

issued by an Accredited Testing Laboratory

Contact person RISE Tomas Lennhager Electronics +46 10 516 54 09 tomas.lennhager@ri.se Date 2017-10-11

Reference 7P05637-L Page 1 (71)

h

SP Testing

Ericsson AB Anders Karlsson BURA DURA RP QRM Torshamnsgatan 21 164 80 Stockholm

Radio measurements on Radio 4478 B71 equipment with FCC ID TA8AKRC161699

Product name: Radio 4478 B71 Product number: KRC 161 699/1 and KRC 161 699/3

RISE Research Institutes of Sweden AB Electronics - EMC

Performed by

Examined by

Tomas Lennhager

Monika Fuller

RISE Research Institutes of Sweden AB

Postal address Box 857 SE-501 15 BORÅS Sweden Office location Brinellgatan 4 SE-504 62 BORÅS

Phone / Fax / E-mail +46 10 516 50 00 +46 33 13 55 02 info@ri.se This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



Reference 7P05637-L





Summary
Description of the test object
Purpose of test
Operation modes during measurements
Conducted measurements
Radiated measurements
References
Measurement equipment
Uncertainties
Reservation7
Delivery of test object
Manufacturer's representative7
Test engineers
Test participant(-s)
Test frequencies used for radiated and conducted measurements
Test setup: conducted measurements
Test setup: radiated measurements
RF power output measurements according to CFR 47 §27.50, conducted 12
Test set-up and procedure
Test set-up and procedure
Results
Results
Results
Results 12 Remark 14 Limits 14 Occupied bandwidth measurements according to CFR47 2.1049 15
Results 12 Remark 14 Limits 14 Occupied bandwidth measurements according to CFR47 2.1049 15 Test set-up and procedure 15
Results 12 Remark 14 Limits 14 Occupied bandwidth measurements according to CFR47 2.1049 15 Test set-up and procedure 15 Results 15
Results12Remark14Limits14Occupied bandwidth measurements according to CFR47 2.104915Test set-up and procedure15Results15Band edge measurements according to CFR 47 §2.104924
Results12Remark14Limits14Occupied bandwidth measurements according to CFR47 2.104915Test set-up and procedure15Results15Band edge measurements according to CFR 47 §2.104924Test set-up and procedure24
Results12Remark14Limits14Occupied bandwidth measurements according to CFR47 2.104915Test set-up and procedure15Results15Band edge measurements according to CFR 47 §2.104924Test set-up and procedure24Results24Results24Results24
Results12Remark14Limits14Occupied bandwidth measurements according to CFR47 2.104915Test set-up and procedure15Results15Band edge measurements according to CFR 47 §2.104924Test set-up and procedure24Results24Limits24Limits25
Results12Remark14Limits14Occupied bandwidth measurements according to CFR47 2.104915Test set-up and procedure15Results15Band edge measurements according to CFR 47 §2.104924Test set-up and procedure24Results24Limits24Conducted spurious emission measurements according to CFR 47 §27.5342

Date 2017-10-11

Reference 7P05637-L





Limits	44
Field strength of spurious radiation measurements according to CFR 47 §27.53	62
Measurement equipment	64
Results	64
Limits	64
Frequency stability measurements according to CFR 47 § 2.1055	66
Test set-up and procedure	66
Results	67
Remark	68
Limits	68
Photos of test object	69



Summary

Standard Listed part of	Compliant	
FCC CFR 47 part 27		
2.1046 RF power output, conducted	Yes	
2.1049 Occupied bandwidth	Yes	
2.1051 Band edge	Yes	
2.1051 Spurious emission at antenna terminals	Yes	
2.1053 Field strength of spurious radiation	Yes	
2.1055 Frequency stability	Yes	





Description of the test object

Equipment:	Radio equipment Radio 4478 B71 Product number KRC 161 699/1 and KRC 161 699/3 FCC ID: TA8AKRC161699
Hardware revision state:	R1B
Tested configuration:	Single RAT LTE
Frequency bands: 3GPP B71:	TX: 617 – 652 MHz RX: 663 – 698 MHz
IBW:	35 MHz
Output power:	Max 40 W/ antenna port
Antenna ports:	4 TX / 4 RX ports
Antenna:	No dedicated antenna, handled during licensing
RF configurations:	Single and multi-carrier, 1-6 carriers/ port TX Diversity, 2x2 MIMO, 4x4 MIMO, Contiguous Spectrum (CS), intra band Carrier Aggregation (CA)
Channel bandwidths:	5 MHz, 10 MHz, 15 MHz and 20 MHz
Modulations:	QPSK, 16QAM, 64QAM and 256QAM
RF power Tolerance:	+0.6/ -2.0 dB
CPRI Speed	Up to 10.1 Gbit/s

The information above is supplied by the manufacturer.

Note: KRC 161 699/1 and KRC 161 699/3 are identical according to the manufacturer.

Page 6 (71)



Purpose of test

The purpose of the tests is to verify compliance to the performance characteristics specified in applicable items of FCC CFR 47.

Operation modes during measurements

LTE measurements were performed with the test object transmitting test models as defined in 3GPP TS 37.141. Test model E-TM1.1 was used to represent QPSK, test model E-TM3.2 to represent 16QAM, test model E-TM3.1 to represent 64QAM modulation and E-TM3.1A to represent 256QAM modulation.

All measurements were performed with the test object configured for maximum transmit power. The measured configurations covers worst case settings. The settings below were used for all measurements if not otherwise noted.

LTE MIMO mode E-TM1.1 Channel bandwidth 5 MHz.

Conducted measurements

The test object was supplied with -48 VDC by an external power supply. Additional connections are documented in the set-up drawings for conducted measurements.

Radiated measurements

The test object was powered with -48 VDC by an external power supply. Additional connections are documented in the set-up drawings for radiated measurements.

References

Measurements were done according to relevant parts of the following standards: ANSI C63.4-2014 CFR 47 part 2, April 2017 CFR 47 part 27, April 2017 ANSI C63.26-2015 KDB 662911 D01 Multiple Transmitter Output v02r02 KDB 971168 D01 Power Meas License Digital Systems v02r02 KDB 971168 D03 IM Emission Repeater Amp v01 3GPP TS 36 141 version 13.6.0 3GPP TS 37.141, version 13.5.0



Measurement equipment

	Calibration Due	RISE number
Test site Tesla	2019-12	503 881
R&S ESU 40	2018-07	901 385
R&S FSQ 40	2018-07	504 143
R&S FSW 43	2018-08	902 073
Control computer with	-	BX62351
R&S software EMC32 version 9.15.0		
High pass filter 1-15 GHz	2018-06	504 199
High pass filter 1-20 GHz	2018-06	901 373
RF attenuator Weinschel WA73-20-11	2018-05	900 691
Coaxial cable Sucoflex 102EA	2018-05	BX50191
Coaxial cable Sucoflex 102EA	2018-05	BX50236
ETS Lindgren BiConiLog Antenna 3142E	2019-03	BX61914
EMCO Horn Antenna 3115	2019-12	502 175
µComp Nordic, Low Noise Amplifier	2017-12	901 545
Temperature and humidity meter, Testo 635	2018-06	504 203
Temperature and humidity meter, Testo 625	2018-06	504 188

Date

2017-10-11

Reference

7P05637-L

Page

7(71)

Uncertainties

Measurement and test instrument uncertainties are described in the quality assurance documentation "SP-QD 10885". The uncertainties are calculated with a coverage factor k=2 (95% level of confidence).

Compliance evaluation is based on a shared risk principle with respect to the measurement uncertainty.

Reservation

The test results in this report apply only to the particular test object as declared in the report.

Delivery of test object

The test object was delivered: 2017-09-07.

Manufacturer's representative

Mikael Jansson, Ericsson AB.

Test engineers

Tomas Isbring for radiated tests, RISE Tomas Lennhager and Andreas Johnson for conducted tests, RISE.

Test participant(-s)

None.

RISE Research Institutes of Sweden AB



Test frequencies used for radiated and conducted measurements

Reference

 Date
 Reference

 2017-10-11
 7P05637-L

Date

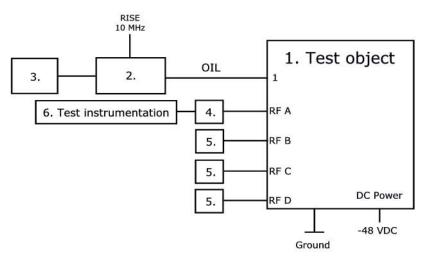
EARFCN	Frequency	Symbolic	c Comment	
Downlink	[MHz]	name		
68610	619.5	B_5	TX bottom frequency in 5 MHz BW configuration	
68635	622.0	B ₁₀	TX bottom frequency in 10 MHz BW configuration	
68660	624.5	B ₁₅	TX bottom frequency in 15 MHz BW configuration	
68685	627.0	B ₂₀	TX bottom frequency in 20 MHz BW configuration	
68760	634.5	M ₅₋₂₀	TX mid frequency in 5-20 MHz BW configuration	
68910	649.5	T_5	TX top frequency in 5 MHz BW configuration	
68885	647.0	T ₁₀	TX top frequency in 10 MHz BW configuration	
68860	644.5	T ₁₅	TX top frequency in 15 MHz BW configuration	
68835	642.0	T ₂₀	TX top frequency in 20 MHz BW configuration	
68610	619.5		2 carriers TX 5 MHz configuration	
68660	624.5	B2		
68610	619.5			
68660	624.5			
68710	629.5	B6	6 carriers TX 5 MHz configuration	
68760	634.5	BO	o carriers TX 5 MHZ configuration	
68810	639.5			
68860	644.5			
68610	619.5			
68660	624.5	Bim	3 carriers TX 5 MHz configuration	
68910	649.5		Ŭ	
68610	619.5	Tim	3 carriers TX 5 MHz configuration	
68860	644.5			
68910	649.5			
68685	627.0	CA	Comion A conception TV 20 MHz and 15 MHz configuration	
68860	644.5	CA ₂₀₋₁₅	Carrier Aggregation TX 20 MHz and 15 MHz configuration	

All RX frequencies were configured 46 MHz above the corresponding TX frequency according the applicable duplex offset for the operating band.

Page 9 (71)



Test setup: conducted measurements



Test object:

Γ	1.	Radio 4478 B71, KRC 161 699/1, rev. R1B, s/n: D16X059364
		With Radio Software: CXP 901 7316/7, rev. R67HA. FCC ID: TA8AKRC161699

Associated equipment:

2.	Testing Equipment:
	CT10, LPC 102 467/1, rev. R1C, s/n: T01F375047, BAMS – 1001466801
	with software CXA 104 446/1, rev. R8AA

Functional test equipment:

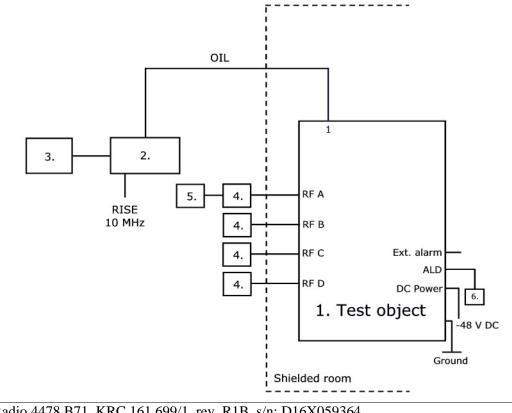
3.	Computer, HP EliteBook 8560w, BAMS - 1001236851	
4.	RF Attenuator: SP number: 900 691	
5.	Terminator, 50 ohm	
6.	RISE Test Instrumentation according to measurement equipment list for each test.	
	The signal analyzer was connected to the RISE 10 MHz reference standard during all	
	measurements.	

