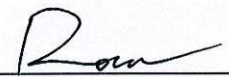


FCC PART 22H /24E TEST REPORT

Applicant : Shanghai Insislink Technology Co., Ltd
Address : TianzhouRoad NO.99, Building NO.9 ROOM 201, Shanghai, China
Manufacturer : Shanghai Insislink Technology Co., Ltd
Address : TianzhouRoad NO.99, Building NO.9 ROOM 201, Shanghai, China
Factory : Shanghai Insislink Technology Co., Ltd
Address : TianzhouRoad NO.99, Building NO.9 ROOM 201, Shanghai, China
E.U.T. : GSM/WCDMA Module
Brand Name : LYNQ
Model No. : L306
FCC PART 22H
Measurement Standard : FCC PART 24E
FCC ID : 2AHSAL306
Date of Receiver : September 30, 2016
Date of Test : September 30, 2016 to November 10, 2016
Date of Report : November 12, 2016

This Test Report is Issued Under the Authority of :

Prepared by


Rose Hu / Engineer

Approved & Authorized Signer


Sunm / Q.A. Director

Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Dongguan Nore Testing Center Co., Ltd. The test results referenced from this report are relevant only to the sample tested.

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Revision History of This Test Report

Report Number	Description	Issued Date
NTC1609124F	Initial Issue	2016-11-12

1. GENERAL INFORMATION

1.1 Product Description of Equipment under Test

Product Name	: GSM/WCDMA Module
Model name	: L306
Model Difference Description	: N/A
Power Supply	: DC 3.8V
Hardware Version	: L306_V2.0
Software Version	: V1.0
GSM Band(s)	: GSM850/GSM900/GSM1800/GSM1900
GPRS Class	: 12
EGPRS Class	: 12
WCDMA Band(s)	: FDD Band II / V
Antenna Type	: External
Antenna Gain	: Permit 3dBi Max.
Note	: N/A

1.2 Product Specification of Equipment under Test

Operation Frequency : TX

GSM/GPRS/EGPRS 850: 824.2 ~ 848.8 MHz
PCS/GPRS/EGPRS 1900: 1850.2 ~ 1909.8 MHz

WCDMA Band V: 826.4 ~ 846.6MHz
WCDMA Band II: 1852.4 ~ 1907.6MHz

RX

GSM/GPRS/EGPRS 850: 869.2 ~ 893.8 MHz
PCS/GPRS/EGPRS 1900: 1930.2 ~ 1989.8 MHz

WCDMA Band V: 871.4 ~ 891.6MHz
WCDMA Band II: 1932.4 ~ 1987.6MHz

Type of Modulation : GSM/GPRS: GMSK
EDGE: GMSK, 8PSK
WCDMA: QPSK
HSPA: 16QAM

Max. Output Power : GSM/GPRS/EDGE
GSM 850: 33.0dBm
PCS 1900: 29.70dBm

WCDMA
Band V: 22.86dBm
Band II: 22.06dBm

Type of Emission :

GSM 850:	245KGXW
GPRS 850:	245KG7W
EGPRS 850:	242KG7W
PCS 1900:	245KGXW
GPRS 1900:	245KG7W
EGPRS 1900:	244KG7W
WCDMA Band V RMC 12.2K:	4M20F9W
WCDMA Band II RMC 12.2K:	4M18F9W

1.3 Test condition of Equipment under Test

Band	Mode	Channel	Frequency MHz
GSM 850	GSM/GPRS/EGPRS	128	824.2
		189	836.4
		251	848.8
PCS 1900	GSM/GPRS/EGPRS	512	1850.2
		661	1880.0
		810	1909.8
WCDMA Band V	RMC/HSDPA/HSUPA	4132	826.4
		4182	836.4
		4233	846.6
WCDMA Band II	RMC/HSDPA/HSUPA	9262	1852.4
		9400	1880.0
		9538	1907.6
Note: All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.			

1.4 Related Submittal(s) / Grant (s)

This submittal(s) test report is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR47 Rules.

1.5 Test Methodology

Both conducted and radiated testing were performed according to the procedures document to TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

1.6 Equipment Modifications

Not available for this EUT intended for grant.

1.7 Support Device

Test jig, it provide by manufacturer.

1.8 Test Facility and Location

Site Description

Lab : Listed by CNAS, August 14, 2015
The certificate is valid until August 13, 2018
The Certificate Registration Number is L5795.

Listed by FCC, July 03, 2014
The Certificate Number is 665078.

Listed by Industry Canada, June 18, 2014
The Certificate Registration Number. Is 46405-9743

Name of Firm : Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)

Site Location : Building D, Gaosheng Science & Technology Park, Zhouxi
Longxi Road, Nancheng District, Dongguan City, Guangdong
Province, China

1.9 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1.0 \times 10^{-6}$
Conducted RF	$\pm 0.56\text{dB}$
Radiated Emissions	$\pm 3.7\text{dB}$
Temperature	$\pm 0.5^{\circ}\text{C}$
Humidity	$\pm 2\%$
DC Voltages	$\pm 1\%$

1.10 Summary of Test Results

FCC Rules	Description Of Test	Result
§2.1046 §22.913(a) §24.232(c)	RF Output Power	Compliant
§24.232(d)	Peak-to-Average Ratio	Compliant
§ 2.1049 § 22.905 § 22.917 § 24.238	Occupied Bandwidth	Compliant
§ 2.1055 § 22.355 § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant
§ 22.917 (a) § 24.238 (a)	Out of band emission, Band Edge	Compliant
§ 2.1047	Modulation Characteristics	N/A
§ 2.1051 § 22.917 (a) § 24.238 (a)	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053 § 22.917 (a) § 24.238 (a)	Field Strength of Spurious Radiation	Compliant
§1.1307, §2.1093	RF Exposure (SAR)	Compliant

2. RF OUTPUT POWER

2.1 Applicable Standard

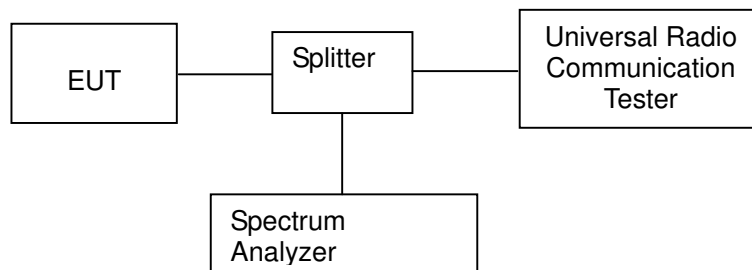
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), in no case may the peak output power of a base station transmitter exceed 2 watt EIRP.

2.2 Test Procedure

Conducted Method:

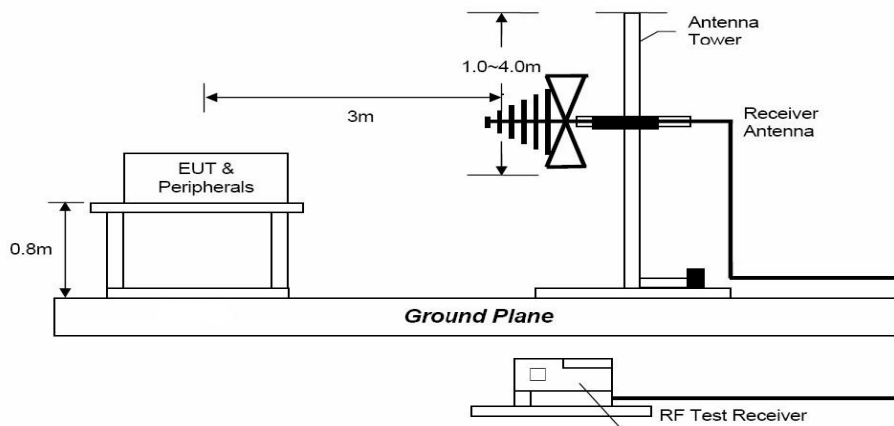
The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a spectrum analysis. Transmitter output was read off the spectrum analysis in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to spectrum analysis reading.



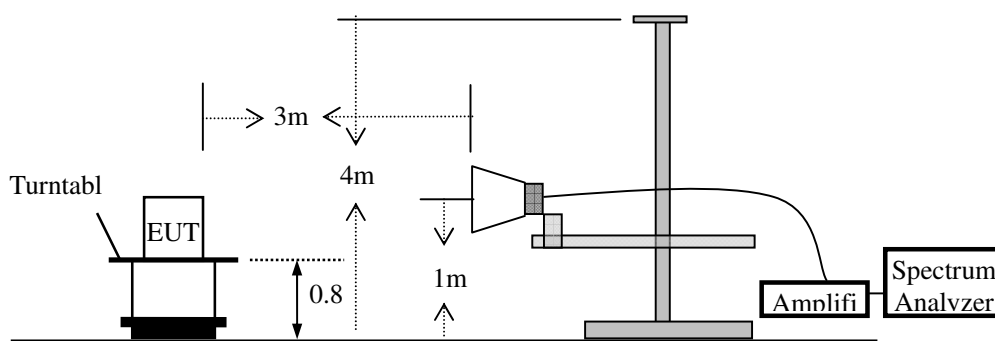
Radiated method:

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. During the measurement, the EUT was in communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 1m to 4m. The reading was recorded and the field strength (E in dBuV/m) was calculated. ERP in frequency band 824.2 – 848.80.8MHz were measured using a substitution method. The EUT was replaced by a dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows: $EIRP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$. ERP in frequency band 1850.2 – 1909.8MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows: $ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$

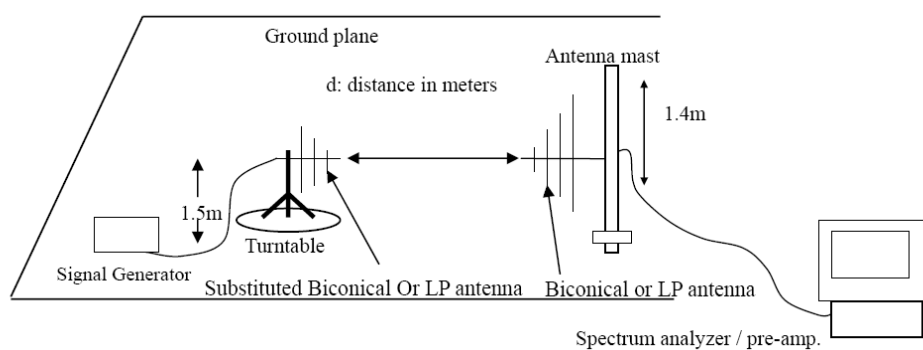
Radiated Emission Test Set-Up, Frequency Below 1000MHz



Radiated Emission Test Set-Up, Frequency above 1GHz



Substituted Method Test Set-UP



2.3 Test Procedure

Pass.

Please refer to following tables.

Conducted Power:

Cellular Band (Part 22H) GSM 850				
Humidity :		50 %	Temperature :	22 °C
Test Result:		PASS	Test By:	Sance
Mode	Channel	Frequency (MHz)	Output Power (dBm)	Tune up power tolerant
GSM	128	824.2	32.70	32.5±1
	189	836.4	32.60	32.5±1
	251	848.8	33.00	32.5±1
GPRS 8 (1 slot)	128	824.2	32.68	32.0±1
	189	836.4	32.52	32.0±1
	251	848.8	32.98	32.0±1
GPRS 10 (2 slot)	128	824.2	31.80	31.5±1
	189	836.4	31.60	31.5±1
	251	848.8	32.08	31.5±1
GPRS 11 (3 slot)	128	824.2	31.04	31.0±1
	189	836.4	30.79	31.0±1
	251	848.8	31.15	31.0±1
GPRS 12 (4 slot)	128	824.2	27.90	28.0±1
	189	836.4	27.69	28.0±1
	251	848.8	28.14	28.0±1
EGPRS 8 (1 slot)	128	824.2	26.82	27.0±1
	189	836.4	27.12	27.0±1
	251	848.8	27.12	27.0±1
EGPRS 10 (2 slot)	128	824.2	25.56	25.0±1
	189	836.4	25.69	25.0±1
	251	848.8	25.80	25.0±1
EGPRS 11 (3 slot)	128	824.2	23.06	23.0±1
	189	836.4	23.22	23.0±1
	251	848.8	23.28	23.0±1
EGPRS 12 (4 slot)	128	824.2	21.69	22.0±1
	189	836.4	21.97	22.0±1
	251	848.8	22.01	22.0±1

PCS Band (Part 24E) PCS 1900				
Humidity :		50 %	Temperature :	22 °C
Test Result:		PASS	Test By:	Sance
Mode	Channel	Frequency (MHz)	Output Power (dBm)	Tune up power tolerant
GSM	512	1850.2	29.70	29.0±1
	661	1880.0	29.70	29.0±1
	810	1909.8	29.60	29.0±1
GPRS 8 (1 slot)	512	1850.2	29.68	29.0±1
	661	1880.0	29.70	29.0±1
	810	1909.8	29.62	29.0±1
GPRS 10 (2 slot)	512	1850.2	28.57	28.0±1
	661	1880.0	28.55	28.0±1
	810	1909.8	28.49	28.0±1
GPRS 11 (3 slot)	512	1850.2	27.35	27.0±1
	661	1880.0	27.29	27.0±1
	810	1909.8	27.22	27.0±1
GPRS 12 (4 slot)	512	1850.2	25.87	26.0±1
	661	1880.0	25.91	26.0±1
	810	1909.8	25.81	26.0±1
EGPRS 8 (1 slot)	512	1850.2	24.99	25.0±1
	661	1880.0	24.85	25.0±1
	810	1909.8	25.18	25.0±1
EGPRS 10 (2 slot)	512	1850.2	23.74	23.0±1
	661	1880.0	23.62	23.0±1
	810	1909.8	23.55	23.0±1
EGPRS 11 (3 slot)	512	1850.2	22.16	22.0±1
	661	1880.0	22.37	22.0±1
	810	1909.8	22.28	22.0±1
EGPRS 12 (4 slot)	512	1850.2	20.49	20.0±1
	661	1880.0	20.11	20.0±1
	810	1909.8	20.23	20.0±1

WCDMA Band V				
Humidity :		50 %	Temperature :	22 °C
Test Result:		PASS	Test By:	Sance
Mode	Channel	Frequency (MHz)	Output Power (dBm)	Tune up power tolerant
RMC 12.2K	4132	826.4	22.86	22.0±1
	4182	836.4	22.84	22.0±1
	4233	846.6	22.77	22.0±1
HSDPA Subtest -1	4132	826.4	21.85	22.0±1
	4182	836.4	21.83	22.0±1
	4233	846.6	21.79	22.0±1
HSDPA Subtest -2	4132	826.4	21.81	22.0±1
	4182	836.4	21.80	22.0±1
	4233	846.6	21.83	22.0±1
HSDPA Subtest -3	4132	826.4	21.79	22.0±1
	4182	836.4	21.82	22.0±1
	4233	846.6	21.78	22.0±1
HSDPA Subtest -4	4132	826.4	21.83	22.0±1
	4182	836.4	21.78	22.0±1
	4233	846.6	21.86	22.0±1
HSUPA Subtest -1	4132	826.4	21.78	22.0±1
	4182	836.4	21.85	22.0±1
	4233	846.6	21.80	22.0±1
HSUPA Subtest -2	4132	826.4	21.71	22.0±1
	4182	836.4	21.86	22.0±1
	4233	846.6	21.74	22.0±1
HSUPA Subtest -3	4132	826.4	21.81	22.0±1
	4182	836.4	21.78	22.0±1
	4233	846.6	21.83	22.0±1
HSUPA Subtest -4	4132	826.4	21.86	22.0±1
	4182	836.4	21.83	22.0±1
	4233	846.6	21.84	22.0±1
HSUPA Subtest -5	4132	826.4	21.85	22.0±1
	4182	836.4	21.80	22.0±1
	4233	846.6	21.82	22.0±1

WCDMA Band II				
Humidity :		50 %	Temperature :	22 °C
Test Result:		PASS	Test By:	Sance
Mode	Channel	Frequency (MHz)	Output Power (dBm)	Tune up power tolerant
RMC 12.2K	9262	1852.4	22.06	22.0±1
	9400	1880.0	22.06	22.0±1
	9538	1907.6	22.01	22.0±1
HSDPA Subtest -1	9262	1852.4	21.09	22.0±1
	9400	1880.0	21.03	22.0±1
	9538	1907.6	21.06	22.0±1
HSDPA Subtest -2	9262	1852.4	21.05	22.0±1
	9400	1880.0	21.01	22.0±1
	9538	1907.6	21.08	22.0±1
HSDPA Subtest -3	9262	1852.4	21.06	22.0±1
	9400	1880.0	21.04	22.0±1
	9538	1907.6	21.02	22.0±1
HSDPA Subtest -4	9262	1852.4	21.03	22.0±1
	9400	1880.0	21.04	22.0±1
	9538	1907.6	21.05	22.0±1
HSUPA Subtest -1	9262	1852.4	21.07	22.0±1
	9400	1880.0	21.03	22.0±1
	9538	1907.6	21.03	22.0±1
HSUPA Subtest -2	9262	1852.4	21.06	22.0±1
	9400	1880.0	21.01	22.0±1
	9538	1907.6	21.02	22.0±1
HSUPA Subtest -3	9262	1852.4	21.02	22.0±1
	9400	1880.0	21.05	22.0±1
	9538	1907.6	21.01	22.0±1
HSUPA Subtest -4	9262	1852.4	21.06	22.0±1
	9400	1880.0	21.05	22.0±1
	9538	1907.6	21.03	22.0±1
HSUPA Subtest -5	9262	1852.4	21.04	22.0±1
	9400	1880.0	21.06	22.0±1
	9538	1907.6	21.04	22.0±1

Radiated Power (ERP and EIRP)

