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Test Report for the Testing of the AirGlu2 to FCC Rule 47CFR 15.247 and ISED RSS-247 for Timecode Systems

Test Report number: C14489TR2

Project number: B5200

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Issue	Description						Issue by	Date
2	*Copy 1*		*Copy 2*		*PDF*	*X*	*MR*	*2nd February 2022*

Registered Address:
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Registered in England and Wales
Company Reg. No. 6048589
VAT Reg. No. GB 887 1276 83

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Test Report Change History

Issue	Date	Modification Details
1	1st February 2022	Original issue of test report
2	2nd February 2022	ISED number amended
3		
4		
5		
6		
7		
8		
9		
10		

Section 1 Test Location

All testing was performed at;

Eurofins York Ltd	Unit 5
	Speedwell Road
	Castleford
	WF10 5PY
	-
Tested by	J Beevers, Test Engineer
Tel:	01977 731173
	-
Website	http://www.yorkemc.co.uk
UKAS Testing No.	1574

1.1 UKAS Accreditation

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Eurofins York latest accreditation schedule can be found at:
http://www.ukas.org/testing/lab_detail.asp?lab_id=989&location_id=&vMenuOption=3

Eurofins York Castleford Laboratory, is an Accredited facility recognised by the Federal Communications Commission (FCC) for certification testing. The appropriate FCC Designation Number is UK2013, dated 1st March 2021.

Eurofins York Castleford Laboratory is recognised by ISED for certification testing.
ISED Assigned Code: 22959

Section 2 Customer Information

Company name	Timecode Systems
Address	Unit 6, Elgar Business Centre
	Mosely Road, Hallow
	Worcester
	WR2 6NJ
	United Kingdom
Contact	Paul Scurrell
Customer Representative(s) present during testing	Paul.scurrell@atomos.com

Section 3Equipment Details

3.1 Equipment Under Test (EUT)

Date received:	17th November 2021		
EUT name:	AirGlu2		
PMN:	AirGlu2		
HVIN:	AirGlu2		
FVIN:	V1.00		
FCC ID:	AYV-AGLU02		
ISED number:	10427A-AGLU02		
Serial no:	00000001		
EUT description:	A transmitter/receiver module which provides wireless sync capabilities to video and audio devices. The unit contains the following radio technologies: Bluetooth Low Energy – 2.4GHz, SRD – 902 - 928 MHz		
Antenna	External via SMA connector. TG.09.0113, Penta-band Cellular Hinged SMA Male Monopole		
Transmission	Frequency Hopping Spread Spectrum (FHSS) Short Range Device (SRD)		
Modulation scheme	2GFSK		
Operating frequency band	902MHz to 928MHz		
No of units tested:	One		
EUT power:	3.3V via USB port		
Highest internal frequency:	2.480GHz		
Size of EUT (m)	Width: 120 mm	Depth: 85 mm	Height: 35 mm
Mode/s of operation	Transmitting on channel 915.8MHz Transmitting on channel 919.0MHz Transmitting on channel 922.2MHz Frequency hopping enabled		
Modifications incorporated during testing:	The output power set by the test software was set to a level of 80.		

Ports and Cables	Cable Length	Screened/ unscreened	Connected to
USB cable	1m	unscreened	PC
5Vdc supply cable	5m	unscreened	DC power supply

3.2 EUT Photos

Photographs of the apparatus and test set ups are provided separately.

3.3 Configuration of EUT

The apparatus was supplied in one single possible configuration.

3.4 EUT Monitoring/Auxiliary Equipment

None.
The channel required was selected via software prior to the testing.

Section 4Test Specifications

FCC Requirements

Regulation / Test Standard	Regulation: Title 47 of the Code of Federal Regulations (CFR) Part 15 (47CFR15) Subpart C – Intentional Radiators Measurement standard: ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

Test description	**Rule Part**	**Result Summary**
Intentional emission, band occupancy, 20dB bandwidth	47 CFR 15.215(C) 47 CFR 15.247 (a)(1)(i)	Pass
FHSS Requirements	Number of hopping channels 47CFR15.247(a)(1)(i)	Pass
	Channel separation 47CFR15.247(a)(1)(i)	Pass
	Hopping channel occupancy time 47CFR15.247(a)(1)(i)	Pass
	Hopping sequence 47CFR15.247(a)(1)(i)	Pass
Peak power output (conducted)	47 CFR 15.247 b (2)	Pass
Radiated spurious emissions* 30MHz to 10GHz	15.247(d)	Pass
band edge compliance	47CFR15.247(d) and 45CFR15.205 and 47CFR15.209	Pass
Mains conducted emissions 150kHz to 30MHz Applicable if the apparatus connects to the AC supply directly or via other apparatus.	47 CFR Part 15C Section 15.207 Test standard: ANSI C63.10-2013 Not applicable – not AC mains connected	Not applicable

Note 1 :All testing was carried out at a test distance of 3m and the limits adjusted accordingly. This is a deviation from the standard as Class A limits are specified at 10m test distance.

Note 2: Applies to carrier current systems see reference 47CFR Part 15Clause 15.109(e).

ISED Requirements

Test description	RSS Reference	Result Summary
Intentional emission, band occupancy	-	Pass
FHSS Requirements	RSS-247 Issue 2 Section 5.1 Channel separation Hopping sequence System receiver bandwidth Number of hopping channels Hopping channel occupancy time	Pass
Peak power output (conducted)	RSS-247 Issue 2 Section 5.4 (b)	Pass
Radiated spurious emissions	RSS-247 Issue 2 Section 5.5	Pass
Band edge compliance	RSS-247 Issue 2 Sections 5.5 RSS-Gen Issue 5 Section 8.10	Pass
AC power line conducted emissions	RSS-247 Section 3.1 RSS Gen Section 8.8 Not applicable – not AC mains connected	Not applicable

4.1 Knowledge Database References

The following KDBs were referenced during the testing.

The latest knowledge database references are available via the FCC KDB website at:

https://apps.**fcc**.gov/kdb

4.1.1 Radiated Emissions (30MHz to 1000MHz)

Publication Number	Keyword	Publication Date
913591	Measurement of radiated emissions at the band-edge for a Part 15 RF Device	04/05/2017

4.1.2 Radiated Emissions (1GHz to 40GHz)

Publication Number	Keyword	Publication Date
704992	Test Site Validation Requirements above 1 GHZ.	12/06/2015
149045	Comparison Noise Emitter (CNE), reference noise source, .pdf	05/04/2007
913591	Measurement of radiated emissions at the band-edge for a Part 15 RF Device	04/05/2017
934285	Comparison Noise Emitters (CNE), test equipment, Broadband.pdf	05/04/2007

4.2 Compliance Statement

The AirGlu2, as tested, was shown to meet requirements of the standards listed in Section 4 of this report.

Section 5 Maximum Conducted Output Power

FCC Rule Part	47CFR15.247(b)(2)
ISED	RSS-247 Issue 2 Section 5.4(a)
Standard	ANSI C63.10:2013
Measurement Uncertainty	The reported uncertainty of measurement y ± U, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% is ±1.5dB

5.1.1 Date of Test

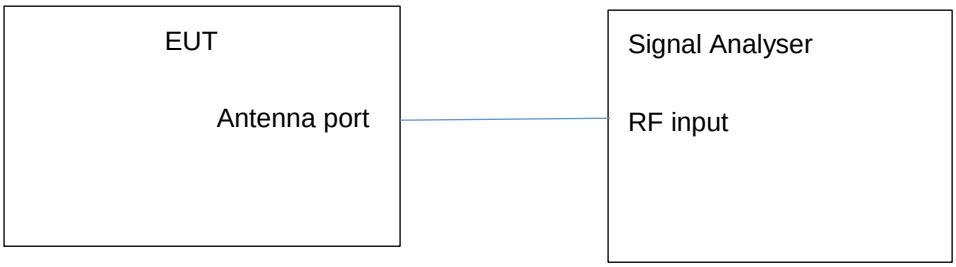
31st January 2022

5.1.2 Test Area

Laboratory 5

5.1.3 Test Setup

The antenna port was connected directly to the signal analyser.



5.1.4 Maximum Peak Conducted Power Limit

47CFR15.247(b)(1)

For frequency hopping systems operating in the 902MHz to 928MHz band: 1 watt (30dBm) for systems employing at least 50 hopping channels.

5.1.5 Test Results

Channel (MHz)	Peak Power (dBm)	Peak Power (Watts)	Limit (Watts)	Figure
915.8	9.50	0.0089	1	5.1.5.1
919.0	9.36	0.0086	1	5.1.5.2
922.2	9.23	0.0084	1	5.1.5.3

