

FCC Part 15E Compliance Test Report

Test Report no.:	FCC15E_RM-824_09.docx	Date of Report:	15-Jul-2012
Number of pages:	29	Customer's Contact person:	Melava Tia
Testing laboratory:	TCC Nokia Salo Laboratory P.O.Box(86) Joensuunkatu 7H / Kiila 1B FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 45220	Customer:	Nokia Corporation P.O.Box(86) Joensuunkatu 7H / Kiila 1B FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 45220
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-824 / Battery BP-5T / Headset WH-208 / AC-Charger AC-50E		
FCC ID:	PYARM-824	IC:	661V-RM824
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart E, ANSI C63.4 (2003), DTS procedures KDB 789033 D01, IC standards, RSS-210 (Issue 8, December 2010). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.		
Test Results:	The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document		
Date and signature for the contents:			

Kalle Hannila, Engineer, EMC & SAR

1. Summary for FCC Part 15E Compliance Test Report

Date of receipt	09-Jul-2012
Testing completed	13-Jul-2012
The customer's contact person	Melava Tia
Test Plan referred to	T:\Projects\RM-824\TestPlan\RS_testplan_RM-824.xls
Notes	-
Document name	T:\Projects\RM-824\EMC\FCC15E_RM-824_09.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:
GSM/WCDMA/WLAN/Bluetooth
The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-824	004402139761625	2210	-	1121_0002_8297_9657_110	16513
Battery	BP-5T	393213222414010011760670665	-	-	-	16514
Headset	WH-208	2023321	-	-	-	16515
AC-Charger	AC-50E	409049207226040151060675619	-	-	-	16516

1.2. Summary of Test Results

5 GHz RLAN:

Section in CFR 47	Section in RSS-GEN or RSS-210	Name of the test	Result
15.407(a)	A9.2	Conducted peak output power	NP
15.407(b)	A9.2	Band edge compliance of RF emissions	PASSED
15.407(a)(6)	A9.2	Peak excursion	NP
15.407(b)	A9.2	Spurious radiated emissions	PASSED
15.407(b)(6)	A9.2	AC powerline conducted emissions	NP
-	A9.2	26dB(bandwidth)	NP
15.407(a)	A9.2	Power spectral density	NP

PASSED
FAILED
NP

The EUT complies with the essential requirements in the standard.
The EUT does not comply with the essential requirements in the standard.
The test was not performed by the TCC Nokia Laboratory.

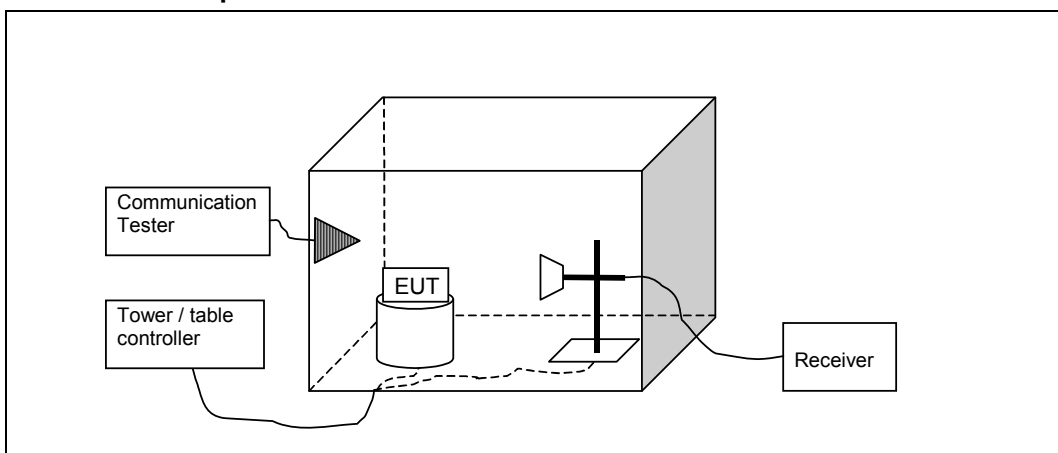
CONTENTS

1. Summary for FCC Part 15E Compliance Test Report.....	2
1.1. EUT and Accessory Information.....	2
1.2. Summary of Test Results.....	2
2. Band edge compliance of RF emissions (FCC §15.407 (b), RSS-210 A9.2).....	4
2.2. Test method and limit.....	4
2.3. 5 GHz RLAN Test results.....	5
3. Spurious radiated emissions (FCC §15.407 (b), RSS-210 A9.2).....	16
3.2. Test method and limit.....	16
3.3. 5 GHz RLAN Test results.....	18
4. Test Equipment.....	28
4.1. Conducted measurements	28
4.2. Radiated measurements	28

2. Band edge compliance of RF emissions (FCC §15.407 (b), RSS-210 A9.2)

EUT with DUT number	RM-824, DUT 16513
Accessories with DUT numbers	BP-5T, DUT 16514 ; WH-208, DUT 16515 ; AC-50E, DUT 16516
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 101
Date of measurements	09-Jul-2012
Measured by	Kalle Hannila / Jari Keto

2.1.1 Test Setup



2.2. Test method and limit

The measurement is made according to KDB 789033 and IC standard RSS-210.

