FCC Test Report

Application Purpose	:	Original grant
Applicant Name:	:	TECNO MOBILE LIMITED
FCC ID	:	2ADYY-N2
Equipment Type	:	Mobile phone
Model Name	:	N2
Report Number	:	FCC16073807-4
Standard(S)	:	FCC Part 22H & 24E Rules
Date Of Receipt	:	July 14, 2016
Date Of Issue	:	August 03, 2016
Test By	:	Daisy Qin *(Daisy Qin)*
Reviewed By	:	Sol Qin *(Sol Qin)*
Authorized by	:	 *(Michal Ling)*
Prepared by	:	**QTC Certification & Testing Co., Ltd.** 2nd Floor,Bl Building,Fengyeyuan Industrial Plant,, Liuxian 2st. Road, Xin'an Street, Bao'an District,,Shenzhen,518000 **Registration Number: 588523**

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	August 03, 2016	Valid	Original Report
V1.1	August 23, 2016	August 03, 2016	Valid	Original Report

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1. CERTIFICATION

Applicant	TECNO MOBILE LIMITED
Address	ROOMS 05-15, 13A/F., SOUTH TOWER,WORLD FINANCE CENTRE, HARBOUR CITY, 17 CANTON ROAD, TSIM SHA TSUI, KOWLOON, HONG KONG
Manufacturer	SHENZHEN TECNO TECHNOLOGY CO.,LTD.
Address	1-4th Floor,3rd Building,Pacific Industrial Park,No.2088,Shenyan Road,Yantian District,Shenzhen,Guangdong,China
Equipment Type	Mobile phone
Brand Name	TECNO
Test Model	N2
Hardware version:	D2030-TECNO-M-CO-E1-V0.1.2-S0712
Software version:	V1.1
Series Model	N/A
Difference description	N/A
Deviation	None
Condition of Test Sample	Normal

We hereby certify that:

The above equipment was tested by QTC Certification & Testing Co., Ltd.
2nd Floor,Bl Building,Fengyeyuan Industrial Plant,, Liuxian 2st. Road, Xin'an Street, Bao'an District,,Shenzhen,518000
Registration Number: 588523
The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C 63.4:2014 and TIA/EIA 603. The sample tested as described in this report is in compliance with the FCC Rules Part2 and 22H.
The test results of this report relate only to the tested sample identified in this report.

2. GENERAL INFORMATION

2.1.EUT Description

Equipment Type:	Mobile phone
Hardware version:	D2030-TECNO-M-CO-E1-V0.1.2-S0712
Software version:	V1.1
Frequency Bands:	☒GSM 850 ☒PCS 1900 (U.S. Bands) ☒GSM 900 ☒DCS 1800 (Non-U.S. Bands) U.S. Bands: ☒UMTS FDD Band II ☒UMTS FDD Band V Non-U.S. Bands: ☒UMTS FDD Band I ☒UMTS FDD Band VIII
Antenna Type:	Detachable Antenna
Antenna gain:	1.55dBi
Battery information:	N/A
Adapter Information:	N/A
Card(S):	Card 1: UMTS Card Slot
Max power:	See note 3
GPRS Class:	12
Extreme Vol. Limits:	DC 3.5V to 4.2V (Normal: DC 3.8V)
Extreme Temp. Tolerance	-10℃ to +50℃

Note 1: The High Voltage DC 4.2V and Low Voltage DC 3.5V were declared by manufacturer, The EUT couldn't be operating normally with higher or lower voltage.

3. TEST DESCRIPTION

3.1.Test Facility

The test site used to collect the radiated data is located at:

QTC Certification & Testing Co., Ltd.

2nd Floor,Bl Building,Fengyeyuan Industrial Plant,, Liuxian 2st. Road, Xin'an Street, Bao'an District,,Shenzhen,518000

EUT System Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

Fig. 3.2-1 Configuration of EUT System

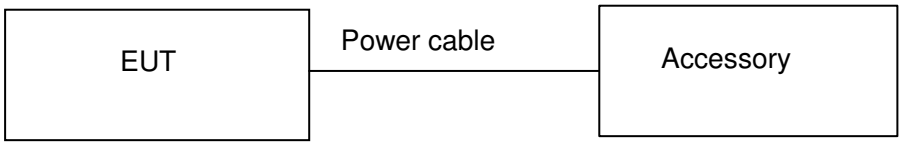


Table 3.2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile phone	N2	FCC ID: 2ADYY-N2	EUT
2	DC SOURCE	RXN-3010D	Series: 2008006875	Power supply

***Note: All the accessories have been used during the test. The following "EUT" in setup diagram means EUT system.

3.2. Description Of Test Channels And Test Modes

During the testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication Tester (CMU 200) to ensure max power transmission and proper modulation. Three channels (The top channel, the middle channel and the bottom channel) were chosen for testing on following frequency band(s).

Test channels:

Band	Channel		Frequency (MHz)
GSM850	Low	128	824.2
	Middle	190	836.6
	High	251	848.8

Band	Channel		Frequency (MHz)
PCS1900	Low	512	1850.2
	Middle	661	1880
	High	810	1909.8

Band	Channel		Frequency (MHz)
WCDMA BAND II	Low	9263	1852.6
	Middle	9400	1880
	High	9537	1907.4

Band	Channel		Frequency (MHz)
WCDMA BAND V	Low	4133	826.6
	Middle	4175	835
	High	4232	846.4

The worst condition was recorded in the test report if no other modes test data.

3.3. Equipment Modifications

Not available for this EUT intended for grant.

4. SUMMARY OF TEST REQUIREMENTS AND RESULTS

For GSM850/GPRS850:

Item Number	Item Description		Test Channel	FCC Rules	Result
1	Output Power	Conducted Output Power	128/190/251	2.1046/22.913(a) (2)	Pass
		Radiated Output Power	128/190/251		
2	Spurious Emission	Conducted Spurious Emission	128/190/251	2.1051 / 22.917	Pass
		Radiated Spurious Emission	128/190/251		
3	Mains Conducted Emission			15.207	Pass
4	Frequency Stability		190	2.1055/22.355	Pass
5	Occupied Bandwidth		128/190/251	2.1049	Pass
6	Emission Bandwidth		128/190/251	22.917(a)(b)	Pass
7	Band Edge		128/190/251	22.917(a)	Pass

For PCS1900/GPRS1900:

Item Number	Item Description		Test Channel	FCC Rules	Result
1	Output Power	Conducted Output Power	512/661/810	2.1046/24.232(c)	Pass
		Radiated Output Power	512/661/810		
2	Peak-to-Average Ratio	Peak-to-Average Ratio	512/661/810	24.232(d)	Pass
3	Spurious Emission	Conducted Spurious Emission	512/661/810	2.1051 / 24.238(a)	Pass
		Radiated Spurious Emission	512/661/810		
4	Mains Conducted Emission			15.207	Pass
5	Frequency Stability		661	2.1055/24.235	Pass
6	Occupied Bandwidth		512/661/810	2.1049	Pass
7	Emission Bandwidth		512/661/810	24.238(a)(b)	Pass
8	Band Edge		512/661/810	24.238(a)(b)	Pass

For WCDMA BAND II:

Item Number	Item Description		Test Channel	FCC Rules	Result
1	Output Power	Conducted Output Power	9263/9400/9537	2.1046/22.913(a) (2)	Pass
		Radiated Output Power	9263/9400/9537		
2	Spurious Emission	Conducted Spurious Emission	9263/9400/9537	2.1051 / 22.917	Pass
		Radiated Spurious Emission	9263/9400/9537		
3	Frequency Stability		9400	2.1055/22.355	Pass
4	Occupied Bandwidth		9263/9400/9537	2.1049	Pass
5	Emission Bandwidth		9263/9400/9537	22.917(a)(b)	Pass
6	Band Edge		9263/9400/9537	22.917(a)	Pass

For WCDMA BAND V:

Item Number	Item Description		Test Channel	FCC Rules	Result
1	Output Power	Conducted Output Power	4133/4175/4232	2.1046/22.913(a) (2)	Pass
		Radiated Output Power	4133/4175/4232		
2	Spurious Emission	Conducted Spurious Emission	4133/4175/4232	2.1051 / 22.917	Pass
		Radiated Spurious Emission	4133/4175/4232		
3	Frequency Stability		4175	2.1055/22.355	Pass
4	Occupied Bandwidth		4133/4175/4232	2.1049	Pass
5	Emission Bandwidth		4133/4175/4232	22.917(a)(b)	Pass
6	Band Edge		4133/4175/4232	22.917(a)	Pass

5. MEASUREMENT INSTRUMENTS

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	Calibration Date	Calibration Due.
EMI Test Receiver	R&S	ESCI	100005	08/19/2015	08/18/2016
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI	101139	08/19/2015	08/18/2016
LISN	AFJ	LS16	16010222119	08/19/2015	08/18/2016
LISN(EUT)	Mestec	AN3016	04/10040	08/19/2015	08/18/2016
Universal Radio Communication Tester	R&S	CMU 200	1100.0008.02	08/19/2015	08/18/2016
Coaxial cable	Megalon	LMR400	N/A	08/12/2015	08/11/2016
GPIB cable	Megalon	GPIB	N/A	08/12/2015	08/11/2016
Spectrum Analyzer	R&S	FSU	100114	08/19/2015	08/18/2016
Pre Amplifier	H.P.	HP8447E	2945A02715	10/13/2015	10/12/2016
Pre-Amplifier	CDSI	PAP-1G18-38	--	10/13/2015	10/12/2016
Bi-log Antenna	SUNOL Sciences	JB3	A021907	09/13/2015	09/12/2016
9*6*6 Anechoic	--	--	--	08/21/2015	08/20/2016
Horn Antenna	COMPLIANCE ENGINEERING	CE18000	--	09/13/2015	09/12/2016
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-631	08/23/2015	08/22/2016
Cable	TIME MICROWAVE	LMR-400	N-TYPE04	04/25/2016	04/24/2017
System-Controller	CCS	N/A	N/A	N.C.R	N.C.R
Turn Table	CCS	N/A	N/A	N.C.R	N.C.R
Antenna Tower	CCS	N/A	N/A	N.C.R	N.C.R
RF cable	Murata	MXHQ87WA3000	-	08/21/2015	08/20/2016
Loop Antenna	EMCO	6502	00042960	08/22/2015	08/21/2016
Horn Antenna	SCHWARZBECK	BBHA 9170	1123	08/19/2015	08/18/2016
Three-way connector	Weinschel	1506A	A1213	08/19/2015	08/18/2016
Attenuator	MCL	BW-N20W5+	1306	08/19/2015	08/18/2016
Signal generator	Agilent	8920B	VS36141817	08/19/2015	08/18/2016
Power amplifier	rflight	NTWPA-00810150100E	13103205	08/19/2015	08/18/2016
Power amplifier	rflight	NTWPA-1060040E	13104214	08/19/2015	08/18/2016
Bi-log Antenna	A.H. Systems Inc.	SAS-522-3	1326	08/21/2015	08/20/2016

6. OUTPUT POWER

5.1.Conducted Output Power

Measurement Method

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all modes (GSM/GPRS 850, GSM/GPRS1900) at 3 typical channels described in section 3.3 of this report for each band.

Measurement Result

Conducted Output Power Limits for GSM850 band		
Mode	**Nominal Peak Power**	**Tolerance(dB)**
GSM	33 dBm (2W)	+/- 1
Conducted Output Power Limits for PCS1900 band		
Mode	**Nominal Peak Power**	**Tolerance(dB)**
GSM	30 dBm (1W)	+/- 1

Conducted Output Power Limits for WCDMA BAND II band		
Mode	**Nominal Average Power**	**Tolerance(dB)**
GSM	23 dBm (1W)	+/- 2
Conducted Output Power Limits for WCDMA BAND V band		
Mode	**Nominal Average Power**	**Tolerance(dB)**
GSM	23 dBm (1W)	+/- 2

GSM 850:

Card 1:

Mode	Frequency (MHz)	Peak Power (dBm)	Avg. Burst Power (dBm)	PAPR (dB)	Duty cycle Factor(dB)	Frame Power(dBm)
GSM850	824.2	32.59	32.31	0.28	-9	23.31
	836.6	32.33	32.13	0.20	-9	23.13
	848.8	32.51	31.96	0.55	-9	22.96
GPRS850 (1 Slot)	824.2	**32.63**	**32.35**	0.28	-9	23.35
	836.6	32.59	32.16	0.43	-9	23.16
	848.8	32.46	31.99	0.47	-9	22.99
GPRS850 (2 Slot)	824.2	31.83	31.43	0.40	-6	25.43
	836.6	31.60	31.24	0.36	-6	25.24
	848.8	31.67	31.08	0.59	-6	25.08
GPRS850 (3 Slot)	824.2	29.90	29.41	0.49	-4.26	25.15
	836.6	29.96	29.52	0.44	-4.26	25.26
	848.8	29.85	29.34	0.51	-4.26	25.08
GPRS850 (4 Slot)	824.2	28.91	28.76	0.15	-3	25.76
	836.6	28.80	28.6	0.20	-3	25.6
	848.8	28.85	28.73	0.12	-3	25.73

Card 2:

Mode	Frequency (MHz)	Peak Power (dBm)	Avg. Burst Power (dBm)	PAPR (dB)	Duty cycle Factor(dB)	Frame Power (dBm)
GSM850	824.2	32.60	32.31	0.29	-9	23.31
	836.6	32.64	32.1	0.54	-9	23.1
	848.8	32.44	31.97	0.47	-9	22.97
GPRS850 (1 Slot)	824.2	**32.84**	**32.33**	0.51	-9	23.33
	836.6	32.37	32.1	0.27	-9	23.1
	848.8	32.44	31.95	0.49	-9	22.95
GPRS850 (2 Slot)	824.2	31.90	31.39	0.51	-6	25.39
	836.6	31.70	31.22	0.48	-6	25.22
	848.8	31.36	31.07	0.29	-6	25.07
GPRS850 (3 Slot)	824.2	29.96	29.67	0.29	-4.26	25.41
	836.6	29.84	29.48	0.36	-4.26	25.22
	848.8	29.71	29.3	0.41	-4.26	25.04
GPRS850 (4 Slot)	824.2	28.86	28.66	0.20	-3	25.66
	836.6	28.73	28.54	0.19	-3	25.54
	848.8	28.82	28.65	0.17	-3	25.65

PCS 1900:

Card 1:

Mode	Frequency (MHz)	Peak Power (dBm)	Avg. Burst Power (dBm)	PAPR (dB)	Duty cycle Factor(dB)	Frame Power (dBm)
GSM1900	1850.2	28.55	28.16	0.39	-9	19.16
	1880	29.63	29.08	0.55	-9	20.08
	1909.8	**29.77**	**29.69**	0.08	-9	20.69
GPRS1900 (1 Slot)	1850.2	28.50	28.12	0.38	-9	19.12
	1880	29.40	29.12	0.28	-9	20.12
	1909.8	29.76	29.61	0.15	-9	20.61
GPRS1900 (2 Slot)	1850.2	27.76	27.17	0.59	-6	21.17
	1880	28.61	28.11	0.50	-6	22.11
	1909.8	28.57	28.09	0.48	-6	22.09
GPRS1900 (3 Slot)	1850.2	26.07	25.5	0.57	-4.26	21.24
	1880	26.61	26.38	0.23	-4.26	22.12
	1909.8	26.83	26.56	0.27	-4.26	22.3
GPRS1900 (4 Slot)	1850.2	25.12	24.61	0.51	-3	21.61
	1880	25.81	25.59	0.22	-3	22.59
	1909.8	25.78	25.49	0.29	-3	22.49

Card 2:

Mode	Frequency (MHz)	Peak Power (dBm)	Avg. Burst Power (dBm)	PAPR (dB)	Duty cycle Factor(dB)	Frame Power (dBm)
GSM1900	1850.2	28.35	28.1	0.25	-9	19.1
	1880	29.34	29.02	0.32	-9	20.02
	1909.8	**29.50**	**29.31**	0.19	-9	20.31
GPRS1900 (1 Slot)	1850.2	28.34	28.09	0.25	-9	19.09
	1880	29.43	29.07	0.36	-9	20.07
	1909.8	29.49	29.35	0.14	-9	20.35
GPRS1900 (2 Slot)	1850.2	27.49	27.16	0.33	-6	21.16
	1880	28.56	28.09	0.47	-6	22.09
	1909.8	28.33	28.08	0.25	-6	22.08
GPRS1900 (3 Slot)	1850.2	25.82	25.41	0.41	-4.26	21.15
	1880	26.77	26.34	0.43	-4.26	22.08
	1909.8	26.69	26.22	0.47	-4.26	21.96
GPRS1900 (4 Slot)	1850.2	25.13	24.6	0.53	-3	21.6
	1880	25.83	25.5	0.33	-3	22.5
	1909.8	25.63	25.4	0.23	-3	22.4

WCDMA BAND: II

Mode	Frequency (MHz)	Peak Power (dBm)	Avg. Burst Power(dBm)	PAPR (dB)
RMC 12.2K	826.4	24.28	22.22	-2.06
	836	24.84	22.23	-2.62
	846.6	24.32	22.54	-1.78
HSDPA SUBTEST 1	826.4	24.35	22.40	-1.95
	836	24.39	22.01	-2.38
	846.6	24.30	22.48	-1.83
HSDPA SUBTEST 2	826.4	24.36	22.63	-1.73
	836	24.74	22.00	-2.74
	846.6	24.69	22.12	-2.57
HSDPA SUBTEST 3	826.4	24.34	21.98	-2.37
	836	24.18	22.32	-1.86
	846.6	24.40	22.23	-2.17
HSDPA SUBTEST 4	826.4	24.17	22.89	-1.28
	836	24.28	22.79	-1.49
	846.6	24.19	22.56	-1.63
HSUPA SUBTEST 1	826.4	24.21	22.24	-1.97
	836	24.08	22.59	-1.49
	846.6	24.19	22.73	-1.46
HSUPA SUBTEST 2	826.4	24.29	22.60	-1.70
	836	24.50	22.75	-1.75
	846.6	24.47	22.38	-2.08
HSUPA SUBTEST 3	826.4	24.47	22.64	-1.84
	836	24.20	22.12	-2.08
	846.6	24.61	22.28	-2.33
HSUPA SUBTEST 4	826.4	24.22	22.06	-2.16
	836	24.51	22.24	-2.26
	846.6	24.71	22.59	-2.12
HSUPA SUBTEST 5	826.4	24.67	22.67	-2.00
	836	24.26	22.87	-1.39
	846.6	24.55	22.50	-2.05

WCDMA BAND V：

Mode	Frequency (MHz)	Peak Power (dBm)	Avg. Burst Power(dBm)	PAPR (dB)
RMC 12.2K	826.4	24.31	22.31	2.00
	836	24.71	22.29	2.42
	846.6	24.64	22.69	1.95
HSDPA SUBTEST 1	826.4	24.44	22.64	1.80
	836	24.30	22.33	1.97
	846.6	24.61	22.45	2.15
HSDPA SUBTEST 2	826.4	24.66	22.49	2.17
	836	24.63	22.30	2.33
	846.6	24.67	22.44	2.23
HSDPA SUBTEST 3	826.4	24.49	22.31	2.18
	836	24.42	22.49	1.93
	846.6	24.44	22.43	2.01
HSDPA SUBTEST 4	826.4	24.47	22.75	1.72
	836	24.30	22.66	1.64
	846.6	24.36	22.64	1.72
HSUPA SUBTEST 1	826.4	24.43	22.45	1.98
	836	24.37	22.65	1.72
	846.6	24.51	22.75	1.76
HSUPA SUBTEST 2	826.4	24.56	22.58	1.98
	836	24.38	22.72	1.66
	846.6	24.57	22.26	2.31
HSUPA SUBTEST 3	826.4	24.36	22.53	1.83
	836	24.30	22.37	1.92
	846.6	24.58	22.51	2.07
HSUPA SUBTEST 4	826.4	24.43	22.34	2.09
	836	24.52	22.45	2.07
	846.6	24.57	22.57	2.00
HSUPA SUBTEST 5	826.4	24.74	22.73	2.01
	836	24.30	22.72	1.59
	846.6	24.46	22.46	2.00

