

Wireless Test Report- 376463-1R1TRFWL

376463-1R1TRFWL

Date of issue: April 8, 2019

Applicant:

Blinq Wireless, Inc

Product:

Base station

Model:

FW-300i

FCC ID:

ROR00000006

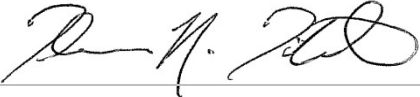
Specifications:

◆ **FCC 47 CFR Part 96**

Citizens Broadband Radio Service

Test location

Company name	Nemko Canada Inc.			
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Test site registration	Organization	Recognition numbers and location		
	FCC/ISED	CA2040 (Ottawa/Almonte); CA2041 (Montreal); CA0101 (Cambridge)		
Website	www.nemko.com			

Tested by	Fahar Abdul Sukkoor
Reviewed by	Tom Tidwell, Director, Nemko Direct for Telecom
Date	April 30, 2020
Signature of reviewer	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 1. Report summary

1.1 Applicant and manufacturer

Company name	Bling Wireless, Inc.
Address	140 Renfrew Drive Suite 205
City	Markham
Province/State	ON
Postal/Zip code	L3R 6B3
Country	Canada

1.2 Test specifications

FCC 47 CFR Part 96	Citizens Broadband Radio Service
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1.3 Test method

ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
940660 D01 Part 96 CBRS Eqpt v01	Certification and test procedures for citizens broadband radio service devices authorized under Part 96
662911 D01 Multiple Transmitter Output v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.5 Exclusions

This test report covers only general requirements of Part 96. For SAS and functionality please refer to the WINNF test report.

1.6 Test report revision history

Revision #	Details of changes made to test report
TRF	Original report issued
R1TRF	Power settings table modified and changes to section 8.1 has been made

Section 2. Summary of test results

2.1 FCC Part 96 test results

Part	Test description	Verdict
\$96.41(e)(3)	Emission and occupied bandwidth	Pass
\$96.41(b)	Power limits	Pass
\$96.41(e)(1)	3.5 GHz Emissions and Interference Limits	Pass
\$96.41(e)(2)	Additional protection levels	Pass
\$96.41(g)	The peak-to-average power ratio (PAPR)	Pass
\$2.1055	Frequency stability	Pass

Notes: None

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	July 15, 2019
Nemko sample ID number	1

3.2 EUT information

Product name	Base station
Model	FW-300i
Serial number	A180831015
Revision number	N/A

3.3 Technical information

Operating band	3550–3700 MHz
Operating frequencies	3550–3700 MHz
Modulation type	OFDM using QPSK and 64 QAM modulations
Channel bandwidth	10 MHz, 20 MHz, 30 MHz, 40 MHz, 60 MHz
Occupied bandwidth (99 %)	8.948 MHz, 17.89 MHz, 28.65 MHz, 37.74 MHz, 57.52 MHz
Emission designator	W7D
Power requirements	48 V _{DC} via 120Vac power adaptor
MIMO type	2 × 2 with completely uncorrelated type of signal
Antenna information	BLiNQ Antenna, Cross-polarized, 17 dBi gain

3.4 Product description and theory of operation

The BLINQ FW-300i system is a tri-sector and tri-carrier Long-Term Evolution (LTE) Evolved Node B (eNB) with the capability to operate in the following bands: 42, 43, 46 and 48 (Citizens Broadband Radio Service (CBRS)). With a distinctive feature set and integration level, the FW-300i brings an ideal solution to an “install anywhere” micro-base transceiver station (micro-BTS) that fully serves private networks, fixed wireless access and mobility use cases.

3.5 EUT exercise details

The EUT was controlled from laptop via Ethernet using Tera term. Link

Power settings:

Carrier Configuration		1CC		2CC		3CC	
BW (MHz)		10	20	10(*)	20(*)	10(*)	20(*)
Aggregated BW (MHz)		10	20	20	40	30	60
FW300i HP - Sector 0	Power set per BW	30dBm	30dBm	Not available	Not available	Not available	Not available
	Power per 10MHz	30dBm	27dBm				
FW300i HP - Sector 1	Power set per BW	30dBm	33dBm	30dBm	30dBm	29dBm	29dBm(**)
	Power per 10MHz	30dBm	30dBm	30dBm	27dBm	29dBm	26dBm
FW300i HP - Sector 2	Power set per BW	30dBm	30dBm	Not available	Not available	Not available	Not available
	Power per 10MHz	30dBm	27dBm				

(*) Transmit bandwidth per single carrier.

(**) For 3CC operation mode, the transmit power setting per carrier is 29dBm as long as the individual 20MHz carriers are operating within the 3575MHz – 3675MHz operational band. In order to operate on the Low or the High 20MHz Channels, meaning using the central carrier frequency at 3565MHz or 3685MHz, the transmit power per that special carrier should be set at maximum 26dBm / 20MHz (equivalent with 23dBm / 10MHz).

3.6 EUT setup diagram

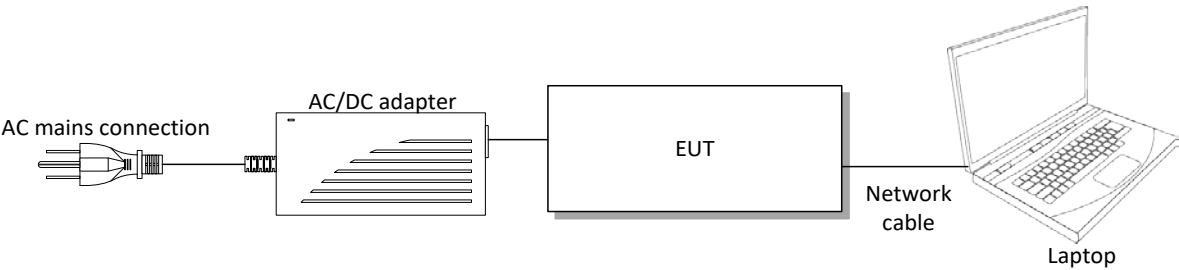


Figure 3.6-1: Setup diagram

3.7 EUT sub assemblies

Table 3.7-1: EUT support equipment

Description	Brand name	Model/Part number	Serial number
Power adaptor	Mean Well	HLG-240H-48	HB81K11319
laptop	Dell Latitude	E6440	FA002914

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of $K = 2$ with 95% certainty.

Test name	Measurement uncertainty, dB
All antenna port measurements	0.55
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA003012	1 year	Aug 22/19
Flush mount turntable	SUNAR	FM2022	FA003006	—	NCR
Controller	SUNAR	SC110V	FA002976	—	NCR
Antenna mast	SUNAR	TLT2	FA003007	—	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESR26	FA002969	1 year	June 4/20
Spectrum analyzer	Rohde & Schwarz	FSW43	FA002971	1 year	June 21/20
Power sensor	Rohde & Schwarz	NRP-6A	FA002963	1 year	June 20/20
Temperature chamber	Espec	EPX-4H	FA003033	1 year	Sept 18/19
Radiated Emissions cable set	Huber + Suhner Inc	—	FA003047	—	NCR
Radiated Emissions cable set	Huber + Suhner Inc	—	FA003044	—	NCR
Preamp (1–18 GHz)	ETS-Lindgren	124334	FA002956	1 year	Sep 18/19
Bilog antenna (20–2000 MHz)	Sun AR	JB1	FA003009	1 year	Sep 6/19
Horn antenna (1–18 GHz)	Electro-Metrics	3115	FA000649	1 year	Nov 28/19

Note: NCR - no calibration required

Section 8. Testing data

8.1 FCC 96.41(b) Output power and PSD

8.1.1 Definitions and limits

Unless otherwise specified in this section, the maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the following table below

Table 8.1-1: Output power and PSD limits

Device	Maximum EIRP, dBm/10 MHz	Maximum PSD, dBm/MHz
End User Device	23	N/A
Category A CBSD	30	20
Category B CBSD	47	37

8.1.2 Test summary

Test date July 23, 2019

8.1.3 Observations, settings and special notes

Based on the maximum RF power listed in this report, considerations pertaining to the maximum allowed EIRP and antenna type should be considered for each installation. As per manufacturer declaration: EUT doesn't transmit more than one channel bandwidth simultaneously.

The test was performed using RMS detector of the spectrum analyzer with RBW of 1 MHz and VBW of 10 MHz and 10 MHz RBW and 30 MHz VBW.

Total transmission power measurement results (in dBm units), provided below in the first 4 tables, are for the information purposes only. These values don't have limit in the section §96.41, since all the limits in the standard are expressed in dBm/10 MHz or dBm/MHz units. The measurement was performed using RMS power meter.

Test results are taken with QPSK modulation as considering worst case scenario.

8.1.4 Test data

Table 8.1-2: Maximum total channel transmission power and EIRP result for 1CC sector 0 MIMO operation of CBRS Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	Tx power, dBm	Antenna gain, dBi	EIRP, dBm
3555	10(low)	0	28.21	17	45.21
		1	27.62	17	44.62
3625	10(mid)	0	28.15	17	45.15
		1	27.70	17	44.70
3695	10(high)	0	28.37	17	45.37
		1	28.18	17	45.18
3560	20(low)	0	28.50	17	45.5
		1	28.19	17	45.19
3625	20(mid)	0	28.60	17	45.60
		1	28.51	17	45.51
3690	20(high)	0	28.97	17	45.97
		1	28.85	17	45.85

Table 8.1-3: Maximum total channel transmission power and EIRP result for 1CC sector 1 MIMO operation of CBRS Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	Tx power, dBm	Antenna gain, dBi	EIRP, dBm
3555	10(low)	0	27.74	17	44.74
		1	27.95	17	44.95
3625	10(mid)	0	28.66	17	45.66
		1	28.83	17	45.83
3695	10(high)	0	28.30	17	45.30
		1	27.23	17	44.23
3560	20(low)	0	31.28	17	48.28
		1	32.24	17	49.24
3625	20(mid)	0	32.04	17	49.04
		1	31.93	17	48.93
3690	20(high)	0	31.80	17	48.80
		1	30.96	17	47.96

Table 8.1-4: Maximum total channel transmission power and EIRP result for 1CC sector 2 MIMO operation of CBRS Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	Tx power, dBm	Antenna gain, dBi	EIRP, dBm
3555	10(low)	0	28.26	17	45.26
		1	28.09	17	45.09
3625	10(mid)	0	27.85	17	44.85
		1	27.89	17	44.89
3695	10(high)	0	28.42	17	45.42
		1	28.32	17	45.32
3560	20(low)	0	29.03	17	46.03
		1	28.98	17	45.98
3625	20(mid)	0	28.44	17	45.44
		1	28.53	17	45.53
3690	20(high)	0	28.98	17	45.98
		1	28.87	17	45.87

Table 8.1-5: Maximum total channel transmission power and EIRP result for 2CC sector 1 MIMO operation of CBRS Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	Tx power, dBm	Antenna gain, dBi	EIRP, dBm
3560	20(low)	0	30.22	17	47.22
		1	31.25	17	48.25
3630	20(mid)	0	30.55	17	47.55
		1	30.76	17	47.76
3690	20(high)	0	30.64	17	47.64
		1	29.61	17	46.61
3570	40(low)	0	29.87	17	46.87
		1	31.62	17	48.62
3625	40(mid)	0	29.86	17	46.86
		1	31.62	17	48.62
3680	40(high)	0	30.57	17	47.57
		1	30.34	17	47.34

Table 8.1-6: Maximum total channel transmission power and EIRP result for 3CC sector 1 MIMO operation of CBRS Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	Tx power, dBm	Antenna gain, dBi	EIRP, dBm
3575	30(low)	0	30.37	17	47.37
		1	30.71	17	47.71
3625	30(mid)	0	30.89	17	47.89
		1	30.79	17	47.79
3675	30(high)	0	31.24	17	48.24
		1	30.75	17	47.75
3585	60(low)	0	30.45	17	47.45
		1	30.95	17	47.95
3625	60(mid)	0	31.34	17	48.34
		1	31.45	17	48.45
3665	60(high)	0	31.41	17	48.41
		1	31.03	17	48.03
3590	60(low)	0	31.01	17	48.01
		1	31.68	17	48.68
3650	60(high)	0	31.63	17	48.63
		1	31.44	17	48.44

Table 8.1-7: EIRP in 10 MHz measurement result for 1CC sector 0 MIMO operation of CBRS Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	Output power, dBm/10 MHz	Antenna gain, dBi	EIRP, dBm / 10 MHz	Limit, , dBm / 10 MHz	Margin, dB
3555	10(low)	0	27.31	17	44.31	47	2.69
		1	27.08	17	44.08	47	2.92
3625	10(mid)	0	27.77	17	44.77	47	2.23
		1	27.05	17	44.05	47	2.95
3695	10(high)	0	28.01	17	45.01	47	1.99
		1	27.74	17	44.74	47	2.26
3560	20(low)	0	26.14	17	43.14	47	3.86
		1	26.04	17	43.04	47	3.96
3625	20(mid)	0	26.50	17	43.5	47	3.50
		1	26.41	17	43.41	47	3.59
3690	20(high)	0	26.59	17	43.59	47	3.41
		1	26.79	17	43.79	47	3.21

Table 8.1-8: EIRP in 10 MHz measurement result for 1CC sector 1 MIMO operation of CBRS Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	Output power, dBm/10 MHz	Antenna gain, dBi	EIRP, dBm / 10 MHz	Limit, , dBm / 10 MHz	Margin, dB
3555	10(low)	0	26.90	17	43.90	47	3.1
		1	27.95	17	44.95	47	2.05
3625	10(mid)	0	28.02	17	45.02	47	1.98
		1	28.24	17	45.24	47	1.76
3695	10(high)	0	27.91	17	44.91	47	2.09
		1	26.78	17	43.78	47	3.22
3560	20(low)	0	29.09	17	46.09	47	0.91
		1	29.77	17	46.77	47	0.23
3625	20(mid)	0	29.75	17	46.75	47	0.25
		1	29.76	17	46.76	47	0.24
3690	20(high)	0	29.46	17	46.46	47	0.54
		1	28.75	17	45.75	47	1.25

Table 8.1-9: EIRP in 10 MHz measurement result for 1CC sector 2 MIMO operation of CBRS Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	Output power, dBm/10 MHz	Antenna gain, dBi	EIRP, dBm / 10 MHz	Limit, , dBm / 10 MHz	Margin, dB
3555	10(low)	0	27.77	17	44.77	47	2.23
		1	27.51	17	44.51	47	2.49
3625	10(mid)	0	27.21	17	44.21	47	2.79
		1	27.44	17	44.44	47	2.56
3695	10(high)	0	27.80	17	44.80	47	2.20
		1	27.99	17	44.99	47	2.01
3560	20(low)	0	26.74	17	43.74	47	3.26
		1	26.87	17	43.87	47	3.13
3625	20(mid)	0	26.46	17	43.46	47	3.54
		1	26.47	17	43.47	47	3.53
3690	20(high)	0	26.25	17	43.25	47	3.75
		1	26.55	17	43.55	47	3.45

Table 8.1-10: EIRP in 10 MHz measurement result for 2CC sector 1 MIMO operation of CBRS Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	Output power, dBm/10 MHz	Antenna gain, dBi	EIRP, dBm / 10 MHz	Limit, , dBm / 10 MHz	Margin, dB
3560	10(low)	0	28.09	17	45.09	47	1.91
		1	28.97	17	45.97	47	1.03
3630	10(mid)	0	27.92	17	44.92	47	2.08
		1	28.14	17	45.14	47	1.86
3690	10(high)	0	28.19	17	45.19	47	1.81
		1	27.26	17	44.26	47	2.74
3560	20(low)	0	29.03	17	46.03	47	0.97
		1	28.98	17	45.98	47	1.02
3625	20(mid)	0	28.44	17	45.44	47	1.56
		1	28.53	17	45.53	47	1.47
3690	20(high)	0	28.98	17	45.98	47	1.02
		1	28.87	17	45.87	47	1.13

Table 8.1-11: EIRP in 10 MHz measurement result for 3CC sector 1 MIMO operation of CBRS Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	Output power, dBm/10 MHz	Antenna gain, dBi	EIRP, dBm / 10 MHz	Limit, , dBm / 10 MHz	Margin, dB
3575	30(low)	0	27.54	17	44.54	47	2.46
		1	27.96	17	44.96	47	2.04
3625	30(mid)	0	27.86	17	44.86	47	2.14
		1	27.85	17	44.85	47	2.15
3675	30(high)	0	28.25	17	45.25	47	1.75
		1	27.67	17	44.67	47	2.33
3585	60(low)	0	25.90	17	42.90	47	4.10
		1	26.79	17	43.79	47	3.21
3625	60(mid)	0	26.14	17	43.14	47	3.86
		1	26.93	17	43.93	47	3.07
3665	60(high)	0	24.79	17	41.79	47	5.21
		1	25.87	17	42.87	47	4.13
3590	60(low)	0	25.34	17	42.34	47	4.66
		1	26.30	17	43.3	47	3.70
3650	60(high)	0	25.20	17	42.20	47	4.8
		1	26.21	17	43.21	47	3.79

Table 8.1-12: PSD in 1 MHz measurement result for 1CC sector 0 CBSD Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	PSD , dBm/MHz	Antenna gain, dBi	PSD with antenna gain dBm/MHz	PSD Limit, dBm/MHz	Margin, dB
3555	10(low)	0	18.86	17	35.86	37	1.14
		1	18.34	17	35.34	37	1.66
3625	10(mid)	0	19.22	17	36.22	37	0.78
		1	19.74	17	36.74	37	0.26
3695	10(high)	0	19.86	17	36.86	37	0.14
		1	19.27	17	36.27	37	0.73
3560	20(low)	0	15.89	17	32.89	37	4.11
		1	15.88	17	32.88	37	4.12
3625	20(mid)	0	16.39	17	33.39	37	3.61
		1	16.35	17	33.35	37	3.65
3690	20(high)	0	16.36	17	33.36	37	3.64
		1	16.32	17	33.32	37	3.68

Table 8.1-13: PSD in 1 MHz measurement result for 1CC sector 1 CBSD Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	PSD , dBm/MHz	Antenna gain, dBi	PSD with antenna gain dBm/MHz	PSD Limit, dBm/MHz	Margin, dB
3555	10(low)	0	19.22	17	36.22	37	0.78
		1	19.74	17	36.74	37	0.26
3625	10(mid)	0	19.17	17	36.17	37	0.83
		1	19.34	17	36.34	37	0.66
3695	10(high)	0	18.75	17	35.75	37	1.25
		1	19.37	17	36.37	37	0.63
3560	20(low)	0	19.47	17	36.47	37	0.53
		1	19.94	17	36.94	37	0.06
3625	20(mid)	0	19.91	17	36.91	37	0.09
		1	19.48	17	36.48	37	0.52
3690	20(high)	0	19.74	17	36.74	37	0.26
		1	19.29	17	36.29	37	0.71

Table 8.1-14: PSD in 1 MHz measurement result for 1CC sector 2 CBSD Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	PSD , dBm/MHz	Antenna gain, dBi	PSD with antenna gain dBm/MHz	PSD Limit, dBm/MHz	Margin, dB
3555	10(low)	0	19.86	17	36.86	37	0.14
		1	19.27	17	36.27	37	0.73
3625	10(mid)	0	18.75	17	35.75	37	1.25
		1	19.37	17	36.37	37	0.63
3695	10(high)	0	19.65	17	36.65	37	0.35
		1	18.27	17	35.27	37	1.73
3560	20(low)	0	16.85	17	33.85	37	3.15
		1	16.42	17	33.42	37	3.58
3625	20(mid)	0	16.63	17	33.63	37	3.37
		1	16.72	17	33.72	37	3.28
3690	20(high)	0	16.94	17	33.94	37	3.06
		1	16.38	17	33.38	37	3.62

Table 8.1-15: PSD in 1 MHz measurement result for 2CC sector 1 CBSD Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	PSD , dBm/MHz	Antenna gain, dBi	PSD with antenna gain dBm/MHz	PSD Limit, dBm/MHz	Margin, dB
3560	10(low)	0	19.42	17	36.42	47	0.58
		1	19.57	17	36.57	47	0.43
3630	10(mid)	0	19.13	17	36.13	47	0.87
		1	18.85	17	35.85	47	1.15
3690	10(high)	0	19.08	17	36.08	47	0.92
		1	18.76	17	35.76	47	1.24
3560	20(low)	0	14.91	17	31.91	47	5.09
		1	17.27	17	34.27	47	2.73
3625	20(mid)	0	14.95	17	31.95	47	5.05
		1	17.73	17	34.73	47	2.27
3690	20(high)	0	16.22	17	33.22	47	3.78
		1	15.62	17	32.62	47	4.38

Table 8.1-16: PSD in 1 MHz measurement result for 3CC sector 1 CBSD Category B

Frequency, MHz	Bandwidth, MHz	Ch 0/1	PSD , dBm/MHz	Antenna gain, dBi	PSD with antenna gain dBm/MHz	PSD Limit, dBm/MHz	Margin, dB
3575	30(low)	0	18.65	17	35.65	47	1.35
		1	19.02	17	36.02	47	0.98
3625	30(mid)	0	19.03	17	36.03	47	0.97
		1	18.93	17	35.93	47	1.07
3675	30(high)	0	19.41	17	36.41	47	0.59
		1	18.93	17	35.93	47	1.07
3585	60(low)	0	14.90	17	31.90	47	5.10
		1	16.93	17	33.93	47	3.07
3625	60(mid)	0	14.12	17	31.12	47	5.88
		1	16.65	17	33.65	47	3.35
3665	60(high)	0	15.69	17	32.69	47	4.31
		1	15.70	17	32.70	47	4.30
3590	60(low)	0	15.88	17	32.88	47	4.12
		1	16.59	17	33.59	47	3.41
3650	60(high)	0	15.73	17	32.73	47	4.27
		1	16.44	17	33.44	47	3.56

