



RF Test Report

Applicant : Netgear Incorporated
Product Type : Mobile Router
Trade Name : NETGEAR
Model Number : MR1100-320
Test Specification : FCC 47 CFR PART 22H
FCC 47 CFR PART 24E
ANSI/TIA-603-D 2010
Receive Date : Apr. 12, 2017
Test Period : Jul. 18 ~ Aug. 06, 2017
Issue Date : Sep. 06, 2017

Issue by

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Taiwan Accreditation Foundation accreditation number: 1330
Test Firm MRA designation number: TW0010

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Aug. 14, 2017	Initial Issue	Snow Wang
01	Sep. 05, 2017	Revised report information.	Snow Wang
02	Sep. 06, 2017	Revised report information.	Snow Wang



Verification of Compliance

Issued Date: Sep. 06, 2017

Applicant : Netgear Incorporated
Product Type : Mobile Router
Trade Name : NETGEAR
Model Number : MR1100-320
FCC ID : PY317200378
EUT Rated Voltage : DC 5V, 2A
Test Voltage : 120 Vac / 60 Hz, 3.85Vdc
Applicable Standard : FCC 47 CFR PART 22H
FCC 47 CFR PART 24E
ANSI/TIA-603-D 2010
Test Result : Complied

Performing Lab. : A Test Lab Techno Corp.
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<http://www.atl-lab.com.tw/e-index.htm>



A Test Lab Techno Corp. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By : Fly Lu Reviewed By : Eric Ou Yang
(Manager) (Fly Lu) (Testing Engineer) (Eric Ou Yang)



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1 General Information

1.1. EUT Description

Applicant	Netgear Incorporated 350 East Plumeria Drive, San Jose, California, United States 95134			
Manufacturer	Netgear Inc. Suite 168 – 10760 Shellbridge Way, Richmond, BC Canada V6X 3H1			
Product Type	Mobile Router			
Trade Name	NETGEAR			
Model Number	MR1100-320			
FCC ID	PY317200378			
IMEI No.	01497500			
Mode	Band	UL Frequency (MHz)	DL Frequency (MHz)	Modulation
WCDMA(RMC12.2K)/ HSDPA/ HSUPA	II	1852.4 ~ 1907.6	1932.4 ~ 1987.6	QPSK
	V	826.4 ~ 846.6	871.4 ~ 891.6	QPSK
Channel Control	Auto			
Antenna information	Type	Max. Gain (dBi)		
	PIFA Antenan	WCDMA/ HSDPA/ HSUPA Band II	1.36	
		WCDMA/ HSDPA/ HSUPA Band V	-0.63	
Operate Temp. Range	0 ~ 50 °C			

Frequency Band	Max. RF Output Power (W)	E.R.P. /E.I.R.P. (W)	
WCDMA/ HSDPA/ HSUPA Band II	0.519	0.154	(E.I.R.P.)
WCDMA/ HSDPA/ HSUPA Band V	0.500	0.150	(E.R.P.)

Frequency Band	Occupied Bandwidth (MHz)	Emission Designator
WCDMA/ HSDPA/ HSUPA Band II	4.1346	4M13F9W
WCDMA/ HSDPA/ HSUPA Band V	4.1506	4M15F9W

1.2. Mode of Operation

ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
WCDMA Mode
HSDPA Mode
HSUPA Mode

Note: Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

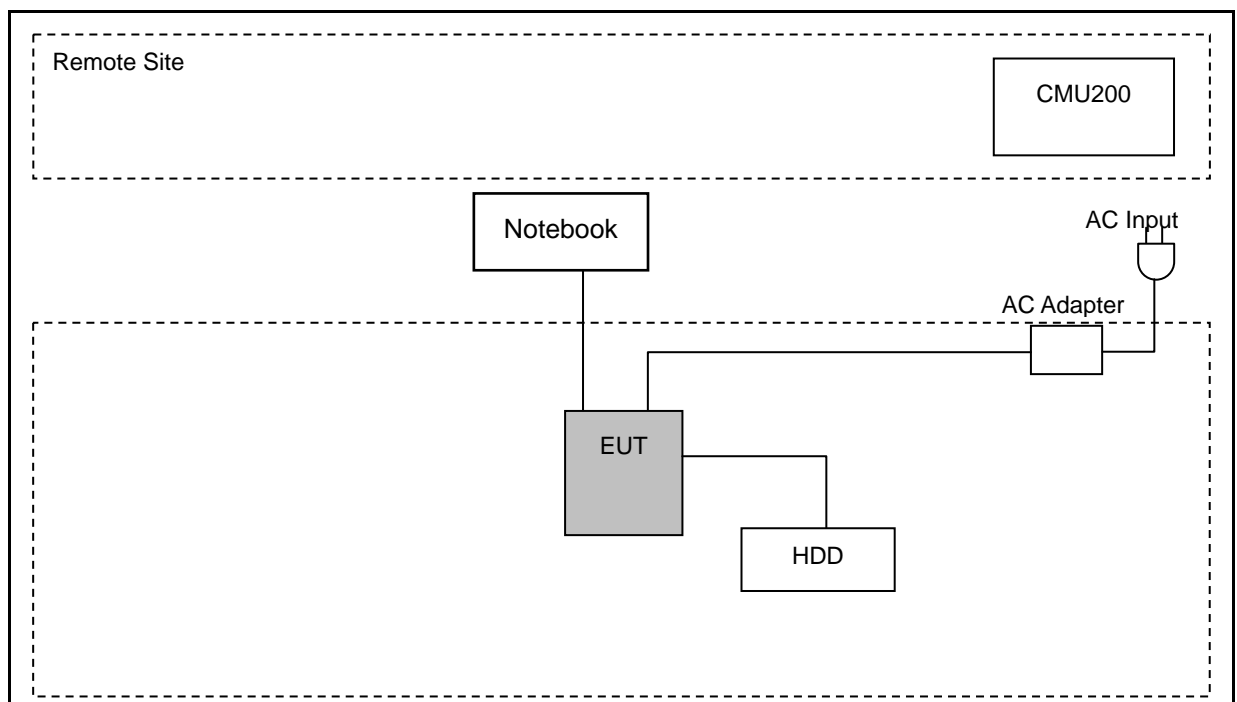
By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "X axis" position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

Note : worst case_Battery Model:W-10a + Adapter Model: AD2037320.

1.3. EUT Exercise Software

1	Setup the EUT and Base Station (CMU200) as shown on 1.4.
2	Turn on the power of all equipment.

1.4. Configuration of Test System Details





1.5. Test Instruments

For Conducted

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Cycle
Universal Radio Communication Tester	R & S	CMU200	112387	03/02/2017	1 year
Spectrum Analyzer	Agilent	N9030A	MY53120541	12/22/2016	1 year
Temperature & Humidity Chamber	TAICHY	MHU-225LA	980729	04/17/2017	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

For Spurious Radiation

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Cycle
RF Pre-selector	Agilent	N9039A	MY46520256	04/24/2017	1 year
Spectrum Analyzer	Agilent	E4446A	MY46180578	04/24/2017	1 year
Pre Amplifier	Agilent	8449B	3008A02237	10/11/2016	1 year
Pre Amplifier	Agilent	8447D	2944A11119	01/12/2017	1 year
Broadband Antenna	Schwarzbeck	VULB9168	416	10/13/2016	1 year
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/20/2017	1 year
Horn Antenna (18~40GHz)	ETS	3116	00086467	09/05/2016	1 year
Microwave Cable	EMCI	EMC102-KM-KM-14000	151001	02/20/2017	1 year
Microwave Cable	EMCI	EMC-104-SM-SM-14000	140202	02/20/2017	1 year
Microwave Cable	EMCI	EMC104-SM-SM-600	140301	02/20/2017	1 year
Signal Generator	Agilent	E8257D	MY44320425	03/02/2017	1 year
Test Site	ATL	TE01	888001	08/29/2016	1 year

Note: N.C.R. = No Calibration Request.



1.6. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950

Test Setting Condition		
L.V.	Low Voltage	DC 3.27 Vdc
N.V.	Normal Voltage	DC 3.85 Vdc
H.V.	High Voltage	DC 4.43 Vdc
L.T.	Low Temperature	-30 °C
N.T.	Normal Temperature	+25 °C
H.T.	High Temperature	+50 °C

1.7. Summary of Test Result

FCC Rule	Description	Result
§2.1046	Conducted Output Power	Pass
§22.913(a)(2)	Effective Radiated Power	Pass
§24.232(c)	Equivalent Isotropic Radiated Power	Pass
§24.232(d) KDB 971168 D01 (5.7.1)	Peak to average ratio	Pass
§2.1049 §22.917(a) §24.238(a)	Emission Bandwidth & Occupied Bandwidth	Pass
§2.1051 §22.917(a) §24.238(a)	Band Edge Measurement	Pass
§2.1051 §22.917(a) §24.238(a)	Conducted Spurious Emission	Pass
§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	Pass
§2.1055 §22.355 §24.235	Frequency Stability for Temperature & Voltage	Pass

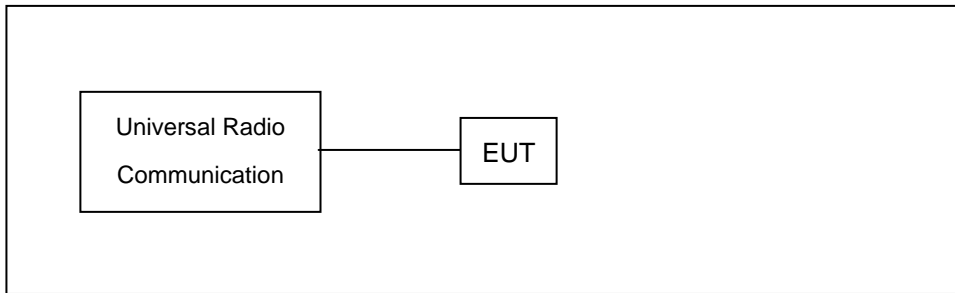
2 Measurement Procedure

2.1. RF Output Power Test

- **Limit**

N/A

- **Test Setup**



- **Test Procedure**

- The EUT was set up for the maximum power with with simulator.
- Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

- **Uncertainty**

The measurement uncertainty is defined as for RF output power measurement is 1.2 dB.

2.2. Effective Radiated Power / Equivalent Isotropic Radiated Power Test

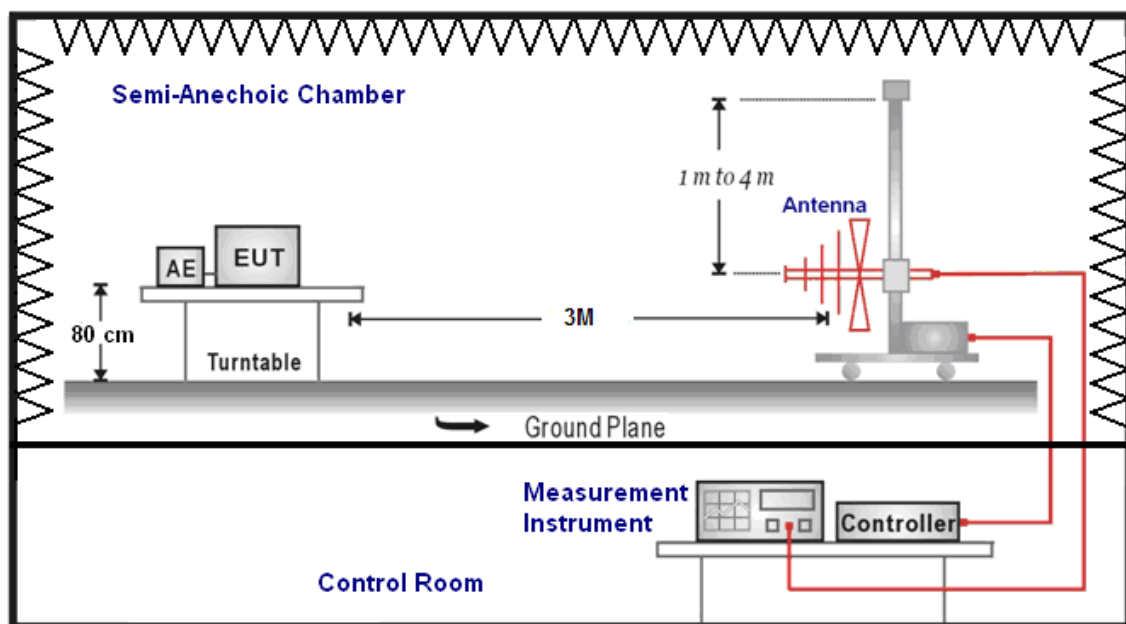
■ Limit

For FCC Part 22.913(a)(2): The E.R.P. of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

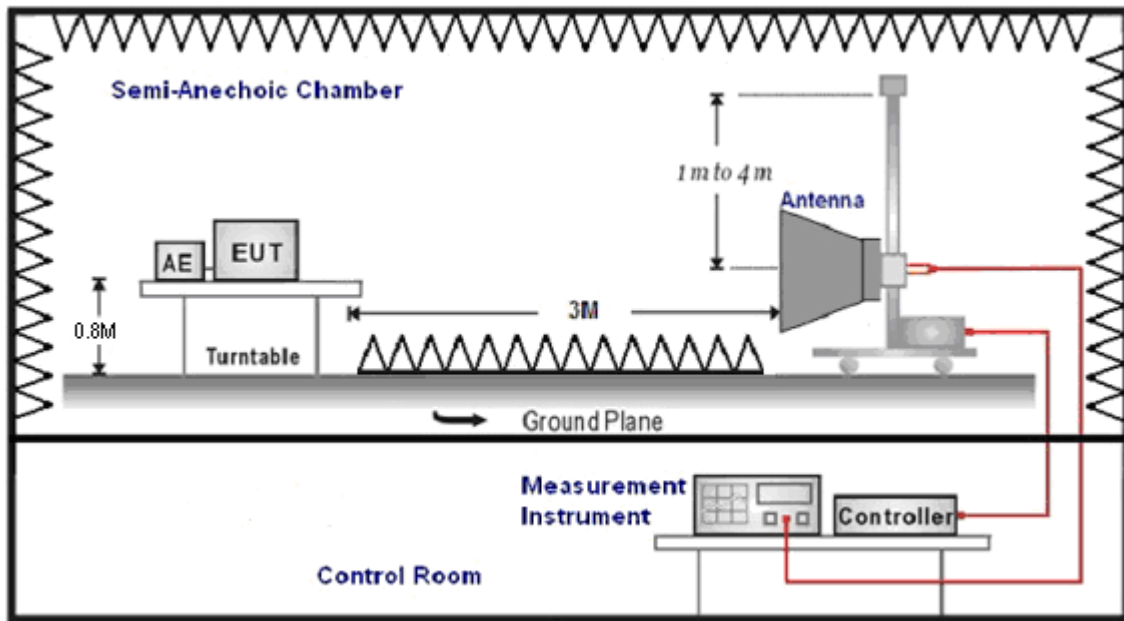
For FCC Part 24.232(c): The E.I.R.P. of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

■ Setup

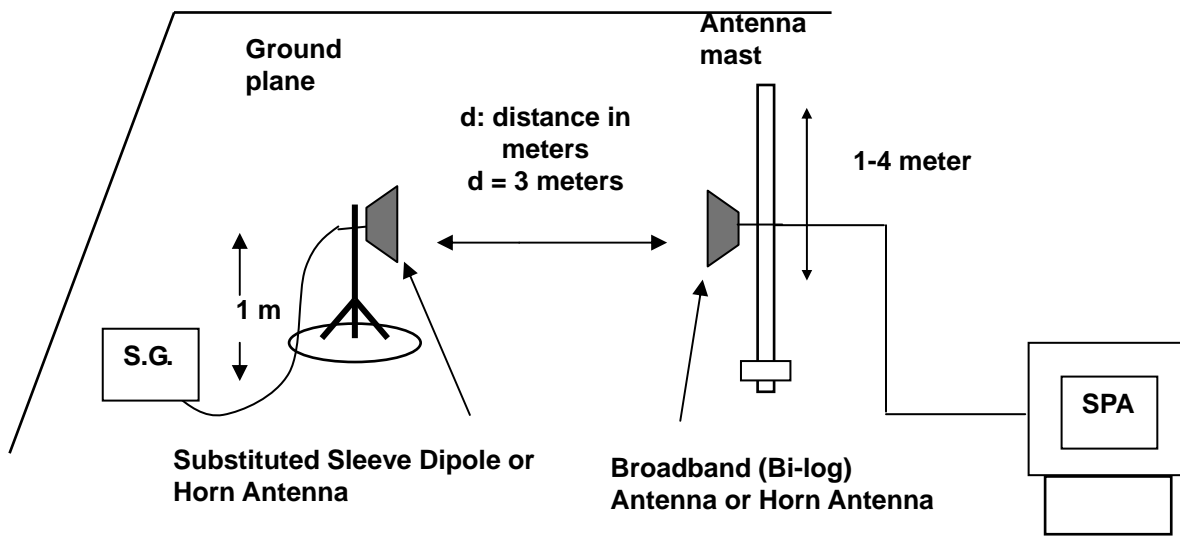
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP





■ Test Procedure

- a. The EUT was set up for the maximum power with wwan link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range).
- b. E.I.R.P power measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution antenna (Note:1 & 2) is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G.
- d. E.I.R.P. = Output power level of S.G - TX cable loss + Antenna gain of substitution horn
- e. E.R.P. = E.I.R.P.- 2.15 dB

Note: 1. Below 1 GHz Substituted Method Test : Sleeve dipole antenna to Bi-Log Antenna

2. Above 1 GHz Substituted Method Test : Horn antenna to Horn Antenna

■ Uncertainty

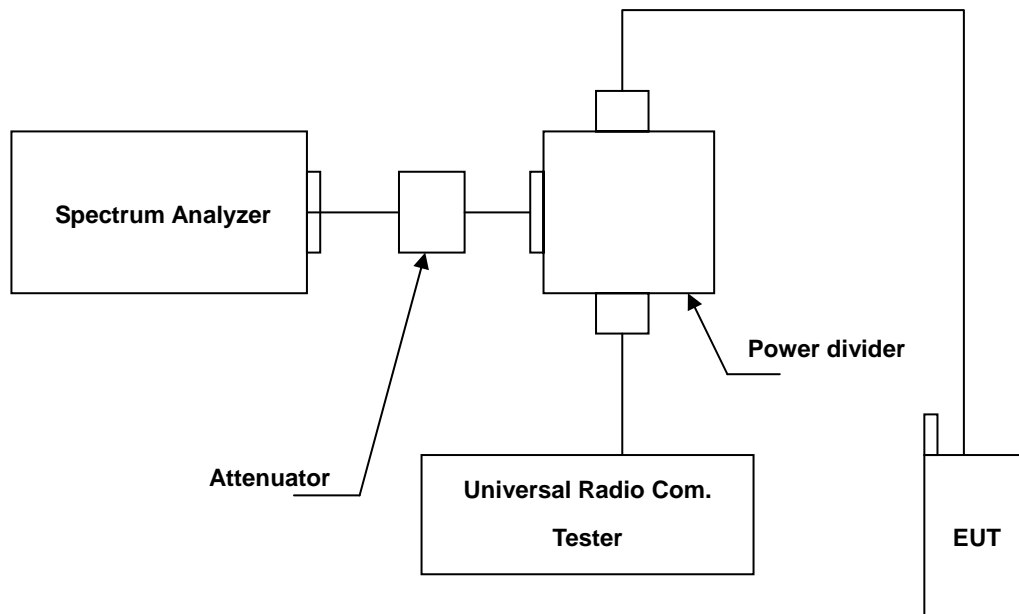
The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is ± 3.072 dB.

2.3. Peak to Average Ratio Test

■ Limit

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.

■ Setup



■ Test Procedure

- Set resolution/measurement bandwidth = signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

■ Uncertainty

The measurement uncertainty is defined as for Conducted Power measurement is 1.2 dB.

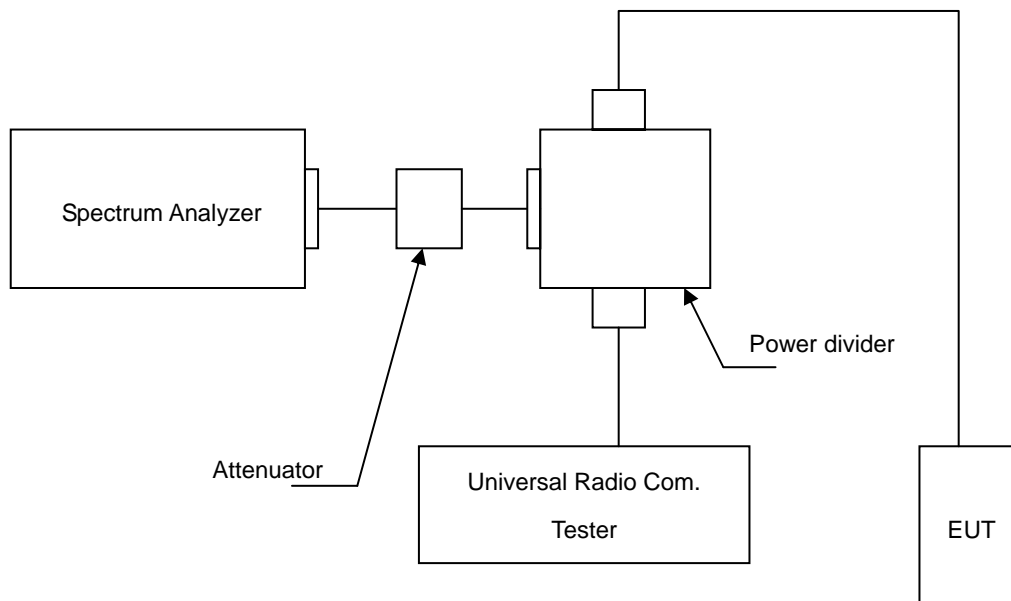
2.4. Emission Bandwidth & Occupied Bandwidth Test

■ Limit

The Occupied Bandwidth Limit:

N/A.