The measurement results are obtained as described below:

$$E \text{ [dB}\mu\text{V/m]} = U_{RX} + A_{TOT}$$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

The limits in the table below are listed for the 100 MHz span around the band edges.

$$P \text{ [W]} = (10 \text{ to power (P [dBm] / 10)}) / 1000.$$

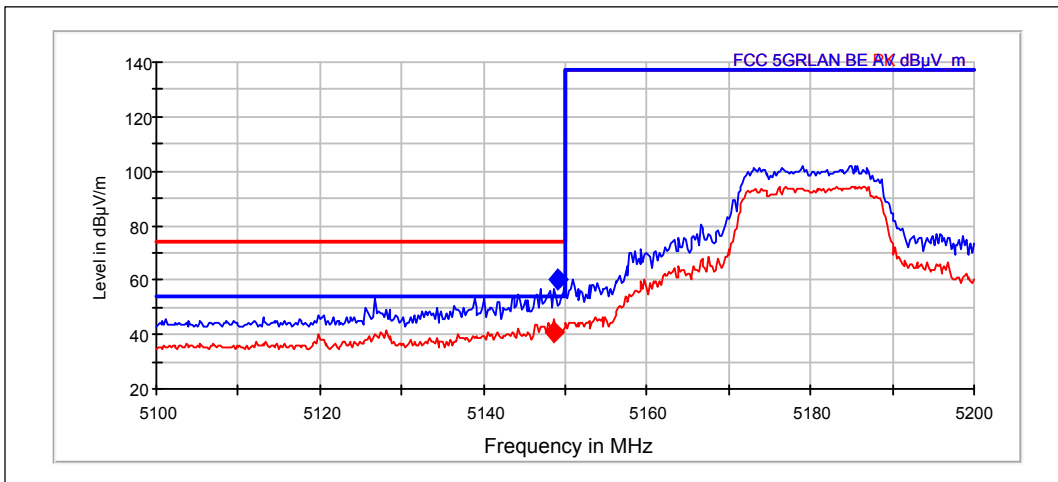
$$E \text{ [dB}\mu\text{V/m]} = 20 * \text{LOG} ((\text{square root (30 * P [W])} / 3 \text{ m}) * 1000000)$$

Frequency range [MHz]	Limit [dBm / MHz]	Limit dBuV/m @ 3m
5150 - 5250	$\leq 5.150 \text{ GHz: } 54 \text{ dBuV/m (avg), } 74 \text{ dBuV/m (pk)}$	68.23
5250 - 5350	$\geq 5.350 \text{ GHz: } 54 \text{ dBuV/m (avg), } 74 \text{ dBuV/m (pk)}$	68.23
5470 - 5725	$\leq 5.460 \text{ GHz: } 54 \text{ dBuV/m (avg), } 74 \text{ dBuV/m (pk)}$ $5.460 - 5.470 \text{ GHz: } -27 \text{ dBm/MHz (pk)}$	68.23
5725 - 5825	$5.825 - 5.835 \text{ GHz: } -17 \text{ dBm/MHz (pk)}$ $\geq 5.835 \text{ GHz: } -27 \text{ dBm/MHz (pk)}$	68.23 78.23

2.3. 5 GHz RLAN Test results

2.3.1 A-mode, 20 MHz CBW, BPSK modulation, 6 Mbps data rate.

Channel 36 / 5180MHz



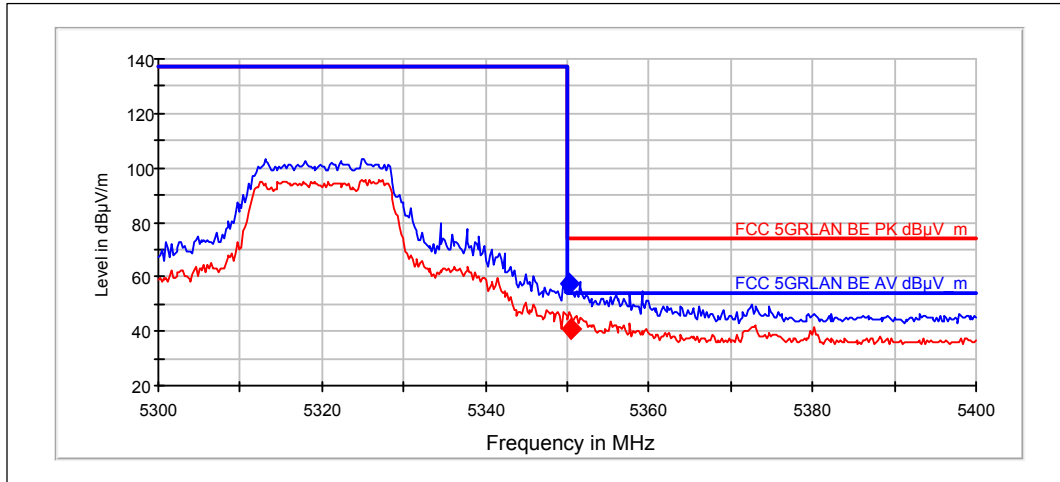
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5149.098	60.22	1025.416	63.73	-3.51	13.8	74	PASSED

Average (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5148.597	40.6	107.115	44.1	-3.5	13.4	54	PASSED

Channel 64 / 5320MHz



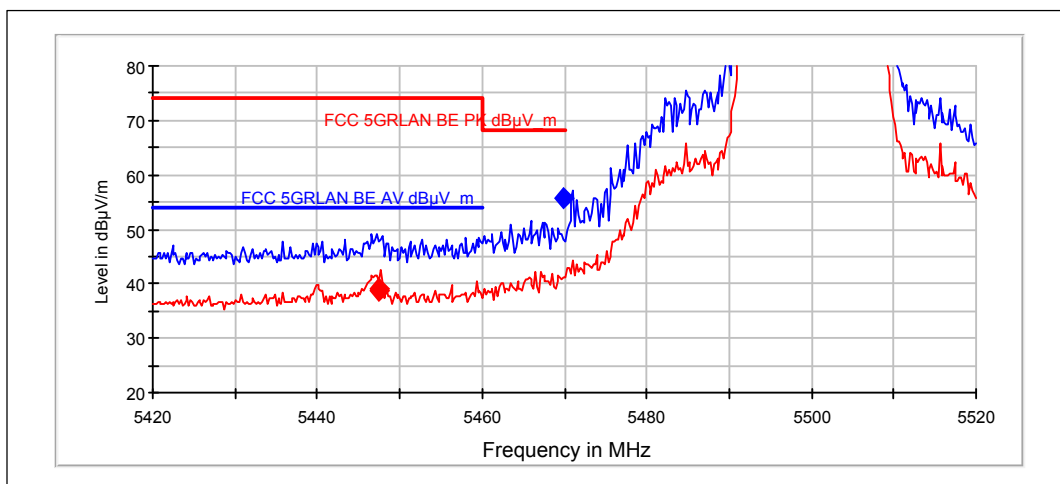
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5350.301	57.68	765.244	61.5	-3.82	16.3	74	PASSED

