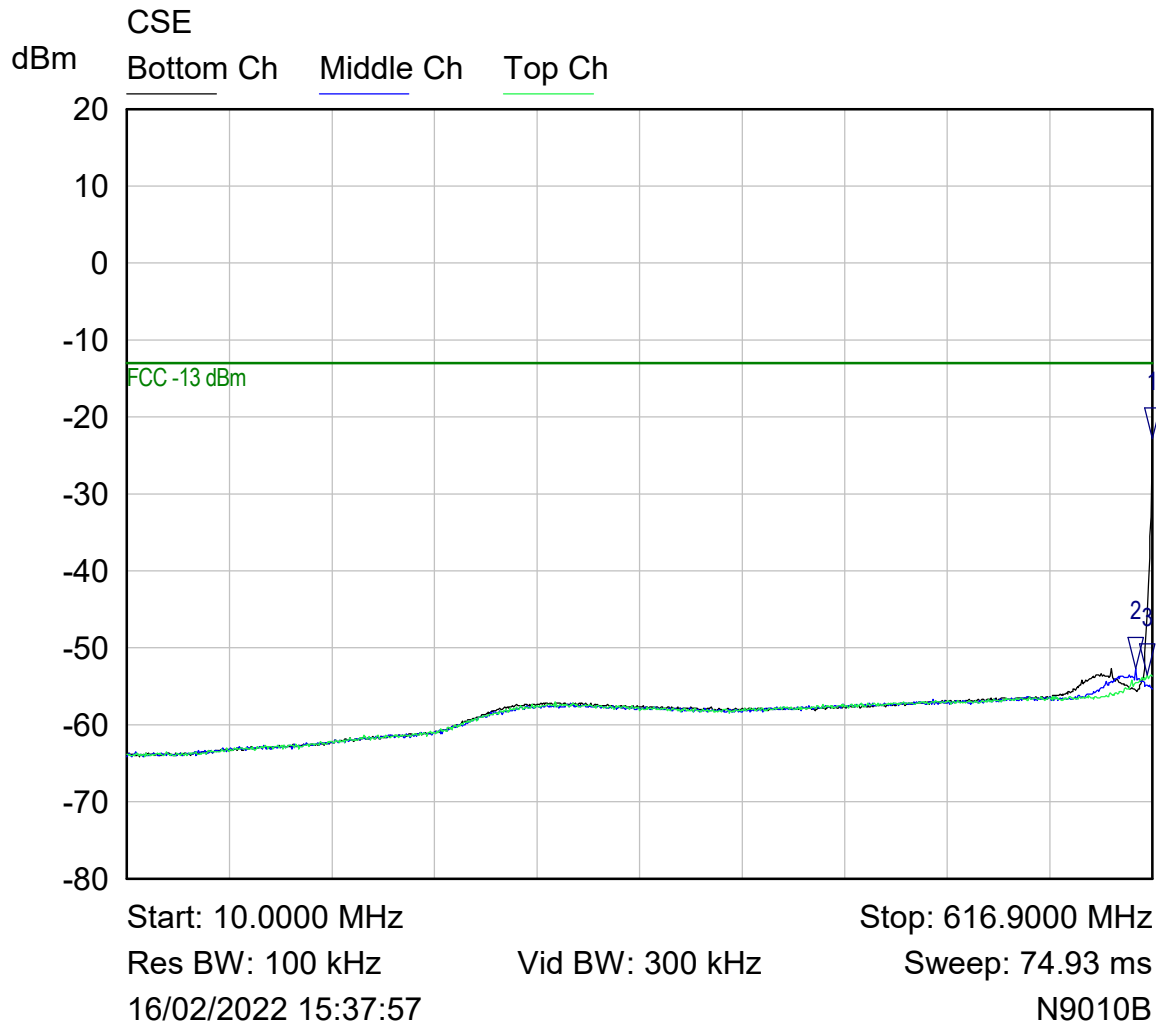


6.4 Spurious emissions at antenna terminals

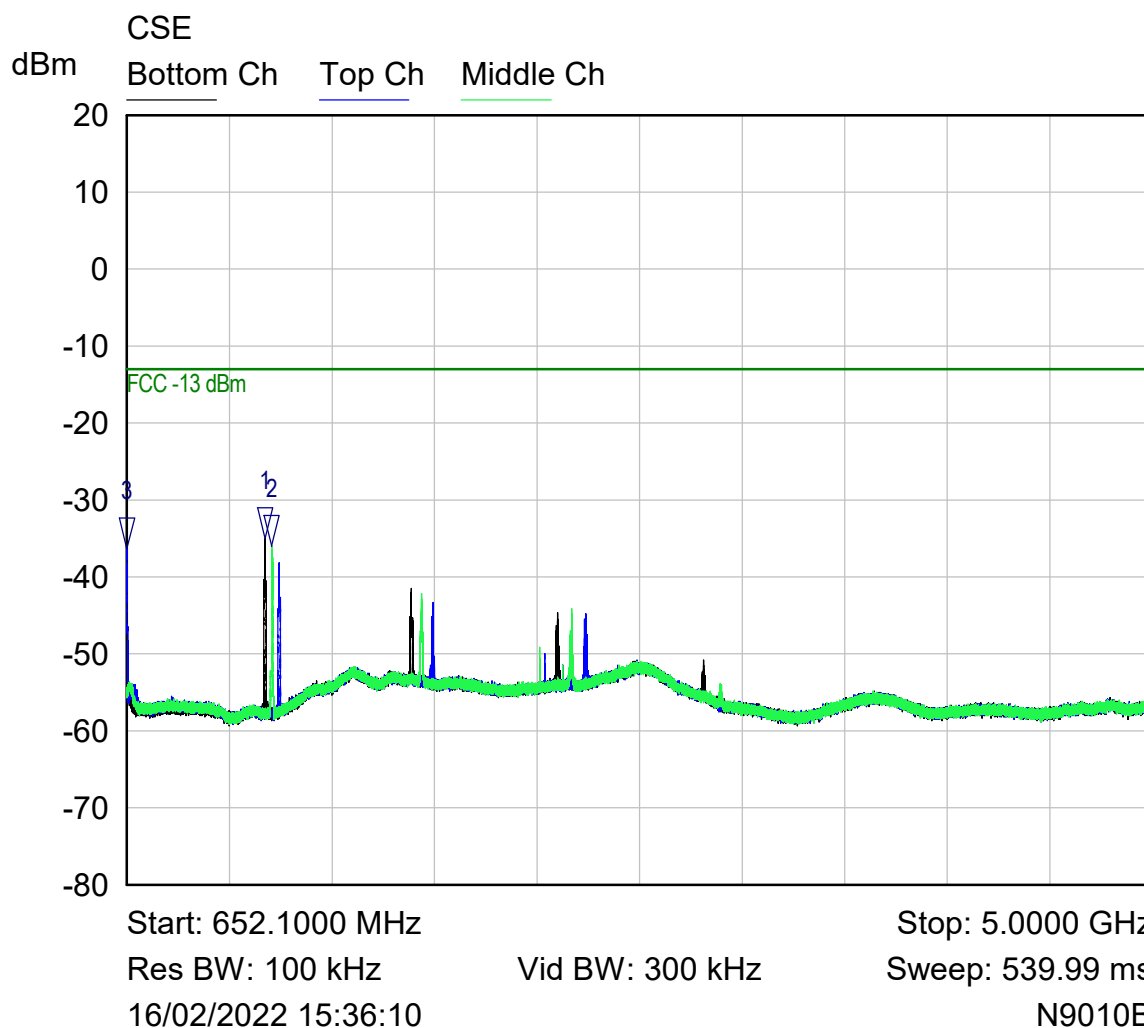
Note: Whilst Low, Mid and high channels in both Single channel and dual channel modes have been tested, only combined Low, Middle and High channel plots for single mode are included in report for each band of operation to minimise report size.

RF Parameters: Band 617-652 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 619.5 MHz, 634 MHz, 649.5 MHz, Single channel mode



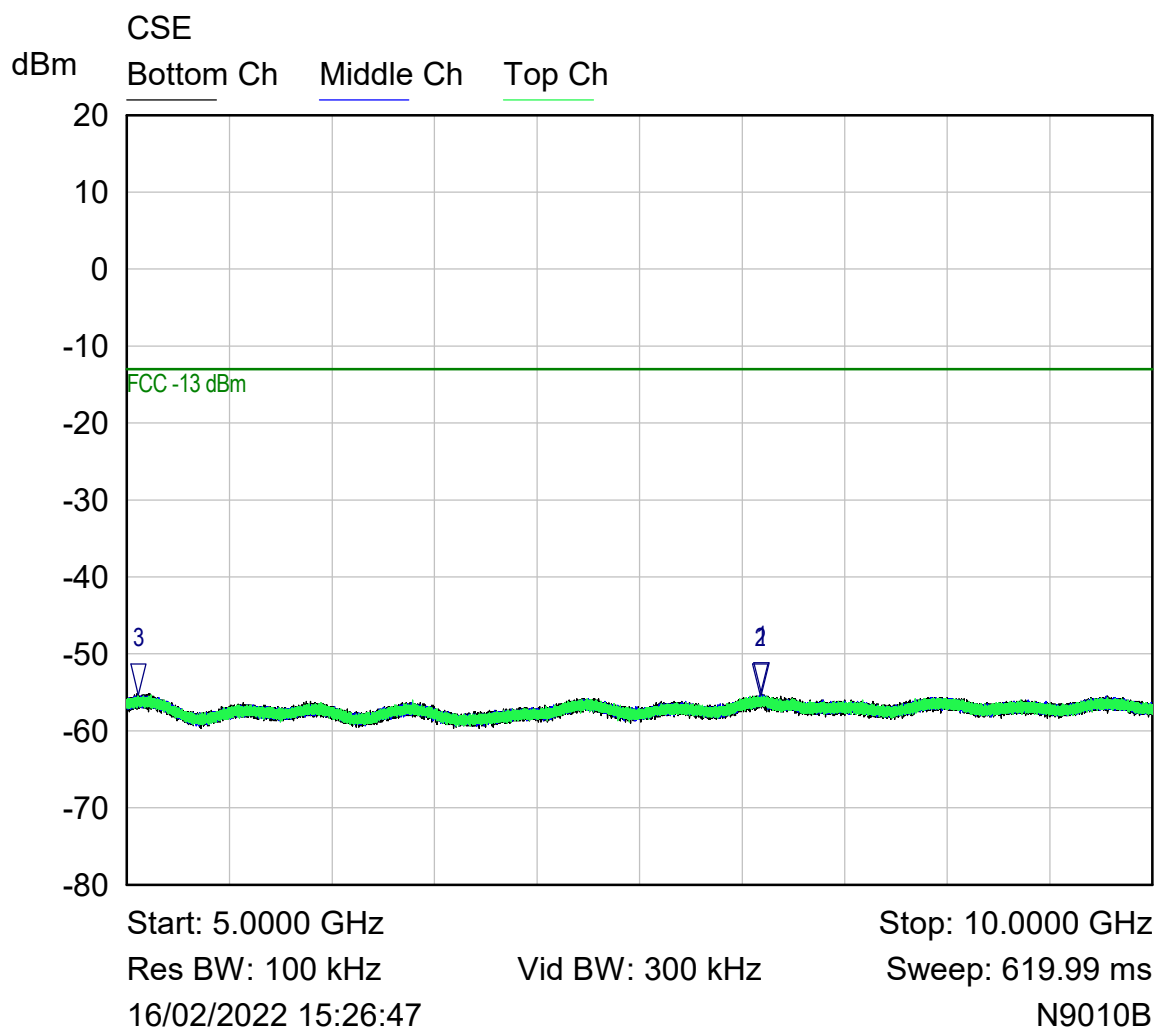
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Bottom Ch	616.9000 MHz	-22.90 dBm	
2 ▾	Middle Ch	607.1896 MHz	-52.62 dBm	
3 ▾	Top Ch	613.8655 MHz	-53.53 dBm	

Plot of conducted emissions single channel mode 10 – 616.9 MHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Bottom Ch	1.2388 GHz	-35.01 dBm	
2 ▽	Middle Ch	1.2681 GHz	-36.08 dBm	
3 ▽	Top Ch	652.1000 MHz	-36.30 dBm	

