TCC Nokia

ilac-MRA FINAS Finnish Accreditation Service T117 (EN ISO/IEC 17025)

FCC Part 15B Compliance Test Report

Test Report no.:	FCC15B_RM-987_01.docx	**Date of Report:**	20-Dec-2013
Number of pages:	11	**Customer's Contact person:**	Zhang David
Testing laboratory:	TCC Nokia Beijing Laboratory Beijing Economic and Technological Development Area No.5 Donghuan Zhonglu Beijing PRC China 100176 Tel. +86 10 8711 8888 Fax. +86 10 8711 4550	**Customer:**	Nokia Corporation Beijing Economic and Technological Development Area No.5 Donghuan Zhonglu Beijing PRC China 100176 Tel. +86 10 8711 8888 Fax. +86 10 8711 4550
FCC listing no.: **IC recognition no.:**	975940 661AH-1		
Tested devices/ accessories:	**Phone RM-987 / Battery BL-5C / USB data cable CA-190CD / Headset WH-108 / Laptop IBM T43 / Printer HP C6427A / Parallel cable for printer - / AC-Adapter 02K6749**		
FCC ID:	QTLRM-987	**IC:**	
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Part 15 Subpart B, ANSI C63.4 (2003), ICES-003, CISPR 22, RSS-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009). 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:	Sherina Gao Digitally signed by Gao Sherina DN: cn=Gao Sherina, o=NOKIA, ou=PSCL, email=sherina.gao@nokia.com, c=CN Date: 2013.12.20 16:07:31 +08'00'		

Gao Sherina, Engineer, EMC

TCC Nokia Beijing Laboratory
Beijing Economic and
Technological Development Area
No.5 Donghuan Zhonglu
Beijing
PRC China 100176
Tel. +86 10 8711 8888
Fax. +86 10 8711 4550

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	01-Dec-2013
Testing completed	12-Dec-2013
The customer's contact person	Zhang David
Test Plan referred to	T:\Projects\RM-986\TestPlan\RS_testplan_RM-986.xlsm
Notes	-
Document name	FCC15B_RM-987_01.docx

1.1. EUT and Accessory Information

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

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-986	SIM1:004402476702141;SIM2:004402476702158	0110	-	1.1347.1	54226
Battery	BL-5C	0670400417535U285L17702815	-	-	-	54232
USB data cable	CA-190CD	07304563223X2F	-	-	-	54235
Headset	WH-108	3293L71	-	-	-	54233
Laptop	IBM T43	L3KXHL3	-	-	-	52468
Printer	HP C6427A	MY15B18156JJ	-	-	-	51838
Parallel cable for printer	-	-	-	-	-	53508
AC-Adapter	02K6749	-	-	-	-	53509
Phone	RM-986	SIM1:004402476700467;SIM2:004402476700476	0110	-	1.1347.1	54239
Battery	BL-5C	0670400417535U285L17702803	-	-	-	54231
Headset	WH-108	305213R	-	-	-	54187

1.2. Summary of Test Results

GSM850:

Section in CFR 47	Section in ICES-003 (RSS-132)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	NP
15.109, a	5.5 (4.6)	Radiated emissions	NP

GSM1900:

Section in CFR 47	Section in ICES-003 (RSS-133)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	PASSED
15.109, a	5.5 (6.6)	Radiated emissions	PASSED

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

The test results of QTLRM-986 are re-used for certification of the QTLRM-987. The table above indicates the results, which will be re-used.

TCC Nokia Beijing Laboratory
Beijing Economic and
Technological Development Area
No.5 Donghuan Zhonglu
Beijing
PRC China 100176
Tel. +86 10 8711 8888
Fax. +86 10 8711 4550

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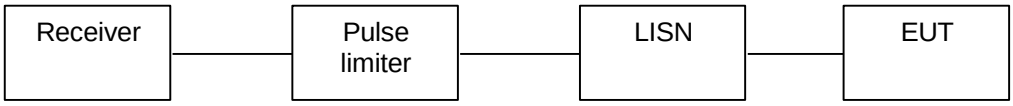
TCC Nokia Beijing Laboratory
Beijing Economic and
Technological Development Area
No.5 Donghuan Zhonglu
Beijing
PRC China 100176
Tel. +86 10 8711 8888
Fax. +86 10 8711 4550

2. AC powerline conducted emissions
(FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-986, DUT 54226
Accessories with DUT numbers	BL-5C, DUT 54232 ; CA-190CD, DUT 54235 ; WH-108, DUT 54233 ; IBM T43, DUT 52468 ; HP C6427A, DUT 51838 ; -, DUT 53508 ; 02K6749, DUT 53509
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	Both SIMs were installed during testing, and data was kept transferring between phone and computer.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	19/35/101.5
Date of measurements	04-Dec-2013
Measured by	Gao Sherina

2.1. Test Setup



2.2. Test method and limit

The measurement is made according to ANSI C63.4-2003 as follows:

The EUT is placed on a wooden table 80 cm above the reference groundplane.