Average (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5350.401	40.51	106.035	44.33	-3.82	13.5	54	PASSED

Channel 100 / 5500MHz



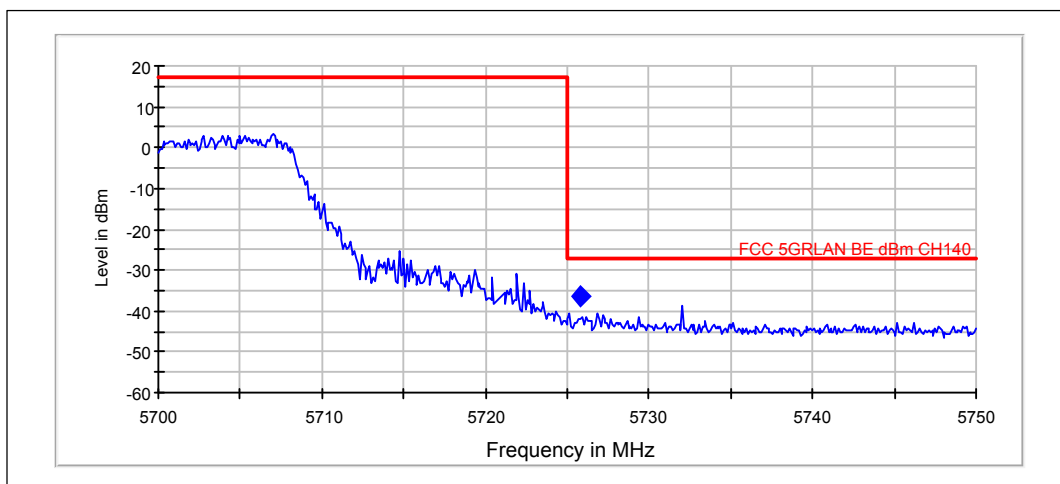
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5469.8	55.84	619.726	59.6	-3.76	12.4	68.2	PASSED

Average (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5447.355	38.89	87.953	42.55	-3.66	15.1	54	PASSED
5447.505	39	89.166	42.66	-3.66	15	54	PASSED

Channel 140 / 5700MHz

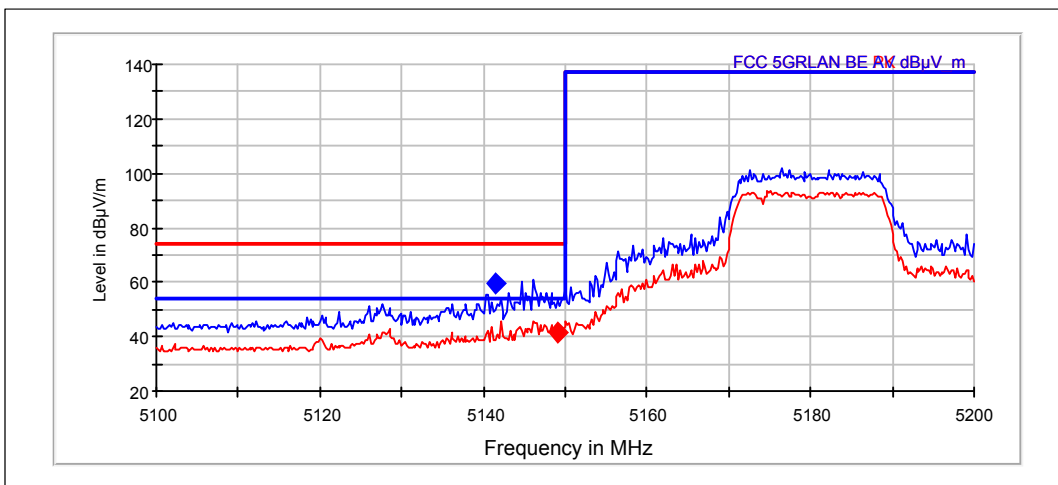


Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Margin	Limit [dBm]	Results
5725.856	-36.32	0.23329	-51.7	15.38	9.3	-27	PASSED

2.3.2 N-mode, 20 MHz CBW, BPSK modulation, 6.5 Mbps data rate.

Channel 36 / 5180MHz



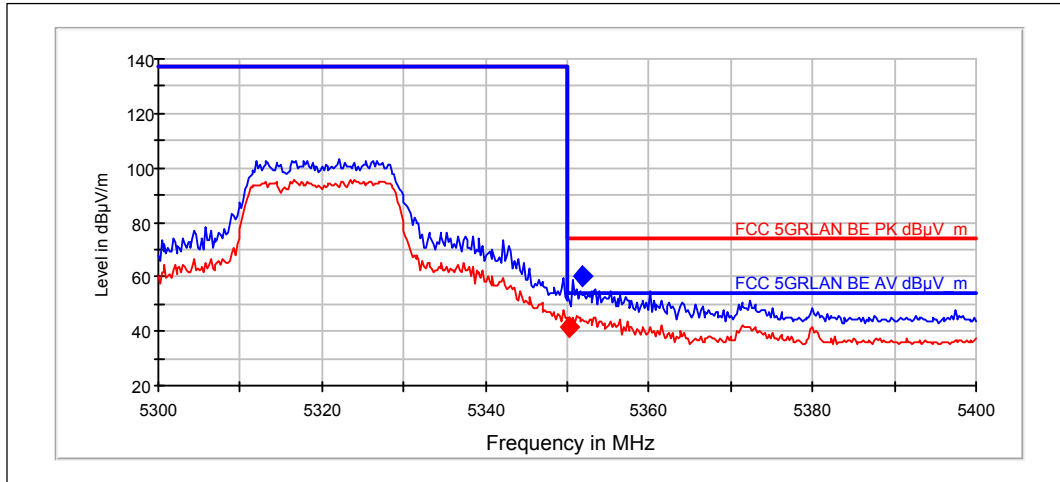
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5141.583	59.51	945.257	62.92	-3.41	14.5	74	PASSED

