

FCC Part 15E Compliance Test Report

Test Report no.:	FCC15E_RM-821_16.docx	Date of Report:	12-Sep-2012
Number of pages:	12	Customer's Contact person:	Lasse Vaattovaara
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FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-821 / AC-Charger AC-50E / Headset WH-205		
FCC ID:	PYARM-821	IC:	661V-RM821
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

1. Summary for FCC Part 15E Compliance Test Report

Date of receipt	19-Jun-2012
Testing completed	12-Sep-2012
The customer's contact person	Lasse Vaattovaara
Test Plan referred to	T:\Projects\RM-820\TestPlan\RS_testplan_RM-820_EMC_FCC_SAR_HAC.xlsm
Notes	-
Document name	T:\Projects\RM-820\EMC\FCC15E_RM-820_29.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-820	004402138706233	2003	-	1121	16489
AC-Charger	AC-50E	409049207226040151060675619	-	-	-	16516
Headset	WH-205	06944221123H1R47224	-	-	-	15956

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	NP
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.

The test results of PYAA are re-used for certification of the PYARM-821. The table above indicates the results, which will be re-used.

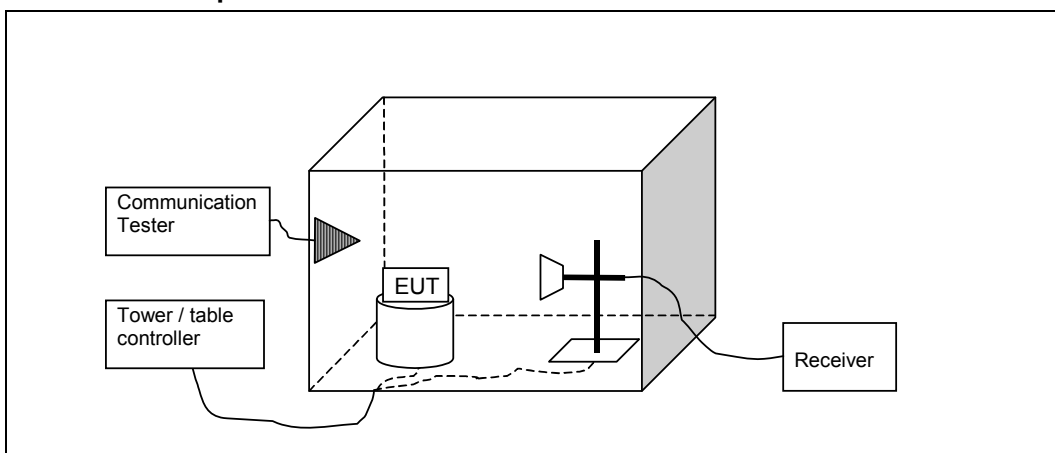
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2. Band edge compliance of RF emissions (FCC §15.407 (b), RSS-210 A9.2)

EUT with DUT number	RM-820, DUT 16489
Accessories with DUT numbers	AC-50E, DUT 16516 ; WH-205, DUT 15956
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	19 / 48 / 101.1
Date of measurements	12-Sep-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.

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

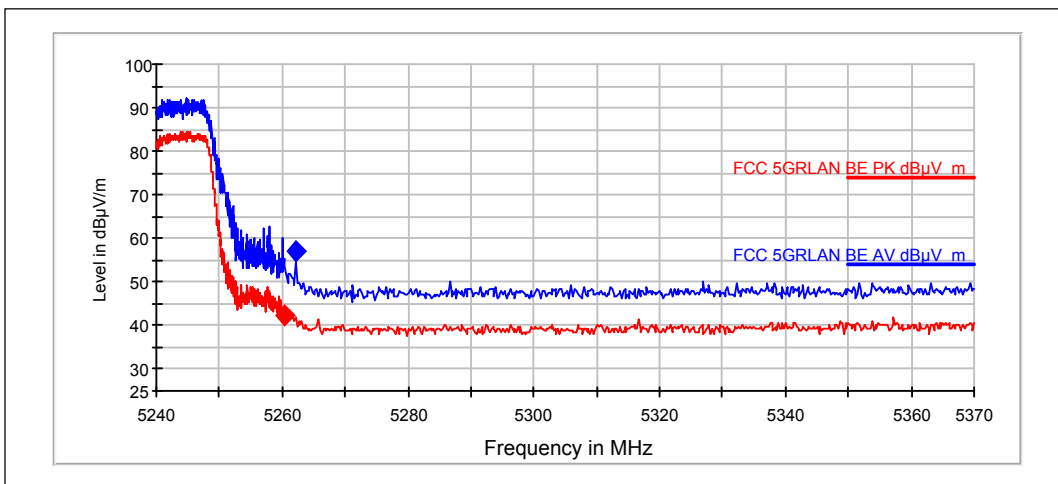
$$E \text{ [dB}\mu\text{V/m]} = 20 * \text{LOG} ((\text{square root (30 * P [W])} / 3 \text{ m}) * 1000000)$$

