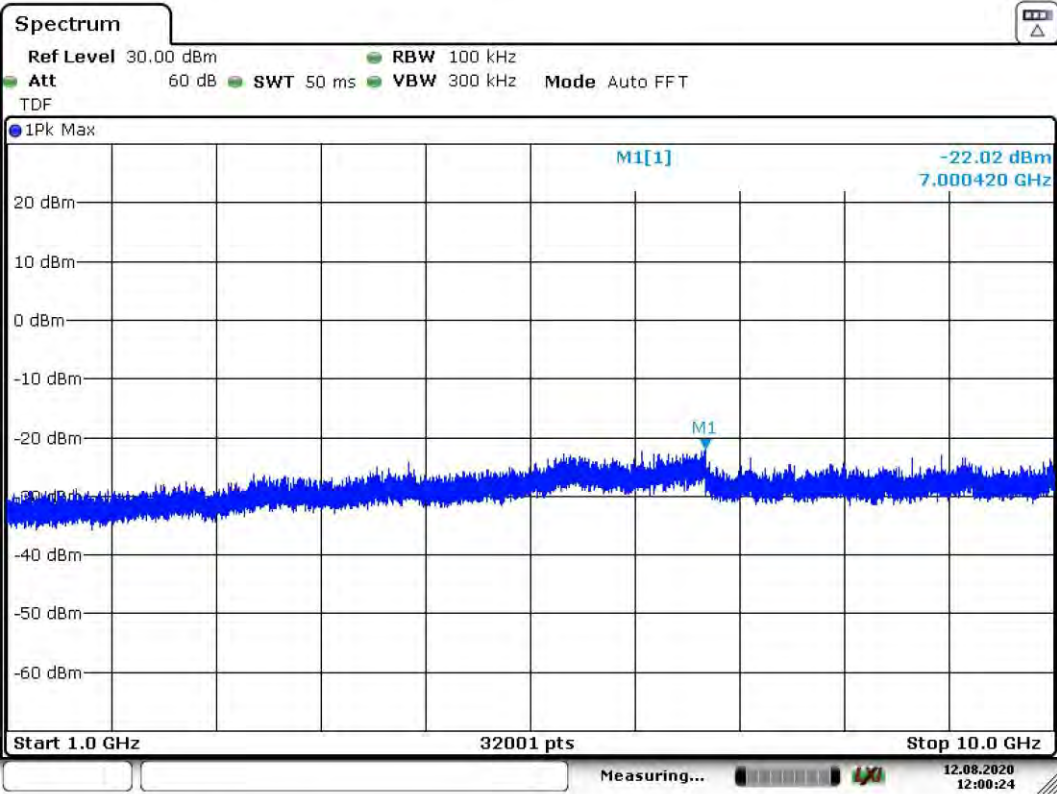
Conclusion: PASS

Test results
RFA 902,6 MHz

RFA Conducted spurious emission

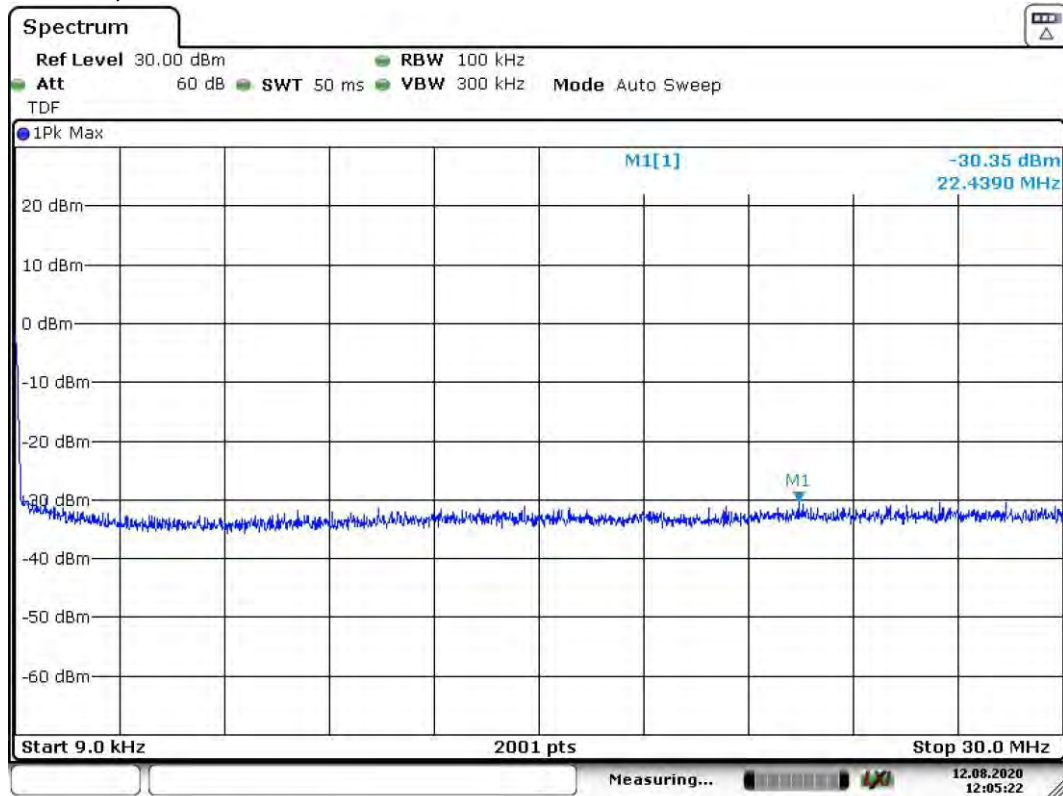


RFA Conducted spurious emission

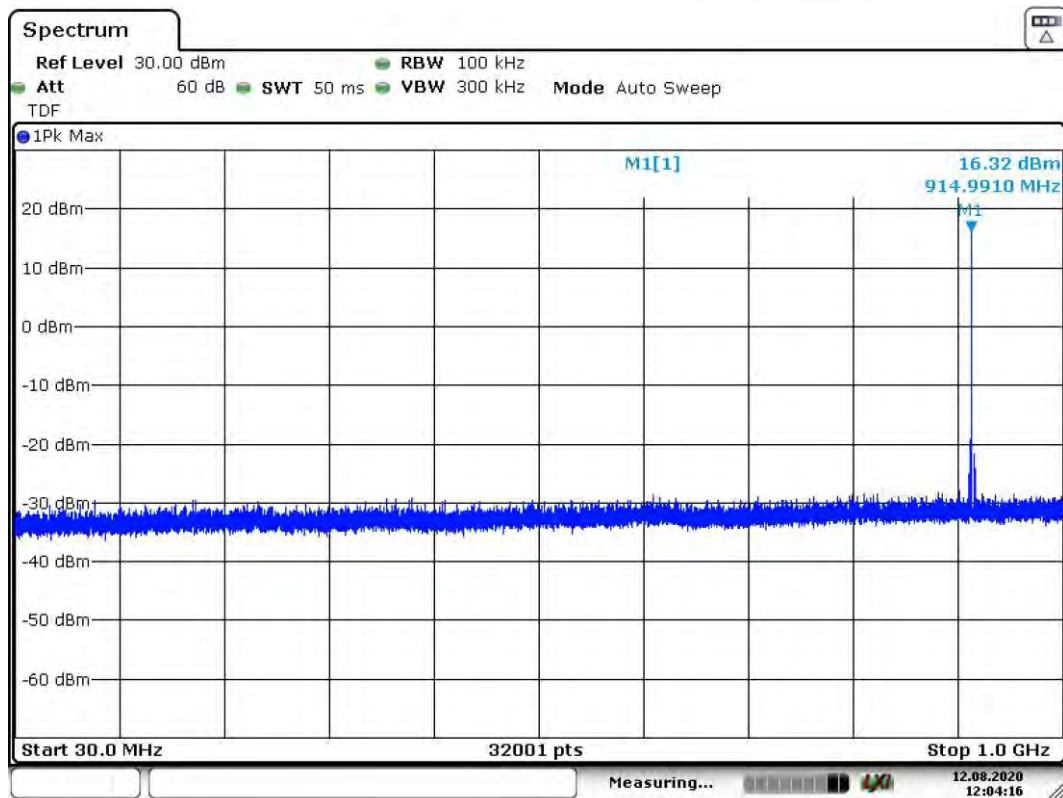


RFA Conducted spurious emission

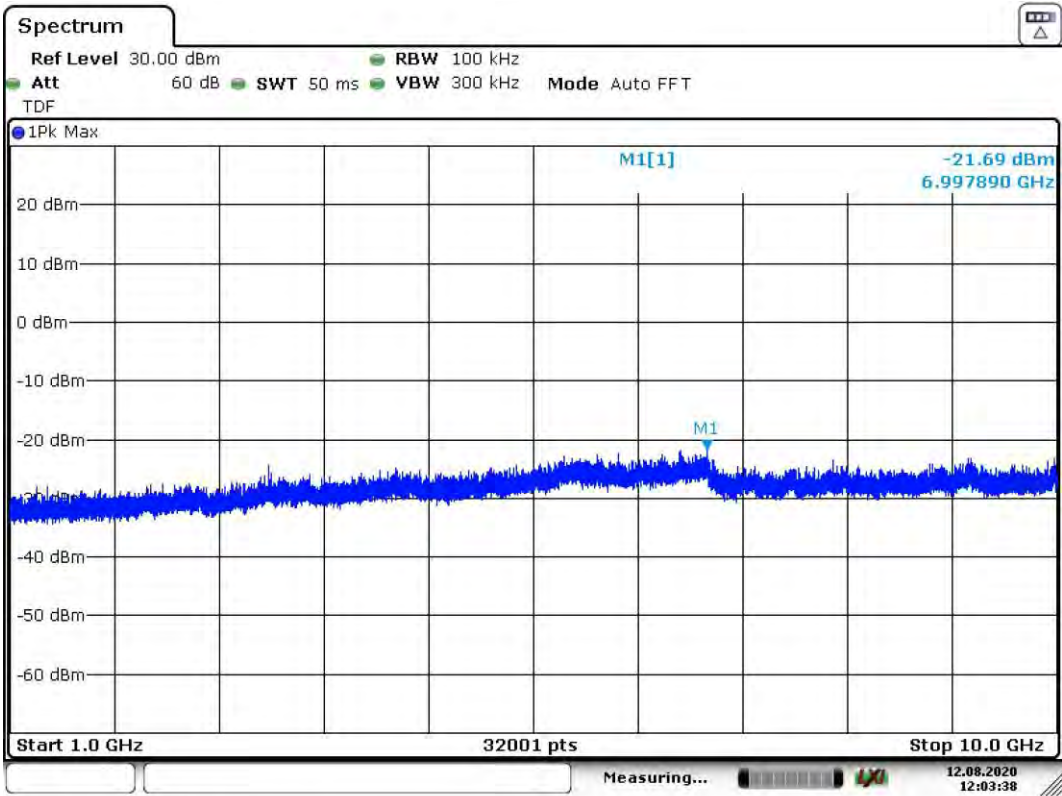
RFA 915,0 MHz



RFA Conducted spurious emission

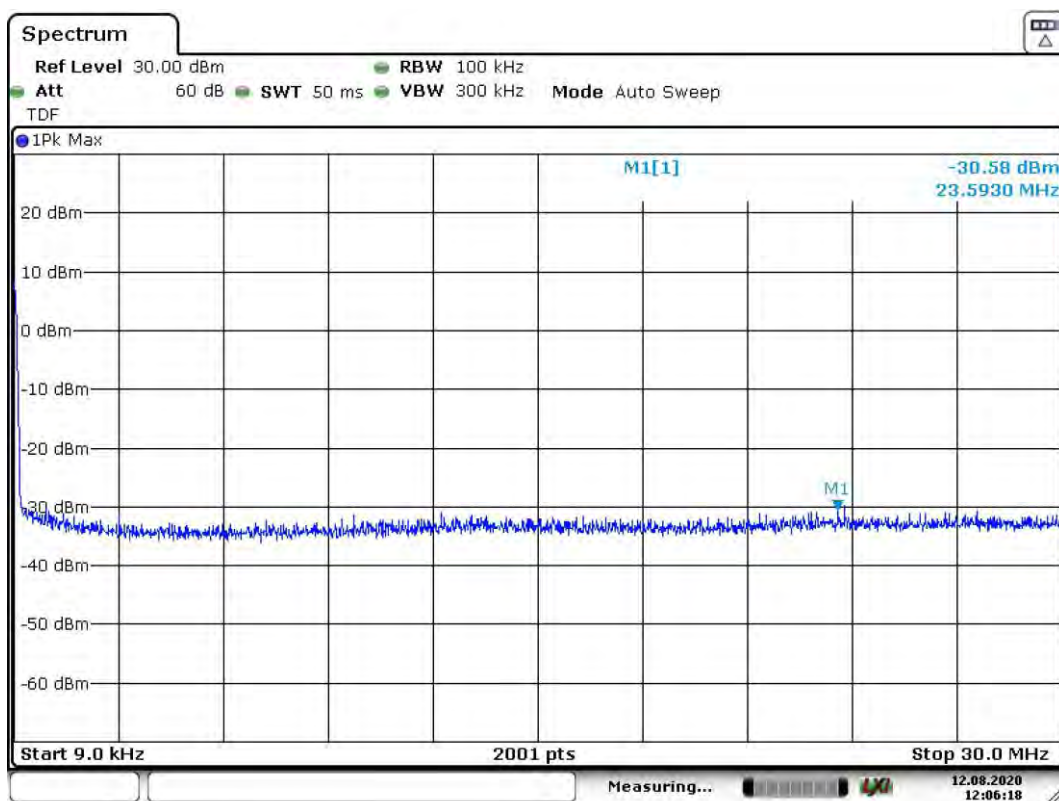


RFA Conducted spurious emission

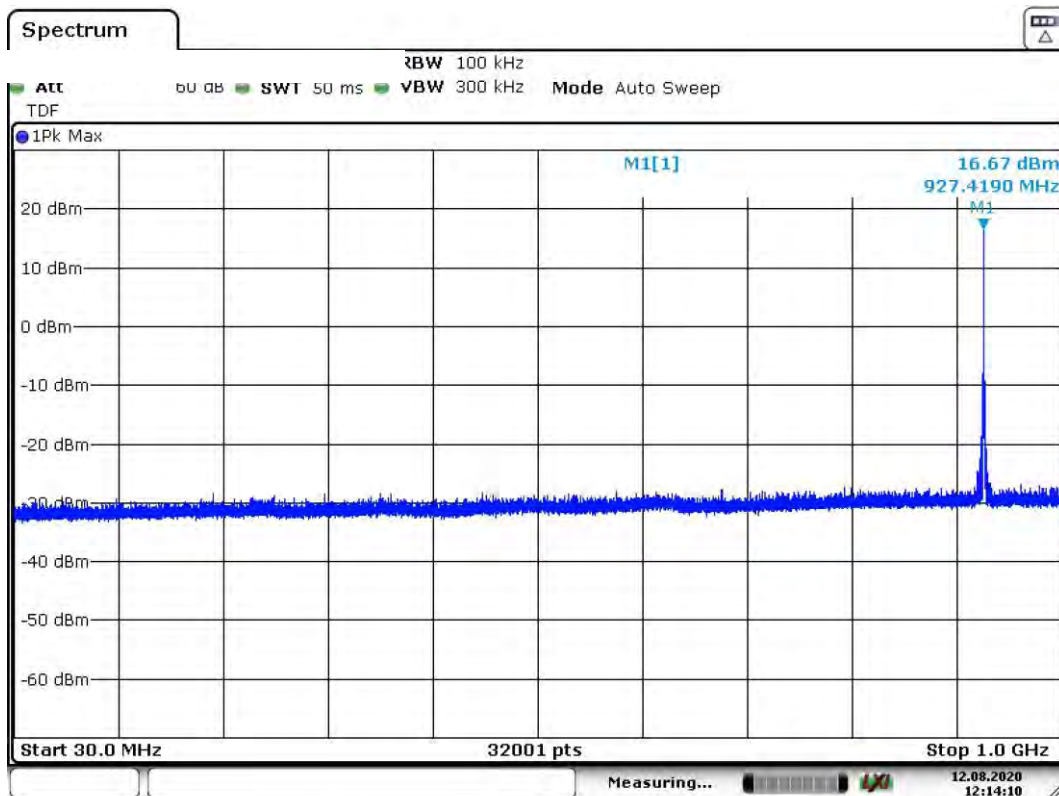


RFA Conducted spurious emission

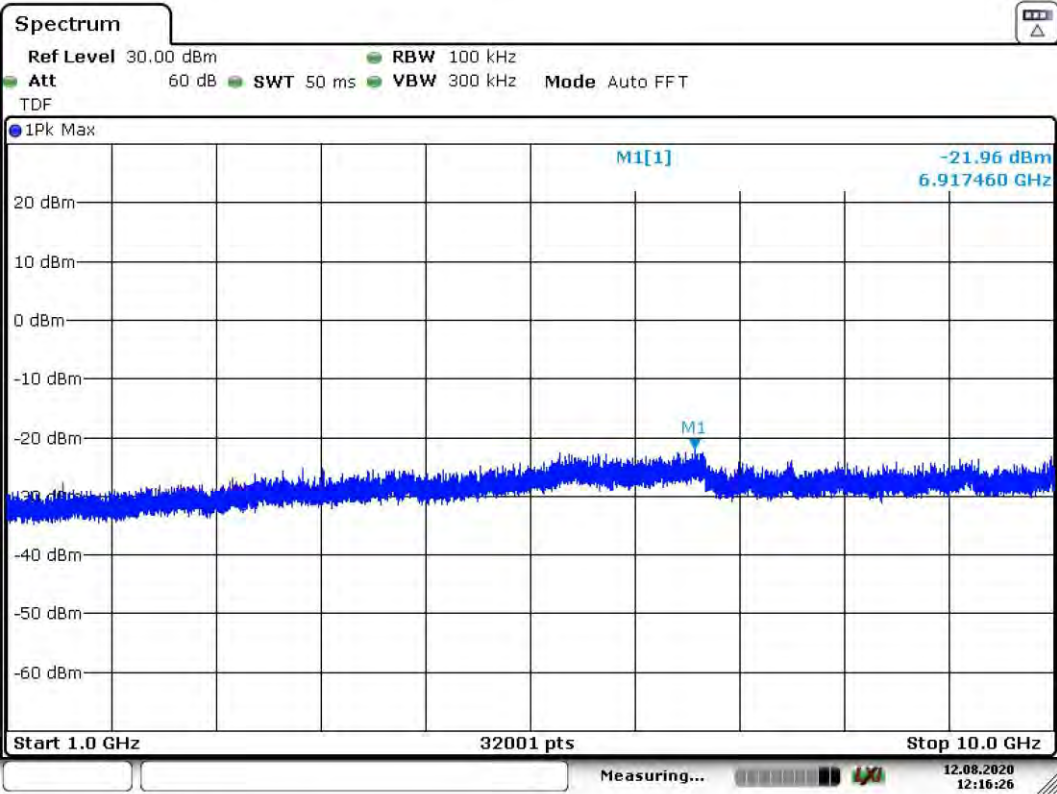
RFA 927,4 MHz



RFA Conducted spurious emission

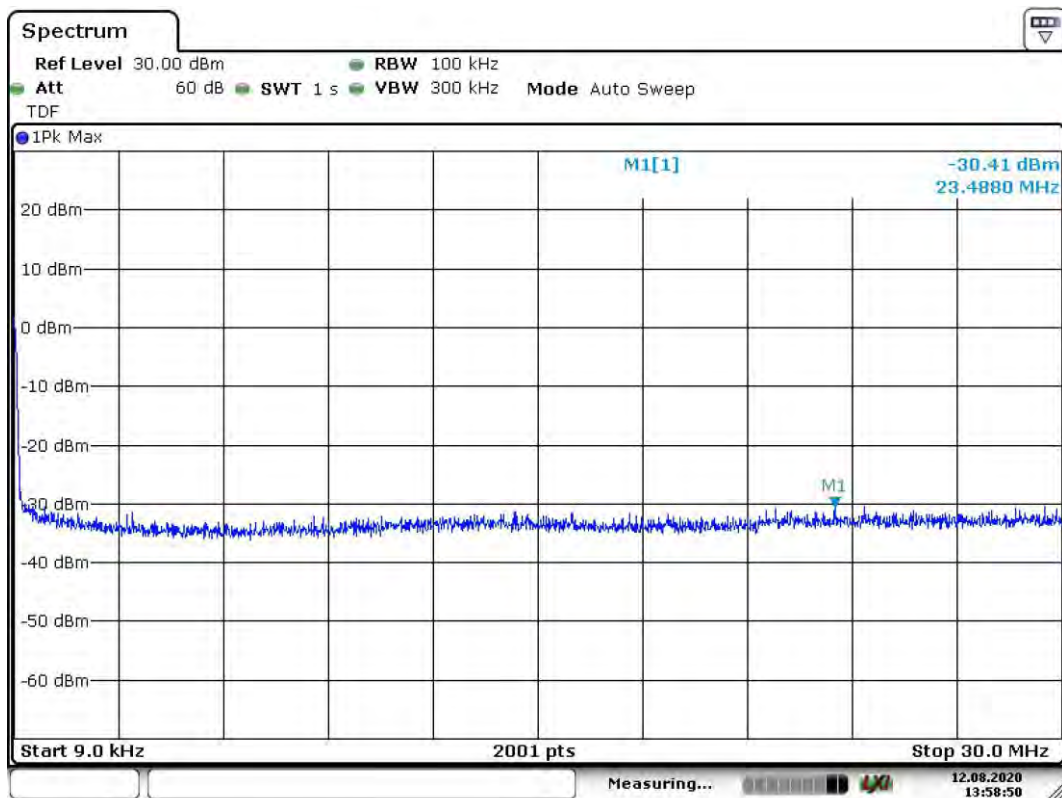


RFA Conducted spurious emission

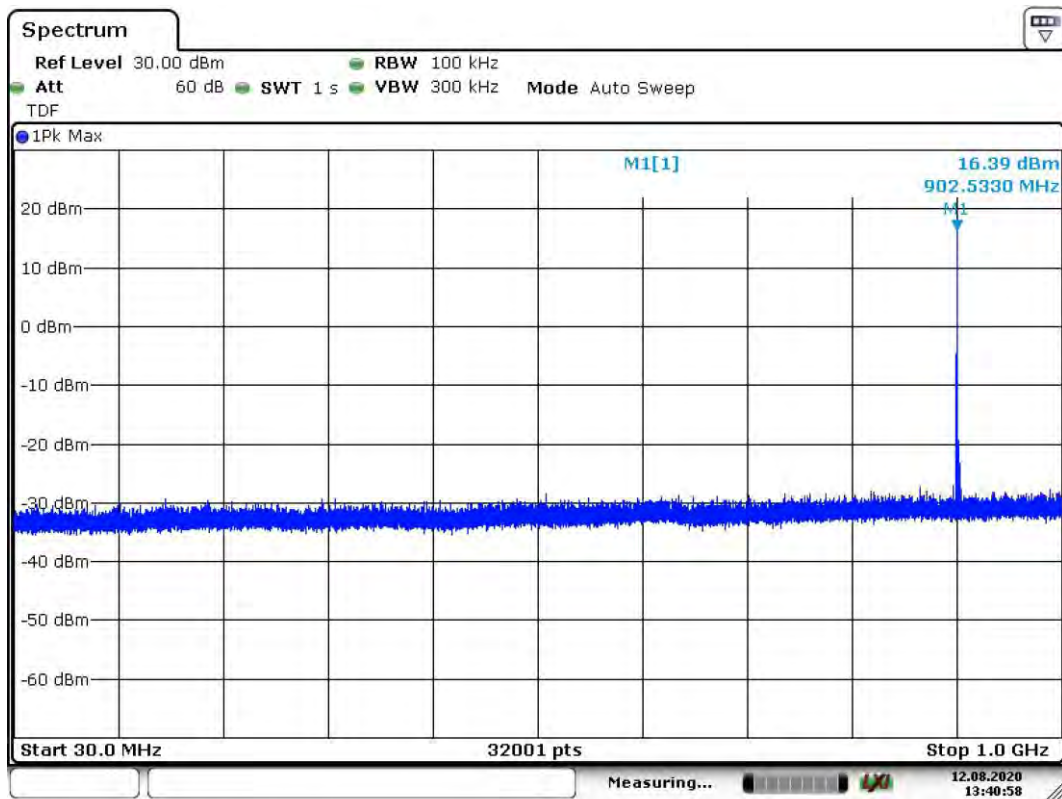


RFA Conducted spurious emission

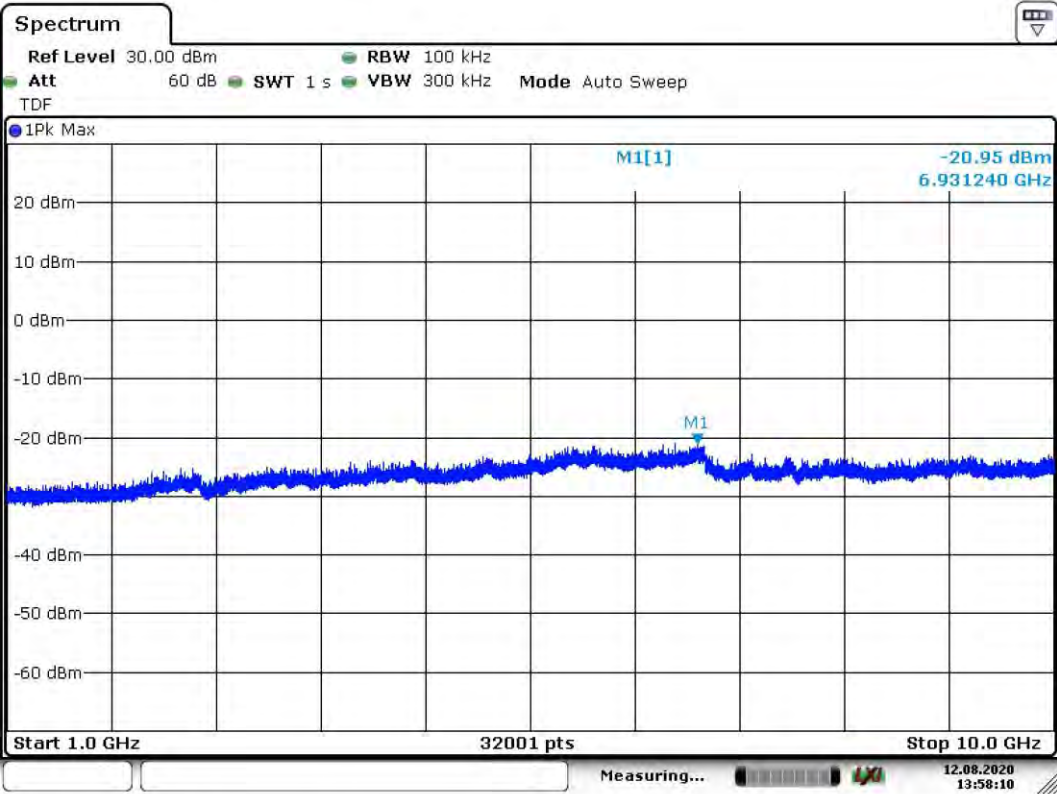
RFB 902,6 MHz



RFB Conducted spurious emission

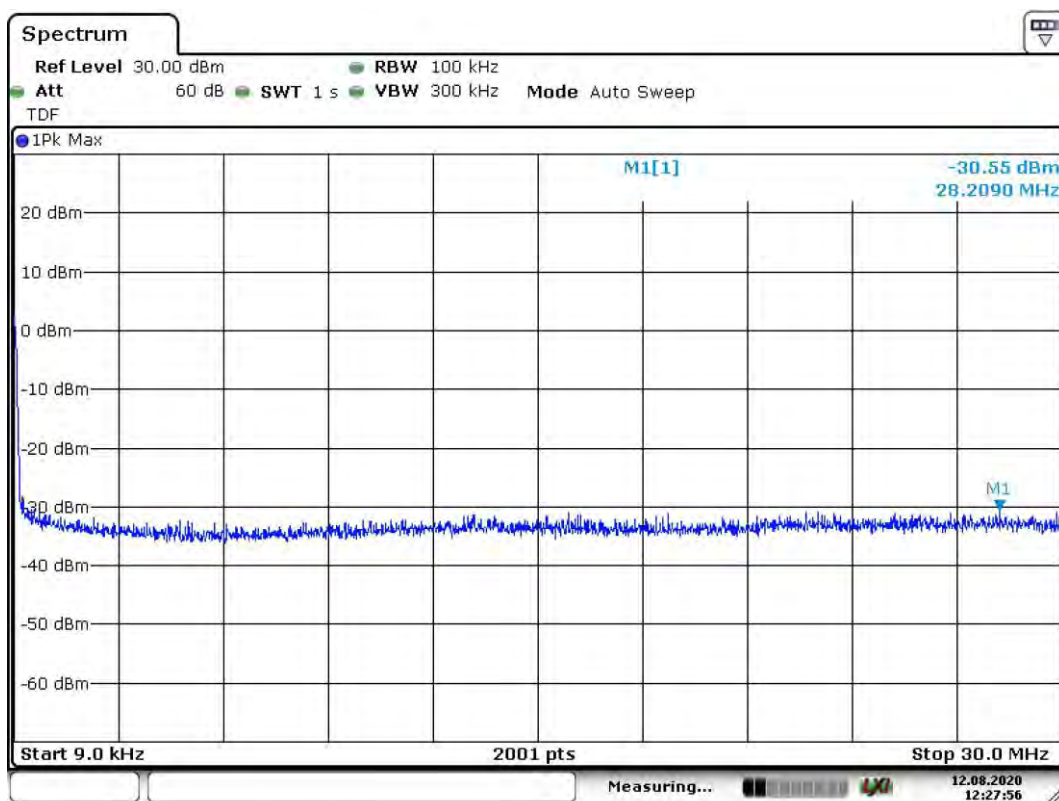


RFB Conducted spurious emission

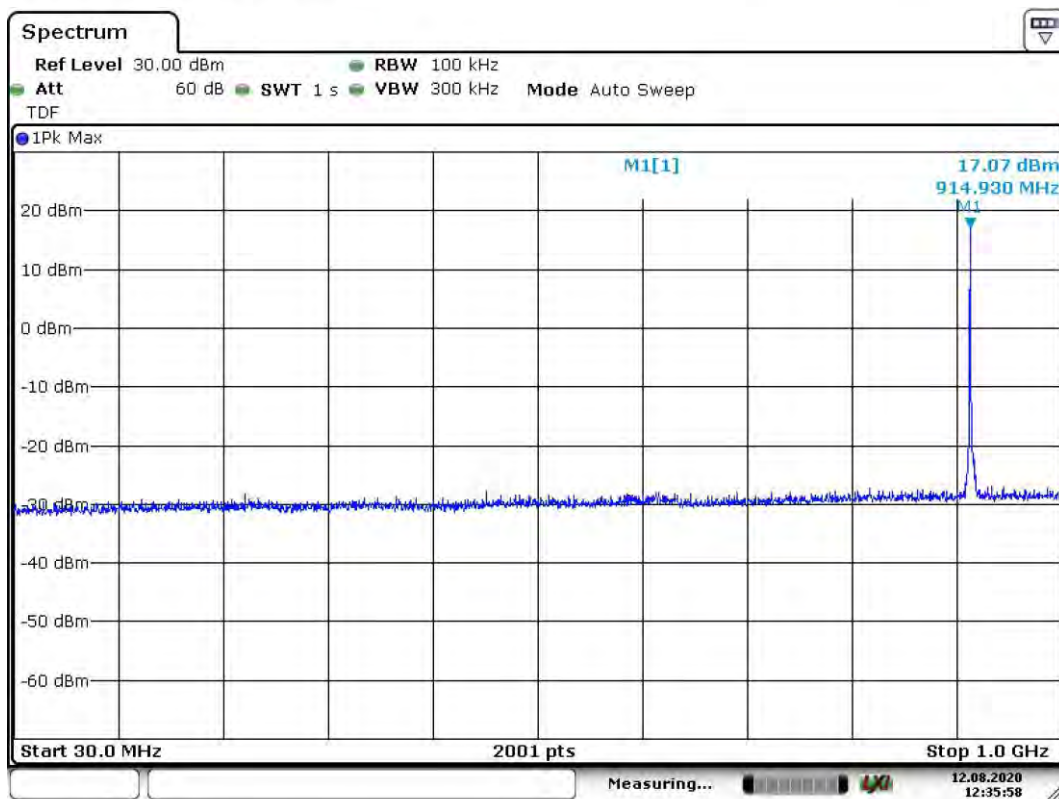


RFB Conducted spurious emission

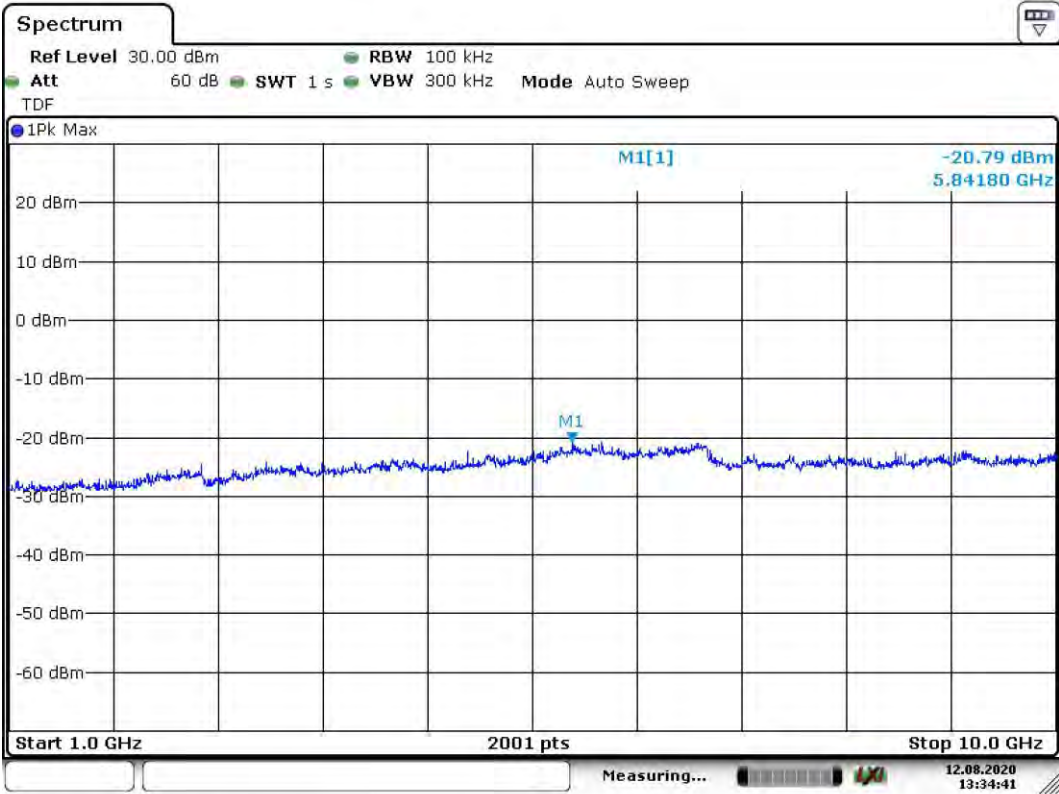
RFB 915,0 MHz



RFB Conducted spurious emission

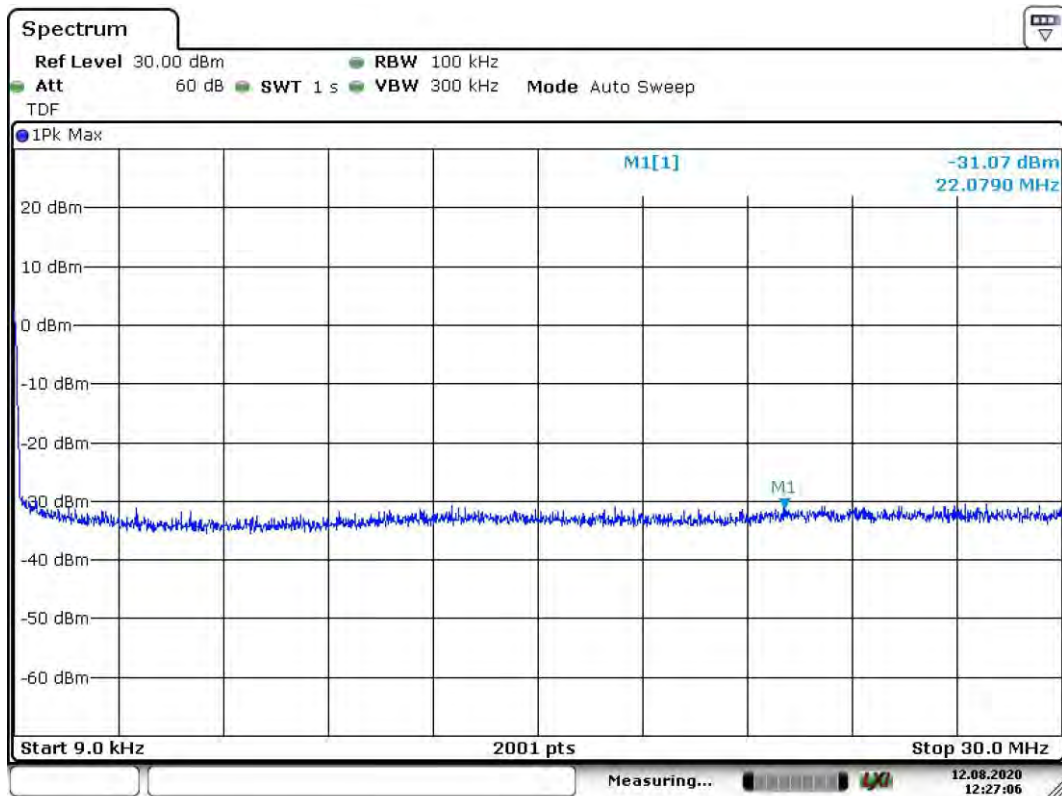


RFB Conducted spurious emission

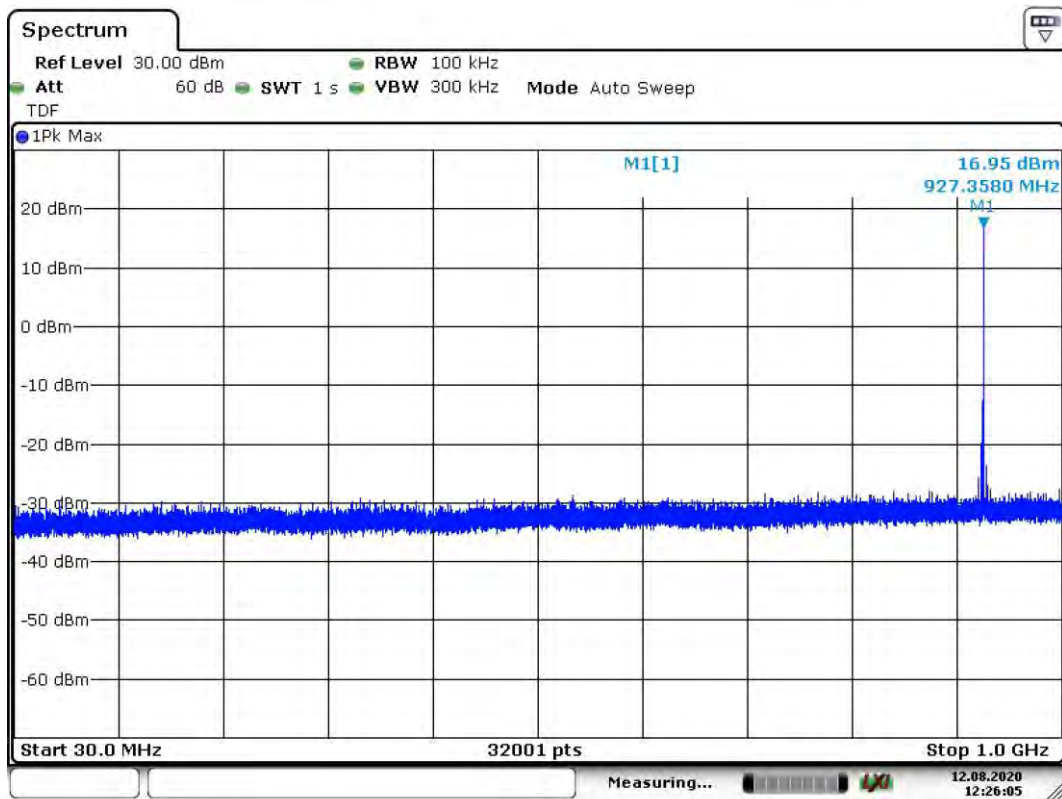


RFB Conducted spurious emission

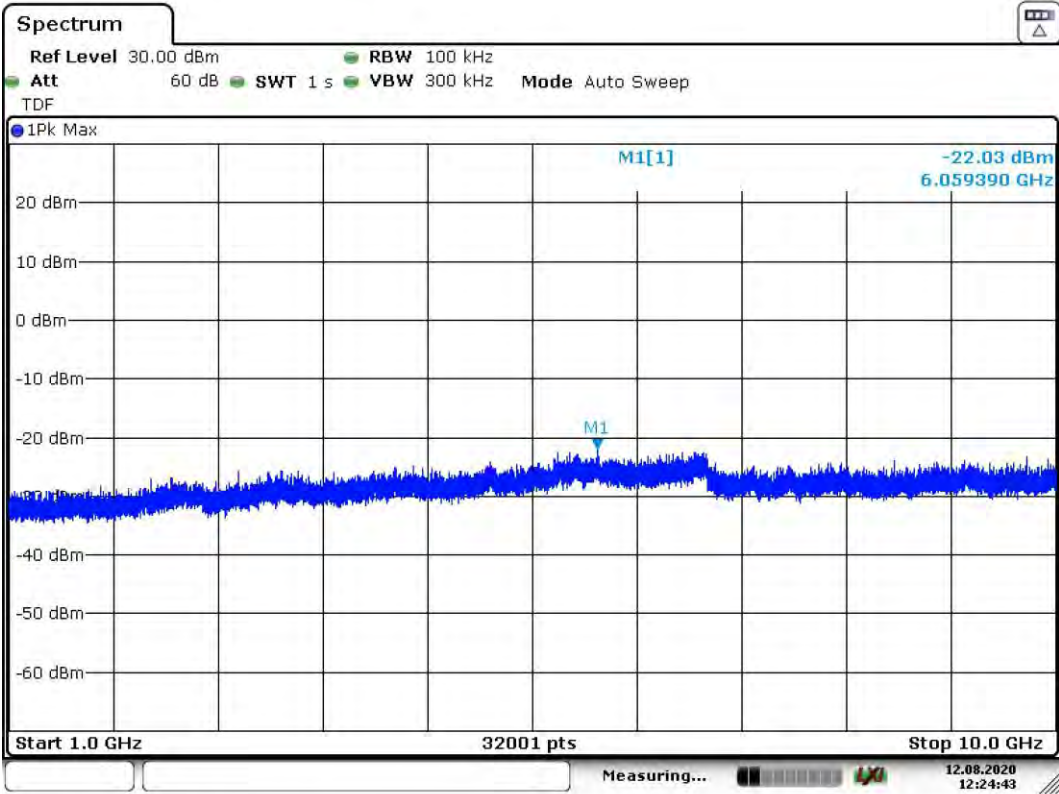
RFB 927,4 MHz



RFB Conducted spurious emission