5.2. RADIATED OUTPUT POWER

Measurement Method

KDB 978 168 5.6 Determining ERP and EIRP from conducted RF output power measurements

In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$ERP/EIRP = P_{Meas} + G_T - L_C$$

where:

ERP/EIRP	=	effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas}, typically dBW or dBm);
P_{Meas}	=	measured transmitter output power or PSD, in dBm or dBW;
G_T	=	gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
L_C	=	signal attenuation in the connecting cable between the transmitter and antenna, in dB. *(For personal/portable radios utilizing an integral antenna, this factor is typically negligible. However, in a fixed station transmit system that utilizes a long cable run between the transmitter and the transmitting antenna, this factor can be significant. The minimum cable loss should be used in this equation)s*

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

Note: ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi. (KDB 412172 D01)

Provisions Applicable

This is the test for the maximum radiated power from the EUT. Rule Part 24.232(b) specifies, “Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power” and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.” Rule Part 22.913(a) specifies “Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

Mode	Nominal Peak Power
GSM 850/WCDMA BAND II	<=37.45 dBm (7W)
PCS 1900	<=33 dBm (2W)

Mode	Nominal Peak Power
GSM 850/WCDMA BAND V	<=38.45 dBm (7W)
PCS 1900	<=33 dBm (2W)

Measurement Result

Card 1:

Radiated Power (E.I.R.P) for GSM 850 MHZ				
Mode	Frequency	Result		Conclusion
		Max. Peak ERP (dBm)	Polarization Of Max. ERP	
GSM850	824.2	32.20	Horizontal	Pass
	836.6	32.33	Horizontal	Pass
	848.8	32.24	Horizontal	Pass

Radiated Power (E.I.R.P) for PCS 1900 MHZ				
Mode	Frequency	Result		Conclusion
		Max. Peak E.I.R.P.(dBm)	Polarization Of Max. E.I.R.P.	
GSM 1900	1850.2	**29.36**	Horizontal	Pass
	1880.0	29.20	Horizontal	Pass
	1909.8	29.13	Horizontal	Pass

Card 2:

Radiated Power (E.I.R.P) for GSM 850 MHZ				
Mode	**Frequency**	**Result**		**Conclusion**
		Max. Peak ERP (dBm)	**Polarization Of Max. ERP**	
GSM850	824.2	**32.47**	Horizontal	Pass
	836.6	32.20	Horizontal	Pass
	848.8	32.39	Horizontal	Pass

Radiated Power (E.I.R.P) for PCS 1900 MHZ				
Mode	**Frequency**	**Result**		**Conclusion**
		Max. Peak E.I.R.P.(dBm)	**Polarization Of Max. E.I.R.P.**	
GSM 1900	1850.2	29.19	Horizontal	Pass
	1880.0	**29.49**	Horizontal	Pass
	1909.8	29.13	Horizontal	Pass

Radiated Power (E.I.R.P) for WCDMA BAND II

Mode	**Frequency (MHz)**	**Result**	**Conclusion**
		Max. Peak ERP (dBm)	
WCDMA BAND II	1852.6	22.32	Pass
	1880	22.15	Pass
	1907.4	22.06	Pass

Radiated Power (E.I.R.P) for WCDMA BAND V

Mode	**Frequency (MHz)**	**Result**	**Conclusion**
		Max. Peak ERP (dBm)	
WCDMA BAND V	826.6	22.11	Pass
	835	22.04	Pass
	846.4	22.13	Pass

7. SPURIOUS EMISSION

6.1.CONDUCTED SPURIOUS EMISSION

Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.
1, Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.

Provisions Applicable

On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

Measurement Result

PLEASE REFER TO: APPENDIX A TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

Note: 1. Below 30MHZ no Spurious found and The GSM modes is the worst condition.

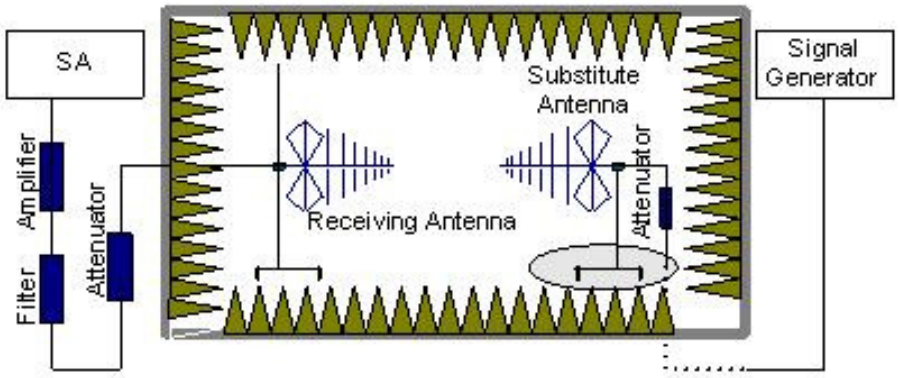
6.2. Radiated Spurious Emission

Measurement Method

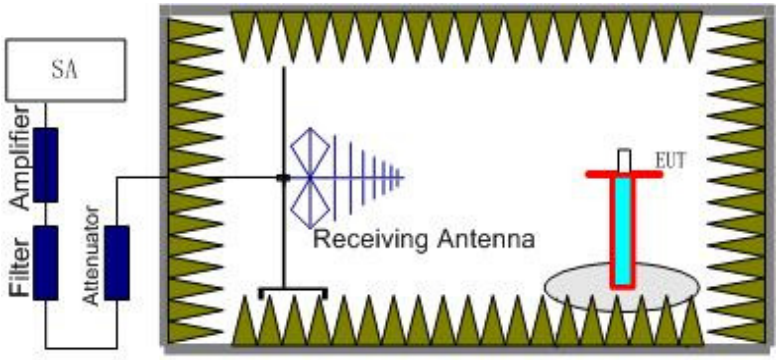
The measurements procedures specified in TIA-603C-2004 were used for testing. The spectrum was scanned from 9 KHz to the 10th harmonic of the highest frequency generated within the equipment. The measurements were performed on all modes(WCDMA BAND V) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx（dBuV）+CL（dB）+SA（dB）+Gain（dBi）-107（dBuV to dBm）The SA is calibrated using following setup.



b) EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the WCDMA BAND V (826.4MHz, 836MHz, 846.6MHz), . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: $Power=P_{Mea}+A_{Rpl}$

Provisions Applicable

(a) On any frequency outside a licensee’s frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Note: only result the worst condition of each test mode:

Measurement Result

GSM850:

The Worst Test Results for Channel 190/836.6MHz					
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
1648.4	-56.22	10.71	-45.51	-13	Horizontal
1648.4	-51.53	10.71	-40.82	-13	Vertical
2472.6	-68.16	11.95	-56.21	-13	Horizontal
2472.6	-56.94	11.95	-44.99	-13	Vertical

PCS1900:

The Worst Test Results for Channel 661/1880MHz					
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
3700.4	-50.49	9.28	-41.21	-13	Horizontal
3700.4	-54.60	9.28	-45.32	-13	Vertical
5550.6	-59.35	11.31	-48.03	-13	Horizontal
5550.6	-52.19	11.31	-40.87	-13	Vertical

WCDMA BAND II:

The Worst Test Results for Channel 9400/1880MHz					
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
1697.6	-33.52	-4.99	-28.53	-13	Horizontal
2546.4	-26.01	-2.45	-23.56	-13	Vertical
3395.2	-26.76	3.61	-30.37	-13	Horizontal
4244	-34.08	2.82	-36.90	-13	Vertical

WCDMA BAND V:

The Worst Test Results for Channel 4175/835MHz					
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit（dBm）	Polarity
1672	-30.46	1.23	-29.23	-13	Horizontal
1672	-34.37	2.21	-32.16	-13	Vertical
2508	-38.25	2.14	-36.11	-13	Horizontal
2508	-29.98	1.35	-28.63	-13	Vertical

Note: Below 30MHZ no Spurious found.

8. FREQUENCY STABILITY

Measurement Method

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

1 , Measure the carrier frequency at room temperature.

2 , Subject the EUT to overnight soak at -10℃.

3 , With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 4180 for WCDMA band V, measure the carrier frequency.

These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

4 , Repeat the above measurements at 10℃ increments from -10℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

5 , Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.

6 , Subject the EUT to overnight soak at +50℃.

7 , With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

8 , Repeat the above measurements at 10℃ increments from +50℃ to -10℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

9 , At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

Provisions Applicable

- **For Hand carried battery powered equipment**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies.For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

- **For equipment powered by primary supply voltage**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d) (1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment, the normal environment temperature is 25°C.

Measurement Result (WORST)

GSM850:

Frequency	Frequency error(Hz)	Frequency error(ppm)
824.2	46	0.56
836.6	44	0.53
848.8	38	0.48

PCS1900:

Frequency	Frequency error(Hz)	Frequency error(ppm)
1850.2	36	0.19
1880	39	0.21
1909.8	34	0.18

UTRA BANDS

BAND 2:

Frequency	Frequency error(Hz)	Frequency error(ppm)
1852.6	40	0.22
1880	36	0.19
1907.4	36	0.19

BAND 5:

Frequency	Frequency error(Hz)	Frequency error(ppm)
826.6	36	0.44
835	33	0.40
846.4	31	0.37

9. OCCUPIED BANDWIDTH

Measurement Method

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

Provisions Applicable

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

Measurement Result

GSM850:

Frequency	OBW(99%)	26dB BW
824.2	246.79 KHz	282.05KHz
836.6	245.19KHz	277.24KHz
848.8	243.59KHz	286.86 KHz

PCS1900:

Frequency	OBW(99%)	26dB BW
1850.2	245.19KHz	275.64KHz
1880	245.19KHz	277.24KHz
1909.8	246.79KHz	290.06KHz

UTRA BANDS

BAND 2:

Frequency	OBW(99%)	26dB BW
1852.6	4.231MHz	4.936MHz
1880	4.231MHz	4.904MHz
1907.4	4.247MHz	4.968MHz

BAND 5:

Frequency	OBW(99%)	26dB BW
826.6	4.215MHz	4.760MHz
835	4.215MHz	4.680MHz
846.4	4.247MHz	4.728MHz

Please refers to Appendix B for compliance test plots

10. EMISSION BANDWIDTH

Measurement Method

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

Provisions Applicable

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

Measurement Result

Emission Bandwidth (-26dBc) for GSM850		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	824.2	4.656
Middle Channel	836.6	4.666
High Channel	848.8	4.676

Emission Bandwidth (-26dBc) for GSM1900		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	1850.2	4.678
Middle Channel	1880	4.678
High Channel	1909.8	4.678

Emission Bandwidth (-26dBc) for WCDMA BAND II		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	1852.6	4.656
Middle Channel	1880	4.666
High Channel	1907.4	4.678

Emission Bandwidth (-26dBc) for WCDMA BAND V		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	826.6	4.679
Middle Channel	835	4.679
High Channel	846.4	4.679

11. BAND EDGE

Measurement Method

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

Provisions Applicable

As Specified in FCC rules of 22.917(a)

Measurement Result

GSM850:

Test Channel	BW(MHz)	UL Channel	Frequency(MHz)	Judgement
Low Range	0.2	128	824.2	Pass
High Range	0.2	251	848.8	Pass

PCS 1900:

Test Channel	BW(MHz)	UL Channel	Frequency(MHz)	Judgement
Low Range	0.2	512	1850.2	Pass
High Range	0.2	810	1909.8	Pass

UTRA BANDS

BAND 2:

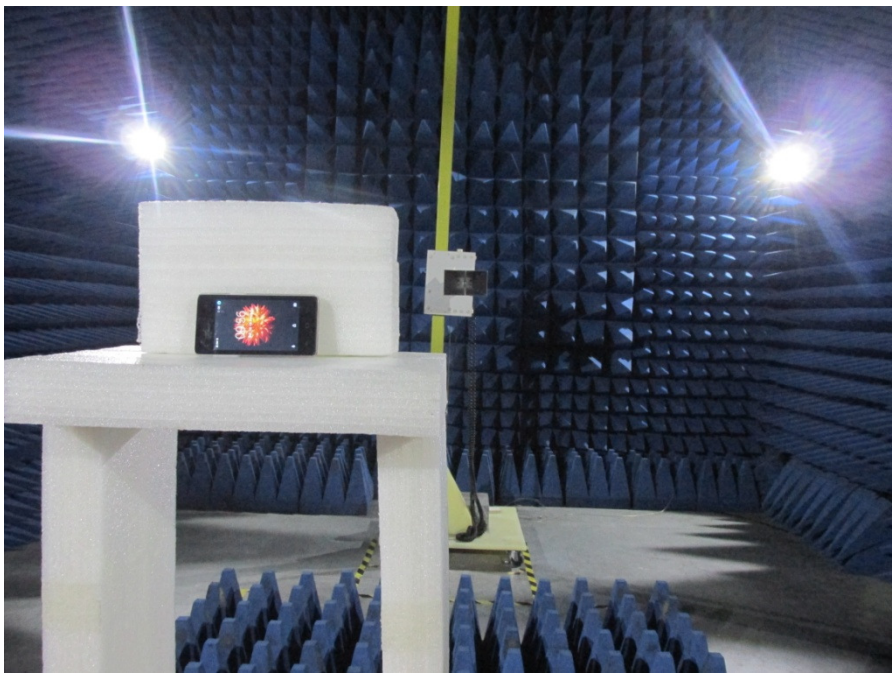
Test Channel	BW(MHz)	UL Channel	Frequency(MHz)	Judgement
Low Range	5	9262	1852.6	Pass
High Range	5	9538	1907.4	Pass

BAND 5:

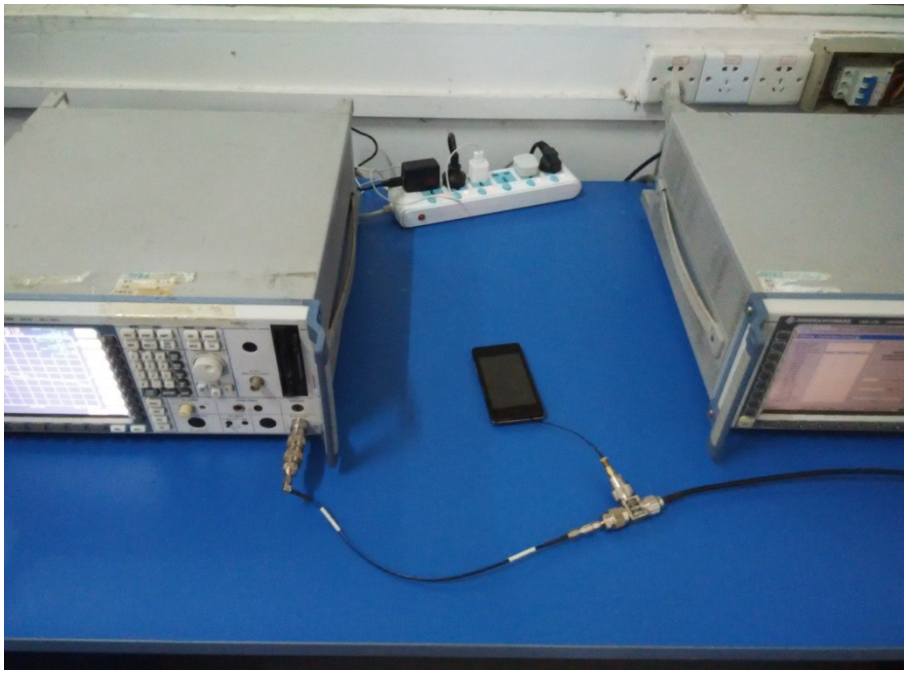
Test Channel	BW(MHz)	UL Channel	Frequency(MHz)	Judgement
Low Range	5	4132	826.6	Pass
High Range	5	4233	846.4	Pass

