



Report No.SH17010030W11

FCC RF TESTREPORT

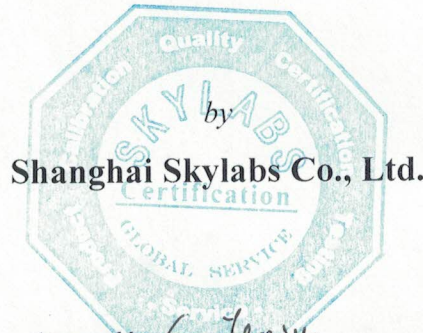
Issued to

Shanghai Sunmi Technology Co., Ltd.

For

Smart POS system

Model Name : W6900
Trade Name : SUNMI
Brand Name : SUNMI
Standard : 47 CFR Part 2
47 CFR Part 22 Subpart H
47 CFR Part 24 Subpart E
FCC ID : 2AH25P1
Test date : Feb.7,2017 to Feb.14,2017
Issue date : Feb.15,2017



Shanghai Skylabs Co., Ltd.

Tested by Wu Hongfei

Approved by Gao Tengyong

Review by Xiaodong Wei

The report refers only to the sample tested and does not apply to the bulk. This report is issued in confidence to the client and it will be strictly treated as such by the Shanghai Skylabs Co., Ltd. It may not be reproduced rather in its entirety or in part and it may not be used for advertising. The client to whom the report is issued may, however, show or send it or a certified copy thereof prepared by the Shanghai Skylabs Co., Ltd to his customer. Supplier or others persons directly concerned. Shanghai Skylabs Co., Ltd will not, without the consent of the client enters into any discussion of correspondence with any third party concerning the contents of the report. In the event of the improper use of the report, Shanghai Skylabs Co., Ltd reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.



DIRECTORY

1.	General Information	4
1.1	Applicant	4
1.2	Manufacturer	4
1.3	Description of EUT	4
2.	Facilities and Accreditations	6
2.1	Test Facility	6
2.2	Environmental Conditions	6
2.3	List of Equipments Used	7
3.	Test Standards and Results	8
4.	Test Result	9
4.1	Conducted Output Power	9
4.2	Occupied Bandwidth	11
4.3	Peak-to-Average Ratio	18
4.4	Frequency Stability	25
4.5	Conducted Out of Band Emissions	28
4.6	Band Edge	41
4.7	Transmitter Radiated Power (EIRP/ERP)	46
4.8	Radiated Out of Band Emissions	49
Annex A	Photos of the EUT	52
Annex B	Photos of Setup	53



Change History

Issue	Date	Reason for change
1.0	Feb.16,2017	First edition



1. General Information

1.1 Applicant

Shanghai Sunmi Technology Co., Ltd.

Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China

1.2 Manufacturer


Shanghai Sunmi Technology Co., Ltd.

Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China

1.3 Description of EUT

EUT Name.....: Smart POS system
Brand Name.....: SUNMI
Trade Name: SUNMI
Model Name: W6900
Hardware Version: V1.1
Software Version: B900_A1BOM_V1.1.4_20170103
Antenna type.....: PIFA antenna
Antenna gain.....: WCDMA Band II: 1 dBi
WCDMA Band V: 1 dBi
Frequency Range: WCDMA Band II
Tx: 1852.4 - 1907.6MHz (at intervals of 200kHz);
Rx: 1932.4 - 1987.6MHz (at intervals of 200kHz)
WCDMA Band V
Tx: 826.4 - 846.6MHz (at intervals of 200kHz);
Rx: 871.4 - 891.6MHz (at intervals of 200kHz)
Modulation Type: QPSK

Charger

Brand Name..... 
Mode No..... TPA-46050200UU
Electrical Rating [Input]..... 100-240V, 0.3A
Electrical Rating [Output] 5V, 2A
Manufacturer SHENZHEN TIANYIN ELECTRONICS CO., LTD.
Manufacturer Address COMMUNITY SHIYAN SUBDISTRICT, BAO'AN DISTRICT
SHENZHEN, GUANGDON 518108 CHINA

NOTE:



- (1) *The transmitter (Tx) frequency arrangement of the WCDMA 850MHz band used by the EUT can be represented with the formula $F(n) = 826.4 + 0.2 * (n - 4132)$, $4132 \leq n \leq 4233$; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 4132 (826.4MHz), 4175 (835MHz) and 4233 (846.6MHz).*
- (2) *The transmitter (Tx) frequency arrangement of the WCDMA 1900MHz band used by the EUT can be represented with the formula $F(n) = 1852.4 + 0.2 * (n - 9262)$, $9262 \leq n \leq 9538$; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 9262 (1852.4MHz), 9400 (1880MHz) and 9538 (1907.6MHz).*
- (2) *The EUT does not support voice communication.*
- (3) *For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.*



2. Facilities and Accreditations

2.1 Test Facility

Shanghai Skylabs Co., Ltd. Skylabs Laboratory is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6644. A 9*6*6(m) fully anechoic chamber was used for the radiated spurious emissions test.

2.2 Environmental Conditions

Ambient temperature: 20 ~ 35°C

Relative humidity: 30 ~ 60%

Atmosphere pressure: 86 ~ 102kPa.



2.3 List of Equipments Used

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB46040102	2016.10.17	1year
Spectrum Analyzer	Rohde&Schwarz	FSU26	200880	2016.6.17	1year
Power Splitter	Weinschel	1506A	NW521	(n.a.)	(n.a.)
Power Splitter	Mini-Circuits	ZFRSC-183-S+	765001016	(n.a.)	(n.a.)
Attenuator 1	Mini-Circuits	10dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 2	Resnet	10dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 3	Resnet	3dB	(n.a.)	(n.a.)	(n.a.)
DC Power Supply	Good Will	GPS-3030DD	EF920938	2015.10.12	2year
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2016.9.20	1year
Full/Half-Anechoic Chamber	CHENGYU	9.2×6.25×6.15m	SAR	2015.9.14	3year
Singal Generator	Rohde&Schwarz	SMF100A	101935	2016.10.17	1year
Broadband Trilog Antenna	Schwarzbeck	VULB 9163	9163-561	2016.9.25	1year
Substitution Broadband Trilog Antenna	Schwarzbeck	VULB 9163	9163-572	2016.9.25	1year
Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1033	2016.7.25	1year
Substitution Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1034	2016.7.25	1year
Broadband Horn Antenna	Schwarzbeck	BBHA 9170	BBHA91970171	2016.9.22	1year
Substitution Broadband Horn Antenna	Schwarzbeck	BBHA 9170	BBHA91970208	2016.9.22	1year
Test Antenna-Loop	Rohde&Schwarz	HFH2-Z2	860004/001	2016.9.22	1year
RF Cable	(n.a.)	0-25GHz	(n.a.)	(n.a.)	(n.a.)

NOTE:

Equipments listed above have been calibrated and are in the period of validation.



3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22 and Part 24 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22	Public Mobile Services
3	47 CFR Part 24	Personal Communications Services

Test detailed items/section required by FCC rules& IC rules and results are as below:

No.	FCC Rules	Description	Result
1	2.1046	Conducted Output Power	PASS
2	2.1049 22.917 24.238	Occupied Bandwidth	PASS
3	2.1055 22.355 24.235	Frequency Stability	PASS
4	24.232	Peak-to-Average Ratio	PASS
5	2.1051 2.1057 22.917 24.238	Conducted Out of Band Emissions	PASS
6	2.1051 2.1057 22.917 24.238	Band Edge	PASS
7	22.913 24.232	Transmitter Radiated Power (EIPR/ERP)	PASS
8	2.1053 2.1057 22.917 24.238	Radiated Out of Band Emissions	PASS

NOTE: Measurement method according to TIA/EIA 603.D-2010.



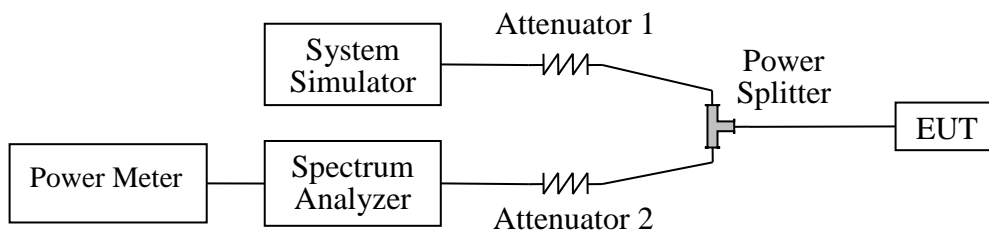
4. Test Result

4.1 Conducted Output Power

4.1.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

4.1.2 Test Description



The EUT, which is powered by battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.



4.1.3 Test Result

Band	Channel	Frequency (MHz)	Measured Output Power(dBm)	Limited (dBm)	Verdict
HSDPA Band V	4132	826.4	22.52	38.5	PASS
	4175	835	22.61	38.5	PASS
	4233	846.6	22.60	38.5	PASS
HSUPA Band V	4132	826.4	22.90	38.5	PASS
	4175	835	22.82	38.5	PASS
	4233	846.6	22.67	38.5	PASS
HSDPA Band II	9262	1852.4	22.36	38.5	PASS
	9400	1880	22.26	38.5	PASS
	9538	1907.6	22.14	38.5	PASS
HSUPA Band II	9262	1852.4	22.06	38.5	PASS
	9400	1880	22.03	38.5	PASS
	9538	1907.6	22.11	38.5	PASS

Note: The Conducted RF Output Power test of HSDPA /HSUPA was tested by power meter.



4.2 Occupied Bandwidth

4.2.1 Definition

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth, or 26dB bandwidth taking the total RF output power as reference.

4.2.2 Test Description

See section 4.2.1 of this report.

4.2.3 Test Results

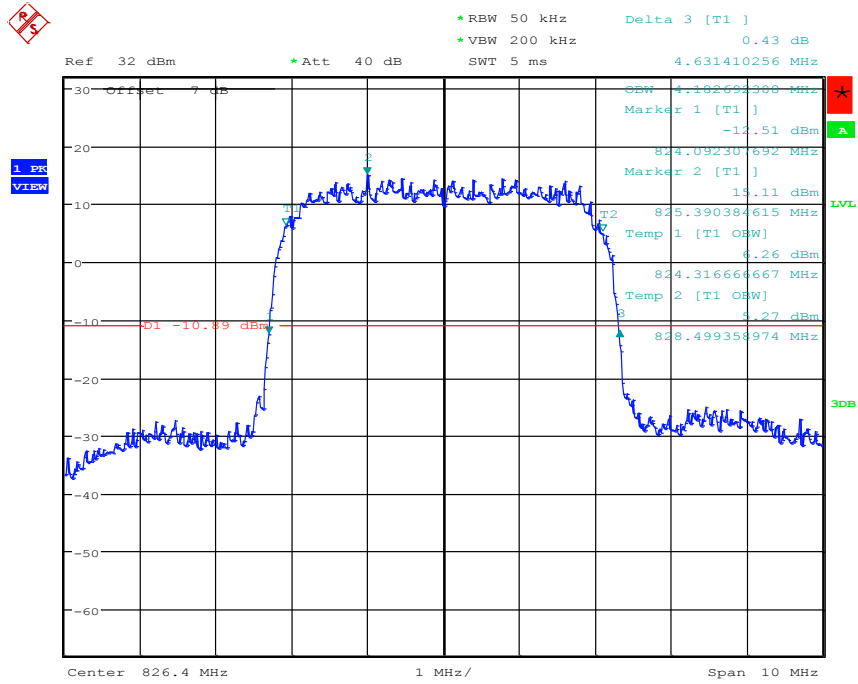
Here the lowest, middle and highest channels are tested to record the 99% and -26dB occupied bandwidth.

Band	Channel	Frequency (MHz)	-26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Refer to Plot
HSDPA Band V	4132	826.4	4.631	4.182	Plot A1
	4175	835	4.641	4.166	Plot A2
	4233	846.6	4.615	4.166	Plot A3
HSUPA Band V	4132	826.4	4.641	4.166	Plot B1
	4175	835	4.625	4.150	Plot B2
	4233	846.6	4.631	4.150	Plot B3

Band	Channel	Frequency (MHz)	-26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Refer to Plot
HSDPA Band II	9262	1852.4	4.663	4.182	Plot C1
	9400	1880	4.647	4.166	Plot C2
	9538	1907.6	4.666	4.198	Plot C3
HSUPA Band II	9262	1852.4	4.663	4.166	Plot D1
	9400	1880	4.679	4.182	Plot D2
	9538	1907.6	4.650	4.150	Plot D3

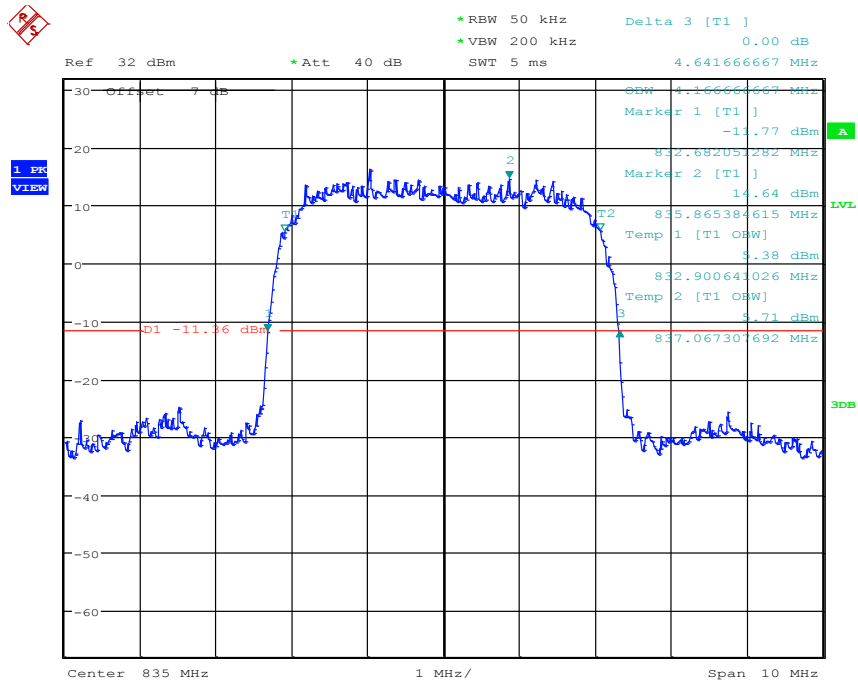


Test Plots:



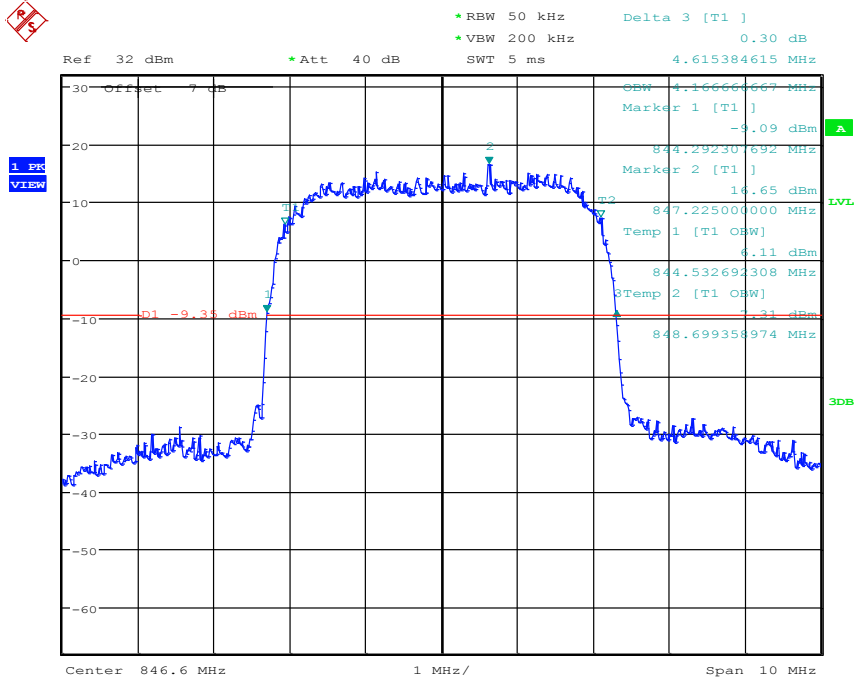
Date: 14.FEB.2017 18:45:35

(Plot A1: HSDPA Band V Channel=4132)