RFB Conducted spurious emission



RFB Conducted spurious emission



3.10 §15.247 Radiated Spurious Emissions

Requirements

§15.35 Measurement detector functions and bandwidths

(b) Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, e.g., see §§15.250, 15.252, 15.253(d), 15.255, 15.256, and 15.509 through 15.519 of this part, the limit on peak radio frequency emissions is 20 dB 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, e.g., the total peak power level. Note that the use of a pulse desensitization correction factor may be needed to determine the total peak emission level. The instruction manual or application note for the measurement instrument should be consulted for determining pulse desensitization factors, as necessary.

§15.209 Radiated emission limit

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency Range (MHz)	Limits (dBµV/m)	Test distance (m)
0,009 to 0,490	$20 \cdot \log(2400/F(\text{kHz}))$	300
0,490 to 1,705	$20 \cdot \log(24000/F(\text{kHz}))$	30
1,705 to 30,0	30	30
30 to 88	40**	3
88 to 216	43.5**	3
216 to 960	46**	3
Above 960	54	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

§15.205 Restricted bands of operation

Requirement

Except as shown in paragraph (d) of §15.205 only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6

Test procedure

As per Clauses 6.3, 6.4, 6.5 and 6.6 from ANSI C63.10-2013

Conclusion: PASS

Test results

EUT Information

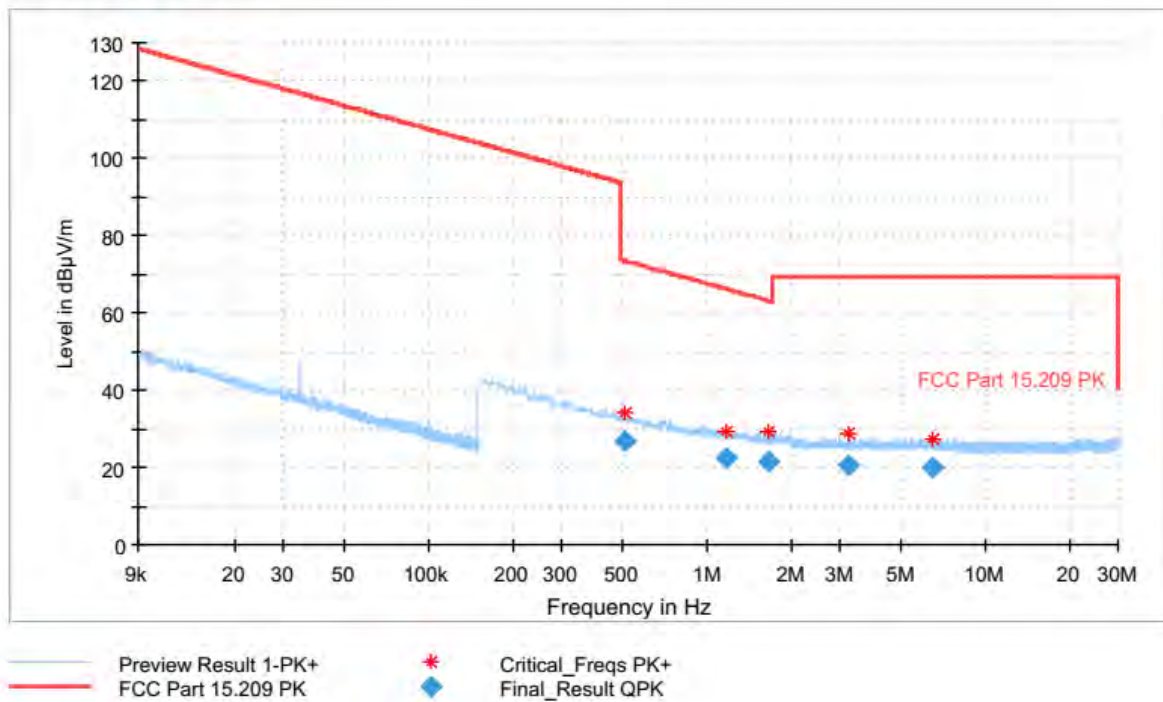
EUT

Operating condition:

PowerFLARM FUSION

TX 902,6 MHz, RFA

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
0.507750	27.10	73.49	46.39	H	0.0	19.1
1.167000	22.61	66.28	43.68	H	92.0	19.1
1.666500	21.40	63.20	41.80	H	268.0	19.1
3.241500	20.38	69.50	49.12	H	92.0	19.2
6.420750	20.21	69.50	49.29	H	180.0	19.2

EUT Information

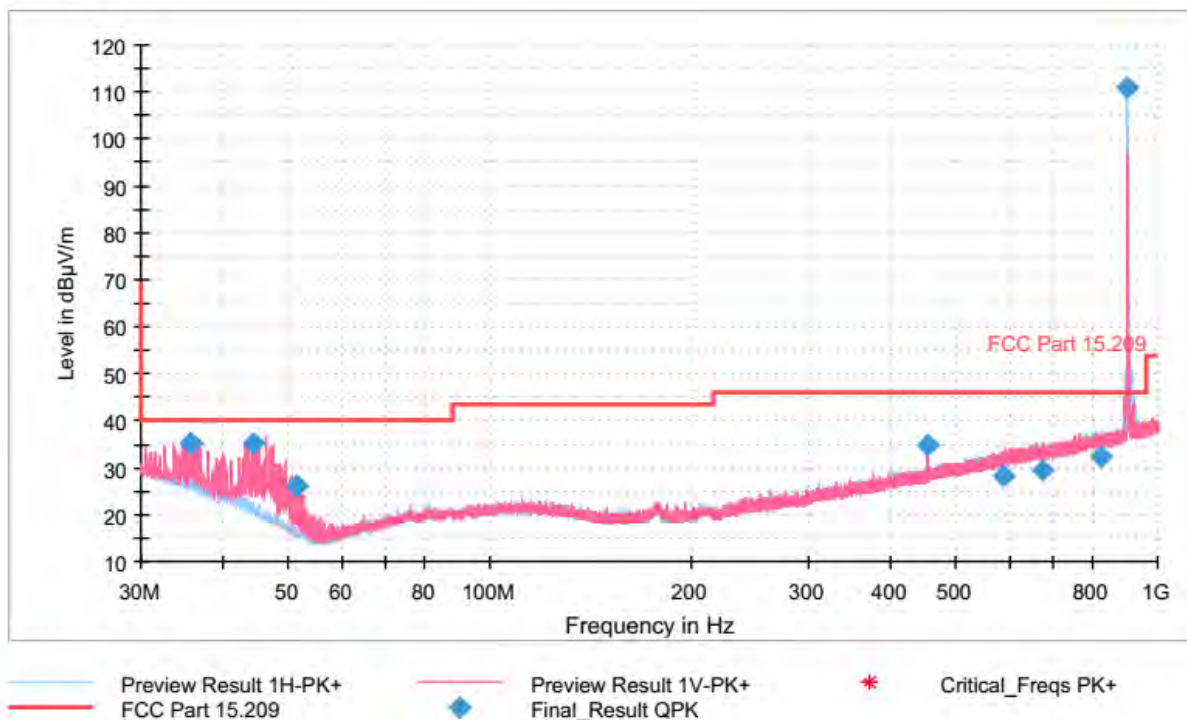
EUT

Operating condition:

PowerFLARM Fusion

TX 902,6 MHz, RFA

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
35.730000	35.16	40.00	4.84	100.0	V	113.0
35.760000	35.27	40.00	4.73	100.0	V	113.0
44.190000	35.15	40.00	4.85	100.0	V	78.0
51.540000	26.11	40.00	13.89	100.0	V	182.0
451.320000	34.64	46.00	11.36	100.0	H	247.0
586.440000	28.21	46.00	17.79	150.0	V	0.0
674.190000	29.54	46.00	16.46	150.0	V	251.0
824.640000	32.22	46.00	13.78	135.0	H	0.0
902.520000	110.70	46.00	-64.70	100.0	H	0.0

EUT Information

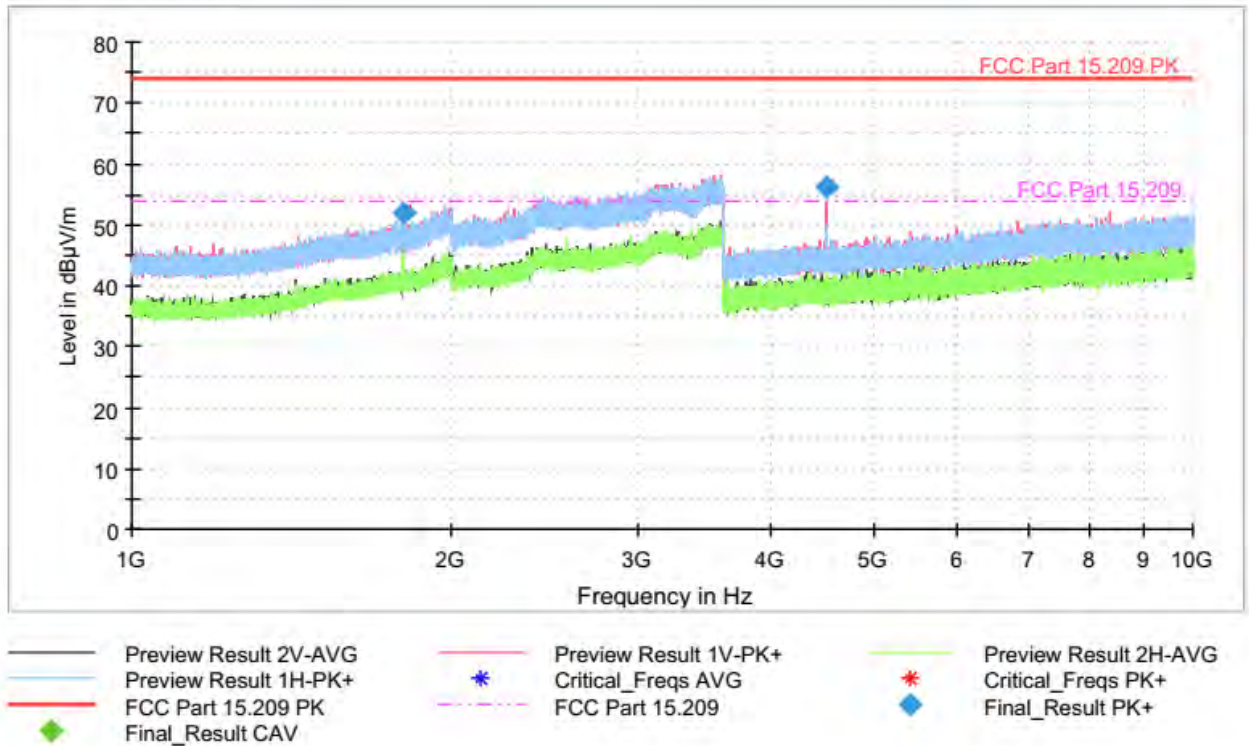
EUT

Operating condition:

PowerFLARM Fusion

TX 902.6 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1805.393333	51.91	74.00	22.09	105.0	V	12.0
4513.066667	56.07	74.00	17.93	132.0	V	54.0

EUT Information

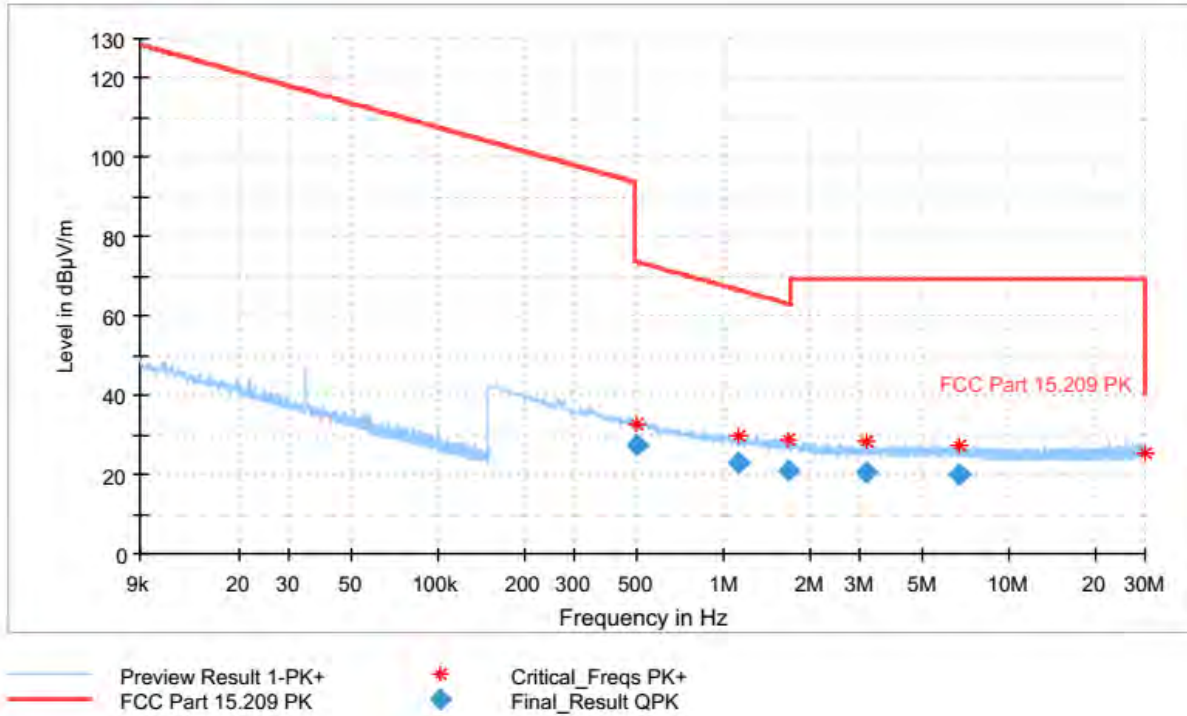
EUT

Operating condition:

PowerFLARM FUSION

TX 915.0 MHz, RFA

Full Spectrum



Final Result

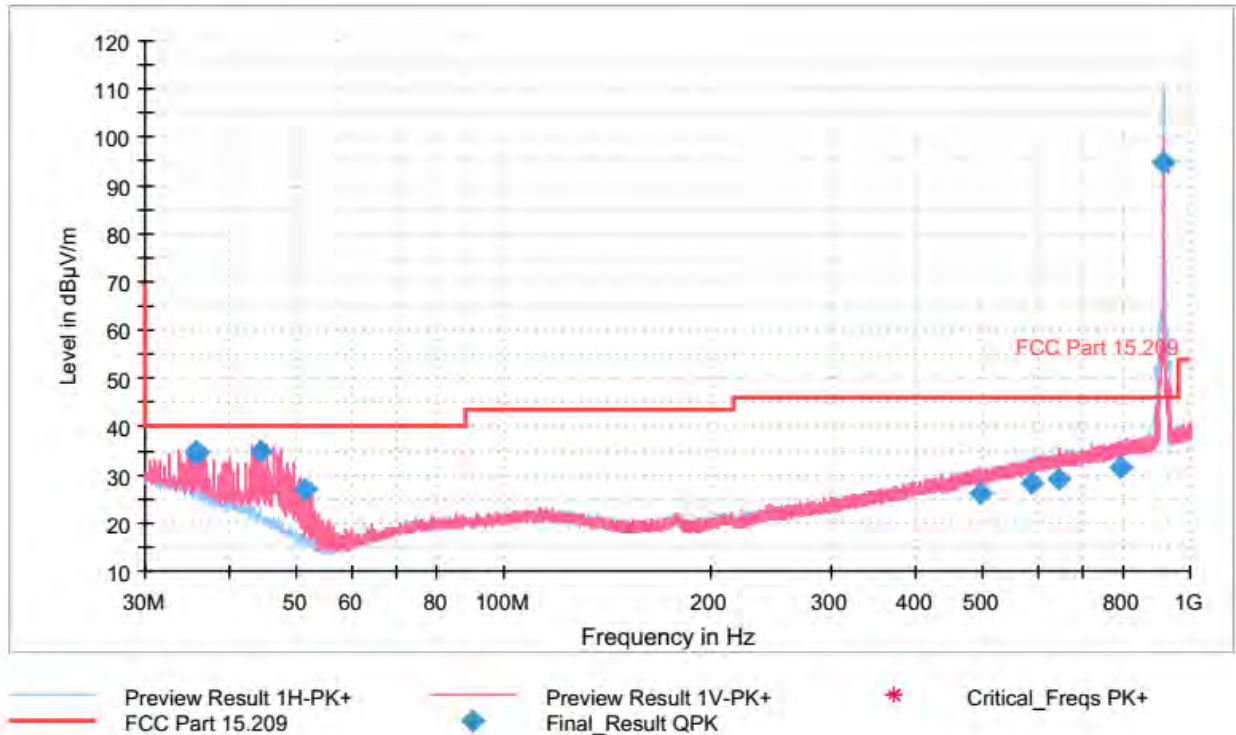
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
0.501000	27.26	73.61	46.34	H	0.0	19.1
1.119750	22.74	66.64	43.90	H	0.0	19.1
1.698000	21.20	63.04	41.84	H	0.0	19.1
3.151500	20.36	69.50	49.14	H	0.0	19.2
6.659250	20.03	69.50	49.47	H	0.0	19.2

EUT Information

EUT
Operating condition:

PowerFLARM Fusion
TX 915 MHz, RFA

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
35.730000	34.42	40.00	5.58	100.0	V	43.0
35.760000	34.77	40.00	5.23	100.0	V	43.0
44.130000	35.00	40.00	5.00	103.0	V	9.0
51.510000	26.97	40.00	13.03	100.0	V	149.0
494.460000	26.01	46.00	19.99	103.0	V	218.0
586.080000	28.26	46.00	17.74	100.0	H	320.0
643.710000	28.95	46.00	17.05	150.0	V	9.0
795.750000	31.52	46.00	14.48	103.0	H	355.0
914.820000	94.90	46.00	-48.90	100.0	H	0.0

EUT Information

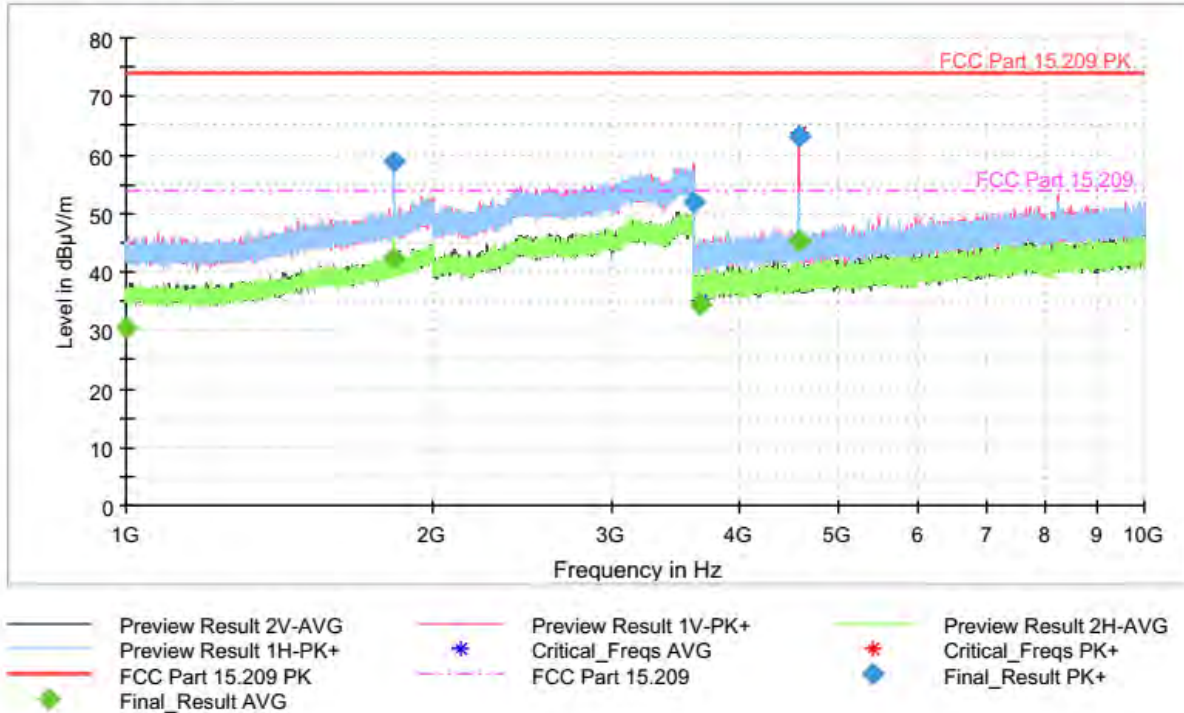
EUT

Operating condition:

PowerFLARM Fusion

TX 915.0 MHz

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1000.000000	---	54.00	23.72	180.0	V	0.0
1830.006667	58.98	74.00	15.02	149.0	H	325.0
1830.006667	---	54.00	11.53	144.0	H	325.0
3600.000000	52.00	74.00	22.00	159.0	V	313.0
3659.946667	---	54.00	19.54	117.0	H	325.0
4574.720000	---	54.00	8.79	104.0	V	56.0
4574.720000	63.16	74.00	10.84	130.0	V	56.0

EUT Information

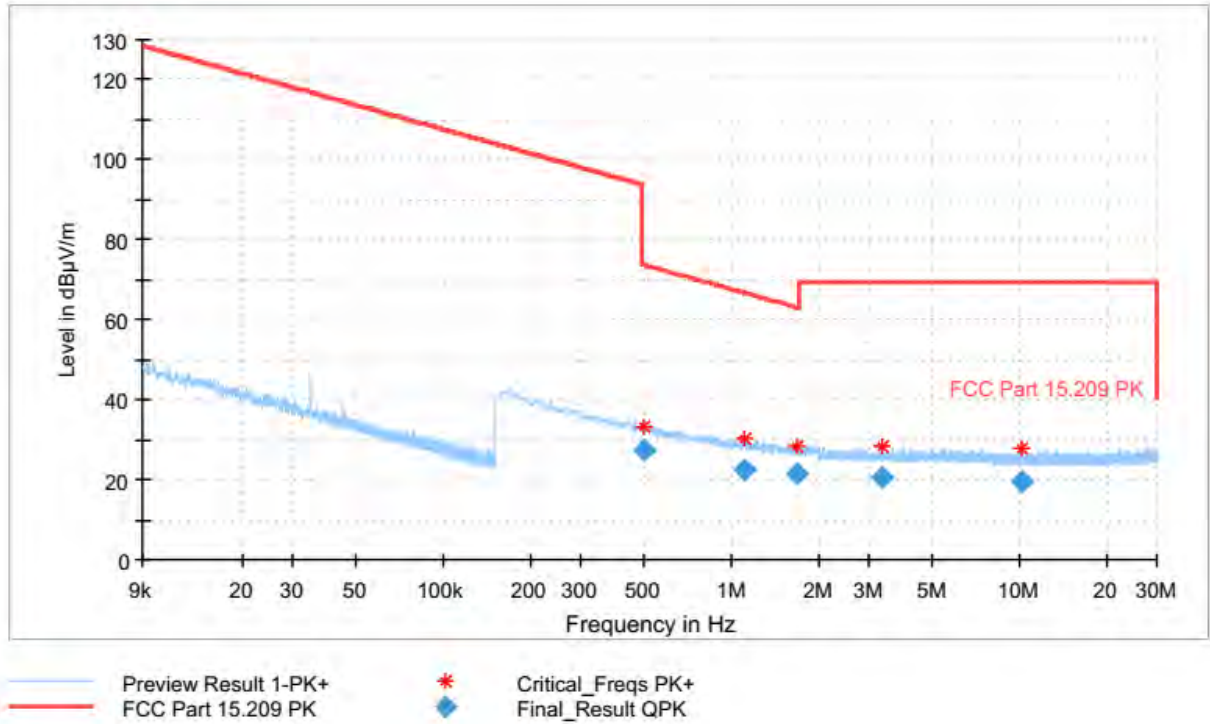
EUT

Operating condition:

PowerFLARM FUSION

TX 927.4 MHz, RFA

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Azimuth h (deg)	Corr. (dB/m)
0.501000	27.17	73.61	46.44	H	0.0	19.1
1.113000	22.70	66.69	43.99	H	0.0	19.1
1.673250	21.29	63.16	41.87	H	0.0	19.1
3.302250	20.37	69.50	49.13	H	0.0	19.2
10.144500	19.40	69.50	50.10	H	0.0	19.2

EUT Information

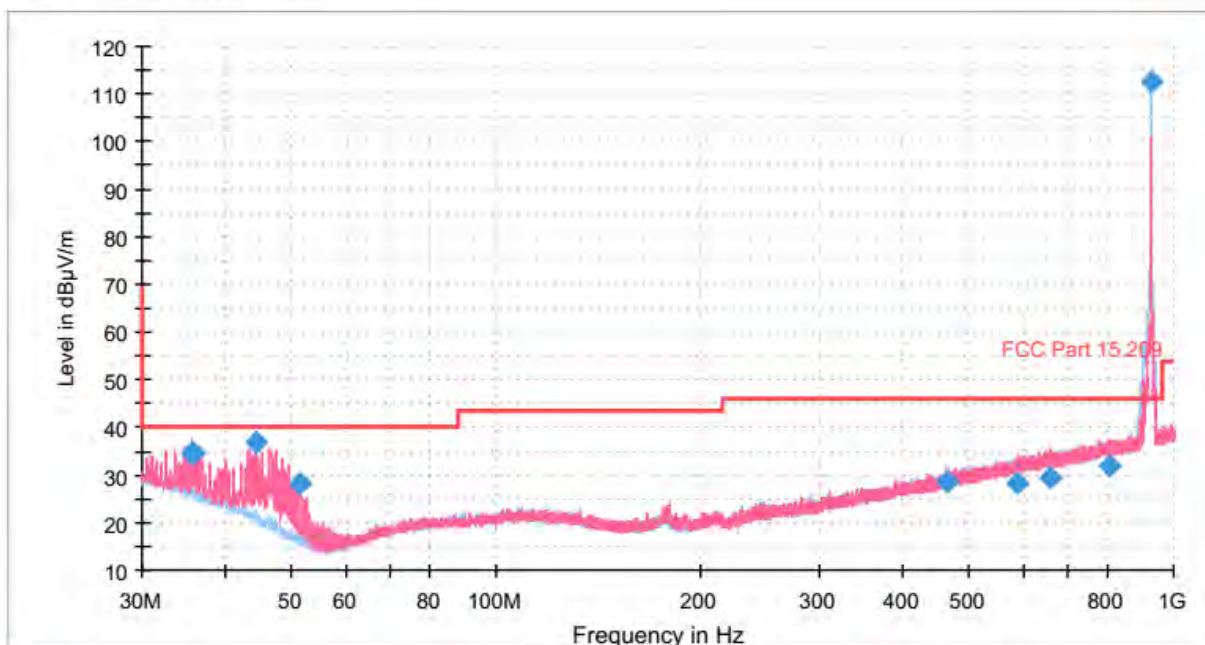
EUT

Operating condition:

PowerFLARM Fusion

TX 927,4 MHz, RFA

Full Spectrum



— Preview Result 1H-PK+ — Preview Result 1V-PK+ * Critical_Freqs PK+
— FCC Part 15.209 ◆ Final_Result QPK

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
35.730000	34.87	40.00	5.13	100.0	V	43.0
35.760000	34.41	40.00	5.59	100.0	V	147.0
44.160000	36.73	40.00	3.27	100.0	V	112.0
51.510000	28.39	40.00	11.61	100.0	V	112.0
463.680000	28.80	46.00	17.20	100.0	H	250.0
587.790000	28.23	46.00	17.77	100.0	V	0.0
657.390000	29.58	46.00	16.42	150.0	V	321.0
806.100000	31.77	46.00	14.23	134.0	V	286.0
927.390000	112.61	46.00	-66.61	100.0	H	145.0

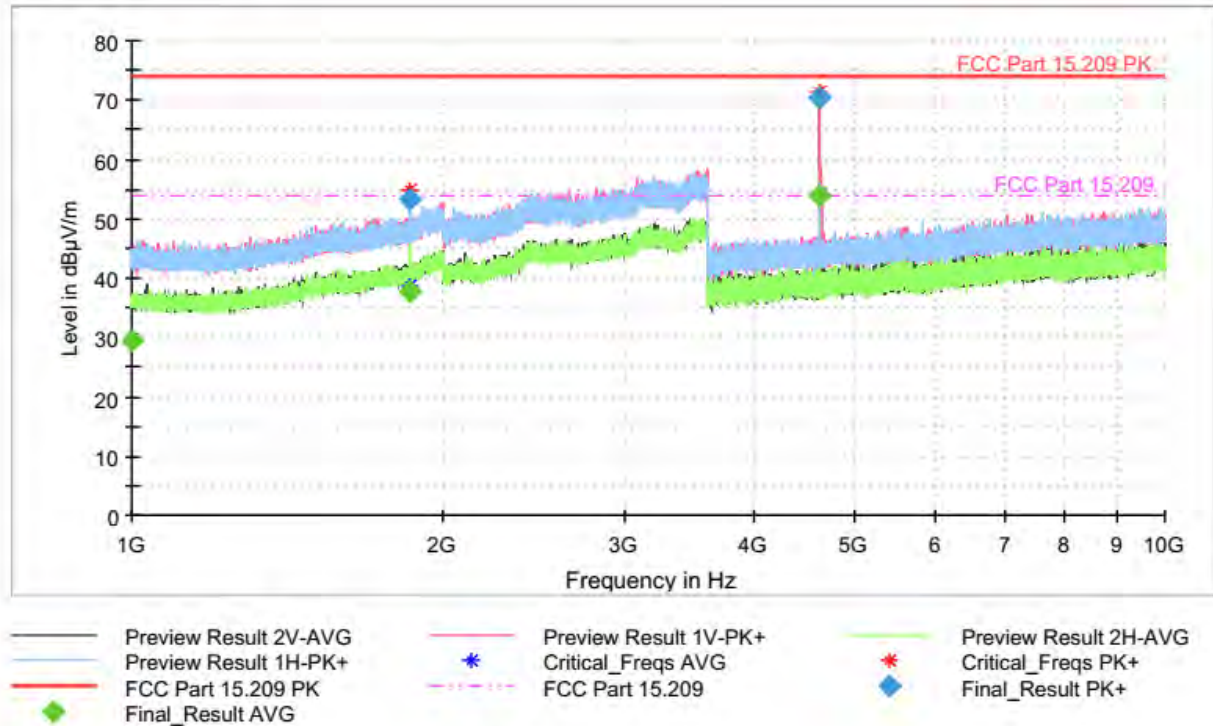
EUT Information

EUT

Operating condition:

PowerFLARM Fusion
TX 927,4 MHz, RFA

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1000.000000	---	54.00	24.71	180.0	V	231.0
1854.706667	53.29	74.00	20.71	144.0	H	297.0
1854.706667	---	54.00	16.26	147.0	H	297.0
4637.013333	---	54.00	0.15	115.0	V	94.0
4637.013333	70.52	74.00	3.48	117.0	V	94.0

EUT Information

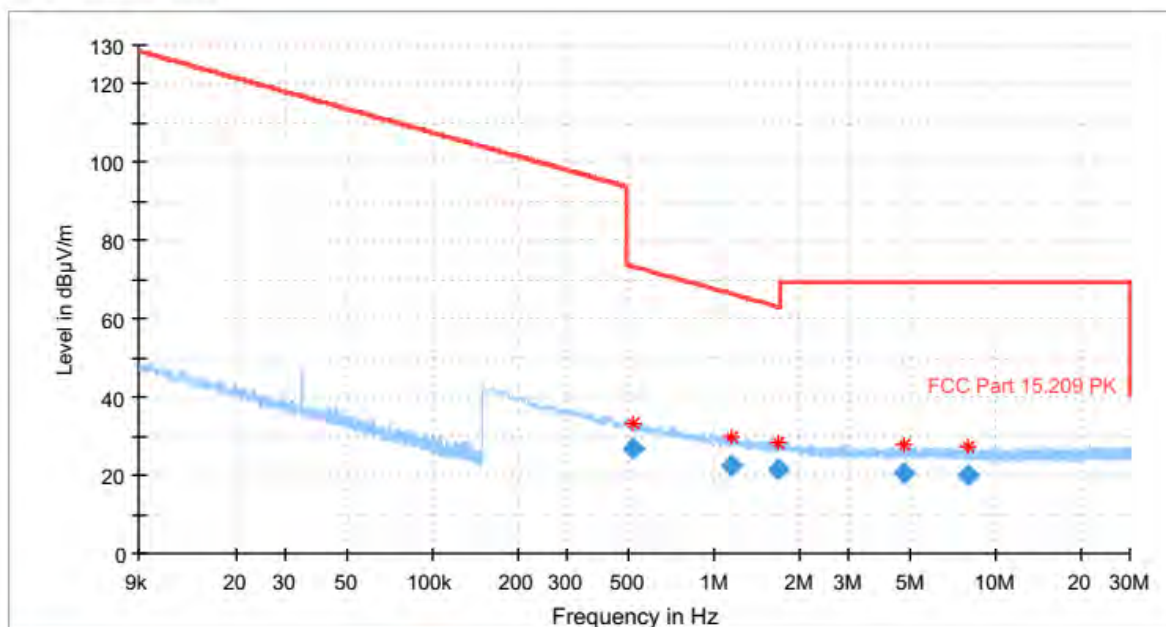
EUT

Operating condition:

PowerFLARM FUSION

TX 902,6 MHz, RFB

Full Spectrum



— Preview Result 1-PK+
— FCC Part 15.209 PK

* Critical_Freqs PK+
◆ Final_Result QPK

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
0.519000	26.97	73.30	46.33	H	0.0	19.1
1.142250	22.68	66.47	43.79	H	0.0	19.1
1.700250	21.32	63.02	41.71	H	0.0	19.1
4.740000	20.35	69.50	49.15	H	0.0	19.2
7.998000	19.96	69.50	49.54	H	0.0	19.2

EUT Information

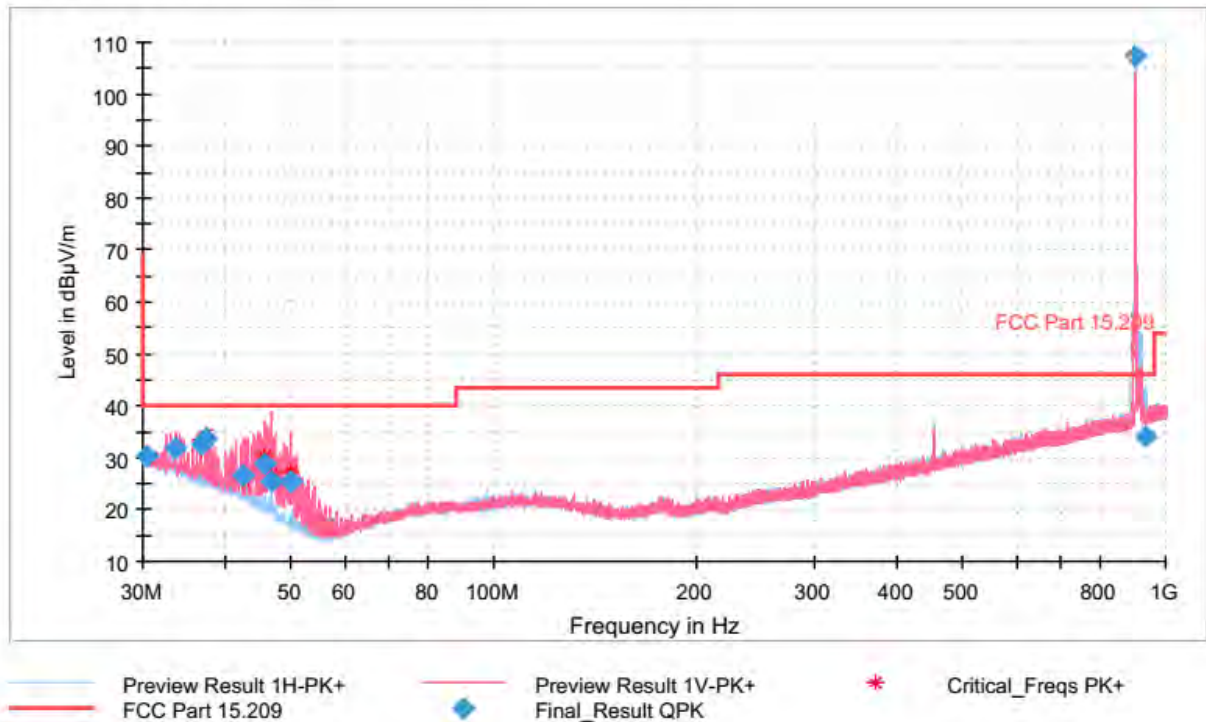
EUT

Operating condition:

PowerFLARM Fusion

TX 902,6 MHz, RFB

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
30.420000	30.14	40.00	9.86	100.0	V	354.0
33.570000	31.78	40.00	8.22	100.0	V	354.0
36.720000	32.68	40.00	7.32	100.0	V	354.0
37.230000	33.65	40.00	6.35	100.0	V	0.0
42.450000	26.58	40.00	13.42	150.0	V	0.0
45.600000	28.94	40.00	11.06	100.0	V	0.0
46.650000	25.46	40.00	14.54	106.0	V	0.0
49.800000	25.33	40.00	14.67	100.0	V	40.0
902.490000	107.33	46.00	-61.33	100.0	H	0.0
932.910000	34.24	46.00	11.76	150.0	H	0.0

EUT Information

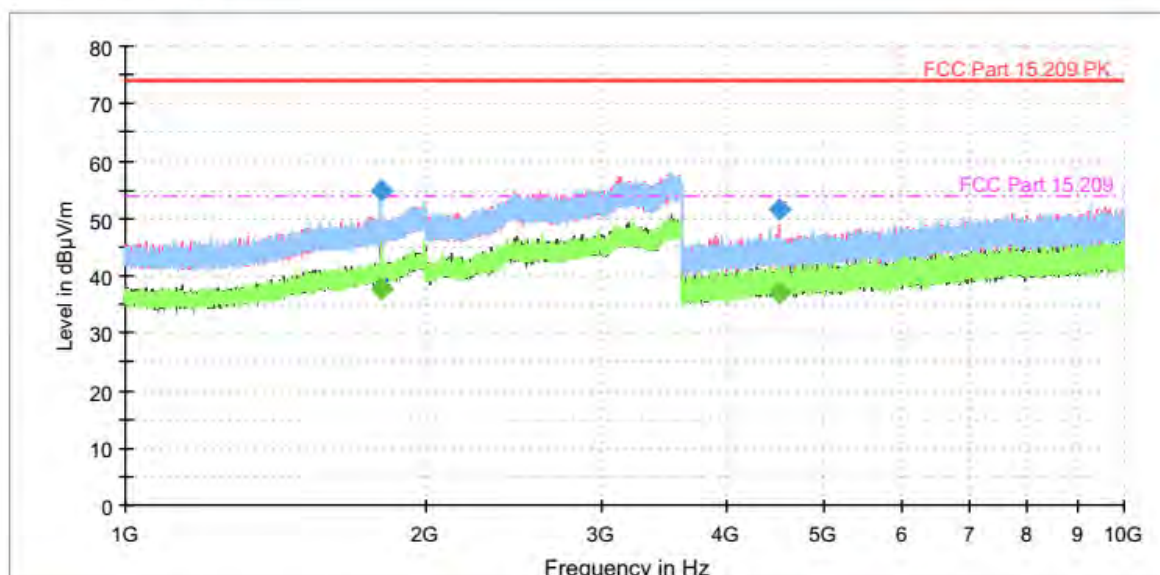
EUT

Operating condition:

PowerFLARM Fusion

TX 902.6 MHz, RFB

Full Spectrum



— Preview Result 2V-AVG * Preview Result 1V-PK+ — Preview Result 2H-AVG
 — Preview Result 1H-PK+ * Critical_Freqs AVG * Critical_Freqs PK+
 ◆ FCC Part 15.209 PK — FCC Part 15.209 ◆ Final_Result PK+
 ◆ Final_Result AVG

Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1805.133333	---	54.00	16.34	141.0	H	314.0
1805.133333	54.95	74.00	19.05	154.0	H	314.0
4513.066667	---	54.00	16.86	100.0	V	126.0
4513.066667	51.62	74.00	22.38	105.0	V	126.0

EUT Information

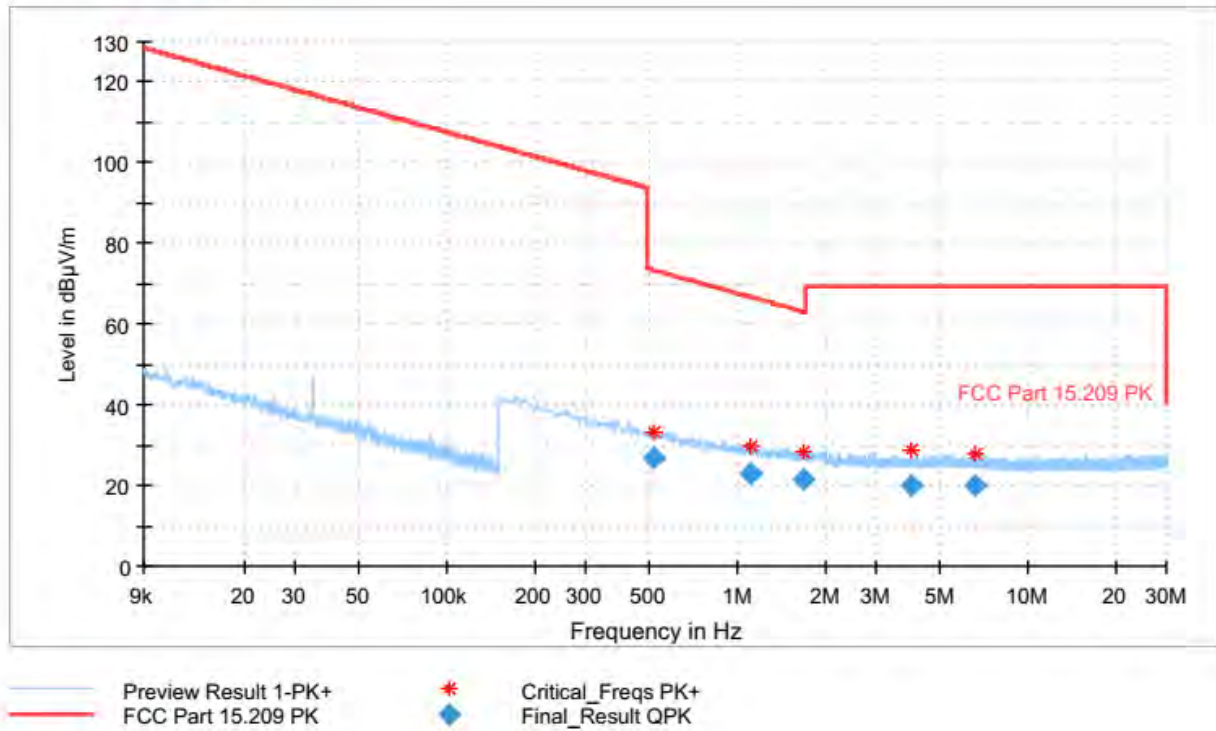
EUT

Operating condition:

PowerFLARM FUSION

TX 915.0 MHz, RFB

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
0.514500	27.06	73.38	46.31	H	0.0	19.1
1.115250	22.75	66.68	43.93	H	0.0	19.1
1.682250	21.32	63.12	41.80	H	0.0	19.1
3.963750	20.16	69.50	49.34	H	0.0	19.2
6.623250	20.06	69.50	49.44	H	0.0	19.2

EUT Information

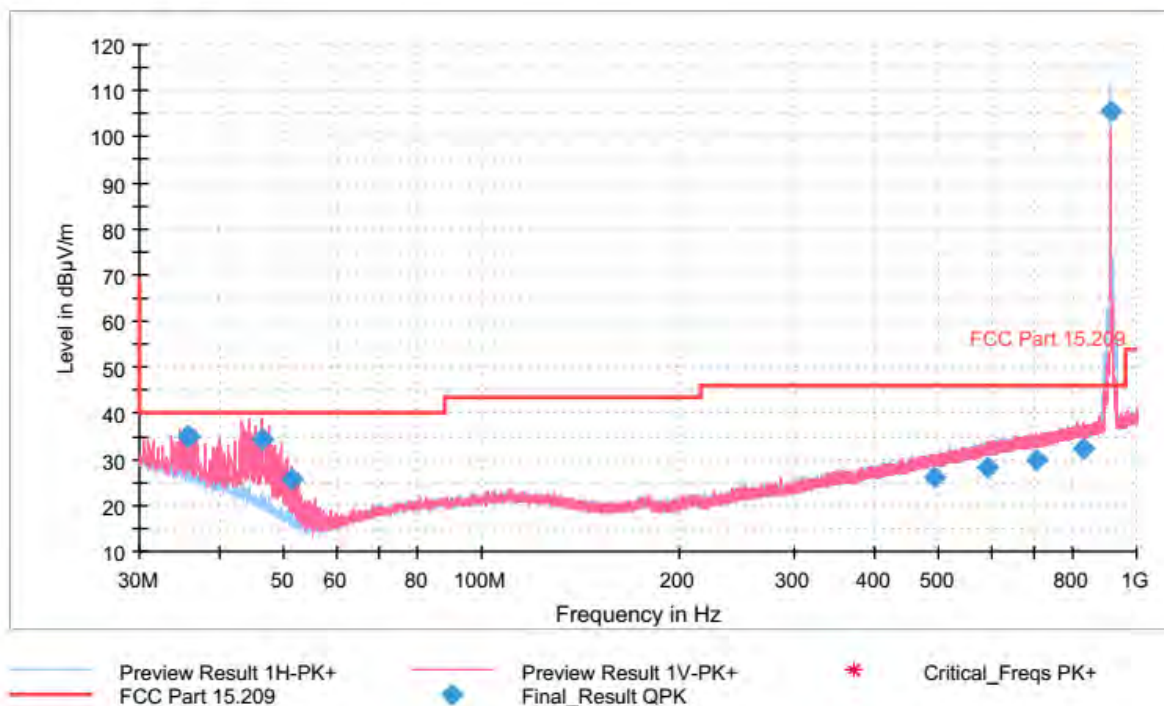
EUT

Operating condition:

PowerFLARM Fusion

TX 915 MHz, RFB

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
35.730000	34.91	40.00	5.09	100.0	V	42.0
35.760000	35.10	40.00	4.90	100.0	V	0.0
46.290000	34.55	40.00	5.45	100.0	V	0.0
51.510000	25.53	40.00	14.47	100.0	V	0.0
493.110000	26.12	46.00	19.88	100.0	V	42.0
590.820000	28.29	46.00	17.71	154.0	V	142.0
701.190000	29.78	46.00	16.22	155.0	V	73.0
829.140000	32.18	46.00	13.82	103.0	V	217.0
914.880000	105.35	46.00	-59.35	150.0	H	0.0

EUT Information

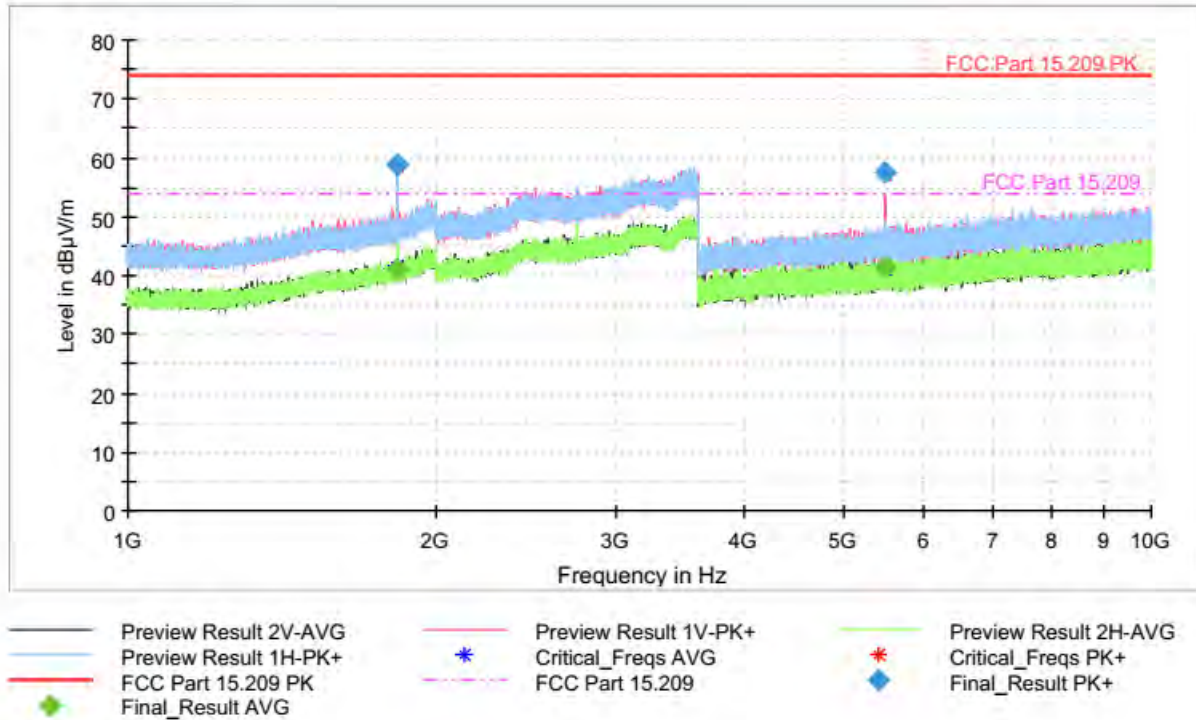
EUT

Operating condition:

PowerFLARM Fusion

TX 915.0 MHz, RFB

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1829.746667	58.92	74.00	15.08	104.0	V	10.0
1829.920000	---	54.00	12.92	171.0	H	325.0
5489.920000	---	54.00	12.65	133.0	V	306.0
5489.920000	57.40	74.00	16.60	131.0	V	306.0

EUT Information

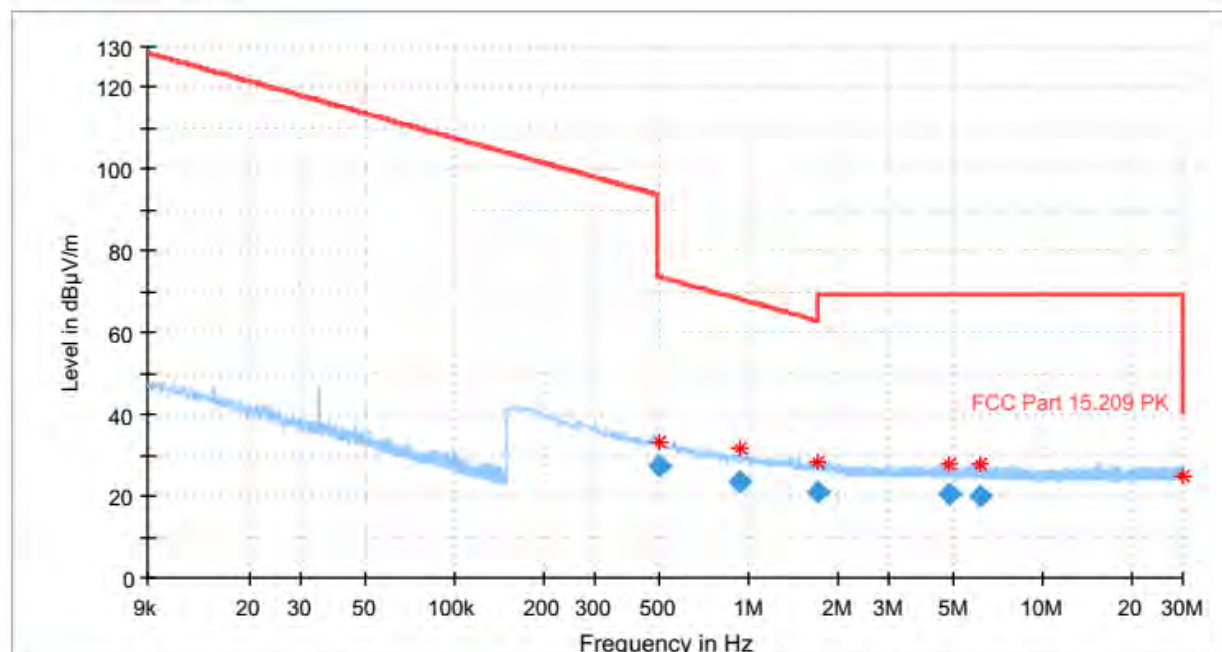
EUT

Operating condition:

PowerFLARM FUSION

TX 927.4 MHz, RFB

Full Spectrum



Preview Result 1-PK+
FCC Part 15.209 PK

* Critical_Freqs PK+
◆ Final_Result QPK

Final Result

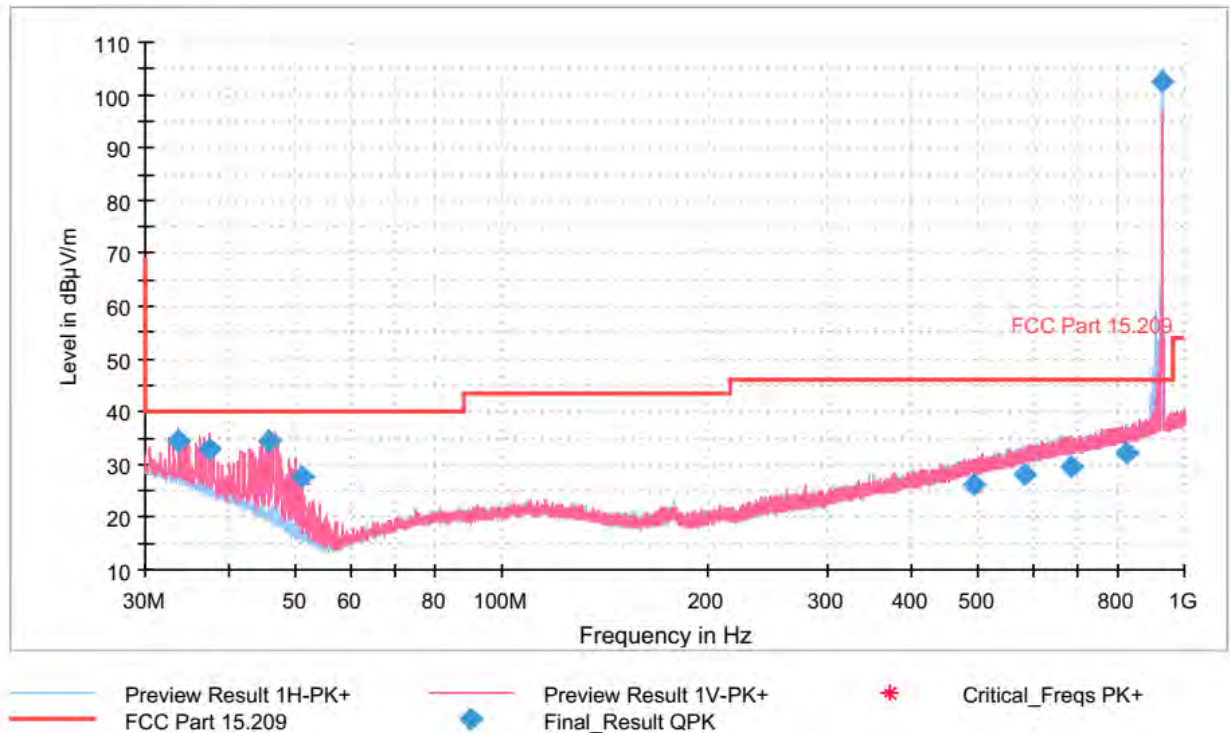
Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
0.494250	27.28	73.73	46.45	H	0.0	19.1
0.933000	23.43	68.22	44.79	H	0.0	19.1
1.702500	21.18	63.01	41.84	H	0.0	19.1
4.845750	20.40	69.50	49.10	H	0.0	19.2
6.087750	20.18	69.50	49.32	H	0.0	19.2

EUT Information

EUT
Operating condition:

PowerFLARM Fusion
TX 927,4 MHz, RFB

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
33.660000	34.43	40.00	5.57	100.0	V	43.0
37.320000	32.75	40.00	7.25	100.0	V	356.0
45.720000	34.41	40.00	5.59	100.0	V	0.0
50.970000	27.59	40.00	12.41	100.0	V	287.0
489.840000	26.01	46.00	19.99	132.0	V	356.0
581.640000	28.18	46.00	17.82	100.0	H	283.0
682.500000	29.55	46.00	16.45	129.0	V	0.0
824.670000	32.20	46.00	13.80	133.0	H	143.0
926.940000	102.37	46.00	-56.37	100.0	H	143.0

EUT Information

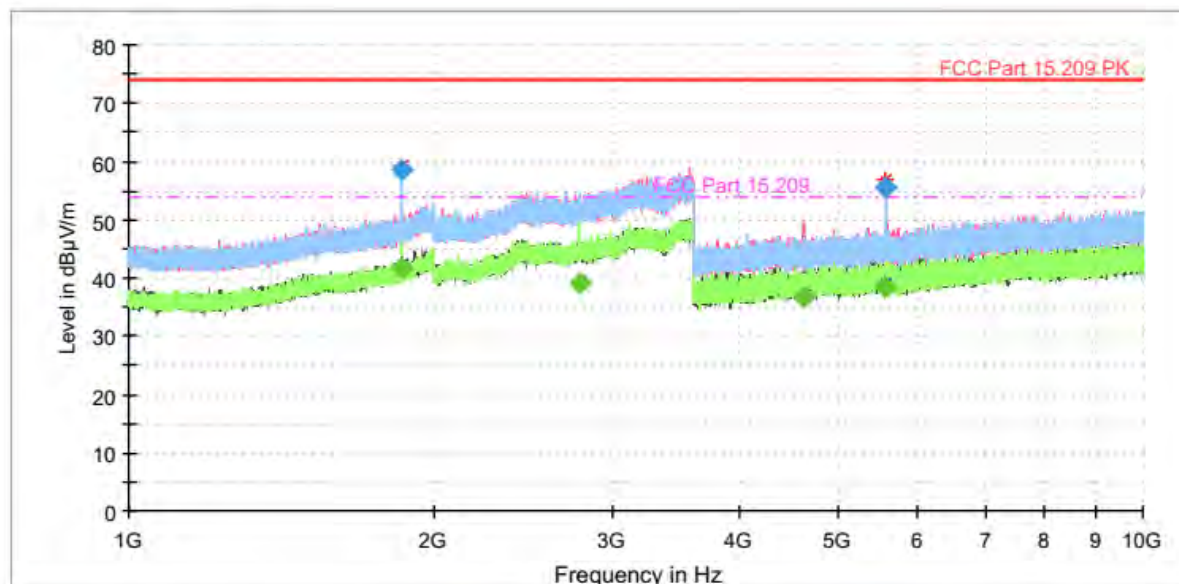
EUT

Operating condition:

PowerFLARM Fusion

TX 927,4 MHz, RFB

Full Spectrum



Preview Result 2V-AVG
 Preview Result 1H-PK+
 FCC Part 15.209 PK
 Final_Result AVG

Preview Result 1V-PK+
 Critical_Freqs AVG
 FCC Part 15.209

Preview Result 2H-AVG
 Critical_Freqs PK+
 Final_Result PK+

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1854.793333	58.59	74.00	15.41	165.0	H	327.0
1854.793333	---	54.00	12.20	166.0	H	327.0
2782.126667	---	54.00	15.02	154.0	H	0.0
4636.586667	---	54.00	17.20	104.0	V	83.0
5563.733333	55.52	74.00	18.48	153.0	H	84.0
5564.160000	---	54.00	15.57	166.0	V	191.0



Final Measurement (dB μ V/m) = Receiver Reading (dB μ V/m) + AF (dB) + CL (dB) + Atten (dB) + Preamp (dB)

where:

Final Measurement = Final measurement result

Receiver Reading = Uncorrected amplitude measured by the receiver

AF = Antenna Factor

CL = Cable Loss

Atten = Attenuator correction

Preamp = Preamplifier correction

3.11 §15.247 (d) Band-edge Compliance of RF Conducted Emissions

Requirement

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

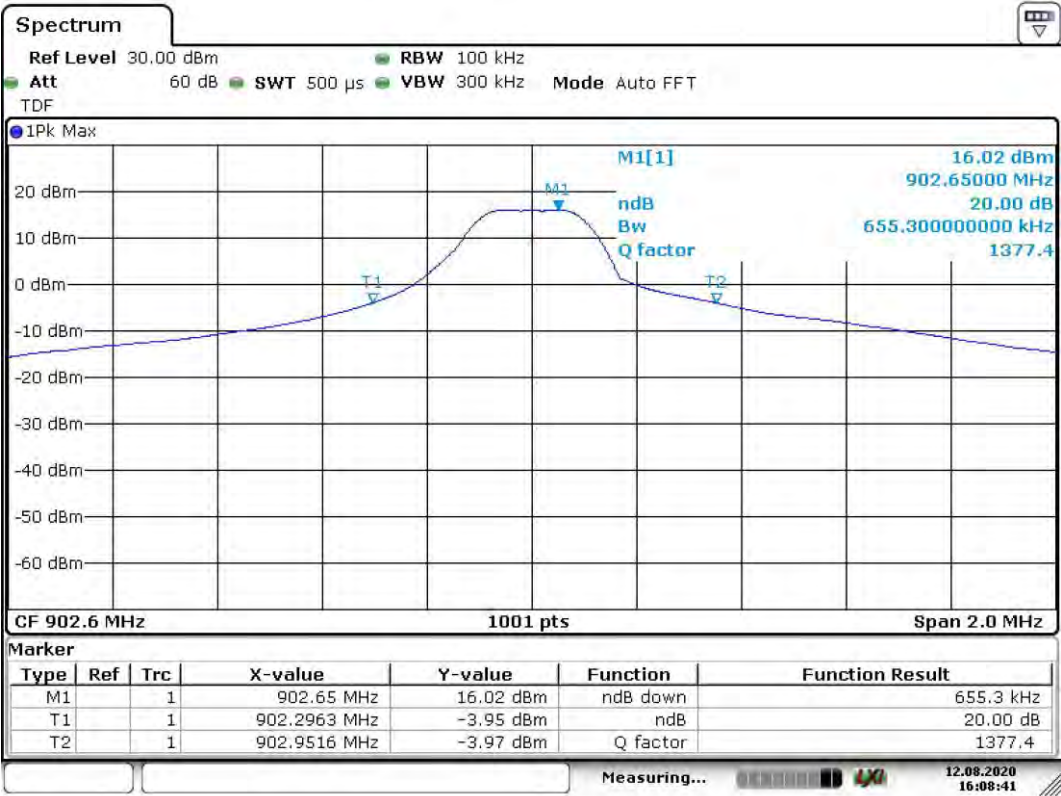
Test Procedure

As per Clause 7.8.6 from ANSI C63.10-2013

Conclusion: PASS

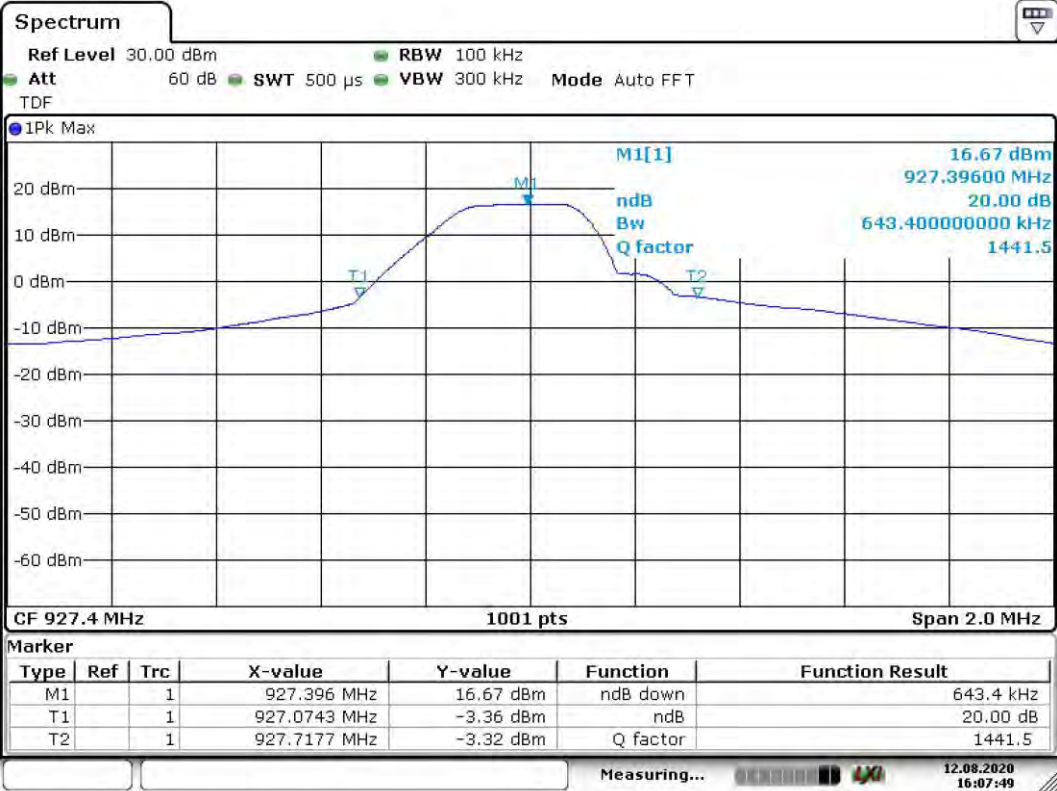


Test results
RFA, 902.6 MHz, NON-HOPPING



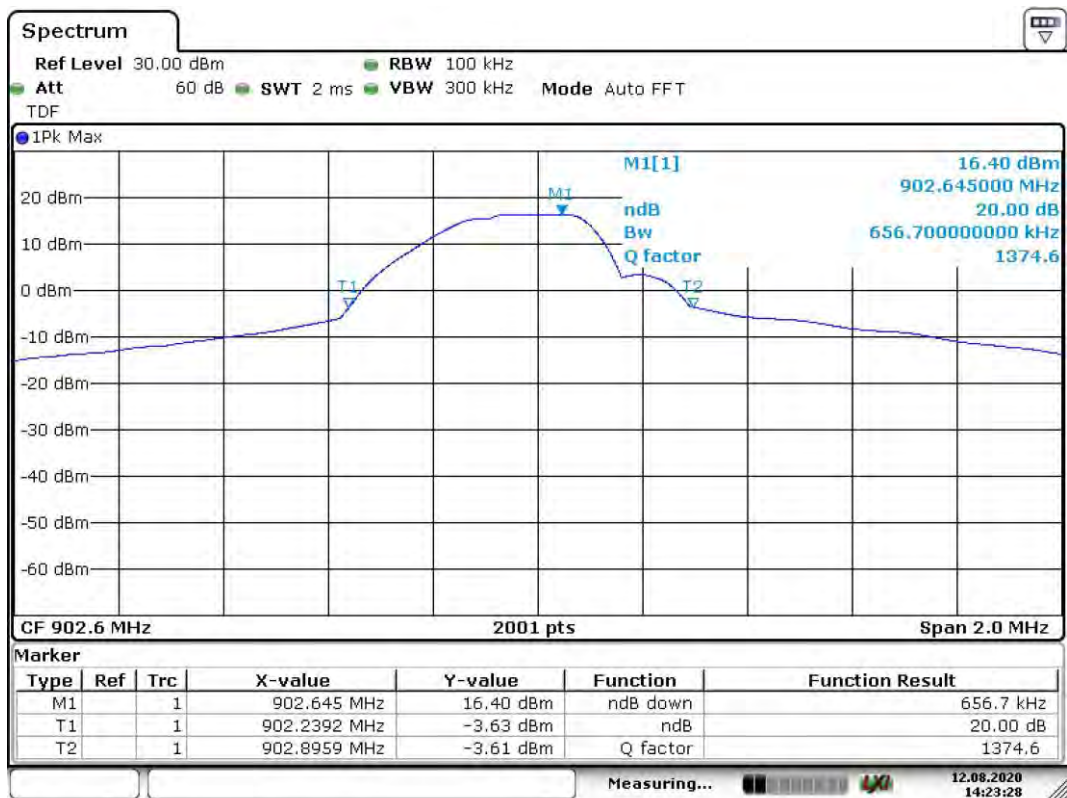
RFA Band edge, Non Hopping

RFA, 927.4 MHz, NON-HOPPING



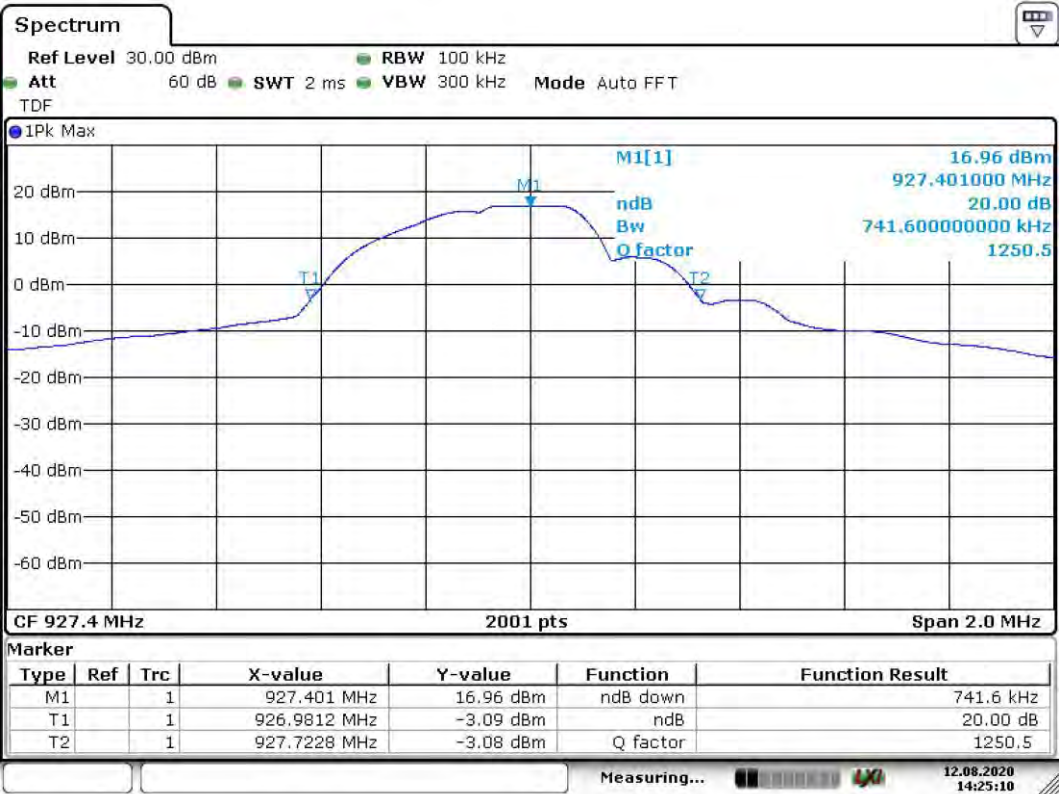
RFA Band edge, Non Hopping

RFB, 902.6 MHz, NON-HOPPING



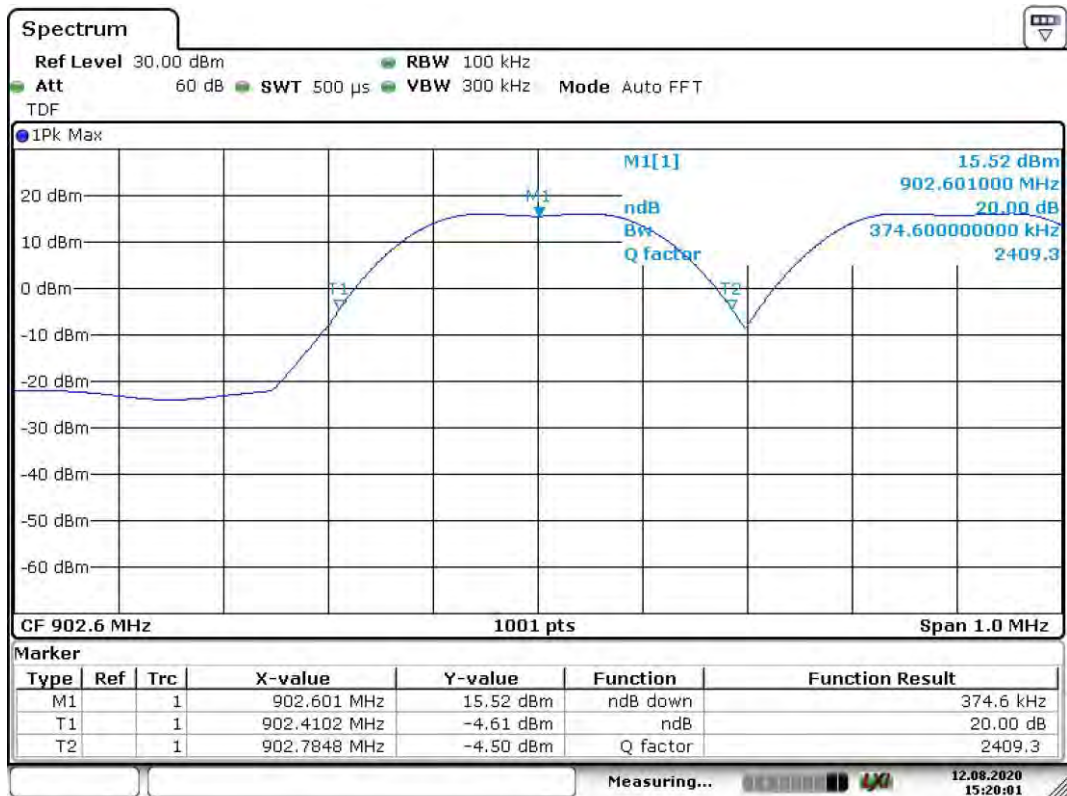
RFB Band edge, Non Hopping

RFB, 927.4 MHz, NON-HOPPING



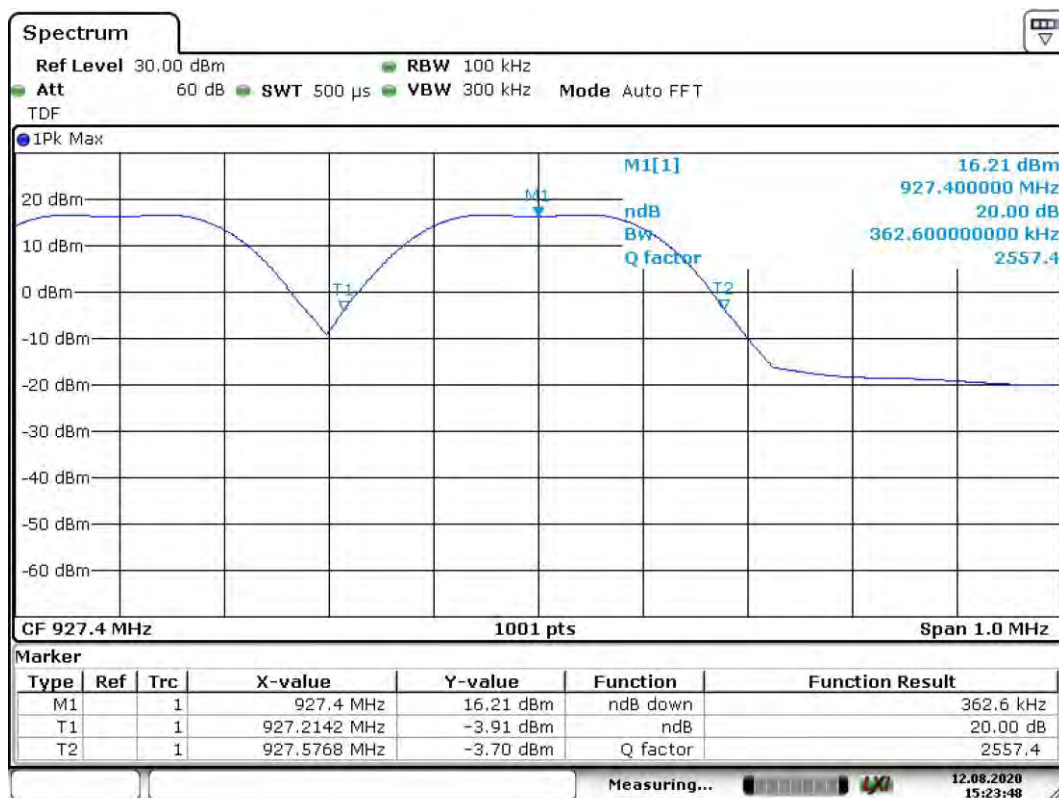
RFB Band edge, Non Hopping

RFA, 902.6 MHz, HOPPING



RFA Band edge, Hopping

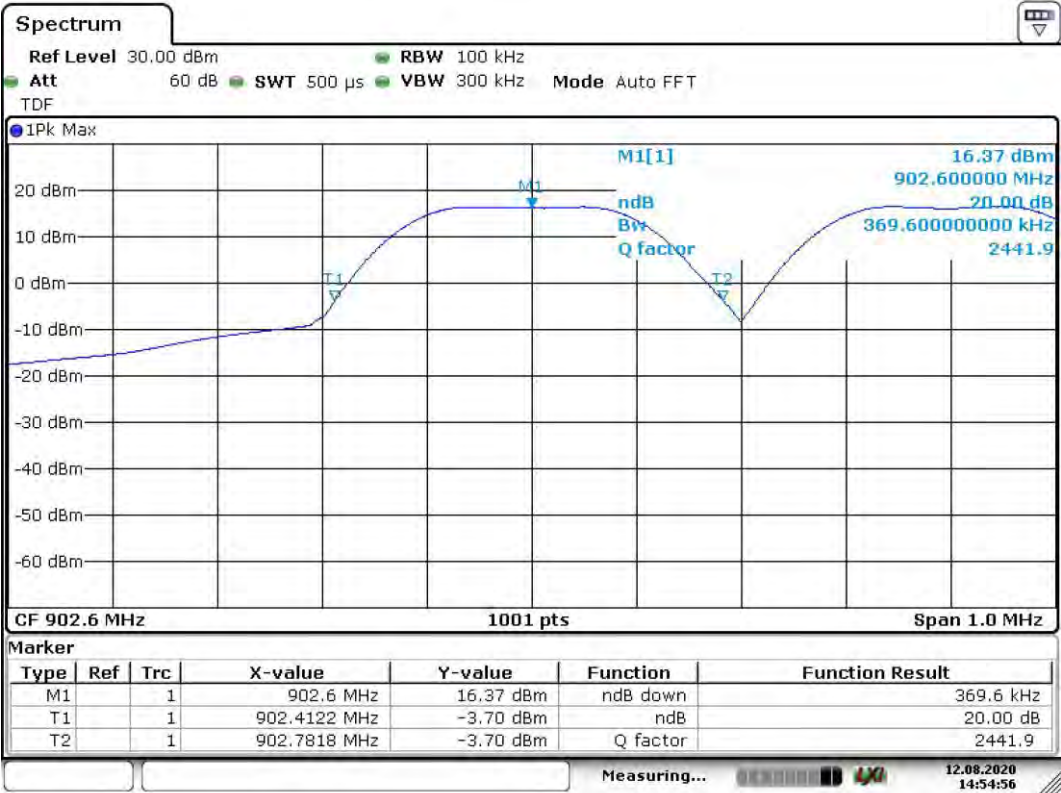
RFA, 927.4 MHz, HOPPING



RFA Band edge, Hopping

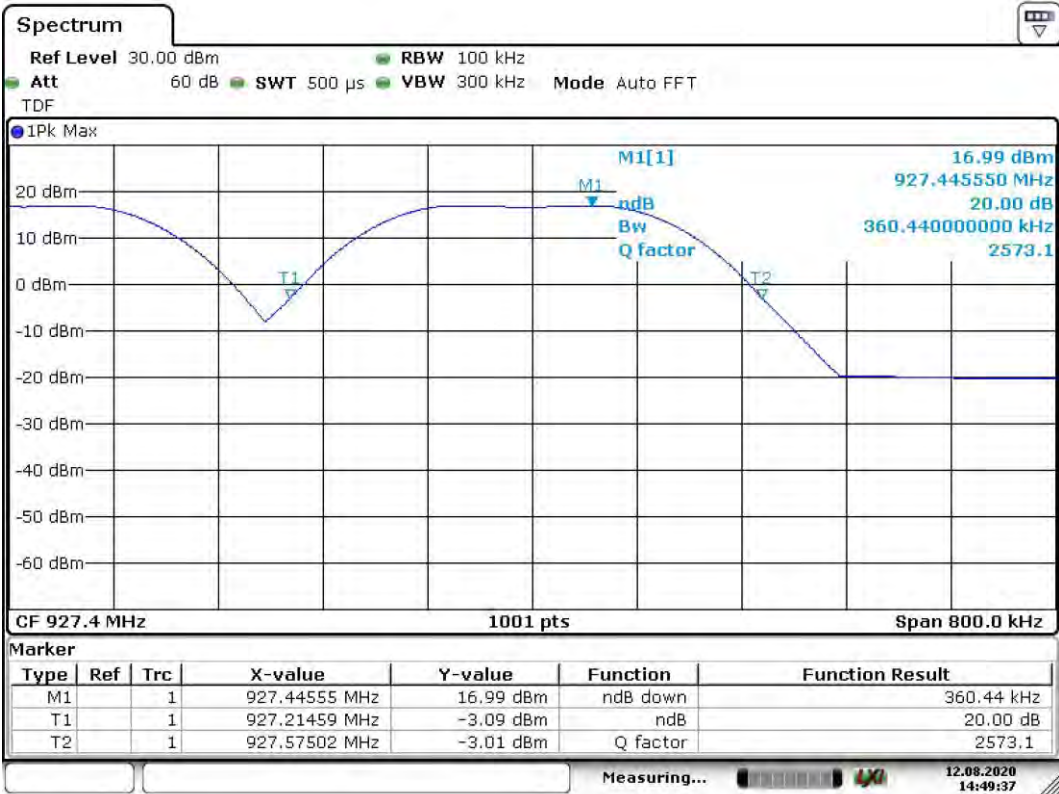


RFB, 902.6 MHz, HOPPING



RFB Band edge, Hopping

RFB, 927.4 MHz, HOPPING



RFB Band edge, Hopping



3.12 §15.247 (i) RF Exposure Compliance Requirements

Requirement

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See §1.1307(b)(1) of this chapter

Limits for Limits for Maximum Permissible Exposure from §1.1310 for General Population/Uncontrolled Exposure: 0.6 mW/cm²

Calculation procedure

OET 65 (Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields:

$$S = PG / 4\pi R^2$$

where:

S = power density (mW/cm²)

P = Power Input to Antenna (mW)

G = Antenna Gain (numeric)

R = distance to the center of radiation of the antenna (cm)

Values:

P = 85 mW

G = 1.64

R = 20 cm

Result:

S = 0.0277 mW/cm²

Conclusion: PASS

4 TEST EQUIPMENT

Description	Model No.	SIQ No.	Last calibration	Calibrated until	Calibration period	Used
Rohde-Schwarz, Spectrum analyzer	FSV40	/	2019-05	2021-05	24 months	X
Rohde-Schwarz, RFI receiver	ESU26	100428	2020-06	2022-06	24 months	X
Rohde & Schwarz, Artificial main network	ESH2-Z5	106899	2019-08	2021-08	24 months	
Rohde & Schwarz, Artificial main network	ENV216	106765	2018-09	2020-09	24 months	
Comtest Engineering, Semi Anechoic Chamber SAC 1	SAC 3m	NPS001	2019-06	2021-06	24 months	
Comtest Engineering, Semi Anechoic Chamber SAC 2	SAC 3m	NPS003	2019-06	2021-06	24 months	X
Rohde & Schwarz, Horn Antenna	HF907 (SN 102508)	102508	2020-08	2022-08	24 months	X
Rohde & Schwarz, Ultra Broadband Antenna	HL562E (SN 100842)	102842	2017-07	2019-07	24 months	X
Schwarzbeck, Biconical antenna	VHBB9124	105112	2018-11	2020-11	24 months	
Schwarzbeck, Active loop antenna	FMZB 1519 B	/	2018-12	2020-12	24 months	X
Rohde & Schwarz, Horn Antenna	HF907 (SN 102494)	102494	2019-05	2021-05	24 months	
Rohde & Schwarz, Ultra Broadband Antenna	HL562E (SN 100843)	102843	2018-05	2020-05	24 months	
Maturo, Turn table (2 m diameter)	TT 2.0 SI	/	N/A	N/A	N/A	X
Maturo, Bore-sight antenna mast	BAM-4.0-P	/	N/A	N/A	N/A	X
Maturo, Multi-channel positioning equipment	Maturo NCD	/	N/A	N/A	N/A	X

5 CABLE LOSS AND ATTENUATION OF RADIATED EMISSION

5.1.1 Conducted RF emission cable (DUT cable 50cm)

Frequency (GHz)	Loss (dB)
0,0009	0,001
0,001	0,01
0,01	0,02
0,1	0,07
0,5	0,17
1	0,24
2	0,34
3	0,41
4	0,48
5	0,54
6	0,63
7	0,67
8	0,70
9	0,75
10	0,81

5.1.2 Radiated emission cables (C03+C04)

Frequency (MHz)	Loss (dB)
0,009	0,01
5	0,17
10	0,29
30	0,40
50	0,50
100	0,69
200	0,96
300	1,20
400	1,40
500	1,57
600	1,72
700	1,86
800	2,00
900	2,13
1000	2,25

(SMA Cable 5 m)

Frequency (MHz)	Loss (dB)
1006,354025	0,78
1056,671726	0,80
1109,505312	0,82
1164,980578	0,85
1223,229607	0,86
1284,391087	0,88
1348,610641	0,90
1416,041173	0,94
1486,843232	0,96
1561,185394	0,98
1639,244663	1,01
1721,206896	1,04
1807,267241	1,06
1897,630603	1,11
1992,512134	1,13
2092,137740	1,16
2196,744627	1,20
2306,581859	1,22
2421,910951	1,26
2543,006499	1,34
2670,156824	1,32
2803,664665	1,38
2943,847898	1,40
3091,040293	1,43
3245,592308	1,48
3407,871923	1,51
3578,265520	1,54
3757,178796	1,62
3945,037735	1,63
4142,289622	1,65
4349,404103	1,70
4566,874308	1,77
4795,218024	1,82
5034,978925	1,88
5286,727871	1,91
5551,064265	1,97
5828,617478	2,02
6120,048352	2,07
6426,050770	2,13
6747,353308	2,19
7084,720973	2,35
7438,957022	2,38
7810,904873	2,53

8201,450117	2,55
8611,522623	2,62
9042,098754	2,65
9494,203692	2,78
9968,913876	2,76
10467,359570	2,93

5.1.3 Antenna HL562E

Frequency (MHz)	Antenna factor HL562E (SN 100842)	Antenna factor HL562E (SN 100843)
30	18.12	18.17
32	17.08	17.07
34	16.01	16
36	14.91	14.94
38	13.76	13.75
40	12.64	12.61
42	11.43	11.4
44	10.17	10.15
46	8.86	8.81
48	7.42	7.44
50	6.01	5.96
52	4.59	4.56
54	3.38	3.37
56	2.84	2.85
58	3.06	3.14
60	3.78	3.76
62	4.44	4.4
64	5.36	5.32
66	6.19	6.18
68	6.96	6.92
70	7.56	7.52
72	8.04	8.01
74	8.38	8.35
76	8.67	8.64
78	8.88	8.85
80	9.04	9.03
82	9.14	9.09
84	9.2	9.14
86	9.22	9.16
88	9.22	9.17
90	9.21	9.17
92	9.22	9.15
94	9.22	9.16
96	9.21	9.16
98	9.22	9.17
100	9.33	9.05
105	9.38	9.39
110	9.67	9.74
115	9.55	10.33
120	10.51	9.88
125	10.15	9.87
130	9.23	9.13
135	8.79	8.71
140	8.4	8.4
145	7.93	7.82
150	7.74	7.75
155	7.68	7.76
160	7.86	7.78
165	8.47	8.33
170	9.83	9.66
175	10.29	10.3
180	7.86	7.93

185	7.19	7.27
190	7.54	7.21
195	7.32	7.2
200	7.56	7.49
205	7.56	7.68
210	7.71	7.95
215	8.68	8.29
220	8.43	8.49
225	8.51	8.62
230	8.85	8.82
235	9.1	9.05
240	9.31	9.29
245	9.33	9.33
250	9.5	9.45
255	9.71	9.64
260	9.86	9.81
265	9.95	9.9
270	10	10.02
275	10.15	10.15
280	10.37	10.36
285	10.58	10.61
290	10.76	10.8
295	10.84	10.9
300	10.83	11.12
305	11.38	11.37
310	11.36	11.32
315	11.53	11.48
320	11.7	11.67
325	11.84	11.81
330	11.98	11.94
335	12.32	12.13
340	12.19	12.22
345	12.29	12.35
350	12.43	12.47
355	12.59	12.61
360	12.72	12.73
365	12.83	12.81
370	12.99	12.99
375	13.08	13.1
380	13.12	13.11
385	13.21	13.2
390	13.38	13.33
395	13.54	13.5
400	13.65	13.63
405	13.74	13.73
410	13.84	13.83
415	14.14	13.96
420	14.1	14
425	14.13	14.08
430	14.24	14.2
435	14.4	14.4
440	14.55	14.49
445	14.7	14.65
450	14.82	14.79
455	14.89	14.91
460	14.9	15.09
465	15.16	15.19