12. EUT TEST PHOTO

RADIATED EMISSION TEST



RF TEST



13. EUT PHOTO

Appearance photograph of EUT

Appearance photograph of EUT

Appearance photograph of EUT

Appearance photograph of EUT

Appearance photograph of EUT

Appearance photograph of EUT

Appearance photograph of EUT

Appearance photograph of EUT

Appearance photograph of EUT

Internal photograph of EUT

Internal photograph of EUT

Internal photograph of EUT

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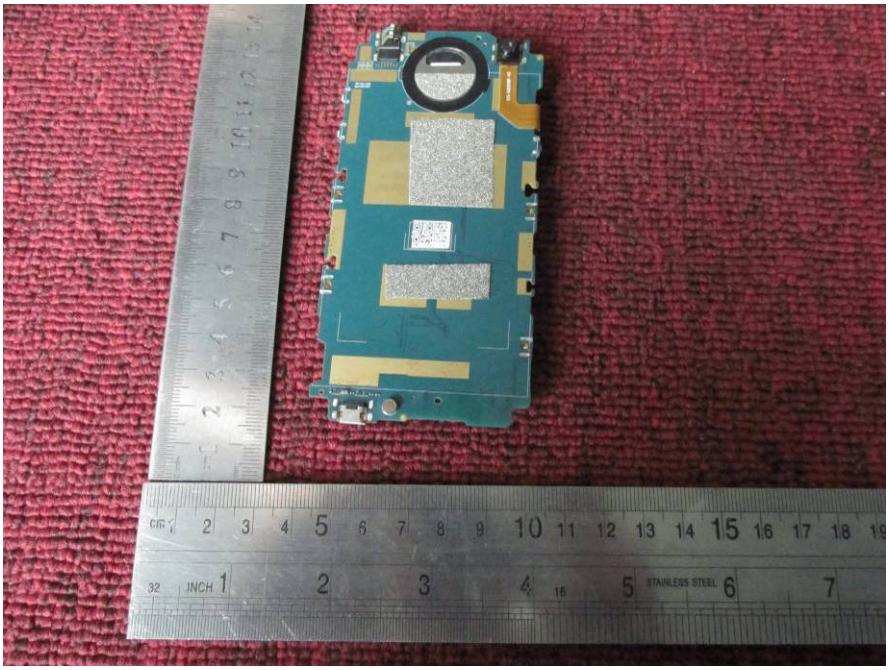
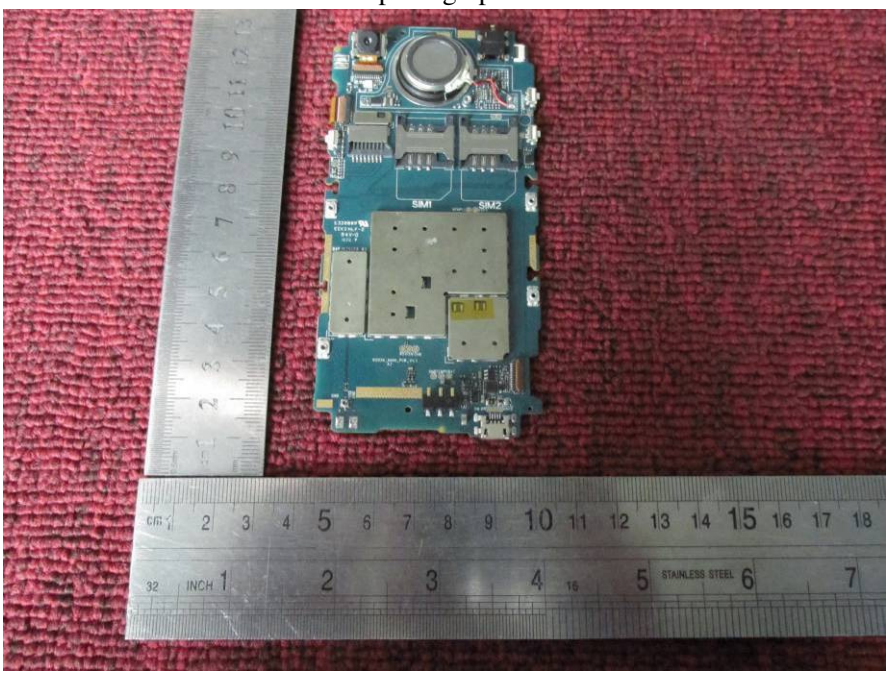
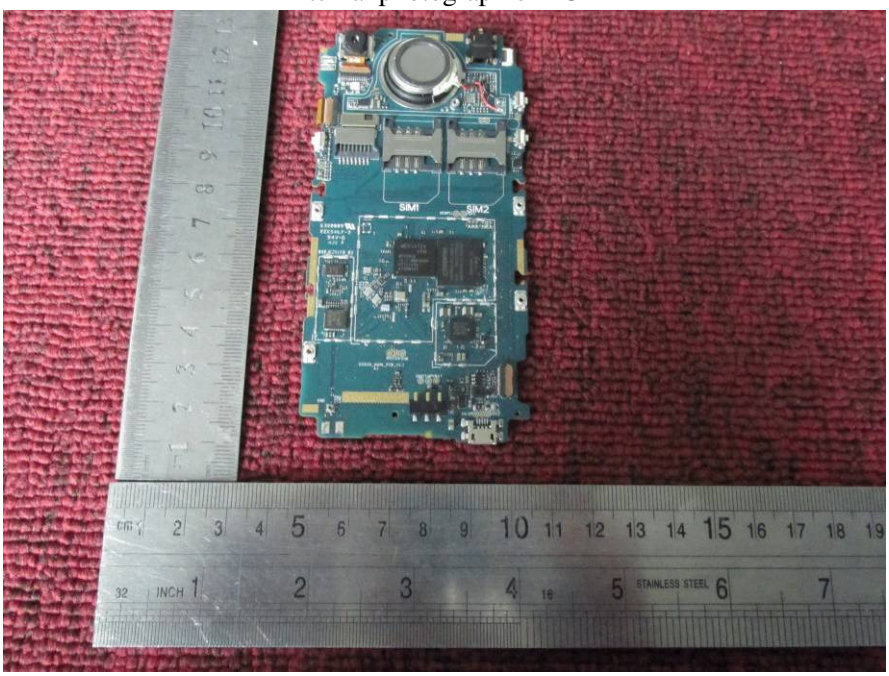
Internal photograph of EUT



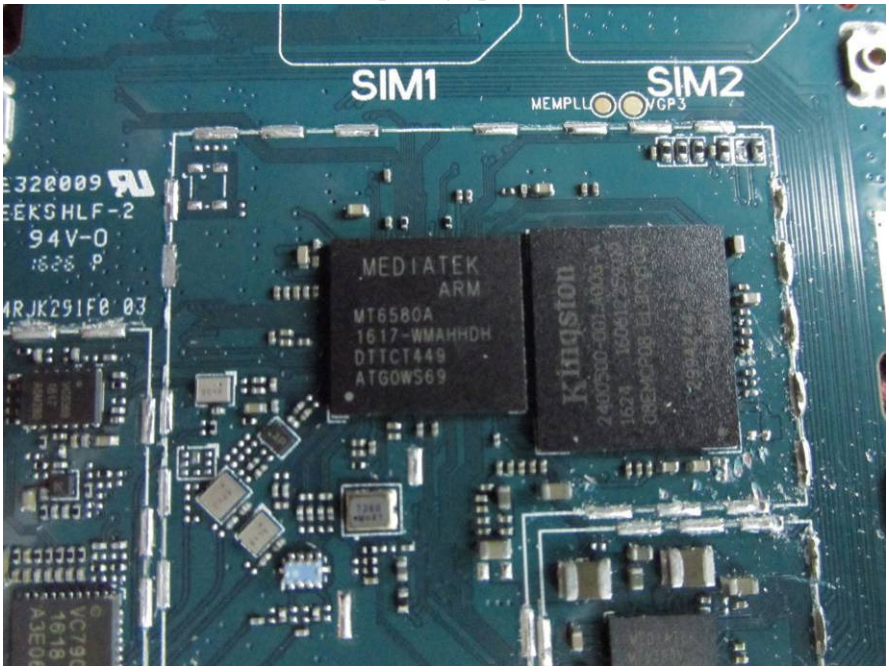
Internal photograph of EUT



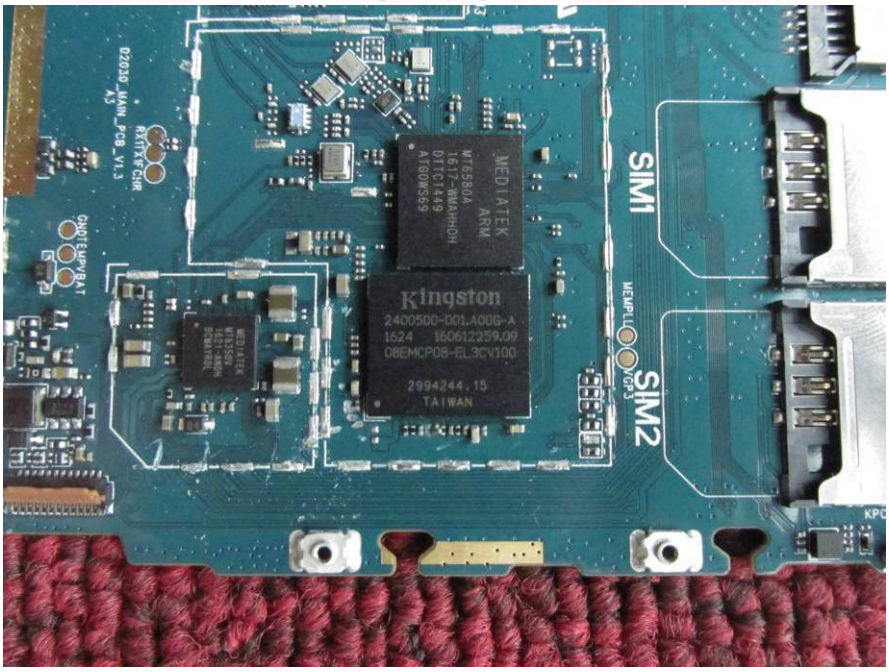
Internal photograph of EUT



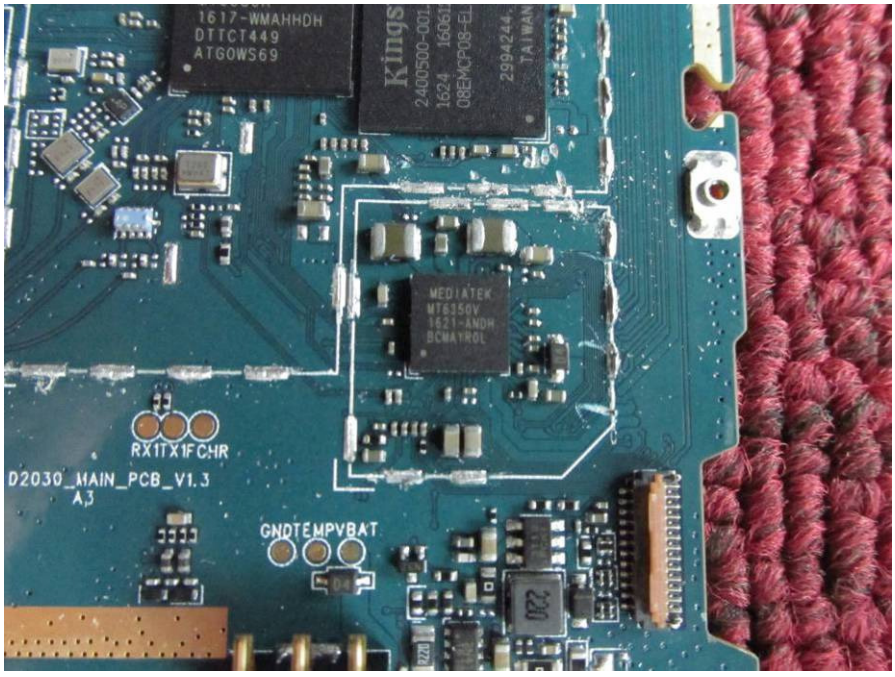
Internal photograph of EUT



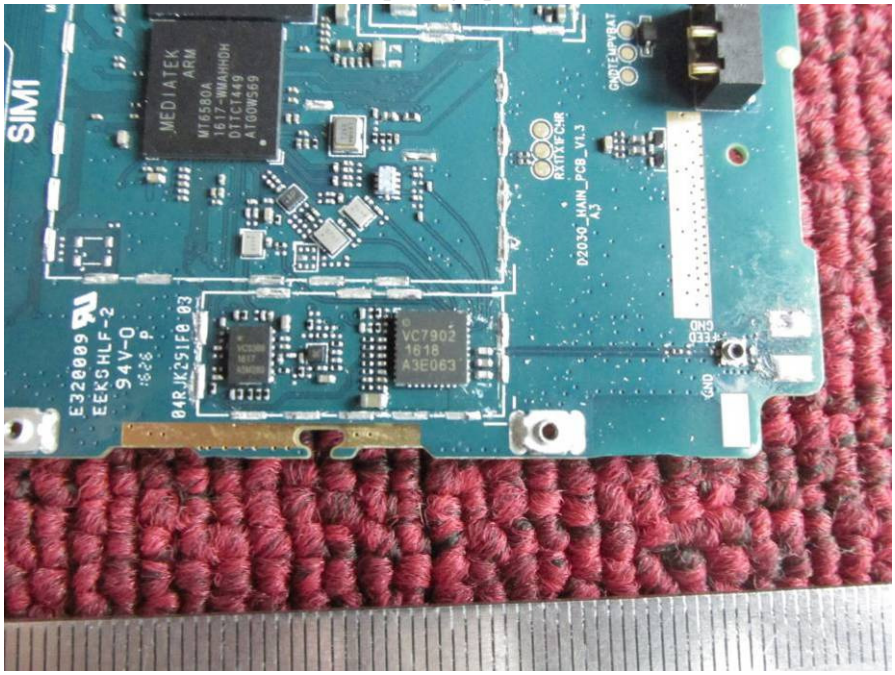
Internal photograph of EUT



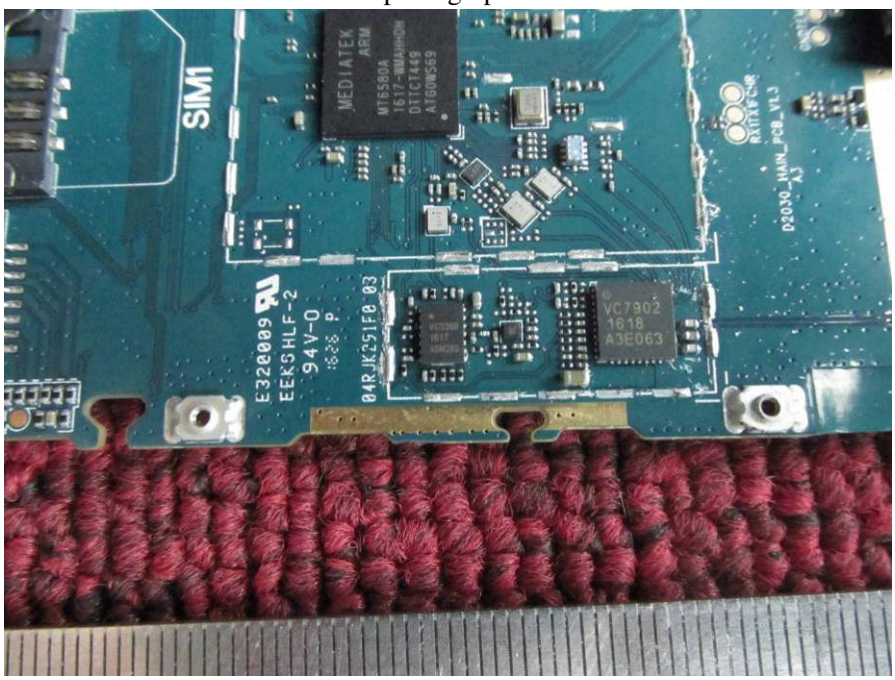
Internal photograph of EUT



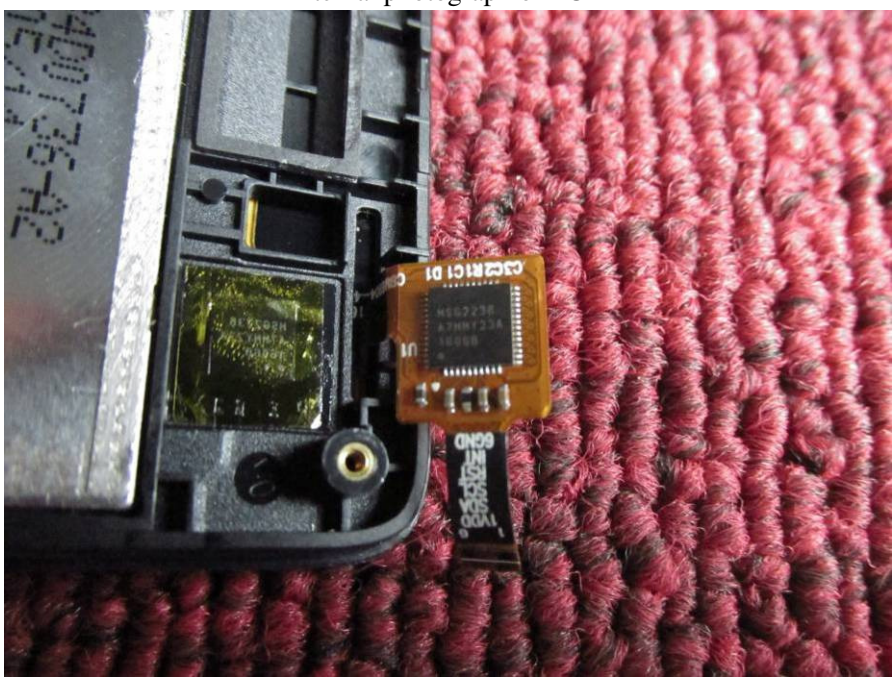
Internal photograph of EUT



Internal photograph of EUT



Internal photograph of EUT

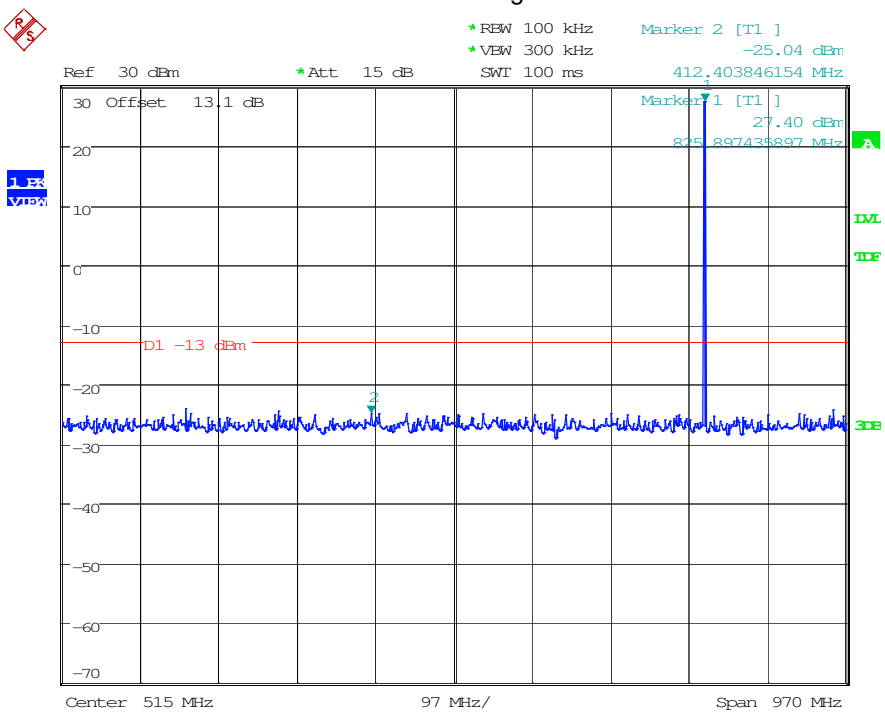


Note: The EUT and CMU200, frequency analyser are connected by three-way connector. There procude loss, like three-way connector loss, attenuator loss, RF cable loss. The offset is compensation.

