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Report On

Radio Testing of the
Nokia Solutions and Networks Oy
Multiradio 10 BTS RRH module 2.6GHz
Radio Access technology: E-UTRA (TDD)
In accordance with FCC 47 CFR Part 2 and FCC 47 CFR Part 27

COMMERCIAL-IN-CONFIDENCE

FCC: VBNFZHJ-01

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DATED

29 June 2015



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SECTION 1

REPORT SUMMARY

Radio Testing of the
Nokia Solutions and Networks Oy
Multiradio 10 BTS RRH module 2.6GHz
Radio Access technology: E-UTRA (TDD)
In accordance with FCC 47 CFR Part 2 and FCC 47 CFR Part 27



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Radio Testing of the Nokia Solutions and Networks Oy Multiradio 10 BTS RRH module 2.6GHz
Radio Access technology: E-UTRA (TDD) In accordance with FCC 47 CFR Part 2 and FCC 47 CFR Part 27 as part of a class 2 permissive change.

Objective	To perform Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Nokia Solutions and Networks Oy
Model Number(s)	FZHJ
Serial Number(s)	RY141229174
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 2 (2012) FCC 47 CFR Part 27 (2012)
Order Number	451/90546422
Date	26 August 2014
Start of Test	13 April 2015
Finish of Test	28 May 2015
Name of Engineer(s)	Kimmo Huuki Jari Veijola



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SECTION 2

DISCLAIMERS AND COPYRIGHT



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2.1 DISCLAIMERS AND COPYRIGHT

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ANNEX A


NOKIA SOLUTIONS AND NETWORKS OY TEST REPORT NO: D532085264

**TEST REPORT NO: D532085264****FCC ID: VBNFZHJ-01**

Date:	Oulu 02.Jun 2015
Pages:	237
Appendices:	-

Equipment Under Test:	Flexi Multiradio 10 BTS RF module 2.6GHz Radio Access technology: E-UTRA (TDD)
Type:	FZIJ
Manufacturer:	Nokia Solutions and Networks Oy
Address:	P.O. Box 319, Kaapelitie 4, FI-90620, Oulu, Finland
Task:	Conformance test according to the specifications mentioned below
Test Specification(s):	FCC 47 CFR part 2 (2012) and FCC 47 CFR part 27 (2012)
Result:	The EUT complies with the requirements of the specification

The results relate only to the items tested as described in this test report.

Approved by:	Date	Signature
Jari Virta		
R&D Line Manager Nokia Networks	02.Jun 2015	



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1. SUMMARY

Due to new Software features new carrier configurations are available to FZHJ unit and FCC class 2 permissive change is mandatory to grant the permission to use these configurations.

The following tests were performed according to the FCC rules in order to verify the compliance of the EUT with the FCC requirements:

Test No.	Measurement	FCC Rule	Page Number of this Report	Result
1	RF Power Output	§ 2.1046, § 27.50	8	compliant
2	Modulation Characteristics	§ 2.1047, § 2.201	17	compliant
3	Occupied Bandwidth	§ 2.1049	18	compliant
4	Spurious Emissions at Antenna Terminals	§ 2.1051, § 2.1057, § 27.53	23	compliant
5	Field Strength of Spurious Radiation	§ 2.1053, § 2.1057, § 27.53, § 27.55	48	compliant

Table 1 Results – Summary

In accordance with the FCC Rule §15.3 (z) the equipment was tested with the limits that are valid for an *unintentional radiator*.

Measurements guidance: FCC OET laboratory KDB: 662911 D01 Multiple Transmitter Output v01r02 and FCC OET KDB:971168 D01 Power Meas License Digital Systems v02r01.

1.1 Test Laboratory

Nokia Solutions and Networks Oy
Kaapelitie 4, FI-90620, Oulu, Finland
Jari Virta
FCC Reg. No: 411251

1.2 Time Schedule

Test No.	1, 2, 3, 4	5	6
Start of Test:	22 Apr 2015	13 April 2015	N/A
End of Test:	28 May 2015	11 May 2015	N/A

1.3 Participants

Name	Function	Signature
Kimmo Huuki (Nokia)	Testing, Setup of EUT	
Jari Veijola (Nokia)	Testing, Setup of EUT	



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2. EQUIPMENT UNDER TEST

The EUT is a LTE Base transceiver station RF module 2.6GHz with 8 power amplifiers.

The BTS performs the full RAN function of LTE system (evolved UTRA). This is sometimes referred to as collapsed RAN, where equivalent functions of former 3G BTS and 3G RNC are all integrated into BTS. BTS is connected directly to the core network via S1 interface, and to mobile stations via Air interface (Uu). In addition BTSs are optionally connected directly to each others via X2 interface for handover purposes. The tested equipment is representative for serial production.

2.1 Configuration of EUT

The used different EUT configurations are shown by the following table.

Module Type		Flexi Multiradio BTS RF module 2.6GHz
Radio Access Technology		E-UTRA
Duplex mode		Time Division Duplex (TDD)
Channel Bandwidth		Single carrier 10MHz (Config. A), Single carrier 15MHz (Config. B), Triple carrier 20MHz (Config C).
Supply Voltage		48.0 V DC
Frequency Bands		
Channel Bandwidth 10MHz	Lowest tunable freq. Single carrier	2501.0 MHz
	Middle freq. Single carrier	2593.0 MHz
	Highest tunable freq. Single carrier	2685.0MHz
Channel Bandwidth 15MHz	Lowest tunable freq. Single carrier	2503.5 MHz
	Middle freq. Single carrier	2593.0 MHz
	Highest tunable freq. Single carrier	2682.5 MHz
Channel Bandwidth 20MHz	Lowest tunable freq. Triple carriers	2506.0/2526.0/2546.0 MHz
	Middle freq. Triple carriers	2573.0/2593.0/2613.0 MHz
	Highest tunable freq. Triple carriers	2640.0/2660.0/2680.0 MHz
Single carrier		
Rated Output Power (Prat)		10W(40dBm),10MHz /15W (43.0dBm),15MHz conducted / carrier
Triple carrier		
Rated Output Power (Prat)		6.6W (38.2dBm), 20MHz conducted / carrier
Downlink/Uplink ratio		6/3 to 8/1
	RX	TX
Number of Antenna Ports		8 (ANT1 to ANT8)
MIMO		Yes

Table 2 Overview of EUT configuration

The tests were performed with one EUT at the antenna ports ANT1, ANT2, ANT3, ANT4, ANT5, ANT6, ANT7 or ANT8.

The used different EUT configurations are shown by the following table.



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Module Name	Serial-No.	Module Type	Config.
FZHJ	RY141229174	Radio module	A, B, C
Other Modules	Module Type	Config.	
FSIH	System module	A, B, C	
FFHS	Rejection filter	A, B, C	

Table 3 Configuration of EUT

For a functional description of the modules, please refer to the appropriate related parts and exhibit sections of this certification application.

2.2 Operating Conditions

The EUT supports QPSK, 16QAM and 64QAM modulation. If not stated otherwise, the following standard setup procedure for the EUT was used:

The transmitter was set up according to 3GPP TS 36.141 E-UTRA Test Models (E-TM) for all tests:

- E-TM 1.1: All QPSK modulation testing
- E-TM 3.1: All 64QAM modulation testing
- E-TM 3.2: All 16QAM modulation testing

During the measurements, one carrier channel was tested at a time. The carrier was set to the maximum power level to ensure the maximum emission amplitudes during all measurements.

During the tests, the Flexi Multiradio BTS is transmitting a pseudo random bit pattern on the data channels. This ensures that the measurements of the emission characteristics of the transmitter are pursuant to § 2.1049.

Test models E-TM1.1, E-TM3.1 and E-TM3.2 have uplink/downlink ratio 3:6.



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3. TEST CONFIGURATION

If not stated otherwise, the following measurement configuration was used to perform all measurements (see figure below).

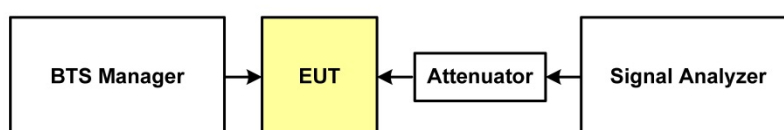


Figure 1 Test Configuration (single output)

The RF output of the transceiver (cell) under test is connected to a signal analyzer via a high power attenuator to protect the input of the signal analyzer from high RF power levels. A description of the analyzer settings is given in each of the sections describing the measurements. The other transceivers are terminated.

A complete list of the measurement equipment is included on page 50 of this measurement report.

3.1 Calibration of the Test Equipment

All relevant test equipment has a valid calibration from an external calibration laboratory. Additionally the signal analyzer has a built-in self-calibration procedure. This calibration procedure was activated prior to the measurements so that the analyzer is deemed accurate. High quality cables were used to connect the measurement equipment to the EUT. The actual loss of the attenuator and the cables was measured with a high precision network analyzer and taken into account for all measurements.



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4. TEST RESULTS

4.1 Test No. 1: RF Power Output (§ 2.1046, § 27.50)

4.1.1. Limits

Para. No. 27.50 (h).(1) Main, booster and base stations. (i) The maximum EIRP of a main, booster or base station shall not exceed $33 \text{ dBW} + 10\log(X/Y) \text{ dBW}$, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section.

Sample calculation: $33\text{dBW} + 10\log(10\text{MHz}/5.5\text{MHz}) \text{ dBW} = 34.26 \text{ dBW} = \sim 2667\text{W}$

4.1.2. Test Procedure and Results

Detachable Antenna: The maximum output power at the antenna terminals was measured using a signal analyzer.

The RF power was measured with a frequency sweep across the carrier (see screenshots). The carrier power was calculated from the signal analyzer by integration over the result. The base station maximum output power is the sum of the measured carrier power and the external attenuation (cable loss of the test set up).

For the MiMo output, RF power output was measured from each antenna port individually and the results summed mathematically in accordance to FCC KDB 662911 D01 -guidance.