ERP for Cellular Band (Part 22H)							
Humidity :		50 %	Temperature :			22 °C	
Test Result:		PASS	Test By:			Sance	
Channel	Frequency (MHz)	Substituted level (dBm)	Polarization (H/V) Antenna	Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
GSM 850							
128	824.2	23.79	H	7.86	0.9	30.75	38.45
		20.27	V	7.86	0.9	27.23	38.45
189	836.4	23.04	H	7.81	0.9	29.95	38.45
		20.57	V	7.81	0.9	27.48	38.45
251	848.8	23.11	H	7.81	0.9	30.02	38.45
		21.28	V	7.81	0.9	28.19	38.45
GPRS 850							
128	824.2	21.78	H	7.86	0.9	28.74	38.45
		17.66	V	7.86	0.9	24.62	38.45
189	836.4	21.62	H	7.81	0.9	28.53	38.45
		17.49	V	7.81	0.9	24.40	38.45
251	848.8	22.00	H	7.81	0.9	28.91	38.45
		16.90	V	7.81	0.9	23.81	38.45
EGPRS 850							
128	824.2	14.66	H	7.86	0.9	21.62	38.45
		11.89	V	7.86	0.9	18.85	38.45
189	836.4	14.38	H	7.81	0.9	21.29	38.45
		11.16	V	7.81	0.9	18.07	38.45
251	848.8	14.75	H	7.81	0.9	21.66	38.45
		11.89	V	7.81	0.9	18.80	38.45

EIRP for PCS Band (Part 24E)							
Humidity :		50 %	Temperature :			22 °C	
Test Result:		PASS	Test By:			Sance	
Channel	Frequency (MHz)	Substituted level (dBm)	Polarization (H/V) Antenna	Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
PCS 1900							
512	1850.2	21.21	H	8.04	2.3	26.95	33.0
		14.97	V	8.04	2.3	20.71	33.0
661	1880.0	21.18	H	8.06	2.3	26.94	33.0
		14.38	V	8.06	2.3	20.14	33.0
810	1909.8	20.32	H	8.09	2.3	26.11	33.0
		14.70	V	8.09	2.3	20.49	33.0
GPRS 1900							
512	1850.2	19.76	H	8.04	2.3	25.50	33.0
		13.59	V	8.04	2.3	19.33	33.0
661	1880.0	19.32	H	8.06	2.3	25.08	33.0
		13.99	V	8.06	2.3	19.75	33.0
810	1909.8	19.03	H	8.09	2.3	24.82	33.0
		13.22	V	8.09	2.3	19.01	33.0
EGPRS 1900							
512	1850.2	13.42	H	8.04	2.3	19.16	33.0
		8.27	V	8.04	2.3	14.01	33.0
661	1880.0	12.88	H	8.06	2.3	18.64	33.0
		7.86	V	8.06	2.3	13.62	33.0
810	1909.8	12.23	H	8.09	2.3	18.02	33.0
		7.26	V	8.09	2.3	13.05	33.0

ERP for WCDMA Band V							
Humidity :		50 %	Temperature :			22 °C	
Test Result:		PASS	Test By:			Sance	
Channel	Frequency (MHz)	Substituted level (dBm)	Polarization (H/V) Antenna	Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
WCDMA Band V RMC 12.2K							
4132	826.4	11.69	H	7.85	0.9	18.64	38.45
		6.84	V	7.85	0.9	13.79	38.45
4182	836.4	11.00	H	7.81	0.9	17.91	38.45
		5.92	V	7.81	0.9	12.83	38.45
4233	846.6	11.86	H	7.81	0.9	18.77	38.45
		7.11	V	7.81	0.9	14.02	38.45
WCDMA Band V HSDPA							
4132	826.4	9.20	H	7.85	0.9	16.15	38.45
		5.31	V	7.85	0.9	12.26	38.45
4182	836.4	9.36	H	7.81	0.9	16.27	38.45
		4.98	V	7.81	0.9	11.89	38.45
4233	846.6	10.03	H	7.81	0.9	16.94	38.45
		5.30	V	7.81	0.9	12.21	38.45
WCDMA Band V HSUPA							
4132	826.4	10.00	H	7.85	0.9	16.95	38.45
		5.23	V	7.85	0.9	12.18	38.45
4182	836.4	9.76	H	7.81	0.9	16.67	38.45
		5.11	V	7.81	0.9	12.02	38.45
4233	846.6	9.32	H	7.81	0.9	16.23	38.45
		5.05	V	7.81	0.9	11.96	38.45

EIRP for WCDMA Band II							
Humidity :		50 %	Temperature :			22 °C	
Test Result:		PASS	Test By:			Sance	
Channel	Frequency (MHz)	Substituted level (dBm)	Polarization (H/V) Antenna	Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
WCDMA Band II RMC 12.2K							
9262	1852.4	11.65	H	8.04	2.3	17.39	33.0
		2.11	V	8.04	2.3	7.85	33.0
9400	1880.0	12.25	H	8.06	2.3	18.01	33.0
		3.36	V	8.06	2.3	9.12	33.0
9538	1907.6	11.84	H	8.10	2.3	17.64	33.0
		2.48	V	8.10	2.3	8.28	33.0
WCDMA Band II HSDPA							
9262	1852.4	10.2	H	8.04	2.3	15.94	33.0
		2.28	V	8.04	2.3	8.02	33.0
9400	1880.0	10.28	H	8.06	2.3	16.04	33.0
		2.59	V	8.06	2.3	8.35	33.0
9538	1907.6	10.63	H	8.10	2.3	16.43	33.0
		2.94	V	8.10	2.3	8.74	33.0
WCDMA Band II HSUPA							
9262	1852.4	10.43	H	8.04	2.3	16.17	33.0
		2.45	V	8.04	2.3	8.19	33.0
9400	1880.0	10.58	H	8.06	2.3	16.34	33.0
		2.22	V	8.06	2.3	7.98	33.0
9538	1907.6	10.65	H	8.10	2.3	16.45	33.0
		2.63	V	8.10	2.3	8.43	33.0

3. TEST OCCUPIED BANDWIDTH

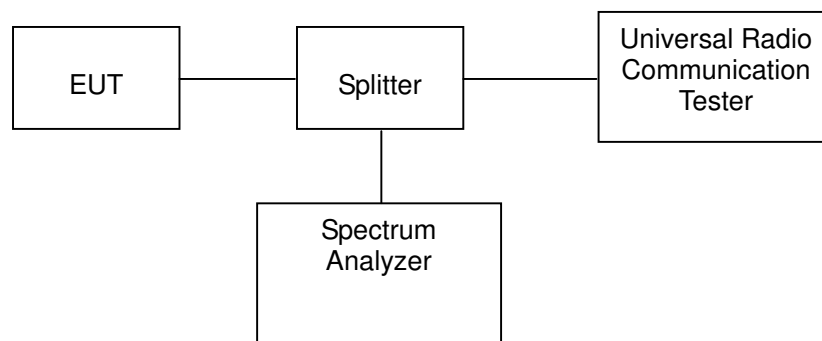
3.1 Applicable Standard

CFR 47 §2.1049, §22.917, §22.905 and §24.238.

3.2 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 30 kHz (Cellular /PCS) and the 26 dB & 99% bandwidth was recorded.



3.3 Test Result

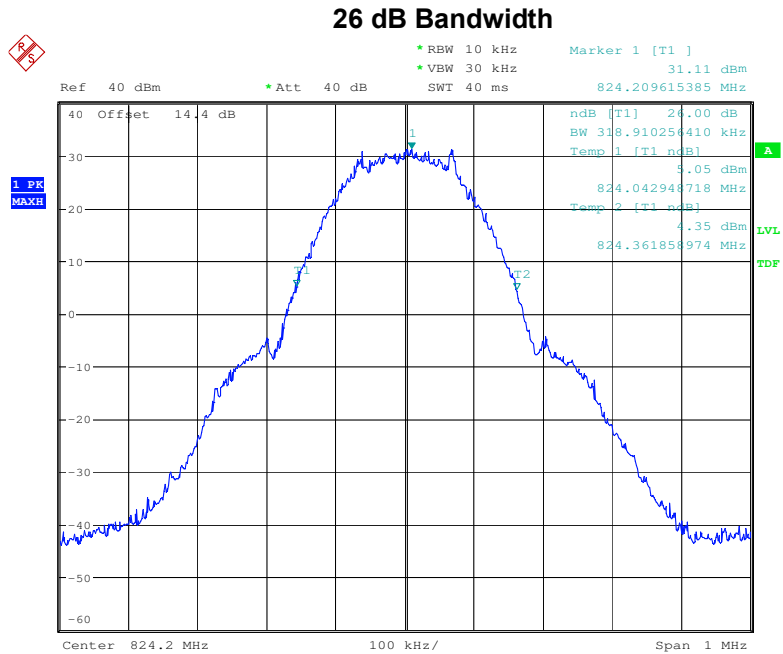
Pass.

Please refer to following tables and plots (the worst case).

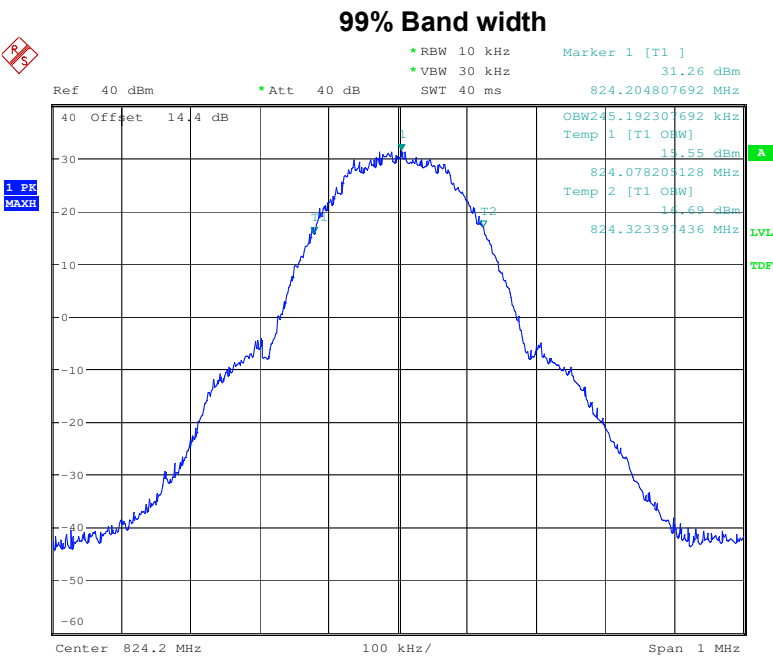
Humidity :		50 %	Temperature :	22 °C
Test Result:		PASS	Test By:	Sance
Mode	Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	26 dB Bandwidth (kHz)
Cellular Band (Part 22H)				
GSM850	128	824.2	245	319
	189	836.4	242	319
	251	848.8	242	319
GPRS 850	128	824.2	244	325
	189	836.4	242	321
	251	848.8	245	319
EGPRS 850	128	824.2	240	304
	189	836.4	242	292
	251	848.8	237	303
PCS Band (Part 24E)				
PCS1900	512	1850.2	242	317
	661	1880.0	244	313
	810	1909.8	245	321
GPRS 1900	512	1850.2	244	321
	661	1880.0	242	317
	810	1909.8	245	316
EGPRS 1900	512	1850.2	240	301
	661	1880.0	244	293
	810	1909.8	242	306

Humidity :		50 %	Temperature :	22 °C
Test Result:		PASS	Test By:	Sance
Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	26 dB Bandwidth (MHz)
WCDMA Band V				
WCDMA Band V RMC 12.2K	4132	826.4	4.20	4.71
	4182	836.4	4.17	4.68
	4233	846.6	4.17	4.71
WCDMA Band V HSDPA	4132	826.4	4.17	4.71
	4182	836.4	4.15	4.71
	4233	846.6	4.17	4.68
WCDMA Band V HSUPA	4132	826.4	4.18	4.71
	4182	836.4	4.17	4.71
	4233	846.6	4.18	4.68
WCDMA Band II				
WCDMA Band II RMC 12.2K	9262	1852.4	4.15	4.70
	9400	1880.0	4.18	4.68
	9538	1907.6	4.17	4.71
WCDMA Band II HSDPA	9262	1852.4	4.17	4.71
	9400	1880.0	4.17	4.71
	9538	1907.6	4.17	4.71
WCDMA Band II HSUPA	9262	1852.4	4.18	4.71
	9400	1880.0	4.17	4.70
	9538	1907.6	4.18	4.71