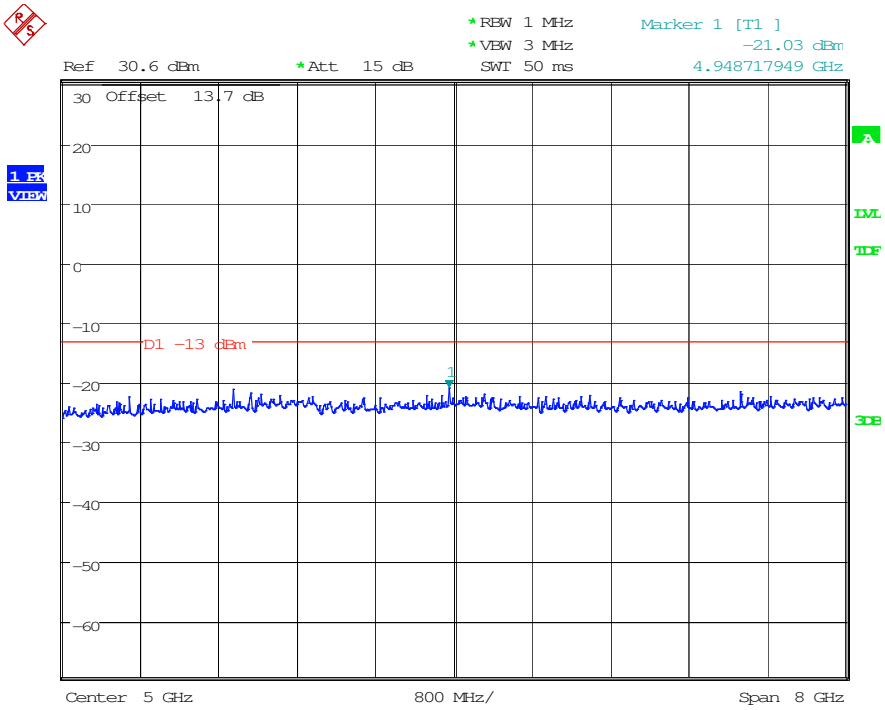
APPENDIX A: TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

CONDUCTED EMISSION IN GSM850 BAND

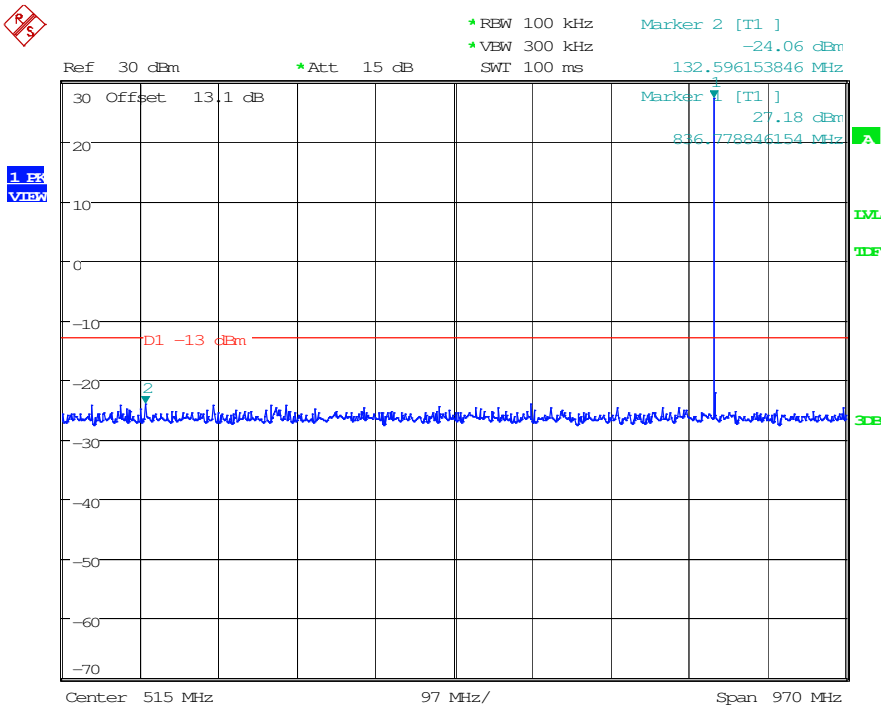
Conducted Emission Transmitting Mode CH 128 30MHz – 1GHz



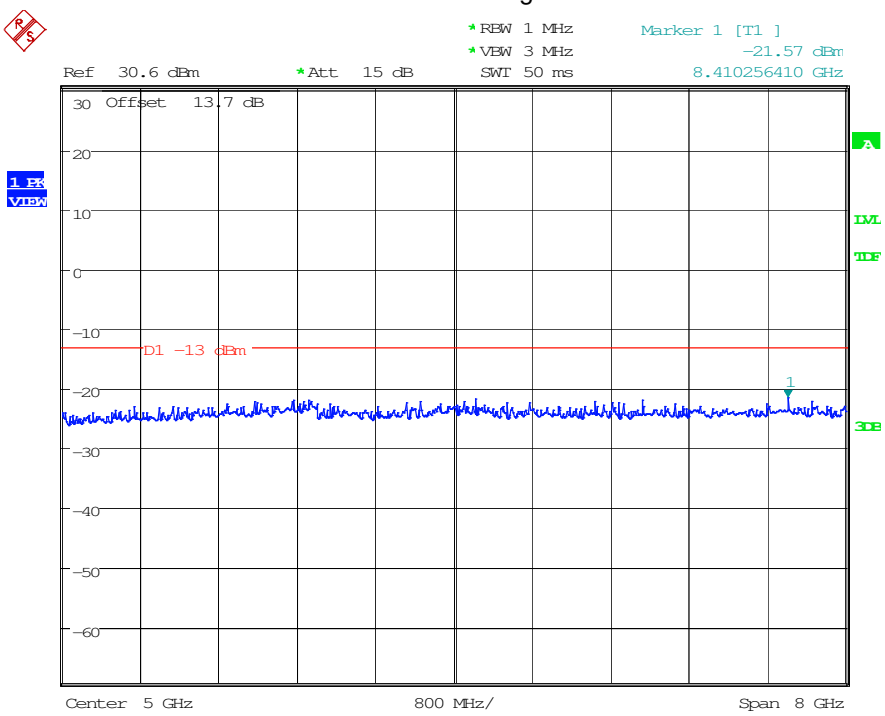
Conducted Emission Transmitting Mode CH 128 1GHz – 9GHz



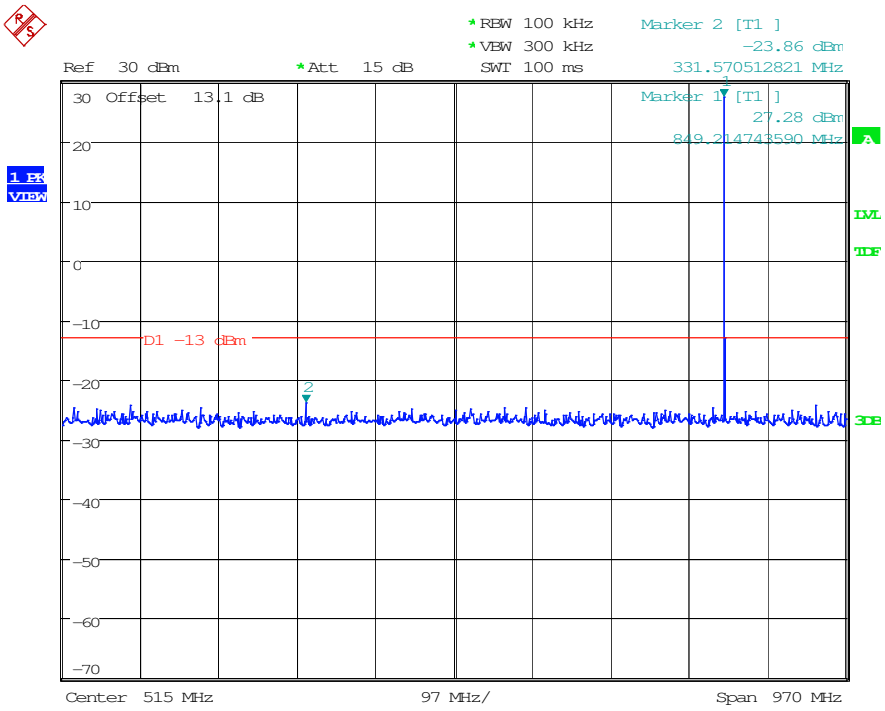
Conducted Emission Transmitting Mode CH 190 30MHz – 1GHz



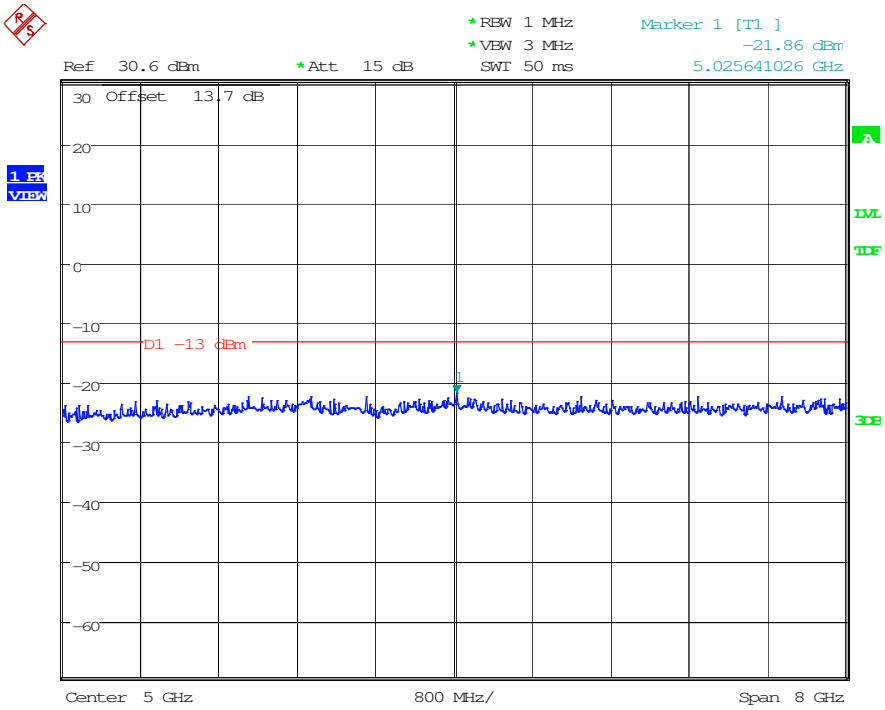
Conducted Emission Transmitting Mode CH 190 1GHz – 9GHz



Conducted Emission Transmitting Mode CH 251 30MHz – 1GHz

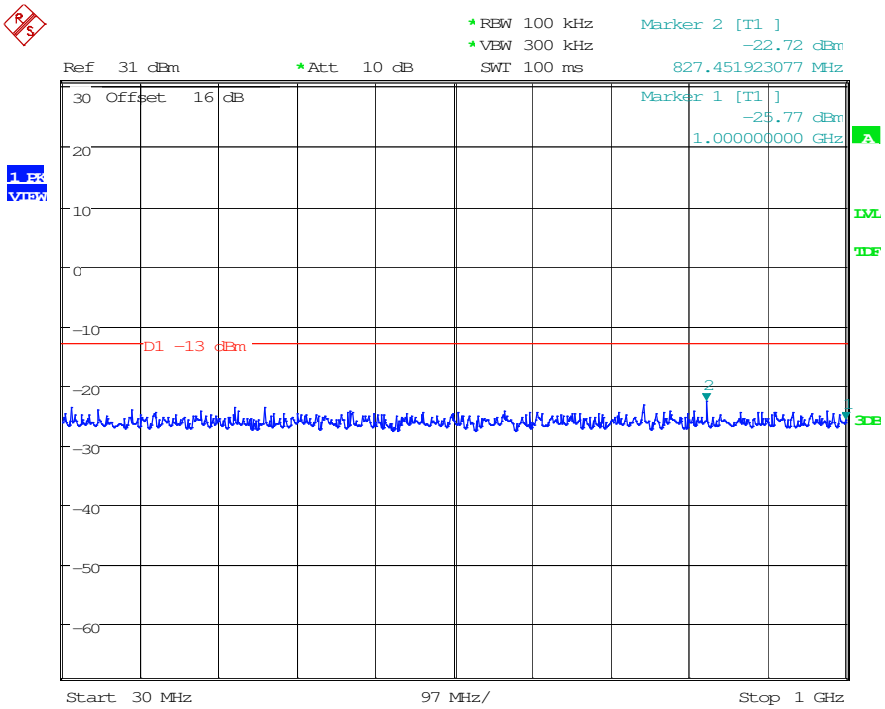


Conducted Emission Transmitting Mode CH 251 1GHz – 9GHz

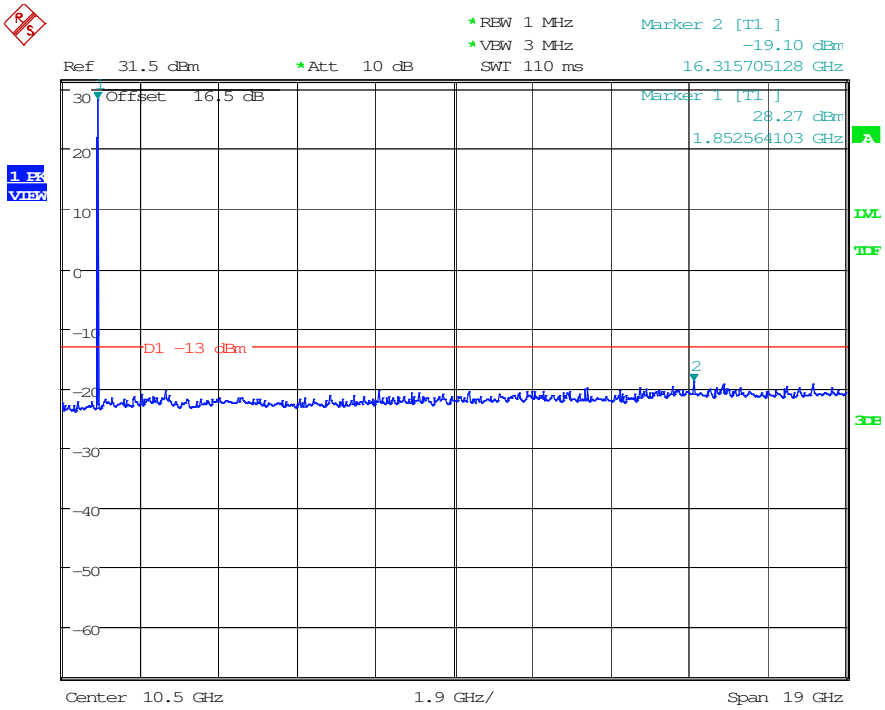


CONDUCTED EMISSION IN PCS1900 BAND

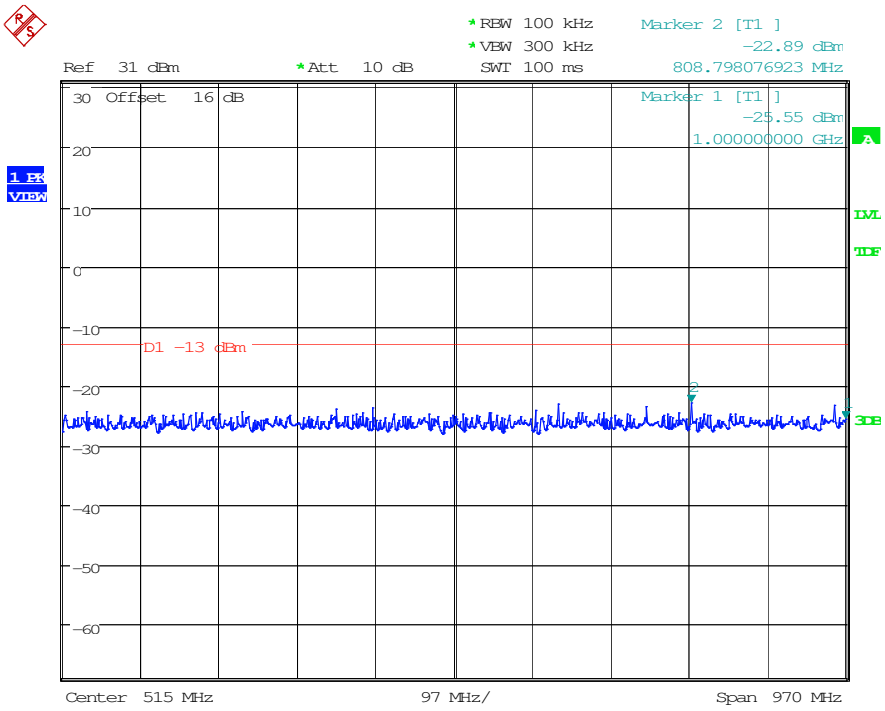
Conducted Emission Transmitting Mode CH 512 30MHz – 1GHz



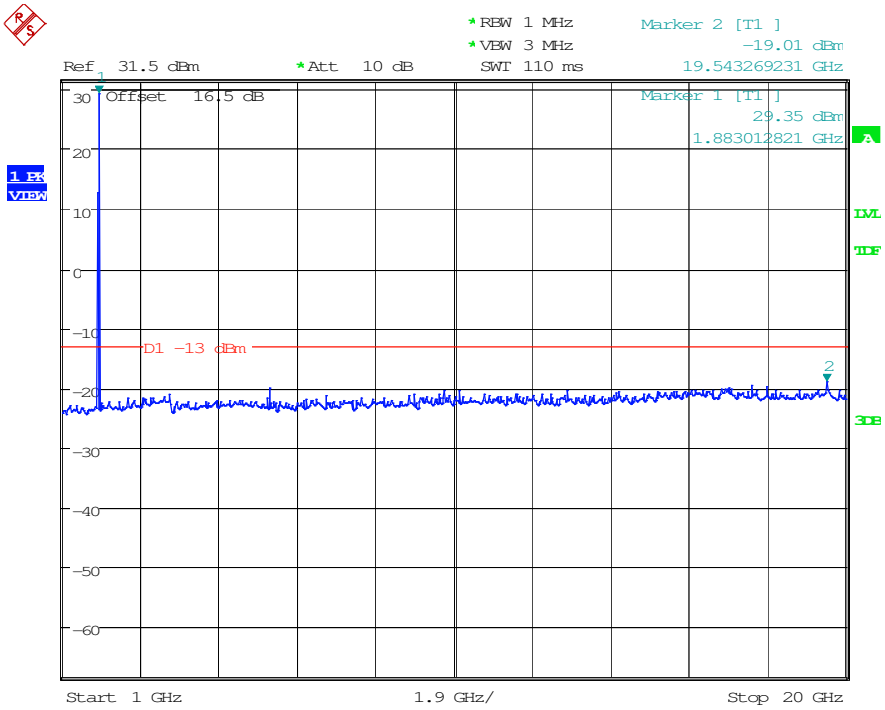
Conducted Emission Transmitting Mode CH 512 1GHz – 20GHz



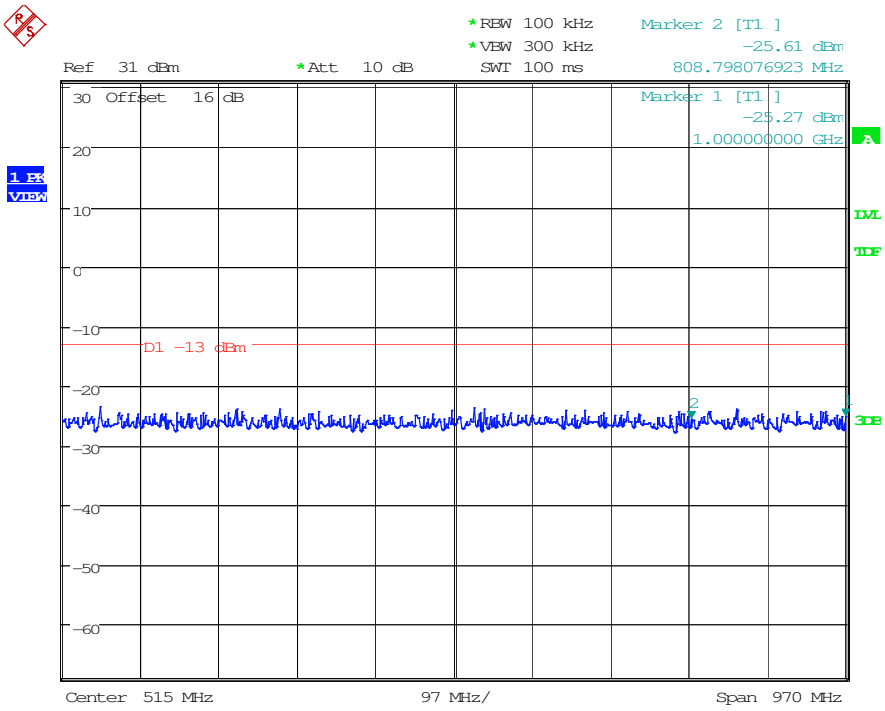
Conducted Emission Transmitting Mode CH 661 30MHz – 1GHz