■ Setup



■ Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via Power Divider.
2. The occupied bandwidth of middle channel for the highest and lowest RF powers was measured.

■ Uncertainty

The measurement uncertainty is defined as $\pm 10\text{Hz}$

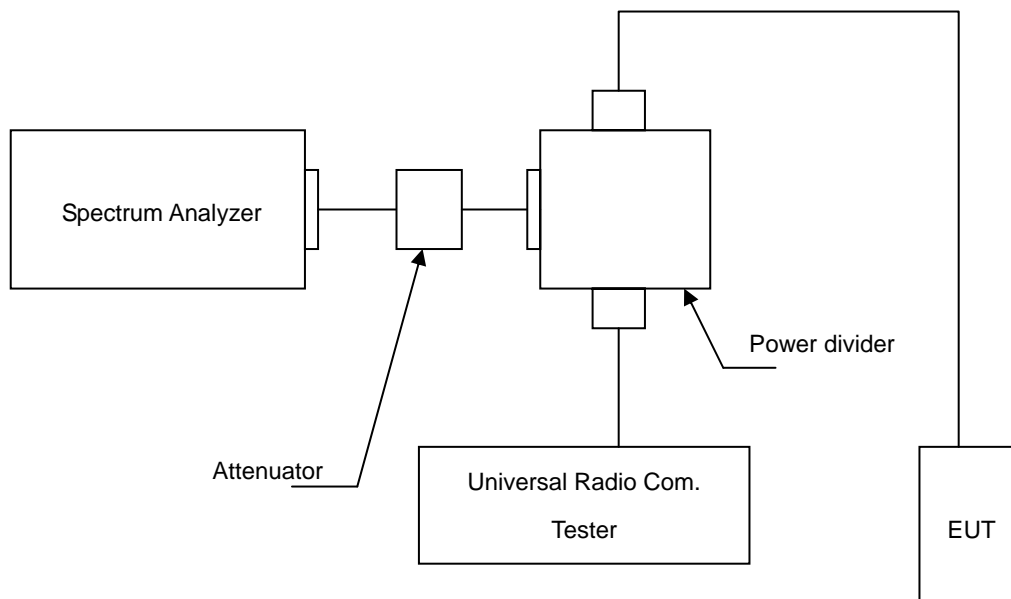
2.5. Band Edge Test

■ Limit

The Band Edge Limit:

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.

■ Setup



■ Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via Power Divider.
2. The band edge of low and high channels for the highest RF powers within the transmitting frequency band were measured.

■ Uncertainty

The measurement uncertainty is defined as ± 10 Hz

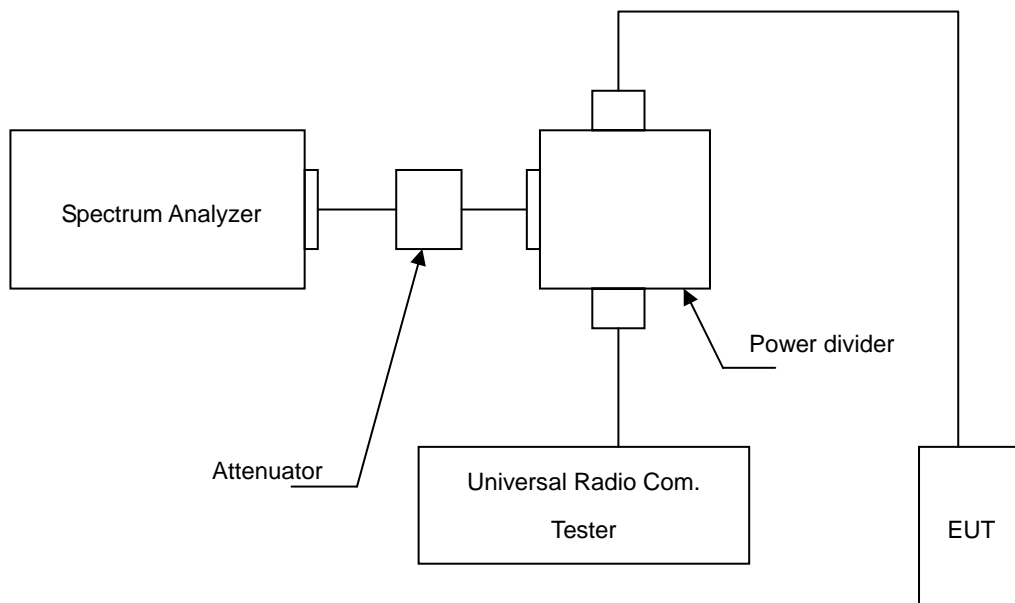
2.6. Conducted Spurious Emission Test

■ Limit

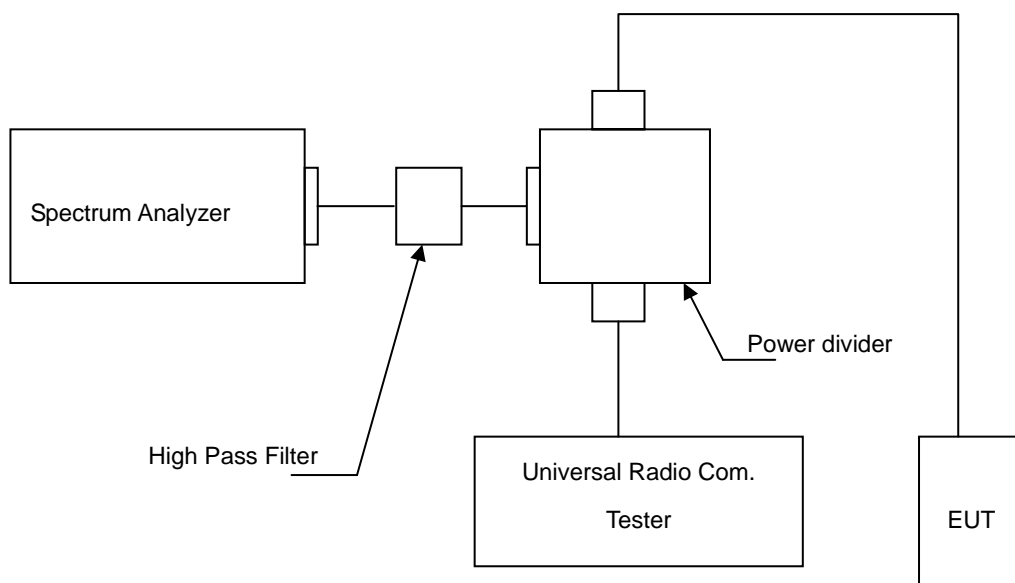
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

■ Setup

Below 2.8GHz



Above 2.8GHz





■ **Test Procedure**

1. The EUT was connected to Spectrum Analyzer and Base Station via Power Divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.
4. Test setting at WCDMA Band IV RB=1MHz, VB=1MHz.

■ **Uncertainty**

The measurement uncertainty is evaluated as ± 2.24 dB.

2.7. Field Strength of Spurious Radiation Test

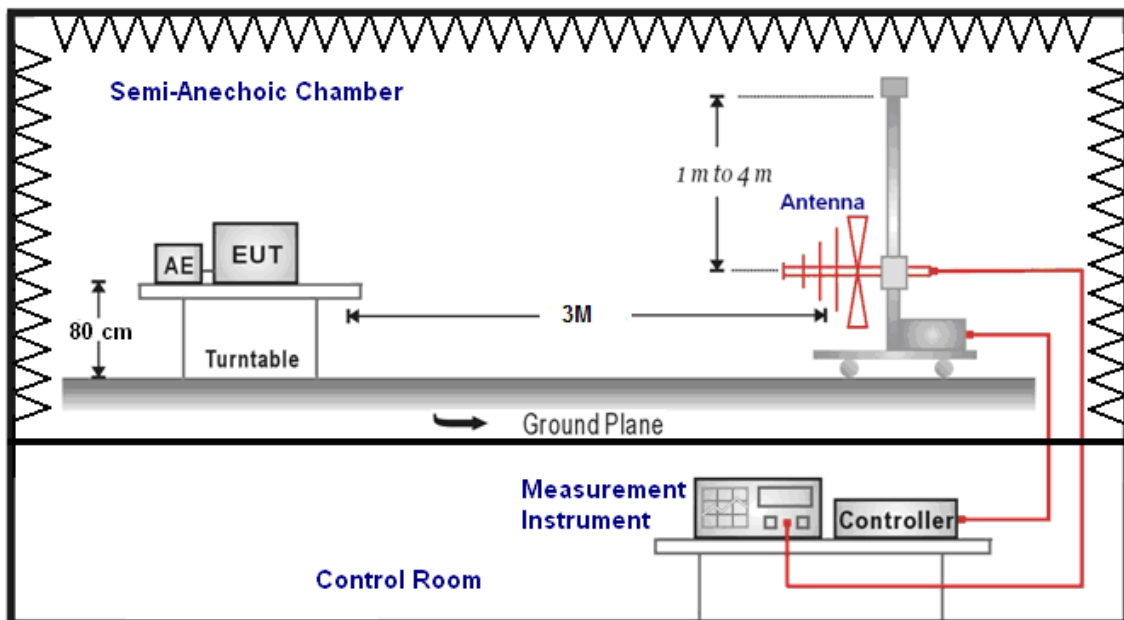
■ Limit

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.

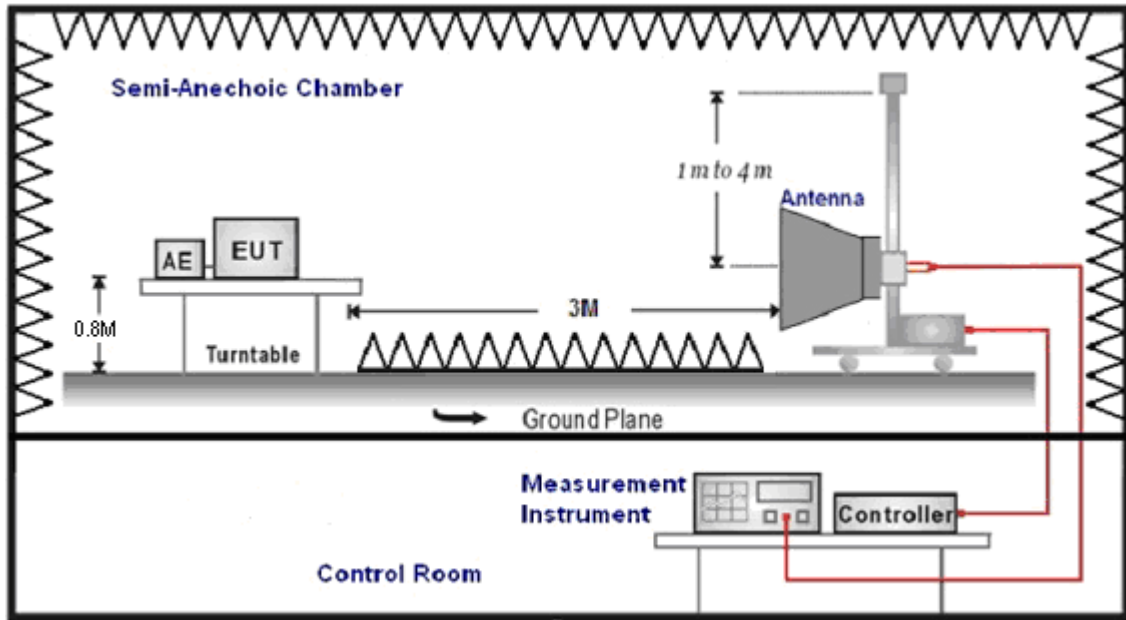
It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

■ Setup

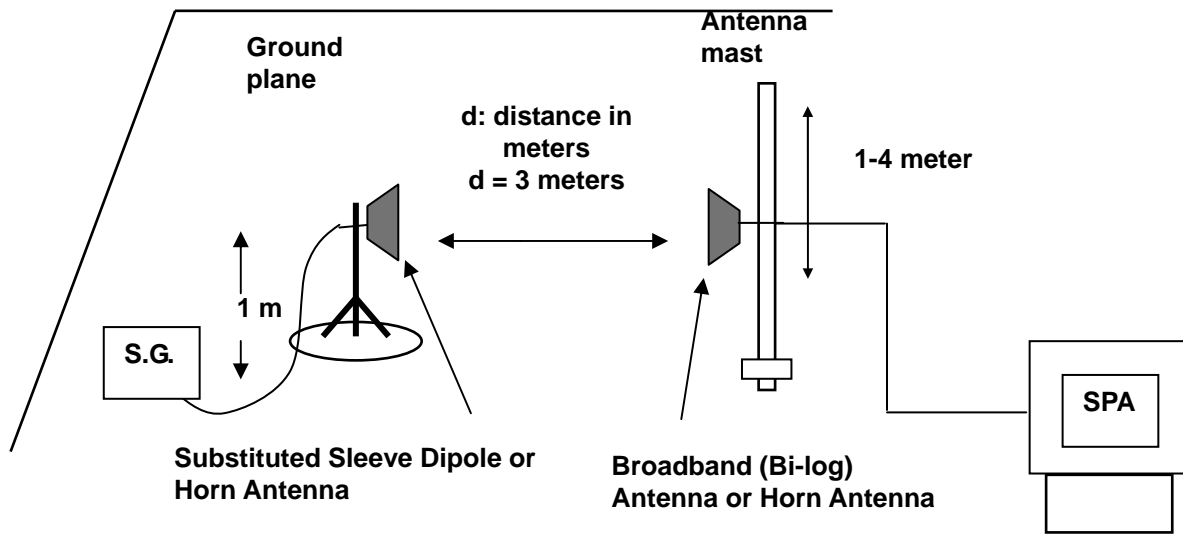
Below 1GHz



Above 1GHz



For Substituted Method Test Set-UP





■ Test Procedure

- a. The EUT was set up for the maximum power with wwan link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range).
- b. E.I.R.P power measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution antenna (Note:1 & 2) is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G.
- d. E.I.R.P. = Output power level of S.G - TX cable loss + Antenna gain of substitution horn
- e. E.R.P. = E.I.R.P.- 2.15 dB

Note: 1. Below 1 GHz Substituted Method Test : Sleeve dipole antenna to Bi-Log Antenna

2. Above 1 GHz Substituted Method Test : Horn antenna to Horn Antenna

■ Uncertainty

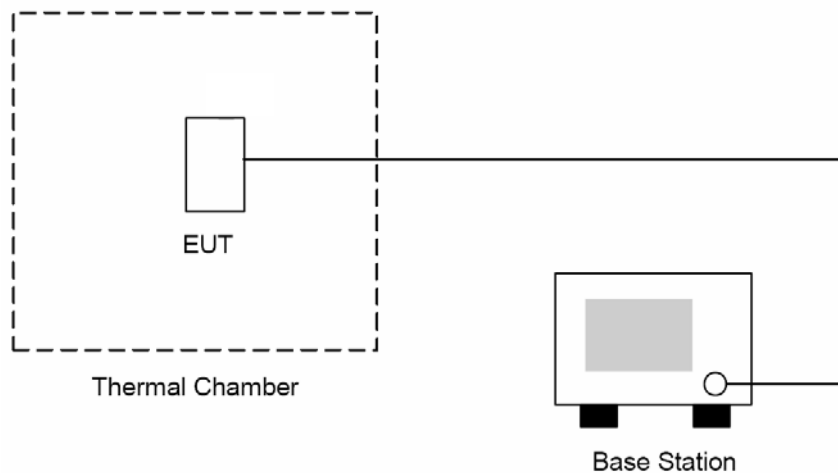
The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is ± 3.072 dB.

2.8. Frequency Stability (Temperature & Voltage Variation) Test

■ Limit

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

■ Setup



■ Test Procedure

1. The EUT and test equipment were set up as shown on the following section.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected as the following section.
5. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
6. The temperature tests were performed for the worst case.
7. Test data was recorded.

■ Uncertainty

The measurement uncertainty is defined as for Frequency Stability (Temperature Variation) measurement is $\pm 10\text{Hz}$.



3 Test Results

Appendix A: RF Output Power

Bands	Modulation Type	Sub-Test	Frequency (MHz)	Average Power		Peak Power	
				(dBm)	(W)	(dBm)	(W)
WCDMA Band 2	QPSK	-----	1852.4	23.89	0.245	27.15	0.519
			1880.0	23.76	0.238	27.02	0.504
			1907.6	23.81	0.240	27.07	0.509
HSDPA Band 2	QPSK	1	1852.4	23.14	0.206	26.39	0.436
			1880.0	22.95	0.197	26.23	0.420
			1907.6	23.04	0.201	26.33	0.430
		2	1852.4	22.65	0.184	25.94	0.393
			1880.0	22.45	0.176	25.75	0.376
			1907.6	22.54	0.179	25.80	0.380
		3	1852.4	22.61	0.182	25.86	0.385
			1880.0	22.43	0.175	25.69	0.371
			1907.6	22.52	0.179	25.76	0.377
		4	1852.4	22.99	0.199	26.25	0.422
			1880.0	22.84	0.192	26.09	0.406
			1907.6	22.91	0.195	26.15	0.412
HSUPA Band 2	QPSK	1	1852.4	22.62	0.183	25.87	0.386
			1880.0	22.43	0.175	25.67	0.369
			1907.6	22.52	0.179	25.76	0.377
		2	1852.4	20.64	0.116	23.90	0.245
			1880.0	20.45	0.111	23.70	0.234
			1907.6	20.55	0.114	23.81	0.240
		3	1852.4	21.59	0.144	24.86	0.306
			1880.0	21.40	0.138	24.66	0.292
			1907.6	21.49	0.141	24.74	0.298
		4	1852.4	20.61	0.115	23.87	0.244
			1880.0	20.39	0.109	23.64	0.231
			1907.6	20.50	0.112	23.77	0.238
		5	1852.4	22.48	0.177	25.77	0.378
			1880.0	22.29	0.169	25.57	0.361
			1907.6	22.38	0.173	25.65	0.367

Note: The peak power testing result was used peak detector.



Bands	Modulation Type	Sub-Test	Frequency (MHz)	Average Power		Peak Power	
				(dBm)	(W)	(dBm)	(W)
WCDMA Band 5	QPSK	-----	826.4	23.65	0.232	26.90	0.490
			836.6	23.73	0.236	26.99	0.500
			846.6	23.69	0.234	26.96	0.497
HSDPA Band 5	QPSK	1	826.4	22.87	0.194	26.14	0.411
			836.6	22.95	0.197	26.24	0.421
			846.6	22.82	0.191	26.09	0.406
		2	826.4	22.36	0.172	25.64	0.366
			836.6	22.46	0.176	25.73	0.374
			846.6	22.30	0.170	25.58	0.361
		3	826.4	22.33	0.171	25.58	0.361
			836.6	22.42	0.175	25.68	0.370
			846.6	22.29	0.169	25.56	0.360
		4	826.4	22.76	0.189	25.99	0.397
			836.6	22.81	0.191	26.08	0.406
			846.6	22.68	0.185	25.92	0.391
HSUPA Band 5	QPSK	1	826.4	22.34	0.171	25.58	0.361
			836.6	22.42	0.175	25.65	0.367
			846.6	22.29	0.169	25.53	0.357
		2	826.4	20.36	0.109	23.61	0.230
			836.6	20.42	0.110	23.66	0.232
			846.6	20.31	0.107	23.55	0.226
		3	826.4	21.31	0.135	24.58	0.287
			836.6	21.42	0.139	24.69	0.294
			846.6	21.28	0.134	24.54	0.284
		4	826.4	20.33	0.108	23.60	0.229
			836.6	20.40	0.110	23.65	0.232
			846.6	20.29	0.107	23.58	0.228
		5	826.4	22.22	0.167	25.52	0.356
			836.6	22.31	0.170	25.58	0.361
			846.6	22.16	0.164	25.46	0.352

Note: The peak power testing result was used peak detector.



