

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC_Cellular_RM-1073_22	Date of Report:	11-Feb-2015
Number of pages:	27	Customer's Contact person:	Juha Paukku
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/accessories:	Phone RM-1073 / Battery BV-T5C / Charger AC-20 / Headset WH-108 / Dummy Battery SD-131		
FCC ID:	PYARM-1073	IC:	661X-RM1073
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Parts 22/24/27, TIA-603-C-2004 and IC standards, RSS-GEN (Issue 4, November 2014), RSS-133 (Issue 6, January 2013), RSS-132 (Issue 3, January 2013), RSS-199 (Issue 2, October 2014). 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 Microsoft.		
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, System Manager, EMC

1. Summary for FCC Part 22/24/27 Compliance Test Report

Date of receipt	17-Nov-2014
Testing completed	03-Dec-2014
The customer's contact person	Juha Paukku
Test Plan referred to	T:\Projects\RM-1072\TestPlan\RS_testplan_RM-1072.xlsm
Notes	-
Document name	T:\Projects\RM-1072\EMC\FCC_Cellular_RM-1072_01.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	M V	SW	DUT
Phone	RM-1072	004402740483304	1500	-	02148.00000.14431.29000	43231
Dummy Battery	SD-131	-	V.1	-	-	43233
Battery	BV-T5C	-	LG HW3.0	-	-	43232
AC charger	AC-20E	4868673411351126865;0675628	-	-	-	43140
Headset	WH-108	4163271	-	-	-	43213
Phone	RM-1072	004402740484500	1500	-	02148.00000.14431.29000	43234
Battery	BV-T5C	-	LG HW3.0	-	-	43235
AC charger	AC-20E	4090494156670711801;0675628	-	-	-	43229
Headset	WH-108	4235VFA	-	-	-	43230
Phone	RM-1072	004402740484534	1500	-	02148.00000.14431.29000	43238

1.2. Summary of Test Results

GSM 1900:

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	NP
§24.232(b)	6.4	Radiated RF output power	NP
N/A	6.4	Peak to average power ratio	NP
§2.1049(h)	6.6	99 % occupied bandwidth	PASSED
§24.238(a)	6.5	Band edge compliance	NP
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	NP
§24.238(a), §2.1053	6.5	Spurious radiated emissions	NP
§2.1055(a)	6.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	6.3	Frequency stability, voltage variation	PASSED

GSM 850:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	NP
§22.913(a)	4.4	Radiated RF output power	NP
N/A	5.4	Peak to average power ratio	NP
§2.1049(h)	6.6	99 % occupied bandwidth	PASSED
§22.917(a)	4.5	Band edge compliance	NP
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	NP
§2.1055(a)	4.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	4.3	Frequency stability, voltage variation	PASSED

WCDMA5:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	NP
§22.913(a)	4.4	Radiated RF output power	NP
N/A	5.4	Peak to average power ratio	NP
§2.1049(h)	6.6	99 % occupied bandwidth	PASSED
§22.917(a)	4.5	Band edge compliance	NP
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	NP
§2.1055(a)	4.3	Frequency stability, temperature variation	NP
§2.1055(d)	4.3	Frequency stability, voltage variation	NP

LTE7:

Section in CFR 47	Section in RSS-GEN or RSS-199	Name of the test	Result
§2.1046(a)	4.4	Conducted RF output power	NP
§27.50(h)(2)	4.4	Radiated RF output power	NP
N/A	N/A	Peak to average power ratio	NP
§2.1049(h)	6.6	99 % occupied bandwidth	PASSED
§27.53(l)	4.5(b)	Band edge compliance	NP
§2.1051	4.5(b)	Spurious emissions at antenna terminals	NP
§27.53(l), §2.1053	4.5(b)	Spurious radiated emissions	NP
§27.54	4.3	Frequency stability, temperature variation	PASSED
§27.54	4.3	Frequency stability, voltage variation	PASSED

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 Microsoft Laboratory.

The test results of PYARM-1072 are re-used for certification of the PYARM-1073. The table above indicates the results, which will be re-used.

CONTENTS

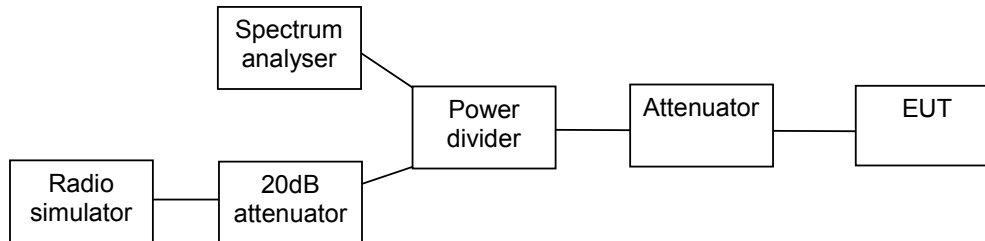
1. Summary for FCC Part 22/24/27 Compliance Test Report	2
1.1. EUT and Accessory Information.....	2
1.2. Summary of Test Results.....	3
2. 99% occupied bandwidth, Antenna 1 (FCC §2.1049(h), RSS-GEN 4.6.1)	7
2.1. Test Setup.....	7
2.2. Test method and limit.....	7
2.3. GSM 1900 Test results	8
2.4. GSM 850 Test results	9
2.5. WCDMA 850 Test results.....	11
3. 99% occupied bandwidth, Antenna 2 (FCC §2.1049(h), RSS-GEN 4.6.1)	12
3.1. Test Setup.....	12
3.2. Test method and limit.....	12
3.3. GSM 1900 Test results	13
3.4. GSM 850 Test results	14
3.5. WCDMA 850 Test results.....	16
4. 99 % occupied bandwidth, LTE 7 (FCC §2.1049(h), RSS-199 4.6.1)	17
4.1. Test Setup.....	17
4.2. Test method and limit.....	17
4.3. LTE7 Test results	18
5. Frequency stability, temperature variation, Antenna 1 (FCC §2.1055(a), RSS-132 4.3, RSS-133 6.3, RSS-130 4.3 (a))	23
5.1. Test Setup.....	23
5.2. Test method and limit.....	23
5.3. GSM 1900 Test results	24
5.4. GSM 850 Test results	24
5.5. LTE7 Test results.....	24
6. Frequency stability, voltage variation (FCC §2.1055(d), RSS-132 4.3, RSS-133 6.3, RSS-130 4.3 (a))	25
6.1. Test Setup.....	25
6.2. Test method and limit.....	25
6.3. GSM 1900 Test results	26
6.4. GSM 850 Test results	26
6.5. LTE7 Test results	26

