Radio Test Report

Dense Air Ltd

STC-v11-Node-n48

AAA

47 CFR Part 96 Effective Date 1st October 2022
↳ 47CFR part 2J Effective Date 1st October 2021
CBD: Citizens Band Category B device
Test Date: 13th June 2023 to 25th September 2023
Report Number: 09-14220-3-23 Issue 01

The testing was carried out by RN Electronics Ltd, an independent test house, at their test facility located at:

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This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF communiqué dated April 2017).

File Name: Dense Air Ltd.14220-3 Issue 01

Arnolds Court, Arnolds Farm Lane, Mountnessing, Brentwood Essex, CM13 1UT

Certificate of Test 14220-3

The equipment noted below has been fully tested by R.N. Electronics Limited and, where appropriate, conforms to the relevant subpart of FCC Part 96 Subpart E. This is a certificate of test only and should not be confused with an equipment authorisation. Other standards may also apply.

Equipment:	STC-v11-Node-n48
Model Number:	AAA
Unique Serial Number:	AAAD32500106
Applicant:	Dense Air Ltd Atlas House, Globe Business Park, Parkway, Third Avenue Marlow, Buckinghamshire SL7 1EY
Proposed FCC ID:	2BBSF-SC11-AAA
Full measurement results are detailed in Report Number:	09-14220-3-23 Issue 01
Test Standards:	47 CFR Part 96 Subpart E, Effective Date 1st October 2022 ↳ 47CFR part 2J Effective Date 1st October 2021 CBD: Citizens Band Category B device

NOTE:
Certain tests were not performed based upon applicant's declarations. Certain other requirements are subject to applicant's declaration only and have not been tested/verified. For details refer to section 3 of this report. This report pertains to the 5G NR functionality of the device under Part 96 E, for 60 GHz functionality please refer to report 09-14220-1-23. Spectrum Access System requirements are not covered in this report.

DEVIATIONS: No deviations have been applied.

This certificate relates only to the unit tested as identified by a unique serial number and in the condition at the time it was tested. It does not relate to any other similar equipment and performance of the product before or after the test cannot be guaranteed. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of unit not meeting the intentions of the standard or the requirements of the Federal Regulations, particularly under different conditions to those during testing. Any compliance statements are made reliant on (a) the application of the product and use of the assigned band being acceptable to the FCC and (b) the modes of operation as instructed to us by the Customer based on their specific knowledge of the application and functionality of the EUT. Statements of compliance, where measurements were made, do not include the measurement uncertainty. The measurement uncertainty, where stated, is the expanded uncertainty based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Date Of Test:	13th June 2023 to 25th September 2023
Test Engineer: Jack Chilvers	Jack Chilvers Digitally signed by: Jack Chilvers DN: CN = Jack Chilvers email = Jack.Chilvers@kiwa.com C = GB O = RN Electronics OU = RN Electronics Date: 2023.11.06 11:44:06 Z
Approved By: Radio Manager	Digitally signed by: Daniel Sims DN: CN = Daniel Sims email = Daniel.Sims@kiwa.com C = GB O = Kiwa Electrical Compliance - Brentwood Date: 2023.11.06 11:37:54 Z
Customer Representative:	DocuSigned by: Peter Warburg 08-11-2023 DAEC5C98D22747C...

1 Contents

2 Equipment under test (EUT)

2.1 Equipment specification

Applicant	Dense Air Ltd Atlas House Globe Business Park Parkway, Third Avenue Marlow Buckinghamshire SL7 1EY	
Manufacturer of EUT	Dense Air Ltd	
Full Name of EUT	STC-v11-Node-n48	
Model Number of EUT	AAA	
Serial Number of EUT	AAAD32500106	
Date Received	5th June 2023	
Date of Test:	13th June 2023 to 25th September 2023	
Purpose of Test	To demonstrate design compliance to the relevant rules of Chapter 47 of the Code of Federal Regulations.	
Date Report Issued	27th October 2023	
Main Function	The unit is a 5G Base Station with integrated optical networking and 60GHz mmWave radio.	
Information Specification	Height	770 mm
	Width	400 mm
	Depth	<770 mm
	Weight	<20.2 kg
	Voltage	+45 VDC Nominal
	Current	<5A

2.2 Configurations for testing

General Parameters	
EUT Normal use position	Professionally installed pole mounted
Choice of model(s) for type tests	Sample
Antenna details	Custom 5G Dipole Array Antennas Switched Beam Antenna (SBA)
Antenna port	8 external SMA ports (not marked)
Baseband Data port (yes/no)?	No
Highest Signal generated in EUT	70.2 GHz
Lowest Signal generated in EUT	9 KHz
Hardware Version (HVIN)	V1.1
Software Version	5G Radio - SR19.00 60GHz mmWave Radio - Rel 0.16
Firmware Version (FVIN)	Particle - 509
Type of Equipment	Outdoor 5G Small Cell Base Station
Technology Type	5G NR and 60 GHz millimetre wave with GPS
Geo-location (yes/no)	5G NR Radio -Yes 60GHz Radio - No
TX Parameters	
Alignment range – transmitter	3550 – 3700 MHz band
EUT Declared Modulation Parameters	QPSK, 16QAM, 64QAM, 256QAM
EUT Declared Power level	+24 dBm per carrier Max conducted +44 dBmi per carrier Max radiated
EUT Declared Signal Bandwidths	10, 20, 30 & 40 MHz
EUT Declared Channel Spacing's	10, 20, 30 & 40 MHz
EUT Declared Duty Cycle	75%
Unmodulated carrier available?	No
Declared frequency stability	20 Hz
RX Parameters	
Alignment range – receiver	3550 – 3700 MHz band
EUT Declared RX Signal Bandwidth	10, 20, 30 & 40 MHz
Receiver Signal Level	-90.6 dBm/Ch BW conducted
FCC Parameters	
FCC Transmitter Class	CBD: Citizens Band Category B device

2.3 Functional description

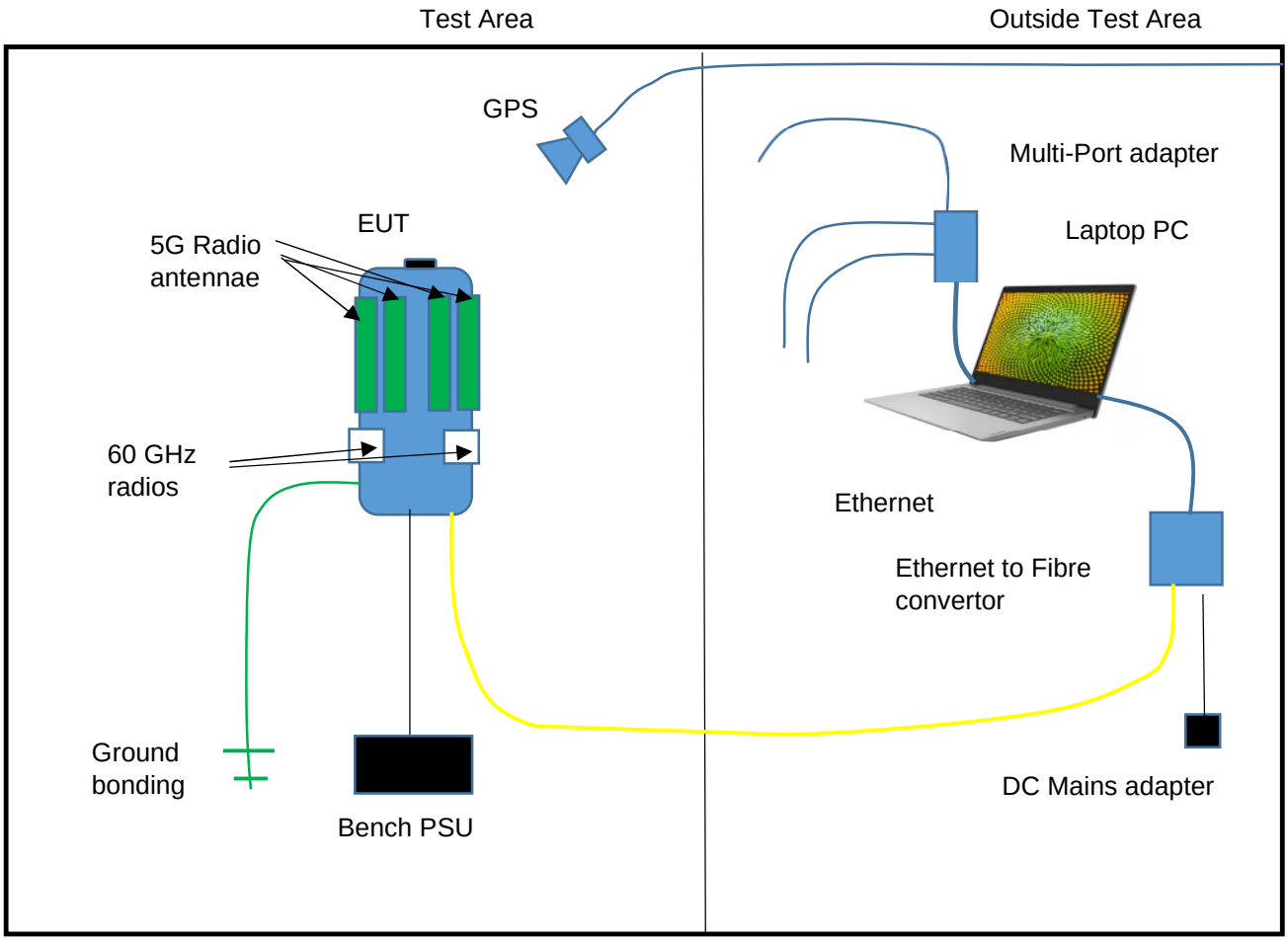
The streetCell v1.1 is a 5G Small Cell Base Station with a switchable antenna designed to allow 5G radio coverage optimisation in each deployment, the streetCell v1.1 also supports multiple back haul options including fixed optical or 60GHz mmWave radio to the core network directly or via another streetCell v1.1 unit.

2.4 Modes of operation

Mode Reference	Description	Used for testing
Mode 1	Transmitting full power Low channel at 3555 MHz using 10MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 2	Transmitting full power Low channel at 3555 MHz using 10MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 3	Transmitting full power Low channel at 3555 MHz using 10MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 4	Transmitting full power Low channel at 3555 MHz using 10MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 5	Transmitting full power Mid channel at 3625 MHz using 10MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 6	Transmitting full power Mid channel at 3625 MHz using 10MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 7	Transmitting full power Mid channel at 3625 MHz using 10MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 8	Transmitting full power Mid channel at 3625 MHz using 10MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 9	Transmitting full power High channel at 3695 MHz using 10MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 10	Transmitting full power High channel at 3695 MHz using 10MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 11	Transmitting full power High channel at 3695 MHz using 10MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 12	Transmitting full power High channel at 3695 MHz using 10MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 13	Transmitting full power Low channel at 3560 MHz using 20MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 14	Transmitting full power Low channel at 3560 MHz using 20MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 15	Transmitting full power Low channel at 3560 MHz using 20MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 16	Transmitting full power Low channel at 3560 MHz using 20MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 17	Transmitting full power Mid channel at 3625 MHz using 20MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 18	Transmitting full power Mid channel at 3625 MHz using 20MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 19	Transmitting full power Mid channel at 3625 MHz using 20MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 20	Transmitting full power Mid channel at 3625 MHz using 20MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 21	Transmitting full power High channel at 3690 MHz using 20MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 22	Transmitting full power High channel at 3690 MHz using 20MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 23	Transmitting full power High channel at 3690 MHz using 20MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 24	Transmitting full power High channel at 3690 MHz using 20MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes

Mode 25	Transmitting full power Low channel at 3565 MHz using 30MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 26	Transmitting full power Low channel at 3565 MHz using 30MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 27	Transmitting full power Low channel at 3565 MHz using 30MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 28	Transmitting full power Low channel at 3565 MHz using 30MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 29	Transmitting full power Mid channel at 3625 MHz using 30MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 30	Transmitting full power Mid channel at 3625 MHz using 30MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 31	Transmitting full power Mid channel at 3625 MHz using 30MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 32	Transmitting full power Mid channel at 3625 MHz using 30MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 33	Transmitting full power High channel at 3685 MHz using 30MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 34	Transmitting full power High channel at 3685 MHz using 30MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 35	Transmitting full power High channel at 3685 MHz using 30MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 36	Transmitting full power High channel at 3685 MHz using 30MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 37	Transmitting full power Low channel at 3570 MHz using 40MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 38	Transmitting full power Low channel at 3570 MHz using 40MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 39	Transmitting full power Low channel at 3570 MHz using 40MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 40	Transmitting full power Low channel at 3570 MHz using 40MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 41	Transmitting full power Mid channel at 3625 MHz using 40MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 42	Transmitting full power Mid channel at 3625 MHz using 40MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 43	Transmitting full power Mid channel at 3625 MHz using 40MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 44	Transmitting full power Mid channel at 3625 MHz using 40MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 45	Transmitting full power High channel at 3680 MHz using 40MHz BW with QPSK modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 46	Transmitting full power High channel at 3680 MHz using 40MHz BW with 16QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 47	Transmitting full power High channel at 3680 MHz using 40MHz BW with 64QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 48	Transmitting full power High channel at 3680 MHz using 40MHz BW with 256QAM modulation on worst case RF port P5 with duty cycle of 75%.	Yes
Mode 49	60 GHz RAD0 and RAD1 both also transmitting on 64.8 GHz max power MCS1 on beam 32.	Yes

2.5 Emissions configuration



The unit was powered from a bench power supply connected to a 120 V / 60 Hz supply. The power supply was set to 45 VDC. In end-user operation the EUT is normally mounted to a metal pole, to replicate this in the test chamber a grounding braid was connected to the EUT metal enclosure, and this was bonded to the ground plane floor of the chamber.
The EUT incorporates two identical 5G cellular radio modules, either 5G radio can operate at the same time as the 60GHz radios in the device, but not with each other. During radiated emissions tests the 5G radio's were configured into a transmit mode on required channels and the 60 GHz radios were also configured into transmit. The EUT was also assessed for any intermodulation products with all antennas in place. Spurious emissions testing was also performed with the 5GNR device antennae disconnected and RF ports P1 to P8 terminated into 50 Ohm loads. The 5G radios were configured using the laptop PC running specialised engineering software (Qualcomm QRCT). The PC was located outside the test chamber/ or removed from the test chamber/test area prior to test. The unit was also configured using a laptop PC and terminal software to allow permanent transmit modes of the 60 GHz function of the device, on both of the 60 GHz radios with individual beam settings of choice. Terminal software was used to configure the 60GHz radio's.

Both 5G radios were assessed at the maximum default power setting per carrier of +24dBm (Internal modem output of 33dBm) using the following channels, Bandwidths and modulations:
Low = 3555 MHz, 10MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation
Mid = 3625 MHz, 10MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation
High = 3695 MHz, 10MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation
Low = 3560 MHz, 20MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation
Mid = 3625 MHz, 20MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation
High = 3690 MHz, 20MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation
Low = 3565 MHz, 30MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation
Mid = 3625 MHz, 30MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation

High = 3685 MHz, 30MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation
Low = 3570 MHz, 40MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation
Mid = 3625 MHz, 40MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation
High = 3680 MHz, 40MHz BW, QPSK, 16QAM, 64QAM and 256QAM Modulation

The identical 5G Radios do not operate at the same time and are un-correlated. Both radios were assessed individually to identify any worst-case radio for full tests. The 5G NR radio identified as FSM2500 provided slightly more power in pre-scan testing than the FSM2600 radio (see pre-scan results below), therefore the FSM2500 radio was used for full test purposes.

The EUT houses two extensive 5G NR RF switching modules which could be set into various RF switching routes to the 8 RF ports/feeds (4 ports on either side of the device) and the 4 Antenna sectors. This is demonstrated in the applicants RF switching/routing table included in the theory of operation document provided for the certification. The EUT can operate in a 4TX (4 port summed) mode of operation as a worst case. Please refer to the technical operation theory document supplied with the certification application for further details.

Pre-scans to determine any 60GHz radio function worst case setting and modulation scheme were also performed, where all modulations were assessed in turn (MCS0 to MCS12). For final intermodulation tests modulation scheme MCS1 was used as this was found to be worst-case.

The 60GHz radios were assessed in combination with the 5GNR radios at the maximum power setting (as per factory calibration) using the following channels and Bandwidth:
Low = 58.32 GHz, 2.16GHz BW, MCS5
Mid = 64.8 GHz, 2.16GHz BW, MCS5
High = 69.12 GHz, 2.16GHz BW, MCS5

Below is a table of pre-compliance power testing performed on the 5G Radio to identify the worst-case ID config and RF port/feed. Results below show that ID config 5, ID config 6 and ID config 9 provided the highest power over the 8 RF ports/feeds. Port/Feed 5 was identified as producing the highest power out of all the RF port/feeds.