The EUT is connected via LISN to a test power supply.

The measurement results are obtained as described below:

$U\ [dB\mu V] = U_{RX} + A_{TOT}$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

CISPR 22 Class B limits

Frequency range [MHz]	Quasi peak limit [dBµV]	Average limit [dBµV]
0.15 - 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

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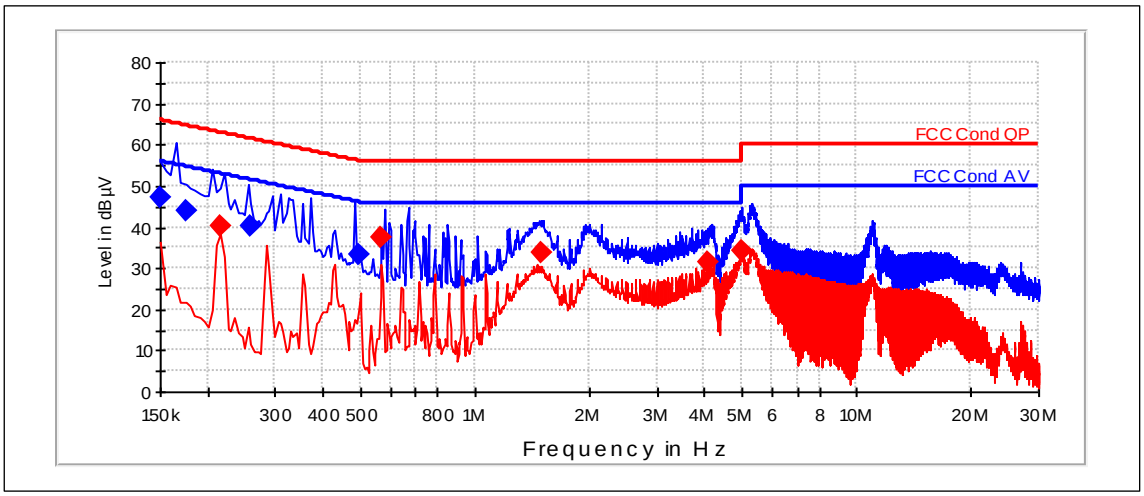
Beijing Economic and
Technological Development Area
No.5 Donghuan Zhonglu
Beijing
PRC China 100176
Tel. +86 10 8711 8888
Fax. +86 10 8711 4550

2.3. GSM 1900 Test results

Channel 661 / 1880.0 MHz



QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.15	47.1	N	PASSED
0.175	43.78	N	PASSED
0.26	40.07	L1	PASSED
0.495	33.38	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.215	40.13	N	PASSED
0.57	37.55	N	PASSED
1.495	33.78	N	PASSED
4.065	31.22	L1	PASSED
4.99	34.29	N	PASSED

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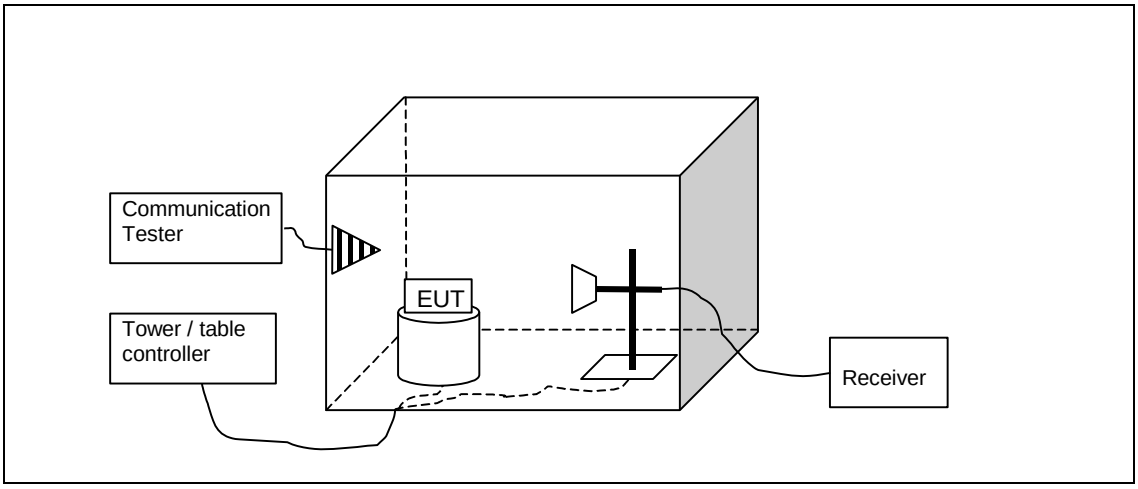
Beijing Economic and
Technological Development Area
No.5 Donghuan Zhonglu
Beijing
PRC China 100176
Tel. +86 10 8711 8888
Fax. +86 10 8711 4550

