

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15CBT_RM-823_05.docx	Date of Report:	14-Feb-2012
Number of pages:	24	Customer's Contact person:	Sonja Länkinen
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 16620 West Bernardo Drive San Diego, CA 92127 USA Tel. +1 858 831 5000 Fax. +1 858 385 1598
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-808 / Headset WH-902, AC-Charger AC-16, Dummy Battery		
FCC ID:	QMNRM-823	IC:	-
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. 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 15C Compliance Test Report

Date of receipt	17-Oct-2011
Testing completed	21-Oct-2011
The customer's contact person	Sonja Länkinen
Test Plan referred to	T:\Projects\RM-808\TestPlan\RS_testplan_RM-808.xls
Notes	-
Document name	T:\Projects\RM-808\EMC\FCC15CBT_RM-823_05.docx

1.1. EUT and Accessory Information

The EUT is a 12-band mobile phone:

GSM850/900/1800/1900

WCDMA I/II(1900)/V(850)/VIII

WLAN/Bluetooth

The EUT is tested with maximum rated TX power, modulated with pseudo random bit sequence (PRBS9).

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-808	004402136834623	0150	-	WK39	16017
Phone	RM-808	004402136831025	0150	-	2130.0000.8 070.11390	16009
Dummy Battery	-	-	-	-	-	-
Headset	WH-902	1245B2R	-	-	-	16019
AC-Charger	AC-16	-	-	-	-	16021

1.2. Summary of Test Results

Bluetooth:

Section in CFR 47	Section in RSS-GEN or RSS-210	Name of the test	Result
15.247(b)(1)	A8(0.4(2))	Conducted peak output power	NP
15.247(d)	A8(0.5)	Band edge compliance of RF emissions	NP
15.247(d)	A8(0.5)	Spurious RF conducted emissions	PASSED
15.247(d), 15.209	A8(0.5)	Spurious radiated emissions	NP
15.207	7.2.2	AC powerline conducted emissions	PASSED
15.247(a)(1)	A8(0.1(1))	20dB(bandwidth)	PASSED
15.247(a)(1)	A8(0.1(2))	Carrier frequency separation	PASSED
15.247(a)(1)(iii)	A8(0.1(4))	Number of hopping frequencies	PASSED
15.247(a)(1)(iii)	A8(0.1(4))	Time of occupancy	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 Nokia Laboratory.

The test results of QMNRM-808 are re-used for certification of the QMNRM-823. The table above indicates the results, which will be re-used

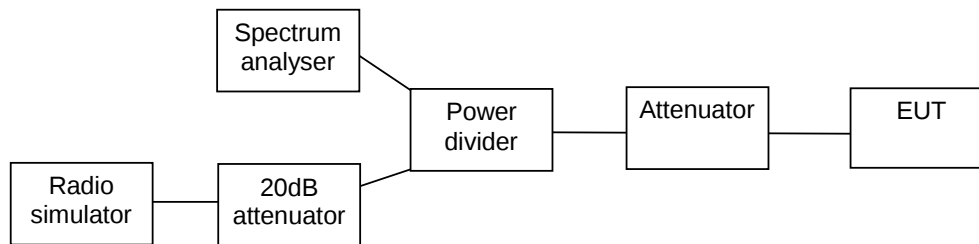
CONTENTS

1. Summary for FCC Part 15C Compliance Test Report	2
1.1. EUT and Accessory Information	2
1.2. Summary of Test Results	2
2. Spurious RF conducted emissions (FCC §15.247(d)).....	4
2.1. Test Setup	4
2.2. Test method and limit	4
2.3. Bluetooth Test results	5
3. 20 dB bandwidth 15.247(a)(1)	8
3.1. Test Setup	8
3.2. Test method and limit	8
3.3. Bluetooth Test results	9
4. Carrier frequency separation 15.247(a)(1)	12
4.1. Test Setup	12
4.2. Test method and limit	12
4.3. Bluetooth Test results	13
5. Number of hopping frequencies 15.247(a)(1)(iii)	15
5.1. Test Setup	15
5.2. Test method and limit	15
5.3. Bluetooth Test results	16
6. Time of occupancy 15.247(a)(1)(iii)	18
6.1. Test Setup	18
6.2. Test method and limit	18
6.3. Bluetooth Test results	19
7. AC powerline conducted emissions (FCC §15.207)	21
7.1. Test method and limit	21
7.2. Bluetooth Test results	22
8. Test Equipment	23
8.1. Conducted measurements	23
8.2. Radiated measurements	24

2. Spurious RF conducted emissions (FCC §15.247(d))

EUT with DUT number	RM-808, DUT 16017
Accessories with DUT numbers	WH-902, DUT 16019; Dummy Battery
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 38 / 100
Date of measurements	18-Oct-2011
Measured by	Anni Manninen

2.1. Test Setup



2.2. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

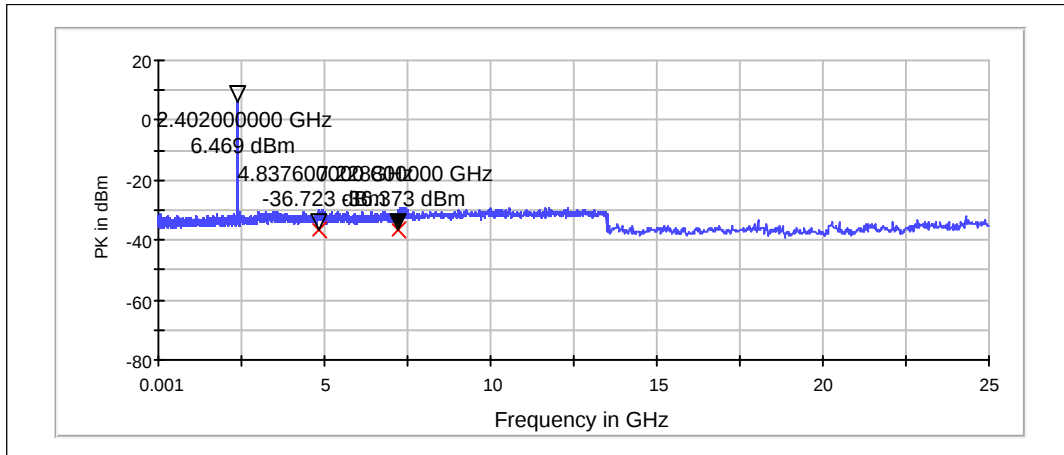
Limits for spurious RF conducted emissions measurements

Frequency range [MHz]	Limit [dBc]
1 – 25000	<= -20

2.3. Bluetooth Test results

2.3.1 GFSK modulation, PRBS packet type

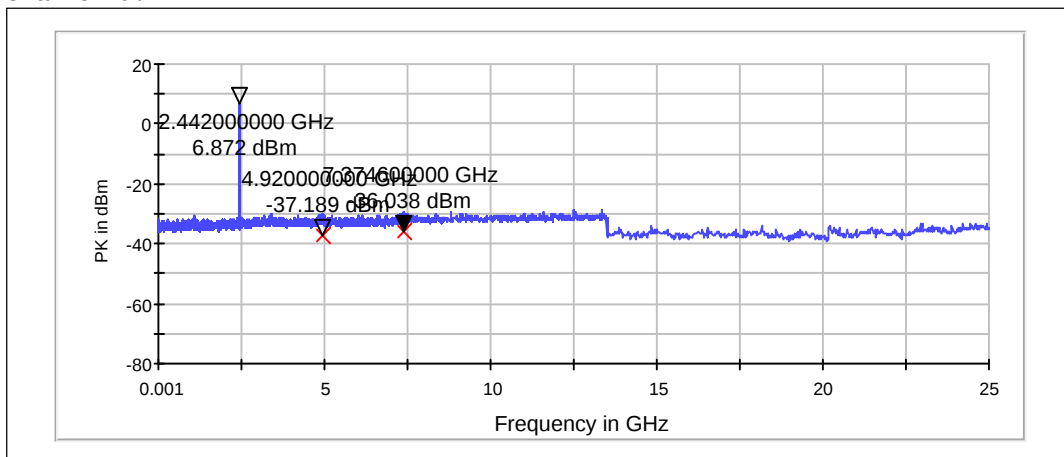
Channel 0 / 2402 MHz



Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4837.6	-36.72	PASSED
7228.8	-36.37	PASSED

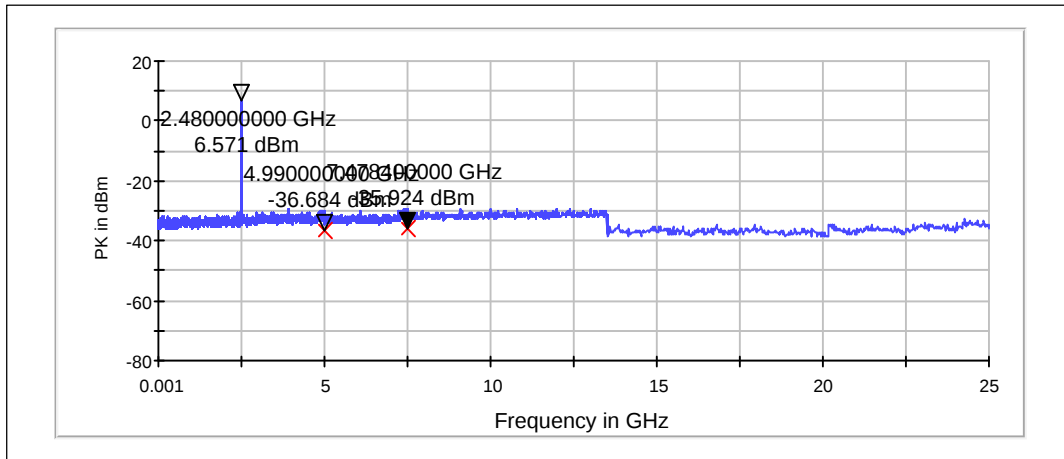
Channel 40 / 2442 MHz



Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4920	-37.19	PASSED
7374.6	-36.04	PASSED

Channel 78 / 2480 MHz

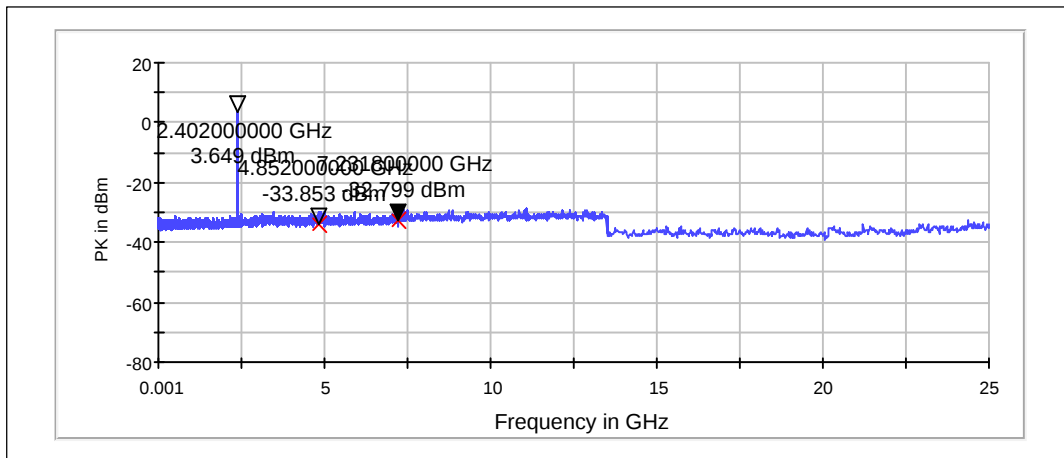


Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4990	-36.68	PASSED
7478.4	-35.92	PASSED

2.3.2 8DPSK modulation, PRBS packet type

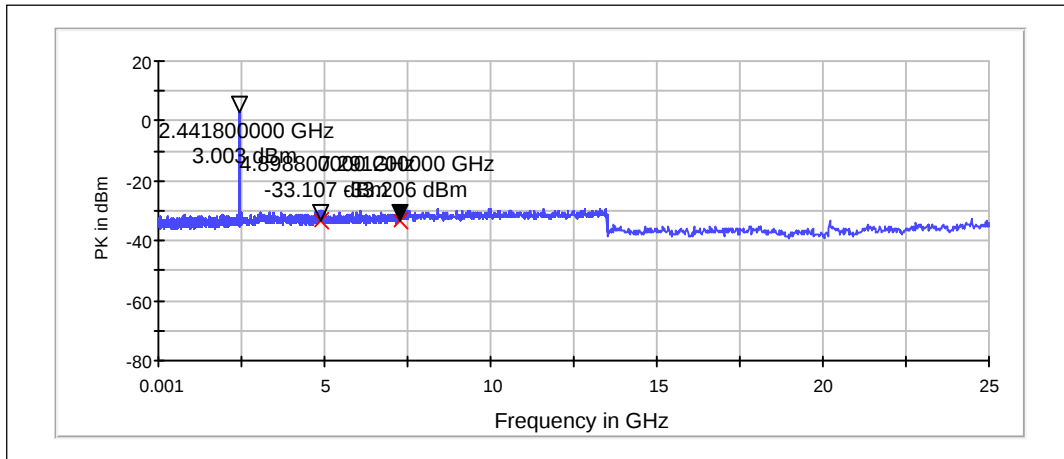
Channel 0 / 2402 MHz



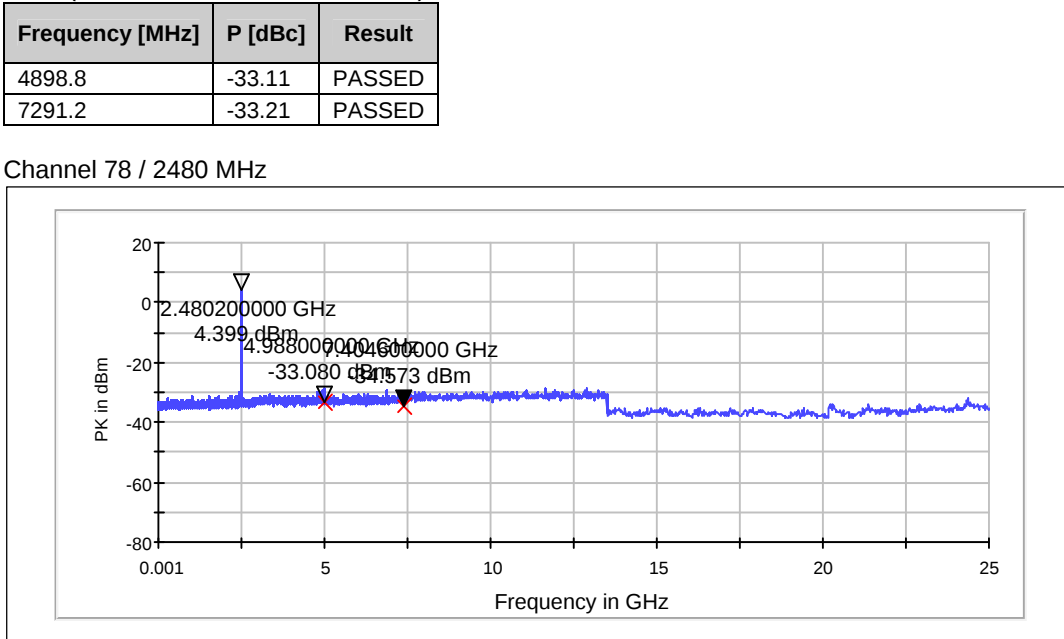
Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4852	-33.85	PASSED
7231.8	-32.8	PASSED

Channel 40 / 2442 MHz



Channel 78 / 2480 MHz



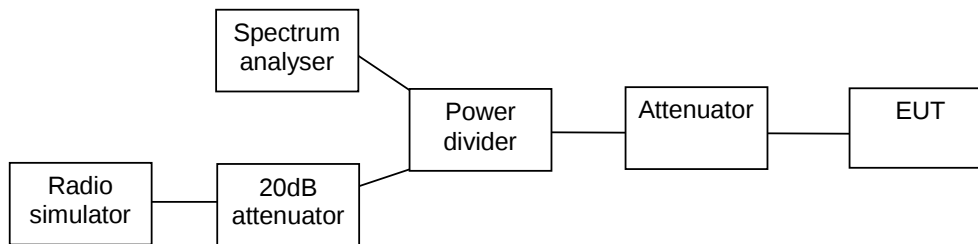
Channel 78 / 2480 MHz

Frequency [MHz]	P [dBc]	Result
4988	-33.08	PASSED
7404.6	-34.57	PASSED

3. 20 dB bandwidth 15.247(a)(1)

EUT with DUT number	RM-808, DUT 16017
Accessories with DUT numbers	WH-902, DUT 16019; Dummy Battery
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 38 / 100
Date of measurements	18-Oct-2011
Measured by	Anni Manninen

3.1. Test Setup



3.2. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

Limits for 20 dB bandwidth measurements

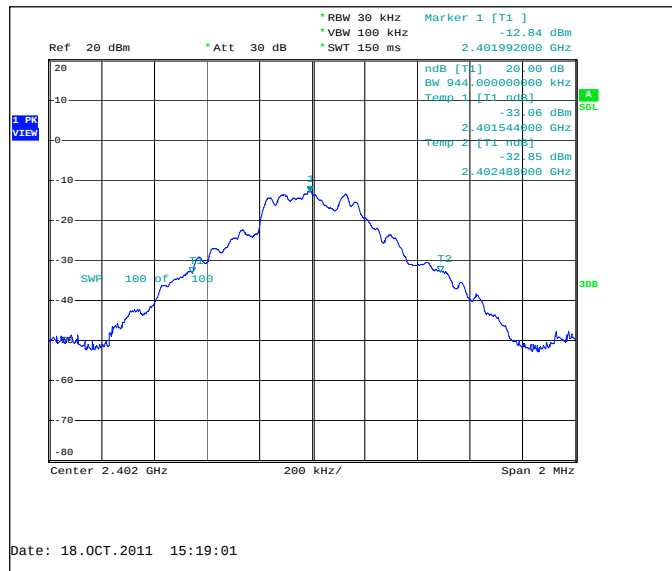
Limit [MHz]
N/A

3.3. Bluetooth Test results

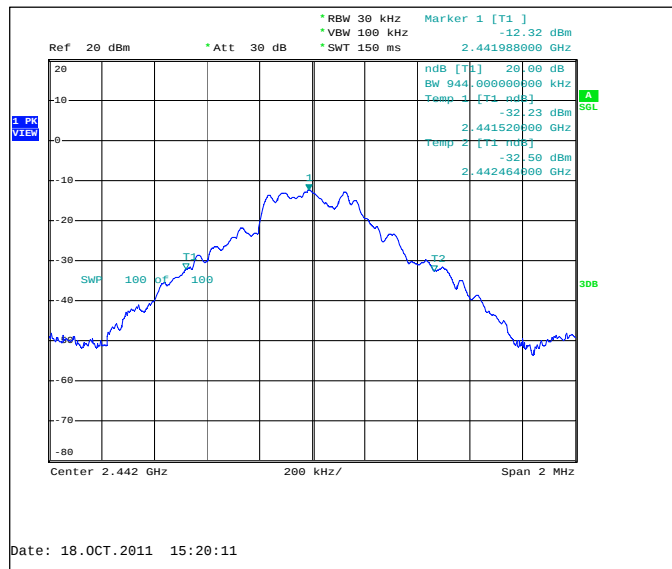
3.3.1 GFSK modulation, PRBS packet type

Channel / f_c [MHz]	20 dB bandwidth [kHz]
0 / 2402	944
40 / 2442	944
78 / 2480	952

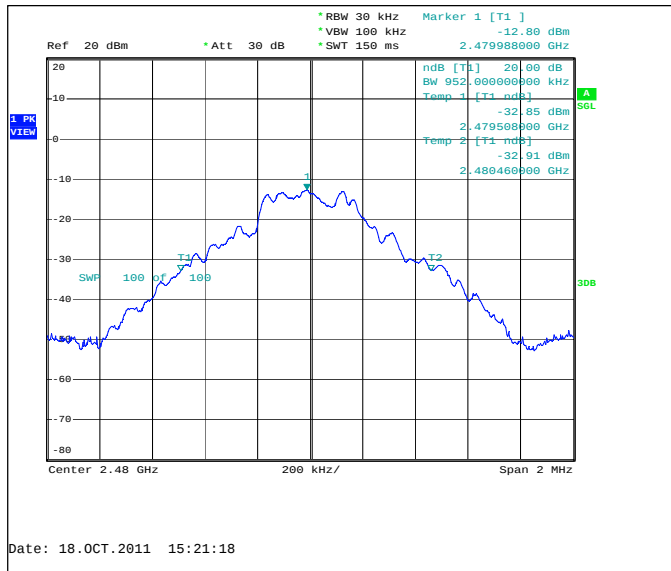
Channel 0 / 2402 MHz



Channel 40 / 2442 MHz



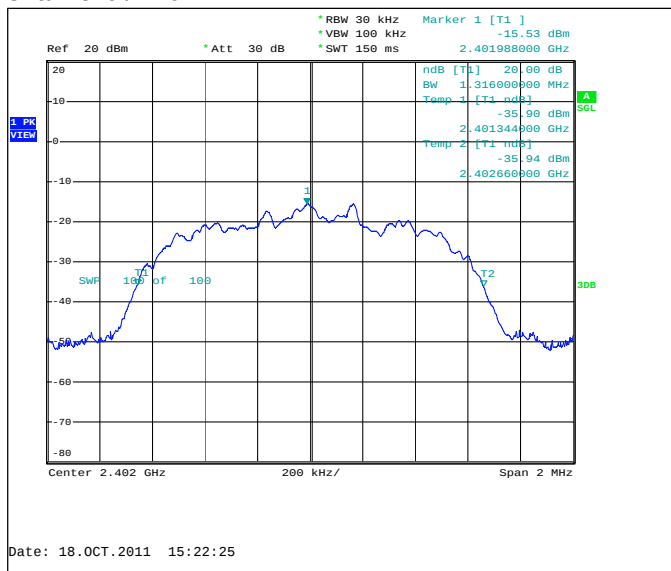
Channel 78 / 2480 MHz



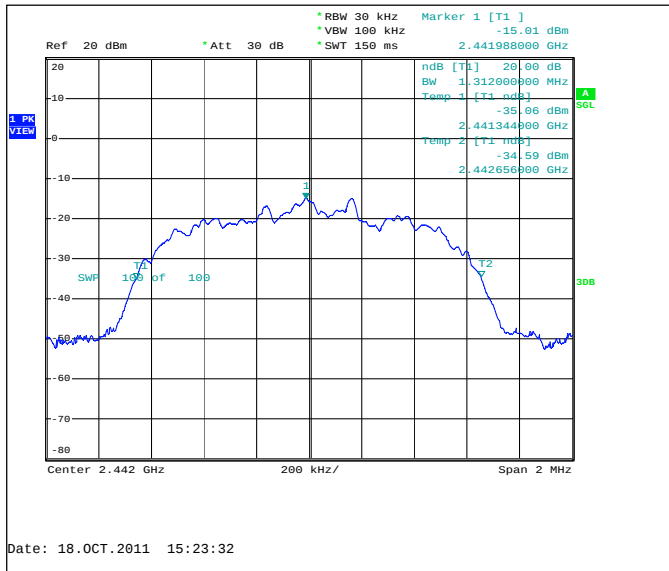
3.3.2 8DPSK modulation, PRBS packet type

Channel / f_c [MHz]	20 dB bandwidth [kHz]
0 / 2402	1316
40 / 2442	1312
78 / 2480	1324

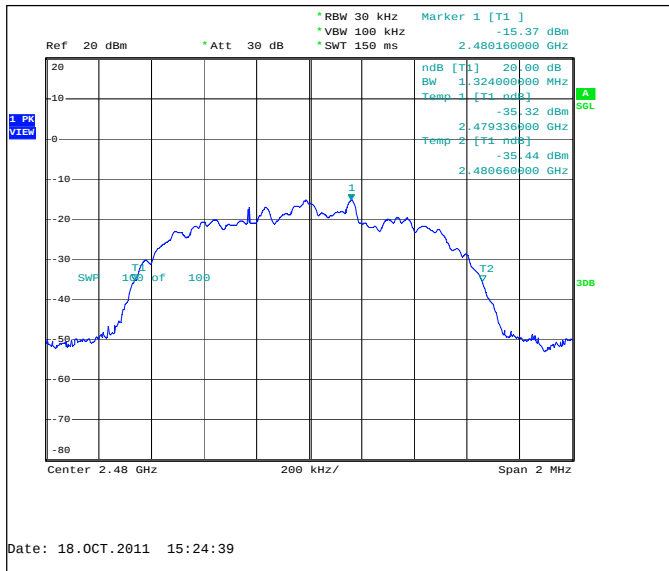
Channel 0 / 2402 MHz



Channel 40 / 2442 MHz



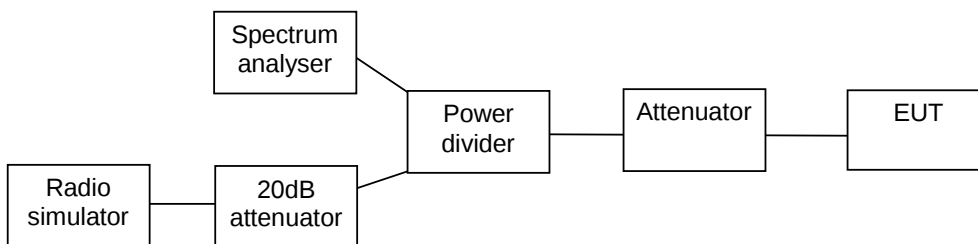
Channel 78 / 2480 MHz



4. Carrier frequency separation 15.247(a)(1)

EUT with DUT number	RM-808, DUT 16017
Accessories with DUT numbers	WH-902, DUT 16019; Dummy Battery
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 45 / 100
Date of measurements	18-Oct-2011
Measured by	Anni Manninen

4.1. Test Setup



4.2. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

Limits for carrier frequency separation measurements

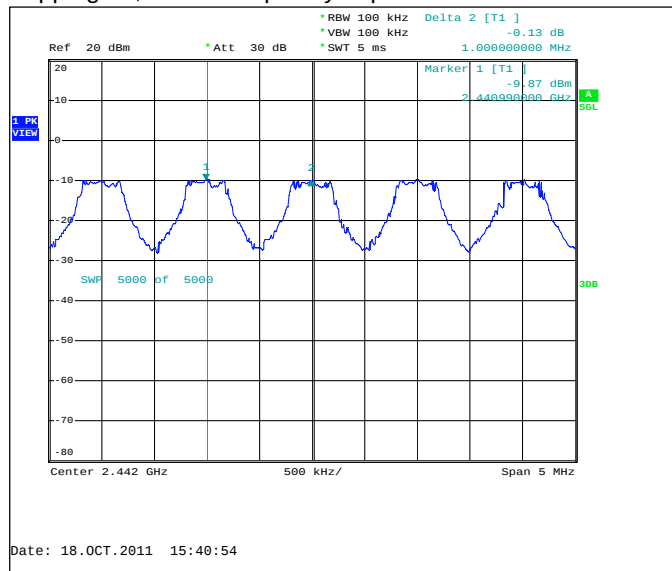
Limit [MHz]
≥ 0.025 or $2/3$ of the 20 dB bandwidth

4.3. Bluetooth Test results

4.3.1 GFSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
1000	PASSED

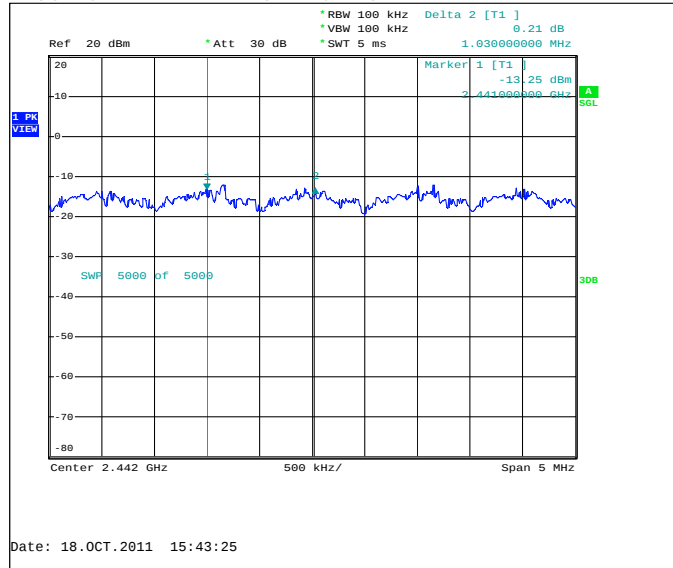
Hopping on, carrier frequency separation of channels 39 / 2441 MHz and 40 / 2442 MHz



4.3.2 8DPSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
1030	PASSED

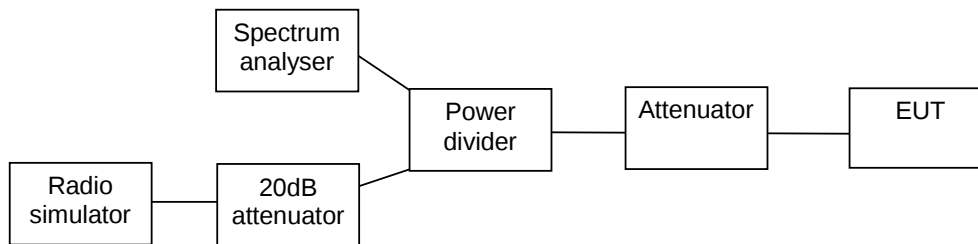
Hopping on, carrier frequency separation of channels 39 / 2441 MHz and 40 / 2442 MHz



5. Number of hopping frequencies 15.247(a)(1)(iii)

EUT with DUT number	RM-808, DUT 16017
Accessories with DUT numbers	WH-902, DUT 16019; Dummy Battery
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 45 / 100
Date of measurements	18-Oct-2011
Measured by	Anni Manninen

5.1. Test Setup



5.2. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

Limits for number of hopping frequencies measurements

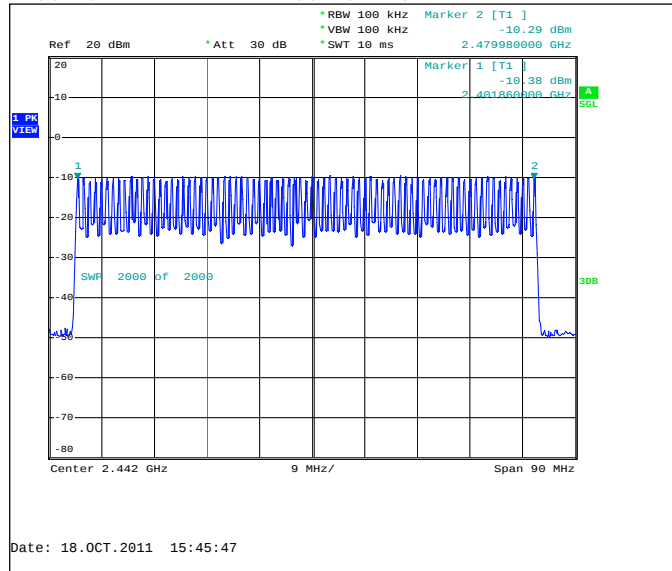
Limit [number]
>= 15

5.3. Bluetooth Test results

5.3.1 GFSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
78	PASSED

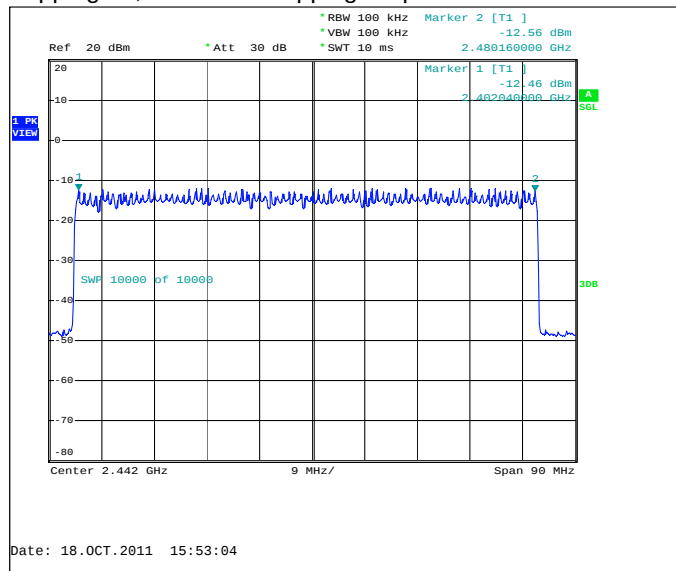
Hopping on, number of hopping frequencies



5.3.2 8DPSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
62	PASSED

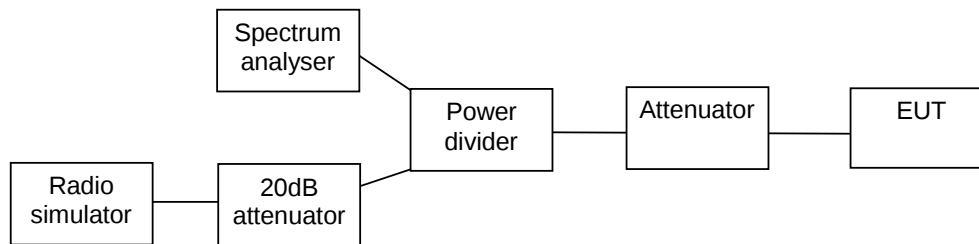
Hopping on, number of hopping frequencies



6. Time of occupancy 15.247(a)(1)(iii)

EUT with DUT number	RM-808, DUT 16017
Accessories with DUT numbers	WH-902, DUT 16019; Dummy Battery
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 45 / 100
Date of measurements	18-Oct-2011
Measured by	Anni Manninen

6.1. Test Setup



6.2. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

The total time of occupancy is get by multiplying the measured number of transmissions occurred during 31.6 second period with the duration of one transmission.

Limits for time of occupancy measurements

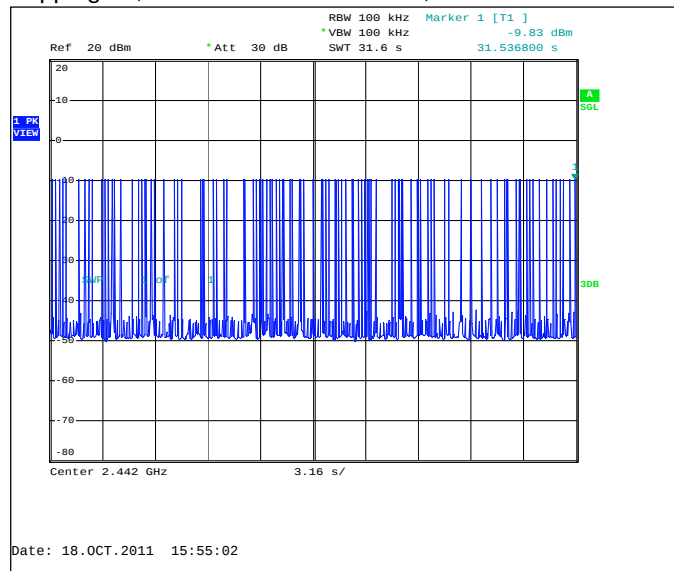
Limit [s]
<= 0.4

6.3. Bluetooth Test results

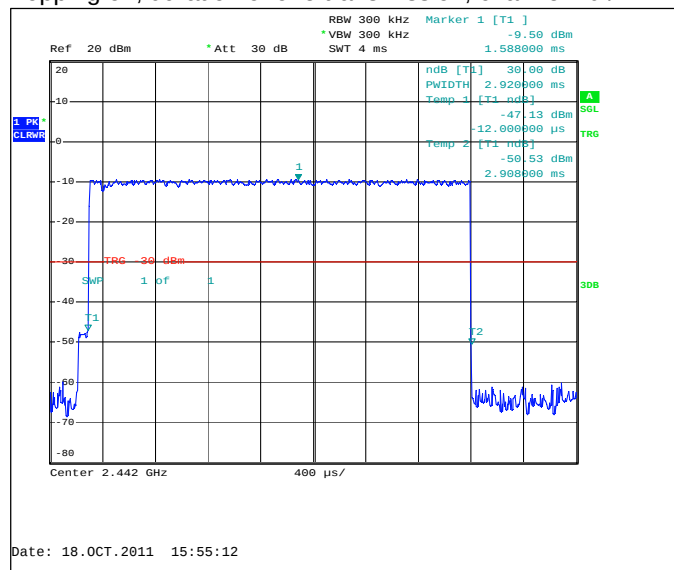
6.3.1 GFSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [ms]	Time of occupancy [s]	Result
93	2.92	0.272	PASSED

Hopping on, number of transmissions, channel 40 / 2442 MHz



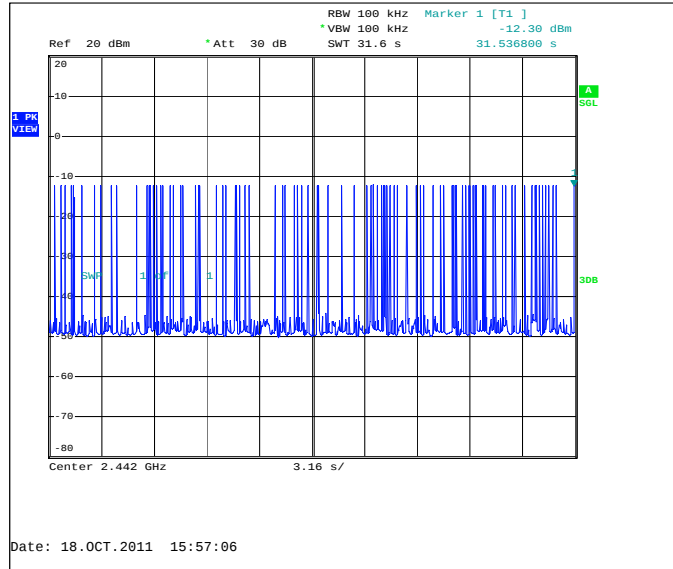
Hopping on, duration of one transmission, channel 40 / 2442 MHz



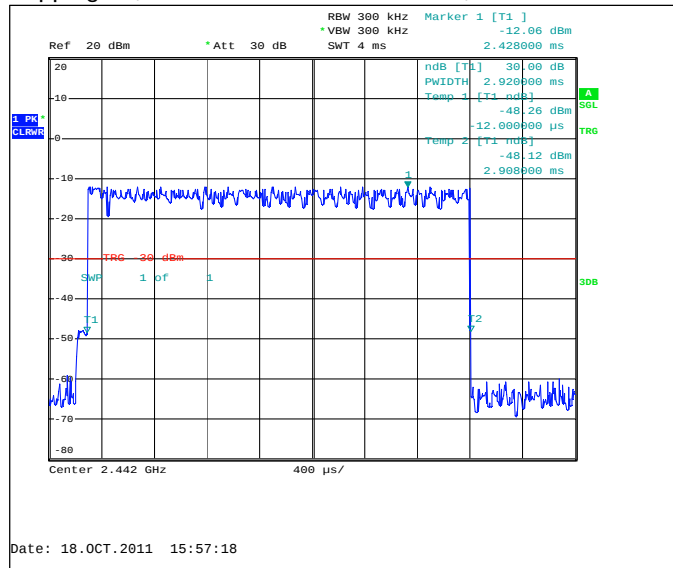
6.3.2 8DPSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [ms]	Time of occupancy [s]	Result
83	2.92	0.242	PASSED

Hopping on, number of transmissions, channel 40 / 2442 MHz



Hopping on, duration of one transmission, channel 40 / 2442 MHz



7. AC powerline conducted emissions (FCC §15.207)

EUT with DUT number	RM-808, DUT 16009
Accessories with DUT numbers	WH-902, DUT 16019; AC-16U, DUT 16021
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 45 / 100
Date of measurements	18-Oct-2011
Measured by	Anni Manninen

7.1. Test method and limit

The measurement is made according to Public notice DA 00-705 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.

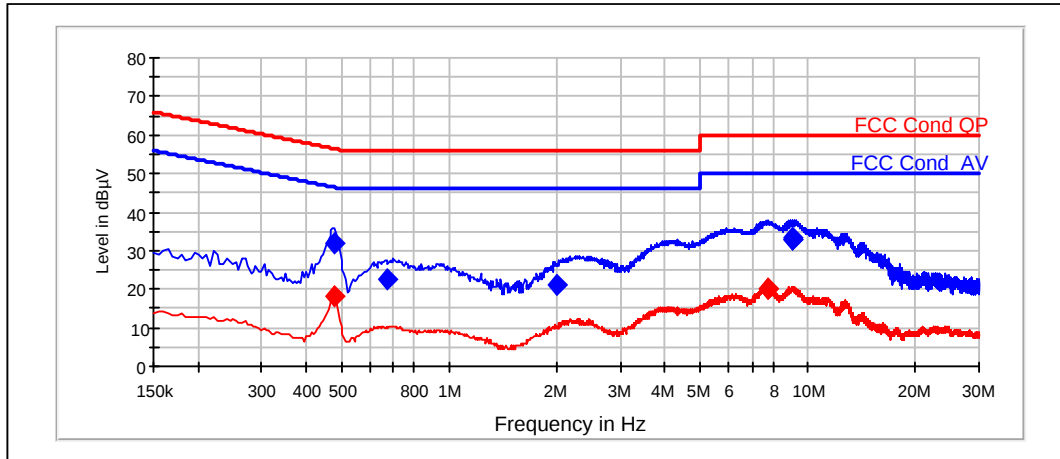
CISPR 22 Class B limits

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

7.2. Bluetooth Test results

7.2.1 GFSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.48	32.13	N	PASSED
0.67	22.42	N	PASSED
1.99	21.33	N	PASSED
9.055	33.07	N	PASSED
9.09	33.14	N	PASSED
9.1	33.07	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.48	17.94	N	PASSED
7.715	20.1	N	PASSED
7.775	20.03	N	PASSED

8. Test Equipment

8.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1916	Communication Tester	CMTA84	R&S	15B
1992	Signal Generator	83630B	Agilent	15C, 15B
1999	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
2039	Power Supply	PL330QMD	Thurlby	15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2068	CDN	S1	NMP	15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
2156	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2180	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2206	Signal Generator	SMX	R&S	15C, 15B
2347	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2352	Spectrum Analyzer	FSP-30	R&S	22/24/27, 15C
2359	Temperature Test Chamber	VT4002	Vötsch	22/24/27
2360	Serial Bus Converter	Serial 488A	IO Tech	22/24/27
2362	Power Supply	NGPX 70/5	R&S	22/24/27
2388	Bluetooth Tester	CBT	R&S	15B
2389	Signal Generator	SMJ 100A	R&S	15B
2390	Directional Coupler	DC2600	AR	-
6009	GPS Antenna	SA-700	Chronos	15C
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	15C
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	15C
6012	CDN	CDN USB/c	Teseq	-
6015	Receiver	ESI	R&S	22/24, 15C, 15B
-	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	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B
6036	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
6038	Data Logger	Testo 580	Testo	22/24/27, 15C, 15B
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B
2059	V-network	ESH3-Z6	R&S	-
6044	V-network	ESH3-Z6	R&S	-
6045	Power splitter	11667B	Agilent	22/24/27, 15C
6046	Attenuator 10dB	8493C	Agilent	22/24/27, 15C
6047	Attenuator 20dB	8493C	Agilent	22/24/27, 15C

8.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1917	Communication Tester	CMTA84	R&S	15B
1988	Antenna	HL562	R&S	22/24/27, 15C, 15B
1989	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2009	Signal Generator	SMP 22	R&S	22/24/27, 15C, 15B
2027	CDN	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	CDN	M3 (modified) DC2	MEB	22/24/27, 15C, 15B
2029	Power Supply	PL330	Thurlby	22/24/27, 15C
2043	Band Reject Filter	WRCA824/849-0,2-6SS	Wainwright	22
2047	Band Reject Filter	WRCC1800/2000-0.2-10SS	Wainwright	24
2051	High Pass Filter	4HC1700-1-KK	R&S	22
2109	Power Supply	PL330QMD	Thurlby	22/24/27, 15C, 15B
2116	Controller	EMCO 2090	ETS	22/24/27, 15C, 15B
2135	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2150	High Pass Filter	F-15041	RLC	22/24/27, 15C
2156	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2176	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2180	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	Miteq	22/24/27, 15C, 15B
2347	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2348	Controller	G-1000DXC	Yaesu	22/24/27, 15C, 15B
2349	Computer Controller	GS-232B	Yaesu	22/24/27, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	Miteq	22/24/27, 15C, 15B
2353	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	15C
2361	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	Euroshield	22/24/27, 15C, 15B
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
2366	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2384	Band Reject Filter	WRCG832/838-825/845-40/5SS	Wainwright	22
2388	Bluetooth Tester	CBT	R&S	15B
2389	Signal Generator	SMJ 100A	R&S	15B
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
6009	GPS Antenna	SA-700	Chronos	15C
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	15C
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	15C
6014	Substitute Calibration Cable	Sucoflex 104PB	Suhner	-
-	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	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B
-	RF immunity / Emission Software	EMC32	R&S	22/24/27, 15C, 15B
6037	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
6038	Data Logger	Testo 580	Testo	22/24/27, 15C, 15B
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B