Cellular Band (Part 22H) GSM850



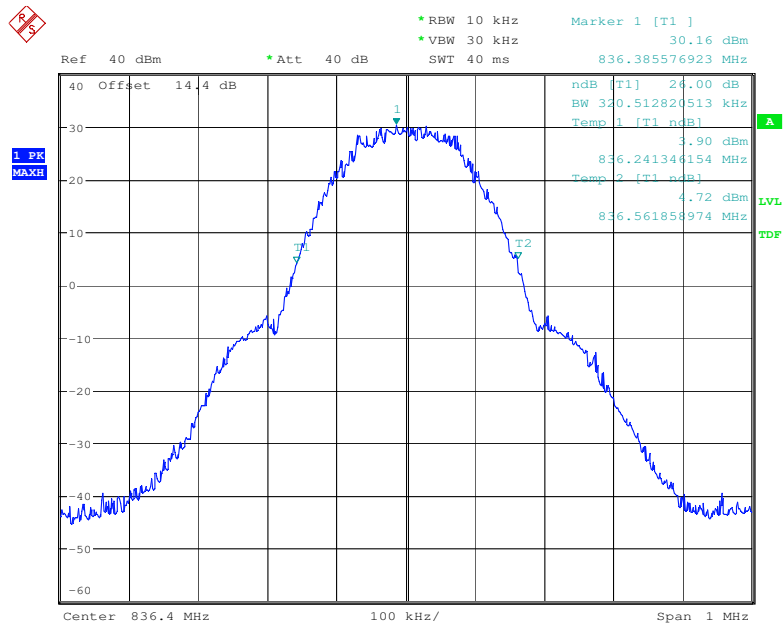
Date: 18.OCT.2016 13:32:18



Date: 18.OCT.2016 13:35:16

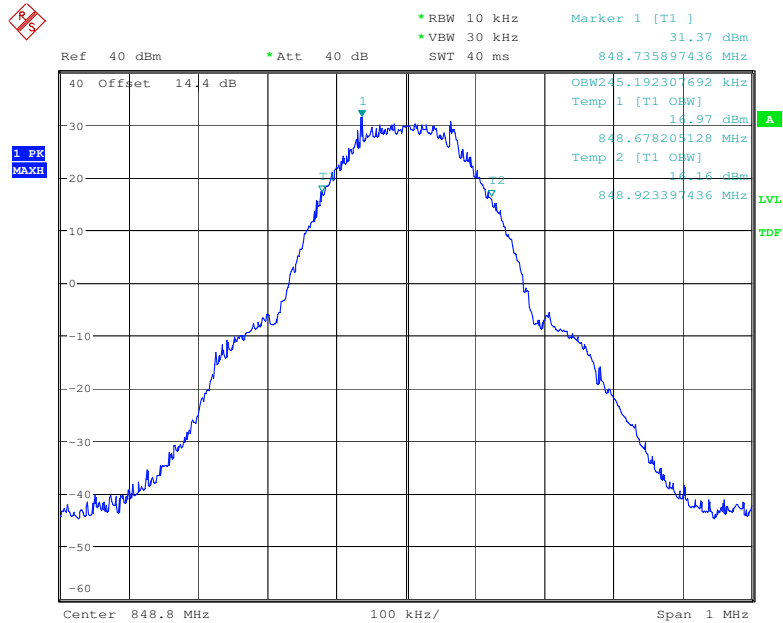
Cellular Band (Part 22H) GPRS 850

26 dB Bandwidth



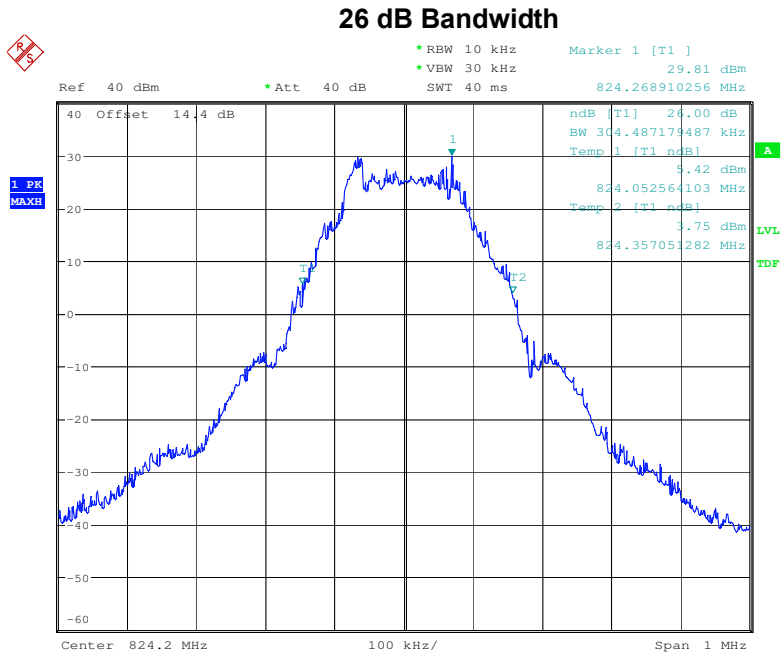
Date: 21.OCT.2016 10:52:44

99% Band width

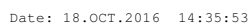


Date: 21.OCT.2016 10:56:38

Cellular Band (Part 22H) EGPRS 850

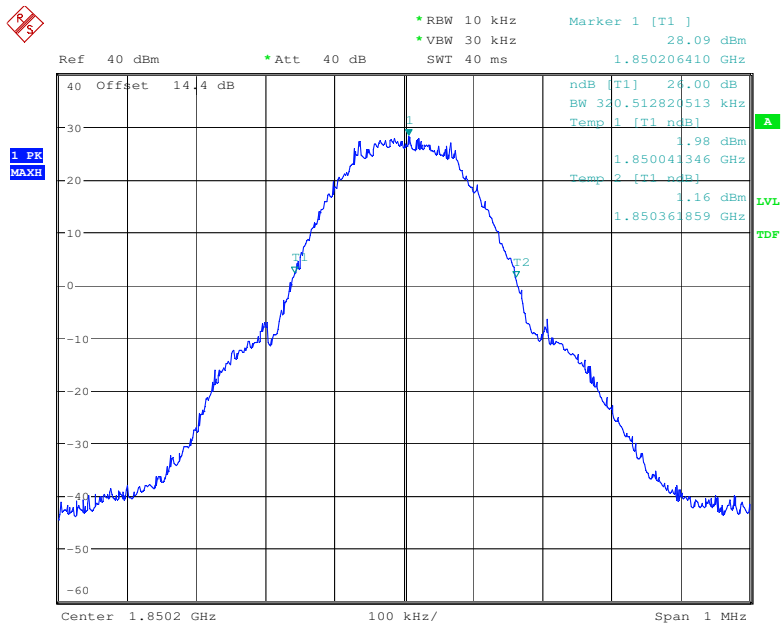


26 dB Bandwidth



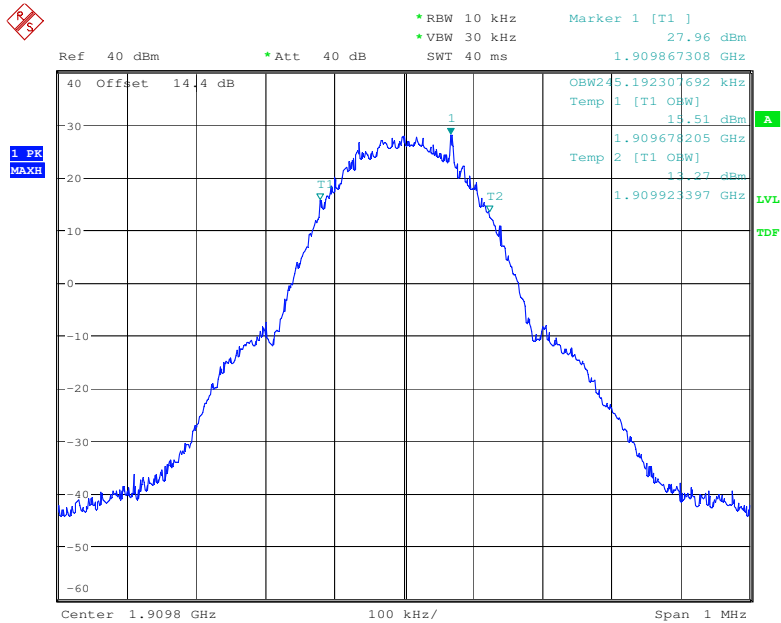
PCS Band (Part 24E) GPRS 1900

26 dB Bandwidth



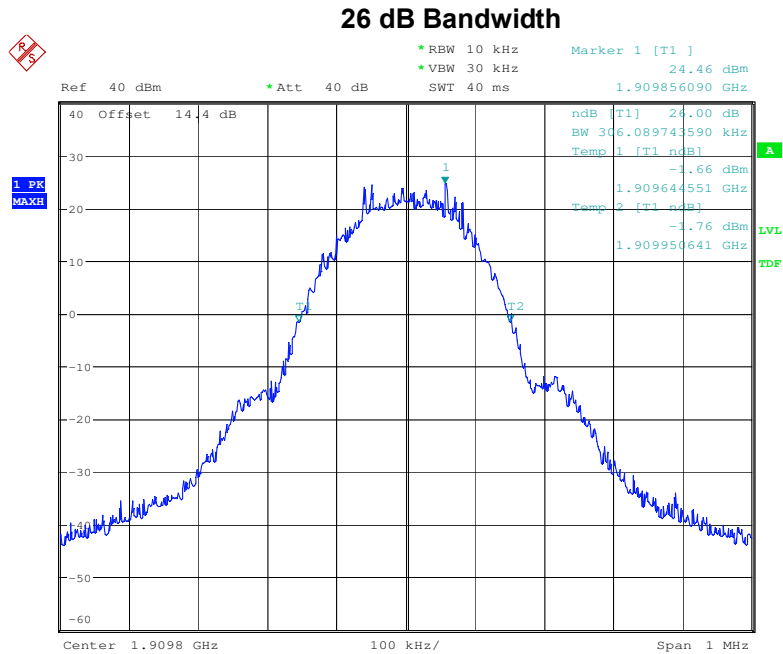
Date: 21.OCT.2016 13:36:19

99% Band width



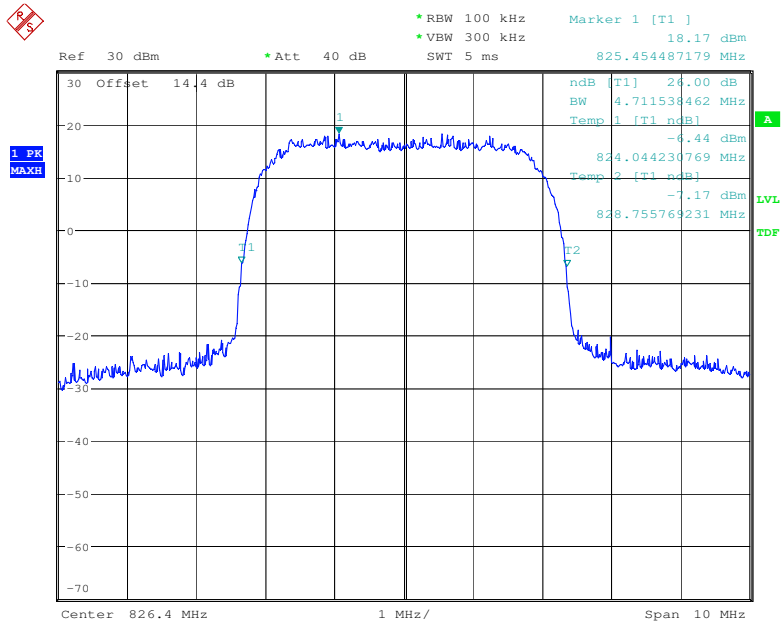
Date: 21.OCT.2016 13:38:35

PCS Band (Part 24E) EGPRS 1900



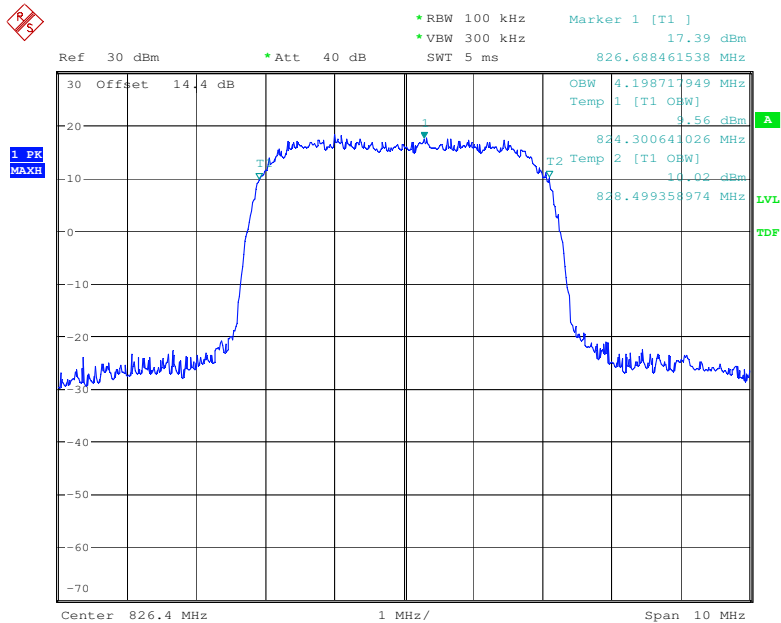
WCDMA Band V RMC 12.2K

26 dB Bandwidth



Date: 21.OCT.2016 14:53:56

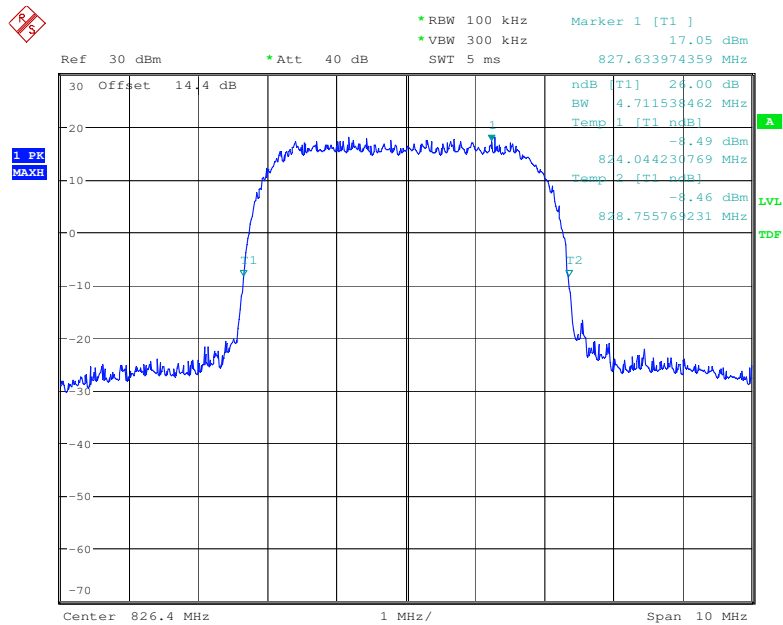
99% Band width



Date: 21.OCT.2016 14:54:14

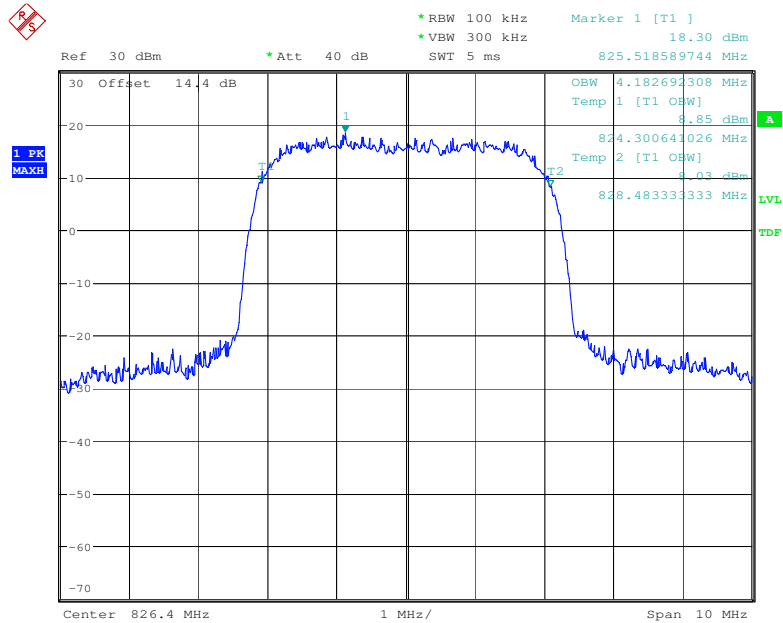
WCDMA Band V HSDPA

26 dB Bandwidth



Date: 21.OCT.2016 14:55:22

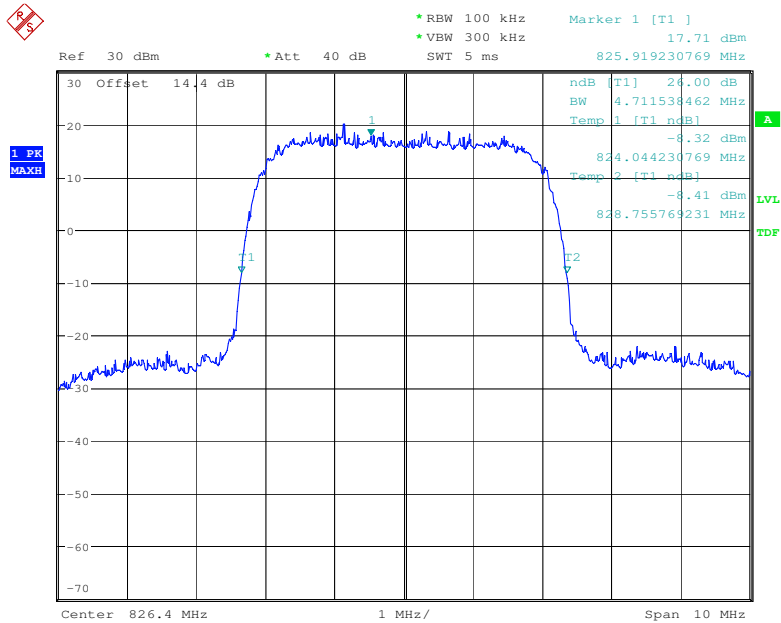
99% Band width



Date: 21.OCT.2016 14:55:34

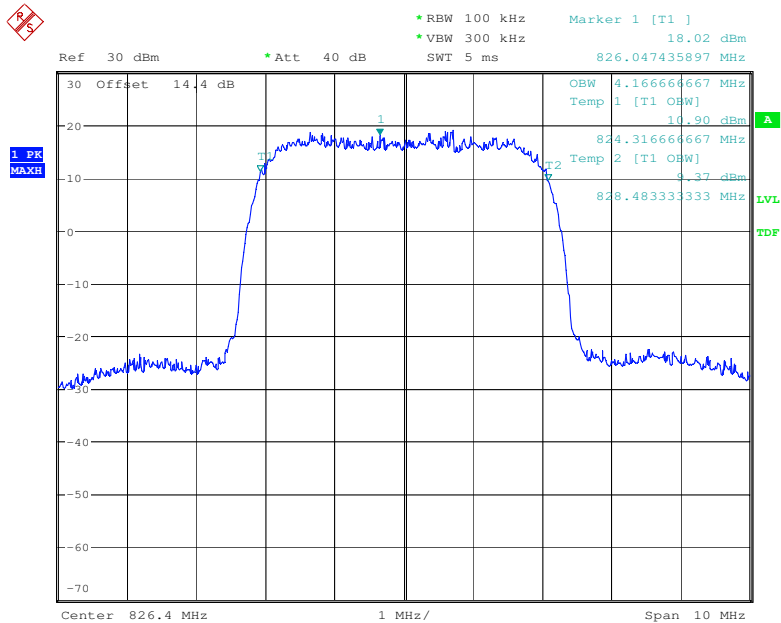
WCDMA Band V HSUPA

26 dB Bandwidth



Date: 21.OCT.2016 14:57:47

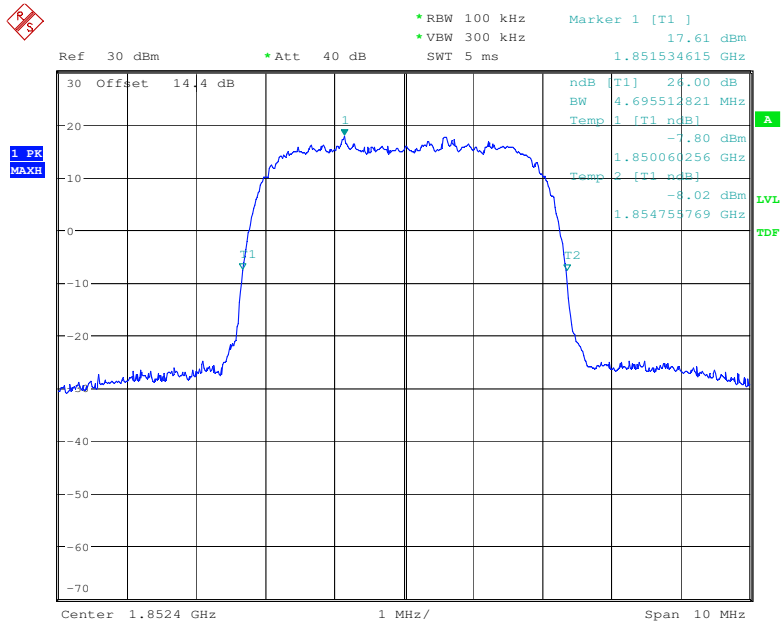
99% Band width



Date: 21.OCT.2016 14:57:35

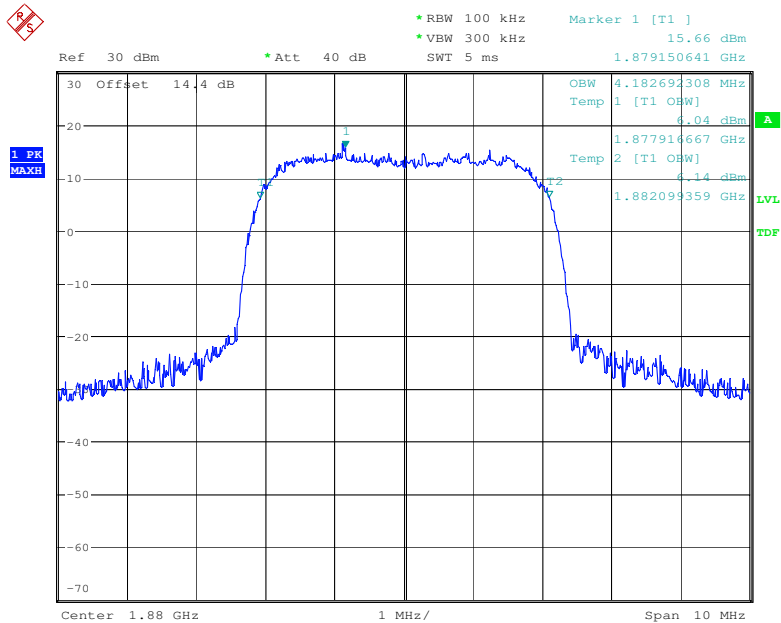
WCDMA Band II RMC 12.2K

26 dB Bandwidth



Date: 21.OCT.2016 14:41:00

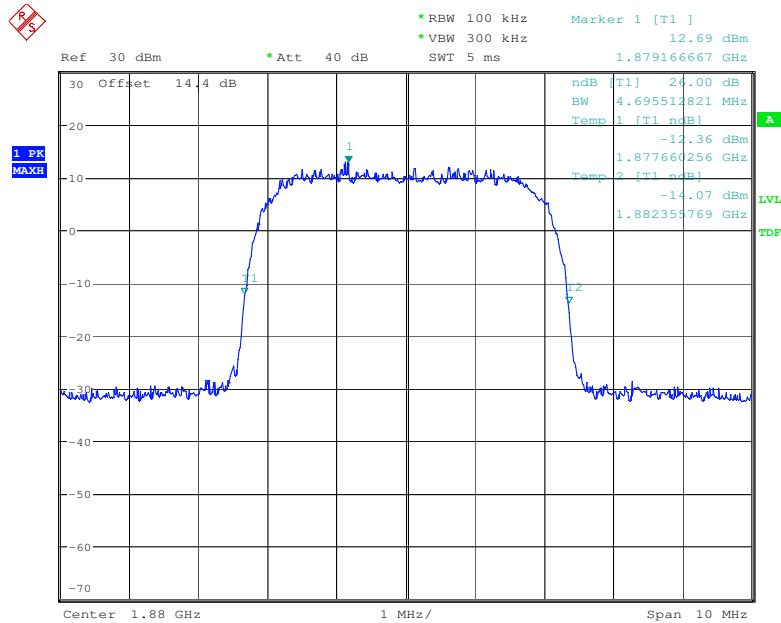
99% Band width



Date: 21.OCT.2016 14:41:48

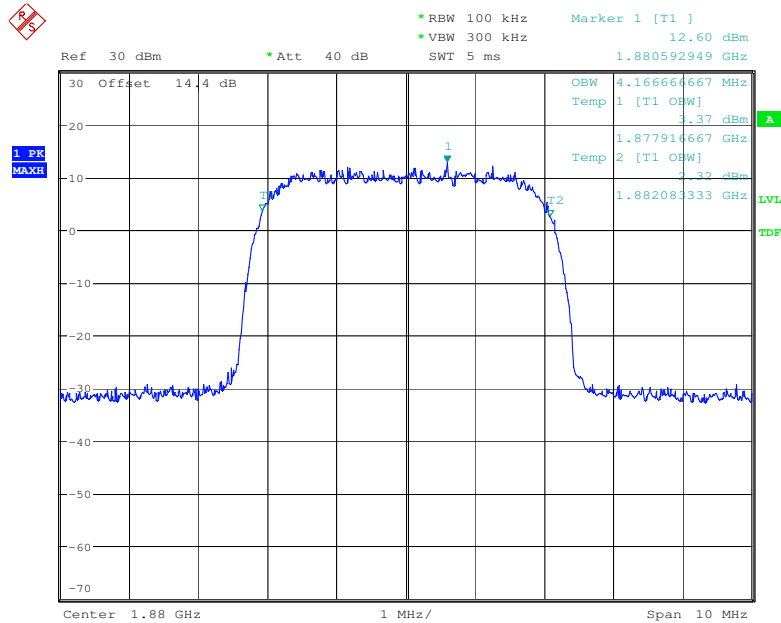
WCDMA Band II HSDPA

26 dB Bandwidth



Date: 21.OCT.2016 14:44:44

99% Band width



Date: 21.OCT.2016 14:45:00

26 dB Bandwidth



4. FREQUENCY STABILITY

4.1 Applicable Standard

CFR47 § 2.1055 (a), § 2.1055 (d), §22.355, §24.235

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

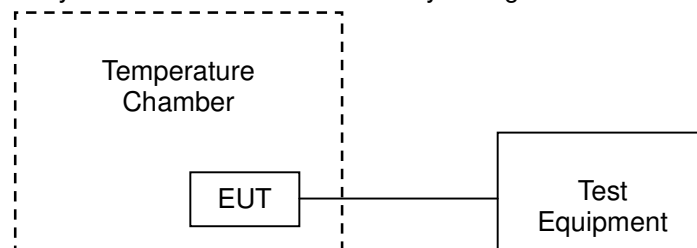
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

4.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 30 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.



4.3 Test Result

Pass.

Please refer to following the tables.

Cellular Band (Part 22H) GSM 850				
Middle channel, $f_o = 836.4\text{MHz}$;				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	-7	-0.008370	2.5
-20		-19	-0.022720	2.5
-10		20	0.023912	2.5
0		20	0.023912	2.5
10		-18	-0.021520	2.5
20		17	0.0203250	2.5
30		14	0.016738	2.5
40		-13	-0.015540	2.5
50		15	0.017934	2.5
20	4.2	-7	-0.008370	2.5
	3.4	10	0.011956	2.5

Cellular Band (Part 22H) GPRS 850				
Middle channel, $f_o = 836.4\text{MHz}$;				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	-22	-0.02630	2.5
-20		-19	-0.02272	2.5
-10		-5	-0.00598	2.5
0		11	0.013152	2.5
10		9	0.010760	2.5
20		15	0.017934	2.5
30		22	0.026303	2.5
40		-19	-0.02272	2.5
50		-16	-0.01913	2.5
20	4.2	8	0.009565	2.5
	3.4	-7	-0.00837	2.5

Cellular Band (Part 22H) EGPRS 850				
Middle channel, $f_o = 836.4\text{MHz}$;				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	19	0.022716	2.5