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 48 / 5124MHz



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

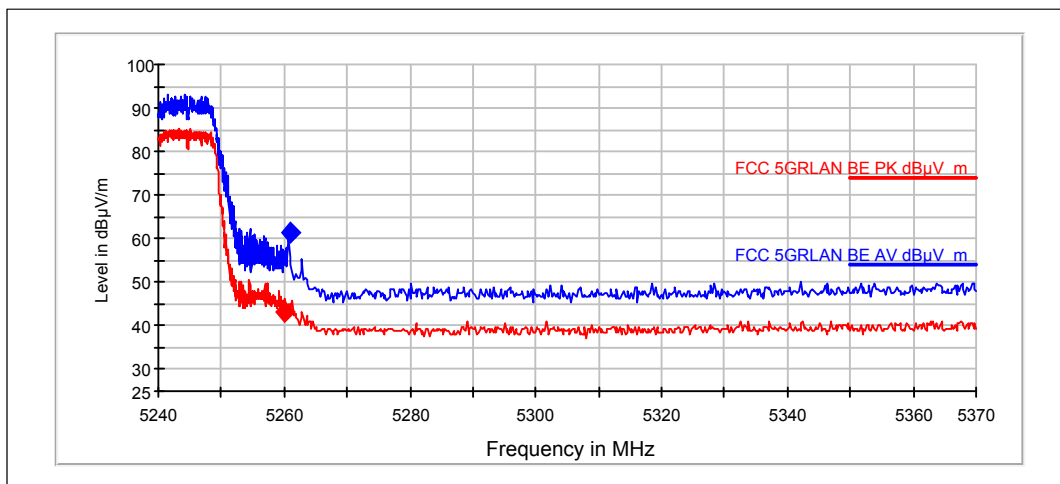
Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5262.164	56.97	705.749	55.67	1.3	---	---	PASSED

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
5260.361	42.54	134.014	41.24	1.3	---	---	PASSED

2.3.2 N-mode, 20 MHz CBW, BPSK modulation, 6.5 / 7.25 Mbps data rate.

Channel 48 / 5124MHz



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

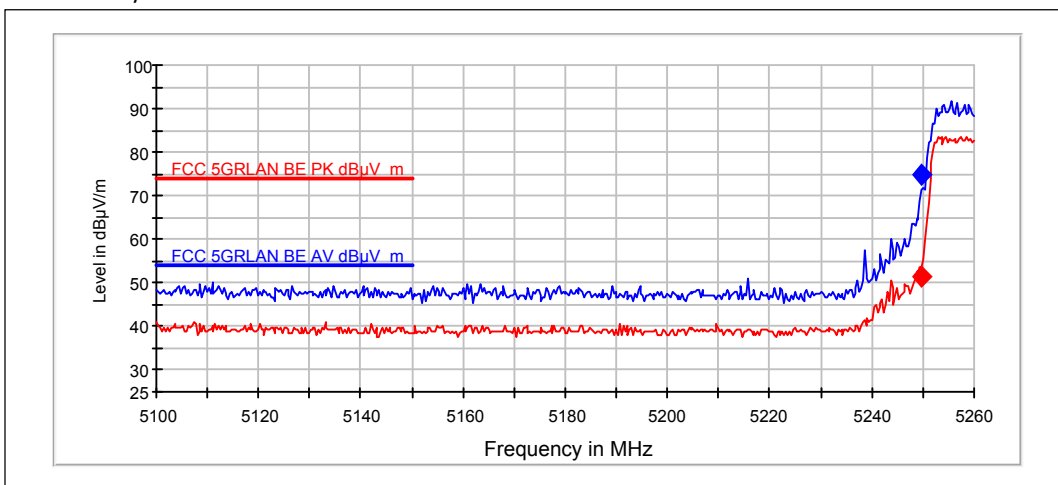
Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5260.962	61.41	1175.709	60.11	1.3	---	---	PASSED

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
5260	43.05	142.004	41.75	1.3	---	---	PASSED

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

Channel 52 / 5260MHz



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

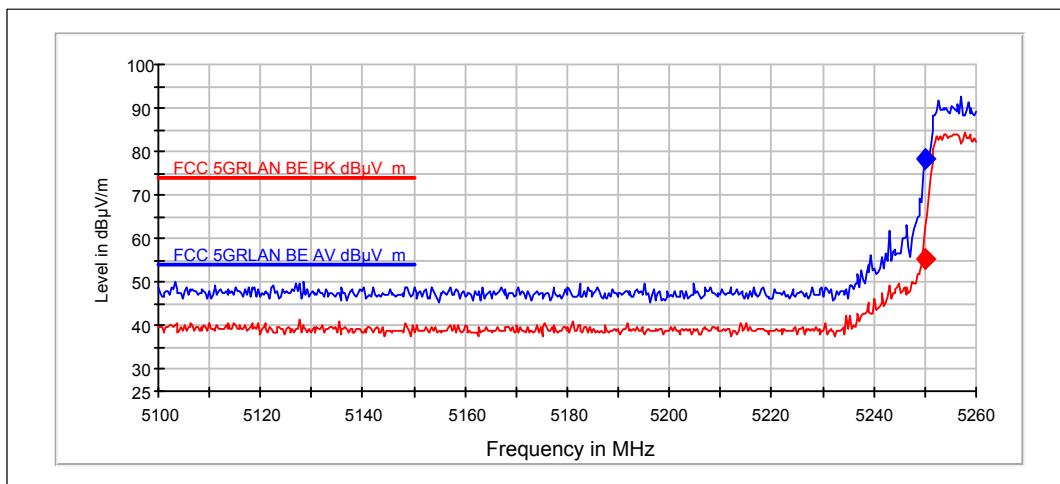
Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5249.86	74.78	5482.77	73.61	1.17	---	---	PASSED