FSM2500 radio set

33 dBm QPSK Top Chan 10 MHz set on both FSM 2500 internally (providing +24dBm conducted per carrier)								
ID	P1	P2	P3	P4	P5	P6	P7	P8
1			24	23.43	24.61	24.4		
2	21.57	21.65	21.3	20.8	21.89	21.66	22.2	21.96
3			24.04	23.66				
4					24.65	24.44		
5	21.4	21.45	21.1	20.69	24.74	24.51		
6			24.08	24.01	21.8	21.43	21.42	21.3
7	21.84	22.09	21.45	21.49			22.11	22.06
8	21.79	21.92			21.67	21.52	22.32	22.27
9	22.14	22.48					22.48	22.34
10	21.43	21.7	21.02	21.03				
11					21.82	21.51	21.94	21.84
Max (dBm)	22.14	22.48	24.08	24.01	24.74	24.51	22.48	22.34
Linear (Watt)	0.1637	0.1770	0.2559	0.2518	0.2979	0.2825	0.1770	0.1714

Linear sum highest P1,P3,P5,P7(W) Sector A	0.8945
Power sum highest P1,P3,P5,P7(dBm) Sector A	29.52
Linear sum highest P2,P4,P6,P8(W) Sector B	0.8827
Power sum highest P2,P4,P6,P8(dBm) Sector B	29.46
P5 (dBm) + 10 log(4) dB, dBm	30.76

FSM2600 Radio set
File Name: Dense Air Ltd.14220-3 Issue 01
QMF21J - Issue 05 - RNE Issue 03; FCC Part 96 2021

33 dBm QPSK Top Chan 10 MHz set on both FSM 2500 internally (providing +24dBm conducted per carrier)								
ID	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**
1			23.53	23.4	23.93	23.03		
2	21.5	20.91	20.92	20.75	21.24	20.34	21.21	20.81
3			23.5	23.43				
4					23.85	22.9		
5	21.29	20.73	20.8	20.52	24.08	23.15		
6			23.82	23.59	21.14	19.88	20.2	21.3
7	21.68	21.36	21.28	21.06			21.29	21
8	21.62	21.12			20.98	21.3	21.54	21.15
9	21.98	21.65					21.72	21.47
10	21.13	20.71	20.76	20.51				
11					21.05	19.92	21.05	20.58
Max (dBm)	**21.98**	**21.65**	**23.82**	**23.59**	**24.08**	**23.15**	**21.72**	**21.47**
Linear (Watt)	0.1578	0.1462	0.2410	0.2286	0.2559	0.2065	0.1486	0.1403

Linear sum highest P1,P3,P5,P7(W) Sector A	0.8032
Power sum highest P1,P3,P5,P7(dBm) Sector A	29.05
Linear sum highest P2,P4,P6,P8(W) Sector B	0.7216
Power sum highest P2,P4,P6,P8(dBm) Sector B	28.58
P5 (dBm) + 10 log(4) dB, dBm	30.10

For the purposes of tests in this report, ID config5 and RF port/feed P5 was identified and used as a worst case/highest RF power output port utilising radio FSM2500. Where required for certain tests all 4 port summation calculations are using the “Measure and add 10 log(NANT) dB, where NANT is the number of outputs” method from KDB 662911 D01 v02r01, where n is the number of ports in this case = 4. This method provides a slight over estimation of test results to ensure, regardless of RF switching scheme, that the EUT remains compliant with the rules/limits

2.5.1 Signal leads

Port Name	Cable Type	Connected
DC input	Twisted 2 Core	Yes
Point-of-Presence	Full Duplex Fibre	Yes
Daisy Chain 1	Full Duplex Fibre	Yes
Daisy Chain 2	Full Duplex Fibre	Yes
Grounding point	Copper braid	Yes
Ethernet	Cat5	No (Applicant declares for engineering use only)
Serial	Cat5	No (Applicant declares for engineering use only)
USB	USB	No (Applicant declares for engineering use only)

3 Summary of test results

The STC-v11-Node-n48, AAA was tested for compliance to the following standard(s):

47 CFR Part 96 Effective Date 1st October 2022
↳ 47CFR part 2J Effective Date 1st October 2021
CBD: Citizens Band Category B device

Any compliance statements are made reliant on (a) the application of the product and use of the assigned band being acceptable to the FCC and (b) the modes of operation as instructed to us by the Customer based on their specific knowledge of the application and functionality of the EUT. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of equipment not meeting the intentions of the standard or the essential requirements of the directive, particularly under different conditions to those during testing. Statements of compliance, where measurements were made, do not include the measurement uncertainty. The measurement uncertainty, where stated, is the expanded uncertainty based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Title	References	Results
Transmitter Tests		
1. Radiated emissions	FCC Part 96 Clause 96.41(e) & 2.1053	PASSED[1]
2. Conducted emissions	FCC Part 96 Clause 96.41(e) & 2.1051	PASSED[1]
3. Power Limits EIRP	FCC Part 96 Clause 96.41(b) & 2.1046	PASSED
4. Power Limits PSD	FCC Part 96 Clause 96.41(b)	PASSED
5. Power Limits PAPR	FCC Part 96 Clause 96.41(g)	PASSED
6. Frequency Stability	FCC Part 2 Clause 2.1055	PASSED
7. Occupied Bandwidth	FCC Part 2 Clause 2.1049	PASSED
8. Emission Mask	FCC Part 96 Clause 96.41(e)	PASSED
9. Modulation Characteristics	FCC Part 96 Clause 96.41(a) FCC Part 27 Clause 2.1047	PROVIDED[2]
10. Transmit Power Control	FCC Part 96 Clause 96.41(c)(1)	DECLARATION[3]
Receiver Tests		
11. RX signal strength/reception limits	FCC Part 96 Clause 96.41(d)/(f)	NOT APPLICABLE[4]

[1] Spectrum investigated up to a frequency of 37GHz based on 10 times the highest channel/ signal generated in equipment of 3695 MHz.
[2] EUT uses digital modulation techniques. Modulation schemes and information is detailed in section 2.2 of this report.
[3] The EUT supports transmitter power control, please see Operational Description Exhibits.
[4] Per KDB940660 D01 Part 96 CBRS eqpt: This is a requirement for licensees and not a requirement for equipment authorization of a CBSD. Therefore, it does not need to be included in the test report

4 Specifications

The tests were performed and operated in accordance with R.N. Electronics Ltd procedures and the relevant standards listed below.

4.1 Relevant standards

Ref.	Standard Number	Version	Description
4.1.1	FCC Part 96	2022	Citizens Broadband Radio Service
4.1.2	47CFR part 2J	2021	Part 2 – Frequency Allocations and radio treaty matters; General rules and regulations
4.1.3	KDB 971168 D01 v03	2017	Federal Communications Commission Office of Engineering and Technology Laboratory Division; Measurement Guidance for Certification of Licensed Digital Transmitters
4.1.4	ANSI C63.26	2015	American National Standard for Compliance testing of transmitters used in Licensed radio services
4.1.5	KDB 662911 D01 v02r01	2013	Federal Communications Commission Office of Engineering and Technology Laboratory Division; Emissions Testing of Transmitters with Multiple Outputs in the Same Band
4.1.6	KDB 940660 D01 Part 96 CBRS Eqpt v03	2020	Certification and test procedures for citizens broadband radio service devices authorized under part 96
4.1.7	KDB 662911 D01 v02r01	2013	Multiple Transmitter output
4.1.8	KDB 662911 D02 v01	2011	MIMO with Cross-Polarized Antenna

4.2 Deviations

No deviations were applied

4.3 Tests at extremes of temperature & voltage

The following test conditions were used to simulate testing at nominal or extremes.

Temperature Test Conditions		Voltage Test Conditions	
T nominal	20 °C	V nominal	45V DC
T minimum	-30 °C	V minimum	40.5V DC
T maximum	50 °C	V maximum	49.5V DC

Extremes of voltage are based on manufacturers declaration of +/-10%.

Extremes of temperature are based upon manufacturer's declaration and rule part 2.1055.
The ambient test conditions of humidity and pressure in the laboratory were as specified in each specific test section within this report

4.4 Test fixtures

In order to measure RF parameters at temperature extremes, the EUT was tested in a temperature-controlled chamber as follows:

The EUT's RF port was used.

5 Tests, methods and results

5.1 Radiated emissions

5.1.1 Test methods

Test Requirements:	FCC Part 96 Clause 96.41(e) [Reference 4.1.1 of this report]
Test Method:	FCC Part 2 Clause 2.1053 [Reference 4.1.2 of this report]
	KDB 971168 Clause 3.6 & 4.7 [Reference 4.1.3 of this report]
	ANSI C63.26 Clause 5.5 [Reference 4.1.4 of this report]
	KDB 662911 Clause E(3)(a)iii [Reference 4.1.5 of this report]
Limits:	FCC Part 96 Clause 96.41(e) [Reference 4.1.1 of this report]

5.1.2 Configuration of EUT

The EUT was tested in an ALSE and ambient conditions were monitored. The EUT was examined in its declared normal use position. The EUT was operated in Modes 1 to 49 for this test. The EUT was tested with 8 RF ports terminated into 50 Ohms, and additionally with its 4 antenna arrays connected, to test for any intermodulation emissions between 5G NR frequencies and 60GHz radio frequencies

5.1.3 Test procedure

Tests were made in accordance with the Test Method noted above using the measuring equipment noted in the 'Test Equipment' Section at Site H, M and B. Peak field strength from the EUT was maximised by rotating it 360 degrees. Only signals found within 20dB of limits are reported.
An RMS detector was used for final measurements.

25MHz - 1GHz.
The measuring antenna was scanned 1 - 4m in both Horizontal and Vertical polarisations. Substitution method was performed using tuned dipoles / a calibrated bi-conical antenna.

1GHz – 37 GHz.
The measuring antenna was used in both Horizontal and Vertical polarisations. Substitution method was performed using standard gain horn antennas.

5.1.4 Test equipment

CAL07, E136, E268, E296-2, E330, E392, E404, E411, E467, E624, E743, E755, E777, LPE364, TMS78, TMS79, TMS812, TMS82

See Section 8 for more details

5.1.5 Test results

Temperature of test environment	18-22°C
Humidity of test environment	40-52%
Pressure of test environment	100-102kPa

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	10 MHz
Mod Scheme	QPSK,16QAM,64QAM ,256QAM
Low channel	3555 MHz

Spurious Frequency (MHz)	Measured Spurious Level (dBm)	Difference to Limit (dB)	Antenna Polarisation	EUT Polarisation
3519.8	-57.1	-17.1	Vertical	Normal use position
3519.8	-55.4	-15.4	Horizontal	Normal use position
10312.5	-47.2	-7.2	Vertical	Normal use position
10312.5	-51.9	-11.9	Horizontal	Normal use position
20625	-52.7	-12.7	Vertical	Normal use position
20625	-52.5	-12.5	Horizontal	Normal use position
22320	-52.8	-12.8	Vertical	Normal use position
22320	-54.6	-14.6	Horizontal	Normal use position
23040	-53.1	-13.1	Vertical	Normal use position
23040	-51.0	-11.0	Horizontal	Normal use position

Note: Signals reported in the table above are generic signals and do not change with channel, Bandwidth or modulation settings. Signals are also present whether the 5G NR antennae arrays were connected or not.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	10 MHz
Mod Scheme	QPSK,16QAM,64QAM ,256QAM
Mid channel	3625 MHz

Spurious Frequency (MHz)	Measured Spurious Level (dBm)	Difference to Limit (dB)	Antenna Polarisation	EUT Polarisation
3519.8	-57.1	-17.1	Vertical	Normal use position
3519.8	-55.4	-15.4	Horizontal	Normal use position
10312.5	-47.2	-7.2	Vertical	Normal use position
10312.5	-51.9	-11.9	Horizontal	Normal use position
20625	-52.7	-12.7	Vertical	Normal use position
20625	-52.5	-12.5	Horizontal	Normal use position
22320	-52.8	-12.8	Vertical	Normal use position
22320	-54.6	-14.6	Horizontal	Normal use position
23040	-53.1	-13.1	Vertical	Normal use position
23040	-51.0	-11.0	Horizontal	Normal use position

Note: Signals reported in the table above are generic signals and do not change with channel, Bandwidth or modulation settings. Signals are also present whether the 5G NR antennae arrays were connected or not.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	10 MHz
Mod Scheme	QPSK,16QAM,64QAM ,256QAM
High channel	3695 MHz

Spurious Frequency (MHz)	Measured Spurious Level (dBm)	Difference to Limit (dB)	Antenna Polarisation	EUT Polarisation
3519.8	-57.1	-17.1	Vertical	Normal use position
3519.8	-55.4	-15.4	Horizontal	Normal use position
10312.5	-47.2	-7.2	Vertical	Normal use position
10312.5	-51.9	-11.9	Horizontal	Normal use position
20625	-52.7	-12.7	Vertical	Normal use position
20625	-52.5	-12.5	Horizontal	Normal use position
22320	-52.8	-12.8	Vertical	Normal use position
22320	-54.6	-14.6	Horizontal	Normal use position
23040	-53.1	-13.1	Vertical	Normal use position
23040	-51.0	-11.0	Horizontal	Normal use position

Note: Signals reported in the table above are generic signals and do not change with channel, Bandwidth or modulation settings. Signals are also present whether the 5G NR antennae arrays were connected or not.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	20 MHz
Mod Scheme	QPSK,16QAM,64QAM,256QAM
Low channel	3560 MHz

Note: Please refer to the results measured for 10MHz Bandwidth channels above. Signals measured were generic signals and did not change with channel, Bandwidth or modulation settings.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	20 MHz
Mod Scheme	QPSK,16QAM,64QAM,256QAM
Mid channel	3625 MHz

Note: Please refer to the results measured for 10MHz Bandwidth channels above. Signals measured were generic signals and did not change with channel, Bandwidth or modulation settings.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	20 MHz
Mod Scheme	QPSK,16QAM,64QAM,256QAM
High channel	3690 MHz

Note: Please refer to the results measured for 10MHz Bandwidth channels above. Signals measured were generic signals and did not change with channel, Bandwidth or modulation settings.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	30 MHz
Mod Scheme	QPSK,16QAM,64QAM,256QAM
Low channel	3565 MHz

Note: Please refer to the results measured for 10MHz Bandwidth channels above. Signals measured were generic signals and did not change with channel, Bandwidth or modulation settings.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	30 MHz
Mod Scheme	QPSK,16QAM,64QAM,256QAM
Mid channel	3625 MHz

Note: Please refer to the results measured for 10MHz Bandwidth channels above. Signals measured were generic signals and did not change with channel, Bandwidth or modulation settings.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	30 MHz
Mod Scheme	QPSK,16QAM,64QAM,256QAM
High channel	3685 MHz

Note: Please refer to the results measured for 10MHz Bandwidth channels above. Signals measured were generic signals and did not change with channel, Bandwidth or modulation settings.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	40 MHz
Mod Scheme	QPSK,16QAM,64QAM,256QAM
Low channel	3570 MHz

Note: Please refer to the results measured for 10MHz Bandwidth channels above. Signals measured were generic signals and did not change with channel, Bandwidth or modulation settings.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	40 MHz
Mod Scheme	QPSK,16QAM,64QAM,256QAM
Mid channel	3625 MHz

Note: Please refer to the results measured for 10MHz Bandwidth channels above. Signals measured were generic signals and did not change with channel, Bandwidth or modulation settings.

Setup Table

Band	3550-3700 MHz
Power Level	33 dBm
Channel Spacing	40 MHz
Mod Scheme	QPSK,16QAM,64QAM,256QAM
High channel	3680 MHz

Note: Please refer to the results measured for 10MHz Bandwidth channels above. Signals measured were generic signals and did not change with channel, Bandwidth or modulation settings.

LIMITS:

96.41(e)(1) ***General protection levels***.

(i) 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 CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed −13 dBm/MHz within 0–10 megahertz above the upper SAS-assigned channel edge and within 0–10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD 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.