-20		20	0.023912	2.5
-10		13	0.015543	2.5
0		-17	-0.02033	2.5
10		-23	-0.02750	2.5
20		-10	-0.01196	2.5
30		-12	-0.01435	2.5
40		-25	-0.02989	2.5
50		-14	-0.01674	2.5
20	4.2	13	0.015543	2.5
	3.4	8	0.009565	2.5

PCS Band (Part 24E) PCS 1900				
Middle channel, $f_o = 1880.0\text{MHz}$;				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	-13	-0.006910	2.5
-20		8	0.004255	2.5
-10		16	0.008511	2.5
0		17	0.009043	2.5
10		-9	-0.004790	2.5
20		-10	-0.005320	2.5
30		16	0.008511	2.5
40		-16	-0.008510	2.5
50		-19	-0.010110	2.5
20	4.2	9	0.004787	2.5
	3.4	-11	-0.005850	2.5

PCS Band (Part 24E) GPRS 1900				
Middle channel, $f_o = 1880.0\text{MHz}$;				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	-15	-0.007980	2.5
-20		-9	-0.004790	2.5
-10		-9	-0.004790	2.5
0		16	0.008511	2.5
10		18	0.009574	2.5
20		-12	-0.006380	2.5
30		-15	-0.007980	2.5
40		-16	-0.008510	2.5
50		-12	-0.006380	2.5
20	4.2	-10	-0.005320	2.5
	3.4	11	0.005851	2.5

PCS Band (Part 24E) EGPRS 1900				
Middle channel, $f_o = 1880.0\text{MHz}$;				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	-12	-0.006380	2.5
-20		15	0.007979	2.5
-10		12	0.006383	2.5
0		11	0.005851	2.5
10		-18	-0.009570	2.5
20		17	0.009043	2.5
30		-9	-0.004790	2.5
40		10	0.005319	2.5
50		-8	-0.004260	2.5
20	4.2	-12	-0.006380	2.5
	3.4	-10	-0.005320	2.5

WCDMA Band V RMC 12.2K				
Middle channel, $f_o = 836.4\text{MHz}$;				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	10	0.011956	2.5
-20		17	0.020325	2.5
-10		-13	-0.015540	2.5
0		-16	-0.019130	2.5
10		-20	-0.023910	2.5
20		11	0.013152	2.5
30		19	0.022716	2.5
40		-18	-0.021520	2.5
50		15	0.017934	2.5
20	4.2	14	0.016738	2.5
	3.4	17	0.020325	2.5

WCDMA Band II RMC 12.2K				
Middle channel, $f_o = 1880.0\text{MHz}$;				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	12	0.006383	2.5
-20		-13	-0.006910	2.5
-10		14	0.007447	2.5
0		-16	-0.008510	2.5
10		19	0.010106	2.5
20		11	0.005851	2.5
30		-13	-0.006910	2.5
40		-18	-0.009570	2.5
50		15	0.007979	2.5
20	4.2	13	0.006915	2.5
	3.4	-12	-0.006380	2.5

5. BAND EDGES

5.1 Applicable Standard

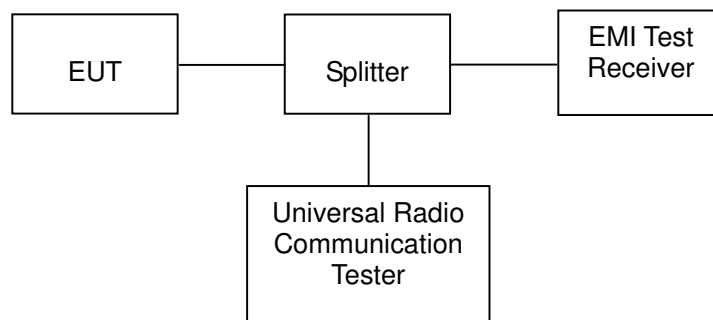
According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

5.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency, RBW set to 3 kHz.

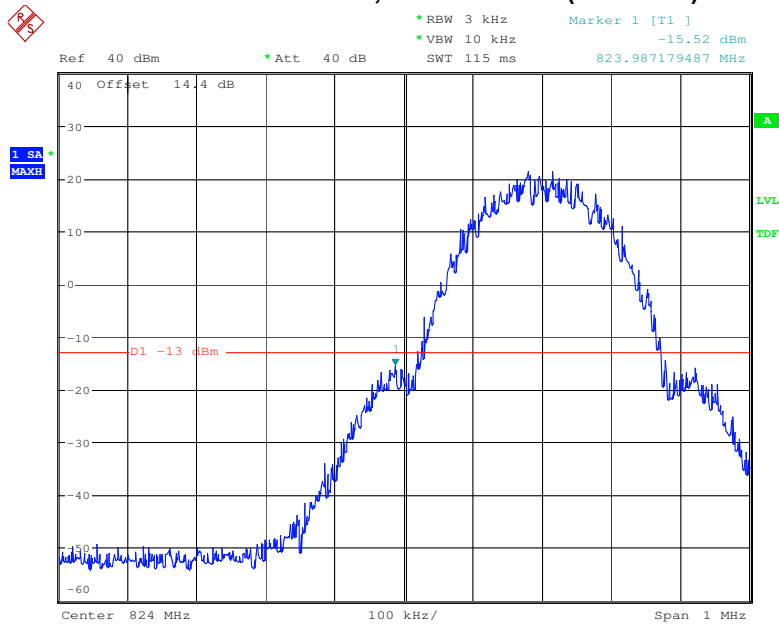


5.3 Test Result

Pass.

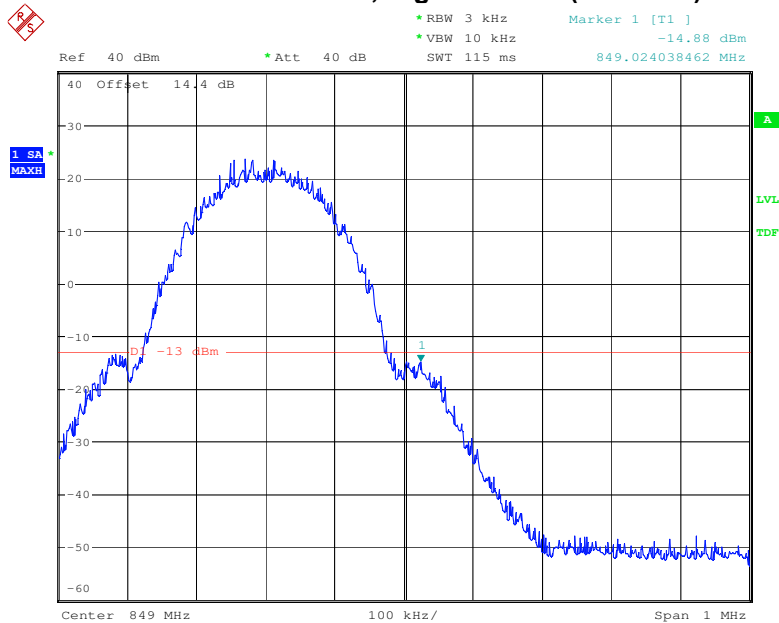
Please refer to following plots.

Cellular Band, Low Channel (GSM 850)



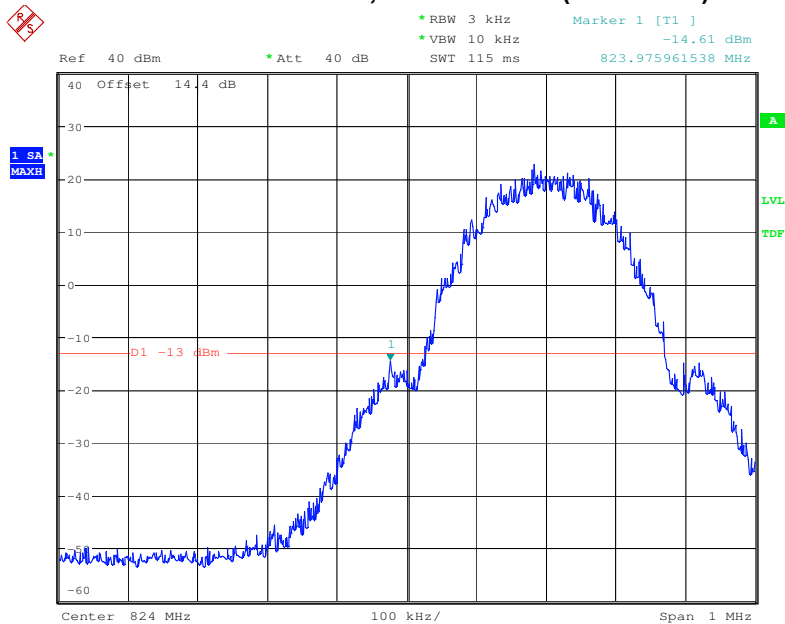
Date: 18.OCT.2016 13:49:05

Cellular Band, High Channel (GSM 850)



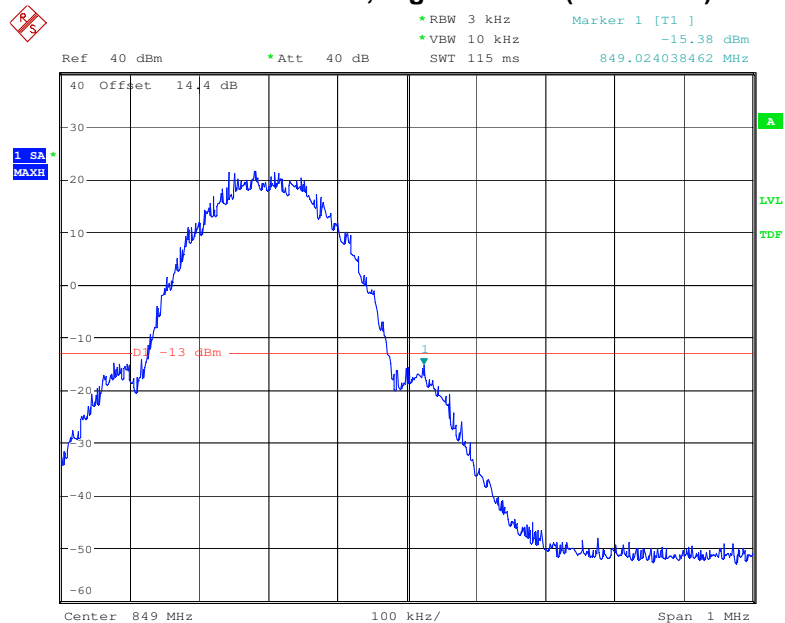
Date: 18.OCT.2016 13:52:59

Cellular Band, Low Channel (GPRS 850)



Date: 21.OCT.2016 11:01:53

Cellular Band, High Channel (GPRS 850)



Date: 21.OCT.2016 11:05:19

Ref 40 dBm * Att 40 dB * RBW 3 kHz Marker 1 [T1] -15.95 dBm
 * VBW 10 kHz SWT 115 ms 823.996794872 MHz

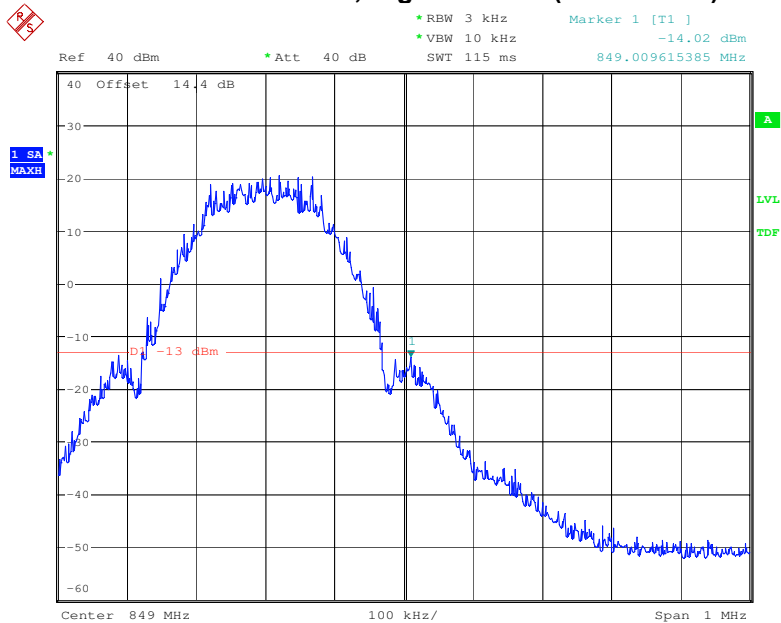
40 Offset 14.4 dB

1 SA MAXH A

D1 -13 dBm

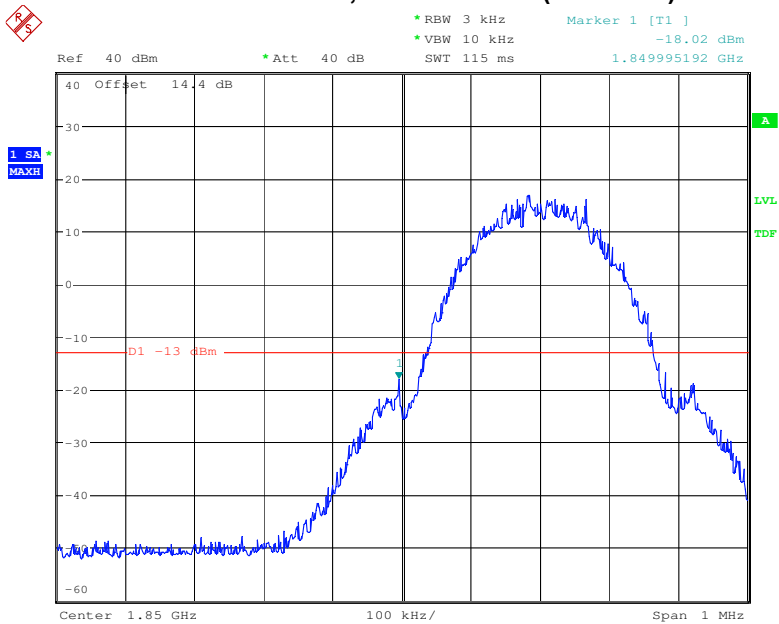
Center 824 MHz 100 kHz/ Span 1 MHz

Cellular Band, High Channel (EGPRS 850)