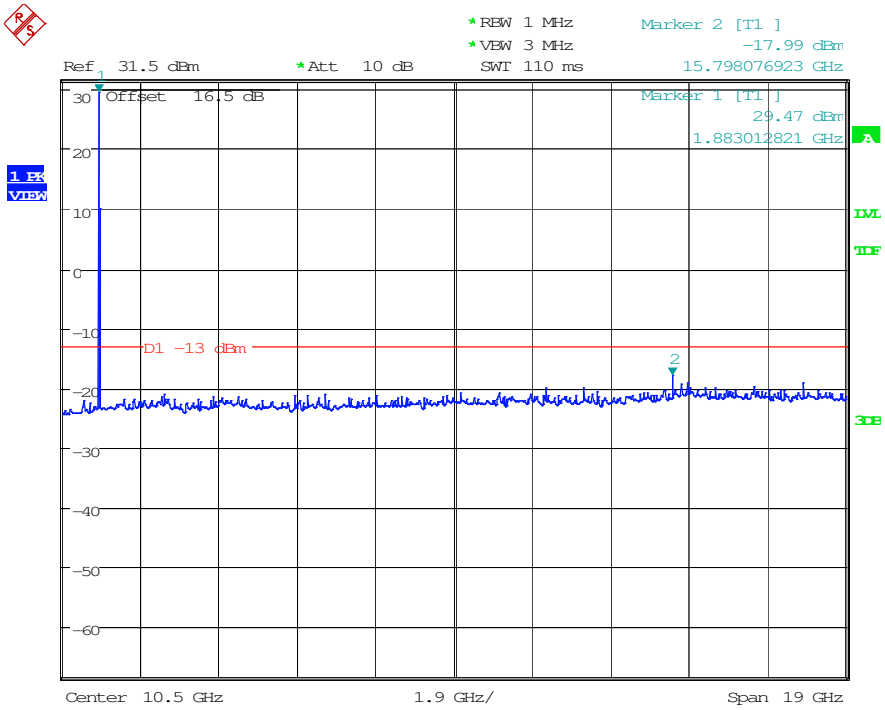
Conducted Emission Transmitting Mode CH 661 1GHz – 20GHz



Conducted Emission Transmitting Mode CH 810 30MHz – 1GHz

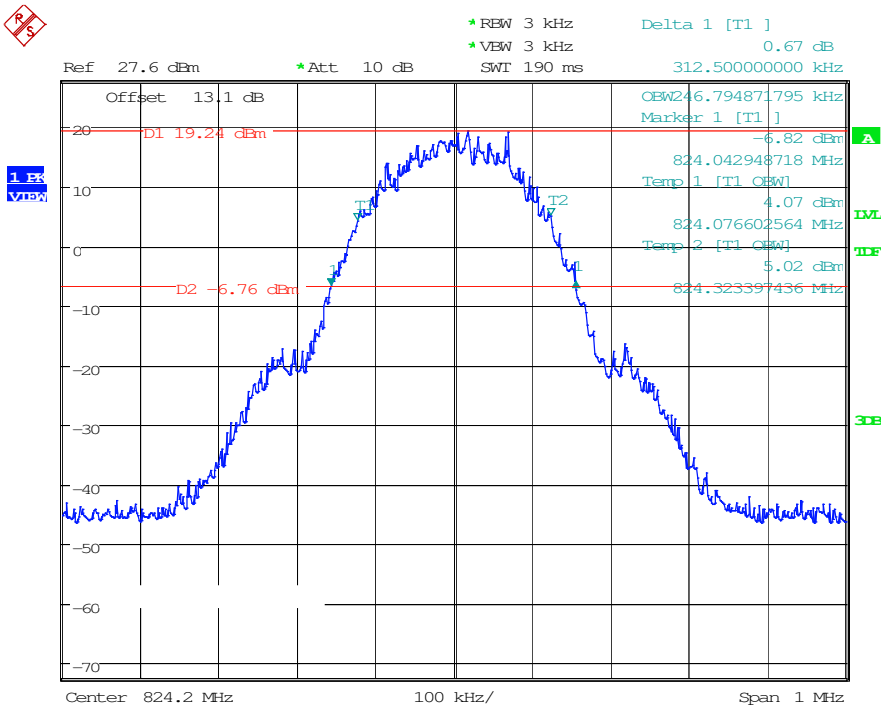


Conducted Emission Transmitting Mode CH 810 1GHz – 20GHz

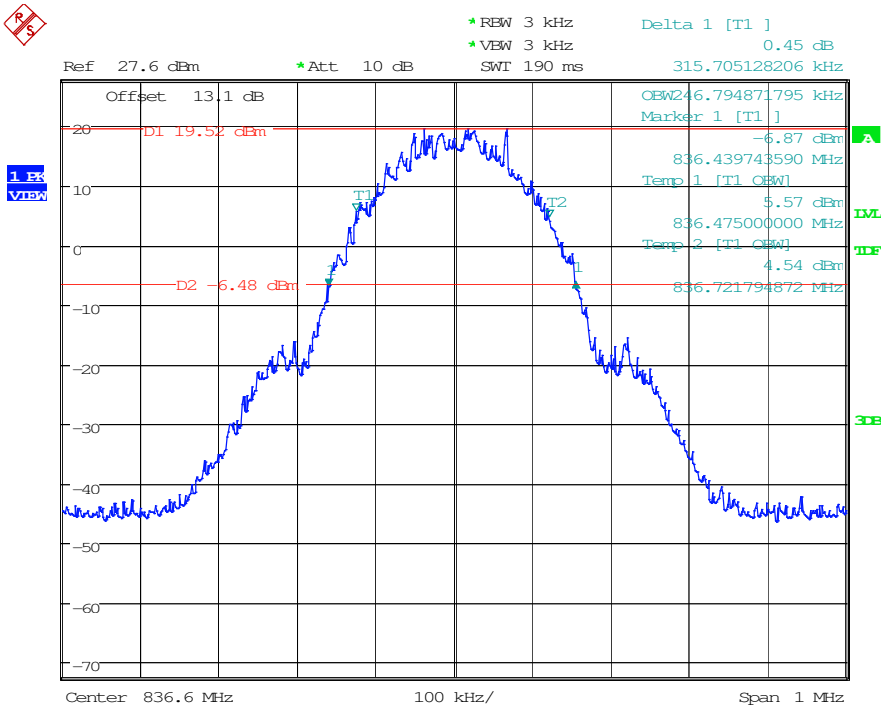


APPENDIX B: TEST PLOTS FOR OCCUPIED BANDWIDTH (99% and -26dBc)

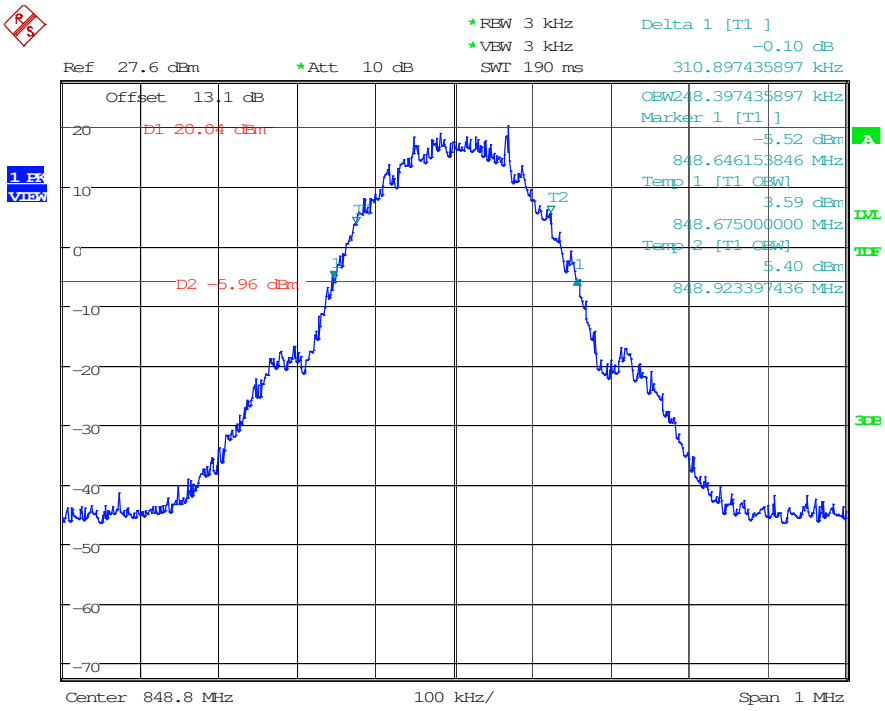
Occupied Bandwidth (99% and -26dBc) GSM 850 BAND CH 128



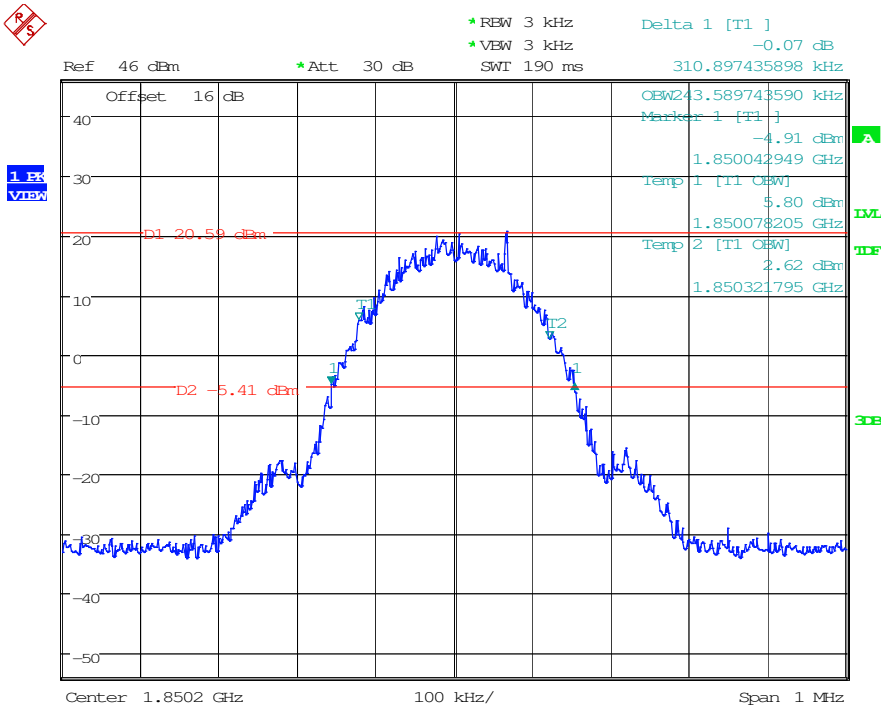
Occupied Bandwidth (99% and -26dBc) GSM 850 BAND CH 190



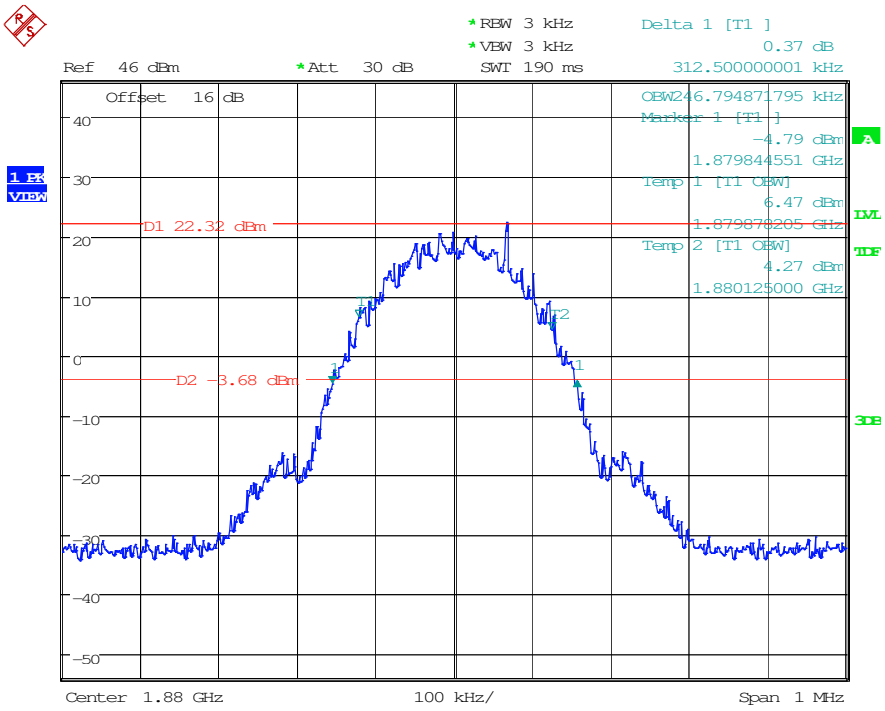
Occupied Bandwidth (99% and -26dBc) GSM 850 BAND CH 251



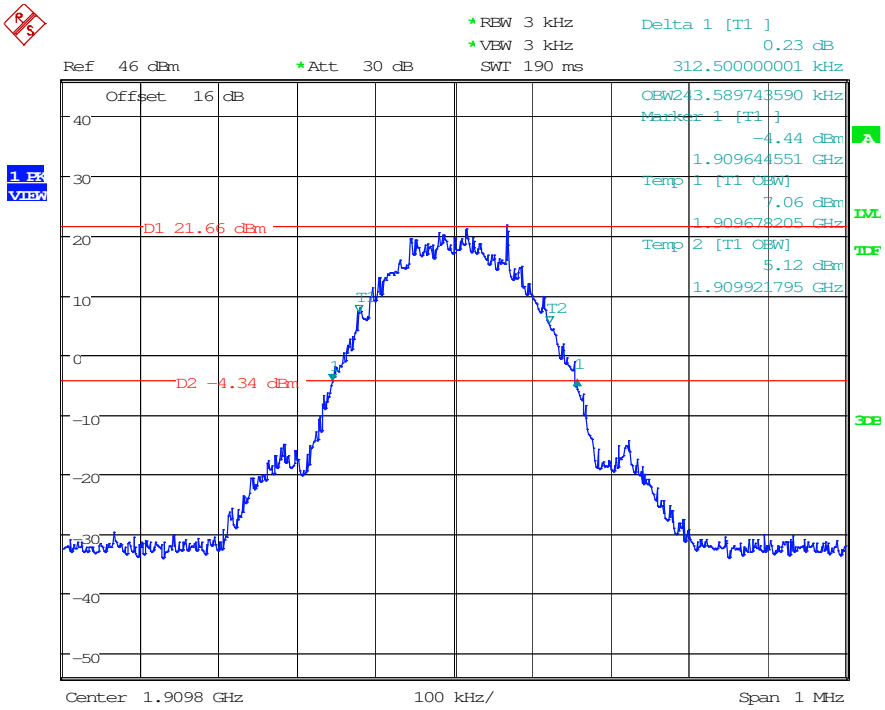
Occupied Bandwidth (99% and -26dBc) PCS 1900 BAND CH 512