96.41(e)(2) ***Additional protection levels.*** Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
30MHz - 1000MHz ±6.1dB, 1 – 18 GHz ±3.5dB, 18 – 26.5 GHz ±3.9dB, 26.5 – 60 GHz ±3.9dB

5.2 Conducted emissions

5.2.1 Test methods

Test Requirements:	FCC Part 96 Clause 96.41(e) [Reference 4.1.1 of this report]
Test Method:	FCC Part 2 Clause 2.1051 [Reference 4.1.2 of this report]
	KDB 971168 Clause 3.6 & 4.7 [Reference 4.1.3 of this report]
	ANSI C63.26 Clause 5.5 [Reference 4.1.4 of this report]
	KDB 662911 Clause E(3)(a) iii [Reference 4.1.5 of this report]
Limits:	FCC Part 96 Clause 96.41(e) [Reference 4.1.1 of this report]

5.2.2 Configuration of EUT

The EUT was operated on a test bench. Measurements were made at the 50 ohm coaxial transmit / receive port. The EUT was operated in Modes 1 to 48 for this test.

5.2.3 Test procedure

Tests were made in accordance with the Test Method noted above using the measuring equipment noted in the 'Test Equipment' Section at Site N. A complete scan of emissions from the lowest frequency generated/ used within the equipment up to 10 times the highest frequency generated/ used was made, to identify any signals within 20dB of the limits. Any identified spurious signals were measured in the required bandwidths. RF Port/Feed P5 using FSM2500 radio was tested and plotted as worst case/highest power port from preliminary scans. Per KDB 662911 D01 for multiple Transmitter output ports, 10Log(NANT) dB (+6.02 dB for 4 antenna ports) was used to apply a +6.02 dB addition to any single port measured results, for comparison with the limits. Band edge emissions are covered under section 5.8 Emissions masks tests.

5.2.4 Test equipment

E615, E725, E853, H071

See Section 8 for more details

5.2.5 Test results

Temperature of test environment	20°C
Humidity of test environment	60%
Pressure of test environment	102kPa

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3555 MHz

Plots
CSE, 9kHz-3549MHz, Low Chan, 10 MHz, P5, ID 5
CSE, 3561MHz-18GHz, Low Chan, 10 MHz, P5, ID 5
CSE, 18-26.5GHz, Low Chan, 10 MHz, P5, ID 5
CSE, 26.5-40GHz, Low Chan, 10 MHz, P5, ID 5

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Plots

CSE, 9kHz-3619MHz, Mid Chan, 10 MHz, P5, ID 5
CSE, 3631MHz-18GHz, Mid Chan, 10 MHz, P5, ID 5
CSE, 18-26.5GHz, Mid Chan, 10 MHz, P5, ID 5
CSE, 26.5-40GHz, Mid Chan, 10 MHz, P5, ID 5

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3695 MHz

Plots
CSE, 9kHz-3689MHz, High Chan, 10 MHz, P5, ID 5
CSE, 3701MHz-18GHz, High Chan, 10 MHz, P5, ID 5
CSE, 18-26.5GHz, High Chan, 10 MHz, P5, ID 5
CSE, 26.5-40GHz, High Chan, 10 MHz, P5, ID 5

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3560 MHz

Plots
CSE, 9kHz-3549MHz, Low Chan, 20 MHz, P5, ID 5
CSE, 3571MHz-18GHz, Low Chan, 20 MHz, P5, ID 5
CSE, 18-26.5GHz, Low Chan, 20 MHz, P5, ID 5
CSE, 26.5-40GHz, Low Chan, 20 MHz, P5, ID 5

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Plots
CSE, 9kHz-3614MHz, Mid Chan, 20 MHz, P5, ID 5
CSE, 3636MHz-18GHz, Mid Chan, 20 MHz, P5, ID 5
CSE, 18-26.5GHz, Mid Chan, 20 MHz, P5, ID 5
CSE, 26.5-40GHz, Mid Chan, 20 MHz, P5, ID 5

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3690 MHz

Plots
CSE, 9kHz-3679MHz, High Chan, 20 MHz, P5, ID 5
CSE, 3701MHz-18GHz, High Chan, 20 MHz, P5, ID 5
CSE, 18-26.5GHz, High Chan, 20 MHz, P5, ID 5
CSE, 26.5-40GHz, High Chan, 20 MHz, P5, ID 5

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3565 MHz

Plots
CSE, 9kHz-3549MHz, Low Chan, 30 MHz, P5, ID 5
CSE, 3581MHz-18GHz, Low Chan, 30 MHz, P5, ID 5
CSE, 18-26.5GHz, Low Chan, 30 MHz, P5, ID 5
CSE, 26.5-40GHz, Low Chan, 30 MHz, P5, ID 5

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Plots
CSE, 9kHz-3609MHz, Mid Chan, 30 MHz, P5, ID 5
CSE, 3641MHz-18GHz, Mid Chan, 30 MHz, P5, ID 5
CSE, 18-26.5GHz, Mid Chan, 30 MHz, P5, ID 5
CSE, 26.5-40GHz, Mid Chan, 30 MHz, P5, ID 5

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3685 MHz

Plots
CSE, 9kHz-3669MHz, High Chan, 30 MHz, P5, ID 5
CSE, 3701MHz-18GHz, High Chan, 30 MHz, P5, ID 5
CSE, 18-26.5GHz, High Chan, 30 MHz, P5, ID 5
CSE, 26.5-40GHz, High Chan, 30 MHz, P5, ID 5

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3570 MHz

Plots
CSE, 9kHz-3549MHz, Low Chan, 40 MHz, P5, ID 5
CSE, 3591MHz-18GHz, Low Chan, 40 MHz, P5, ID 5
CSE, 18-26.5GHz, Low Chan, 40 MHz, P5, ID 5
CSE, 26.5-40GHz, Low Chan, 40 MHz, P5, ID 5

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem

Channel Bandwidth	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Plots
CSE, 9kHz-3604MHz, Mid Chan, 40 MHz, P5, ID 5
CSE, 3646MHz-18GHz, Mid Chan, 40 MHz, P5, ID 5
CSE, 18-26.5GHz, Mid Chan, 40 MHz, P5, ID 5
CSE, 26.5-40GHz, Mid Chan, 40 MHz, P5, ID 5

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Bandwidth	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3680 MHz

Plots
CSE, 9kHz-3659MHz, High Chan, 40 MHz, P5, ID 5
CSE, 3701MHz-18GHz, High Chan, 40 MHz, P5, ID 5
CSE, 18-26.5GHz, High Chan, 40 MHz, P5, ID 5
CSE, 26.5-40GHz, High Chan, 40 MHz, P5, ID 5

No Spurious emissions found within 20 dB of limits, except for Band edge emissions which are covered under section 5.8 along with emissions mask. The plots referred to in the above table may be found in section 6.

LIMITS:

96.41(e)(1) ***General protection levels***.

(i) 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 CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed −13 dBm/MHz within 0–10 megahertz above the upper SAS-assigned channel edge and within 0–10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD 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.

96.41(e)(2) ***Additional protection levels.*** Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows: ± 2.8 dB up to 26.5 GHz. 26.5 – 60 GHz ±3.6dB

5.3 Power Limits EIRP

5.3.1 Test methods

Test Requirements:	FCC Part 96 Clause 96.41(b) [Reference 4.1.1 of this report]
Test Method:	FCC Part 2 Clause 2.1046 [Reference 4.1.2 of this report]
	KDB 971168 Clause 5.4/5.5 [Reference 4.1.3 of this report]
	ANSI C63.26 Clause 5.2.5.3/5.2.4.5 [Reference 4.1.4 of this report]
	KDB 662911 Clause E [Reference 4.1.5 of this report]
Limits:	FCC Part 96 Clause 96.41(b) [Reference 4.1.1 of this report]

5.3.2 Configuration of EUT

The EUT was measured on a bench using a spectrum analyser connected to the external RF ports.
Preliminary scans of power made on stated RF ID configs & ports to determine worst case RF port for tests this was found to be P5 and ID config 5 using modem FSM2500.
The EUT was operated in Modes 1 to Modes 48 for this test.
The EUT was set to each mode and test signal in turn (see section 2.4) and highest power levels recorded.

5.3.3 Test procedure

Tests were made in accordance with the Test Method noted above using the measuring equipment listed in the 'Test Equipment' Section.
Channel power function of the analyser was used with an RMS detector. For test modes not utilising 100% duty cycle, and as the duty cycle of the EUT was constant (within +-1%) a duty cycle correction was added on to the result using the following equation: 10.Log(1/0.75) where 0.75 is the duty cycle (75%) and equates to 1.25dB correction, see clause 5.2.4.4.2 and 5.2.4.3.4 of ANSI C63.26 for methodology. Duty correction was accounted for in the spectrum analyser along with any network/attenuation losses
Antenna Gain was added to conducted results to calculate EIRP results. The testing for dBm per 10MHz PSD for the EUT's 10MHz Bandwidth setting was using the channel power function of the analyser.
For dBm per 10MHz PSD results for 20, 30, and 40MHz Bandwidth settings, power was computed from obtained trace data in accordance with ANSI C63.26 Clause 5.2.4.4.2 (i). i.e. Summed spectrum levels in Linear terms at intervals equal to the RBW, extending across the OBW of the spectrum.
Measurements were made on a test bench in site N.

5.3.4 Test equipment

E533, E534, E887, E899, E938, F153, F249, H071

See Section 8 for more details

5.3.5 Test results

Temperature of test environment	20-22°C
Humidity of test environment	48-60%
Pressure of test environment	100-102kPa

Preliminary scans of power across the two modems were made on stated RF ID configs & ports to determine worst case port for tests. This was found to be P5 and ID config 5 and was used for final measurements. Per KDB 662911, 10Log(4) = +6.02 dB was added to single port results to calculate worst case power with 4 RF ports transmitting, before the antenna array gain was added to determine overall Radiated power with respect to the limits. Power results measured below are referenced to dBm/10MHz and also include total power over the entire channel Bandwidth, PSD results for power measured in 1MHz RBW are shown in section 5.4, channel power plots shown in section 6 also show PSD in 1MHz results.

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3555 MHz

Test Instance modulation	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm/10MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/10MHz) (incl Ant G) 4port
QPSK	21.49	21.49	21.49	21.49	14	0.564	41.51	47	-5.49	41.511
16QAM	21.97	21.97	21.97	21.97	14	0.630	41.99	47	-5.01	41.991
64QAM	21.59	21.59	21.59	21.59	14	0.577	41.61	47	-5.39	41.611
256QAM	21.33	21.33	21.33	21.33	14	0.543	41.35	47	-5.65	41.351

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	Average Cond Power (dBm/10 MHz) TX Chain 1	Average Cond Power (dBm/10 MHz) TX Chain 2	Average Cond Power (dBm/10 MHz) TX Chain 3	Average Cond Power (dBm/10 MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP 4ports (dBm/10 MHz) (incl Ant G)	Power Limit (dBm/10 MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/10 MHz) (incl Ant G) 4port
QPSK	21.52	21.52	21.52	21.52	14	0.568	41.54	47	-5.46	41.541
16QAM	21.1	21.1	21.1	21.1	14	0.515	41.12	47	-5.88	41.121
64QAM	21.68	21.68	21.68	21.68	14	0.589	41.70	47	-5.30	41.701
256QAM	21.7	21.7	21.7	21.7	14	0.592	41.72	47	-5.28	41.721

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3695 MHz

Test Instance modulation	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm/10MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/10MHz) (incl Ant G) 4port
QPSK	23.26	23.26	23.26	23.26	14	0.847	43.28	47	-3.72	43.281
16QAM	23.42	23.42	23.42	23.42	14	0.879	43.44	47	-3.56	43.441
64QAM	23.31	23.31	23.31	23.31	14	0.857	43.33	47	-3.67	43.331
256QAM	23.43	23.43	23.43	23.43	14	0.881	43.45	47	-3.55	43.451

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3560 MHz

Test Instance modulation	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm/10MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/20MHz) (incl Ant G) 4port
QPSK	19.98	19.98	19.98	19.98	14	0.398	40.00	47	-7.00	41.990
16QAM	19.96	19.96	19.96	19.96	14	0.396	39.98	47	-7.02	42.060
64QAM	19.51	19.51	19.51	19.51	14	0.357	39.53	47	-7.47	41.420
256QAM	19.48	19.48	19.48	19.48	14	0.355	39.50	47	-7.50	41.530

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm/10MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/20MHz) (incl Ant G) 4port
QPSK	20.47	20.47	20.47	20.47	14	0.446	40.49	47	-6.51	42.340
16QAM	19.97	19.97	19.97	19.97	14	0.397	39.99	47	-7.01	42.290
64QAM	20.23	20.23	20.23	20.23	14	0.422	40.25	47	-6.75	42.230
256QAM	20.49	20.49	20.49	20.49	14	0.448	40.51	47	-6.49	42.420

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3690 MHz

Test Instance modulation	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm/10MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/20MHz) (incl Ant G) 4port
QPSK	22.26	22.26	22.26	22.26	14	0.673	42.28	47	-4.72	44.210
16QAM	21.96	21.96	21.96	21.96	14	0.628	41.98	47	-5.02	44.200

64QAM	22.16	22.16	22.16	22.16	14	0.658	42.18	47	-4.82	44.030
256QAM	22.27	22.27	22.27	22.27	14	0.675	42.29	47	-4.71	44.250

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3565 MHz

Test Instance (e.g. modulation or Resource block)	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm/10MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/30MHz) (incl Ant G) 4port
QPSK	17.7	17.7	17.7	17.7	14	0.236	37.72	47	-9.28	41.540
16QAM	18.23	18.23	18.23	18.23	14	0.266	38.25	47	-8.75	42.740
64QAM	17.73	17.73	17.73	17.73	14	0.237	37.75	47	-9.25	41.470
256QAM	17.58	17.58	17.58	17.58	14	0.229	37.60	47	-9.40	41.370

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance (e.g. modulation or Resource block)	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm/10MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/30MHz) (incl Ant G) 4port
QPSK	18.85	18.85	18.85	18.85	14	0.307	38.87	47	-8.13	42.530
16QAM	18.54	18.54	18.54	18.54	14	0.286	38.56	47	-8.44	42.090
64QAM	19.14	19.14	19.14	19.14	14	0.328	39.16	47	-7.84	42.480
256QAM	18.62	18.62	18.62	18.62	14	0.291	38.64	47	-8.36	42.410

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3685 MHz

Test Instance (e.g. modulation or	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm/10MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/30MHz) (incl

Resource block)						(Watts)				Ant G) 4port
QPSK	19.98	19.98	19.98	19.98	14	0.398	40.00	47	-7.00	43.680
16QAM	19.54	19.54	19.54	19.54	14	0.360	39.56	47	-7.44	43.600
64QAM	20.11	20.11	20.11	20.11	14	0.410	40.13	47	-6.87	43.860
256QAM	20.36	20.36	20.36	20.36	14	0.435	40.38	47	-6.62	43.800

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3570 MHz

Test Instance (e.g. modulation or Resource block)	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm EIRP)	Power Margin (dB)	Total Power EIRP (dBm/40MHz) (incl Ant G) 4port
QPSK	17.95	17.95	17.95	17.95	14	0.249	37.97	47	-9.03	42.540
16QAM	18.08	18.08	18.08	18.08	14	0.257	38.10	47	-8.90	42.940
64QAM	17.37	17.37	17.37	17.37	14	0.218	37.39	47	-9.61	42.080
256QAM	17.91	17.91	17.91	17.91	14	0.247	37.93	47	-9.07	42.620

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance (e.g. modulation or Resource block)	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm/10MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/40MHz) (incl Ant G) 4port
QPSK	18.44	18.44	18.44	18.44	14	0.279	38.46	47	-8.54	43.090
16QAM	17.61	17.61	17.61	17.61	14	0.231	37.63	47	-9.37	42.940
64QAM	18.82	18.82	18.82	18.82	14	0.305	38.84	47	-8.16	43.260
256QAM	17.63	17.63	17.63	17.63	14	0.232	37.65	47	-9.35	42.390

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3680 MHz

Test Instance (e.g. modulation or Resource block)	Average Cond Power (dBm/10MHz) TX Chain 1	Average Cond Power (dBm/10MHz) TX Chain 2	Average Cond Power (dBm/10MHz) TX Chain 3	Average Cond Power (dBm/10MHz) TX Chain 4	Antenna Gain dBi	Total Cond Pow MIMO 4 Port (Watts)	Total Power EIRP (dBm/10MHz) (incl Ant G)	Power Limit (dBm/10MHz EIRP)	Power Margin (dB)	Total Power EIRP (dBm/40MHz) (incl Ant G) 4port
QPSK	19.02	19.02	19.02	19.02	14	0.319	39.04	47	-7.96	43.770
16QAM	18.1	18.1	18.1	18.1	14	0.258	38.12	47	-8.88	43.260
64QAM	18.93	18.93	18.93	18.93	14	0.313	38.95	47	-8.05	43.770
256QAM	18.95	18.95	18.95	18.95	14	0.314	38.97	47	-8.03	43.740

Channel power Plots may be found in section 6.