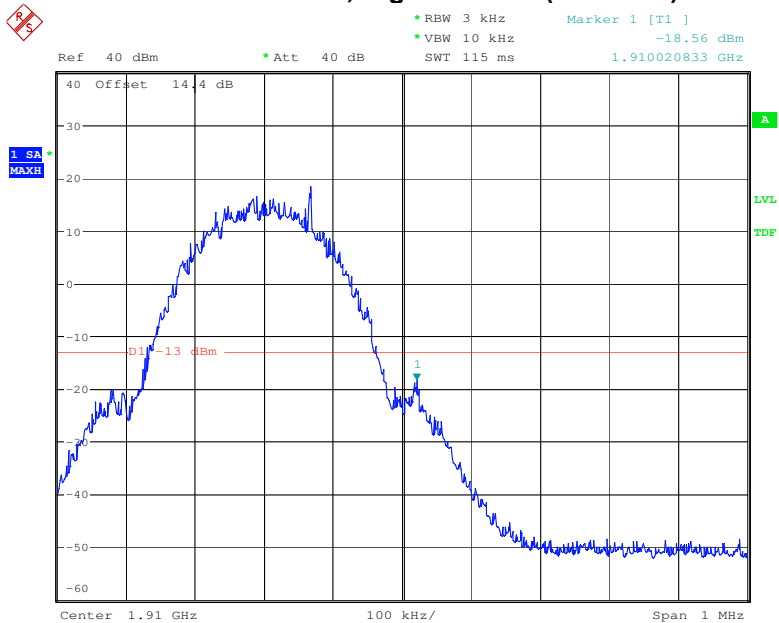
Page 45 of 75

PCS Band, Low Channel (PCS1900)



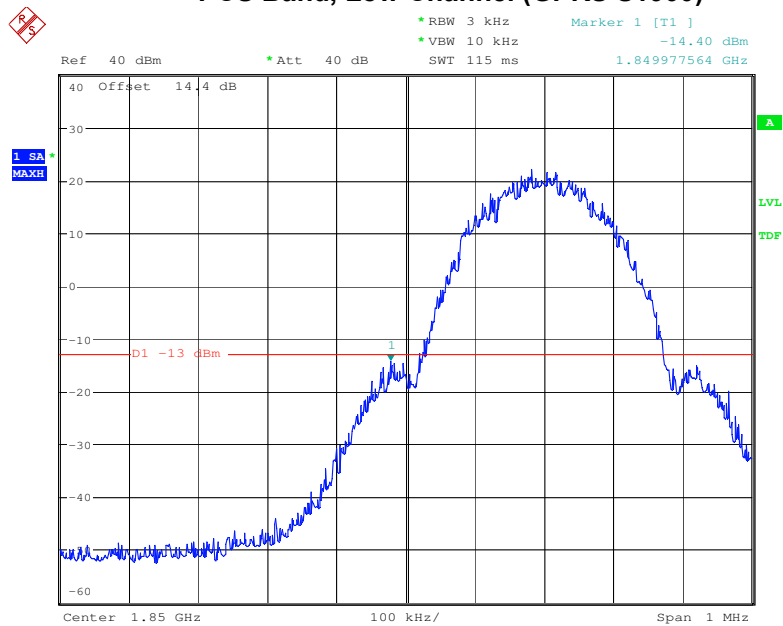
Date: 18.OCT.2016 14:41:45

PCS Band, High Channel (PCS1900)



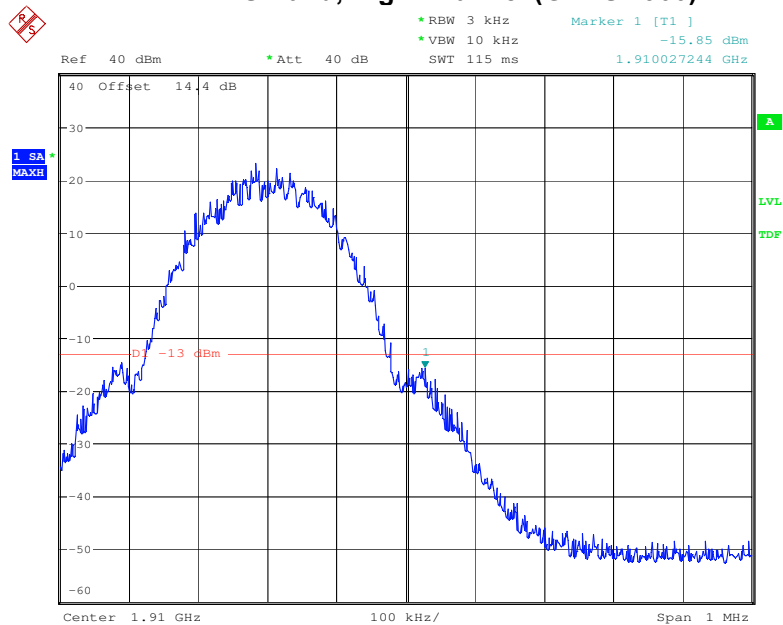
Date: 18.OCT.2016 14:39:42

PCS Band, Low Channel (GPRS S1900)



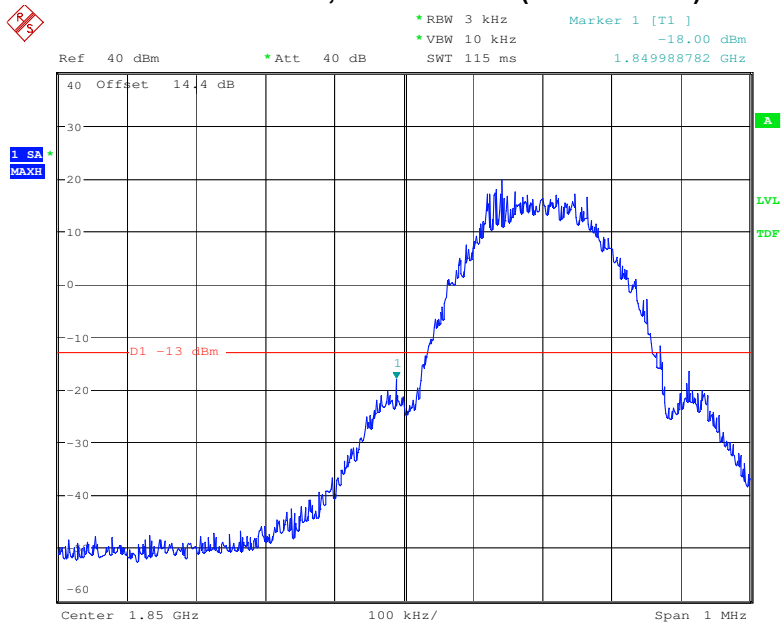
Date: 21.OCT.2016 13:42:18

PCS Band, High Channel (GPRS 1900)



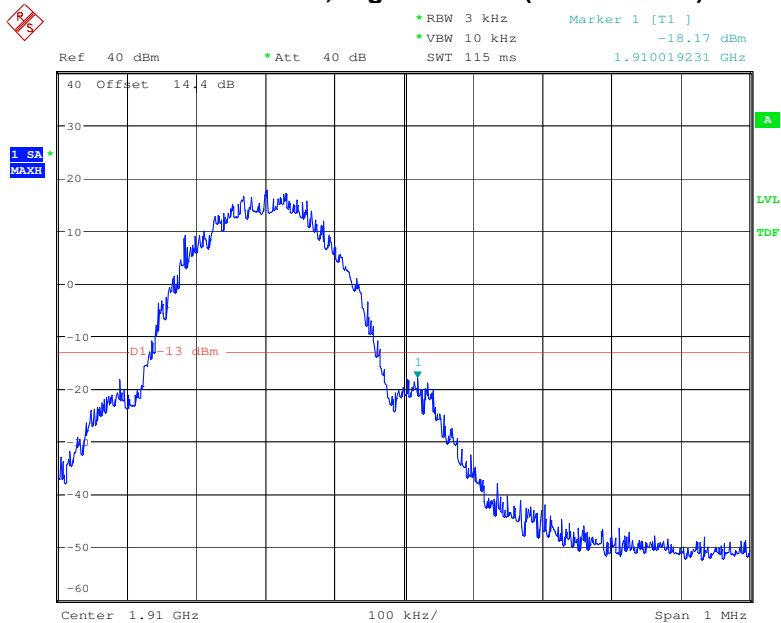
Date: 21.OCT.2016 13:43:53

PCS Band, Low Channel (EGPRS 1900)



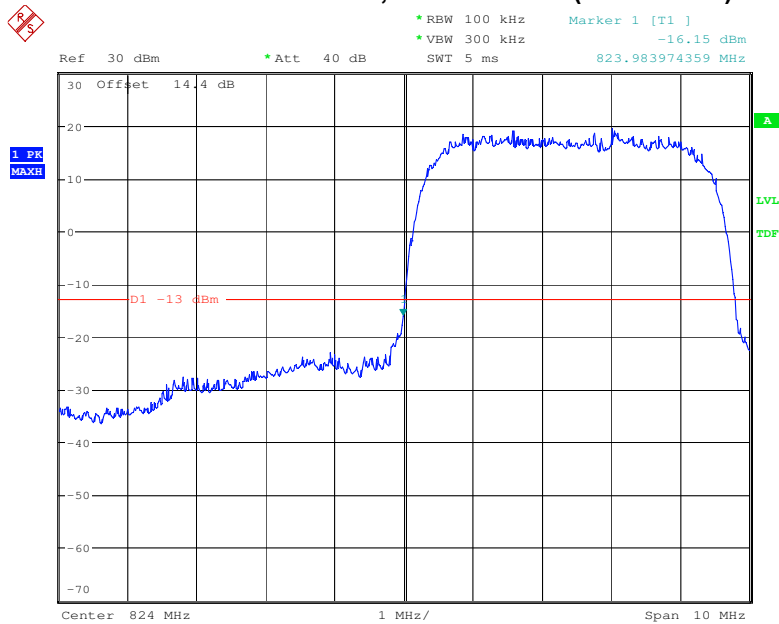
Date: 21.OCT.2016 14:03:21

PCS Band, High Channel (EGPRS 1900)



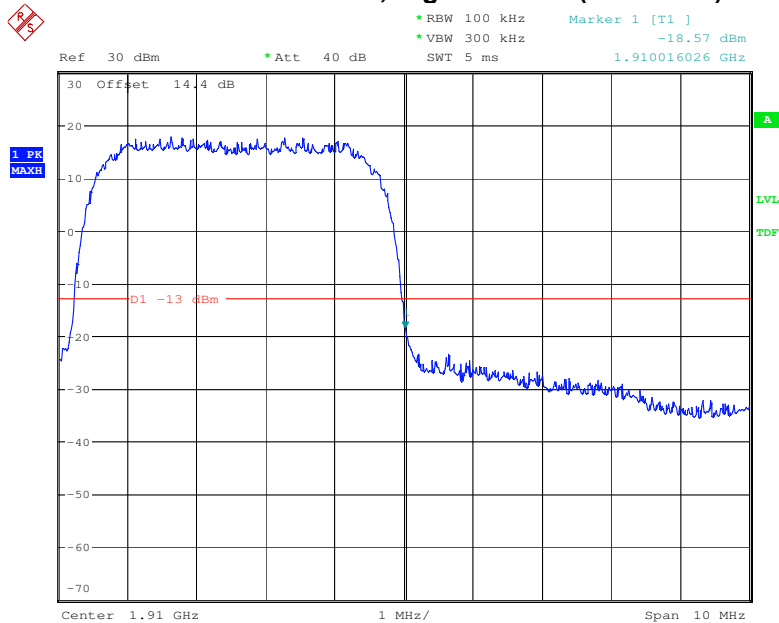
Date: 21.OCT.2016 14:01:51

WCDMA Band V , Low Channel (RMC 12.2K)



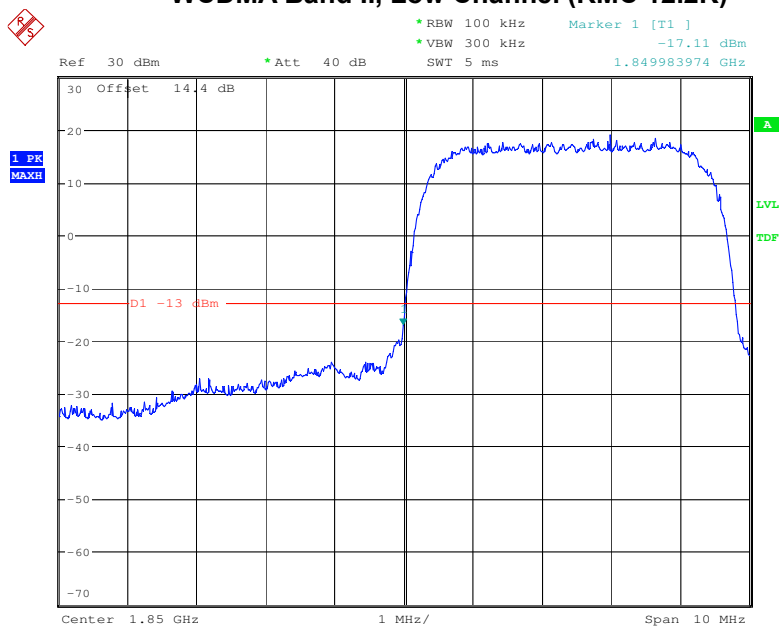
Date: 21.OCT.2016 15:02:25

WCDMA Band V, High Channel (RMC 12.K)



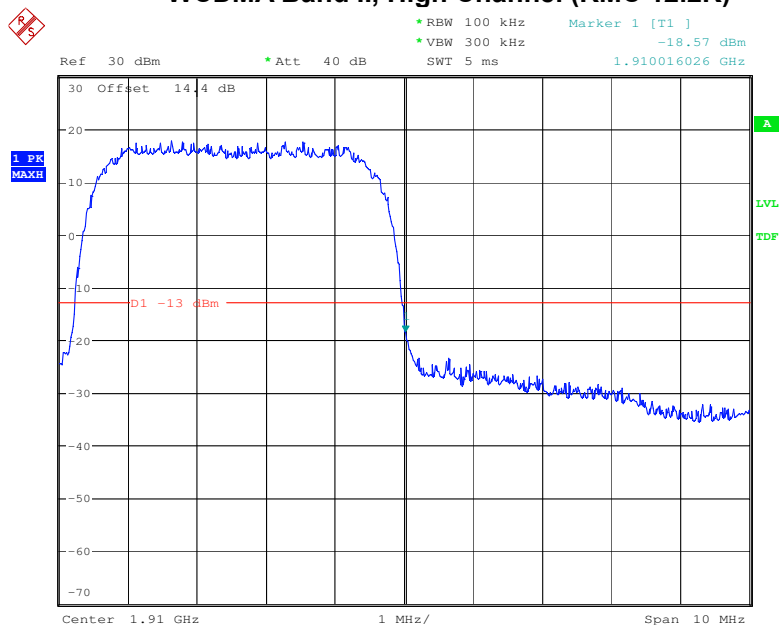
Date: 21.OCT.2016 15:04:42

WCDMA Band II, Low Channel (RMC 12.2K)



Date: 21.OCT.2016 15:04:07

WCDMA Band II, High Channel (RMC 12.2K)



Date: 21.OCT.2016 15:04:42

6. MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

7. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

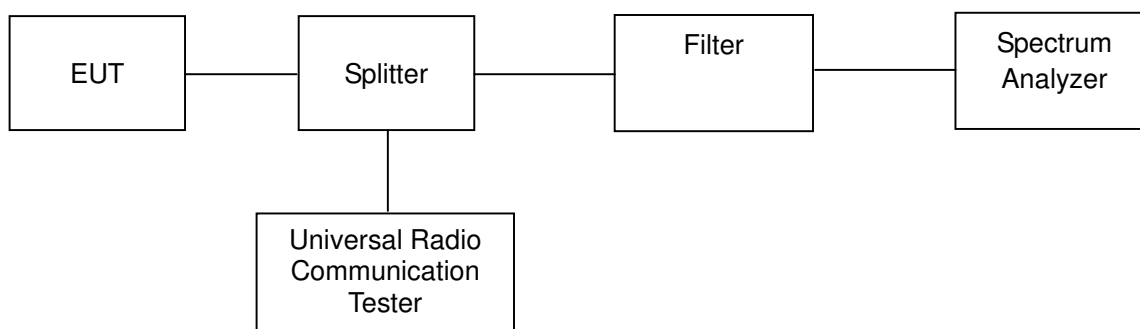
7.1 Applicable Standards

CFR 47 §2.1051, §22.917(a) and §24.238(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

7.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1000 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

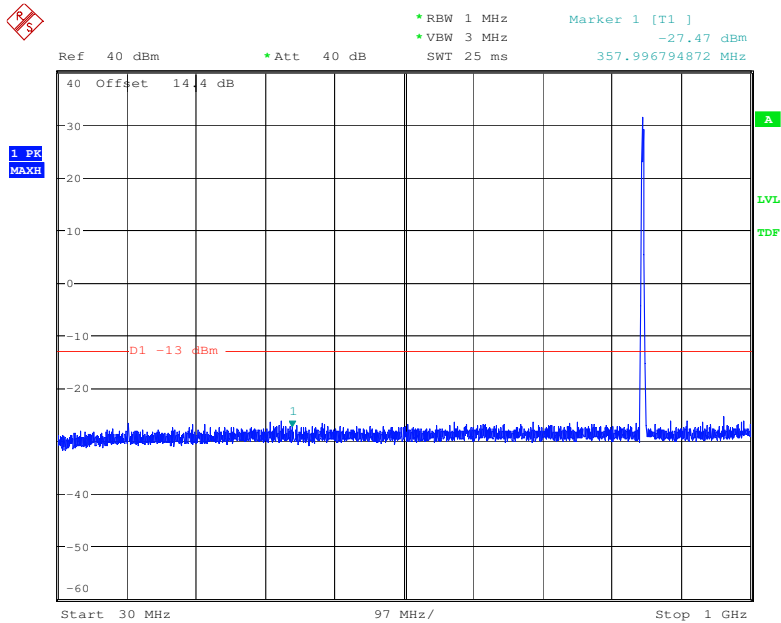


7.3 Test Procedure

Pass.