Peak Output Power Measurement

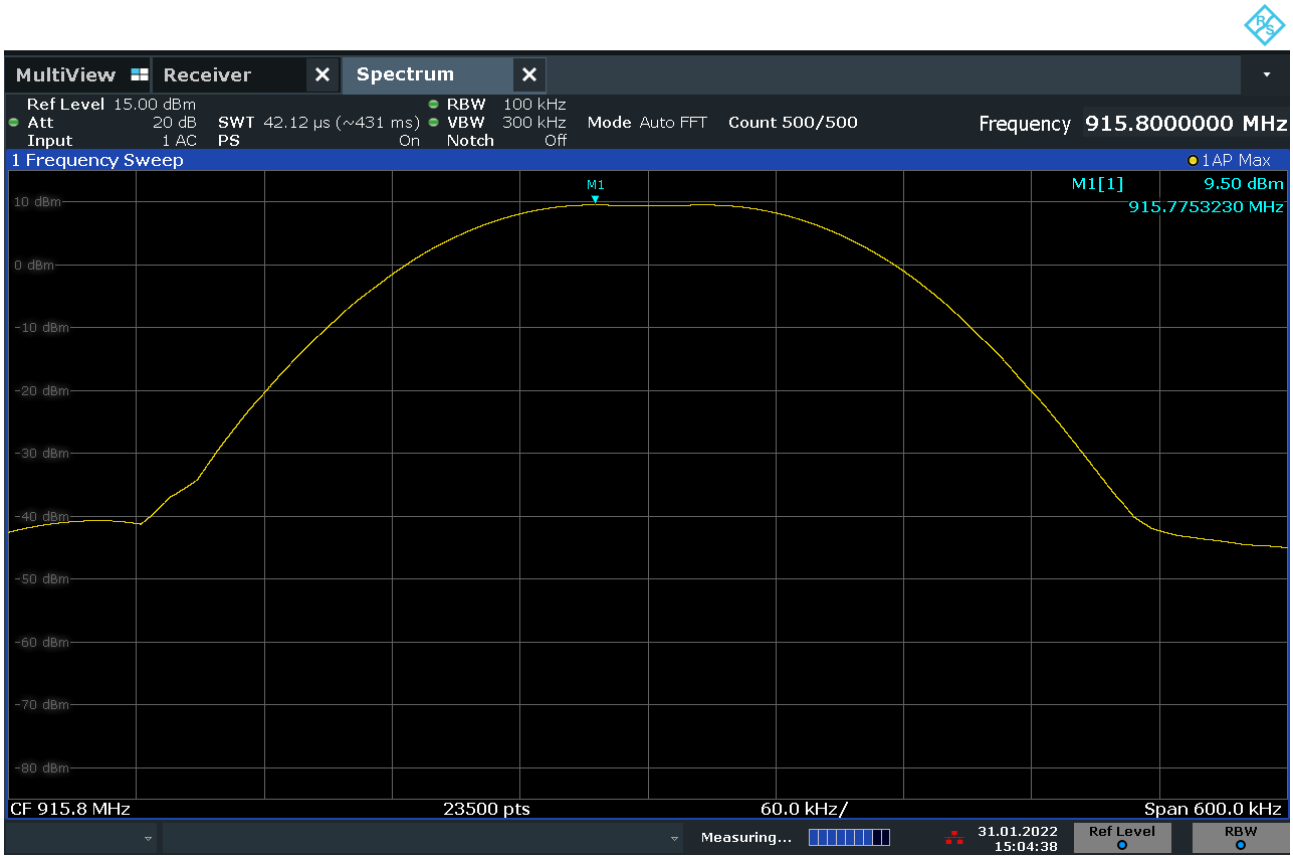


Figure 5.1.5.1: Peak output power – Bottom Channel 915.8MHz

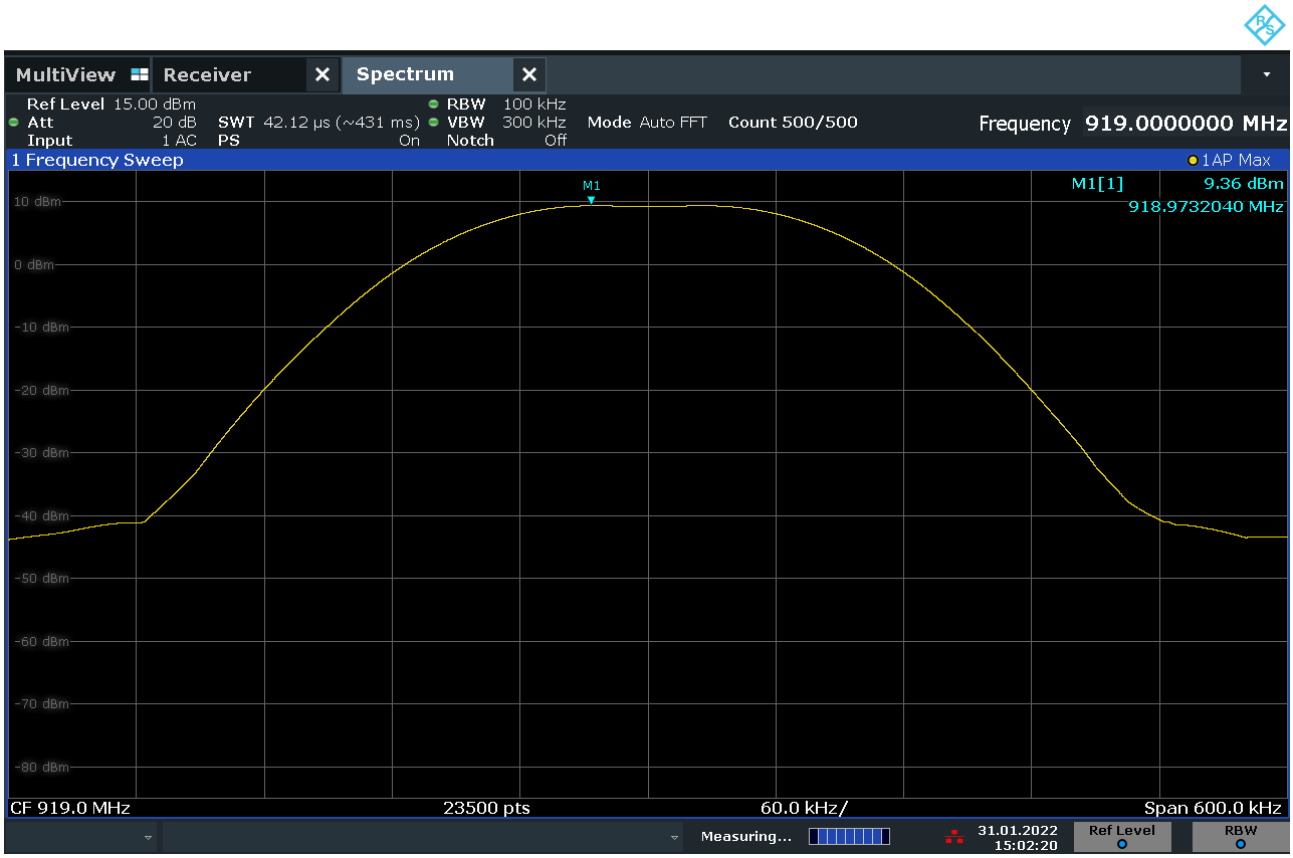


Figure 5.1.5.2: Peak output power – Middle Channel 919.0MHz

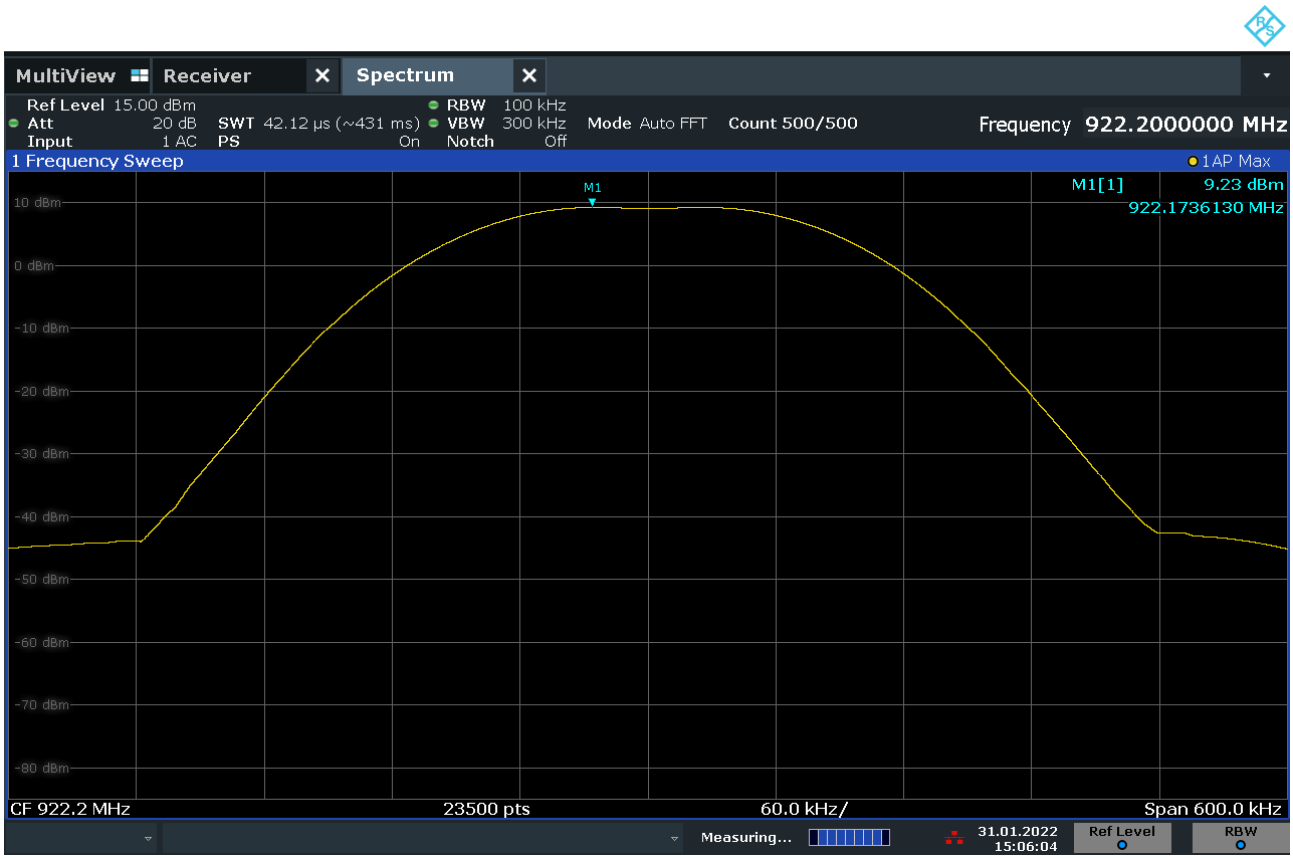


Figure 5.1.5.3: Peak output power – Top Channel 922.2MHz

Section 6 Conducted Spurious Emission Results

FCC Rule Part	47CFR15.247(d)
ISED	RSS-247 Issue 2
Standard	ANSI C63.10:2013
Measurement Uncertainty	The reported uncertainty of measurement y ± U, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% is ±1.5dB

6.1.1 Date of Test

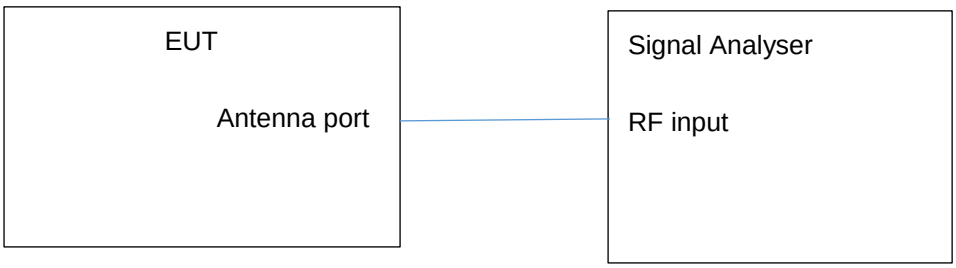
20th January 2022

6.1.2 Test Area

Laboratory 1

6.1.3 Test Setup

The antenna port was connected directly to the signal analyser.



6.1.4 Maximum Peak Conducted Spurious Power Limit

47CFR15.247(d)

The unwanted 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

Emissions within the restricted bands must comply with the radiated emission limits of 47CFR 15.209.

6.1.5 Test Results

The measurements were taken with the equipment transmitting on the top, middle and bottom channels.

In the spectrum analyser displays the red display line is positioned 20dB below the peak carrier. All disturbances are greater than 50dB below the carrier in all cases.