470	15.24	15.22
475	15.31	15.25
480	15.38	15.32
485	15.48	15.43
490	15.58	15.52
495	15.66	15.6
500	15.72	15.7
505	15.74	15.75
510	15.83	15.82
515	16.05	15.92
520	15.95	15.93
525	15.97	15.97
530	16.05	16.01
535	16.09	16.07
540	16.16	16.15
545	16.21	16.21
550	16.29	16.3
555	16.38	16.41
560	16.51	16.53
565	16.67	16.68
570	16.78	16.85
575	16.87	17.02
580	17.03	17.11
585	17.06	17.08
590	17.1	17.09
595	17.15	17.13
600	17.22	17.18
605	17.28	17.25
610	17.35	17.33
615	17.42	17.37
620	17.41	17.42
625	17.48	17.48
630	17.56	17.55
635	17.67	17.65
640	17.8	17.79
645	17.94	17.95
650	18.08	18.13
655	18.16	18.12
660	18.18	18.03
665	18.12	17.99
670	18.13	18.01
675	18.19	18.09
680	18.26	18.24
685	18.42	18.41
690	18.56	18.56
695	18.62	18.61
700	18.67	18.67
705	18.7	18.74
710	18.74	18.79
715	18.81	18.86
720	18.89	18.95
725	19.09	19.09
730	19.22	19.26
735	19.17	19.23
740	19.19	19.14
745	19.14	19.1
750	19.13	19.09

755	19.17	19.1
760	19.19	19.15
765	19.24	19.21
770	19.34	19.29
775	19.37	19.36
780	19.36	19.36
785	19.43	19.41
790	19.51	19.48
795	19.59	19.56
800	19.7	19.66
805	19.83	19.79
810	19.98	19.95
815	20.07	20.04
820	20.1	19.96
825	20.11	19.92
830	20.09	19.94
835	20.09	19.96
840	20.14	20.05
845	20.19	20.11
850	20.27	20.2
855	20.36	20.29
860	20.42	20.37
865	20.46	20.44
870	20.5	20.51
875	20.52	20.55
880	20.59	20.61
885	20.7	20.69
890	20.82	20.77
895	20.89	20.83
900	20.88	20.92
905	20.83	21.08
910	20.93	21.21
915	21.19	21.17
920	21.22	21.1
925	21.09	21.03
930	20.98	21
935	20.95	21
940	20.96	21.01
945	21	21.04
950	21.05	21.06
955	21.09	21.07
960	21.15	21.13
965	21.23	21.2
970	21.27	21.26
975	21.31	21.3
980	21.36	21.37
985	21.43	21.44
990	21.52	21.53
995	21.63	21.64
1000	21.73	21.73

5.1.4 Antenna HF907

Frequency (GHz)	Antenna factor HF907 (SN 102508)	Antenna factor HF907 (SN 102494)
1	24.36	24.36
1.01	24.34	24.38
1.02	24.53	24.55
1.03	24.6	24.63
1.04	24.46	24.51
1.05	24.35	24.41
1.06	24.48	24.49
1.07	24.51	24.56
1.08	24.32	24.37
1.09	24.26	24.29
1.1	24.33	24.35
1.11	24.38	24.44
1.12	24.23	24.25
1.13	24.18	24.19
1.14	24.23	24.24
1.15	24.35	24.38
1.16	24.3	24.3
1.17	24.23	24.26
1.18	24.37	24.4
1.19	24.56	24.57
1.2	24.52	24.55
1.21	24.39	24.42
1.22	24.51	24.52
1.23	24.66	24.7
1.24	24.64	24.68
1.25	24.51	24.54
1.26	24.53	24.55
1.27	24.69	24.72
1.28	24.65	24.65
1.29	24.46	24.47
1.3	24.48	24.52
1.31	24.66	24.68
1.32	24.64	24.65
1.33	24.49	24.5
1.34	24.53	24.53
1.35	24.75	24.75
1.36	24.73	24.76
1.37	24.62	24.65
1.38	24.74	24.76
1.39	24.96	24.99
1.4	25.02	25.05
1.41	24.94	24.95
1.42	25.02	25.03
1.43	25.31	25.37
1.44	25.39	25.43
1.45	25.27	25.29
1.46	25.37	25.42
1.47	25.7	25.7
1.48	25.77	25.76
1.49	25.66	25.67
1.5	25.76	25.77
1.51	26.04	26.03

1.52	26.12	26.12
1.53	26.01	26.03
1.54	26.06	26.03
1.55	26.29	26.29
1.56	26.35	26.36
1.57	26.25	26.25
1.58	26.27	26.27
1.59	26.41	26.45
1.6	26.51	26.5
1.61	26.37	26.36
1.62	26.33	26.33
1.63	26.48	26.52
1.64	26.58	26.57
1.65	26.42	26.44
1.66	26.35	26.37
1.67	26.51	26.53
1.68	26.64	26.59
1.69	26.46	26.47
1.7	26.36	26.34
1.71	26.52	26.5
1.72	26.7	26.7
1.73	26.54	26.53
1.74	26.4	26.38
1.75	26.62	26.64
1.76	26.85	26.83
1.77	26.72	26.73
1.78	26.59	26.57
1.79	26.75	26.8
1.8	27.08	27.07
1.81	26.92	26.92
1.82	26.77	26.76
1.83	27	27
1.84	27.26	27.23
1.85	27.09	27.06
1.86	26.92	26.88
1.87	27.17	27.14
1.88	27.4	27.35
1.89	27.27	27.22
1.9	27.14	27.12
1.91	27.43	27.38
1.92	27.72	27.71
1.93	27.59	27.56
1.94	27.55	27.52
1.95	27.9	27.9
1.96	28.25	28.24
1.97	28.13	28.1
1.98	28.06	28.04
1.99	28.43	28.44
2	28.67	28.63
2.01	28.5	28.45
2.02	28.37	28.39
2.03	28.67	28.63
2.04	28.76	28.76
2.05	28.48	28.46
2.06	28.37	28.36
2.07	28.49	28.48
2.08	28.52	28.51

2.09	28.31	28.29
2.1	28.16	28.14
2.11	28.24	28.23
2.12	28.28	28.27
2.13	28.15	28.13
2.14	28.01	28
2.15	28.1	28.09
2.16	28.22	28.21
2.17	28.14	28.1
2.18	28.02	28
2.19	28.11	28.08
2.2	28.29	28.28
2.21	28.24	28.21
2.22	28.11	28.08
2.23	28.21	28.18
2.24	28.37	28.36
2.25	28.31	28.28
2.26	28.16	28.13
2.27	28.21	28.19
2.28	28.4	28.38
2.29	28.37	28.35
2.3	28.21	28.19
2.31	28.28	28.25
2.32	28.46	28.43
2.33	28.47	28.44
2.34	28.35	28.33
2.35	28.41	28.38
2.36	28.56	28.54
2.37	28.62	28.59
2.38	28.54	28.49
2.39	28.56	28.55
2.4	28.73	28.71
2.41	28.77	28.74
2.42	28.72	28.69
2.43	28.74	28.72
2.44	28.86	28.85
2.45	28.9	28.89
2.46	28.86	28.84
2.47	28.89	28.88
2.48	29.02	29.01
2.49	29.08	29.07
2.5	29.05	29.03
2.51	29.1	29.09
2.52	29.3	29.29
2.53	29.39	29.39
2.54	29.38	29.35
2.55	29.39	29.38
2.56	29.58	29.57
2.57	29.74	29.73
2.58	29.65	29.62
2.59	29.54	29.52
2.6	29.71	29.68
2.61	29.9	29.87
2.62	29.71	29.68
2.63	29.53	29.5
2.64	29.67	29.65
2.65	29.87	29.84

2.66	29.72	29.66
2.67	29.5	29.48
2.68	29.6	29.58
2.69	29.82	29.79
2.7	29.71	29.69
2.71	29.51	29.48
2.72	29.59	29.55
2.73	29.77	29.76
2.74	29.72	29.68
2.75	29.56	29.51
2.76	29.59	29.56
2.77	29.74	29.71
2.78	29.69	29.63
2.79	29.53	29.48
2.8	29.54	29.51
2.81	29.65	29.61
2.82	29.6	29.55
2.83	29.44	29.42
2.84	29.49	29.47
2.85	29.63	29.6
2.86	29.6	29.56
2.87	29.49	29.47
2.88	29.59	29.57
2.89	29.79	29.78
2.9	29.79	29.77
2.91	29.73	29.71
2.92	29.88	29.86
2.93	30.1	30.09
2.94	30.16	30.14
2.95	30.08	30.06
2.96	30.23	30.21
2.97	30.54	30.52
2.98	30.57	30.55
2.99	30.46	30.43
3	30.58	30.56
3.05	31.17	31.18
3.1	31.68	31.64
3.15	31.58	31.55
3.2	31.75	31.72
3.25	31.89	31.85
3.3	31.71	31.68
3.35	31.64	31.6
3.4	31.7	31.67
3.45	31.84	31.83
3.5	31.95	31.91
3.55	32.01	31.96
3.6	32.09	32.07
3.65	32.32	32.29
3.7	32.52	32.48
3.75	32.62	32.57
3.8	32.85	32.8
3.85	32.93	32.89
3.9	32.94	32.91
3.95	33.02	32.98
4	32.97	32.91
4.05	33.07	33.01
4.1	33.21	33.17

4.15	33.33	33.31
4.2	33.48	33.43
4.25	33.71	33.66
4.3	33.87	33.83
4.35	34.02	33.99
4.4	33.83	33.82
4.45	33.57	33.53
4.5	33.61	33.58
4.55	33.61	33.59
4.6	33.51	33.49
4.65	33.44	33.39
4.7	33.6	33.58
4.75	33.93	33.92
4.8	34.06	34.05
4.85	34.13	34.13
4.9	34.27	34.25
4.95	34.38	34.36
5	34.38	34.34
5.05	34.19	34.17
5.1	33.99	33.97
5.15	33.93	33.93
5.2	33.97	33.96
5.25	33.92	33.91
5.3	33.93	33.93
5.35	34.17	34.18
5.4	34.37	34.38
5.45	34.43	34.44
5.5	34.38	34.38
5.55	34.42	34.42
5.6	34.45	34.45
5.65	34.28	34.28
5.7	34.05	34.04
5.75	34.04	34.05
5.8	34.2	34.2
5.85	34.31	34.31
5.9	34.35	34.35
5.95	34.47	34.49
6	34.69	34.7
6.05	34.87	34.86
6.1	34.82	34.82
6.15	34.75	34.75
6.2	34.78	34.79
6.25	34.77	34.79
6.3	34.68	34.69
6.35	34.66	34.68
6.4	34.84	34.87
6.45	35.03	35.07
6.5	35.13	35.14
6.55	35.13	35.13
6.6	35.26	35.26
6.65	35.36	35.36
6.7	35.29	35.29
6.75	35.17	35.16
6.8	35.16	35.15
6.85	35.26	35.28
6.9	35.37	35.38
6.95	35.35	35.36

7	35.44	35.45
7.05	35.59	35.61
7.1	35.74	35.76
7.15	35.73	35.74
7.2	35.61	35.63
7.25	35.65	35.66
7.3	35.65	35.67
7.35	35.64	35.64
7.4	35.63	35.64
7.45	35.71	35.74
7.5	35.89	35.9
7.55	35.99	36.01
7.6	36.09	36.1
7.65	36.18	36.21
7.7	36.23	36.25
7.75	36.26	36.29
7.8	36.21	36.22
7.85	36.2	36.2
7.9	36.14	36.16
7.95	36.16	36.17
8	36.14	36.15
8.05	36.19	36.19
8.1	36.3	36.32
8.15	36.46	36.47
8.2	36.5	36.5
8.25	36.51	36.53
8.3	36.51	36.5
8.35	36.48	36.48
8.4	36.46	36.45
8.45	36.4	36.39
8.5	36.41	36.4
8.55	36.45	36.45
8.6	36.56	36.58
8.65	36.7	36.71
8.7	36.71	36.7
8.75	36.79	36.83
8.8	36.85	36.88
8.85	36.88	36.85
8.9	36.79	36.75
8.95	36.79	36.81
9	36.87	36.84
9.05	36.82	36.75
9.1	36.85	36.81
9.15	36.9	36.88
9.2	36.89	36.9
9.25	36.92	36.91
9.3	36.97	36.97
9.35	37.07	37.07
9.4	37.11	37.11
9.45	37.14	37.16
9.5	37.2	37.19
9.55	37.1	37.08
9.6	37.06	37.03
9.65	37.04	37.05
9.7	36.96	36.97
9.75	36.93	36.93
9.8	37	37

9.85	37.15	37.16
9.9	37.23	37.24
9.95	37.25	37.22
10	37.31	37.3
10.05	37.31	37.3
10.1	37.23	37.2
10.15	37.15	37.13
10.2	37.11	37.13
10.25	37.11	37.15
10.3	37.11	37.13
10.35	37.15	37.19
10.4	37.21	37.24
10.45	37.25	37.27
10.5	37.27	37.28
10.55	37.24	37.24
10.6	37.18	37.18
10.65	37.17	37.19
10.7	37.19	37.19
10.75	37.16	37.17
10.8	37.16	37.18
10.85	37.26	37.26
10.9	37.32	37.32
10.95	37.33	37.32
11	37.36	37.35
11.05	37.34	37.33
11.1	37.34	37.36
11.15	37.35	37.34
11.2	37.34	37.33
11.25	37.29	37.29
11.3	37.28	37.29
11.35	37.34	37.31
11.4	37.31	37.3
11.45	37.32	37.33
11.5	37.38	37.39
11.55	37.41	37.42
11.6	37.44	37.43
11.65	37.44	37.42
11.7	37.43	37.42
11.75	37.48	37.48
11.8	37.39	37.38
11.85	37.4	37.38
11.9	37.45	37.39
11.95	37.45	37.43
12	37.48	37.47
12.05	37.51	37.5
12.1	37.54	37.51
12.15	37.58	37.58
12.2	37.59	37.6
12.25	37.62	37.6
12.3	37.62	37.6
12.35	37.61	37.62
12.4	37.61	37.65
12.45	37.65	37.63
12.5	37.67	37.66
12.55	37.71	37.71
12.6	37.8	37.76
12.65	37.86	37.82

12.7	37.89	37.86
12.75	37.92	37.9
12.8	38	37.98
12.85	38.05	38.02
12.9	38.06	38.02
12.95	38.09	38.05
13	38.14	38.1
13.05	38.21	38.19
13.1	38.29	38.24
13.15	38.36	38.35
13.2	38.44	38.47
13.25	38.57	38.55
13.3	38.63	38.59
13.35	38.68	38.67
13.4	38.77	38.73
13.45	38.84	38.77
13.5	38.9	38.8
13.55	38.92	38.88
13.6	39.03	39
13.65	39.15	39.11
13.7	39.3	39.23
13.75	39.42	39.33
13.8	39.53	39.49
13.85	39.66	39.59
13.9	39.74	39.65
13.95	39.81	39.7
14	39.89	39.83
14.05	39.96	39.92
14.1	40.02	39.96
14.15	40.08	40.04
14.2	40.16	40.11
14.25	40.25	40.18
14.3	40.33	40.27
14.35	40.37	40.28
14.4	40.44	40.32
14.45	40.5	40.4
14.5	40.62	40.56
14.55	40.7	40.61
14.6	40.77	40.64
14.65	40.83	40.71
14.7	40.86	40.77
14.75	40.83	40.72
14.8	40.79	40.65
14.85	40.76	40.65
14.9	40.84	40.76
14.95	40.87	40.77
15	40.89	40.79
15.05	40.95	40.85
15.1	41.03	40.94
15.15	41.08	40.96
15.2	41.02	40.93
15.25	40.99	40.88
15.3	41.01	40.91
15.35	41.04	40.88
15.4	41.08	40.92
15.45	41.12	40.96
15.5	41.15	40.97

15.55	41.18	41
15.6	41.14	41.01
15.65	41.05	40.99
15.7	40.99	40.95
15.75	40.99	40.92
15.8	41.03	41
15.85	41.14	41.11
15.9	41.18	41.15
15.95	41.27	41.22
16	41.34	41.33
16.05	41.4	41.36
16.1	41.39	41.34
16.15	41.33	41.32
16.2	41.31	41.31
16.25	41.4	41.37
16.3	41.47	41.43
16.35	41.53	41.52
16.4	41.66	41.66
16.45	41.77	41.75
16.5	41.82	41.77
16.55	41.84	41.87
16.6	41.83	41.95
16.65	41.85	41.94
16.7	41.91	42
16.75	42.09	42.2
16.8	42.23	42.35
16.85	42.36	42.39
16.9	42.5	42.49
16.95	42.61	42.59
17	42.63	42.6
17.05	42.63	42.57
17.1	42.64	42.54
17.15	42.76	42.58
17.2	42.82	42.63
17.25	42.86	42.75
17.3	43.02	42.9
17.35	43.15	42.98
17.4	43.28	43.1
17.45	43.3	43.17
17.5	43.32	43.16
17.55	43.37	43.19
17.6	43.39	43.23
17.65	43.5	43.35
17.7	43.52	43.41
17.75	43.62	43.49
17.8	43.74	43.6
17.85	43.89	43.69
17.9	43.92	43.81
17.95	44.02	43.89
18	44.18	43.98

5.1.5 Loop antenna FMZB 1519

Frequency (MHz)	Antenna factor (dB)
0,009	-30,60
0,010	-30,80
0,020	-31,80
0,030	-32,00
0,040	-32,10
0,050	-32,20
0,060	-32,20
0,070	-32,20
0,080	-32,20
0,090	-32,30
0,100	-32,30
0,150	-32,30
0,200	-32,40
0,300	-32,40
0,400	-32,40
0,500	-32,40
0,600	-32,40
0,700	-32,50
0,800	-32,50
0,900	-32,50
1,000	-32,50
2,000	-32,50
3,000	-32,50
4,000	-32,50
5,000	-32,50
6,000	-32,50
7,000	-32,50
8,000	-32,50
9,000	-32,50
10,000	-32,50
11,000	-32,50
12,000	-32,50
13,000	-32,50
14,000	-32,40
15,000	-32,40
16,000	-32,40
17,000	-32,40
18,000	-32,30
19,000	-32,30
20,000	-32,20
21,000	-32,10
22,000	-32,10
23,000	-32,00
24,000	-31,90
25,000	-31,80
26,000	-31,70
27,000	-31,60
28,000	-31,50
29,000	-31,40
30,000	-31,30

6 CONVERSION FACTORS AND ALL OTHER FORMULAS

Unit	Conversion unit	Formula of conversion
$\text{dB}\mu\text{V}$	$\text{dB}\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m} = \text{dB}\mu\text{V} + \text{AF}$
$\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m}$	$\text{dB}\mu\text{V}/\text{m} = 20\log(X(\mu\text{V}/\text{m})/1\mu\text{V})$

	Test distance stated in standard	Test distance of measurement	Conversion factor
Class B	3 m	3 m	/
Class A	10 m	3 m	20dB/decade