3. Radiated emissions

(FCC §15.109, ICES-003 section 5.5, RSS-132 4.6, RSS-133 6.6)

EUT with DUT number	RM-986, DUT 54239
Accessories with DUT numbers	BL-5C, DUT 54231 ; CA-190CD, DUT 54235 ; WH-108, DUT 54187 ; IBM T43, DUT 52468 ; HP C6427A, DUT 51838 ; -, DUT 53508 ; 02K6749, DUT 53509
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	Both SIMs were installed during testing, and data was kept transferring between phone and computer.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	18 / 33 / 102
Date of measurements	12-Dec-2013
Measured by	Zou Ming

3.1.1 Test setup



3.2. Test method and limit

The measurement is made according to ANSI C63.4-2003as follows:

The measurement is performed in the Semi-Anechoic Chamber with conducting metal floor.

The measurement distance is 3 m.

The EUT is placed on a nonconductive plate at 80 cm height.

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.

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No.5 Donghuan Zhonglu
Beijing
PRC China 100176
Tel. +86 10 8711 8888
Fax. +86 10 8711 4550

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 ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

CISPR 22 and FCC Part 15 Class B limits (3 m measurement distance)

Frequency range [MHz]	Quasi peak limit [dBµV/m]	Average limit [dBµV/m]	Peak limit [dBµV/m]
30 - 230	40	-	-
230 – 1000	47	-	-
1000 - 3000	-	50	70
Above 3000	-	54	74

TCC Nokia Beijing Laboratory
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Technological Development Area
No.5 Donghuan Zhonglu
Beijing
PRC China 100176
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3.3. GSM1900 test results

RX mode, channel 512 / 1930.2 MHz

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
3859	40	100.046	40.38	-0.38	34	74	PASSED
7720.8	48.66	271.05	38.3	10.37	25.3	74	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
3859	26.79	21.845	27.17	-0.38	27.2	54	PASSED
7720.8	35.74	61.214	25.38	10.37	18.3	54	PASSED

RX mode, channel 661 / 1960.0 MHz

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	21.13	11.388	28.79	-7.66	18.9	40	PASSED
34.089	14.09	5.064	30.46	-16.37	25.9	40	PASSED
38.988	16.97	7.053	36.19	-19.22	23	40	PASSED
69.968	25.72	19.311	54.84	-29.12	14.3	40	PASSED
103.885	37.3	73.257	63.56	-26.26	2.7	40	PASSED
108.036	38.9	88.074	64.78	-25.88	1.1	40	PASSED
112.562	28.19	25.674	54.2	-26.01	11.8	40	PASSED
116.534	30.16	32.2	55.9	-25.74	9.8	40	PASSED
118.52	27.28	23.131	52.87	-25.59	12.7	40	PASSED
121.106	26.49	21.12	52.04	-25.55	13.5	40	PASSED
212.333	36.96	70.477	63.02	-26.06	3	40	PASSED

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
3001.5	38.6	85.114	40.02	-1.42	35.4	74	PASSED
3921.8	39.62	95.675	40.03	-0.41	34.4	74	PASSED
7819.938	50.35	329.344	39.78	10.57	23.6	74	PASSED
7828.159	49.4	295.121	38.8	10.6	24.6	74	PASSED
7840.9	49.15	286.748	38.55	10.6	24.8	74	PASSED
7855.207	49.69	305.141	39.05	10.65	24.3	74	PASSED
7864.827	49.52	299.192	38.8	10.72	24.5	74	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
3001.5	25.93	19.781	27.35	-1.42	28.1	54	PASSED
3921.8	26.69	21.592	27.1	-0.41	27.3	54	PASSED
7819.938	36.55	67.182	25.98	10.57	17.5	54	PASSED
7828.159	36.53	67.042	25.93	10.6	17.5	54	PASSED
7840.9	36.53	67.058	25.93	10.6	17.5	54	PASSED