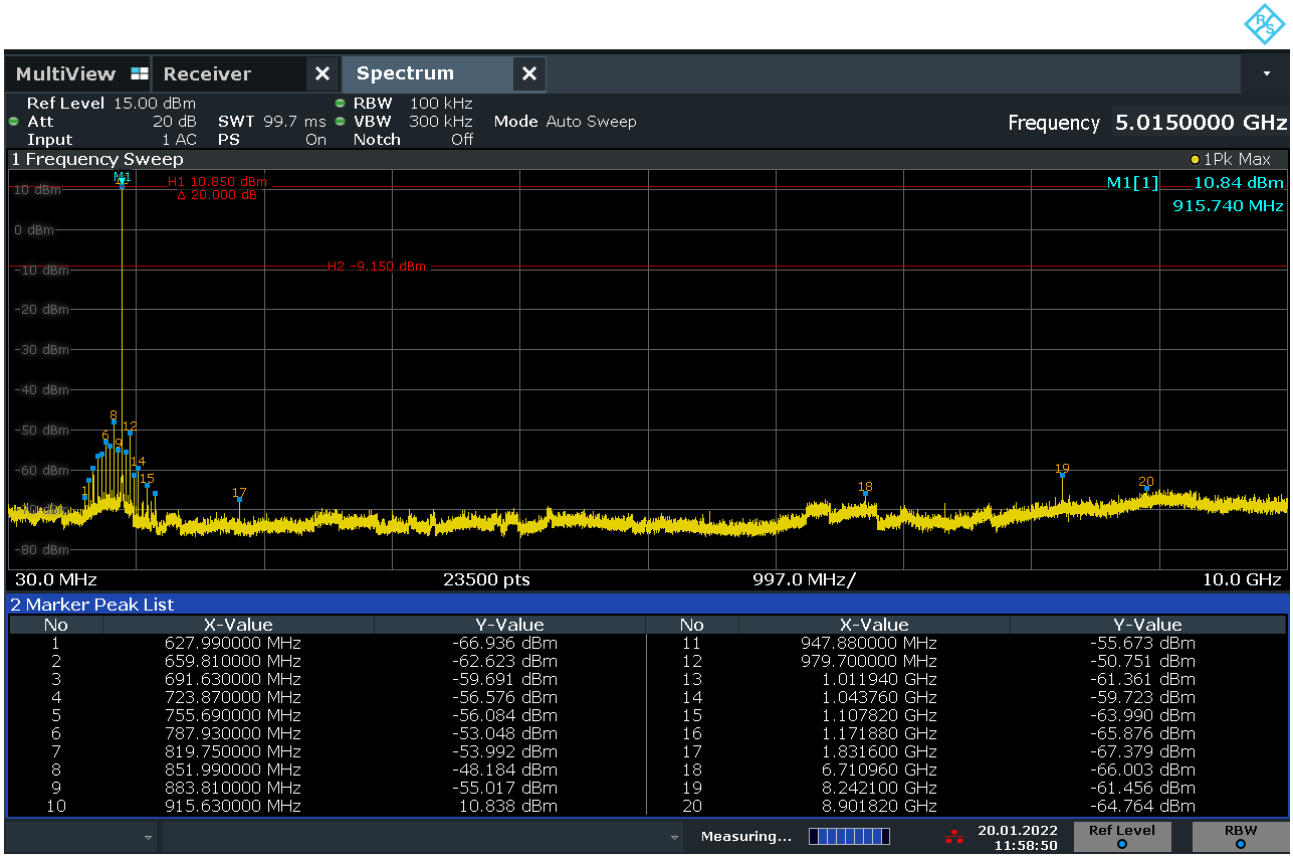


Figure 6.1.5.1: Conducted emissions bottom channel 30MHz to 10GHz

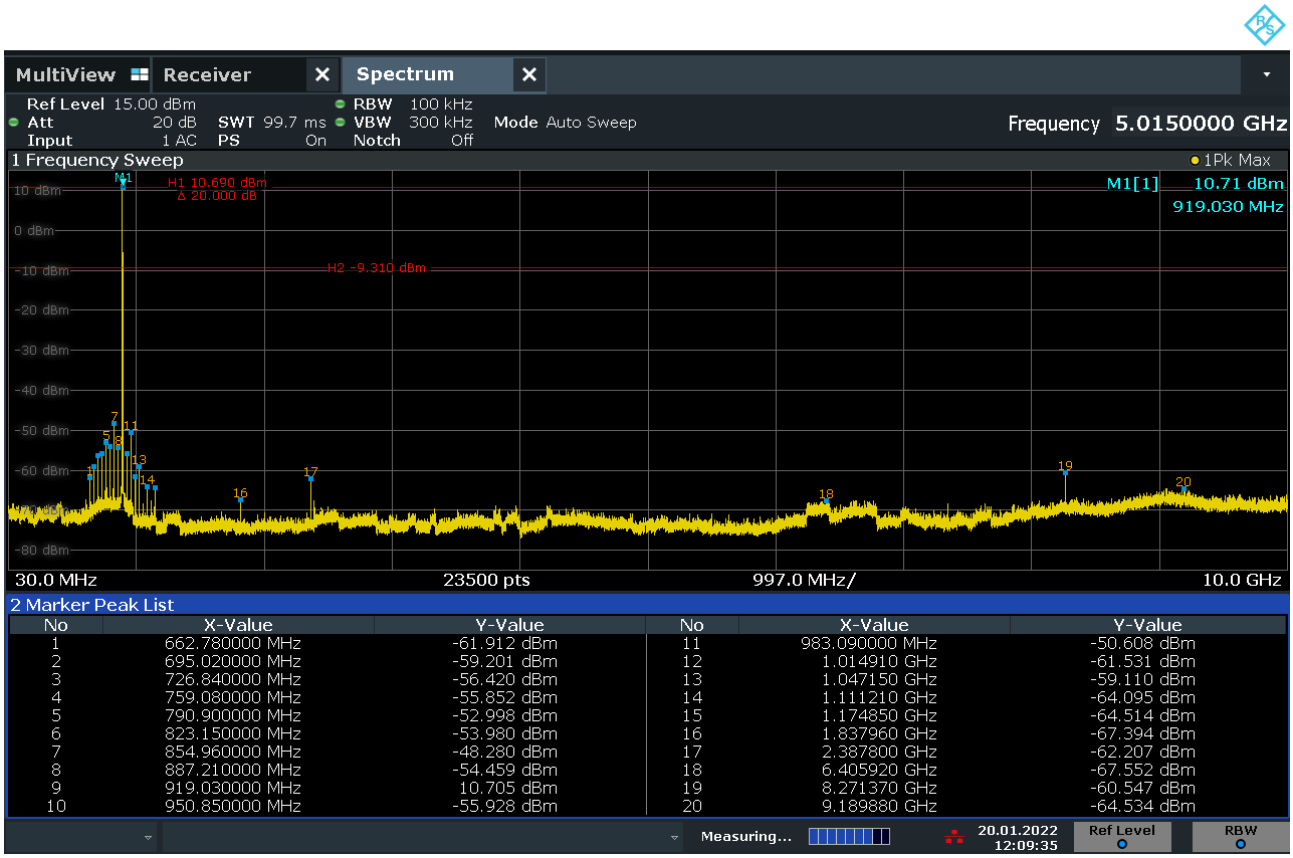


Figure 6.1.5.2: Conducted emissions middle channel 30MHz to 10GHz

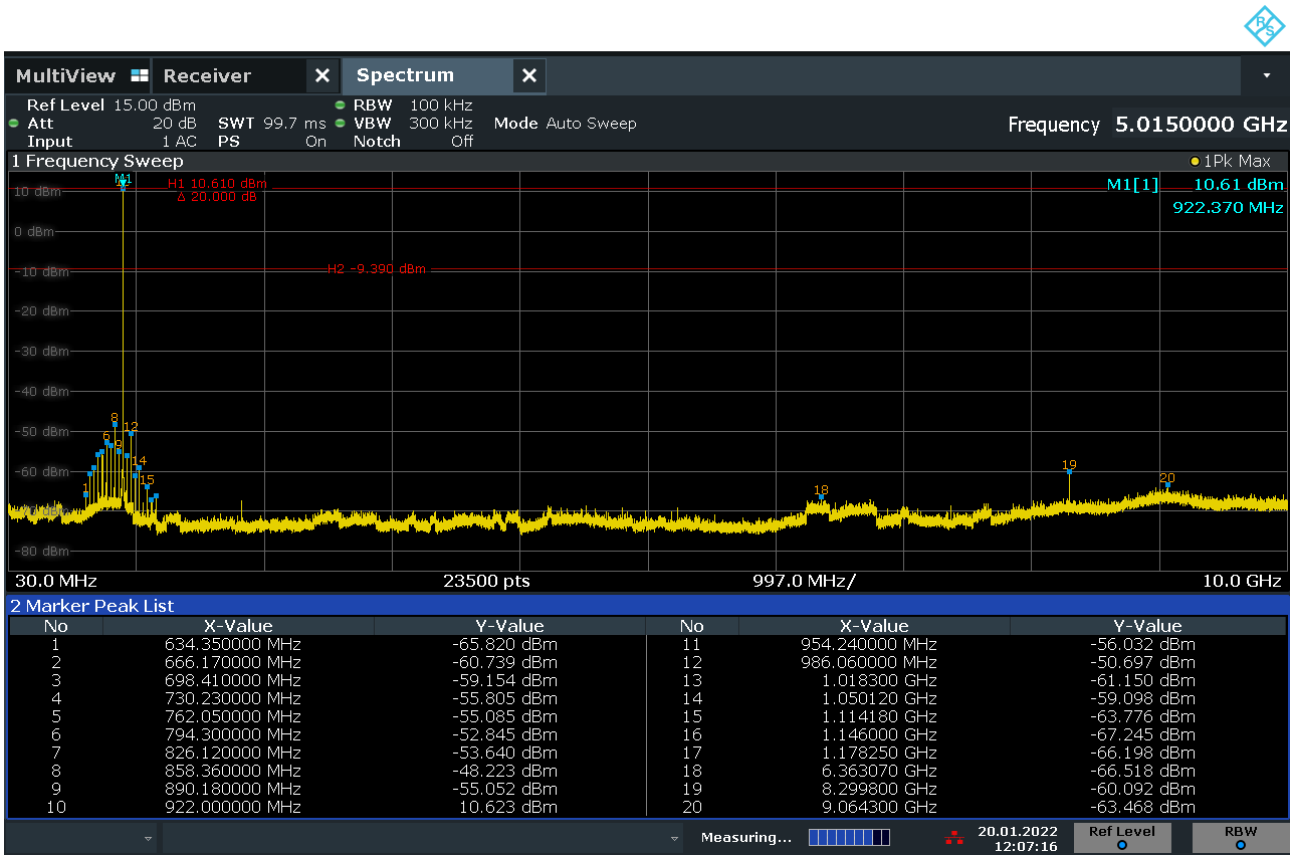


Figure 6.1.5.3: Conducted emissions Top Channel 30MHz to 10GHz

Section 7 Radiated Emission Results

7.1 Test Specification

FCC Rule Part	47CFR15.247(d) and 47CFR15.209
Standard	ANSI C63.10-2013
Measurement Uncertainty	The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% is +/- 4.27dB for the frequency range from 9kHz to 30MHz +/- 5.81dB for the frequency range 30MHz to 1GHz +/- 4.64dB for the frequency range from 1GHz to 6GHz +/- 4.96dB for the frequency range from 6GHz to 18GHz +/- 4.77dB for the frequency range from 18GHz to 40GHz

7.2 Procedure and Test Software Version

Eurofins York Test procedure (9kHz to 30MHz)	CEP22 Issue 3
Eurofins York test procedure (30MHz to 1GHz)	CEP23b Issue 9
Eurofins York test procedure (1GHz to 40GHz)	CEP64b Issue 9
Test software	Radimation Version 2018.2.8

7.3 Radiated Emissions (30MHz to 1GHz)

Radiated electric field emission measurements are applied as defined in 47CFR15.205 and 47CFR15.209.

7.3.1 Electric Field Strength Limits

The electric field strength limits are defined in 47CFR15.209. The radiated limits apply to any disturbance within the restricted bands defined section 47CFR15.205. All other emissions must comply with the conducted emission requirement of 47CFR15.247(d).

Frequency (MHz)	Quasi Peak (dBμV/m)
30 - 88	40.0
88 -216	43.5
216 - 960	46.0
960- 1000	54.0

Note: FCC 47 CFR Part 15 Section 15.209 specifies test limits at 3m.

7.3.2 Receiver Settings

Receiver Parameters	Setting
Detector Function for spectrum analyser swept measurements	Peak hold
Detector Function for final measurements	Quasi Peak
Start Frequency	30MHz
Stop Frequency	1000MHz
Resolution Bandwidth	120kHz
Video Bandwidth	Auto

7.3.3 Emissions measurement

7.3.4 Date of Test

26th January 2022

7.3.5 Test Area

Laboratory 1

7.3.6 Test Setup

The EUT was configured in the Semi-Anechoic Chamber (SAC) on an 80cm high table.

The measurement was performed with an antenna to EUT separation distance of 3m. The Quasi peak limits are therefore increased by 10dB (from the 10m values), to allow for the reduction in the measurement distance.

The results were maximised in orientation 0-360 degrees and height 1-4m.

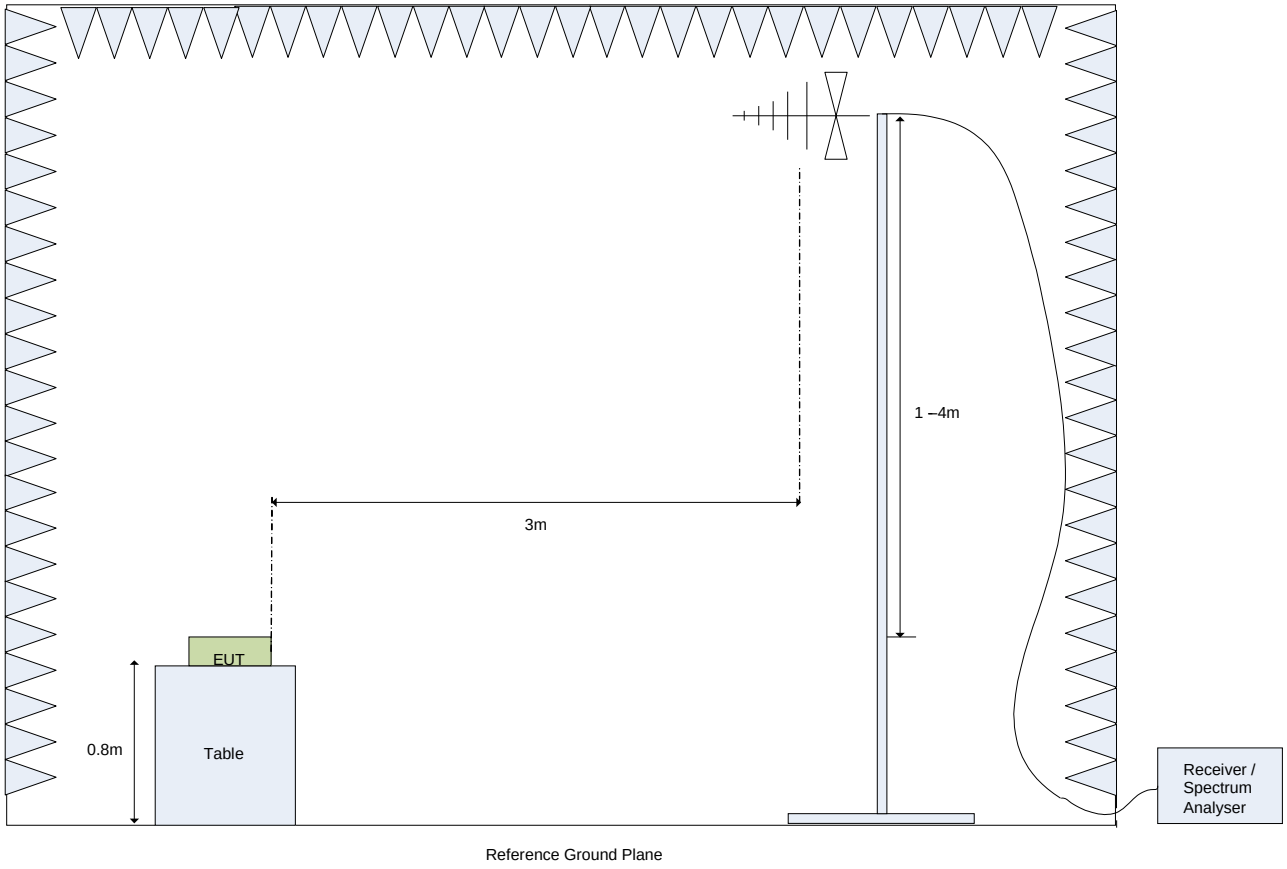


Figure 11: Arrangement for radiated electric field emissions 30MHz to 1GHz

There were no significant environmental temperature changes during the test duration and hence it was not considered necessary to consider any variation in cable loss.

Operating Mode During testing

During spurious emission testing the equipment under test was set to transmit at the same frequency on the following channels: 915.8MHz, 919.0MHz and 922.2MHz

The equipment under test was pre-scanned using peak detection when operating on all three channels. Final measurements were performed with the equipment under test operating on 922.2MHz.

7.3.7 Radiated Electric field emissions, 30MHz to 1GHz

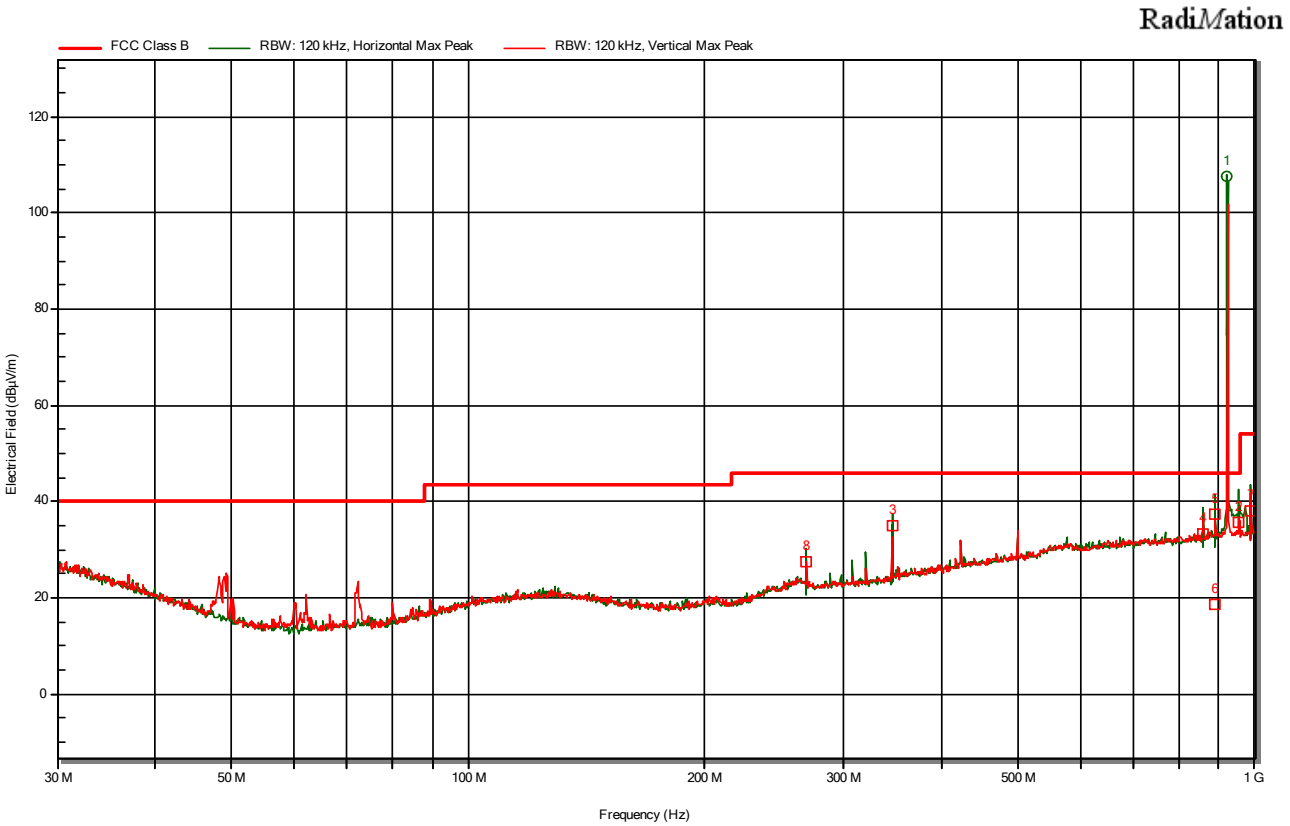


Figure 7.3.7.1: Radiated electric field emissions. Operation on 922.2MHz

Frequency (MHz)	Quasi-Peak (dBµV/m)	Quasi-Peak Limit (dBµV/m)	Quasi-Peak Difference (dB)	Quasi-Peak Status	Angle (degree)	Height (m)	Polarization
954.198	35.6	46	-10.4	Pass	35	1.5	Horizontal
345.600	34.9	46	-11.1	Pass	195	1.0	Horizontal
858.180	33.4	46	-12.6	Pass	160	1.0	Horizontal
890.178	37.3	46	-8.7	Pass	25	1.0	Horizontal
891.720	18.7	46	-27.3	Pass	150	1.0	Horizontal
986.208	37.9	54	-16.1	Pass	85	1.5	Vertical
268.800	27.4	46	-18.6	Pass	185	1.0	Horizontal