Date Reference 2017-10-11 7P05637-L

Page 10 (71)



Test setup: radiated measurements



Radio 4478 B71, KRC 161 699/1, rev. R1B, s/n: D16X059364
 With Radio Software: CXP 901 7316/7, rev. R67HA. FCC ID: TA8AKRC161699

Associated equipment:

2.	Testing Equipment:
	CT10, LPC 102 467/1, rev. R1C, s/n: T01F375047, BAMS – 1001466801
	with software CXA 104 446/1, rev. R8AA

Functional test equipment:

3.	Computer, HP EliteBook 8560w, BAMS - 1001236851
4.	Attenuator
5.	R&S ESIB 26, RISE no: 503 292, for supervision purpose only
6.	ALD Control, Andrew, model: ATM200-A20, s/n: DESA101412073



Reference Date 2017-10-11 7P05637-L Page 11 (71)



Interfaces:				
Power input configuration DC: -48 VDC	Power			
RF A, 4.3-10 connector, combined TX/RX	Antenna			
RF B, 4.3-10 connector, combined TX/RX	Antenna			
RF C, 4.3-10 connector, combined TX/RX	Antenna			
RF D, 4.3-10 connector, combined TX/RX	Antenna			
1, Optical Interface Link, single mode opto fibre	Signal			
2, Optical Interface Link, not used in this configuration	Signal			
EXT Alarm, shielded multi-wire	Signal			
ALD, shielded multi-wire	Signal			
Ground wire	Ground			



RF power output measurements according to CFR 47 27.50, conducted

Date	Temperature	Humidity
2017-09-22	$22 \degree C \pm 3 \degree C$	42 % ± 5 %
2017-10-05	$22 \degree C \pm 3 \degree C$	30 % ± 5 %

Test set-up and procedure

The test object was connected to a signal analyser measuring peak and RMS output power in CDF mode. A resolution bandwidth of 80 MHz was used.

Measurement equipment	RISE number
R&S FSW 43	902 073
RF attenuator	900 691
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 1.1 dB

Results

Single carrier ETM 1.1 QPSK

Data d antenat a arrea	level of each DE	mout 1 m 16 dDm/mout
Rated output power	level at each Kr	port 1x 46 dBm/ port.

		Output power CCDF [RMS dBm/ PAR dB]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power ¹⁾	
B_5	45.58/ 7.34	45.71/ 7.34	45.72/ 7.34	45.60/ 7.34	51.67	
\mathbf{B}_{10}	45.57/ 7.36	45.68/ 7.36	45.66/ 7.36	45.55/ 7.36	51.64	
B ₁₅	45.53 7.38	45.64/ 7.38	45.61/ 7.38	45.53/ 7.38	51.60	
B ₂₀	45.50/ 7.38	45.60/ 7.38	45.58/ 7.38	45.49/ 7.38	51.56	
M ₅	45.50/ 7.32	45.62/7.30	45.46/ 7.38	45.49/ 7.32	51.54	
T ₅	45.37/ 7.38	45.52/ 7.38	45.46/ 7.38	45.37/ 7.38	51.45	

¹⁾: summed output power according to FCC KDB662911 Multiple transmitter output.

Note: The PAR value is the 0.1 % Peak to Average Ratio.



Single carrier ETM 3.2 16 QAM

Rated output power level at each RF port 1x 46 dBm/ port.

Date

		Output power	CCDF [RMS	dBm/ PAR dB	3]
symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power ¹⁾
B ₅	45.58/ 7.34	45.69/ 7.34	45.68/ 7.34	45.58/ 7.34	51.65

Single carrier ETM 3.1 64 QAM

Rated output power level at each RF port 1x 46 dBm/ port.

		Output power	CCDF [RMS	dBm/ PAR dB	3]
symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power ¹⁾
B ₅	45.56/ 7.34	45.69/ 7.36	45.71/ 7.36	45.60/ 7.36	51.66

Single carrier ETM 3.1a 256 QAM

Rated output power level at each RF port 1x 46 dBm/ port.

		Output power	CCDF [RMS	dBm/ PAR dB	3]
symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power ¹⁾
B ₅	45.53/ 7.36	45.67/ 7.36	45.65/ 7.36	45.57/ 7.36	51.63

Multi carrier ETM 1.1 QPSK

Rated output power level at each RF port 2x 43 dBm/ port.

		Output power	CCDF [RMS	dBm/ PAR dB	3]
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power ¹⁾
B2	45.60/ 7.22	45.69/7.22	45.69/ 7.22	45.56/ 7.22	51.66

Multi carrier ETM 1.1 QPSK

Rated output power level at each RF port 6x 38.2 dBm/ port.

		Output power	CCDF [RMS	dBm/ PAR dB	3]
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power ¹⁾
B6	45.33/ 7.26	45.49/7.38	45.48/ 7.36	45.36/ 7.38	51.44

¹⁾: summed output power according to FCC KDB662911 Multiple transmitter output

Note: The PAR value is the 0.1 % Peak to Average Ratio.



Single carrier ETM 1.1 QPSK

Rated output power level at RF connector 1x 46 dBm/ port.

	Output power per 1 MHz [RMS dBm]					
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power ¹⁾	
B ₅	39.29	39.40	39.45	39.32	45.39	
B ₁₀	36.24	36.43	36.36	36.27	42.35	
B ₁₅	34.54	34.66	34.64	34.55	40.62	
B ₂₀	33.24	33.42	33.38	33.29	39.35	

¹⁾: summed output power according to FCC KDB662911 Multiple transmitter output.

Remark

ERP/EIRP compliance is addressed at the time of licensing, as required by the responsible FCC/IC Bureau(s). Licensee's are required to take into account maximum antenna gain used in combination with above power settings to prevent the radiated output power to exceed the limits.

Limits

§27.50:

(c) (4) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section;

complies: I'es



Occupied bandwidth measurements according to CFR47 2.1049

Date	Temperature	Humidity
2017-09-25	$22 \degree C \pm 3 \degree C$	42 % ± 5 %

Test set-up and procedure

The measurements were made per definition in § 2.1049. The output was connected to a signal analyzer with the Peak detector activated in max hold.

Measurement equipment	RISE number
R&S FSW 43	902 073
RF attenuator	900 691
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

Single carrier ETM 1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [MHz]
1	M ₅	RF C	4.477

Single carrier ETM 3.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [MHz]
2	M_5	RF A	4.495
3	M_5	RF B	4.493
4	B_5	RF C	4.493
5	M_5	RF C	4.495
6	M ₁₀ RF C		8.973
7	M_{15}	RF C	13.470
8	M_{20}	RF C	17.896
9	T_5	RF C	4.494
10	M_5	RF D	4.494

Page 16 (71)



Diagram	Symbolic name	Tested Port	Occupied BW (99%) [MHz]
11	M ₅	RF C	4.479

Single carrier ETM 3.1a

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [MHz]
12	M ₅	RF C	4.486

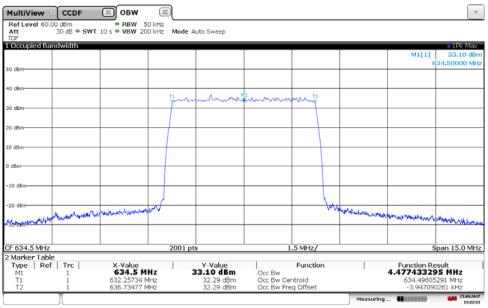
Carrier Aggregation ETM 3.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [MHz]
13	CA ₂₀₋₁₅	RF C	32.970



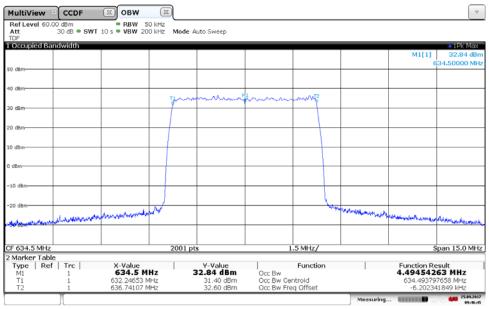
Page 17 (71)





11:22:12 25.09.2017

Diagram 2:



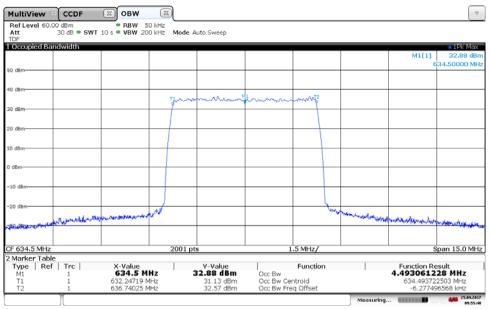
09:46:45 25.09.2017



Date 2017-10-11

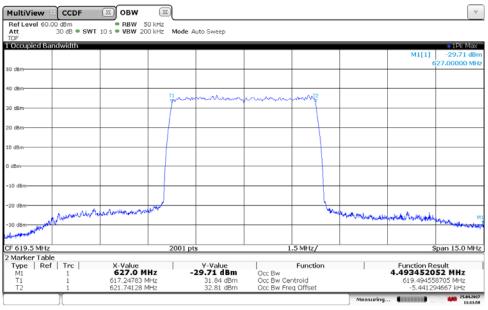
Reference 7P05637-L Page 18 (71)





09:55:49 25.09.2017

Diagram 4:



11:11:59 25.09.2017

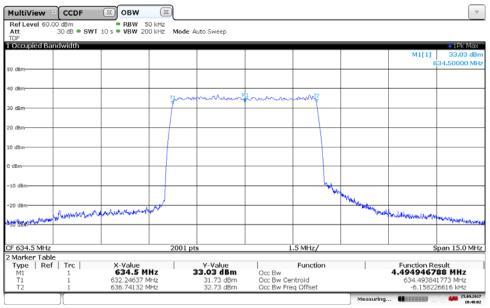


Date

Reference 2017-10-11 7P05637-L

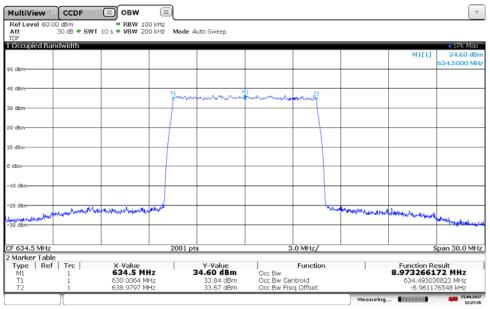
Page 19 (71)





