FCC Part 15C Compliance Test Report

Test Report no.:	Salo_FCC_0917_17.doc	**Date of Report:**	23-Apr-2009
Number of pages:	14	**Customer's Contact person:**	Futoshi Kimura
Testing laboratory:	TCC Nokia Tampere Laboratory P.O. Box 68 Sinitaival 5 FIN-33720 TAMPERE, FINLAND Tel. +358 (0) 7180 46800 Fax. +358 (0) 7180 46880	**Customer:**	Nokia Corporation Arco Tower Shimomeguro 1-8-1 Meguro-ku TOKYO 153-0064 JAPAN Tel. +81 3 5759 7001 Fax. +81 3 5740 6858
FCC listing no.: **IC recognition no.:**	94436 3608		
Tested devices/ accessories:	**Phone RM-505 / Battery BP-4L, AC charger AC-10E**		
FCC ID:	QVVRM-507	**IC:**	661AE-RM507
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), Public Notice DA 00-705, DTS procedures KDB 558074, IC standards RSS-GEN (Issue 2, June 2007) and RSS-210 (Issue 7, June 2007). 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:	 Digitally signed by Anni Manninen DN: cn=Anni Manninen, c=FI, o=Nokia, ou=CertMT, email=ext-anni.manninen@nokia.com Date: 2009.04.23 15:16:55 +03'00'		

Anni Manninen, Test System Manager

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	18-Feb-2009
Testing completed	11-Mar-2009
The customer's contact person	Futoshi Kimura
Test Plan referred to	T:\Projects\\RM-505\TestPlan_RS\RS_testplan_RM-505.xls
Notes	-
Document name	T:\Projects\RM-507\EMC\Results\FCC\Salo_FCC_0917_17.doc

1.1. EUT and Accessory Information

The EUT is a 7-band (GSM850/900/1800/1900 and WCDMA Band I/II(1900)/V(850)) mobile phone with GPRS, EGPRS, Bluetooth, WLAN and FM transmitter. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-505	004401104483645	2004	-	52.50.2009.50.1	41810
Battery	BP-4L	-	-	-	-	41800
AC charger	AC-10E	-	-	-	-	41798

1.2. Summary of Test Results

FM TX:

Section in CFR 47	Section in RSS-210	Name of the test	Result
15.239(a)	A2.8	Field strength of the fundamental signal	PASSED
15.239(c)	A2.8	Spurious radiated emissions	PASSED
15.207	6.6	AC powerline conducted emissions	PASSED
15.239(a)	A2.8	26 dB bandwidth	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 Tampere Laboratory.

"*The test results of QVVRM-507 are re-used for certification of the QVVRM-505. The table above indicates the results, which will be re-used.*"

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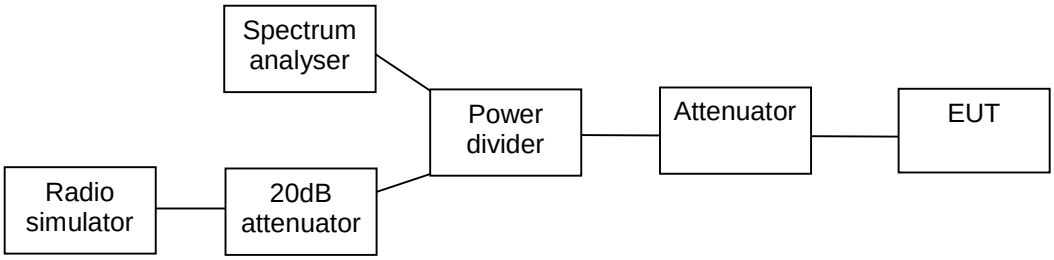
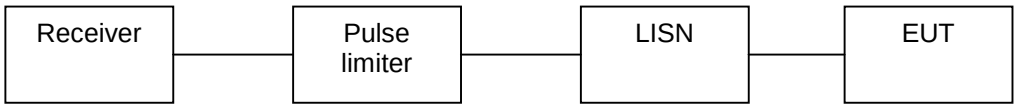
2. Test setups