Average (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5149.098	41.27	115.758	44.78	-3.51	12.7	54	PASSED

Channel 64 / 5320MHz



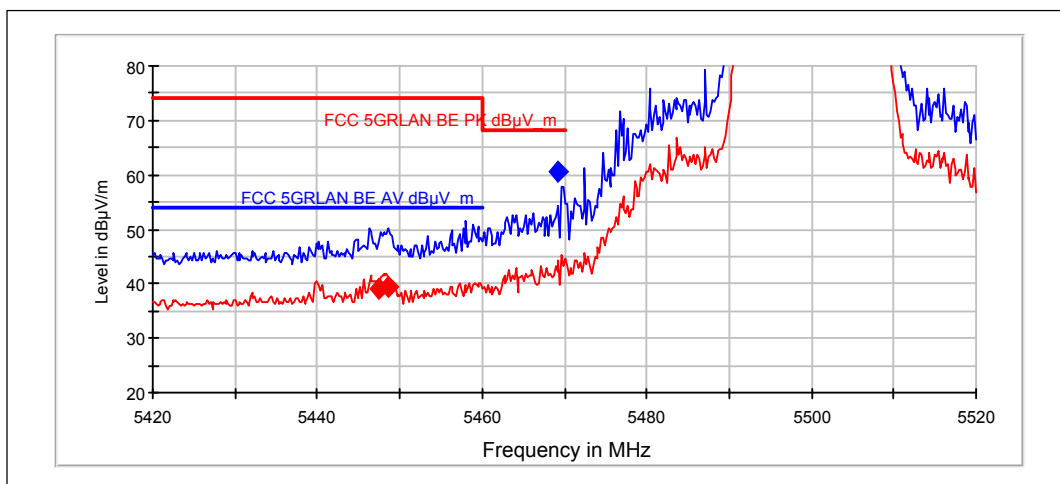
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5351.904	60.34	1040.16	64.16	-3.82	13.7	74	PASSED

Average (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5350.301	41.56	119.729	45.38	-3.82	12.4	54	PASSED

Channel 100 / 5500MHz



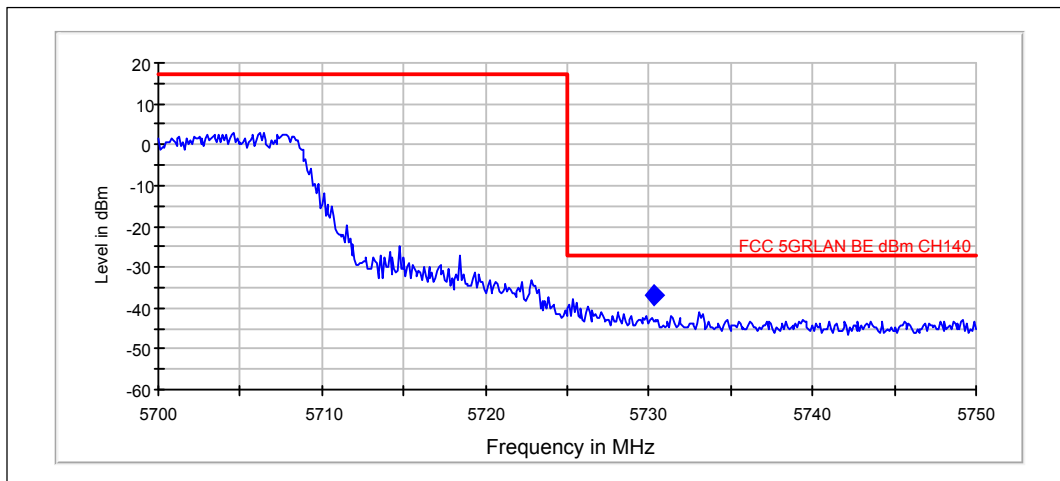
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5469.198	60.55	1064.878	64.31	-3.76	7.7	68.2	PASSED

Average (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5447.555	39.07	89.826	42.73	-3.66	14.9	54	PASSED
5448.707	39.35	92.747	43	-3.65	14.7	54	PASSED

Channel 140 / 5700MHz

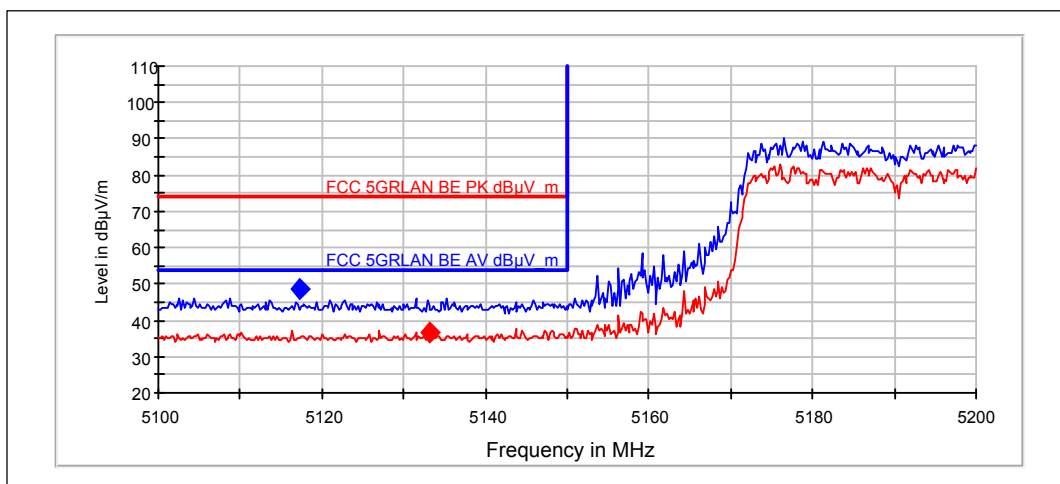


Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Margin	Limit [dBm]	Results
5730.265	-36.97	0.20114	-52.49	15.52	10	-27	PASSED