7. Test Equipment.....	27
7.1. Conducted measurements	27
7.2. Radiated measurements	28

2. 99% occupied bandwidth, Antenna 1 (FCC §2.1049(h), RSS-GEN 4.6.1)

EUT with DUT number	RM-1072, DUT 43231
Accessories with DUT numbers	BV-T5C DUT 43232, AC-20E DUT43140, WH-108 DUT43213
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 41 / 103.5
Date of measurements	17-Nov-2014
Measured by	Hannu Söderholm

2.1. Test Setup



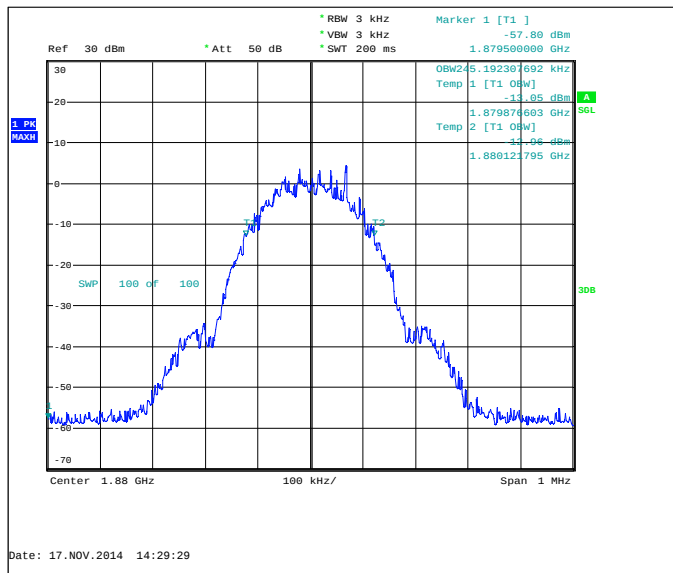
2.2. Test method and limit

The measurement is made according to FCC rules parts 22, 24 and IC standard RSS-GEN

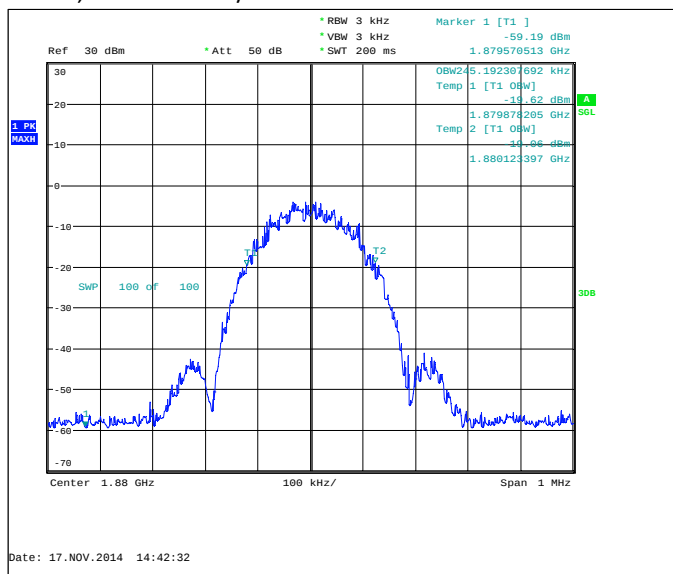
2.3. GSM 1900 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	245.2
EGPRS	245.2
GPRS	245.2