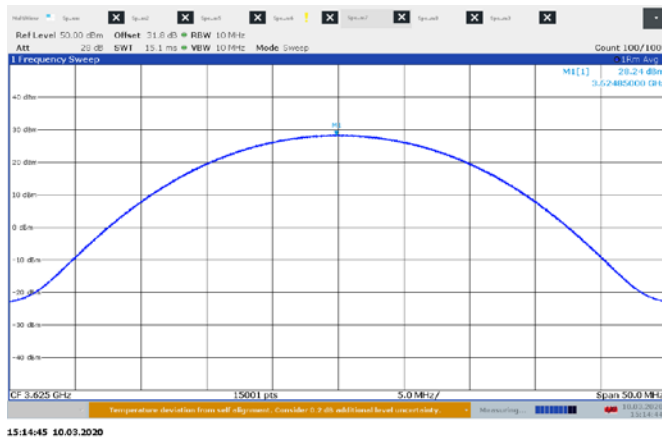


Figure 8.1-1: Output power sample plot, 1cc 10 MHz channel

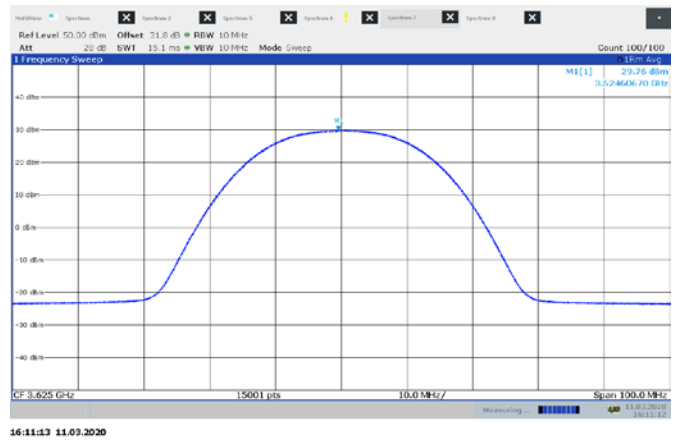


Figure 8.1-2: Output power sample plot 1cc, 20 MHz channel

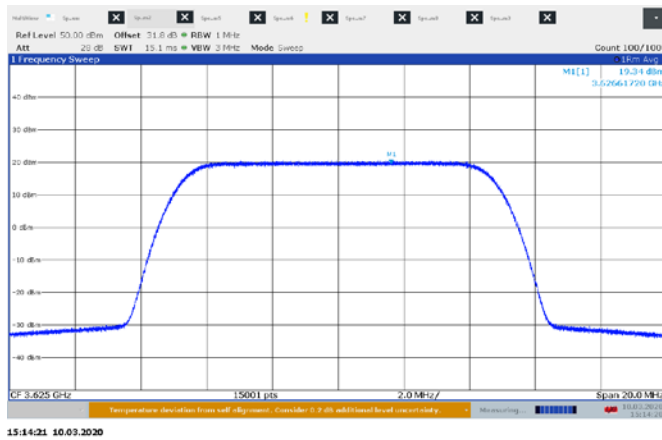


Figure 8.1-3: Power spectral density sample plot, 1cc 10 MHz channel

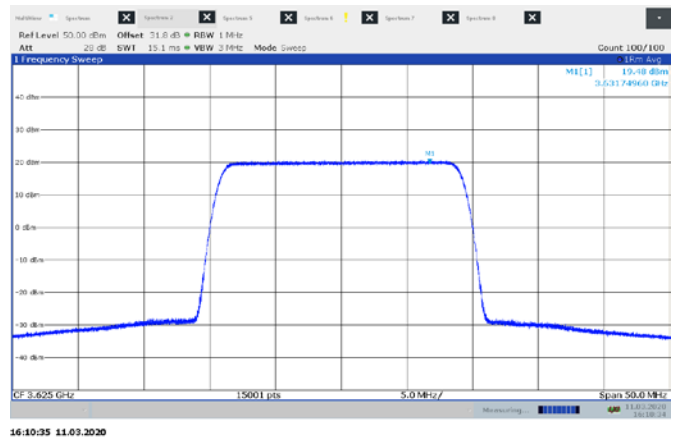


Figure 8.1-4: Power spectral density sample plot 1cc, 20 MHz channel

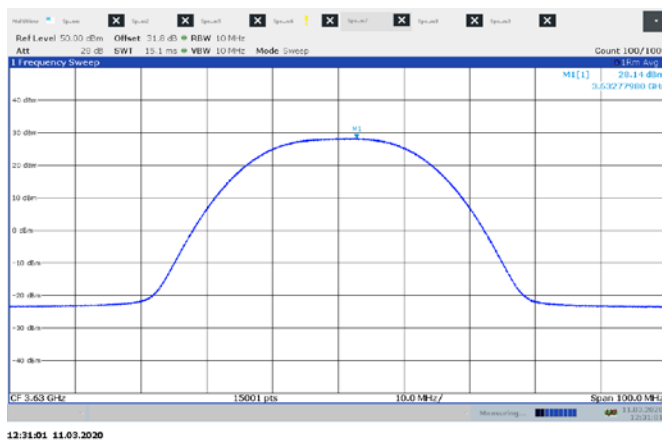


Figure 8.1-5: Output power sample plot, 2cc 10 MHz channel

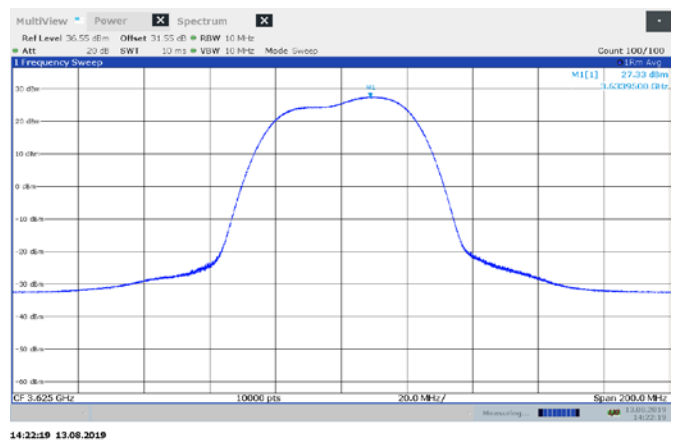


Figure 8.1-6: Output power sample plot 2cc, 20 MHz channel

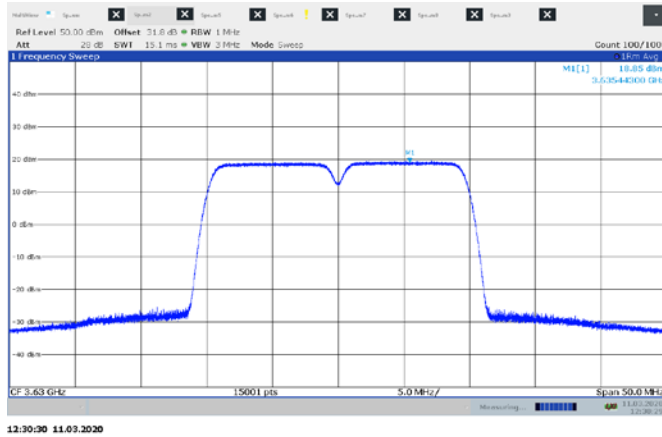


Figure 8.1-7: Power spectral density sample plot, 2cc 10 MHz channel

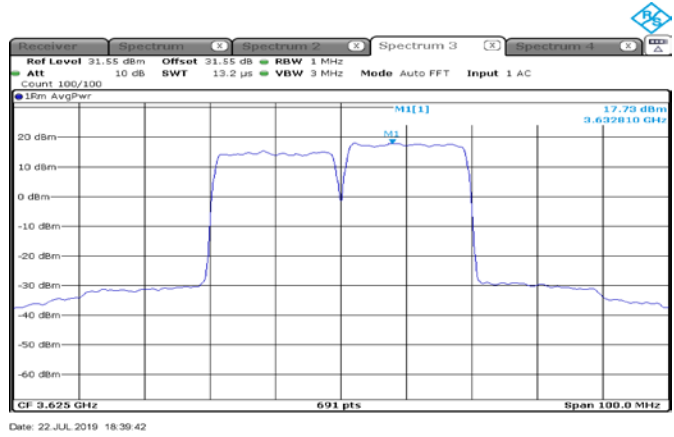


Figure 8.1-8: Power spectral density sample plot, 20 MHz channel

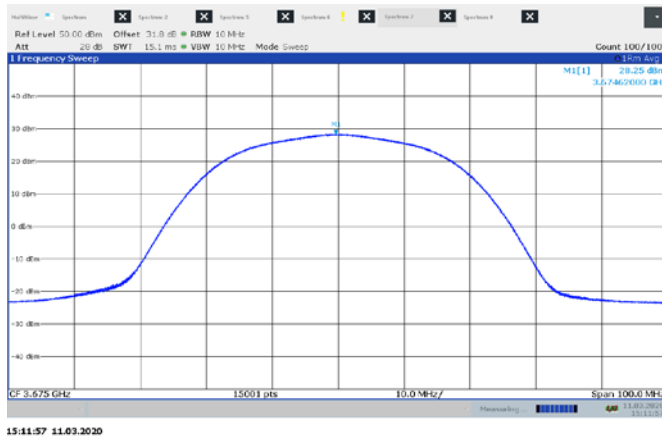


Figure 8.1-9: Output power sample plot, 3cc 10 MHz channel

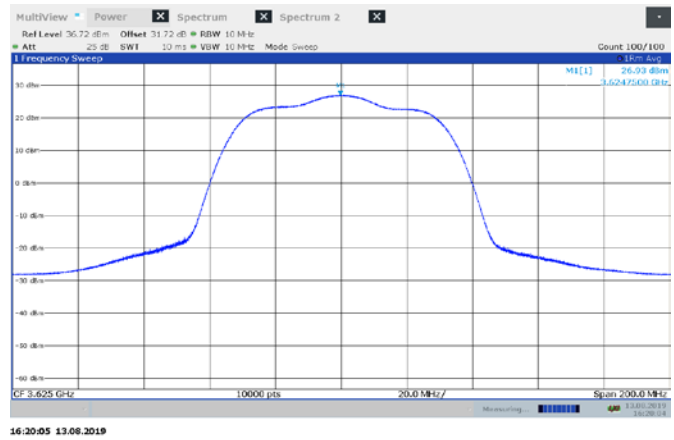


Figure 8.1-10: Output power sample plot, 3cc, 20 MHz channel

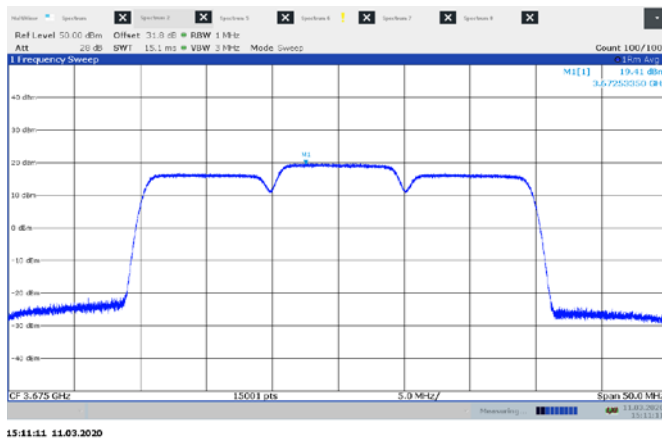


Figure 8.1-11: Power spectral density sample plot, 3cc 10 MHz channel

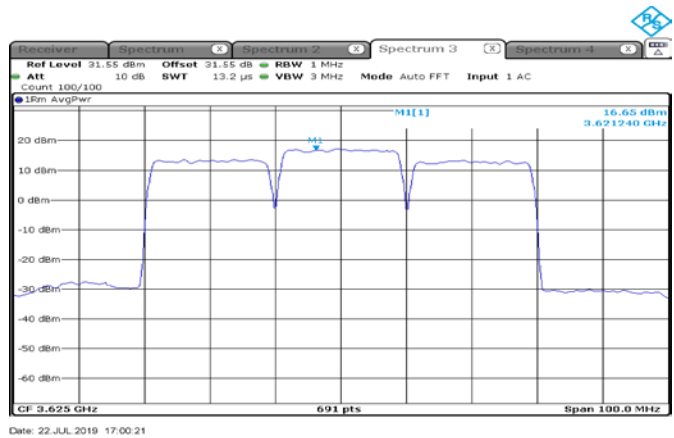


Figure 8.1-12: Power spectral density sample plot, 3cc, 20 MHz channel

8.2 FCC 96.41(g) The peak-to-average power ratio (PAPR)

8.2.1 Definitions and limits

The peak-to-average power ratio (PAPR) of any CBSD transmitter output power must not exceed 13 dB. PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities or another Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

8.2.2 Test summary

Test date July 23, 2019

8.2.3 Observations, settings and special notes

The test was performed using spectrum analyzer signal statistics' Complimentary Cumulative Distribution Function

8.2.4 Test data

Table 8.2-1: PAPR measurement results sector 0

Channel BW, MHz	No. of carriers	Antenna port	Frequency, MHz	CCDF at 0.1%, dB	Limit, dB	Margin, dB
10(low)	1	0	3555	8.16	13	4.84
10(mid)	1	0	3625	8.16	13	4.84
10(high)	1	0	3695	8.16	13	4.84
10(low)	1	1	3555	8.20	13	4.80
10(mid)	1	1	3625	8.10	13	4.90
10(high)	1	1	3695	8.14	13	4.86
20(low)	1	0	3560	8.38	13	4.62
20(mid)	1	0	3625	8.36	13	4.64
20(high)	1	0	3690	8.41	13	4.59
20(low)	1	1	3560	8.34	13	4.66
20(mid)	1	1	3625	8.40	13	4.6
20(high)	1	1	3690	8.32	13	4.68

Table 8.2-2: PAPR measurement results sector 1

Channel BW, MHz	No. of carriers	Antenna port	Frequency, MHz	CCDF at 0.1%, dB	Limit, dB	Margin, dB
10(low)	1	0	3555	8.16	13	4.84
10(mid)	1	0	3625	8.18	13	4.82
10(high)	1	0	3695	8.22	13	4.78
10(low)	1	1	3555	8.22	13	4.78
10(mid)	1	1	3625	8.22	13	4.78
10(high)	1	1	3695	8.24	13	4.76
20(low)	1	0	3560	8.34	13	4.66
20(mid)	1	0	3625	8.34	13	4.66
20(high)	1	0	3690	8.40	13	4.60
20(low)	1	1	3560	8.38	13	4.62
20(mid)	1	1	3625	8.36	13	4.64
20(high)	1	1	3690	8.40	13	4.60
20(low)	2	0	3560	8.62	13	4.38
20(mid)	2	0	3630	8.62	13	4.38
20(high)	2	0	3690	8.80	13	4.20
20(low)	2	1	3560	8.82	13	4.18
20(mid)	2	1	3630	8.76	13	4.24
20(high)	2	1	3690	8.82	13	4.18
40(low)	2	0	3570	8.38	13	4.62
40(mid)	2	0	3625	8.46	13	4.54
40(high)	2	0	3680	8.40	13	4.60
40(low)	2	1	3570	8.32	13	4.68
40(mid)	2	1	3625	8.38	13	4.62
40(high)	2	1	3680	8.38	13	4.62
30(low)	3	0	3575	8.10	13	4.90
30(mid)	3	0	3625	8.06	13	4.94
30(high)	3	0	3675	8.14	13	4.86
30(low)	3	1	3575	8.08	13	4.92
30(mid)	3	1	3625	8.14	13	4.86
30(high)	3	1	3675	8.20	13	4.80
60(low)	3	0	3585	8.40	13	4.60
60(mid)	3	0	3625	8.40	13	4.60
60(high)	3	0	3665	8.32	13	4.68
60(low)	3	1	3585	8.32	13	4.68
60(mid)	3	1	3625	8.23	13	4.77
60(high)	3	1	3665	8.17	13	4.83
60(low)	3	0	3590	7.97	13	5.03
60(high)	3	0	3650	7.97	13	5.03
60(low)	3	1	3590	7.83	13	5.17
60(high)	3	1	3650	7.86	13	5.14

Table 8.2-3: PAPR measurement results sector 2

Channel BW, MHz	No. of carriers	Antenna port	Frequency, MHz	CCDF at 0.1%, dB	Limit, dB	Margin, dB
10(low)	1	0	3555	8.14	13	4.86
10(mid)	1	0	3625	8.18	13	4.82
10(high)	1	0	3695	8.22	13	4.78
10(low)	1	1	3555	8.18	13	4.82
10(mid)	1	1	3625	8.14	13	4.86
10(high)	1	1	3695	8.14	13	4.86
20(low)	1	0	3560	8.30	13	4.70
20(mid)	1	0	3625	8.38	13	4.62
20(high)	1	0	3690	8.36	13	4.64
20(low)	1	1	3560	8.32	13	4.68
20(mid)	1	1	3625	8.38	13	4.62
20(high)	1	1	3690	8.36	13	4.64



Figure 8.2-1: CCDF sample plot, 1cc 10 MHz channel

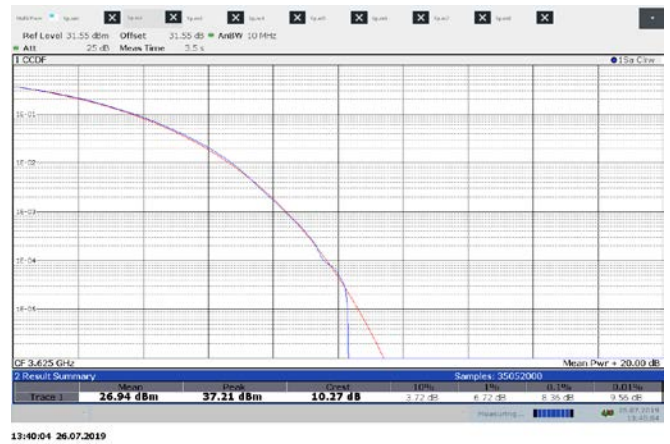


Figure 8.2-2: CCDF sample plot, 1cc 20 MHz channel



Figure 8.2-3: CCDF sample plot, 2cc 10 MHz channel

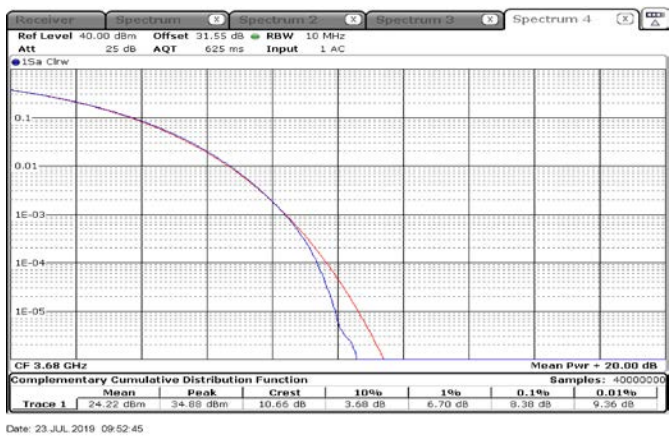


Figure 8.2-4: CCDF sample plot, 2cc 20 MHz channel



Figure 8.2-5: CCDF sample plot, 3cc 10 MHz channel

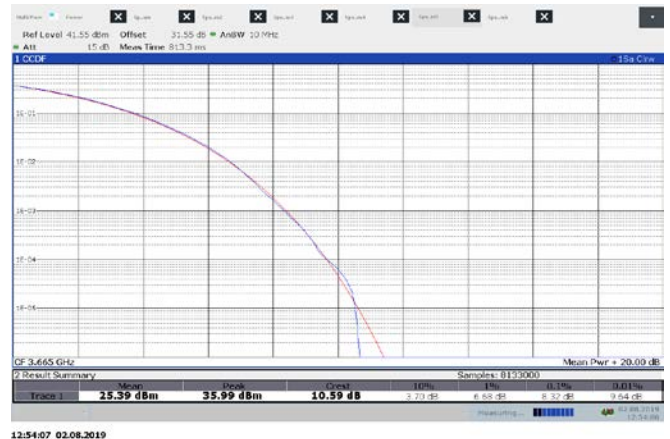


Figure 8.2-6: CCDF sample plot, 3cc 20 MHz channel

8.3 FCC 96.41(e)(3) Emission bandwidth and occupied bandwidth

8.3.1 Definitions and limits

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

FCC 2.1049 The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

8.3.2 Test summary

Test date August 23, 2019

8.3.3 Observations, settings and special notes

Spectrum analyser settings for OBW measurements:

Resolution bandwidth	100 kHz
Video bandwidth	300 kHz
Detector mode	Peak
Trace mode	Max Hold

8.3.4 Test data

Table 8.3-1: Occupied bandwidth measurement results for sector 0

Bandwidth, MHz	No of carriers	Antenna port	Frequency, MHz	99% OBW, MHz	26 dB BW, MHz
10(low)	1	0	3555	8.97	9.78
10(mid)	1	0	3625	8.97	9.78
10(high)	1	0	3695	8.97	9.78
10(low)	1	1	3555	8.94	9.78
10(mid)	1	1	3625	8.97	9.78
10(high)	1	1	3695	8.97	9.78
20(low)	1	0	3560	17.86	19.38
20(mid)	1	0	3625	17.85	19.38
20(high)	1	0	3690	17.89	19.45
20(low)	1	1	3560	17.85	19.38
20(mid)	1	1	3625	17.86	18.55
20(high)	1	1	3690	17.85	19.38