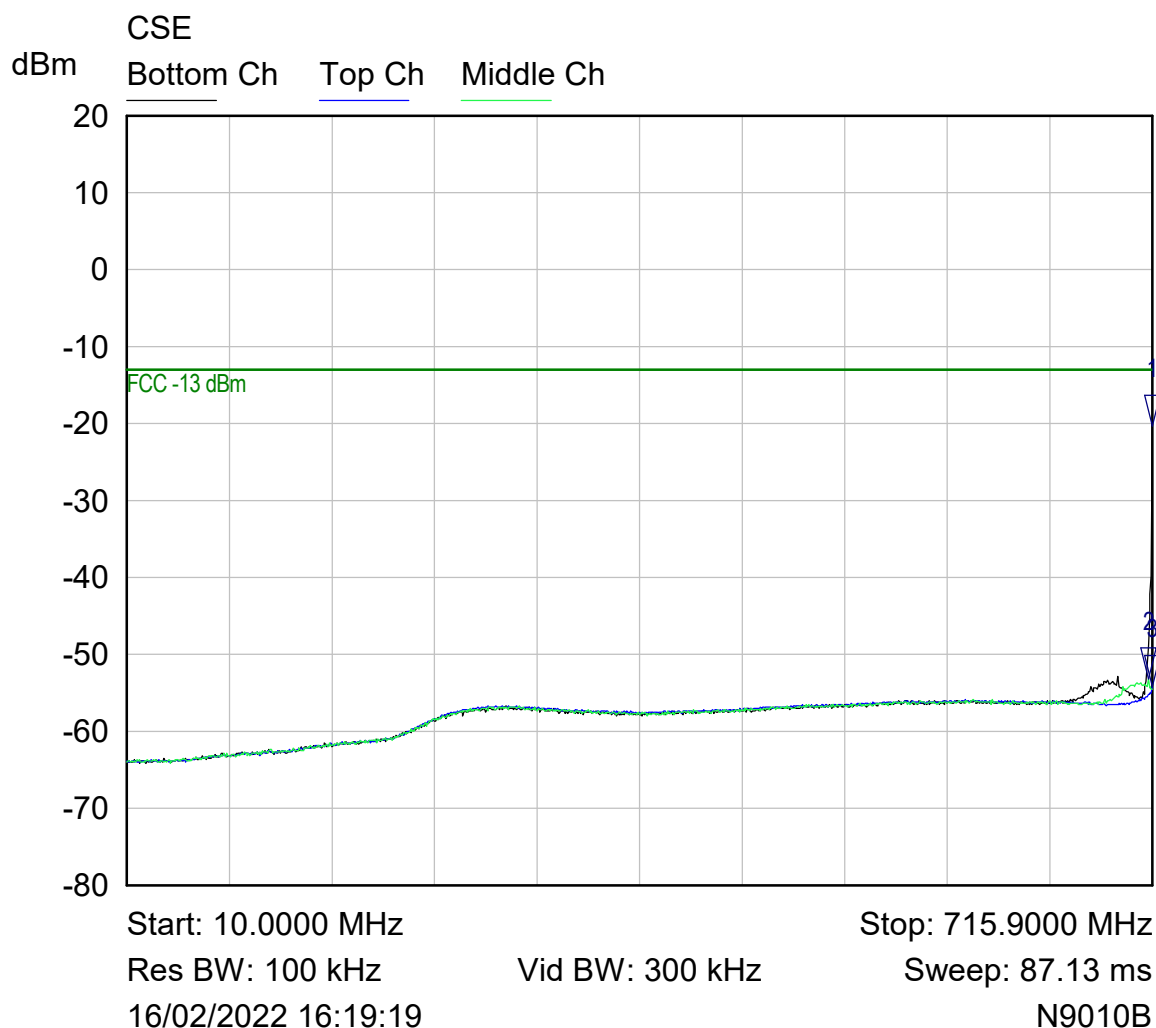
Plot of conducted emissions single channel mode 652.1 – 5000 MHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Bottom Ch	8.0945 GHz	-55.11 dBm	
2 ▽	Middle Ch	8.0881 GHz	-55.40 dBm	
3 ▽	Top Ch	5.0550 GHz	-55.25 dBm	

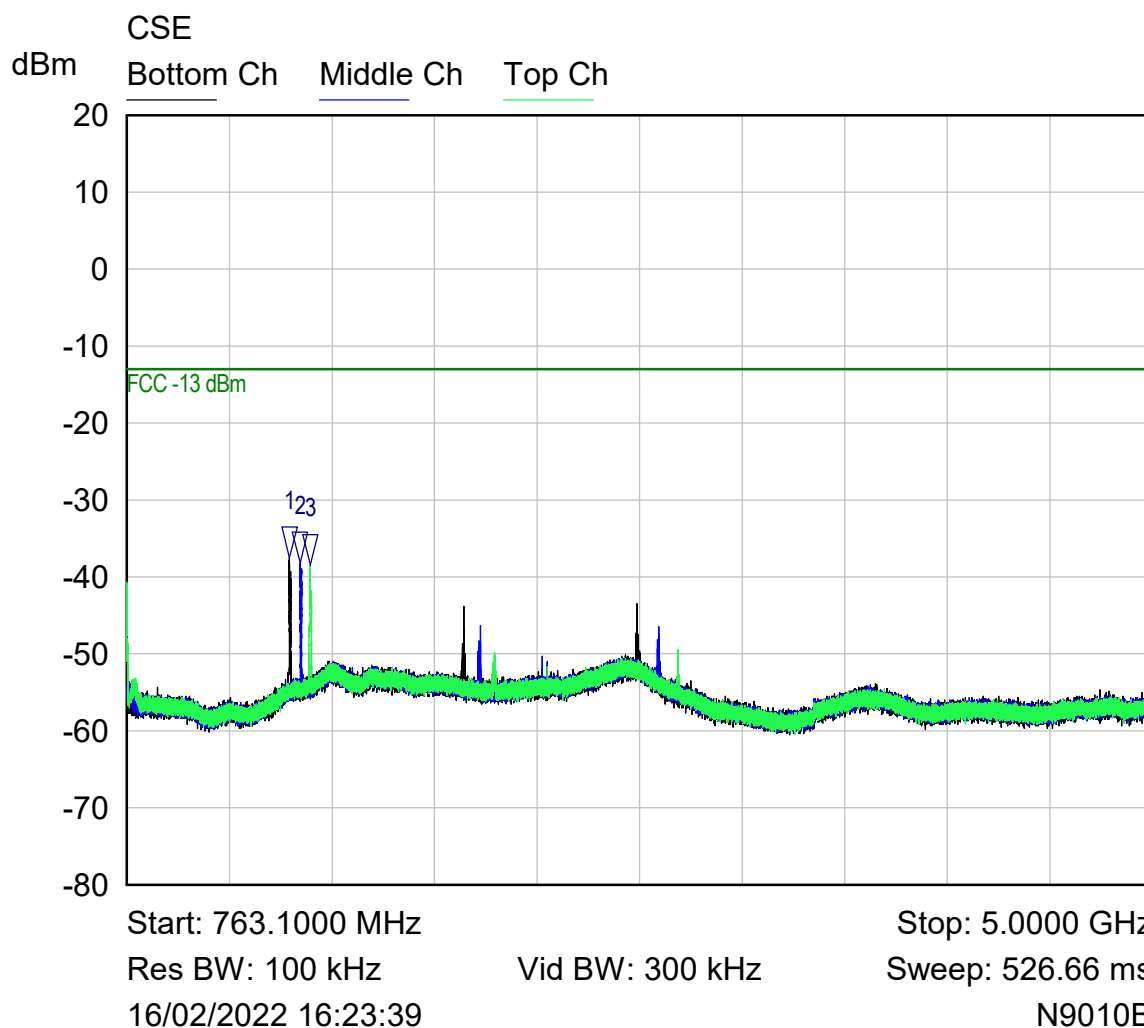
Plot of conducted emissions single channel mode 5 – 10 GHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)

RF Parameters: Band 716-758 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 718.5 MHz, 740 MHz, 755.5 MHz, Single channel mode



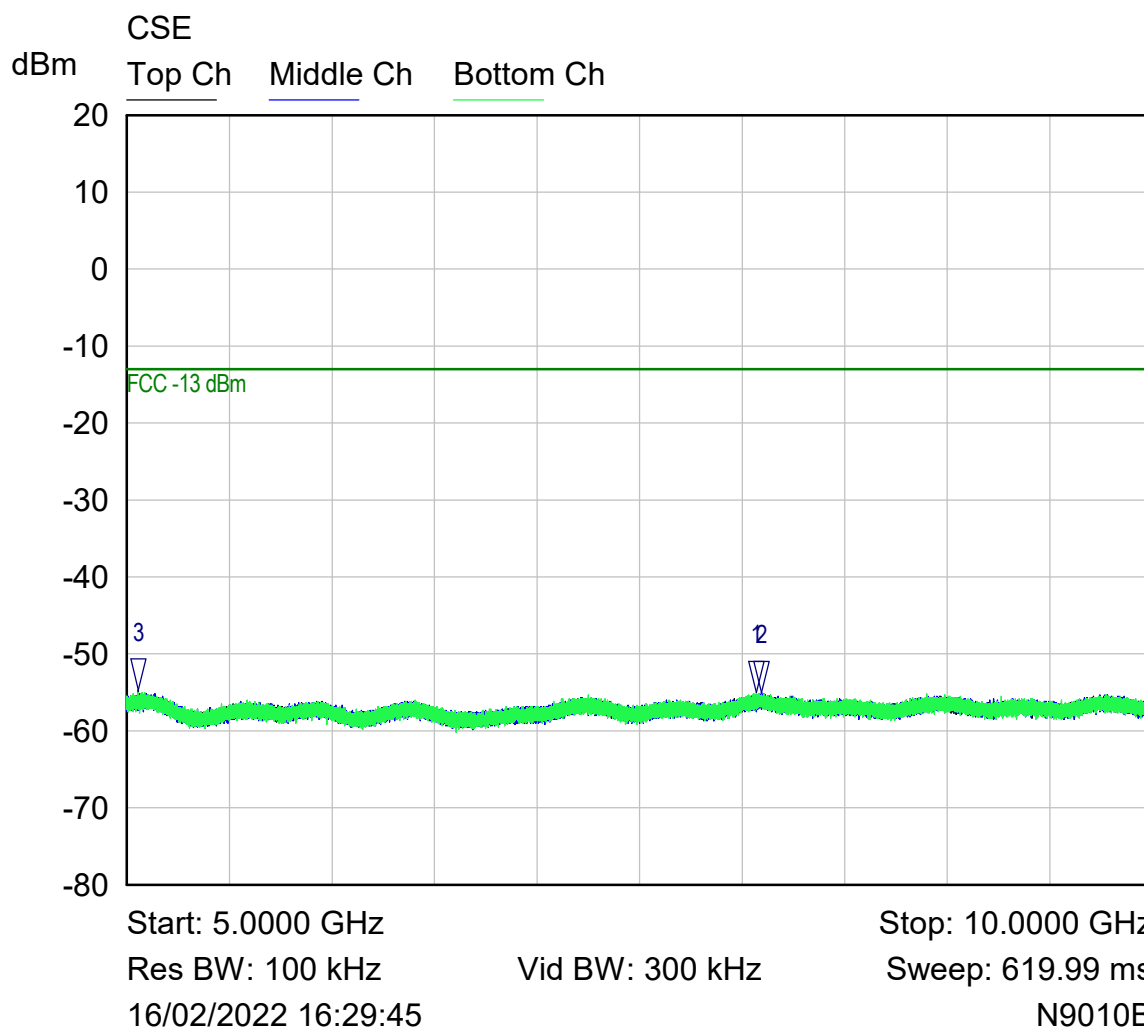
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Bottom Ch	715.9000 MHz	-20.41 dBm	
2 ▾	Middle Ch	713.0764 MHz	-53.18 dBm	
3 ▾	Top Ch	715.9000 MHz	-54.23 dBm	

Plot of conducted emissions single channel mode 10 – 715.9 MHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Bottom Ch	1.4371 GHz	-37.51 dBm	
2 ▽	Middle Ch	1.4803 GHz	-38.22 dBm	
3 ▽	Top Ch	1.5210 GHz	-38.53 dBm	

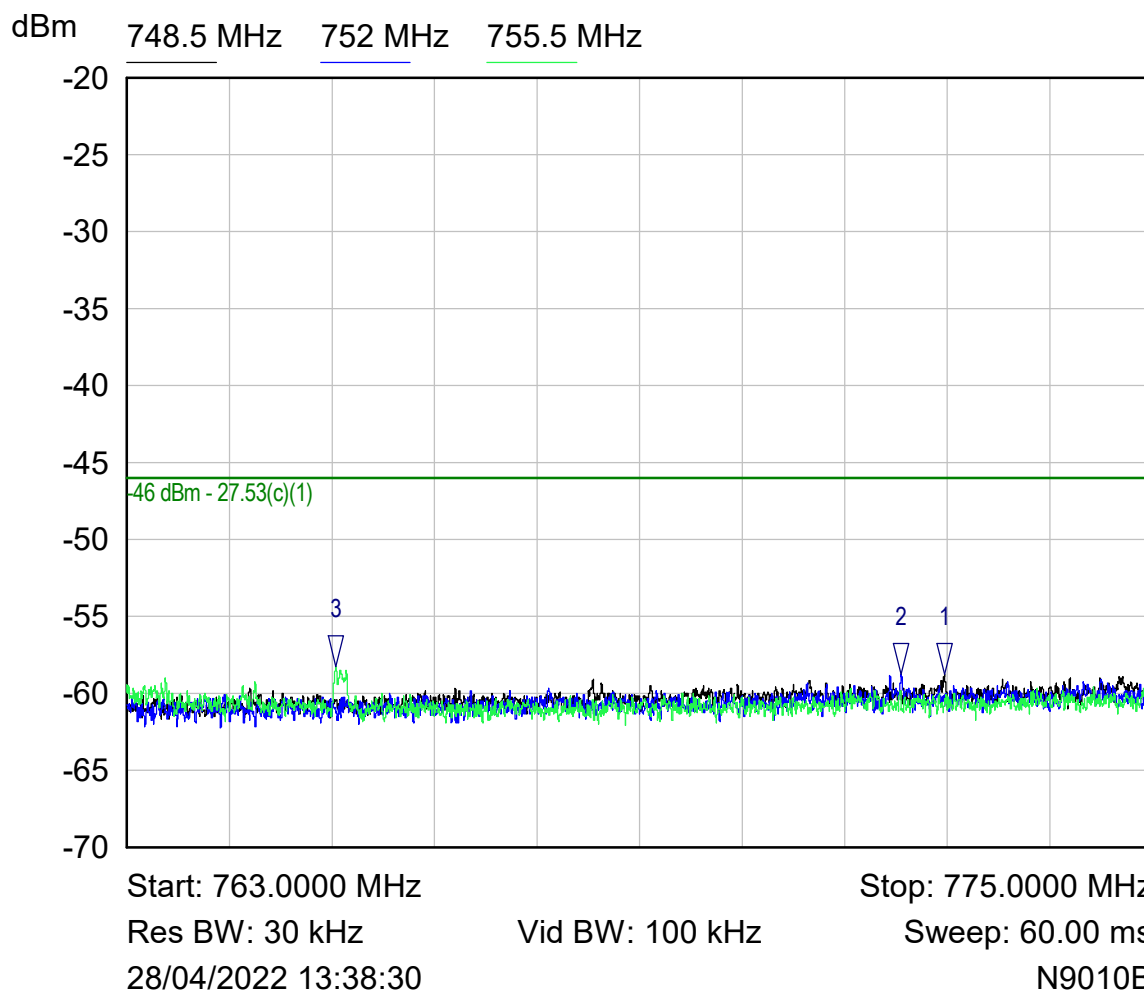
Plot of conducted emissions single channel mode 763.1 – 5000 MHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Bottom Ch	8.0712 GHz	-54.97 dBm	
2 ▽	Middle Ch	8.0924 GHz	-54.97 dBm	
3 ▽	Top Ch	5.0550 GHz	-54.68 dBm	