Test Instance modulation	Measured duty cycle %	Duty cycle correction to 100%	Plot reference
QPSK	74.39	1.28 dB	Duty Cycle QPSK 10 MHz Mid chan
16QAM	74.11	1.30 dB	Duty Cycle 16 QAM 10 MHz Mid chan
64QAM	74.15	1.30 dB	Duty Cycle 64 QAM 10 MHz Mid chan
256QAM	73.88	1.31 dB	Duty Cycle 256 QAM 10 MHz Mid chan

LIMITS:
96.41(b)

Device	Maximum EIRP (dBm/10 megahertz)	Maximum PSD (dBm/MHz)
End User Device	23	n/a
Category A CBSD	30	20
Category B CBSD	47	37

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows: <± 1.0 dB

5.4 Power Limits PSD

5.4.1 Test methods

Test Requirements:	FCC Part 96 Clause 96.41(b) [Reference 4.1.1 of this report]
Test Method:	KDB 971168 Clause 5.4/5.5 [Reference 4.1.3 of this report]
	ANSI C63.26 Clause 5.2.5.3/5.2.4.5 [Reference 4.1.4 of this report]]
	KDB 662911 Clause E [Reference 4.1.5 of this report]
Limits:	FCC Part 96 Clause 96.41(b) [Reference 4.1.1 of this report]

5.4.2 Configuration of EUT

The EUT was configured as for the Average conducted power test. The EUT was operated in modes 1- 48 for this test.

5.4.3 Test procedure

Tests were made in accordance with the Test Method noted above using the measuring equipment listed in the 'Test Equipment' Section.
The Spectrum analysers Channel power and PSD power function was used to determine Power Spectral Density over 1MHz RBW. Plots were captured. For test modes not utilising 100% duty cycle, and as the duty cycle of the EUT was constant (within +-1%) a duty cycle correction was added on to the result using the following equation: 10.Log(1/0.75) where 0.75 is the duty cycle (75%) and equates to 1.25dB correction, see clause 5.2.4.4.2 and 5.2.4.3.4 of ANSI C63.26 for methodology. Duty correction was accounted for in the spectrum analyser along with any network/attenuation losses
Measurements were made in test site N.

5.4.4 Test equipment

E533, E534, E887, E899, E938, F153, F249, H071

See Section 8 for more details

5.4.5 Test results

Temperature of test environment	20-22°C
Humidity of test environment	48-60%
Pressure of test environment	100-102kPa

Preliminary scans of power were made on both radio modems using stated RF ID configs & ports to determine worst case port for tests. This was found to be P5 and ID config 5 using modem FSM2500 and this was used for final measurements. Per KDB 662911, 10Log(4) = +6.02 dB was added to single port results to calculate worst case power with 4 RF ports transmitting, before the antenna array gain was added to determine overall Radiated power PSD/MHz with respect to the limits.

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3555 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	11.49	17.51	14	0.056	31.511	37.0	-5.489
16QAM	11.97	17.99	14	0.063	31.991	37.0	-5.009
64QAM	11.59	17.61	14	0.058	31.611	37.0	-5.389
256QAM	11.33	17.35	14	0.054	31.351	37.0	-5.649

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR Low Chan 10 MHz QPSK
16QAM	14220-3 Total PWR Low Chan 10 MHz 16 QAM
64QAM	14220-3 Total PWR Low Chan 10 MHz 64 QAM
256QAM	14220-3 Total PWR Low Chan 10 MHz 256 QAM

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	11.52	17.54	14	0.057	31.541	37.0	-5.459
16QAM	11.1	17.12	14	0.052	31.121	37.0	-5.879
64QAM	11.68	17.7	14	0.059	31.701	37.0	-5.299
256QAM	11.7	17.72	14	0.059	31.721	37.0	-5.279

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR Mid Chan 10 MHz QPSK
16QAM	14220-3 Total PWR Mid Chan 10 MHz 16 QAM
64QAM	14220-3 Total PWR Mid Chan 10 MHz 64 QAM
256QAM	14220-3 Total PWR Mid Chan 10 MHz 256 QAM

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3695 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	13.26	19.28	14	0.085	33.281	37.0	-3.719
16QAM	13.42	19.44	14	0.088	33.441	37.0	-3.559
64QAM	13.31	19.33	14	0.086	33.331	37.0	-3.669
256QAM	13.43	19.45	14	0.088	33.451	37.0	-3.549

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR High Chan 10 MHz QPSK
16QAM	14220-3 Total PWR High Chan 10 MHz 16 QAM
64QAM	14220-3 Total PWR High Chan 10 MHz 64 QAM

256QAM	14220-3 Total PWR High Chan 10 MHz 256 QAM

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3560 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	8.962	14.982	14	0.031	28.983	37.0	-8.017
16QAM	9.034	15.054	14	0.032	29.055	37.0	-7.945
64QAM	8.391	14.411	14	0.028	28.412	37.0	-8.588
256QAM	8.504	14.524	14	0.028	28.525	37.0	-8.475

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR Low Chan 20 MHz QPSK
16QAM	14220-3 Total PWR Low Chan 20 MHz 16 QAM
64QAM	14220-3 Total PWR Low Chan 20 MHz 64 QAM
256QAM	14220-3 Total PWR Low Chan 20 MHz 256 QAM

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	9.306	15.326	14	0.034	29.327	37.0	-7.673
16QAM	9.259	15.279	14	0.034	29.280	37.0	-7.720
64QAM	9.16	15.18	14	0.033	29.181	37.0	-7.819
256QAM	9.39	15.41	14	0.035	29.411	37.0	-7.589

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR Mid Chan 20 MHz QPSK
16QAM	14220-3 Total PWR Mid Chan 20 MHz 16 QAM
64QAM	14220-3 Total PWR Mid Chan 20 MHz 64 QAM
256QAM	14220-3 Total PWR Mid Chan 20 MHz 256 QAM

Setup Table

Band	3550-3700 MHz

Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3690 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	11.18	17.2	14	0.052	31.201	37.0	-5.799
16QAM	11.17	17.19	14	0.052	31.191	37.0	-5.809
64QAM	11	17.02	14	0.050	31.021	37.0	-5.979
256QAM	11.22	17.24	14	0.053	31.241	37.0	-5.759

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR High Chan 20 MHz QPSK
16QAM	14220-3 Total PWR High Chan 20 MHz 16 QAM
64QAM	14220-3 Total PWR High Chan 20 MHz 64 QAM
256QAM	14220-3 Total PWR High Chan 20 MHz 256 QAM

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3565 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	6.748	12.768	14	0.019	26.769	37.0	-10.231
16QAM	7.952	13.972	14	0.025	27.973	37.0	-9.027
64QAM	6.679	12.699	14	0.019	26.700	37.0	-10.300
256QAM	6.584	12.604	14	0.018	26.605	37.0	-10.395

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR Low Chan 30 MHz QPSK
16QAM	14220-3 Total PWR Low Chan 30 MHz 16 QAM
64QAM	14220-3 Total PWR Low Chan 30 MHz 64 QAM
256QAM	14220-3 Total PWR Low Chan 30 MHz 256 QAM

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	7.738	13.758	14	0.024	27.759	37.0	-9.241
16QAM	7.295	13.315	14	0.021	27.316	37.0	-9.684
64QAM	7.693	13.713	14	0.024	27.714	37.0	-9.286
256QAM	7.62	13.64	14	0.023	27.641	37.0	-9.359

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR Mid Chan 30 MHz QPSK
16QAM	14220-3 Total PWR Mid Chan 30 MHz 16 QAM
64QAM	14220-3 Total PWR Mid Chan 30 MHz 64 QAM
256QAM	14220-3 Total PWR Mid Chan 30 MHz 256 QAM

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3685 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	8.887	14.907	14	0.031	28.908	37.0	-8.092
16QAM	8.807	14.827	14	0.030	28.828	37.0	-8.172
64QAM	9.064	15.084	14	0.032	29.085	37.0	-7.915
256QAM	9.006	15.026	14	0.032	29.027	37.0	-7.973

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR High Chan 30 MHz QPSK
16QAM	14220-3 Total PWR High Chan 30 MHz 16 QAM
64QAM	14220-3 Total PWR High Chan 30 MHz 64 QAM
256QAM	14220-3 Total PWR High Chan 30 MHz 256 QAM

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3570 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)

QPSK	6.5	12.52	14	0.018	26.521	37.0	-10.479
16QAM	6.895	12.915	14	0.020	26.916	37.0	-10.084
64QAM	6.044	12.064	14	0.016	26.065	37.0	-10.935
256QAM	6.576	12.596	14	0.018	26.597	37.0	-10.403

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR Low Chan 40 MHz QPSK
16QAM	14220-3 Total PWR Low Chan 40 MHz 16 QAM
64QAM	14220-3 Total PWR Low Chan 40 MHz 64 QAM
256QAM	14220-3 Total PWR Low Chan 40 MHz 256 QAM

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	7.047	13.067	14	0.020	27.068	37.0	-9.932
16QAM	6.302	12.322	14	0.017	26.323	37.0	-10.677
64QAM	7.223	13.243	14	0.021	27.244	37.0	-9.756
256QAM	6.345	12.365	14	0.017	26.366	37.0	-10.634

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR Mid Chan 40 MHz QPSK
16QAM	14220-3 Total PWR Mid Chan 40 MHz 16 QAM
64QAM	14220-3 Total PWR Mid Chan 40 MHz 64 QAM
256QAM	14220-3 Total PWR Mid Chan 40 MHz 256 QAM

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3680 MHz

Test Instance modulation	Average PSD Power (dBm/MHz) TX Chain 1	Average PSD Power (dBm/MHz) 4 ports	Antenna Gain dBi	Total PSD per MHz 4 Port (Watts)	Total PSD (dBm/1MHz) 4 Port (incl Ant G)	PSD Limit (dBm/MHz)	PSD Margin (dB)
QPSK	7.724	13.744	14	0.024	27.745	37.0	-9.255
16QAM	7.218	13.238	14	0.021	27.239	37.0	-9.761
64QAM	7.726	13.746	14	0.024	27.747	37.0	-9.253
256QAM	7.701	13.721	14	0.024	27.722	37.0	-9.278

Test Instance modulation	Plot filename reference
QPSK	14220-3 Total PWR High Chan 40 MHz QPSK
16QAM	14220-3 Total PWR High Chan 40 MHz 16 QAM
64QAM	14220-3 Total PWR High Chan 40 MHz 64 QAM
256QAM	14220-3 Total PWR High Chan 40 MHz 256 QAM

Plots referred to in the above table may be found in section 6.

LIMITS:
96.41(b)

Device	Maximum EIRP (dBm/10 megahertz)	Maximum PSD (dBm/MHz)
End User Device	23	n/a
Category A CBSD	30	20
Category B CBSD	47	37

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
<± 1.0 dB

5.5 Power Limits PAPR

5.5.1 Test methods

Test Requirements:	FCC Part 96 Clause 96.41(g) [Reference 4.1.1 of this report]
Test Method:	KDB 971168 Clause 5.7.2 [Reference 4.1.3 of this report]
	ANSI C63.26 Clause 5.2.3.4 [Reference 4.1.4 of this report]
Limits:	FCC Part 96 Clause 96.41(g) [Reference 4.1.1 of this report]

5.5.2 Configuration of EUT

The EUT was operated on a test bench. Measurements were made at the 50-ohm coaxial transmit / receive port. The EUT was operated in Modes 1 to 48.

5.5.3 Test procedure

Tests were made in accordance with the Test Method noted above using the measuring equipment listed in the 'Test Equipment' Section.
Preliminary scans of power were made on the two modems FSM2500 and FSM2600 with the stated RF ID configs & ports to determine worst case port for tests. This was found to be modem FSM2500 and port P5 with ID config 5, this was used for final measurements. The Spectrum analysers CCDF power function was used to determine Peak to Average Power ratio over 0.1% transmission time. Analyser plots were captured.

Measurements were made in test site N.

5.5.4 Test equipment

E533, E534, H071, E938, E887, F153, E899, F249

See Section 8 for more details

5.5.5 Test results

Temperature of test environment	24°C
Humidity of test environment	52%
Pressure of test environment	103kPa

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3555 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR Low Chan 10 MHz QPSK	9.69	13	-3.31
16QAM	14220-3 PAPR Low Chan 10 MHz 16 QAM	9.58	13	-3.42
64QAM	14220-3 PAPR Low Chan 10 MHz 64 QAM	9.57	13	-3.43
256QAM	14220-3 PAPR Low Chan 10 MHz 256 QAM	9.62	13	-3.38

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)

QPSK	14220-3 PAPR Mid Chan 10 MHz QPSK	9.35	13	-3.65
16QAM	14220-3 PAPR Mid Chan 10 MHz 16 QAM	9.46	13	-3.54
64QAM	14220-3 PAPR Mid Chan 10 MHz 64 QAM	9.52	13	-3.48
256QAM	14220-3 PAPR Mid Chan 10 MHz 256 QAM	9.63	13	-3.37

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3695 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR High Chan 10 MHz QPSK	9.21	13	-3.79
16QAM	14220-3 PAPR High Chan 10 MHz 16 QAM	9.48	13	-3.52
64QAM	14220-3 PAPR High Chan 10 MHz 64 QAM	9.76	13	-3.24
256QAM	14220-3 PAPR High Chan 10 MHz 256 QAM	9.01	13	-3.99

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3560 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR Low Chan 20 MHz QPSK	9.42	13	-3.58
16QAM	14220-3 PAPR Low Chan 20 MHz 16 QAM	9.37	13	-3.63
64QAM	14220-3 PAPR Low Chan 20 MHz 64 QAM	9.44	13	-3.56
256QAM	14220-3 PAPR Low Chan 20 MHz 256 QAM	9.49	13	-3.51

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR Mid Chan 20 MHz QPSK	8.87	13	-4.13
16QAM	14220-3 PAPR Mid Chan 20 MHz 16 QAM	9.36	13	-3.64
64QAM	14220-3 PAPR Mid Chan 20 MHz 64 QAM	9.06	13	-3.94
256QAM	14220-3 PAPR Mid Chan 20 MHz 256 QAM	9.06	13	-3.94

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3690 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR High Chan 20 MHz QPSK	9.31	13	-3.69
16QAM	14220-3 PAPR High Chan 20 MHz 16 QAM	9.55	13	-3.45
64QAM	14220-3 PAPR High Chan 20 MHz 64 QAM	9.41	13	-3.59
256QAM	14220-3 PAPR High Chan 20 MHz 256 QAM	9.18	13	-3.82

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3565 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR Low Chan 30 MHz QPSK	9.36	13	-3.64
16QAM	14220-3 PAPR Low Chan 30 MHz 16 QAM	9.67	13	-3.33
64QAM	14220-3 PAPR Low Chan 30 MHz 64 QAM	9.2	13	-3.8
256QAM	14220-3 PAPR Low Chan 30 MHz 256 QAM	9.18	13	-3.82

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR Mid Chan 30 MHz QPSK	9.09	13	-3.91
16QAM	14220-3 PAPR Mid Chan 30 MHz 16 QAM	9.72	13	-3.28
64QAM	14220-3 PAPR Mid Chan 30 MHz 64 QAM	9.52	13	-3.48
256QAM	14220-3 PAPR Mid Chan 30 MHz 256 QAM	9.45	13	-3.55

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3685 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR High Chan 30 MHz QPSK	9.34	13	-3.66
16QAM	14220-3 PAPR High Chan 30 MHz 16 QAM	9.9	13	-3.1
64QAM	14220-3 PAPR High Chan 30 MHz 64 QAM	9.44	13	-3.56
256QAM	14220-3 PAPR High Chan 30 MHz 256 QAM	8.97	13	-4.03

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3570 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR Low Chan 40 MHz QPSK	9.62	13	-3.38
16QAM	14220-3 PAPR Low Chan 40 MHz 16 QAM	9.28	13	-3.72
64QAM	14220-3 PAPR Low Chan 40 MHz 64 QAM	9.62	13	-3.38
256QAM	14220-3 PAPR Low Chan 40 MHz 256 QAM	9.56	13	-3.44

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR Mid Chan 40 MHz QPSK	9.39	13	-3.61
16QAM	14220-3 PAPR Mid Chan 40 MHz 16 QAM	9.33	13	-3.67
64QAM	14220-3 PAPR Mid Chan 40 MHz 64 QAM	9.15	13	-3.85
256QAM	14220-3 PAPR Mid Chan 40 MHz 256 QAM	9.28	13	-3.72

Setup Table

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3680 MHz

Test Instance modulation	CCDF pk to av plot ref filename	Peak to AV ratio (dB)	PK to AV Limit (dB)	PK to AV Margin (dB)
QPSK	14220-3 PAPR High Chan 40 MHz QPSK	9.56	13	-3.44
16QAM	14220-3 PAPR High Chan 40 MHz 16 QAM	9.39	13	-3.61
64QAM	14220-3 PAPR High Chan 40 MHz 64 QAM	9.04	13	-3.96
256QAM	14220-3 PAPR High Chan 40 MHz 256 QAM	8.98	13	-4.02

Plots referred to in the above table may be found in section 6.