Table 8.3-2: Occupied bandwidth measurement results for sector 1

Bandwidth, MHz	No of carriers	Antenna, Port	Frequency, MHz	99% OBW, MHz	26 dB BW, MHz
10(low)	1	0	3555	8.97	9.75
10(mid)	1	0	3625	8.97	9.78
10(high)	1	0	3695	8.97	9.81
10(low)	1	1	3555	8.94	9.81
10(mid)	1	1	3625	8.97	9.78
10(high)	1	1	3695	8.97	9.78
20(low)	1	0	3560	17.89	19.36
20(mid)	1	0	3625	17.89	19.27
20(high)	1	0	3690	17.89	19.28
20(low)	1	1	3560	17.89	19.28
20(mid)	1	1	3625	17.89	19.36
20(high)	1	1	3690	17.89	19.36
20(low)	2	0	3560	18.74	20.04
20(mid)	2	0	3630	18.89	19.97
20(high)	2	0	3690	18.89	19.97
20(low)	2	1	3560	18.88	19.90
20(mid)	2	1	3630	18.89	19.97
20(high)	2	1	3690	18.89	19.97
40(low)	2	0	3570	37.59	39.96
40(mid)	2	0	3625	37.60	38.70
40(high)	2	0	3680	37.61	39.96
40(low)	2	1	3570	37.62	39.36
40(mid)	2	1	3625	37.77	39.51
40(high)	2	1	3680	37.63	39.51
30(low)	3	0	3575	28.58	30.10
30(mid)	3	0	3625	28.65	30.02
30(high)	3	0	3675	28.65	30.02
30(low)	3	1	3575	28.58	30.10
30(mid)	3	1	3625	28.65	30.03
30(high)	3	1	3675	28.58	30.03
60(low)	3	0	3585	57.17	59.94
60(mid)	3	0	3625	57.23	59.94
60(high)	3	0	3665	57.22	60.14
60(low)	3	1	3585	57.13	59.39
60(mid)	3	1	3625	57.31	59.39
60(high)	3	1	3665	56.96	62.00
60(low)	3	0	3590	57.01	59.91
60(high)	3	0	3650	57.60	59.91
60(low)	3	1	3590	57.16	59.91
60(high)	3	1	3650	57.16	59.91

Table 8.3-3: Occupied bandwidth measurement results for sector 2

Bandwidth, MHz	No of carriers	Antenna port	Frequency, MHz	99% OBW, MHz	26 dB BW, MHz
10(low)	1	0	3555	8.97	9.78
10(mid)	1	0	3625	8.97	9.75
10(high)	1	0	3695	8.97	9.67
10(low)	1	1	3555	8.97	9.84
10(mid)	1	1	3625	8.97	9.78
10(high)	1	1	3695	8.97	9.78
20(low)	1	0	3560	17.86	19.43
20(mid)	1	0	3625	17.86	19.38
20(high)	1	0	3690	17.87	18.96
20(low)	1	1	3560	17.86	19.43
20(mid)	1	1	3625	17.86	19.33
20(high)	1	1	3690	17.87	19.32

Section 8
Test name
Specification

Testing data
96.41(e)(3) Emission bandwidth and occupied bandwidth
FCC Part 96 and FCC Part 2

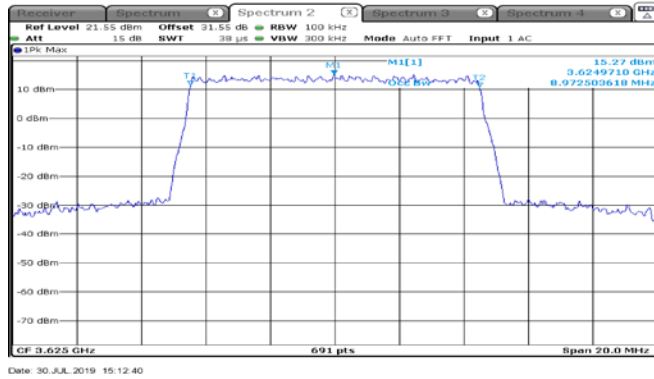


Figure 8.3-1: Occupied bandwidth sample plot for 1 CC 10 MHz channel

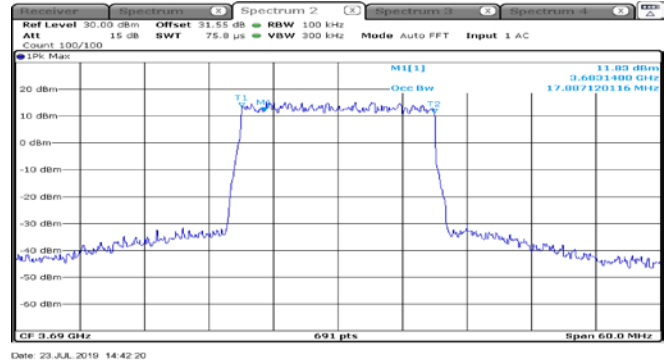


Figure 8.3-2: Occupied bandwidth sample plot for 1CC 20 MHz channel

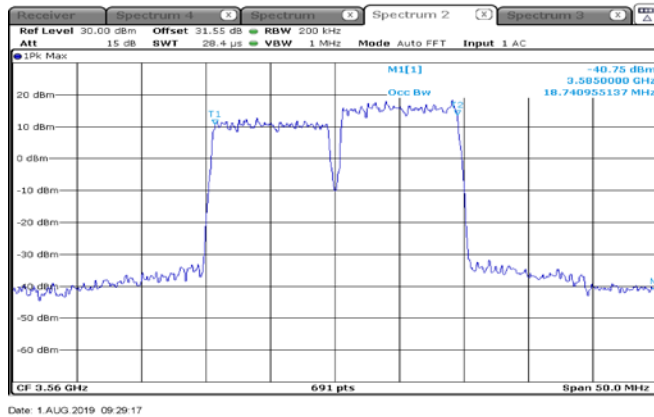


Figure 8.3-3: Occupied bandwidth sample plot for 2 CC 10 MHz channel

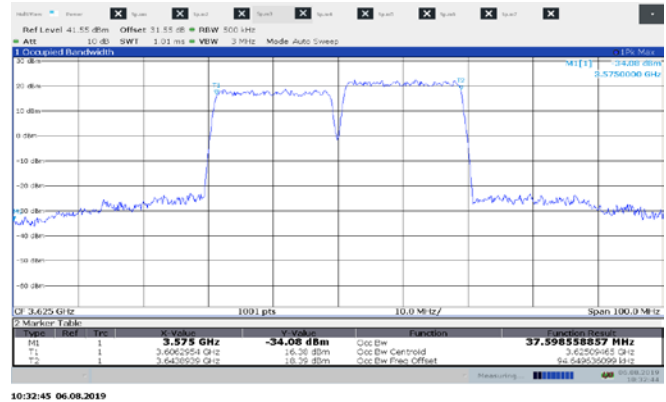


Figure 8.3-4: Occupied bandwidth sample plot for 2CC 20 MHz channel

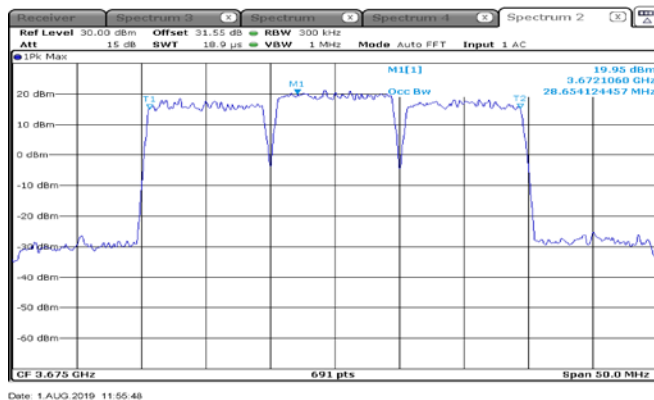


Figure 8.3-5: Occupied bandwidth sample plot for 3 CC 10 MHz channel

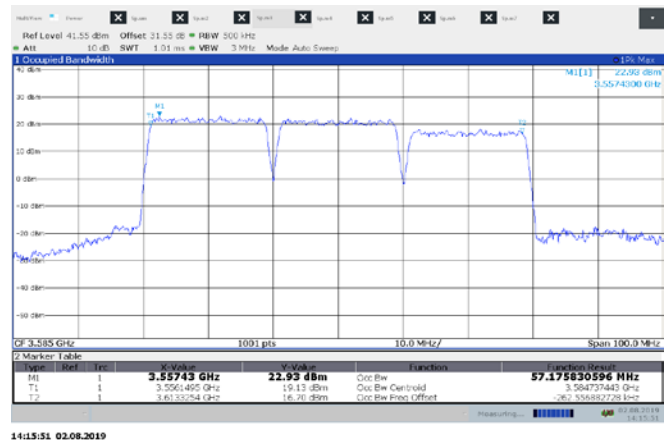


Figure 8.3-6: Occupied bandwidth sample plot for 3 CC 20 MHz channel

Specification

FCC Part 96 and FCC Part 2

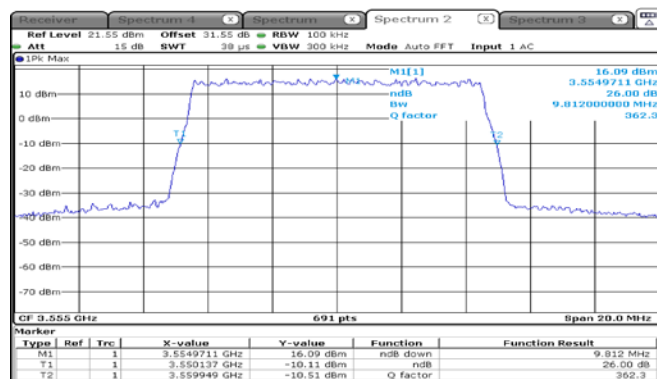


Figure 8.3-7: 26 dB bandwidth sample plot for 1 CC 10 MHz channel

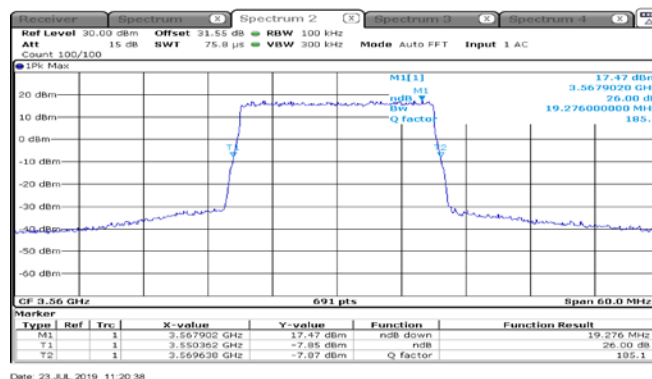


Figure 8.3-8: 26 dB bandwidth sample plot for 1CC 20 MHz channel

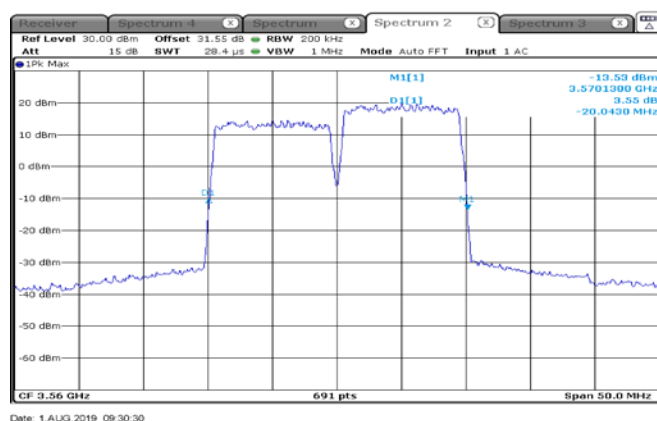


Figure 8.3-9: 26 dB bandwidth sample plot for 2 CC 10 MHz channel

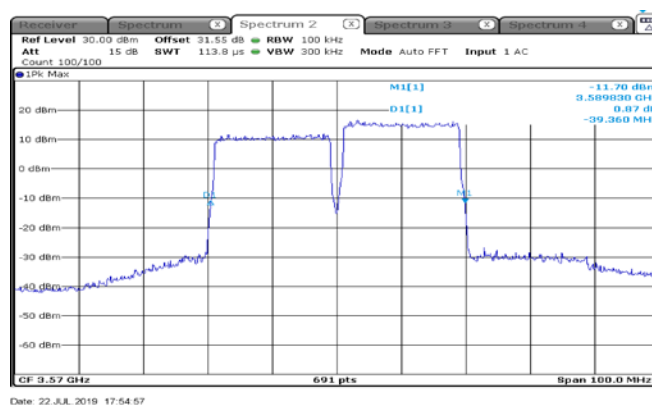


Figure 8.3-10: 26 dB bandwidth sample plot for 2CC 20 MHz channel

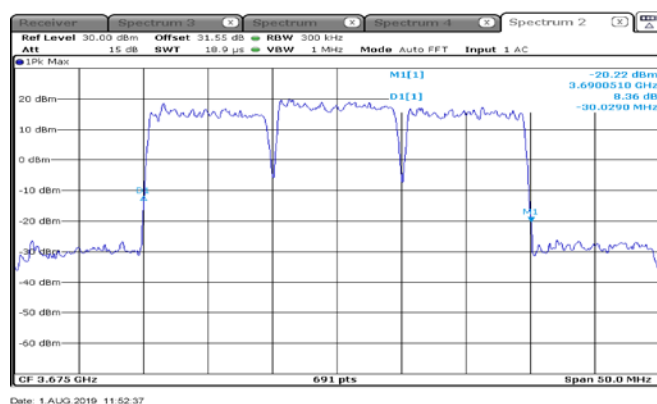


Figure 8.3-11: 26 dB bandwidth sample plot for 3 CC 10 MHz channel

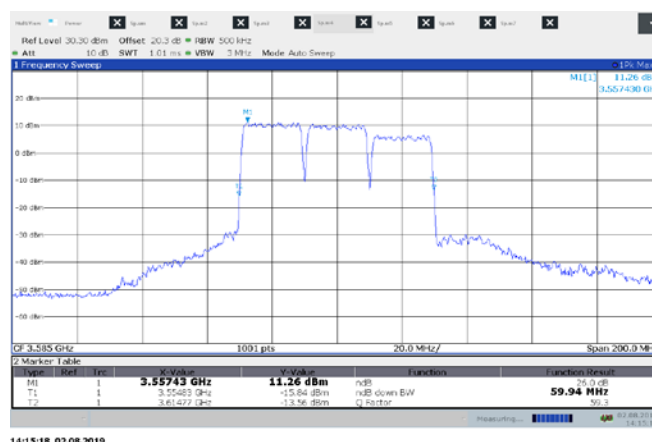


Figure 8.3-12: 26 dB bandwidth sample plot for 3 CC 20 MHz channel

8.4 FCC 96.41(e)(1) 3.5 GHz emissions and interference limits

8.4.1 Definitions and limits

General protection levels. Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0–10 MHz above the upper SAS-assigned channel edge and within 0–10 MHz below the lower SAS-assigned channel edge. At all frequencies greater than 10 MHz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed -25 dBm/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.

(3) Measurement procedure. (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (i.e., 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

8.4.2 Test summary

Test date	July 31, 2019
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8.4.3 Observations, settings and special notes

This test was performed at the antenna ports and radiated with both antennas terminated with 50 Ohm load.

EUT was transmitting from both antenna connectors at the maximum power settings.

Emission results for both QPSK and 64 QAM modulation are shown in table below

Spectrum analyser settings for measurements within 1 MHz from the SAS assigned channel edges:

Resolution bandwidth	1 % of occupied Bandwidth
Video bandwidth	3 × RBW
Detector mode	RMS
Trace mode	Power averaging

Spectrum analyser settings for measurements outside 1 MHz from the SAS assigned channel edges:

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Detector mode	RMS
Trace mode	Power averaging

8.4.4 Test data

Table 8.4-1: Emission mask measurements for sector o QPSK modulation

Antenna port	No of carriers	Channel & Bandwidth,MHz	Offset from the SAS assigned channel edges, MHz	Frequency of max emission, MHz	Emission level, dBm	Limit ¹ , dBm	Margin, dB
0	1	10(low)	>10	3540	-41.12	-28.00	13.12
1	1	10(low)	>10	3540	-40.98	-28.00	12.98
0	1	10(low)	0-1	3550	-32.04	-16.00	16.04
1	1	10(low)	0-1	3550	-32.95	-16.00	16.95
0	1	10(low)	0-1	3560	-32.72	-16.00	16.72
1	1	10(low)	0-1	3560	-31.57	-16.00	15.57
0	1	10(low)	>10	3570	-39.04	-28.00	11.04
1	1	10(low)	>10	3570	-39.38	-28.00	11.38
0	1	10(mid)	>10	3610	-38.30	-28.00	10.30
1	1	10(mid)	>10	3610	-39.25	-28.00	11.25
0	1	10(mid)	0-1	3620	-31.63	-16.00	15.63
1	1	10(mid)	0-1	3620	-34.62	-16.00	18.62
0	1	10(mid)	0-1	3630	-30.13	-16.00	14.13
1	1	10(mid)	0-1	3630	-32.33	-16.00	16.33
0	1	10(mid)	>10	3640	-38.43	-28.00	10.43
1	1	10(mid)	>10	3640	-40.04	-28.00	12.04
0	1	10(high)	>10	3680	-38.03	-28.00	10.03
1	1	10(high)	>10	3680	-39.02	-28.00	11.02
0	1	10(high)	0-1	3690	-31.57	-16.00	15.57
1	1	10(high)	0-1	3690	-31.64	-16.00	15.64
0	1	10(high)	0-1	3700	-32.39	-16.00	16.39
1	1	10(high)	0-1	3700	-33.05	-16.00	17.05
0	1	10(high)	>10	3710	-40.17	-28.00	12.17
1	1	10(high)	>10	3710	-40.33	-28.00	12.33
0	1	20(low)	>10	3540	-32.66	-28.00	4.66
1	1	20(low)	>10	3540	-33.15	-28.00	5.15
0	1	20(low)	0-1	3550	-38.68	-16.00	22.68
1	1	20(low)	0-1	3550	-38.19	-16.00	22.19
0	1	20(low)	0-1	3570	-37.39	-16.00	21.39
1	1	20(low)	0-1	3570	-37.79	-16.00	21.79
0	1	20(low)	>10	3580	-29.64	-28.00	1.64
1	1	20(low)	>10	3580	-28.99	-28.00	0.99
0	1	20(mid)	>10	3605	-31.30	-28.00	3.30
1	1	20(mid)	>10	3605	-30.33	-28.00	2.33
0	1	20(mid)	0-1	3615	-38.29	-16.00	22.29
1	1	20(mid)	0-1	3615	-37.80	-16.00	21.80
0	1	20(mid)	0-1	3635	-37.86	-16.00	21.86
1	1	20(mid)	0-1	3635	-37.91	-16.00	21.91
0	1	20(mid)	>10	3645	-29.44	-28.00	1.44
1	1	20(mid)	>10	3645	-30.03	-28.00	2.03
0	1	20(high)	>10	3670	-28.89	-28.00	0.89
1	1	20(high)	>10	3670	-28.12	-28.00	0.12
0	1	20(high)	0-1	3680	-34.83	-16.00	18.83
1	1	20(high)	0-1	3680	-34.83	-16.00	18.83
0	1	20(high)	0-1	3700	-35.28	-16.00	19.28
1	1	20(high)	0-1	3700	-36.45	-16.00	20.45
0	1	20(high)	>10	3710	-28.93	-28.00	0.93
1	1	20(high)	>10	3710	-30.26	-28.00	2.26

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above.