Occupied Bandwidth (99% and -26dBc) PCS 1900 BAND CH 661

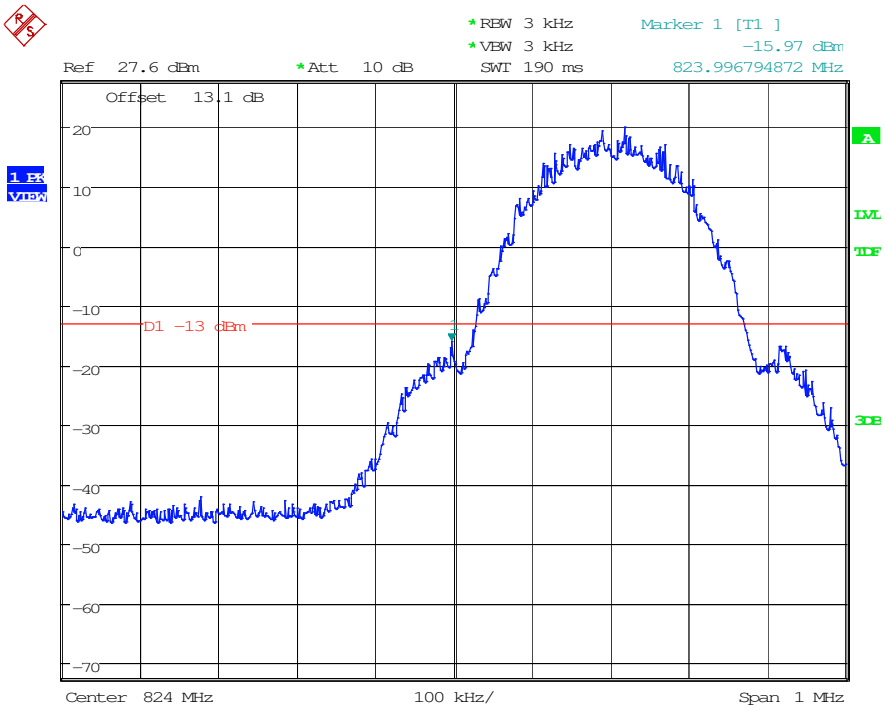


Occupied Bandwidth (99% and -26dBc) PCS 1900 BAND CH 810

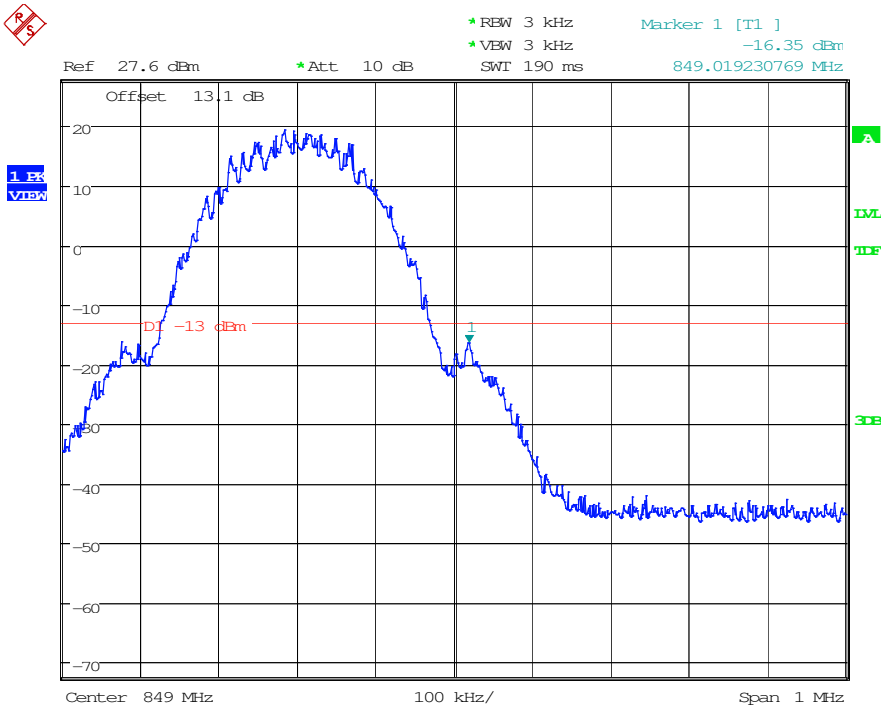


APPENDIX C: TEST PLOTS FOR BAND EDGES

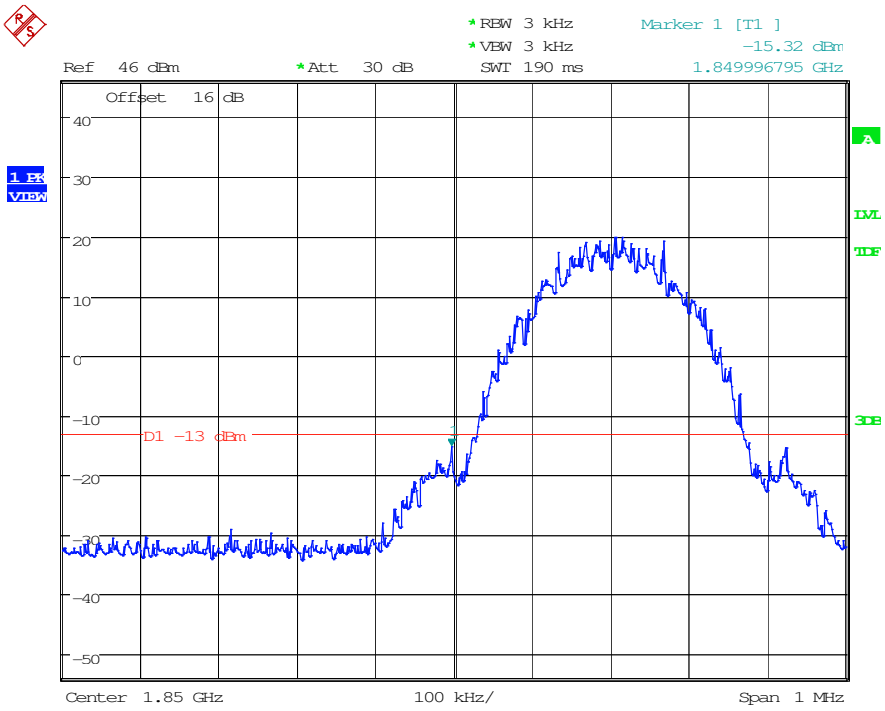
Low Band Edge GSM 850 BAND CH 128



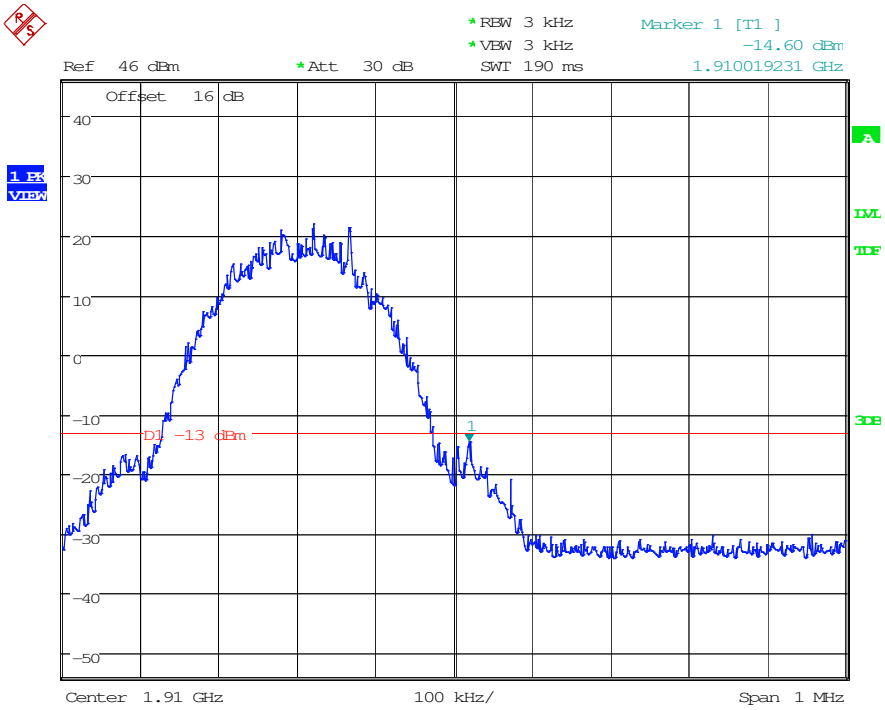
High Band Edge GSM 850 BAND CH 251



Low Band Edge PCS 1900 BAND CH 512

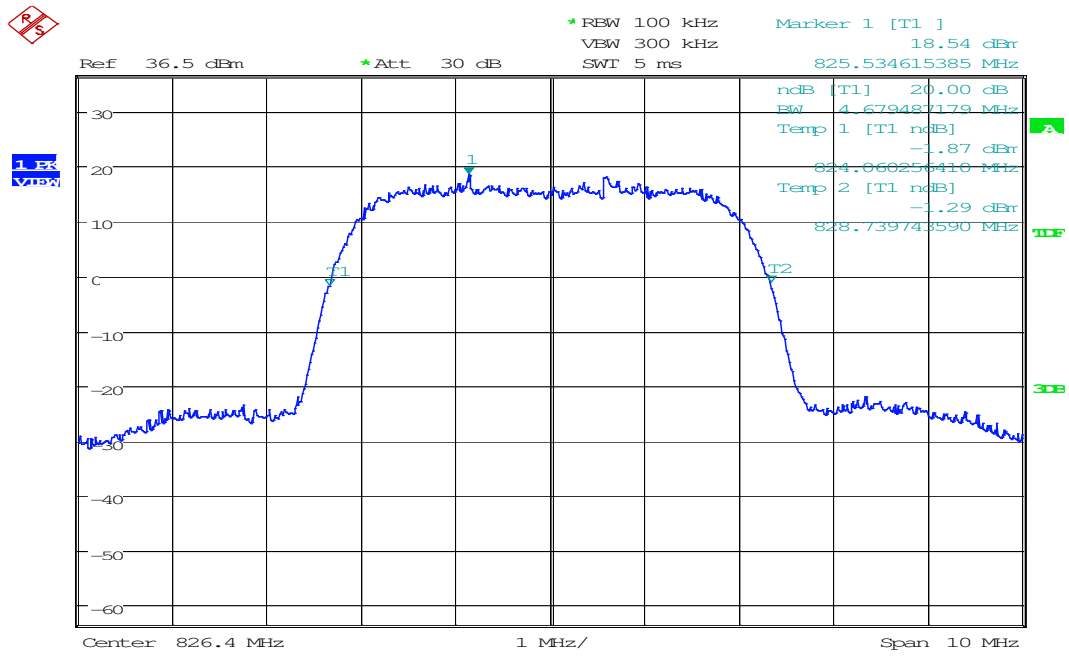


High Band Edge PCS 1900 BAND CH 810



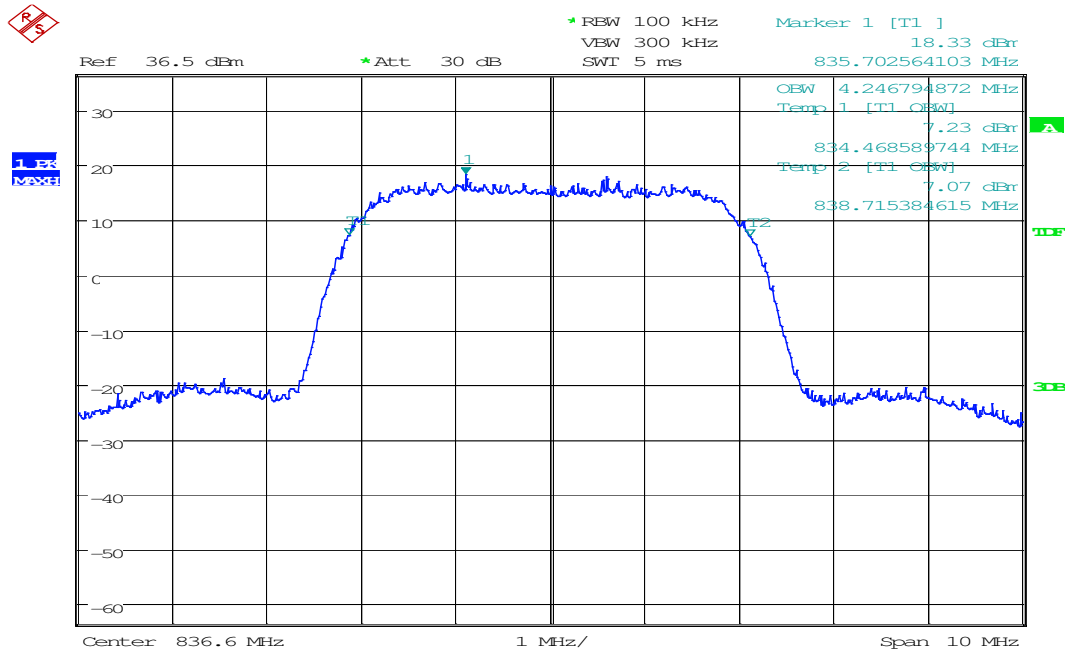
APPENDIX B: TEST PLOTS FOR OCCUPIED BANDWIDTH (99%)

Occupied Bandwidth (99%) WCDMA BAND V CH 4133



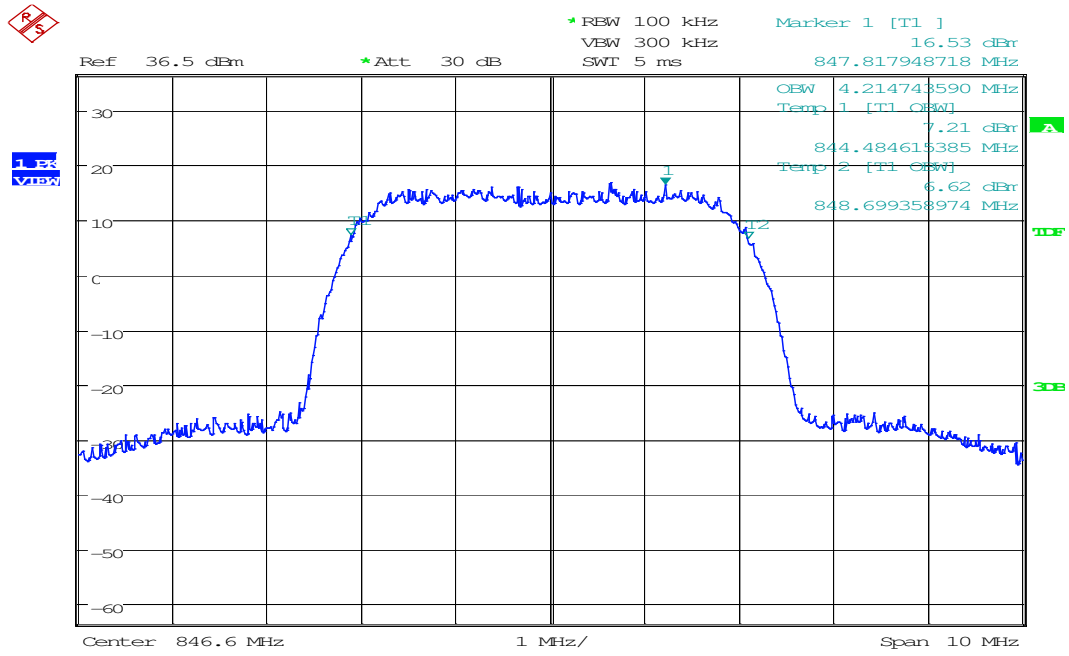
Date: 22.JUN.2016 17:30:20

Occupied Bandwidth (99%) WCDMA BAND V CH 4175



Date: 22.JUN.2016 17:32:44

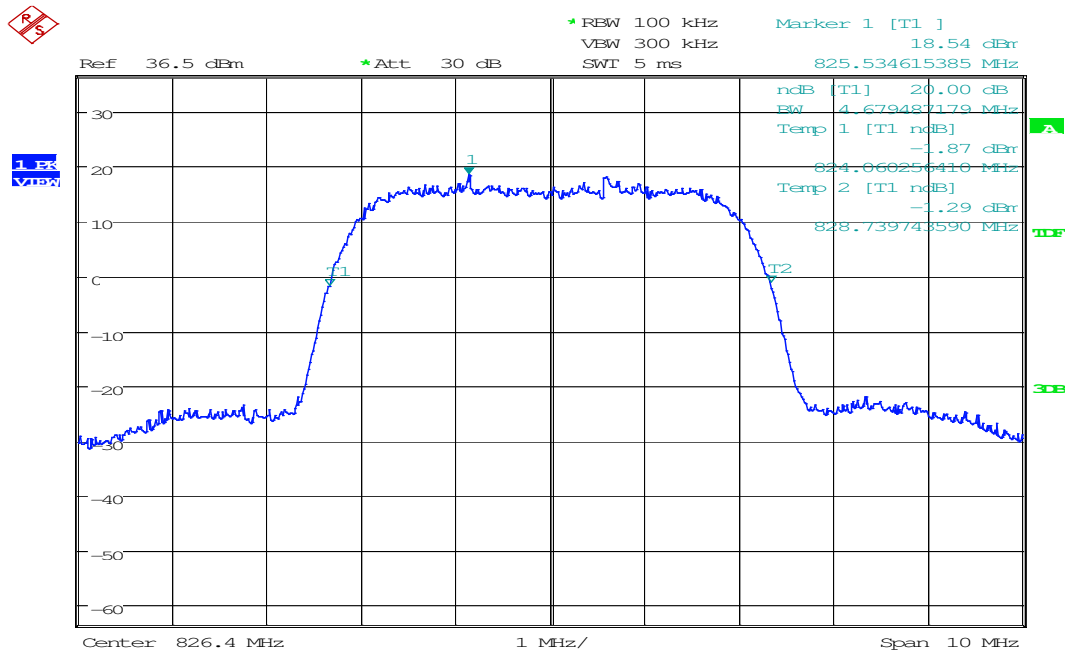
Occupied Bandwidth (99%) WCDMA BAND V CH 4232



Date: 22.JUN.2016 17:33:36

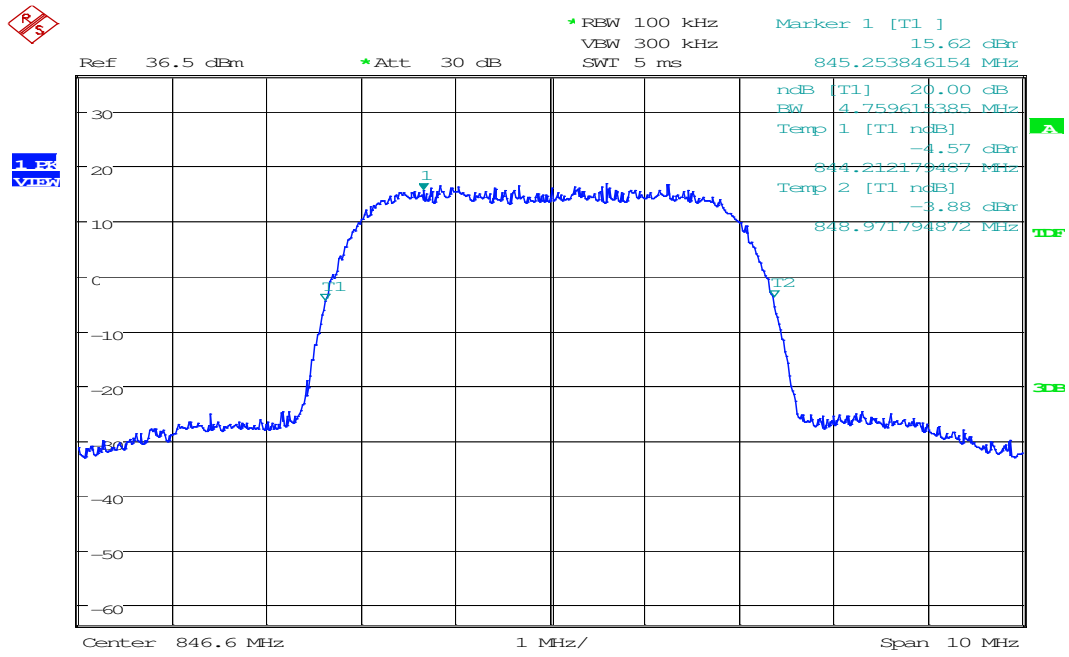
APPENDIX C: TEST PLOTS FOR EMISSION BANDWIDTH (-26dBc)

Occupied Bandwidth (-26dBc) WCDMA BAND V CH 4133



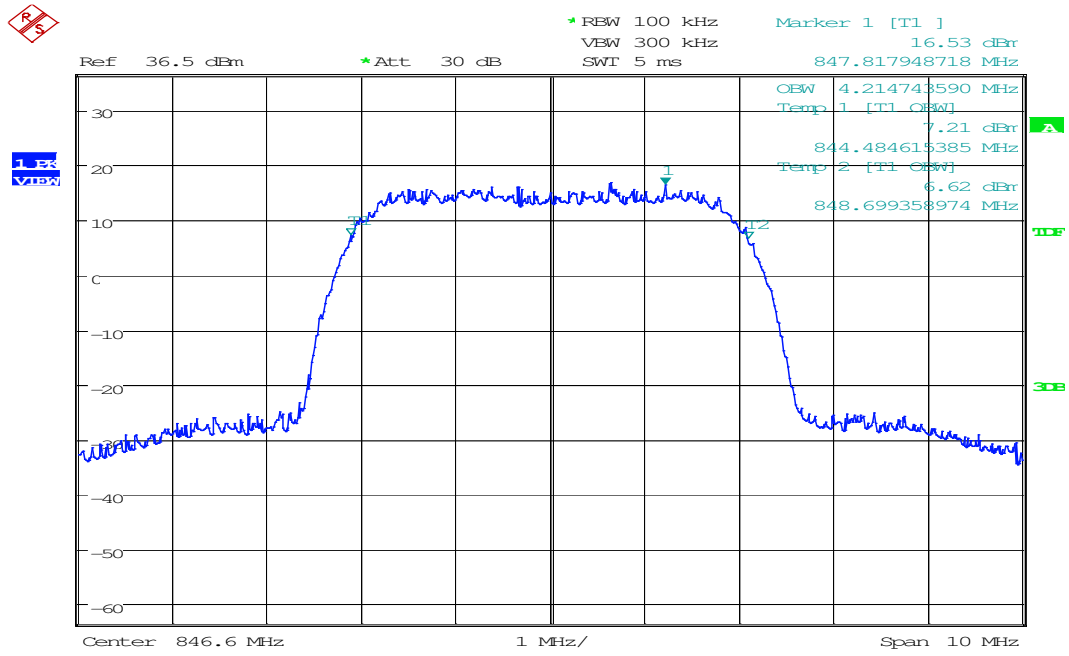
Date: 22.JUN.2016 17:30:20

Occupied Bandwidth (-26dBc) WCDMA BAND V CH 4175



Date: 22.JUN.2016 17:34:12

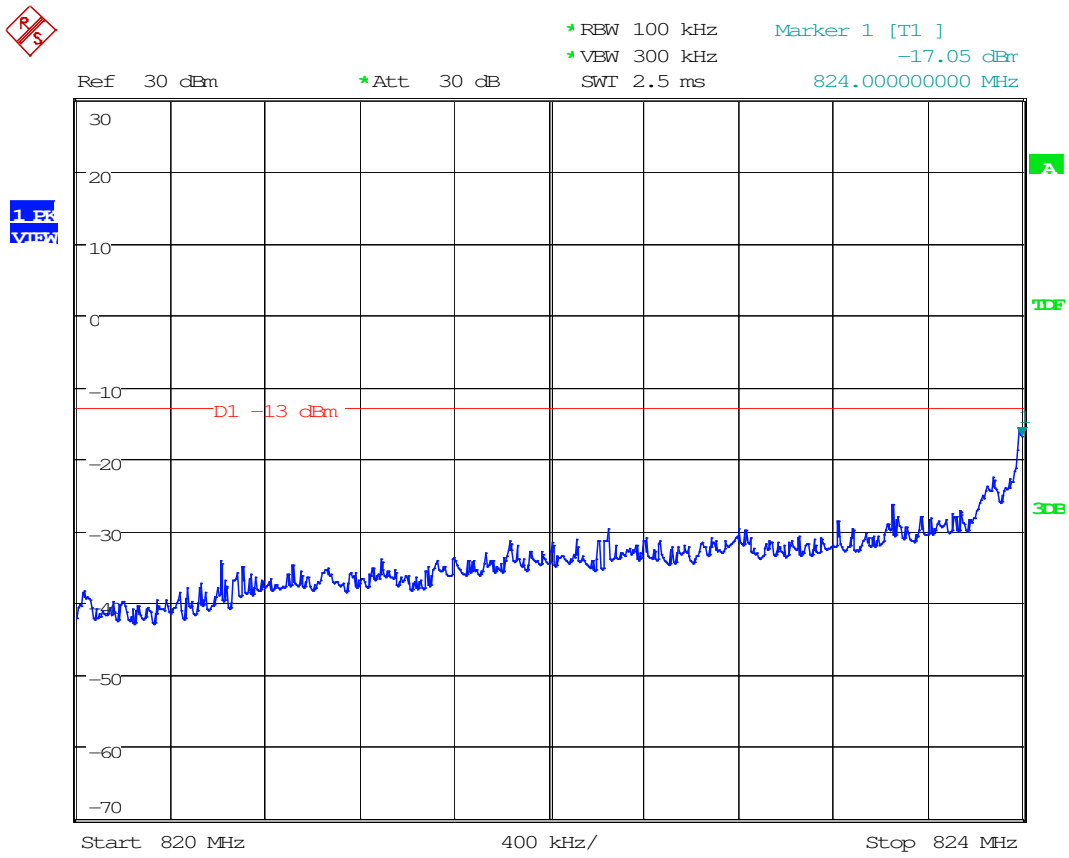
Occupied Bandwidth (-26dBc) WCDMA BAND V CH 4232