LIMITS:

96.41(g) ***Power measurement.*** 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

These results show that the EUT has PASSED this test.

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The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
<± 1.0 dB

5.6 Frequency Stability

5.6.1 Test methods

Test Requirements:	FCC Part 2 Clause 2.1055 [Reference 4.1.2 of this report]
Test Method:	FCC Part 2 Clause 2.1055 [Reference 4.1.2 of this report]
	KDB 971168 Clause 9 [Reference 4.1.3 of this report]
	ANSI C63.26 Clause 5.6 [Reference 4.1.4 of this report]
Limits:	FCC Part 2 Clause 2.1055 [Reference 4.1.2 of this report]

5.6.2 Configuration of EUT

The EUT was placed in a temperature-controlled chamber and thermal balance was achieved before tests began. The EUT emission measurements were made at the EUT 50 ohm port. The EUT was operated in Modes 1-48.

5.6.3 Test procedure

Tests were made in accordance with the Test Method noted above, using the measuring equipment listed in the 'Test Equipment' Section. The EUT was not provided with a CW test mode, as such tests were performed on the modulated signals. Refer to clause 5.6.4 for procedure. As the frequency stability requirement is for the fundamental emissions to stay within the authorized bands of operation, A reference point was established at the applicable unwanted emissions limits, using the RBW equal to the RBW required by the rule part for band edge emissions. Each modulated signal trace data was captured to ensure it remained within the applicable band emissions limits, at the lower and upper channel frequencies, see clause 5.6.4(l) of ANSI C63.10:2015 for further method details.
Temperature stability was achieved at each temperature test level before taking measurements. At nominal temperature the supply voltage to EUT was varied over the manufacturer's declared endpoints.
Tests were performed using Test Site J.

5.6.4 Test equipment

E367, E602, H071, L264, S036

See Section 8 for more details

5.6.5 Test results

Temperature of test environment	20°C
Humidity of test environment	50%
Pressure of test environment	101kPa

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK
Low channel	3555 MHz
High channel	3695 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-32.71	-30.99
-20°C	Volts Nominal (45)	-35.65	-31.95
-10°C	Volts Nominal (45)	-34.43	-32.92
0°C	Volts Nominal (45)	-36.07	-32.84
10°C	Volts Nominal (45)	-37.02	-34.86
20°C	Volts Minimum (40.5)	-36.18	-31.50
	Volts Nominal (45)	-36.86	-32.04
	Volts Maximum (49.5)	-36.39	-33.30
30°C	Volts Nominal (45)	-37.17	-33.49

40°C	Volts Nominal (45)	-34.63	-30.57
50°C	Volts Nominal (45)	-35.28	-33.93
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -30°C Lower and 40°C upper channel		-13.69	-11.55

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	16QAM
Low channel	3555 MHz
High channel	3695 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-32.46	-32.28
-20°C	Volts Nominal (45)	-33.99	-33.72
-10°C	Volts Nominal (45)	-33.14	-30.03
0°C	Volts Nominal (45)	-33.97	-34.50
10°C	Volts Nominal (45)	-34.94	-33.62
20°C	Volts Minimum (40.5)	-35.25	-32.30
	Volts Nominal (45)	-36.27	-32.77
	Volts Maximum (49.5)	-34.77	-32.53
30°C	Volts Nominal (45)	-34.37	-31.82
40°C	Volts Nominal (45)	-34.86	-34.35
50°C	Volts Nominal (45)	-32.26	-33.92
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit 50°C Lower and -10°C upper channel		-13.24	-11.01

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	64QAM
Low channel	3555 MHz
High channel	3695 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-31.45	-29.89
-20°C	Volts Nominal (45)	-34.56	-31.96
-10°C	Volts Nominal (45)	-33.08	-31.51
0°C	Volts Nominal (45)	-36.54	-31.97
10°C	Volts Nominal (45)	-36.58	-32.95
20°C	Volts Minimum (40.5)	-36.52	-31.90
	Volts Nominal (45)	-36.04	-33.26
	Volts Maximum (49.5)	-36.91	-32.67
30°C	Volts Nominal (45)	-37.46	-33.13
40°C	Volts Nominal (45)	-36.58	-33.29
50°C	Volts Nominal (45)	-36.64	-32.43
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02

Closest Margin to limit -30°C Lower and -30°C upper channel	-12.43	-10.87

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	256QAM
Low channel	3555 MHz
High channel	3695 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-33.65	-32.89
-20°C	Volts Nominal (45)	-34.28	-31.32
-10°C	Volts Nominal (45)	-34.64	-32.82
0°C	Volts Nominal (45)	-34.93	-33.99
10°C	Volts Nominal (45)	-35.79	-32.57
20°C	Volts Minimum (40.5)	-36.88	-31.19
	Volts Nominal (45)	-35.89	-31.88
	Volts Maximum (49.5)	-36.59	-30.83
30°C	Volts Nominal (45)	-36.88	-33.06
40°C	Volts Nominal (45)	-36.18	-33.28
50°C	Volts Nominal (45)	-36.53	-32.28
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -30°C Lower and 20°C upper channel		-14.63	-11.81

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK
Low channel	3560 MHz
High channel	3690 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-34.46	-33.35
-20°C	Volts Nominal (45)	-36.04	-29.04
-10°C	Volts Nominal (45)	-36.60	-28.85
0°C	Volts Nominal (45)	-36.62	-29.74
10°C	Volts Nominal (45)	-36.01	-31.40
20°C	Volts Minimum (40.5)	-35.86	-32.20
	Volts Nominal (45)	-36.69	-31.48
	Volts Maximum (49.5)	-36.83	-30.18
30°C	Volts Nominal (45)	-36.36	-29.59
40°C	Volts Nominal (45)	-36.59	-30.45
50°C	Volts Nominal (45)	-34.40	-31.67
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit 50°C Lower and -10°C upper channel		-15.38	-9.83

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	16QAM
Low channel	3560 MHz
High channel	3690 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-31.03	-28.75
-20°C	Volts Nominal (45)	-34.55	-29.49
-10°C	Volts Nominal (45)	-34.50	-32.07
0°C	Volts Nominal (45)	-32.73	-29.75
10°C	Volts Nominal (45)	-35.09	-31.27
20°C	Volts Minimum (40.5)	-34.98	-33.82
	Volts Nominal (45)	-33.18	-27.86
	Volts Maximum (49.5)	-36.58	-33.38
30°C	Volts Nominal (45)	-36.46	-34.22
40°C	Volts Nominal (45)	-34.73	-29.71
50°C	Volts Nominal (45)	-36.85	-31.82
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -30°C Lower and 20°C upper channel		-12.01	-8.84

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	64QAM
Low channel	3560 MHz
High channel	3690 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-31.87	-29.71
-20°C	Volts Nominal (45)	-32.78	-26.82
-10°C	Volts Nominal (45)	-34.76	-29.11
0°C	Volts Nominal (45)	-34.96	-27.74
10°C	Volts Nominal (45)	-35.02	-31.77
20°C	Volts Minimum (40.5)	-38.92	-30.13
	Volts Nominal (45)	-35.86	-31.13
	Volts Maximum (49.5)	-35.82	-30.62
30°C	Volts Nominal (45)	-33.73	-29.09
40°C	Volts Nominal (45)	-35.57	-31.63
50°C	Volts Nominal (45)	-36.91	-31.43
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -30°C Lower and -20°C upper channel		-12.85	-7.8

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	256QAM
Low channel	3560 MHz
High channel	3690 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-32.71	-27.78
-20°C	Volts Nominal (45)	-32.66	-26.79
-10°C	Volts Nominal (45)	-34.22	-29.93
0°C	Volts Nominal (45)	-35.21	-26.37
10°C	Volts Nominal (45)	-40.48	-36.99
20°C	Volts Minimum (40.5)	-36.56	-32.39
	Volts Nominal (45)	-37.92	-29.32
	Volts Maximum (49.5)	-36.71	-31.76
30°C	Volts Nominal (45)	-36.57	-30.06
40°C	Volts Nominal (45)	-38.99	-31.33
50°C	Volts Nominal (45)	-37.20	-32.46
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -20°C Lower and 0°C upper channel		-13.64	-7.35

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK
Low channel	3565 MHz
High channel	3685 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-32.35	-30.45
-20°C	Volts Nominal (45)	-33.05	-31.98
-10°C	Volts Nominal (45)	-35.04	-33.61
0°C	Volts Nominal (45)	-35.71	-31.32
10°C	Volts Nominal (45)	-37.65	-31.95
20°C	Volts Minimum (40.5)	-37.19	-34.17
	Volts Nominal (45)	-38.48	-32.46
	Volts Maximum (49.5)	-37.80	-34.43
30°C	Volts Nominal (45)	-36.70	-35.93
40°C	Volts Nominal (45)	-37.39	-33.10
50°C	Volts Nominal (45)	-35.66	-34.56
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -30°C Lower and -30°C upper channel		-13.33	-11.43

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	16QAM

Low channel	3565 MHz
High channel	3685 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-31.87	-32.64
-20°C	Volts Nominal (45)	-32.67	-30.59
-10°C	Volts Nominal (45)	-33.05	-32.57
0°C	Volts Nominal (45)	-38.48	-34.82
10°C	Volts Nominal (45)	-34.65	-40.36
20°C	Volts Minimum (40.5)	-36.82	-33.88
	Volts Nominal (45)	-36.32	-30.92
	Volts Maximum (49.5)	-38.94	-34.64
30°C	Volts Nominal (45)	-36.95	-35.25
40°C	Volts Nominal (45)	-39.00	-32.88
50°C	Volts Nominal (45)	-36.08	-32.56
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -30°C Lower and -30°C upper channel		-12.85	-11.57

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	64QAM
Low channel	3565 MHz
High channel	3685 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-33.26	-29.38
-20°C	Volts Nominal (45)	-32.34	-28.53
-10°C	Volts Nominal (45)	-34.53	-33.65
0°C	Volts Nominal (45)	-37.26	-33.00
10°C	Volts Nominal (45)	-37.23	-32.69
20°C	Volts Minimum (40.5)	-40.34	-33.68
	Volts Nominal (45)	-39.43	-35.07
	Volts Maximum (49.5)	-36.80	-34.86
30°C	Volts Nominal (45)	-37.96	-35.77
40°C	Volts Nominal (45)	-38.21	-36.78
50°C	Volts Nominal (45)	-35.49	-31.69
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -20°C Lower and -20°C upper channel		-14.24	-9.51

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	256QAM
Low channel	3565 MHz
High channel	3685 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-34.69	-28.40
-20°C	Volts Nominal (45)	-36.70	-33.31
-10°C	Volts Nominal (45)	-35.43	-35.33
0°C	Volts Nominal (45)	-35.66	-33.55
10°C	Volts Nominal (45)	-40.48	-36.99
20°C	Volts Minimum (40.5)	-39.34	-34.69
	Volts Nominal (45)	-37.55	-34.58
	Volts Maximum (49.5)	-39.89	-32.56
30°C	Volts Nominal (45)	-37.07	-33.99
40°C	Volts Nominal (45)	-39.89	-35.86
50°C	Volts Nominal (45)	-34.14	-37.52
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -30°C Lower and -30°C upper channel		-15.12	-9.38

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK
Low channel	3570 MHz
High channel	3680 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-28.67	-29.14
-20°C	Volts Nominal (45)	-31.69	-30.82
-10°C	Volts Nominal (45)	-32.92	-34.28
0°C	Volts Nominal (45)	-34.41	-29.00
10°C	Volts Nominal (45)	-35.60	-31.92
20°C	Volts Minimum (40.5)	-35.65	-32.43
	Volts Nominal (45)	-32.66	-34.89
	Volts Maximum (49.5)	-32.93	-29.13
30°C	Volts Nominal (45)	-34.67	-32.85
40°C	Volts Nominal (45)	-35.60	-31.03
50°C	Volts Nominal (45)	-33.13	-35.99
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -30°C Lower and 0°C upper channel		-9.65	-9.98

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	16QAM
Low channel	3570 MHz
High channel	3680 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-31.72	-27.93

-20°C	Volts Nominal (45)	-31.33	-29.01
-10°C	Volts Nominal (45)	-33.17	-28.84
0°C	Volts Nominal (45)	-31.84	-30.02
10°C	Volts Nominal (45)	-33.24	-32.21
20°C	Volts Minimum (40.5)	-36.01	-32.39
	Volts Nominal (45)	-36.68	-29.22
	Volts Maximum (49.5)	-33.11	-26.57
30°C	Volts Nominal (45)	-33.53	-29.24
40°C	Volts Nominal (45)	-33.47	-32.07
50°C	Volts Nominal (45)	-34.00	-27.75
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -20°C Lower and 20°C upper channel		-12.31	-7.55

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	64QAM
Low channel	3570 MHz
High channel	3680 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-28.28	-28.86
-20°C	Volts Nominal (45)	-32.91	-30.40
-10°C	Volts Nominal (45)	-34.72	-33.65
0°C	Volts Nominal (45)	-34.72	-32.34
10°C	Volts Nominal (45)	-34.72	-32.95
20°C	Volts Minimum (40.5)	-35.02	-30.37
	Volts Nominal (45)	-36.03	-32.73
	Volts Maximum (49.5)	-37.86	-25.12
30°C	Volts Nominal (45)	-33.21	-34.20
40°C	Volts Nominal (45)	-37.11	-27.15
50°C	Volts Nominal (45)	-36.85	-30.01
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -30°C Lower and 20°C upper channel		-9.26	-6.10

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	256QAM
Low channel	3570 MHz
High channel	3680 MHz

Test conditions		Level at band edge(dBm) Low channel	Level at band edge(dBm) High channel
-30°C	Volts Nominal (45)	-28.67	-29.10
-20°C	Volts Nominal (45)	-31.45	-27.88
-10°C	Volts Nominal (45)	-37.38	-30.14
0°C	Volts Nominal (45)	-37.38	-28.94
10°C	Volts Nominal (45)	-37.38	-35.51

20°C	Volts Minimum (40.5)	-36.48	-35.21
	Volts Nominal (45)	-37.59	-35.68
	Volts Maximum (49.5)	-33.64	-30.14
30°C	Volts Nominal (45)	-35.04	-33.46
40°C	Volts Nominal (45)	-38.13	-29.37
50°C	Volts Nominal (45)	-37.57	-28.68
-13dBm Limit -6.02dB for 4 port TX		-19.02	-19.02
Closest Margin to limit -30°C Lower and -20°C upper channel		-9.65	-8.86

Whilst Low and High channels using QPSK, 16QAM, 64QAM and 256QAM have been measured using 10, 20, 30 and 40 MHz Bandwidths, only worst case 40MHz Bandwidth 64QAM plots are shown in section 6 to help minimise report size.

LIMITS:
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows: <± 0.7 ppm

5.7 Occupied Bandwidth

5.7.1 Test methods

Test Requirements:	FCC Part 2 Clause 2.1049 [Reference 4.1.2 of this report]
Test Method:	KDB 971168 Clause 4 [Reference 4.1.3 of this report]
	ANSI C63.26 Clause 5.4 [Reference 4.1.4 of this report]
Limits:	FCC Part 2 Clause 2.1049 [Reference 4.1.2 of this report]

5.7.2 Configuration of EUT

The EUT was operated on a test bench. Measurements were made at the 50-ohm coaxial transmit / receive port. The EUT was operated in Modes 1 to 48 for this test

5.7.3 Test procedure

Tests were made in accordance with the Test Method noted above using the measuring equipment listed in the 'Test Equipment' Section. A 1% of occupied bandwidth was set as RBW, 3x VBW, auto sweep time and max hold settings were used for the 26dB / 99% bandwidth.
The EUT was set to each Bandwidth/mod scheme in turn (see section 2.4) and 26 dB bandwidth / 99% bandwidth recorded.
Tests were performed using test Site N.