Appendix B: Effective Radiated Power / Equivalent Isotropic Radiated Power

Band 2								
Band	Modulation	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction Factor (dBm)	E.I.R.P.		Limit (W)
						(dBm)	(W)	
WCDMA	QPSK	1852.4	H	10.07	9.86	19.93	0.098	< 2
			V	11.88	9.86	21.74	0.149	< 2
		1880.0	H	9.62	9.97	19.59	0.091	< 2
			V	11.90	9.97	21.87	0.154	< 2
		1907.6	H	9.47	10.09	19.56	0.090	< 2
			V	11.63	10.09	21.72	0.149	< 2

Band 5								
Band	Modulation	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction Factor (dBm)	E.R.P.		Limit (W)
						(dBm)	(W)	
WCDMA	QPSK	826.4	H	10.85	8.78	19.63	0.092	< 7
			V	12.56	8.78	21.34	0.136	< 7
		836.6	H	11.03	8.96	19.99	0.100	< 7
			V	12.81	8.95	21.76	0.150	< 7
		846.6	H	10.24	9.09	19.33	0.086	< 7
			V	11.98	9.09	21.07	0.128	< 7



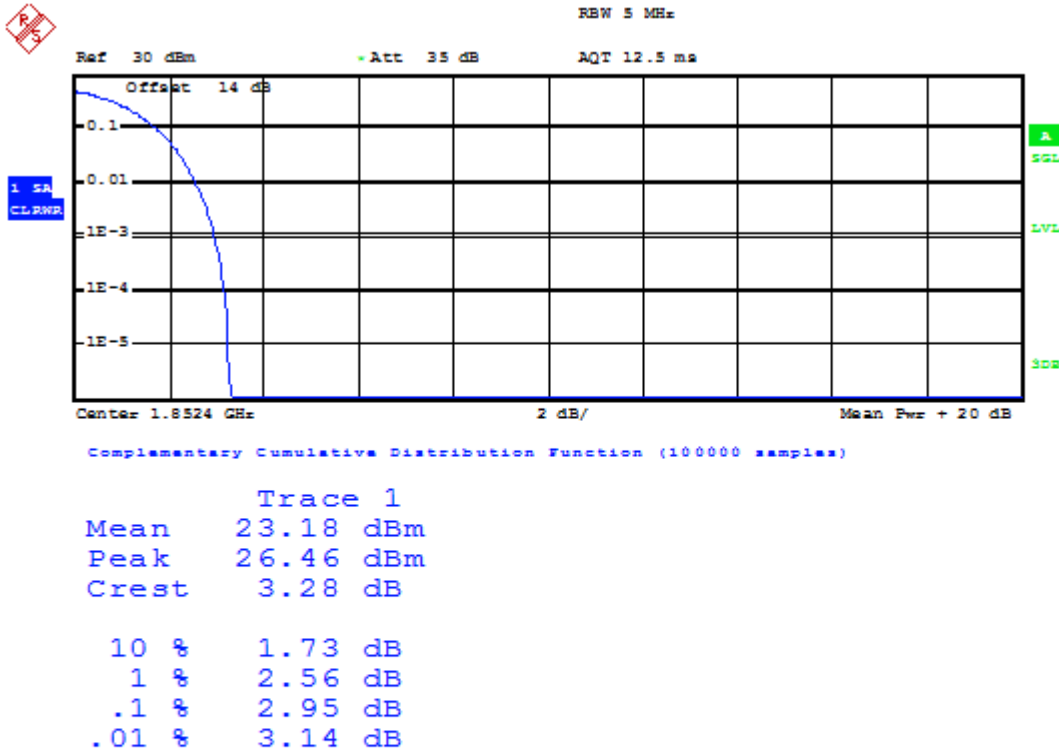
Appendix C: Peak to Average Ratio

Test Band	Test Mode	Test Channel	Measured (db)	Limit (db)	Verdict
WCDMA1900	UMTS/TM1	LCH	2.95	13	PASS
		MCH	3.11	13	PASS
		HCH	3.30	13	PASS

1.1 Test Band=WCDMA1900

1.1.1 Test Mode=UMTS/TM1

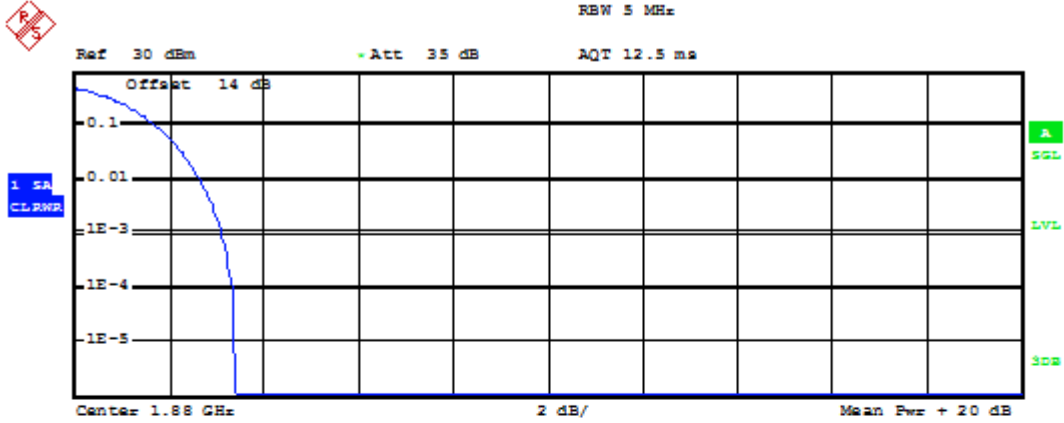
1.1.1.1 Test Channel=LCH



Date: 16.AUG.2017 06:46:03



1.1.1.2 Test Channel=MCH



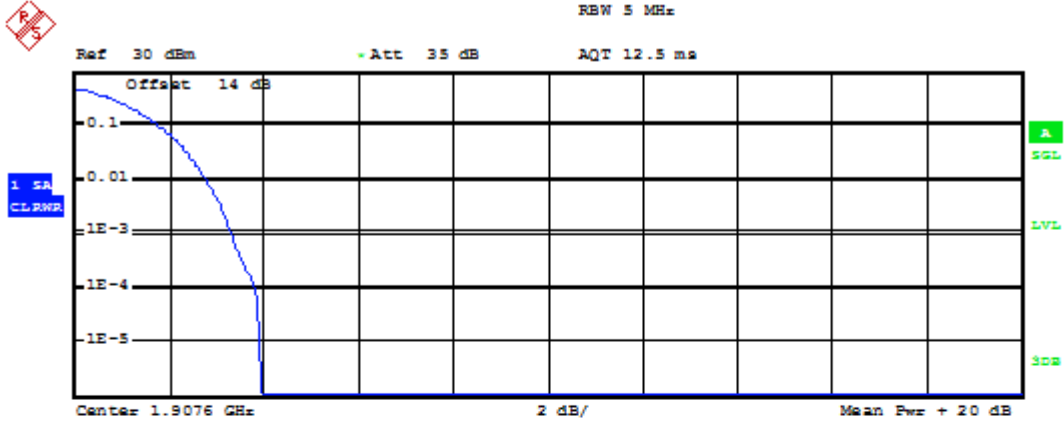
Complementary Cumulative Distribution Function (100000 samples)

Trace 1	
Mean	22.87 dBm
Peak	26.25 dBm
Crest	3.38 dB
10 %	1.73 dB
1 %	2.66 dB
.1 %	3.11 dB
.01 %	3.33 dB

Date: 16.AUG.2017 06:46:21



1.1.1.3 Test Channel=HCH



Complementary Cumulative Distribution Function (100000 samples)

Trace 1	
Mean	22.25 dBm
Peak	26.18 dBm
Crest	3.93 dB
10 %	1.79 dB
1 %	2.79 dB
.1 %	3.30 dB
.01 %	3.78 dB

Date: 16.AUG.2017 06:46:40

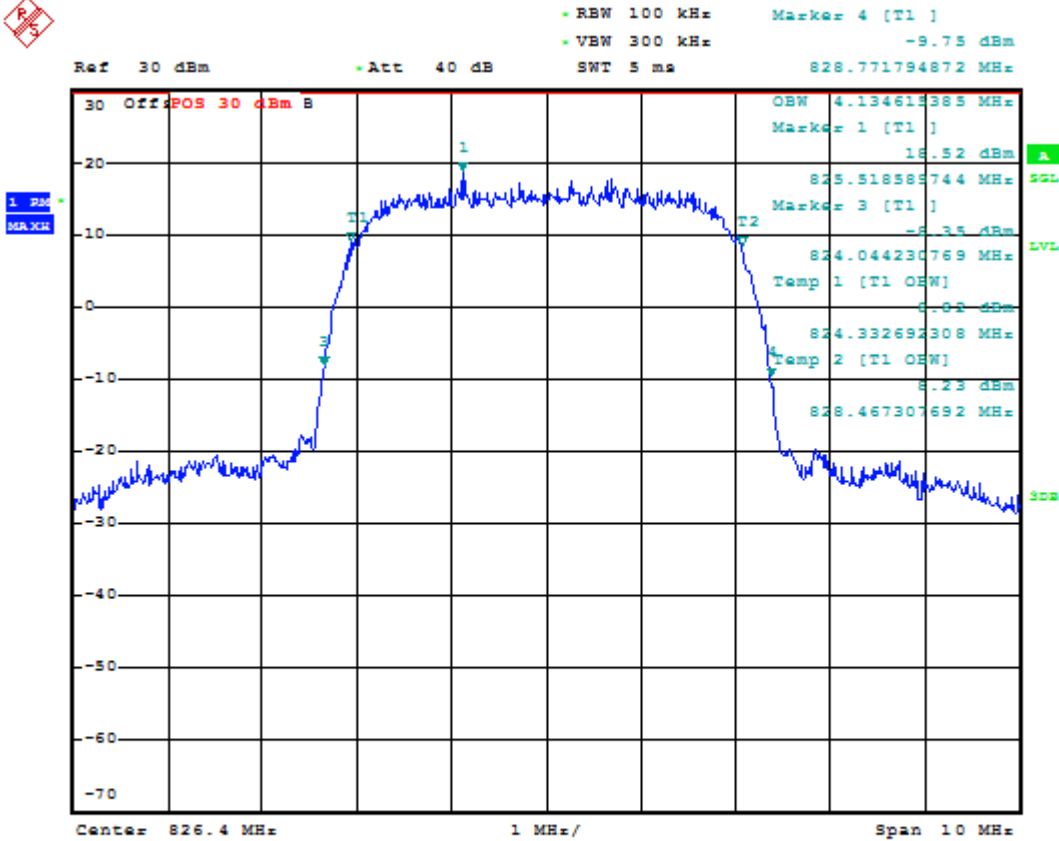
**Appendix D: Emission Bandwidth & Occupied Bandwidth**

Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
WCDMA 850	UMTS/TM1	LCH	4134.6	4728	PASS
		MCH	4134.6	4712	PASS
		HCH	4134.6	4744	PASS

Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
WCDMA 1900	UMTS/TM1	LCH	4134.6	4760	PASS
		MCH	4118.6	4744	PASS
		HCH	4150.6	4744	PASS



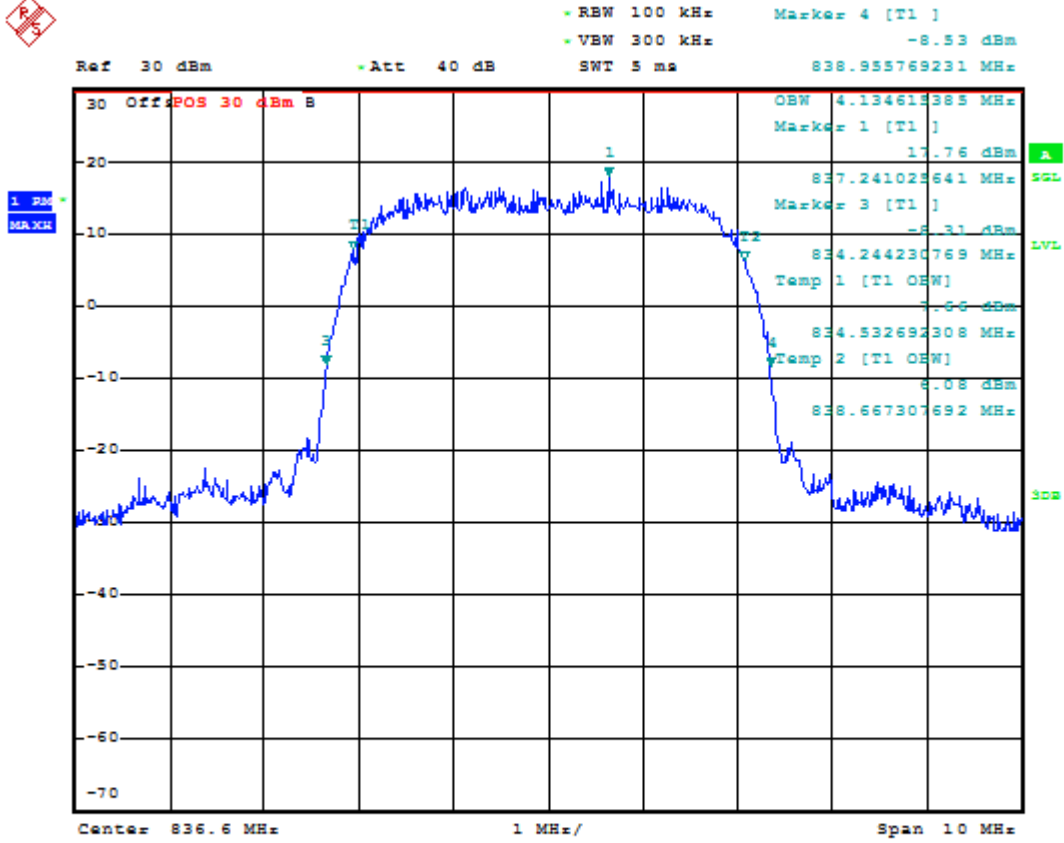
- 2 For WCDMA
- 2.1 Test Band=WCDMA850
- 2.1.1 Test Mode=UMTS/TM1
- 2.1.1.1 Test Channel=LCH