Plot of conducted emissions single channel mode 5 – 10 GHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)

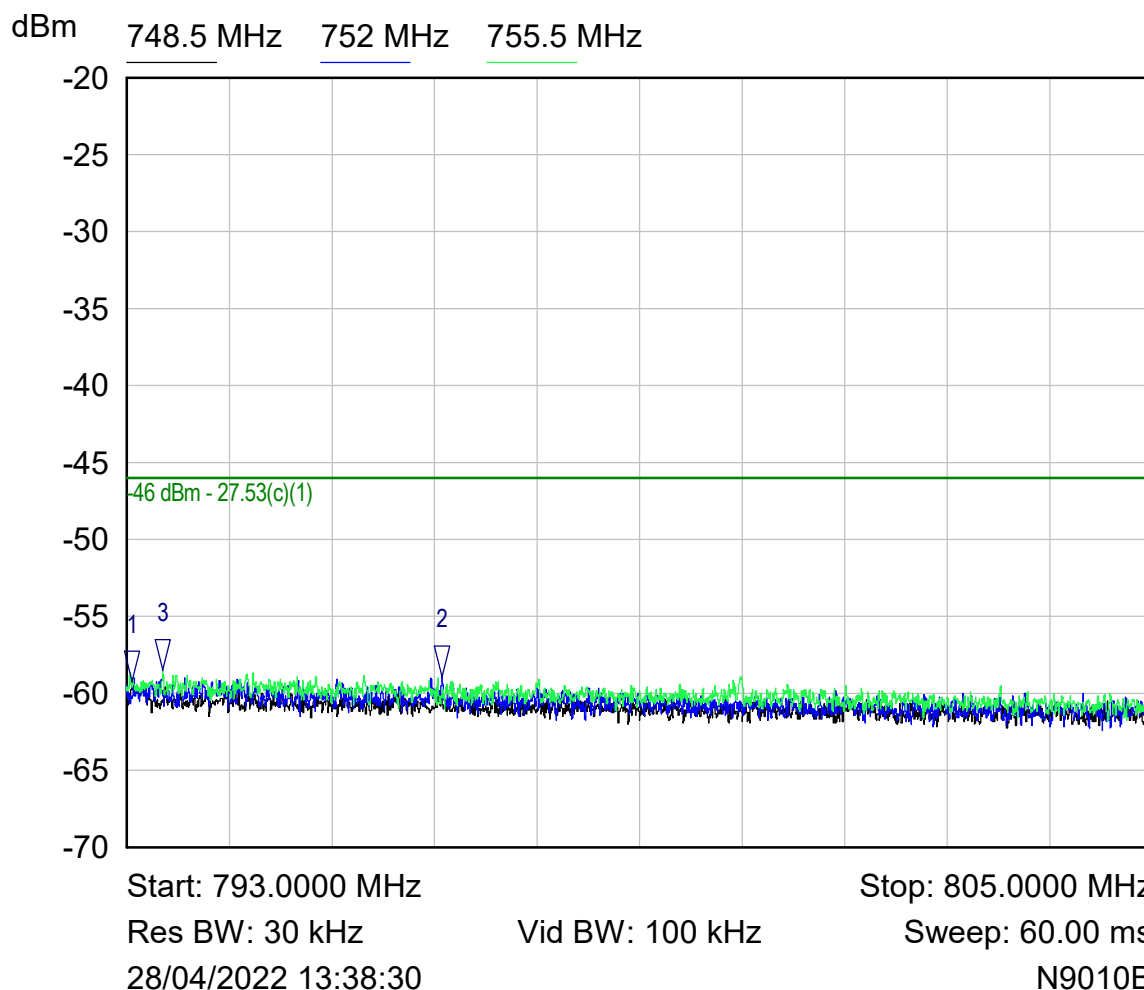
RF Parameters: Band 746-758 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 748.5 MHz, 753 MHz, 755.5 MHz, Single channel mode
Part 27.53(c)(3)



Mkr	Trace	X-Axis	Value	Notes
1 ▽	748.5 MHz	772.5690 MHz	-58.78 dBm	
2 ▽	752 MHz	772.0620 MHz	-58.71 dBm	
3 ▽	755.5 MHz	765.4444 MHz	-58.21 dBm	

Plot of conducted emissions single channel mode 763 – 775 MHz range
Note: 6.25kHz Narrowband emissions measured with a 30kHz RBW which was sufficient for showing compliance.

RF Parameters: Band 746-758 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 748.5 MHz, 753 MHz, 755.5 MHz, Single channel mode
Part 27.53(c)(3)

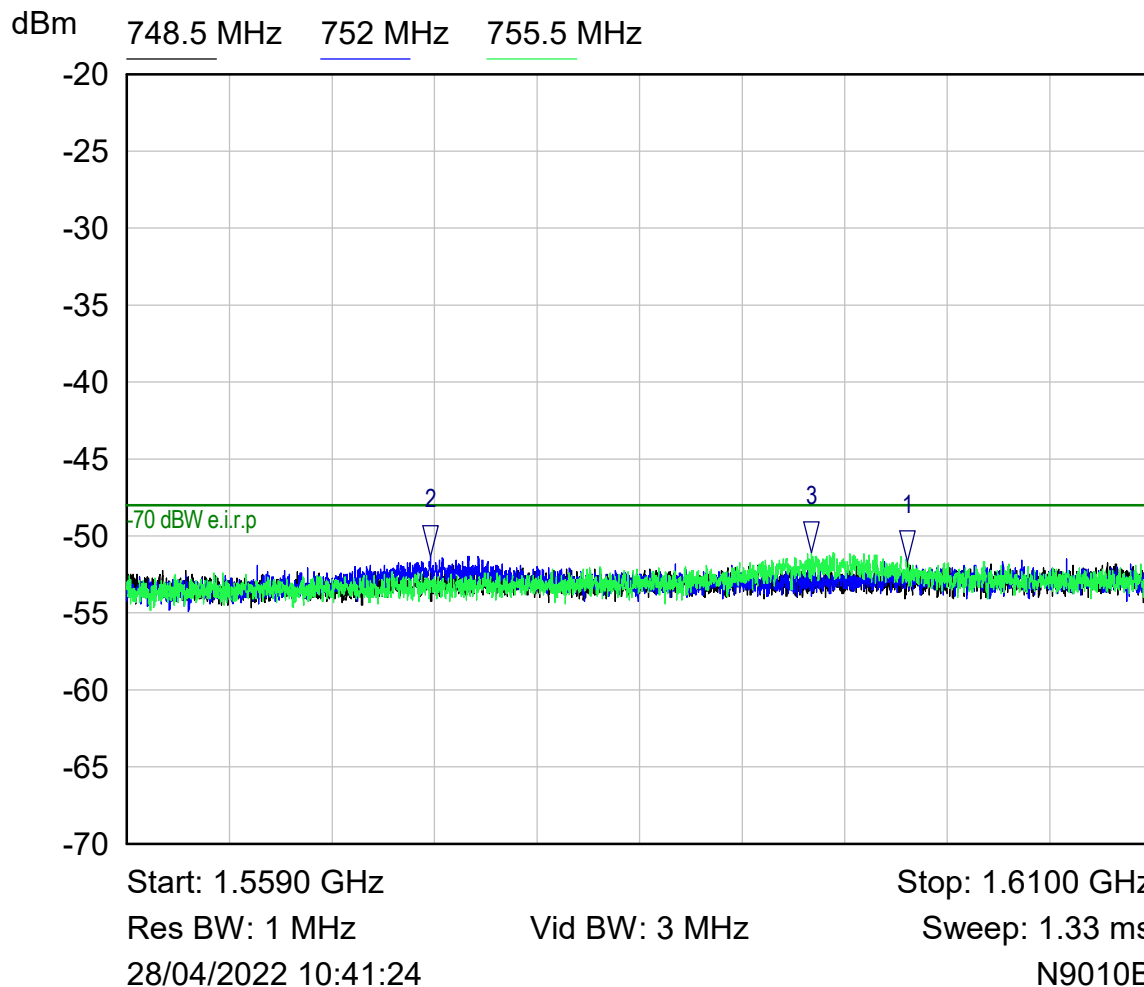


Mkr	Trace	X-Axis	Value	Notes
1 ▽	748.5 MHz	793.0589 MHz	-59.24 dBm	
2 ▽	752 MHz	796.6919 MHz	-58.91 dBm	
3 ▽	755.5 MHz	793.4209 MHz	-58.50 dBm	

Plot of conducted emissions single channel mode 793-805 MHz range

Note: 6.25kHz Narrowband emissions measured with a 30kHz RBW which was sufficient for showing compliance.

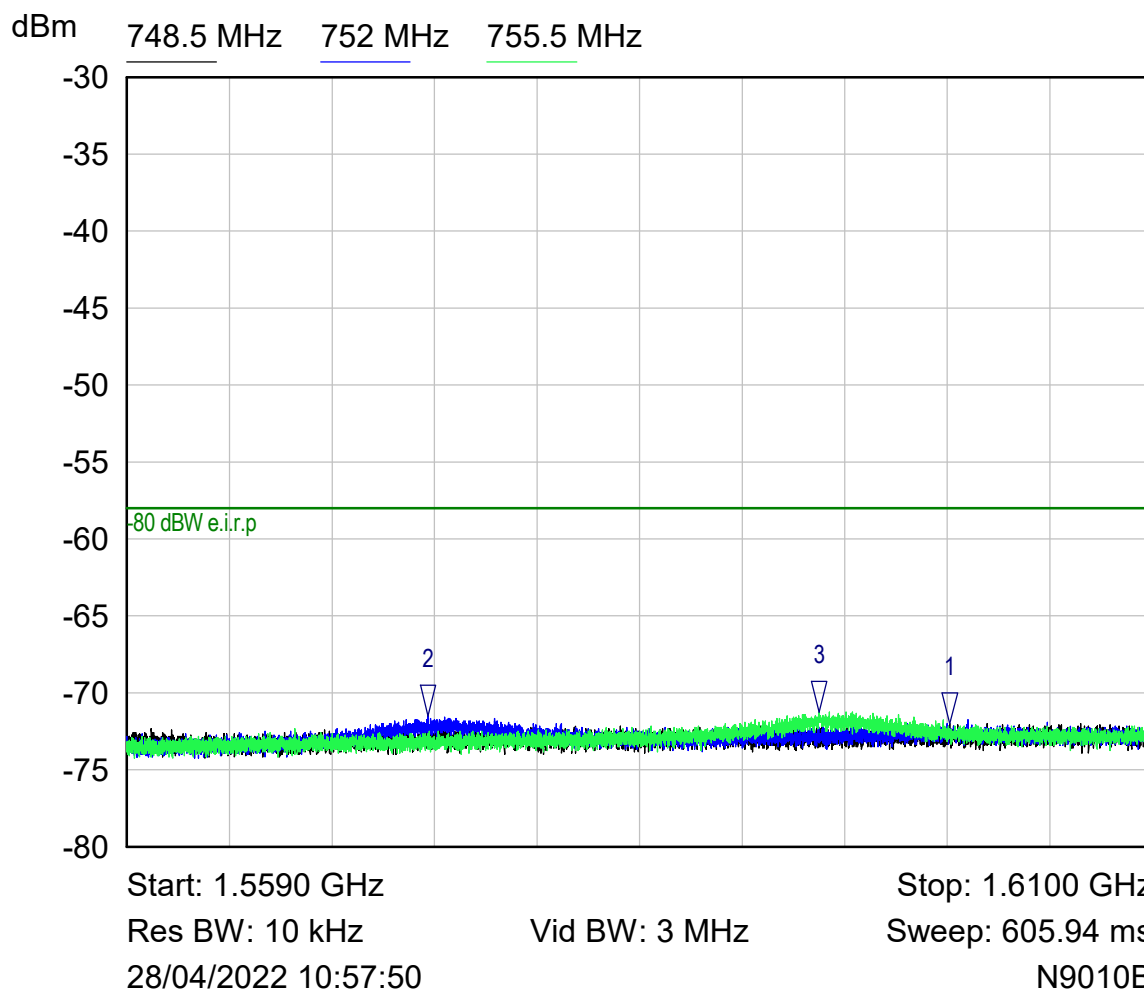
RF Parameters: Band 746-758 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 748.5 MHz, 753 MHz, 755.5 MHz, Single channel mode
Part 27.53(f)



Mkr	Trace	X-Axis	Value	Notes
1 ▽	748.5 MHz	1.5978 GHz	-51.71 dBm	
2 ▽	752 MHz	1.5741 GHz	-51.31 dBm	
3 ▽	755.5 MHz	1.5930 GHz	-51.05 dBm	

Plot of conducted emissions single channel mode 1559 – 1610 MHz range

Note: -70dBW EIRP equates to a limit of -78 dBW conducted for 8dBi antenna, which is -48dBm for wideband emissions.