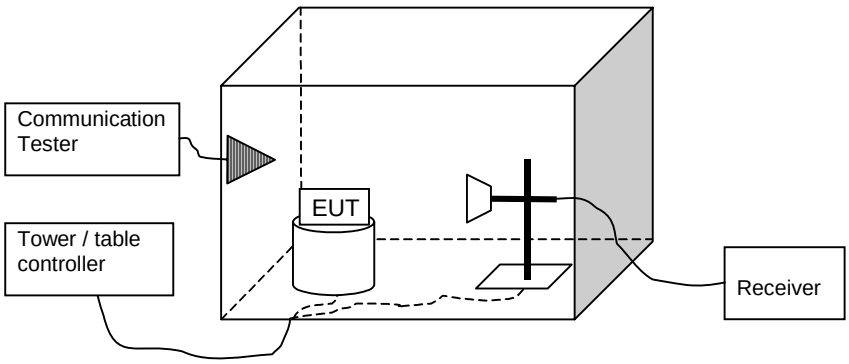
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Radiated test setup



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3. Field strength of the fundamental signal

(FCC §15.239(a), RSS-210 A2.8)

EUT with DUT number	RM-505 DUT 41810
Accessories with DUT numbers	BP-4L DUT 41800, AC-10E DUT 41798
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Slide open, FM TX modulated with music
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	25 / 46 / 99.9
Date of measurements	10-Mar-2009
Measured by	Jari Jantunen

3.1. Test method and limit

The measurement is made according to ANSI C63.4 and IC standard RSS-210.

Limits for field strength of the fundamental signal measurements (3 m measurement distance)

Limit [µV/m]	Limit [dBµV/m]	Detector
250	48	Average
2500	68	Peak

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3.2. FM TX Test results

Peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
88.100000	43.80	154.88	79.50	-35.7	HORIZONTAL	PASSED
98.000000	38.00	79.43	73.50	-35.5	HORIZONTAL	PASSED
107.900000	26.90	22.13	61.80	-34.9	VERTICAL	PASSED

Average (RBW: 120 kHz, VBW: 300 kHz)

Channel / f_C [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
Low / 88.1	39.80	97.72	75.50	-35.7	HORIZONTAL	PASSED
Middle / 98.0	35.20	57.54	70.70	-35.5	HORIZONTAL	PASSED
High / 107.9	21.70	12.16	56.60	-34.9	VERTICAL	PASSED

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4. Spurious radiated emissions

(FCC §15.239(c), RSS-210 A2.8)

EUT with DUT number	RM-505 DUT 41810
Accessories with DUT numbers	BP-4L DUT 41800, AC-10E DUT 41798
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Slide open, FM TX modulated with music
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	25 / 46 / 99.9
Date of measurements	10-Mar-2009
Measured by	Jari Jantunen

4.1. Test method and limit

The measurement is made according to ANSI C63.4 and IC standard RSS-210 as follows:

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:

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

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

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Limits for spurious radiated emissions measurements (3 m measurement distance)

Frequency range [MHz[	Limit [µV/m]	Limit [dBµV/m]	Detector
30 – 88	100	40	Quasi peak
88 – 216	150	43.5	Quasi peak
216 – 960	200	46	Quasi peak
960 – 1000	500	54	Quasi peak
1000 – 1100	500	54	Average
1000 – 1100	5000	74	Peak

Spurious radiated emissions shall not exceed the field strength of the fundamental signal at any frequencies.

4.2. FM TX Test results

Low channel / 88.1 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
30.000000	29.90	31.26	55.40	-25.5	VERTICAL	PASSED
30.659920	28.80	27.54	54.60	-25.8	VERTICAL	PASSED
52.452445	28.80	27.54	66.40	-37.6	HORIZONTAL	PASSED
52.534429	27.70	24.27	65.30	-37.6	VERTICAL	PASSED
52.782405	28.00	25.12	65.80	-37.8	VERTICAL	PASSED

Middle channel / 98.0 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
30.000000	24.30	16.41	49.80	-25.5	VERTICAL	PASSED
30.659920	23.00	14.13	48.80	-25.8	VERTICAL	PASSED
52.502445	21.20	11.48	58.80	-37.6	HORIZONTAL	PASSED
52.834429	20.20	10.23	58.10	-37.9	VERTICAL	PASSED
52.982405	27.60	23.99	65.60	-38.0	VERTICAL	PASSED

High channel / 107.9 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
30.000000	25.40	18.62	50.90	-25.5	VERTICAL	PASSED
30.659920	26.50	21.13	52.30	-25.8	VERTICAL	PASSED
52.652445	21.00	11.22	58.70	-37.7	HORIZONTAL	PASSED
52.984429	20.90	11.09	58.90	-38.0	VERTICAL	PASSED
53.382405	19.60	9.55	57.90	-38.3	VERTICAL	PASSED

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5. AC powerline conducted emissions

(FCC §15.207, RSS-210 6.6)