Date: 16.AUG.2017 06:43:24



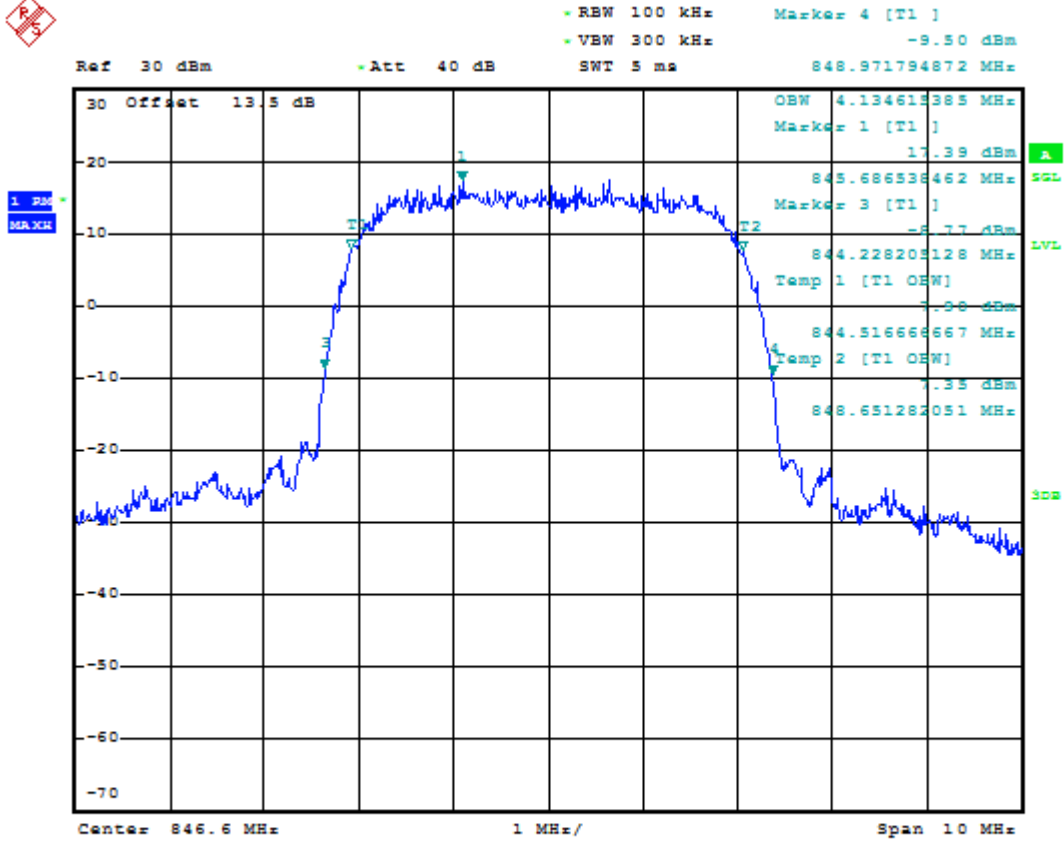
2.1.1.2 Test Channel=MCH



Date: 16.AUG.2017 06:43:47



2.1.1.3 Test Channel=HCH



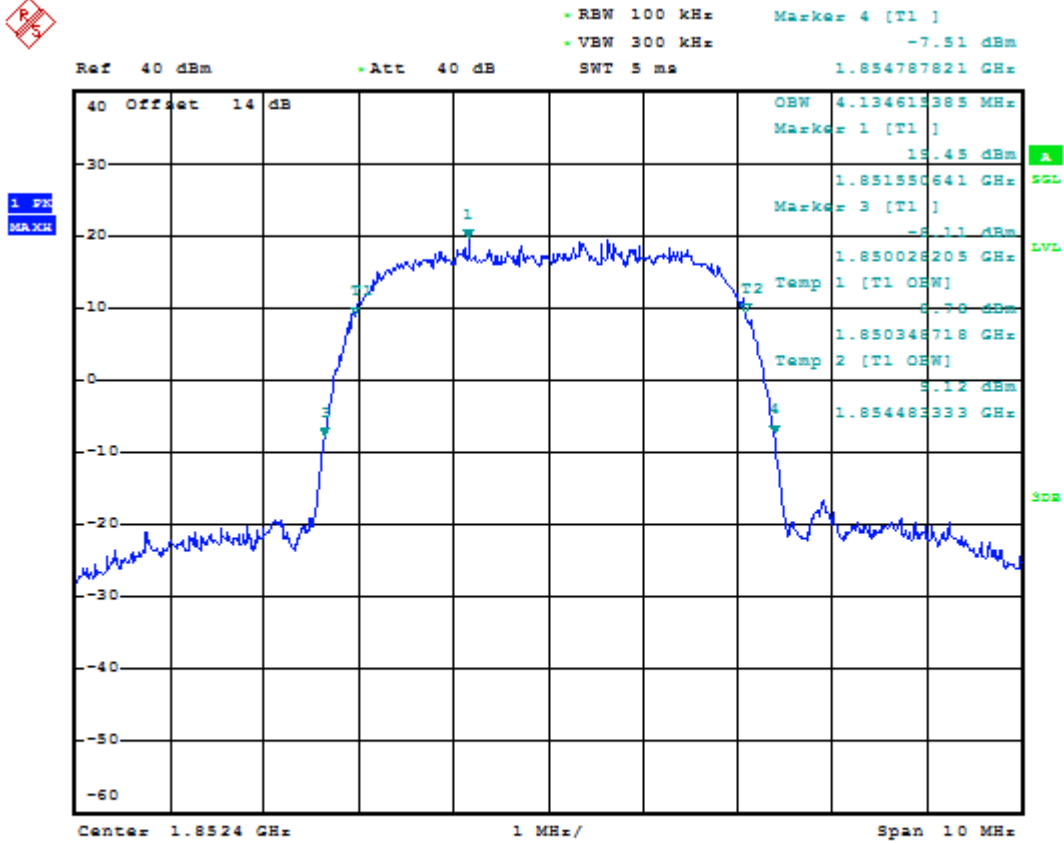
Date: 16.AUG.2017 06:44:09



2.2 Test Band=WCDMA1900

2.2.1 Test Mode=UMTS/TM1

2.2.1.1 Test Channel=LCH



Date: 16.AUG.2017 06:40:04



2.2.1.2 Test Channel=MCH

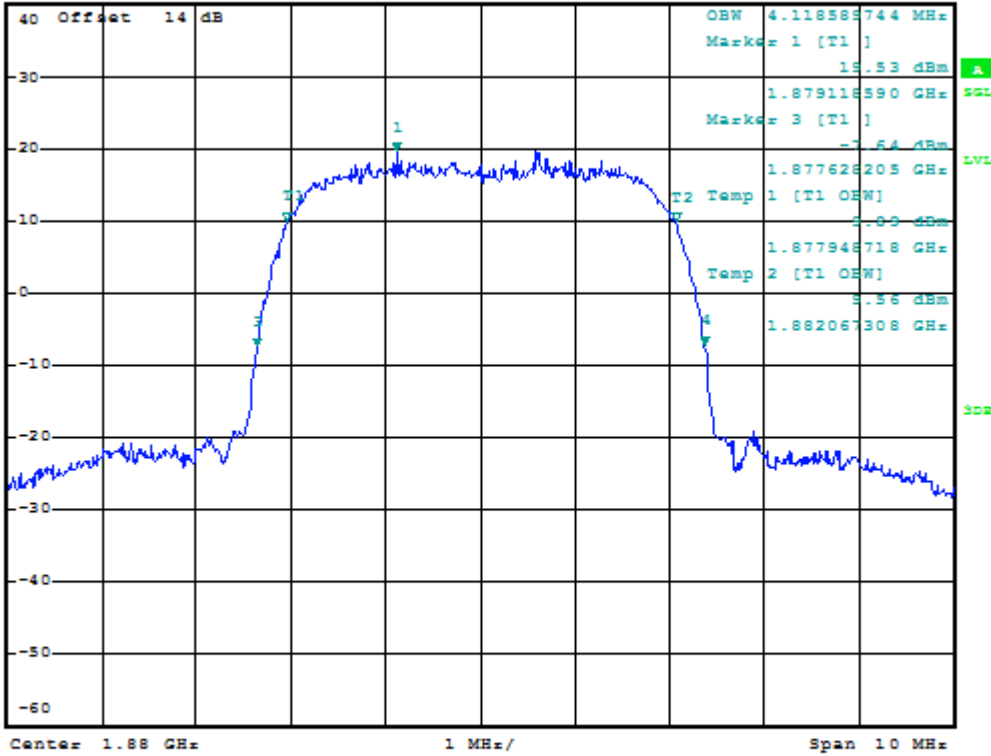


RBW 100 kHz Marker 4 [T1]
VBW 300 kHz -7.43 dBm
SWT 5 ms 1.882371795 GHz

Ref 40 dBm

Att 40 dB

1. PK
MAX



Date: 16.AUG.2017 06:40:27



2.2.1.3 Test Channel=HCH

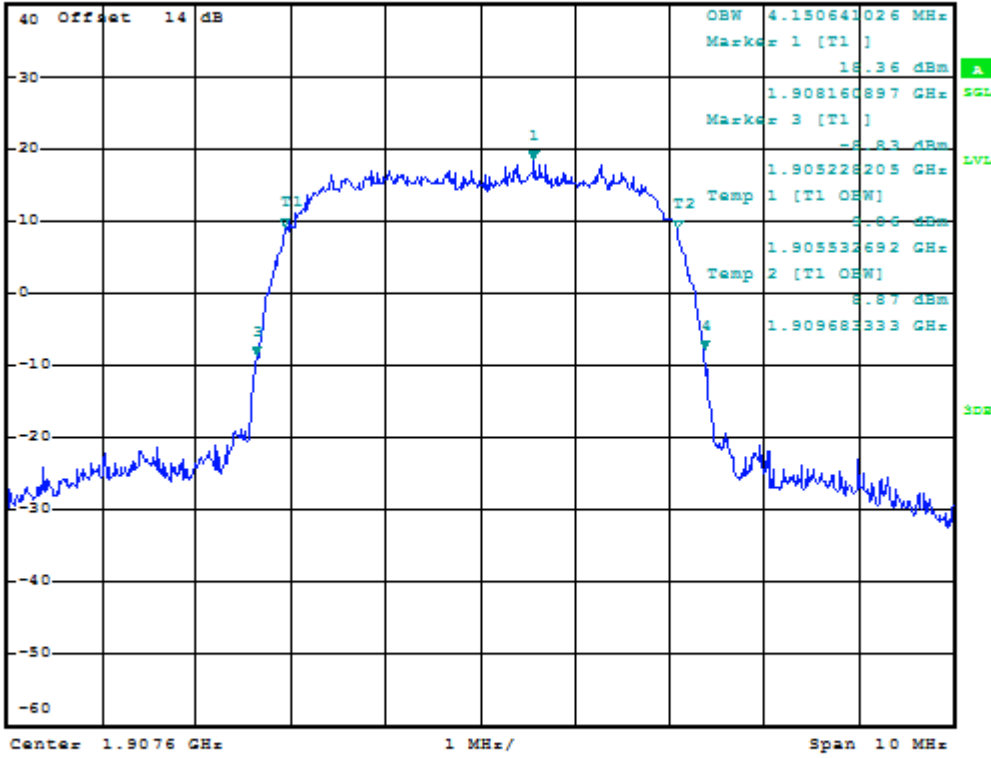


RBW 100 kHz Marker 4 [T1]
VBW 300 kHz -8.00 dBm
SWT 5 ms 1.909971795 GHz

Ref 40 dBm

Att 40 dB

1. PK
MAX

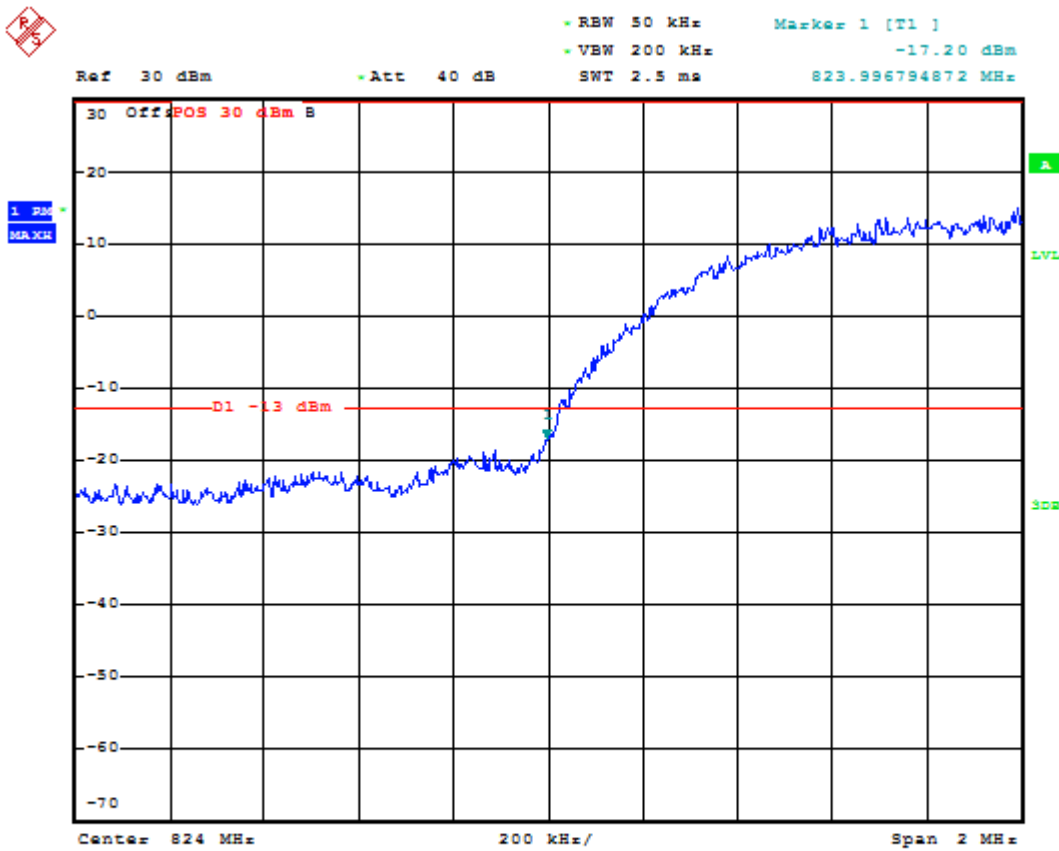


Date: 16.AUG.2017 06:40:49



Appendix E: Band Edge

- 1 For WCDMA
- 1.1 Test Band=WCDMA850
- 1.1.1 Test Mode=UMTS/TM1
- 1.1.1.1 Test Channel=LCH



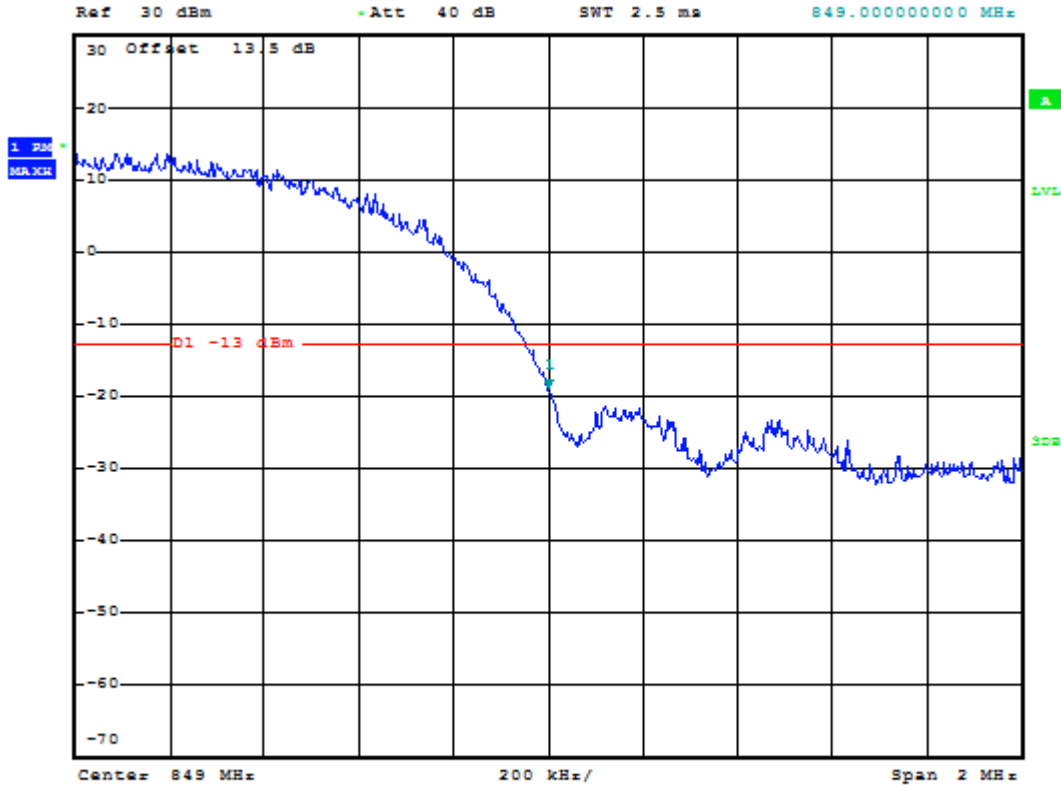
Date: 16.AUG.2017 06:36:57



1.1.1.2 Test Channel=HCH



RBW 50 kHz Marker 1 [T1]
VBW 200 kHz -19.10 dBm
SWT 2.5 ms 849.000000000 MHz



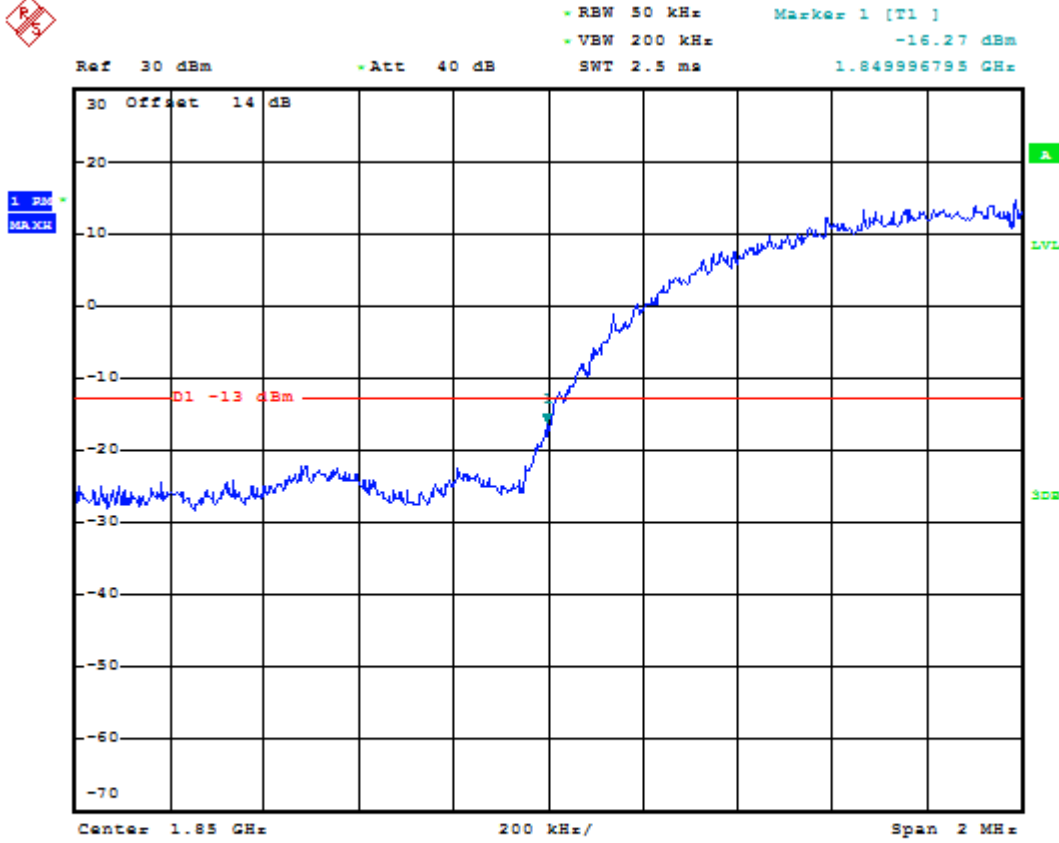
Date: 16.AUG.2017 06:37:12



1.2 Test Band=WCDMA1900

1.2.1 Test Mode=UMTSTM1

1.2.1.1 Test Channel=LCH



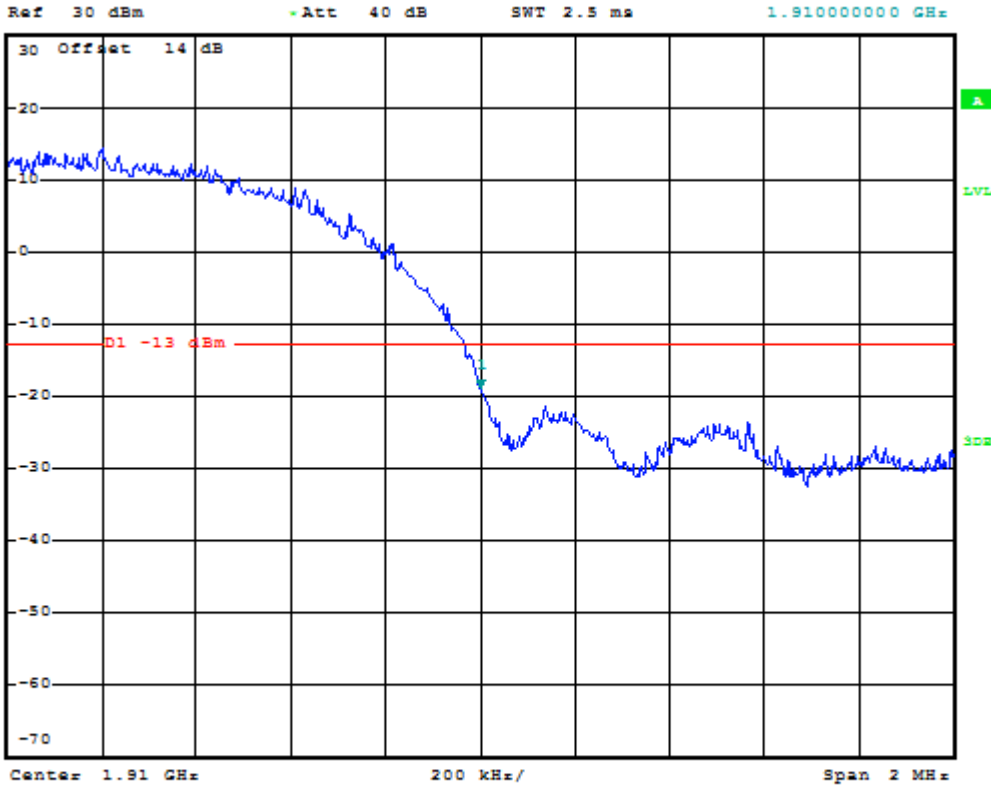
Date: 16.AUG.2017 06:35:01



1.2.1.2 Test Channel=HCH



RBW 50 kHz Marker 1 (T1)
VBW 200 kHz -18.96 dBm
SWT 2.5 ms 1.910000000 GHz

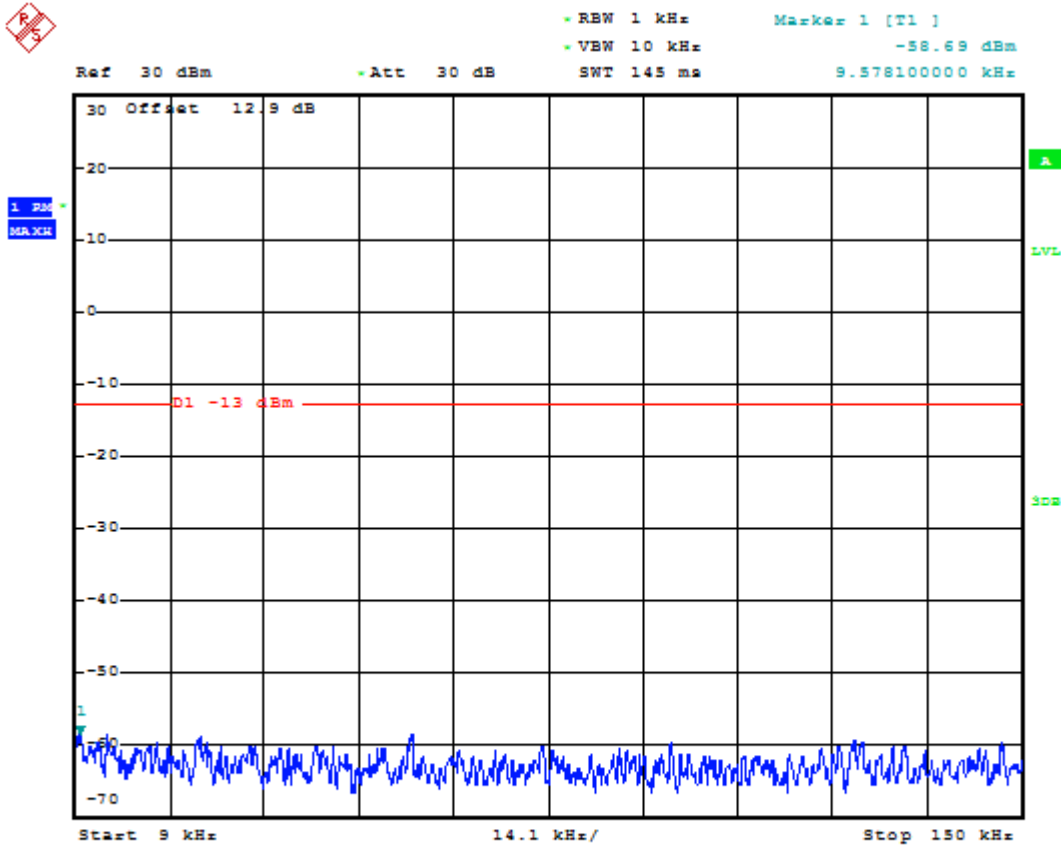


Date: 16.AUG.2017 06:35:16

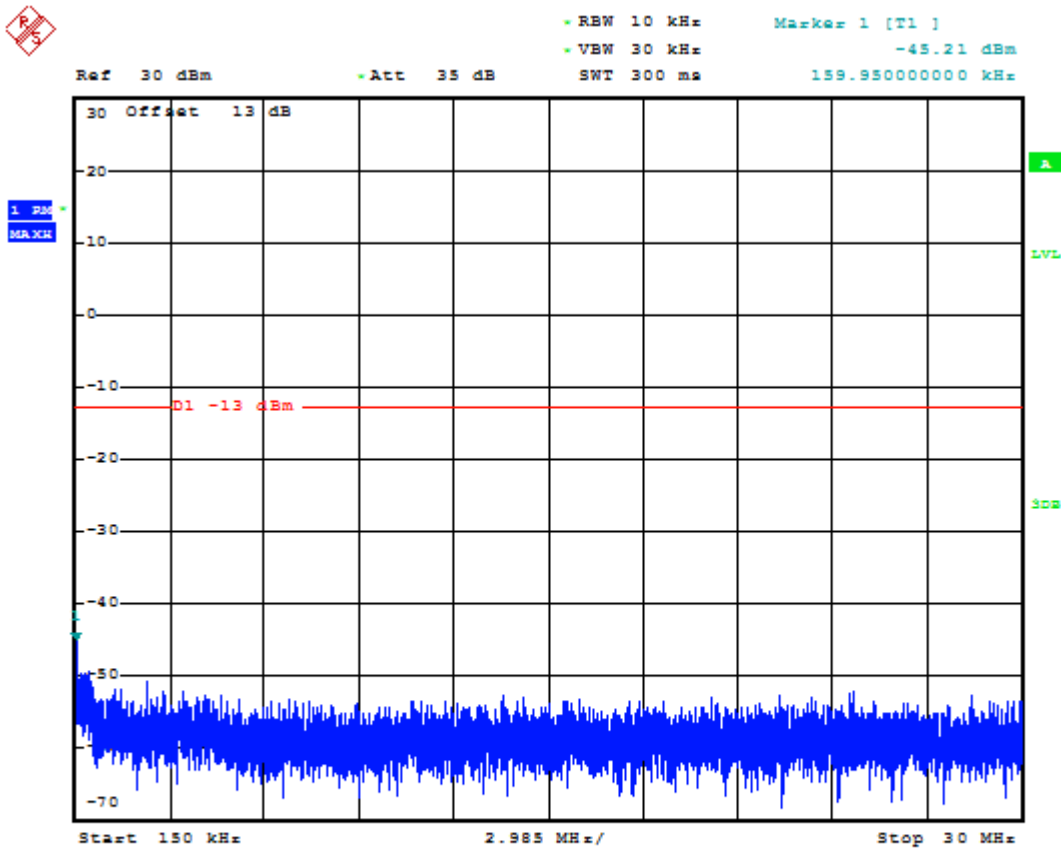


Appendix F: Conducted Spurious Emission

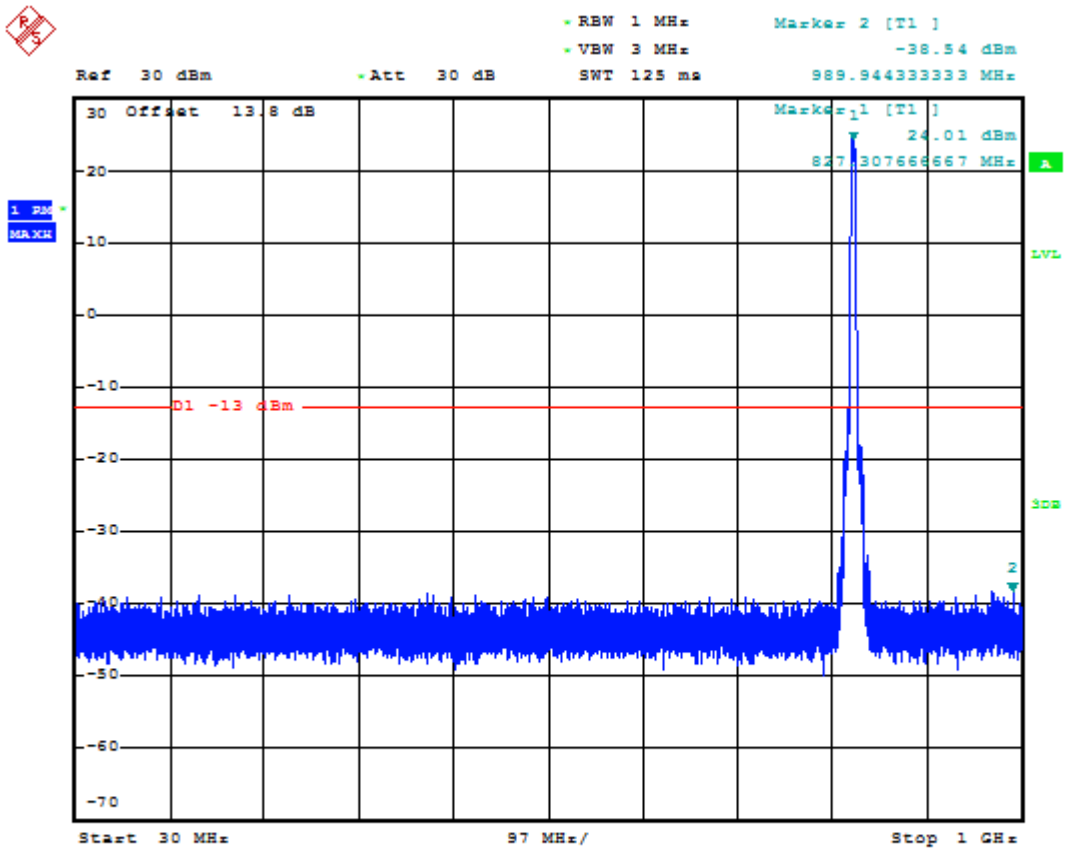
- 1 For WCDMA
- 1.1 Test Band=WCDMA850
- 1.1.1 Test Mode=UMTS/TM1
- 1.1.1.1 Test Channel=LCH