Date: 22.JUN.2016 17:33:36

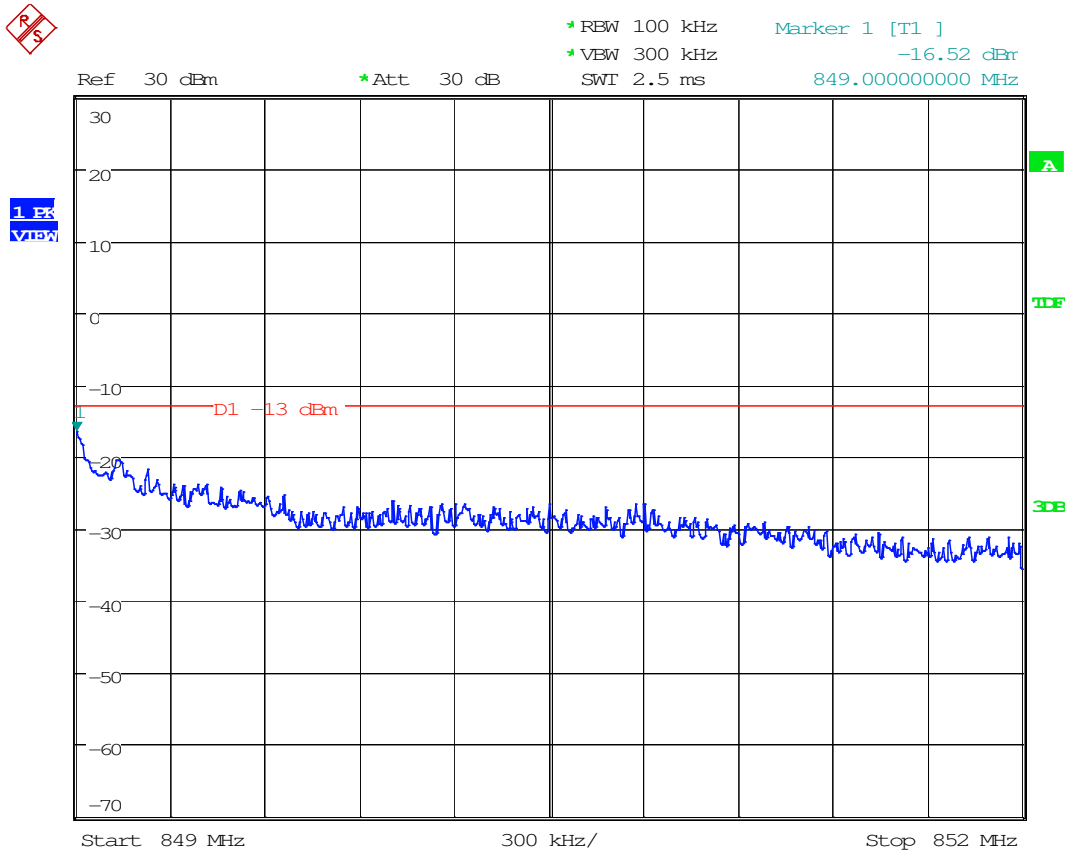
APPENDIX D: TEST PLOTS FOR BAND EDGES

Low Band Edge WCDMA BAND V CH 4133



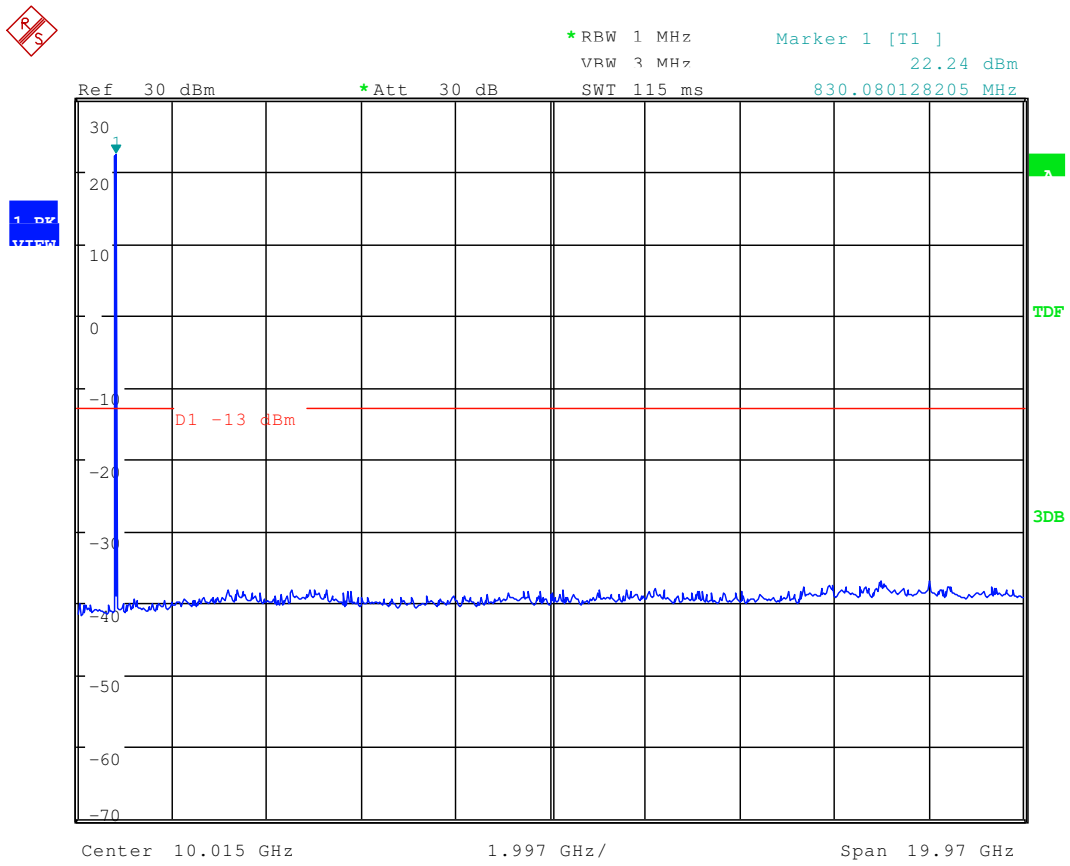
Date: 28.MAY.2016 06:34:18

High Band Edge WCDMA BAND V CH 4232

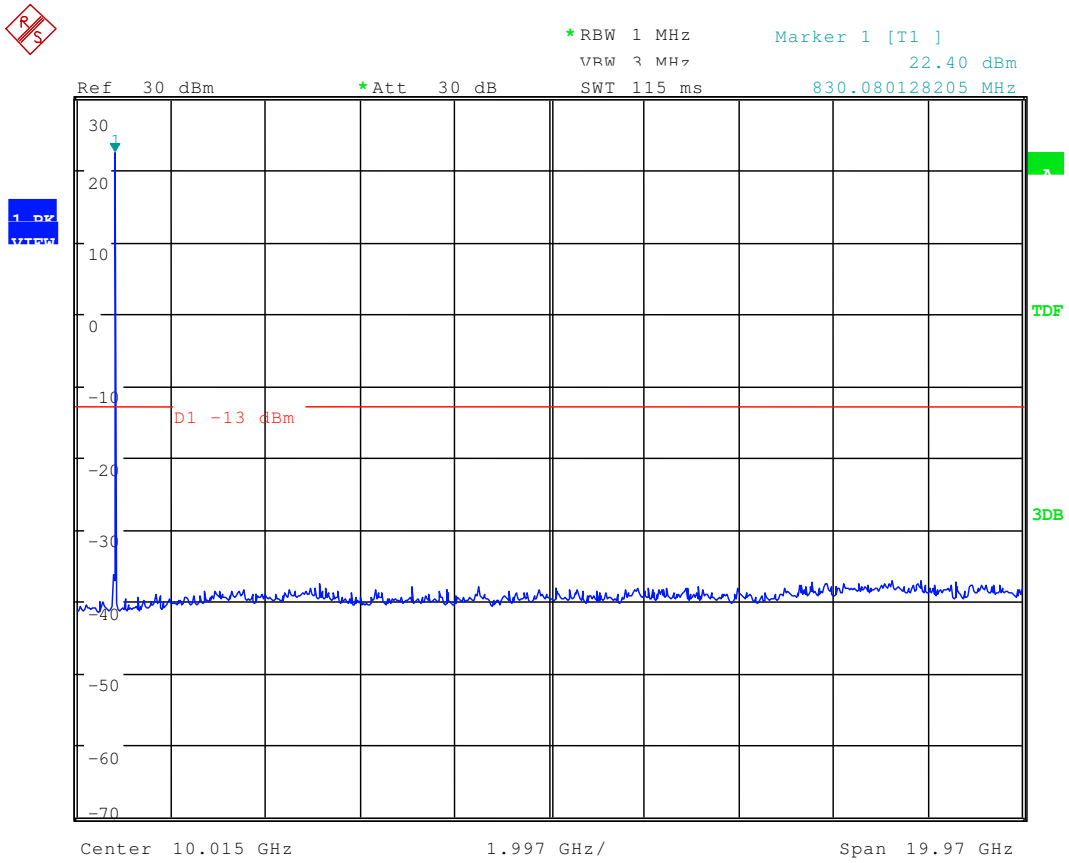


Date: 28.MAY.2016 06:37:46

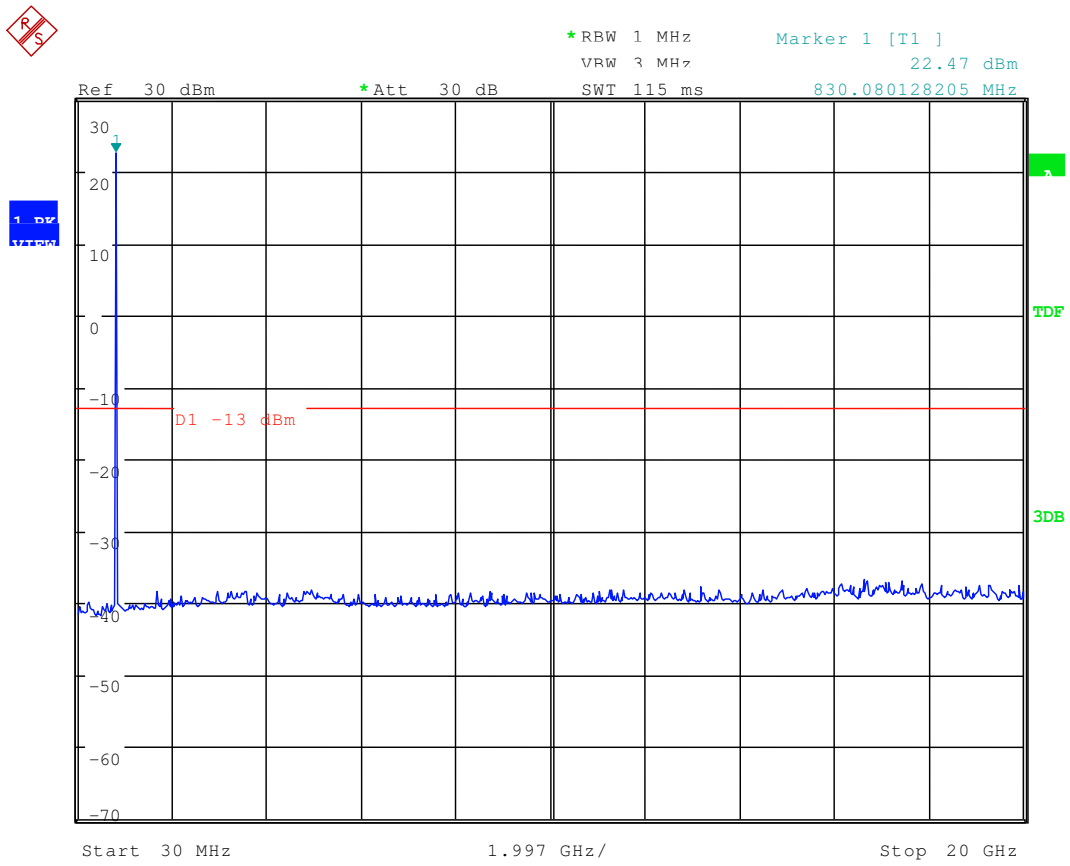
Conducted Emission Transmitting Mode WCDMA BAND V CH 4133



Conducted Emission Transmitting Mode WCDMA BAND V CH 4175

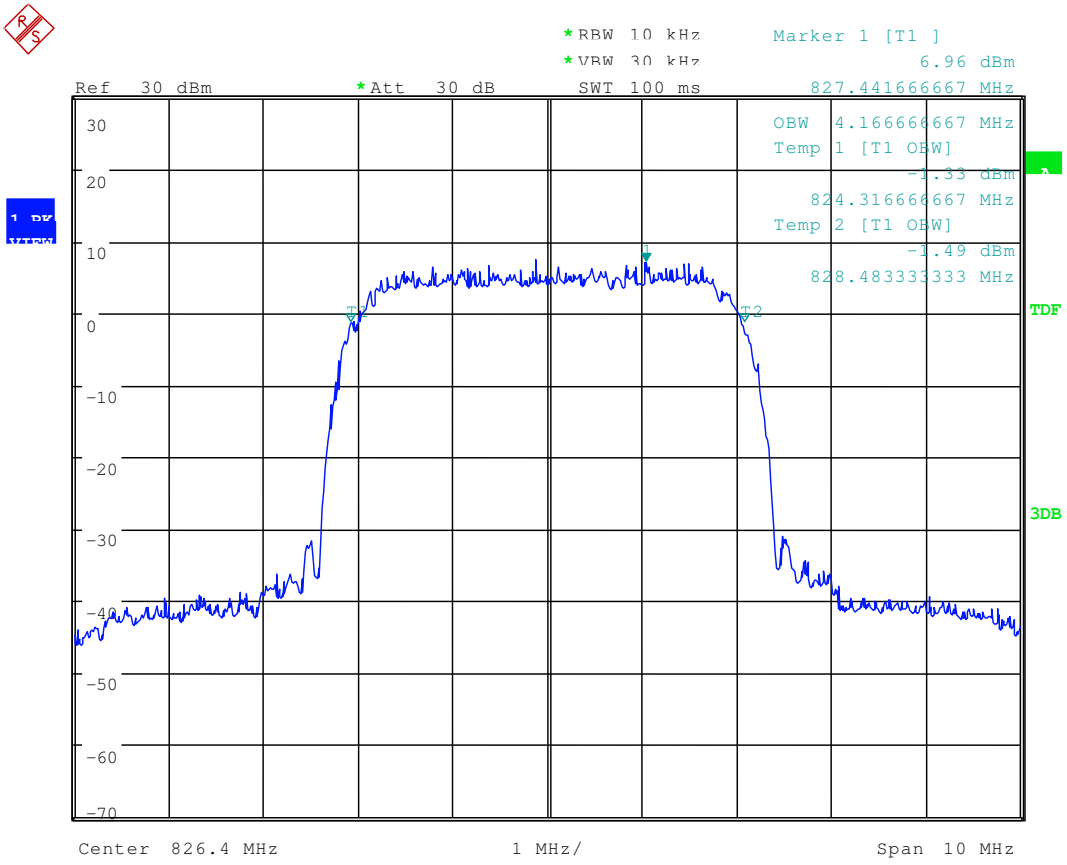


Conducted Emission Transmitting Mode WCDMA BAND V CH 4132

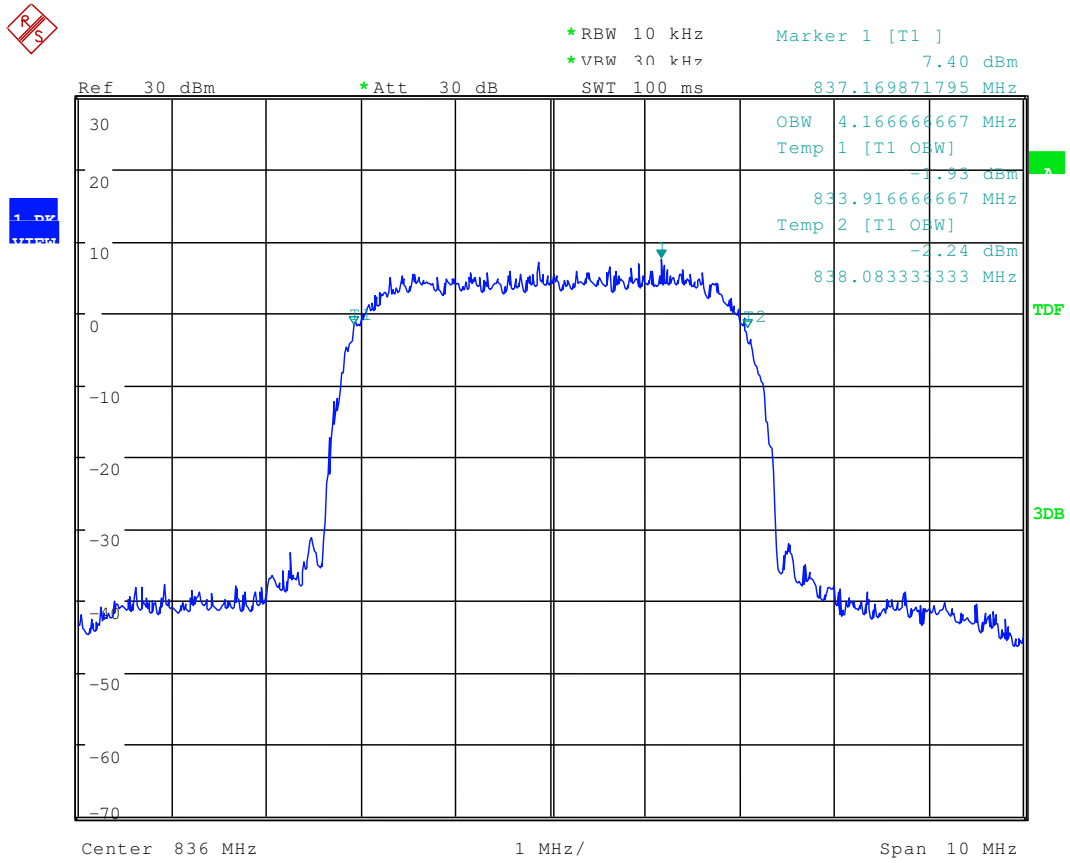


APPENDIX B: TEST PLOTS FOR OCCUPIED BANDWIDTH (99%)