Table 7.3.7.1 Electric Field Emissions Peaks, 30MHz to 1GHz. 922.2MHz Operation

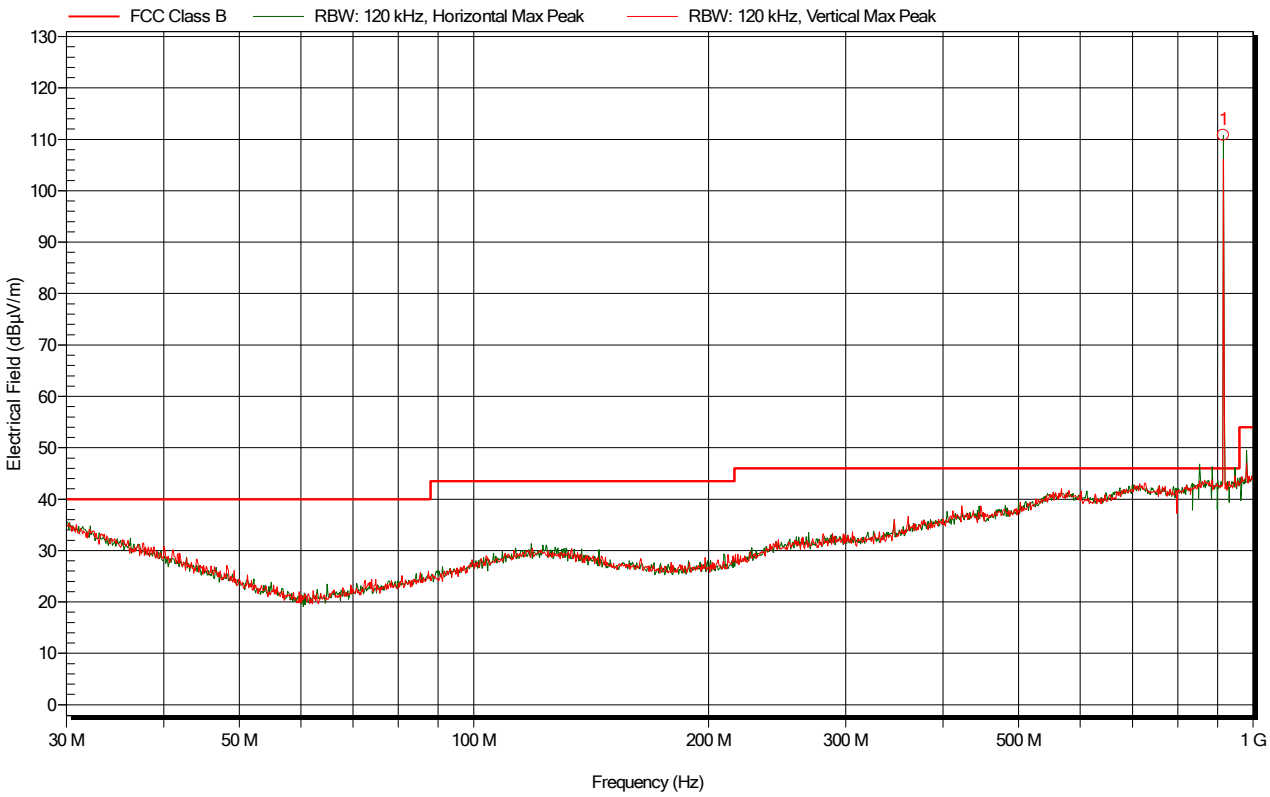


Figure 7.3.7.2 Electric field emissions Plot, 30MHz to 1GHz, Operation on 915.8MHz - Peak detector scan

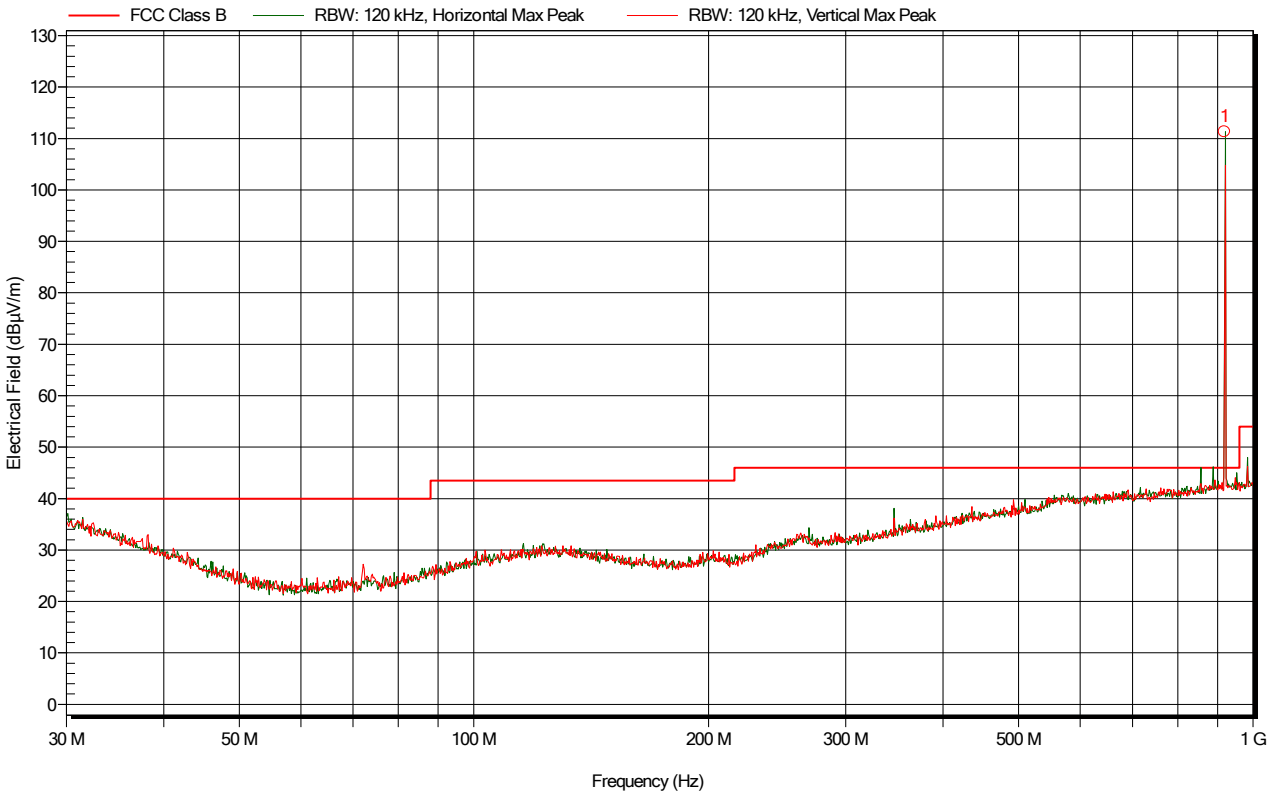


Figure 7.3.7.3: Electric field emissions Plot, 30MHz to 1GHz, Operation on 919.0MHz - Peak detector scan

7.3.8 Quasi Peak correction factors

The reported field strength consists of Indicated signal level (receiver voltage reading), Antenna factor (AF) and Cable loss (CL).

Field strength (FS) is calculated as follows:

FS (dBµV/m) = Indicated Signal Level (dBµV) + AF (dB/m) + CL (dB)

7.3.9 Sample Data

From Figure 7.3.7.1, table 7.3.7.1, the Quasi-Peak level at 268.8MHz is calculated as follows:

FS (dBµV/m) = 6.9(dBµV) + 18.9(dB/m) + 1.6 (dB) = 27.4 dBµV/m

7.4 Radiated electric field emissions 1GHz to 10GHz

7.4.1 Limits

Frequency (GHz)	Limit (dBµV/m)	Limit (dBµV/m)
	Peak	Average
1-10	74.0	54.0

7.4.2 Receiver Settings

Receiver Parameters	Setting
Detector Function for spectrum analyser swept measurements	Peak hold
Detector Function for final measurements	Average
Start Frequency	1GHz
Stop Frequency	10GHz
Resolution Bandwidth	1MHz
Video Bandwidth	Auto

7.4.3 Emissions measurements

7.4.4 Date of Test

18th January 2022

7.4.5 Test Area

Laboratory 1

7.4.6 Test Setup

The EUT was configured in the SAC on an 1.5m high polystyrene support.

Exploratory measurements on the EUT were carried out to identify suspect frequencies and worst case orientations, see Section 7.4.7.

The measurement was then performed with an antenna to EUT separation distance of 3m.

The antenna was kept in the “cone of radiation” from the EUT and pointed at the area both in azimuth and elevation using the tilt mechanism on the antenna mast.

The results were maximised in orientation 0-360 degrees and height 1-4m.

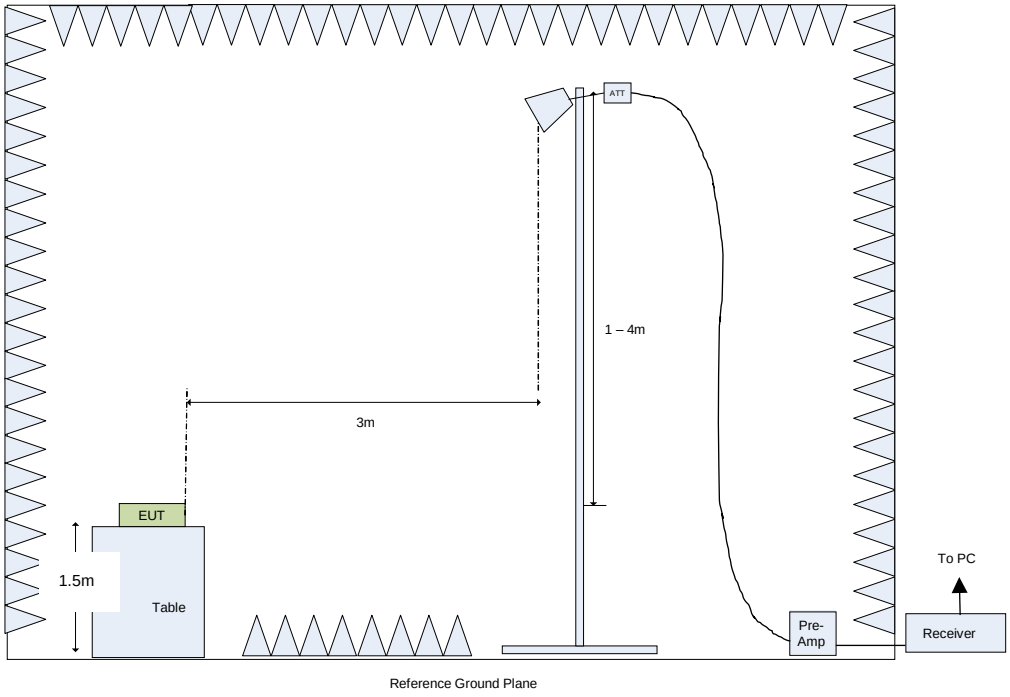


Figure 7.4.6.1: Test Setup for Final E-Field Measurements from 1GHz to 10GHz

Note 1 : With the EUT de-energized the ambient radio noise and signals met the 6dB peak detection requirement of ANSI C63.10 2013 Clause 6.6.4.1.

Note 2 : There were no significant environmental temperature changes during the test duration and hence it was not considered necessary to consider any variation in cable loss.

7.4.7 Exploratory Radiated Emission Maximization

During exploratory testing, suspect emissions from the EUT were identified both in terms of the frequency and directionality. This was achieved by manually positioning the antenna close to the EUT and also by scanning it over all sides of the EUT whilst observing a spectral display. The typical distance between the surface of the EUT and the scanning antenna was circa 30cm.

Frequency (GHz)	Mode of operation	EUT face *	Emissions Angle (w.r.t. turntable)	Height	Polarization
9.134	Transmitting on channel 915.8MHz	Side face	0	1.5	H
9.160	Transmitting on channel 919.0MHz	Side face	0	1.5	H
8.847	Transmitting on channel 922.2MHz	Side face	0	1.5	H

Note 1 : The front face of the EUT is deemed to be 0°, which is then turned in a clockwise direction through 360 degrees.