Table 8.4-2: Emission mask measurements for sector 1 QPSK modulation 1CC results

Antenna port	No of carriers	Channel & Bandwidth,MHz	Offset from the SAS assigned channel edges, MHz	Frequency of max emission, MHz	Emission level, dBm	Limit ¹ , dBm	Margin, dB
0	1	10(low)	>10	3540	-47.81	-28.00	19.81
1	1	10(low)	>10	3540	-45.18	-28.00	17.18
0	1	10(low)	0-1	3550	-34.74	-16.00	18.74
1	1	10(low)	0-1	3550	-34.62	-16.00	18.62
0	1	10(low)	0-1	3560	-33.89	-16.00	17.89
1	1	10(low)	0-1	3560	-30.87	-16.00	14.87
0	1	10(low)	>10	3570	-45.91	-28.00	17.91
1	1	10(low)	>10	3570	-43.31	-28.00	15.31
0	1	10(mid)	>10	3610	-46.66	-28.00	18.66
1	1	10(mid)	>10	3610	-43.83	-28.00	15.83
0	1	10(mid)	0-1	3620	-34.05	-16.00	18.05
1	1	10(mid)	0-1	3620	-32.70	-16.00	16.70
0	1	10(mid)	0-1	3630	-32.88	-16.00	16.88
1	1	10(mid)	0-1	3630	-28.64	-16.00	12.64
0	1	10(mid)	>10	3640	-46.48	-28.00	18.48
1	1	10(mid)	>10	3640	-43.20	-28.00	15.20
0	1	10(high)	>10	3680	-43.83	-28.00	15.83
1	1	10(high)	>10	3680	-43.78	-28.00	15.78
0	1	10(high)	0-1	3690	-29.60	-16.00	13.60
1	1	10(high)	0-1	3690	-30.34	-16.00	14.34
0	1	10(high)	0-1	3700	-25.82	-16.00	9.82
1	1	10(high)	0-1	3700	-28.87	-16.00	12.87
0	1	10(high)	>10	3710	-44.62	-28.00	16.62
1	1	10(high)	>10	3710	-45.27	-28.00	17.27
0	1	20(low)	>10	3540	-36.68	-28.00	8.68
1	1	20(low)	>10	3540	-39.33	-28.00	11.33
0	1	20(low)	0-1	3550	-24.96	-16.00	8.96
1	1	20(low)	0-1	3550	-37.68	-16.00	21.68
0	1	20(low)	0-1	3570	-38.16	-16.00	22.16
1	1	20(low)	0-1	3570	-38.39	-16.00	22.39
0	1	20(low)	>10	3580	-38.75	-28.00	10.75
1	1	20(low)	>10	3580	-39.71	-28.00	11.71
0	1	20(mid)	>10	3605	-47.31	-28.00	19.31
1	1	20(mid)	>10	3605	-32.00	-28.00	4.00
0	1	20(mid)	0-1	3615	-39.82	-16.00	23.82
1	1	20(mid)	0-1	3615	-35.56	-16.00	19.56
0	1	20(mid)	0-1	3635	-40.43	-16.00	24.43
1	1	20(mid)	0-1	3635	-40.43	-16.00	24.43
0	1	20(mid)	>10	3645	-41.89	-28.00	13.89
1	1	20(mid)	>10	3645	-39.86	-28.00	11.86
0	1	20(high)	>10	3670	-33.72	-28.00	5.72
1	1	20(high)	>10	3670	-34.05	-28.00	6.05
0	1	20(high)	0-1	3680	-23.75	-16.00	7.75
1	1	20(high)	0-1	3680	-28.03	-16.00	12.03
0	1	20(high)	0-1	3700	-39.21	-16.00	23.21
1	1	20(high)	0-1	3700	-40.26	-16.00	24.26
0	1	20(high)	>10	3710	-40.70	-28.00	12.70
1	1	20(high)	>10	3710	-44.33	-28.00	16.33

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above

Table 8.4-3: Emission mask measurements for sector 1 QPSK modulation 2CC results

Antenna port	No of carriers	Channel & Bandwidth,MHz	Offset from the SAS assigned channel edges, MHz	Frequency of max emission, MHz	Emission level, dBm	Limit ¹ , dBm	Margin, dB
0	2	20(low)	>10	3540	-44.60	-28.00	16.60
1	2	20(low)	>10	3540	-43.77	-28.00	15.77
0	2	20(low)	0-1	3550	-35.15	-16.00	19.15
1	2	20(low)	0-1	3550	-31.85	-16.00	15.85
0	2	20(low)	0-1	3570	-24.65	-16.00	8.65
1	2	20(low)	0-1	3570	-24.69	-16.00	8.69
0	2	20(low)	>10	3580	-41.41	-28.00	13.41
1	2	20(low)	>10	3580	-39.94	-28.00	11.94
0	2	20(mid)	>10	3610	-42.77	-28.00	14.77
1	2	20(mid)	>10	3610	-37.63	-28.00	9.63
0	2	20(mid)	0-1	3620	-30.79	-16.00	14.79
1	2	20(mid)	0-1	3620	-33.76	-16.00	17.76
0	2	20(mid)	0-1	3640	-25.82	-16.00	9.82
1	2	20(mid)	0-1	3640	-27.65	-16.00	11.65
0	2	20(mid)	>10	3650	-41.94	-28.00	13.94
1	2	20(mid)	>10	3650	-36.92	-28.00	8.92
0	2	20(high)	>10	3670	-38.13	-28.00	10.13
1	2	20(high)	>10	3670	-39.74	-28.00	11.74
0	2	20(high)	0-1	3680	-31.78	-16.00	15.78
1	2	20(high)	0-1	3680	-31.86	-16.00	15.86
0	2	20(high)	0-1	3700	-28.71	-16.00	12.71
1	2	20(high)	0-1	3700	-28.42	-16.00	12.42
0	2	20(high)	>10	3710	-36.67	-28.00	8.67
1	2	20(high)	>10	3710	-38.91	-28.00	10.91
0	2	40(low)	>10	3540	-40.20	-28.00	12.20
1	2	40(low)	>10	3540	-31.04	-28.00	3.04
0	2	40(low)	0-1	3550	-34.25	-16.00	18.25
1	2	40(low)	0-1	3550	-27.31	-16.00	11.31
0	2	40(low)	0-1	3590	-26.86	-16.00	10.86
1	2	40(low)	0-1	3590	-28.37	-16.00	12.37
0	2	40(low)	>10	3600	-36.45	-28.00	8.45
1	2	40(low)	>10	3600	-30.15	-28.00	2.15
0	2	40(mid)	>10	3595	-35.72	-28.00	7.72
1	2	40(mid)	>10	3595	-32.13	-28.00	4.13
0	2	40(mid)	0-1	3605	-28.93	-16.00	12.93
1	2	40(mid)	0-1	3605	-39.92	-16.00	23.92
0	2	40(mid)	0-1	3645	-26.83	-16.00	10.83
1	2	40(mid)	0-1	3645	-39.81	-16.00	23.81
0	2	40(mid)	>10	3655	-32.23	-28.00	4.23
1	2	40(mid)	>10	3655	-30.07	-28.00	2.07
0	2	40(high)	>10	3650	-32.39	-28.00	4.39
1	2	40(high)	>10	3650	-28.97	-28.00	0.97
0	2	40(high)	0-1	3660	-28.90	-16.00	12.90
1	2	40(high)	0-1	3660	-39.23	-16.00	23.23
0	2	40(high)	0-1	3700	-28.84	-16.00	12.84
1	2	40(high)	0-1	3700	-40.79	-16.00	24.79
0	2	40(high)	>10	3710	-31.04	-28.00	3.04
1	2	40(high)	>10	3710	-30.46	-28.00	2.46

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above

Table 8.4-4: Emission mask measurements for sector 1 QPSK modulation 3CC results

Antenna port	No of carriers	Channel & Bandwidth,MHz	Offset from the SAS assigned channel edges, MHz	Frequency of max emission, MHz	Emission level, dBm	Limit ¹ , dBm	Margin, dB
0	3	30(low)	>10	3550	-31.40	-28.00	3.40
1	3	30(low)	>10	3550	-32.67	-28.00	4.67
0	3	30(low)	0-1	3560	-23.76	-16.00	7.76
1	3	30(low)	0-1	3560	-24.40	-16.00	8.40
0	3	30(low)	0-1	3590	-27.99	-16.00	11.99
1	3	30(low)	0-1	3590	-25.56	-16.00	9.56
0	3	30(low)	>10	3600	-33.70	-28.00	5.70
1	3	30(low)	>10	3600	-34.19	-28.00	6.19
0	3	30(mid)	>10	3600	-39.84	-28.00	11.84
1	3	30(mid)	>10	3600	-37.89	-28.00	9.89
0	3	30(mid)	0-1	3610	-28.17	-16.00	12.17
1	3	30(mid)	0-1	3610	-26.83	-16.00	10.83
0	3	30(mid)	0-1	3640	-24.31	-16.00	8.31
1	3	30(mid)	0-1	3640	-24.09	-16.00	8.09
0	3	30(mid)	>10	3650	-37.53	-28.00	9.53
1	3	30(mid)	>10	3650	-37.69	-28.00	9.69
0	3	30(high)	>10	3650	-33.11	-28.00	5.11
1	3	30(high)	>10	3650	-35.29	-28.00	7.29
0	3	30(high)	0-1	3660	-27.71	-16.00	11.71
1	3	30(high)	0-1	3660	-26.42	-16.00	10.42
0	3	30(high)	0-1	3690	-23.86	-16.00	7.86
1	3	30(high)	0-1	3690	-22.67	-16.00	6.67
0	3	30(high)	>10	3700	-33.44	-28.00	5.44
1	3	30(high)	>10	3700	-35.16	-28.00	7.16
0	3	60(low)	>10	3545	-32.88	-28.00	4.88
1	3	60(low)	>10	3545	-32.68	-28.00	4.68
0	3	60(low)	0-1	3555	-29.06	-16.00	13.06
1	3	60(low)	0-1	3555	-41.20	-16.00	25.20
0	3	60(low)	0-1	3615	-29.61	-16.00	13.61
1	3	60(low)	0-1	3615	-41.93	-16.00	25.93
0	3	60(low)	>10	3625	-31.85	-28.00	3.85
1	3	60(low)	>10	3625	-31.25	-28.00	3.25
0	3	60(mid)	>10	3585	-29.56	-28.00	1.56
1	3	60(mid)	>10	3585	-28.98	-28.00	0.98
0	3	60(mid)	0-1	3595	-28.81	-16.00	12.81
1	3	60(mid)	0-1	3595	-40.53	-16.00	24.53
0	3	60(mid)	0-1	3655	-29.74	-16.00	13.74
1	3	60(mid)	0-1	3655	-42.77	-16.00	26.77
0	3	60(mid)	>10	3665	-33.43	-28.00	5.43
1	3	60(mid)	>10	3665	-31.70	-28.00	3.70
0	3	60(high)	>10	3625	-31.27	-28.00	3.27
1	3	60(high)	>10	3625	-28.35	-28.00	0.35
0	3	60(high)	0-1	3635	-27.30	-16.00	11.30
1	3	60(high)	0-1	3635	-24.37	-16.00	8.37
0	3	60(high)	0-1	3695	-32.89	-16.00	16.89
1	3	60(high)	0-1	3695	-45.11	-16.00	29.11
0	3	60(high)	>10	3705	-31.04	-28.00	3.04
1	3	60(high)	>10	3705	-30.08	-28.00	2.08

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above

Table 8.4-5: Emission mask measurements for sector 1 QPSK modulation 3CC additional frequency results

Antenna port	No of carriers	Channel & Bandwidth,MHz	Offset from the SAS assigned channel edges, MHz	Frequency of max emission, MHz	Emission level, dBm	Limit ¹ , dBm	Margin, dB
0	3	60(low)	>10	3560	-28.55	-28.00	0.55
1	3	60(low)	>10	3560	-28.25	-28.00	0.25
0	3	60(low)	0-1	3570	-27.38	-16.00	11.38
1	3	60(low)	0-1	3570	-26.11	-16.00	10.11
0	3	60(low)	0-1	3630	-25.46	-16.00	9.46
1	3	60(low)	0-1	3630	-26.52	-16.00	10.52
0	3	60(low)	>10	3640	-29.90	-28.00	1.90
1	3	60(low)	>10	3640	-29.05	-28.00	1.05
0	3	60(high)	>10	3610	-28.25	-28.00	0.25
1	3	60(high)	>10	3610	-29.23	-28.00	1.23
0	3	60(high)	0-1	3620	-26.72	-16.00	10.72
1	3	60(high)	0-1	3620	-25.83	-16.00	9.83
0	3	60(high)	0-1	3680	-24.57	-16.00	8.57
1	3	60(high)	0-1	3680	-27.74	-16.00	11.74
0	3	60(high)	>10	3690	-28.10	-28.00	0.10
1	3	60(high)	>10	3690	-29.15	-28.00	1.15

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above

Table 8.4-6: Emission mask measurements for sector 2 QPSK modulation 1CC results

Antenna port	No of carriers	Channel & Bandwidth,MHz	Offset from the SAS assigned channel edges, MHz	Frequency of max emission, MHz	Emission level, dBm	Limit ¹ , dBm	Margin, dB
0	1	10(low)	>10	3540	-41.67	-28.00	13.67
1	1	10(low)	>10	3540	-40.06	-28.00	12.06
0	1	10(low)	0-1	3550	-31.18	-16.00	15.18
1	1	10(low)	0-1	3550	-31.58	-16.00	15.58
0	1	10(low)	0-1	3560	-31.84	-16.00	15.84
1	1	10(low)	0-1	3560	-30.44	-16.00	14.44
0	1	10(low)	>10	3570	-38.42	-28.00	10.42
1	1	10(low)	>10	3570	-37.81	-28.00	9.81
0	1	10(mid)	>10	3610	-39.21	-28.00	11.21
1	1	10(mid)	>10	3610	-36.67	-28.00	8.67
0	1	10(mid)	0-1	3620	-31.71	-16.00	15.71
1	1	10(mid)	0-1	3620	-31.05	-16.00	15.05
0	1	10(mid)	0-1	3630	-30.62	-16.00	14.62
1	1	10(mid)	0-1	3630	-30.71	-16.00	14.71
0	1	10(mid)	>10	3640	-39.58	-28.00	11.58
1	1	10(mid)	>10	3640	-36.89	-28.00	8.89
0	1	10(high)	>10	3680	-39.21	-28.00	11.21
1	1	10(high)	>10	3680	-36.56	-28.00	8.56
0	1	10(high)	0-1	3690	-26.99	-16.00	10.99
1	1	10(high)	0-1	3690	-32.53	-16.00	16.53
0	1	10(high)	0-1	3700	-25.82	-16.00	9.82
1	1	10(high)	0-1	3700	-32.54	-16.00	16.54
0	1	10(high)	>10	3710	-38.61	-28.00	10.61
1	1	10(high)	>10	3710	-40.23	-28.00	12.23
0	1	20(low)	>10	3540	-31.21	-28.00	3.21
1	1	20(low)	>10	3540	-30.58	-28.00	2.58
0	1	20(low)	0-1	3550	-35.97	-16.00	19.97
1	1	20(low)	0-1	3550	-35.56	-16.00	19.56
0	1	20(low)	0-1	3570	-35.48	-16.00	19.48
1	1	20(low)	0-1	3570	-35.78	-16.00	19.78
0	1	20(low)	>10	3580	-28.42	-28.00	0.42
1	1	20(low)	>10	3580	-28.51	-28.00	0.51
0	1	20(mid)	>10	3605	-31.19	-28.00	3.19
1	1	20(mid)	>10	3605	-31.22	-28.00	3.22
0	1	20(mid)	0-1	3615	-37.83	-16.00	21.83
1	1	20(mid)	0-1	3615	-37.90	-16.00	21.90
0	1	20(mid)	0-1	3635	-37.79	-16.00	21.79
1	1	20(mid)	0-1	3635	-37.11	-16.00	21.11
0	1	20(mid)	>10	3645	-28.91	-28.00	0.91
1	1	20(mid)	>10	3645	-30.23	-28.00	2.23
0	1	20(high)	>10	3670	-30.81	-28.00	2.81
1	1	20(high)	>10	3670	-28.12	-28.00	0.12
0	1	20(high)	0-1	3680	-25.68	-16.00	9.68
1	1	20(high)	0-1	3680	-26.88	-16.00	10.88
0	1	20(high)	0-1	3700	-28.70	-16.00	12.70
1	1	20(high)	0-1	3700	-27.03	-16.00	11.03
0	1	20(high)	>10	3710	-29.37	-28.00	1.37
1	1	20(high)	>10	3710	-29.25	-28.00	1.25

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above.

Table 8.4-7: Emission mask measurements for sector 1 64 QAM modulation 1CC results

Antenna port	No of carriers	Channel & Bandwidth,MHz	Offset from the SAS assigned channel edges, MHz	Frequency of max emission, MHz	Emission level, dBm	Limit ¹ , dBm	Margin, dB
0	1	10(low)	>10	3540	-45.03	-28.00	17.03
1	1	10(low)	>10	3540	-44.53	-28.00	16.53
0	1	10(low)	0-1	3550	-29.09	-16.00	13.09
1	1	10(low)	0-1	3550	-27.98	-16.00	11.98
0	1	10(low)	0-1	3560	-34.08	-16.00	18.08
1	1	10(low)	0-1	3560	-30.35	-16.00	14.35
0	1	10(low)	>10	3570	-43.92	-28.00	15.92
1	1	10(low)	>10	3570	-43.47	-28.00	15.47
0	1	10(mid)	>10	3610	-43.36	-28.00	15.36
1	1	10(mid)	>10	3610	-43.40	-28.00	15.4
0	1	10(mid)	0-1	3620	-28.42	-16.00	12.42
1	1	10(mid)	0-1	3620	-28.15	-16.00	12.15
0	1	10(mid)	0-1	3630	-32.60	-16.00	16.6
1	1	10(mid)	0-1	3630	-31.33	-16.00	15.33
0	1	10(mid)	>10	3640	-44.12	-28.00	16.12
1	1	10(mid)	>10	3640	-43.20	-28.00	15.2
0	1	10(high)	>10	3680	-43.69	-28.00	15.69
1	1	10(high)	>10	3680	-44.19	-28.00	16.19
0	1	10(high)	0-1	3690	-26.55	-16.00	10.55
1	1	10(high)	0-1	3690	-27.34	-16.00	11.34
0	1	10(high)	0-1	3700	-33.92	-16.00	17.92
1	1	10(high)	0-1	3700	-34.88	-16.00	18.88
0	1	10(high)	>10	3710	-44.87	-28.00	16.87
1	1	10(high)	>10	3710	-45.36	-28.00	17.36
0	1	20(low)	>10	3540	-39.03	-28.00	11.03
1	1	20(low)	>10	3540	-38.73	-28.00	10.73
0	1	20(low)	0-1	3550	-31.83	-16.00	15.83
1	1	20(low)	0-1	3550	-33.91	-16.00	17.91
0	1	20(low)	0-1	3570	-33.43	-16.00	17.43
1	1	20(low)	0-1	3570	-29.83	-16.00	13.83
0	1	20(low)	>10	3580	-39.71	-28.00	11.71
1	1	20(low)	>10	3580	-38.36	-28.00	10.36
0	1	20(mid)	>10	3605	-36.07	-28.00	8.07
1	1	20(mid)	>10	3605	-36.01	-28.00	8.01
0	1	20(mid)	0-1	3615	-31.70	-16.00	15.7
1	1	20(mid)	0-1	3615	-29.39	-16.00	13.39
0	1	20(mid)	0-1	3635	-32.09	-16.00	16.09
1	1	20(mid)	0-1	3635	-30.68	-16.00	14.68
0	1	20(mid)	>10	3645	-38.18	-28.00	10.18
1	1	20(mid)	>10	3645	-37.68	-28.00	9.68
0	1	20(high)	>10	3670	-34.39	-28.00	6.39
1	1	20(high)	>10	3670	-35.23	-28.00	7.23
0	1	20(high)	0-1	3680	-29.09	-16.00	13.09
1	1	20(high)	0-1	3680	-29.54	-16.00	13.54
0	1	20(high)	0-1	3700	-31.42	-16.00	15.42
1	1	20(high)	0-1	3700	-31.28	-16.00	15.28
0	1	20(high)	>10	3710	-37.67	-28.00	9.67
1	1	20(high)	>10	3710	-38.29	-28.00	10.29

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above. For this modulation results are shown only sector1 since other sector results are repetitive and further investigated to be well within limits..

Table 8.4-8: Emission mask measurements for sector 1 64 QAM modulation 2CC results

Antenna port	No of carriers	Channel & Bandwidth,MHz	Offset from the SAS assigned channel edges, MHz	Frequency of max emission, MHz	Emission level, dBm	Limit ¹ , dBm	Margin, dB
0	2	20(low)	>10	3540	-46.88	-28.00	18.88
1	2	20(low)	>10	3540	-42.97	-28.00	14.97
0	2	20(low)	0-1	3550	-30.20	-16.00	14.2
1	2	20(low)	0-1	3550	-30.81	-16.00	14.81
0	2	20(low)	0-1	3570	-30.48	-16.00	14.48
1	2	20(low)	0-1	3570	-27.69	-16.00	11.69
0	2	20(low)	>10	3580	-41.58	-28.00	13.58
1	2	20(low)	>10	3580	-39.20	-28.00	11.2
0	2	20(mid)	>10	3610	-41.60	-28.00	13.6
1	2	20(mid)	>10	3610	-40.25	-28.00	12.25
0	2	20(mid)	0-1	3620	-28.67	-16.00	12.67
1	2	20(mid)	0-1	3620	-27.53	-16.00	11.53
0	2	20(mid)	0-1	3640	-29.94	-16.00	13.94
1	2	20(mid)	0-1	3640	-29.54	-16.00	13.54
0	2	20(mid)	>10	3650	-39.01	-28.00	11.01
1	2	20(mid)	>10	3650	-38.27	-28.00	10.27
0	2	20(high)	>10	3670	-40.33	-28.00	12.33
1	2	20(high)	>10	3670	-40.21	-28.00	12.21
0	2	20(high)	0-1	3680	-31.35	-16.00	15.35
1	2	20(high)	0-1	3680	-32.10	-16.00	16.10
0	2	20(high)	0-1	3700	-30.43	-16.00	14.43
1	2	20(high)	0-1	3700	-31.15	-16.00	15.15
0	2	20(high)	>10	3710	-38.26	-28.00	10.26
1	2	20(high)	>10	3710	-39.02	-28.00	11.02
0	2	40(low)	>10	3540	-36.00	-28.00	8.00
1	2	40(low)	>10	3540	-34.46	-28.00	6.46
0	2	40(low)	0-1	3550	-28.62	-16.00	12.62
1	2	40(low)	0-1	3550	-25.82	-16.00	9.82
0	2	40(low)	0-1	3590	-27.44	-16.00	11.44
1	2	40(low)	0-1	3590	-23.27	-16.00	7.27
0	2	40(low)	>10	3600	-35.26	-28.00	7.26
1	2	40(low)	>10	3600	-29.04	-28.00	1.04
0	2	40(mid)	>10	3595	-31.27	-28.00	3.27
1	2	40(mid)	>10	3595	-30.25	-28.00	2.25
0	2	40(mid)	0-1	3605	-27.76	-16.00	11.76
1	2	40(mid)	0-1	3605	-27.79	-16.00	11.79
0	2	40(mid)	0-1	3645	-26.19	-16.00	10.19
1	2	40(mid)	0-1	3645	-25.88	-16.00	9.88
0	2	40(mid)	>10	3655	-30.18	-28.00	2.18
1	2	40(mid)	>10	3655	-28.56	-28.00	0.56
0	2	40(high)	>10	3650	-29.02	-28.00	1.02
1	2	40(high)	>10	3650	-29.00	-28.00	1.00
0	2	40(high)	0-1	3660	-26.82	-16.00	10.82
1	2	40(high)	0-1	3660	-25.62	-16.00	9.62
0	2	40(high)	0-1	3700	-23.48	-16.00	7.48
1	2	40(high)	0-1	3700	-26.40	-16.00	10.4
0	2	40(high)	>10	3710	-30.23	-28.00	2.23
1	2	40(high)	>10	3710	-30.69	-28.00	2.69