5.7.4 Test equipment

E309, E533, E807, E843, H071

See Section 8 for more details

5.7.5 Test results

Temperature of test environment	20°C
Humidity of test environment	60%
Pressure of test environment	101kPa

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	10 MHz
Mod Scheme	QPSK
Low channel	3555 MHz
Mid channel	3625 MHz
High channel	3695 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	8.683	8.658	8.667
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 10MHz QPSK	14220-3 Mid 10MHz QPSK	14220-3 High 10MHz QPSK
26dB Bandwidth (MHz)	10.05	9.5	9.907
Frequency Error (kHz) include sign '-	-15.735	30.259	-21.914
Operating frequency (MHz)	3555	3625	3695
FLOW Worst case (MHz)	3550.642765	3620.701259	3690.644586
FHIGH Worst case (MHz)	3559.325765	3629.359259	3699.311586

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	10 MHz
Mod Scheme	16 QAM
Low channel	3555 MHz
Mid channel	3625 MHz
High channel	3695 MHz

	Low channel	Mid channel	High channel
99% Bandwidth (MHz) Nominal Temp & Volts	8.74	8.709	8.662
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 10MHz 16QAM	14220-3 Mid 10MHz 16QAM	14220-3 High 10MHz 16QAM
26dB Bandwidth (MHz)	10.43	10.44	10.24
Frequency Error (kHz) include sign '-	16.335	-11.295	0.77
Operating frequency (MHz)	3555	3625	3695
FLOW Worst case (MHz)	3550.646335	3620.634205	3690.66977
FHIGH Worst case (MHz)	3559.386335	3629.343205	3699.33177

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	10 MHz
Mod Scheme	64 QAM
Low channel	3555 MHz
Mid channel	3625 MHz
High channel	3695 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	8.748	8.6978	8.676
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 10MHz 64QAM	14220-3 Mid 10MHz 64QAM	14220-3 High 10MHz 64QAM
26dB Bandwidth (MHz)	10.08	9.832	9.461
Frequency Error (kHz) include sign '-	-4.984	9.786	-2.519
Operating frequency (MHz)	3555	3625	3695
FLOW Worst case (MHz)	3550.621016	3620.660886	3690.659481
FHIGH Worst case (MHz)	3559.369016	3629.358686	3699.335481

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	10 MHz
Mod Scheme	256 QAM
Low channel	3555 MHz
Mid channel	3625 MHz
High channel	3695 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	8.7438	8.6662	8.67
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 10MHz 256QAM	14220-3 Mid 10MHz 256QAM	14220-3 High 10MHz 256QAM
26dB Bandwidth (MHz)	10.32	9.85	10.13
Frequency Error (kHz) include sign '-	-13.333	18.704	-13.315
Operating frequency (MHz)	3555	3625	3695
FLOW Worst case (MHz)	3550.614767	3620.685604	3690.651685
FHIGH Worst case (MHz)	3559.358567	3629.351804	3699.321685

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	20 MHz
Mod Scheme	QPSK
Low channel	3560 MHz
Mid channel	3625 MHz
High channel	3690 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	18.404	18.303	18.345
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 20MHz QPSK	14220-3 Mid 20MHz QPSK	14220-3 High 20MHz QPSK
26dB Bandwidth (MHz)	20.33	19.75	19.79
Frequency Error (kHz) include sign '-	-31.758	39.517	6.487
Operating frequency (MHz)	3560	3625	3690
FLOW Worst case (MHz)	3550.766242	3615.888017	3680.833987
FHIGH Worst case (MHz)	3569.170242	3634.191017	3699.178987

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	20 MHz
Mod Scheme	16 QAM
Low channel	3560 MHz
Mid channel	3625 MHz
High channel	3690 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	18.353	18.393	18.308
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 20MHz 16QAM	14220-3 Mid 20MHz 16QAM	14220-3 High 20MHz 16QAM
26dB Bandwidth (MHz)	20.06	19.81	19.61
Frequency Error (kHz) include sign '-	17.731	-2.636	-4.473
Operating frequency (MHz)	3560	3625	3690
FLOW Worst case (MHz)	3550.841231	3615.800864	3680.841527
FHIGH Worst case (MHz)	3569.194231	3634.193864	3699.149527

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	20 MHz
Mod Scheme	64 QAM
Low channel	3560 MHz
Mid channel	3625 MHz
High channel	3690 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	18.434	18.371	18.584
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 20MHz 64QAM	14220-3 Mid 20MHz 64QAM	14220-3 High 10MHz Dual 64QAM
26dB Bandwidth (MHz)	20.16	20.02	19.63
Frequency Error (kHz) include sign '-	-20.815	-35.564	-71.731
Operating frequency (MHz)	3560	3625	3690
FLOW Worst case (MHz)	3550.762185	3615.778936	3680.636269
FHIGH Worst case (MHz)	3569.196185	3634.149936	3699.220269

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	20 MHz
Mod Scheme	256 QAM
Low channel	3560 MHz
Mid channel	3625 MHz
High channel	3690 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	18.416	18.334	18.628
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 20MHz 256QAM	14220-3 Mid 20MHz 256QAM	14220-3 High 10MHz Dual 256QAM
26dB Bandwidth (MHz)	23.26	19.91	19.81
Frequency Error (kHz) include sign '-	-0.275	55.826	-11.44
Operating frequency (MHz)	3560	3625	3690
FLOW Worst case (MHz)	3550.791725	3615.888826	3680.67456
FHIGH Worst case (MHz)	3569.207725	3634.222826	3699.30256

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	30 MHz
Mod Scheme	QPSK
Low channel	3565 MHz
Mid channel	3625 MHz

High channel	3685 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	27.938	27.985	27.927
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 30MHz QPSK	14220-3 Mid 30MHz QPSK	14220-3 High 30MHz QPSK
26dB Bandwidth (MHz)	29.98	29.7	29.67
Frequency Error (kHz) include sign '-	39.813	84.295	64.673
Operating frequency (MHz)	3565	3625	3685
FLOW Worst case (MHz)	3551.070813	3611.091795	3671.101173
FHIGH Worst case (MHz)	3579.008813	3639.076795	3699.028173

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	30 MHz
Mod Scheme	16 QAM
Low channel	3565 MHz
Mid channel	3625 MHz
High channel	3685 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	27.886	27.925	27.969
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 30MHz 16QAM	14220-3 Mid 30MHz 16QAM	14220-3 High 30MHz 16QAM
26dB Bandwidth (MHz)	29.57	29.31	29.59
Frequency Error (kHz) include sign '-	19.236	3.415	56.659
Operating frequency (MHz)	3565	3625	3685
FLOW Worst case (MHz)	3551.076236	3611.040915	3671.072159
FHIGH Worst case (MHz)	3578.962236	3638.965915	3699.041159

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	30 MHz
Mod Scheme	64 QAM
Low channel	3565 MHz
Mid channel	3625 MHz
High channel	3685 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	27.903	27.88	27.937
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 30MHz 64QAM	14220-3 Mid 30MHz 64QAM	14220-3 High 30MHz 64QAM
26dB Bandwidth (MHz)	29.33	29.2	29.35
Frequency Error (kHz) include sign '-	10.109	78.497	-13.133
Operating frequency (MHz)	3565	3625	3685

FLOW Worst case (MHz)	3551.058609	3611.138497	3671.018367
FHIGH Worst case (MHz)	3578.961609	3639.018497	3698.955367

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	30 MHz
Mod Scheme	256 QAM
Low channel	3565 MHz
Mid channel	3625 MHz
High channel	3685 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	27.962	28.012	27.974
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 30MHz 256QAM	14220-3 Mid 30MHz 256QAM	14220-3 High 30MHz 256QAM
26dB Bandwidth (MHz)	29.63	29.67	29.63
Frequency Error (kHz) include sign '-	58.715	53.678	44.435
Operating frequency (MHz)	3565	3625	3685
FLOW Worst case (MHz)	3551.077715	3611.047678	3671.057435
FHIGH Worst case (MHz)	3579.039715	3639.059678	3699.031435

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	40 MHz
Mod Scheme	QPSK
Low channel	3570 MHz
Mid channel	3625 MHz
High channel	3680 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	38.036	38.07	37.957
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 40MHz QPSK	14220-3 Mid 40MHz QPSK	14220-3 High 40MHz QPSK
26dB Bandwidth (MHz)	40.35	40.52	40.21
Frequency Error (kHz) include sign '-	68.807	170.2	-49.346
Operating frequency (MHz)	3570	3625	3680
FLOW Worst case (MHz)	3551.050807	3606.1352	3660.972154
FHIGH Worst case (MHz)	3589.086807	3644.2052	3698.929154

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	40 MHz
Mod Scheme	16 QAM
Low channel	3570 MHz

Mid channel	3625 MHz
High channel	3680 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	38.159	38.186	38.115
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 40MHz 16QAM	14220-3 Mid 40MHz 16QAM	14220-3 High 40MHz 16QAM
26dB Bandwidth (MHz)	40.35	40.39	40.36
Frequency Error (kHz) include sign '-	70.807	36.985	-4.054
Operating frequency (MHz)	3570	3625	3680
FLOW Worst case (MHz)	3550.991307	3605.943985	3660.938446
FHIGH Worst case (MHz)	3589.150307	3644.129985	3699.053446

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	40 MHz
Mod Scheme	64 QAM
Low channel	3570 MHz
Mid channel	3625 MHz
High channel	3680 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	38.113	37.982	38.122
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 40MHz 64QAM	14220-3 Mid 40MHz 64QAM	14220-3 High 40MHz 64QAM
26dB Bandwidth (MHz)	40.26	40.3	40.29
Frequency Error (kHz) include sign '-	22.551	155.64	-81.194
Operating frequency (MHz)	3570	3625	3680
FLOW Worst case (MHz)	3550.966051	3606.16464	3660.857806
FHIGH Worst case (MHz)	3589.079051	3644.14664	3698.979806

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem MHz
Channel Spacing	40 MHz
Mod Scheme	256 QAM
Low channel	3570 MHz
Mid channel	3625 MHz
High channel	3680 MHz

	Low channel	Mid channel	High channel
99%Bandwidth (MHz) Nominal Temp & Volts	37.917	37.975	37.895
Plot for 99%Bandwidth (MHz) Nominal Temp & Volts	14220-3 Low 40MHz 256QAM	14220-3 Mid 40MHz 256QAM	14220-3 High 40MHz 256QAM
26dB Bandwidth (MHz)	39.71	39.75	39.74
Frequency Error (kHz) include sign '-	93.138	45.336	-3.957
Operating frequency (MHz)	3570	3625	3680
FLOW Worst case (MHz)	3551.134638	3606.057836	3661.048543
FHIGH Worst case (MHz)	3589.051638	3644.032836	3698.943543

Analyser plots for bandwidth can be found in Section 6 of this report.

LIMITS:
Bandwidth of the emission must be contained within the designated frequency band.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
<± 1.9 %

5.8 Emission Mask

5.8.1 Test methods

Test Requirements:	FCC Part 96 Clause 96.41(e) [Reference 4.1.1 of this report]
Test Method:	KDB 971168 Clause 6 [Reference 4.1.3 of this report]
	ANSI C63.26 Clause 5.7 [Reference 4.1.4 of this report]
	KDB 662911 Clause E [Reference 4.1.5 of this report]
Limits:	FCC Part 96 Clause 96.41(e) [Reference 4.1.1 of this report]

5.8.2 Configuration of EUT

The EUT was operated on a test bench. Measurements were made at the 50-ohm coaxial transmit / receive port. The EUT was operated in Modes 1 to 36 for this test.

5.8.3 Test procedure

Tests were made in accordance with the Test Method noted above, using the measuring equipment listed in the 'Test Equipment' Section. A RBW of minimum 1% of EUT BW was used to measure emissions within 1MHz of the band edges, without the need to integrate back to 1MHz, from +1MHz outside the lower and upper band edges measurements are referenced/integrated to 1MHz RBW. All modulation schemes in combination with channel bandwidths and upper and lower channel frequencies were assessed and plotted. (See section 2.4 for mode details). Per KDB 662911, 10Log(4) = +6.02 dB was added to single port results to calculate worst case emissions at band edges with 4 RF ports transmitting.
The EUT was tested in Site N..

5.8.4 Test equipment

E533, E534, H071, E938, E887, E899, F249

See Section 8 for more details

5.8.5 Test results

Temperature of test environment	20°C
Humidity of test environment	50%
Pressure of test environment	102kPa

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3555 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 10 MHz Low Chan QPSK			
QPSK Close in	-34.65	14220-3 BE 10 MHz Low Chan QPSK	-28.63	-21.65	-15.63
16 QAM Mask	-	Mask 10 MHz Low Chan 16 QAM			
16 QAM Close in	-32.07	14220-3 Band Edge 10 MHz Low Chan 16 QAM	-26.05	-19.07	-13.05
64 QAM Mask	-	Mask 10 MHz Low Chan 64 QAM			
64 QAM Close in	-35.81	14220-3 BE 10 MHz Low Chan 64 QAM	-29.79	-22.81	-16.79
256 QAM Mask	-	Mask 10 MHz Low Chan 256 QAM			
256 QAM Close in	-36	14220-3 BE 10 MHz Low Chan 256 QAM	-29.98	-23	-16.98

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 10 MHz Mid Chan QPSK			
QPSK Close in	-30.61	14220-3 BE 10 MHz Mid Chan QPSK	-24.59	-17.61	-11.59
16 QAM Mask	-	Mask 10 MHz Mid Chan 16 QAM			
16 QAM Close in	-31.29	14220-3 Band Edge 10 MHz High Chan 16 QAM	-25.27	-18.29	-12.27
64 QAM Mask	-	Mask 10 MHz Mid Chan 64 QAM			
64 QAM Close in	-24.25	14220-3 BE 10 MHz Mid Chan 64 QAM	-18.23	-11.25	-5.23
256 QAM Mask	-	Mask 10 MHz Mid Chan 256 QAM			
256 QAM Close in	-30.13	14220-3 BE 10 MHz Mid Chan 256 QAM	-24.11	-17.13	-11.11

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	10 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3695 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 10 MHz High Chan QPSK	-	-	-
QPSK Close in	-32.4	14220-3 BE 10 MHz High Chan QPSK	-26.38	-19.4	-13.38
16 QAM Mask	-	Mask 10 MHz High Chan 16 QAM			
16 QAM Close in	-29.24	14220-3 Band Edge 10 MHz High Chan 16 QAM	-23.22	-16.24	-10.22
64 QAM Mask	-	Mask 10 MHz High Chan 64 QAM			
64 QAM Close in	-31.32	14220-3 BE 10 MHz High Chan 64 QAM	-25.3	-18.32	-12.3
256 QAM Mask	-	Mask 10 MHz High Chan 256 QAM			
256 QAM Close in	-32.5	14220-3 BE 10 MHz High Chan 256 QAM	-26.48	-19.5	-13.48

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3560 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 20 MHz Low Chan QPSK	-	-	-
QPSK Close in	-35.73	14220-3 BE 20 MHz Low Chan QPSK	-29.71	-22.73	-16.71
16 QAM Mask	-	Mask 20 MHz Low Chan 16 QAM			
16 QAM Close in	-34.03	14220-3 Band Edge 20 MHz Low Chan 16 QAM	-28.01	-21.03	-15.01
64 QAM Mask	-	Mask 20 MHz Low Chan 64 QAM			
64 QAM Close in	-38.09	14220-3 BE 20 MHz Low Chan 64 QAM	-32.07	-25.09	-19.07
256 QAM Mask	-	Mask 20 MHz Low Chan 256 QAM			
256 QAM Close in	-36.9	14220-3 BE 20 MHz Low Chan 256 QAM	-30.88	-23.9	-17.88

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 20 MHz Mid Chan QPSK	-	-	-
QPSK Close in	-31.99	14220-3 BE 20 MHz Mid Chan QPSK	-25.97	-18.99	-12.97
16 QAM Mask	-	Mask 20 MHz Mid Chan 16 QAM	-	-	-
16 QAM Close in	-34.00	14220-3 Band Edge 20 MHz High Chan 16 QAM	-27.98	-21	-14.98
64 QAM Mask	-	Mask 20 MHz Mid Chan 64 QAM	-	-	-
64 QAM Close in	-32.25	14220-3 BE 20 MHz Mid Chan 64 QAM	-26.23	-19.25	-13.23
256 QAM Mask	-	Mask 20 MHz Mid Chan 256 QAM	-	-	-
256 QAM Close in	-31.57	14220-3 BE 20 MHz Mid Chan 256 QAM	-25.55	-18.57	-12.55

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	20 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3690 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 20 MHz High Chan QPSK	-	-	-
QPSK Close in	-32.08	14220-3 BE 20 MHz High Chan QPSK	-26.06	-19.08	-13.06
16 QAM Mask	-	Mask 20 MHz High Chan 16 QAM			