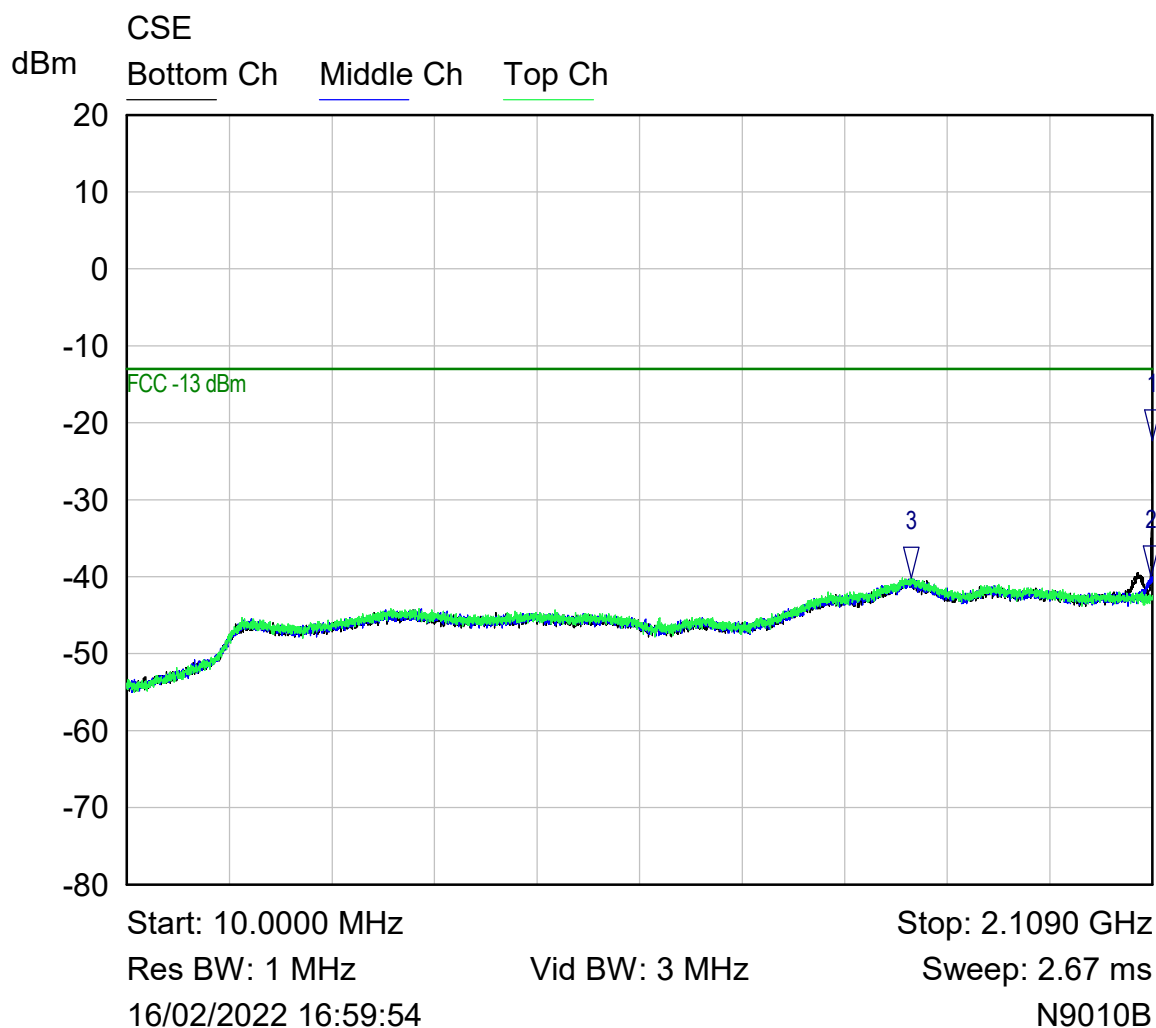
Mkr	Trace	X-Axis	Value	Notes
1 ▽	748.5 MHz	1.5999 GHz	-71.97 dBm	
2 ▽	752 MHz	1.5740 GHz	-71.51 dBm	
3 ▽	755.5 MHz	1.5934 GHz	-71.23 dBm	

Plot of conducted emissions single channel mode 1559 – 1610 MHz range

Note: -80dBW EIRP equates to a limit of -88 dBW conducted for 8dBi antenna, which is -58dBm for narrowband emissions (discrete signals <700Hz bandwidth)

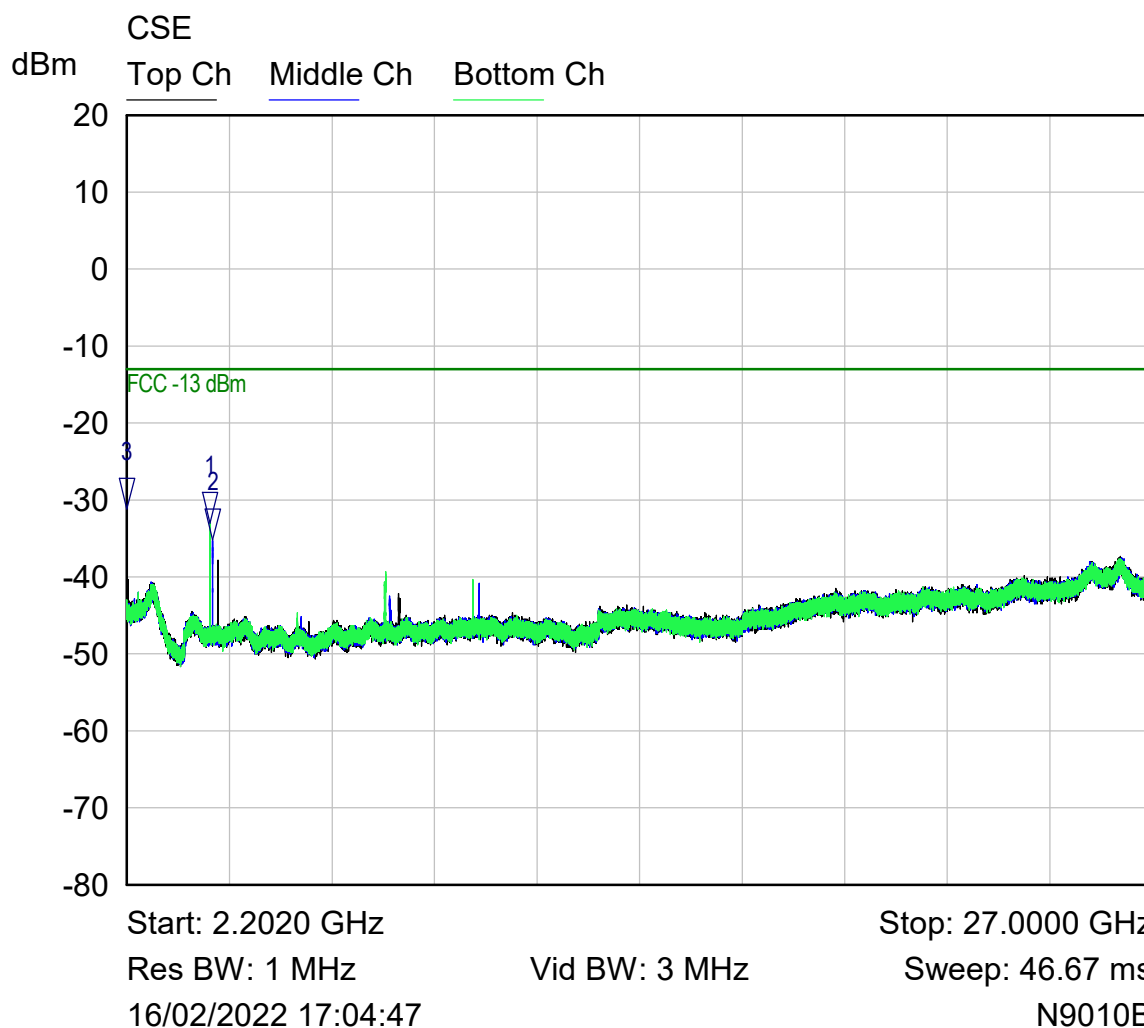
Note: measurement made with larger BW, 10 kHz, but 700Hz limit still applied

RF Parameters: Band 2110-2200 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 2112.5 MHz, 2155 MHz, 2197.5 MHz, Single channel mode



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Bottom Ch	2.1090 GHz	-22.30 dBm	
2 ▽	Middle Ch	2.1071 GHz	-39.98 dBm	
3 ▽	Top Ch	1.6169 GHz	-40.14 dBm	

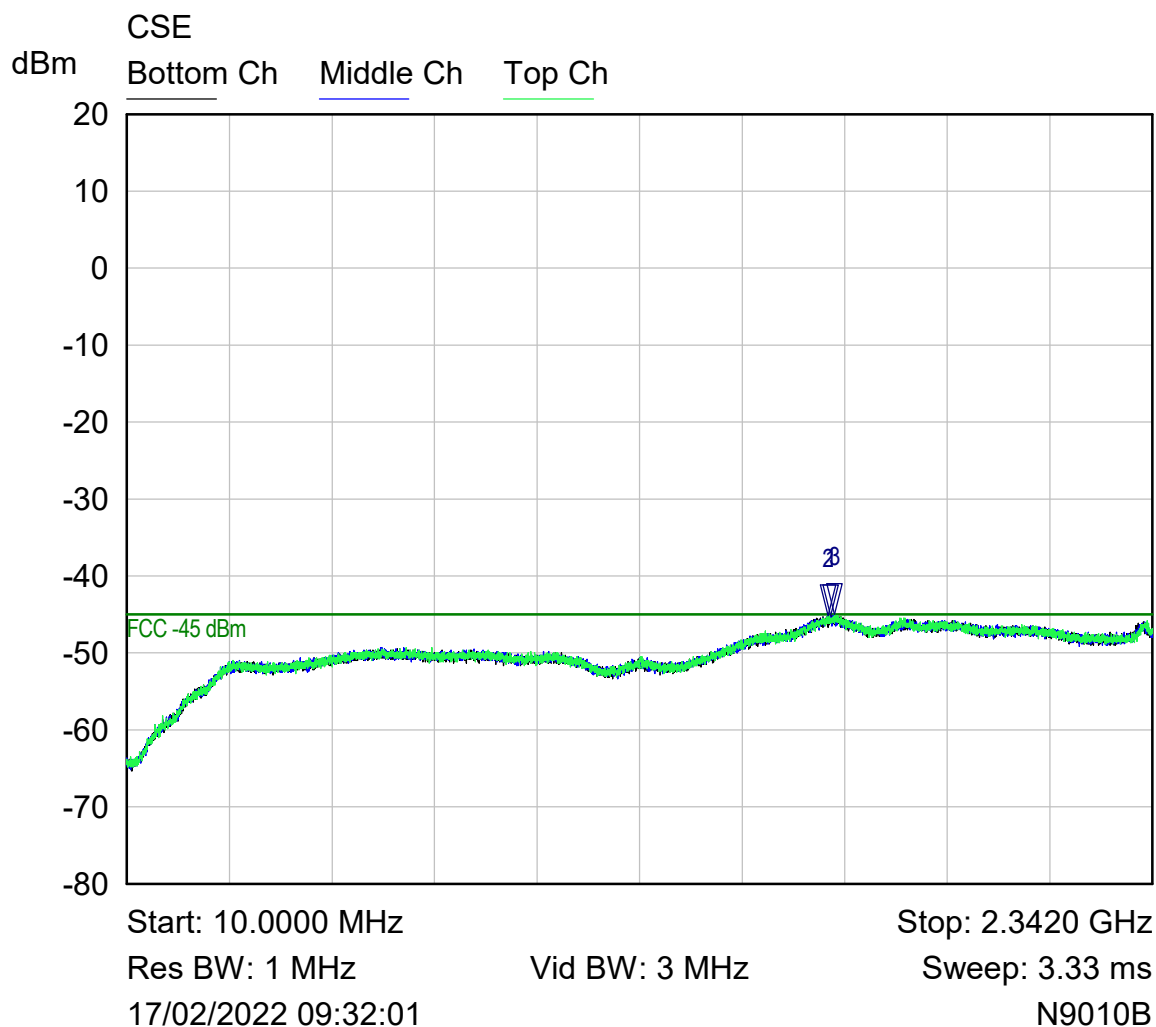
Plot of conducted emissions single channel mode 10 – 2109 MHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Bottom Ch	4.2250 GHz	-33.03 dBm	
2 ▽	Middle Ch	4.2841 GHz	-35.12 dBm	
3 ▽	Top Ch	2.2025 GHz	-31.16 dBm	