10:48:03 25.09.2017

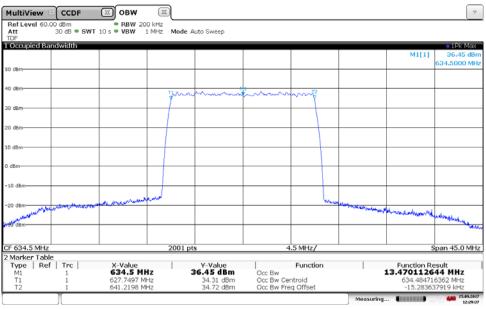
Diagram 6:



12:27:17 25.09.2017

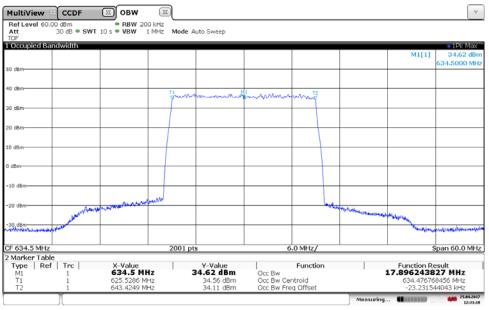






12:29:38 25.09.2017

Diagram 8:



12:31:18 25.09.2017



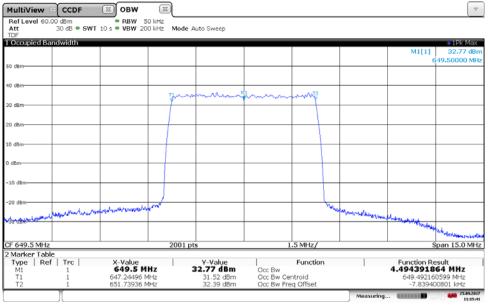
2017-10-11

Date

Reference 7P05637-L Page 21 (71)

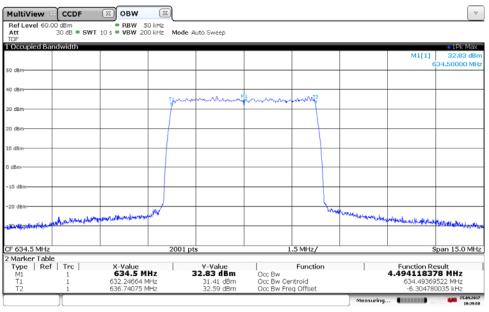


Diagram 9:



11:15:42 25.09.2017

Diagram 10:



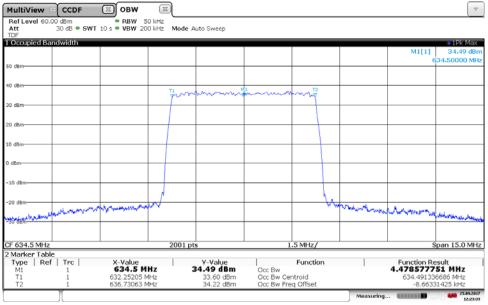
10:39:58 25.09.2017



Page 22 (71)

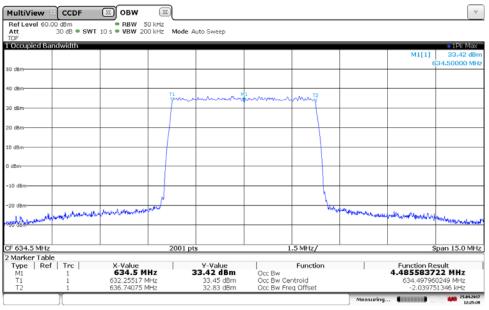


Diagram 11:



12:23:34 25.09.2017

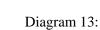
Diagram 12:



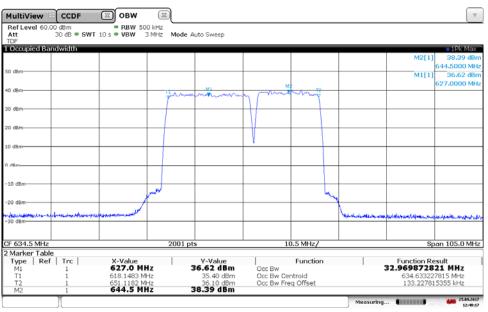
12:25:38 25.09.2017



Reference 7P05637-L Page 23 (71)



RI. SE



12:40:17 25.09.2017



Band edge measurements according to CFR 47 §2.1049

Date	Temperature	Humidity
2017-09-25	$22 \degree C \pm 3 \degree C$	42 % ± 5 %

Test set-up and procedure

The measurements were made per definition in CFR 47 §27.53. The test object was connected to a spectrum analyzer with the RMS detector activated. The spectrum analyzer was connected to an external 10 MHz reference standard during the measurements.

Before comparing the results to the limit, 6 dB [10 log (4)] to cover 4x4 MIMO, should be added according to method c "measure and add 10 log(N_{ANT})" of FCC KDB662911 D01 Multiple Transmitter Output.

Measurement equipment	RISE number
R&S FSW 43	902 073
RF attenuator	900 691
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

Single carrier TM 1	.1	
Diagram	Symbolic name	Tested Port
1 a-b	B ₅	RF A
2 a-b	B_5	RF B
3 a-b	B_5	RF C
4 a-b	B_5	RF D
5 a-b	B_{10}	RF C
6 a-b	B ₁₅	RF C
7 a-b	B_{20}	RF C
8 a-b	T ₅	RF A
9 a-b	T ₅	RF B
10 a-b	T ₅	RF C
11 a-b	T ₅	RF D
12 a-b	T ₁₀	RF C
13 а-ь	T ₁₅	RF C
14 a-b	T ₂₀	RF C

Multi carrier TM 1.1

Diagram	Symbolic name	Tested Port
15 a-b	Bim	RF C
16 a-b	Tim	RF C





Limits

CFR 47 §27.53

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P) dB$. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Complies?

Yes

Date 2017-10-11

Reference 7P05637-L Page 26 (71)



Diagram 1a:

	B1 🖾			12 🗵					▼
Ref Level 50 Att DF			V 30 kHz V 100 kHz Mod	le Auto Sweep				c	ount 100/100
Frequency S	weep								1Rm Avg
								M1[1] 61	-32.21 dBr 7.000000 MH
0 dBm									
) dBm									
1 dbm									
0 dBm									
0 d8m									
GBIN				-	_				
dBm				and the second second					
10 dBm			And the second s						
	H1 -13.000 dBm	معمر							
20 dBm									
30 dBm	ML								
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~									
+0 dBm									
16.9 MHz			1001 pt	s	6	0.0 kHz/	_		
616.9 MHz 7:02:13 25.09.201	][		1001 pt	s	6	0.0 kHz/	Measuring.		617.5 M

#### Diagram 1b:

MultiView 🕀 🛛 🛛 🛛			H1 🖾	H2 🖾				
Ref Level 50.00 Att 3 DF	dBm 0 dB 🖷 SWT	100 ms = VB	W 100 kHz W 1 MHz M	ode Auto Sweep			c	ount 100/10
Frequency Swe	ep							• 1Rm Avg
							M1[1]	
D dBm								
0 dBm								
0 dBm				-				
) dBm								
dBm								
10 dBm	13.000 d8m —							
20 dBm								
0 d8m								
o ubm							 	
i0 dBm								
06.0 MHz			1001	ate		09 MHz/		616.9 MH
00.0 1112			1001	Jta	1.	09 1112/	 	25.49.201

17:02:56 25.09.2017

Date 2017-10-11

Reference 7P05637-L Page 27 (71)



#### Diagram 2a:

			=  1	12 🔟					
Ref Level 50. Att DF		• RBV 100 ms • VBV	V 30 kHz V 100 kHz Mod	le Auto Sweep				G	ount 100/100
Frequency S	weep					_			1Rm Avg
								M1[1] 61	-32.87 dBi 7.000000 MH
dBm									
dBm									
) dBm									
) dBm					and the second s				
dBm				a decourse of the second					
0 dBm	H1 -13.000 dBm -		part -						
0 d8m	HI -13.000 08//								
o dani									
0 dBm	Mi martine								
0 dBm									
16.9 MHz			1001 pt	\$	6	0.0 kHz/			617.5 MH
56:15 25.09.201	7						Measuring		25.89.201 16:56:1

#### Diagram 2b:

AultiView ⊞ B1 🖾 B2			 ~
Ref Level         50.00 dBm           Att         30 dB • SWT 10	RBW 100 kHz 0 ms      VBW 1 MHz     Mode Auto Sweep		Count 100/100
IDF Frequency Sweep			• 1Rm Avg
			M1[1] -29.81 dB
			616.8946 MF
dBm-			 
) dBm			 
I dBm			
, down			
) dBm			 
dBm			 
10 dBm-			 
H1 -13.000 dBm			 
20 dBm-			
0 dBm-			 
0 dBm			 
06.0 MHz	1001 pts	1.09 MHz/	616.9 MH

16:56:38 25.09.2017

Date 2017-10-11

Reference 7P05637-L Page 28 (71)



#### Diagram 3a:

TDF         #18m           Frequency Sweep         #111           -30.78         -30.78	Ref Level 50.		• RB	W 30 kHz	12 ≹⊠			 	
MI[1]     -30.78       ddm     Image: Second secon	DF		100 ms 🛡 VB	W 100 kHz Mod	le Auto Sweep			C	ount 100/10
0 d8m     617.000000       0 d8m     1	Frequency S	weep							1Rm Avg
D d8m									-30.78 dB 7.000000 Mi
A dam and a second seco	dBm								
dBm     dBm <td>dBm</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	dBm								
dBm     dBm <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td> </td> <td></td>						-		 	
	dBm								
	dBm					1			
	dBm				administration of the second s				
	0 dBm			Margaret Market					
	o dem	H1 -13.000 dBm	- where						
	0 dBm								
	0 dBm	MI	~						
D d8m.	0 dBm								
16.9 MHz 1001 pts 60.0 kHz/ 617.5	16.9 MHz			1001 pt	s	6	0.0 kHz/		617.5 MF

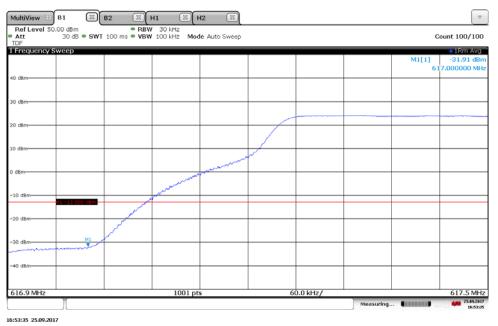
#### Diagram 3b:

fultiView 🕀 B1			Пні	X H2	××		 	
Ref Level 50.00 d Att 30 DF	IBm ) dB 🖷 SWT	100 ms 🖷	VBW 100 kH	z z Mode A	uto Sweep		c	ount 100/10
Frequency Swee	ep							1Rm Avg
							M1[1]	
D dBm								
D dBm						 		
D dBm								
) dBm								
dBm								
10 dBm						 		
20 d8m-	13.000 d8m							
LO GDIN								
30 dBm							 	
40 dBm								
06.01415								
06.0 MHz			1	001 pts		 .09 MHz/		616.9 MH