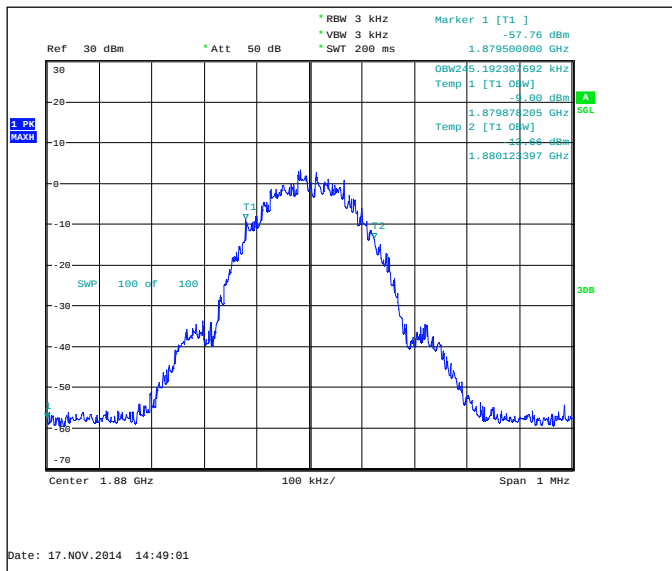
GSM, Channel 661 / 1880.0 MHz



EGPRS, Channel 661 / 1880.0 MHz



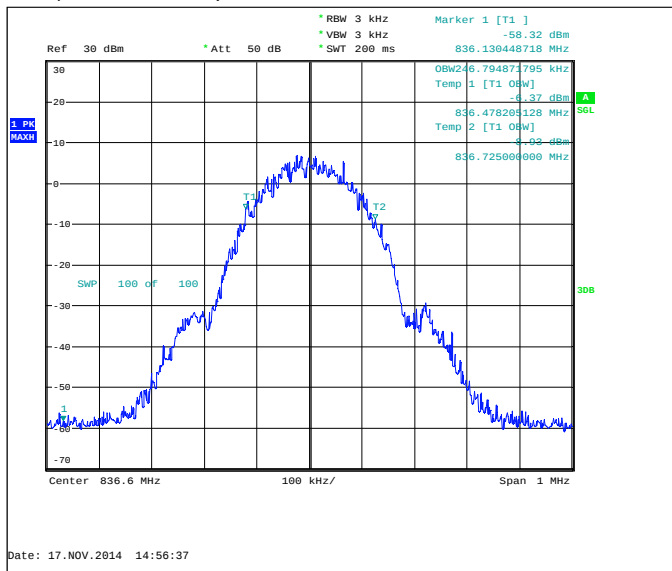
GPRS, Channel 661 / 1880.0 MHz



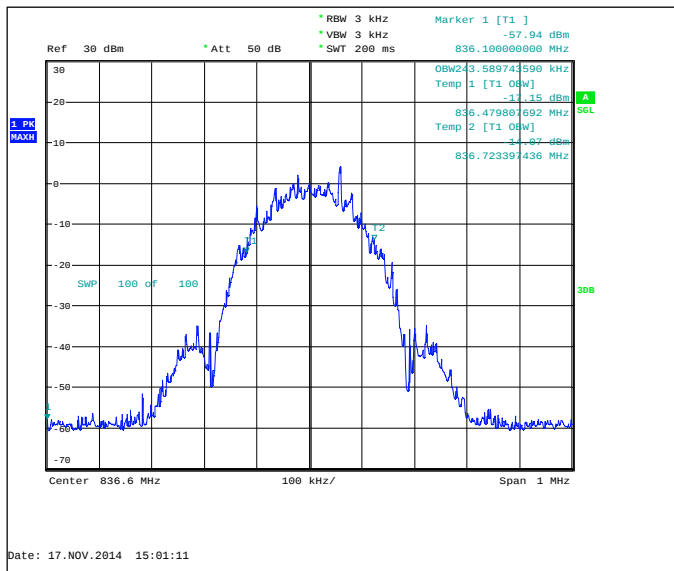
2.4. GSM 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	246.8
EGPRS	243.6
GPRS	245.2

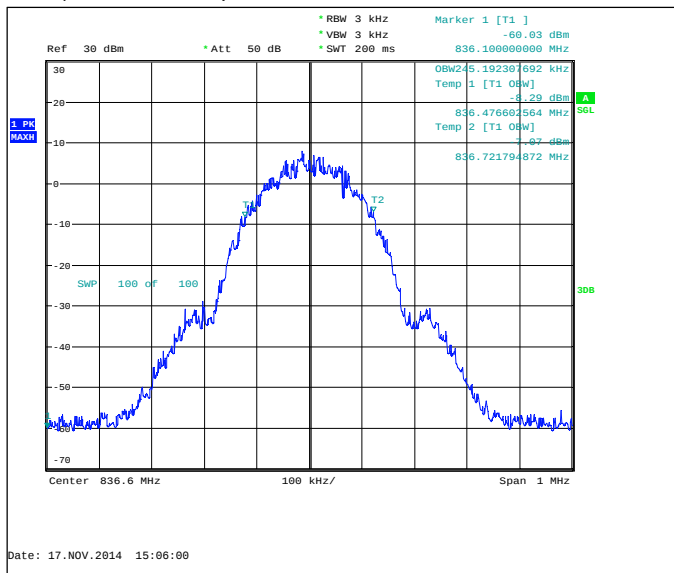
GSM, Channel 190 / 836.6 MHz



EGPRS, Channel 190 / 836.6 MHz



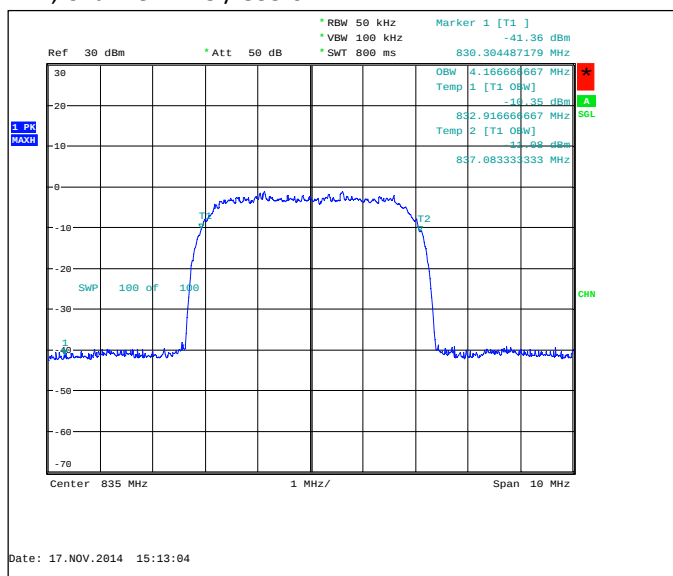
GPRS, Channel 190 / 836.6 MHz



2.5. WCDMA 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4166.7

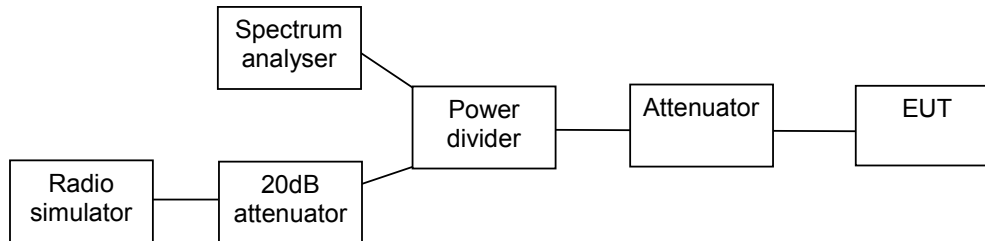
FDD, Channel 4175 / 835.0 MHz



3. 99% occupied bandwidth, Antenna 2 (FCC §2.1049(h), RSS-GEN 4.6.1)

EUT with DUT number	RM-1072, DUT 43231
Accessories with DUT numbers	BV-T5C DUT 43232, AC-20E DUT43140, WH-108 DUT43213
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 41 / 103.5
Date of measurements	17-Nov-2014
Measured by	Hannu Söderholm