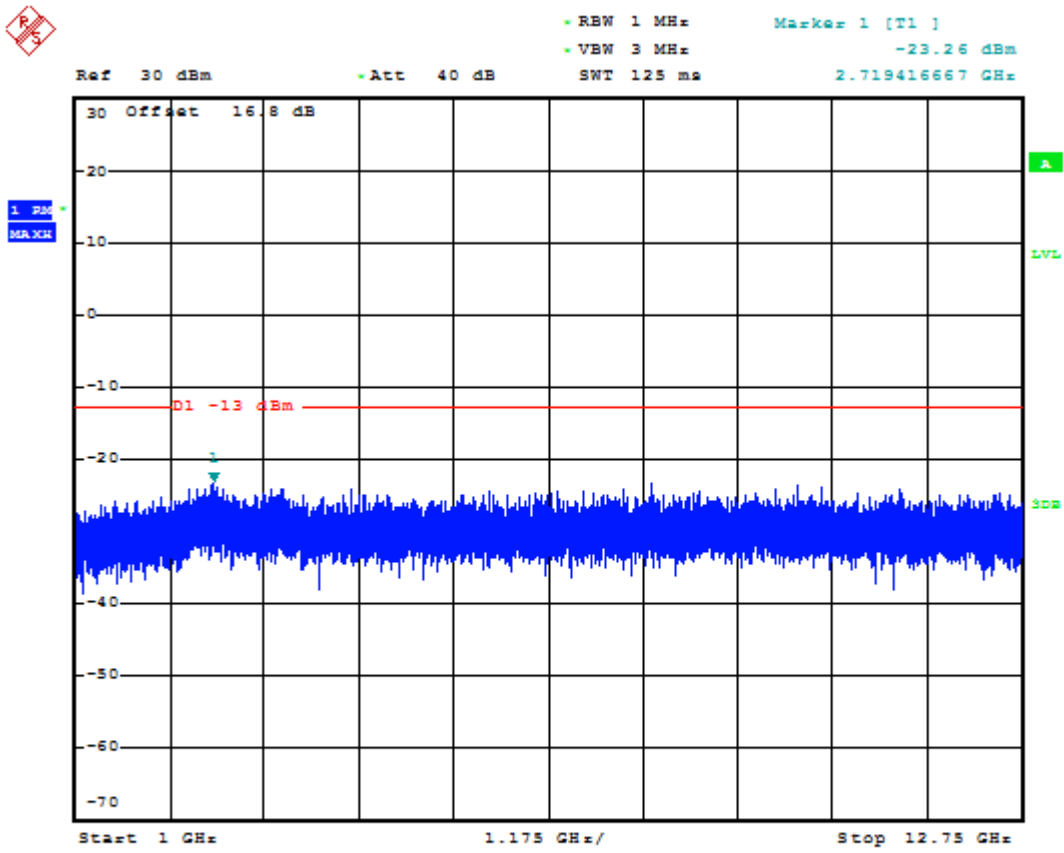
Date: 16.AUG.2017 06:30:47



Date: 16.AUG.2017 06:31:02



Date: 16.AUG.2017 06:31:12



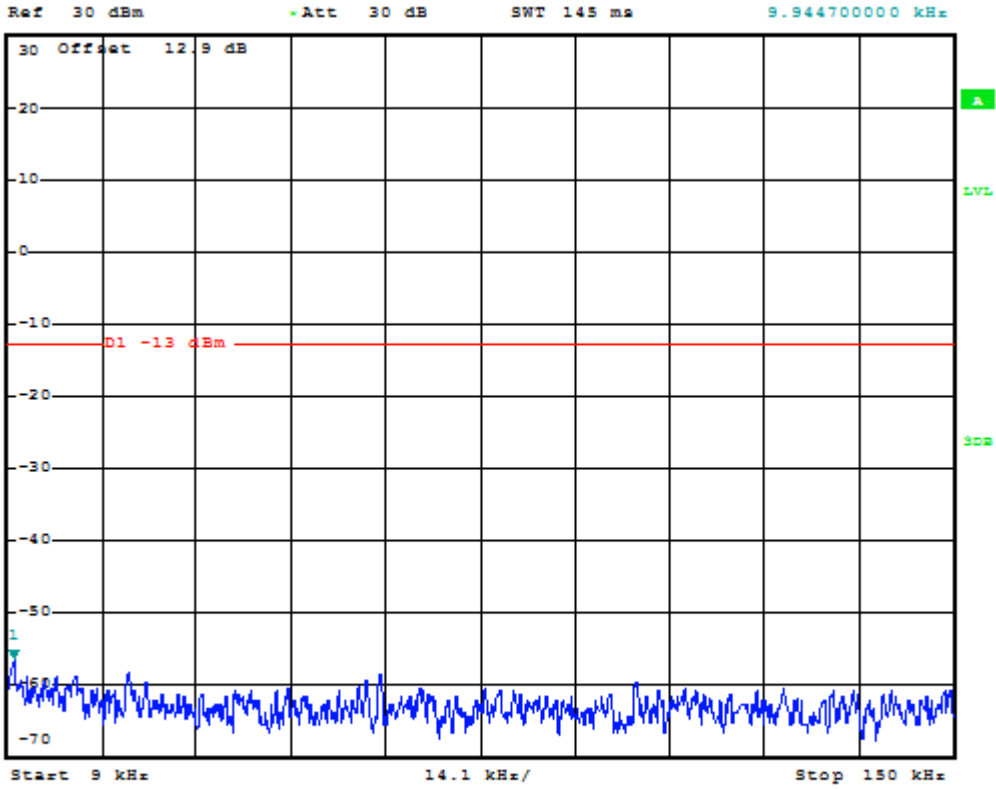
Date: 16.AUG.2017 06:31:21



1.1.1.2 Test Channel=MCH



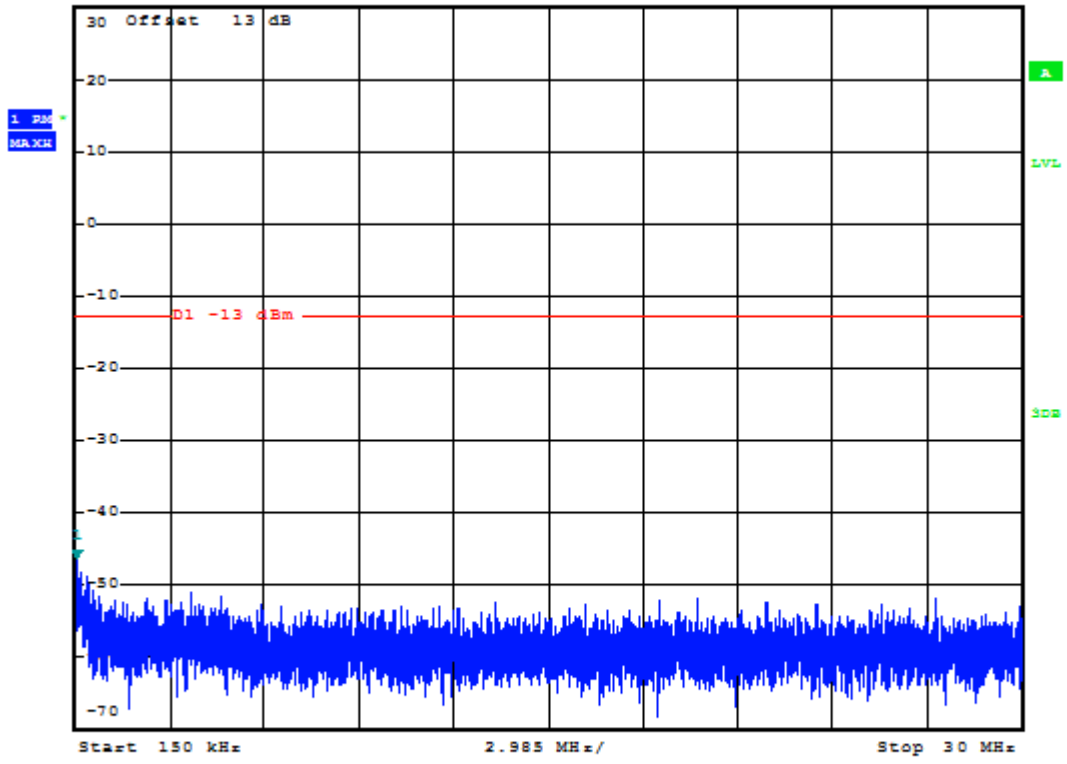
RBW 1 kHz Marker 1 [T1]
VBW 10 kHz -56.70 dBm
SWT 145 ms 9.944700000 kHz



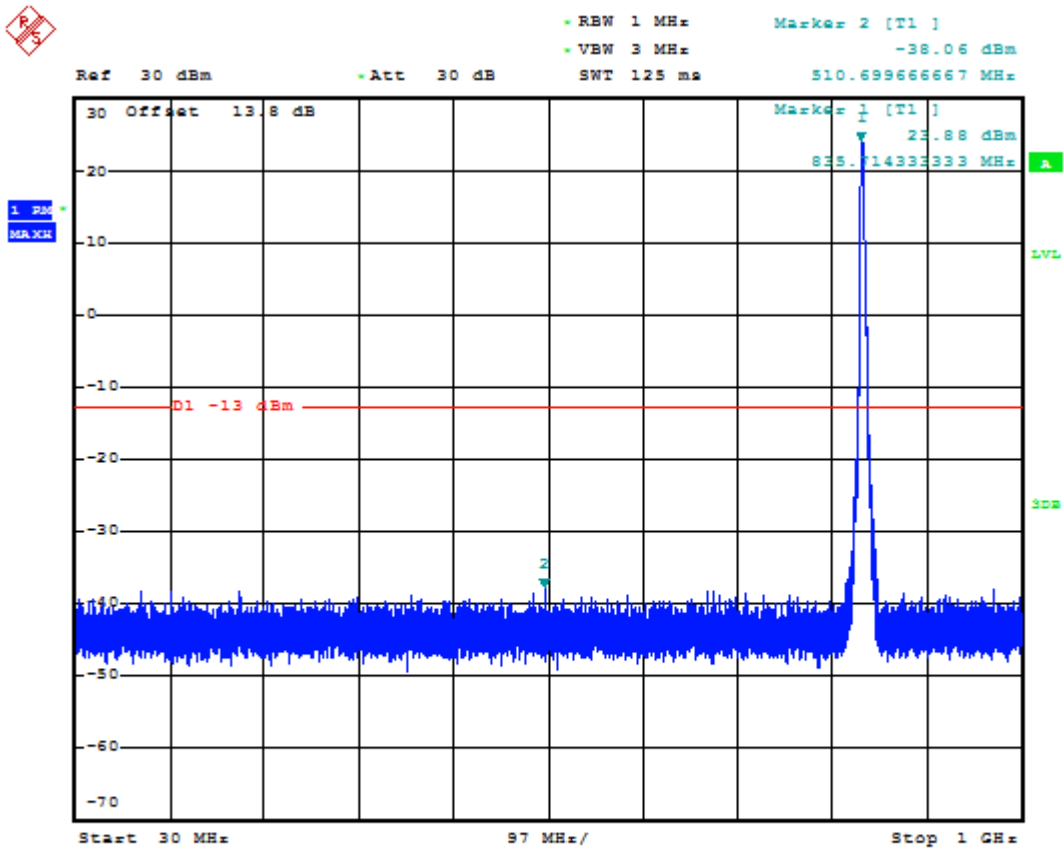
Date: 16.AUG.2017 06:31:33



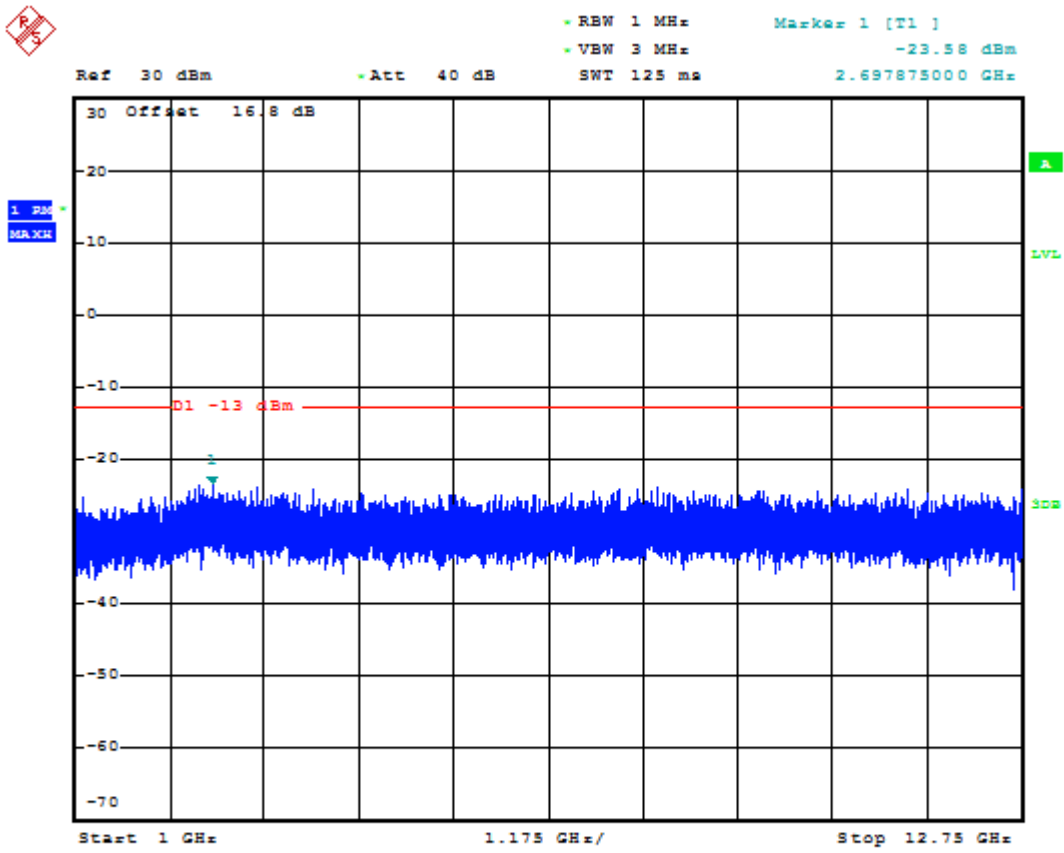
Ref 30 dBm -Att 35 dB RBW 10 kHz Marker 1 [T1]
-46.54 dBm
VBW 30 kHz
SWT 300 ms 185.82000000 kHz



Date: 16.AUG.2017 06:31:49



Date: 16.AUG.2017 06:31:59



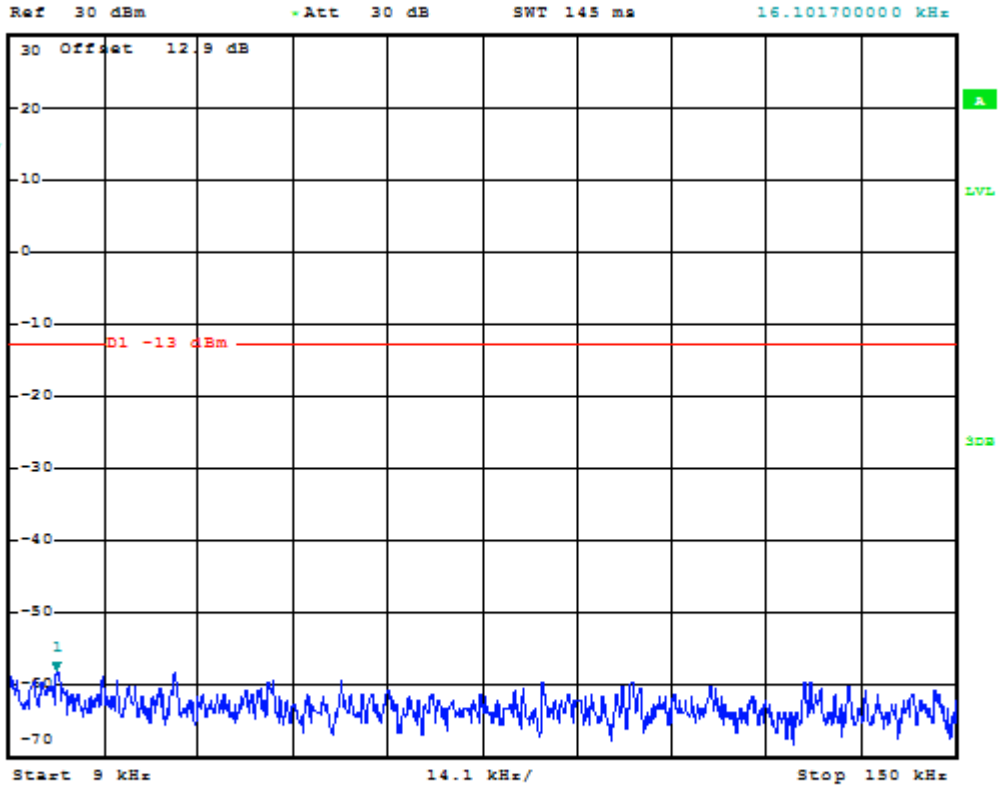
Date: 16.AUG.2017 06:32:08



1.1.1.3 Test Channel=HCH



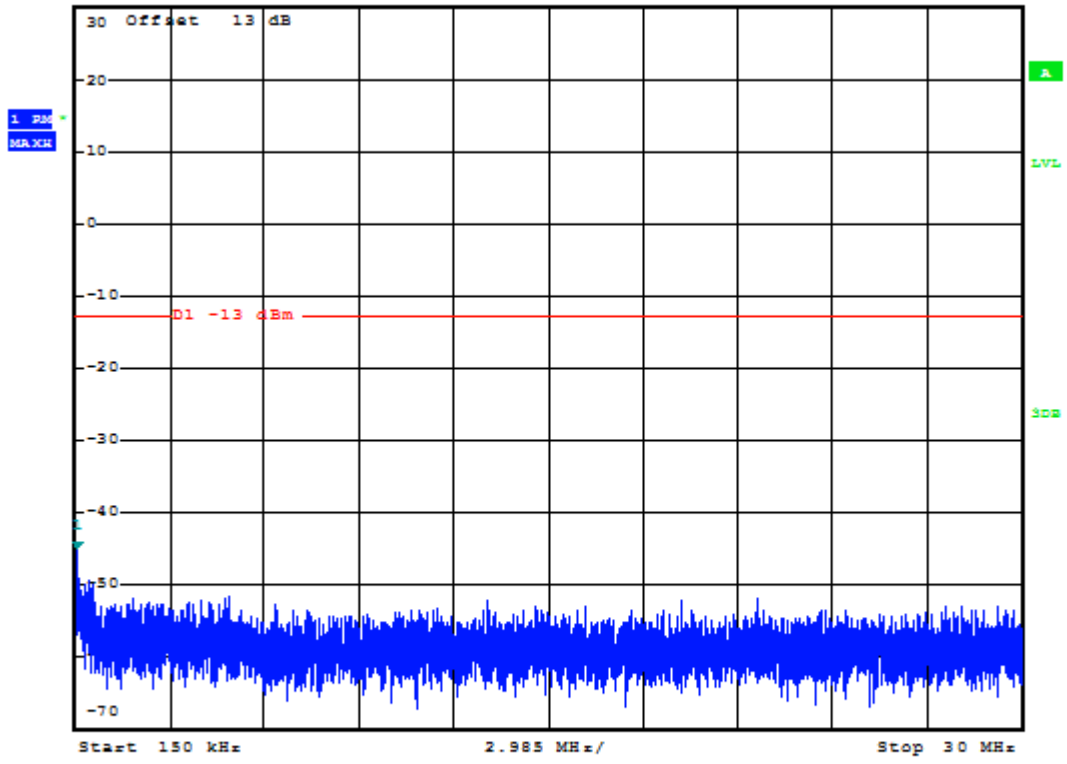
RBW 1 kHz Marker 1 [T1]
VBW 10 kHz -58.33 dBm
SWT 145 ms 16.101700000 kHz