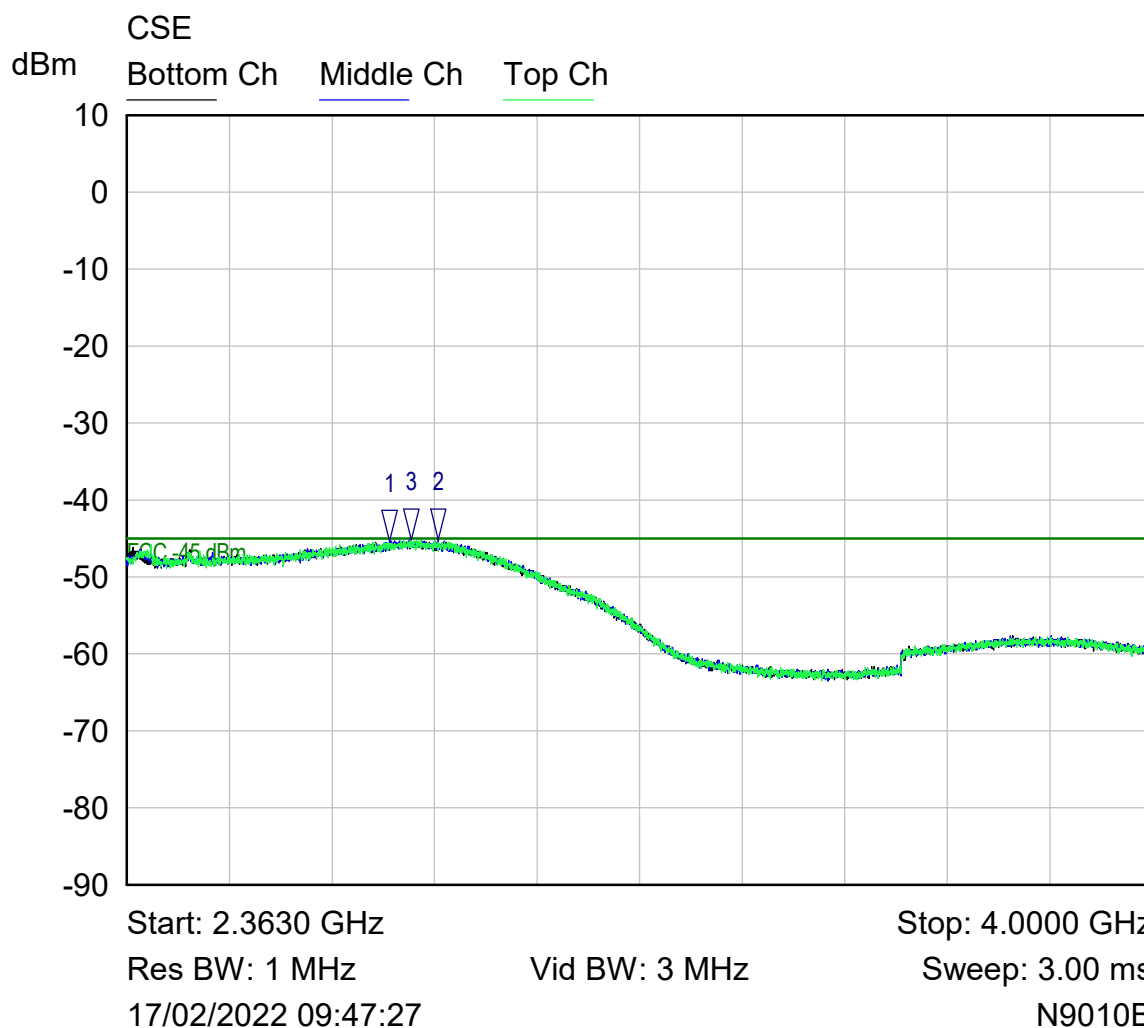
Plot of conducted emissions single channel mode 2.202 – 27 GHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)

RF Parameters: Band 2345-2360 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 2347.5 MHz, 2352.5 MHz, 2357.5 MHz, Single channel mode



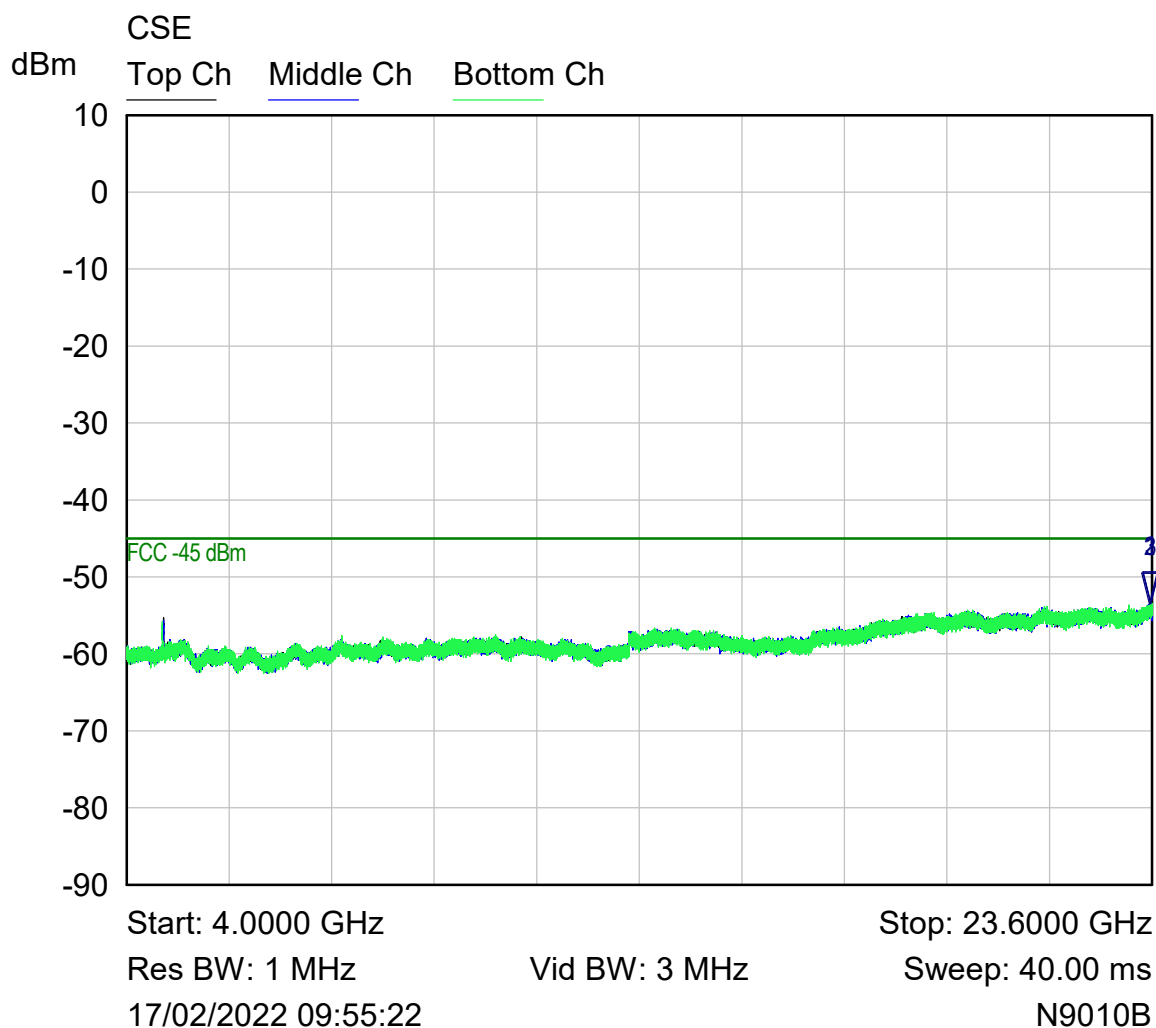
Mkr	Trace	X-Axis	Value	Notes
1 ▾	Bottom Ch	1.6097 GHz	-45.16 dBm	
2 ▾	Middle Ch	1.6059 GHz	-45.18 dBm	
3 ▾	Top Ch	1.6183 GHz	-45.06 dBm	

Plot of conducted emissions single channel mode 10 – 2342 MHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Bottom Ch	2.7825 GHz	-45.30 dBm	
2 ▽	Middle Ch	2.8607 GHz	-45.19 dBm	
3 ▽	Top Ch	2.8172 GHz	-45.19 dBm	

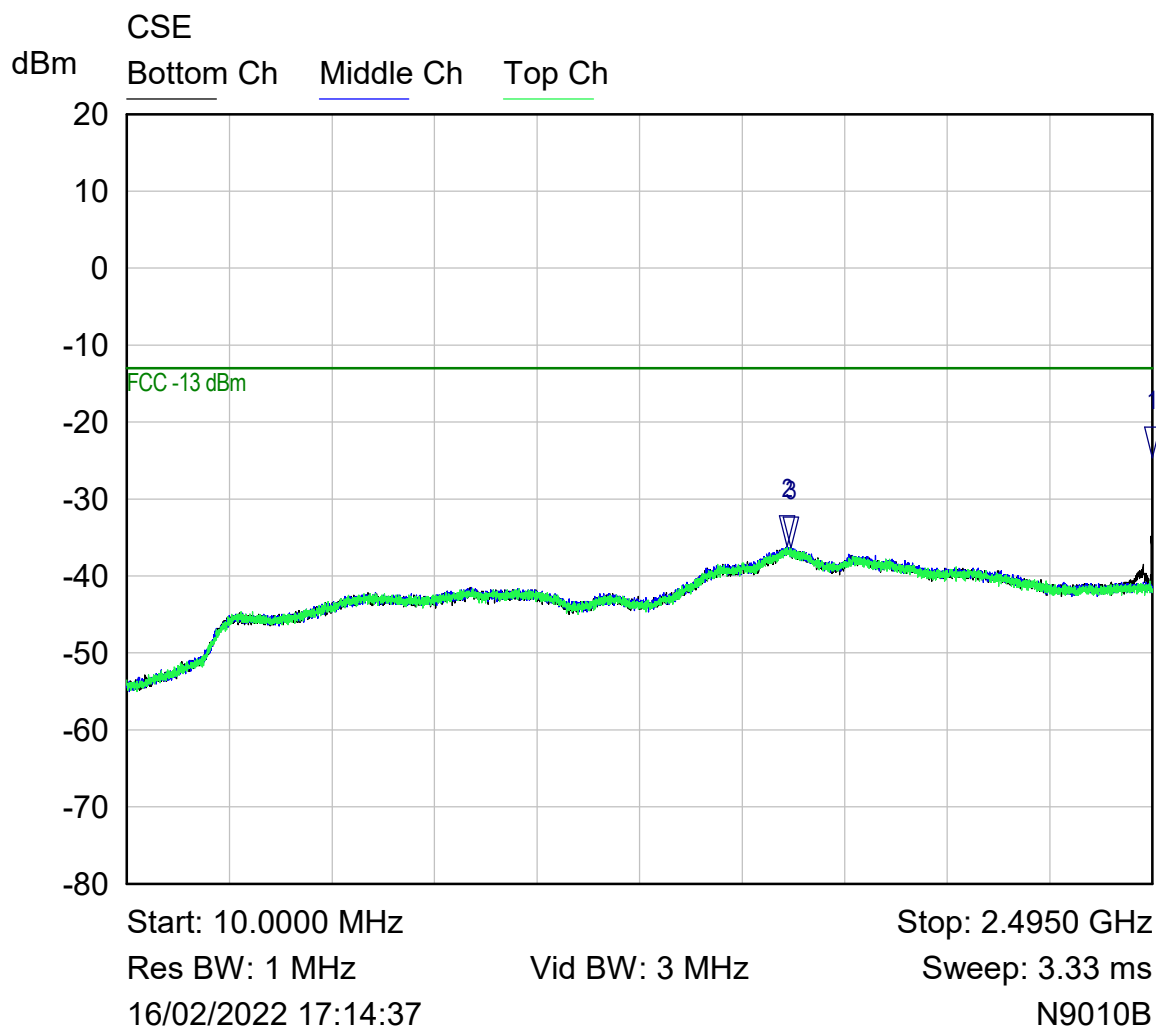
Plot of conducted emissions single channel mode 2.363 – 4 GHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Bottom Ch	23.5785 GHz	-53.27 dBm	
2 ▽	Middle Ch	23.5628 GHz	-53.46 dBm	
3 ▽	Top Ch	23.5697 GHz	-53.57 dBm	