3.1. Test Setup



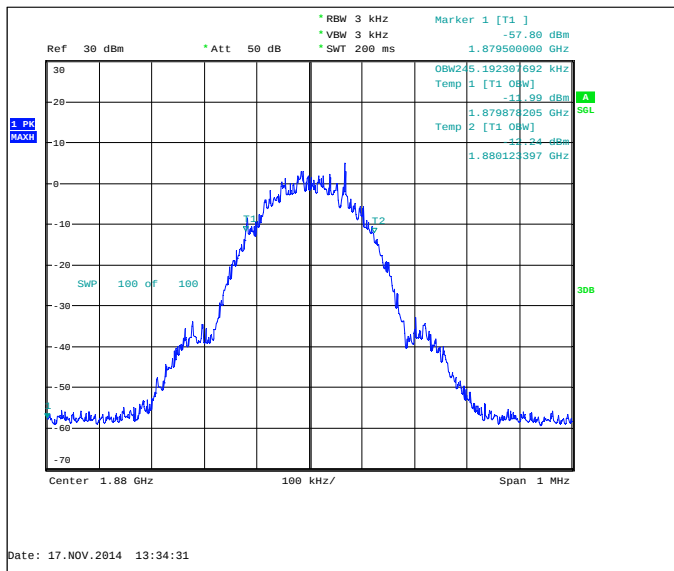
3.2. Test method and limit

The measurement is made according to FCC rules parts 22, 24 and IC standard RSS-GEN.

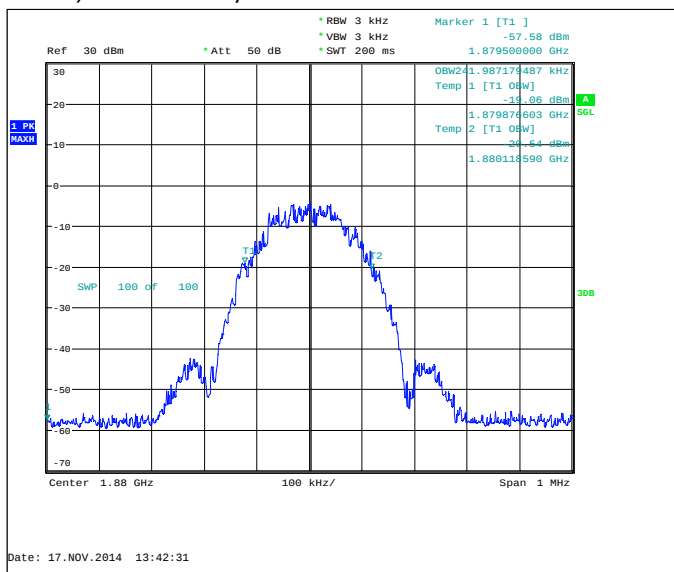
3.3. GSM 1900 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	245.2
EGPRS	242
GPRS	245.2

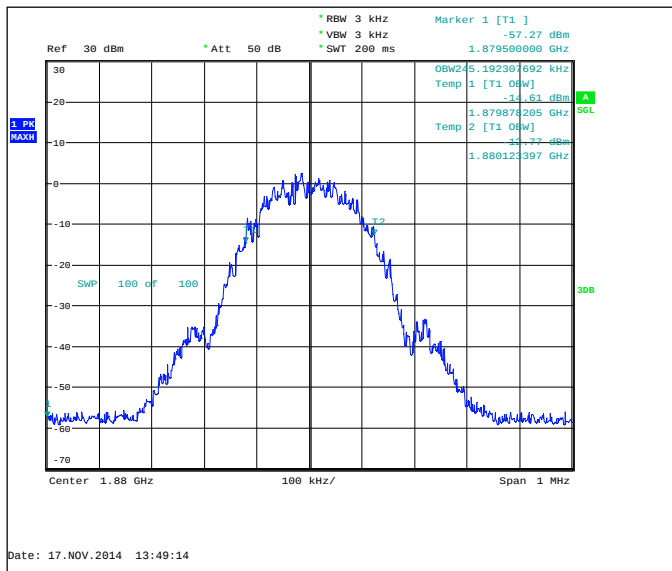
GSM, Channel 661 / 1880.0 MHz



EGPRS, Channel 661 / 1880.0 MHz



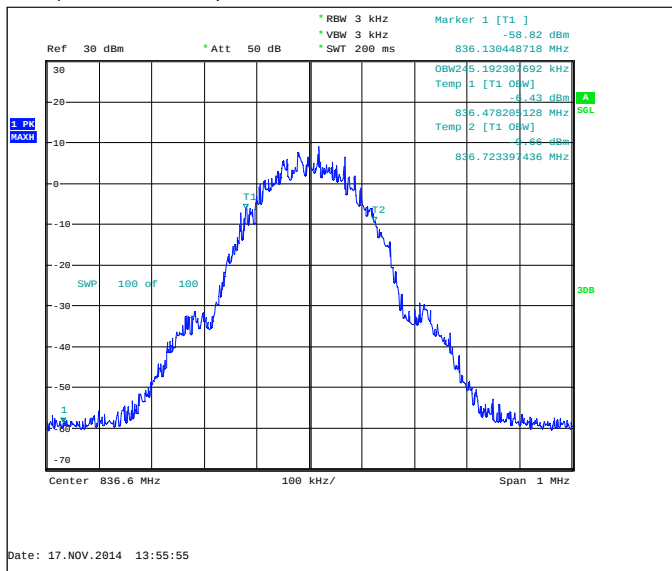
GPRS, Channel 661 / 1880.0 MHz



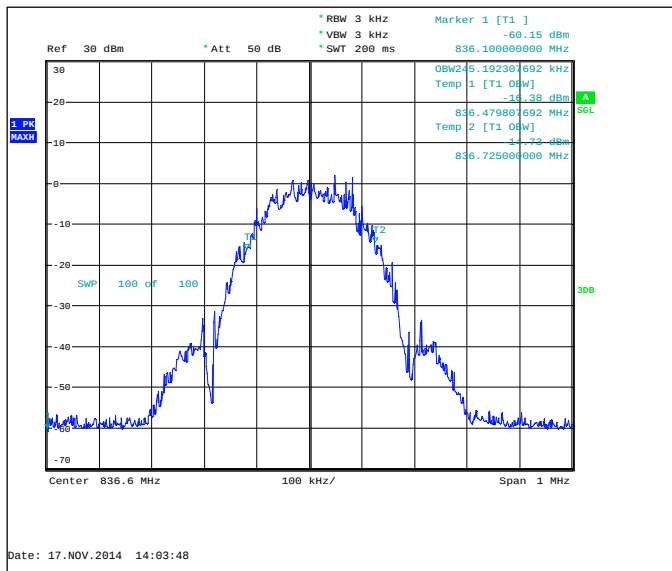
3.4. GSM 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	245.2
EGPRS	245.2
GPRS	242