Peak to average power (PAPR) was examined using CCDF method and 0.1% value recorded in dB to the tables below.

External filter and Cables insertion losses were measured with ZVA network analyzer. These losses should be added to measured output power results to get correct values in output power test, because measurement point is now in filter antenna port not as normally in RF modules antenna port.

Measured insertion losses are below.

Channel Frequency:	Carrier RBW:	Cable+Filter path loss:
2501/2593/2685 MHz	10MHz	-0.70/-0.88/-0.95 dB
2503.5/2593/2682.5 MHz	15MHz	-0.73/-0.88/-0.86 dB
2506/2526/2546 MHz	20MHz	-0.74/-0.70/-0.52 dB
2573/2593/2613 MHz	20MHz	-0.72/-0.70/-0.57 dB
2640/2660/2680 MHz	20MHz	-0.85/-0.48/-0.80 dB



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The following table shows the measured output powers at the antenna connector.

Config A:

Carrier Frequency [MHz]	RF Power Output		PAPR	Result
	[dBm]	[W]	[dB]	
QPSK-Modulation ANT1				
2501.0	39.07	8.07	8.56	compliant
2593.0	39.15	8.22	8.62	compliant
2685.0	38.88	7.73	8.60	compliant
QPSK-Modulation ANT2				
2501.0	39.27	8.45	8.60	compliant
2593.0	39.19	8.30	8.58	compliant
2685.0	38.91	7.78	8.60	compliant
QPSK-Modulation ANT3				
2501.0	39.08	8.09	8.62	compliant
2593.0	39.08	8.09	8.58	compliant
2685.0	38.97	7.89	8.62	compliant
QPSK-Modulation ANT4				
2501.0	38.90	7.76	8.54	compliant
2593.0	38.99	7.93	8.60	compliant
2685.0	38.70	7.41	8.62	compliant
QPSK-Modulation ANT5				
2501.0	39.06	8.05	8.52	compliant
2593.0	38.62	7.28	8.56	compliant
2685.0	39.18	8.28	8.60	compliant
QPSK-Modulation ANT6				
2501.0	39.34	8.59	8.52	compliant
2593.0	39.33	8.57	8.56	compliant
2685.0	38.96	7.87	8.60	compliant
QPSK-Modulation ANT7				
2501.0	38.94	7.83	8.60	compliant
2593.0	39.23	8.38	8.60	compliant
2685.0	38.91	7.78	8.60	compliant
QPSK-Modulation ANT8				
2501.1	39.13	8.18	8.54	compliant
2593.0	39.45	8.81	8.58	compliant
2685.0	39.07	8.07	8.64	compliant
QPSK-Modulation ANT1+ANT2+ANT3+ANT4+ANT5+ANT6+ANT7+ANT8 Calculated Total				
2501.0	48.13190	65.04	-	compliant
2593.0	48.16711	65.57	-	compliant
2685.0	47.98039	62.81	-	compliant
16QAM-Modulation ANT1				
2501.0	39.11	8.15	8.48	compliant
2593.0	39.20	8.32	8.48	compliant
2685.0	38.89	7.74	8.48	compliant
16QAM-Modulation ANT2				
2501.0	39.16	8.24	8.50	compliant
2593.0	39.20	8.36	8.50	compliant
2685.0	39.03	8.00	8.42	compliant
16QAM-Modulation ANT3				
2501.0	39.13	8.18	8.50	compliant
2593.0	39.13	8.18	8.48	compliant
2685.0	38.90	7.76	8.48	compliant
16QAM-Modulation ANT4				



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2501.0	38.94	7.83	8.48	compliant
2593.0	39.03	8.00	8.50	compliant
2685.0	38.77	7.53	8.46	compliant
16QAM-Modulation ANT5				
2501.0	39.05	8.04	8.52	compliant
2593.0	39.18	8.28	8.50	compliant
2685.0	38.86	7.70	8.52	compliant
16QAM-Modulation ANT6				
2501.0	39.33	8.57	8.52	compliant
2593.0	39.39	8.69	8.50	compliant
2685.0	39.11	8.15	8.48	compliant
16QAM-Modulation ANT7				
2501.0	39.01	7.96	8.54	compliant
2593.0	39.27	8.45	8.48	compliant
2685.0	38.93	7.82	8.46	compliant
16QAM-Modulation ANT8				
2501.0	39.09	8.11	8.52	compliant
2593.0	39.49	8.90	8.50	compliant
2685.0	39.25	8.41	8.52	compliant
16QAM-Modulation ANT1+ANT2+ANT3+ANT4+ANT5+ANT6+ANT7+ANT8 Calculated Total				
2501.0	48.13476	65.08	-	compliant
2593.0	48.27178	67.17	-	compliant
2685.0	48.00081	63.11	-	compliant
64QAM-Modulation ANT1				
2501.0	39.01	7.96	8.50	compliant
2593.0	39.17	8.26	8.52	compliant
2685.0	38.88	7.73	8.46	compliant
64QAM-Modulation ANT2				
2501.0	39.17	8.26	8.50	compliant
2593.0	39.10	8.13	8.48	compliant
2685.0	39.00	7.94	8.48	compliant
64QAM-Modulation ANT3				
2501.0	39.01	7.96	8.46	compliant
2593.0	39.07	8.07	8.42	compliant
2685.0	38.72	7.45	8.48	compliant
64QAM-Modulation ANT4				
2501.0	38.87	7.71	8.40	compliant
2593.0	39.00	7.94	8.44	compliant
2685.0	38.71	7.43	8.54	compliant
64QAM-Modulation ANT5				
2501.0	38.65	7.33	8.42	compliant
2593.0	39.17	8.26	8.42	compliant
2685.0	38.96	7.87	8.54	compliant
64QAM-Modulation ANT6				
2501.0	39.28	8.47	8.40	compliant
2593.0	39.32	8.55	8.42	compliant
2685.0	39.13	8.18	8.48	compliant
64QAM-Modulation ANT7				
2501.0	39.14	8.20	8.44	compliant
2593.0	39.22	8.36	8.44	compliant
2685.0	38.97	7.88	8.52	compliant
64QAM-Modulation ANT8				
2501.0	39.09	8.11	8.42	compliant

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2593.0	39.43	8.77	8.56	compliant
2685.0	39.30	8.51	8.46	compliant
64QAM-Modulation ANT1+ANT2+ANT3+ANT4+ANT5+ANT6+ANT7+ANT8 Calculated Total				
2501.0	48.06222	64.01	-	compliant
2593.0	48.21785	66.34	-	compliant
2685.0	47.99359	63.00	-	compliant

Table 4 RF Power Output (10 MHz Channel BW)

Config B:

Carrier Frequency [MHz]	RF Power Output		PAPR	Result
	[dBm]	[W]	[dB]	
QPSK-Modulation ANT1				
2503.5	40.91	12.33	7.94	compliant
2593.0	41.15	13.03	7.90	compliant
2682.5	41.11	12.91	7.98	compliant
QPSK-Modulation ANT2				
2503.5	41.23	13.27	7.88	compliant
2593.0	41.25	13.34	7.88	compliant
2682.5	41.06	12.76	7.98	compliant
QPSK-Modulation ANT3				
2503.5	41.03	12.68	7.90	compliant
2593.0	41.08	12.82	7.92	compliant
2682.5	40.91	12.33	7.96	compliant
QPSK-Modulation ANT4				
2503.5	40.98	12.53	7.88	compliant
2593.0	41.18	13.12	7.92	compliant
2682.5	41.05	12.74	7.96	compliant
QPSK-Modulation ANT5				
2503.5	41.12	12.94	8.00	compliant
2593.0	41.11	12.91	7.92	compliant
2682.5	41.15	13.03	8.00	compliant
QPSK-Modulation ANT6				
2503.5	41.19	13.15	7.88	compliant
2593.0	41.31	13.52	7.90	compliant
2682.5	40.94	12.42	7.94	compliant
QPSK-Modulation ANT7				
2503.5	40.98	12.53	7.88	compliant
2593.0	41.09	12.85	7.98	compliant
2682.5	40.81	12.05	7.96	compliant
QPSK-Modulation ANT8				
2503.5	41.00	12.59	7.92	compliant
2593.0	41.34	13.61	7.98	compliant
2682.5	41.27	13.40	7.98	compliant
QPSK-Modulation ANT1+ANT2+ANT3+ANT4+ANT5+ANT6+ANT7+ANT8 Calculated Total				
2503.5	50.08719	102.03	-	compliant
2593.0	50.22067	105.21	-	compliant
2682.5	50.07056	101.64	-	compliant
16QAM-Modulation ANT1				
2503.5	40.9	12.30	7.88	compliant
2593.0	41.15	13.03	7.90	compliant
2682.5	41.06	12.76	7.92	compliant