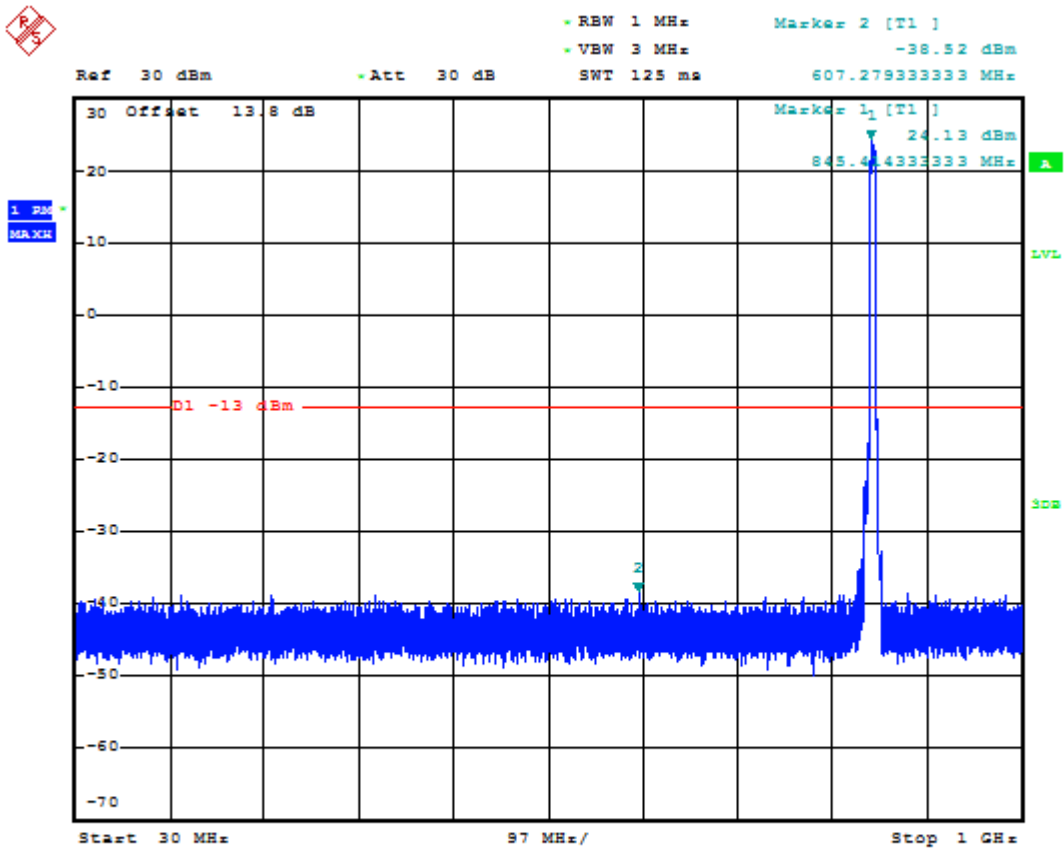
Date: 16.AUG.2017 06:32:20



Ref 30 dBm -Att 35 dB RBW 10 kHz Marker 1 [T1]
-45.38 dBm
SWT 300 ms 195.77000000 kHz



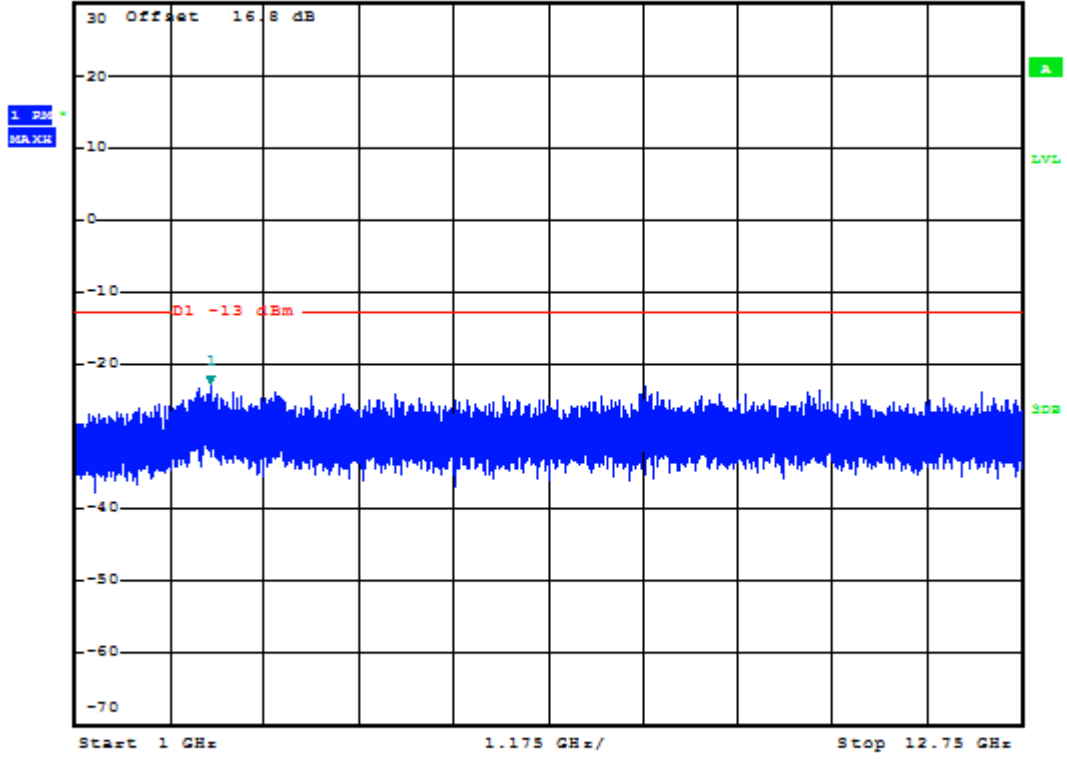
Date: 16.AUG.2017 06:32:35



Date: 16.AUG.2017 06:32:45



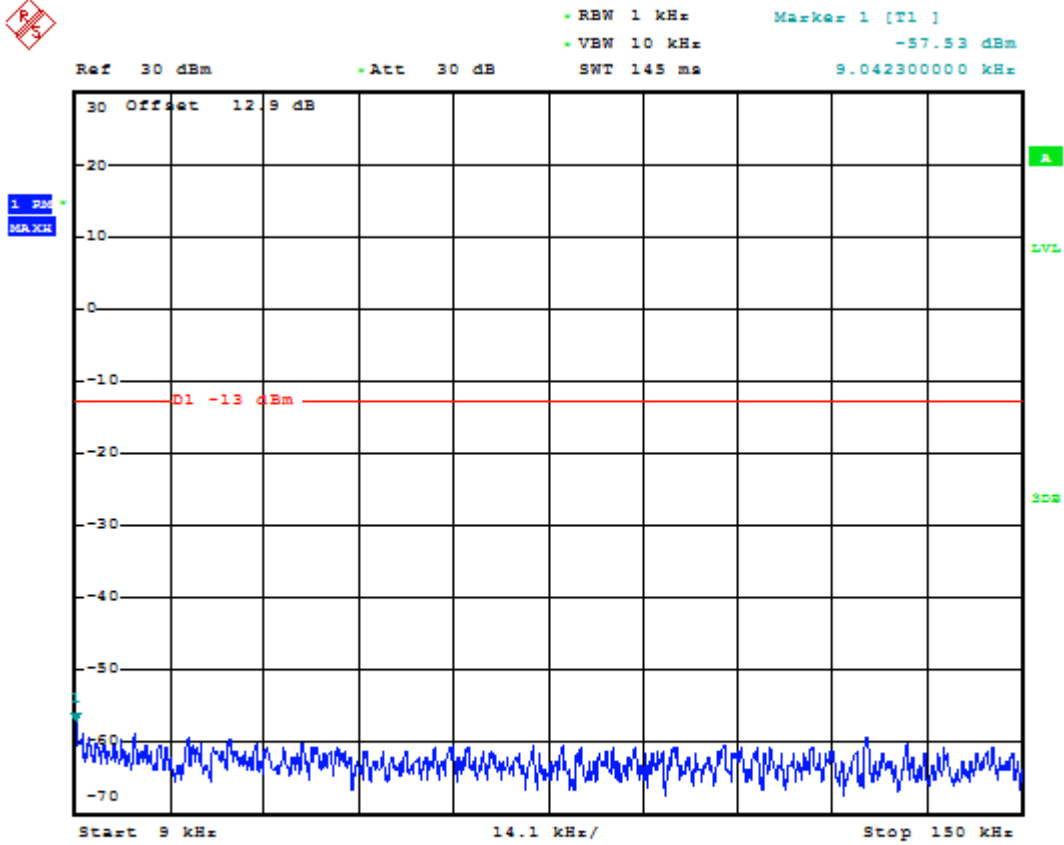
Ref 30 dBm -Att 40 dB RBW 1 MHz Marker 1 [T1] -22.98 dBm
SWT 125 ms 2.677900000 GHz