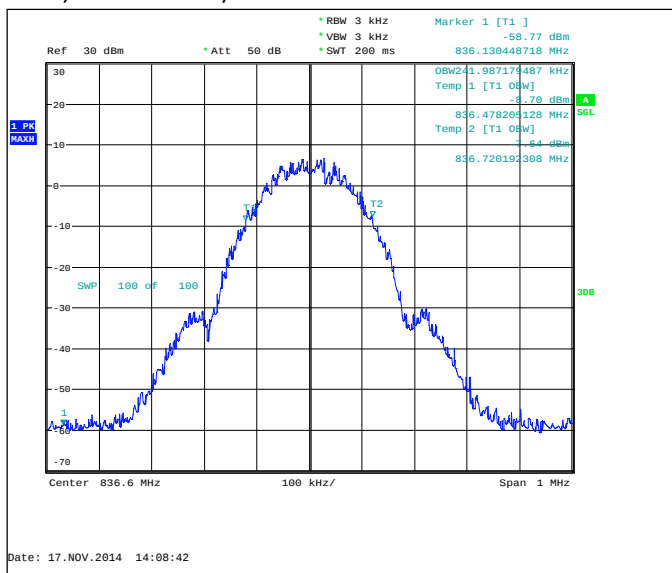
GSM, Channel 190 / 836.6 MHz



EGPRS, Channel 190 / 836.6 MHz



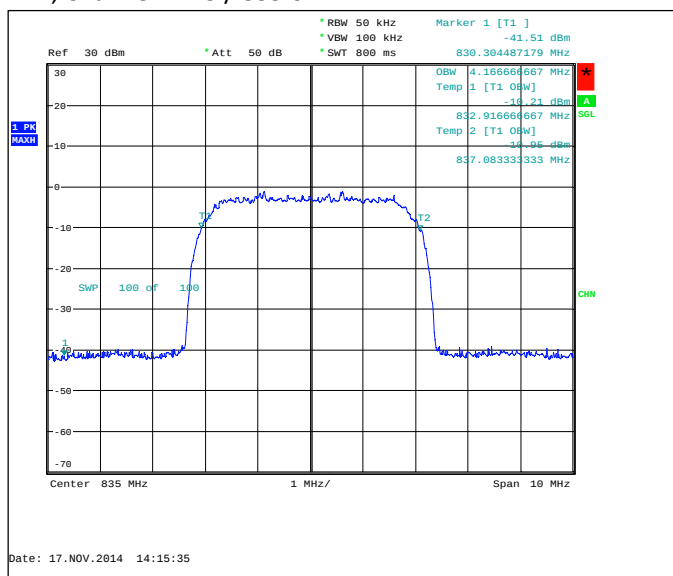
GPRS, Channel 190 / 836.6 MHz



3.5. WCDMA 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4166.7

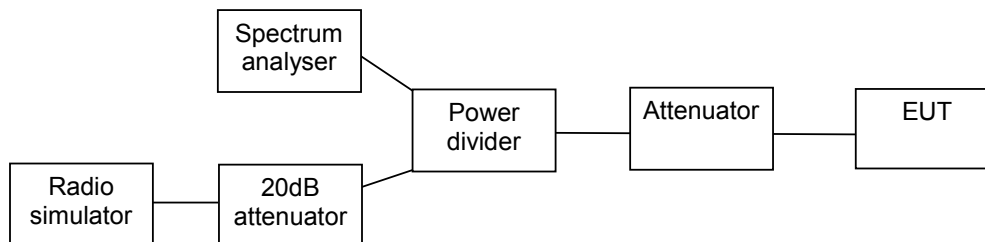
FDD, Channel 4175 / 835.0 MHz



4. 99 % occupied bandwidth, LTE 7 (FCC §2.1049(h), RSS-199 4.6.1)

EUT with DUT number	RM-1072, DUT 43231
Accessories with DUT numbers	BV-T5C DUT 43232, AC-20E DUT43140, WH-108 DUT43213
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 41 / 103.5
Date of measurements	19-Nov-2014
Measured by	Hannu Söderholm

4.1. Test Setup



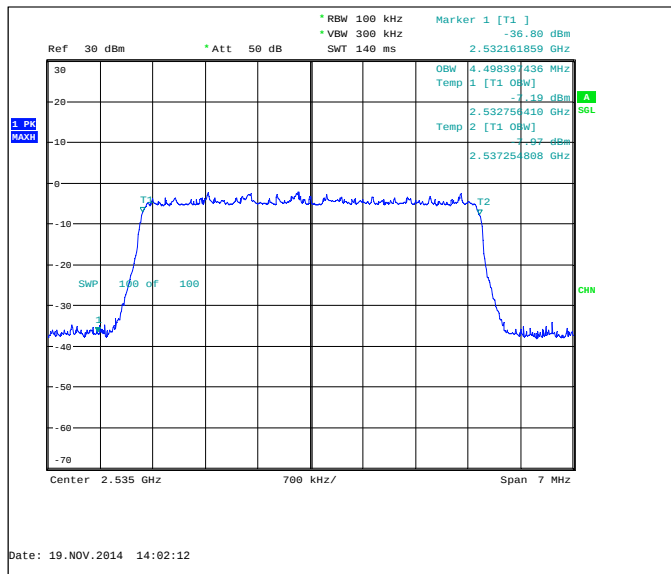
4.2. Test method and limit

The measurement is made according to applicable FCC rule parts and IC standards.