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16QAM-Modulation ANT2				
2503.5	41.2	13.18	7.88	compliant
2593.0	41.17	13.09	7.88	compliant
2682.5	41.13	12.97	7.90	compliant
16QAM-Modulation ANT3				
2503.5	41.1	12.88	7.90	compliant
2593.0	41.1	12.88	7.90	compliant
2682.5	40.94	12.42	7.88	compliant
16QAM-Modulation ANT4				
2503.5	40.98	12.53	7.90	compliant
2593.0	41.32	13.55	7.90	compliant
2682.5	41.05	12.74	7.90	compliant
16QAM-Modulation ANT5				
2503.5	40.99	12.56	7.90	compliant
2593.0	41.12	12.94	7.90	compliant
2682.5	41.02	12.65	7.92	compliant
16QAM-Modulation ANT6				
2503.5	41.17	13.09	7.88	compliant
2593.0	41.16	13.06	7.88	compliant
2682.5	41.08	12.82	7.90	compliant
16QAM-Modulation ANT7				
2503.5	40.97	12.50	7.86	compliant
2593.0	41.07	12.79	7.90	compliant
2682.5	40.75	11.89	7.88	compliant
16QAM-Modulation ANT8				
2503.5	41.11	12.91	7.92	compliant
2593.0	41.35	13.65	7.90	compliant
2682.5	41.19	13.15	7.90	compliant
16QAM-Modulation ANT1+ANT2+ANT3+ANT4+ANT5+ANT6+ANT7+ANT8 Calculated Total				
2503.5	50.08456	101.97	-	compliant
2593.0	50.21194	105.00	-	compliant
2682.5	50.06019	101.40	-	compliant
64QAM-Modulation ANT1				
2503.5	40.97	12.50	7.90	compliant
2593.0	41.14	13.00	8.00	compliant
2682.5	41.02	12.65	8.08	compliant
64QAM-Modulation ANT2				
2503.5	40.74	11.86	7.92	compliant
2593.0	41.22	13.24	8.00	compliant
2682.5	41.03	12.68	8.02	compliant
64QAM-Modulation ANT3				
2503.5	41.04	12.71	7.92	compliant
2593.0	41.08	12.82	8.02	compliant
2682.5	40.84	12.13	8.02	compliant
64QAM-Modulation ANT4				
2503.5	40.93	12.39	8.00	compliant
2593.0	41.3	13.49	7.98	compliant
2682.5	41.03	12.68	8.00	compliant
64QAM-Modulation ANT5				
2503.5	41.05	12.74	7.94	compliant
2593.0	41.15	13.03	7.98	compliant
2682.5	40.87	12.21	8.04	compliant
64QAM-Modulation ANT6				



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2503.5	41.07	12.79	7.90	compliant
2593.0	41.12	12.94	7.98	compliant
2682.5	41.13	12.97	8.04	compliant
64QAM-Modulation ANT7				
2503.5	40.98	12.53	7.98	compliant
2593.0	41.13	12.97	8.00	compliant
2682.5	40.9	12.30	8.04	compliant
64QAM-Modulation ANT8				
2503.5	41.07	12.79	7.9	compliant
2593.0	41.26	13.37	8.00	compliant
2682.5	41.17	13.09	8.02	compliant
64QAM-Modulation ANT1+ANT2+ANT3+ANT4+ANT5+ANT6+ANT7+ANT8 Calculated Total				
2503.5	50.01336	100.31	-	compliant
2593.0	50.20649	104.87	-	compliant
2682.5	50.03110	100.72	-	compliant

Table 5 RF Power Output (15 MHz Channel BW)



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Config C:

Carrier Frequency [MHz]	RF Power Output		PAPR	Result
	[dBm]	[W]	[dB]	
QPSK-Modulation ANT1				
2506.0/2526.0/2546.0	36.25/36.50/36.63	4.22/4.47/4.60	8.36	compliant
2573.0/2593.0/2613.0	36.48/36.51/36.67	4.45/4.48/4.65	8.34	compliant
2640.0/2660.0/2680.0	36.37/36.38/36.20	4.34/4.35/4.17	8.06	compliant
QPSK-Modulation ANT2				
2506.0/2526.0/2546.0	36.40/36.63/36.71	4.37/4.60/4.69	8.22	compliant
2573.0/2593.0/2613.0	36.52/36.53/36.76	4.49/4.50/4.74	8.32	compliant
2640.0/2660.0/2680.0	36.49/36.51/36.33	4.46/4.48/4.30	8.10	compliant
QPSK-Modulation ANT3				
2506.0/2526.0/2546.0	36.27/36.50/36.54	4.24/4.47/4.51	8.32	compliant
2573.0/2593.0/2613.0	36.40/36.54/36.69	4.37/4.51/4.67	8.44	compliant
2640.0/2660.0/2680.0	36.48/36.50/36.43	4.45/4.47/4.40	7.46	compliant
QPSK-Modulation ANT4				
2506.0/2526.0/2546.0	36.30/36.57/36.66	4.27/4.57/4.63	8.24	compliant
2573.0/2593.0/2613.0	36.37/36.46/36.64	4.34/4.43/4.61	8.44	compliant
2640.0/2660.0/2680.0	36.47/36.5/36.38	4.44/4.47/4.35	8.04	compliant
QPSK-Modulation ANT5				
2506.0/2526.0/2546.0	36.50/36.62/36.74	4.47/4.59/4.72	7.96	compliant
2573.0/2593.0/2613.0	36.45/36.52/36.62	4.42/4.49/4.59	8.44	compliant
2640.0/2660.0/2680.0	36.64/36.66/36.42	4.61/4.63/4.39	7.44	compliant
QPSK-Modulation ANT6				
2506.0/2526.0/2546.0	36.42/36.66/36.69	4.39/4.63/4.67	8.24	compliant
2573.0/2593.0/2613.0	36.50/36.56/36.69	4.47/4.53/4.67	8.28	compliant
2640.0/2660.0/2680.0	36.44/36.49/36.33	4.41/4.46/4.30	7.70	compliant
QPSK-Modulation ANT7				
2506.0/2526.0/2546.0	36.05/36.38/36.45	4.03/4.35/4.42	8.04	compliant
2573.0/2593.0/2613.0	36.34/36.44/36.63	4.31/4.41/4.60	7.86	compliant
2640.0/2660.0/2680.0	36.28/36.42/36.27	4.24/4.39/4.24	7.46	compliant
QPSK-Modulation ANT8				
2506.0/2526.0/2546.0	36.25/36.51/36.71	4.22/4.48/4.69	8.04	compliant
2573.0/2593.0/2613.0	36.63/36.66/36.80	4.60/4.63/4.79	8.46	compliant
2640.0/2660.0/2680.0	36.55/36.55/36.44	4.52/4.52/4.41	7.72	compliant
QPSK-Modulation ANT1+ANT2+ANT3+ANT4+ANT5+ANT6+ANT7+ANT8 Calculated Total				
2506.0/2526.0/2546.0	50.30314	107.23	-	compliant
2573.0/2593.0/2613.0	50.36248	108.70	-	compliant
2640.0/2660.0/2680.0	50.24221	105.74	-	compliant
16QAM-Modulation ANT1				
2506.0/2526.0/2546.0	37.06/37.13/37.26	5.08/5.16/5.32	8.20	compliant
2573.0/2593.0/2613.0	37.10/37.28/37.26	5.13/5.35/5.32	7.52	compliant
2640.0/2660.0/2680.0	36.33/36.34/36.15	4.30/4.31/4.12	8.48	compliant
16QAM-Modulation ANT2				
2506.0/2526.0/2546.0	37.09/37.52/37.42	5.12/5.65/5.52	8.20	compliant
2573.0/2593.0/2613.0	36.46/36.46/36.70	4.43/4.43/4.68	7.58	compliant
2640.0/2660.0/2680.0	37.31/37.19/37.00	5.38/5.24/5.01	8.10	compliant
16QAM-Modulation ANT3				
2506.0/2526.0/2546.0	36.86/37.07/37.29	4.85/5.09/5.36	8.22	compliant
2573.0/2593.0/2613.0	36.38/36.49/36.63	4.35/4.46/4.60	7.58	compliant
2640.0/2660.0/2680.0	37.22/37.10/36.93	5.27/5.13/4.93	8.10	compliant
16QAM-Modulation ANT4				
2506.0/2526.0/2546.0	36.92/37.02/37.12	4.92/5.04/5.15	7.86	compliant
2573.0/2593.0/2613.0	36.98/37.07/37.40	4.99/5.09/5.50	7.52	compliant



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2640.0/2660.0/2680.0	36.60/36.63/36.52	4.57/4.60/4.49	8.44	compliant
16QAM-Modulation ANT5				
2506.0/2526.0/2546.0	37.32/37.34/37.50	5.40/5.42/5.62	7.92	compliant
2573.0/2593.0/2613.0	37.11/37.34/37.27	5.14/5.42/5.33	7.52	compliant
2640.0/2660.0/2680.0	37.29/37.15/36.91	5.36/5.19/4.91	8.28	compliant
16QAM-Modulation ANT6				
2506.0/2526.0/2546.0	37.10/37.17/37.19	5.13/5.21/5.23	8.22	compliant
2573.0/2593.0/2613.0	37.30/37.21/37.31	5.37/5.26/5.38	7.54	compliant
2640.0/2660.0/2680.0	37.04/37.28/36.94	5.05/5.35/4.94	8.30	compliant
16QAM-Modulation ANT7				
2506.0/2526.0/2546.0	36.86/37.16/37.40	4.85/5.20/5.50	8.18	compliant
2573.0/2593.0/2613.0	37.03/37.13/37.46	5.05/5.16/5.57	7.66	compliant
2640.0/2660.0/2680.0	37.21/37.19/37.04	5.26/5.24/5.06	8.06	compliant
16QAM-Modulation ANT8				
2506.0/2526.0/2546.0	37.15/37.23/37.44	5.19/5.28/5.55	8.02	compliant
2573.0/2593.0/2613.0	36.61/36.70/36.87	4.58/4.68/4.86	7.52	compliant
2640.0/2660.0/2680.0	36.55/36.55/36.42	4.52/4.52/4.39	8.08	compliant
16QAM-Modulation ANT1+ANT2+ANT3+ANT4+ANT5+ANT6+ANT7+ANT8 Calculated Total				
2506.0/2526.0/2546.0	50.99845	125.85	-	compliant
2573.0/2593.0/2613.0	50.79611	120.12	-	compliant
2640.0/2660.0/2680.0	50.68648	117.12	-	compliant
64QAM-Modulation ANT1				
2506.0/2526.0/2546.0	36.35/36.60/36.73	4.32/4.57/4.71	7.80	compliant
2573.0/2593.0/2613.0	36.46/36.48/36.64	4.43/4.45/4.61	8.36	compliant
2640.0/2660.0/2680.0	36.31/36.33/36.16	4.28/4.30/4.13	7.60	compliant
64QAM-Modulation ANT2				
2506.0/2526.0/2546.0	36.43/36.69/36.76	4.40/4.67/4.74	8.22	compliant
2573.0/2593.0/2613.0	36.45/36.57/36.73	4.42/4.54/4.71	8.34	compliant
2640.0/2660.0/2680.0	36.41/36.42/36.24	4.38/4.39/4.21	8.10	compliant
64QAM-Modulation ANT3				
2506.0/2526.0/2546.0	36.04/36.27/36.30	4.02/4.24/4.27	7.80	compliant
2573.0/2593.0/2613.0	36.43/36.54/36.72	4.40/4.51/4.70	8.14	compliant
2640.0/2660.0/2680.0	36.36/36.37/36.20	4.33/4.31/4.17	7.44	compliant
64QAM-Modulation ANT4				
2506.0/2526.0/2546.0	36.04/36.32/36.40	4.02/4.29/4.37	8.22	compliant
2573.0/2593.0/2613.0	36.39/36.49/36.66	4.36/4.46/4.63	8.38	compliant
2640.0/2660.0/2680.0	36.39/36.41/36.31	4.36/4.38/4.28	7.42	compliant
64QAM-Modulation ANT5				
2506.0/2526.0/2546.0	36.47/36.67/36.80	4.44/4.65/4.79	8.28	compliant
2573.0/2593.0/2613.0	36.53/36.61/36.74	4.50/4.58/4.72	8.46	compliant
2640.0/2660.0/2680.0	36.47/36.45/36.23	4.44/4.42/4.20	7.72	compliant
64QAM-Modulation ANT6				
2506.0/2526.0/2546.0	36.40/36.64/36.67	4.37/4.61/4.65	8.00	compliant
2573.0/2593.0/2613.0	36.51/36.56/36.68	4.48/4.53/4.66	8.46	compliant
2640.0/2660.0/2680.0	36.28/36.34/36.18	4.25/4.31/4.15	8.30	compliant
64QAM-Modulation ANT7				
2506.0/2526.0/2546.0	36.02/36.35/36.43	4.00/4.32/4.40	8.28	compliant
2573.0/2593.0/2613.0	36.34/36.43/36.61	4.31/4.40/4.58	7.86	compliant
2640.0/2660.0/2680.0	36.32/36.45/36.29	4.29/4.42/4.26	7.48	compliant
64QAM-Modulation ANT8				
2506.0/2526.0/2546.0	36.26/36.53/36.72	4.23/4.50/4.70	8.28	compliant
2573.0/2593.0/2613.0	36.50/36.56/36.72	4.47/4.53/4.70	8.44	compliant