2.3.3 N-mode, 40 MHz CBW, OFDM modulation, 13 Mbps data rate.

Channel 36+40 / 5180MHz



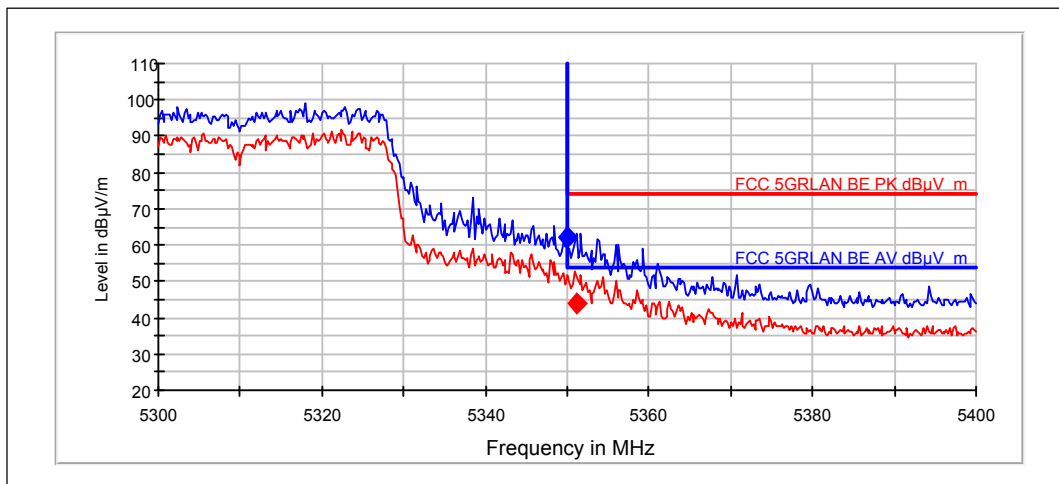
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μ V/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5117.335	48.56	268.009	51.94	-3.38	25.4	74	PASSED

Average (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5133.166	36.51	66.888	39.84	-3.33	17.5	54	PASSED

Channel 60+64 / 5310MHz



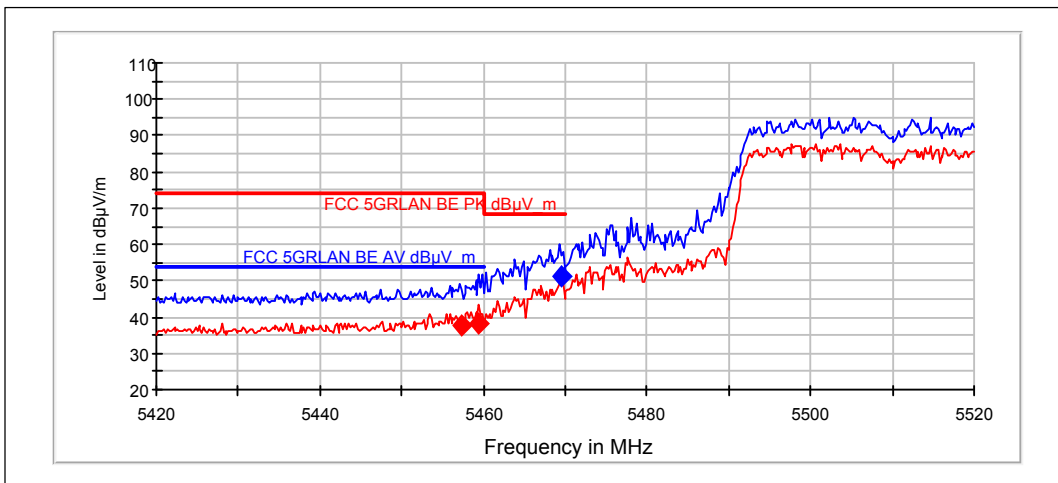
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5350.1	62.02	1261.537	65.84	-3.82	12	74	PASSED

Average (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5351.102	44.16	161.492	47.98	-3.82	9.8	54	PASSED

Channel 100+104 / 5510MHz



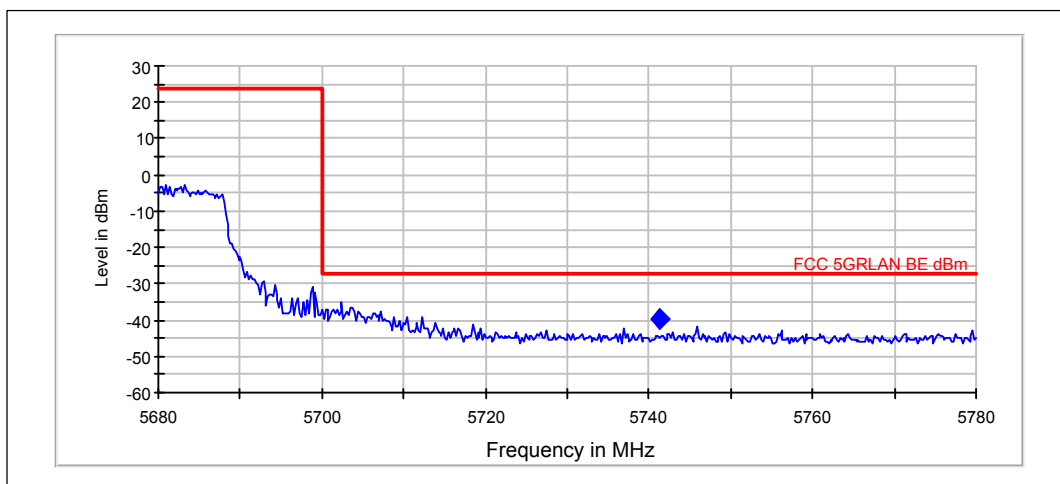
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5469.599	51.28	366.438	55.04	-3.76	16.9	68.2	PASSED

Average (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5457.375	37.88	78.352	41.57	-3.69	16.1	54	PASSED
5459.329	38.19	81.152	41.89	-3.7	15.8	54	PASSED