7.4.8 Electric field emissions, 1GHz to 10GHz

The equipment under test was pre-scanned using peak detection when operating on all three channels. Final measurements were performed with the equipment under test operating on 922.2MHz

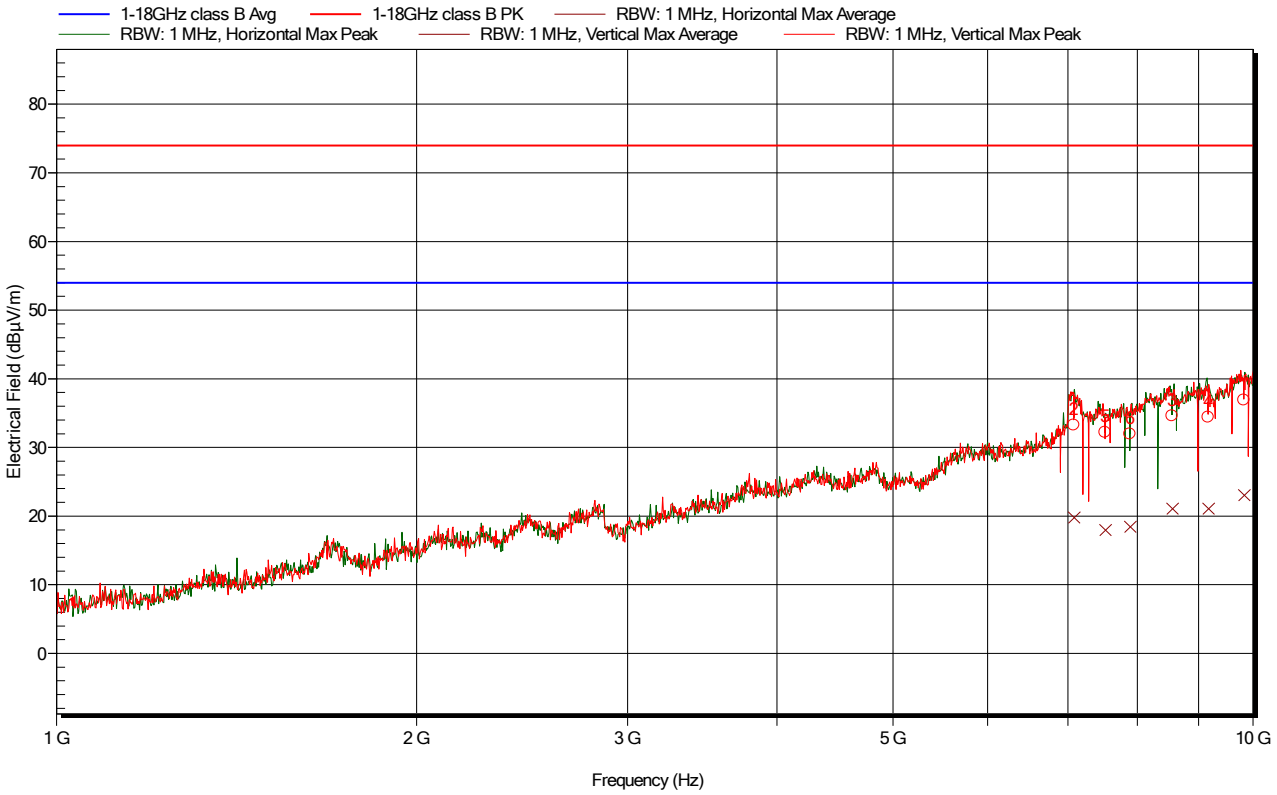


Figure 7.4.8.1: Electric field emissions, 1GHz to 10GHz. Operation on 922.2MHz

Frequency	Average	Average Limit	Average Difference	Average Status	Angle	Height	Polarization
GHz	dBµV/m	dBµV/m	dB		degrees	m	
9.824	23.11	54	-30.89	Pass	190	2.2	Vertical
7.080	19.86	54	-34.14	Pass	45	3.1	Vertical
8.555	21.13	54	-32.87	Pass	220	3.8	Horizontal
9.170	21.15	54	-32.85	Pass	285	2.8	Vertical
7.520	18.02	54	-35.98	Pass	75	2.0	Vertical
7.889	18.50	54	-35.50	Pass	150	1.0	Horizontal

Table 7.4.8.1 Electric Field Emissions Peaks, 1GHz to 10GHz – Operation on 922.2MHz

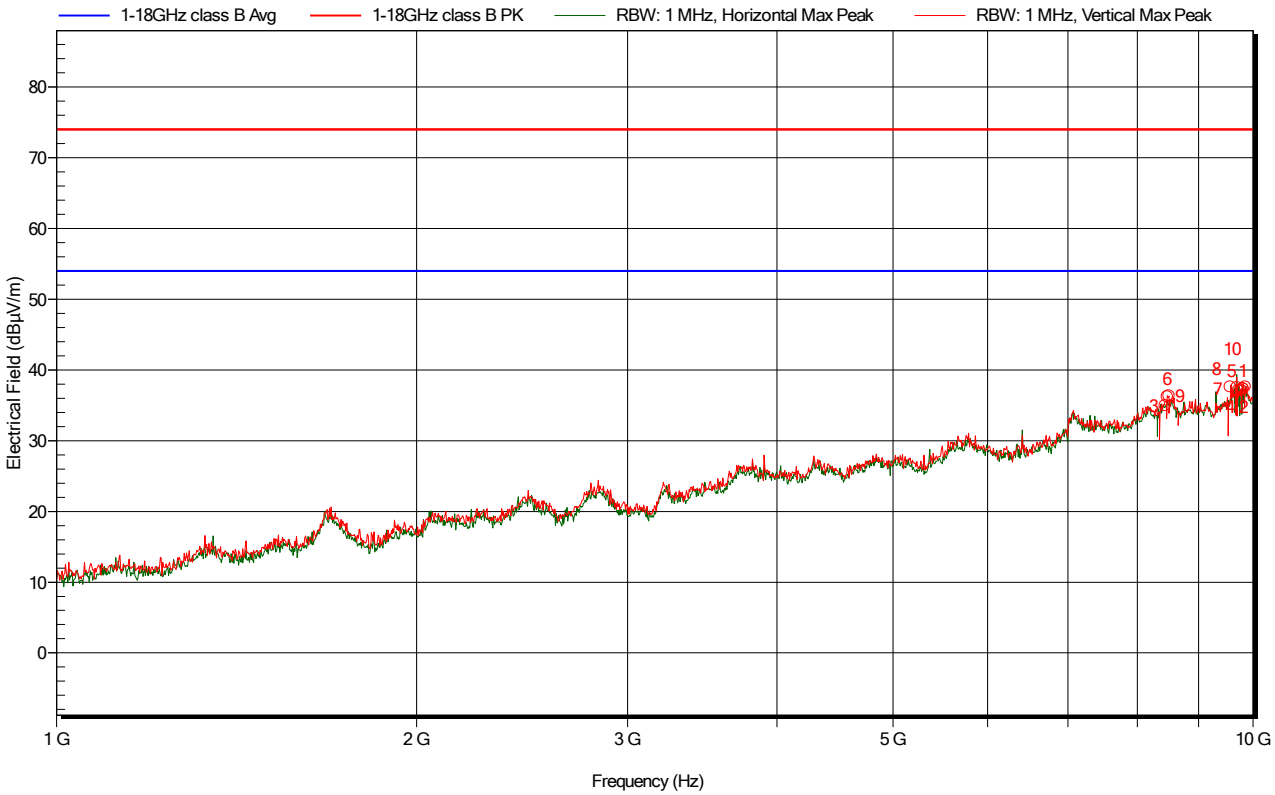


Figure 7.4.8.2: Electric field emissions Peaks, 1GHz to 10GHz. Operation on 915.8MHz

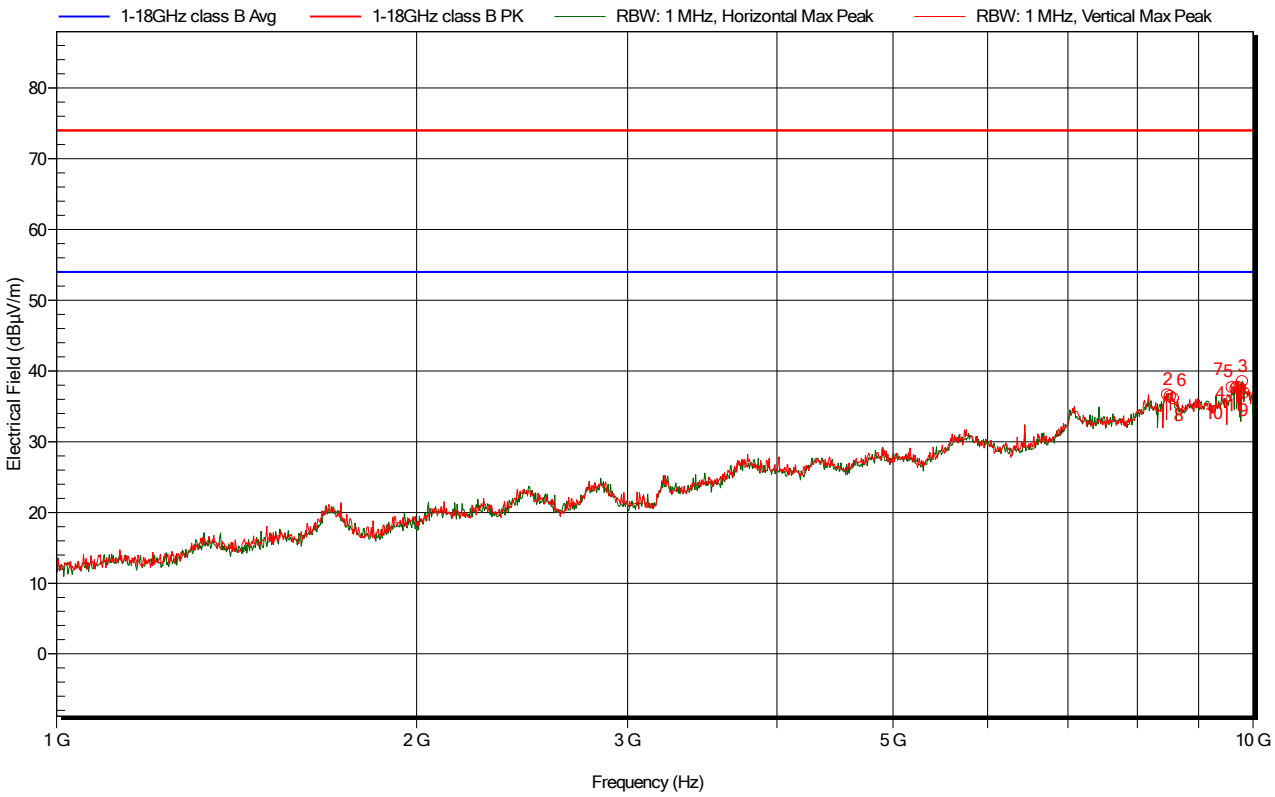


Figure 7.4.8.3: Electric field emissions Peaks, 1GHz to 10GHz. Operation on 919.0MHz

7.4.8.1 Example field strength calculation

The total average corrections are shown in the above table. This correction figure consists of Preamplifier gain (PG), Antenna factor (AF); Attenuator loss (AL) and Cable loss (CL).

Field strength (FS) is calculated as follows:

FS (dBµV/m) = Indicated Signal Level (dBµV) - PG (dB) + AF (dB) + AL (dB) + CL (dB)

7.4.8.2 Sample Data

From Figure 7.4.8.1 and table 7.4.8.1, The Average level at 7.889GHz is calculated as follows:

FS (dBµV/m) = 23.39(dBµV) -51.54(dB) +37.94(dB/m) +8.71 (dB) = 18.50BµV/m

Section 8 20dB Bandwidth

FCC Rule Part	47CFR15.247(a)(1)(i)
ISED	RSS Gen Clause 6.7
Standard	ANSI C63.10:2013
Measurement Uncertainty	The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% is Frequency: $\pm 10^{-8}$

8.1.1 Date of Test

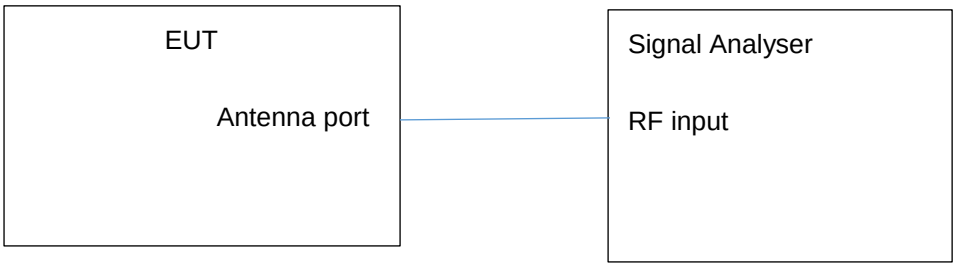
21st December 2021

8.1.2 Test Area

Laboratory 5

8.1.3 Test Setup

The antenna port was connected directly to the signal analyser.



8.1.4 20dB Bandwidth Requirement

The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping. stopped.