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2640.0/2660.0/2680.0	36.72/36.70/36.60	4.70/4.68/4.57	7.84	compliant
64QAM-Modulation ANT1+ANT2+ANT3+ANT4+ANT5+ANT6+ANT7+ANT8 Calculated Total				
2506.0/2526.0/2546.0	50.26180	106.21	-	compliant
2573.0/2593.0/2613.0	50.35980	108.64	-	compliant
2640.0/2660.0/2680.0	50.17696	104.16	-	compliant

Table 6 RF Power Output (20 MHz Channel BW)

The base station maximum output power was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.



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4.2 Test No. 2: Modulation Characteristics (§ 2.1047, § 2.201)

The occupied bandwidth was measured by using relative measurement procedure (Config. A, C and E), which represents the -26dB OBW positive frequency between two markers to reference value (see the following section and screenshots on pages 56).

Therefore, the modulation characteristic of the base stations transceiver is:

Config A: 9M00D9W (Channel bandwidth 10 MHz)

Config C: 13M5D9W (Channel bandwidth 15 MHz)

Config E: 18M0D9W (Channel bandwidth 20 MHz)

No further testing is required under this section of the FCC rules. No measurements other than the occupied bandwidth are required.

Sample modulation screenshots are on page 52, in I/Q constellation diagrams and tables, showing QPSK, 16QAM and 64QAM –modulation generation.

The modulation characteristics were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.



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4.3 Test No. 3: Occupied Bandwidth (§ 2.1049)

4.3.1. Limits

Para. No. 2.1049. The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5% of the emitted power.

According FCC KDB 971168 D01 –guidance. Relative OBW must be measured and reported when it is specified in the applicable rule part in this case §27.53 (5).

4.3.2. Test Procedure and Results

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

(Screenshots are on page 56 for details). The following tables summarize the results:

Config A:

Carrier Frequency [MHz]	Occupied Bandwidth [MHz]	Result
QPSK-Modulation ANT1		
2501.0	9.52	compliant
2593.0	9.48	compliant
2685.0	9.46	compliant
QPSK-Modulation ANT2		
2501.0	9.54	compliant
2593.0	9.48	compliant
2685.0	9.50	compliant
QPSK-Modulation ANT3		
2501.0	9.48	compliant
2593.0	9.50	compliant
2685.0	9.50	compliant
QPSK-Modulation ANT4		
2501.0	9.52	compliant
2593.0	9.48	compliant
2685.0	9.52	compliant
QPSK-Modulation ANT5		
2501.0	9.48	compliant
2593.0	9.48	compliant
2685.0	9.50	compliant
QPSK-Modulation ANT6		
2501.0	9.48	compliant
2593.0	9.48	compliant
2685.0	9.54	compliant
QPSK-Modulation ANT7		
2501.0	9.52	compliant
2593.0	9.50	compliant
2685.0	9.52	compliant
QPSK-Modulation ANT8		



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2501.0	9.54	compliant
2593.0	9.50	compliant
2685.0	9.54	compliant
16QAM-Modulation ANT1		
2501.0	9.48	compliant
2593.0	9.42	compliant
2685.0	9.38	compliant
16QAM-Modulation ANT2		
2501.0	9.46	compliant
2593.0	9.44	compliant
2685.0	9.44	compliant
16QAM-Modulation ANT3		
2501.0	9.46	compliant
2593.0	9.42	compliant
2685.0	9.48	compliant
16QAM-Modulation ANT4		
2501.0	9.48	compliant
2593.0	9.44	compliant
2685.0	9.38	compliant
16QAM-Modulation ANT5		
2501.0	9.42	compliant
2593.0	9.44	compliant
2685.0	9.48	compliant
16QAM-Modulation ANT6		
2501.0	9.48	compliant
2593.0	9.42	compliant
2685.0	9.36	compliant
16QAM-Modulation ANT7		
2501.0	9.40	compliant
2593.0	9.38	compliant
2685.0	9.46	compliant
16QAM-Modulation ANT8		
2501.0	9.46	compliant
2593.0	9.44	compliant
2685.0	9.54	compliant
64QAM-Modulation ANT1		
2501.0	9.48	compliant
2593.0	9.50	compliant
2685.0	9.50	compliant
64QAM-Modulation ANT2		
2501.0	9.48	compliant
2593.0	9.50	compliant
2685.0	9.46	compliant
64QAM-Modulation ANT3		
2501.0	9.48	compliant
2593.0	9.50	compliant
2685.0	9.48	compliant
64QAM-Modulation ANT4		
2501.0	9.48	compliant
2593.0	9.50	compliant
2685.0	9.48	compliant
64QAM-Modulation ANT5		



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2501.0	9.48	compliant
2593.0	9.50	compliant
2685.0	9.48	compliant
64QAM-Modulation ANT6		
2501.0	9.48	compliant
2593.0	9.50	compliant
2685.0	9.50	compliant
64QAM-Modulation ANT7		
2501.0	9.48	compliant
2593.0	9.50	compliant
2685.0	9.50	compliant
64QAM-Modulation ANT8		
2501.0	9.48	compliant
2593.0	9.48	compliant
2685.0	9.50	compliant
Measurement Uncertainty:		±48kHz

Table 7 Occupied Bandwidth (10 MHz Channel BW)

Config B:

Carrier Frequency [MHz]	Occupied Bandwidth [MHz]	Result
QPSK-Modulation ANT1		
2503.5	14.32	compliant
2593.0	14.20	compliant
2682.5	14.17	compliant
QPSK-Modulation ANT2		
2503.5	14.32	compliant
2593.0	14.20	compliant
2682.5	14.17	compliant
QPSK-Modulation ANT3		
2503.5	14.08	compliant
2593.0	14.20	compliant
2682.5	14.27	compliant
QPSK-Modulation ANT4		
2503.5	14.32	compliant
2593.0	14.20	compliant
2682.5	14.26	compliant
QPSK-Modulation ANT5		
2503.5	14.32	compliant
2593.0	14.20	compliant
2682.5	14.29	compliant
QPSK-Modulation ANT6		
2503.5	14.32	compliant
2593.0	14.20	compliant
2682.5	14.17	compliant
QPSK-Modulation ANT7		
2503.5	14.24	compliant
2593.0	14.20	compliant
2682.5	14.29	compliant
QPSK-Modulation ANT8		
2503.5	14.32	compliant



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2593.0	14.20	compliant
2682.5	14.29	compliant
16QAM-Modulation ANT1		
2503.5	14.08	compliant
2593.0	14.02	compliant
2682.5	14.17	compliant
16QAM-Modulation ANT2		
2503.5	14.17	compliant
2593.0	14.08	compliant
2682.5	14.17	compliant
16QAM-Modulation ANT3		
2503.5	14.32	compliant
2593.0	14.08	compliant
2682.5	14.17	compliant
16QAM-Modulation ANT4		
2503.5	14.08	compliant
2593.0	14.08	compliant
2682.5	14.17	compliant
16QAM-Modulation ANT5		
2503.5	14.08	compliant
2593.0	14.05	compliant
2682.5	14.11	compliant
16QAM-Modulation ANT6		
2503.5	14.14	compliant
2593.0	14.11	compliant
2682.5	14.17	compliant
16QAM-Modulation ANT7		
2503.5	14.14	compliant
2593.0	14.08	compliant
2682.5	14.17	compliant
16QAM-Modulation ANT8		
2503.5	14.17	compliant
2593.0	13.99	compliant
2682.5	14.14	compliant
64QAM-Modulation ANT1		
2503.5	14.26	compliant
2593.0	14.26	compliant
2682.5	14.06	compliant
64QAM-Modulation ANT2		
2503.5	14.33	compliant
2593.0	14.26	compliant
2682.5	14.23	compliant
64QAM-Modulation ANT3		
2503.5	14.26	compliant
2593.0	14.26	compliant
2682.5	14.23	compliant
64QAM-Modulation ANT4		
2503.5	14.32	compliant
2593.0	14.26	compliant
2682.5	14.29	compliant
64QAM-Modulation ANT5		
2503.5	14.32	compliant



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2593.0	14.26	compliant
2682.5	14.23	compliant
64QAM-Modulation ANT6		
2503.5	14.26	compliant
2593.0	14.26	compliant
2682.5	14.29	compliant
64QAM-Modulation ANT7		
2503.5	14.26	compliant
2593.0	14.26	compliant
2682.5	14.17	compliant
64QAM-Modulation ANT8		
2503.5	14.26	compliant
2593.0	14.26	compliant
2682.5	14.29	compliant
Measurement Uncertainty:		±48kHz

Table 8 Occupied Bandwidth (15 MHz Channel BW)

The occupied bandwidth was found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.