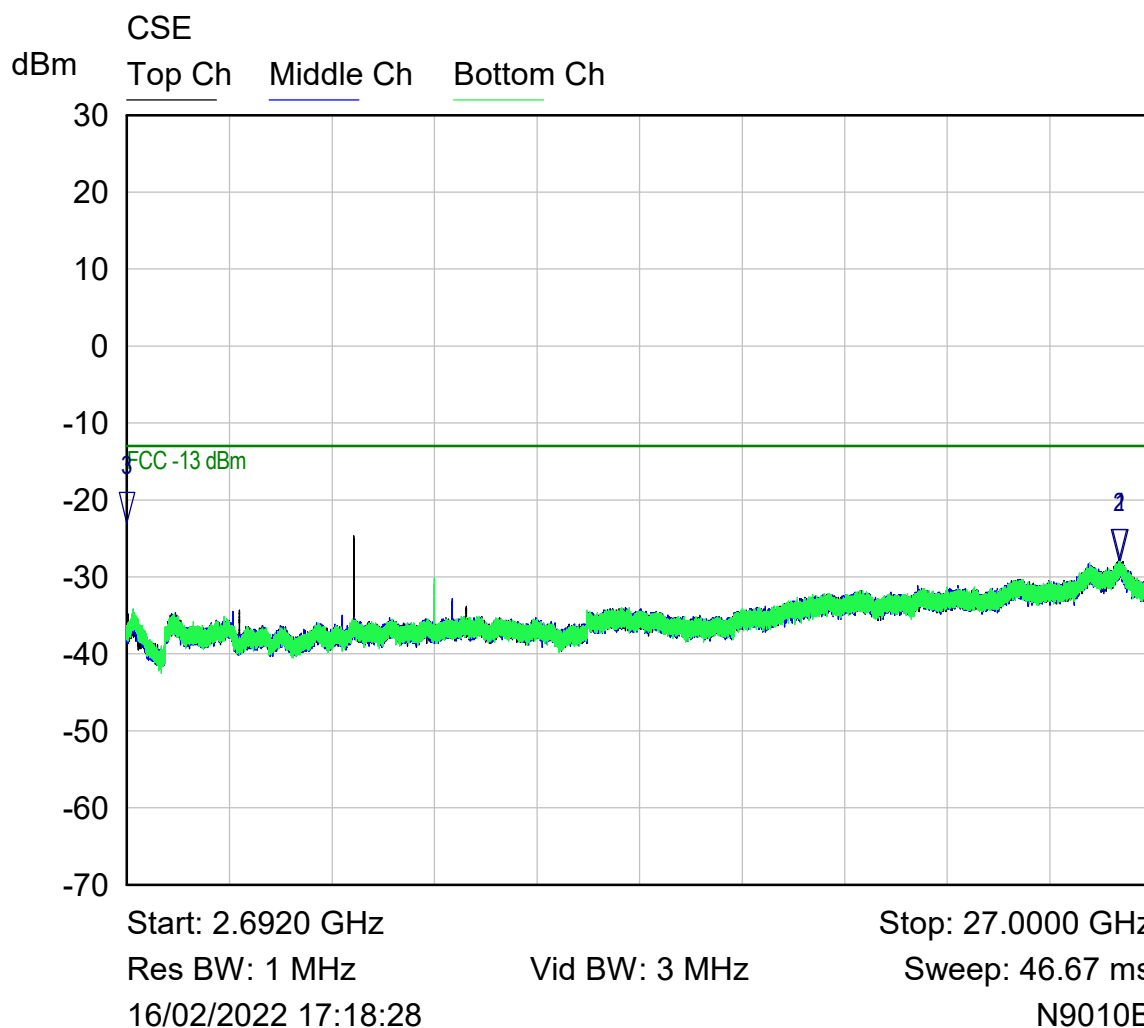
Plot of conducted emissions single channel mode 4 – 23.6 GHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)

RF Parameters: Band 2496-2690 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 2498.5 MHz, 2600 MHz, 2687.5 MHz, Single channel mode



Mkr	Trace	X-Axis	Value	Notes
1 ▾	Bottom Ch	2.4950 GHz	-24.73 dBm	
2 ▾	Middle Ch	1.6100 GHz	-36.23 dBm	
3 ▾	Top Ch	1.6185 GHz	-36.25 dBm	

Plot of conducted emissions single channel mode 10 – 2495 MHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)

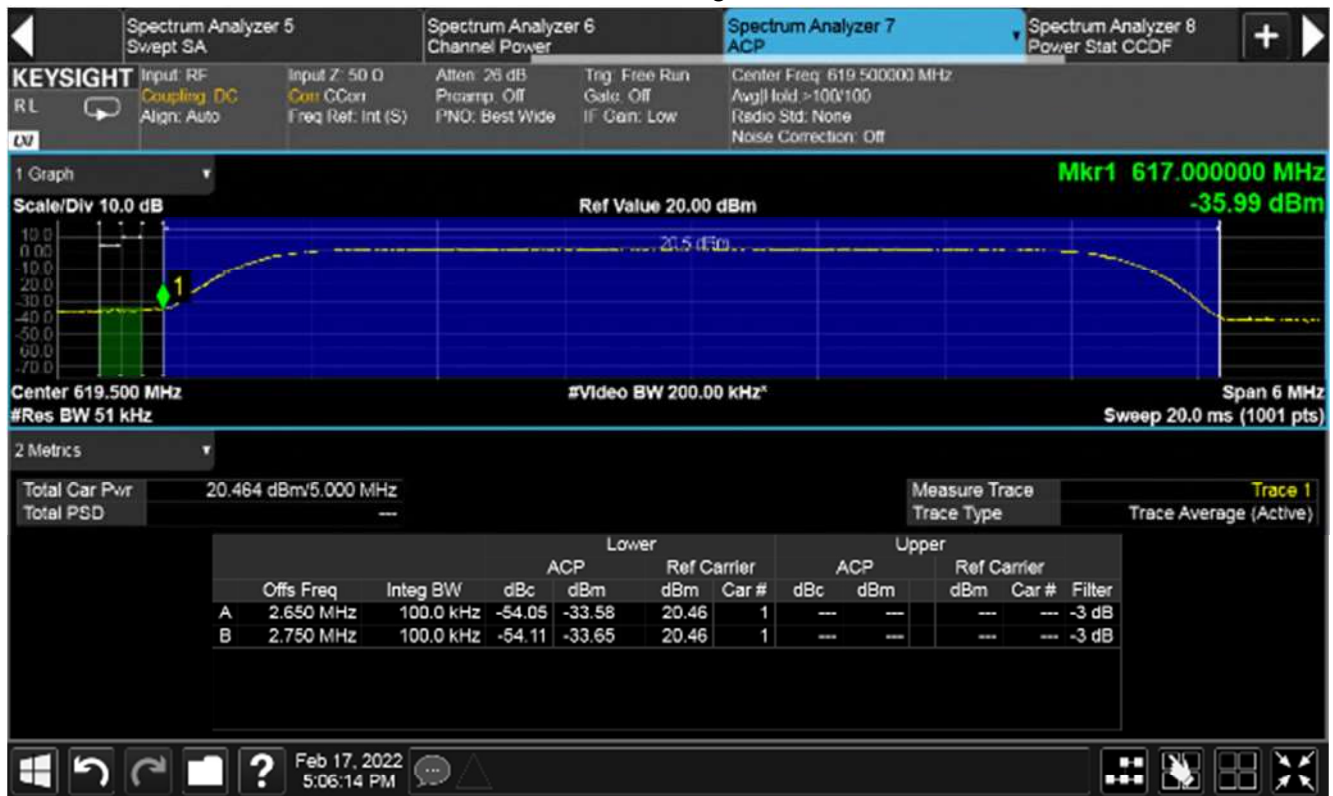


Mkr	Trace	X-Axis	Value	Notes
1 ▽	Bottom Ch	26.2498 GHz	-27.92 dBm	
2 ▽	Middle Ch	26.2204 GHz	-27.81 dBm	
3 ▽	Top Ch	2.6920 GHz	-22.98 dBm	

Plot of conducted emissions single channel mode 2.692 – 27 GHz range
(Note: Low, Mid and High channels overlaid on a single plot using 3 separate traces)

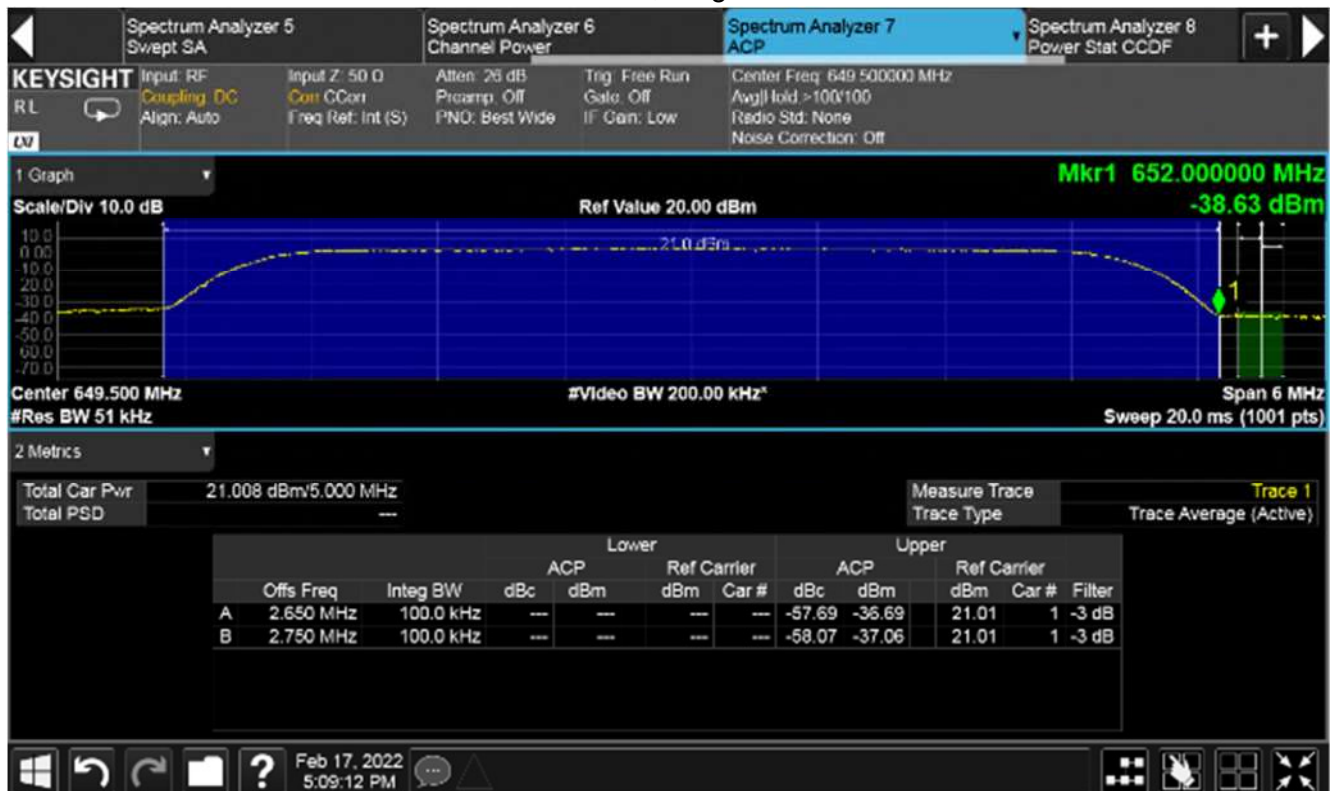
6.5 Band edge emissions

RF Parameters: Band 617-652 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN, Channel 619.5 MHz, Single channel mode