EUT with DUT number	RM-505 DUT 41810
Accessories with DUT numbers	BP-4L DUT 41800, AC-10E DUT 41798
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	FM TX modulated with music
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 45 / 101.3
Date of measurements	24-Feb-2009
Measured by	Jari Jantunen

5.1. Test method and limit

The measurement is made according to ANSI C63.4 and IC standard RSS-GEN 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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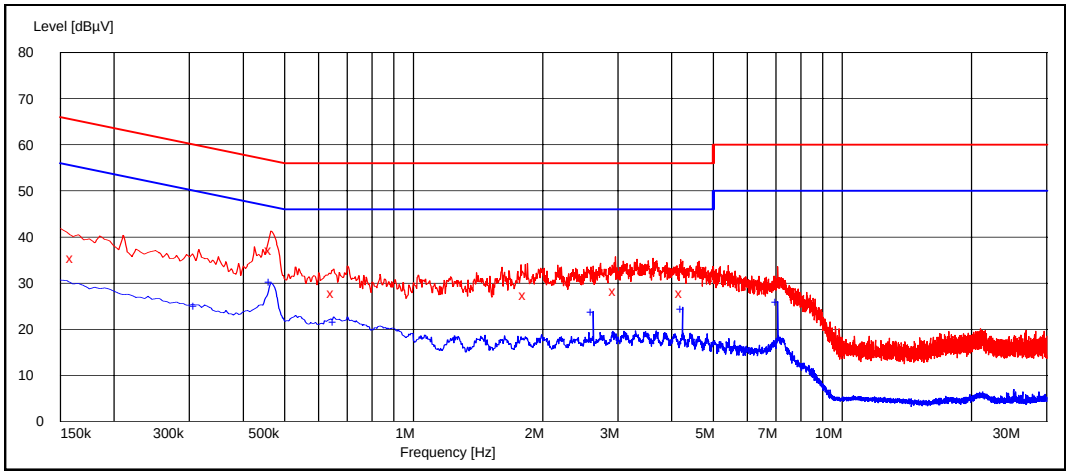
5.2. FM TX Test results

Middle channel / 98.0 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.160000	35.50	L1	PASSED
0.465000	37.10	L1	PASSED
0.650000	27.80	L1	PASSED
1.820000	27.50	L1	PASSED
2.955000	28.20	L1	PASSED
4.215000	27.80	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.310000	25.10	L1	PASSED
0.465000	30.30	L1	PASSED
0.655000	21.50	L1	PASSED
2.625000	23.80	L1	PASSED
4.240000	24.50	L1	PASSED
7.065000	25.90	L1	PASSED

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6. 26 dB bandwidth

(FCC §15.239(a), RSS-210 A2.8)

EUT with DUT number	RM-505 DUT 41810
Accessories with DUT numbers	BP-4L DUT 41800, AC-10E DUT 41798
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Slide open, FM TX modulated with music
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 47 / 101.0
Date of measurements	11-Mar-2009
Measured by	Jari Jantunen

6.1. Test method and limit

The measurement is made according to ANSI C63.4 and IC standard RSS-210.

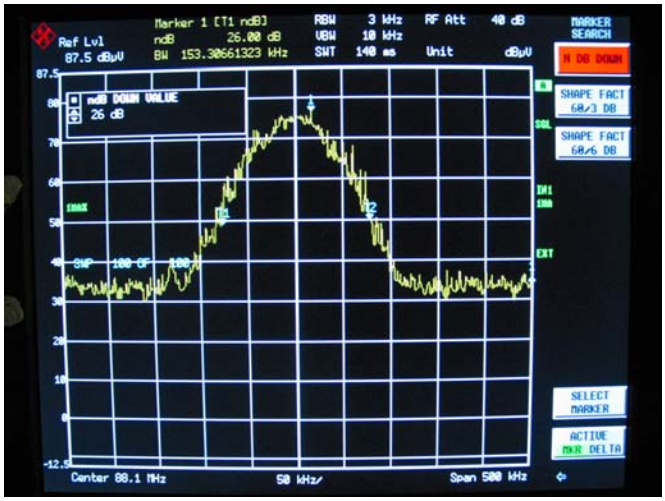
Limits for 26 dB bandwidth measurements

Limit [kHz]
≤ 200

6.2. FM TX Test results

Channel / f_C [MHz]	26 dB bandwidth [kHz]	Result
Low / 88.1	153.3	PASSED
Middle / 98.0	143.3	PASSED
High / 107.9	147.3	PASSED