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4.4 Test No. 4: Spurious Emissions at Antenna Terminals (§ 2.1051, § 2.1057, § 27.53)

4.4.1. Limits

Para. No. 27.53(1). For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts.

(1)(2) For fixed and temporary fixed digital stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB (P = transmitter power in Watts).

The compliance limit was calculated in the following way:

Maximum transmitter output power [W]:	P
Maximum transmitter output power [dBm]:	$30 + 10 \log_{10} P$ (conversion from W to dBm)
Attenuation required by FCC:	$43 + 10 \log_{10} P$
Compliance limit = Maximum transmitter output power - Required attenuation	
	$= 30 + 10 \log_{10} P - (43 + 10 \log_{10} P) = \underline{-13 \text{ dBm}}$

For MiMo output from 8 TX -antenna connectors, each antenna connectors were measured individually and each individual limit line was reduced by $10 \log(8)$. Limit line was calculated to show -22.03dB emission limit, according to FCC KDB 662911 D01 guidance.

4.4.2. Test Procedure and Results

The tests were carried out in accordance with § 27.53. For all frequency ranges except two (immediately below and above the carrier frequency block) a 1 MHz resolution bandwidth was used for the measurements.

In the 1 MHz frequency bands immediately outside and adjacent to the carrier frequency block the resolution bandwidth is lowered to 1% of the 26 dB occupied bandwidth of the transmitted carrier.

According to § 2.1057, all emissions including the fundamental frequency from the lowest radio frequency generated in the equipment, without going below 9 kHz, up to the 10th harmonic were investigated.

The following tables summarize the worst case detected emission levels (see screenshots on page 80 for details). The external attenuation (cable loss of the set up) is already added in the results. It can be seen separately as the 'Offset' value in the screenshots.



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Config A Lower band edge:

Carrier Frequency: 2501.0 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
	2496	-32.63	compliant
QPSK-Modulation ANT2			
	2496	-33.05	compliant
QPSK-Modulation ANT3			
	2496	-32.58	compliant
QPSK-Modulation ANT4			
	2496	-32.31	compliant
QPSK-Modulation ANT5			
	2496	-32.22	compliant
QPSK-Modulation ANT6			
	2496	-32.62	compliant
QPSK-Modulation ANT7			
	2496	-32.83	compliant
QPSK-Modulation ANT8			
	2496	-32.55	compliant
16QAM-Modulation ANT1			
	2496	-33.15	compliant
16QAM-Modulation ANT2			
	2496	-33.24	compliant
16QAM-Modulation ANT3			
	2496	-32.86	compliant
16QAM-Modulation ANT4			
	2496	-32.47	compliant
16QAM-Modulation ANT5			
	2496	-32.80	compliant
16QAM-Modulation ANT6			
	2496	-32.21	compliant
16QAM-Modulation ANT7			
	2496	-32.15	compliant
16QAM-Modulation ANT8			
	2496	-32.86	compliant
64QAM-Modulation ANT1			
	2496	-32.61	compliant
64QAM-Modulation ANT2			
	2496	-33.50	compliant



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64QAM-Modulation ANT3			
	2496	-33.14	compliant
64QAM-Modulation ANT4			
	2496	-32.83	compliant
64QAM-Modulation ANT5			
	2496	-32.19	compliant
64QAM-Modulation ANT6			
	2496	-32.77	compliant
64QAM-Modulation ANT7			
	2496	-33.18	compliant
64QAM-Modulation ANT8			
	2496	-33.41	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 9 Spurious Emissions (Lower band edge) (10 MHz CH BW)

Config A Upper band edge:

Carrier Frequency: 2685.0 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
	2690	-35.87	compliant
QPSK-Modulation ANT2			
	2690	-34.56	compliant
QPSK-Modulation ANT3			
	2690	-34.48	compliant
QPSK-Modulation ANT4			
	2690	-34.63	compliant
QPSK-Modulation ANT5			
	2690	-34.93	compliant
QPSK-Modulation ANT6			
	2690	-34.11	compliant
QPSK-Modulation ANT7			
	2690	-35.33	compliant
QPSK-Modulation ANT8			
	2690	-36.12	compliant
16QAM-Modulation ANT1			
	2690	-35.91	compliant



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16QAM-Modulation ANT2			
	2690	-34.69	compliant
16QAM-Modulation ANT3			
	2690	-34.23	compliant
16QAM-Modulation ANT4			
	2690	-34.70	compliant
16QAM-Modulation ANT5			
	2690	-33.60	compliant
16QAM-Modulation ANT6			
	2690	-34.09	compliant
16QAM-Modulation ANT7			
	2690	-36.37	compliant
16QAM-Modulation ANT8			
	2690	-35.45	compliant
64QAM-Modulation ANT1			
	2690	-35.50	compliant
64QAM-Modulation ANT2			
	2690	-34.66	compliant
64QAM-Modulation ANT3			
	2690	-34.64	compliant
64QAM-Modulation ANT4			
	2690	-34.83	compliant
64QAM-Modulation ANT5			
	2690	-33.31	compliant
64QAM-Modulation ANT6			
	2690	-33.72	compliant
64QAM-Modulation ANT7			
	2690	-35.73	compliant
64QAM-Modulation ANT8			
	2690	-35.43	compliant
		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ Measurement Uncertainty: $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 10 Spurious Emissions (Upper band edge) (10 MHz CH BW)



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Config A Spurious emissions:

Carrier Frequency: 2501.0 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
0.009 – 26900	5002	-34.83	compliant
QPSK-Modulation ANT2			
0.009 – 26900	5002	-34.62	compliant
QPSK-Modulation ANT3			
0.009 – 26900	5002	-34.63	compliant
QPSK-Modulation ANT4			
0.009 – 26900	5002	-34.93	compliant
QPSK-Modulation ANT5			
0.009 – 26900	5002	-34.61	compliant
QPSK-Modulation ANT6			
0.009 – 26900	5002	-34.59	compliant
QPSK-Modulation ANT7			
0.009 – 26900	5002	-35.05	compliant
QPSK-Modulation ANT8			
0.009 – 26900	5002	-34.74	compliant
16QAM-Modulation ANT1			
0.009 – 26900	5002	-32.34	compliant
16QAM-Modulation ANT2			
0.009 – 26900	5002	-34.57	compliant
16QAM-Modulation ANT3			
0.009 – 26900	5002	-34.88	compliant
16QAM-Modulation ANT4			
0.009 – 26900	5002	-34.94	compliant
16QAM-Modulation ANT5			
0.009 – 26900	5002	-34.85	compliant
16QAM-Modulation ANT6			
0.009 – 26900	5002	-34.23	compliant
16QAM-Modulation ANT7			
0.009 – 26900	5002	-34.82	compliant
16QAM-Modulation ANT8			
0.009 – 26900	5002	-34.75	compliant
64QAM-Modulation ANT1			
0.009 – 26900	5002	-34.69	compliant
64QAM-Modulation ANT2			
0.009 – 26900	5002	-35.05	compliant



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64QAM-Modulation ANT3			
0.009 – 26900	5002	-34.72	compliant
64QAM-Modulation ANT4			
0.009 – 26900	5002	-34.93	compliant
64QAM-Modulation ANT5			
0.009 – 26900	5002	-34.53	compliant
64QAM-Modulation ANT6			
0.009 – 26900	5002	-34.43	compliant
64QAM-Modulation ANT7			
0.009 – 26900	5002	-34.82	compliant
64QAM-Modulation ANT8			
0.009 – 26900	5002	-34.91	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 11 Spurious Emissions (10 MHz Channel BW)

Config A Spurious emissions:

Carrier Frequency: 2593.0 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
0.009 – 26900	5193	-33.75	compliant
QPSK-Modulation ANT2			
0.009 – 26900	5193	-33.15	compliant
QPSK-Modulation ANT3			
0.009 – 26900	5193	-34.63	compliant
QPSK-Modulation ANT4			
0.009 – 26900	5193	-33.57	compliant
QPSK-Modulation ANT5			
0.009 – 26900	5193	-33.61	compliant
QPSK-Modulation ANT6			
0.009 – 26900	5193	-34.06	compliant
QPSK-Modulation ANT7			
0.009 – 26900	5193	-33.31	compliant
QPSK-Modulation ANT8			
0.009 – 26900	5193	-33.08	compliant
16QAM-Modulation ANT1			
0.009 – 26900	5193	-33.60	compliant



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16QAM-Modulation ANT2			
0.009 – 26900	5193	-33.47	compliant
16QAM-Modulation ANT3			
0.009 – 26900	5193	-34.88	compliant
16QAM-Modulation ANT4			
0.009 – 26900	5193	-33.72	compliant
16QAM-Modulation ANT5			
0.009 – 26900	5193	-33.98	compliant
16QAM-Modulation ANT6			
0.009 – 26900	5193	-33.07	compliant
16QAM-Modulation ANT7			
0.009 – 26900	5193	-33.22	compliant
16QAM-Modulation ANT8			
0.009 – 26900	5193	-32.65	compliant
64QAM-Modulation ANT1			
0.009 – 26900	5193	-33.72	compliant
64QAM-Modulation ANT2			
0.009 – 26900	5193	-33.38	compliant
64QAM-Modulation ANT3			
0.009 – 26900	5193	-34.72	compliant
64QAM-Modulation ANT4			
0.009 – 26900	5193	-33.53	compliant
64QAM-Modulation ANT5			
0.009 – 26900	5193	-33.66	compliant
64QAM-Modulation ANT6			
0.009 – 26900	5193	-33.10	compliant
64QAM-Modulation ANT7			
0.009 – 26900	5193	-33.30	compliant
64QAM-Modulation ANT8			
0.009 – 26900	5193	-33.73	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 12 Spurious Emissions (10 MHz Channel BW)