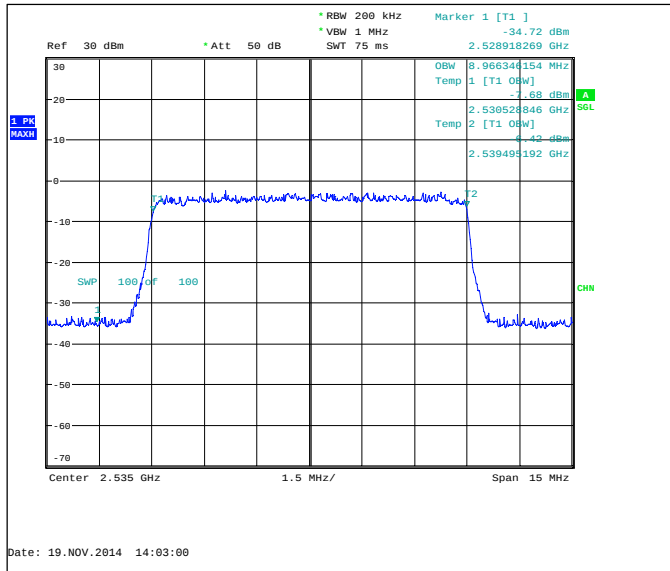
4.3. LTE7 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 5MHz, QPSK, 25 RB	4498.4
FDD, CBW 10MHz, QPSK, 50 RB	8966.3
FDD, CBW 15MHz, QPSK, 75 RB	13429.5
FDD, CBW 20MHz, QPSK, 100 RB	17868.6
FDD, CBW 5MHz, 16QAM, 25 RB	4476
FDD, CBW 10MHz, 16QAM, 50 RB	8966.3
FDD, CBW 15MHz, 16QAM, 75 RB	13397.4
FDD, CBW 20MHz, 16QAM, 100 RB	17868.6

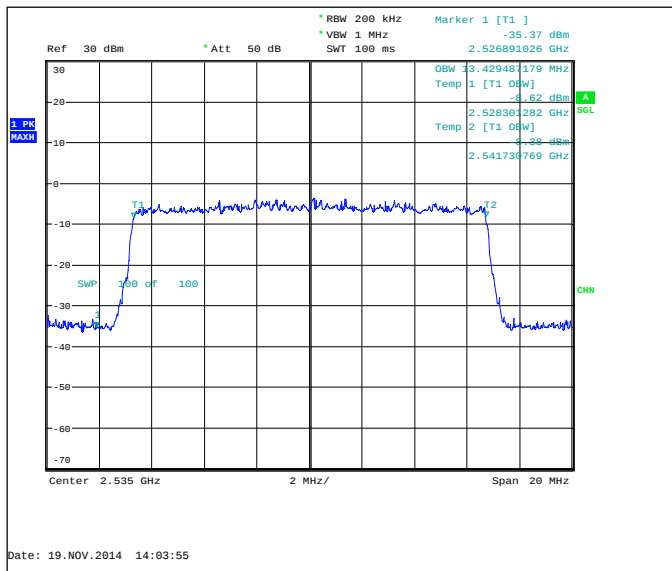
FDD, CBW 5MHz, QPSK, 25 RB, Channel 21100 / 2535.0 MHz



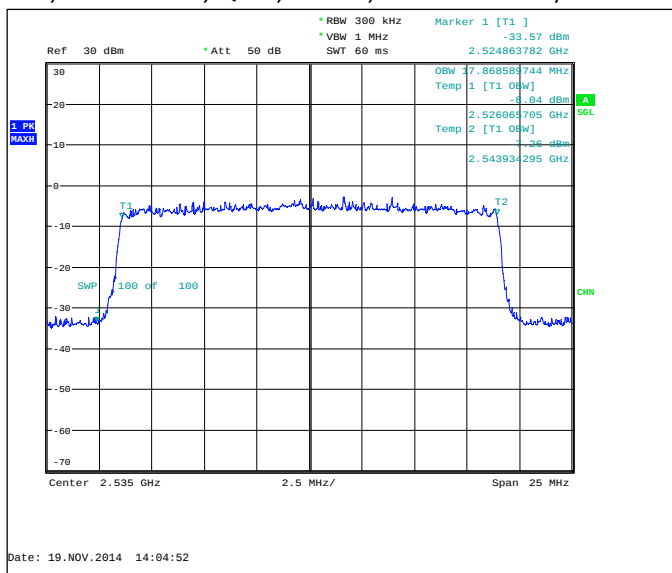
FDD, CBW 10MHz, QPSK, 50 RB, Channel 21100 / 2535.0 MHz



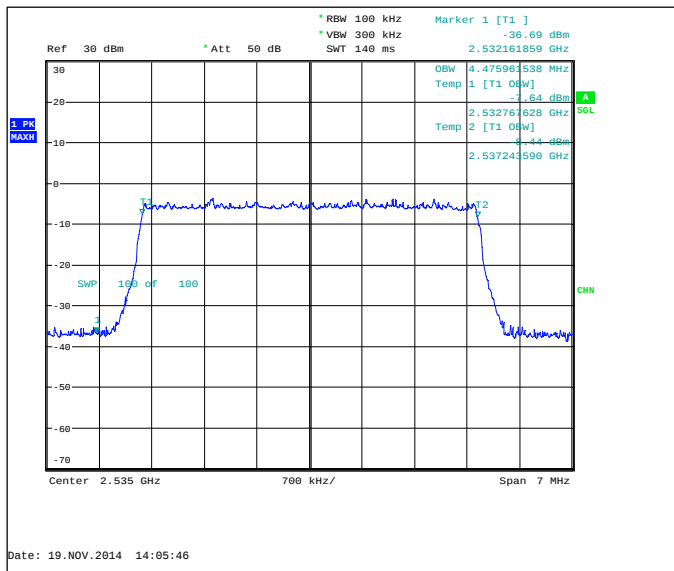
FDD, CBW 15MHz, QPSK, 75 RB, Channel 21100 / 2535.0 MHz