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above

Table 8.4-9: Emission mask measurements for sector 1 64 QAM modulation 3CC results

Antenna port	No of carriers	Channel & Bandwidth,MHz	Offset from the SAS assigned channel edges, MHz	Frequency of max emission, MHz	Emission level, dBm	Limit ¹ , dBm	Margin, dB
0	3	30(low)	>10	3550	-35.28	-28.00	7.28
1	3	30(low)	>10	3550	-38.17	-28.00	10.17
0	3	30(low)	0-1	3560	-26.49	-16.00	10.49
1	3	30(low)	0-1	3560	-28.07	-16.00	12.07
0	3	30(low)	0-1	3590	-36.90	-16.00	20.9
1	3	30(low)	0-1	3590	-36.20	-16.00	20.2
0	3	30(low)	>10	3600	-39.22	-28.00	11.22
1	3	30(low)	>10	3600	-37.36	-28.00	9.36
0	3	30(mid)	>10	3600	-35.42	-28.00	7.42
1	3	30(mid)	>10	3600	-34.44	-28.00	6.44
0	3	30(mid)	0-1	3610	-28.24	-16.00	12.24
1	3	30(mid)	0-1	3610	-29.00	-16.00	13
0	3	30(mid)	0-1	3640	-33.78	-16.00	17.78
1	3	30(mid)	0-1	3640	-35.40	-16.00	19.4
0	3	30(mid)	>10	3650	-37.56	-28.00	9.56
1	3	30(mid)	>10	3650	-33.36	-28.00	5.36
0	3	30(high)	>10	3650	-37.46	-28.00	9.46
1	3	30(high)	>10	3650	-35.50	-28.00	7.50
0	3	30(high)	0-1	3660	-29.44	-16.00	13.44
1	3	30(high)	0-1	3660	-26.58	-16.00	10.58
0	3	30(high)	0-1	3690	-35.23	-16.00	19.23
1	3	30(high)	0-1	3690	-35.15	-16.00	19.15
0	3	30(high)	>10	3700	-36.79	-28.00	8.79
1	3	30(high)	>10	3700	-35.31	-28.00	7.31
0	3	60(low)	>10	3545	-30.01	-28.00	2.01
1	3	60(low)	>10	3545	-33.08	-28.00	5.08
0	3	60(low)	0-1	3555	-29.60	-16.00	13.6
1	3	60(low)	0-1	3555	-31.68	-16.00	15.68
0	3	60(low)	0-1	3615	-29.94	-16.00	13.94
1	3	60(low)	0-1	3615	-29.48	-16.00	13.48
0	3	60(low)	>10	3625	-32.39	-28.00	4.39
1	3	60(low)	>10	3625	-30.18	-28.00	2.18
0	3	60(mid)	>10	3585	-28.56	-28.00	0.56
1	3	60(mid)	>10	3585	-28.59	-28.00	0.59
0	3	60(mid)	0-1	3595	-28.93	-16.00	12.93
1	3	60(mid)	0-1	3595	-28.91	-16.00	12.91
0	3	60(mid)	0-1	3655	-26.11	-16.00	10.11
1	3	60(mid)	0-1	3655	-26.25	-16.00	10.25
0	3	60(mid)	>10	3665	-29.91	-28.00	1.91
1	3	60(mid)	>10	3665	-30.82	-28.00	2.82
0	3	60(high)	>10	3625	-29.98	-28.00	1.98
1	3	60(high)	>10	3625	-28.71	-28.00	0.71
0	3	60(high)	0-1	3635	-28.25	-16.00	12.25
1	3	60(high)	0-1	3635	-26.78	-16.00	10.78
0	3	60(high)	0-1	3695	-30.33	-16.00	14.33
1	3	60(high)	0-1	3695	-31.73	-16.00	15.73
0	3	60(high)	>10	3705	-31.95	-28.00	3.95
1	3	60(high)	>10	3705	-32.24	-28.00	4.24

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above

Table 8.4-10: Emission mask measurements for sector 1 3CC 64 QAM modulation additional frequency results

Antenna port	No of carriers	Channel & Bandwidth,MHz	Offset from the SAS assigned channel edges, MHz	Frequency of max emission, MHz	Emission level, dBm	Limit ¹ , dBm	Margin, dB
0	3	60(low)	>10	3560	-29.13	-28.00	1.13
1	3	60(low)	>10	3560	-28.67	-28.00	0.67
0	3	60(low)	0-1	3570	-31.83	-16.00	15.83
1	3	60(low)	0-1	3570	-28.88	-16.00	12.88
0	3	60(low)	0-1	3630	-29.60	-16.00	13.6
1	3	60(low)	0-1	3630	-27.08	-16.00	11.08
0	3	60(low)	>10	3640	-31.33	-28.00	3.33
1	3	60(low)	>10	3640	-29.63	-28.00	1.63
0	3	60(high)	>10	3610	-28.10	-28.00	0.10
1	3	60(high)	>10	3610	-28.13	-28.00	0.13
0	3	60(high)	0-1	3620	-25.27	-16.00	9.27
1	3	60(high)	0-1	3620	-24.99	-16.00	8.99
0	3	60(high)	0-1	3680	-27.18	-16.00	11.18
1	3	60(high)	0-1	3680	-26.64	-16.00	10.64
0	3	60(high)	>10	3690	-28.91	-28.00	0.91
1	3	60(high)	>10	3690	-28.79	-28.00	0.79

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above

Section 8
Test name
Specification

Testing data
 FCC 96.41(e)(1) 3.5 GHz emissions and interference limits
 FCC Part 96, FCC Part 2.1051 and FCC Part 2.1053

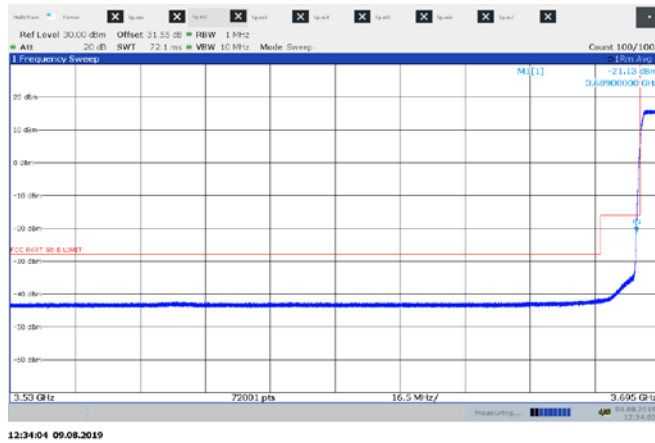


Figure 8.4-1: Emission measurement outside 10 MHz and within 1-10 MHz low end from the SAS assigned channel edge, sample plot for 1CC 10 MHz channel

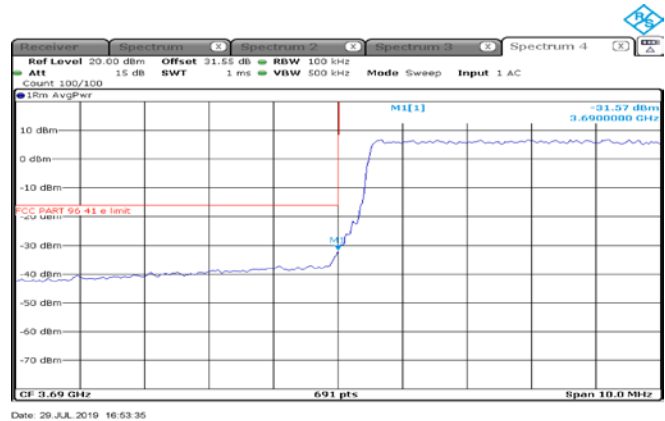


Figure 8.4-2: Emission measurement within 0-1 MHz low end from the SAS assigned channel edge, sample plot for 1CC 10 MHz channel

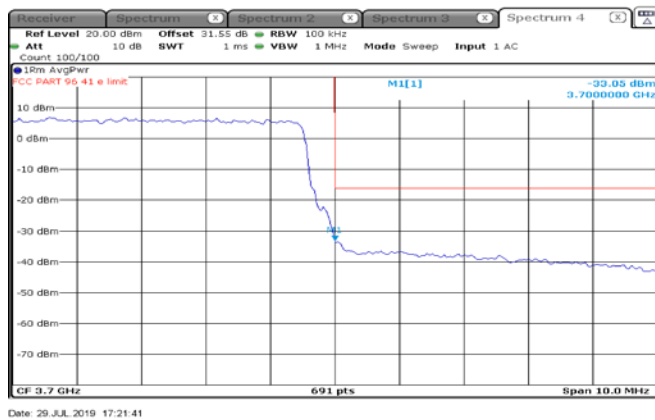


Figure 8.4-3: Emission measurement within 0-1 MHz high end from the SAS assigned channel edge, sample plot for 1CC 10 MHz channel

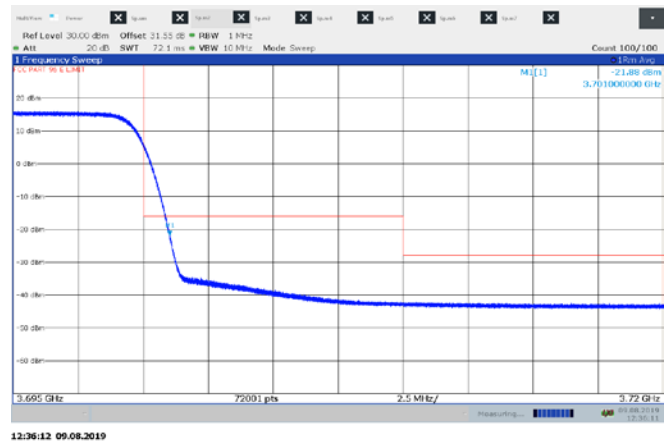


Figure 8.4-4: Emission measurement within 1-10 MHz and outside 10 MHz high end from the SAS assigned channel edge, sample plot for 1CC 10 MHz channel

Section 8
Test name
Specification

Testing data
 FCC 96.41(e)(1) 3.5 GHz emissions and interference limits
 FCC Part 96, FCC Part 2.1051 and FCC Part 2.1053

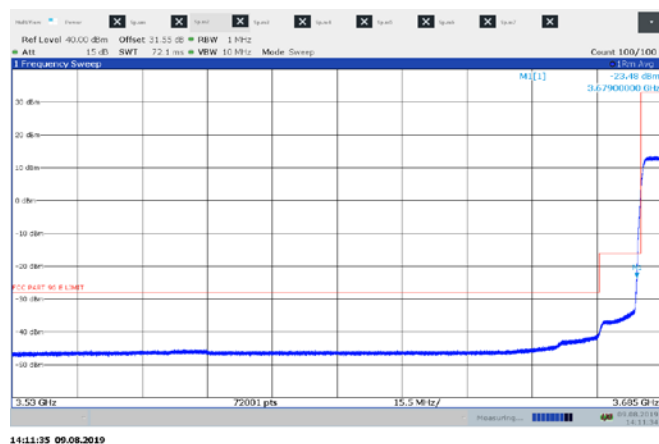


Figure 8.4-5: Emission measurement outside 10 MHz and within 1-10 MHz low end from the SAS assigned channel edge, sample plot for 2CC 10 MHz channel

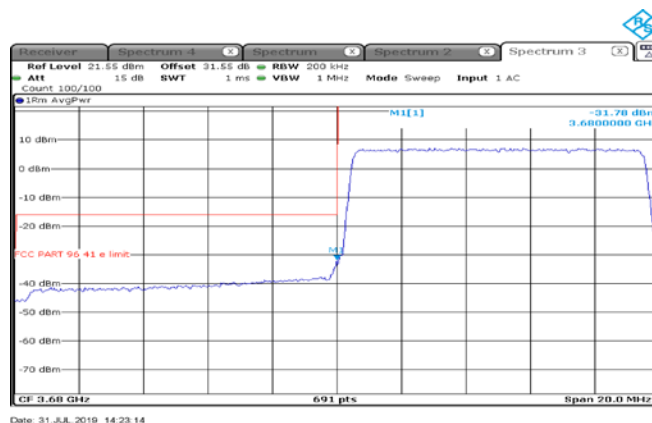


Figure 8.4-6: Emission measurement within 0-1 MHz low end from the SAS assigned channel edge, sample plot for 2CC 10 MHz channel

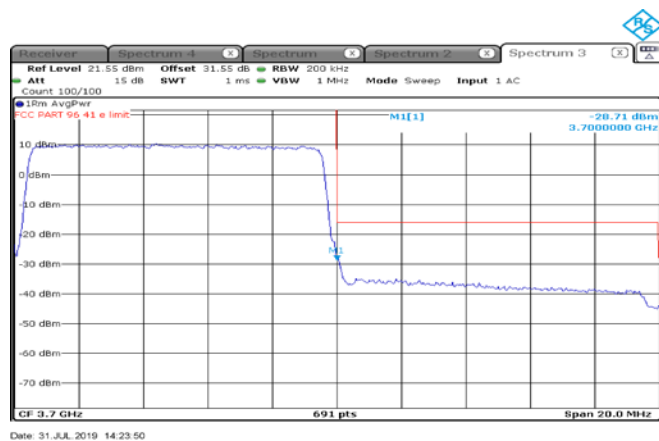


Figure 8.4-7: Emission measurement within 0-1 MHz high end from the SAS assigned channel edge, sample plot for 2CC 10 MHz channel

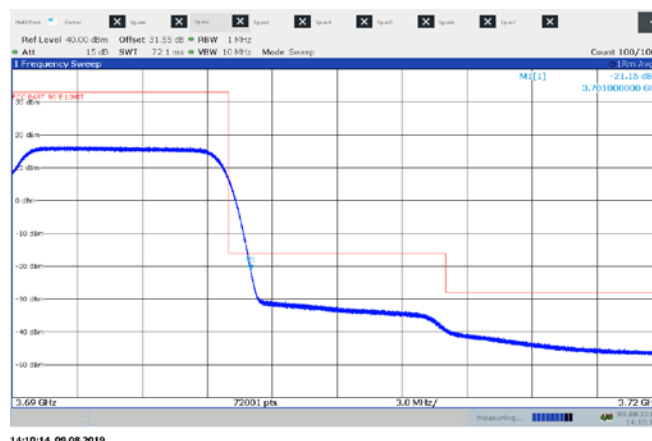


Figure 8.4-8: Emission measurement within 1-10 MHz and outside 10 MHz high end from the SAS assigned channel edge, sample plot for 2CC 10 MHz channel

Section 8
Test name
Specification

Testing data
 FCC 96.41(e)(1) 3.5 GHz emissions and interference limits
 FCC Part 96, FCC Part 2.1051 and FCC Part 2.1053

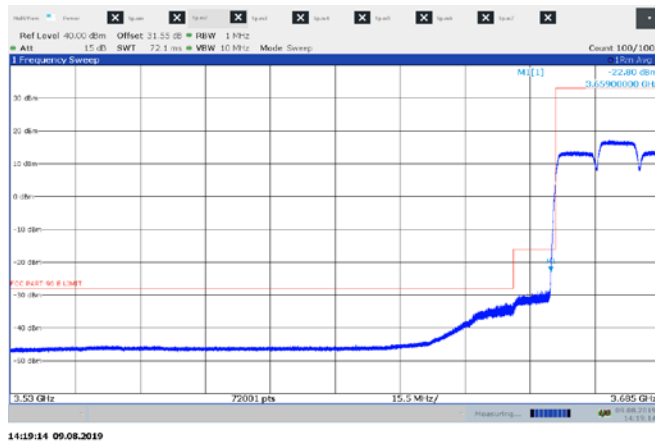


Figure 8.4-9: Emission measurement outside 10 MHz and within 1-10 MHz low end from the SAS assigned channel edge, sample plot for 3CC 10 MHz channel

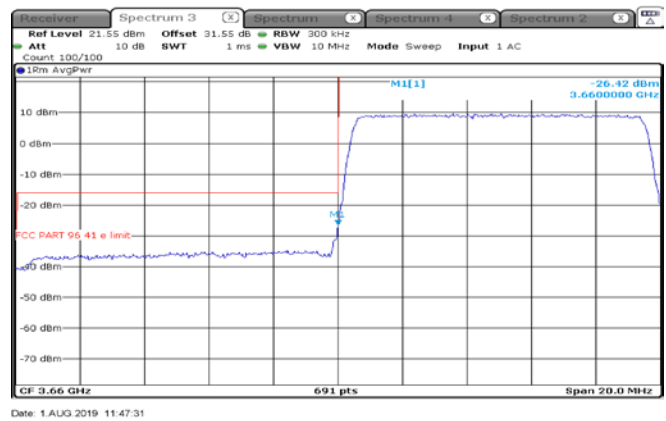


Figure 8.4-10: Emission measurement within 0-1 MHz low end from the SAS assigned channel edge, sample plot for 3CC 10 MHz channel

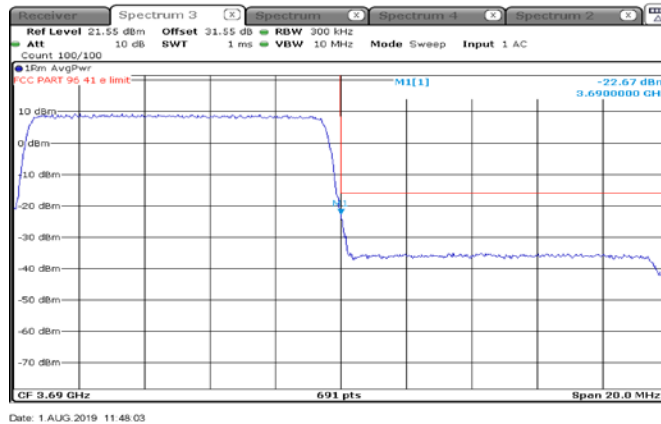


Figure 8.4-11: Emission measurement within 0-1 MHz high end from the SAS assigned channel edge, sample plot for 3CC 10 MHz channel

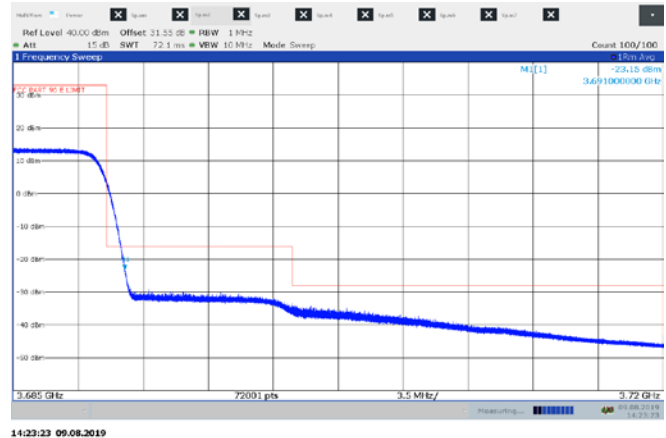


Figure 8.4-12: Emission measurement within 1-10 Mhz and outside 10 MHz high end from the SAS assigned channel edge, sample plot for 3CC 10 MHz channel

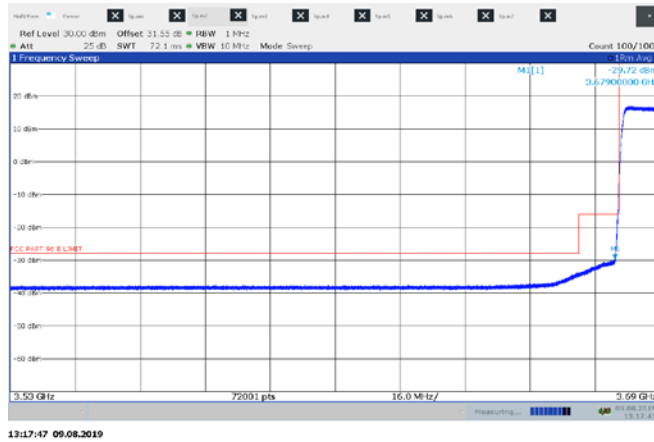


Figure 8.4-13: Emission measurement outside 10 MHz and within 1-10 MHz low end from the SAS assigned channel edge, sample plot for 1CC 20 MHz channel

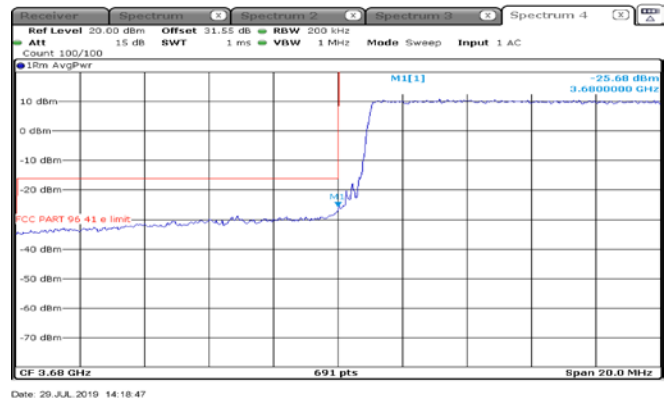


Figure 8.4-14: Emission measurement within 0-1 MHz low end from the SAS assigned channel edge, sample plot for 1CC 20 MHz channel