15:38:21 25.09.2017







#### Diagram 4b:

MultiView ः B1 ( Ref Level 50.00 dBm	B2 E H1	⊠[H2 ⊠			
Att 30 dB =	SWT 100 ms • VBW 1 MHz	Mode Auto Sweep			Count 100/10
Frequency Sweep					1Rm Avg
				M1[	
0 dBm					
0 dBm					
0 d8m					
o usin					
0 dBm					
dBm					
10 dBm	_				
41 - 13 000 d					
a dom					
30 dBm					
40 dBm					
06.0 MHz	100	01 pts	1.09 MHz/		616.9 MF
Y	10	- A 1999	102.001	Measuring	25.89.20

16:54:09 25.09.2017

Date Reference 2017-10-11 7P05637-L

Page 30 (71)



#### Diagram 5a:

MultiView 🖽	B1 🖾	B2 🔟 I	H1 🖾 (H	12 🤾 🖾					
Ref Level 50. Att TDF		• RBW 100 ms • VBW	30 kHz 100 kHz Mod	e Auto Sweep				C	ount 100/100
Frequency S	weep								1Rm Ava
								M1[1] 61	-35.35 dBm 7.000000 MHz
10 dBm									
30 dBm									
20 dBm									
10 dBm									
) dBm								and the second second	and the second se
, abiii						manan	and the state of t		
-10 dBm	H1 -13.000 dBm -			- And and a start of the start	and the second second second				
20 dBm			and the second second second						
30 dBm	M1								
40 dBm									
616.9 MHz			1001 pts		6	0.0 kHz/			617.5 MHz
0101910112	Y		1001 pt	,	00	0.0 10 12/			25.09.2017
5:44:22 25.09.201	 7						Measuring.		15:44:21

#### Diagram 5b:

fultiView ⊕ B1 🖾 B2			
Ref Level 50.00 dBm Att 30 dB = SWT 10 DF	RBW 100 kHz      Of ms • VBW 1 MHz Mode Auto Sweep		Count 100/10
Frequency Sweep			1Rm Avg
			M1[1] -30.87 dB 616.8946 M
0 dBm-			
D dBm			
D dBm			
) dBm-			
dBm			
10 dBm			
20 dBm			
80 dBm			
40 dBm			
06.0 MHz	1001 pts	1.09 MHz/	616.9 MH

15:45:02 25.09.2017

Date Reference 2017-10-11 7P05637-L

Page 31 (71)



#### Diagram 6a:

MultiView 😁	B1 🖾	B2 🕅	н1 🖾 (н	12 🖾					▼
Ref Level 50 Att		• RBV 100 ms • VBW	30 kHz 100 kHz Mod	le Auto Sweep				c	ount 100/100
Frequency S	weep								1Rm Avg
								M1[1]	-36.84 dBr
									7.000000 MH
0 dBm									
/ 00/11									
0 dBm									
2 Gen									
0 dBm									
0 dBm									
dBm									
									and the second second
10 dBm									
	H1 -13.000 dBm -								
						······			
20 dBm					warman and a second				
				and the second sec					
30 dBm									
30 dBm			- water and the second second						
	M1								
40 dBm									
to dom									
516.9 MHz			1001 pt	s	6	0.0 kHz/			617.5 MH:
	1						Measuring.		25.49.2017
									1515311
53:15 25.09.201	7								

#### Diagram 6b:

AultiView ⊕ B1			H1 🖾	H2 🗵				
Att 3 DF	abm 0 dB 🖷 SWT	100 ms • VE	W 100 kHz W 1 MHz M	ode Auto Sweep			C	ount 100/10
Frequency Swe	ep							1Rm Avg
							M1[1]	
) dBm								
) dBm								
0 dBm								
0 dBm								
dBm								
ubiii-								
10 dBm	13.000 dBm							
20 dBm								
80 dBm								
0 dBm								
06.0 MHz			1001 g	200		.09 MHz/		616.9 MF
00.0 MILL2			1001	Jia	1	.09 14112/	 	010.9 NF

15:53:45 25.09.2017

Date Reference 2017-10-11 7P05637-L

Page 32 (71)



#### Diagram 7a:

AultiView 🖽 B1 🛛 🖾	B2 🖾 H1 🖾 H2	X	
RefLevel 50.00 dBm Att 30 dB • SW DF	RBW 30 kHz T 100 ms • VBW 100 kHz Mode Auto S	weep	Count 100/100
Frequency Sweep			1Rm Avg
			M1[1] -37.61 dB 617.000000 Mi
I dBm			
) dBm			
d8m			
) dBm			
dBm			
0 dBm			
0 dBm			and
0 dBm-M1			
0 dBm			
16.9 MHz	1001 pts	60.0 kHz/	617.5 MH
Л		Me	easuring 🚺 🚺 🦇 25.49.201 15:554

#### Diagram 7b:

MultiView 🕀 B1		_	П	) X	H2 🗵					
Ref Level 50.00 Att 3 IDF	dBm 0 dB = SWT	100 ms 🖷	RBW 100 VBW 11	kHz MHz <b>Mo</b> e	le Auto Sweep				С	ount 100/100
Frequency Swe	ер									1Rm Avg
	σp								M1[1]	
0 dBm										01011000011
0 dBm										
0 dBm										
) dBm										
) ubin										
dBm										
10 dBm	13.000 dkm —									
20 dBm										
0 dBm										MI
0 dBm										
06.0 MHz				1001 pt	s	1	.09 MHz/			616.9 MH
								Measuring		25.89.201

15:57:05 25.09.2017

Date 2017-10-11 Reference 7P05637-L Page 33 (71)



#### Diagram 8a:

Ref Level 50.00 dBm           Att         30 dB • S	RBW SWT 100 ms = VBW :	30 kHz 100 kHz Mod	e Auto Sweep			c	Count 100/100
DF Frequency Sweep							• 1Rm Avg
						M1[1] 65	-31.25 dB
) dBm							
dBm							
) dBm			_				
UBII-							
dBm-				~			
dBm					and a construction of the second s		
.0 dBm							
H1 -13.000 dB							
0 dBm							
0 dBm-						MI	
0 dBm							
51.5 MHz		1001 pts	3	6	0.0 kHz/		652.1 MH

#### Diagram 8b:

lultiView ⊞ B1 🖾 B2 Ref Level 50.00 dBm	H1      H2      H2     RBW 100 kHz			
Att 30 dB = SWT 100 r DF	ms • VBW 1 MHz Mode Auto Sweep			Count 100/10
Frequency Sweep				1Rm Avg
			M1[1	
				652.1163 M
				0.02.1110.0 Mil
I dBm-				
) dBm				
dBm				
dem				
dBm				
ubin				
dBm				
561				
0 dBm				
H1 -13 000 dBm				
0 dBm				
o dom		1 1 1		
0-d8m				
o dont				
0 dBm	~			
				+
52.1 MHz	1001 pts	1.09 MHz/		663.0 Mł
1			Measuring	0 0 0 25.89. 17 1

17:00:14 25.09.2017

Date 2017-10-11

Reference 7P05637-L Page 34 (71)



#### Diagram 9a:

Ref Level 50.0 Att		• RBV	V 30 kHz	de Auto Sweep			 	ount 100/100
DF		100 ms - 101	100 1012 1010	ac Auto officep				
Frequency Sv	veep						M1[1] 65	<ul> <li>1Rm Avg</li> <li>-32.58 dB</li> <li>-3000000 MH</li> </ul>
dBm-								
dBm							 	
) dBm								
dBm								
dBm					and the second s			
0 dBm						and the second		
o dem	11 -13.000 dBm							
0 dBm								
0 dBm-							Tyraun	
0 dBm								
51.5 MHz			1001 pt	s	6	0.0 kHz/	 	652.1 MH

Diagram 9b:

Ref Level 50.00 dBm Att 30 dB • SWT 1	RBW 100 ki 100 ms • VBW 1 Mi	Hz Hz Mode Auto Sweep			c	ount 100/100
DF						-
Frequency Sweep					MILLI	<ul> <li>1Rm Avg</li> <li>-29.68 dB</li> </ul>
						652.1054 M
dBm						
do co						
dBm						
dBm				-		
dBm						
dBm						
3Bm						
0 dBm						
H1 -13.000 dBm						
0 dBm						
0 dBm						
D dBm						
	1					
52.1 MHz		1001 pts	1.09 MHz/			663.0 MH

16:58:17 25.09.2017

Date 2017-10-11

Reference 7P05637-L Page 35 (71)



#### Diagram 10a:

Att DF		1 100 ms - VB	W 100 kHz Mo	de Auto Sweep				ount 100/10
Frequency S	Sweep				_			1Rm Avc
							M1[1]	-31.71 dB
dBm								121000000
dBm								
0Bm-								
		+		h				
d8m								<u> </u>
dBm				$\vdash$				
					manne			
dBm					- man		 	
						- and		
0 dBm						- ~ ~	 	
	H1 -13.000 dBm							<u> </u>
0 dBm								
0 d8m							M1	
o obiii							-	
0it								
0 dBm								
51.5 MHz			1001 pt	s		50.0 kHz/		652.1 MF

Diagram 10b:

efLevel 50.00 dBm tt 30 dB ● SWT 100 n	<ul> <li>RBW 100 kHz</li> <li>ns </li> <li>VBW 1 MHz M</li> </ul>	ode Auto Sweep		Co	ount 100/10
equency Sweep					1Rm Avg
				M1[1]	
					652 <b>.</b> 1054 M
Bm				 	
Bm				 	
8m					
_					
8m-					
m				 	
dBm				 	
H1 -13.000 dBm					
dBm					
dBm					
dBm		+ +		 	
	1001		1.09 MHz/		663.0 M

16:30:35 25.09.2017

Date 2017-10-11

Reference 7P05637-L Page 36 (71)



### Diagram 11a:

Att		T 100 ms = VBN	W 100 kHz Mod	ie Auto Sweep			c	Count 100/100
Frequency S	Sweep							1Rm Avg
							M1[1]	-31.76 dB
dBm								121000000 111
dBm								
dBm								
dBm								
dom					-			
dBm								
ubiii-						the second secon		
LO dBm								
to usin-	H1 -13.000 dBm							
0 dBm								
20 dBm								
							M1	
0 dBm							James	
+0 dBm								
51.5 MHz			1001 pt	s	6	0.0 kHz/		652.1 MH

#### Diagram 11b:

	<ul> <li>RBW 100 kHz</li> </ul>			
RefLevel 50.00 dBm Att 30 dB ● SWT 100 ms 0 DF	• VBW 1 MHz Mode Auto Sweep		0	Count 100/100
Frequency Sweep				1Rm Avg
			M1[1]	
				652.1054 M
dBm				+
dBm				
dbm				
dBm				+
dBm				
/Bm-				
0 dBm				+
41 - 13.000 d8m				
D dBm				
0. dBm-				+
D dBm				+
52.1 MHz	1001 pts	1.09 MHz/		663.0 MH