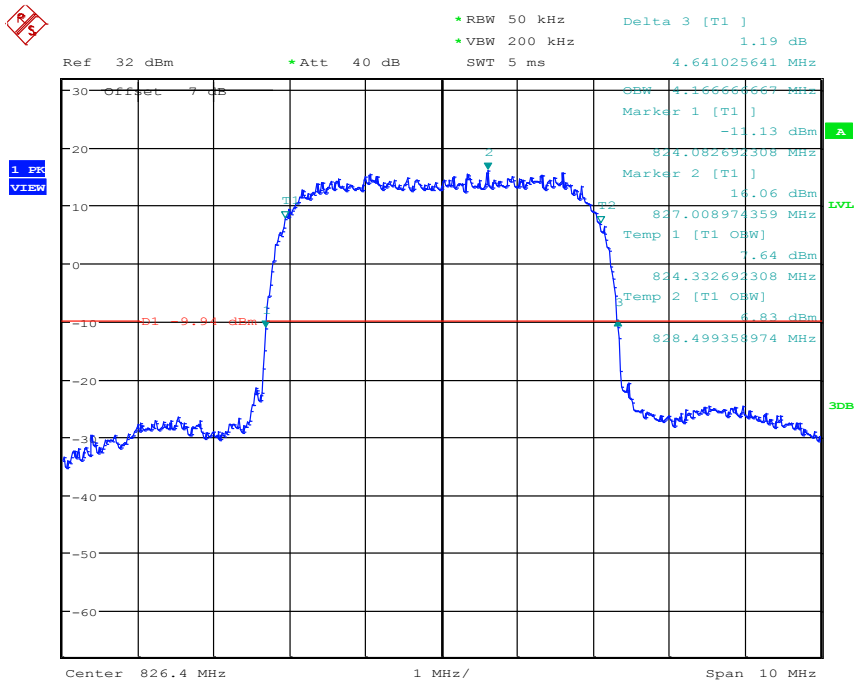
Date: 14.FEB.2017 18:48:29

(Plot A2: HSDPA Band V Channel=4182)



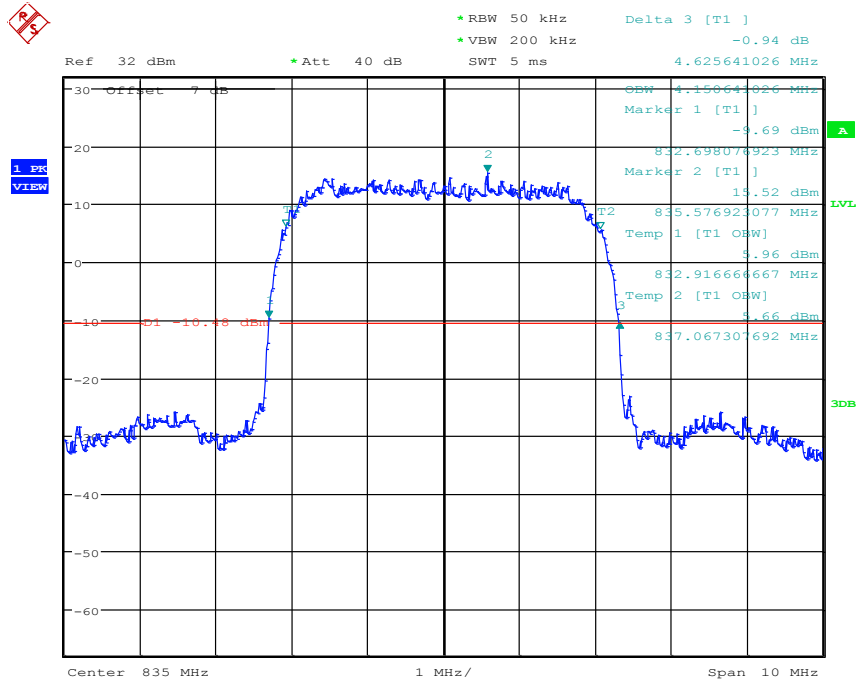
Date: 14.FEB.2017 18:51:07

(Plot A3: HSDPA Band V Channel=4233)



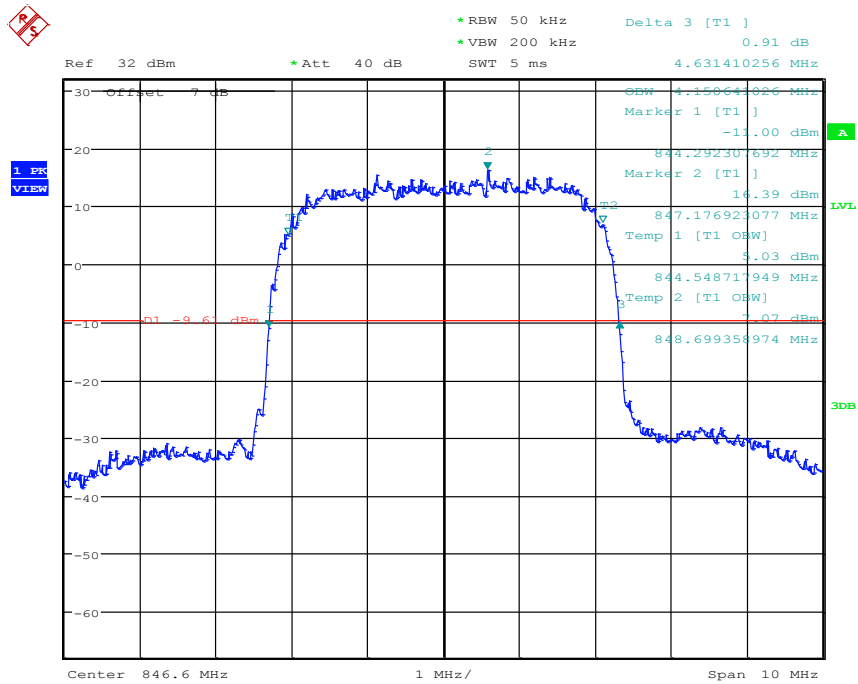
Date: 14.FEB.2017 18:44:06

(Plot B1: HSUPA Band V Channel=4132)



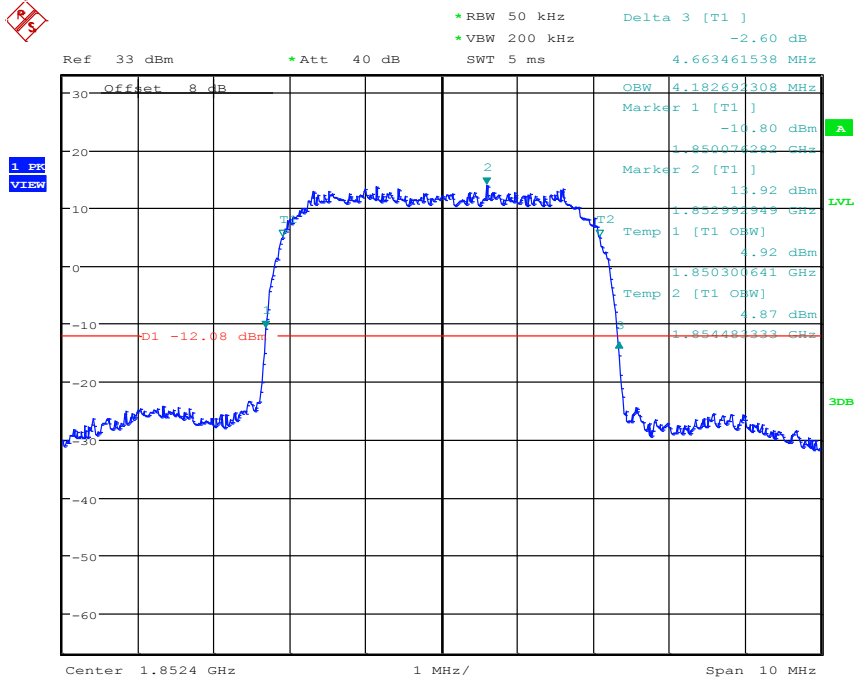
Date: 14.FEB.2017 18:47:40

(Plot B2: HSUPA Band V Channel=4182)



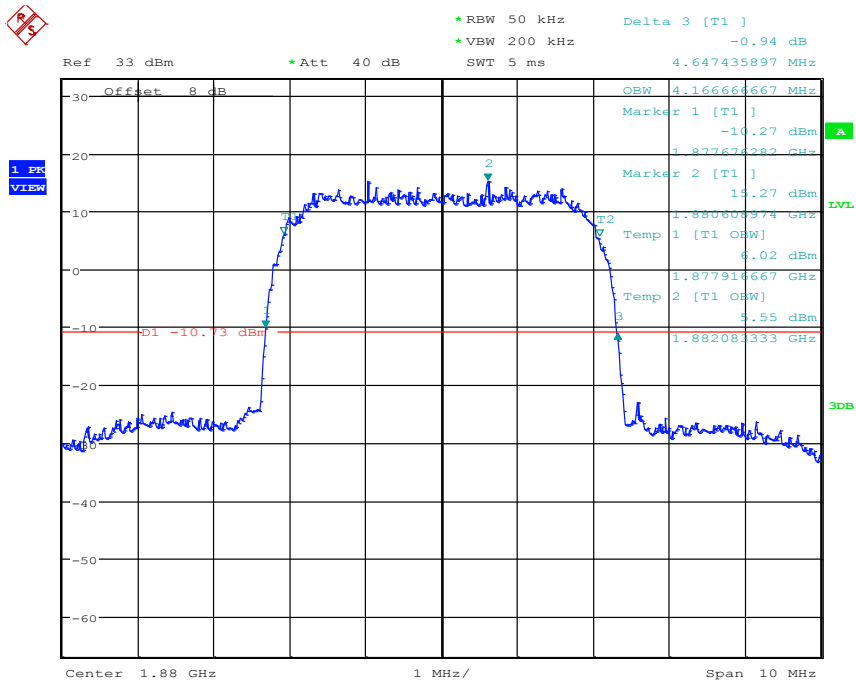
Date: 14.FEB.2017 18:49:55

(Plot B3: HSUPA Band V Channel=4233)



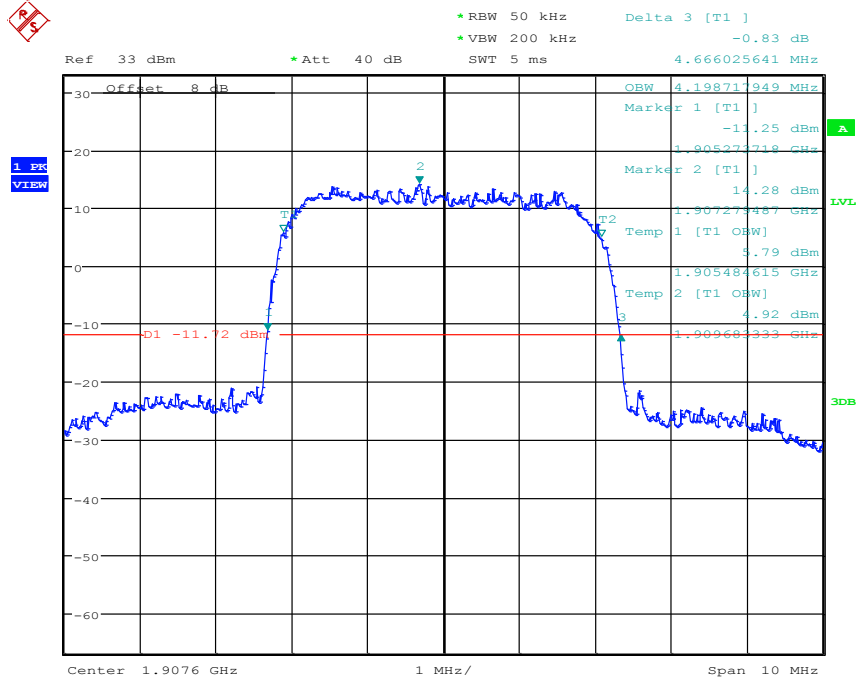
Date: 14.FEB.2017 17:54:07

(Plot C1: HSDPA Band II Channel=9262)



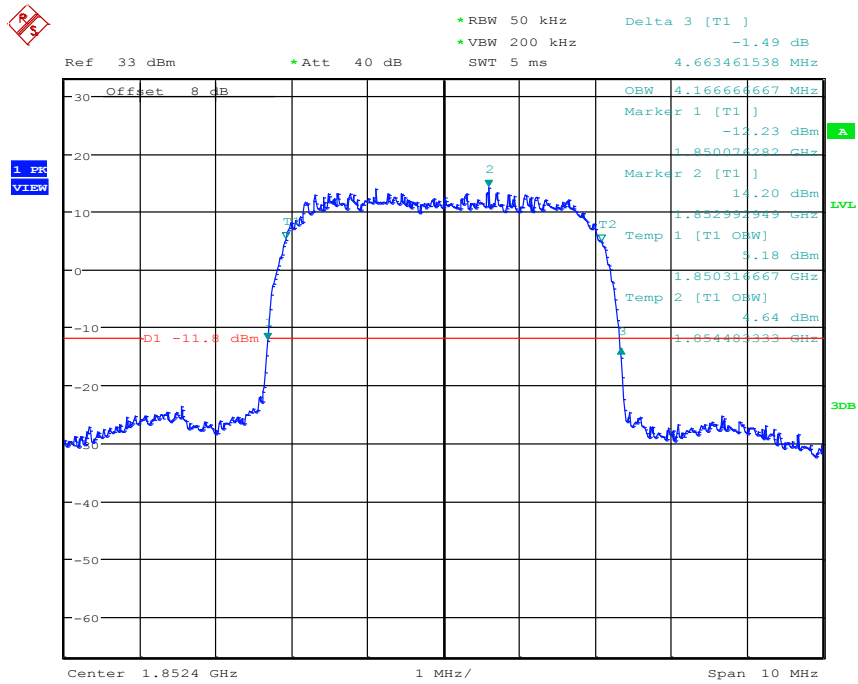
Date: 14.FEB.2017 17:50:20

(Plot C2: HSDPA Band II Channel=9400)



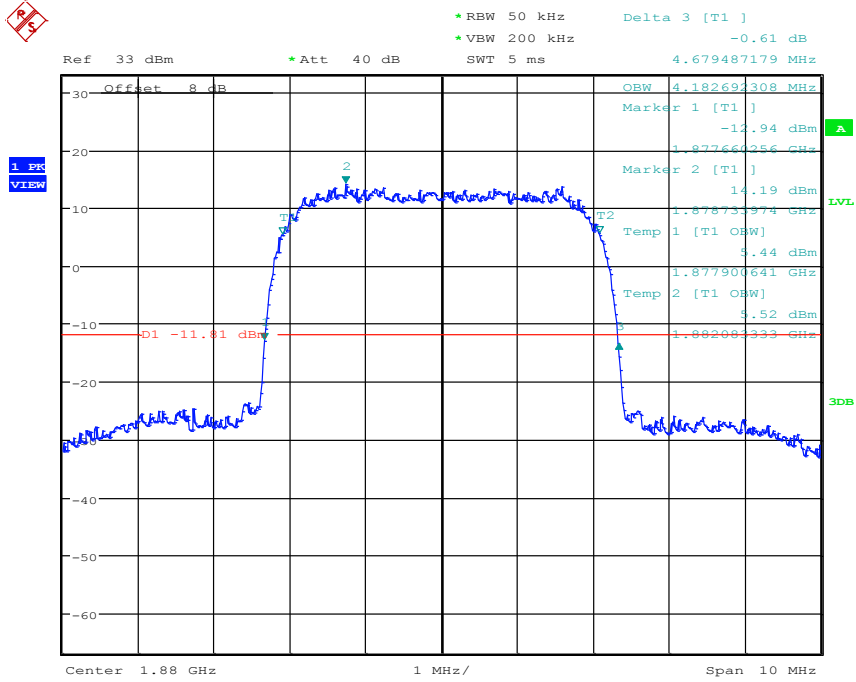
Date: 14.FEB.2017 17:47:40

(Plot C3: HSDPA Band II Channel=9538)



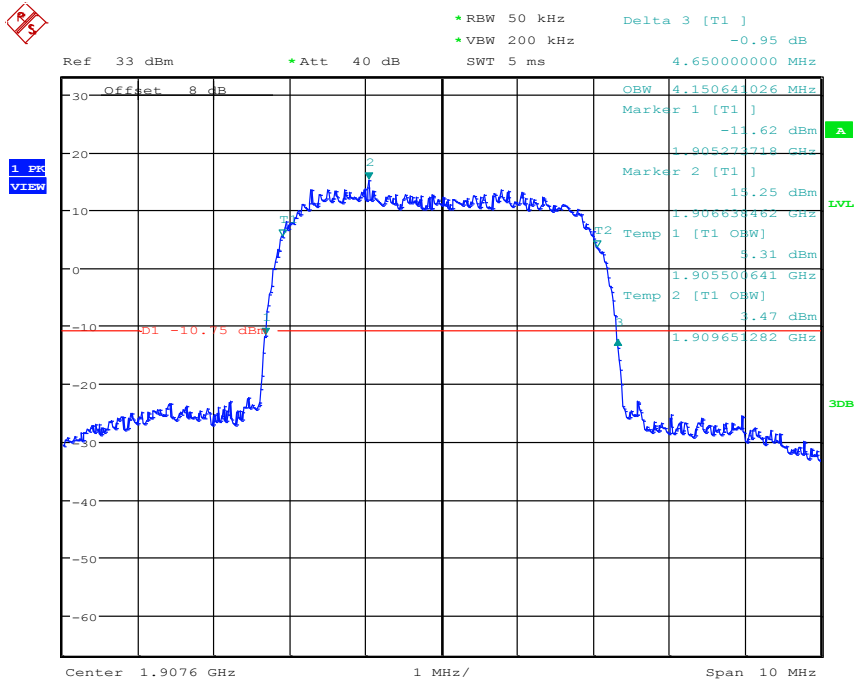
Date: 14.FEB.2017 17:52:33

(Plot D1: HSUPA Band II Channel=9262)



Date: 14.FEB.2017 17:49:30

(Plot D2: HSUPA Band II Channel=9400)



Date: 14.FEB.2017 17:44:07

(Plot D3: HSUPA Band II Channel=9538)