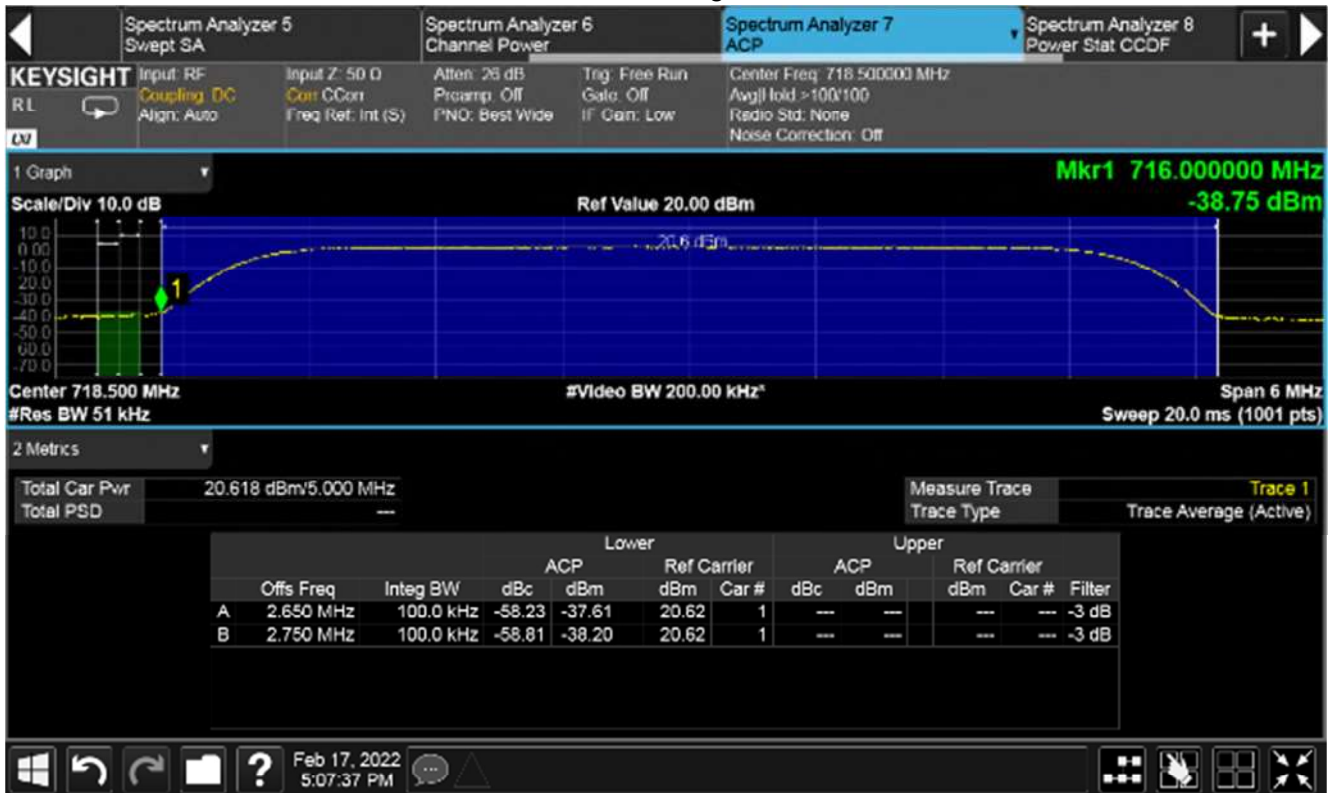
Plot of lower band edge for Low channel (619.5MHz)

RF Parameters: Band 617-652 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN, Channel 649.5 MHz, Single channel mode



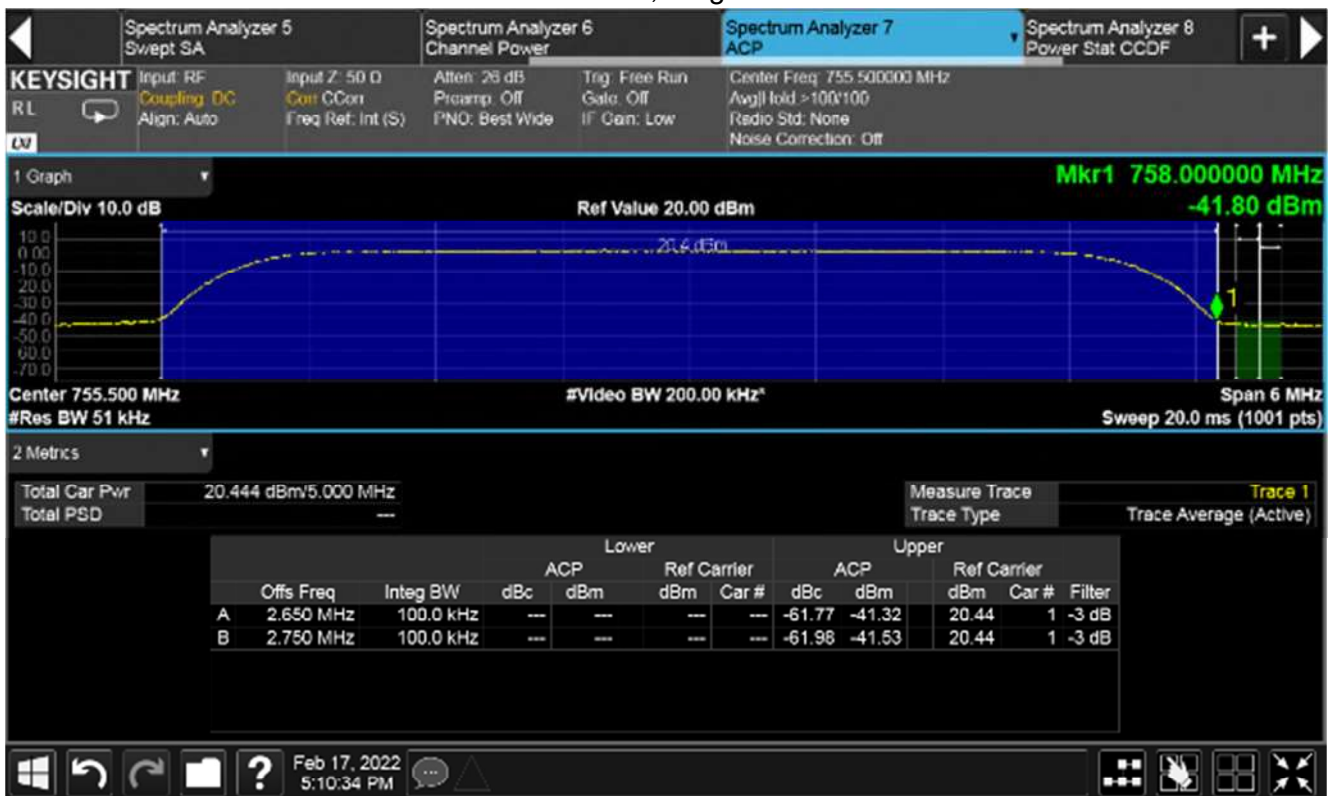
Plot of upper band edge for High channel (649.5MHz)

RF Parameters: Band 716-758 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channel 718.5 MHz, Single channel mode



Plot of lower band edge for Low channel (718.5MHz)

RF Parameters: Band 716-758 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channel 755.5 MHz, Single channel mode



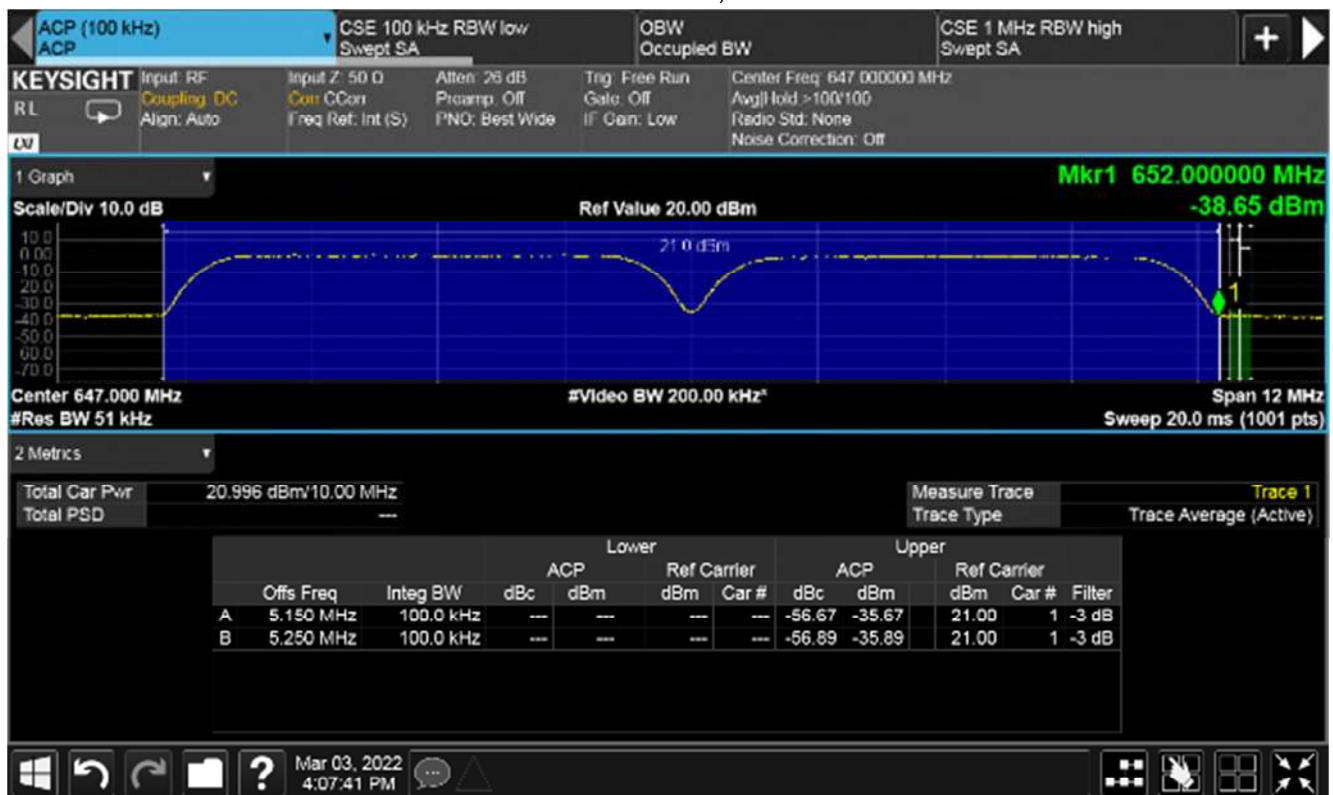
Plot of upper band edge for High channel (755.5MHz)

RF Parameters: Band 617-652 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channel 619.5 & 624.5 MHz, Dual channel mode



Plot of lower band edge for Low channels (619.5 & 624.5MHz)

RF Parameters: Band 617-652 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channel 644.5 & 649.5 MHz, Dual channel mode



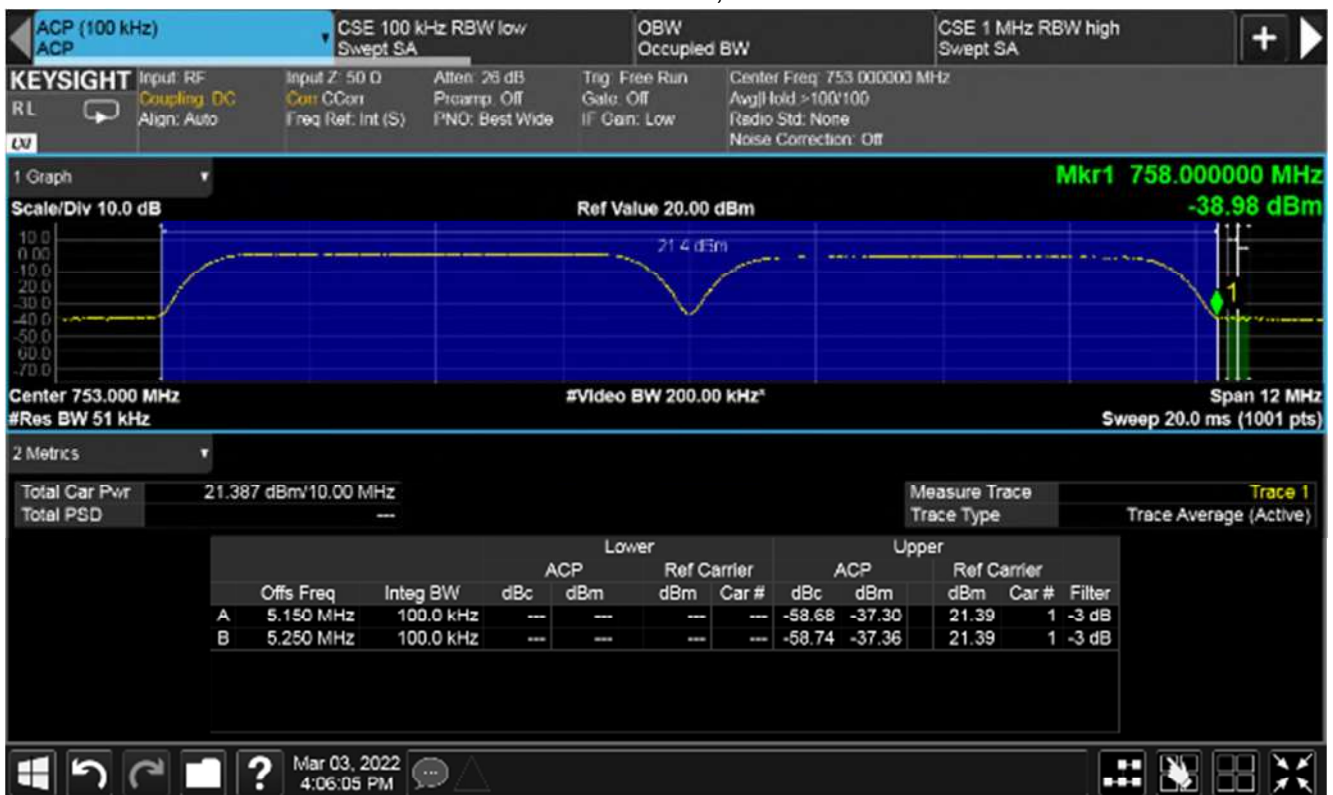
Plot of upper band edge for High channels (644.5 & 649.5MHz)

RF Parameters: Band 716-758 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channel 718.5 & 723.5 MHz, Dual channel mode



Plot of lower band edge for Low channels (748.5 & 753.5MHz)

RF Parameters: Band 716-758 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channel 750.5 & 755.5 MHz, Dual channel mode



Plot of upper band edge for High channels (750.5 & 755.5MHz)