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7855.207	36.54	67.112	25.9	10.65	17.5	54	PASSED
7864.827	36.55	67.212	25.83	10.72	17.5	54	PASSED

RX mode, channel 810 / 1989.8 MHz

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
3981.3	40.9	110.943	41.11	-0.21	33.1	74	PASSED
7961.8	49.34	293.022	38.3	11.04	24.7	74	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
3981.3	26.9	22.141	27.11	-0.21	27.1	54	PASSED
7961.8	36.72	68.525	25.68	11.04	17.3	54	PASSED

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Beijing Economic and
Technological Development Area
No.5 Donghuan Zhonglu
Beijing
PRC China 100176
Tel. +86 10 8711 8888
Fax. +86 10 8711 4550

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
-	RF Emission Software	EMC32 Test Software	R&S	22/24/27, 15C, 15B
BJPCHW0020	DC Power supply	Hp6632B	HP	22/24/27, 15C
BJPCPT0040	Receiver	ESCS30	R&S	15C,15B
BJPCPT0069	LISN 50 µH	ESH3-Z5	R&S	15C,15B
BJPCTC0323	Signal Generator	SMR 27	R&S	22/24/27, 15C, 15B
BJPCPT0073	Signal Generator	SMR 20	R&S	22/24/27, 15C, 15B
BJPCPT0191	Pulse Limiter	ESH3-Z2	R&S	15C,15B
BJPCPT0208	UPS	PULSAR RX10	Merlin gerin	15C.15B
BJPCTC0001	DIGITAL CAMERA	PC1015	CANON	15C.15R
BJPCTC0017	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
BJPCTC0062	AC Power source	6812B	Hp	15C.15B
BJPCTC0067	Bluetooth Tester	CBT	R&S	22/24/27, 15C
BJPCTC0082	Humidity and Temperature Sensor	175-H2	Testo	15B,15C
BJPCTC0088	Absolut pressure meter	testo 511	Testo	22/24/27, 15B,15C
BJPCTC0089	Tempreture Test chamber	VT4002	Votsch industrietechnik	22/24/27, 15C
BJPCTC0090	FSP spectrum analyzer	FSP30	R&S	22/24/27, 15C
BJPCTC0094	GPIB-RS232 convertor	GPIB-RS232	NI	22/24/27, 15C
BJPCTC0112	Power Splitter	11667B	Agilent	22/24/27, 15C
BJPCTC0115	Communication Tester	CMU200	R&S	22/24/27, 15B, 15C
BJPCTC0127	AC Power source	SOYI-500VA	SOYI	15B 15C
BJPCTC0128	Communication antenna	JXTXLB-10180	A-INFOMW	22/24/27 15B 15C
BJPCTC0129	Communication antenna	JXTXLB-10180	A-INFOMW	22/24/27 15B 15C
BJPCTC0131	Communication tester	CMW500	R&S	22/24/27 15B 15C
BJPCTC0136	Communication antenna	JXTXLB-880-NF	A-INFOMW	15B 15C
BJPCTC0306	Power Splitter	11667B	Agilent	22/24/27, 15C
BJPCTC0305	GPIB converter	GPIB-RS232	NI	22/24/27, 15C
BJPCTC0304	Spectrum Analyser	FSV30	R&S	22/24/27, 15C
BJPCTC0309	GPIB-RS232 convertor	RS232	NI	22/24/27, 15C
BJPCTC0307	Dual channel battery/charger simulator	2306	KEITHLEY	22/24/27, 15C
BJPCTC0308	Dual channel battery/charger simulator	2306	KEITHLEY	22/24/27, 15C
BJPCHW0571	Signal Generator 20GHz	MG3692B	Anritsu	22/24/27, 15C
BJBDATC0169	Tempreture Test chamber	VT4002	Votsch	22/24/27, 15C

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	15C, 15B
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	15C, 15B
-	RF Emission Software	EMC32 Test Software	R&S	22/24/27, 15C, 15B
BJPCPT0072	Receiver	ESI B26	R&S	22/24/27, 15C, 15B
BJPCPT0150	High Pass Filter	WHKS1200-10SS	Wainwright	22/24/27, 15C, 15B
BJPCPT0151	Band Reject Filter	WRCD1880/2000-0.2/40-5SSK	Wainwright	24, 15B
BJPCPT0154	Band Reject Filter	WRCT2402/2480-2400/2483.5-30-20SS	Wainwright	15C, 15B
BJPCPT0166	Antenna	VUBA 9117	Swarzbeck	22/24/27
BJPCPT0208	UPS	PULSAR RX10	Merlin gerin	15C.15B
BJPCTC0001	DIGITAL CAMERA	PC1015	CANON	15C.15R
BJPCTC0007	Antenna	HL562	R&S	22/24/27, 15C, 15B
BJPCTC0029	Antenna	HF906	R&S	22/24/27, 15C, 15B