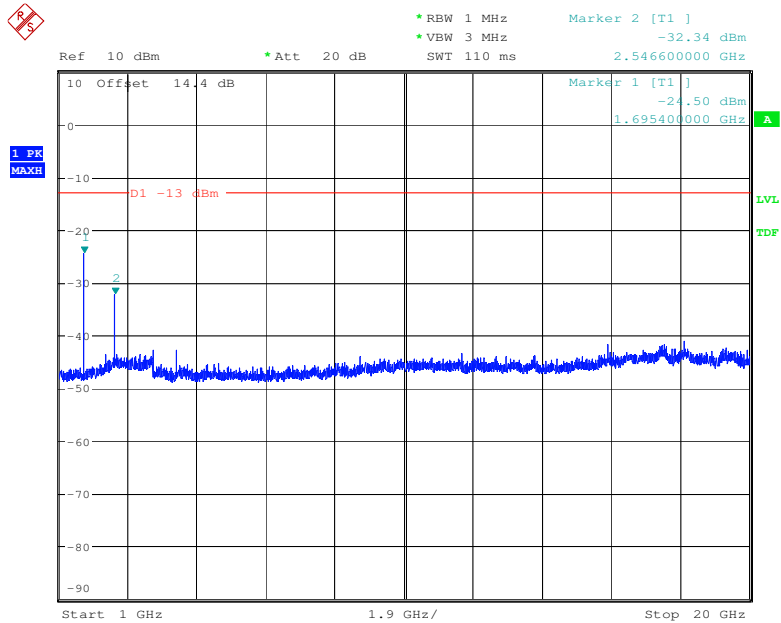
Please refer to following plots (the worst case).