Low channel / 88.1 MHz



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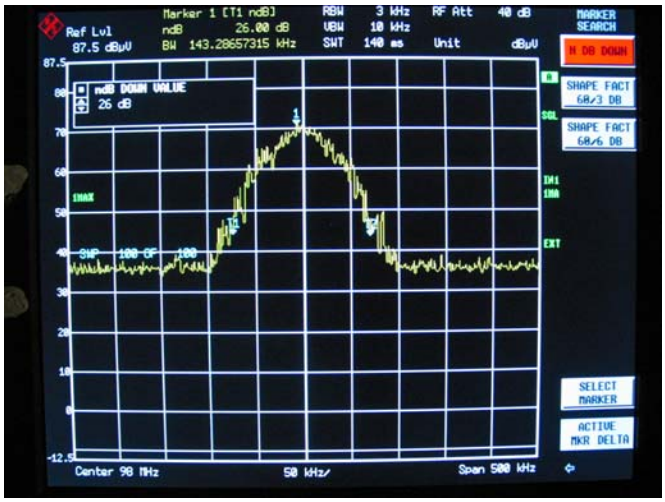
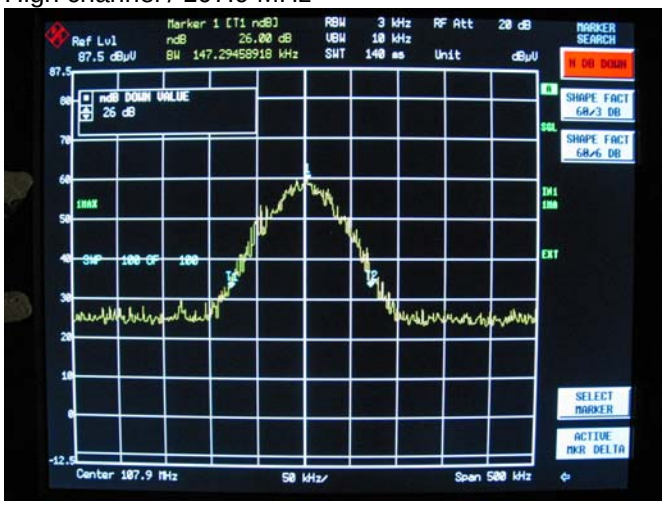
Middle channel / 98.0 MHz



High channel / 107.9 MHz



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7. Test Equipment

7.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30597	Power splitter	11667A	Agilent	22/24/27, 15C
TM37499	Power splitter	11667A	Agilent	22/24/27, 15C
TM38111	Multimeter	34401A	Agilent	22/24/27, 15C
TM38112	DC power supply	6632A	Agilent	22/24/27, 15C
TM22901	Attenuator	8496A	Agilent	22/24/27, 15C
TM30636	Artificial mains net	L2-16	PMM	15C, 15B
TM37678	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM37773	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM30600	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum analyzer	FSU	R&S	22/24/27, 15C
TM22835	Multimeter	87	Fluke	15C, 15B
TM37500	Microwave switch system	7116-MSW	Keithley	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Transformatic	22/24/27, 15C, 15B
	Temperature chamber	VT4002	Vötsch	22/24/27, 15C
2058	EMI Test receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B

7.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	22/24/27, 15C, 15B
TM38845	EMI receiver	ESI 40	R&S	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	22/24/27, 15C, 15B
TM37516	Biconilog antenna	HL562	R&S	22/24/27, 15C, 15B
TM26496	Double ridged waveguide antenna	3115	EMCO	22/24/27, 15C, 15B
TM39158	Horn antenna	3116	EMCO	22/24/27, 15C, 15B
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	22/24/27, 15C, 15B
TM37501	Dipole antenna	3125-870	EMCO	22/24/27
TM37502	Dipole antenna	3125-1880	EMCO	22/24/27
TM37773	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM38631	Signal generator	83640L	Agilent	22/24/27, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24/27, 15C, 15B
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24/27
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24/27
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Mast/Turntable controller	HD-100	Deisel	22/24/27, 15C, 15B
TM26500	Turntable	DS412	Deisel	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	EMCO	22/24/27, 15C, 15B
TM38843	Antenna mast	2075	EMCO	22/24/27, 15C, 15B
TM38114	DC power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
TM37678	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Transformatic	22/24/27, 15C, 15B
TM23892	Yaesu controller	G-1000SDX	Yaesu	22/24/27, 15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B

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Eq. No	Equipment	Type	Manufacturer	Used in
2002	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B

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