Channel 132+136 / 5670MHz



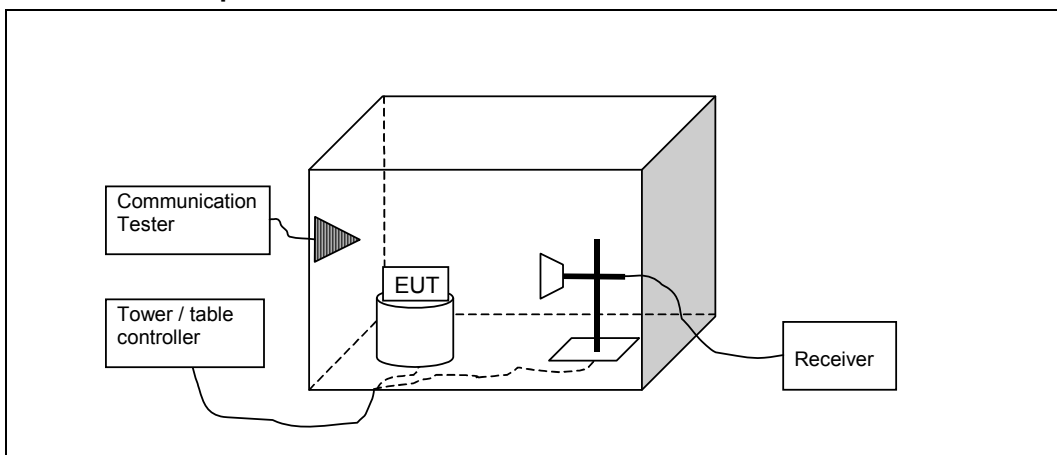
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Margin	Limit [dBm]	Results
5741.176	-39.75	0.10588	-55.42	15.67	12.8	-27	PASSED

3. Spurious radiated emissions (FCC §15.407 (b), RSS-210 A9.2)

EUT with DUT number	RM-824, DUT 16513
Accessories with DUT numbers	BP-5T, DUT 16514 ; WH-208, DUT 16515 ; AC-50E, DUT 16516
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	EUT did not produce any harmonics above 18GHz
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 101
Date of measurements	10-Jul-2012
Measured by	Kalle Hannila / Jari Keto

3.1.1 Test Setup



3.2. Test method and limit

The measurement is made the following way:

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.

The measurement results are obtained as described below:

$$E [dB\mu V/m] = U_{RX} + A_{TOT}$$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

Limits for spurious radiated emissions measurements (3 m measurement distance)
There are 2 sets of limit lines. Part 15.209 limits apply below 1 GHz and on restricted bands above 1GHz. The other limits are described in the table below.

Frequency range [MHz]	Limit [dBm / MHz]
5150 - 5250	1 GHz – 5.15 GHz, 5.35 GHz – 40 GHz: -27
5250 - 5350	1 GHz – 5.25 GHz, 5.35 GHz – 40 GHz: -27
5470 - 5725	1 GHz – 5.47 GHz, 5.725 GHz – 40 GHz: -27
5725 - 5825	1 GHz – 5.715 GHz, 5.835 GHz – 40 GHz: -27 5.715 GHz – 5.725 GHz, 5.825 GHz – 5.835 GHz: -17

3.3. 5 GHz RLAN Test results

3.3.1 A-mode, 20 MHz CBW, BPSK modulation, 6 Mbps data rate.

Channel 36 / 5180MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10361.4	69.08	2842.824	60.35	8.74	9.1	78.2	PASSED
10361.421	68.38	2624.521	59.65	8.74	9.8	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
905.209	23.47	14.902	27.42	-3.95	22.5	46	PASSED
940.343	43.95	157.489	47.79	-3.84	2.1	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10361.4	53.74	486.351	45.01	8.74	---	---	PASSED
10361.421	53.01	447.25	44.28	8.74	---	---	PASSED

Channel 48 / 5124MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10479.1	71.71	3848.575	62.51	9.2	6.5	78.2	PASSED
10479.562	72	3980.155	62.8	9.2	6.2	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.463	43.46	149.005	47.3	-3.84	2.5	46	PASSED
949.049	38.73	86.417	42.75	-4.02	7.3	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10479.1	39.61	95.62	29.79	9.2	---	---	PASSED
10479.562	50.68	341.94	29.1	9.2	---	---	PASSED

Channel 64 / 5320MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10639.4	73.2	4572.461	64.16	9.04	5	78.2	PASSED
10641.387	72.65	4289.928	63.62	9.03	5.6	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.463	45.61	190.678	49.45	-3.84	0.4	46	PASSED
948.929	32.86	43.964	36.88	-4.02	13.1	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10639.4	53.74	486.351	48.16	9.04	-3.2	54	PASSED
10641.387	53.01	447.25	47.81	9.03	-2.8	54	PASSED

Channel 52 / 5260MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10518.5	71.69	3839.282	62.51	9.18	6.5	78.2	PASSED
10519.338	71.97	3966.432	62.8	9.17	6.2	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.343	43.23	144.961	47.07	-3.84	2.8	46	PASSED
949.079	37.98	79.278	42	-4.02	8	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10518.5	42.29	130.197	45.99	9.18	---	---	PASSED
10519.338	51.4	371.492	42.17	9.17	---	---	PASSED

Channel 100 / 5500MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11000.3	65.06	1791.431	55.28	9.78	13.1	78.2	PASSED
11001.704	65.17	1814.262	55.42	9.75	13	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.343	44.62	170.255	48.46	-3.84	1.4	46	PASSED
948.929	38.32	82.366	42.34	-4.02	7.7	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11000.3	50.38	330.37	40.6	9.78	3.6	54	PASSED
11001.704	50.06	318.493	40.31	9.75	3.9	54	PASSED

Channel 116 / 5580MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11156.917	57.77	773.215	48.47	9.3	20.4	78.2	PASSED
11159.2	58.89	880.035	49.62	9.27	19.3	78.2	PASSED
16738.179	65.78	1945.584	43.6	22.18	12.4	78.2	PASSED
16741.4	67.02	2243.107	44.78	22.24	11.2	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.343	45.48	187.932	49.32	-3.84	0.5	46	PASSED
948.929	37.18	72.294	41.2	-4.02	8.8	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11156.917	43.5	149.675	34.2	9.3	10.5	54	PASSED
11159.2	44.12	160.657	34.85	9.27	9.9	54	PASSED
16738.179	52.26	410.346	30.08	22.18	---	---	PASSED
16741.4	52.34	414.047	30.1	22.24	---	---	PASSED