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Config A Spurious emissions:

Carrier Frequency: 2685.0 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
0.009 – 26900	5372	-35.29	compliant
QPSK-Modulation ANT2			
0.009 – 26900	5372	-35.44	compliant
QPSK-Modulation ANT3			
0.009 – 26900	5372	-35.28	compliant
QPSK-Modulation ANT4			
0.009 – 26900	5372	-35.26	compliant
QPSK-Modulation ANT5			
0.009 – 26900	5372	-34.66	compliant
QPSK-Modulation ANT6			
0.009 – 26900	5372	-34.86	compliant
QPSK-Modulation ANT7			
0.009 – 26900	5372	-34.95	compliant
QPSK-Modulation ANT8			
0.009 – 26900	5372	-35.47	compliant
16QAM-Modulation ANT1			
0.009 – 26900	5372	-34.93	compliant
16QAM-Modulation ANT2			
0.009 – 26900	5372	-34.76	compliant
16QAM-Modulation ANT3			
0.009 – 26900	5372	-35.16	compliant
16QAM-Modulation ANT4			
0.009 – 26900	5372	-35.33	compliant
16QAM-Modulation ANT5			
0.009 – 26900	5372	-35.01	compliant
16QAM-Modulation ANT6			
0.009 – 26900	5372	-34.93	compliant
16QAM-Modulation ANT7			
0.009 – 26900	5372	-35.08	compliant
16QAM-Modulation ANT8			
0.009 – 26900	5372	-34.76	compliant
64QAM-Modulation ANT1			
0.009 – 26900	5372	-34.98	compliant
64QAM-Modulation ANT2			
0.009 – 26900	5372	-34.93	compliant



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64QAM-Modulation ANT3			
0.009 – 26900	5372	-35.05	compliant
64QAM-Modulation ANT4			
0.009 – 26900	5372	-35.22	compliant
64QAM-Modulation ANT5			
0.009 – 26900	5372	-35.03	compliant
64QAM-Modulation ANT6			
0.009 – 26900	5372	-34.89	compliant
64QAM-Modulation ANT7			
0.009 – 26900	5372	-35.20	compliant
64QAM-Modulation ANT8			
0.009 – 26900	5372	-34.30	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 13 Spurious Emissions (10 MHz Channel BW)



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Config B Lower band edge:

Carrier Frequency: 2503.5 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
	2496	-30.01	compliant
QPSK-Modulation ANT2			
	2496	-30.18	compliant
QPSK-Modulation ANT3			
	2496	-29.82	compliant
QPSK-Modulation ANT4			
	2496	-29.53	compliant
QPSK-Modulation ANT5			
	2496	-29.87	compliant
QPSK-Modulation ANT6			
	2496	-29.68	compliant
QPSK-Modulation ANT7			
	2496	-30.85	compliant
QPSK-Modulation ANT8			
	2496	-30.53	compliant
16QAM-Modulation ANT1			
	2496	-30.43	compliant
16QAM-Modulation ANT2			
	2496	-31.13	compliant
16QAM-Modulation ANT3			
	2496	-30.98	compliant
16QAM-Modulation ANT4			
	2496	-29.95	compliant
16QAM-Modulation ANT5			
	2496	-32.33	compliant
16QAM-Modulation ANT6			
	2496	-30.52	compliant
16QAM-Modulation ANT7			
	2496	-31.14	compliant
16QAM-Modulation ANT8			
	2496	-30.74	compliant
64QAM-Modulation ANT1			
	2496	-30.09	compliant
64QAM-Modulation ANT2			
	2496	-30.90	compliant



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64QAM-Modulation ANT3			
	2496	-30.33	compliant
64QAM-Modulation ANT4			
	2496	-29.43	compliant
64QAM-Modulation ANT5			
	2496	-30.23	compliant
64QAM-Modulation ANT6			
	2496	-30.38	compliant
64QAM-Modulation ANT7			
	2496	-31.01	compliant
64QAM-Modulation ANT8			
	2496	-33.47	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 14 Spurious Emissions (Lower band edge) (15 MHz CH BW)

Config B Upper band edge:

Carrier Frequency: 2682.5 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
	2690	-32.04	compliant
QPSK-Modulation ANT2			
	2690	-31.43	compliant
QPSK-Modulation ANT3			
	2690	-34.40	compliant
QPSK-Modulation ANT4			
	2690	-30.91	compliant
QPSK-Modulation ANT5			
	2690	-33.26	compliant
QPSK-Modulation ANT6			
	2690	-30.66	compliant
QPSK-Modulation ANT7			
	2690	-33.04	compliant
QPSK-Modulation ANT8			
	2690	-32.07	compliant
16QAM-Modulation ANT1			
	2690	-32.34	compliant



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16QAM-Modulation ANT2			
	2690	-29.84	compliant
16QAM-Modulation ANT3			
	2690	-31.65	compliant
16QAM-Modulation ANT4			
	2690	-32.10	compliant
16QAM-Modulation ANT5			
	2690	-30.32	compliant
16QAM-Modulation ANT6			
	2690	-31.68	compliant
16QAM-Modulation ANT7			
	2690	-32.72	compliant
16QAM-Modulation ANT8			
	2690	-32.24	compliant
64QAM-Modulation ANT1			
	2690	-31.92	compliant
64QAM-Modulation ANT2			
	2690	-29.78	compliant
64QAM-Modulation ANT3			
	2690	-31.63	compliant
64QAM-Modulation ANT4			
	2690	-31.49	compliant
64QAM-Modulation ANT5			
	2690	-30.93	compliant
64QAM-Modulation ANT6			
	2690	-30.45	compliant
64QAM-Modulation ANT7			
	2690	-34.15	compliant
64QAM-Modulation ANT8			
	2690	-33.43	compliant
		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ Measurement Uncertainty: $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 15 Spurious Emissions (Upper band edge) (15 MHz CH BW)



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Config A Spurious emissions:

Carrier Frequency: 2503.5 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
0.009 – 26900	5002	-33.69	compliant
QPSK-Modulation ANT2			
0.009 – 26900	5002	-33.09	compliant
QPSK-Modulation ANT3			
0.009 – 26900	5002	-33.37	compliant
QPSK-Modulation ANT4			
0.009 – 26900	5002	-33.54	compliant
QPSK-Modulation ANT5			
0.009 – 26900	5002	-33.29	compliant
QPSK-Modulation ANT6			
0.009 – 26900	5002	-33.30	compliant
QPSK-Modulation ANT7			
0.009 – 26900	5002	-33.66	compliant
QPSK-Modulation ANT8			
0.009 – 26900	5002	-34.06	compliant
16QAM-Modulation ANT1			
0.009 – 26900	5002	-34.49	compliant
16QAM-Modulation ANT2			
0.009 – 26900	5002	-32.94	compliant
16QAM-Modulation ANT3			
0.009 – 26900	5002	-33.48	compliant
16QAM-Modulation ANT4			
0.009 – 26900	5002	-33.89	compliant
16QAM-Modulation ANT5			
0.009 – 26900	5002	-33.41	compliant
16QAM-Modulation ANT6			
0.009 – 26900	5002	-33.53	compliant
16QAM-Modulation ANT7			
0.009 – 26900	5002	-34.01	compliant
16QAM-Modulation ANT8			
0.009 – 26900	5002	-33.64	compliant
64QAM-Modulation ANT1			
0.009 – 26900	5002	-33.69	compliant
64QAM-Modulation ANT2			
0.009 – 26900	5002	-33.31	compliant



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64QAM-Modulation ANT3			
0.009 – 26900	5002	-33.43	compliant
64QAM-Modulation ANT4			
0.009 – 26900	5002	-33.70	compliant
64QAM-Modulation ANT5			
0.009 – 26900	5002	-33.68	compliant
64QAM-Modulation ANT6			
0.009 – 26900	5002	-33.20	compliant
64QAM-Modulation ANT7			
0.009 – 26900	5002	-34.87	compliant
64QAM-Modulation ANT8			
0.009 – 26900	5002	-33.63	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 16 Spurious Emissions (15 MHz Channel BW)

Config B Spurious emissions:

Carrier Frequency: 2593.0 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
0.009 – 26900	5193	-30.71	compliant
QPSK-Modulation ANT2			
0.009 – 26900	5181	-31.72	compliant
QPSK-Modulation ANT3			
0.009 – 26900	5181	-35.04	compliant
QPSK-Modulation ANT4			
0.009 – 26900	5181	-31.70	compliant
QPSK-Modulation ANT5			
0.009 – 26900	5181	-29.98	compliant
QPSK-Modulation ANT6			
0.009 – 26900	5181	-30.13	compliant
QPSK-Modulation ANT7			
0.009 – 26900	5181	-31.72	compliant
QPSK-Modulation ANT8			
0.009 – 26900	5181	-31.78	compliant
16QAM-Modulation ANT1			
0.009 – 26900	5181	-29.70	compliant