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Technological Development Area
No.5 Donghuan Zhonglu
Beijing
PRC China 100176
Tel. +86 10 8711 8888
Fax. +86 10 8711 4550

Eq. No	Equipment	Type	Manufacturer	Used in
BJPCTC0034	Band Reject Filter	WRCT 800/880-0.2/40-5SSK	Wainwright	22, 15B
BJPCTC0049	Preamplifier	Blma 0118-1A-Bt	Bonn	22/24/27, 15C, 15B
BJPCTC0055	Communication Tester	CMU200	R&S	22/24/27,15C,15B
BJPCTC0058	Bluetooth Tester	CBT	R&S	15C, 15B
BJPCTC0062	AC Power source	6812B	Hp	15C.15B
BJPCTC0064	Band Reject Filter	WRCG1877/1883-1870/1890-40/6SS	Wainwright	24, 15B
BJPCTC0071	Multi-Device Controller	2090	EMCO	22/24/27, 15C, 15B
BJPCTC0072	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	ETS	22/24/27, 15C, 15B
BJPCTC0073	MAST	Model-TR/POL	ETS	22/24/27, 15C, 15B
BJPCTC0074	MAST	Model 2070-2	ETS	22/24/27, 15C, 15B
BJPCTC0075	Turntable	Model 2188	ETS-EMCO	22/24/27, 15C, 15B
BJPCTC0081	Humidity and Temperature Sensor	175-H2	Testo	15B, 15C
BJPCTC0088	Absolut pressure meter	testo 511	Testo	22/24/27, 15B,15C
BJPCTC0113	Receiver	ESI B26	R&S	22/24/27, 15B, 15C
BJPCTC0115	Communication Tester	CMU200	R&S	22/24/27, 15B, 15C
BJPCTC0124	Attenuator	SA18N200W-40	Fairview Microwave	-
BJPCTC0125	Loop Antenna	HFH2-Z2	R&S	15C
BJPCTC0126	Tripod	FHU-Z	R&S	15C
BJPCTC0128	Communication antenna	JXTXLB-10180	A-INFOMW	22/24/27 15B 15C
BJPCTC0129	Communication antenna	JXTXLB-10180	A-INFOMW	22/24/27 15B 15C
BJPCTC0131	Communication tester	CMW500	R&S	22/24/27 15B 15C
BJPCTC0133	Open Swith and contril unit	OSP 150	R&S	15B,15C
BJPCTC0134	Open Swith and contril unit	OSP 150	R&S	15B,15C
BJPCTC0135	Open Swith and contril unit	OSP 130	R&S	15B,15C
BJPCTC0136	Communication antenna	JXTXLB-880-NF	A-INFOMW	15B 15C
BJPCTC0171	Broad-band Horn Antenna	BBHA9120 D	SCHWARZBECK MESS - ELEKTRONIK	22/24/27, 15C, 15B
BJPCTC0310	Horn Antenna	QSH20SMA	Q-par	22/24/27, 15C, 15B
BJPCTC0311	Horn Antenna	QSH18SMA	Q-par	22/24/27, 15C, 15B
BJPCTC0312	Relay Switch Unit	-	-	22/24/27, 15C, 15B
BJPCTC0313	High Pass Filter	WHKX1.0/15G-12SS	Wainwright	22/24/27, 15C, 15B
BJPCTC0314	High Pass Filter	WHKX8.0/18G-88SS	Wainwright	22/24/27, 15C, 15B
BJPCTC0315	High Pass Filter	WHKX3.0/18G-12SS	Wainwright	22/24/27, 15C, 15B
BJPCTC0316	Preamplifier	AMT-5F-18002550-25-108	-	22/24/27, 15C, 15B
BJPCTC0317	Preamplifier	AMF-6D-02001800-29-20P	-	22/24/27, 15C, 15B
BJPCTC0318	Preamplifier	AFS42-00101500-25-10P-42	-	22/24/27, 15C, 15B
BJPCTC0324	Preamplifier	AFS4-00100300-20-23P-6	Miteq	22/24/27, 15C, 15B
BJPCTC0329	Relay Switch Unit	-	-	22/24/27, 15C, 15B

TCC Nokia Beijing Laboratory
Beijing Economic and
Technological Development Area
No.5 Donghuan Zhonglu
Beijing
PRC China 100176
Tel. +86 10 8711 8888
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