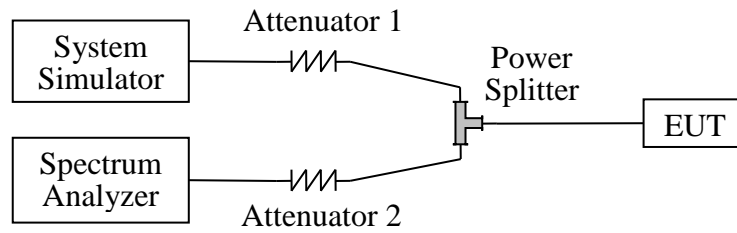


4.3 Peak-to-Average Ratio

4.3.1 Requirement

According to FCC section 24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.3.2 Test Description



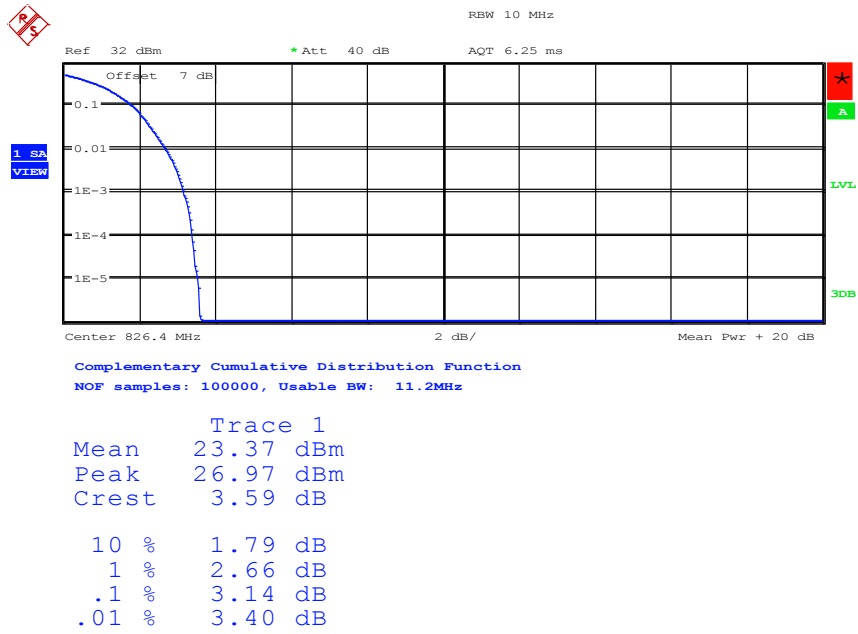
4.3.3 Test Result

Band	Channel	Frequency (MHz)	Peak-to-Average Ratio (dB)	Refer to Plot
HSDPA Band V	4132	826.4	3.40	A1
	4175	835	3.21	A2
	4233	846.6	3.40	A3
HSUPA Band V	4132	826.4	3.40	B1
	4175	835	3.17	B2
	4233	846.6	3.40	B3

Band	Channel	Frequency (MHz)	Peak-to-Average Ratio (dB)	Refer to Plot
HSDPA Band II	9262	1852.4	2.98	C1
	9400	1880	2.72	C2
	9538	1907.6	2.44	C3
HSUPA Band II	9262	1852.4	3.04	D1
	9400	1880	2.76	D2
	9538	1907.6	2.44	D3

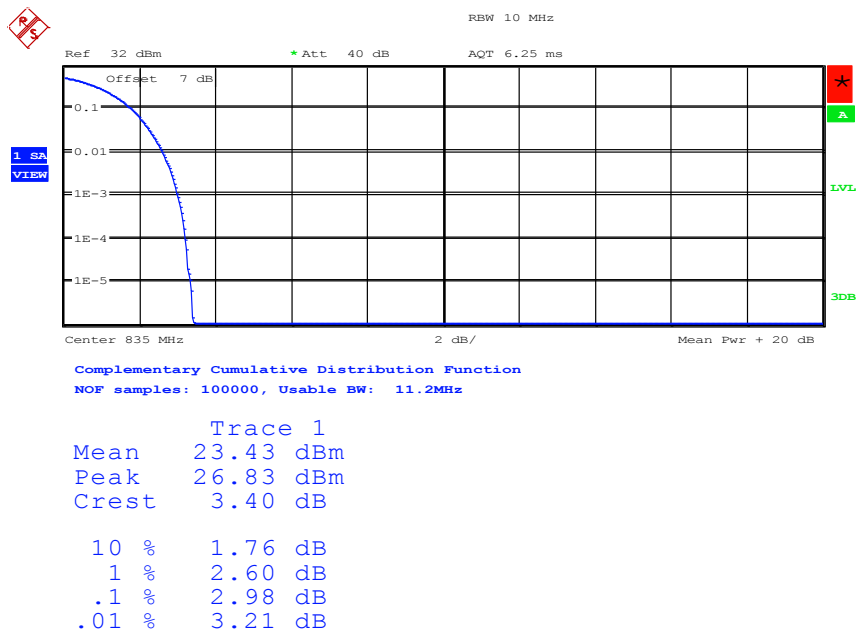


Test Plots:



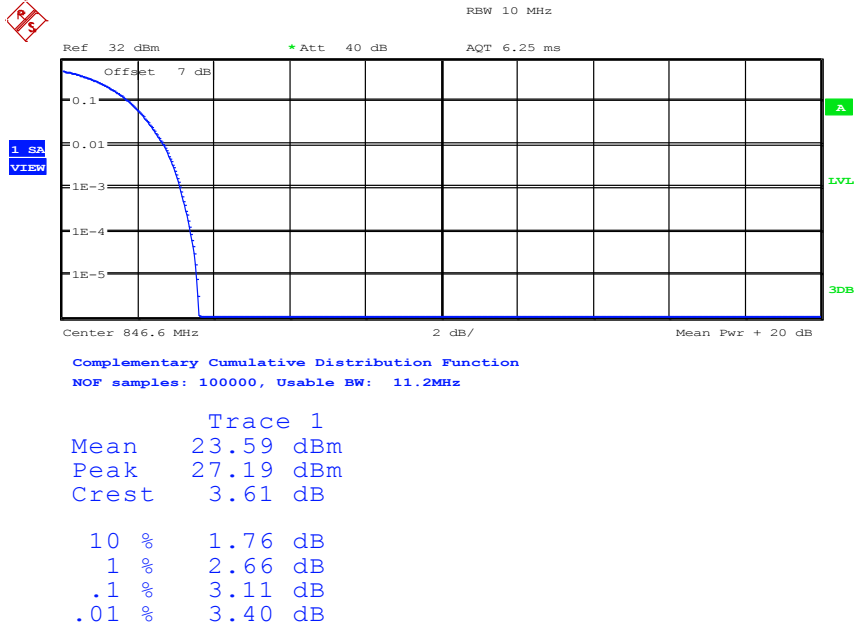
Date: 14.FEB.2017 18:53:32

(Plot A1: HSDPA Band V Channel=4132)



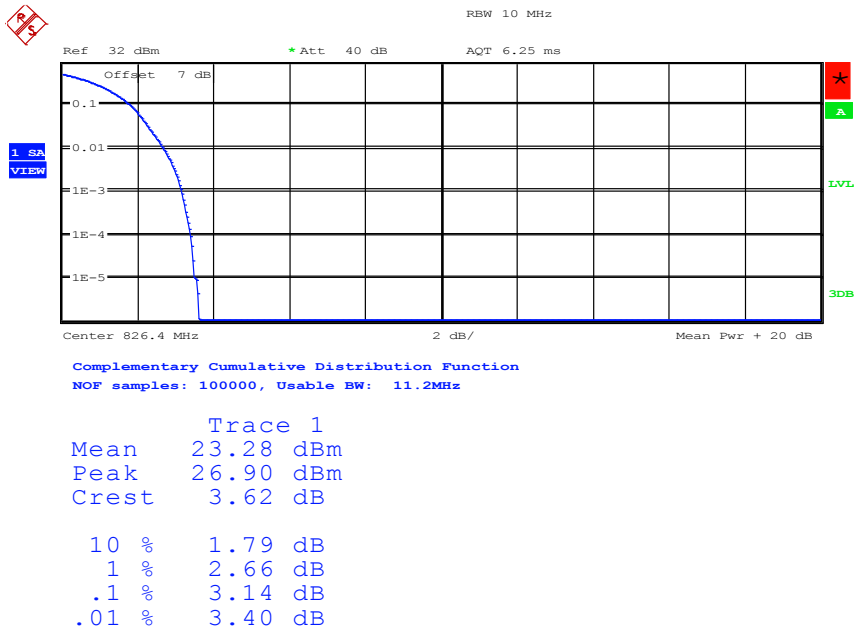
Date: 14.FEB.2017 18:52:55

(Plot A2: HSDPA Band V Channel=4182)



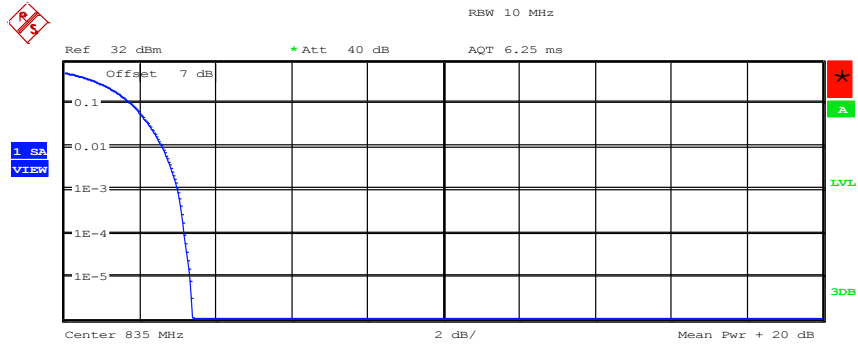
Date: 14.FEB.2017 18:52:16

(Plot A3: HSDPA Band V Channel=4233)



Date: 14.FEB.2017 18:53:22

(Plot B1: HSUPA Band V Channel=4132)

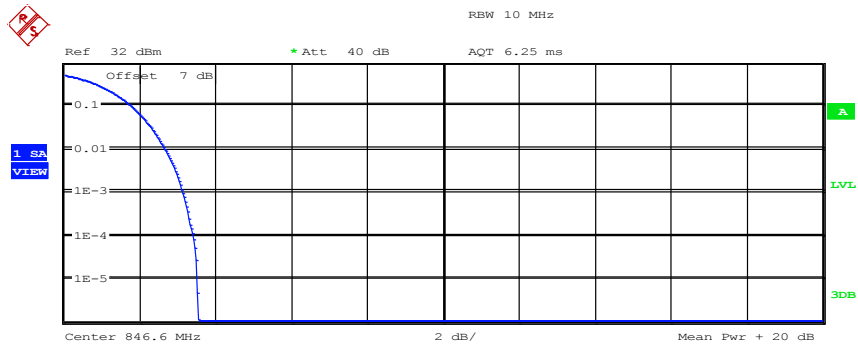


Center 835 MHz 2 dB/ Mean Pwr + 20 dB
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	23.45 dBm
Peak	26.83 dBm
Crest	3.38 dB
10 %	1.76 dB
1 %	2.60 dB
.1 %	3.01 dB
.01 %	3.17 dB

Date: 14.FEB.2017 18:52:45

(Plot B2: HSUPA Band V Channel=4182)

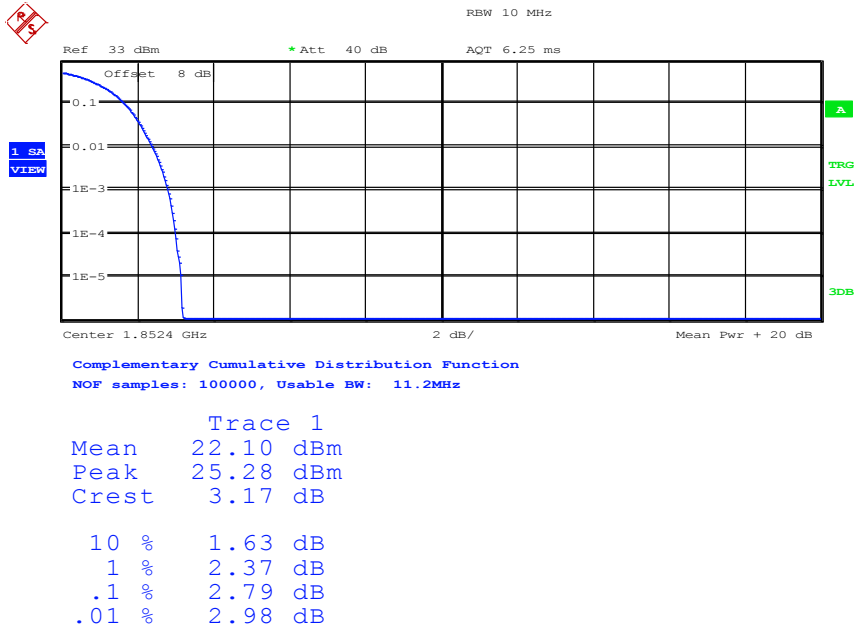


Center 846.6 MHz 2 dB/ Mean Pwr + 20 dB
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	23.67 dBm
Peak	27.19 dBm
Crest	3.53 dB
10 %	1.76 dB
1 %	2.66 dB
.1 %	3.14 dB
.01 %	3.40 dB

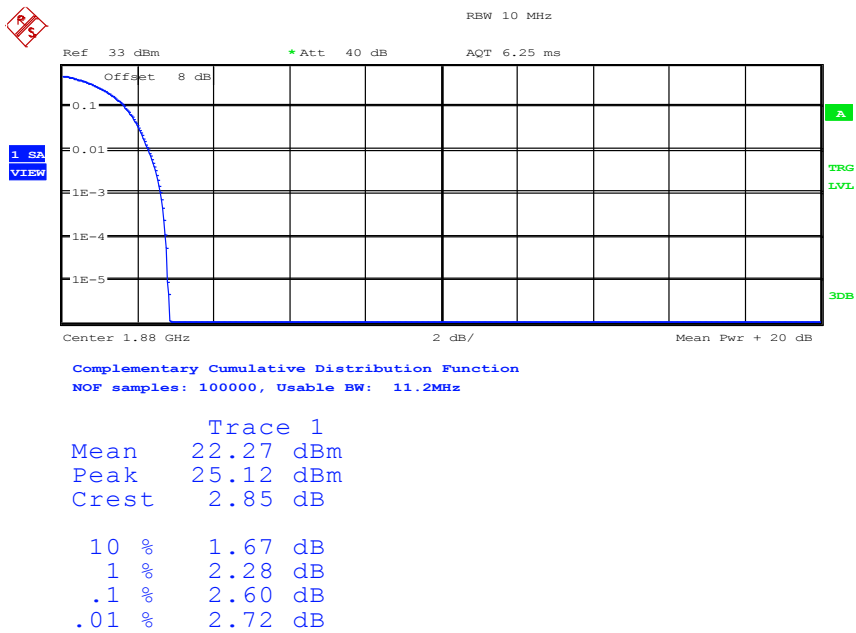
Date: 14.FEB.2017 18:51:55

(Plot B3: HSUPA Band V Channel=4233)



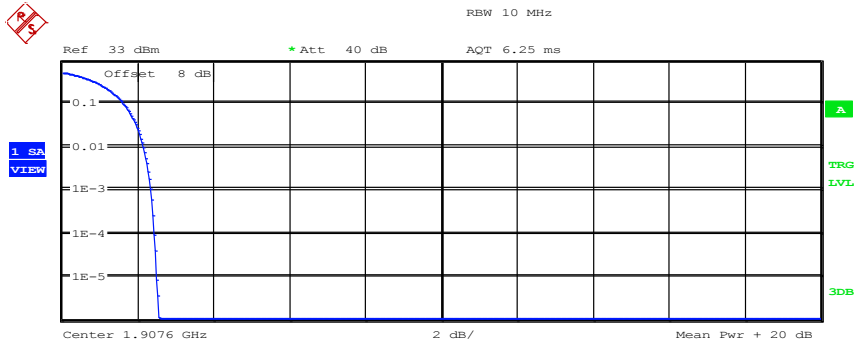
Date: 14.FEB.2017 18:02:35

(Plot C1: HSDPA Band II Channel=9262)



Date: 14.FEB.2017 18:06:12

(Plot C2: HSDPA Band II Channel=9400)

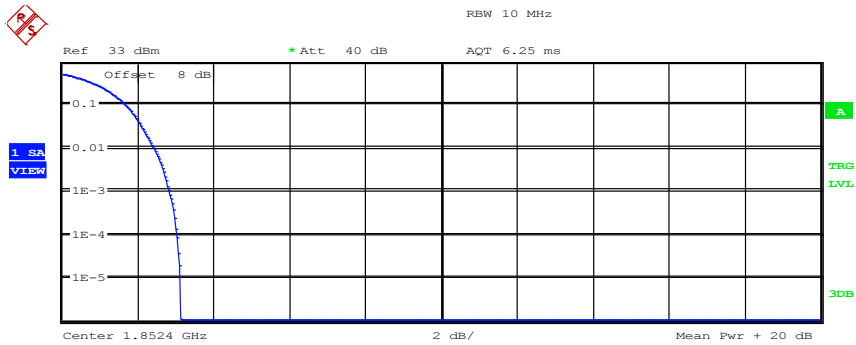


Center 1.9076 GHz 2 dB/ Mean Pwr + 20 dB
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	22.45 dBm
Peak	25.00 dBm
Crest	2.55 dB
10 %	1.60 dB
1 %	2.15 dB
.1 %	2.34 dB
.01 %	2.44 dB