The 20dB bandwidth must remain within the frequency allocation.
The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

8.1.5 Test Results

Channel (MHz)	99% Occupied Bandwidth (kHz)	Measured 20dB bandwidth (kHz)	Figure	Result
915.8	86.254	92.84	8.1.5.1	Pass
922.2	86.265	92.79	8.1.5.2	Pass

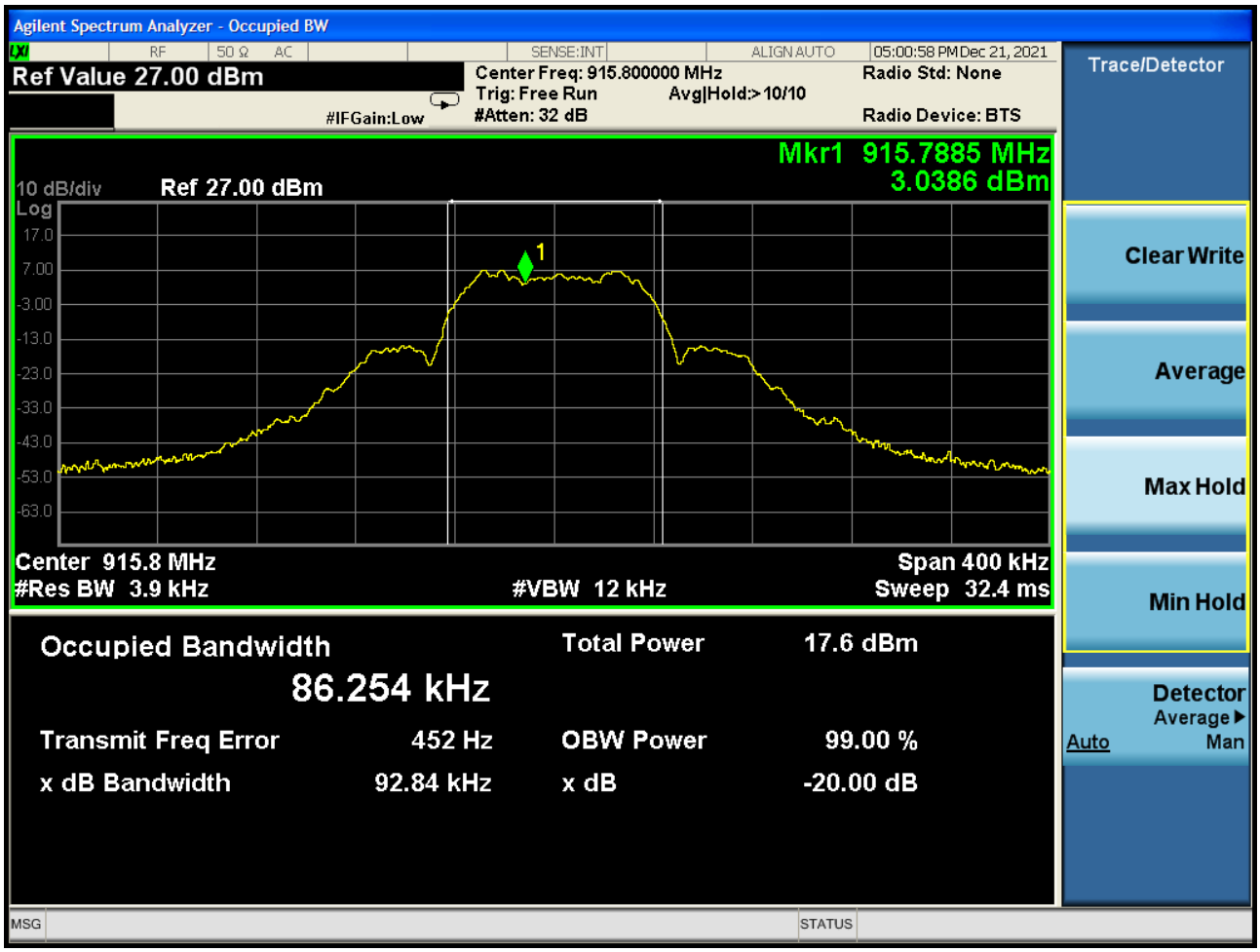


Figure 8.1.5.1: 20dB Bandwidth bottom channel 915.8MHz

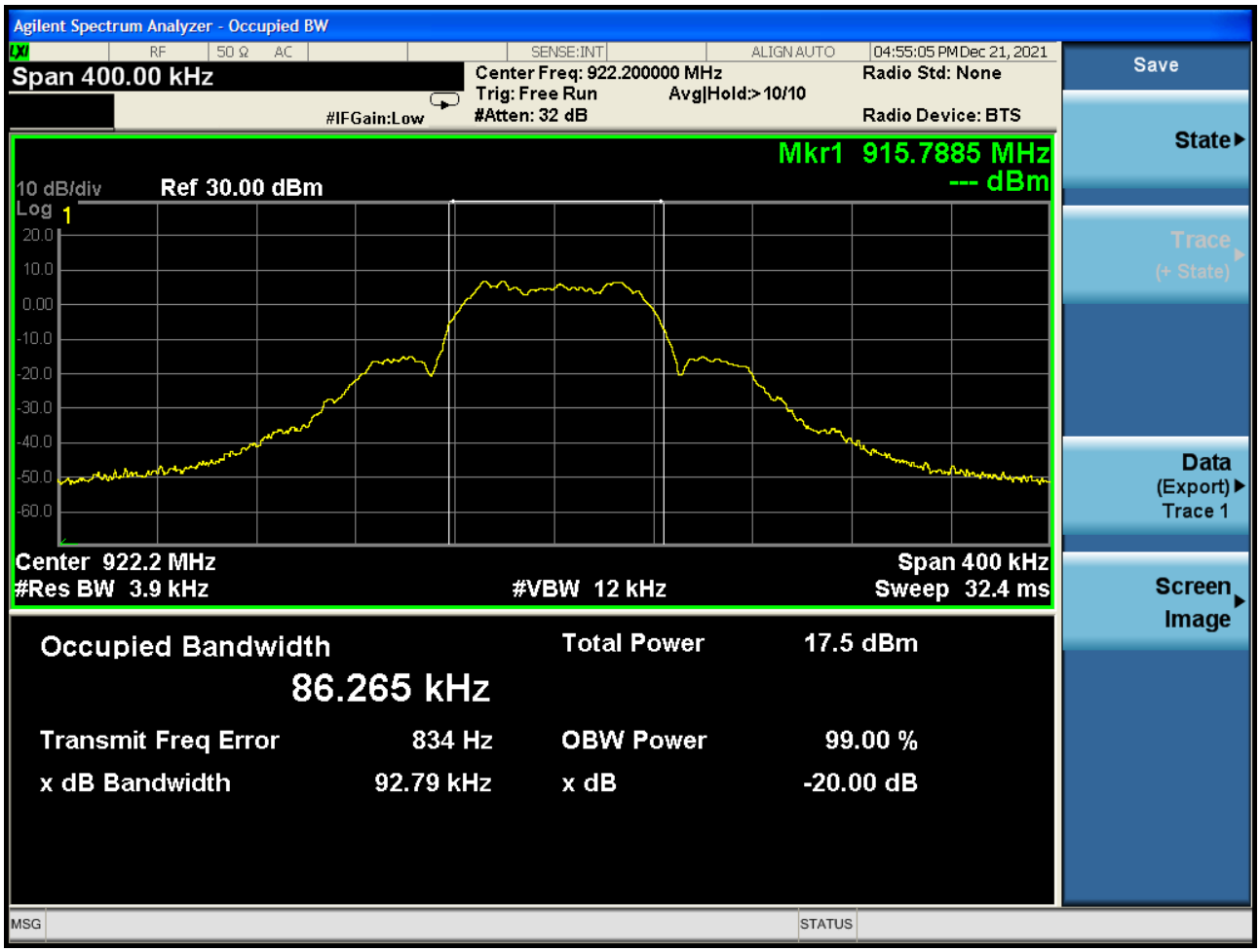


Figure 8.1.5.2: 20dB Bandwidth top channel 922.2MHz

Section 9 Frequency Hopping Spread Spectrum Requirements

9.1 Number of Hopping Frequencies

FCC Rule Part	47CFR15.247(a)(1)(i)
ISED	RSS-247 Issue 2 Section 5.1
Standard	ANSI C63.10:2013
Measurement Uncertainty	The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% is Not applicable

9.1.1 Date of Test

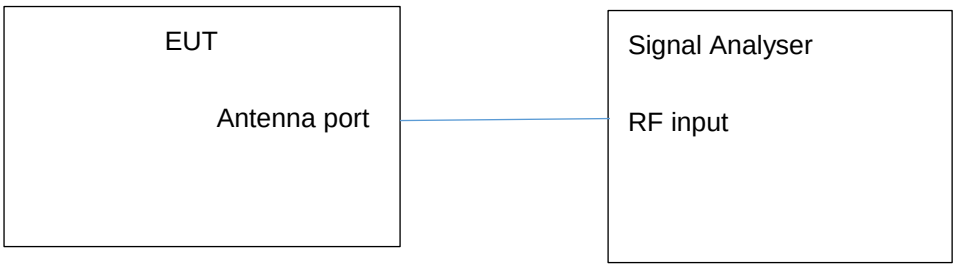
22nd December 2021

9.1.2 Test Area

Laboratory 1

9.1.3 Test Setup

The antenna port was connected directly to the signal analyser.



9.1.4 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.

The procedure described in ANSI C63.10-2013 Clause 7.8.3 was followed.

9.1.5 Test Results

The results show that 65 hopping channels were utilised. The analyser screen displays show the 65 hopping channels, split into two subranges:

Overall requirement of at least 50 hopping frequencies was met.

Figure 9.1.5.1: Number of hopping frequencies

Figure 9.1.5.2: Number of hopping frequencies

9.2 Frequency Hopping Channel Separation

FCC Rule Part	47CFR15.247(a)(1)
ISED	RSS-247 Issue 2 Section 5.1
Standard	ANSI C63.10:2013
Measurement Uncertainty	The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% is Frequency: $\pm 10^{-8}$

9.2.1 Date of Test

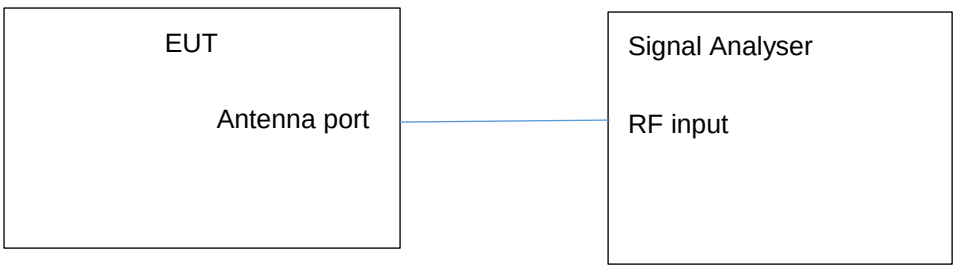
22nd December 2021

9.2.2 Test Area

Laboratory 1

9.2.3 Test Setup

The antenna port was connected directly to the signal analyser.



9.2.4 Requirement 47CFR15.247(a)(1)

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.

Since the measured 20dB bandwidth is greater than 25kHz, the carrier frequency separation shall be greater than the measured 20dB bandwidth.

9.2.5 Procedure

The procedure described in ANSI C63.10-2013 Clause 7.8.2 was followed.

9.2.6 Test Results

Between any two adjacent channels the carrier separation was measured to be, compliant with the requirement.

Measured Separation (kHz)	Limit (kHz)	Result
100.0	>92.84kHz	Pass

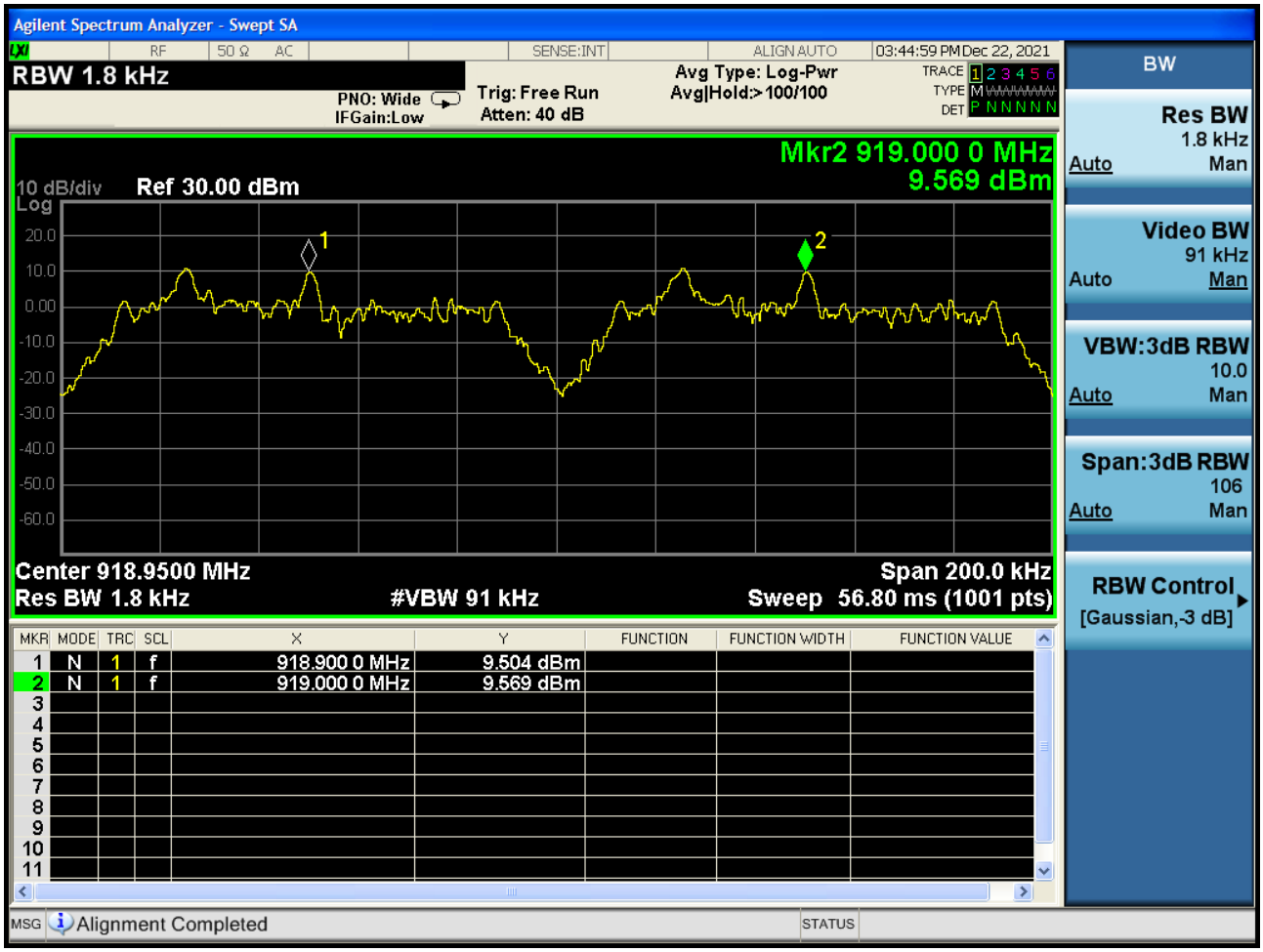


Figure 9.2.6.1: Carrier frequency separation

9.3 Hopping Channel Occupancy Time

FCC Rule Part	47CFR15.247(a)(1)(i)
ISED	RSS-247 Issue 2 Section 5.1
Standard	ANSI C63.10:2013
Measurement Uncertainty	The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% is Frequency: $\pm 10^{-8}$

9.3.1 Date of Test

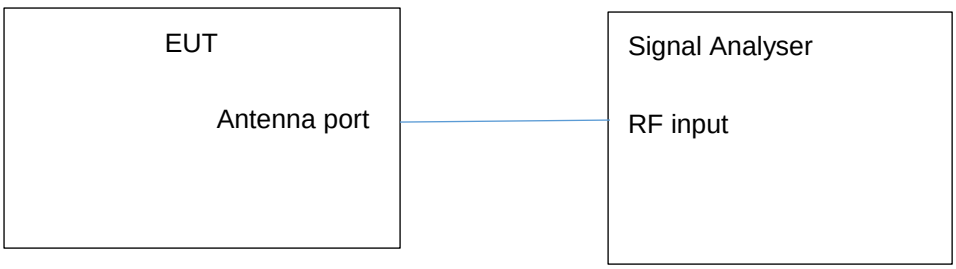
22nd December 2021

9.3.2 Test Area

Laboratory 5

9.3.3 Test Setup

The antenna port was connected directly to the signal analyser.