Channel 140 / 5700MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11400.2	54.73	545.255	45.5	9.23	23.5	78.2	PASSED
11400.302	54.99	561.888	45.76	9.23	23.2	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
835.163	22.87	13.911	27.84	-4.97	23.1	46	PASSED
940.403	43	141.205	46.84	-3.84	3	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11400.2	41.41	117.557	32.18	9.23	12.6	54	PASSED
11400.302	41.37	117.044	32.14	9.23	12.6	54	PASSED

3.3.2 N-mode, 20 MHz CBW, BPSK modulation, 13.0 / 14.4 Mbps data rate.

Channel 36 / 5180MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10360.2	66.13	2024.65	57.41	8.72	12.1	78.2	PASSED
10363.829	65.39	1859.516	56.62	8.77	12.8	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.403	41.61	120.42	45.45	-3.84	4.4	46	PASSED
949.049	39.1	90.199	43.12	-4.02	6.9	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10360.2	52	397.878	43.28	8.72	---	---	PASSED
10363.829	51.28	366.522	42.51	8.77	---	---	PASSED

Channel 48 / 5124MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10480.1	70.86	3491.403	61.65	9.21	7.3	78.2	PASSED
10480.658	71.13	3599.565	61.91	9.22	7.1	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.343	40.11	101.251	43.95	-3.84	5.9	46	PASSED
948.989	32.28	41.12	36.3	-4.02	13.7	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10480.1	46.82	219.18	37.78	9.21	---	---	PASSED
10480.658	50.8	346.577	30.29	9.22	---	---	PASSED

Channel 52 / 5260MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10518.1	72.08	4019.296	62.9	9.18	6.1	78.2	PASSED
10518.238	71.94	3952.756	62.76	9.18	6.3	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
30.03	26.31	20.678	31.08	-4.77	13.7	40	PASSED
940.343	41.78	122.673	45.62	-3.84	4.2	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10518.1	52.21	407.943	43.21	9.18	---	---	PASSED
10518.238	52.19	406.912	43.19	9.18	---	---	PASSED

Channel 64 / 5320MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10640	72.63	4281.047	63.59	9.04	5.6	78.2	PASSED
10641.287	71.79	3887.317	62.76	9.03	6.4	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
30.12	26.21	20.448	31.04	-4.83	13.8	40	PASSED
940.343	40.78	109.396	44.62	-3.84	5.2	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10640	42.49	133.214	33.23	9.04	-4	54	PASSED
10641.287	51.05	356.821	28.81	9.03	-3.9	54	PASSED

Channel 100 / 5500MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11000.2	65.15	1808.631	55.37	9.78	13.1	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.403	44.28	163.587	48.12	-3.84	1.7	46	PASSED
948.989	40	99.965	44.02	-4.02	6	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11000.2	50.87	349.422	41.09	9.78	3.1	54	PASSED

Channel 140 / 5700MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11400.1	54.21	513.334	44.97	9.24	24	78.2	PASSED
11400.102	54.73	545.318	45.49	9.24	23.5	78.2	PASSED
17098.6	63.37	1474.178	40.41	22.96	14.8	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
906.559	23.45	14.876	27.42	-3.97	22.6	46	PASSED
940.343	42.27	129.852	46.11	-3.84	3.7	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11400.1	42.28	130.062	33.04	9.24	11.7	54	PASSED
11400.102	41.94	125.012	32.7	9.24	12.1	54	PASSED
17098.6	50.62	339.547	27.66	22.96	---	---	PASSED

3.3.3 N-mode, 40 MHz CBW, 64-QAM modulation, 108 Mbps data rate.

Channel 36+40 / 5190MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5132.958	58.86	876.799	62.19	-3.33	9.3	68.2	PASSED
10378.1	67.32	2323.807	58.46	8.86	10.9	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.323	41.26	115.611	45.1	-3.84	4.7	46	PASSED
948.999	35.75	61.334	40.8	-5.05	10.2	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5132.958	39.2	91.159	42.53	-3.33	14.8	54	PASSED
10378.1	52.16	405.275	43.3	8.86	---	---	PASSED

Channel 44+48 / 5230MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10458.1	67.47	2362.381	58.47	9	10.7	78.2	PASSED
10458.114	67.33	2325.145	58.33	9	10.9	78.2	PASSED
15567.6	63.43	1483.713	42.15	21.29	14.8	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
30.03	26.59	21.35	31.36	-4.77	13.4	40	PASSED
940.323	41.24	115.292	45.08	-3.84	4.8	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10458.1	52.21	407.943	43.21	9	---	---	PASSED
10458.114	52.19	406.912	43.19	9	---	---	PASSED
15567.6	50.33	328.284	29.05	21.29	3.7	54	PASSED

Channel 52+56 / 5270MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10537.9	70.43	3322.003	61.4	9.03	7.8	78.2	PASSED
10537.974	70.43	3321.62	61.4	9.03	7.8	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.323	41.04	112.72	44.88	-3.84	5	46	PASSED
948.999	30.3	32.727	34.32	-4.02	15.7	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10537.9	52.21	407.943	43.21	9.03	---	---	PASSED
10537.974	52.19	406.912	43.19	9.03	---	---	PASSED

Channel 60+64 / 5310MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10617.934	71.66	3826.485	62.48	9.18	6.5	78.2	PASSED
10618	71.66	3826.044	62.48	9.18	6.5	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.383	45.46	187.478	49.3	-3.84	0.5	46	PASSED
949.059	29.51	29.888	33.53	-4.02	16.5	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
10617.934	52.21	407.943	43.21	9.18	-1.9	54	PASSED
10618	52.19	406.912	43.19	9.18	-2	54	PASSED