16:51:38 25.09.2017

Date 2017-10-11

Reference 7P05637-L Page 37 (71)



# Diagram 12a:

TDF Frequency Sweep	100/100 IRm Avg
M1[1] -3 6\$2.00	.Rm Avg
652.000	
0 dBm	5.06 dBi 0000 MH
dem	
0.08m	
d8m	
0 dBm	
00 dem	
10 d8m	
10 dBm-	
551.5 MHz 1001 pts 60.0 kHz/ 65	52.1 MH

#### Diagram 12b:

1ultiView ⊞ B1	🖾 [ В2 🛛 🖾 [ Н		2 🖾				
Att 30 dB	<ul> <li>RBW</li> <li>SWT 100 ms</li> <li>VBW</li> </ul>	100 kHz 1 MHz Mode	e Auto Sweep			C	ount 100/100
DF Frequency Sweep							1Rm Avg
riequency oweep						M1[1]	
							652.1054 MF
) dBm							
) dBm							
) dBm						 	
-							
dBm							
dBm							
0.40							
0 dBm	0 dBm						
0 dBm						 	
0 d8m							
o opin							
	the second s						
0 dBm						 	
52.1 MHz		1001 pts		1.	.09 MHz/		663.0 MH

16:33:10 25.09.2017

Date 2017-10-11

Reference 7P05637-L Page 38 (71)



# Diagram 13a:

MultiView 🔠	B1 🖾	B2 🔟	н1 🖾 р	12 🖾					~
Ref Level 50 Att		• RBW T 100 ms • VBW	/ 30 kHz / 100 kHz Mod	le Auto Sweep				c	ount 100/100
Frequency S	Sweep								1Rm Avg
								M1[1] 65	-36.84 dB 2.000000 MF
0 dBm									
0 dBm									
0 dBm									
upin-									
0 dBm									
dBm									
10 dBm									
	41 -13.000 dBm	monor	montenanter						
20 dBm				and a second descent of the second of the second	and a second sec				
30 dBm								M1	
40 dBm									
51.5 MHz			1001 pt		6	0.0 kHz/			652.1 MH
	T.		1001 00	-			Maasuring	descent the	25.89.201
:17:43 25.09.201	][						Measuring		25.49.3 16:1

#### Diagram 13b:

IultiView 🗄 B1 🖾 B2	[H1 □] H2 □     [     ]		
Ref Level 50.00 dBm Att 30 dB ● SWT 100 ms DF	RBW 100 kHz     VBW 1 MHz Mode Auto Sweep		Count 100/1
DF Frequency Sweep			1Rm A
			M1[1] -32.33 (
			652.1272
0 dBm			
0 dBm			
) dBm			
J UBIN			
) dBm			
dBm			
10 dBm			
41 -13 000 d8m			
20 dBm			
0 d8m			
0 dBm-			
52.1 MHz	1001 pts	1.09 MHz/	663.0 N

16:18:09 25.09.2017

Date 2017-10-11

Reference 7P05637-L Page 39 (71)



# Diagram 14a:

MultiView 🗄 B1 🖾 B2	🖾 H1 🖾 H2 🖾	1		~
Ref Level 50.00 dBm Att 30 dB ● SWT 10 DF	RBW 30 kHz 0 ms • VBW 100 kHz Mode Auto Swee	p		Count 100/100
Frequency Sweep				1Rm Ava
			M1[1]	-38.53 dBi 552.000000 MH
0 dBm				
0 dBm				
0 dBm-				
) dBm-				
dBm				
10 dBm				
Washington and the second seco				
0 dBm	mar and a man series and a mar			
30 dBm-	and the second sec	when we want the second s		
40 dBm			M1	
551.5 MHz	1001 pts	60.0 kHz/		652.1 MH
π			Measuring	400 25.69.201 16:02:4

#### Diagram 14b:

	B2 🖾 H1 🖾	H2 🖾				~
Ref Level 50.00 dBm Att 30 dB ● SWT DF	<ul> <li>RBW 100 kHz</li> <li>100 ms</li> <li>VBW</li> <li>1 MHz</li> <li>MHz</li> </ul>	lode Auto Sweep			C	ount 100/10
Frequency Sweep						1Rm Avg
inequents, encop					M1[1]	
						652.1163 MF
						002.11100 M
D dBm						
0 dBm						
0 dBm						
o della						
0 dBm						
dBm						
10 dBm						
H1 -13.000 d8m						
20 dBm						
0 dBm-						
40 dBm-		+ +				
52.1 MHz	1001	pts	1.09 MHz/			663.0 MH
Π Π				Mancurlea		0 444 25.49.20 16:07:

16:07:43 25.09.2017

Date 2017-10-11

Reference 7P05637-L Page 40 (71)



# Diagram 15a:

MultiView 😁	B1 🖾			12 🔟					
Ref Level 50 Att		• RBV 100 ms • VBV	V 30 kHz V 100 kHz Mod	le Auto Sweep				c	ount 100/100
Frequency S	Sweep								1Rm Ava
								M1[1] 61	-32.58 dBr 7.000000 MH
D dBm									
0 dBm									
0 dBm									
0 d8m									
dBm				and the second se					
10 dBm			Manne						
20 dBm	H1 -13.000 dBm	J.	- Martin -						
30 dBm		-							
40 dBm									
516.9 MHz			1001 pt:	s	6	0.0 kHz/			617.5 MH
40:36 25.09.201							Measuring		25.09.201 16:40:31

#### Diagram 15b:

		I H1 ⊠ H2 ⊠		
Count 100/1		RBW 100 kHz /BW 1 MHz Mode Auto Sweep	30 dB • SWT 100 ms • VB	Ref Level 50.0 Att DF
1Rm A			weep	Frequency Sw
M1[1] -29.37 c 616.8946 f				
				) dBm
				0 dBm
				0 dBm-
				) dBm
				dBm
				0Bm
			H1 -13.000 dBm	10 dBm
				20 dBm-
				80 dBm-
				40 dBm
616.9 N	1.09 MHz/	1001 pts		506.0 MHz

16:41:09 25.09.2017

Date 2017-10-11

Reference 7P05637-L Page 41 (71)



# Diagram 16a:

RefLevel 50.00 dBm Att 30 dB = SWT 100 m	RBW 30 kHz     So kHz     Mode Auto Sweep		Count 100/10
DF Frequency Sweep			• 1Rm Avc
			M1[1] -31.99 dB 652.000000 MI
dBm			
dBm			
dBm			
dBm-			
JBm-			
0 dBm			
D dBm-			
			MI
0 dBm			The second secon
0 dBm			
51.5 MHz	1001 pts	60.0 kHz/	652.1 MH

Diagram 16b:

Ref Level 50.0 Att DF		100 ms = VBW	100 kHz 1 MHz Moo	le Auto Sweep			с	ount 100/100
Frequency Sv	weep							1Rm Avc
							M1[1]	
								652 <b>.</b> 1054 M
dBm								
dBm								
dBm								
dBm								
Bm								
0111								
dBm-	41 -13.000 d8m -							
dBm								
dBm								
dBm								
52.1 MHz			1001 pt	s	1	.09 MHz/		663.0 MH

16:47:05 25.09.2017



# Conducted spurious emission measurements according to CFR 47 §27.53

Date	Temperature	Humidity
2017-09-26	$22 \degree C \pm 3 \degree C$	46 % ± 5 %
2017-10-05	$22 \ ^{\circ}C \pm 3 \ ^{\circ}C$	30 % ± 5 %

# Test set-up and procedure

The measurements were made per definition in §27.53. The output was connected to a spectrum analyzer with a RBW setting of 1 MHz and RMS detector activated. The spectrum analyzer was connected to an external 10 MHz reference standard during the measurements.

Before comparing the results to the limit, 6 dB  $[10 \log (4)]$  to cover 4x4 MIMO, should be added according to method c "measure and add 10  $\log(N_{ANT})$ " of FCC KDB662911 D01 Multiple Transmitter Output.

Measurement equipment	RISE number
R&S FSW 43	902 073
RF attenuator	900 691
HP filter	901 373
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB





# Results

## Single carrier E-TM 1.1

Diagram	Symbolic name	Tested Port
1 a-b	B ₅	RF C
2 a-b	$M_5$	RF C
3 a-b	$T_5$	RF C
4 a-b	$M_{10}$	RF C
5 a-b	$M_{15}$	RF C
6 a-b	$M_{20}$	RF C
7 a-b	$M_5$	RF A
8 a-b	$M_5$	RF B
9 a-b	M ₅	RF D

## Multi carrier E-TM 1.1

Diagram	Symbolic name	Tested Port
10 a-c	B2	RF C
11 a-c	B6	RF C
12 a-c	Bim	RF C
13 a-c	Tim	RF C

Note: Measurements were mainly limited to port RF C due to the measurement result in single carrier mode that shows that the ports are electrical identical as declared by the client.

Reference 7P05637-L





## Remark

The emission at 9 kHz on the plots was not generated by the test object. A complementary measurement with a smaller RBW showed that it was related to the LO feed-through.

The highest fundamental frequency is 652 MHz. The measurements were made up to 7 GHz (10x652 MHz = 6520 GHz).

## Limits

CFR 47 §27.53

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P) dB$ . Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Complies? Yes	Complies?	Yes
---------------	-----------	-----

RI. SE

Date

Reference 2017-10-11 7P05637-L Page 45 (71)



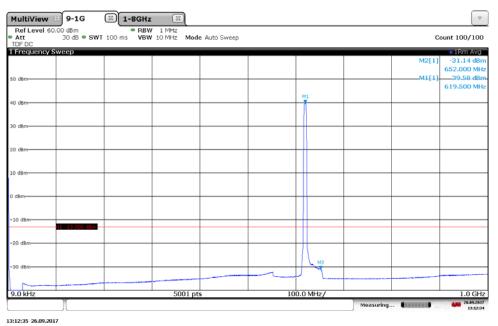


Diagram 1b:

RefLevel 20.00 dBm Att 0 dB = SW	<ul> <li>RBW 1 MHz</li> <li>T 50 ms</li> <li>VBW 10 MHz</li> <li>Me</li> </ul>	ode Auto Sweep		Count 100/10
DF Frequency Sweep				• 1Rm Av
				M1[1] -45.91 dt
				1.239093 G
dBm				
/Bm-				
80				
0 dBm				 
H1 -13.000 dBm				
) dBm				
, don				
0 dBm				
0 dBm				
M1				
T I				
) dism				
) d8m				
0 dBm-				
0 GHz	3500	1 pts	700.0 MHz/	8.0 G

13:18:06 26.09.2017

Reference 7P05637-L 2017-10-11

Date

Page 46 (71)