Date: 14.FEB.2017 18:07:32

(Plot C3: HSDPA Band II Channel=9538)

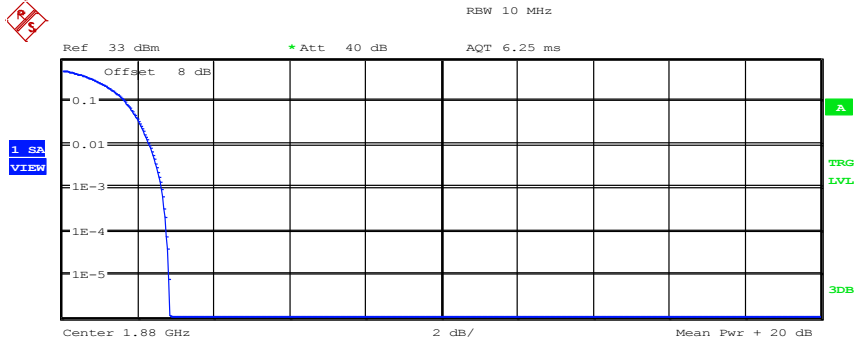


Center 1.8524 GHz 2 dB/ Mean Pwr + 20 dB
Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	21.64 dBm
Peak	24.78 dBm
Crest	3.14 dB
10 %	1.67 dB
1 %	2.44 dB
.1 %	2.82 dB
.01 %	3.04 dB

Date: 14.FEB.2017 18:02:09

(Plot D1: HSUPA Band II Channel=9262)

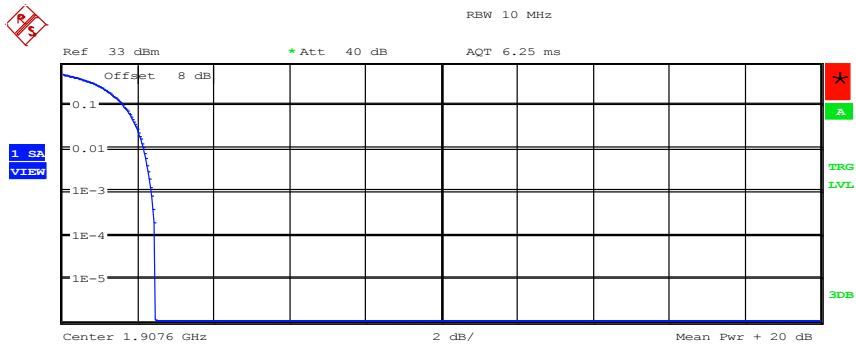


Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	22.22 dBm
Peak	25.05 dBm
Crest	2.82 dB
10 %	1.67 dB
1 %	2.31 dB
.1 %	2.63 dB
.01 %	2.76 dB

Date: 14.FEB.2017 18:05:55

(Plot D2: HSUPA Band II Channel=9400)



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

Trace 1	
Mean	22.47 dBm
Peak	24.93 dBm
Crest	2.46 dB
10 %	1.60 dB
1 %	2.15 dB
.1 %	2.37 dB
.01 %	2.44 dB

Date: 14.FEB.2017 18:07:05

(Plot D3: HSUPA Band II Channel=9538)



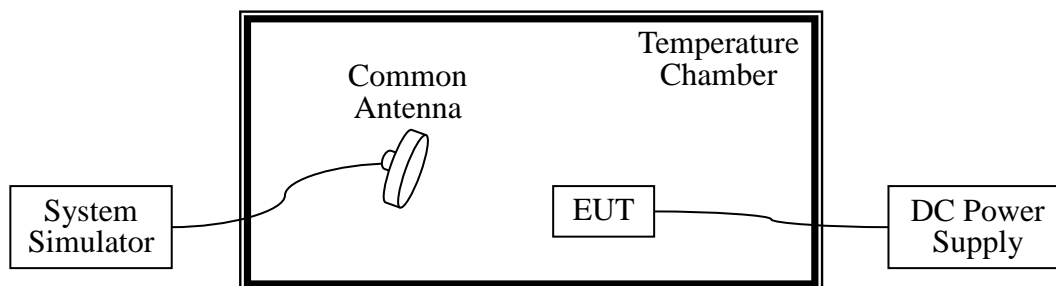
4.4 Frequency Stability

4.4.1 Requirement

According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from -30°C to $+50^{\circ}\text{C}$ at intervals of not more than 10°C .
- (b) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

4.4.2 Test Description



4.4.3 Test Setup

The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.



4.4.4 Test Results

For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer; the normal temperature here used is 25°C. The frequency deviation limit is ± 2.5 ppm.

Band	Test Conditions		Frequency Deviation						Limit/Verdict
	Power (VDC)	Temp (°C)	Low Channel		Middle Channel		High Channel		
			Dev. Freq. Hz	Deviation (ppm)	Dev. Freq. Hz	Deviation (ppm)	Dev. Freq. Hz	Deviation (ppm)	±2.5ppm 850 ±1ppm 1900
HSDPA 850 MHz	3.7	-30	---	---	---	---	---	---	PASS
		-20	---	---	---	---	---	---	
		-10	---	---	---	---	---	---	
		0	43	0.053	70	0.083	-76	-0.089	
		10	31	0.038	-12	-0.015	-58	-0.068	
		20	-8	-0.009	56	0.067	-3	-0.004	
		30	28	0.034	57	0.068	22	0.025	
		40	-53	-0.064	33	0.039	-41	-0.049	
		50	58	0.070	-49	-0.059	8	0.009	
		60	---	---	---	---	---	---	
	70	---	---	---	---	---	---		
	4.2	25	41	0.050	55	0.065	12	0.015	
3.3	25	-72	-0.088	45	0.053	33	0.038		
HSDPA 1900 MHz	3.7	-30	---	---	---	---	---	---	PASS
		-20	---	---	---	---	---	---	
		-10	---	---	---	---	---	---	
		0	54	0.029	-22	-0.026	54	0.028	
		10	60	0.032	-38	-0.045	-48	-0.025	
		20	-1	-0.001	7	0.009	-11	-0.006	
		30	-9	-0.005	-44	-0.052	-49	-0.026	
		40	-5	-0.003	44	0.053	-27	-0.014	
		50	-28	-0.015	78	0.093	-70	-0.036	
		60	---	---	---	---	---	---	
	70	---	---	---	---	---	---		
	4.2	25	-27	-0.014	9	0.011	43	0.023	
3.3	25	-47	-0.026	-45	-0.053	-22	-0.011		



Band	Test Conditions		Frequency Deviation						Limit/Verdict
	Power (VDC)	Temp (°C)	Low Channel		Middle Channel		High Channel		±2.5ppm 850 ±1ppm 1900
			Dev. Freq. Hz	Deviation (ppm)	Dev. Freq. Hz	Deviation (ppm)	Dev. Freq. Hz	Deviation (ppm)	
HSUPA 850 MHz	3.7	-30	---	---	---	---	---	---	PASS
		-20	---	---	---	---	---	---	
		-10	---	---	---	---	---	---	
		0	-27	-0.033	-6	-0.007	-3	-0.003	
		10	67	0.082	-37	-0.045	-71	-0.084	
		20	24	0.028	-50	-0.060	78	0.092	
		30	-24	-0.029	-67	-0.080	74	0.088	
		40	17	0.020	35	0.042	17	0.020	
		50	-41	-0.050	-42	-0.050	-18	-0.022	
		60	---	---	---	---	---	---	
	70	---	---	---	---	---	---		
	4.2	25	-41	-0.050	-54	-0.064	-76	-0.090	
3.3	25	74	0.090	-70	-0.083	52	0.062		
HSUPA 1900 MHz	3.7	-30	---	---	---	---	---	---	PASS
		-20	---	---	---	---	---	---	
		-10	---	---	---	---	---	---	
		0	37	0.020	-40	-0.048	-33	-0.017	
		10	-15	-0.008	-37	-0.044	-74	-0.039	
		20	1	0.000	-59	-0.070	-11	-0.006	
		30	-44	-0.024	21	0.025	-47	-0.025	
		40	21	0.011	3	0.004	26	0.014	
		50	22	0.012	35	0.041	27	0.014	
		60	---	---	---	---	---	---	
	70	---	---	---	---	---	---		
	4.2	25	-41	-0.022	-39	-0.047	-43	-0.023	
3.3	25	48	0.026	-36	-0.043	-26	-0.013		

NOTE:

- (1) The EUT stops transmitting at temperatures -10°C, 60°C
- (2) The manufacturer declared that the EUT could work properly between temperatures 0°C~50°C.
- (3) Normal Voltage = 3.7V; Max Voltage= 4.2V; Min Voltage=3.3V.



4.5 Conducted Out of Band Emissions

4.5.1 Requirement

According to FCC section 22.917(a) and FCC section 24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \cdot \log(P)$ dB. This calculated to be -13dBm.

4.5.2 Test Description

See section 4.2.1 of this report.

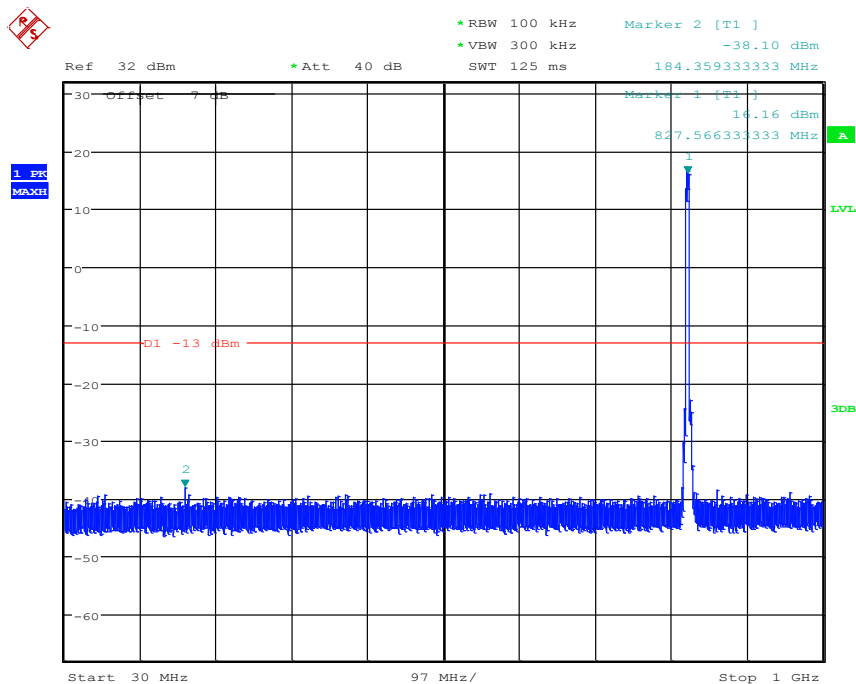
4.5.3 Test Results

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

Test Plots:

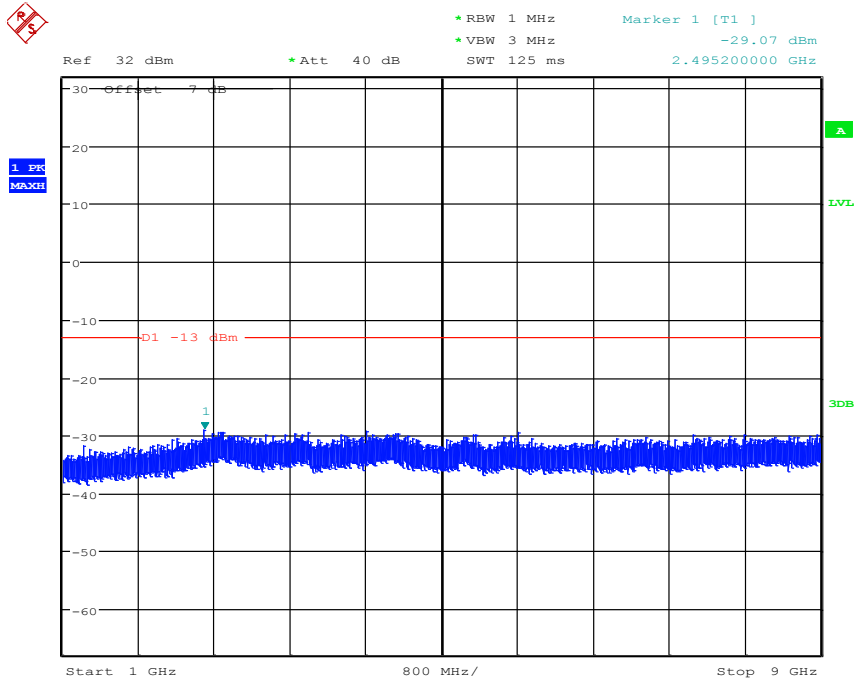
NOTE:

- 1) The power of the EUT transmitting frequency should be ignored.
- 2) All of HSDPA/HSUPA modes were tested, and just the worst data was record in this report.



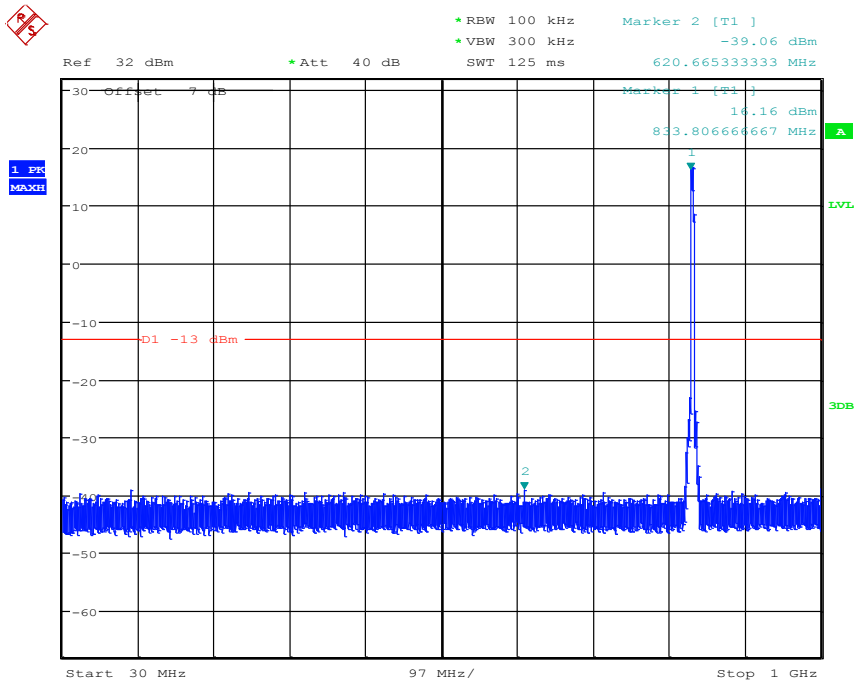
Date: 14.FEB.2017 18:57:03

(HSUPA Band V, Channel = 4132, 30MHz to 1GHz)



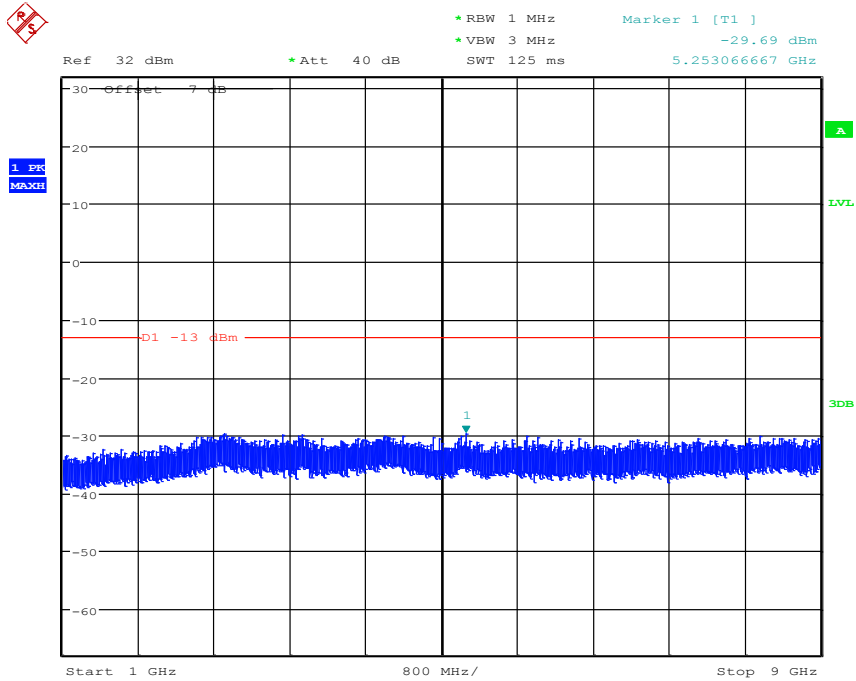
Date: 14.FEB.2017 19:01:27

(HSUPA Band V, Channel = 4132, 1GHz to 9GHz)