Date: 16.AUG.2017 06:32:54



1.2 Test Band=WCDMA1900
1.2.1 Test Mode=UMTS/TM1
1.2.1.1 Test Channel=LCH



Date: 16.AUG.2017 06:25:31

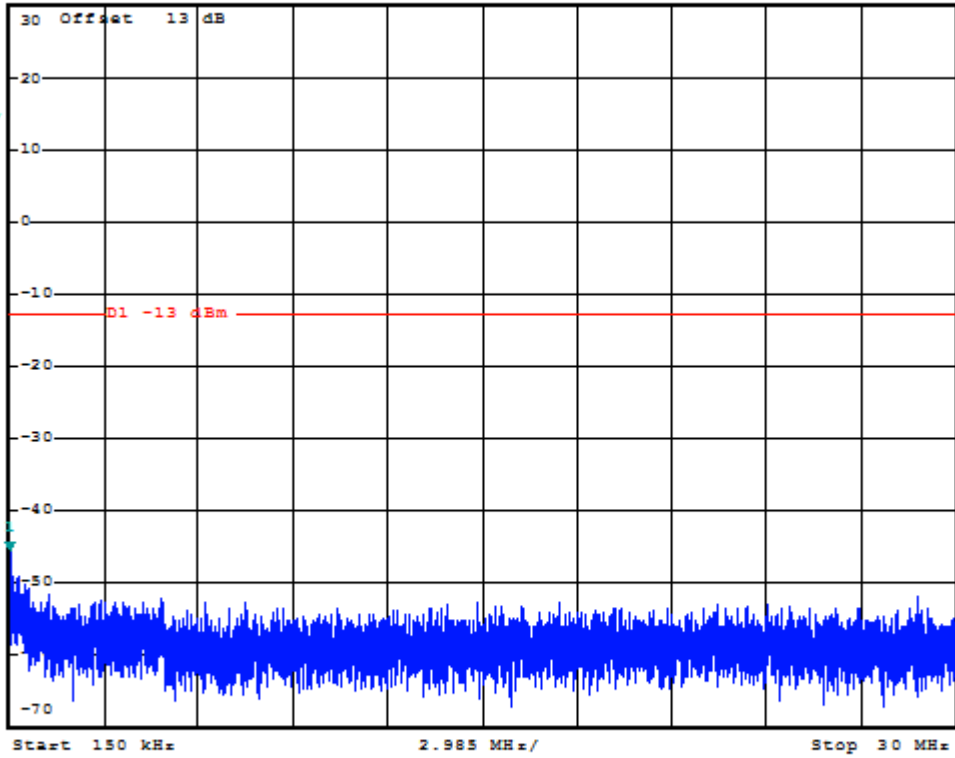


- RBW 10 kHz Marker 1 [T1]
- VBW 30 kHz -45.83 dBm
SWT 300 ms 155.97000000 kHz

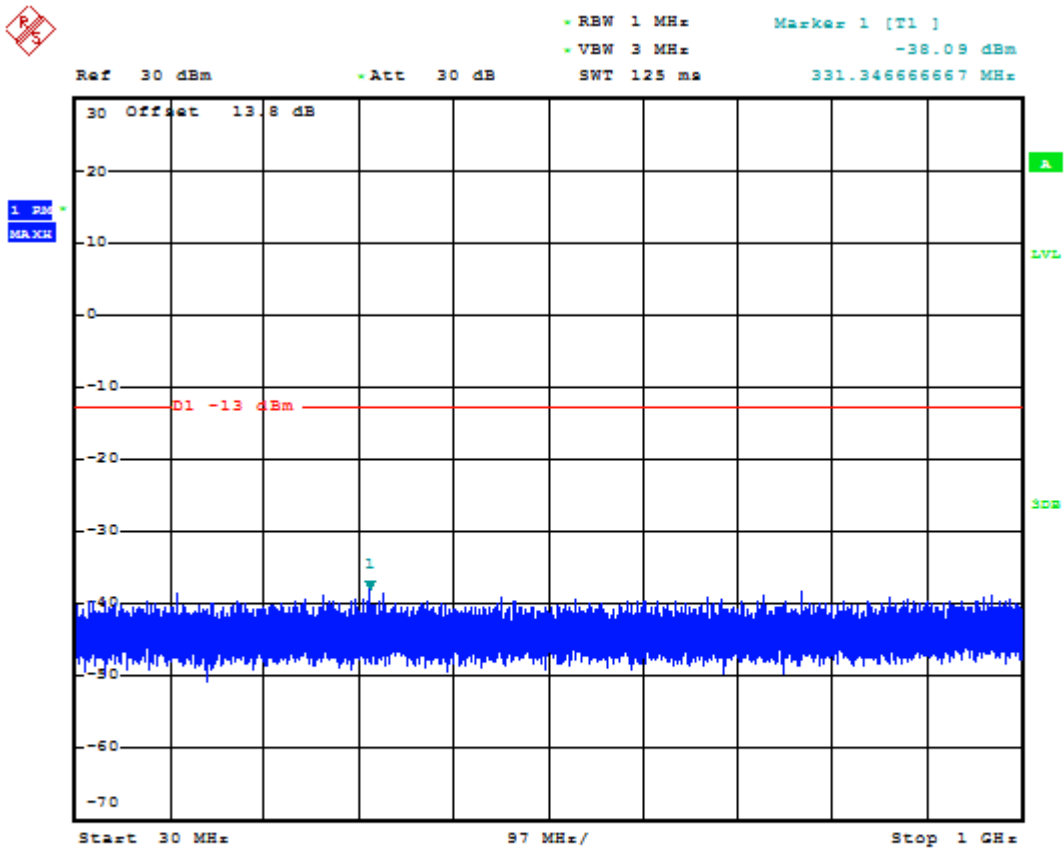
Ref 30 dBm

- Att 35 dB

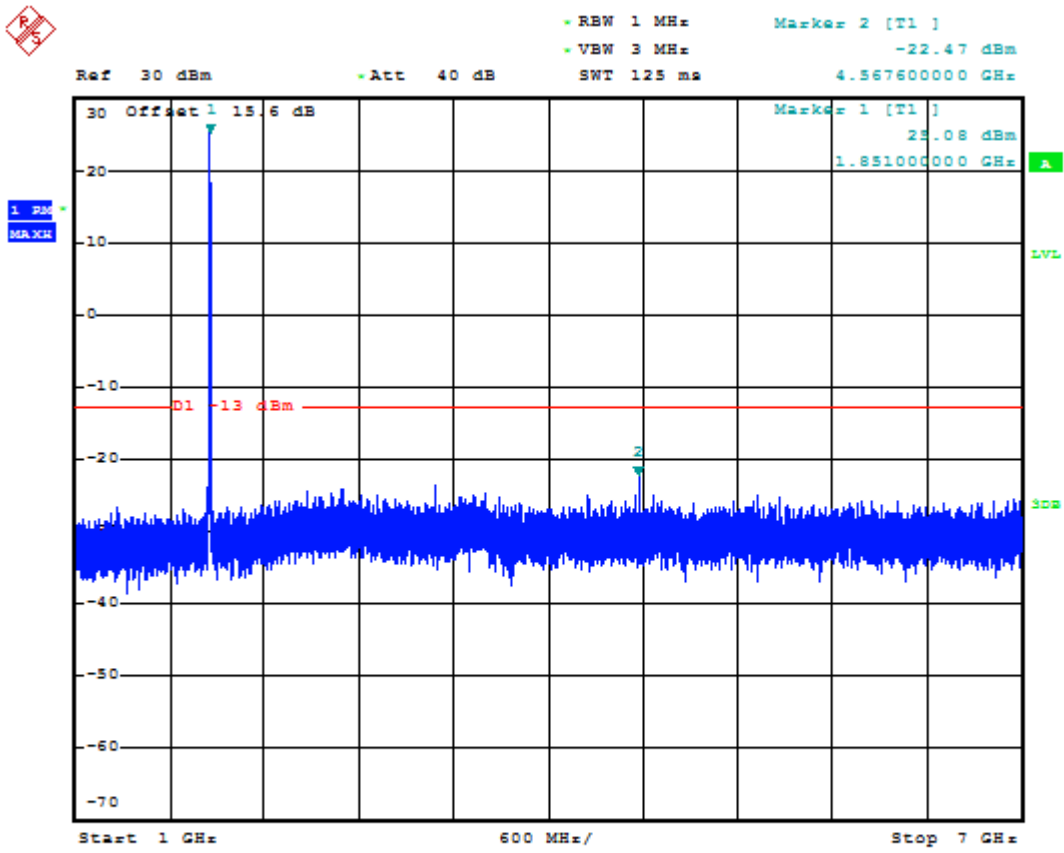
1. P20
MAX



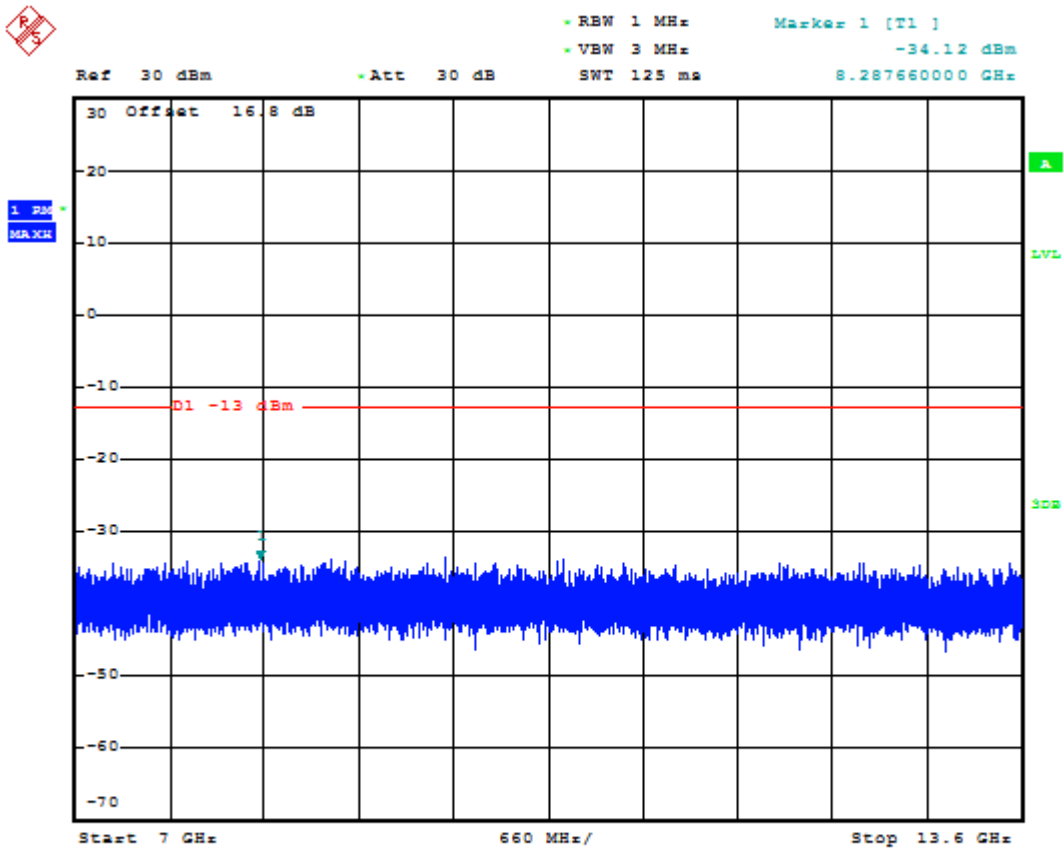
Date: 16.AUG.2017 06:25:47



Date: 16.AUG.2017 06:25:56



Date: 16.AUG.2017 06:26:06

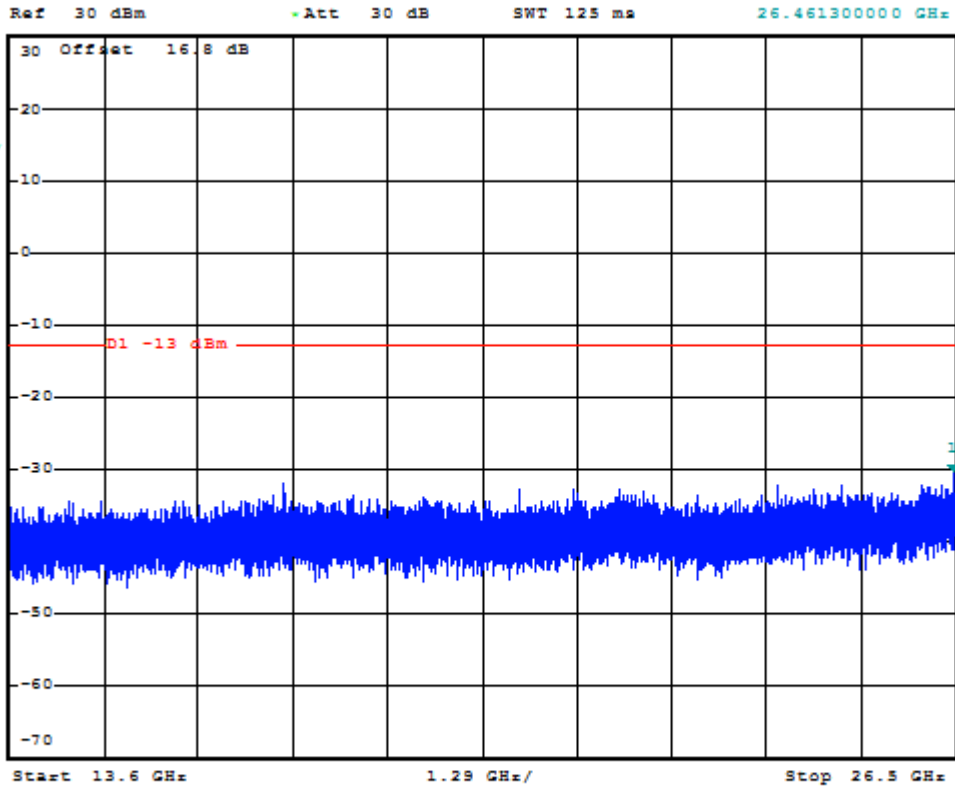


Date: 16.AUG.2017 06:26:14



RBW 1 MHz
VBW 3 MHz
SWT 125 ms

Marker 1 [T1]
-30.69 dBm
26.461300000 GHz



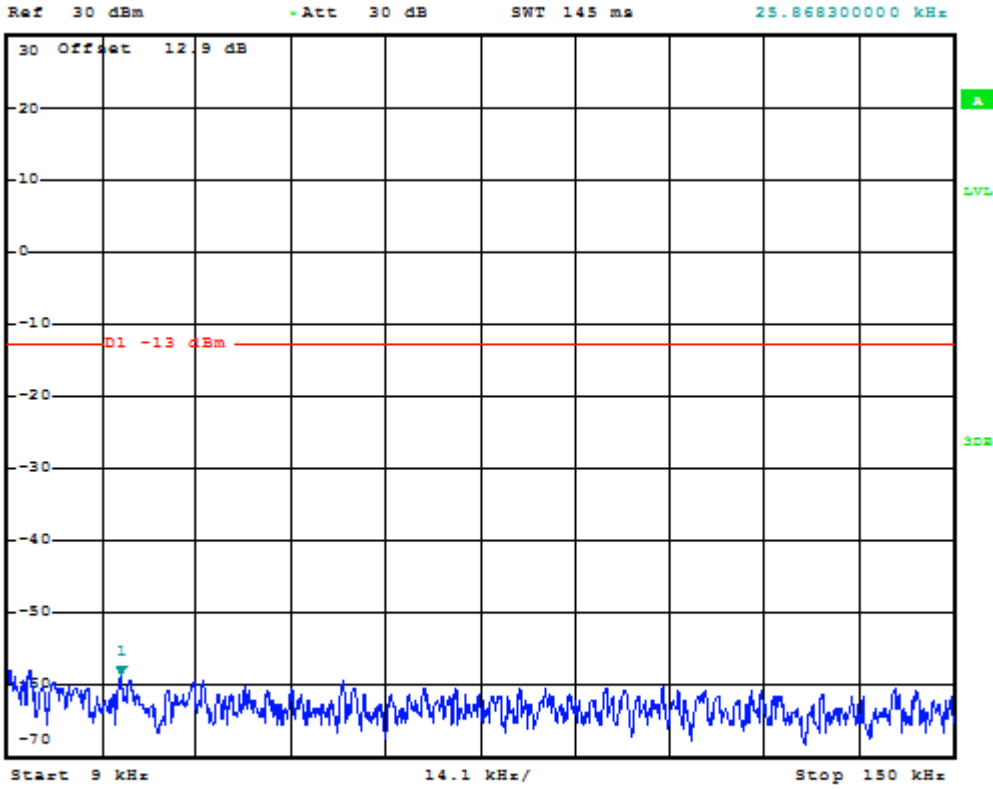
Date: 16.AUG.2017 06:26:23



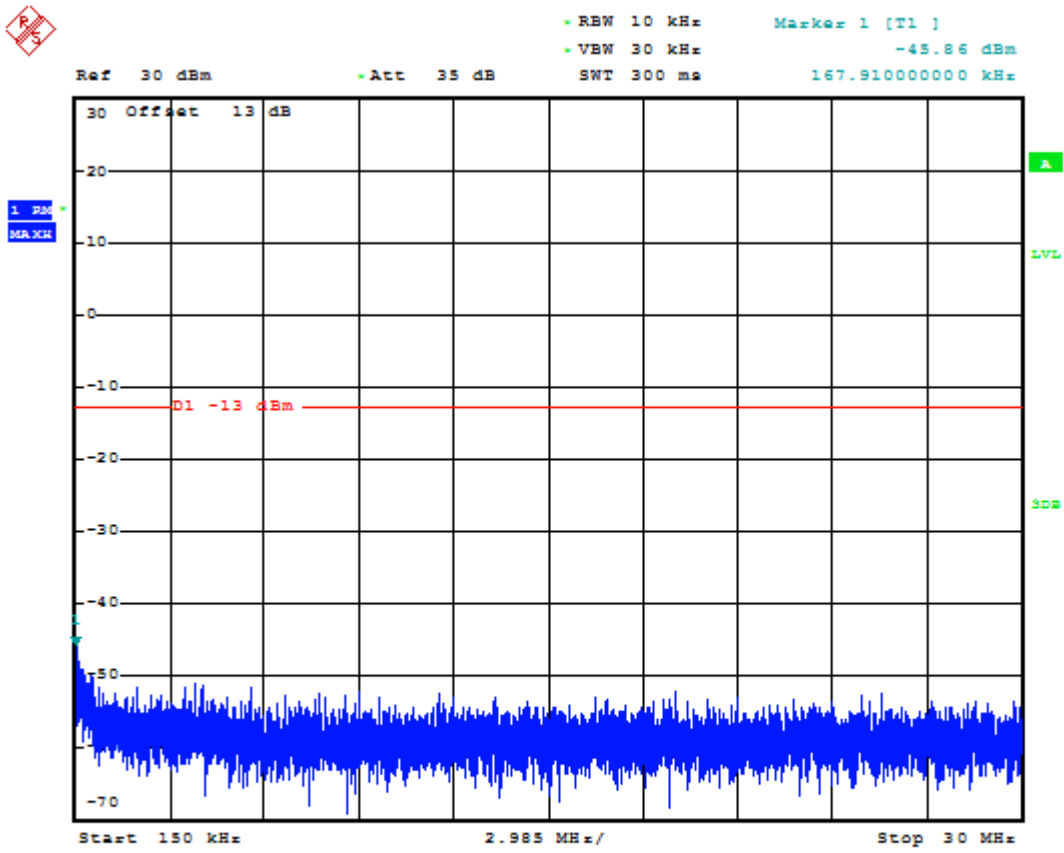
1.2.1.2 Test Channel=MCH



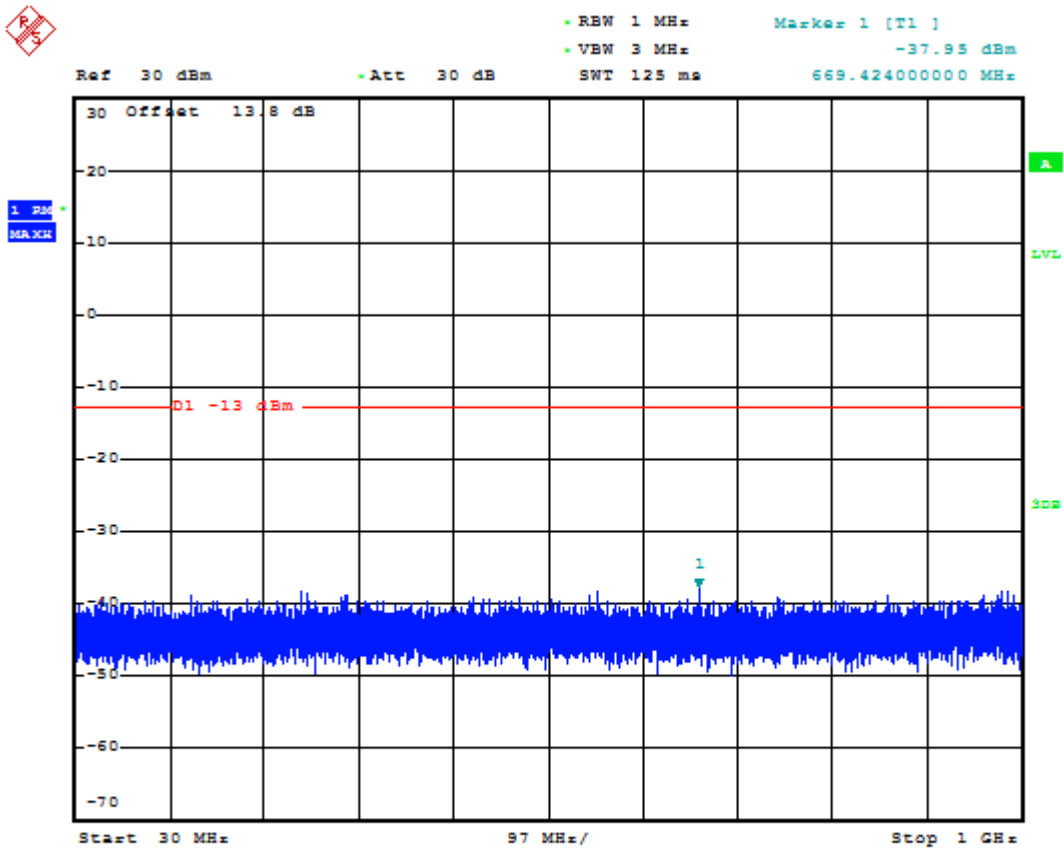
RBW 1 kHz Marker 1 [T1]
VBW 10 kHz -58.69 dBm
SWT 145 ms 25.868300000 kHz