# Diagram 2a:

Ref Level 60.0 Att IDF DC		100 ms VBW	/ 1 MHz / 10 MHz Mod	e Auto Sweep				C	ount 100/10
Frequency Sy	veep								1Rm Avç
D dBm								M2[1]	-31.16 dB 652.000 MI 
							11		634.500 M
0 dBm									
0 dBm									
) dBm									
) dBm									
dBm									
10 dBm									
0 dBm-	11 -13 000 dBm								
80 dBm							M2		
ou uddii						1			
.0 kHz			5001 pt	s	1	00.0 N	1Hz/		1.0 Gł

## Diagram 2b:

AultiView 30 9- Ref Level 20.00 dB		Iz 🖾		
Att 0 d	B • SWT 50 ms • VBV	V 10 MHz Mode Auto Swe	ep	Count 100/100
Frequency Sweep				1Rm Avg
				M1[1] -44.86 dBi
				1.268892 G
dBm				
dBm				 
0 dBm				
	000 dBm			
0 dBm-				
0 dBm				 
0 dBm				
M1				
a. 40 .				
0 dBm				
0 dBm				
0 dBm				 
.0 GHz		35001 pts	700.0 MHz/	8.0 GH

11:04:08 26.09.2017

2017-10-11

Date

Reference 7P05637-L Page 47 (71)



#### Diagram 3a:

Ref Level         60.00 dBm           Att         30 dB ● SWT           DF DC         30 dB ● SWT	<ul> <li>RBW 1 MHz</li> <li>100 ms</li> <li>VBW 10 MHz</li> <li>Mod</li> </ul>	le Auto Sweep		Count 100/10
Frequency Sweep				• 1Rm Av
				M2[1] -30.90 dB
				617.000 M
I dBm				M1[1] 39.24 dE 649.500 M
				649.500 M
dBm			M1	
dBm-				
dBm				
dBm				
obiir				
dBm				
0 dBm				
H1 -13.000 dBm				
0 dBm				
0 dBm-			M2	
0 kHz	5001 p	ts	100.0 MHz/	1.0 Gi

Diagram 3b:

MultiView 🗄 9-1G 🛛 1-8GHz ▼  $\square$  
 Ref Level 20.00 dBm
 RBW
 1 MHz

 • Att
 0 dB • SWT 50 ms • VBW 10 MHz
 Mode Auto Sweep

 TDF
 1 Frequency Sweep
 Count 100/100 • 1Rm Avg м1[1 -46.41 dBn 1.299091 GH: 20 d 30 dE -50 dB -60 dB 70 dB 700.0 MHz/ 1.0 GHz 35001 pts 8.0 GHz Measuring.. ...... 26.09.2017 13:15:53

13:15:53 26.09.2017

RI. SE

2017-10-11

Date

Reference 7P05637-L

Page 48 (71)



DF DC	SWT 100 ms VBV	10 MHz Mode Auto Sv	veep	Cou	int 100/10
requency Sweep				M2[1]	• 1Rm Avg -30.07 dB 552.000 M
dBm-					36.10 dE 534.500 M
dBm					
dBm					
dBm					
łm					
dBm					
dBm			42		
(Jpm)		5001 pts	100.0 MHz/		1.0 G

## Diagram 4b:

RefLevel 20.00 dBm Att 0 dB =	SWT 50 ms . VBW	1 MHz 10 MHz Mode Au	to Sweep			C	ount 100/100
DF Frequency Sweep							1Rm Avg
						M1[1]	-47.59 dB
							1.267892 G
dBm							
Bm							
5m							
0 dBm	_					 	
41 -13.000 0	10m						
) dBm							
, dom							
0 dBm							
) dBm							
M1							
Y							
I dBm							
) d8m							
			-				
0 dBm-		+ + +					
0 GHz		35001 pts		700.	0 MHz/		8.0 G

11:12:16 26.09.2017

RI. SE

Date

Reference 7P05637-L 2017-10-11

Page 49 (71)



tefLevel 60.00 dBm tt 30 dB ● SWT 10 FDC	RBW 1 MHz     Node     Node	Auto Sweep		Count 100/10
requency Sweep				• 1Rm Avc
dBm				12[1] -26.34 dB 617.000 MI 11[1] 34.38 dB 634.500 MI
dBm			M1	 
d8m			- Ă	 
dBm				
BRU1				
Bm				_
m				
dBm-				
dBm				 
dBm			Mg/	
) kHz	5001 pts		100.0 MHz/	1.0 Gł

11:16:28 26.09.2017

#### Diagram 5b:

IultiView 🙃	9-1G	1-8GH	<b>z</b> 🖾						
Att DF	0 dB • SWT	50 ms • VBW	10 MHz Mode	Auto Sweep				С	ount 100/100
Frequency Swe	ер								• 1Rm Avg
								M1[1]	
									1.268492 GF
dBm									
dBm									
0 dBm									
	-13.000 dBm								
0 dBm-									
0 dBm									
0 dBm									
									1
M1									1
0 dBm									
0 dem	1								
						I			
0 dBm									
.0 GHz			35001 p	ts	70	0.0 MHz/			8.0 GH
							Measuring		26.89.201

11:13:22 26.09.2017

RI. SE

2017-10-11

Date

Reference 7P05637-L

Page 50 (71)

# Diagram 6a:

RefLevel 60.00 dBm Att 30 dB = DF DC	SWT 100 ms VB	W 1 MHz W 10 MHz Mod	e Auto Sweep				С	ount 100/100
Frequency Sweep								• 1Rm Avg
							M2[1]	
								617.000 M
dBm-					-		M1[1]	33.13 dB
								634.500 M
dBm							 	
					M)			1
					₹ر	1		1
dBm								
								1
dBm								
								1
dBm								
								1
18m-					$\square$		 	
								1
								1
0 dBm	d Date				$\vdash$			
0 dBm-								
					M			1
					17	$\langle   \rangle$		1
0 dBm-					11			
					۲	L	 	
				L	0.014			
0 kHz		5001 pt	s	10	0.0 M	HZ/	 ig (	1.0 Gł

## Diagram 6b:

Att 0 dB	• RB	W 1 MHz W 10 MHz Mode /	Suto Sween				GL ount 100/100
DF		W 10 MHZ Mode A	ato sweep				-
Frequency Sweep		_					1Rm Avg
						M1[1]	
							1.267292 G
dBm						 	
in							
dBm							
0 dBm		_					
	00 dBm						
0 dBm						 	
0 dBm							
0 dBm-							
- dom							
M1							
0 dBm							<u> </u>
A							and the second second second
0 d6m	Contraction of the local division of the loc			and the second division of the second divisio			
and provide the second second second							
0 dBm-							
0 GHz		35001 pts		700	0.0 MHz/		8.0 Gł
0.0112		55001 pts	,	700	5.0 MITZ/	 	26.09.20

11:14:22 26.09.2017

Date Reference 2017-10-11 7P05637-L

Page 51 (71)



# Diagram 7a:

IultiView		🖾 1-8GH							
Ref Level 60. Att DF DC	30 dB 🖷 SW1	• RB 100 ms • VB	W 1 MHz W 10 MHz Moo	le Auto Sweep				c	ount 100/100
Frequency S	weep			_					1Rm Avg
								M2[1]	-31.09 dB
									652.000 MF
) dBm								M1[1]	39.09 dB
									634.500 MF
						Ι.			
) dBm						-	41	 	
							ו ו		
) dBm						-		 	
) dBm						-			
) dBm								 	
dBm						+ +		 	
10 dBm									
	H1 -13.000 dBm -								
20 dBm-									
							1		
						1/	M2		
30 dBm						17	3		
						-	L	 	
.0 kHz			5001 p	ts	1	00.0 N	1Hz/		1.0 GH
	11							ıg 🚺	25.89.201

## Diagram 7b:

Att 0 dB	<ul> <li>SWT 50 ms</li> <li>VBV</li> </ul>	N 1 MHz N 10 MHz Mode A	uto Sweep		с	ount 100/100
DF Frequency Sweep						• 1Rm Avg
requercy oneop					M1[1]	
						1.268092 G
dBm						
Bm						
dBm		++			 	
41 -13.0	00 dim					
) dBm						
dom						
dBm		++				
dBm						
M1						
) dBm						
) dBm						
- International Action						
) dBm						
0 GHz		35001 pts		0.0 MHz/		8.0 Gł

10:48:39 26.09.2017

RI. SE

Reference 7P05637-L Page 52 (71)



IultiView 🖽 Ref Level 60.0	,	I-8GF ■ RE	IZ 🖾						
		100 ms VB	W 10 MHz M	ode Auto Sweep				c	ount 100/100
Frequency Sw	еер								1Rm Avg
								M2[1]	652.000 MF
dBm								M1[1]	39,10 dB 634,500 M
dBm						M1			
dBm									
dBm									
dBm									
dBm									
0 dBm	-13.000 dBm								
0 dBm									
o dem									
0 dBm						M2			
			-	-		+ $-$			
.0 kHz			5001	pts	. 1	00.0 MHz/	·		1.0 GH

Date 2017-10-11

Diagram 8b:

Ref Level 20.00	lBm	RBW	1 MHz					
Att 0 DF	) dB = SWT 5	50 ms 🖷 VBW	10 MHz Mode	Auto Sweep			С	ount 100/10
Frequency Swee	:p							1Rm Avc
							M1[1]	
								1.269092 G
dBm							 	
jBm								
0 dBm-								
	13.000 dBm							
0 dBm								
0 dBm								
o dom								
d dam							 	
Ť								
D dBm								
	1							
) d8m								
) dBm								
0 GHz			35001 pt	te	70	0.0 MHz/		8.0 Gł

10:51:57 26.09.2017

RI. SE

Date

Reference 7P05637-L 2017-10-11

Page 53 (71)



Ref Level 60	.00 dBm	RBV	1 MHz							
Att DF DC	30 dB 🖷 SWT	100 ms VBV	10 MHz Mod	e Auto Sweep					c	ount 100/10
Frequency S	Sweep							_		• 1Rm Avg
									M2[1]	-31.12 dB 652.000 MI 39.12 dB
dBm						м	,		(WILL)	634.500 M
dBm										
dBm						+				
dBm										
dBm										
18m										
0 dBm	H1 -13.000 dBm					$\square$				
dBm										
dBm						₽	M2			
0 kHz			5001 pt	s	10	00.0 M	Hz/			1.0 Gł

10:56:10 26.09.2017

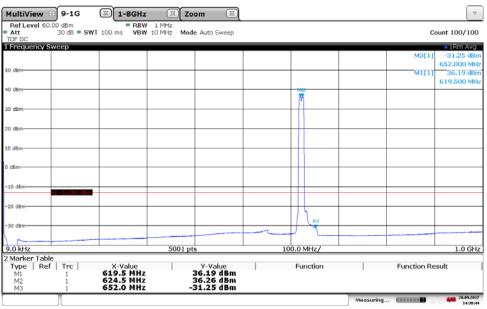
#### Diagram 9b:

Ref Level 20.00 dBm	• R	BW 1 MHz					
Att 0 dE DF	5 - 5 - 5 U ms - Vi	BW 10 MHz Mode A	uto Sweep			c	ount 100/10
Frequency Sweep		_	_	_			1Rm Avç
						M1[1]	-44,44 dB
							1.268492 G
dBm							
jBm							
0 dBm							
	00 dBm						
0 dBm						 	
0 dBm							
0 dBm							
M1							
0 dBm							
0 dBm	and the second designed in the second designe	-			and the second data is a s		
and a second							
0 dBm-							
0 GHz		35001 pts		700	0.0 MHz/		8.0 G

11:00:12 26.09.2017

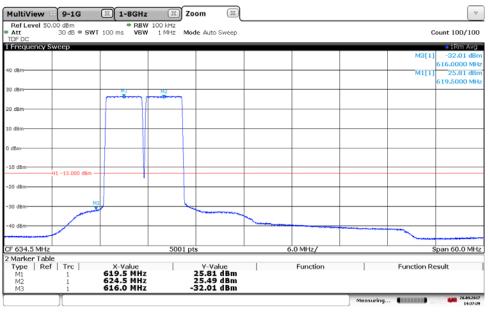
RI. SE





14:38:44 26.09.2017

#### Diagram 10b:



14:37:39 26.09.2017

Date 2017-10-11

Reference 7P05637-L Page 55 (71)



# Diagram 10c:

Ref Level 2 Att DF	0 dB 🖷 SWT	50 ms 🖷 VBV	V 1 MHz V 10 MHz Mode	Auto Sweep			c	ount 100/100
requency	Sweep							1Rm Avg
							M1[1]	-48.09 dBn 1.244093 GH
dBm								
Bm								
dBm								
dBm								
dom								
dBm								
dBm								
M1								
) dem								
) d6m				-				
uban-								
dBm								
) GHz			35001 p	ts	7	00.0 MHz/		8.0 GH

14:10:11 26.09.2017

Date 2017-10-11

Reference 7P05637-L Page 56 (71)

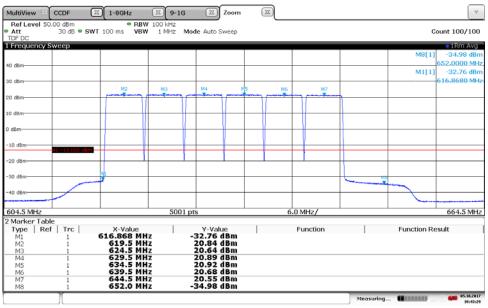


## Diagram 11a:

TDF DC  I Frequency Sweep  S0 d8m  M8[1] -24.82 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000 -652.000	AultiView 🗄 CCDF (	🖾 1-8GHz 🛛 🖾 9-	1G Zoom	X				
Frequency Sweep         Item         M8[1]         -24.82         -24.82         -652.000         -610.000         -24.82         -610.000         -24.82         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.000         -610.0000         -6	Att 30 dB • SW		Mode Auto Sweep				C	ount 100/100
0 dem								1Rm Avg
0.08m     M1[1]     -33.45       0.08m     M1[1]     -10.0       0.08m     M1     -10.0       0.08m     M1     -10.0       0.08m     M1     -10.0       0.08m     M1     -10.0       Marker Table     V-Value     Function       Type     Ref     Trc       X-Value     V-Value     Function       M1     1     610.0       M3     1     624.5       M4     1     629.5       M5     1     639.5       M6     1     639.5       M7     1     644.5							M8[1]	-24,82 dB
dbm     M1[1]     -33.45       dbm     AB     AB       dbm     AB <td>dBm</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>652.000 MI</td>	dBm							652.000 MI
dBm     dBm <td></td> <td></td> <td></td> <td></td> <td>   </td> <td></td> <td>M1[1]</td> <td>-33.45 dB</td>							M1[1]	-33.45 dB
dem	dBm							-610.000 M
dbm     dbm     dbm     dbm     dbm     dbm       dbm     dbm     dbm <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
dbm         dbm <td>dBm</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	dBm							
dBm     dBm <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
Bm         Image: Constraint of the second seco	dBm							
Bm         Image: Constraint of the second of the seco	dBm							
Idem         Idem <th< td=""><td>0011</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	0011							
Integration	8m-							
Introduct         Sol pts         100.0 MHz         1.0           0 kHz         5001 pts         100.0 MHz/         1.0           0 kHz         31.36 dBm         Function Result         Function Result           M1         1         619.5 MHz         31.36 dBm         Function Result           M3         1         624.5 MHz         31.37 dBm         Function Result           M4         1         629.5 MHz         31.37 dBm         Function Result           M5         1         634.5 MHz         31.37 dBm         Function Result           M6         1         639.5 MHz         31.32 dBm         Function Result         Function Result           M7         1         644.5 MHz         30.99 dBm         Function Result         Function Result								
0 d8m	) dBm							
Idem         Idem <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>								
O kHz         5001 pts         100.0 MHz/         1.0           darker Table	) dBm							
O kHz         5001 pts         100.0 MHz/         1.0           darker Table	dam				Mb			
Marker Table         Y-Value         Y-Value         Function         Function Result           Yppe         Ref         Trc         X-Value         Y-Value         Function         Function Result           M1         1         610.0 MHz         -33.45 dBm         Function         Function Result           M2         1         619.5 MHz         31.40 dBm         Function         Function Result           M3         1         624.5 MHz         31.36 dBm         Function         Function Result           M4         1         629.5 MHz         31.37 dBm         Function         Function Result           M5         1         634.5 MHz         31.37 dBm         Function         Function Result           M6         1         639.5 MHz         31.22 dBm         Function         Function Result           M7         1         644.5 MHz         30.99 dBm         Function         Function Result	( dbin							
Marker Table         Y-Value         Y-Value         Function         Function Result           Yppe         Ref         Trc         X-Value         Y-Value         Function         Function Result           M1         1         610.0 MHz         -33.45 dBm         Function         Function Result           M2         1         619.5 MHz         31.40 dBm         Function         Function Result           M3         1         624.5 MHz         31.36 dBm         Function         Function Result           M4         1         629.5 MHz         31.37 dBm         Function         Function Result           M5         1         634.5 MHz         31.37 dBm         Function         Function Result           M6         1         639.5 MHz         31.22 dBm         Function         Function Result           M7         1         644.5 MHz         30.99 dBm         Function         Function Result								1.0.0
Fype         Ref         Trc         X-Value         Y-Value         Function         Function Result           M1         1         610.0 MHz         -33.45 dBm         Function         Function Result           M2         1         619.5 MHz         31.40 dBm         Function         Function Result           M3         1         624.5 MHz         31.36 dBm         Function         Function           M4         1         629.5 MHz         31.38 dBm         Function         Function           M5         1         634.5 MHz         31.37 dBm         Function         Function           M6         1         639.5 MHz         31.22 dBm         Function         Function           M7         1         664.5 MHz         30.99 dBm         Function         Function		51	JU1 pts	1	00.0 MHZ/			1.0 G
M1         1         610.0 MHz         -33.45 dBm           M2         1         619.5 MHz         31.40 dBm           M3         1         624.5 MHz         31.36 dBm           M4         1         629.5 MHz         31.38 dBm           M5         1         634.5 MHz         31.37 dBm           M6         1         639.5 MHz         31.22 dBm           M7         1         644.5 MHz         30.99 dBm		M Mahaa III	V Value		Eucotion	1	Eurotion Do	out
M2         1         619.5 MHz         31.40 dBm           M3         1         624.5 MHz         31.36 dBm           M4         1         629.5 MHz         31.38 dBm           M5         1         634.5 MHz         31.37 dBm           M6         1         639.5 MHz         31.22 dBm           M7         1         644.5 MHz         30.99 dBm			-33.45 dBm		Function		Function Re	suit
M4         1         629.5 MHz         31.38 dBm           M5         1         634.5 MHz         31.37 dBm           M6         1         639.5 MHz         31.22 dBm           M7         1         644.5 MHz         30.99 dBm		619.5 MHz	31.40 dBm					
MS 1 634.5 MHz 31.37 dBm M6 1 639.5 MHz 31.22 dBm M7 1 644.5 MHz 30.99 dBm		624.5 MHz						
M6 1 639.5 MHz 31.22 dBm M7 1 644.5 MHz 30.99 dBm								
M7 1 644.5 MHz 30.99 dBm			31.22 dBm					
M8 1 652.0 MHz -24.82 dBm		644.5 MHz	30.99 dBm					
		652.0 MHz	-24.82 dBm					

10:47:03 05.10.2017

#### Diagram 11b:



10:43:29 05.10.2017

Date 2017-10-11 Reference 7P05637-L Page 57 (71)



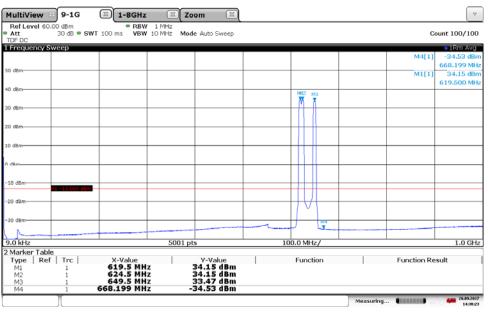
# Diagram 11c:

Att 0 d	m 18 • SWT 50 ms •	RBW 1 MHz VBW 10 MHz Mode	Auto Sweep			Count 100/100
DF		TOTAL MOR	- Hato officep			
Frequency Sweep			_	_		1Rm Avg
						M1[1] -52.64 dBn 1.264092 GH
dBm						
dBm						 
0 dBm						
	.000 dBm					
0 dBm						
0 dBm						 
0 dBm						 
0 dBih						
U OBIA						
0 d8m						
0 dBm						 
.0 GHz		35001 p	ots	700.	0 MHz/	8.0 GH

10:48:20 05.10.2017

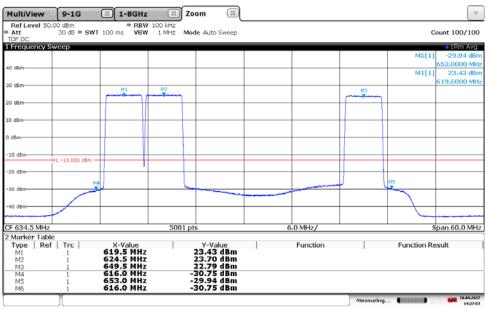
RI. SE Page 58 (71)





14:30:23 26.09.2017

#### Diagram 12b:



14:27:54 26.09.2017

Date 2017-10-11

Reference 7P05637-L Page 59 (71)

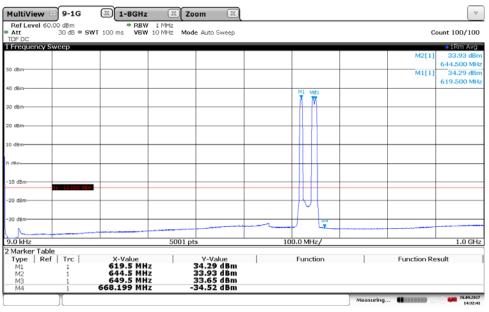


# Diagram 12c:

Ref Level 20.00 d Att 0 DF		<ul> <li>RBW 1 MH</li> <li>ns</li> <li>VBW 10 MH</li> </ul>	iz Mode Auto Sw	eep		Co	ount 100/100
Frequency Swee	p						1Rm Avg
						M1[1]	-52.55 dBn 1.243293 GH
dBm							
JBm							
0 dBm	3.000 dim						
0 dBm							
0 dBm							
0 dBm							
D defin							
0 d&n	1			$ \rightarrow $			
) dBm							
.0 GHz			35001 pts		700.0 MHz/		8.0 GH