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16QAM-Modulation ANT2			
0.009 – 26900	5181	-30.75	compliant
16QAM-Modulation ANT3			
0.009 – 26900	5193	-30.49	compliant
16QAM-Modulation ANT4			
0.009 – 26900	5181	-33.02	compliant
16QAM-Modulation ANT5			
0.009 – 26900	5181	-33.22	compliant
16QAM-Modulation ANT6			
0.009 – 26900	5181	-29.43	compliant
16QAM-Modulation ANT7			
0.009 – 26900	5181	-30.73	compliant
16QAM-Modulation ANT8			
0.009 – 26900	5181	-29.07	compliant
64QAM-Modulation ANT1			
0.009 – 26900	5181	-29.80	compliant
64QAM-Modulation ANT2			
0.009 – 26900	5181	-29.53	compliant
64QAM-Modulation ANT3			
0.009 – 26900	5181	-31.89	compliant
64QAM-Modulation ANT4			
0.009 – 26900	5181	-31.29	compliant
64QAM-Modulation ANT5			
0.009 – 26900	5181	-30.81	compliant
64QAM-Modulation ANT6			
0.009 – 26900	5193	-29.88	compliant
64QAM-Modulation ANT7			
0.009 – 26900	5181	-29.66	compliant
64QAM-Modulation ANT8			
0.009 – 26900	5181	-31.21	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 17 Spurious Emissions (15 MHz Channel BW)



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Config B Spurious emissions:

Carrier Frequency: 2682.5 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
0.009 – 26900	5372	-34.58	compliant
QPSK-Modulation ANT2			
0.009 – 26900	5372	-34.65	compliant
QPSK-Modulation ANT3			
0.009 – 26900	5372	-34.72	compliant
QPSK-Modulation ANT4			
0.009 – 26900	5372	-34.64	compliant
QPSK-Modulation ANT5			
0.009 – 26900	5372	-34.27	compliant
QPSK-Modulation ANT6			
0.009 – 26900	5372	-34.59	compliant
QPSK-Modulation ANT7			
0.009 – 26900	5372	-35.05	compliant
QPSK-Modulation ANT8			
0.009 – 26900	5372	-34.66	compliant
16QAM-Modulation ANT1			
0.009 – 26900	5372	-34.53	compliant
16QAM-Modulation ANT2			
0.009 – 26900	5372	-33.89	compliant
16QAM-Modulation ANT3			
0.009 – 26900	5372	-34.12	compliant
16QAM-Modulation ANT4			
0.009 – 26900	5372	-34.76	compliant
16QAM-Modulation ANT5			
0.009 – 26900	5372	-35.02	compliant
16QAM-Modulation ANT6			
0.009 – 26900	5372	-34.52	compliant
16QAM-Modulation ANT7			
0.009 – 26900	5372	-34.90	compliant
16QAM-Modulation ANT8			
0.009 – 26900	5372	-35.12	compliant
64QAM-Modulation ANT1			
0.009 – 26900	5372	-34.40	compliant
64QAM-Modulation ANT2			
0.009 – 26900	5372	-33.82	compliant



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64QAM-Modulation ANT3			
0.009 – 26900	5372	-34.79	compliant
64QAM-Modulation ANT4			
0.009 – 26900	5372	-34.63	compliant
64QAM-Modulation ANT5			
0.009 – 26900	5372	-34.78	compliant
64QAM-Modulation ANT6			
0.009 – 26900	5372	-34.53	compliant
64QAM-Modulation ANT7			
0.009 – 26900	5372	-35.02	compliant
64QAM-Modulation ANT8			
0.009 – 26900	5372	-35.12	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 18 Spurious Emissions (15 MHz Channel BW)

The measured conducted emission levels were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.

Config C Lower band edge:

Carrier Frequency: 2506.0/2526.0/2546.0 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
	2496	-27.44	compliant
QPSK-Modulation ANT2			
	2496	-27.36	compliant
QPSK-Modulation ANT3			
	2496	-27.27	compliant
QPSK-Modulation ANT4			
	2496	-27.57	compliant
QPSK-Modulation ANT5			
	2496	-26.84	compliant
QPSK-Modulation ANT6			
	2496	-26.48	compliant
QPSK-Modulation ANT7			
	2496	-27.85	compliant
QPSK-Modulation ANT8			
	2496	-27.57	compliant



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16QAM-Modulation ANT1			
	2496	-29.42	compliant
16QAM-Modulation ANT2			
	2496	-27.43	compliant
16QAM-Modulation ANT3			
	2496	-26.24	compliant
16QAM-Modulation ANT4			
	2496	-27.29	compliant
16QAM-Modulation ANT5			
	2496	-29.13	compliant
16QAM-Modulation ANT6			
	2496	-29.12	compliant
16QAM-Modulation ANT7			
	2496	-29.33	compliant
16QAM-Modulation ANT8			
	2496	-29.70	compliant
64QAM-Modulation ANT1			
	2496	-26.58	compliant
64QAM-Modulation ANT2			
	2496	-26.89	compliant
64QAM-Modulation ANT3			
	2496	-27.12	compliant
64QAM-Modulation ANT4			
	2496	-27.05	compliant
64QAM-Modulation ANT5			
	2496	-26.31	compliant
64QAM-Modulation ANT6			
	2496	-26.84	compliant
64QAM-Modulation ANT7			
	2496	-27.21	compliant
64QAM-Modulation ANT8			
	2496	-28.20	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 59 Spurious Emissions (Lower band edge) (20 MHz CH BW)



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Config C Upper band edge:

Carrier Frequency: 2640.0/2660.0/2680.0MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
	2690	-30.85	compliant
QPSK-Modulation ANT2			
	2690	-31.31	compliant
QPSK-Modulation ANT3			
	2690	-31.43	compliant
QPSK-Modulation ANT4			
	2690	-31.62	compliant
QPSK-Modulation ANT5			
	2690	-31.17	compliant
QPSK-Modulation ANT6			
	2690	-30.94	compliant
QPSK-Modulation ANT7			
	2690	-31.81	compliant
QPSK-Modulation ANT8			
	2690	-30.97	compliant
16QAM-Modulation ANT1			
	2690	-30.94	compliant
16QAM-Modulation ANT2			
	2690	-31.04	compliant
16QAM-Modulation ANT3			
	2690	-27.61	compliant
16QAM-Modulation ANT4			
	2690	-31.06	compliant
16QAM-Modulation ANT5			
	2690	-28.84	compliant
16QAM-Modulation ANT6			
	2690	-29.67	compliant
16QAM-Modulation ANT7			
	2690	-31.70	compliant
16QAM-Modulation ANT8			
	2690	-28.93	compliant
64QAM-Modulation ANT1			
	2690	-31.48	compliant
64QAM-Modulation ANT2			



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	2690	-30.85	compliant
64QAM-Modulation ANT3			
	2690	-30.78	compliant
64QAM-Modulation ANT4			
	2690	-30.44	compliant
64QAM-Modulation ANT5			
	2690	-31.08	compliant
64QAM-Modulation ANT6			
	2690	-31.00	compliant
64QAM-Modulation ANT7			
	2690	-30.87	compliant
64QAM-Modulation ANT8			
	2690	-30.95	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}$: $\pm 1.1\text{dB}$, $1.0\text{GHz} \leq f < 3.6\text{GHz}$: $\pm 1.2\text{dB}$, $3.6\text{GHz} \leq f < 8.0\text{GHz}$: $\pm 1.6\text{dB}$, $8.0\text{GHz} \leq f$: $\pm 1.9\text{dB}$	

Table 20 Spurious Emissions (Upper band edge) (20 MHz CH BW)



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Config C Spurious emissions:

Carrier Frequency: 2506.0/2526.0/2546.0 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
0.009 – 26900	5049	-34.04	compliant
QPSK-Modulation ANT2			
0.009 – 26900	5049	-33.60	compliant
QPSK-Modulation ANT3			
0.009 – 26900	5049	-35.03	compliant
QPSK-Modulation ANT4			
0.009 – 26900	5049	-33.69	compliant
QPSK-Modulation ANT5			
0.009 – 26900	5049	-33.69	compliant
QPSK-Modulation ANT6			
0.009 – 26900	5049	-34.32	compliant
QPSK-Modulation ANT7			
0.009 – 26900	5049	-34.36	compliant
QPSK-Modulation ANT8			
0.009 – 26900	5049	-33.91	compliant
16QAM-Modulation ANT1			
0.009 – 26900	5049	-34.66	compliant
16QAM-Modulation ANT2			
0.009 – 26900	5049	-33.91	compliant
16QAM-Modulation ANT3			
0.009 – 26900	5049	-34.42	compliant
16QAM-Modulation ANT4			
0.009 – 26900	5049	-34.05	compliant
16QAM-Modulation ANT5			
0.009 – 26900	5049	-34.34	compliant
16QAM-Modulation ANT6			
0.009 – 26900	5049	-34.64	compliant
16QAM-Modulation ANT7			
0.009 – 26900	5049	-34.33	compliant
16QAM-Modulation ANT8			
0.009 – 26900	5049	-34.45	compliant
64QAM-Modulation ANT1			
0.009 – 26900	5049	-33.77	compliant
64QAM-Modulation ANT2			
0.009 – 26900	5049	-34.73	compliant



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64QAM-Modulation ANT3			
0.009 – 26900	5049	-34.30	compliant
64QAM-Modulation ANT4			
0.009 – 26900	5049	-34.01	compliant
64QAM-Modulation ANT5			
0.009 – 26900	5049	-33.60	compliant
64QAM-Modulation ANT6			
0.009 – 26900	5049	-33.72	compliant
64QAM-Modulation ANT7			
0.009 – 26900	5049	-34.04	compliant
64QAM-Modulation ANT8			
0.009 – 26900	5049	-33.64	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 21 Spurious Emissions (20 MHz Channel BW)

Config C Spurious emissions:

Carrier Frequency: 2573.0/2593.0/2613.0 MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
0.009 – 26900	5193	-29.91	compliant
QPSK-Modulation ANT2			
0.009 – 26900	5193	-30.70	compliant
QPSK-Modulation ANT3			
0.009 – 26900	5193	-30.37	compliant
QPSK-Modulation ANT4			
0.009 – 26900	5193	-31.06	compliant
QPSK-Modulation ANT5			
0.009 – 26900	5181	-30.88	compliant
QPSK-Modulation ANT6			
0.009 – 26900	5193	-29.95	compliant
QPSK-Modulation ANT7			
0.009 – 26900	5193	-30.20	compliant
QPSK-Modulation ANT8			
0.009 – 26900	5193	-30.11	compliant
16QAM-Modulation ANT1			
0.009 – 26900	5193	-31.35	compliant