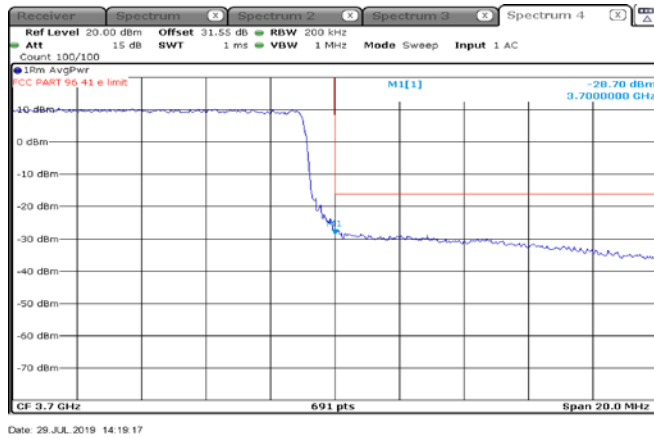


Figure 8.4-15: Emission measurement within 0-1 MHz high end from the SAS assigned channel edge, sample plot for 1CC 20 MHz channel

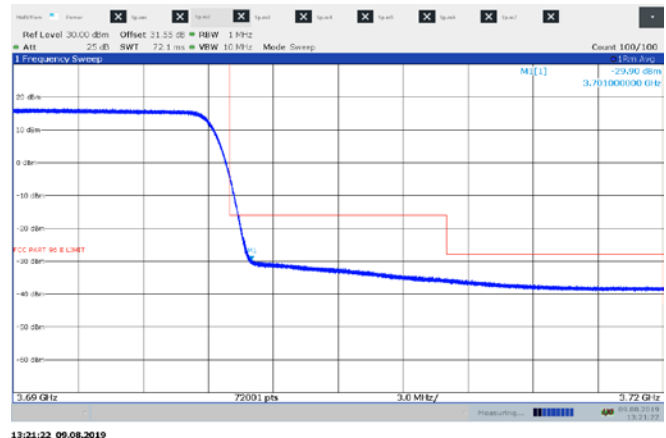


Figure 8.4-16: Emission measurement within 1-10 MHz and outside 10 MHz high end from the SAS assigned channel edge, sample plot for 1CC 20 MHz channel

Section 8
Test name
Specification

Testing data
FCC 96.41(e)(1) 3.5 GHz emissions and interference limits
FCC Part 96, FCC Part 2.1051 and FCC Part 2.1053

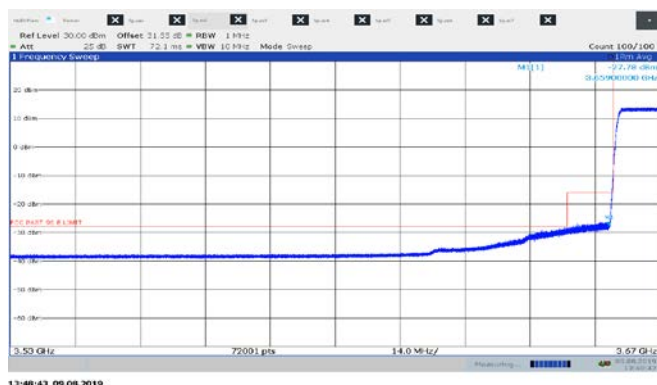


Figure 8.4-17: Emission measurement outside 10 MHz and within 1-10 MHz low end from the SAS assigned channel edge, sample plot for 2CC 20 MHz channel

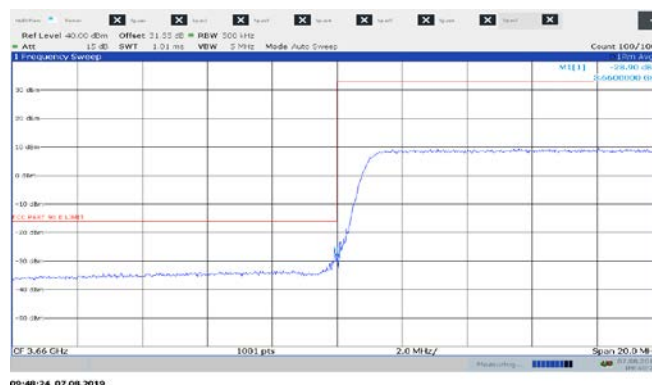


Figure 8.4-18: Emission measurement within 0-1 MHz low end from the SAS assigned channel edge, sample plot for 2CC 20 MHz channel

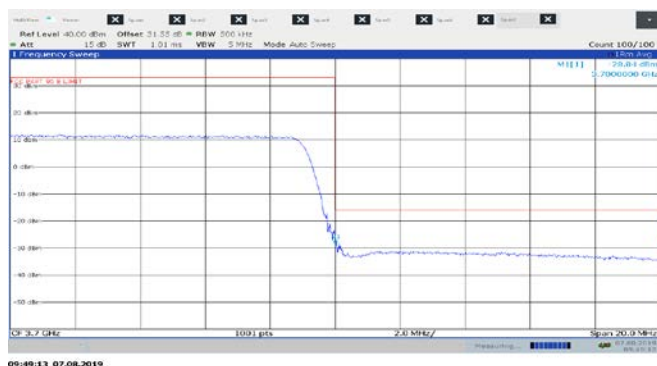


Figure 8.4-19: Emission measurement within 0-1 MHz high end from the SAS assigned channel edge, sample plot for 2CC 20 MHz channel

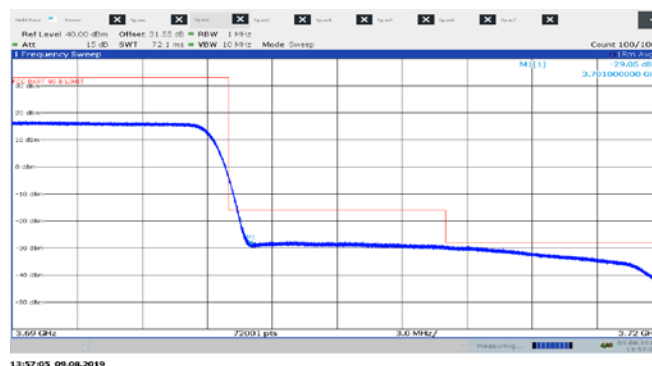


Figure 8.4-20: Emission measurement within 1-10 MHz and outside 10 MHz high end from the SAS assigned channel edge, sample plot for 2CC 20 MHz channel

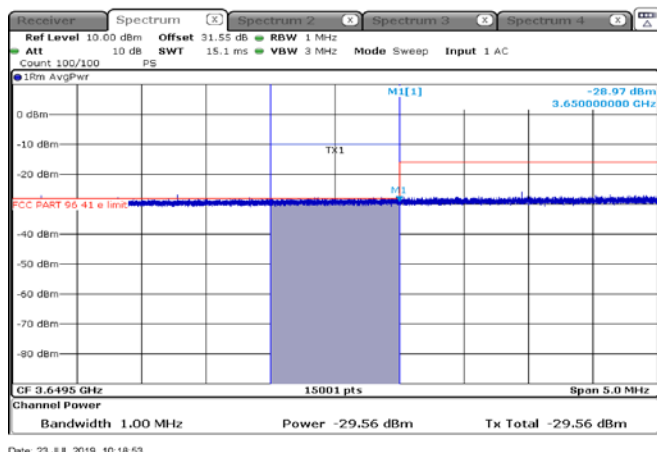


Figure 8.4-21: Emission measurement outside 10 MHz measurement low end from the SAS assigned channel edge, sample plot for 2CC 20 MHz channel

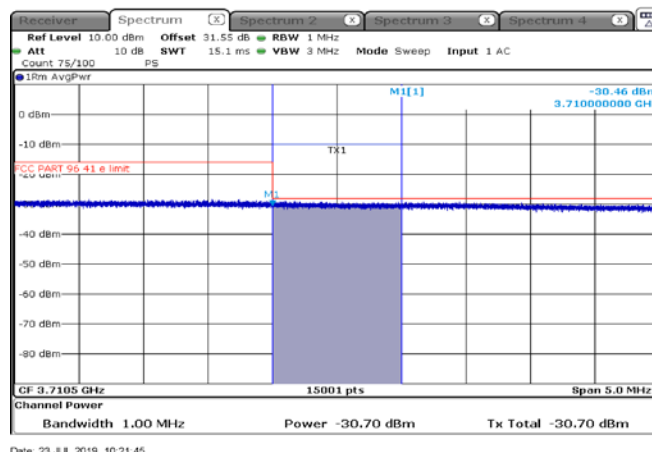


Figure 8.4-22: Emission measurement outside 10 MHz high end from the SAS assigned channel edge, sample plot for 2CC 20 MHz channel

Section 8
Test name
Specification

Testing data
FCC 96.41(e)(1) 3.5 GHz emissions and interference limits
FCC Part 96, FCC Part 2.1051 and FCC Part 2.1053

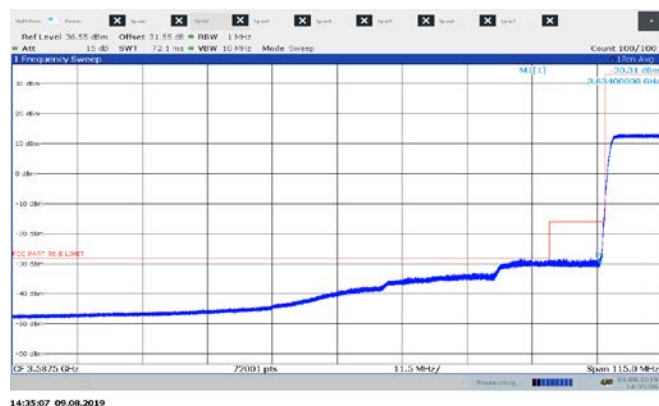


Figure 8.4-23: Emission measurement outside 10 MHz and within 1-10 MHz low end from the SAS assigned channel edge, sample plot for 3CC 20 MHz channel

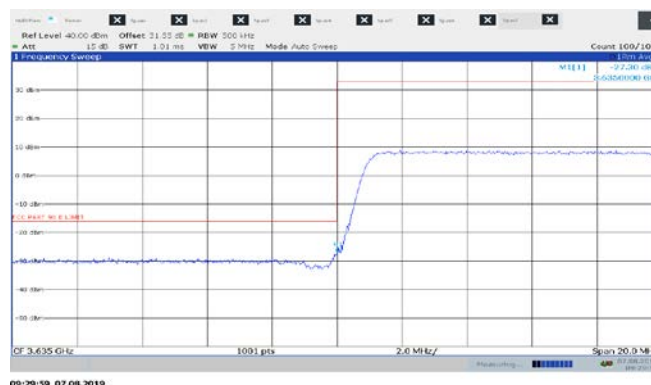


Figure 8.4-24: Emission measurement within 0-1 MHz low end from the SAS assigned channel edge, sample plot for 3CC 20 MHz channel

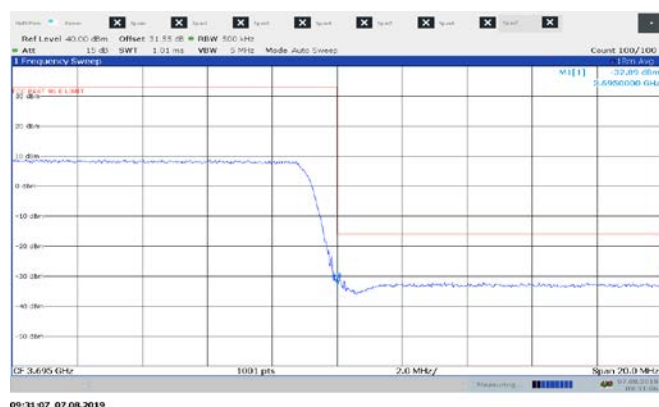


Figure 8.4-25: Emission measurement within 0-1 MHz high end from the SAS assigned channel edge, sample plot for 3CC 20 MHz channel

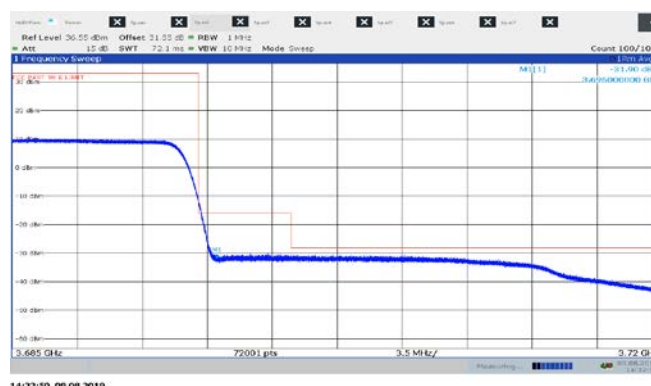


Figure 8.4-26: Emission measurement within 1-10 MHz and outside 10 MHz high end from the SAS assigned channel edge, sample plot for 3CC 20 MHz channel

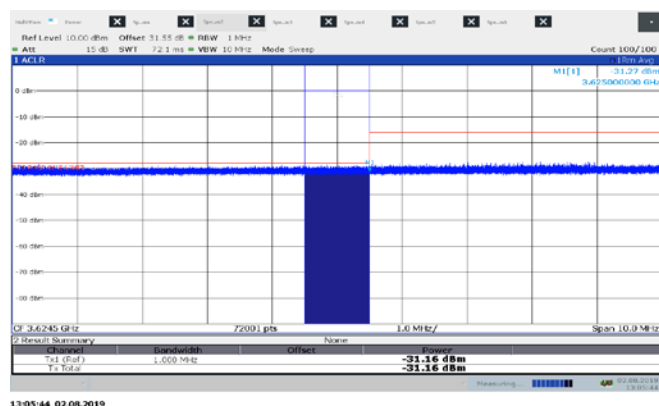


Figure 8.4-27: Emission measurement outside 10 MHz measurement low end from the SAS assigned channel edge, sample plot for 3CC 20 MHz channel

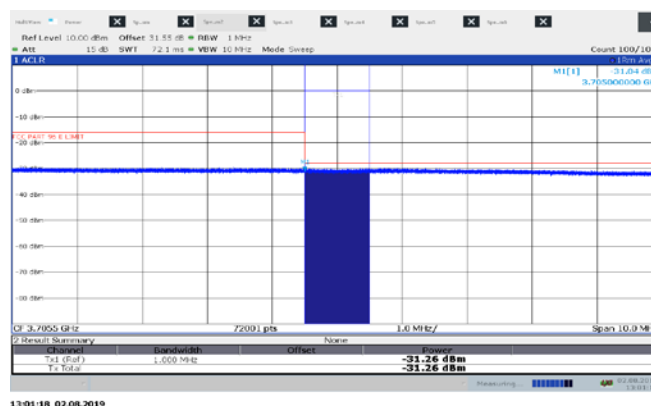


Figure 8.4-28: Band edge measurement outside 10 MHz high end from the SAS assigned channel edge, sample plot for 3CC 20 MHz channel

8.5 FCC 96.41(e)(2) Additional protection levels

8.5.1 Definitions and limits

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

8.5.2 Test summary

Test date July 30, 2019

8.5.3 Observations, settings and special notes

The testing was performed conducted on each antenna port as well as radiated with both ports operating simultaneously in MIMO mode and terminated with 50 Ohm loads. Spurious emissions were tested from 30 MHz to the 10th harmonic. Only critical plots provided in test data below. Spectrum analyser settings:

Resolution bandwidth	100 kHz (below 1 GHz) 1 MHz (conducted)
Video bandwidth	3 × RBW
Detector and trace mode	RMS Power averaging (conducted), Peak Max-hold (radiated)

8.5.4 Test data

Table 8.5-1: Additional emission measurements at 3530 and 3720 MHz sector 0 QPSK modulation 1CC results

Antenna port	No of carriers	Channel BW, MHz	Frequency of max emission, MHz	Emission level, dBm/MHz	Limit ¹ , dBm/MHz	Margin, dB
0	1	10(low)	3530	-53.74	-43	10.74
1	1	10(low)	3530	-50.55	-43	7.55
0	1	10(low)	3720	-55.91	-43	12.91
1	1	10(low)	3720	-51.29	-43	8.29
0	1	10(mid)	3530	-46.34	-43	3.34
1	1	10(mid)	3530	-51.17	-43	8.17
0	1	10(mid)	3720	-45.70	-43	2.70
1	1	10(mid)	3720	-51.08	-43	8.08
0	1	10(high)	3530	-46.33	-43	3.33
1	1	10(high)	3530	-46.61	-43	3.61
0	1	10(high)	3720	-45.68	-43	2.68
1	1	10(high)	3720	-45.75	-43	2.75
0	1	20(low)	3530	-45.05	-43	2.05
1	1	20(low)	3530	-44.97	-43	1.97
0	1	20(low)	3720	-48.65	-43	5.65
1	1	20(low)	3720	-48.60	-43	5.60
0	1	20(mid)	3530	-48.53	-43	5.53
1	1	20(mid)	3530	-48.53	-43	5.53
0	1	20(mid)	3720	-48.60	-43	5.60
1	1	20(mid)	3720	-48.61	-43	5.61
0	1	20(high)	3530	-48.45	-43	5.45
1	1	20(high)	3530	-48.51	-43	5.51
0	1	20(high)	3720	-44.91	-43	1.91
1	1	20(high)	3720	-45.50	-43	2.50

Note: ¹Margin of SISO operation. For MIMO 2×2 operation 3 dB is subtracted from the limit in the table above.

Table 8.5-2: Additional emission measurements at 3530 and 3720 MHz sector 1 QPSK modulation 1CC results

Antenna port	No of carriers	Channel BW, MHz	Frequency of max emission, MHz	Emission level, dBm/MHz	Limit ¹ , dBm/MHz	Margin, dB
0	1	10(low)	3530	-51.38	-43	8.38
1	1	10(low)	3530	-46.33	-43	3.33
0	1	10(low)	3720	-51.27	-43	8.27
1	1	10(low)	3720	-46.21	-43	3.21
0	1	10(mid)	3530	-51.42	-43	8.42
1	1	10(mid)	3530	-46.52	-43	3.52
0	1	10(mid)	3720	-50.93	-43	7.93
1	1	10(mid)	3720	-46.43	-43	3.43
0	1	10(high)	3530	-46.48	-43	3.48
1	1	10(high)	3530	-46.43	-43	3.43
0	1	10(high)	3720	-45.82	-43	2.82
1	1	10(high)	3720	-46.32	-43	3.32
0	1	20(low)	3530	-53.69	-43	10.69
1	1	20(low)	3530	-50.12	-43	7.12
0	1	20(low)	3720	-50.77	-43	7.77
1	1	20(low)	3720	-51.20	-43	8.20
0	1	20(mid)	3530	-66.30	-43	23.30
1	1	20(mid)	3530	-53.59	-43	10.59
0	1	20(mid)	3720	-55.67	-43	12.67
1	1	20(mid)	3720	-55.86	-43	12.86
0	1	20(high)	3530	-59.98	-43	16.98
1	1	20(high)	3530	-59.56	-43	16.56
0	1	20(high)	3720	-55.03	-43	12.03
1	1	20(high)	3720	-56.74	-43	13.74

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above.

Table 8.5-3: Additional emission measurements at 3530 and 3720 MHz sector 1 QPSK modulation 2CC results

Antenna port	No of carriers	Channel BW, MHz	Frequency of max emission, MHz	Emission level, dBm/MHz	Limit ¹ , dBm/MHz	Margin, dB
0	2	20(low)	3530	-46.50	-43	3.50
1	2	20(low)	3530	-46.17	-43	3.17
0	2	20(low)	3720	-46.16	-43	3.16
1	2	20(low)	3720	-45.92	-43	2.92
0	2	20(mid)	3530	-51.24	-43	8.24
1	2	20(mid)	3530	-46.17	-43	3.17
0	2	20(mid)	3720	-55.93	-43	12.93
1	2	20(mid)	3720	-51.12	-43	8.12
0	2	20(high)	3530	-46.14	-43	3.14
1	2	20(high)	3530	-46.21	-43	3.21
0	2	20(high)	3720	-45.55	-43	2.55
1	2	20(high)	3720	-46.11	-43	3.11
0	2	40(low)	3530	-53.88	-43	10.88
1	2	40(low)	3530	-44.91	-43	1.91
0	2	40(low)	3720	-58.20	-43	15.20
1	2	40(low)	3720	-54.47	-43	11.47
0	2	40(mid)	3530	-48.70	-43	5.70
1	2	40(mid)	3530	-55.99	-43	12.99
0	2	40(mid)	3720	-53.52	-43	10.52
1	2	40(mid)	3720	-45.70	-43	2.70
0	2	40(high)	3530	-48.50	-43	5.50
1	2	40(high)	3530	-50.42	-43	7.42
0	2	40(high)	3720	-44.69	-43	1.69
1	2	40(high)	3720	-43.53	-43	0.53

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above.

Table 8.5-4: Additional emission measurements at 3530 and 3720 MHz sector 1 QPSK modulation 3CC results

Antenna port	No of carriers	Channel BW, MHz	Frequency of max emission, MHz	Emission level, dBm/MHz	Limit ¹ , dBm/MHz	Margin, dB
0	3	30(low)	3530	-52.64	-43	9.64
1	3	30(low)	3530	-50.71	-43	7.71
0	3	30(low)	3720	-55.90	-43	12.90
1	3	30(low)	3720	-51.17	-43	8.17
0	3	30(mid)	3530	-51.16	-43	8.16
1	3	30(mid)	3530	-51.13	-43	8.13
0	3	30(mid)	3720	-51.22	-43	8.22
1	3	30(mid)	3720	-51.01	-43	8.01
0	3	30(high)	3530	-46.72	-43	3.72
1	3	30(high)	3530	-46.44	-43	3.44
0	3	30(high)	3720	-54.21	-43	11.21
1	3	30(high)	3720	-45.73	-43	2.73
0	3	60(low)	3530	-44.37	-43	1.37
1	3	60(low)	3530	-43.32	-43	0.32
0	3	60(low)	3720	-48.62	-43	5.62
1	3	60(low)	3720	-50.96	-43	7.96
0	3	60(mid)	3530	-48.56	-43	5.56
1	3	60(mid)	3530	-49.97	-43	6.97
0	3	60(mid)	3720	-48.56	-43	5.56
1	3	60(mid)	3720	-50.16	-43	7.16
0	3	60(high)	3530	-48.63	-43	5.63
1	3	60(high)	3530	-51.02	-43	8.02
0	3	60(high)	3720	-44.81	-43	1.81
1	3	60(high)	3720	-43.65	-43	0.65
0	3	60(low) additional	3530	-50.11	-43	7.11
1	3	60(low) additional	3530	-45.04	-43	2.04
0	3	60(low) additional	3720	-51.43	-43	8.43
1	3	60(low) additional	3720	-46.13	-43	3.13
0	3	60(high) additional	3530	-51.37	-43	8.37
1	3	60(high) additional	3530	-45.97	-43	2.97
0	3	60(high) additional	3720	-47.22	-43	4.22
1	3	60(high) additional	3720	-45.54	-43	2.54

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above.