16 QAM Close in	-31.05	14220-3 Band Edge 20 MHz High Chan 16 QAM	-25.03	-18.05	-12.03
64 QAM Mask	-	Mask 20 MHz High Chan 64 QAM			
64 QAM Close in	-30.45	14220-3 BE 20 MHz High Chan 64 QAM	-24.43	-17.45	-11.43
256 QAM Mask	-	Mask 20 MHz High Chan 256 QAM			
256 QAM Close in	-30.82	14220-3 BE 20 MHz High Chan 256 QAM	-24.8	-17.82	-11.8

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3565 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 30 MHz Low Chan QPSK	-	-	-
QPSK Close in	-38.51	14220-3 BE 30 MHz Low Chan QPSK	-32.49	-25.51	-19.49
16 QAM Mask	-	Mask 30 MHz Low Chan 16 QAM			
16 QAM Close in	-36.77	14220-3 Band Edge 30 MHz Low Chan 16 QAM	-30.75	-23.77	-17.75
64 QAM Mask	-	Mask 30 MHz Low Chan 64 QAM			
64 QAM Close in	-36.26	14220-3 BE 30 MHz Low Chan 64 QAM	-30.24	-23.26	-17.24
256 QAM Mask	-	Mask 30 MHz Low Chan 256 QAM			
256 QAM Close in	-34.67	14220-3 BE 30 MHz Low Chan 256 QAM	-28.65	-21.67	-15.65

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 30 MHz Mid Chan QPSK	-	-	-
QPSK Close in	-33.99	14220-3 BE 30 MHz Mid Chan QPSK	-27.97	-20.99	-14.97
16 QAM Mask	-	Mask 30 MHz Mid Chan 16 QAM	-	-	-
16 QAM Close in	-35.29	14220-3 Band Edge 30 MHz Mid Chan 16 QAM	-29.27	-22.29	-16.27
64 QAM Mask	-	Mask 30 MHz Mid Chan 64 QAM	-	-	-
64 QAM Close in	-33.94	14220-3 BE 30 MHz Mid Chan 64 QAM	-27.92	-20.94	-14.92
256 QAM Mask	-	Mask 30 MHz Mid Chan 256 QAM	-	-	-
256 QAM Close in	-33.52	14220-3 BE 30 MHz Mid Chan 256 QAM	-27.5	-20.52	-14.5

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	30 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3685 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 30 MHz High Chan QPSK	-	-	-
QPSK Close in	-32.08	14220-3 BE 30 MHz High Chan QPSK	-26.06	-19.08	-13.06
16 QAM Mask	-	Mask 30 MHz High Chan 16 QAM			
16 QAM Close in	-34.13	14220-3 Band Edge 30 MHz High Chan 16 QAM	-28.11	-21.13	-15.11
64 QAM Mask	-	Mask 30 MHz High Chan 64 QAM			
64 QAM Close in	-31.53	14220-3 BE 30 MHz High Chan 64 QAM	-25.51	-18.53	-12.51
256 QAM Mask	-	Mask 30 MHz High Chan 256 QAM			
256 QAM Close in	-32.98	14220-3 BE 30 MHz High Chan 256 QAM	-26.96	-19.98	-13.96

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Low channel	3570 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 40 MHz Low Chan QPSK	-	-	-
QPSK Close in	-34.44	14220-3 BE 40 MHz Low Chan QPSK	-28.42	-21.44	-15.42
16 QAM Mask	-	Mask 40 MHz Low Chan 16 QAM			
16 QAM Close in	-34.99	14220-3 Band Edge 40 MHz Low Chan 16 QAM	-28.97	-21.99	-15.97
64 QAM Mask	-	Mask 40 MHz Low Chan 64 QAM			
64 QAM Close in	-30.65	14220-3 BE 40 MHz Low Chan 64 QAM	-24.63	-17.65	-11.63
256 QAM Mask	-	Mask 40 MHz Low Chan 256 QAM			
256 QAM Close in	-29.7	14220-3 BE 40 MHz Low Chan 256 QAM	-23.68	-16.7	-10.68

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
Mid channel	3625 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 40 MHz Mid Chan QPSK	-	-	-
QPSK Close in	-32.65	14220-3 BE 40 MHz Mid Chan QPSK	-26.63	-19.65	-13.63
16 QAM Mask	-	Mask 40 MHz Mid Chan 16 QAM	-	-	-
16 QAM Close in	-34.84	14220-3 Band Edge 40 MHz Mid Chan 16 QAM	-28.82	-21.84	-15.82
64 QAM Mask	-	Mask 40 MHz Mid Chan 64 QAM	-	-	-
64 QAM Close in	-32.42	14220-3 BE 40 MHz Mid Chan 64 QAM	-26.4	-19.42	-13.4
256 QAM Mask	-	Mask 40 MHz Mid Chan 256 QAM	-	-	-
256 QAM Close in	-32.55	14220-3 BE 40 MHz Mid Chan 256 QAM	-26.53	-19.55	-13.53

Band	3550-3700 MHz
Power Level	+33 dBm set internal modem
Channel Spacing	40 MHz
Mod Scheme	QPSK, 16QAM, 64QAM, 256QAM
High channel	3680 MHz

Test Instance modulation	Highest Band edge result Single Port 1 (dBm)	Plot reference Port 1	Band edge result Single Port 1+6.02dB summed (4ports) (dBm)	Single Port 1 (dB) Margin	4 Port (dB) Margin
QPSK Mask	-	Mask 40 MHz High Chan QPSK	-	-	-
QPSK Close in	-33.06	14220-3 BE 40 MHz High Chan QPSK	-27.04	-20.06	-14.04
16 QAM Mask	-	Mask 40 MHz High Chan 16 QAM			
16 QAM Close in	-34.82	14220-3 Band Edge 40 MHz High Chan 16 QAM	-28.8	-21.82	-15.8
64 QAM Mask	-	Mask 40 MHz High Chan 64 QAM			
64 QAM Close in	-31.57	14220-3 BE 40 MHz High Chan 64 QAM	-25.55	-18.57	-12.55
256 QAM Mask	-	Mask 40 MHz High Chan 256 QAM			
256 QAM Close in	-33.24	14220-3 BE 40 MHz High Chan 256 QAM	-27.22	-20.24	-14.22

The plots referred to in the above table may be found in section 6.

LIMITS:

96.41(e)(1) ***General protection levels***.

(i) 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 CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed −13 dBm/MHz within 0–10 megahertz above the upper SAS-assigned channel edge and within 0–10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD 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.
96.41(e)(2) ***Additional protection levels.*** Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:

5.9 Modulation Characteristics

PROVIDED: EUT uses digital modulation techniques. Modulation schemes and information is detailed in section 2.2 of this report.

5.10 Transmit Power Control

The EUT supports transmitter power control, please see Operational Description Exhibits.

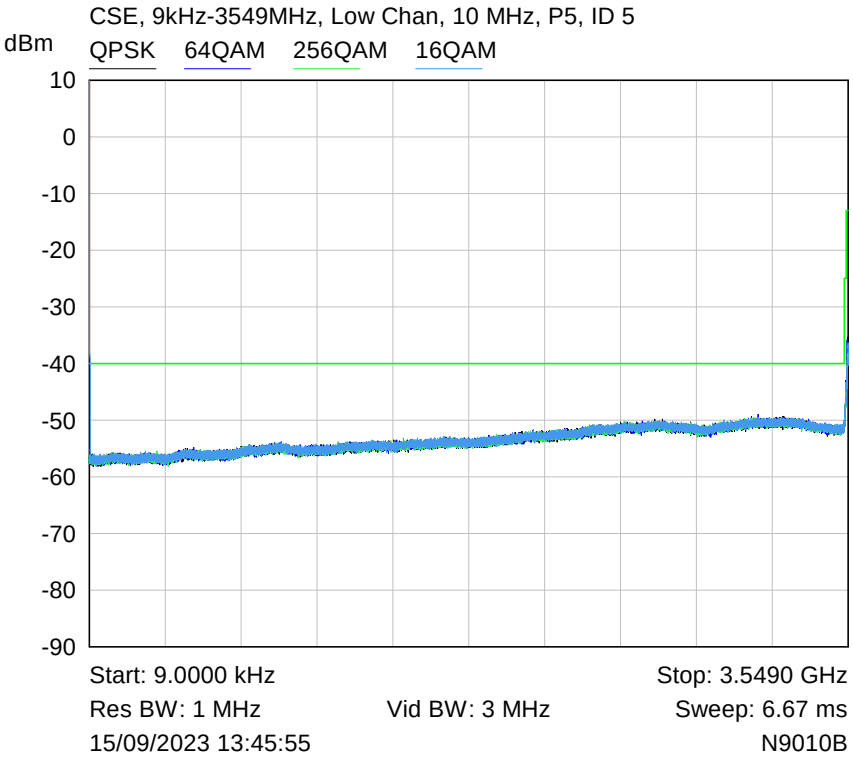
5.11 RX signal strength/reception limits

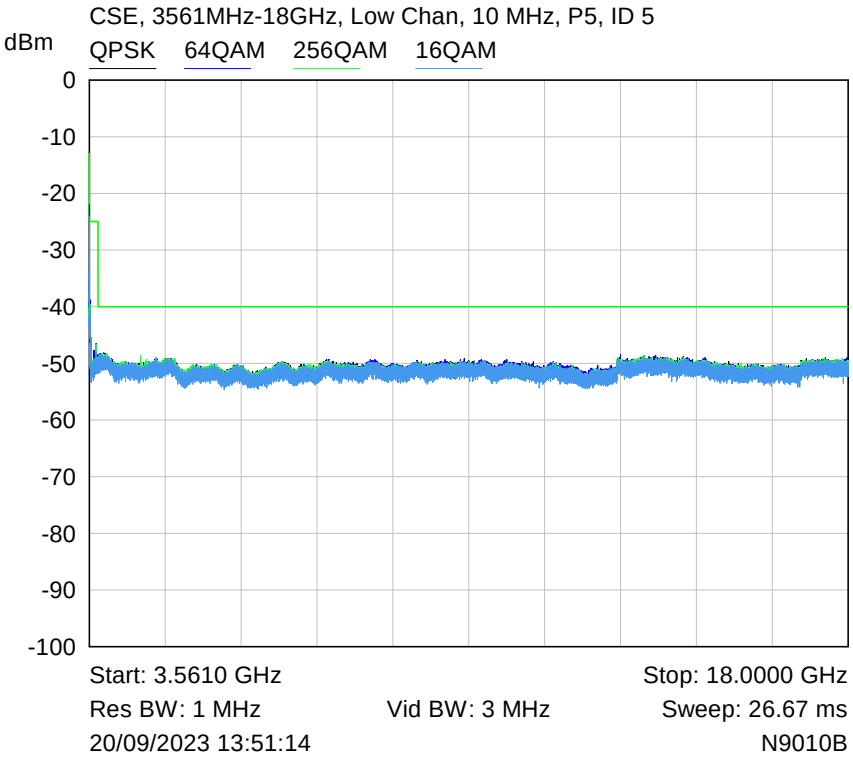
NOT APPLICABLE: Per KDB940660 D01 Part 96 CBRS eqpt: This is a requirement for licensees and not a requirement for equipment authorization of a CBSD. Therefore, it does not need to be included in the test report.

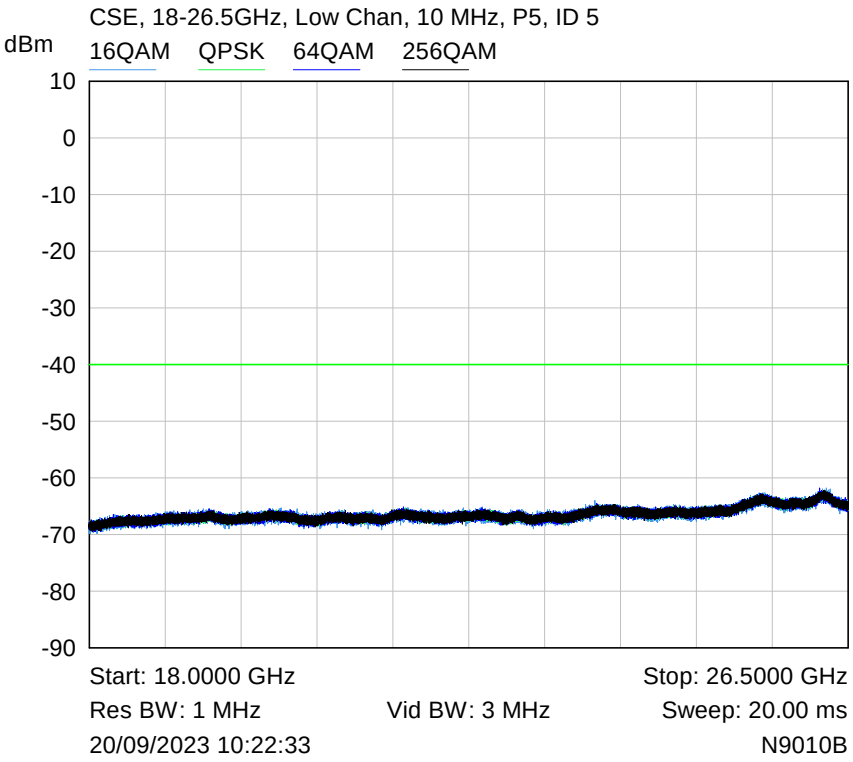
6 Plots/Graphical results

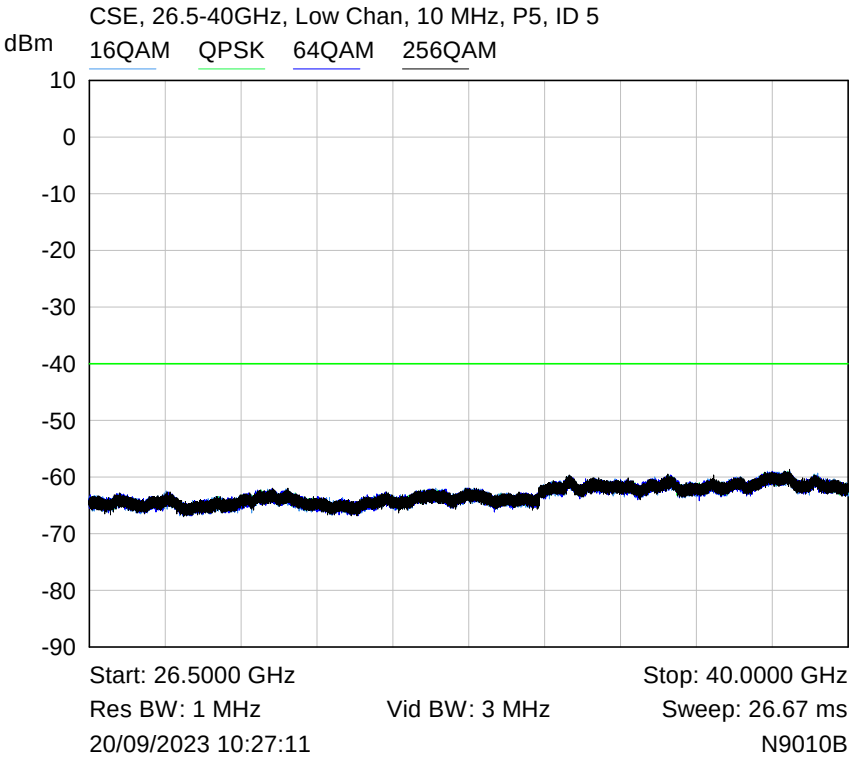
6.1 Conducted emissions

RF Parameters: Band 3550-3700 MHz, Power +33 dBm set internal modem, Channel Spacing 10 MHz, Modulation All modulation schemes, Low channel