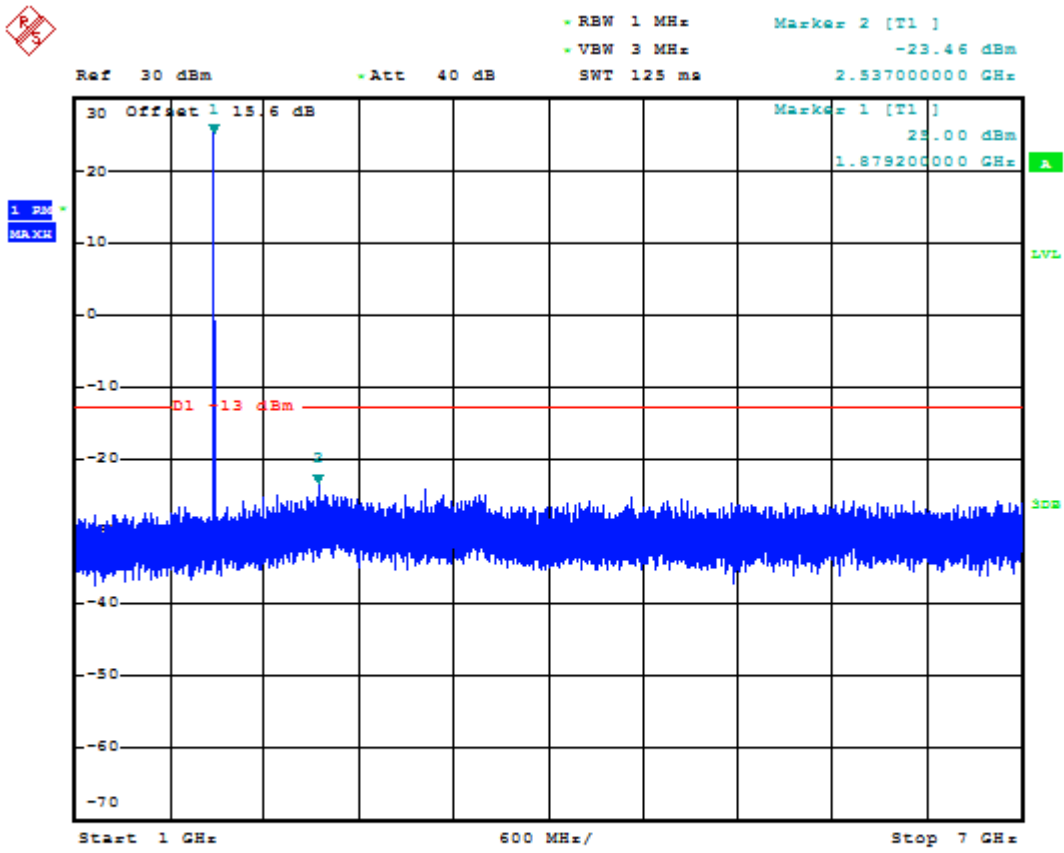
Date: 16.AUG.2017 06:26:35



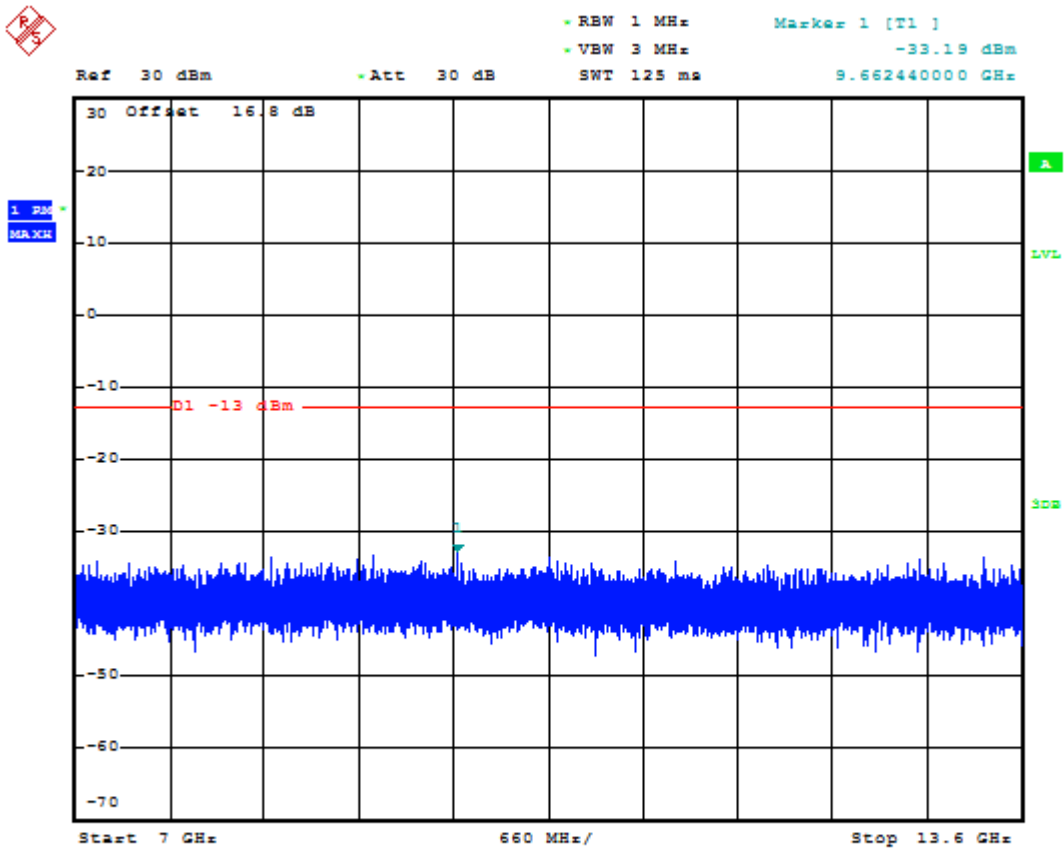
Date: 16.AUG.2017 06:26:51



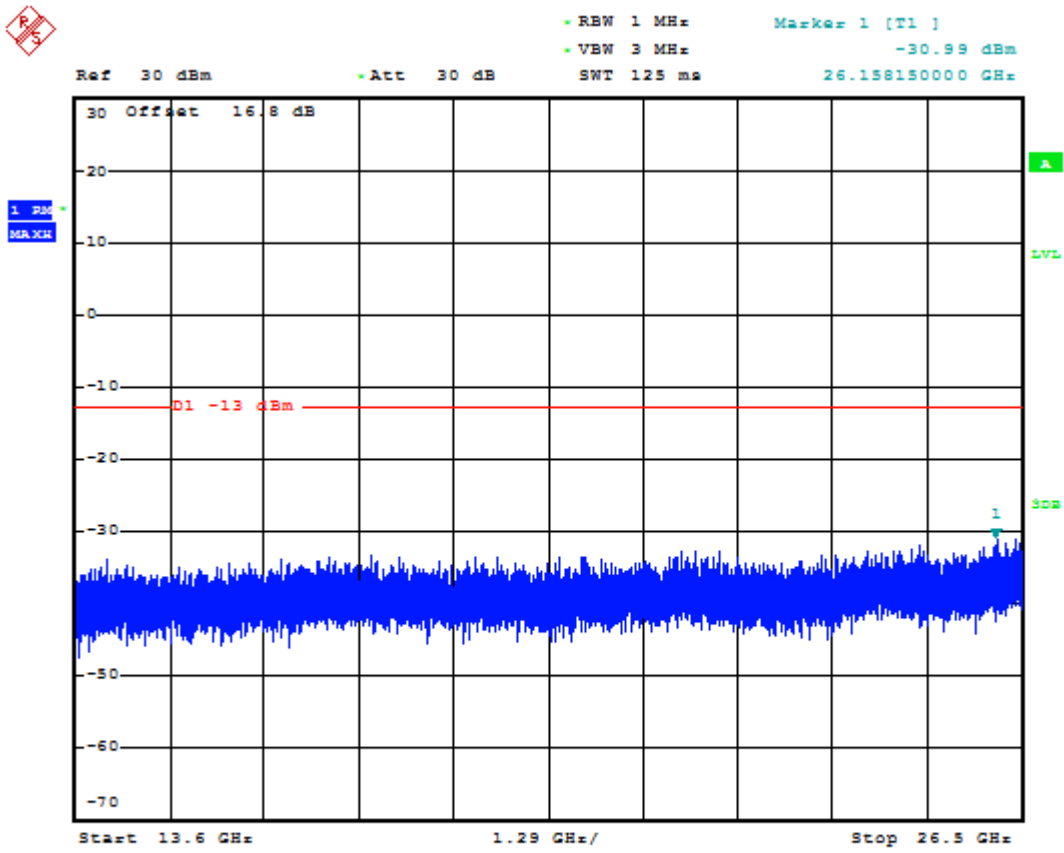
Date: 16.AUG.2017 06:27:00



Date: 16.AUG.2017 06:27:10



Date: 16.AUG.2017 06:27:18



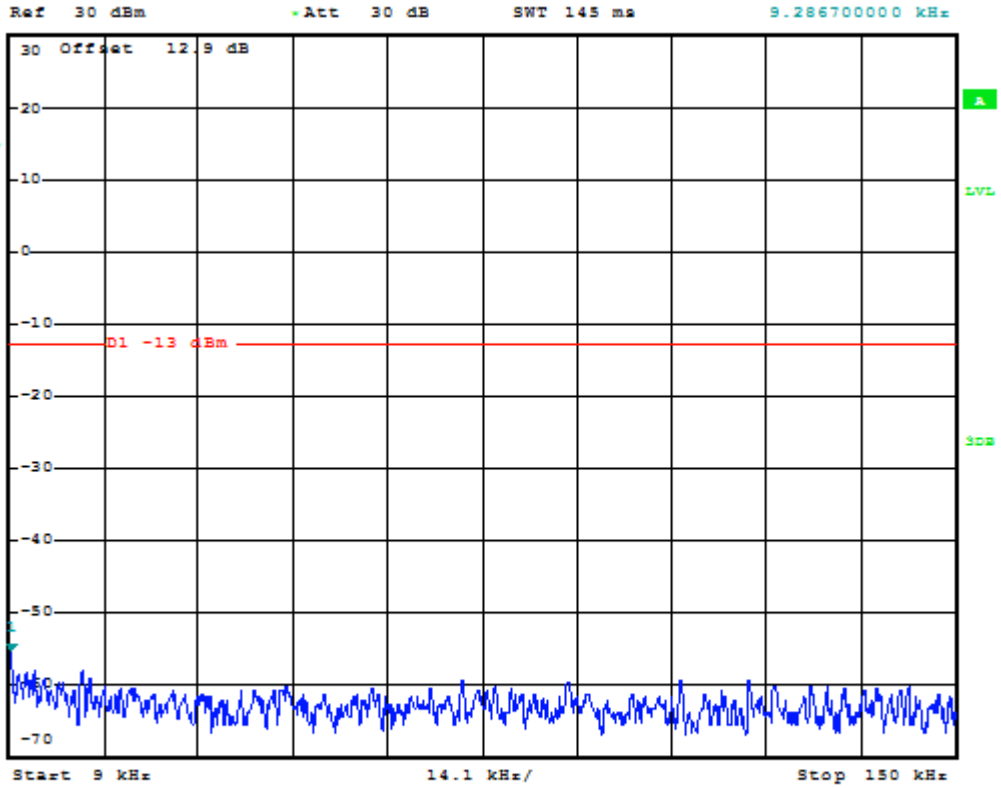
Date: 16.AUG.2017 06:27:27



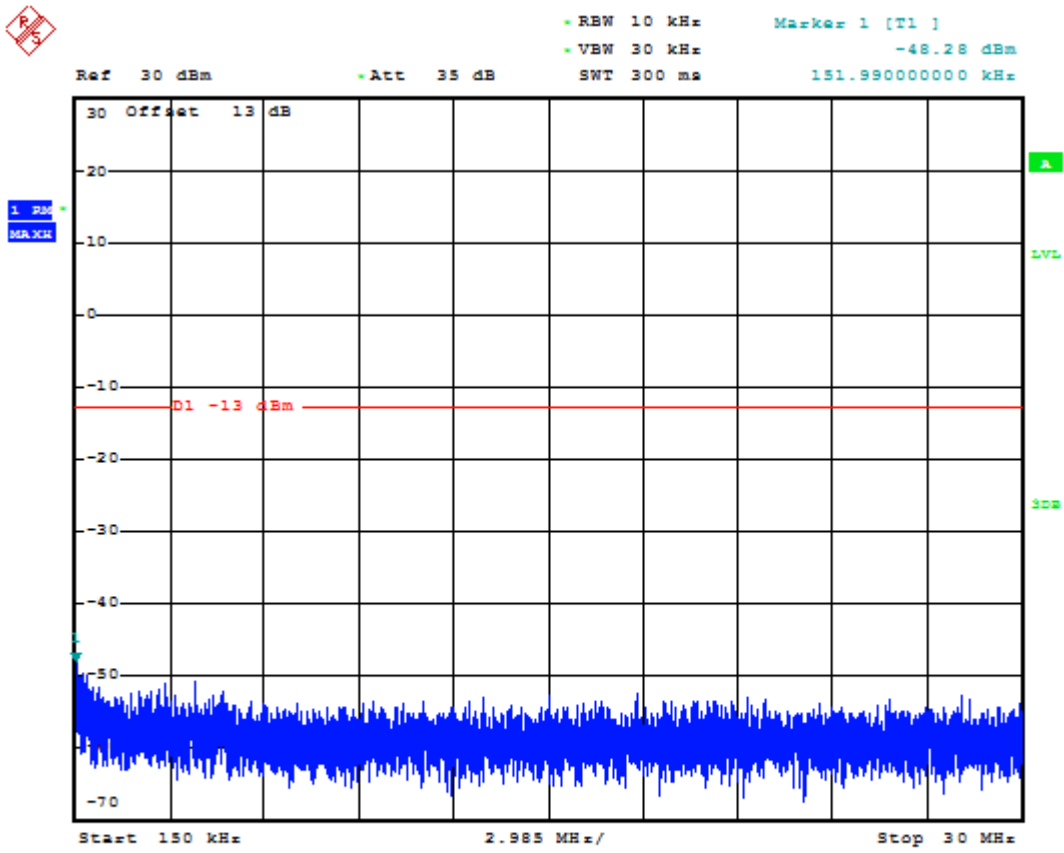
1.2.1.3 Test Channel=HCH



RBW 1 kHz Marker 1 [T1]
VBW 10 kHz -55.68 dBm
SWT 145 ms 9.286700000 kHz



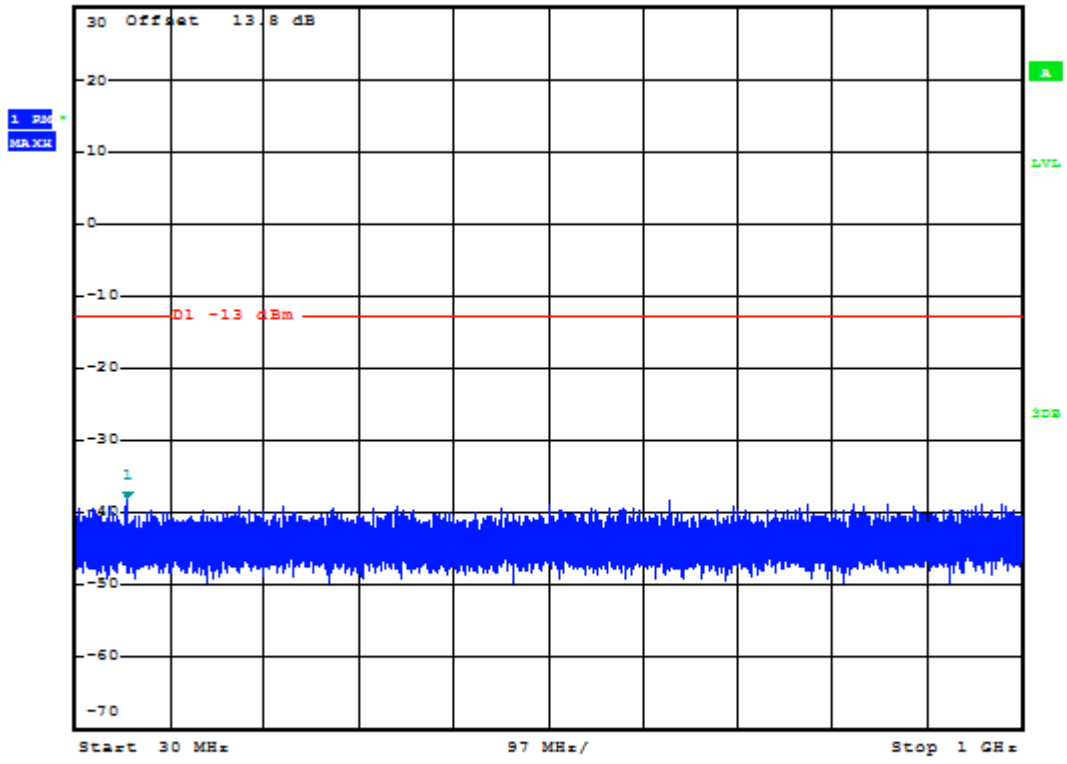
Date: 16.AUG.2017 06:27:39



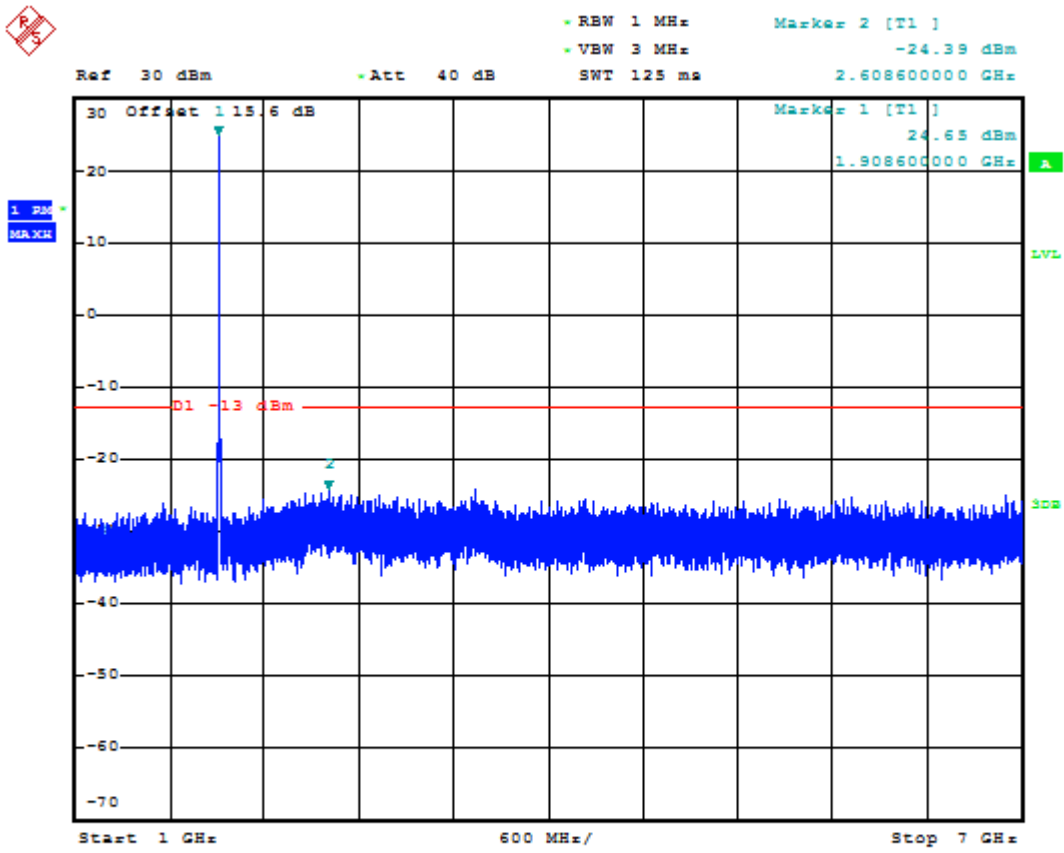
Date: 16.AUG.2017 06:27:54



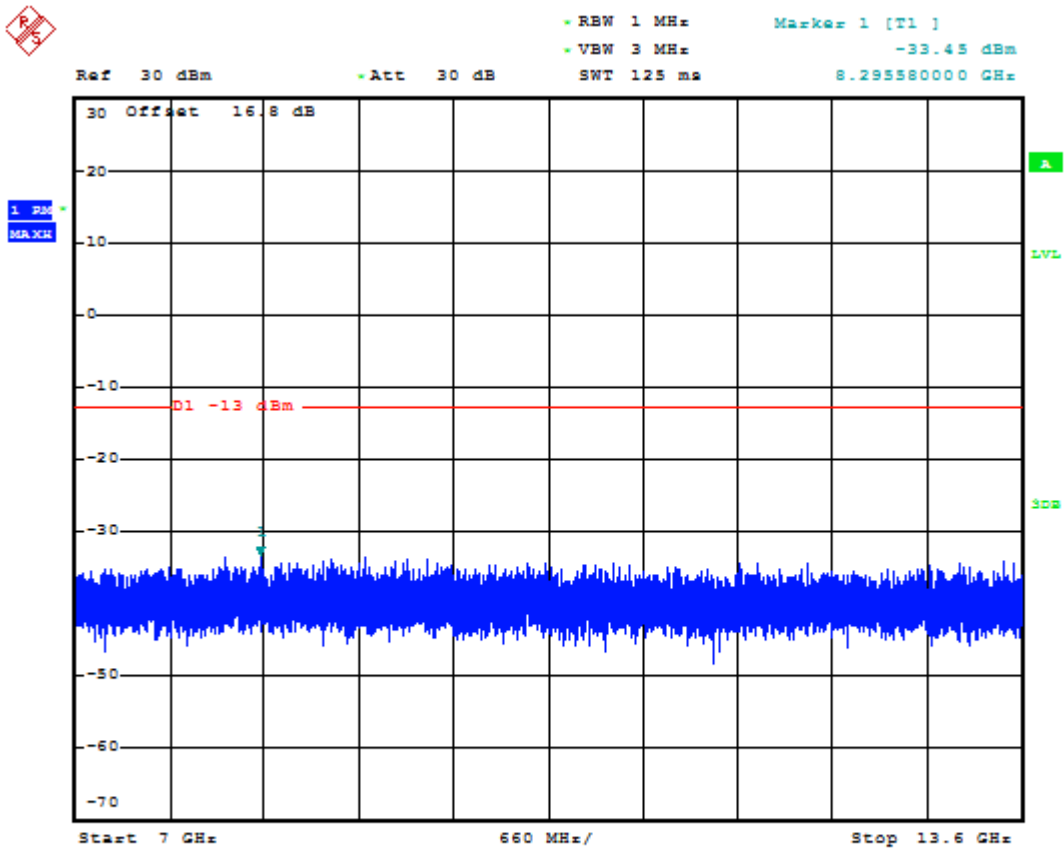
Ref 30 dBm Att 30 dB RBW 1 MHz Marker 1 [T1] -38.43 dBm
SWT 125 ms 82.21833333 MHz



Date: 16.AUG.2017 06:28:03



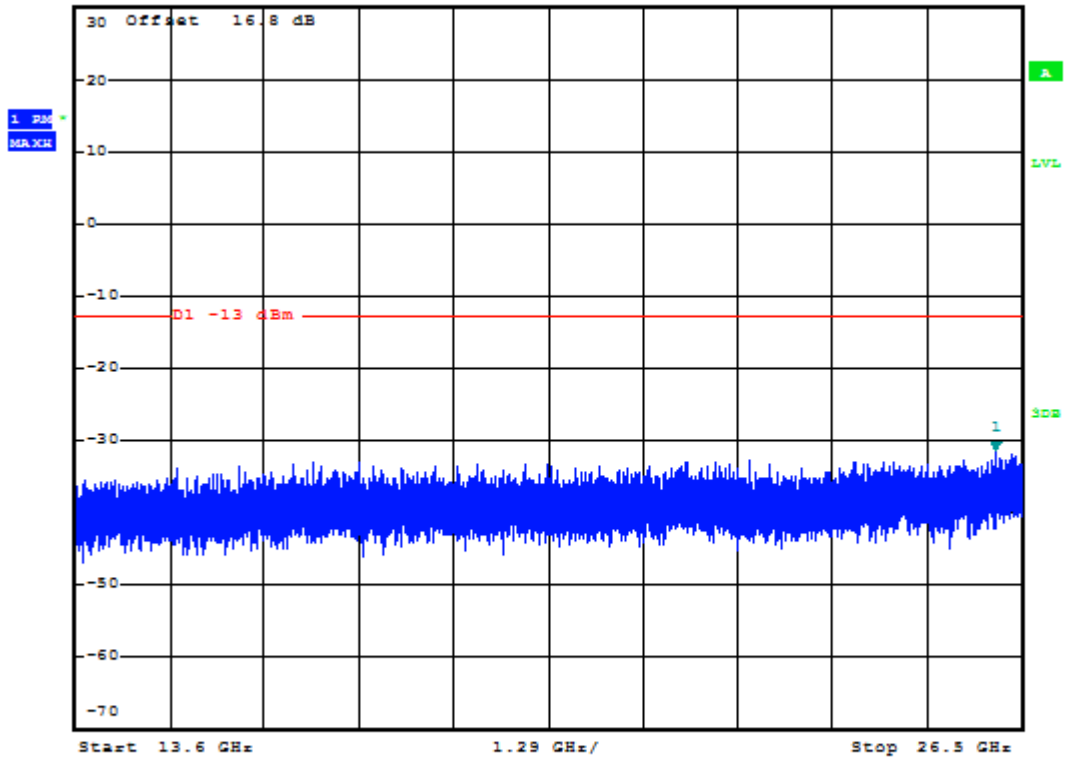
Date: 16.AUG.2017 06:28:13



Date: 16.AUG.2017 06:28:22



Ref 30 dBm -Att 30 dB RBW 1 MHz Marker 1 [T1] -31.66 dBm
SWT 125 ms 26.138370000 GHz



Date: 16.AUG.2017 06:28:30



Appendix G: Field Strength of Spurious Radiation

Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	1852.4MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 2_CH9262	Date:	08/06/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3704.800	-56.19	2.76	-53.43	-13.00	-40.43	peak

Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	1852.4MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 2_CH9262	Date:	08/06/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3704.800	-56.10	2.76	-53.34	-13.00	-40.34	peak



Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	1880MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 2_CH9400	Date:	08/06/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3760.000	-56.02	2.88	-53.14	-13.00	-40.14	peak

Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	1880MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 2_CH9400	Date:	08/06/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3760.000	-56.29	2.88	-53.41	-13.00	-40.41	peak



Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	1907.6MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 2_CH9538	Date:	08/06/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3815.200	-55.06	3.00	-52.06	-13.00	-39.06	peak

Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	1907.6MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 2_CH9538	Date:	08/06/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3815.200	-55.99	3.00	-52.99	-13.00	-39.99	peak



Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	826.4MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 5_CH4132	Date:	08/06/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1652.800	-53.64	-4.38	-58.02	-13.00	-45.02	peak

Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	826.4MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 5_CH4132	Date:	08/06/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1652.800	-51.99	-4.38	-56.37	-13.00	-43.37	peak



Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	836.6MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 5_CH4183	Date:	08/06/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1673.200	-53.80	-4.30	-58.10	-13.00	-45.10	peak

Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	836.6MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 5_CH4183	Date:	08/06/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1673.200	-53.36	-4.30	-57.66	-13.00	-44.66	peak



Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	846.6MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 5_CH4233	Date:	08/06/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1692.800	-54.40	-4.25	-58.65	-13.00	-45.65	peak

Standard:	FCC Part 22H & 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Frequency:	846.6MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3G_BAND 5_CH4233	Date:	08/06/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1692.800	-53.47	-4.25	-57.72	-13.00	-44.72	peak



Appendix H: Frequency Stability (Temperature & Voltage Variation)

Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA 850	TM1	LCH	TN	VL	8.19	0.009915	±2.5	PASS
			TN	VN	2.33	0.002825	±2.5	PASS
			TN	VH	5.49	0.006647	±2.5	PASS
		MCH	TN	VL	6.29	0.007514	±2.5	PASS
			TN	VN	2.33	0.008627	±2.5	PASS
			TN	VH	1.80	0.002152	±2.5	PASS
		HCH	TN	VL	7.98	0.009426	±2.5	PASS
			TN	VN	2.33	0.009030	±2.5	PASS
			TN	VH	7.46	0.008814	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA 1900	TM1	LCH	TN	VL	8.42	0.004547	±2.5	PASS
			TN	VN	8.79	0.004745	±2.5	PASS
			TN	VH	6.53	0.003526	±2.5	PASS
		MCH	TN	VL	6.64	0.003531	±2.5	PASS
			TN	VN	8.79	0.002760	±2.5	PASS
			TN	VH	9.80	0.005211	±2.5	PASS
		HCH	TN	VL	2.84	0.001488	±2.5	PASS
			TN	VN	8.79	0.001920	±2.5	PASS
			TN	VH	1.79	0.000936	±2.5	PASS



Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA 850	TM1	LCH	VN	-30	4.07	0.004930	±2.5	PASS
			VN	-20	5.33	0.006444	±2.5	PASS
			VN	-10	6.18	0.007478	±2.5	PASS
			VN	0	4.65	0.005632	±2.5	PASS
			VN	10	7.29	0.008826	±2.5	PASS
			VN	20	1.69	0.002050	±2.5	PASS
			VN	30	7.46	0.009029	±2.5	PASS
			VN	40	7.26	0.008789	±2.5	PASS
WCDMA 850	TM1	MCH	VN	-30	6.87	0.008208	±2.5	PASS
			VN	-20	3.97	0.004742	±2.5	PASS
			VN	-10	5.08	0.006074	±2.5	PASS
			VN	0	7.39	0.008828	±2.5	PASS
			VN	10	9.52	0.011381	±2.5	PASS
			VN	20	3.94	0.004706	±2.5	PASS
			VN	30	6.70	0.008007	±2.5	PASS
			VN	40	8.65	0.010342	±2.5	PASS
WCDMA 850	TM1	HCH	VN	-30	9.77	0.011535	±2.5	PASS
			VN	-20	6.09	0.007191	±2.5	PASS
			VN	-10	7.64	0.009030	±2.5	PASS
			VN	0	8.93	0.010544	±2.5	PASS
			VN	10	5.95	0.007029	±2.5	PASS
			VN	20	10.57	0.012490	±2.5	PASS
			VN	30	7.77	0.009174	±2.5	PASS
			VN	40	5.86	0.006921	±2.5	PASS
VN	50	9.61	0.011355	±2.5	PASS			



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA 1900	TM1	LCH	VN	-30	11.78	0.006359	±2.5	PASS
			VN	-20	8.26	0.004456	±2.5	PASS
			VN	-10	10.41	0.005618	±2.5	PASS
			VN	0	8.33	0.004498	±2.5	PASS
			VN	10	13.70	0.007397	±2.5	PASS
			VN	20	10.09	0.005445	±2.5	PASS
			VN	30	12.97	0.007002	±2.5	PASS
			VN	40	10.48	0.005659	±2.5	PASS
			VN	50	15.24	0.008229	±2.5	PASS
WCDMA 1900	TM1	MCH	VN	-30	8.21	0.004367	±2.5	PASS
			VN	-20	9.09	0.004837	±2.5	PASS
			VN	-10	9.77	0.005194	±2.5	PASS
			VN	0	4.58	0.002435	±2.5	PASS
			VN	10	4.50	0.002394	±2.5	PASS
			VN	20	10.31	0.005487	±2.5	PASS
			VN	30	6.18	0.003287	±2.5	PASS
			VN	40	9.25	0.004919	±2.5	PASS
			VN	50	9.60	0.005105	±2.5	PASS
WCDMA 1900	TM1	HCH	VN	-30	6.18	0.003240	±2.5	PASS
			VN	-20	5.95	0.003120	±2.5	PASS
			VN	-10	5.43	0.002848	±2.5	PASS
			VN	0	3.39	0.001776	±2.5	PASS
			VN	10	4.00	0.002096	±2.5	PASS
			VN	20	1.60	0.000840	±2.5	PASS
			VN	30	1.89	0.000992	±2.5	PASS
			VN	40	5.08	0.002664	±2.5	PASS
			VN	50	2.81	0.001472	±2.5	PASS