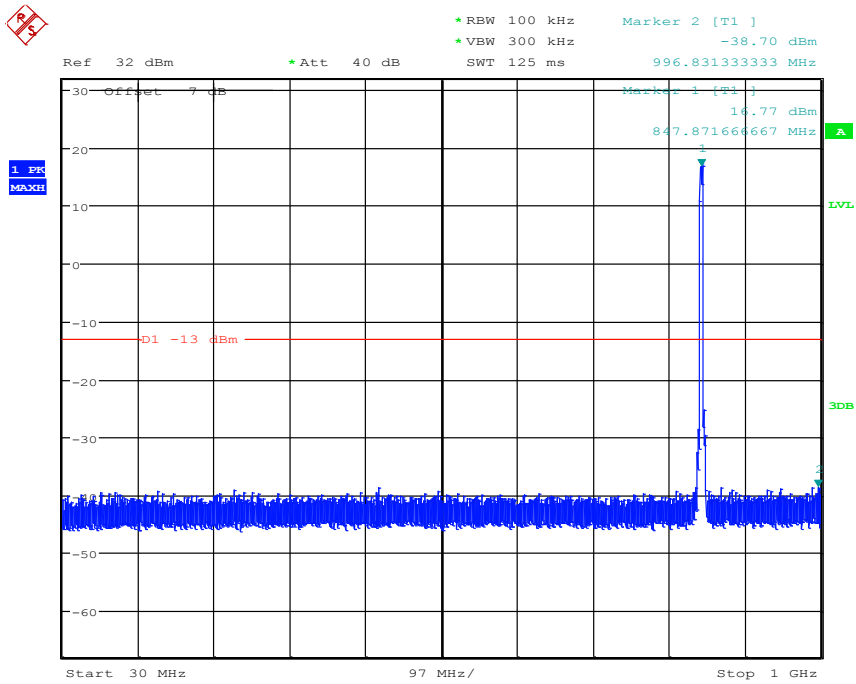
Date: 14.FEB.2017 18:57:49

(HSUPA Band V Channel = 4182, 30MHz to 1GHz)



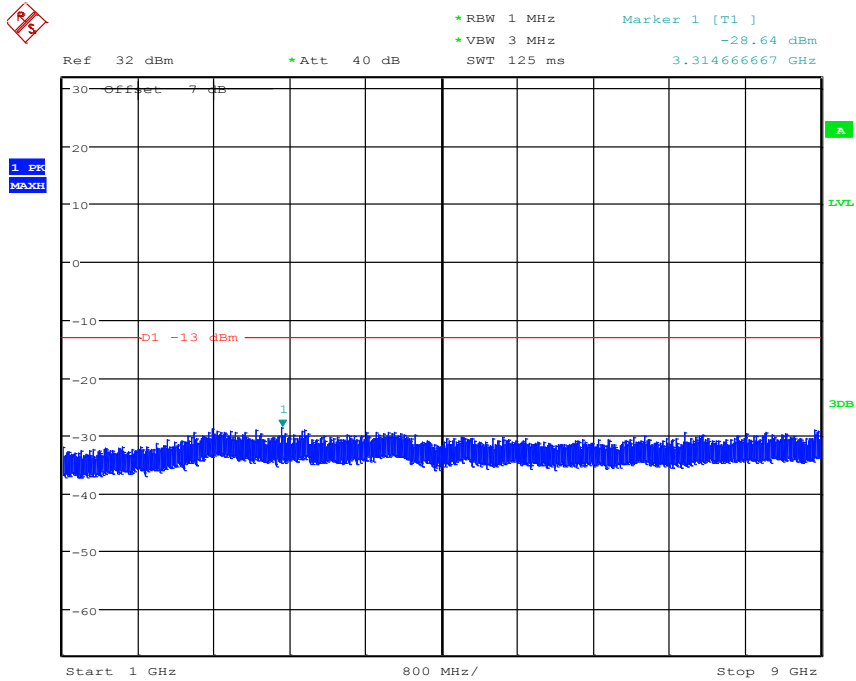
Date: 14.FEB.2017 19:01:49

(HSUPA Band V Channel = 4182, 1GHz to 9GHz)



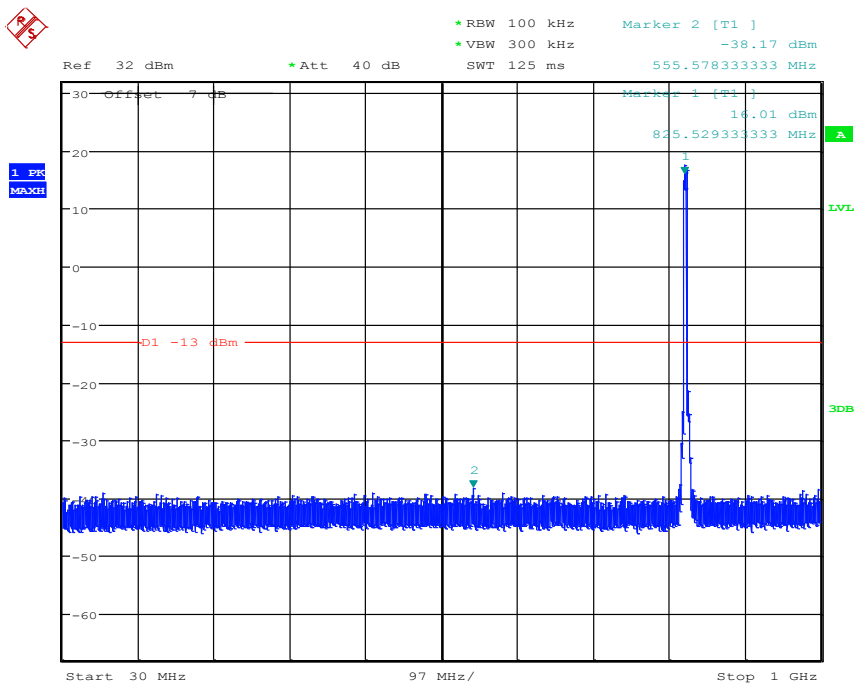
Date: 14.FEB.2017 19:00:39

(HSUPA Band V Channel = 4233, 30MHz to 1GHz)



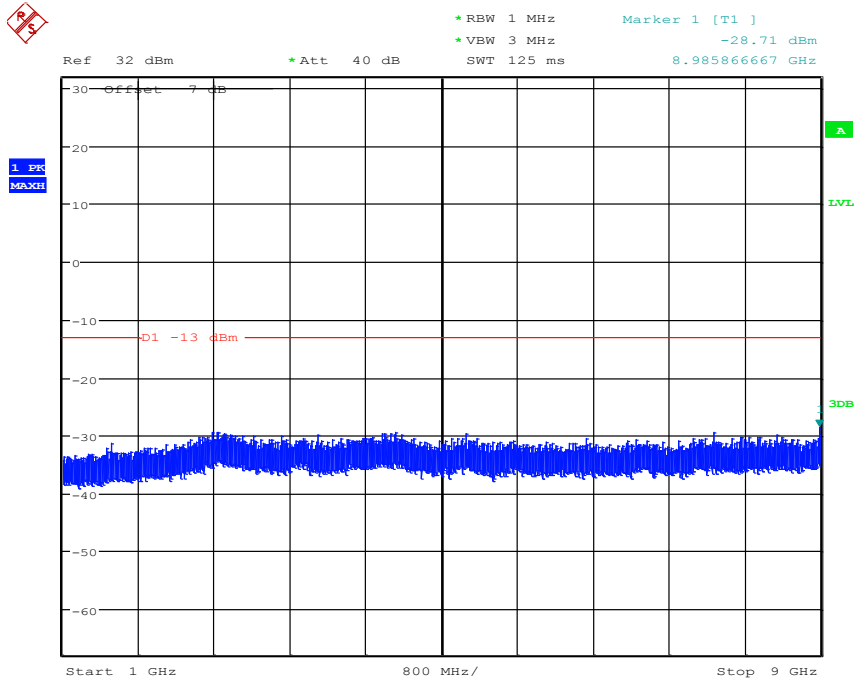
Date: 14.FEB.2017 19:02:36

(HSUPA Band V Channel = 4233, 1GHz to 9GHz)



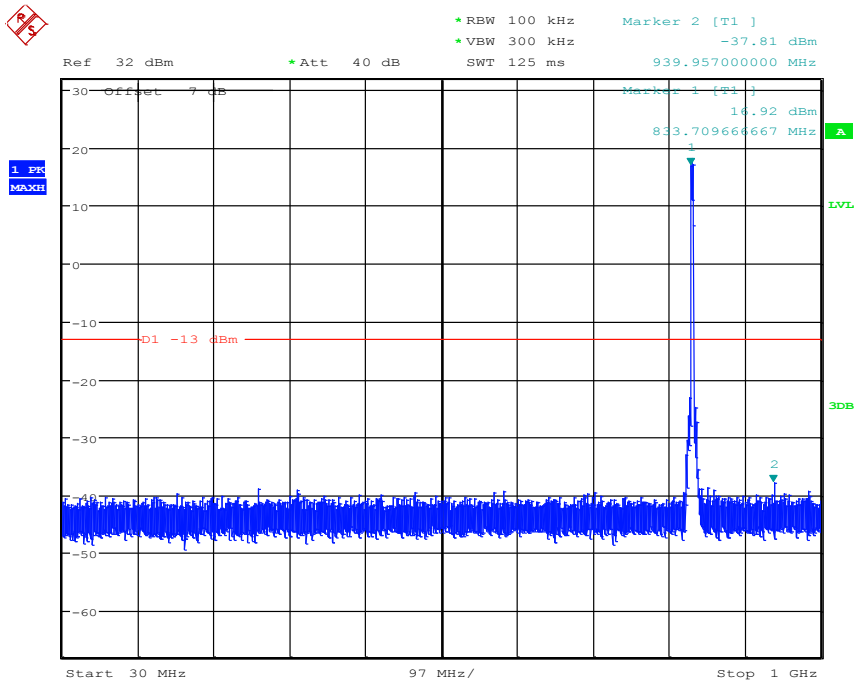
Date: 14.FEB.2017 18:56:15

(HSDPA Band V, Channel = 4132, 30MHz to 1GHz)



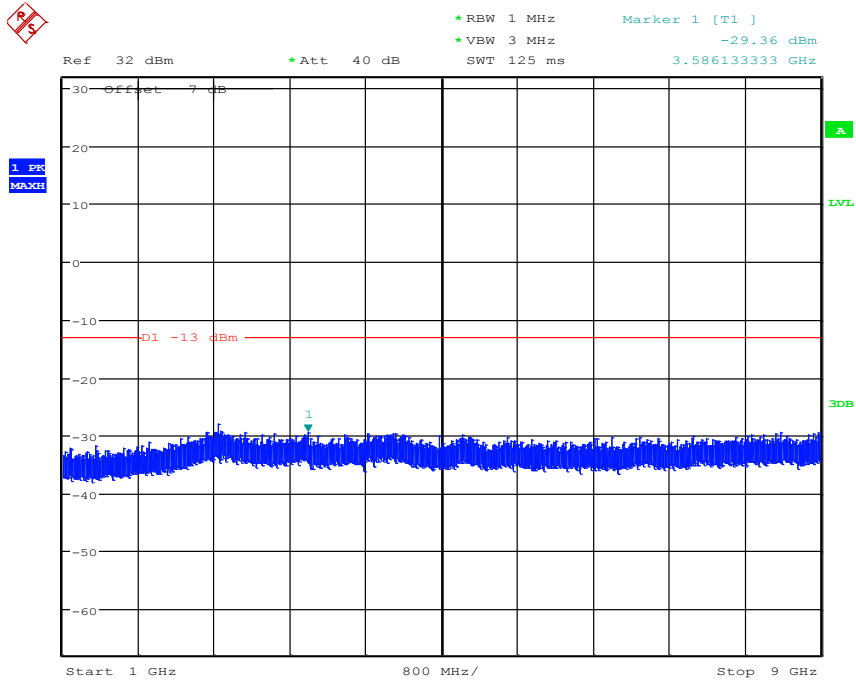
Date: 14.FEB.2017 19:01:39

(HSDPA Band V, Channel = 4132, 1GHz to 9GHz)



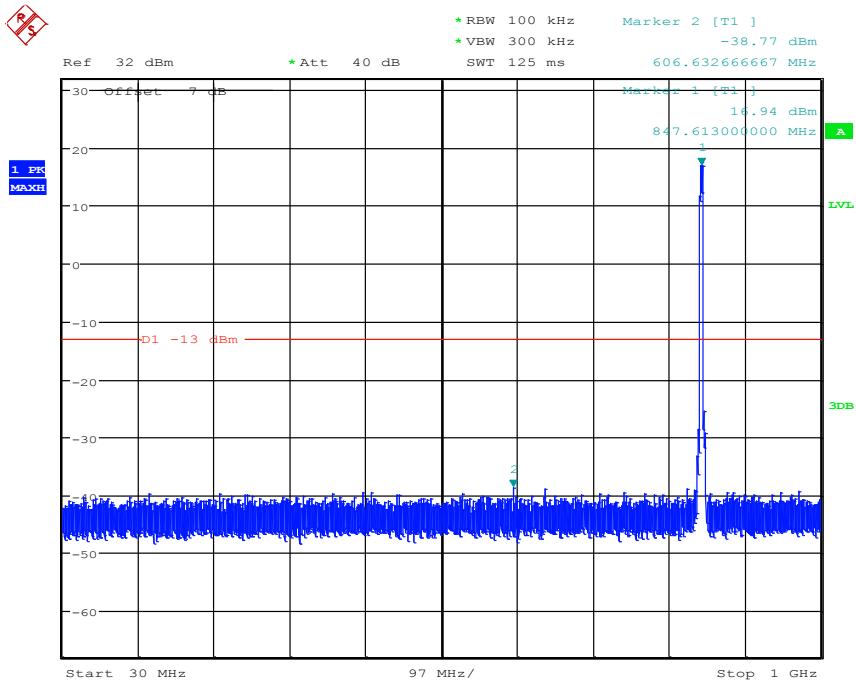
Date: 14.FEB.2017 18:58:26

(HSDPA Band V Channel = 4182, 30MHz to 1GHz)



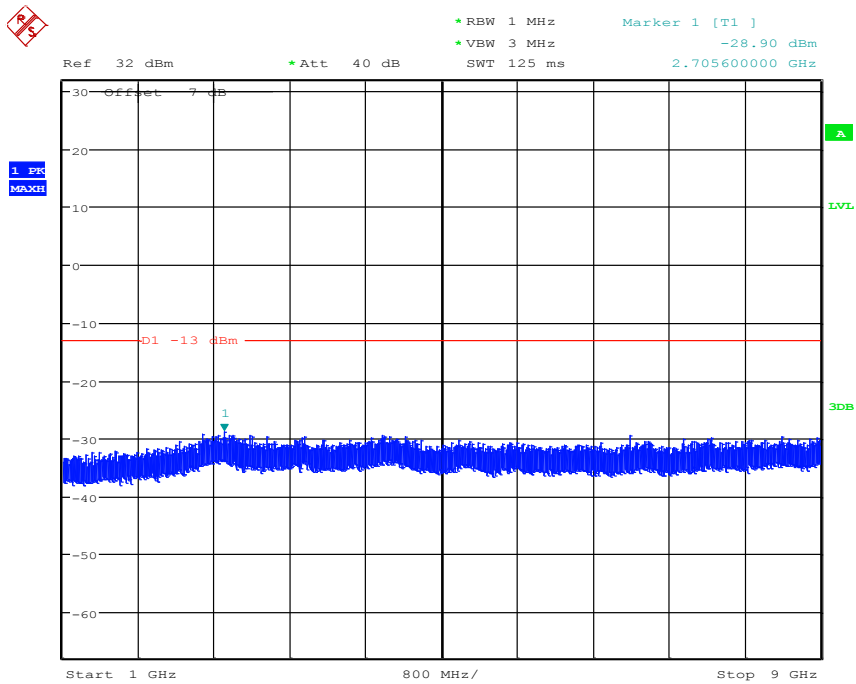
Date: 14.FEB.2017 19:02:09

(HSDPA Band V Channel = 4182, 1GHz to 9GHz)



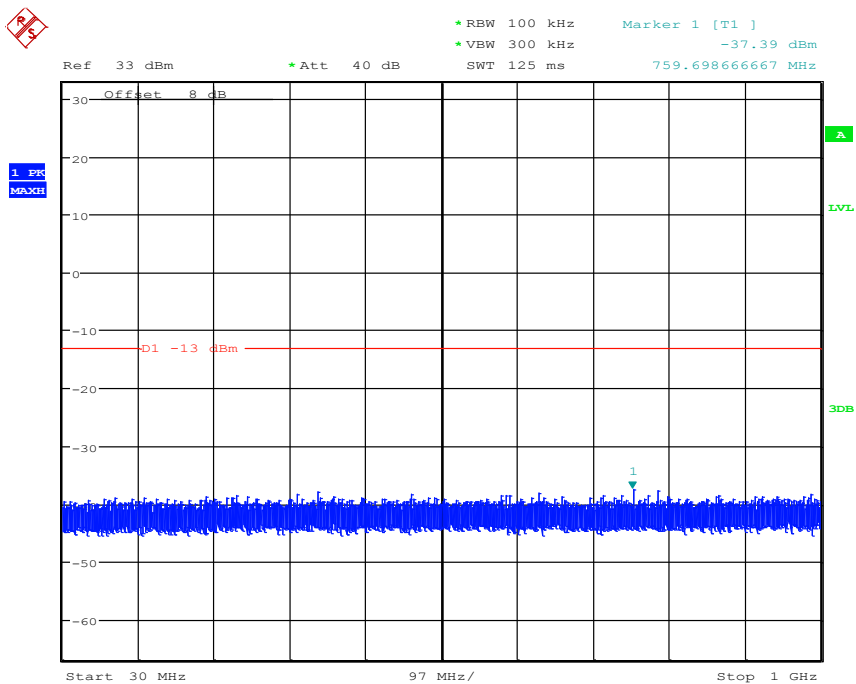
Date: 14.FEB.2017 19:01:02

(HSDPA Band V Channel = 4233, 30MHz to 1GHz)