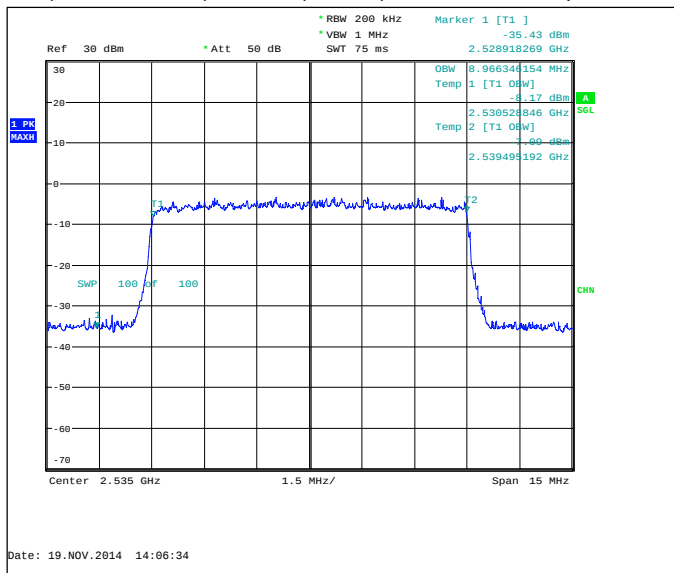
FDD, CBW 20MHz, QPSK, 100 RB, Channel 21100 / 2535.0 MHz



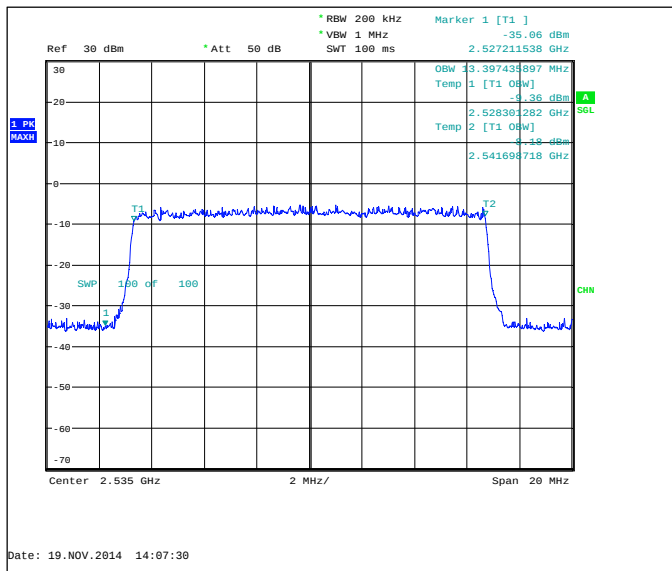
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 21100 / 2535.0 MHz



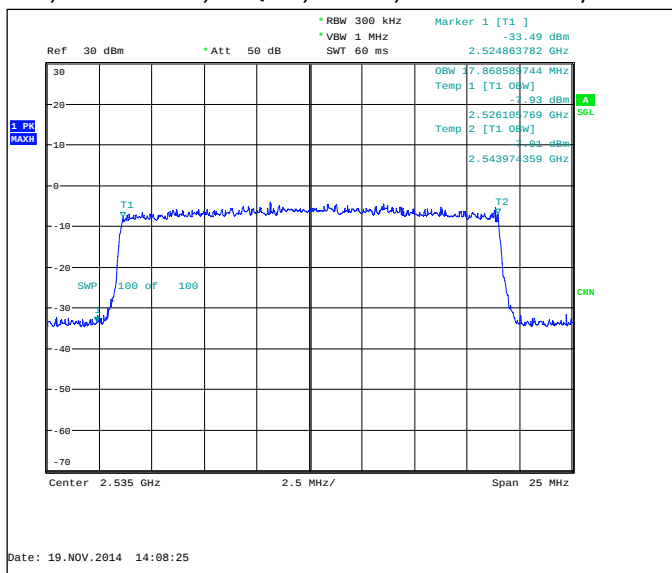
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 21100 / 2535.0 MHz



FDD, CBW 15MHz, 16QAM, 75 RB, Channel 21100 / 2535.0 MHz



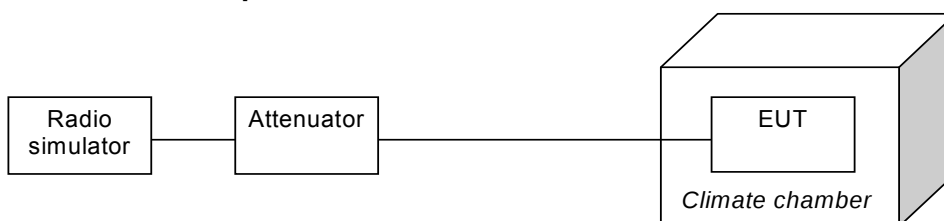
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 21100 / 2535.0 MHz



5. Frequency stability, temperature variation, Antenna 1 (FCC §2.1055(a), RSS-132 4.3, RSS-133 6.3, RSS-130 4.3 (a))

EUT with DUT number	RM-1072, DUT 43231
Accessories with DUT numbers	BV-T5C DUT 43232, AC-20E DUT43140, WH-108 DUT43213
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 41 / 103.5
Date of measurements	19-Nov-2014
Measured by	Hannu Söderholm

5.1. Test Setup



5.2. Test method and limit

The measurement is made according to FCC rules parts 22, 24 and IC standard RSS-132, RSS-133 as follows:

The climate chamber temperature is set to the maximum value and the temperature is allowed to stabilize.

The EUT is placed in the chamber.

The EUT is set in idle mode for 15 minutes.

The EUT is set to transmit.

The transmit frequency error was measured immediately.