9.3.4 Requirement 47CFR15.247(a)(1)(i)

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 average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

9.3.5 Procedure

The procedure described in ANSI C63.10-2013 Clause 7.8.4 was followed.

9.3.6 Test Results

Channel (MHz)	Sweep time (s)	No of hops in period specified by requirements	Transmit time per Hop (ms)	Occupancy time (s)	Limit (s)
920.1	20	39	2.96	0.1154	0.4

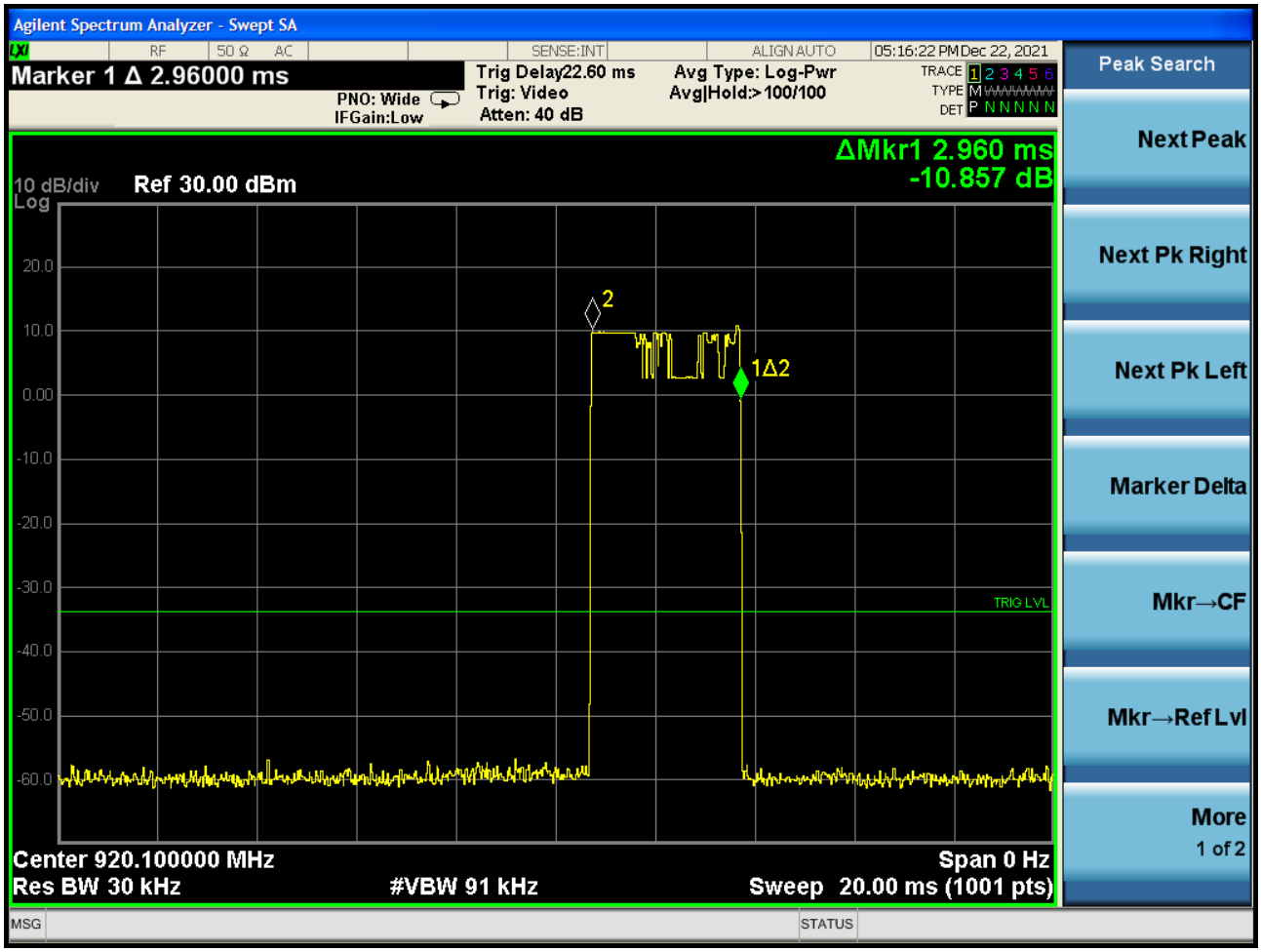


Figure 9.3.6.1: transmit time per hop

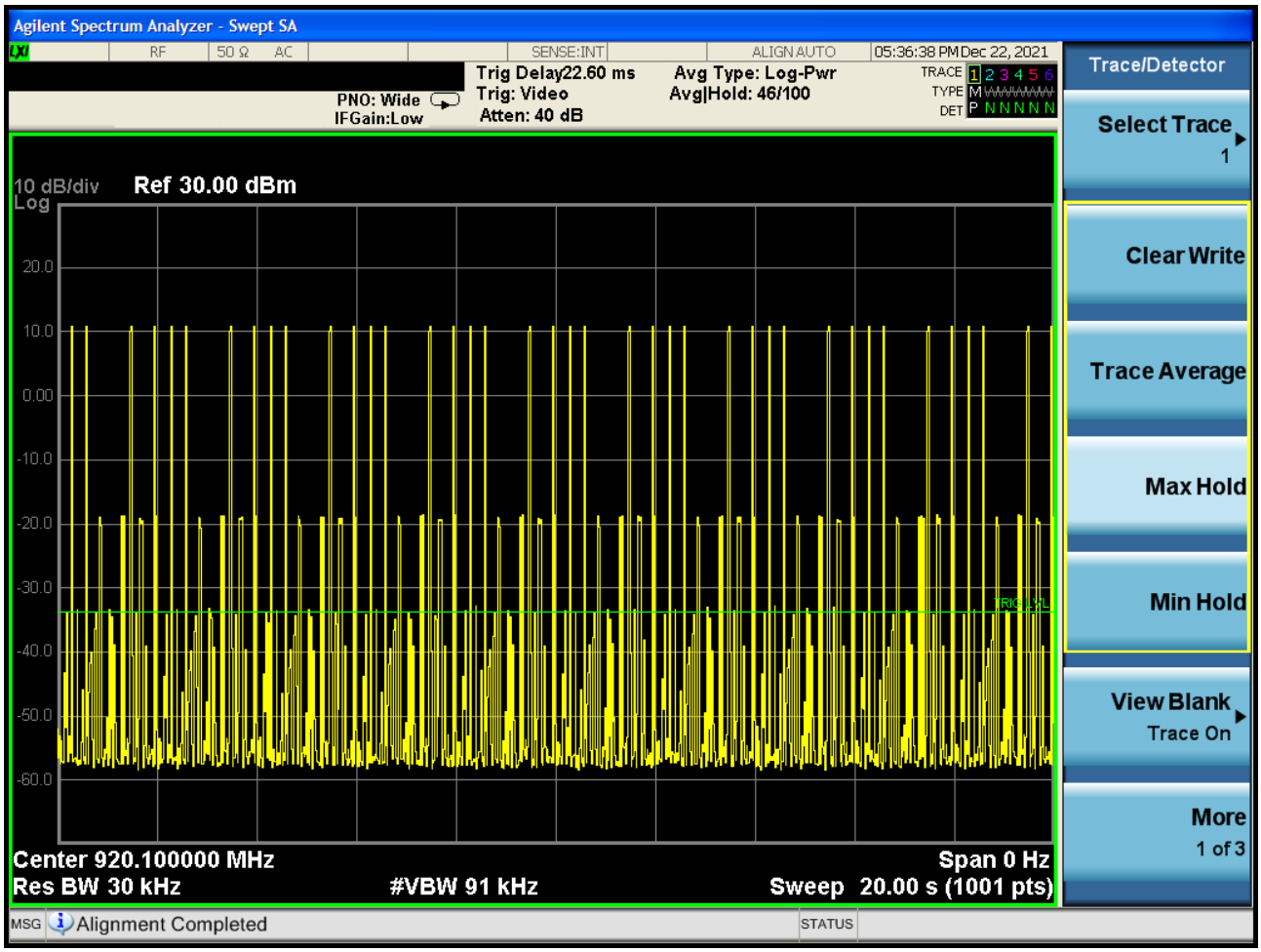


Figure 9.3.6.2: number of hops in specified period

Section 10 Band Edge Compliance

FCC Rule Part	47CFR15.247(d)
ISED	RSS-247 Issue 2 Sections 3.3 and 5.5 RSS-Gen Issue 5 Section 8.10
Standard	ANSI C63.10:2013
Measurement Uncertainty	The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% is Frequency: $\pm 10^{-8}$

10.1.1 Date of Test

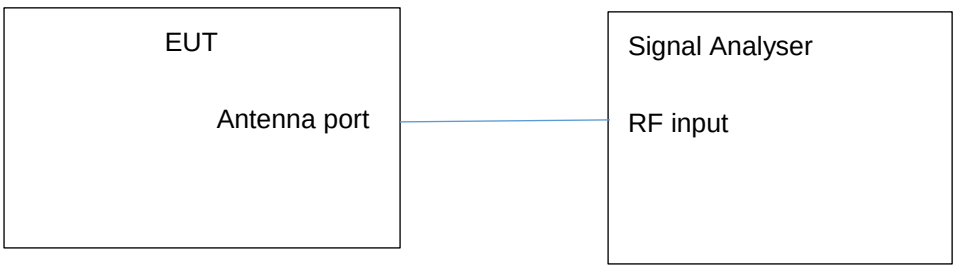
20th January 2022

10.1.2 Test Area

Laboratory 1

10.1.3 Test Setup

The antenna port was connected directly to the signal analyser.



10.1.4 Requirement 47CFR15 / RSS-GEN.

For a 902MHz to 928MHz device, there are no restricted bands adjacent to the band edge.

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.

For FHSS apparatus, testing was performed with both frequency hopping with both enabled and disabled according to ANSI C63.10-2013 Clause 6.10.4.

10.1.5 Procedure

The procedure described in ANSI C63.10-2013 Clause 6.10.4 “Authorised Band Edge Measurements”.

10.1.6 Results

The plots below demonstrate that at the band edge the power is more than 20 dB below the carrier power in the 100kHz bandwidth. Therefore, this demonstrates compliance.