Cellular Band (Part 22H)
GSM 850
30 – 1000 MHz



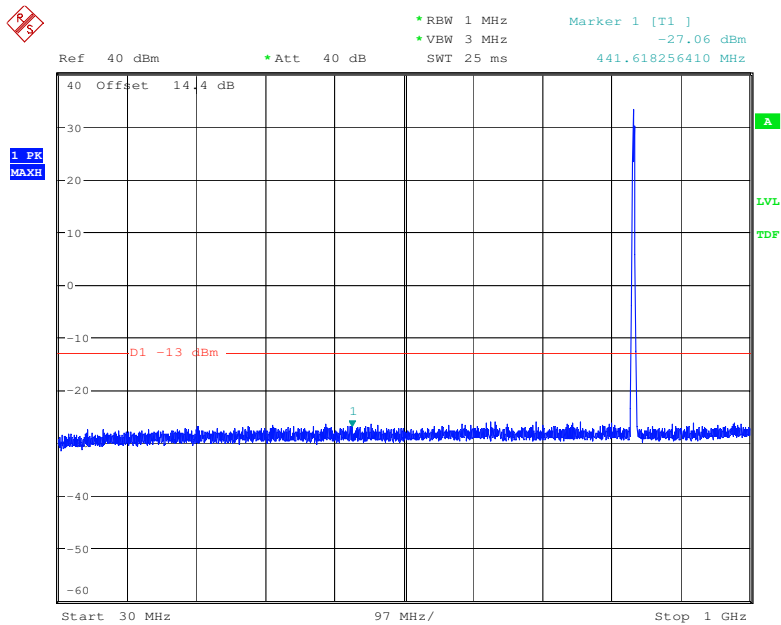
Date: 18.OCT.2016 14:01:43

1GHz – 20GH



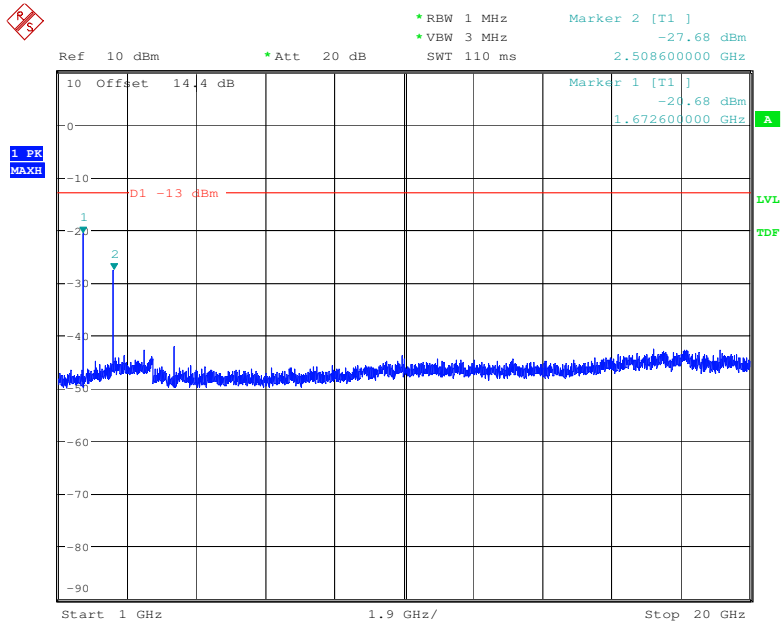
Date: 18.OCT.2016 14:04:35

Cellular Band (Part 22H)
GPRS 850
30 – 1000 MHz



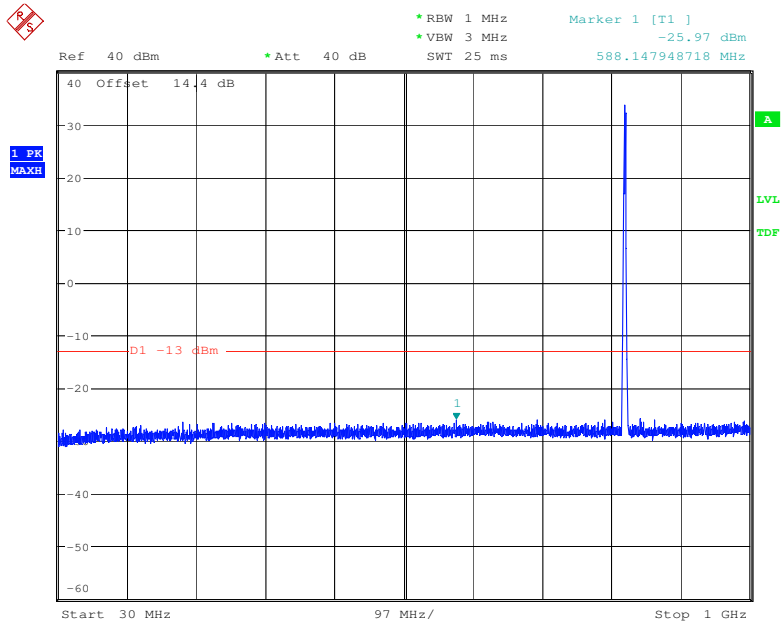
Date: 21.OCT.2016 11:09:18

1GHz – 20GH



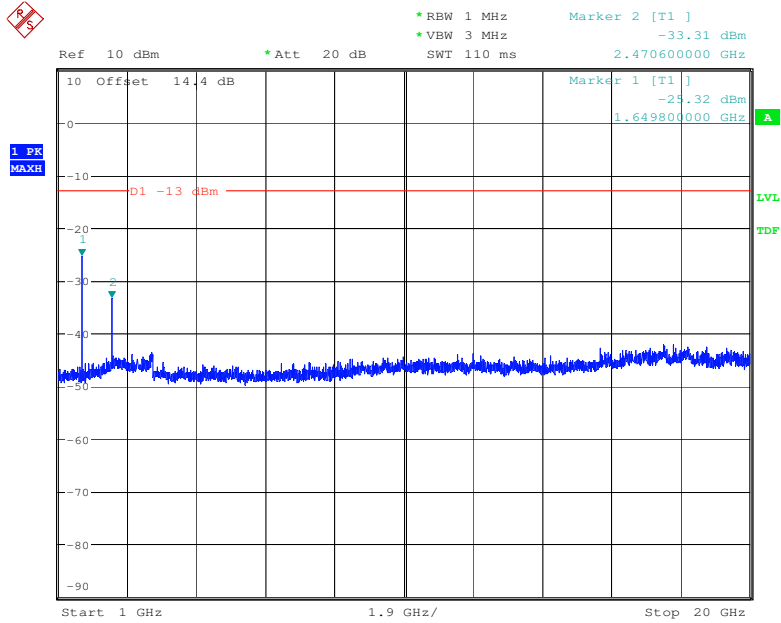
Date: 21.OCT.2016 11:09:55

Cellular Band (Part 22H)
EGPRS 850
30 – 1000 MHz



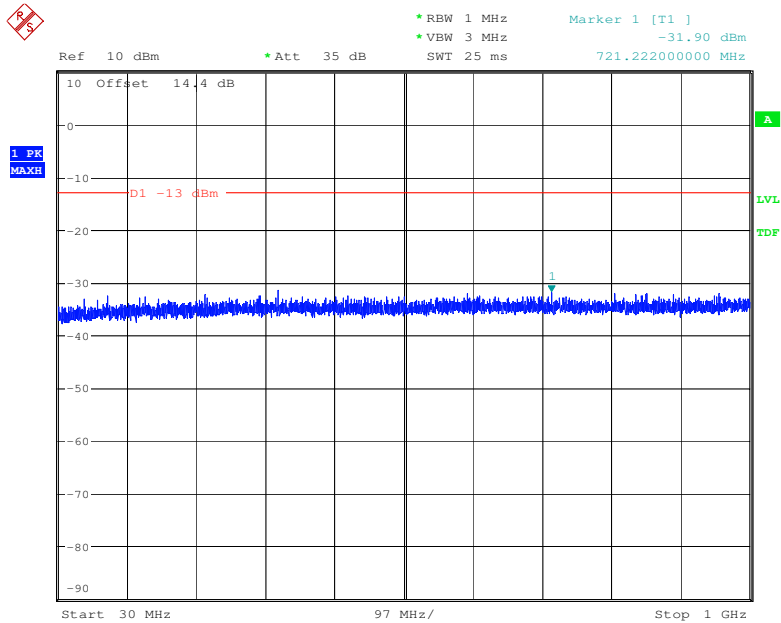
Date: 21.OCT.2016 11:16:51

1GHz – 20GH



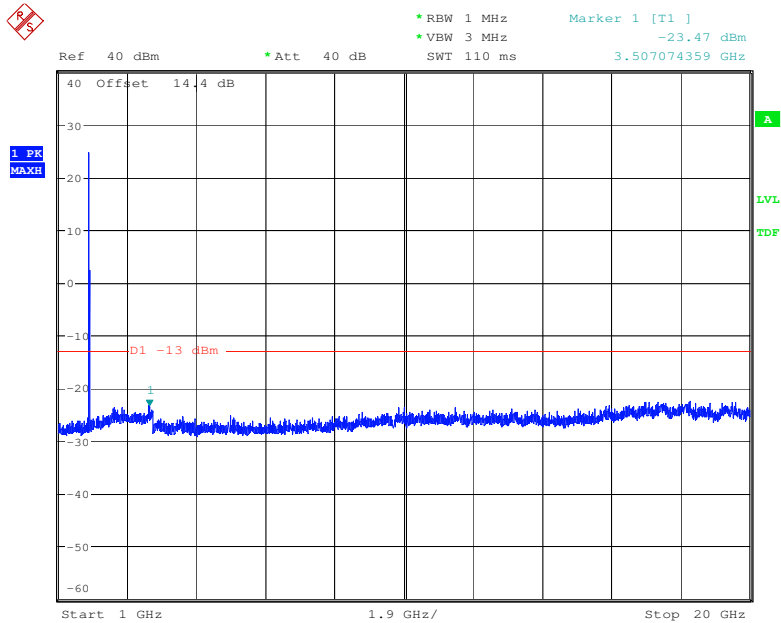
Date: 21.OCT.2016 11:17:52

PCS Band (Part 24E)
PCS 1900
30 – 1000 MHz



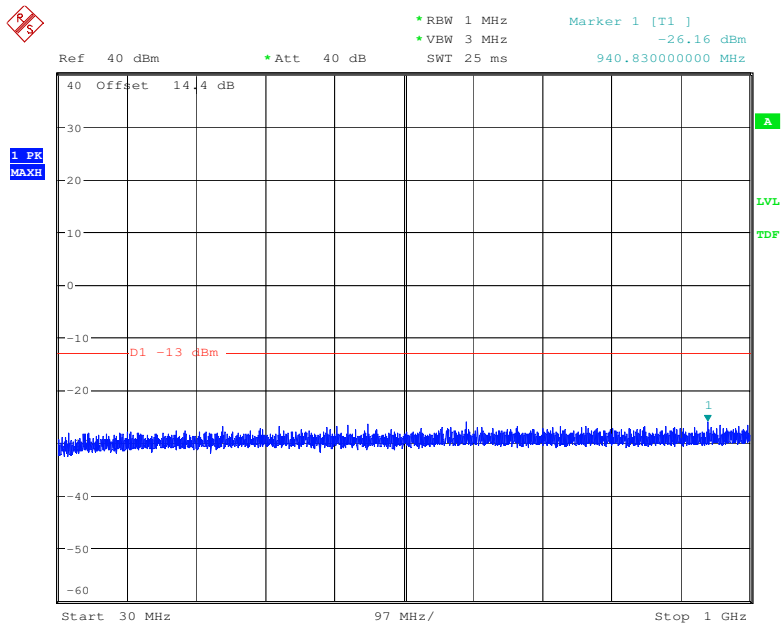
Date: 18.OCT.2016 14:44:16

1GHz – 20GH



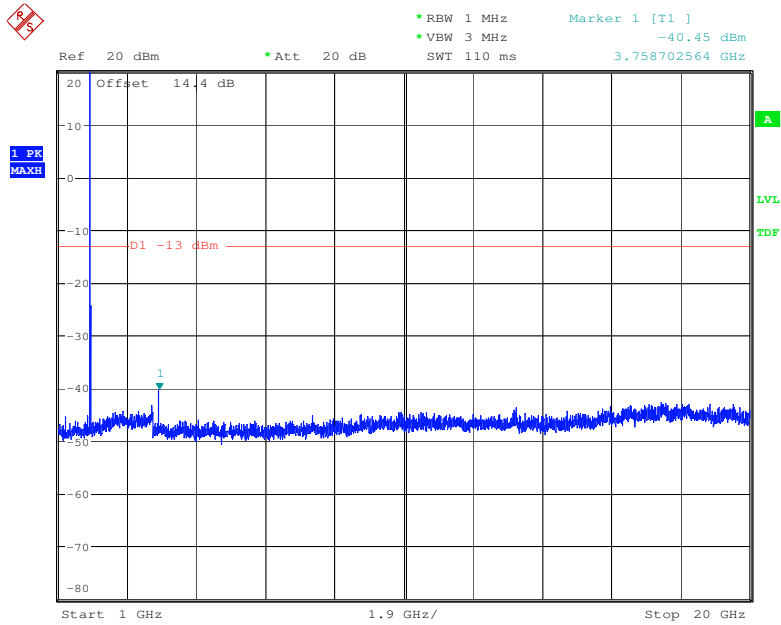
Date: 18.OCT.2016 14:45:57

PCS Band (Part 24E)
GPRS 1900
30 – 1000 MHz



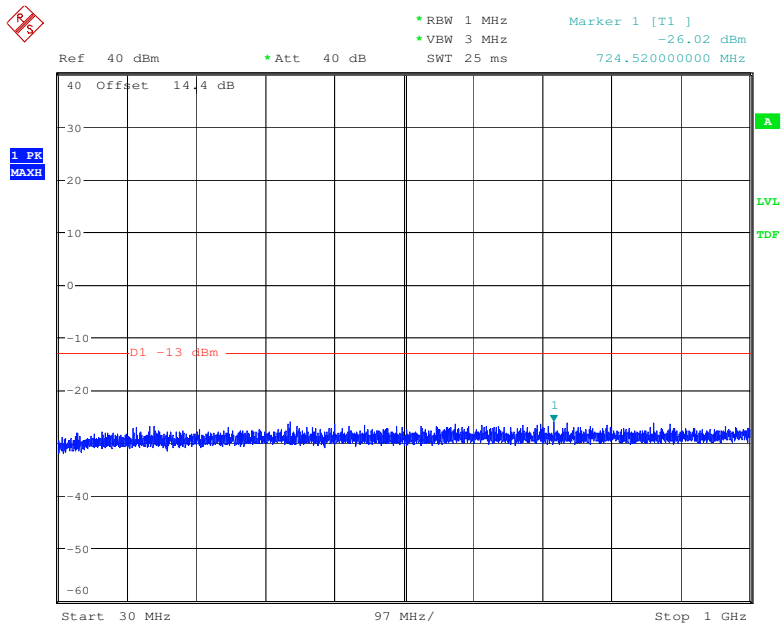
Date: 21.OCT.2016 13:46:32

1GHz – 20GH



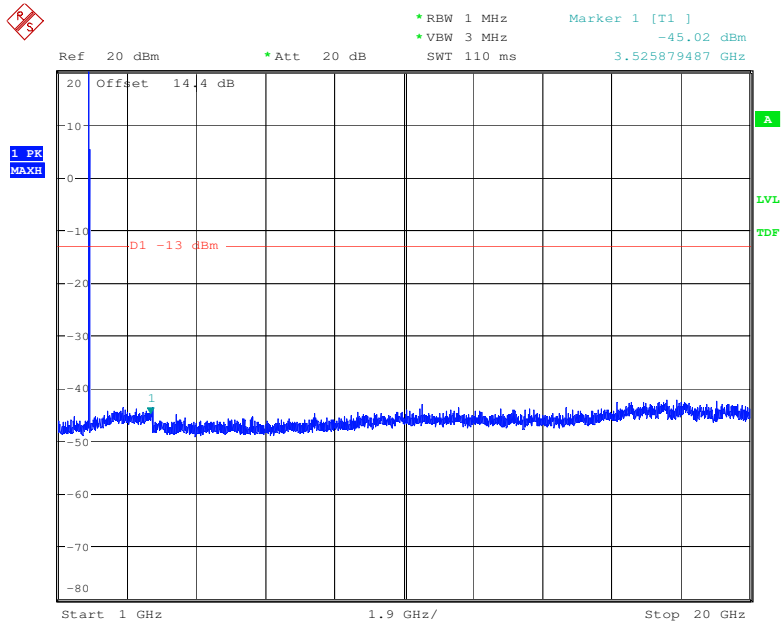
Date: 21.OCT.2016 13:48:25

PCS Band (Part 24E)
EGPRS 1900
30 – 1000 MHz



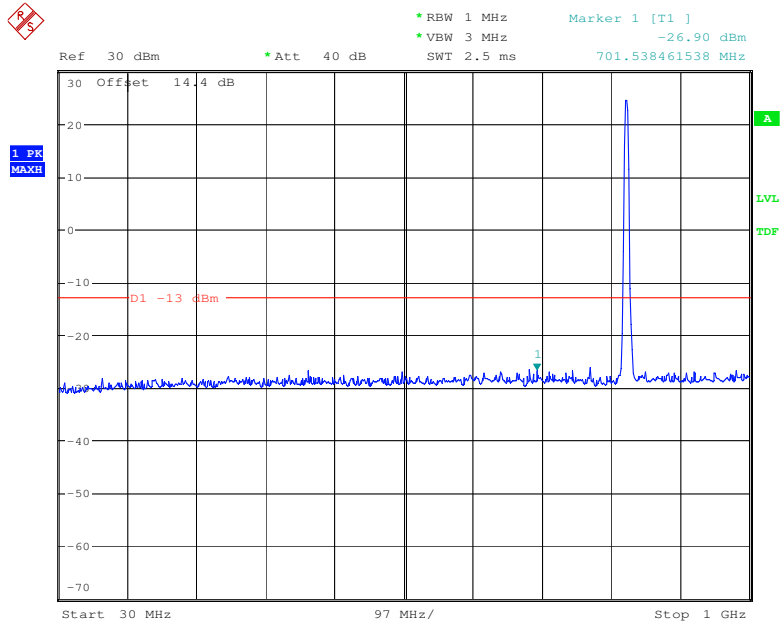
Date: 21.OCT.2016 13:55:19

1GHz – 20GH



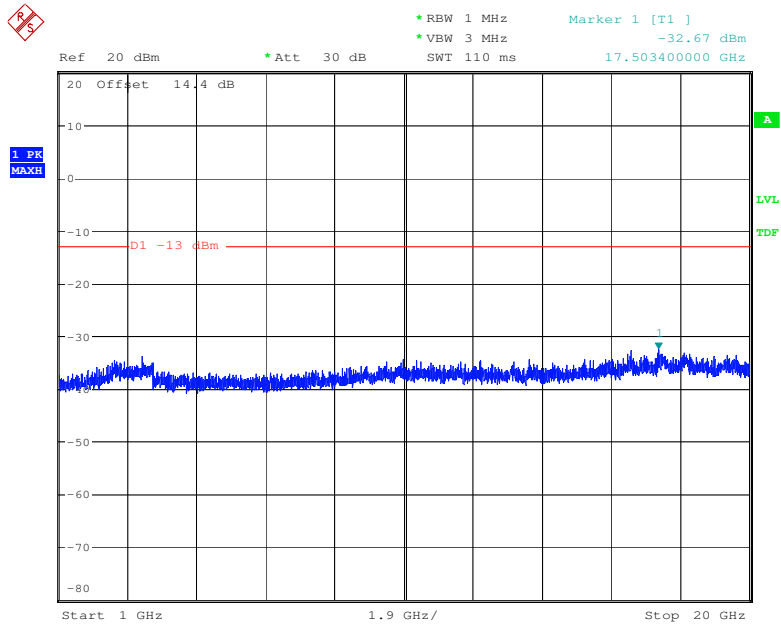
Date: 21.OCT.2016 13:52:01

WCDMA Band V RMC 12.2K
30 – 1000 MHz



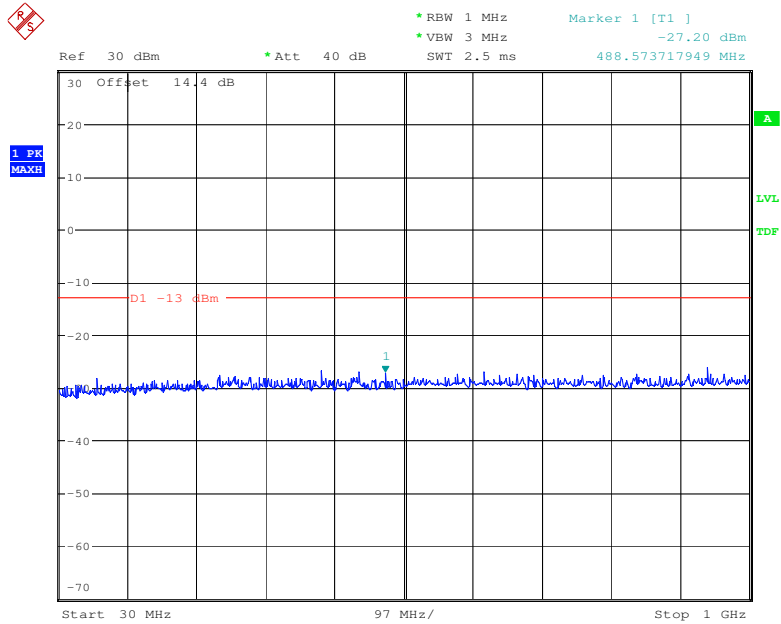
Date: 21.OCT.2016 15:10:59

1GHz – 20GHz



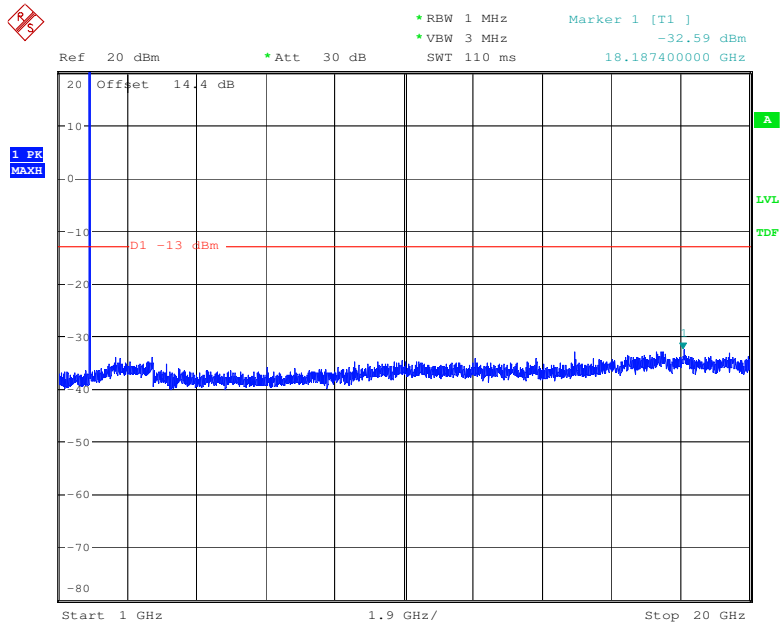
Date: 21.OCT.2016 15:13:56

WCDMA Band II RMC 12.2K
30 – 1000 MHz



Date: 21.OCT.2016 15:11:18

1GHz – 20GHz



Date: 21.OCT.2016 15:12:30

8. FIELD STRENGTH OF SPURIOUS RADIATED EMISSIONS

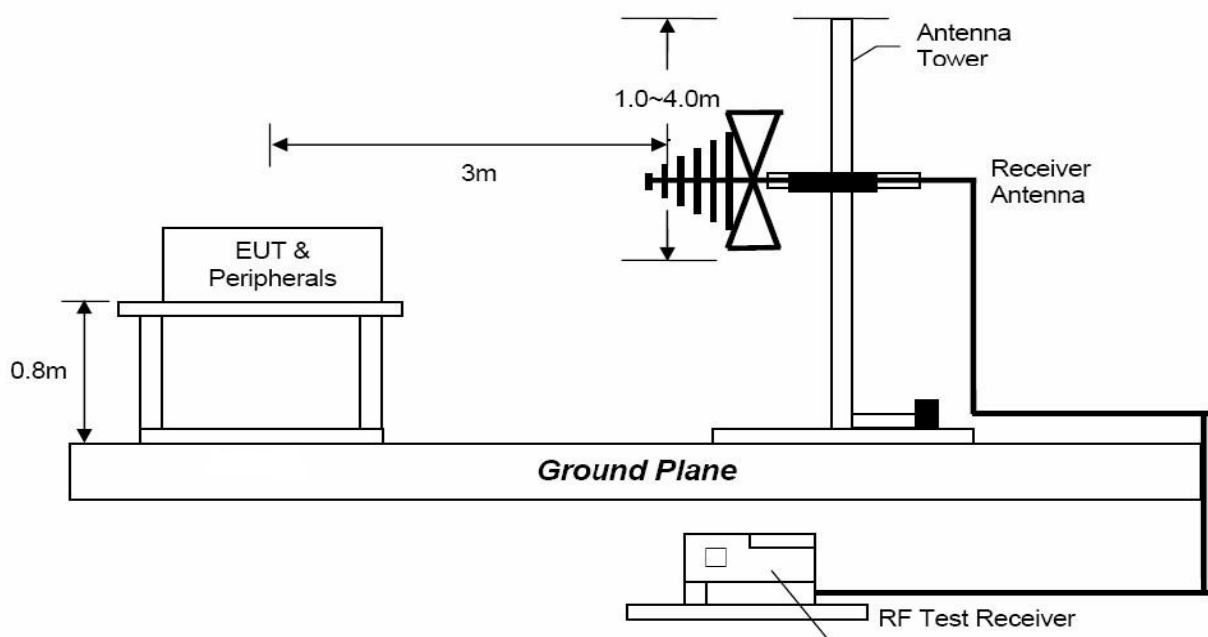
8.1 Applicable Standards

According to FCC §2.1053

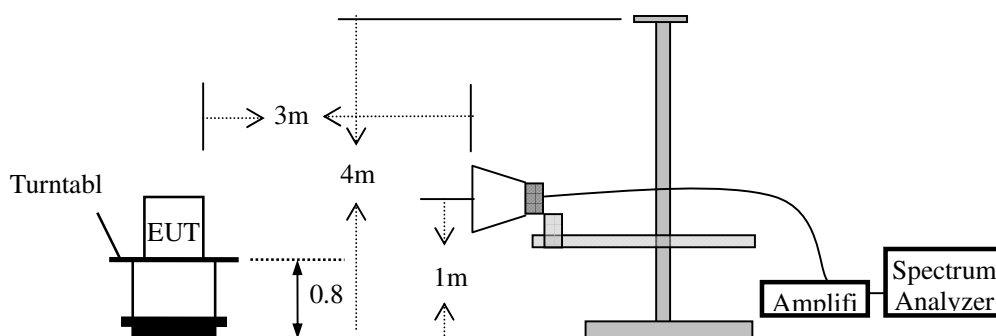
FCC §22.917(a), §24.238(a), the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than $43 + 10 \log$ (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

8.2 Test of Block Diagram of configuration

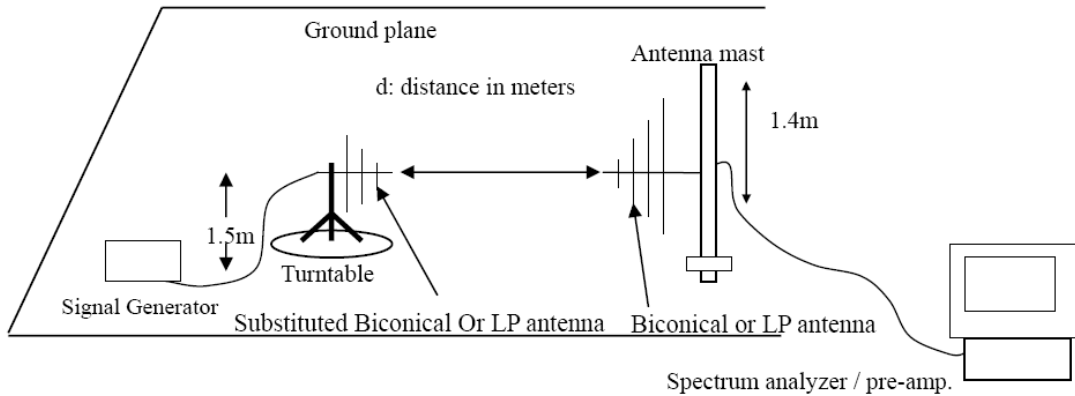
Radiated Emission Test Set-Up, Frequency Below 1000MHz



Radiated Emission Test Set-Up, Frequency above 1GHz



Substituted Method Test Set-UP



8.3 Test Procedure

The EUT was placed on a non-conductive, The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission were identified, the power of the emission was determined using the substitution method. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. $EIRP = S.G. \text{ output (dBm)} + \text{Antenna Gain(dBi)} - \text{Cable Loss (dB)}$

8.4 Test Result

Pass.

Please refer to following tables.

Cellular Band (Part 22H)							
Humidity :		50 %	Temperature :			22 °C	
Test Result:		PASS	Test By:			Sance	
Channel	Frequency (MHz)	Substituted level (dBm)	Polarization (H/V) Antenna	Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
GSM850							
Middle	1672.4	-29.95	H	8.26	2.1	-23.79	-13.00
	1672.4	-35.10	V	8.26	2.1	-28.94	-13.00
	2509.2	-37.83	H	9.2	2.6	-31.23	-13.00
	2509.2	-40.39	V	9.2	2.6	-33.79	-13.00
GPRS 850							
Middle	1672.4	-31.95	H	8.26	2.1	-25.79	-13.00
	1672.4	-36.18	V	8.26	2.1	-30.02	-13.00
	2509.2	-39.15	H	9.2	2.6	-32.55	-13.00
	2509.2	-41.56	V	9.2	2.6	-34.96	-13.00
EGPRS 850							
Middle	1672.4	-33.28	H	8.26	2.1	-27.12	-13.00
	1672.4	-37.93	V	8.26	2.1	-31.77	-13.00
	2509.2	-40.01	H	9.2	2.6	-33.41	-13.00
	2509.2	-43.49	V	9.2	2.6	-36.89	-13.00

Note: Spurious emissions below 1000MHz were found more than 20dB below limit line.

PCS Band (Part 24E)							
Humidity :		50 %	Temperature :			22 °C	
Test Result:		PASS	Test By:			Sance	
Channel	Frequency (MHz)	Substituted level (dBm)	Polarization (H/V) Antenna	Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
PCS 1900							
Middle	3760	-47.19	H	10.5	3.9	-40.59	-13.00
	3760	-47.72	V	10.5	3.9	-41.12	-13.00
GPRS 1900							
Middle	3760	-48.33	H	10.5	3.9	-41.73	-13.00
	3760	-48.62	V	10.5	3.9	-42.02	-13.00
EGPRS 1900							
Middle	3760	-48.26	H	10.5	3.9	-41.66	-13.00
	3760	-49.45	V	10.5	3.9	-42.85	-13.00

Note: Spurious emissions below 1000MHz were found more than 20dB below limit line.

WCDMA Band V RMC 12.2K							
Humidity :		50 %	Temperature :			22 °C	
Test Result:		PASS	Test By:			Sance	
Channel	Frequency (MHz)	Substituted level (dBm)	Polarization (H/V) Antenna	Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
Middle	1672.4	-50.11	H	8.26	2.1	-43.95	-13.00
	1672.4	-51.98	V	8.26	2.1	-45.82	-13.00

WCDMA Band II RMC 12.2K							
Humidity :		50 %	Temperature :			22 °C	
Test Result:		PASS	Test By:			Sance	
Channel	Frequency (MHz)	Substituted level (dBm)	Polarization (H/V) Antenna	Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
Middle	3760	-48.57	H	10.5	3.9	-41.97	-13.00
	3760	-49.14	V	10.5	3.9	-42.54	-13.00

Note: Spurious emissions below 1000MHz were found more than 20dB below limit line.

9. PEAK-AVERAGE RATIO

9.1 Applicable Standards

According to FCC §24.232(d)
The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

9.2 Test Procedure

According with KDB 971168

The signal analyzer's CCDF measurement profile is enabled,

Frequency = carrier center frequency,

Measurement BW > Emission bandwidth of signal,

The signal analyzer was set to collect one million samples to generate the CCDF curve,
The measurement interval was set depending on the type of signal analyzed. For continuous signals > 98% duty cycle, the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power.

9.3 Test Result

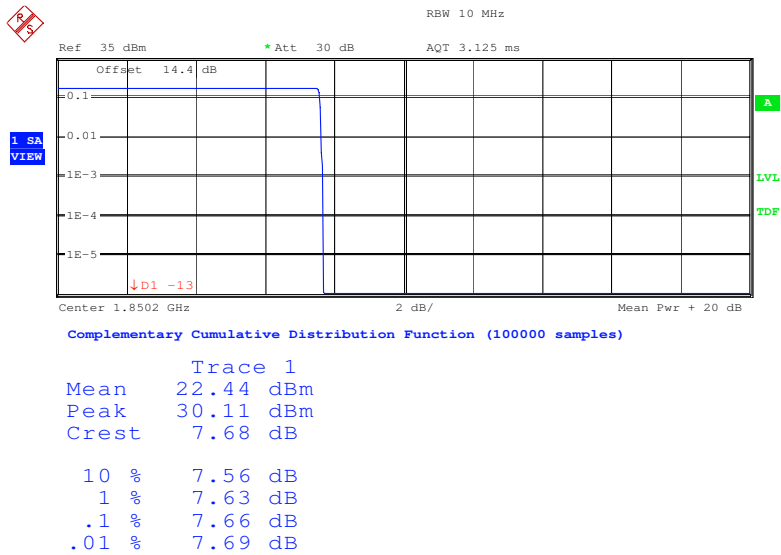
Pass.