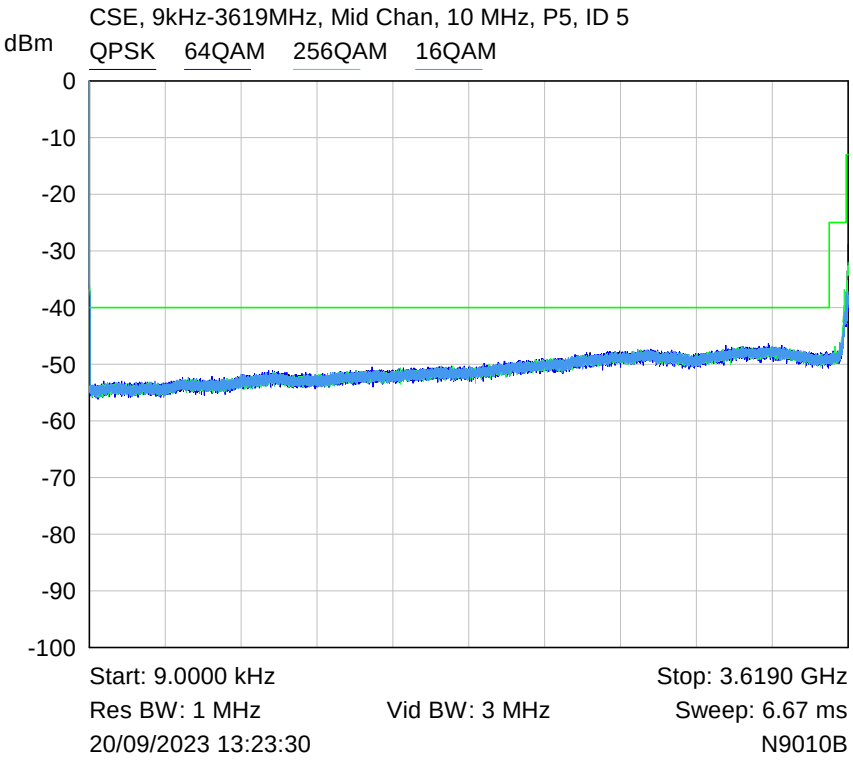


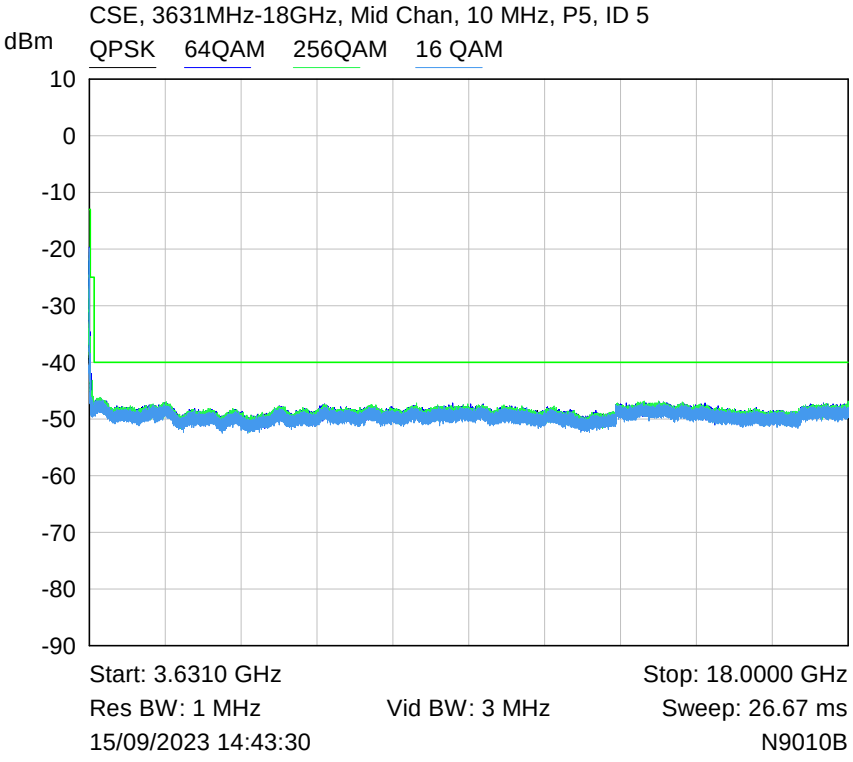


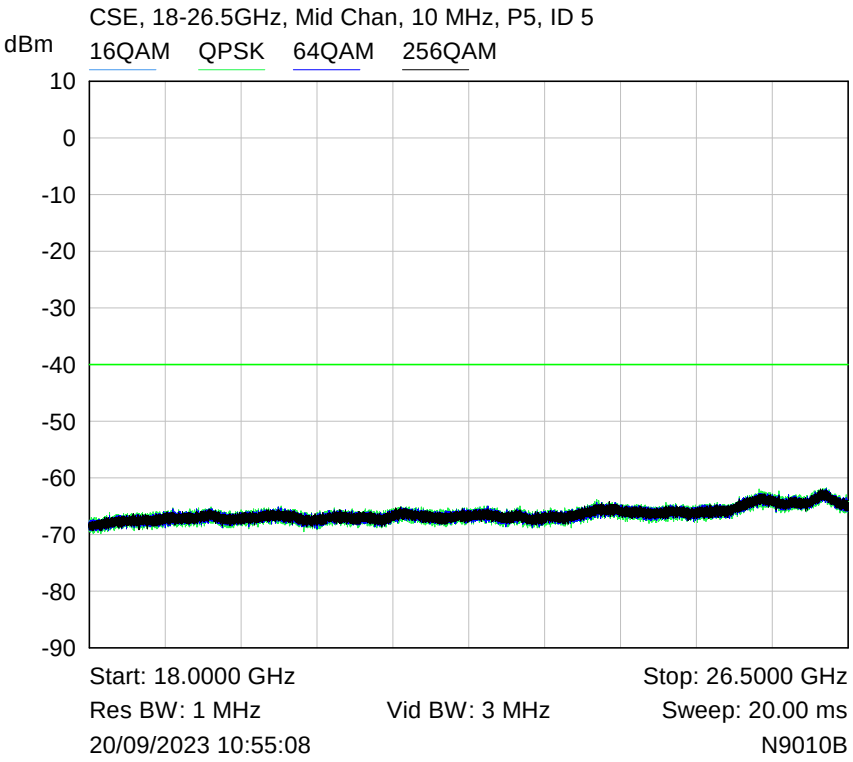


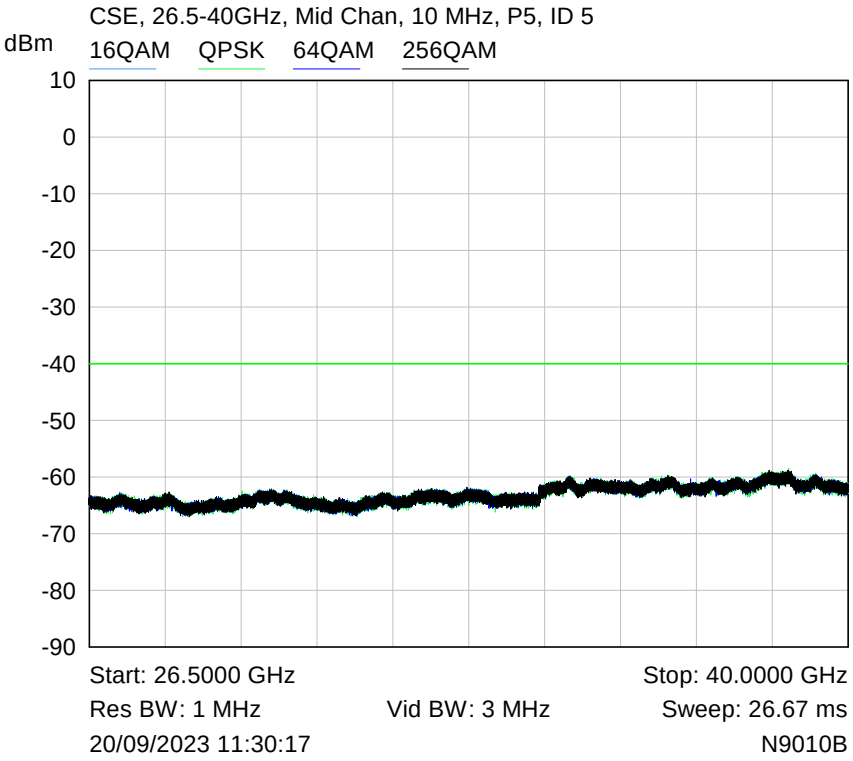


RF Parameters: Band 3550-3700 MHz, Power +33 dBm set internal modem, Channel Spacing 10 MHz, Modulation All modulation schemes, Mid channel

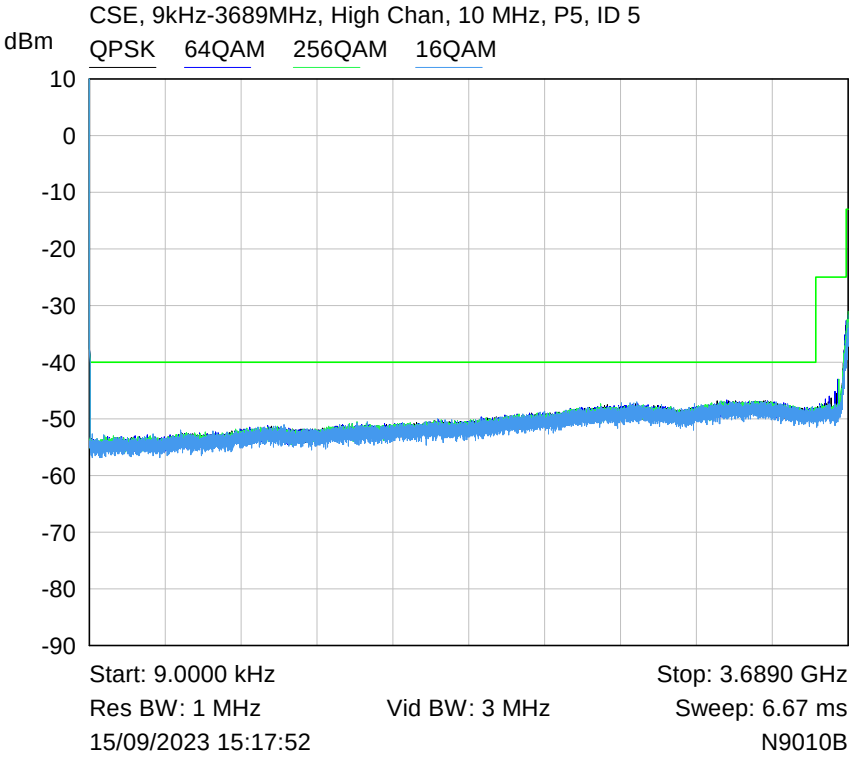


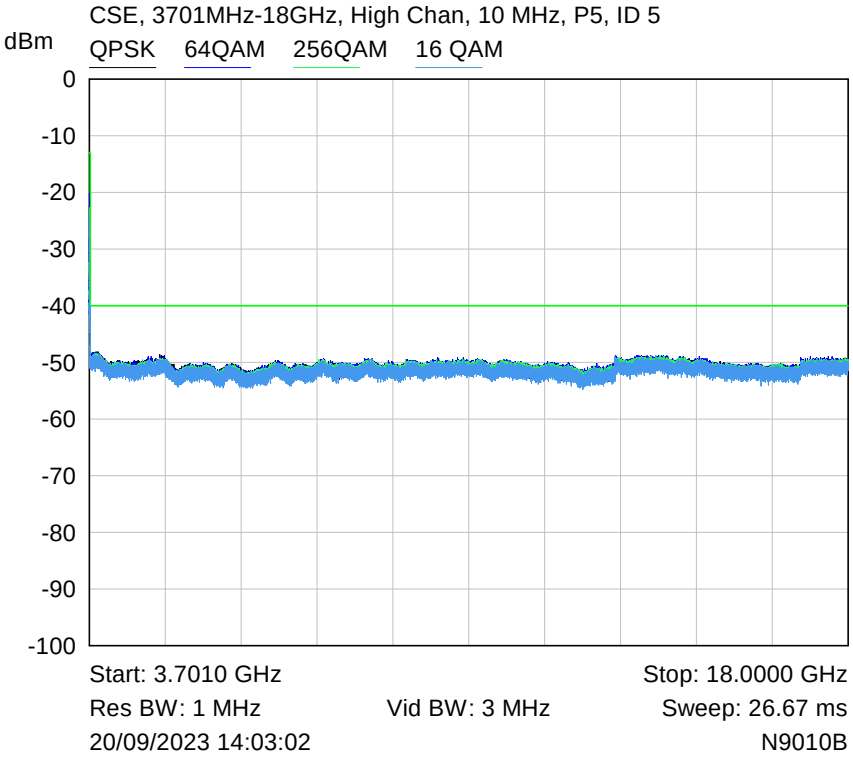


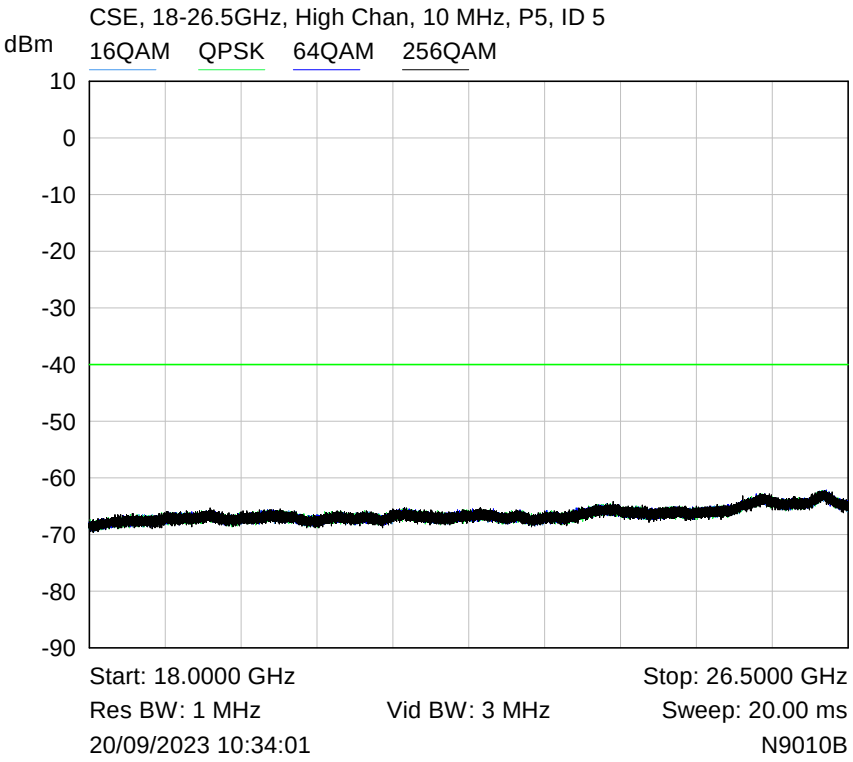


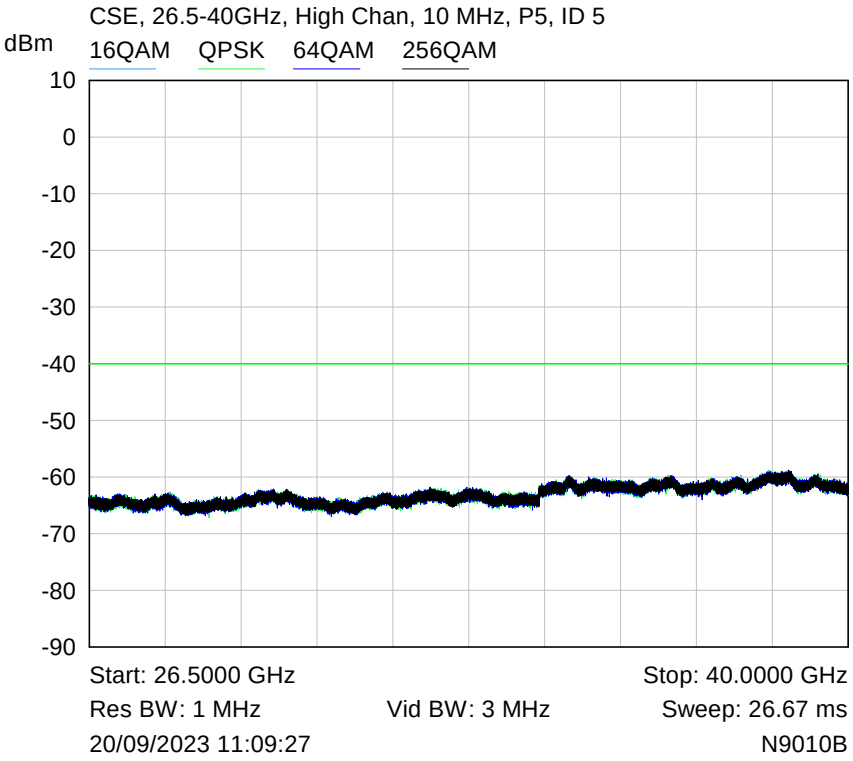


RF Parameters: Band 3550-3700 MHz, Power +33 dBm set internal modem, Channel Spacing 10 MHz, Modulation All modulation schemes, High channel









RF Parameters: Band 3550-3700 MHz, Power +33 dBm set internal modem, Channel Spacing 20 MHz, Modulation All modulation schemes, Low channel