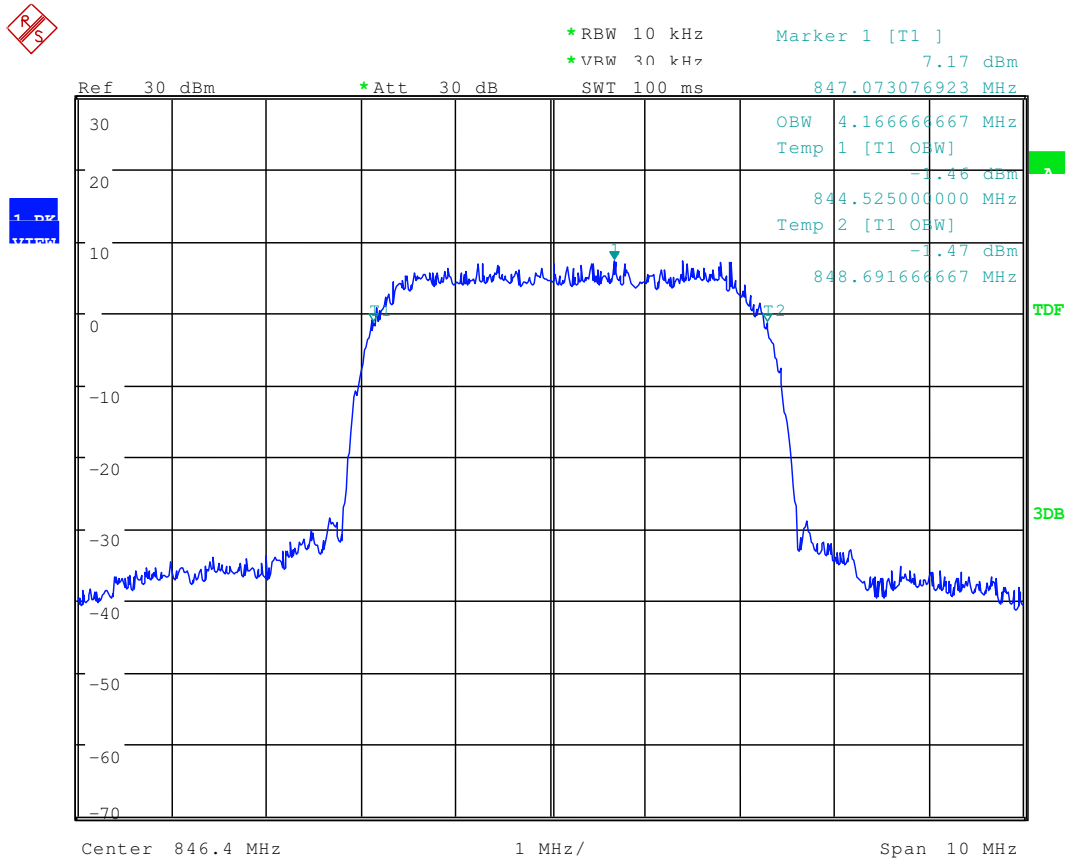
Occupied Bandwidth (99%) WCDMA BAND V CH 4133



Occupied Bandwidth (99%) WCDMA BAND V CH 4175

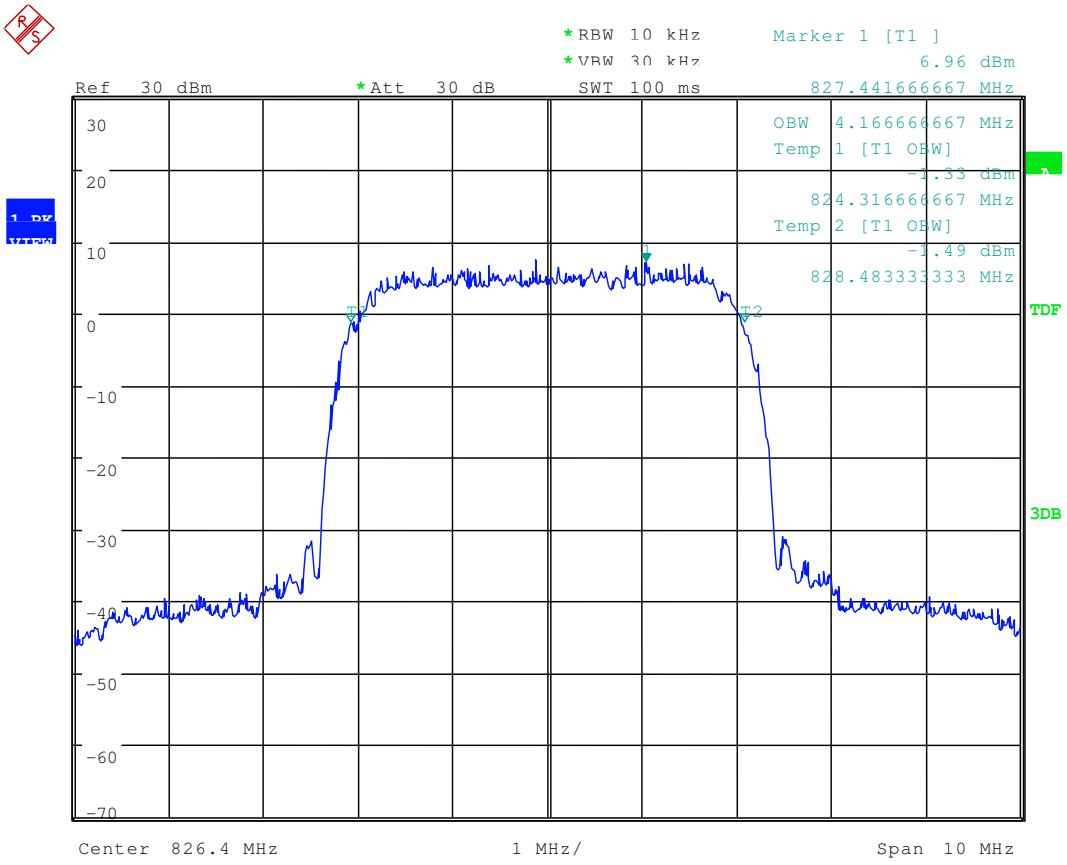


Occupied Bandwidth (99%) WCDMA BAND V CH 4232

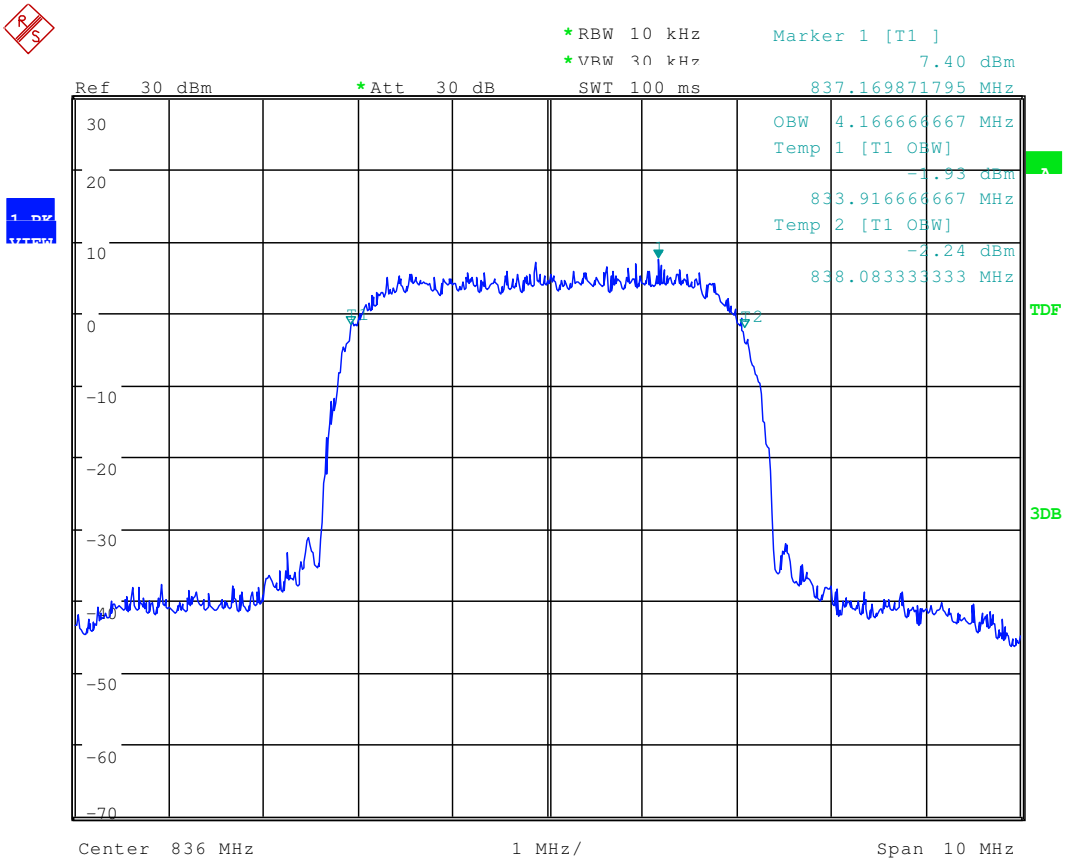


APPENDIX C: TEST PLOTS FOR EMISSION BANDWIDTH (-26dBc)

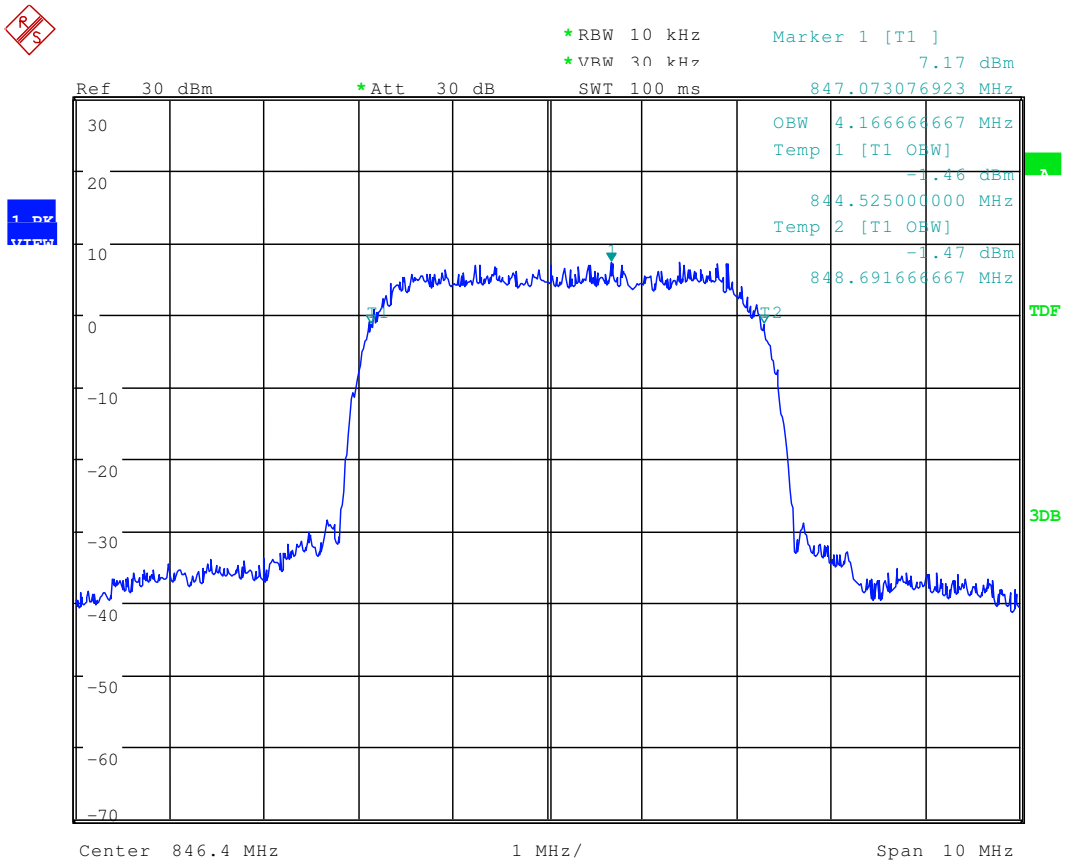
Occupied Bandwidth (-26dBc) WCDMA BAND V CH 4133



Occupied Bandwidth (-26dBc) WCDMA BAND V CH 4175

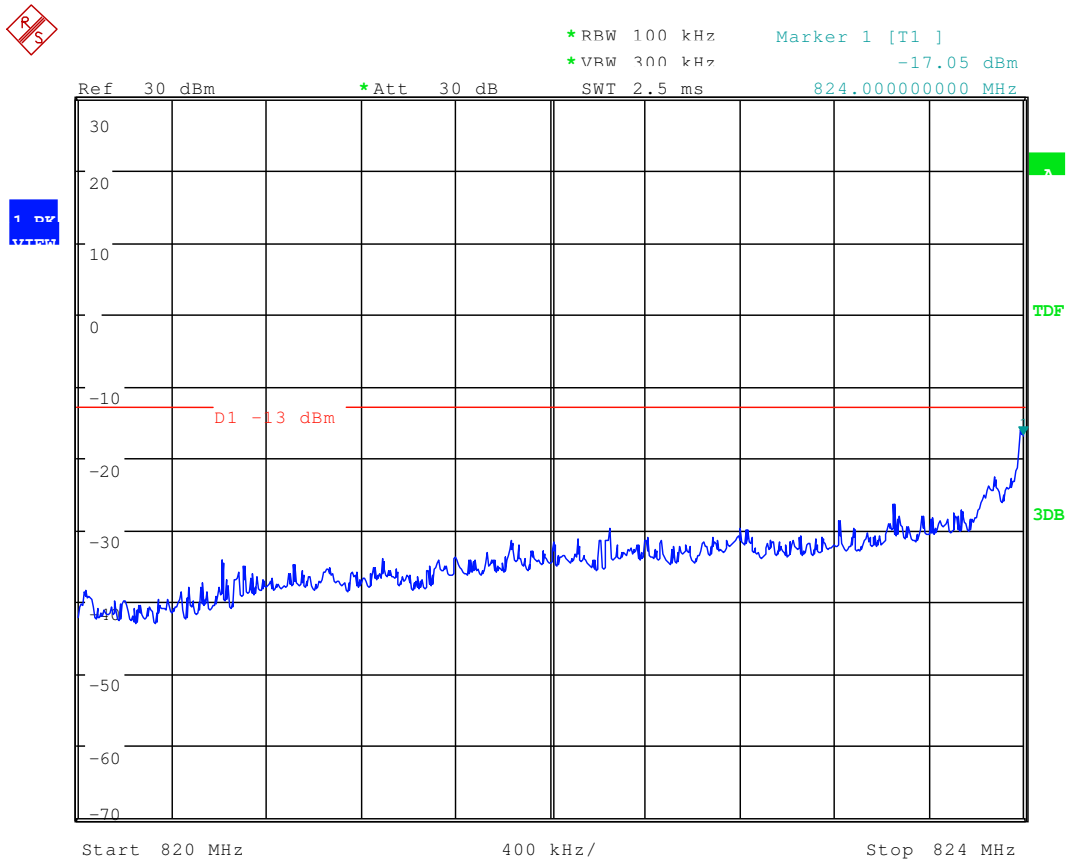


Occupied Bandwidth (-26dBc) WCDMA BAND V CH 4232

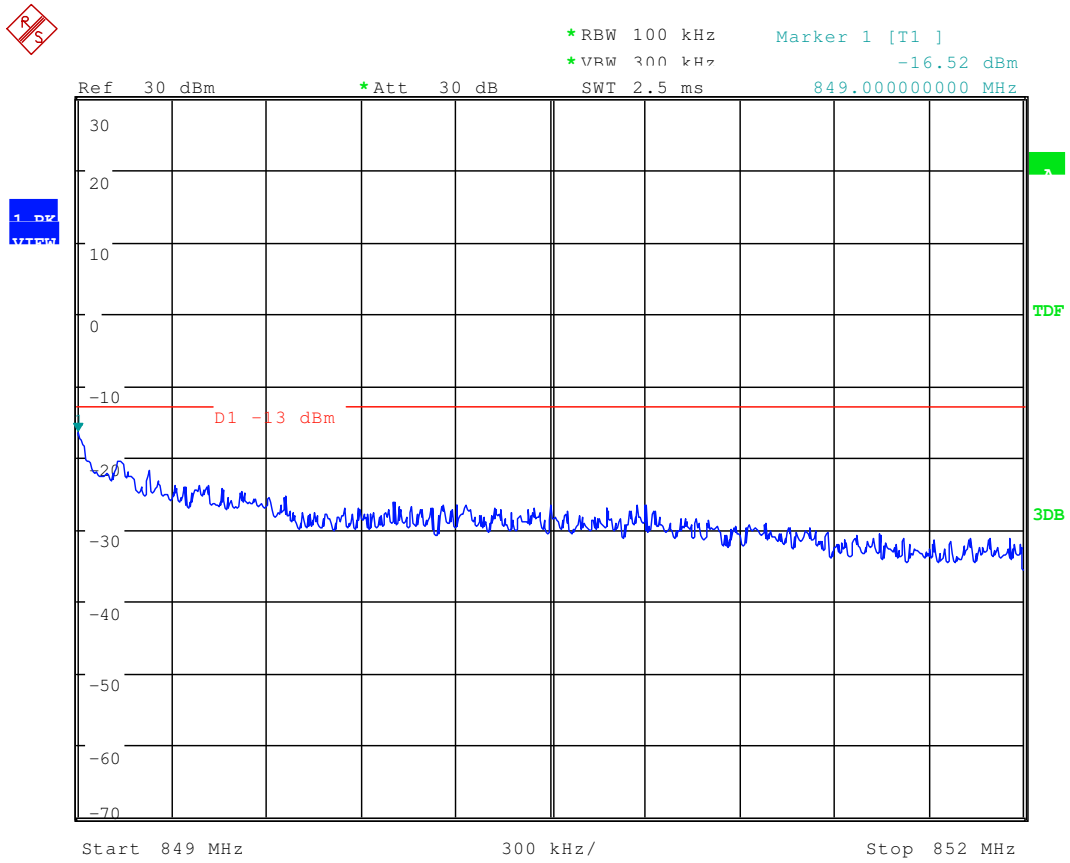


APPENDIX D: TEST PLOTS FOR BAND EDGES

Low Band Edge WCDMA BAND V CH 4133



High Band Edge WCDMA BAND V CH 4232



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