Please refer to following tables and plots.

PCS Band									
Temperature:	21℃			Humidity:	52%				
Test By:	Sance			Test Result:	Pass				
Mode	PCS 1900			GPRS 1900			EGPRS 1900		
Channel	512	661	810	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8
Peak –to –Average Ratio (dB)	7.68	7.61	7.61	7.66	7.61	7.68	10.99	10.56	10.69
Limit (dB)	<13dB								

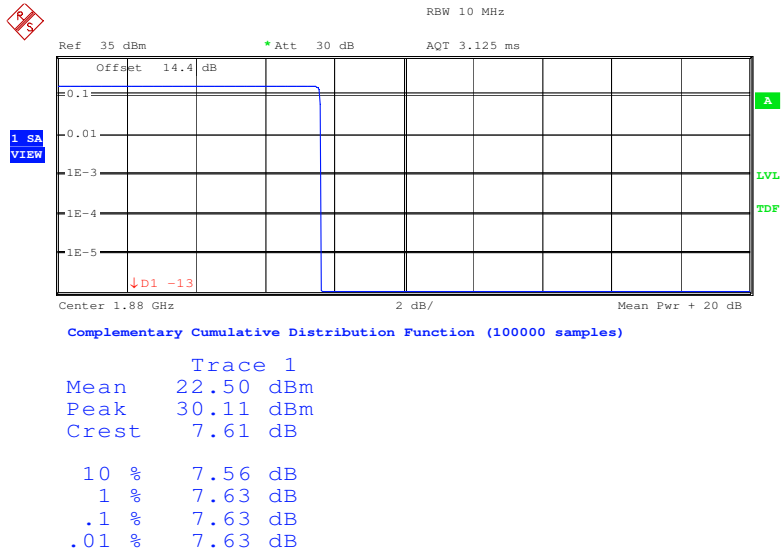
WCDMA Band II			
Temperature:	21℃	Humidity:	52%
Test By:	Sance	Test Result:	Pass
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
Peak –to –Average Ratio (dB)	3.41	3.34	3.19
Limit (dB)	<13dB		

PCS Band (Part 24E)
PCS1900
Low Channel



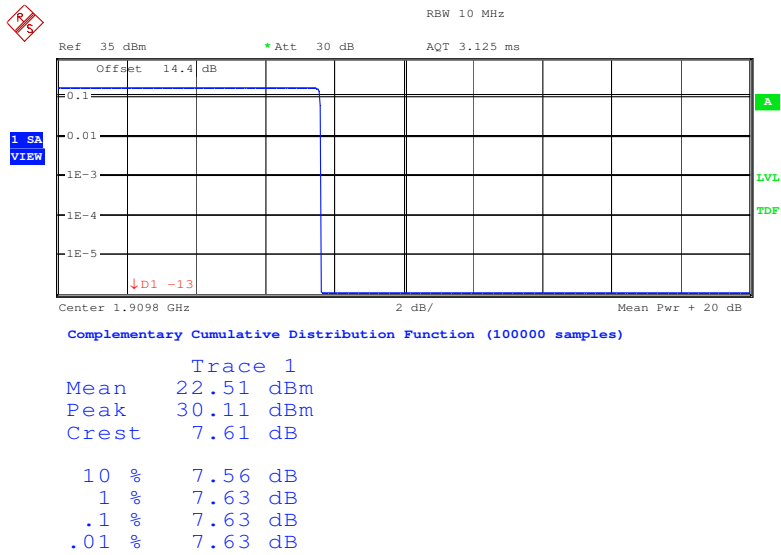
Date: 21.OCT.2016 15:28:20

Middle Channel



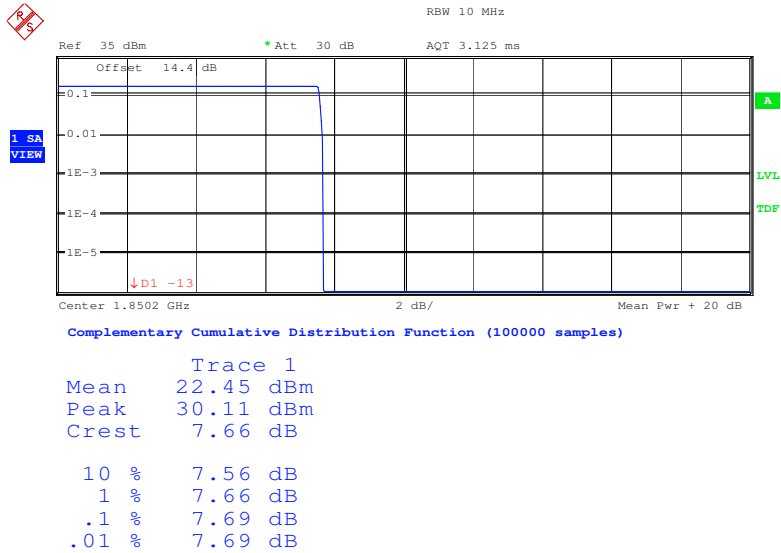
Date: 21.OCT.2016 15:28:53

High Channel



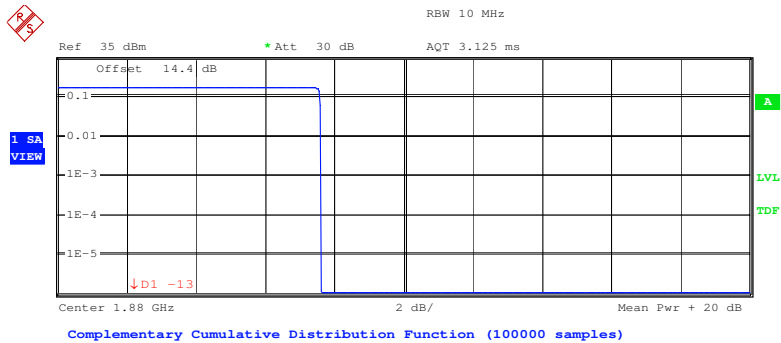
Date: 21.OCT.2016 15:29:25

PCS Band (Part 24E)
GPRS 1900
Low Channel



Date: 21.OCT.2016 15:30:33

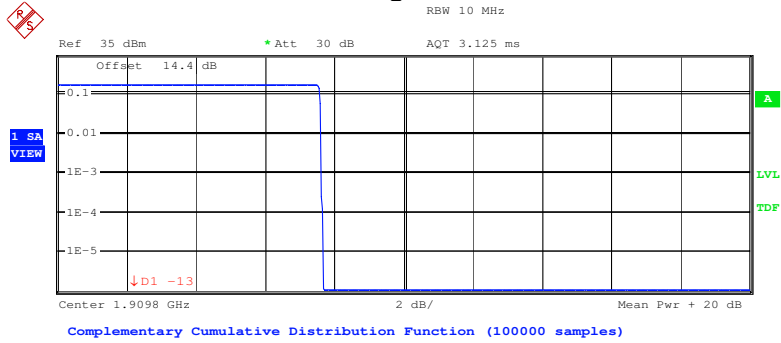
Middle Channel



Trace 1	
Mean	22.51 dBm
Peak	30.11 dBm
Crest	7.61 dB
10 %	7.56 dB
1 %	7.63 dB
.1 %	7.63 dB
.01 %	7.63 dB

Date: 21.OCT.2016 15:31:14

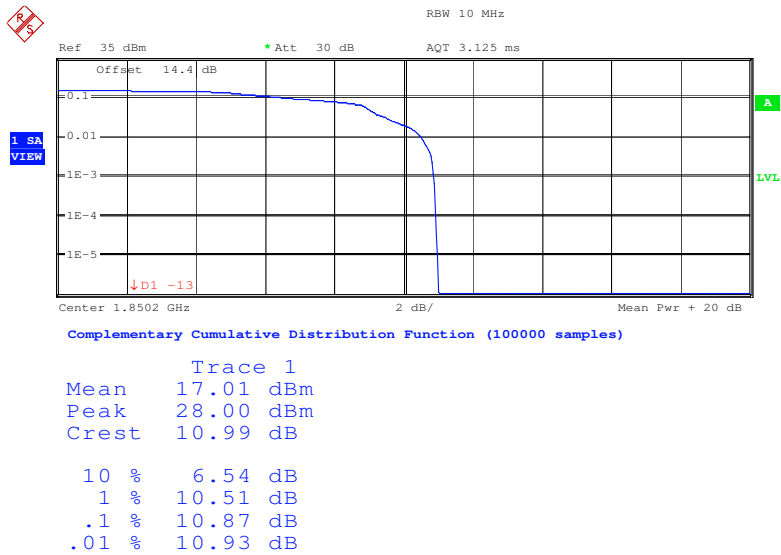
High Channel



Trace 1	
Mean	22.51 dBm
Peak	30.18 dBm
Crest	7.68 dB
10 %	7.56 dB
1 %	7.63 dB
.1 %	7.63 dB
.01 %	7.66 dB

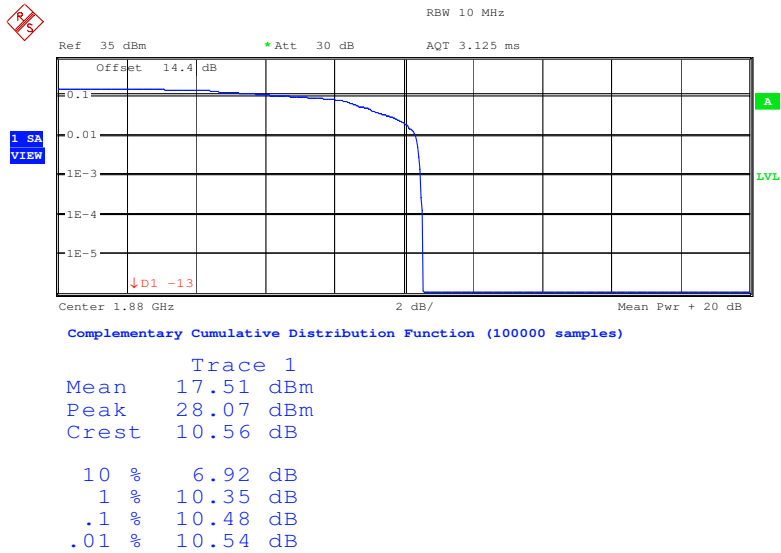
Date: 21.OCT.2016 15:31:56

PCS Band (Part 24E)
EGPRS 1900
Low Channel

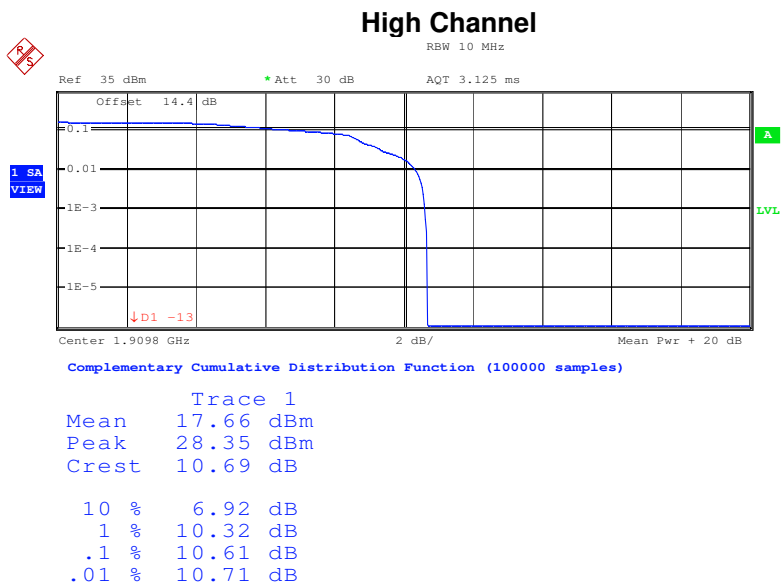


Date: 21.OCT.2016 15:33:25

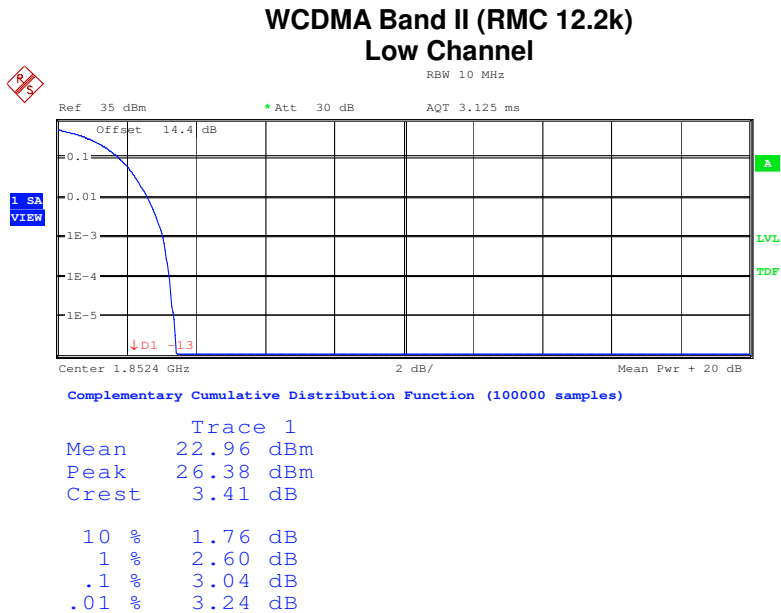
Middle Channel



Date: 21.OCT.2016 15:33:48

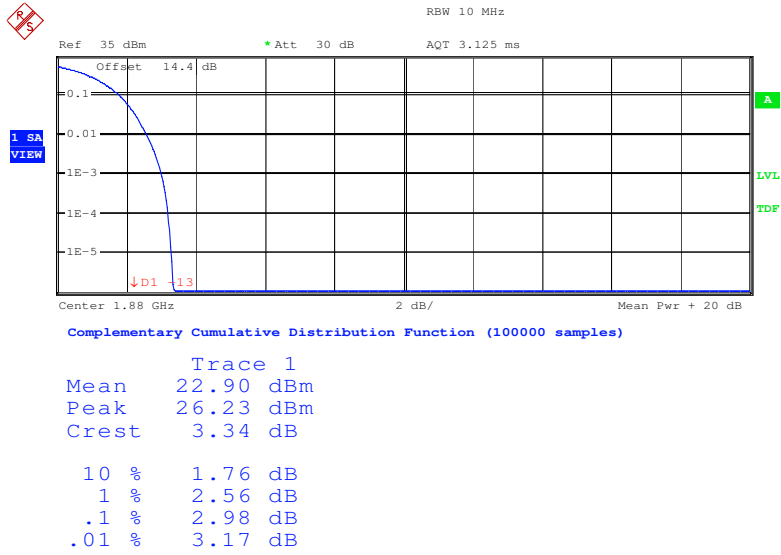


Date: 21.OCT.2016 15:34:30



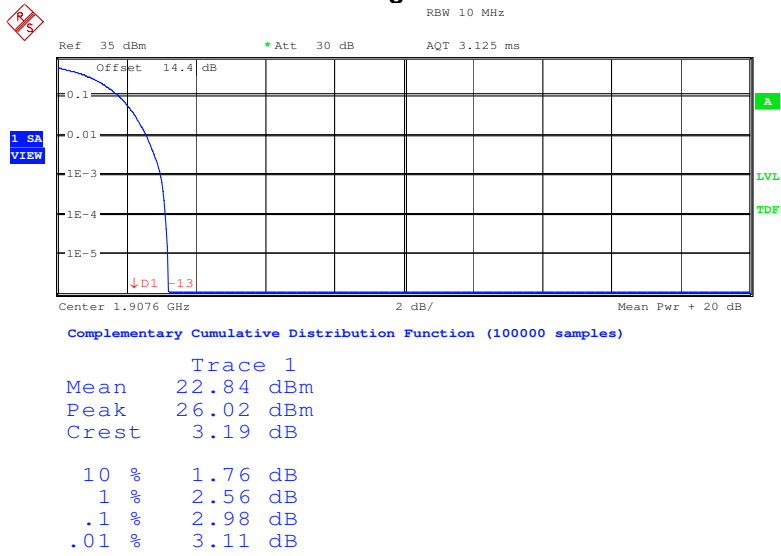
Date: 21.OCT.2016 15:20:11

Middle Channel



Date: 21.OCT.2016 15:19:30

High Channel



Date: 21.OCT.2016 15:20:48

10. RF Exposure

10.1 Applicable Standards

§1.1307 and §2.1093.

10.2 Test Result

Compliance

Please refer to RF exposure evaluation report (NTC1609124F-1).

11. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	Nov. 23, 2015	Nov. 22, 2016
Antenna	Schwarzbeck	VULB9162	9162-010	Nov. 26, 2015	Nov. 25, 2016
Cable	Huber+Suhner	CBL2-NN-1M	22390001	Nov. 06, 2016	Nov. 05, 2017
Antenna	Teseq	CBL 6111D	27086	Nov. 26, 2015	Nov. 25, 2016
Power Amplifier	HP	HP 8447D	1145A00203	Nov. 06, 2016	Nov. 05, 2017
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	Oct. 22, 2016	Oct. 21, 2017
Horn Antenna	Com-Power	AH-118	071078	Nov. 04, 2016	Nov. 03, 2017
Analyzer Modulation	HP	8901A	2026A00847	Dec. 24, 2015	Dec. 23, 2016
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Aug. 31, 2016	Aug. 30, 2017
Pre-Amplifier	Agilent	8449B	3008A02964	Nov. 02, 2016	Nov. 01, 2017
SMA Cable	REBES	A46-NMNM	N/A	Nov. 06, 2016	Nov. 05, 2017
Temperature & Humidity Chamber	BELL	BE-TH-408	N/A	Dec. 24, 2015	Dec. 23, 2016
DC Source	HUAYI	HY5003-2	N/A	Dec. 24, 2015	Dec. 23, 2016
Signal Generator	Agilent	N5182A	MY48180739	Mar. 07, 2016	Mar. 06, 2017
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	117060	Mar. 07, 2016	Mar. 06, 2017

--End--