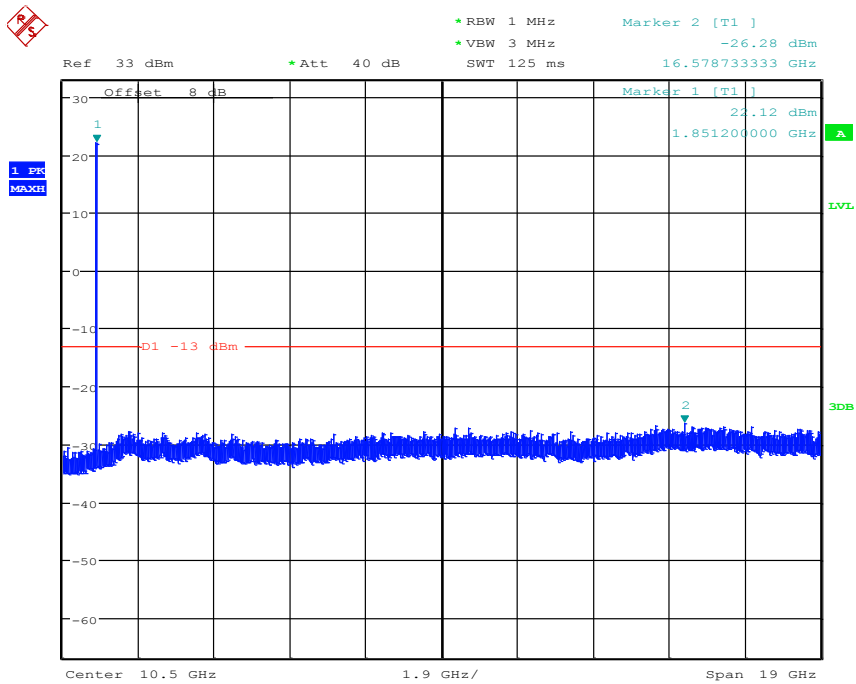
Date: 14.FEB.2017 19:02:53

(HSDPA Band V Channel = 4233, 1GHz to 9GHz)



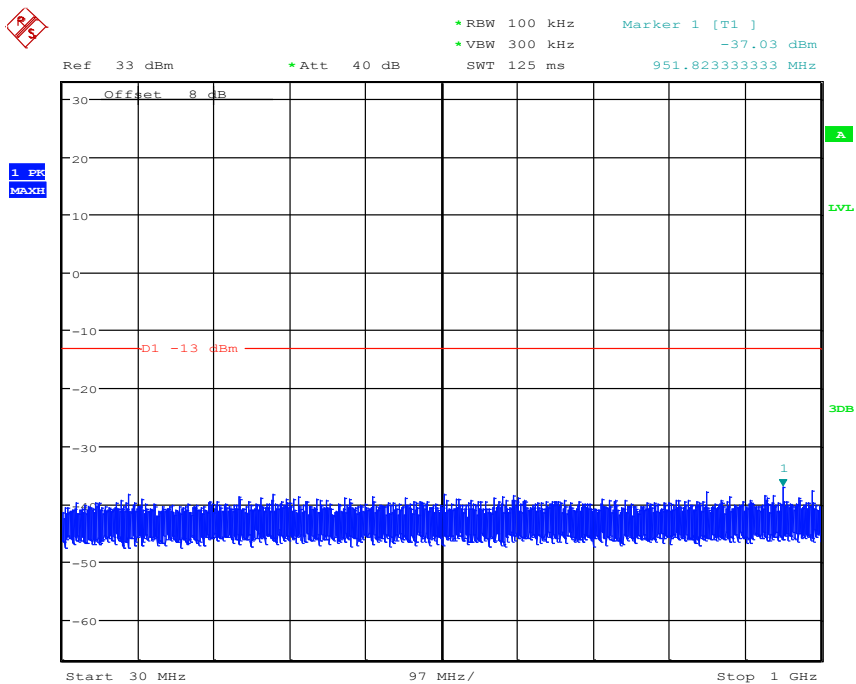
Date: 14.FEB.2017 18:17:49

(HSUPA Band II, Channel = 9262, 30MHz to 1GHz)



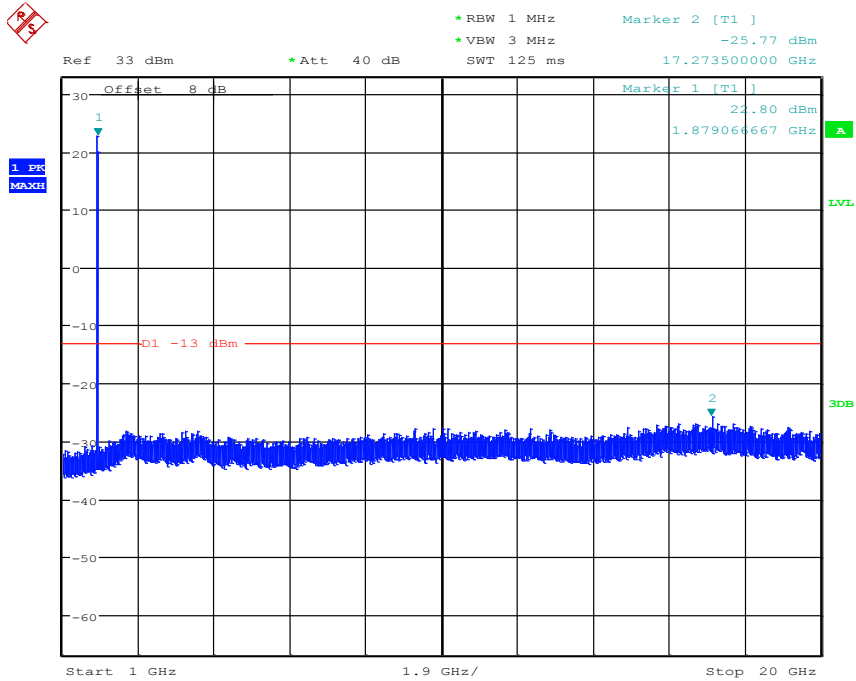
Date: 14.FEB.2017 18:22:32

(HSUPA Band II, Channel = 9262, 1GHz to 20GHz)



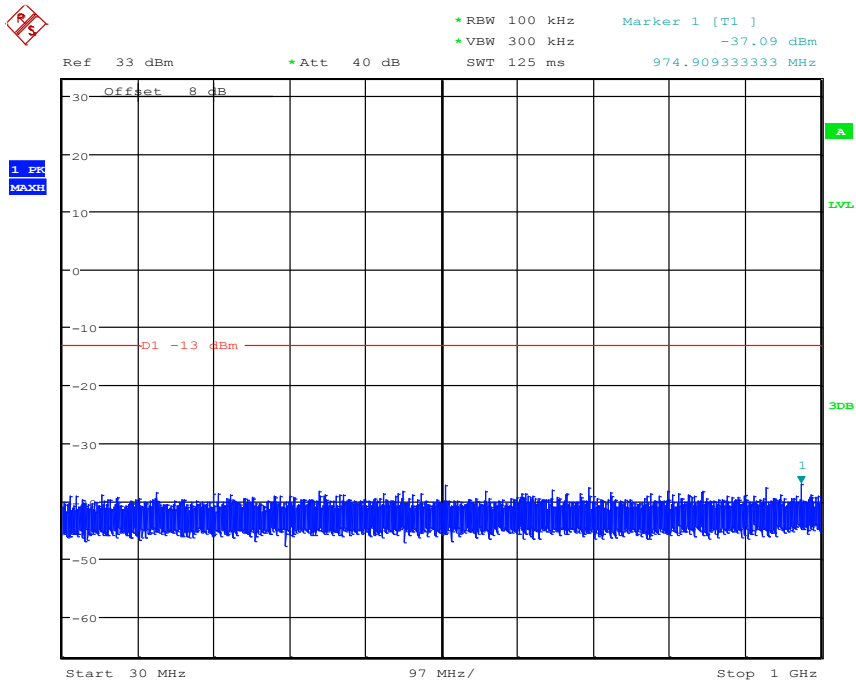
Date: 14.FEB.2017 18:16:51

(HSUPA Band II Channel =9400, 30MHz to 1GHz)



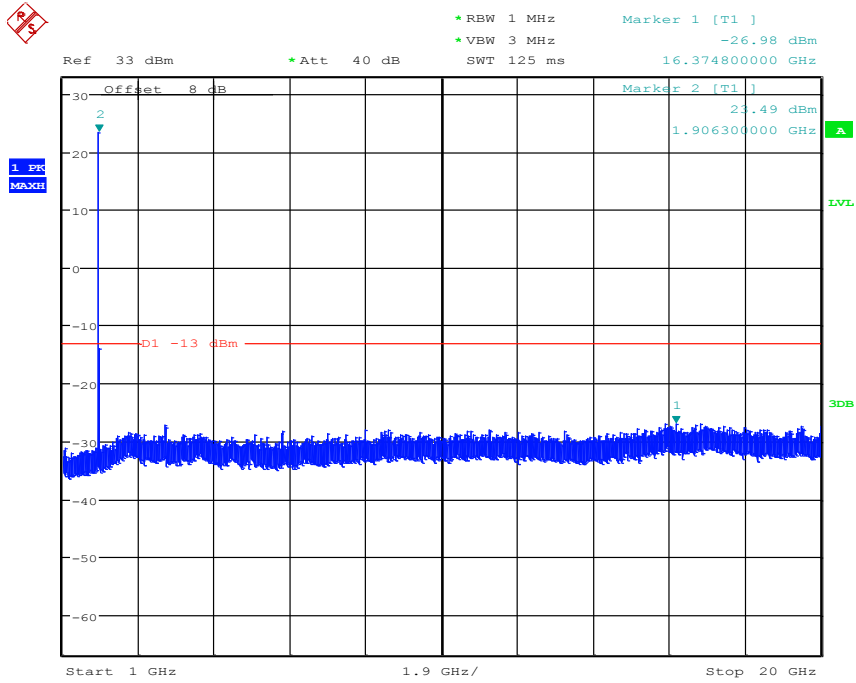
Date: 14.FEB.2017 18:20:39

(HSUPA Band II Channel =9400, 1GHz to 20GHz)



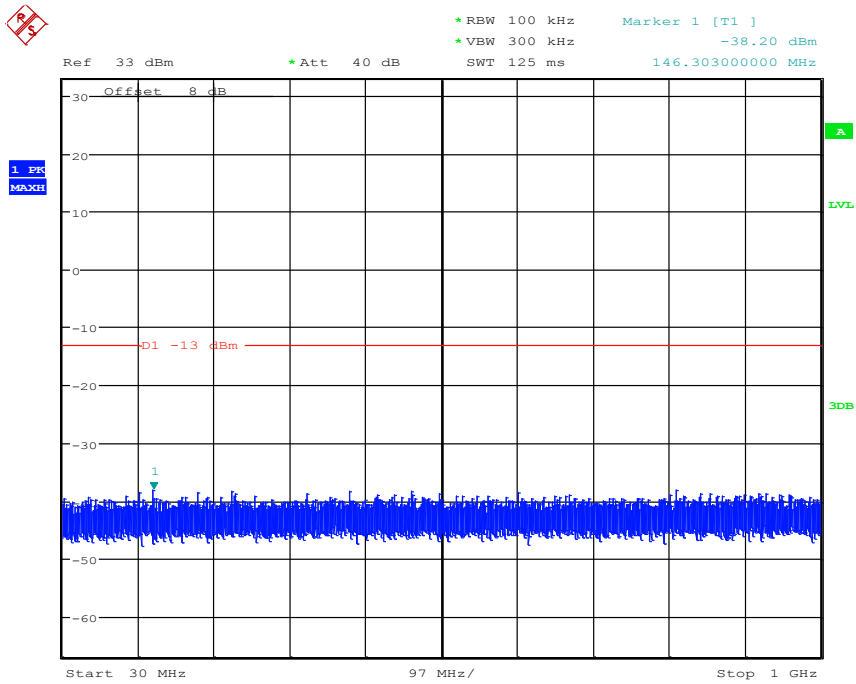
Date: 14.FEB.2017 18:16:12

(HSUPA Band II Channel = 9538, 30MHz to 1GHz)



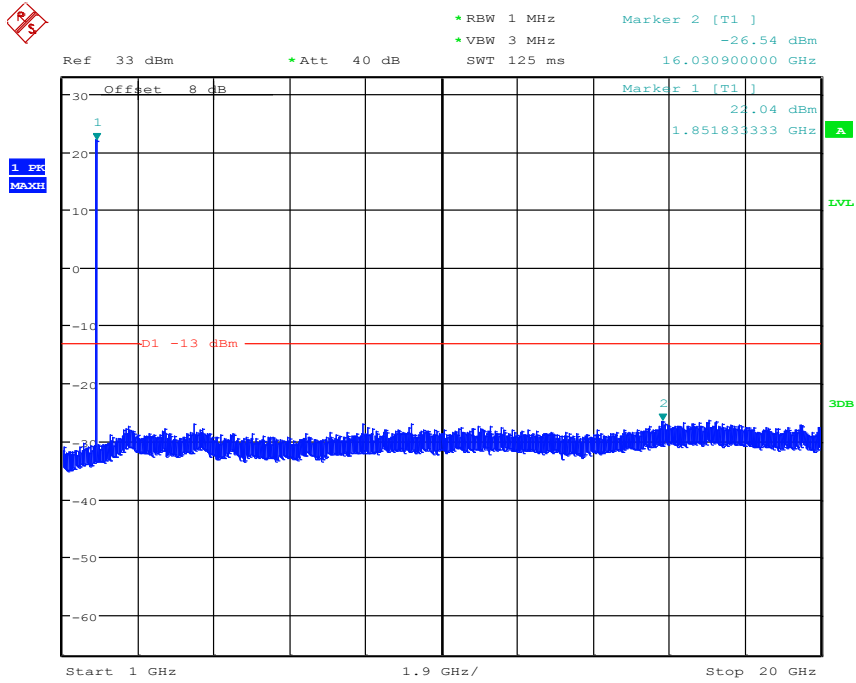
Date: 14.FEB.2017 18:18:53

(HSUPA Band II Channel = 9538, 1GHz to 20GHz)



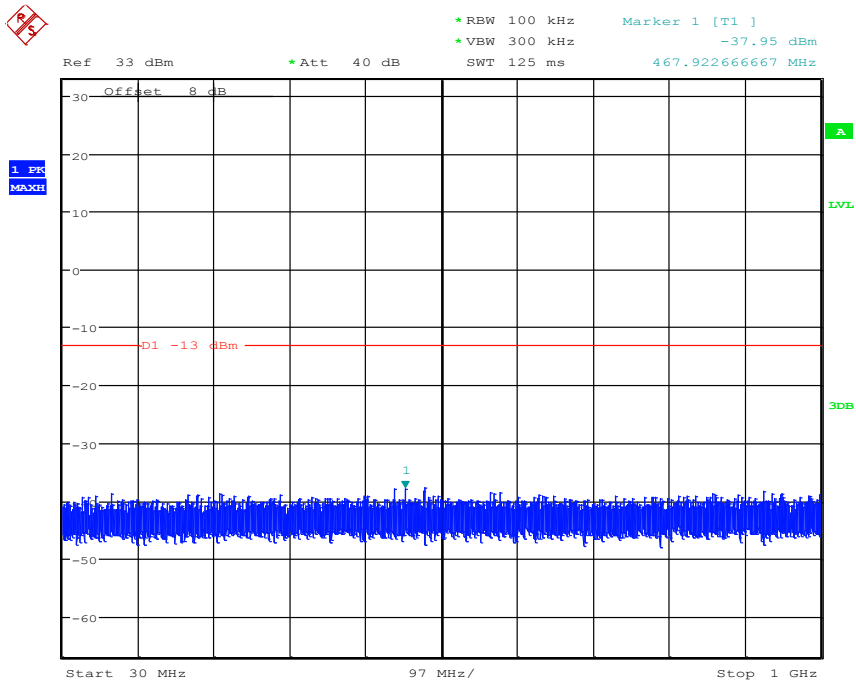
Date: 14.FEB.2017 18:18:12

(HSDPA Band II, Channel = 9262, 30MHz to 1GHz)