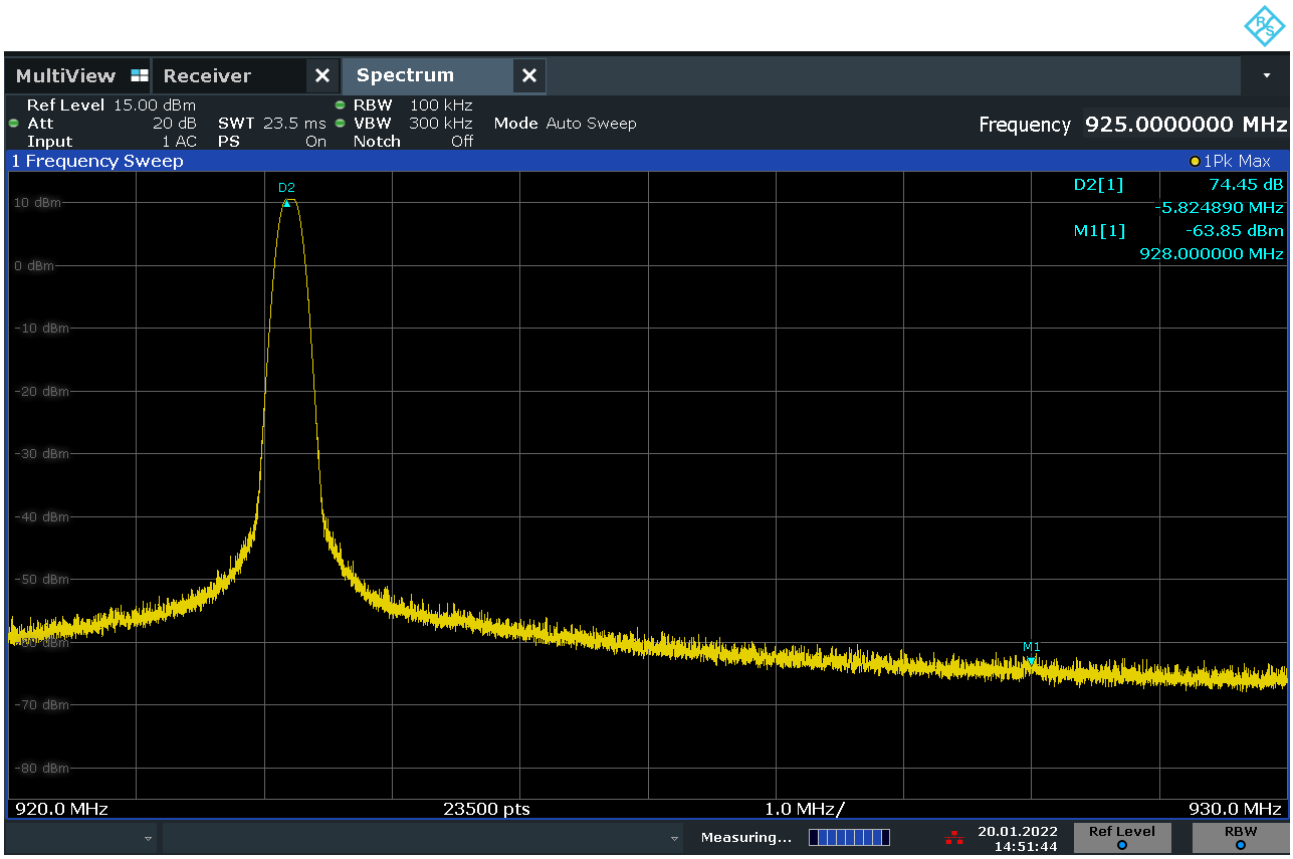


Figure 10.1.6.1: Upper band edge – top channel

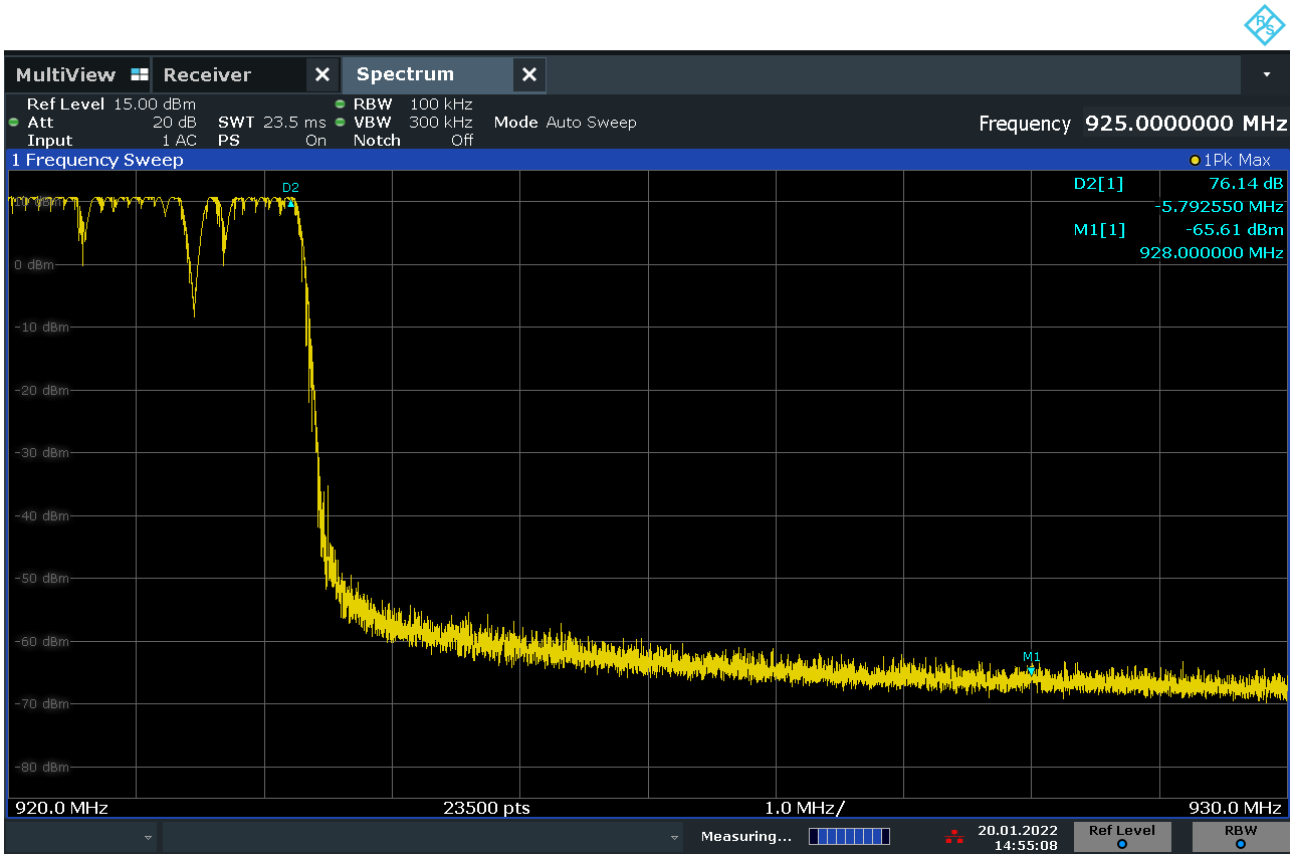


Figure 10.1.6.2: Upper band edge – hopping enabled

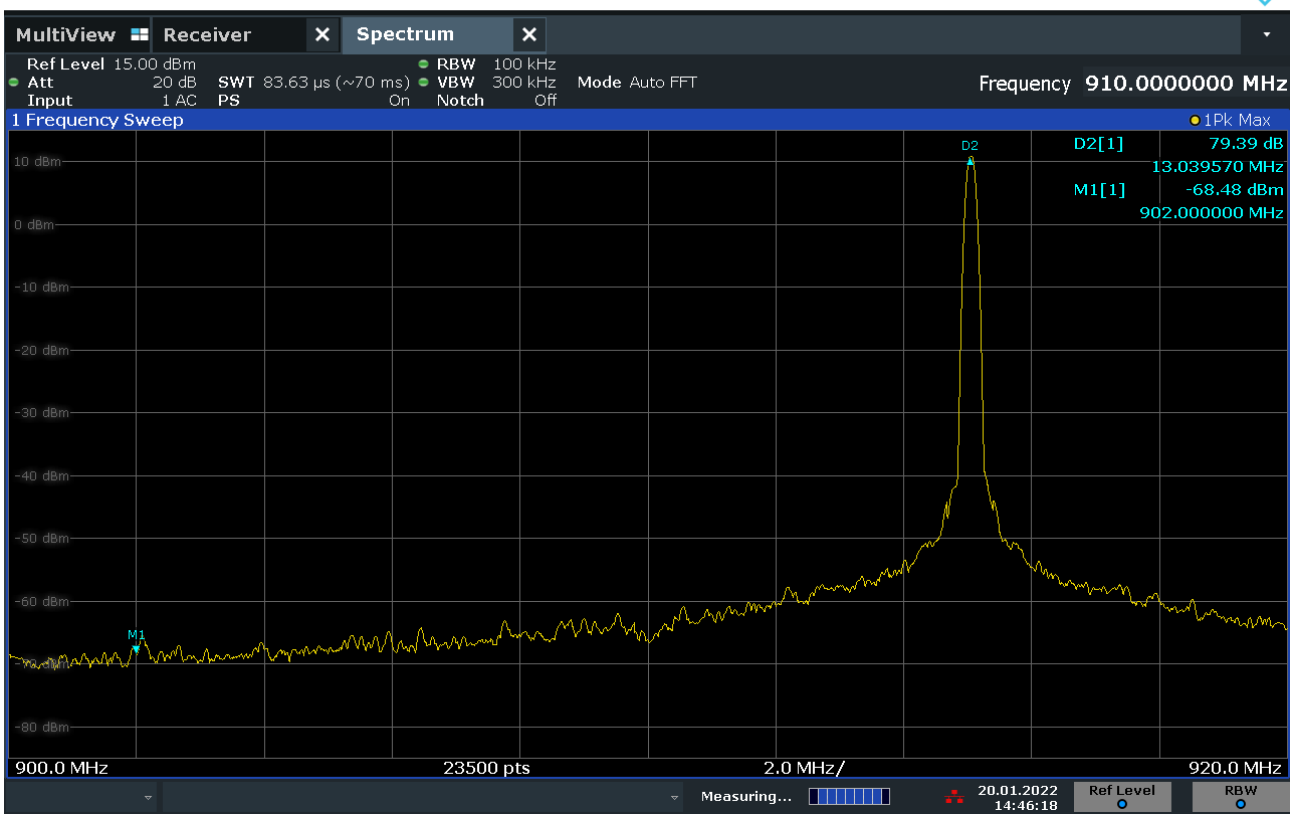


Figure 10.1.6.3: Lower band edge – low channel

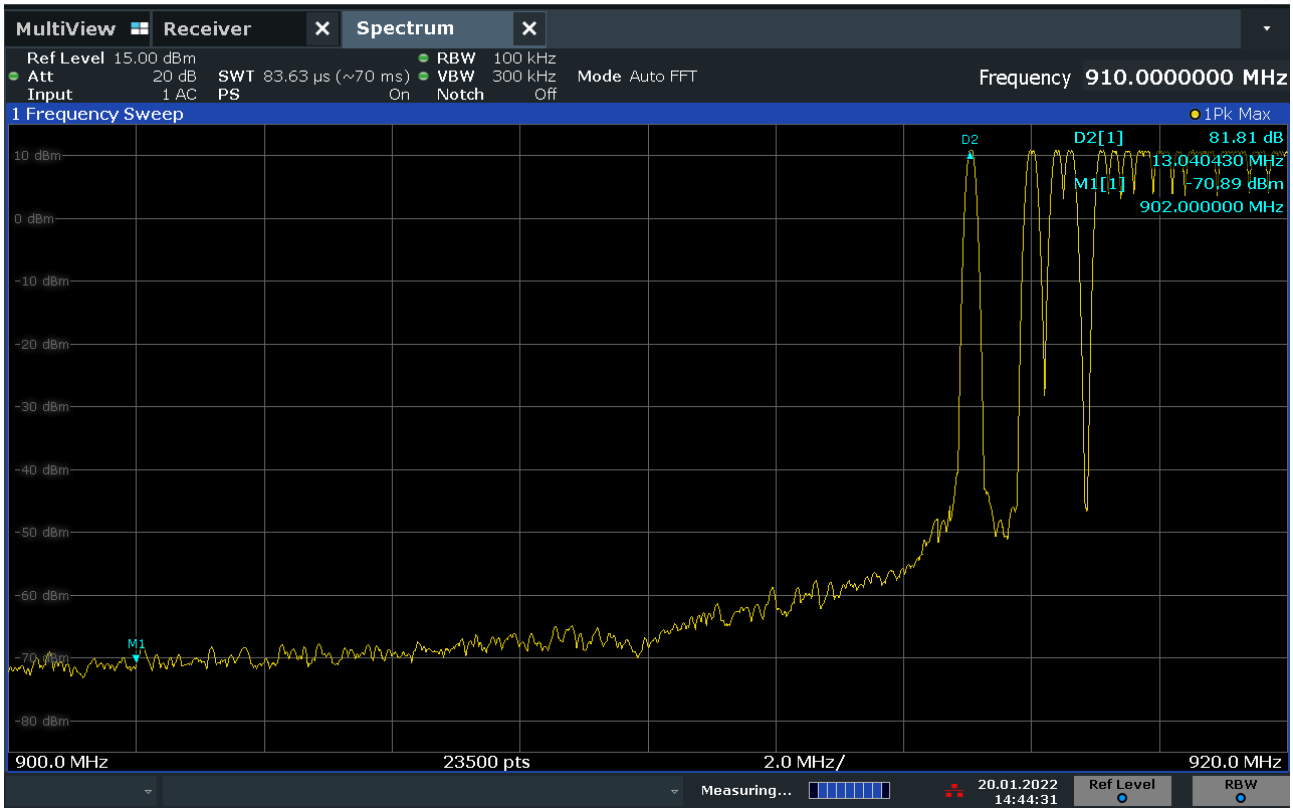


Figure 10.1.6.4: Lower band edge – hopping enabled

Appendix A EUT Test Photos

Photographs are supplied separately.

Appendix B Test Equipment List

Radiated and conducted antenna port emissions Equipment

Item	Serial No.	Last Calibration Date	Calibration Interval
Laboratory 1 Semi-Anechoic Chamber	Lab 1	28th January 2020	36 Months
ETS Lindgren 2017B Mast (1 – 4m) with tilting mechanism	--	N/A	N/A
R & S ESR	C0502	10th November 2021	12 Months
Chase CBL6112B Bilog Antenna, 78167	1503	13th December 2019	36 Months
6dB Attenuator (For use with Bilog Antenna)	78708B	13th December 2019	36 Months
HF26 Cable	HF26	17th January 2022	12 Months
HF35 Cable	HF35	17th January 2022	12 Months
HF27 Cable	HF27	17th January 2022	12 Months
Schwarzbeck D-69250 Antenna 1-18GHz	C0626	23rd December 2021	24 Months
BONN BLMA 0118-5A Preamplifier	149759	9th March 2021	12 Months
ETS Lingren 3116C-PA Horn Antenna 18-40GHz	C0433	17th October 2019	36 Months
RF Cable	Cable 9	January 2022	12 Months
Rhode & Schwarz ESW EMI Receiver	C0658	15th November 2021	12 Months
Keysight MXE EMI Receiver	C0339	25th January 2022	12 Months