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16QAM-Modulation ANT2			
0.009 – 26900	5193	-30.00	compliant
16QAM-Modulation ANT3			
0.009 – 26900	5193	-30.10	compliant
16QAM-Modulation ANT4			
0.009 – 26900	5193	-31.65	compliant
16QAM-Modulation ANT5			
0.009 – 26900	5193	-30.99	compliant
16QAM-Modulation ANT6			
0.009 – 26900	5193	-32.55	compliant
16QAM-Modulation ANT7			
0.009 – 26900	5193	-31.58	compliant
16QAM-Modulation ANT8			
0.009 – 26900	5193	-29.76	compliant
64QAM-Modulation ANT1			
0.009 – 26900	5193	-31.43	compliant
64QAM-Modulation ANT2			
0.009 – 26900	5193	-29.80	compliant
64QAM-Modulation ANT3			
0.009 – 26900	5193	-29.93	compliant
64QAM-Modulation ANT4			
0.009 – 26900	5193	-29.82	compliant
64QAM-Modulation ANT5			
0.009 – 26900	5193	-31.36	compliant
64QAM-Modulation ANT6			
0.009 – 26900	5193	-31.54	compliant
64QAM-Modulation ANT7			
0.009 – 26900	5193	-31.75	compliant
64QAM-Modulation ANT8			
0.009 – 26900	5193	-31.50	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}$: $\pm 1.1\text{dB}$, $1.0\text{GHz} \leq f < 3.6\text{GHz}$: $\pm 1.2\text{dB}$, $3.6\text{GHz} \leq f < 8.0\text{GHz}$: $\pm 1.6\text{dB}$, $8.0\text{GHz} \leq f$: $\pm 1.9\text{dB}$	

Table 22 Spurious Emissions (20 MHz Channel BW)



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Config C Spurious emissions:

Carrier Frequency: 2640.0/2660.0/2680.0MHz			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation ANT1			
0.009 – 26900	5276	-36.51	compliant
QPSK-Modulation ANT2			
0.009 – 26900	5276	-36.37	compliant
QPSK-Modulation ANT3			
0.009 – 26900	5276	-36.20	compliant
QPSK-Modulation ANT4			
0.009 – 26900	5276	-36.19	compliant
QPSK-Modulation ANT5			
0.009 – 26900	5276	-36.11	compliant
QPSK-Modulation ANT6			
0.009 – 26900	5276	-36.49	compliant
QPSK-Modulation ANT7			
0.009 – 26900	5276	-36.54	compliant
QPSK-Modulation ANT8			
0.009 – 26900	5276	-36.31	compliant
16QAM-Modulation ANT1			
0.009 – 26900	5276	-36.56	compliant
16QAM-Modulation ANT2			
0.009 – 26900	5276	-34.37	compliant
16QAM-Modulation ANT3			
0.009 – 26900	5276	-34.41	compliant
16QAM-Modulation ANT4			
0.009 – 26900	5276	-36.02	compliant
16QAM-Modulation ANT5			
0.009 – 26900	5276	-34.47	compliant
16QAM-Modulation ANT6			
0.009 – 26900	5276	-34.54	compliant
16QAM-Modulation ANT7			
0.009 – 26900	5276	-34.91	compliant
16QAM-Modulation ANT8			
0.009 – 26900	5276	-36.42	compliant
64QAM-Modulation ANT1			
0.009 – 26900	5276	-36.60	compliant
64QAM-Modulation ANT2			
0.009 – 26900	5276	-36.41	compliant



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64QAM-Modulation ANT3			
0.009 – 26900	5276	-36.41	compliant
64QAM-Modulation ANT4			
0.009 – 26900	5276	-36.39	compliant
64QAM-Modulation ANT5			
0.009 – 26900	5276	-36.28	compliant
64QAM-Modulation ANT6			
0.009 – 26900	5276	-36.39	compliant
64QAM-Modulation ANT7			
0.009 – 26900	5276	-36.53	compliant
64QAM-Modulation ANT8			
0.009 – 26900	5276	-36.91	compliant
Measurement Uncertainty:		$f < 1.0\text{GHz}: \pm 1.1\text{dB},$ $1.0\text{GHz} \leq f < 3.6\text{GHz}: \pm 1.2\text{dB},$ $3.6\text{GHz} \leq f < 8.0\text{GHz}: \pm 1.6\text{dB},$ $8.0\text{GHz} \leq f: \pm 1.9\text{dB}$	

Table 23 Spurious Emissions (20 MHz Channel BW)

The measured conducted emission levels were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.



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4.5 Test No. 5: Field Strength of Spurious Radiation (§ 2.1053, § 2.1057, § 27.53)

4.5.1. Limits

Para. No. 27.53(m). For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts.

(m)(2) For digital base stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB (P = transmitter power in Watts).

4.5.2. Test Configuration

The measurements were performed in an anechoic chamber. The radiated test site complies with the site attenuation requirements listed in ANSI C63.4 2003 and is listed with the FCC.

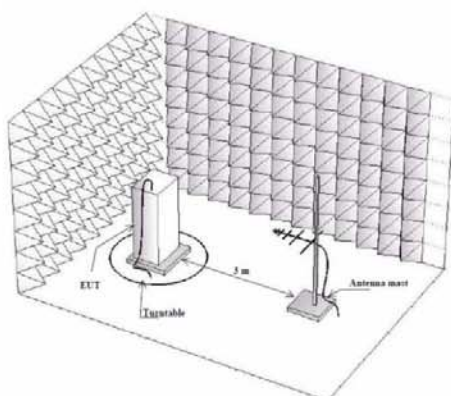


Figure 2 Test Configuration

Photographs of the EUT in the anechoic chamber are shown on page 224 of this measurement report.

4.5.3. Test Procedure and Results

TIA/EIA-603-C-2004, Section 2.2.12

The test was performed in a semi-anechoic shielded room. The EUT was placed on a non-conductive 0.8 m high table standing on the turntable. During the test in the frequency range 30 - 26500 MHz the distance from the EUT to the measuring antenna was 3 m. In order to find the maximum levels of the disturbance radiation the angle of the turntable, the height of the measuring antenna were varied during the tests. The test was performed with the measuring antenna being both in horizontal and vertical polarizations.



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Vertical and horizontal polarizations in the frequency range 30 - 26500 MHz was first measured by using the peak detector. During the peak detector scan the turntable was rotated from 0° to 360° with 30° step with the antenna heights 1.0 m and 2.5 m.

The limit of -13 dBm has been calculated to correspond 84.4 dB (μV/m). Spurious emissions closer than 20 dB to the limit was measured with average detector.

According to § 2.1057, all emissions from the lowest radio frequency generated in the equipment, without going below 9 kHz, up to the 10th harmonic were investigated.

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The EUT was replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator $G_{\text{Antenna[dBi]}}$. This antenna was fed with a signal at the spurious frequency $P_{\text{Gen[dBm]}}$. The level of the signal was adjusted to repeat the previously measured level. The resulting

EIRP is the signal level fed to the reference antenna corrected for gain referenced to an isotropic.

The formula below was used to calculate the EIRP of the EUT.

$$P_{\text{EIRP[dBm]}} = P_{\text{Gen[dBm]}} - L_{\text{Cable[dB]}} + G_{\text{Antenna[dBi]}}$$

Worst case detected emission levels are reported in the following table (refer to spectral plots included on pages 100 for details). The antenna factor and cable loss is according to the manufacturer's specification.

Config A, B, C:

Carrier Frequency:Error! Reference source not found.			
Frequency Range [MHz]	Emission Frequency [MHz]	Maximum Emission Level [dBm]	Result
QPSK-Modulation TX1			
30 - 26500	26401	-19.36 dBm	compliant
Measurement Uncertainty:			±5.4dB

Table 6 Field Strength of Spurious Radiation (10, 15 and 20 MHz Channel BW)

The measured emission levels were found to be compliant with the manufacturer's specifications and with all requirements of the FCC rules.



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5. TEST DATA AND SCREENSHOTS

5.1 Part List of the RF Measurement Test Equipment

No.	Test Equipment	Manufacturer & Type	Serial Number	Calibration date	Calibration due	Test No.
1	Signal Analyzer	Rohde & Schwarz: FSV 30	100781	05/2013	07/2015	1, 2, 3, 4
2	Signal Analyzer	Rohde & Schwarz: FSW -43	100747			1
3	Vector Network Analyzer	Rohde & Schwarz: ZVA40	100146	01/2015	01/2016	4
4	Vector Network Analyzer	Rohde & Schwarz: ZVL13	101177	07/2014	07/2015	1, 2, 3, 4
5	Calibration Unit	Rohde & Schwarz: ZV-Z54	100125	07/2014	07/2015	4
6	Multimeter	Fluke 83	65870302	12/2014	12/2015	1, 2, 3, 4
7	Humidity and Temperature Indicator	Vaisala: HMI 31	P3730008	01/2015	01/2016	1, 2, 3, 4
8	DC Power Supply	Sorensen: SGI 80/188	1245A00011	cnn	-	1, 2, 3, 4
9	Attenuator	Aeroflex/Weinschel: 66-20-33	BV3346	cnn	-	4
10	EMI Test Receiver	R&S ESIB26	100335	07/2014	07/2015	5
11	Horn Antenna	Emco 3115	6346	07/2014	07/2015	5
12	Bilog Antenna	Chase CBL6112	2003	09/2014	09/2015	5
13	Log Periodic Antenna	R&S 1-26.5GHz	356749/012	09/2014	09/2015	5
14	Amplifier	Miteq AFSX4	902638	cnn	-	5
15	Antenna Mast	Deisel HD240	2401323194	cnn	-	5
16	Mast Controller	Deisel HD100	1001331	cnn	-	5

Table 25 Part List of the RF Measurement Test Equipment