The steps c - e were repeated for each temperature. Limits for frequency stability, temperature variation measurements

Frequency deviation [ppm]
+/- 2.5

5.3. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	46.30000	0.0246	PASSED
40	1880.00	48.56000	0.0258	PASSED
30	1880.00	44.10000	0.0235	PASSED
20	1880.00	43.91000	0.0234	PASSED
10	1880.00	46.43000	0.0247	PASSED
0	1880.00	44.81000	0.0238	PASSED
-10	1880.00	46.69000	0.0248	PASSED
-20	1880.00	44.10000	0.0235	PASSED
-30	1880.00	54.95000	0.0292	PASSED

5.4. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.60	8.39000	0.01	PASSED
40	836.60	10.14000	0.0121	PASSED
30	836.60	-0.45000	-0.0005	PASSED
20	836.60	5.62000	0.0067	PASSED
10	836.60	1.68000	0.002	PASSED
0	836.60	2.26000	0.0027	PASSED
-10	836.60	-1.74000	-0.0021	PASSED
-20	836.60	-3.16000	-0.0038	PASSED
-30	836.60	2.07000	0.0025	PASSED

5.5. LTE7 Test results

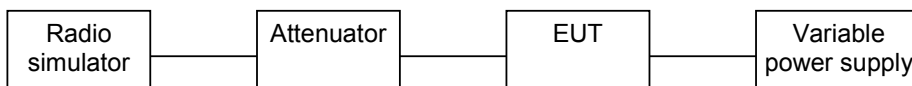
FDD, CBW 20MHz, QPSK, 100 RB, Channel 21100 / 2535.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	2535.00	4.66347	0.0018	PASSED
40	2535.00	-5.20706	-0.0021	PASSED
30	2535.00	8.19683	0.0032	PASSED
20	2535.00	-7.20978	-0.0028	PASSED
10	2535.00	0.67234	0.0003	PASSED
0	2535.00	-4.36306	-0.0017	PASSED
-10	2535.00	-7.43866	-0.0029	PASSED
-20	2535.00	9.19819	0.0036	PASSED
-30	2535.00	-1.63078	-0.0006	PASSED

6. Frequency stability, voltage variation (FCC §2.1055(d), RSS-132 4.3, RSS-133 6.3, RSS-130 4.3 (a))

EUT with DUT number	RM-1072, DUT 43231
Accessories with DUT numbers	SD-131, DUT 43233
Operation Voltage [V] / [Hz]	Lo 3.5V, Mid 3.8V, Hi 4.35V
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 41 / 103.5
Date of measurements	17-Nov-2014
Measured by	Hannu Söderholm

6.1. Test Setup



6.2. Test method and limit

The measurement is made according to FCC rules parts 22, 24 and IC standard RSS-132, RSS-133 as follows:

The EUT battery was replaced with an adjustable power supply. The frequency stability was measured at nominal voltage and at the battery cut-off point.

Limits for frequency stability, voltage variation measurements

Frequency deviation [ppm]
+/- 2.5

6.3. GSM 1900 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Nominal / 3.8	1880.00	44.88000	0.0239	PASSED
Battery cut-off point / 3.5	1880.00	47.20000	0.0251	PASSED
Max / 4.3	1880.00	51.79000	0.0275	PASSED

6.4. GSM 850 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Nominal / 3.8	836.60	7.36000	0.0088	PASSED
Battery cut-off point / 3.5	836.60	8.33000	0.01	PASSED
Max / 4.3	836.60	3.68000	0.0044	PASSED

6.5. LTE7 Test results

FDD, CBW 20MHz, QPSK, 100 RB, Channel 21100 / 2535.0 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.3	2535.00	-6.58035	-0.0026	PASSED
Battery cut-off point / 3.5	2535.00	-2.18868	-0.0009	PASSED
Nominal / 3.8	2535.00	3.27587	0.0013	PASSED

7. Test Equipment

7.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15B
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C, 15E
TM23007	Oscilloscope	TDS684B	Tektronix	15E
TM22806	Battery	BAT 20/E	Fiskars	15C, 15B
TM22805	UPS	PS 20/1.2	Fiskars	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
-	Temperature test chamber	VT 4002	Vötsch	22/24/27
2001	Bluetooth tester	CBT	R&S	15C, 15B
2009	LISN 50 µH	ENV216	R&S	15C, 15B
2010	LISN 50 µH	ENV216	R&S	15C, 15B
2012	Power splitter	11667B	Agilent	22/24/27, 15C
2013	Attenuator	8493C	Agilent	22/24/27, 15C
2014	Attenuator	8493C	Agilent	22/24/27, 15C
2019	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2020	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2021	Communication Tester	CMW500	R&S	22/24/27
2022	Communication Tester	CMU200	R&S	22/24/27
2023	Spectrum Analyzer	ESMI-RF	R&S	15B/15C
2024	Analyzer display unit	ESAI-D	R&S	15B/15C
2026	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
-	Bluetooth tester	CBT	R&S	15C, 15B

7.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15E, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15E, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15E, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15E, 15B
-	RF system panel	OSP130	R&S	22/24/27, 15C, 15E, 15B
-	Mini mast	2075-2	ETS Lindgren	22/24/27, 15C, 15B
TM38843	Mini mast	2075	Emco	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	Emco	22/24/27, 15C, 15B
TM30643	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C, 15B
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	Miteq	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	Miteq	22/24/27, 15C, 15B
TM30599	Semi anechoic chamber	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15E, 15B
TM38066	High pass filter	WHKX3.0/18G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
2028	High pass filter	WHKX 1.0/15G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
TM37545	Tunable notch filter	800.0/960.0-0.2/40-8SSK	Wainwright	22
TM26512	Tunable notch filter	WRCD1850/1910-0.2/40-10SSK	Wainwright	24
-	Band reject filter	WRCG1877/1883-1870/1890-40/6EE	Wainwright	24
-	Band reject filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
TM23892	Controller	G-1000SDX	Yaesu	22/24/27, 15C, 15E
2001	Bluetooth tester	CBT	R&S	15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27
2021	Communication Tester	CMW500	R&S	22/24/27
2025	Antenna	HFH2-Z2	R&S	15C
2026	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
2052	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C, 15B, 15E
-	Antenna	QSH18S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Bluetooth tester	CBT	R&S	15C, 15B