RF Parameters: Band 2110-2200 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channel 2112.5 MHz, Single channel mode



Plot of lower band edge for Low channel (2112.5MHz)

RF Parameters: Band 2110-2200 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channel 2197.5 MHz, Single channel mode



Plot of upper band edge for High channel (2197.5MHz)

RF Parameters: Band 2110-2200 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 2112.5 & 2117.5MHz, Dual channel mode



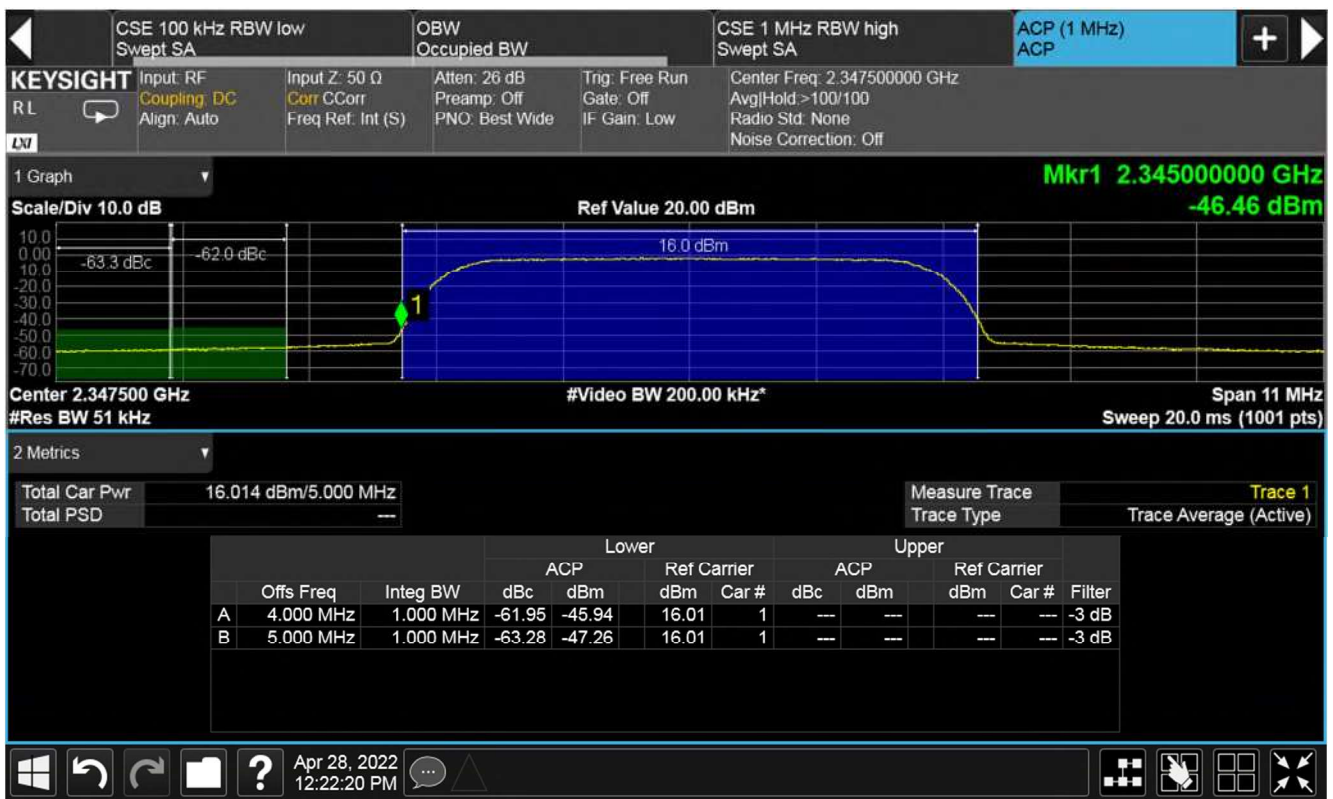
Plot of lower band edge for Low channels (2112.5 & 2117.5 MHz)

RF Parameters: Band 2110-2200 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 2192.5 & 2197.5MHz, Dual channel mode



Plot of upper band edge for High channels (2192.5 & 2197.5MHz)

RF Parameters: Band 2345-2360 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channel 2347.5 MHz, Single channel mode



Plot of lower band edge for Low channel (2347.5 MHz)

RF Parameters: Band 2345-2360 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channel 2357.5 MHz, Single channel mode



Plot of upper band edge for High channel (2357.5MHz)

RF Parameters: Band 2345-2360 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 2347.5 & 2352.5MHz, Dual channel mode



Plot of lower band edge for Low channels (2347.5 & 2352.5MHz)

RF Parameters: Band 2345-2360 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 2352.5 & 2357.5MHz, Dual channel mode



Plot of upper band edge for High channels (2352.5 & 2357.5MHz)

RF Parameters: Band 2496-2690 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN, Channel 2498.5 MHz, Single channel mode



Plot of lower band edge for Low channel (2498.5MHz)

RF Parameters: Band 2496-2690 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN, Channel 2687.5 MHz, Single channel mode



Plot of upper band edge for High channel (2687.5MHz)

RF Parameters: Band 2496-2690 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 2498.5 & 2503.5MHz, Dual channel mode



Plot of lower band edge for Low channels (2498.5 & 2503.5MHz)

RF Parameters: Band 2496-2690 MHz, Power +20 dBm, Channel Spacing 5MHz, Modulation AWGN,
Channels 2682.5 & 2687.5MHz, Dual channel mode



Plot of upper band edge for High channels (2682.5 & 2687.5MHz)

7 Photographs

For confidentiality purposes, photographs are not included at client's request.

8 Test equipment calibration list

The following is a list of the test equipment used by R.N. Electronics Ltd to test the unit detailed within this report. In line with our procedures, the equipment was within calibration for the period during which testing was carried out.

RN No.	Model No.	Description	Manufacturer	Calibration date	Cal period
CAL07	MWX221	Cable N Type to SMA Blue 2m	Junflon	14-Dec-2021	6 months
E136	3105	Horn Antenna 1 - 12.5 GHz	EMCO	#02-Apr-2022	12 months
E266	2032	Signal Generator 10kHz - 5.4GHz	Marconi Instruments	24-Jan-2022	12 months
E268	BHA 9118	Horn Antenna 1 - 18 GHz	Schaffner	#02-Apr-2022	12 months
E296-2	11970A	Harmonic Mixer 26.5-40GHz	Hewlett Packard	07-Jul-2021	12 months
E330	2224-20	Horn Antenna 26.5-40GHz	Flann (FMI)	#22-Apr-2022	12 months
E411	N9039A	9 kHz - 1 GHz RF Filter Section	Agilent Technologies	08-Jul-2021	12 months
E412	E4440A	PSA 3 Hz - 26.5 GHz	Agilent Technologies	30-Jun-2020	24 months
E463	8431A	Filter Band pass 2-4 GHz	Hewlett Packard	25-Oct-2021	12 months
E478	LQ2992/H	Filter Band pass 1-3GHz	RACAL-MESL	#11-Mar-2022	12 months
E602	MG3692A	Signal Generator 10 MHz - 20 GHz	Anritsu	#21-Feb-2022	12 months
E621	360B	Filter Low Pass Filter 1200 MHz	Hewlett Packard	N/A	N/A
E624	E4440A	PSA 3 Hz - 26.5 GHz	Agilent Technologies	08-Jul-2021	24 months
E743	2017 4/2dB	Attenuator 4/2dB 30-1000MHz	RN Electronics	#10-Mar-2022	12 months
E777	MG3695B	Signal Generator 8 MHz - 50 GHz	Anritsu	14-Jun-2021	12 months
F031	X6L120-1250-0017-0001-00	Filter Low Pass 1250MHz	K&L Microwave Inc	N/A	N/A
F078	AA18-10H	Attenuator SMA 10dB 18GHz	AtlanTecRF	30-Jul-2021	12 months
H071	N9010B	EXA Signal Analyser 10 Hz to 44 GHz	Keysight Technologies	09-Nov-2020	24 months
LPE364	CBL6112A	Antenna BiLog 30MHz - 2GHz	Chase Electronics Ltd	#28-Mar-2022	24 months
TMS82	8449B	Pre-Amplifier 1GHz - 26.5GHz	Agilent Technologies	16-Dec-2021	12 months

Equipment was within calibration dates for tests and has been re-calibrated since/during date of tests.

9 Auxiliary and peripheral equipment

9.1 Customer supplied equipment

Item No.	Model No.	Description	Manufacturer	Serial No.
1	N5172B	EXG signal generator	Agilent	MY53050810
2	N5172B	EXG signal generator	Keysight	MY53050728
3	15542	30 dB attenuator	Mini-Circuits	VUU78901032
4	UNAT-20+	20 dB attenuator	Mini-Circuits	-
5	UNAT-20+	20 dB attenuator	Mini-Circuits	-
6	305-0001	UNItivity 5000 Primary Hub	Zinwave Ltd	650110010101
7	305-0004	Zinwave Secondary Hub	Zinwave Ltd	621100002218
8	E4433B	ESG-D signal generator	Keysight	GB38450326
9	E4433B	ESG-D signal generator	Keysight	GB39340714
10	-	Dual long fibre optic cables	-	-
11	-	DC power cable	-	-
12	-	Male to Male N RF cables (x4)	-	-
13	305-0001	UNItivity 5000 primary hub	Zinwave Ltd	650110010102
14	305-0004	Zinwave Secondary Hub	Zinwave Ltd	620110000204

9.2 RN Electronics supplied equipment

RN No.	Model No.	Description	Manufacturer	Serial No
E558	18N20W-30dB	Attenuator 30dB 20W	Inmet	-

10 Condition of the equipment tested

In order for the EUT to produce the results shown within this report the following modifications, if any, were implemented.

10.1 Modifications before test

No modifications were made before test by RN Electronics Ltd.

10.2 Modifications during test

No modifications were made during test by RN Electronics Ltd.

11 Description of test sites

Site A	Radio Laboratory and Anechoic Chamber
Site B	Semi-Anechoic Chamber and Control Room FCC Registration No. 293246, ISED Registration No. 5612A-4
Site C	Transient Laboratory
Site D	Screened Room (Conducted Immunity)
Site E	Screened Room (Control Room for Site D)
Site F	Screened Room (Conducted Emissions)
Site G	Screened Room (Control Room for Site H)
Site H	3m Semi-Anechoic Chamber (indoor OATS) FCC Registration No. 293246, ISED Registration No. 5612A-2, VCCI Registration No. 4065
Site J	Transient Laboratory
Site K	Screened Room (Control Room for Site M)
Site M	3m Semi-Anechoic Chamber (indoor OATS) FCC Registration No. 293246, ISED Registration No. 5612A-3
Site N	Radio Laboratory
Site Q	Fully-Anechoic Chamber
Site OATS 3m and 10m Open Area Test Site	FCC Registration No. 293246, ISED Registration No. 5612A-1
Site R	Screened Room (Conducted Immunity)
Site S	Safety Laboratory
Site T	Transient Laboratory

RN Electronics CAB identifier as issued by Innovation, Science and Economic Development Canada is UK0002
RN Electronics CAB identifier as issued by FCC is UK0015

12 Abbreviations and units

%	Percent	LBT	Listen Before Talk
µA/m	microAmps per metre	LO	Local Oscillator
µV	microVolts	mA	milliAmps
µW	microWatts	max	maximum
AC	Alternating Current	kPa	Kilopascal
ALSE	Absorber Lined Screened Enclosure	Mbit/s	MegaBits per second
AM	Amplitude Modulation	MHz	MegaHertz
Amb	Ambient	mic	Microphone
ATPC	Automatic Transmit Power Control	min	minimum
BER	Bit Error Rate	mm	milliMetres
°C	Degrees Celsius	ms	milliSeconds
C/I	Carrier / Interferer	mW	milliWatts
CEPT	European Conference of Postal and Telecommunications Administrations	NA	Not Applicable
COFDM	Coherent OFDM	nom	Nominal
CS	Channel Spacing	nW	nanoWatt
CW	Continuous Wave	OATS	Open Area Test Site
dB	decibels	OFDM	Orthogonal Frequency Division Multiplexing
dBµA/m	decibels relative to 1µA/m	ppm	Parts per million
dBµV	decibels relative to 1µV	PRBS	Pseudo Random Bit Sequence
dBc	decibels relative to Carrier	QAM	Quadrature Amplitude Modulation
dBm	decibels relative to 1mW	QPSK	Quadrature Phase Shift Keying
DC	Direct Current	R&TTE	Radio and Telecommunication Terminal Equipment
DTA	Digital Transmission Analyser	Ref	Reference
EIRP	Equivalent Isotropic Radiated Power	RF	Radio Frequency
ERP	Effective Radiated Power	RFC	Remote Frequency Control
EU	European Union	RSL	Received Signal Level
EUT	Equipment Under Test	RTP	Room Temperature and Pressure
FM	Frequency Modulation	RTPC	Remote Transmit Power Control
FSK	Frequency Shift Keying	Rx	Receiver
g	Grams	s	Seconds
GHz	GigaHertz	SINAD	Signal to Noise And Distortion
Hz	Hertz	Tx	Transmitter
IF	Intermediate Frequency	V	Volts
kHz	kiloHertz		