Channel 100+104 / 5510MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11018	61.93	1248.389	52.33	9.6	16.3	78.2	PASSED
11018.032	61.8	1229.561	52.2	9.6	16.4	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
30.03	26.35	20.773	31.12	-4.77	13.6	40	PASSED
940.323	43.16	143.896	47	-3.84	2.8	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11018	46.42	209.459	36.82	9.6	7.6	54	PASSED
11018.032	46.4	208.809	36.8	9.6	7.6	54	PASSED

Channel 108+112 / 5550MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11097.992	58.62	853.198	49.54	9.08	19.6	78.2	PASSED
11098	58.89	879.63	49.81	9.08	19.3	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.383	42.44	132.419	46.28	-3.84	3.6	46	PASSED
948.999	35.77	61.468	39.79	-4.02	10.2	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11097.992	43.08	142.495	34	9.08	10.9	54	PASSED
11098	43.54	150.366	34.46	9.08	10.5	54	PASSED

Channel 132+136 / 5670MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11341.177	55.26	579.495	46.4	8.86	22.9	78.2	PASSED
11341.3	54.49	530.335	45.63	8.86	23.7	78.2	PASSED

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.323	43.8	154.935	47.64	-3.84	2.2	46	PASSED
949.059	36.36	65.758	40.38	-4.02	9.6	46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11341.177	41.28	115.824	32.42	8.86	12.7	54	PASSED
11341.3	41.15	114.183	32.29	8.86	12.8	54	PASSED

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
6038	Data Logger	Testo 580	Testo	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
2389	Signal Generator	SMJ 100A	R&S	-
6009	GPS Antenna	SA-700	Chronos	-
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	-
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	-
6015	Receiver	ESI	R&S	-
2059	V-network	ESH3-Z6	R&S	-
6044	V-network	ESH3-Z6	R&S	-
1759	LISN 50 µH	ESH3-Z5	R&S	-
2390	Directional Coupler	DC2600	AR	-
1916	Communication Tester	CMTA84	R&S	-
6012	CDN	CDN USB/c	Teseq	-
2388	Bluetooth Tester	CBT	R&S	-
6046	Attenuator 10dB	8493C	Agilent	-
6047	Attenuator 20dB	8493C	Agilent	-
6036	Data Logger	175-H2	Testo	-
6045	Power Splitter	11667B	Agilent	-
6039	USB Interface	5541765	Testo	-
10479	Communication Tester	CMW500	R&S	-
6094	Communication Tester	CMW500	R&S	-
6096	EMC Analyzer	E7405A	HP	-
6098	Signal Generator	8648C	Agilent	-
6103	Bluetooth tester	CBT	R&S	-
6113	Signal Generator	SMF100A	R&S	-
6120	Thermal Chamber	WT 20/40	Weiss	-
6121	Power Splitter	HP11667B	Agilent	-
6122	Power Splitter	HP11667B	Agilent	-
6134	Attenuator 10dB	BW-S10-2W263+	Mini-Circuits	-
6136	Attenuator 20dB	BW-S20-2W263+	Mini-Circuits	-
2359	Temperature Test Chamber	VT4002	Vötsch	-
2347	Communication Tester	CMU200	R&S	-
2180	Communication Tester	CMU200	R&S	-
2156	Communication Tester	CMU200	R&S	-
1999	Receiver	ESIB26	R&S	-
2352	Spectrum Analyzer	FSP-30	R&S	-
2097	Pulse Limiter	ESH3-Z2	R&S	-
2039	Power Supply	PL330QMD	Thurlby	-
1992	Signal Generator	83630B	Agilent	-
2206	Signal Generator	SMX	R&S	-

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
6038	Data Logger	Testo 580	Testo	-
6014	Substitute Calibration Cable	Sucoflex 104PB	Suhner	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
2389	Signal Generator	SMJ 100A	R&S	-
6009	GPS Antenna	SA-700	Chronos	-

Eq. No	Equipment	Type	Manufacturer	Used in
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	-
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	-
1988	Antenna	HL562	R&S	-
-	RF immunity / Emission Software	EMC32	R&S	-
1917	Communication Tester	CMTA84	R&S	-
2388	Bluetooth Tester	CBT	R&S	-
6037	Data Logger	175-H2	Testo	-
6039	USB Interface	5541765	Testo	-
6087	Antenna	BBHA 9120D	Scharzbeck	-
6088	Antenna	VUBA 9117	Scharzbeck	-
6089	Antenna	HFH2-Z2	R&S	-
10479	Communication Tester	CMW500	R&S	-
6094	Communication Tester	CMW500	R&S	-
6103	Bluetooth tester	CBT	R&S	-
6113	Signal Generator	SMF 100A	R&S	-
6115	Open switch and control unit	OSP 130	R&S	-
6116	Open switch and control unit	OSP 150	R&S	-
6130	Notch Filter	WRCD1880-1.1.25/50-10SS	Wainwright	-
6131	Notch Filter	WRCT902.4-0.4/40-8SS	Wainwright	-
6135	Notch Filter	WRCJV2531/2539-2523/2547-60/12SS	Wainwright	-
2140	Antenna	EMCO93110B	EMCO	-
2142	Antenna	3146	EMCO	-
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	-
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
2043	Band Reject Filter	WRCA824/849-0,2-6SS	Wainwright	22
2347	Communication Tester	CMU200	R&S	-
2180	Communication Tester	CMU200	R&S	-
2156	Communication Tester	CMU200	R&S	-
2176	CDN	CDN 801-M3	Lüthi	-
2027	CDN	M2 (modified) DC1	MEB	-
2028	CDN	M3 (modified) DC2	MEB	-
1984	Antenna	BBHA 9120 D	Schwarzbeck	-
6017	Antenna	SBA 9113	Schwarzbeck	-
2009	Signal Generator	SMP 22	R&S	-
2029	Power Supply	PL330	Thurlby	-
2361	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	Euroshield	-
2353	Receiver	ESIB26	R&S	-
2135	CDN	CDN 801-M3	Lüthi	-
6015	Receiver	ESIB 40	R&S	-
2003	Antenna	3116	ETS	-