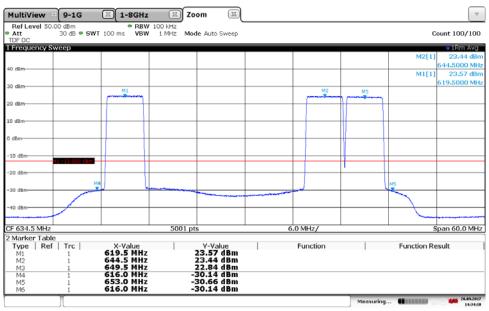
RI. SE





14:32:41 26.09.2017

#### Diagram 13b:



14:34:11 26.09.2017

Date 2017-10-11

Reference 7P05637-L Page 61 (71)



# Diagram 13c:

Att	.00 dBm 0 dB = SW	W 1 MHz W 10 MHz Mode	e Auto Sweep			с	ount 100/100
Frequency S	weep		_				1Rm Avg
						M1[1]	-52.78 dBn 1.264492 GH
dBm							
dBm							
0 dBm	41 - 13.000 dRm -						
20 dBm							
30 dBm							
40 dBm							
0 dBh							
i0 dem							
0 dBm							
.0 GHz		35001 p	ots	7	00.0 MHz/		8.0 GH:

**RISE Research Institutes of Sweden AB** 



# Field strength of spurious radiation measurements according to CFR 47 §27.53

Date	Temperature	Humidity	
2017-10-03	$22 \degree C \pm 3 \degree C$	48 % ± 5 %	

The test sites are listed at FCC, Columbia with registration number: 93866. The test site complies with RSS-Gen, Industry Canada file no. 3482A-1.

The measurements were performed with both horizontal and vertical polarization of the antenna. The antenna distance was 3 m in the frequency range 30 MHz - 7 GHz.

The measurements in the frequency range 30 - 1000 MHz was performed with a RBW of 100 kHz and EUT at height of 80 cm. The measurements in the frequency range 1 - 7 GHz was performed with a RBW of 1 MHz and EUT at height of 150 cm and absorbents on the floor between EUT and the antenna.

A propagation loss in free space was calculated. The used formula was

 $\gamma = 20 \log \left(\frac{4\pi D}{\lambda}\right)$ ,  $\gamma$  is the propagation loss and *D* is the antenna distance.

The measurement procedure was as the following:

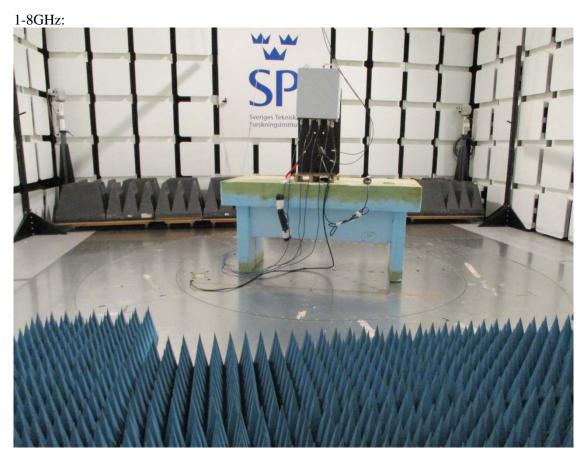
- A pre-measurement is performed with peak detector. For measurement < 1 GHz the test object was measured in eight directions with the antenna at three heights, 1.0 m, 1.5 m and 2.0 m. For measurements > 1 GHz the test object was measured in seventeen directions with the antenna height 1.0 m and 1.5 m.
- 2. Spurious radiation on frequencies closer than 20 dB to the limit in the pre-measurement is scanned 0-360 degrees and the antenna is scanned 1- 4 m for maximum response. The emission is then measured with the RMS detector and the RMS value is reported. Frequencies closer than 10 dB to the limit when measured with the RMS detector were measured with the substitution method according to ANSI 63.26.

Date 2017-10-11 Reference 7P05637-L Page 63 (71)



The test set-up during the spurious radiation measurements is shown in the pictures below: 30-1000MHz:





Measurement equipment	RISE number
Semi anechoic chamber Tesla	503 881
R&S ESU 40	901 385
EMC 32 ver. 9.15.0	BX62351
ETS Lindgren BiConiLog 3142E	BX61914
ETS Lindgren Horn Antenna 3115	502 175
µComp Nordic, Low Noise Amplifier	901 545
HP Filter 1-20 GHz	901 501
Temperature and humidity meter, Testo 625	504 188

Date

2017-10-11

Reference

7P05637-L

## Results

representing worst case:

Symbolic name M₅, TX mid frequency, BW 5 MHz, Diagram 1 a-b

	Spurious emission level (dBm)		
Frequency (MHz)	Vertical	Horizontal	
30-7000	All emission > 20 dB below limit	All emission > 20 dB below limit	

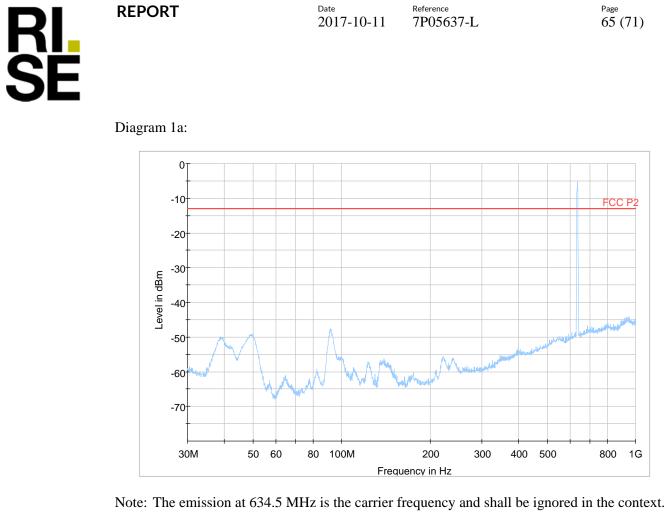
Measurement uncertainty: 3.1 dB

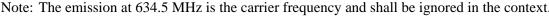
## Limits

CFR 47 §27.53

(g) Outside a licensee's frequency band(s) of operation the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P) dB$ , resulting in a limit of -13 dBm.

- 0.01	nplies?	Y	les





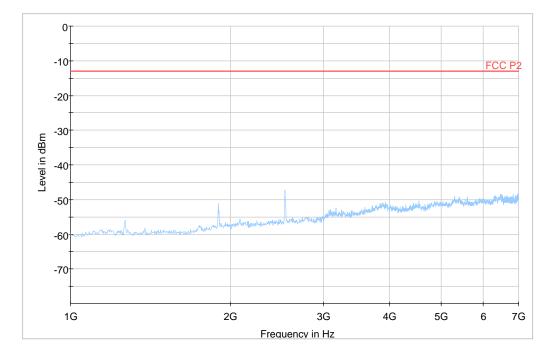


Diagram 1b:



Frequency stability measurements according to CFR 47 § 2.1055						
Date	Temperature (test equipment)	Humidity (test equipment)				
2017-09-26	$22 \degree C \pm 3 \degree C$	46 % ± 5 %				
2017-10-02	$22 \ ^{\circ}C \pm 3 \ ^{\circ}C$	47 % ± 5 %				
2017-10-03	$22 \ ^{\circ}C \pm 3 \ ^{\circ}C$	48 % ± 5 %				
2017-10-04	$22 \ ^{\circ}C \pm 3 \ ^{\circ}C$	37 % ± 5 %				

# Frequency stability measurements according to CFR 47 § 2.1055

## Test set-up and procedure

The measurement was made per 3GPP TS 36.141. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during the measurements.

The measurement was also made per IC RSS 199 Issue 3, 4.3. Using a resolution bandwidth of 1% of the emission bandwidth, a reference point at the unwanted emission level which complies with the attenuation of  $43 + 10 \log 10 p$  (watts) (i.e. -13 dBm) (for 4x 4MIMO -19 dBm) at the band edge of the lowest and highest channel was selected, and the frequency at these points was recorded as fL and fH respectively.

Measurement equipment	RISE number
Rohde & Schwarz signal analyzer FSQ 40	504 143
Rohde & Schwarz signal analyzer FSW 43	902 073
RF attenuator	900 691
Temperature Chamber	503 360
Testo 635, temperature and humidity meter	504 203
Multimeter Fluke 87	502 190

Reference 7P05637-L Page 67 (71)



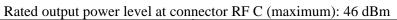
# Results

Nominal transmitter frequency was 634.5 MHz (M) with a bandwidth of 5 MHz. Rated output power level at connector RF C (maximum): 46 dBm.

Test conditions			
Supply voltage DC (V)	Temp. (°C)	Frequency error (Hz)	
40.8	+20	4	
55.2	+20	3	
48	+20	4	
48	+30	4	
48	+40	5	
48	+50	5	
48	+10	4	
48	0	4	
48	-10	4	
48	-20	7	
48	-30	5	
Maximum freq. error (Hz)		7	
Measurement uncertainty		$< \pm 1 \ge 10^{-7}$	

KI. SE Page

68 (71)



Test conditions		Frequency margin to band edge at -19dBm					
Supply voltage	Temp [°C].	Carrier Bandwidth [MHz]	Test frequency Symbolic name Bottom		Test freq	Test frequency Symbolic name Top	
DC [V]			fL [MHz]	Offset to lower band edge (617 MHz) [kHz]	fH [MHz]	Offset to upper band edge (652 MHz) [kHz]	
-48.0	+20	5	617.010	10	651.985	15	
-48.0	+20	20	617.064	64	651.921	79	

The frequency error results clearly shows that the frequency stability is good enough to ensure that the transmitted carrier stay within the operating band.

## Remark

It was deemed sufficient to test one combination of TX frequency, channel bandwidth configuration and test model (modulation), as all combinations share a common internal reference to derive the TX frequency from.

## Limits

#### §27.54

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

Complies?	Yes
-----------	-----

Date 2017-10-11

Reference 7P05637-L Page 69 (71)



# Photos of test object Front side





# Left side



## Right side



RI. SE

Date 2017-10-11

Reference 7P05637-L

Page 70 (71)

#### Bottom side

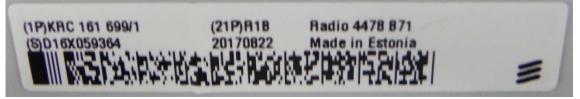




KI. SE Date 2017-10-11

Reference 7P05637-L Page 71 (71)

Test object label:



SFP module:

