

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC22&24&27_RM-1038_15.docx	Date of Report:	29-Jul-2014
Number of pages:	35	Customer's Contact person:	Hu Helen
Testing laboratory:	TCC Microsoft 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:	Microsoft 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.:	975940		
IC recognition no.:	661AH-1		
Tested devices/ accessories:	Phone RM-1038 / Battery Samsung BV-T5A / Wireless charger cover CC-3086 / AC-Charger AC-20E / Headset WH-108 /Dummy Battery SD-233R		
FCC ID:	QTLRM-1038	IC:	
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Parts 22/24, TIA-603-C-2004 and IC standards, RSS-GEN (Issue 3, December 2010), RSS-130 (Issue 1, October 2013), 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 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:			

Gao Sherina, Engineer, EMC

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

Date of receipt	07-Jul-2014
Testing completed	16-Jul-2014
The customer's contact person	Hu Helen
Test Plan referred to	T:\Projects\RM-1038\TestPlan\RS_testplan_RM-1038.xlsm
Notes	-
Document name	FCC22&24&27_RM-1038_15.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-1038	004402479235842	0201	-	02030.00000.14244.22000	54428
Battery	Samsung BV-T5A	4175354224C10106893;0670738	Proto V5	-	-	54452
AC-Charger	AC-20E	4868672472430500265;0675628	-	-	-	54463
Headset	WH-108	3022D71	-	-	-	54459
Dummy battery	SD-233R	DV1450401	-	-	-	54473
Phone	RM-1038	004402479235016	0201	-	02030.00000.14244.22000	54429
Battery	Samsung BV-T5A	4175354224C10106707;0670738	Proto V5	-	-	54450
Wireless charger cover	CC-3086	040-121531	-	-	-	54447
AC-Charger	AC-20E	4868672472430500314;0675628	-	-	-	54461
Headset	WH-108	3022D71	-	-	-	54455

1.2. Summary of Test Results

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
§2.1049(h)	4.2	99 % occupied bandwidth	PASSED
§27.53(l)	4.5(b)	Band edge compliance	PASSED
§27.53(h), §2.1051	4.5(b)	Spurious emissions at antenna terminals	NP
§27.53(l), §2.1053	4.5(b)	Spurious radiated emissions	PASSED
§27.54	4.3	Frequency stability, temperature variation	PASSED
§27.54	4.3"	Frequency stability, voltage variation	PASSED

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
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§24.238(a)	6.5	Band edge compliance	PASSED
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	NP

§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§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
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§22.917(a)	4.5	Band edge compliance	PASSED
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	4.3	Frequency stability, voltage variation	PASSED

WCDMA 850 (Band V):

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
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§22.917(a)	4.5	Band edge compliance	PASSED
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	NP
§2.1055(d)	4.3	Frequency stability, voltage variation	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 Microsoft Laboratory.

CONTENTS

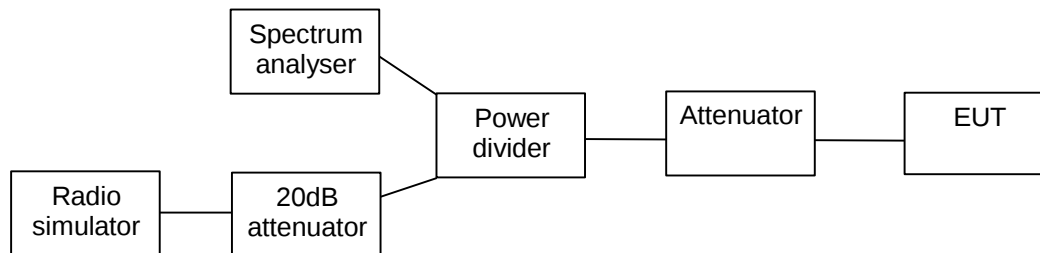
1. Summary for FCC Part 22/24 Compliance Test Report	2
1.1. EUT and Accessory Information	2
1.2. Summary of Test Results	2
2. 99 % occupied bandwidth (FCC §2.1049(h), RSS-199 4.2, RSS-133 4.6.1)	6
2.1. Test Setup	6
2.2. Test method and limit	6
2.3. LTE7 Test results.....	7
2.4. GSM 1900 Test results	11
2.5. GSM 850 Test results	12
2.6. WCDMA 850 Test results	13
3. Band edge compliance (FCC §27.53(I), §24.238(a), RSS-199 4.5(b), RSS-133 6.5)	14
3.1. Test Setup	14
3.2. Test method and limit	14
3.3. LTE7 Test results.....	15
3.4. GSM 1900 Test results	19
3.5. GSM 850 Test results	21
3.6. WCDMA 850 Test results	23
4. Spurious radiated emissions (FCC §22.917(a), §27.53(I), §2.1053, §22.917(a), §2.1053, §24.238(a), §2.1053, §2.1053, RSS-132 4.5, RSS-133 6.5, RSS-199 4.5(b))	24
4.2. Test method and limit	24
4.3. GSM 850 test results	26
4.4. GSM 850 E-GPRS (MSC9) test results.....	26
4.5. GSM 1900 test results	26
4.6. GSM 1900 E-GPRS (MSC9) test results.....	26
4.7. WCDMA 850 test results	27
4.8. LTE7 test results.....	27
5. Frequency stability, temperature variation (FCC §27.54, §2.1055(a), RSS-199 4.3, RSS-133 6.3)	29
5.1. Test Setup	29
5.2. Test method and limit	29
5.3. LTE7 Test results.....	30
5.4. GSM 1900 Test results	30
5.5. GSM 850 Test results	30

6. Frequency stability, voltage variation (FCC §27.54, §2.1055(d), RSS-199 4.3", RSS-132 4.3, RSS-133 6.3)	31
6.1. Test Setup	31
6.2. Test method and limit	31
6.3. LTE7 Test results.....	32
6.4. GSM 850 Test results	32
6.5. GSM 1900 Test results	32
7. Test Equipment.....	33
7.1. Conducted measurements	33
7.2. Radiated measurements	33

2. 99 % occupied bandwidth (FCC §2.1049(h), RSS-199 4.2, RSS-133 4.6.1)

EUT with DUT number	RM-1038, DUT 54428
Accessories with DUT numbers	Samsung BV-T5A , DUT 54452 ; AC-20E, DUT 54463 ; WH-108, DUT 54459
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24/55/100
Date of measurements	15-Jul-2014
Measured by	Dou Rubo

2.1. Test Setup



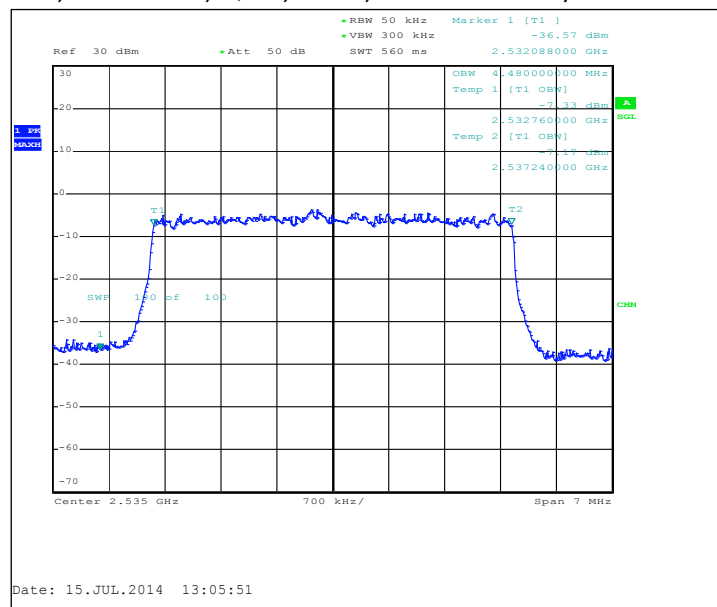
2.2. Test method and limit

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

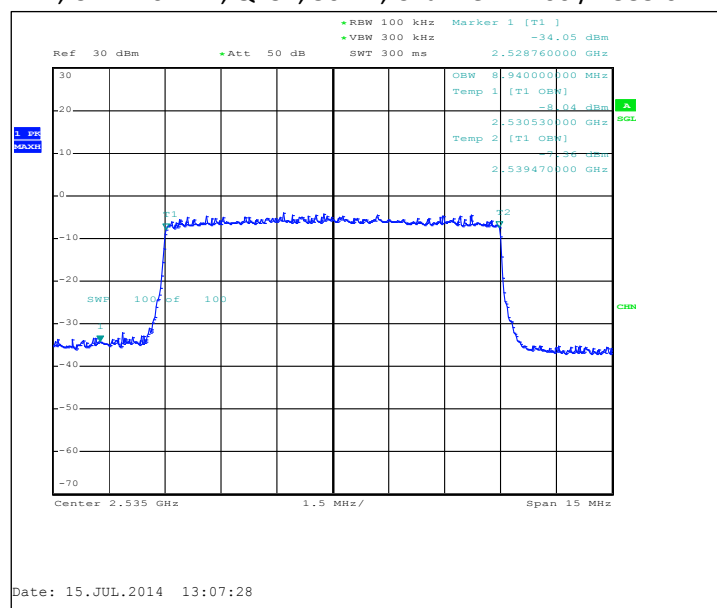
2.3. LTE7 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 5MHz, QPSK, 25 RB	4480
FDD, CBW 10MHz, QPSK, 50 RB	8940
FDD, CBW 15MHz, QPSK, 75 RB	13440
FDD, CBW 20MHz, QPSK, 100 RB	17900
FDD, CBW 5MHz, 16QAM, 25 RB	4480
FDD, CBW 10MHz, 16QAM, 50 RB	8940
FDD, CBW 15MHz, 16QAM, 75 RB	13440
FDD, CBW 20MHz, 16QAM, 100 RB	17850

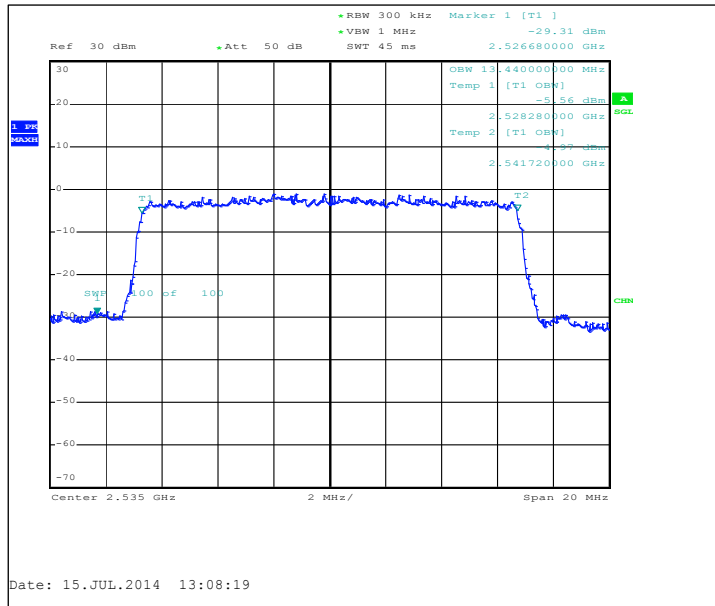
FDD, CBW 5MHz, QPSK, 25 RB, Channel 21100 / 2535.0 MHz



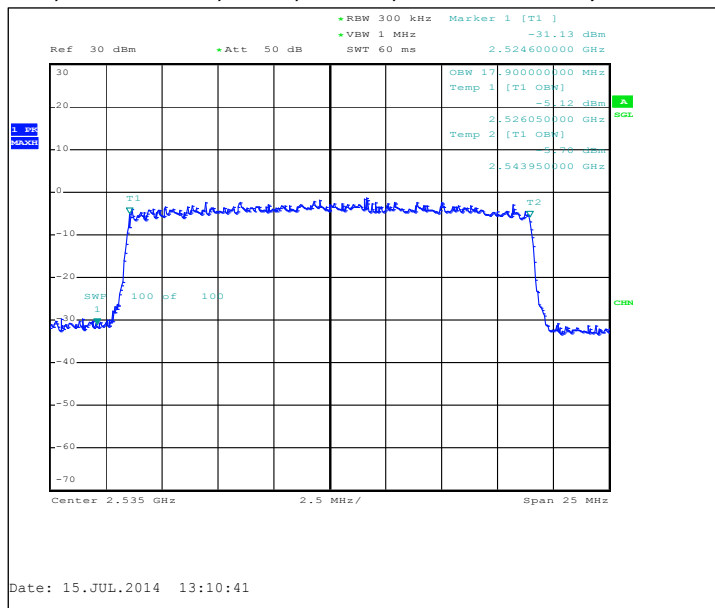
FDD, CBW 10MHz, QPSK, 50 RB, Channel 21100 / 2535.0 MHz



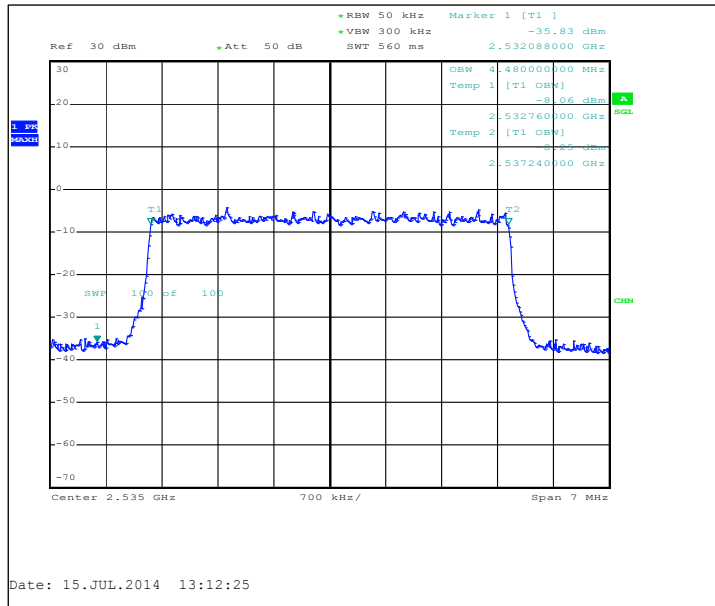
FDD, CBW 15MHz, QPSK, 75 RB, Channel 21100 / 2535.0 MHz



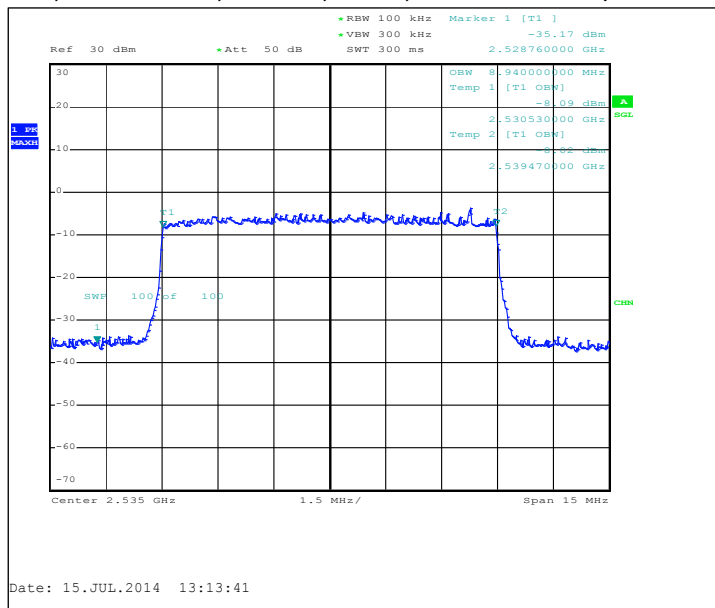
FDD, CBW 20MHz, QPSK, 100 RB, Channel 21100 / 2535.0 MHz



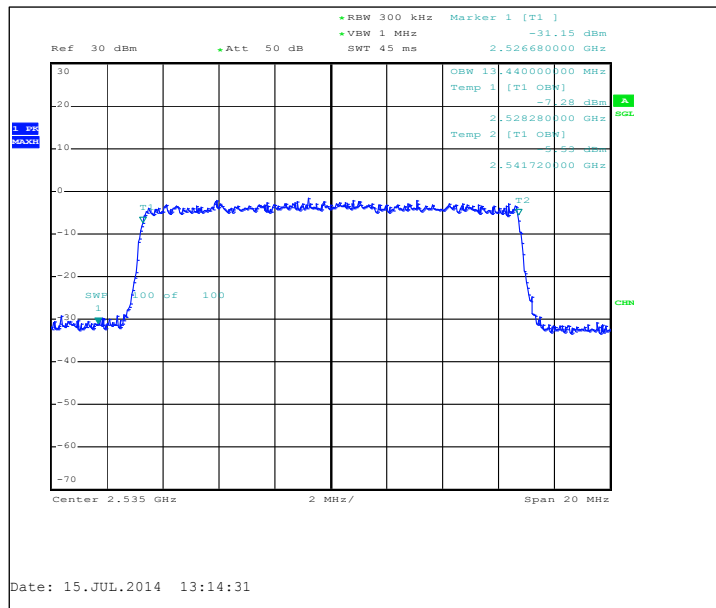
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 21100 / 2535.0 MHz



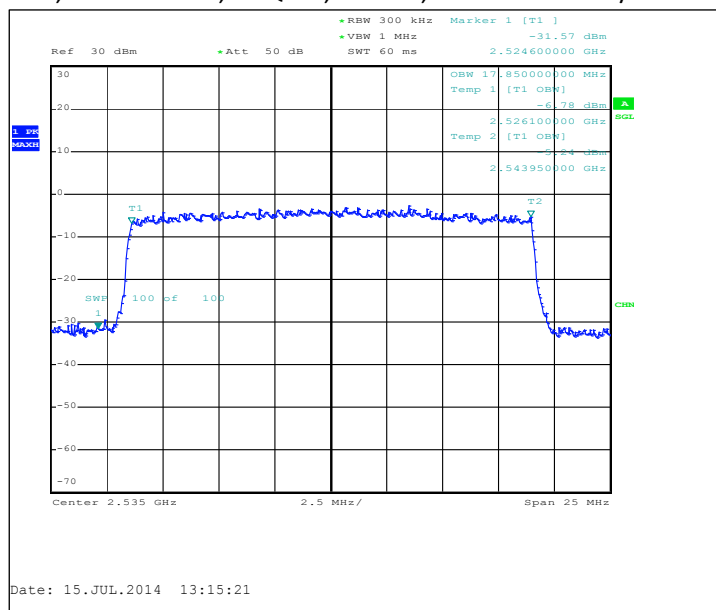
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 21100 / 2535.0 MHz



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



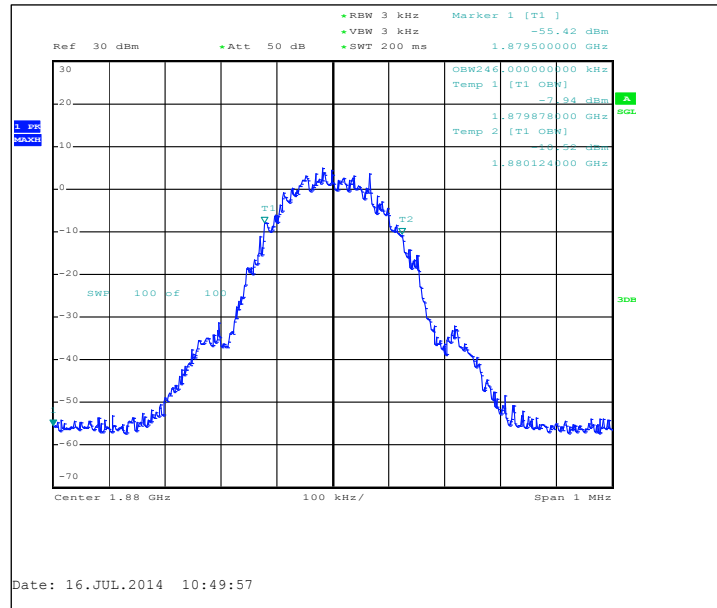
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 21100 / 2535.0 MHz



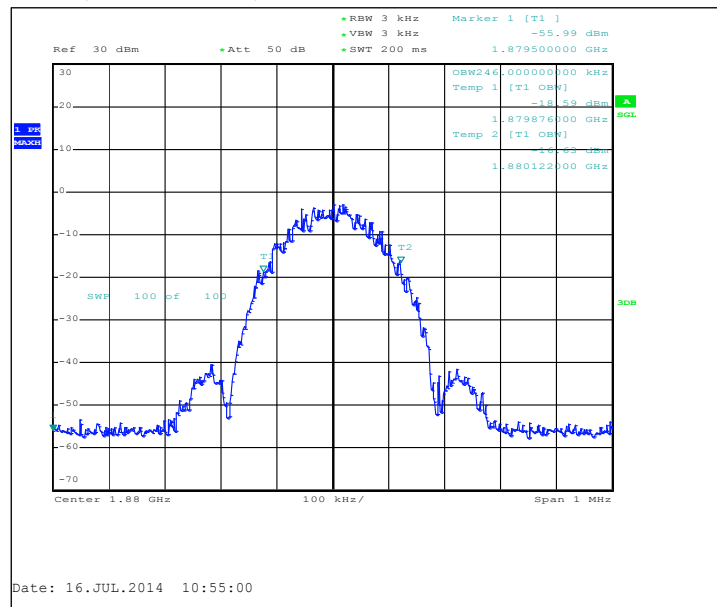
2.4. GSM 1900 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	246
EGPRS	246

GSM, Channel 661 / 1880.0 MHz



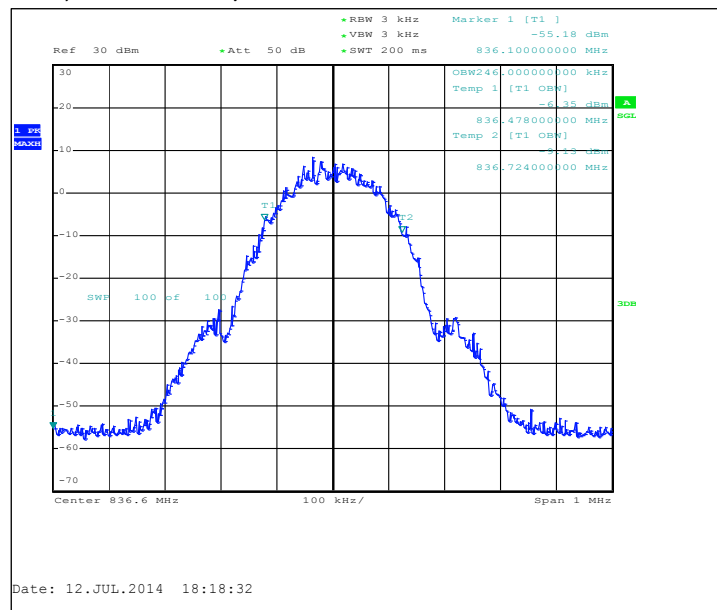
EGPRS, Channel 661 / 1880.0 MHz



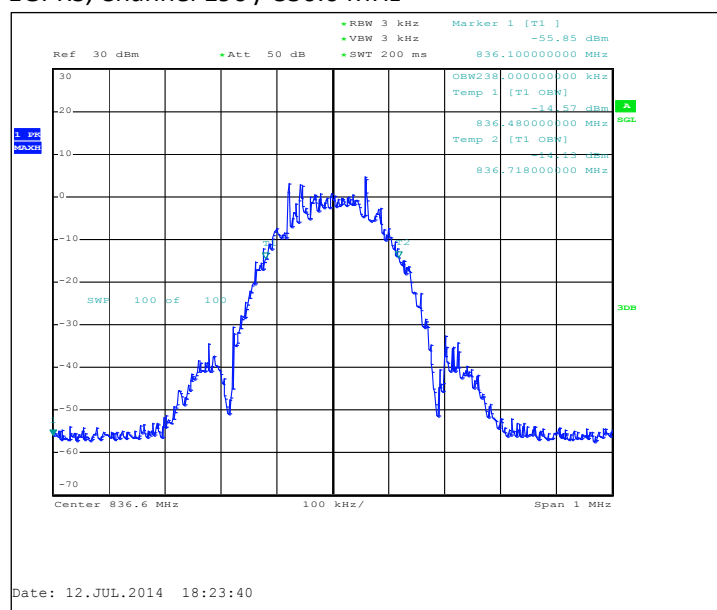
2.5. GSM 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	246
EGPRS	238

GSM, Channel 190 / 836.6 MHz



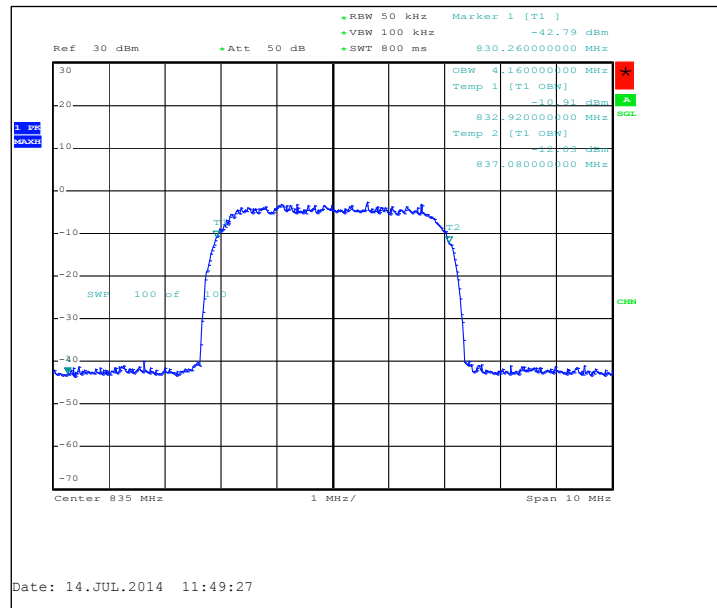
EGPRS, Channel 190 / 836.6 MHz



2.6. WCDMA 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
WCDMA 850	4160

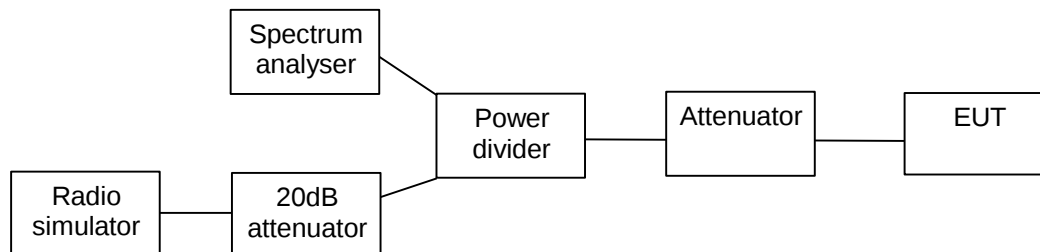
FDD, Channel 4175 / 835.0 MHz



3. Band edge compliance (FCC §27.53(l), §24.238(a), RSS-199 4.5(b), RSS-133 6.5)

EUT with DUT number	RM-1038, DUT 54428
Accessories with DUT numbers	Samsung BV-T5A , DUT 54452 ; AC-20E, DUT 54463 ; WH-108, DUT 54459
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24/55/100
Date of measurements	15-Jul-2014
Measured by	Dou Rubo

3.1. Test Setup



3.2. Test method and limit

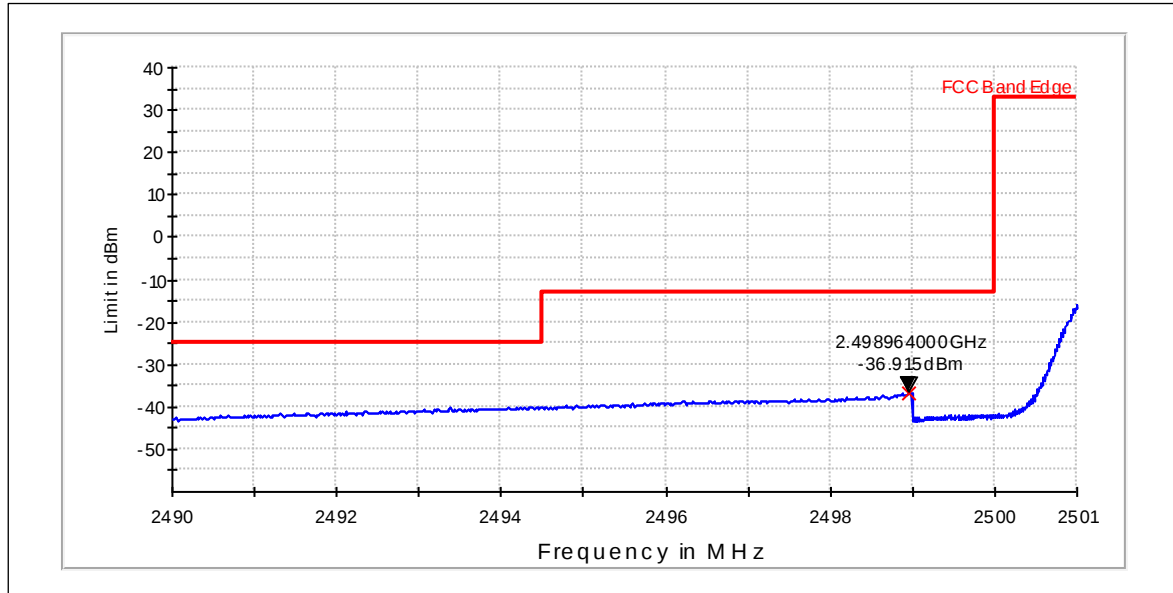
The measurement is made according to applicable FCC rule parts and IC standards.

Limits for band edge compliance measurements

Operation band	Frequency range [MHz]	Limit [dBm]
LTE7	Below 2494.5	-25 (RBW = 1 MHz, EiRP)
	2494.5 - 2499	-13 (RBW = 1 MHz, EiRP)
	2499 – 2500	-13 (RBW = 200 kHz, EiRP)
	2570 – 2571	-13 (RBW = 200 kHz, EiRP)
	2571 – 2575.5	-13 (RBW = 1 MHz, EiRP)
	Above 2575.5	-25 (RBW = 1 MHz, EiRP)
GSM 1900	Below 1850 and above 1910	-13

3.3. LTE7 Test results

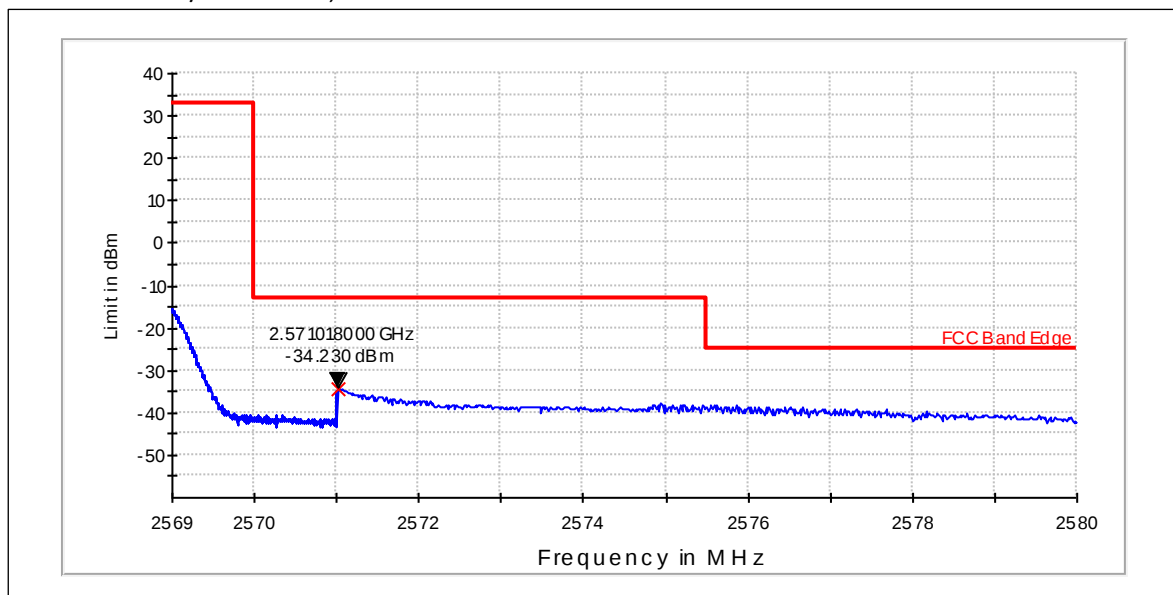
Channel 20850 / 2510 MHz; Antenna 1



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Results
FDD, CBW 20MHz, QPSK, 100 RB	2498.964	-36.92	PASSED

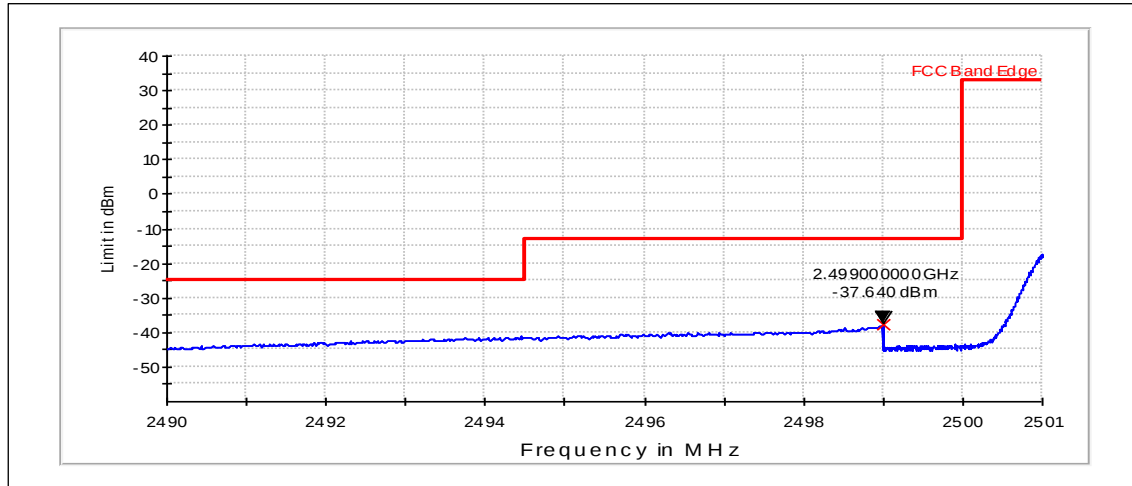
Channel 21350 / 2560 MHz; Antenna 1



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Results
FDD, CBW 20MHz, QPSK, 100 RB	2571.018	-34.23	PASSED

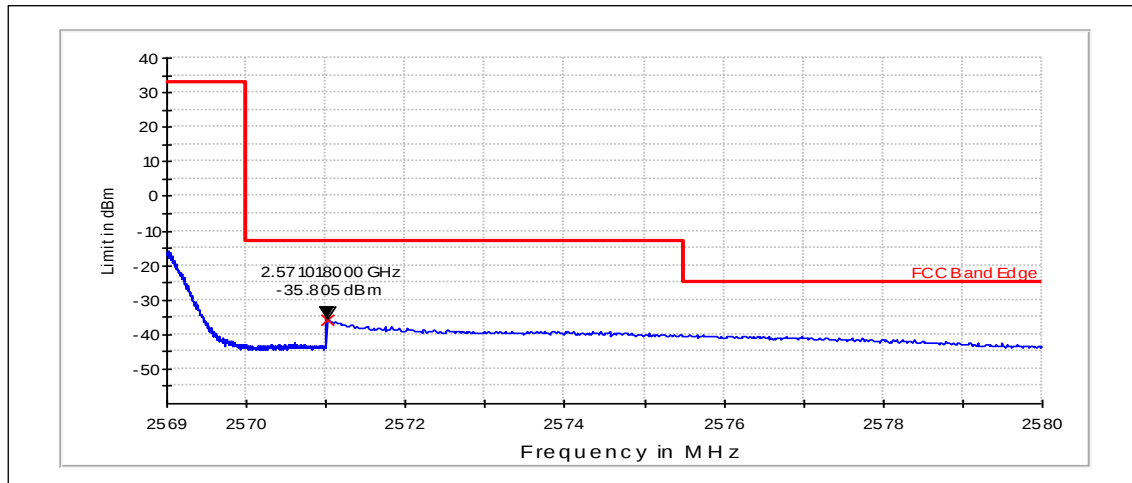
Channel 20850 / 2510 MHz; Antenna 1



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	2499.000	-37.64	PASSED

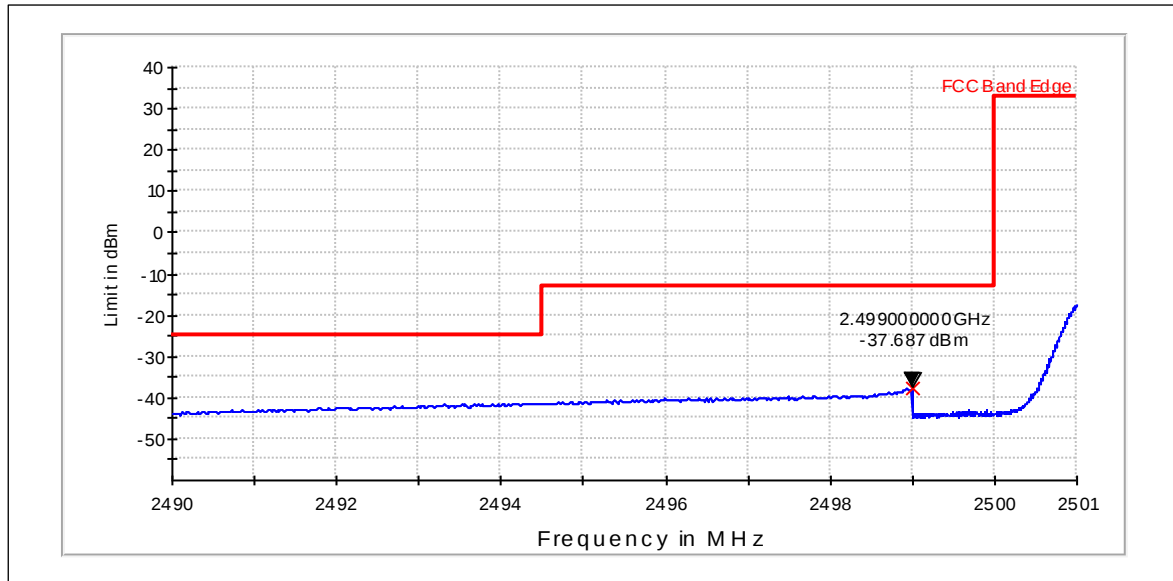
Channel 21350 / 2560 MHz; Antenna 1



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	2571.018	-35.80	PASSED

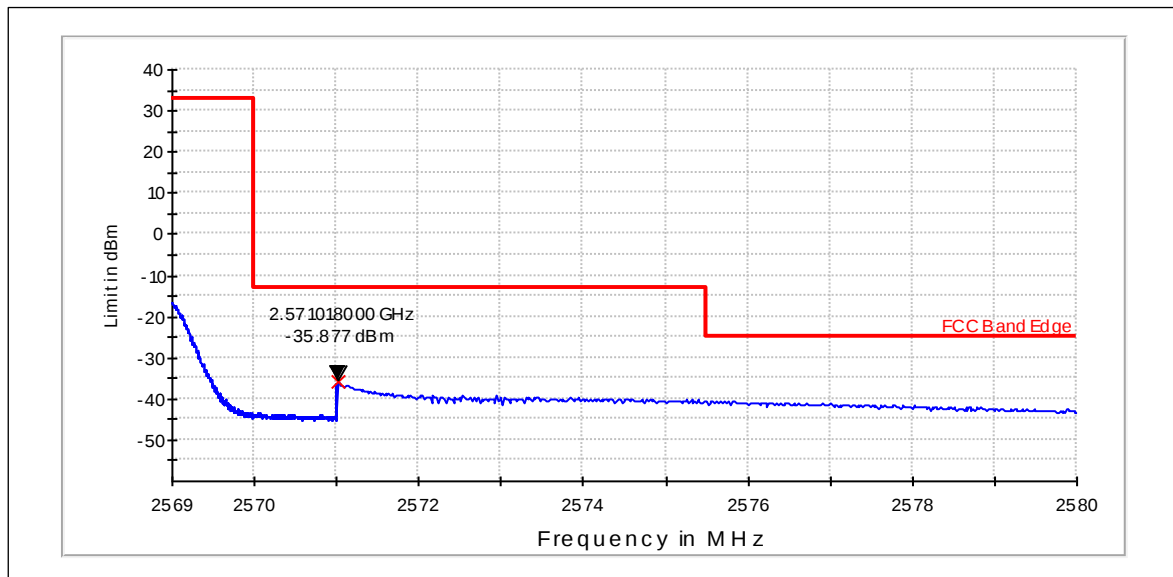
Channel 20850 / 2510 MHz; Antenna 2



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Results
FDD, CBW 20MHz, QPSK, 100 RB	2499.000	-37.69	PASSED

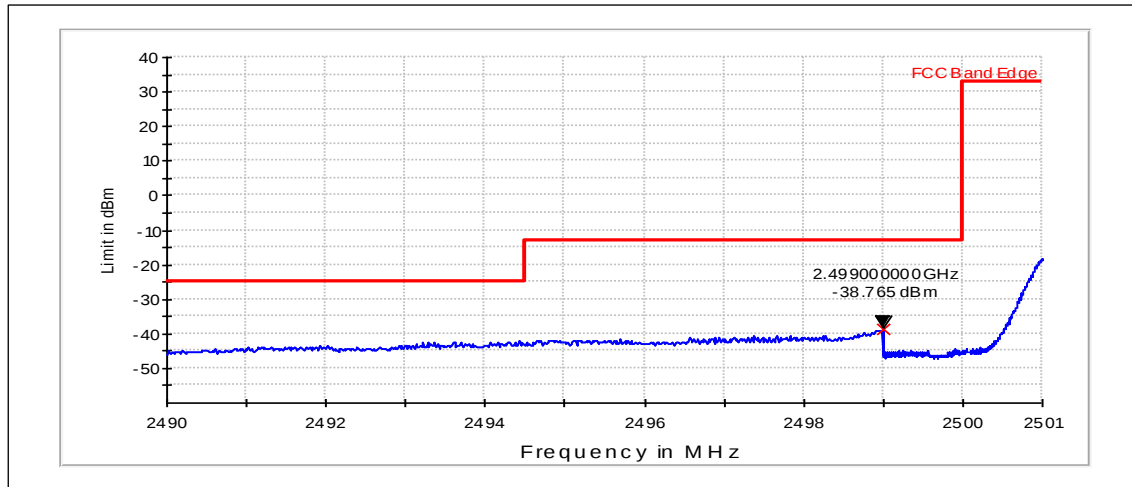
Channel 21350 / 2560 MHz; Antenna 2



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Results
FDD, CBW 20MHz, QPSK, 100 RB	2571.018	-35.88	PASSED

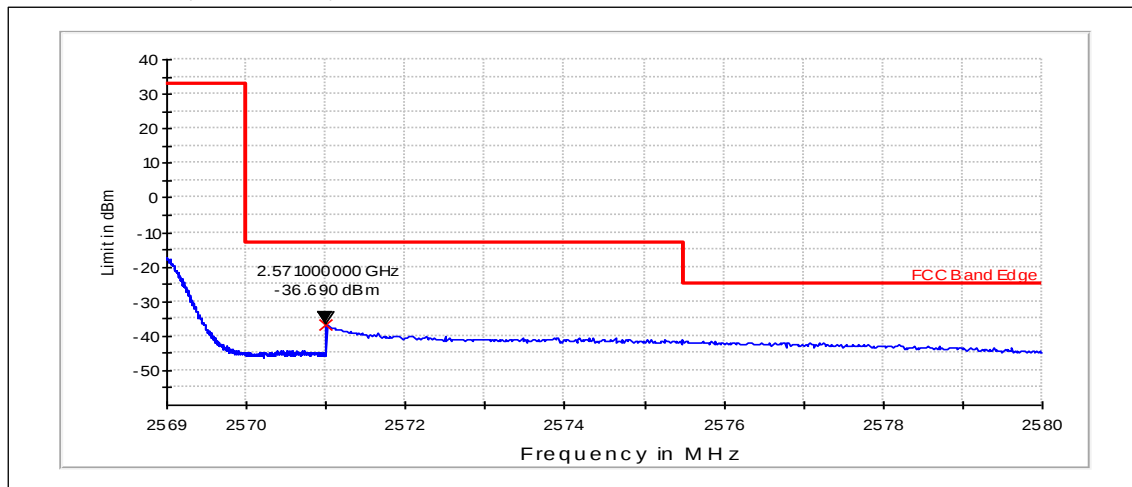
Channel 20850 / 2510 MHz; Antenna 2



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	2499.000	-38.77	PASSED

Channel 21350 / 2560 MHz; Antenna 2

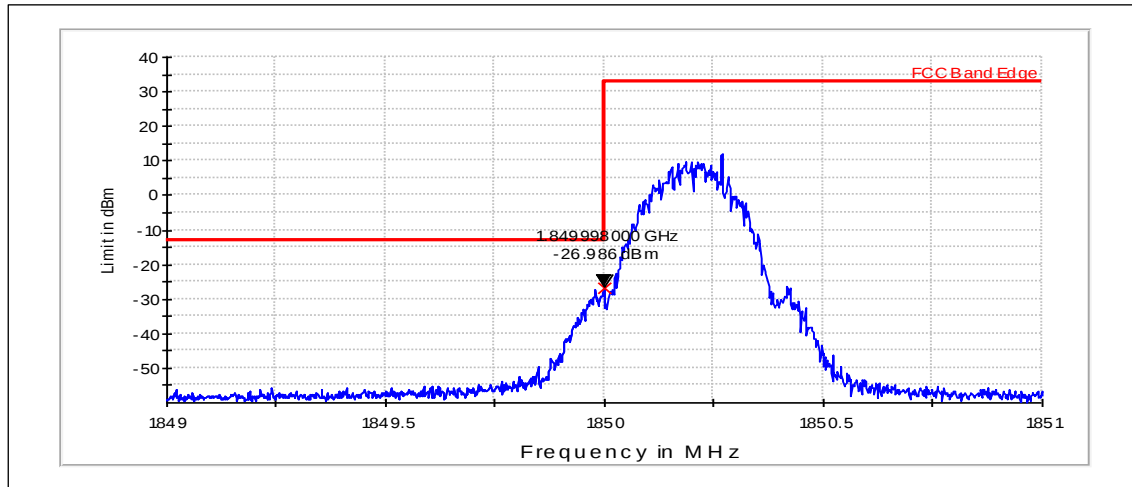


RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	2571.000	-36.69	PASSED

3.4. GSM 1900 Test results

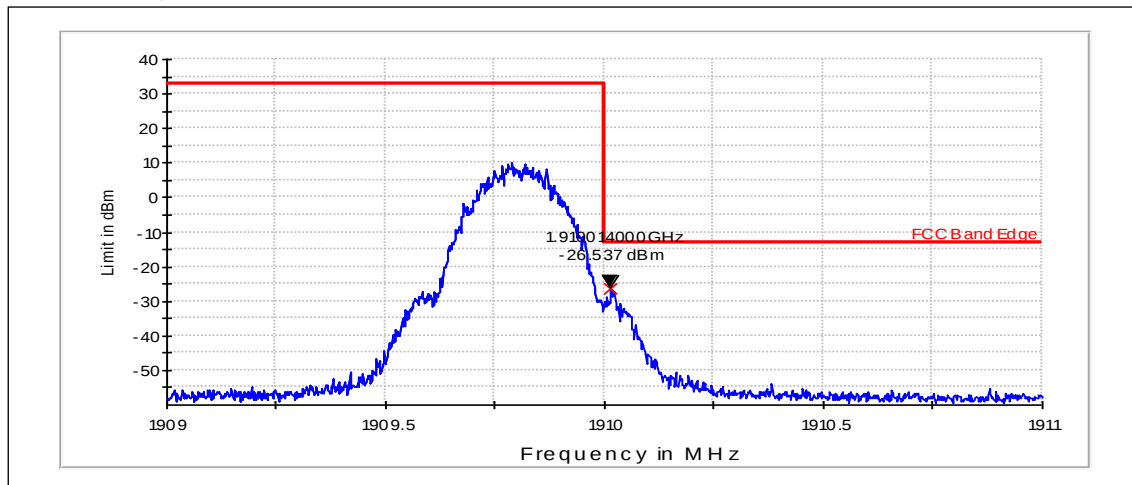
Channel 512 / 1850.2 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1849.998	-26.99	PASSED

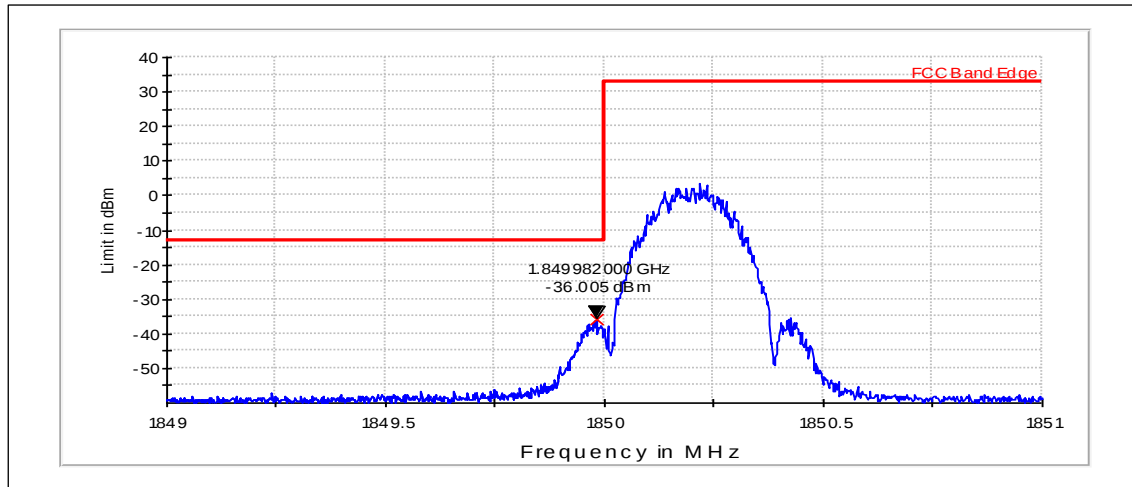
Channel 810 / 1909.8 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1910.014	-26.54	PASSED

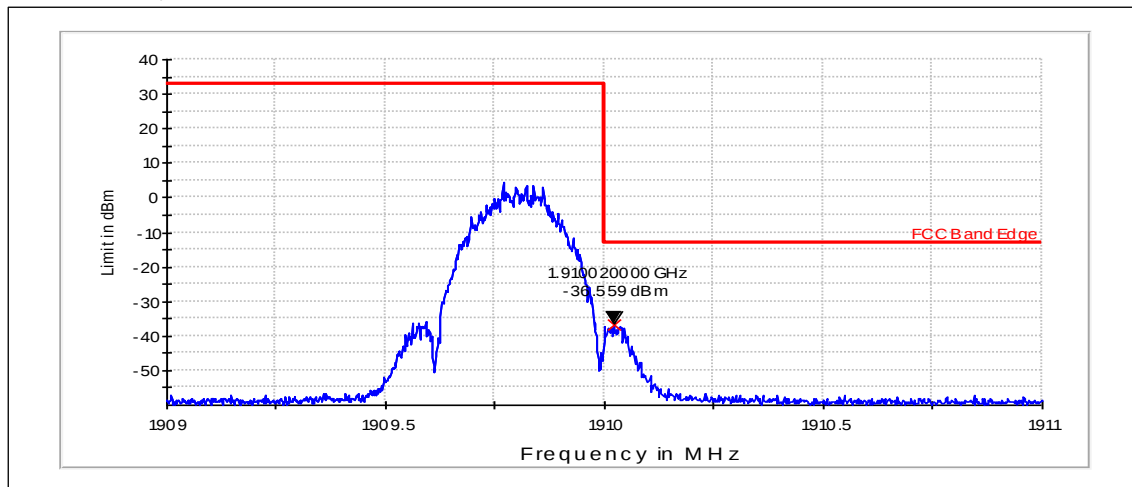
Channel 512 / 1850.2 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1849.982	-36.01	PASSED

Channel 810 / 1909.8 MHz

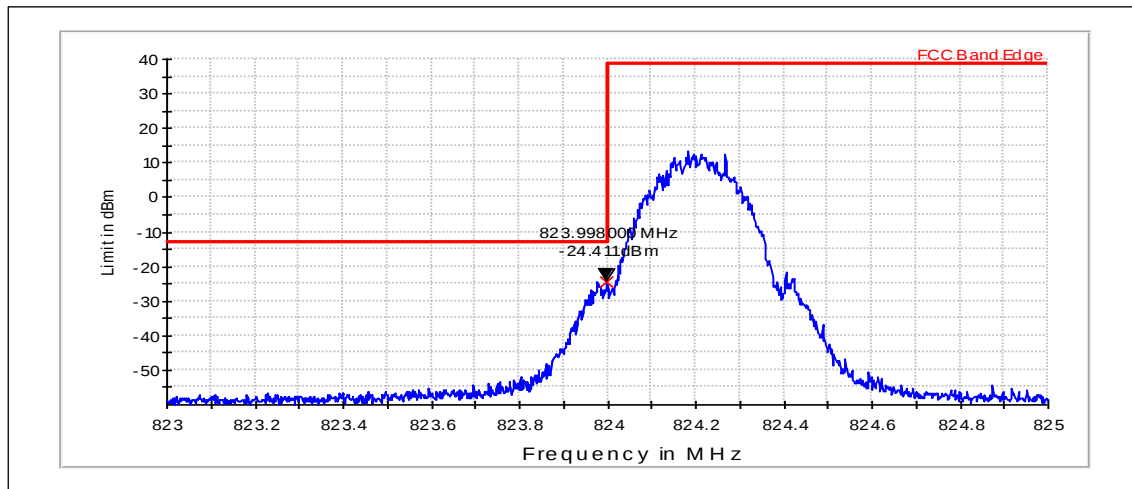


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1910.020	-36.56	PASSED

3.5. GSM 850 Test results

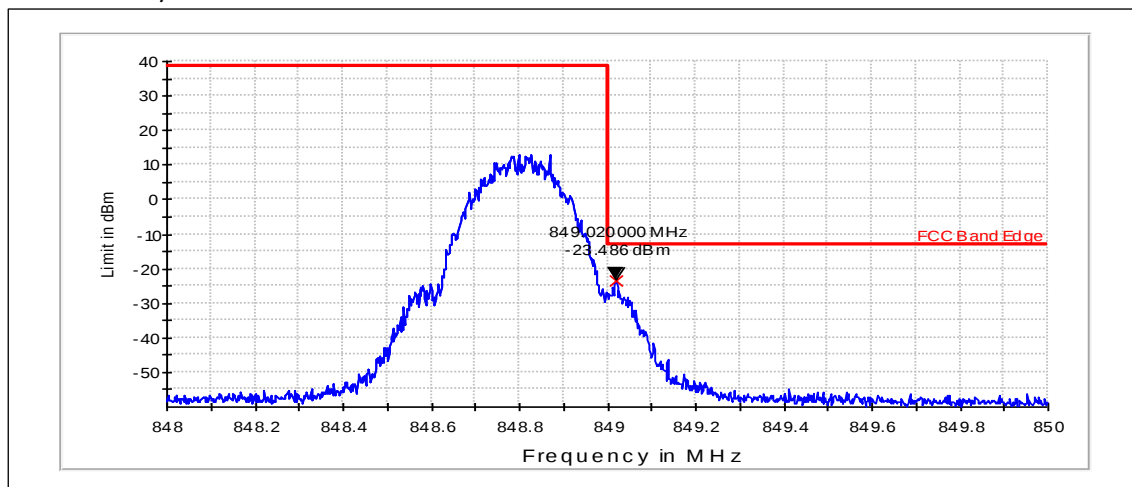
Channel 128 / 824.2 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	823.998	-24.41	PASSED

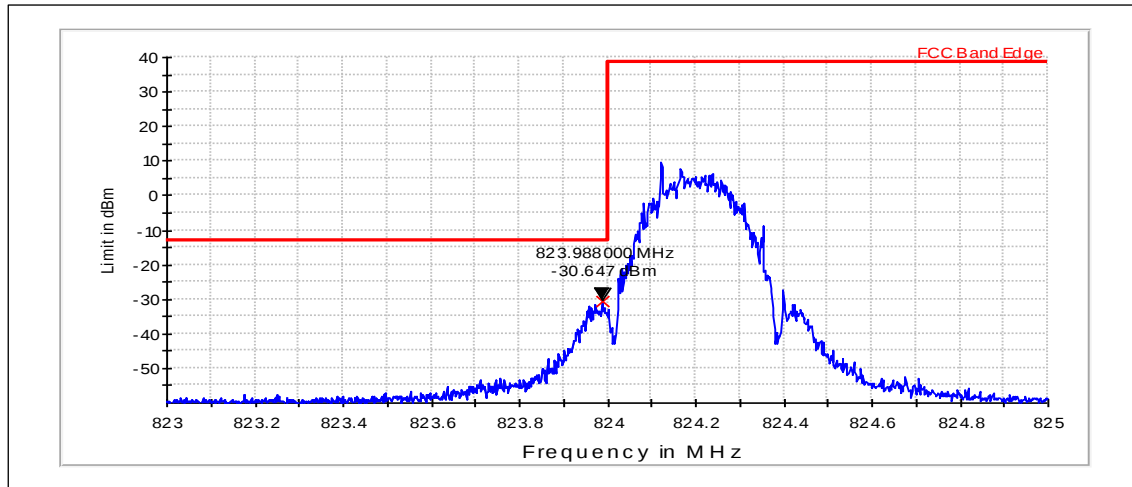
Channel 251 / 848.8 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	849.020	-23.49	PASSED

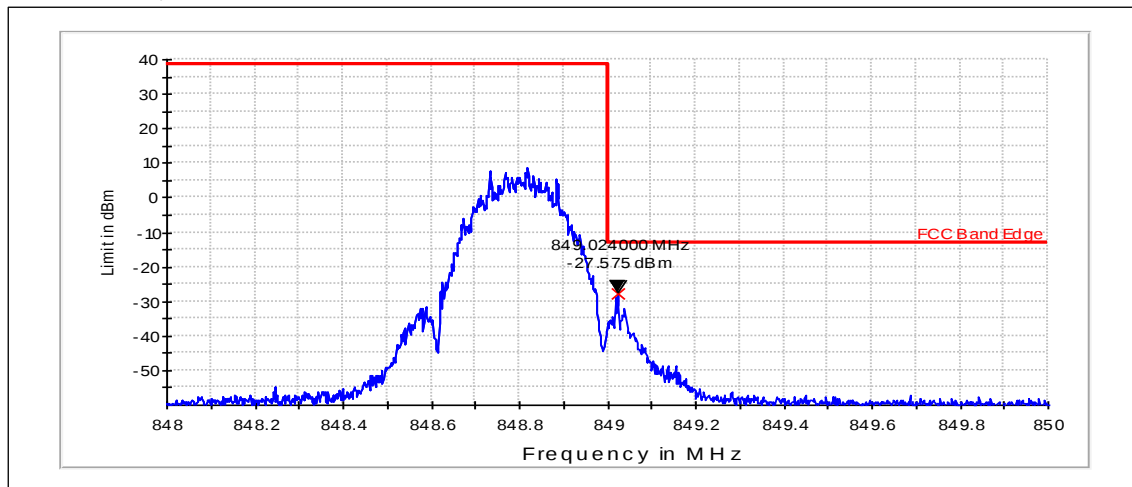
Channel 128 / 824.2 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	823.988	-30.65	PASSED

Channel 251 / 848.8 MHz

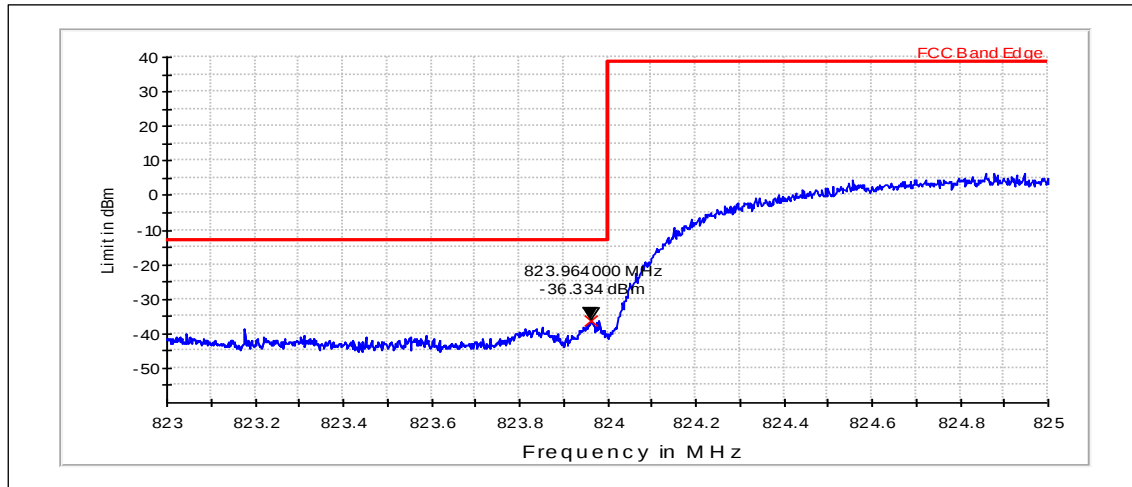


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	849.024	-27.58	PASSED

3.6. WCDMA 850 Test results

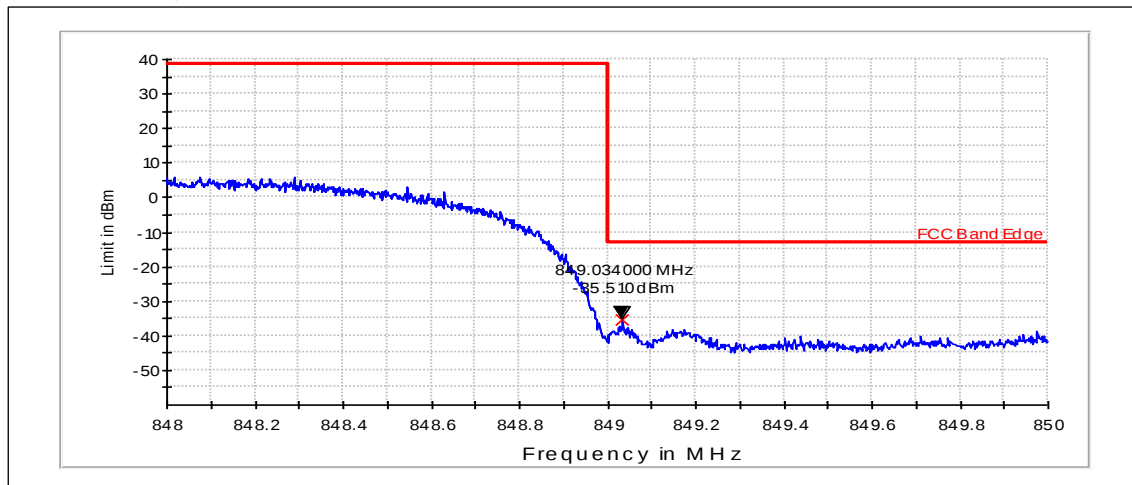
Channel 4132 / 826.4 MHz



RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	823.964	-36.33	PASSED

Channel 4233 / 846.6 MHz



RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

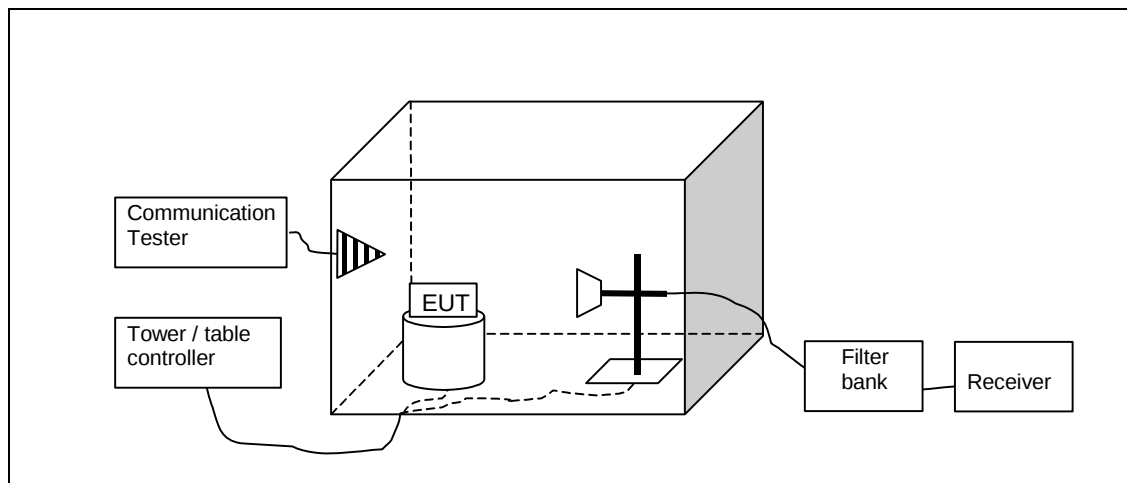
Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	849.034	-35.51	PASSED

4. Spurious radiated emissions

(FCC §22.917(a), §27.53(l), §2.1053, §22.917(a), §2.1053, §24.238(a), §2.1053, §2.1053, RSS-132 4.5, RSS-133 6.5, RSS-199 4.5(b))

EUT with DUT number	RM-1038, DUT 54429
Accessories with DUT numbers	Samsung BV-T5A , DUT 54450 ; CC-3086, DUT 54447 ; AC-20E, DUT 54461 ; WH-108, DUT 54455
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Test was done in lab1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23/67/99.8 to 23/54/100
Date of measurements	07-Jul-2014 to 12-Jul-2014
Measured by	Gao Sherina

4.1.1 Test setup



4.2. Test method and limit

The measurement is made according to TIA-603-C-2004 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 substitution method is used. Substitution values at each frequencies are measured beforehand and saved to the test software.

The substitution corrections are obtained as described below:

$$ASUBST = PSUBST_TX - PSUBST_RX - LSUBST_CABLES + GSUBST_TX_ANT$$

Where ASUBST is the final substitution correction including receive antenna gain. PSUBST_TX is signal generator level, PSUBST_RX is receiver level, LSUBST_CABLES is cable losses including both TX and RX cables and GSUBST_TX_ANT is substitution antenna gain.

The measurement results are obtained as described below:

$$P \text{ [dBm]} = \text{PMEAS} + \text{ATOT}$$

Where PMEAS is receiver reading in dBm and ATOT is total correction factor including cable loss, preamplifier gain and substitution correction (ATOT = LCABLES - GPREAMP + ASUBST).

Limits for spurious radiated emissions measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850	30 - 8500	-13
GSM 1900	30 - 19100	-13
WCDMA 850	30 - 8500	-13
LTE7	30 - 25700	-13

4.3. GSM 850 test results

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
848.6	-75.49	3E-05	-71.79	-3.7	VERTICAL	PASSED
1673.427	-56.49	0.00224	-60.69	4.2	HORIZONTAL	PASSED
2509.78	-47.61	0.01734	-58.31	10.7	VERTICAL	PASSED
3291.022	-56.27	0.00236	-63.77	7.5	HORIZONTAL	PASSED
3362.084	-56.11	0.00245	-63.91	7.8	HORIZONTAL	PASSED

*Substitution method could not be utilized as no emissions above noise floor were found during measurements.

4.4. GSM 850 E-GPRS (MSC9) test results

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1675.304	-56.67	0.00215	-60.87	4.2	HORIZONTAL	PASSED
2509.82	-49.21	0.01199	-59.91	10.7	VERTICAL	PASSED

*Substitution method could not be utilized as no emissions above noise floor were found during measurements.

4.5. GSM 1900 test results

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1910.929	-40.18	0.09594	-48.98	8.8	VERTICAL	PASSED
1912.866	-41.81	0.06592	-50.51	8.7	VERTICAL	PASSED
8991.343	-43.07	0.04932	-66.97	23.9	VERTICAL	PASSED
9311.102	-42.02	0.06281	-66.72	24.7	HORIZONTAL	PASSED
9847.695	-41.57	0.06966	-67.57	26	VERTICAL	PASSED
9922.959	-42.23	0.05984	-68.13	25.9	VERTICAL	PASSED

*Substitution method could not be utilized as no emissions above noise floor were found during measurements.

4.6. GSM 1900 E-GPRS (MSC9) test results

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3755.291	-53.77	0.0042	-64.47	10.7	VERTICAL	PASSED
5643.026	-48.3	0.01479	-62.7	14.4	HORIZONTAL	PASSED

*Substitution method could not be utilized as no emissions above noise floor were found during measurements.

4.7. WCDMA 850 test results

Channel 4175 / 835.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
850.686	-46.11	0.02449	-80.31	34.2	HORIZONTAL	PASSED
857.757	-45.88	0.02582	-80.58	34.7	VERTICAL	PASSED
878.617	-34.93	0.32137	-69.93	35	VERTICAL	PASSED
880.301	-34.05	0.39355	-68.85	34.8	VERTICAL	PASSED
884.89	-45.21	0.03013	-80.11	34.9	HORIZONTAL	PASSED
989.591	-42.73	0.05333	-79.73	37	HORIZONTAL	PASSED
1670.261	-58.03	0.00157	-62.03	4	VERTICAL	PASSED
2514.319	-51.81	0.00659	-62.61	10.8	VERTICAL	PASSED
3330.281	-56.32	0.00233	-63.92	7.6	VERTICAL	PASSED
4170.491	-55.31	0.00294	-65.31	10	VERTICAL	PASSED
5017.114	-51.5	0.00708	-62.7	11.2	HORIZONTAL	PASSED
5842.976	-48.48	0.01419	-61.18	12.7	VERTICAL	PASSED
6670.882	-43.56	0.04406	-60.56	17	VERTICAL	PASSED
7510.13	-46.05	0.02483	-65.95	19.9	HORIZONTAL	PASSED
8349.94	-46.79	0.02094	-66.89	20.1	VERTICAL	PASSED

*Substitution method could not be utilized as no emissions above noise floor were found during measurements.

4.8. LTE7 test results

Channel 21100 / 2535.0 MHz

FDD, CBW 5MHz, QPSK, 1 RB, RMS detector; Antenna 1

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2573.76	-61.99	0.00063	-73.59	11.6	HORIZONTAL	PASSED
5070.261	-57.76	0.00167	-71.46	13.7	HORIZONTAL	PASSED
7596.323	-55.76	0.00265	-77.96	22.2	HORIZONTAL	PASSED
10139.739	-52.28	0.00592	-77.98	25.7	HORIZONTAL	PASSED
12666.002	-51.67	0.00681	-79.07	27.4	HORIZONTAL	PASSED

*Substitution method could not be utilized as no emissions above noise floor were found during measurements.

Channel 21100 / 2535.0 MHz

FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector; Antenna 1

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2569.19	-62.1	0.00062	-73.6	11.5	HORIZONTAL	PASSED
5076.834	-59.33	0.00117	-73.03	13.7	HORIZONTAL	PASSED
7602.214	-55.74	0.00267	-77.94	22.2	HORIZONTAL	PASSED
10136.533	-52.29	0.0059	-77.99	25.7	HORIZONTAL	PASSED
12675.782	-51.68	0.00679	-79.08	27.4	HORIZONTAL	PASSED

*Substitution method could not be utilized as no emissions above noise floor were found during measurements.

Channel 21100 / 2535.0 MHz

FDD, CBW 5MHz, QPSK, 1 RB, RMS detector ; Antenna 2

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2567.327	-62.15	0.00061	-73.65	11.5	HORIZONTAL	PASSED
5066.693	-59.09	0.00123	-72.69	13.6	HORIZONTAL	PASSED
7613.637	-55.88	0.00258	-77.98	22.1	HORIZONTAL	PASSED
10140.14	-52.28	0.00592	-77.98	25.7	HORIZONTAL	PASSED
12674.9	-51.69	0.00678	-79.09	27.4	HORIZONTAL	PASSED

*Substitution method could not be utilized as no emissions above noise floor were found during measurements.

Channel 21100 / 2535.0 MHz

FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector; Antenna 2

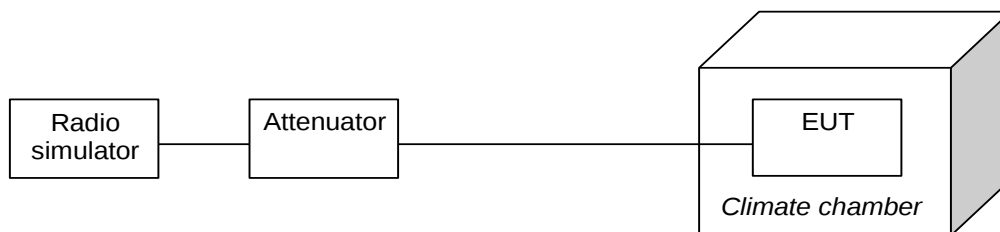
Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2572.637	-62.01	0.00063	-73.61	11.6	HORIZONTAL	PASSED
5069.419	-59.06	0.00124	-72.76	13.7	HORIZONTAL	PASSED
7607.866	-55.73	0.00267	-77.93	22.2	HORIZONTAL	PASSED
10137.295	-52.29	0.0059	-77.99	25.7	HORIZONTAL	PASSED
12672.896	-51.68	0.00679	-79.08	27.4	HORIZONTAL	PASSED

*Substitution method could not be utilized as no emissions above noise floor were found during measurements.

5. Frequency stability, temperature variation (FCC §27.54, §2.1055(a), RSS-199 4.3, RSS-133 6.3)

EUT with DUT number	RM-1038, DUT 54428
Accessories with DUT numbers	Samsung BV-T5A , DUT 54452 ; AC-20E, DUT 54463 ; WH-108, DUT 54459
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24/55/100
Date of measurements	15-Jul-2014
Measured by	Dou Rubo

5.1. Test Setup



5.2. Test method and limit

The measurement is made according to applicable FCC rule parts and IC standards 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. 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	-1.77383	-0.0007	PASSED
40	2535.00	4.80652	0.0019	PASSED
30	2535.00	0.77248	0.0003	PASSED
20	2535.00	1.80244	0.0007	PASSED
10	2535.00	-2.34604	-0.0009	PASSED
0	2535.00	1.78814	0.0007	PASSED
-10	2535.00	5.67913	0.0022	PASSED
-20	2535.00	-5.46455	-0.0022	PASSED
-30	2535.00	2.07424	0.0008	PASSED

5.4. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	47.27000	0.0251	PASSED
40	1880.00	48.56000	0.0258	PASSED
30	1880.00	44.75000	0.0238	PASSED
20	1880.00	38.48000	0.0205	PASSED
10	1880.00	42.17000	0.0224	PASSED
0	1880.00	41.46000	0.0221	PASSED
-10	1880.00	40.81000	0.0217	PASSED
-20	1880.00	47.59000	0.0253	PASSED
-30	1880.00	49.91000	0.0265	PASSED

5.5. GSM 850 Test results

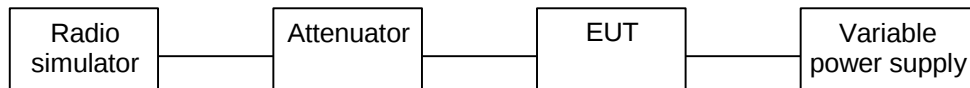
GSM, Channel 190 / 836.6 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.60	8.85000	0.0106	PASSED
40	836.60	2.71000	0.0032	PASSED
30	836.60	5.17000	0.0062	PASSED
20	836.60	1.10000	0.0013	PASSED
10	836.60	0.06000	0.0001	PASSED
0	836.60	-1.61000	-0.0019	PASSED
-10	836.60	-2.78000	-0.0033	PASSED
-20	836.60	3.10000	0.0037	PASSED
-30	836.60	6.07000	0.0073	PASSED

6. Frequency stability, voltage variation (FCC §27.54, §2.1055(d), RSS-199 4.3", RSS-132 4.3, RSS-133 6.3)

EUT with DUT number	RM-1038, DUT 54428
Accessories with DUT numbers	SD-233R, DUT 54473
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24/55/100
Date of measurements	16-Jul-2014
Measured by	Dou Rubo

6.1. Test Setup



6.2. Test method and limit

The measurement is made according to applicable FCC rule parts and IC standards 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. 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 / 4.2	2535.00	3.13282	0.0012	PASSED
Battery cut-off point / 3.6	2535.00	-0.08583	0	PASSED
Nominal / 4.2	2535.00	-1.30177	-0.0005	PASSED

6.4. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	836.60	8.14000	0.0097	PASSED
Battery cut-off point / 3.6	836.60	7.94000	0.0095	PASSED
Nominal / 4.2	836.60	5.23000	0.0063	PASSED

6.5. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1880.00	39.78000	0.0212	PASSED
Battery cut-off point / 3.6	1880.00	46.43000	0.0247	PASSED
Nominal / 4.2	1880.00	46.43000	0.0247	PASSED

7. Test Equipment

7.1. Conducted 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
BJPCHW0020	DC Power supply	HP6632B	HP	22/24/27, 15C
BJPCPT0040	Receiver	ESCS30	R&S	15C, 15B
BJPCPT0069	LISN 50 μ H	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	Temperature Test chamber	VT4002	Votsch industrietechnik	22/24/27, 15C
BJPCTC0090	FSP spectrum analyzer	FSP30	R&S	22/24/27, 15C
BJPCTC0094	GPIO-RS232 convertor	GPIO-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	GPIO converter	GPIO-RS232	NI	22/24/27, 15C
BJPCTC0304	Spectrum Analyser	FSV30	R&S	22/24/27, 15C
BJPCTC0309	GPIO-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
BJPCTC0352	Signal Generator 20GHz	MG3692B	Anritsu	22/24/27, 15C
BJBDATC0169	Temperature Test chamber	VT4002	Votsch	22/24/27, 15C
BJPCTC0334	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
BJPCTC0342	Communication Tester	CMU200	R&S	15B, 15C
BJPCTC0343	Power Splitter	1167A	Agilent	EN300328
BJPCTC0344	Power Splitter	1167A	Agilent	EN300328
BJPCTC0345	Power Splitter	1167A	Agilent	EN300328
BJPCTC0346	Attenuator	8496A	Agilent	EN300328
BJPCTC0347	Directional Coupler	4226-20	Narda	EN300328
BJPCTC0348	Signal generator	E4438C	Agilent	EN300328
BJPCTC0336	Signal Generator	SMP22	R&S	22/24/27, 15C

7.2. 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

Eq. No	Equipment	Type	Manufacturer	Used in
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
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
BJPCTC0350	Preamplifier	AMF-4D-01000800-30-29P	Miteq	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
BJPCTC0334	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
BJPCTC0342	Communication Tester	CMU200	R&S	15B, 15C

Eq. No	Equipment	Type	Manufacturer	Used in
BJPCTC0349	Preamplifier	AMF-4D-01000800-30-79P	Miteg	22/24/27, 15C, 15B
BJPCTC0350	Preamplifier	AMF-4D-01000800-30-29P	Miteg	22/24/27, 15C, 15B
BJPCTC0351	Preamplifier	AFS4-00101800	-	22/24/27, 15C, 15B