Table 8.5-5: Additional emission measurements at 3530 and 3720 MHz sector 2 QPSK modulation 1CC results

Antenna port	No of carriers	Channel BW, MHz	Frequency of max emission, MHz	Emission level, dBm/MHz	Limit ¹ , dBm/MHz	Margin, dB
0	1	10(low)	3530	-50.23	-43	7.23
1	1	10(low)	3530	-50.25	-43	7.25
0	1	10(low)	3720	-51.29	-43	8.29
1	1	10(low)	3720	-50.79	-43	7.79
0	1	10(mid)	3530	-46.36	-43	3.36
1	1	10(mid)	3530	-51.11	-43	8.11
0	1	10(mid)	3720	-45.78	-43	2.78
1	1	10(mid)	3720	-51.15	-43	8.15
0	1	10(high)	3530	-48.98	-43	5.98
1	1	10(high)	3530	-50.92	-43	7.92
0	1	10(high)	3720	-50.04	-43	7.04
1	1	10(high)	3720	-49.78	-43	6.78
0	1	20(low)	3530	-44.14	-43	1.14
1	1	20(low)	3530	-44.66	-43	1.66
0	1	20(low)	3720	-50.56	-43	7.56
1	1	20(low)	3720	-48.61	-43	5.61
0	1	20(mid)	3530	-48.55	-43	5.55
1	1	20(mid)	3530	-43.64	-43	0.64
0	1	20(mid)	3720	-48.61	-43	5.61
1	1	20(mid)	3720	-43.65	-43	0.65
0	1	20(high)	3530	-49.58	-43	6.58
1	1	20(high)	3530	-46.29	-43	3.29
0	1	20(high)	3720	-45.08	-43	2.08
1	1	20(high)	3720	-44.81	-43	1.81

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above.

Table 8.5-6: Additional emission measurements at 3530 and 3720 MHz sector 1 64 QAM modulation 1CC results

Antenna port	No of carriers	Channel BW, MHz	Frequency of max emission, MHz	Emission level, dBm/MHz	Limit ¹ , dBm/MHz	Margin, dB
0	1	10(low)	3530	-46.93	-43	3.93
1	1	10(low)	3530	-46.69	-43	3.69
0	1	10(low)	3720	-46.45	-43	3.45
1	1	10(low)	3720	-46.62	-43	3.62
0	1	10(mid)	3530	-47.06	-43	4.06
1	1	10(mid)	3530	-46.91	-43	3.91
0	1	10(mid)	3720	-46.79	-43	3.79
1	1	10(mid)	3720	-46.65	-43	3.65
0	1	10(high)	3530	-46.80	-43	3.8
1	1	10(high)	3530	-46.21	-43	3.21
0	1	10(high)	3720	-46.66	-43	3.66
1	1	10(high)	3720	-46.40	-43	3.40
0	1	20(low)	3530	-46.37	-43	3.37
1	1	20(low)	3530	-46.02	-43	3.02
0	1	20(low)	3720	-47.07	-43	4.07
1	1	20(low)	3720	-46.98	-43	3.98
0	1	20(mid)	3530	-46.87	-43	3.87
1	1	20(mid)	3530	-46.67	-43	3.67
0	1	20(mid)	3720	-46.43	-43	3.43
1	1	20(mid)	3720	-46.90	-43	3.90
0	1	20(high)	3530	-47.01	-43	4.01
1	1	20(high)	3530	-47.03	-43	4.03
0	1	20(high)	3720	-46.46	-43	3.46
1	1	20(high)	3720	-46.63	-43	3.63

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above. . For this modulation results for sector 1 is only shown since other sector results are repetitive and further investigated to be well within limits

Table 8.5-7: Additional emission measurements at 3530 and 3720 MHz sector 1 64 QAM modulation 2CC results

Antenna port	No of carriers	Channel BW, MHz	Frequency of max emission, MHz	Emission level, dBm/MHz	Limit ¹ , dBm/MHz	Margin, dB
0	2	20(low)	3530	-46.68	-43	3.68
1	2	20(low)	3530	-46.77	-43	3.77
0	2	20(low)	3720	-46.70	-43	3.70
1	2	20(low)	3720	-46.22	-43	3.22
0	2	20(mid)	3530	-46.25	-43	3.25
1	2	20(mid)	3530	-46.89	-43	3.89
0	2	20(mid)	3720	-46.96	-43	3.96
1	2	20(mid)	3720	-46.60	-43	3.60
0	2	20(high)	3530	-46.73	-43	3.73
1	2	20(high)	3530	-46.92	-43	3.92
0	2	20(high)	3720	-46.33	-43	3.33
1	2	20(high)	3720	-46.17	-43	3.17
0	2	40(low)	3530	-46.98	-43	3.98
1	2	40(low)	3530	-45.90	-43	2.90
0	2	40(low)	3720	-48.50	-43	5.50
1	2	40(low)	3720	-48.49	-43	5.49
0	2	40(mid)	3530	-48.47	-43	5.47
1	2	40(mid)	3530	-48.46	-43	5.46
0	2	40(mid)	3720	-48.45	-43	5.45
1	2	40(mid)	3720	-48.43	-43	5.43
0	2	40(high)	3530	-48.48	-43	5.48
1	2	40(high)	3530	-48.48	-43	5.48
0	2	40(high)	3720	-43.39	-43	0.39
1	2	40(high)	3720	-43.46	-43	0.46

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above.

Table 8.5-8: Additional emission measurements at 3530 and 3720 MHz sector 1 64 QAM modulation 3CC results

Antenna port	No of carriers	Channel BW, MHz	Frequency of max emission, MHz	Emission level, dBm/MHz	Limit ¹ , dBm/MHz	Margin, dB
0	3	30(low)	3530	-46.26	-43	3.26
1	3	30(low)	3530	-46.39	-43	3.39
0	3	30(low)	3720	-46.74	-43	3.74
1	3	30(low)	3720	-46.62	-43	3.62
0	3	30(mid)	3530	-46.95	-43	3.95
1	3	30(mid)	3530	-46.93	-43	3.93
0	3	30(mid)	3720	-47.10	-43	4.10
1	3	30(mid)	3720	-46.39	-43	3.39
0	3	30(high)	3530	-46.53	-43	3.53
1	3	30(high)	3530	-46.52	-43	3.52
0	3	30(high)	3720	-46.85	-43	3.85
1	3	30(high)	3720	-46.30	-43	3.30
0	3	60(low)	3530	-43.02	-43	0.02
1	3	60(low)	3530	-44.13	-43	1.13
0	3	60(low)	3720	-48.54	-43	5.54
1	3	60(low)	3720	-48.47	-43	5.47
0	3	60(mid)	3530	-48.24	-43	5.24
1	3	60(mid)	3530	-48.29	-43	5.29
0	3	60(mid)	3720	-48.20	-43	5.20
1	3	60(mid)	3720	-48.14	-43	5.14
0	3	60(high)	3530	-48.50	-43	5.50
1	3	60(high)	3530	-48.50	-43	5.50
0	3	60(high)	3720	-43.48	-43	0.48
1	3	60(high)	3720	-43.52	-43	0.52
0	3	60(low) additional	3530	-47.13	-43	4.13
1	3	60(low) additional	3530	-47.14	-43	4.14
0	3	60(low) additional	3720	-48.51	-43	5.51
1	3	60(low) additional	3720	-48.44	-43	5.44
0	3	60(high) additional	3530	-48.42	-43	5.42
1	3	60(high) additional	3530	-48.24	-43	5.24
0	3	60(high) additional	3720	-44.48	-43	1.48
1	3	60(high) additional	3720	-44.97	-43	1.97

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above.

Section 8
Test name
Specification

Testing data
FCC 96.41(e)(2) Additional protection levels
FCC Part 96, FCC Part 2.1051 and FCC Part 2.1053

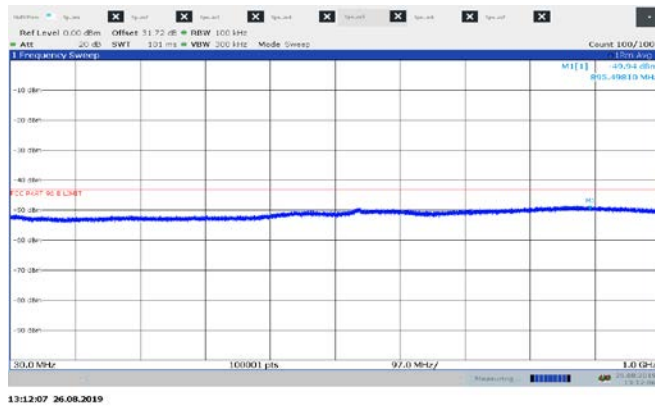


Figure 8.5-1: Conducted spurious emissions for 1CC 10 MHz channel sample plot 30 MHz – 1GHz

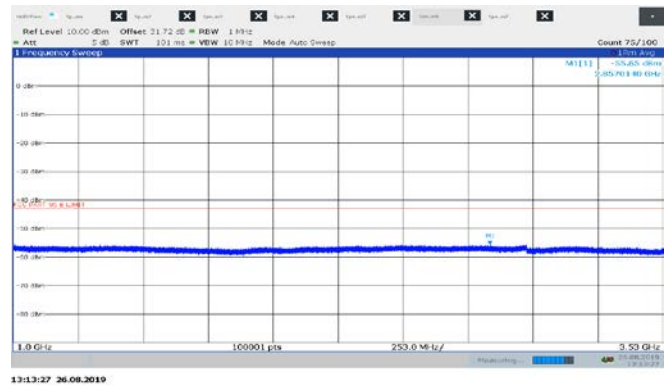


Figure 8.5-2: Conducted spurious emissions for 1CC 10 MHz channel sample plot 1 GHz – 3.53 GHz

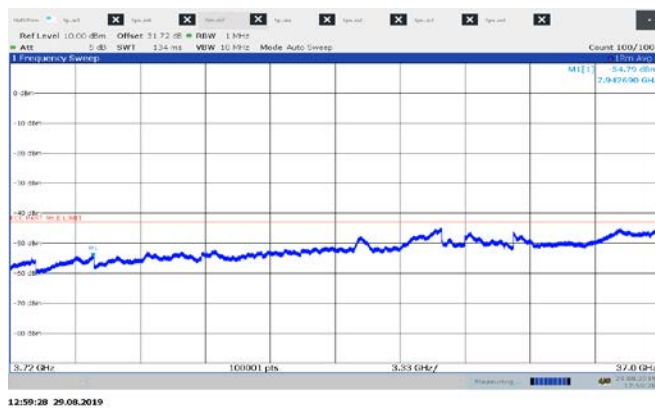


Figure 8.5-3: Conducted spurious emissions for 1CC 10 MHz channel sample plot 3.72 GHz – 37 GHz

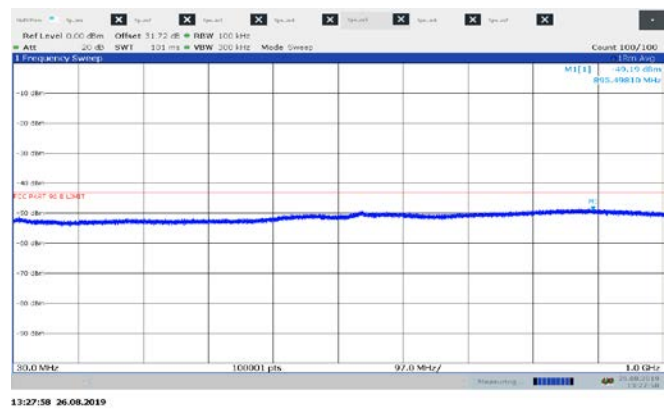


Figure 8.5-4: Conducted spurious emissions for 2CC 10 MHz channel sample plot 30 MHz – 1GHz

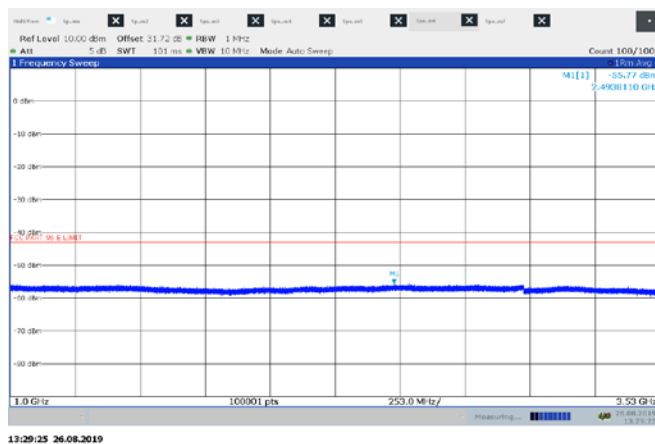


Figure 8.5-5: Conducted spurious emissions for 2CC 10 MHz channel sample plot 1 GHz – 3.53 GHz

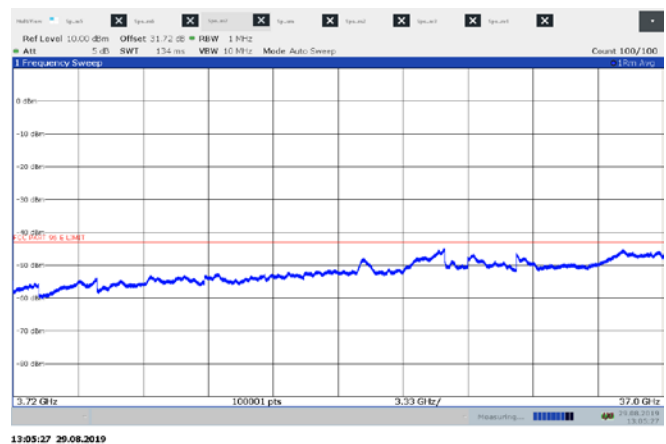


Figure 8.5-6: Conducted spurious emissions for 2CC 10 MHz channel sample plot 3.72 GHz – 37 GHz

Section 8
Test name
Specification

Testing data
FCC 96.41(e)(2) Additional protection levels
FCC Part 96, FCC Part 2.1051 and FCC Part 2.1053

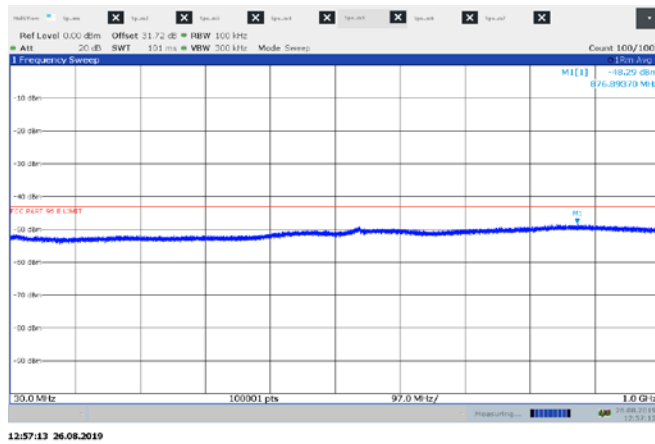


Figure 8.5-7: Conducted spurious emissions for 3CC 10 MHz channel sample plot 30 MHz – 1GHz

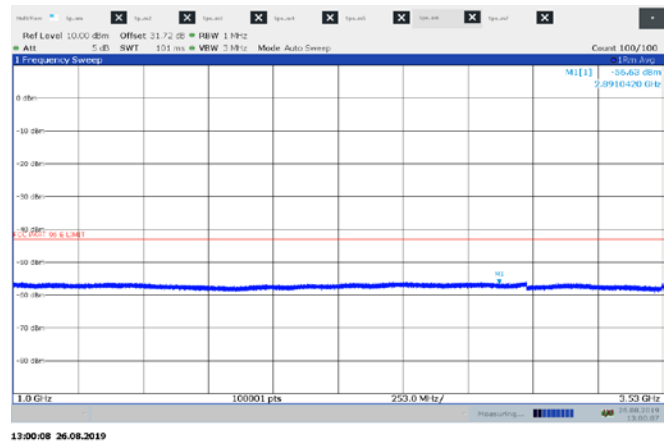


Figure 8.5-8: Conducted spurious emissions for 3CC 10 MHz channel sample plot 1 GHz – 3.53 GHz

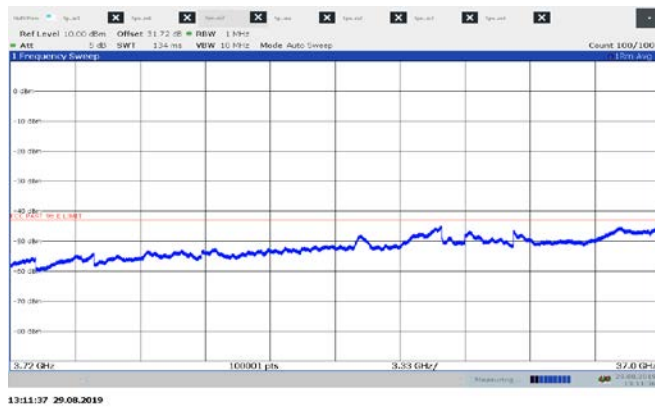


Figure 8.5-9: Conducted spurious emissions for 3CC 10 MHz channel sample plot 3.72 GHz – 37 GHz

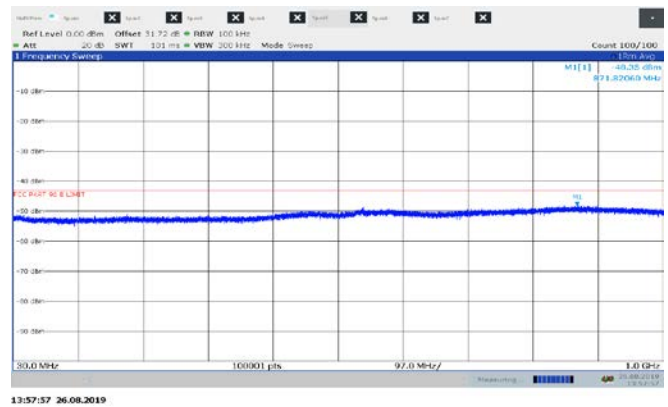


Figure 8.5-10: Conducted spurious emissions for 1CC 20 MHz channel sample plot 30 MHz – 1GHz

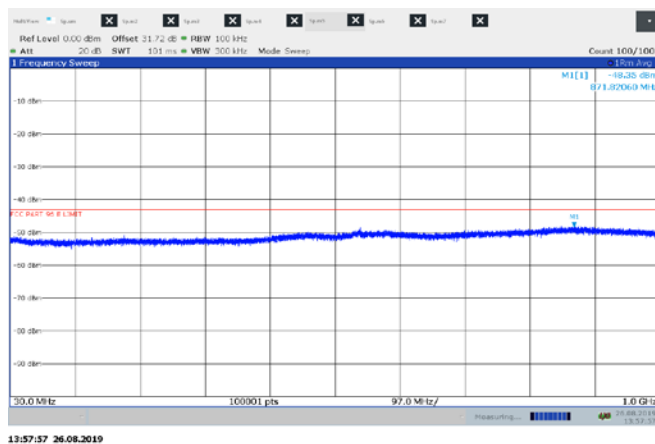


Figure 8.5-11: Conducted spurious emissions for 1CC 20 MHz channel sample plot 1 GHz – 3.53 GHz

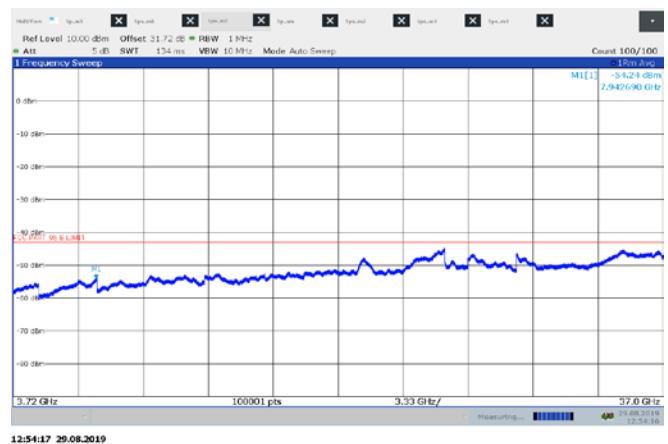


Figure 8.5-12: Conducted spurious emissions for 1CC 20 MHz channel sample plot 3.72 GHz – 37 GHz

Section 8
Test name
Specification

Testing data
 FCC 96.41(e)(2) Additional protection levels
 FCC Part 96, FCC Part 2.1051 and FCC Part 2.1053