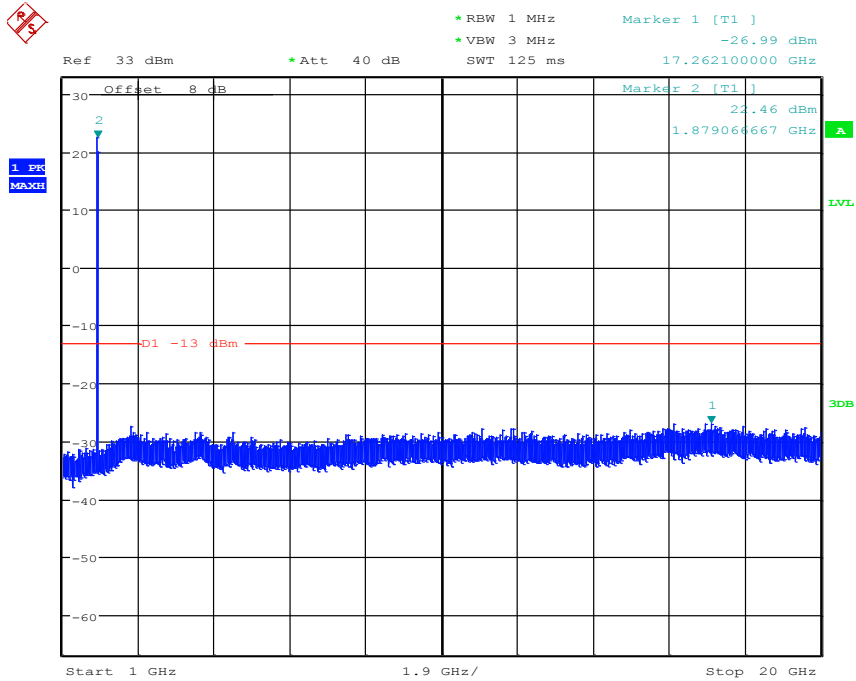
Date: 14.FEB.2017 18:24:59

(HSDPA Band II, Channel = 9262, 1GHz to 20GHz)



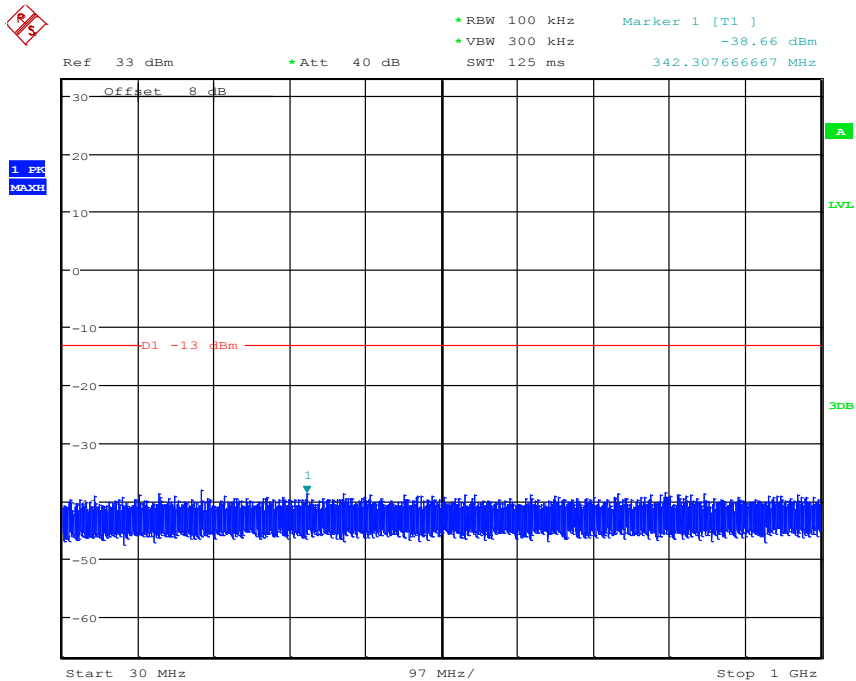
Date: 14.FEB.2017 18:17:09

(HSDPA Band II Channel = 9400, 30MHz to 1GHz)



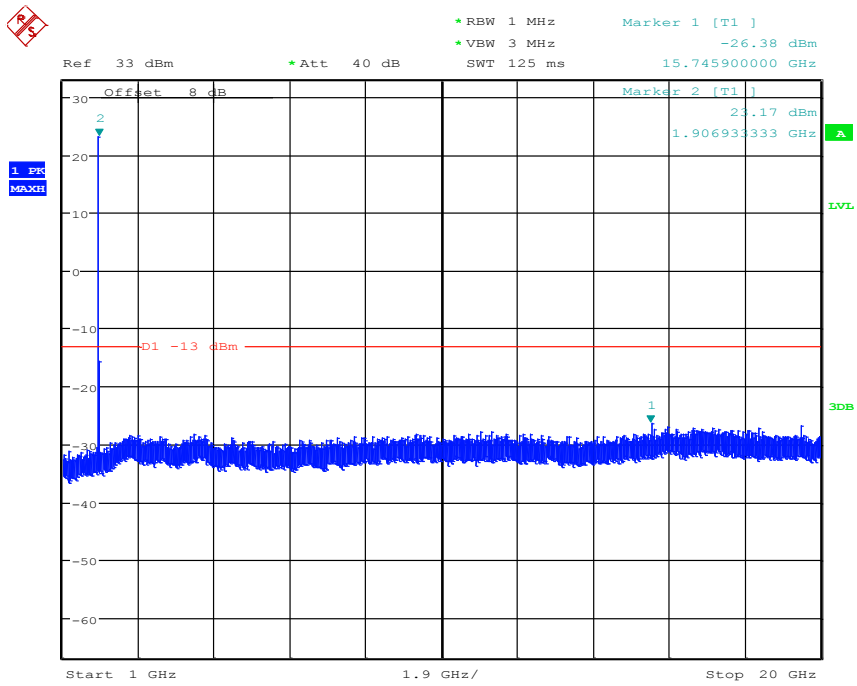
Date: 14.FEB.2017 18:21:00

(HSDPA Band II Channel =9400, 1GHz to 20GHz)



Date: 14.FEB.2017 18:16:32

(HSDPA Band II Channel = 9538, 30MHz to 1GHz)



Date: 14.FEB.2017 18:19:46

(HSDPA Band II Channel = 9538, 1GHz to 20GHz)



4.6 Band Edge

4.6.1 Requirement

According to FCC section 22.917(b) and FCC section 24.238(b), in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

4.6.2 Test Description

See section 4.2.1 of this report.

4.6.3 Test Results

The lowest and highest channels are tested to verify the band edge emissions.

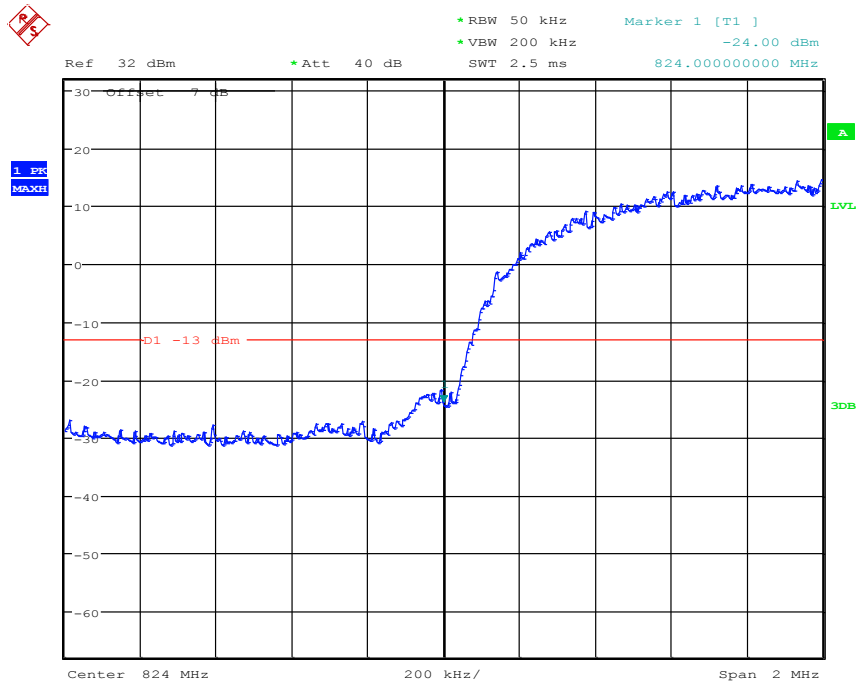
Band	Channel	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
HSDPA Band V	4132	826.4	-24.00	Plat A1	-13	PASS
	4233	846.6	-25.14	Plot A2		PASS
HSUPA Band V	4132	826.4	-21.74	Plat B1		PASS
	4233	846.6	-22.62	Plot B2		PASS
HSDPA Band II	9262	1852.4	-21.95	Plat C1		PASS
	9538	1907.6	-20.87	Plot C2		PASS
HSUPA Band II	9262	1852.4	-23.26	Plat D1		PASS
	9538	1907.6	-19.58	Plot D2		PASS

NOTE:

1) The power of the EUT transmitting frequency should be ignored.

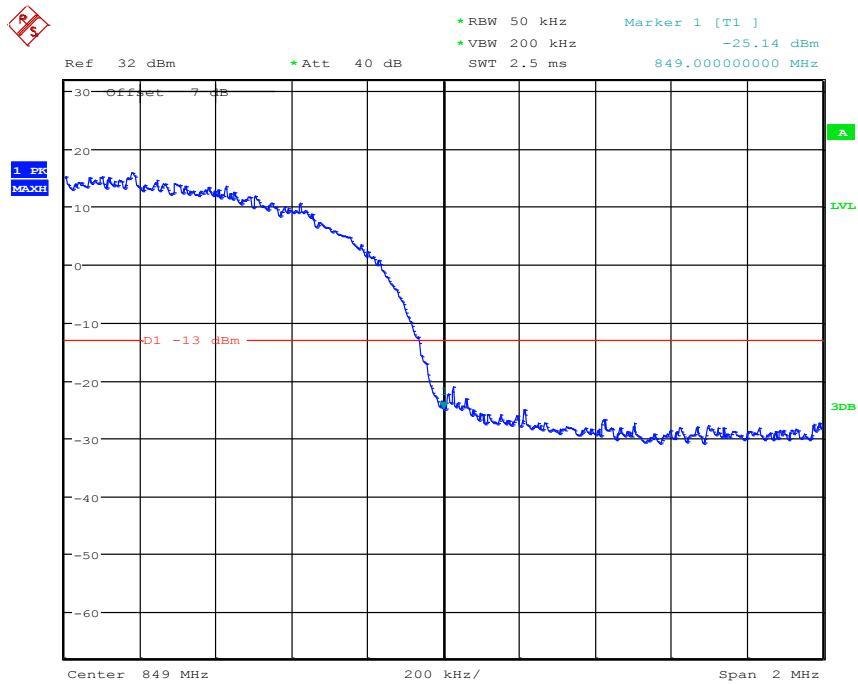


Test Plots:



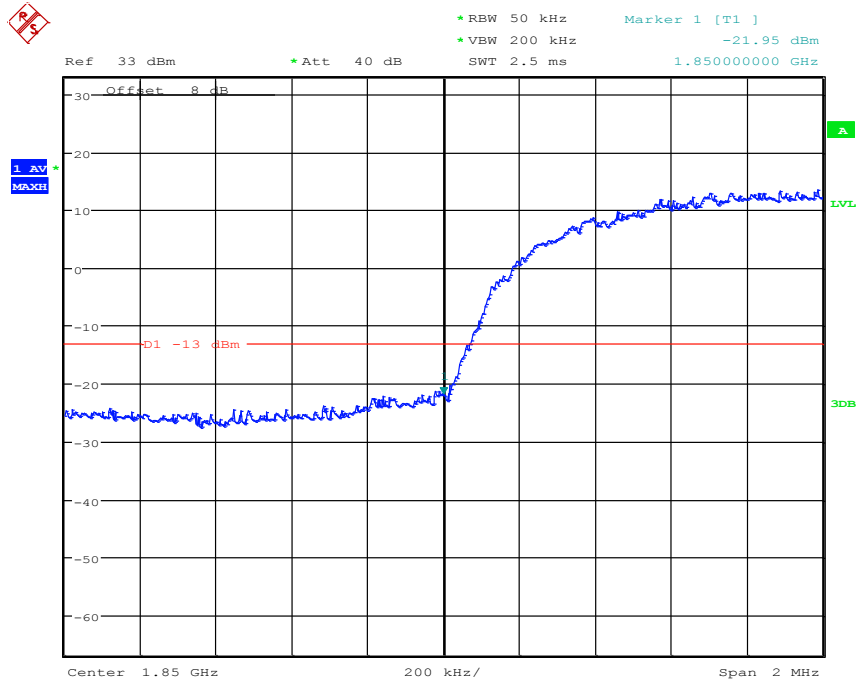
Date: 14.FEB.2017 19:05:15

(Plot A1: HSDPA Band V Channel=4132)



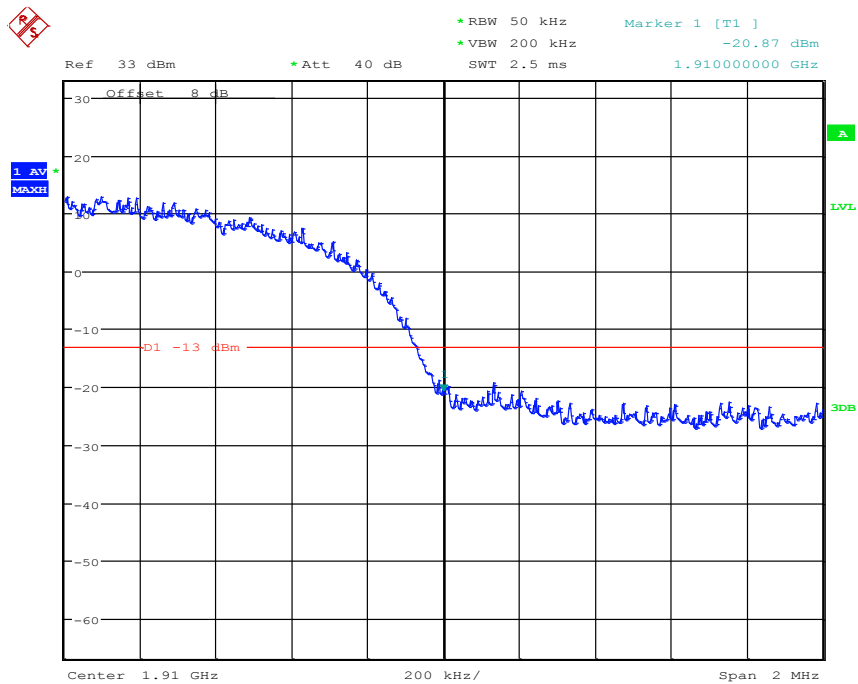
Date: 14.FEB.2017 19:04:30

(Plot A2: HSDPA Band V Channel=4233)



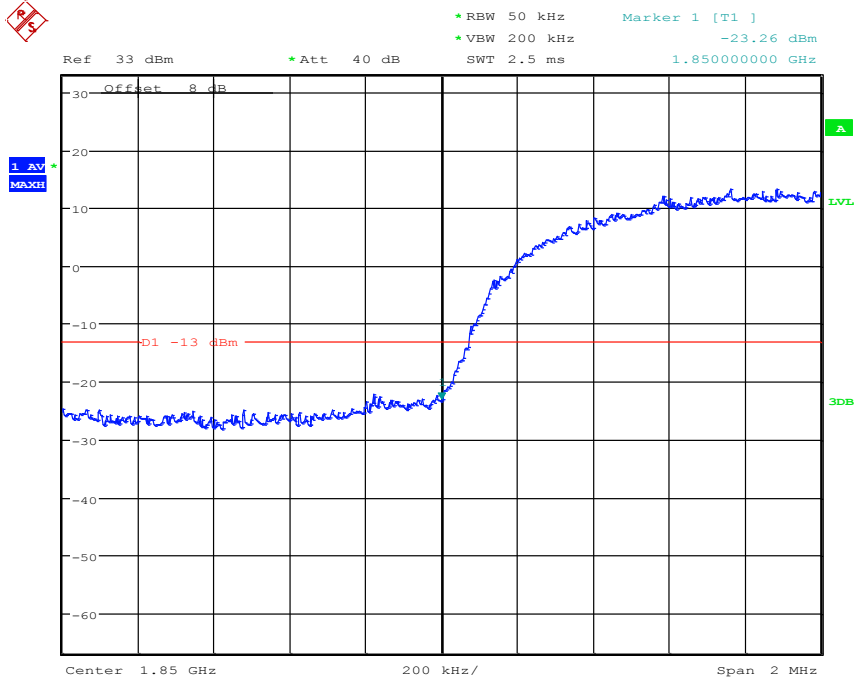
Date: 14.FEB.2017 18:27:53

(Plot C1: HSDPA Band II Channel=9262)



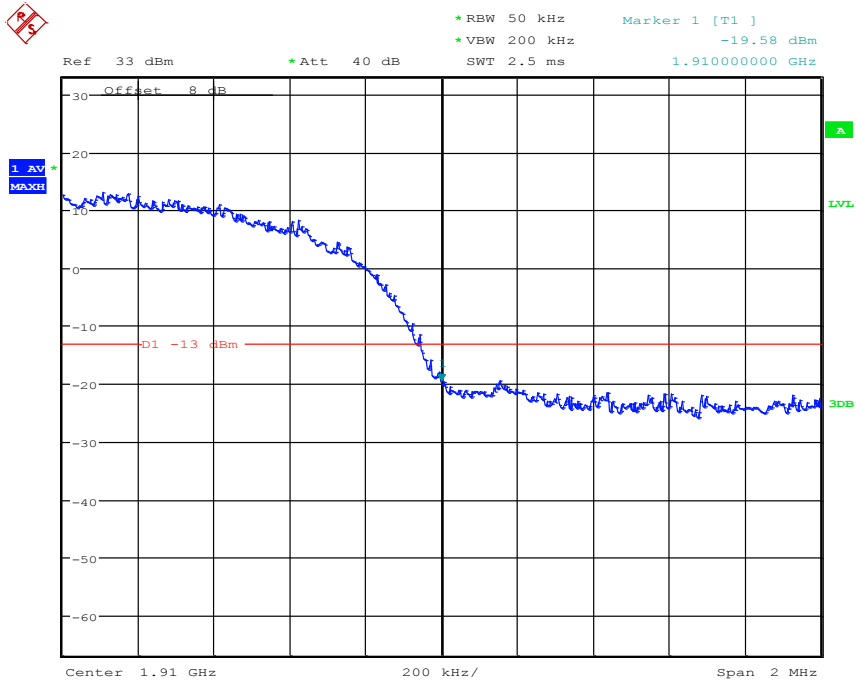
Date: 14.FEB.2017 18:28:53

(Plot C2: HSDPA Band II Channel=9538)