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
5249.719	51.54	377.355	50.37	1.17	---	---	PASSED

2.3.4 N-mode, 20 MHz CBW, BPSK modulation, 6.5 / 7.25 Mbps data rate.

Channel 52 / 5260MHz



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

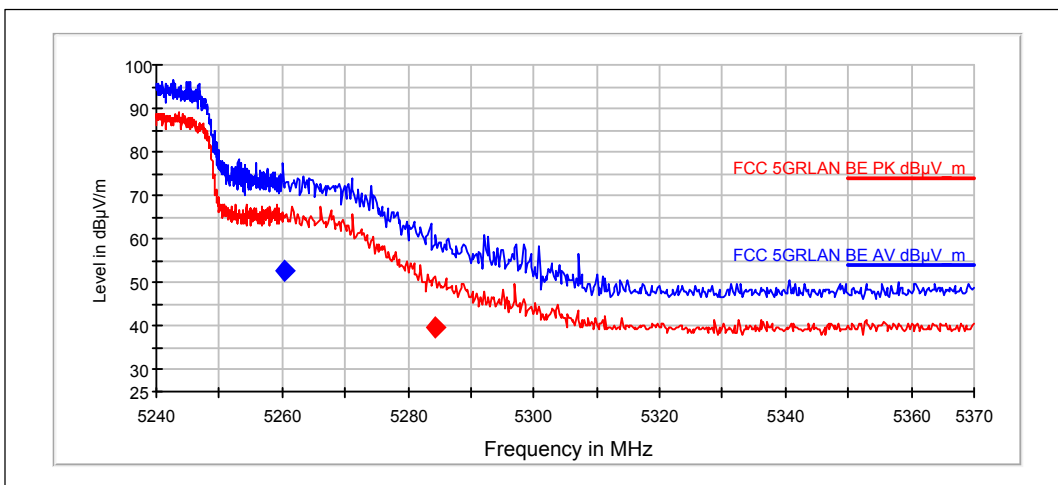
Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5250	78.14	8073.28	76.97	1.17	---	---	PASSED

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
5250	55.5	595.731	54.33	1.17	---	---	PASSED

2.3.5 N-mode, 40 MHz CBW, BPSK modulation, 13.5 / 15.0 Mbps.

Channel 44+48 / 5230MHz



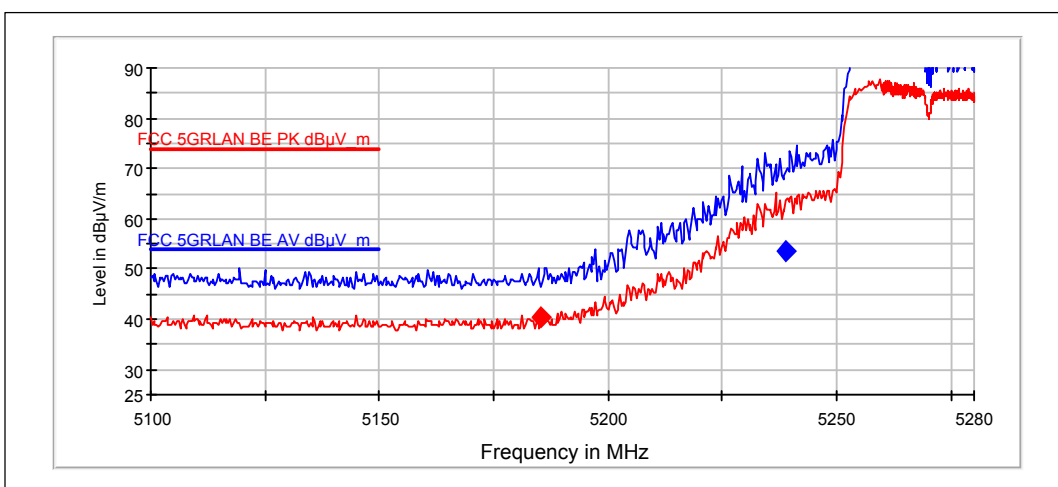
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
5260.361	52.75	433.86	51.45	1.3	---	---	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
5284.289	39.7	96.605	38.35	1.35	---	---	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
5238.918	53.61	479.237	52.31	1.3	---	---	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
5185.19	40.55	106.476	38.98	1.57	---	---	PASSED

3. Test Equipment

3.1. 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	-

3.2. 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	-