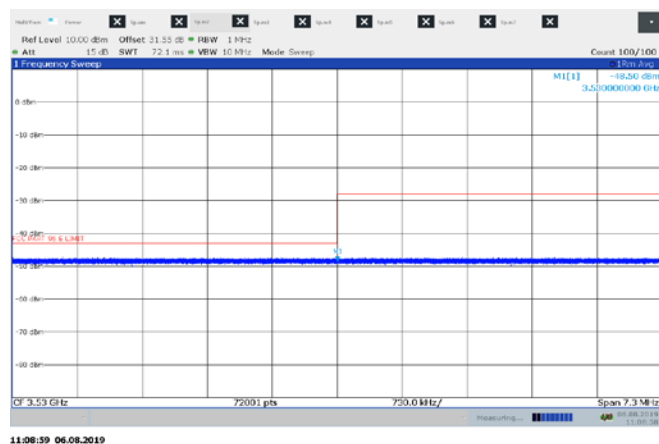


Figure 8.5-13: Emission measurement at 3530 MHz for 2CC 20 MHz sample plot

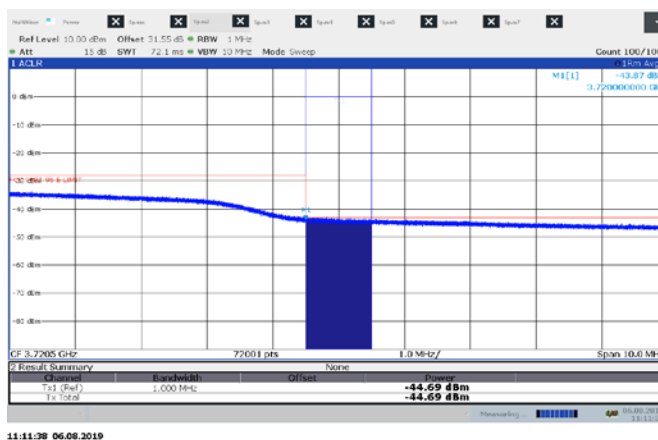


Figure 8.5-14: Emission measurement at 3720 MHz for 2CC 20 MHz sample plot

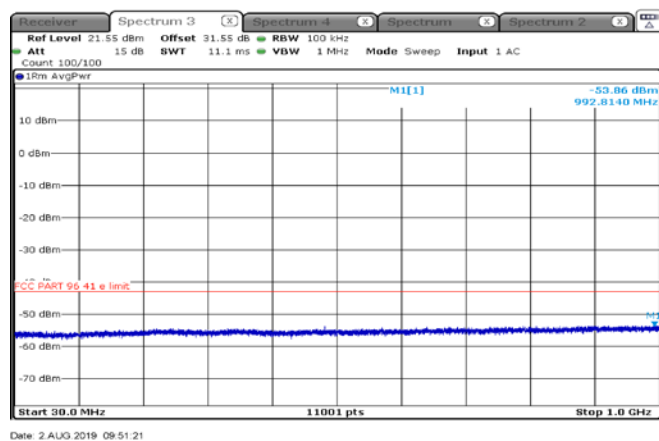


Figure 8.5-15: Conducted spurious emissions for 2CC 20 MHz channel sample plot 30 MHz – 1GHz

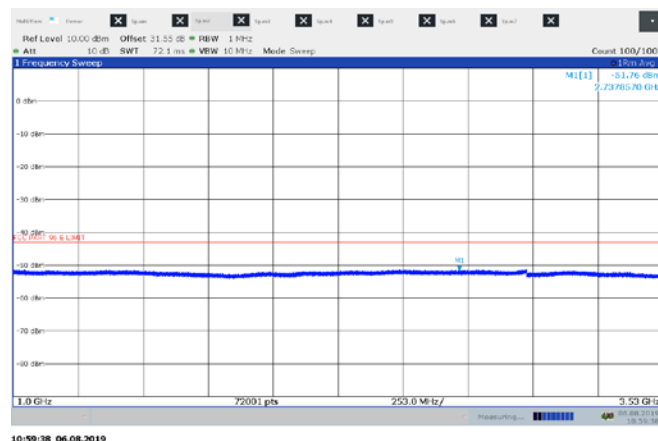


Figure 8.5-16: Conducted spurious emissions for 2CC 20 MHz channel sample plot 1 GHz – 3.53 GHz

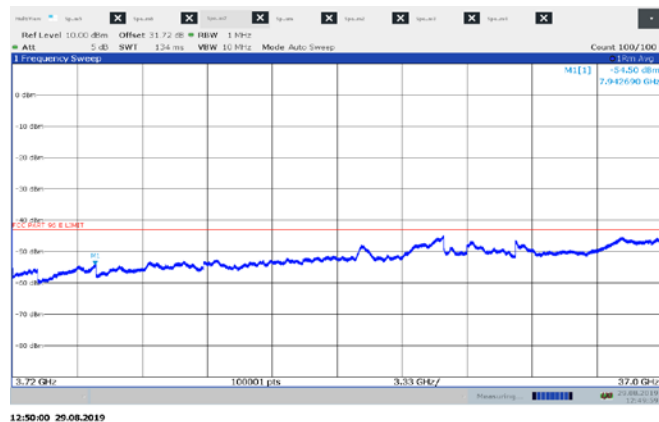


Figure 8.5-17: Conducted spurious emissions for 2CC 20 MHz channel sample plot 3.72 GHz – 37 GHz

Section 8
Test name
Specification

Testing data
FCC 96.41(e)(2) Additional protection levels
FCC Part 96, FCC Part 2.1051 and FCC Part 2.1053

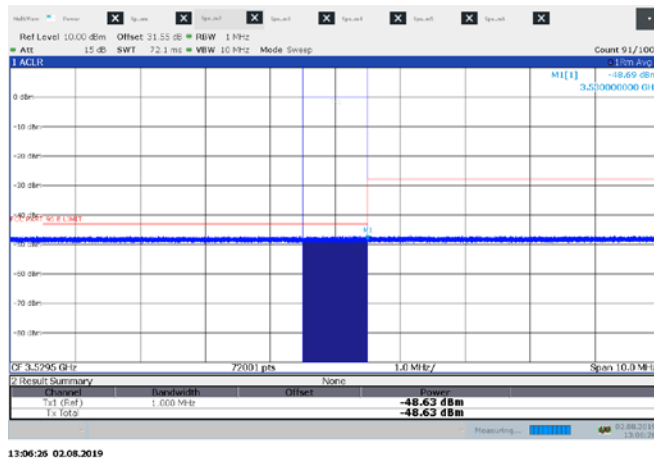


Figure 8.5-18: Emission measurement at 3530 MHz for 3CC 20 MHz sample plot

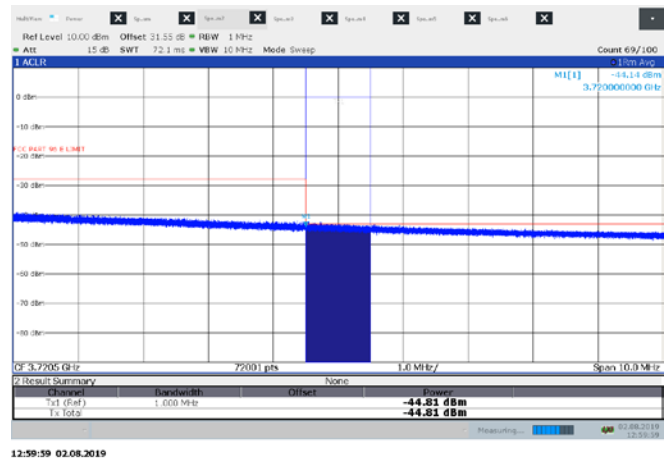


Figure 8.5-19: Emission measurement at 3720 MHz for 3CC 20 MHz sample plot

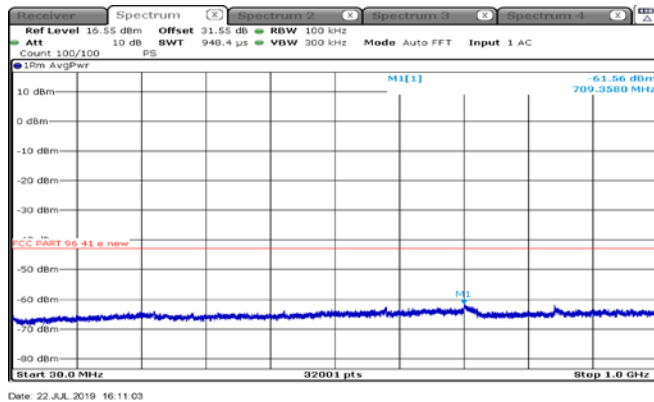


Figure 8.5-20: Conducted spurious emissions for 3CC 20 MHz channel sample plot 30 MHz – 1 GHz

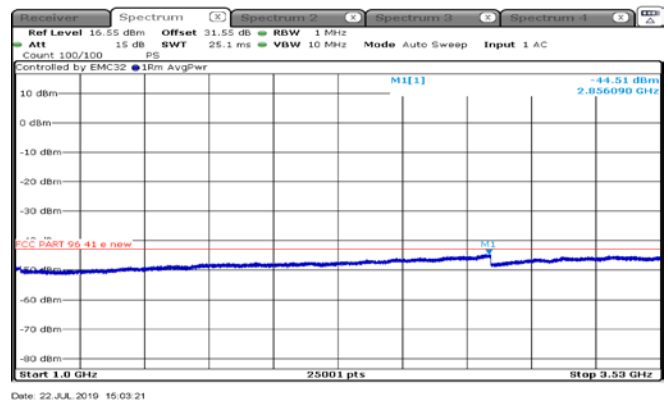


Figure 8.5-21: Conducted spurious emissions for 3CC 20 MHz channel sample plot 1 GHz – 3.53 GHz

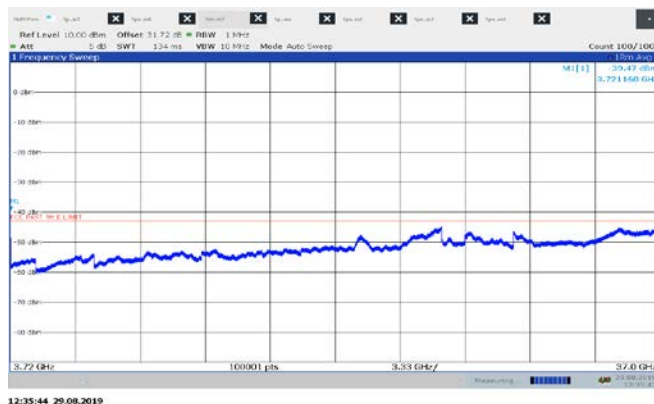
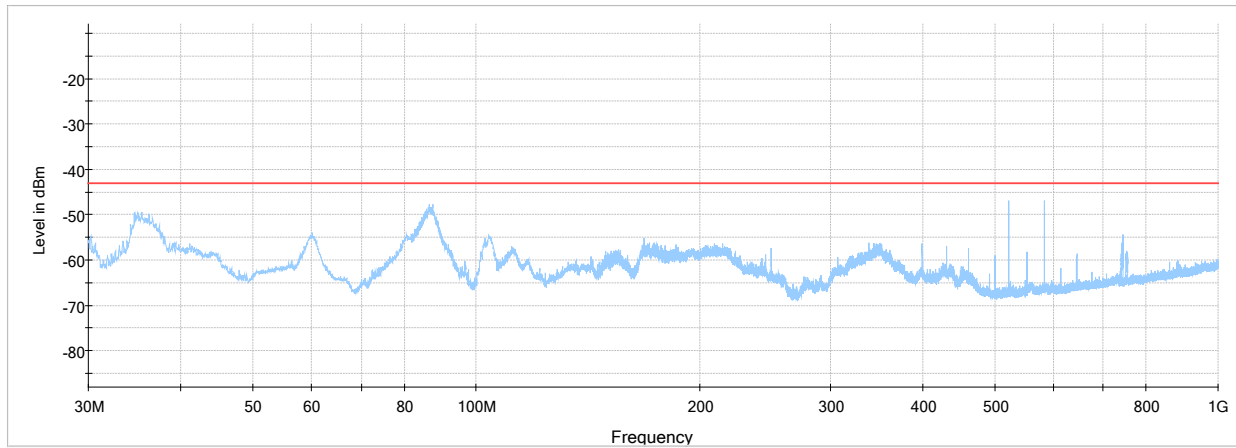


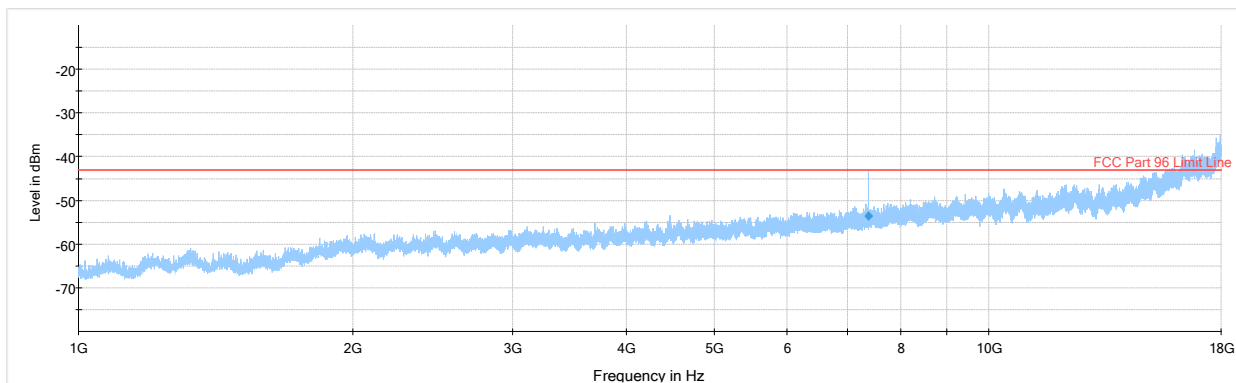
Figure 8.5-22: Conducted spurious emissions for 3CC 20 MHz channel sample plot 3.72 GHz – 37 GHz



NEX-376463 Cabinet Spurious 30 MHz - 1 GHz sector 1

— Preview Result 1-PK+
— FCC Part 96 Limit Line

Figure 8.5-1: Cabinet spurious emissions sample plot (30 to 1000 MHz)



NEX-376463 Cabinet Spurious 1 - 18 GHz sector 1

— Preview Result 1-PK+
— FCC Part 96 Limit Line
◆ Final_Result PK+

Figure 8.5-2: Cabinet spurious emissions sample plot (1 to 18 GHz)

On the plots above in the frequency range above 17.5 GHz the noise floor of the measuring equipment exceeded the limit. Further technical investigation led to conclusion that there are no spurious emissions and harmonics within this frequency range

Table 8.5-9: Conducted spurious emission measurement results QPSK modulation results

Antenna port	sector	No of carriers	Channel BW, MHz	Frequency of max emission, MHz	Emission level, dBm/MHz	Limit ¹ , dBm/MHz	Margin, dB
0	0	1	10(low)	3491	-46.37	-43	3.37
1	0	1	10(low)	16333	-48.27	-43	5.27
0	2	1	10(low)	16313	-48.44	-43	5.44
1	2	1	10(low)	16333	-48.37	-43	5.37
1	0	1	10(mid)	16333	-48.39	-43	5.39
1	1	1	10(mid)	3238	-46.45	-43	3.45
1	2	1	10(mid)	16333	-48.39	-43	5.39
0	0	1	10(high)	16333	-48.38	-43	5.38
1	1	1	10(high)	16333	-48.35	-43	5.35
0	0	1	20(low)	14175	-48.03	-43	5.03
1	2	1	20(low)	14148	-48.01	-43	5.01
1	1	1	20(mid)	16349	-47.78	-43	4.78
0	1	2	40(mid)	14188	-46.94	-43	3.94
0	1	3	60(mid)	14194	-47.66	-43	4.66
1	1	3	60(high)	2856	-44.51	-43	1.51

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above.

Table 8.5-10: Conducted spurious emission measurement results 64 QAM modulation results

Antenna port	sector	No of carriers	Channel BW, MHz	Frequency of max emission, MHz	Emission level, dBm/MHz	Limit ¹ , dBm/MHz	Margin, dB
0	1	1	10(low)	14014	-53.44	-43	10.44
0	1	1	10(mid)	2479	-55.98	-43	12.98
0	1	1	10(mid)	14191	-52.74	-43	9.74
1	1	1	10(high)	15898	-53.31	-43	10.31
0	1	2	20(low)	14033	-53.09	-43	10.09
0	1	2	40(mid)	874.5	-49.35	-43	6.35
0	1	3	60(low)	898.4	-48.77	-43	5.77

Note: ¹Margin of SISO operation. For MIMO 2x2 operation 3 dB is subtracted from the limit in the table above.

8.6 FCC 2.1055 Frequency stability

8.6.1 Definitions and limits

- (a) The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From -30°C to +50°C for all equipment except that specified in paragraphs (a)(2) and (3) of this section
(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° C through the range.
(d) The frequency stability shall be measured with variation of primary supply voltage as follows:
(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

8.6.2 Test summary

Test date: August 22, 2019

8.6.3 Observations, settings and special notes

Spectrum analyser settings:

Resolution bandwidth	≥ 1 % of emission bandwidth
Video bandwidth	≥ 3 × RBW
Frequency span	Wider than emission bandwidth
Detector mode	Peak

8.6.4 Test data

Table 8.6-1: Frequency drift measurement results

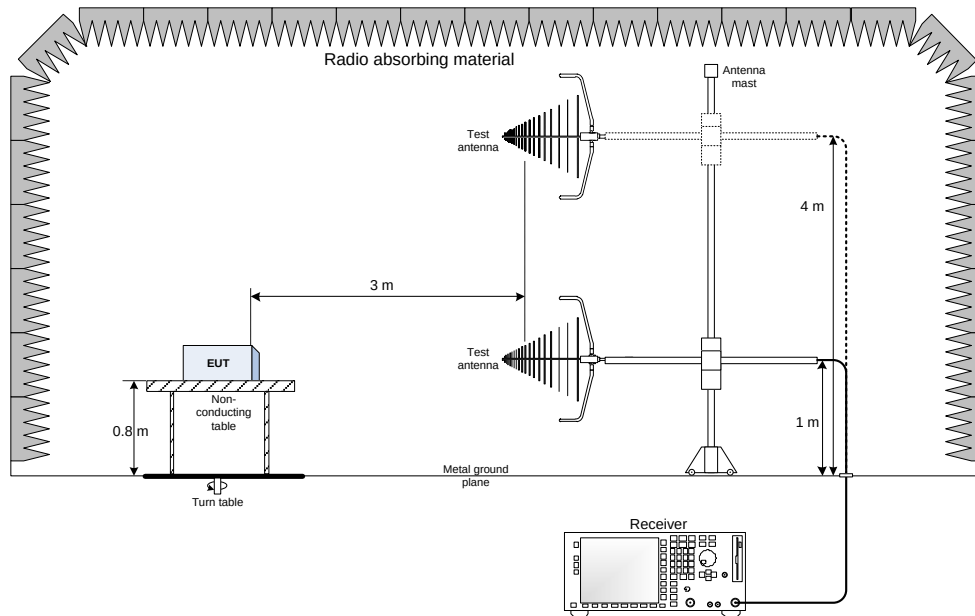
Test conditions	Frequency, Hz	Offset, ppm
+50 °C, Nominal	3624956537	-0.14
+40 °C, Nominal	3624957029	-0.01
+30 °C, Nominal	3624957056	0.00
+20 °C, +15 %	3624957704	0.18
+20 °C, Nominal	3624957061	Reference
+20 °C, -15 %	3624957456	0.11
+10 °C, Nominal	3624959224	0.60
0 °C, Nominal	3624964476	2.05
-10 °C, Nominal	3624964201	1.97
-20 °C, Nominal	3624965323	2.28
-30 °C, Nominal	3624964276	1.99

Note: Offset was calculated as per the following formula:

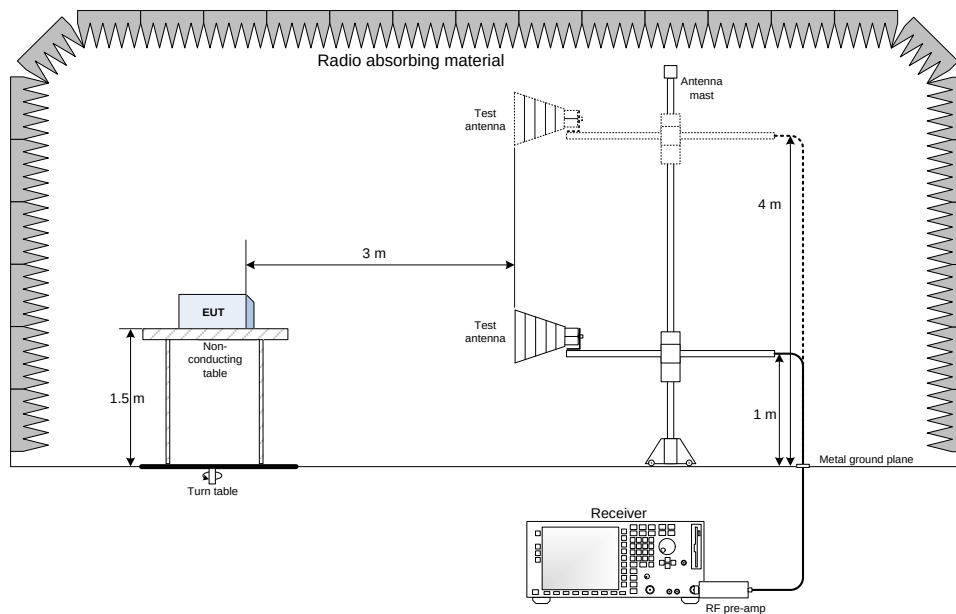
$$\frac{F_{\text{Measured}} - F_{\text{reference}}}{F_{\text{reference}}} \times 1 \cdot 10^6$$

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up for frequencies below 1 GHz



9.2 Radiated emissions set-up for frequencies above 1 GHz



9.3 Conducted emissions set-up