Date: 14.FEB.2017 18:27:16

(Plot D1: HSUPA Band II Channel=9262)



Date: 14.FEB.2017 18:28:45

(Plot D2: HSUPA Band II Channel=9538)

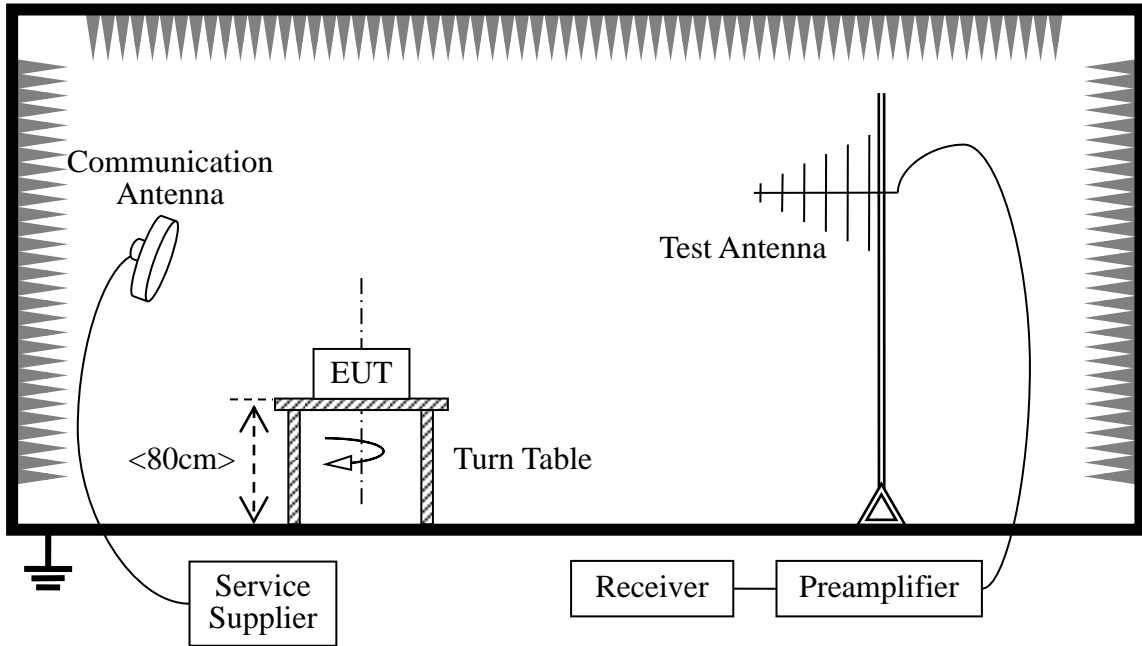


4.7 Transmitter Radiated Power (EIRP/ERP)

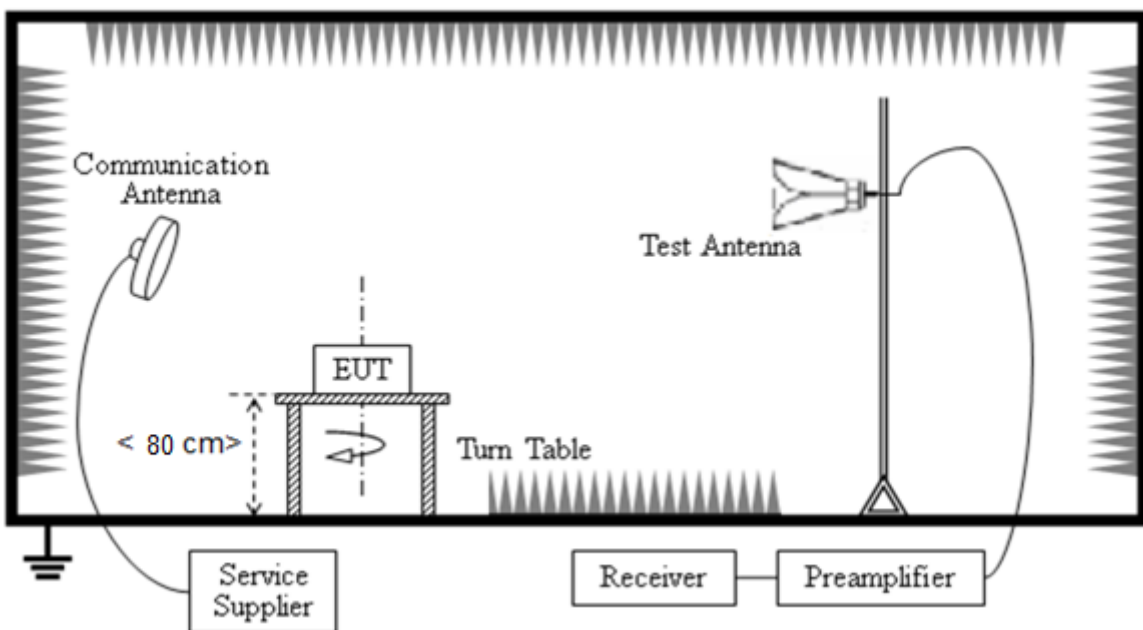
4.7.1 Requirement

According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7Watts, and FCC section 24.232, the broadband PCS mobile station is limited to 2Watts e.i.r.p peak power.

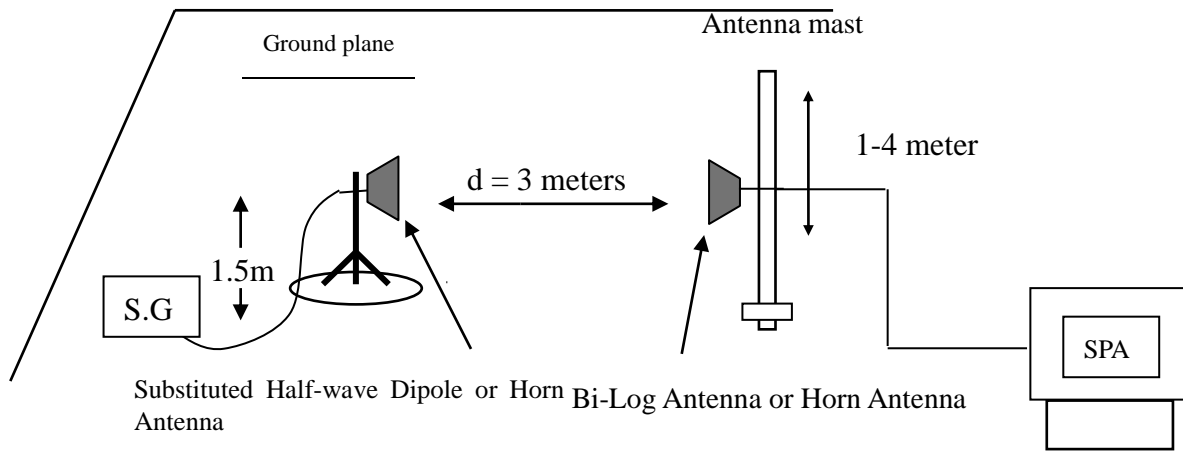
4.7.2 Test Description



Radiated Emissions 30-1000MHz



Radiated Emissions above 1000MHz



Substituted method

4.7.3 Test Procedure

The measurements procedures in TIA/EIA 603.D-2010 are used.

1. 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 EUT for emission measurements. The height of receiving antenna is 1-4m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (P_r).
3. The EUT shall be replaced by a substitution antenna. In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
4. The cable loss (P_{cl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test. The measurement results are obtained as described below:
Power (EIRP) = $P_{Mea} + P_{cl} + G_a$
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15dBi$.



4.7.4 Test Results

The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested. All modes are tested.

Limits:

Band	Burst Peak ERP (dBm)
WCDMA Band V	≤38.45dBm (7W)

Band	Burst Peak ERIP (dBm)
WCDMA Band II	≤33.0dBm (2W)

Measurement Result:

Band	Channel	Peak ERP (dBm)	Limit (dBm)	Polarization
V	4132	20.20	38.45	Horizontal
	4175	21.44	38.45	Horizontal
	4233	21.57	38.45	Horizontal
	4132	17.97	38.45	Vertical
	4175	18.26	38.45	Vertical
	4233	18.55	38.45	Vertical

Band	Channel	Peak EIRP (dBm)	Limit (dBm)	Polarization
II	9262	22.58	33.0	Horizontal
	9400	22.41	33.0	Horizontal
	9538	21.84	33.0	Horizontal
	9262	19.24	33.0	Vertical
	9400	18.73	33.0	Vertical
	9538	18.74	33.0	Vertical

Remark:

$$\text{ERP (dBm)} = P_{\text{Mea}} + P_{\text{cl}} + G_{\text{a}} - 2.15$$

NOTE:

- 1) The power of the EUT transmitting frequency should be ignored.
- 2) All of HSDPA/HSUPA modes were tested, and only the highest power was record in this report.



4.8 Radiated Out of Band Emissions

4.8.1 Requirement

According to FCC section 22.917(a) and section 24.238(a), the power of any emission 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. This calculated to be -13dBm.

4.8.2 Test Description

See section 4.6.2 of this report.

4.8.3 Test Description

See section 4.7.2 of this report.

4.8.4 Test Procedure

1. The lowest, middle and the highest channel were selected to perform tests respectively.
2. The EUT was placed on a rotatable non-conductive table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A substituted antenna was in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12. $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$



4.8.5 Test Results

Measured Max. Spurious Emission(dBm)						
Band	Channel	Polarization	Frequency	Level(dBm)	Limit(dBm)	Verdict
Band V	4132	V	1652.8	-50.8	-13	Pass
		V	2479.2	-49.1	-13	Pass
		V	3305.6	nf	-13	Pass
		V	4132.0	nf	-13	Pass
		V	4958.4	nf	-13	Pass
		H	1652.8	-51.0	-13	Pass
		H	2479.2	-48.8	-13	Pass
		H	3305.6	nf	-13	Pass
		H	4132.0	nf	-13	Pass
		H	4958.4	nf	-13	Pass
Band V	4175	V	1670.0	-51.3	-13	Pass
		V	2505.0	-50.6	-13	Pass
		V	3340.0	nf	-13	Pass
		V	4175.0	nf	-13	Pass
		V	5010.0	nf	-13	Pass
		H	1670.0	-49.0	-13	Pass
		H	2505.0	-50.4	-13	Pass
		H	3340.0	nf	-13	Pass
		H	4175.0	nf	-13	Pass
		H	5010.0	nf	-13	Pass
Band V	4233	V	1693.2	-50.3	-13	Pass
		V	2539.8	-51.5	-13	Pass
		V	3386.4	nf	-13	Pass
		V	4233.0	nf	-13	Pass
		V	5079.6	nf	-13	Pass
		H	1693.2	-50.5	-13	Pass
		H	2539.8	-49.2	-13	Pass
		H	3386.4	nf	-13	Pass
		H	4233.0	nf	-13	Pass
		H	5079.6	nf	-13	Pass



Measured Max. Spurious Emission(dBm)						
Band	Channel	Polarization	Frequency	Level(dBm)	Limit(dBm)	Verdict
Band II	9262	V	3704.8	-52.7	-13	Pass
		V	5557.2	-51.3	-13	Pass
		V	7409.6	-50.2	-13	Pass
		V	9262.0	nf	-13	Pass
		V	11114.4	nf	-13	Pass
		H	3704.8	-47.3	-13	Pass
		H	5557.2	-51.6	-13	Pass
		H	7409.6	-49.5	-13	Pass
		H	9262.0	nf	-13	Pass
		H	11114.4	nf	-13	Pass
Band II	9400	V	3760.0	-54.2	-13	Pass
		V	5640.0	-53.3	-13	Pass
		V	7520.0	-51.4	-13	Pass
		V	9400.0	nf	-13	Pass
		V	11280.0	nf	-13	Pass
		H	3760.0	-44.7	-13	Pass
		H	5640.0	-53.9	-13	Pass
		H	7520.0	-52.5	-13	Pass
		H	9400.0	nf	-13	Pass
		H	11280.0	nf	-13	Pass
Band II	9538	V	3815.2	-50.7	-13	Pass
		V	5722.8	-52.8	-13	Pass
		V	7630.4	-50.4	-13	Pass
		V	9538.0	nf	-13	Pass
		V	11445.6	nf	-13	Pass
		H	3815.2	-49.8	-13	Pass
		H	5722.8	-50.2	-13	Pass
		H	7630.4	-52.6	-13	Pass
		H	9538.0	nf	-13	Pass
		H	11445.6	nf	-13	Pass

NOTE:

- 1) The power of the EUT transmitting frequency should be ignored.
- 2) All spurious emission tests were performed in X, Y, Z axis directions; EUT was tested at HSDPA/HSUPA mode.
Only the worst axis test condition was recorded in this test report.
- 3) 'nf' means that the emission level is too low to read out from the noise floor.
- 4) The emission levels of below 1 GHz are very lower than the limit (<-40dBm) and not show in this report.
- 5) All of HSDPA/HSUPA modes were tested, and only the worst result was record in this report.

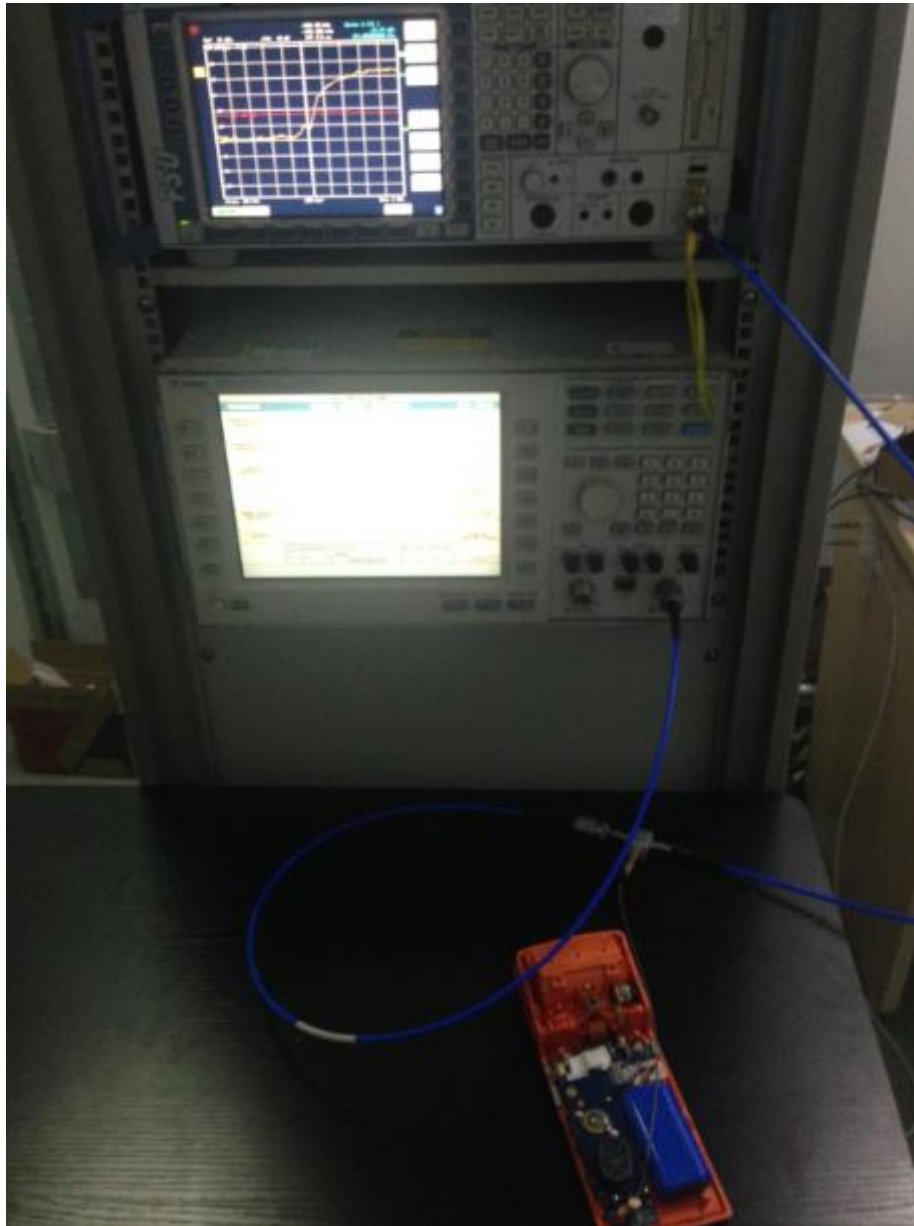


Annex A Photos of the EUT





Annex B Photos of Setup



**** END OF REPORT ****