

RF Test Report

Applicant : MANN HUMMEL FILTER TECHNOLOGY S.E.A. PTE. LTD.
Product Type : Senzit
Trade Name : SENZIT
Model Number : Senzit
Test Specification : FCC 47 CFR PART 22H
FCC 47 CFR PART 24E
ANSI/TIA-603-D 2010
Receive Date : Apr. 26, 2017
Test Period : Sep. 06 ~ Sep. 13, 2017
Issue Date : Oct. 02, 2017

Issue by

A Test Lab Techno Corp.
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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	Sep. 19, 2017	Initial Issue	Nina Lin
01	Oct. 02, 2017	Revised report information.	Nina Lin



Verification of Compliance

Issued Date: Oct. 02, 2017

Applicant : MANN HUMMEL FILTER TECHNOLOGY S.E.A. PTE. LTD.
Product Type : Senzit
Trade Name : SENZIT
Model Number : Senzit
FCC ID : 2ANLX-SZT-1
EUT Rated Voltage : DC 9V~32V
Test Voltage : DC 10.2V / DC 12V / DC 13.8V
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.

No. 140-1, Changan Street, Bade District,
Taoyuan City 33465, Taiwan (R.O.C)

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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

(Manager)

(Fly Lu)

Reviewed By :

Eric Ou Yang

(Testing Engineer)

(Eric Ou Yang)



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1 General Information

1.1. EUT Description

Applicant	MANN HUMMEL FILTER TECHNOLOGY S.E.A. PTE. LTD. Fusionopolis Symbiosis, #11-24, 3 Fusionopolis Way, S138633, Singapore			
Manufacturer	DAVISCOMMS (MALAYSIA) SDN.BHD. PLOT 324A, LORONG PERINDUSTRIAN BUKIT MINYAK 20, MK13, PENANG SCIENCE PARK,14100 SIMPANG AMPAT,PULAU PINANG.			
Product Type	Senzit			
Trade Name	SENZIT			
Model Number	Senzit			
FCC ID	2ANLX-SZT-1			
IMEI No.	357042067181280			
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)	
	Chip Antenan		WCDMA/ HSDPA/ HSUPA Band II	3.64
			WCDMA/ HSDPA/ HSUPA Band V	3.3
Operate Temp. Range	-25 ~ 80 °C			

Frequency Band	Max. RF Output Power (W)	E.R.P. /E.I.R.P. (W)	
WCDMA/ HSDPA/ HSUPA Band II	0.408	0.176	(E.I.R.P.)
WCDMA/ HSDPA/ HSUPA Band V	0.492	0.292	(E.R.P.)

Frequency Band	Occupied Bandwidth (MHz)	Emission Designator
WCDMA/ HSDPA/ HSUPA Band II	4.1827	4M18F9W
WCDMA/ HSDPA/ HSUPA Band V	4.1987	4M20F9W

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
Mode 1: WCDMA Band II Link Mode
Mode 2: WCDMA Band V Link Mode

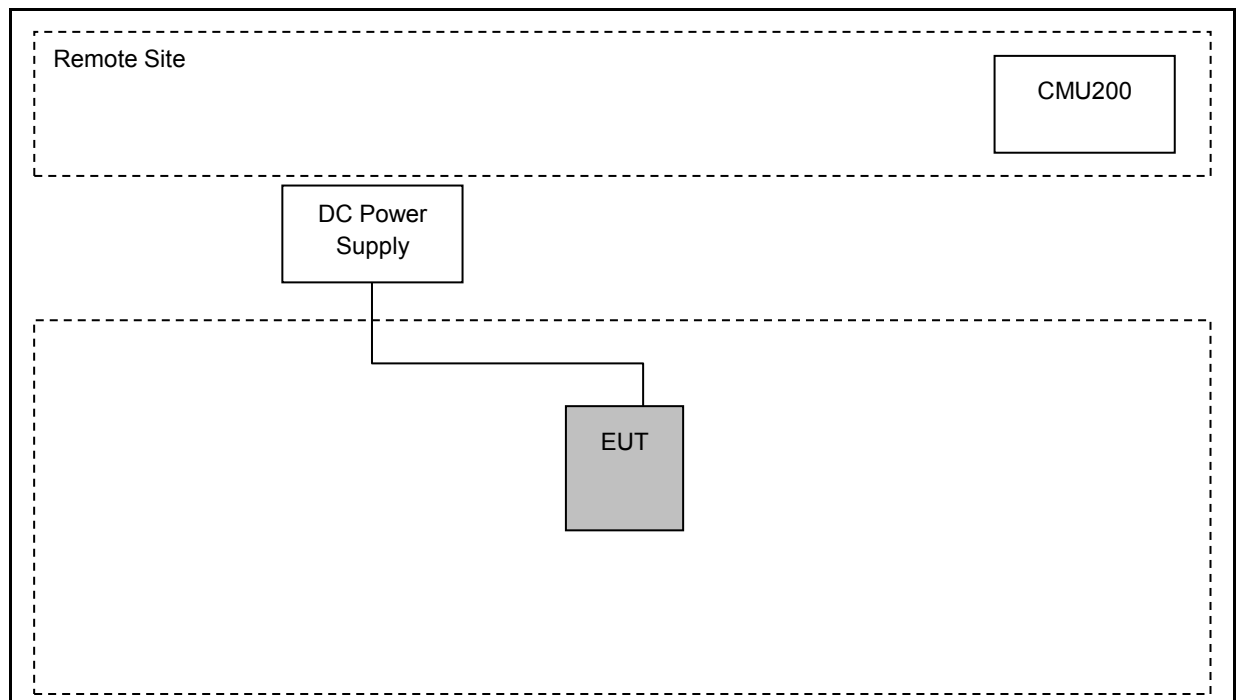
Note: Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

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.

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
Power divider	Agilent	87302C	3239A00760	N.C.R.	-----
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	09/11/2017	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	08/29/2017	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 10.2V
N.V.	Normal Voltage	DC 12V
H.V.	High Voltage	DC 13.8V
L.T.	Low Temperature	-25 °C
N.T.	Normal Temperature	+25 °C
H.T.	High Temperature	+80 °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) §27.50 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

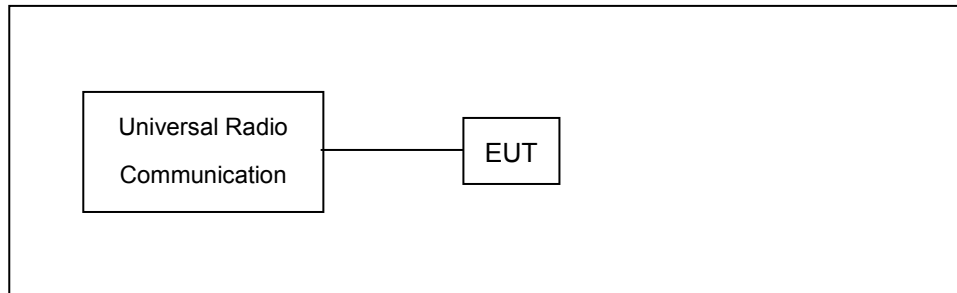
2 Measurement Procedure

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

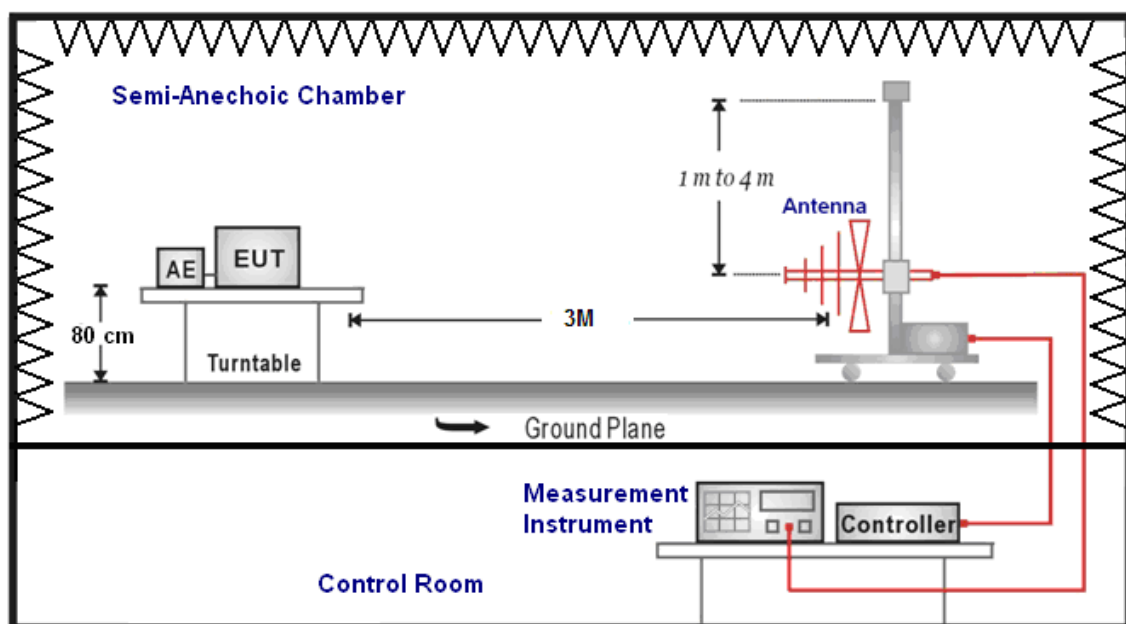
■ Limit

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

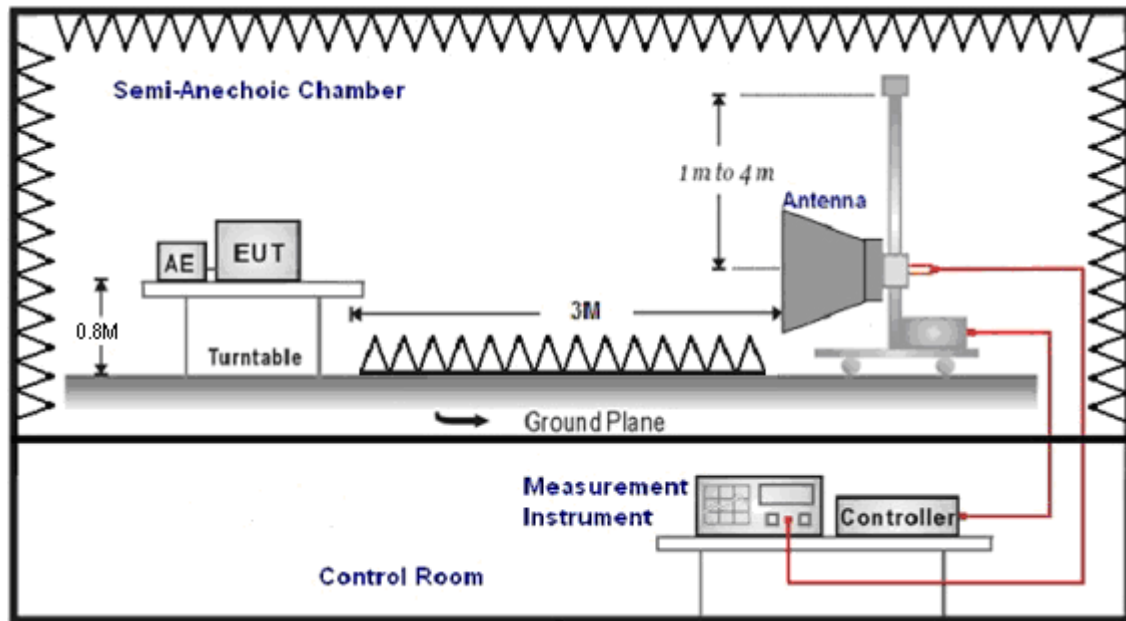
For FCC Part 24.232(c): The E.I.R.P. of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

■ Setup

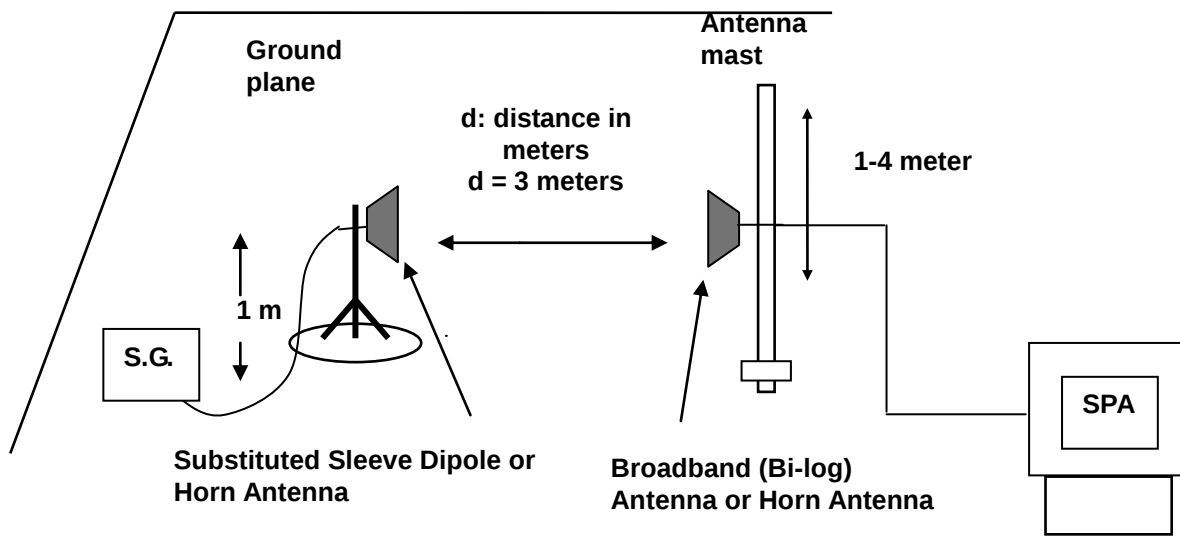
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



■ Test Procedure

For FCC

- 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. $E.I.R.P. = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$
- e. $E.R.P. = E.I.R.P. - 2.15 \text{ dB}$

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

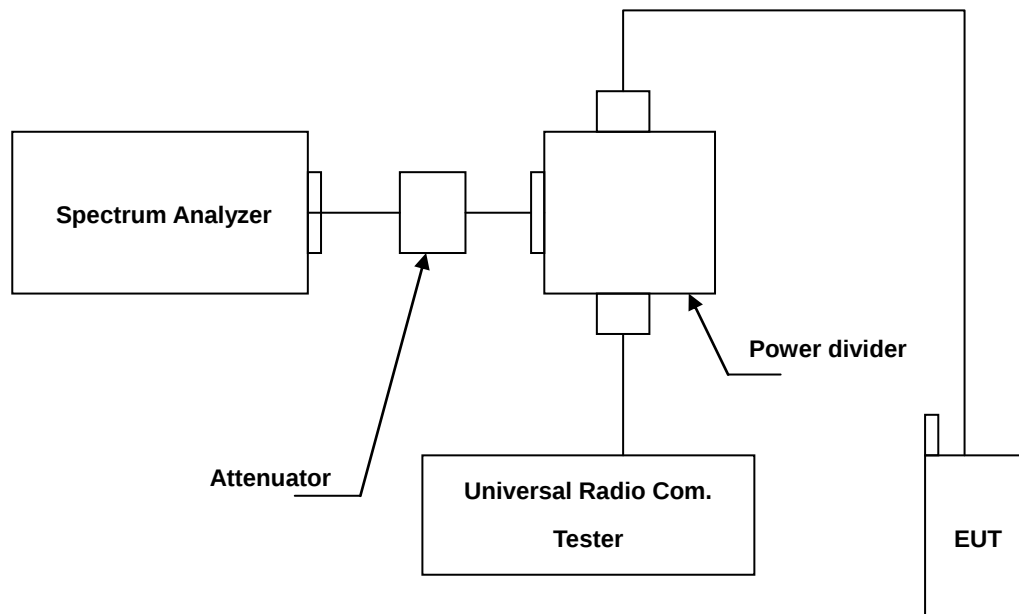
The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is $\pm 3.072 \text{ dB}$.

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.

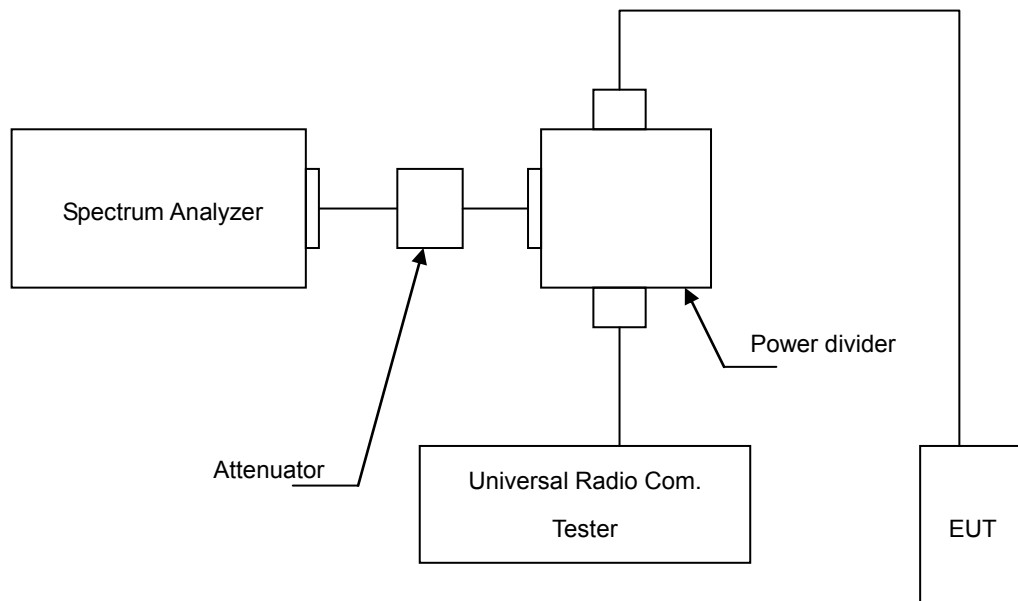
2.4. Emission Bandwidth & Occupied Bandwidth Test

■ 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 $\pm 10\text{Hz}$

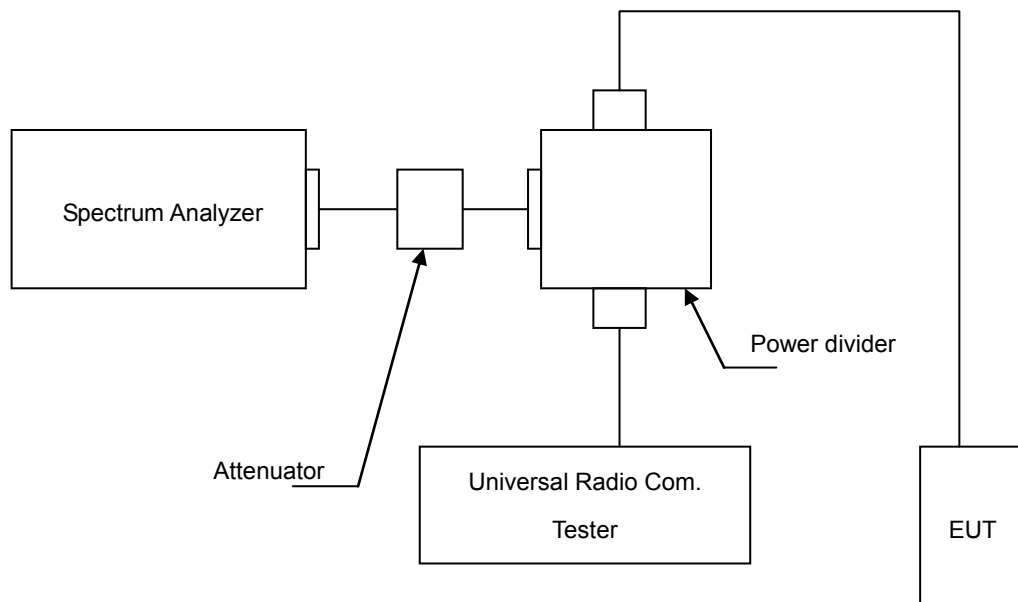
2.5. Band Edge Test

■ 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

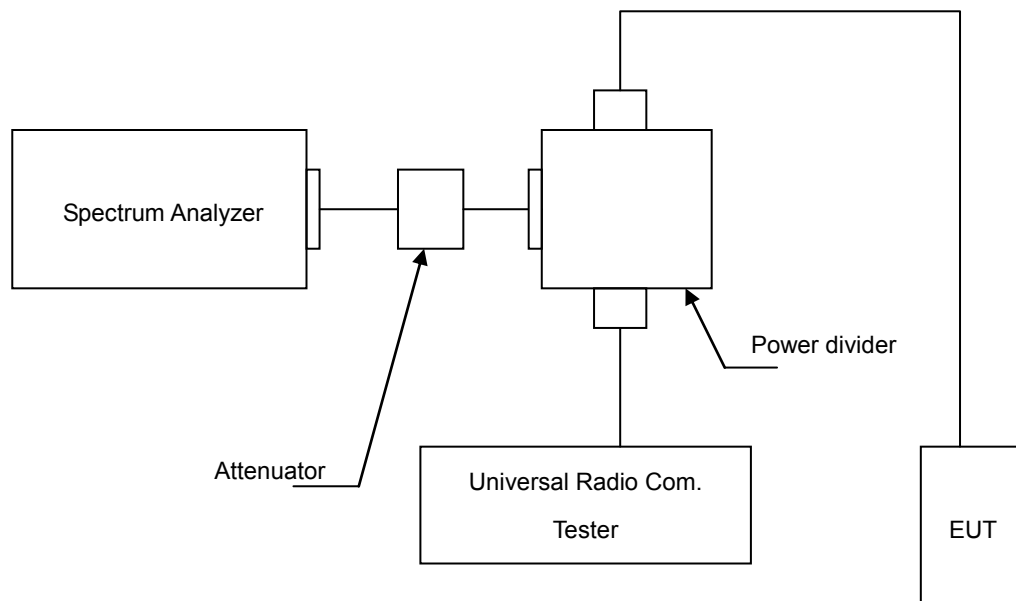
2.6. Conducted Spurious Emission Test

■ Limit

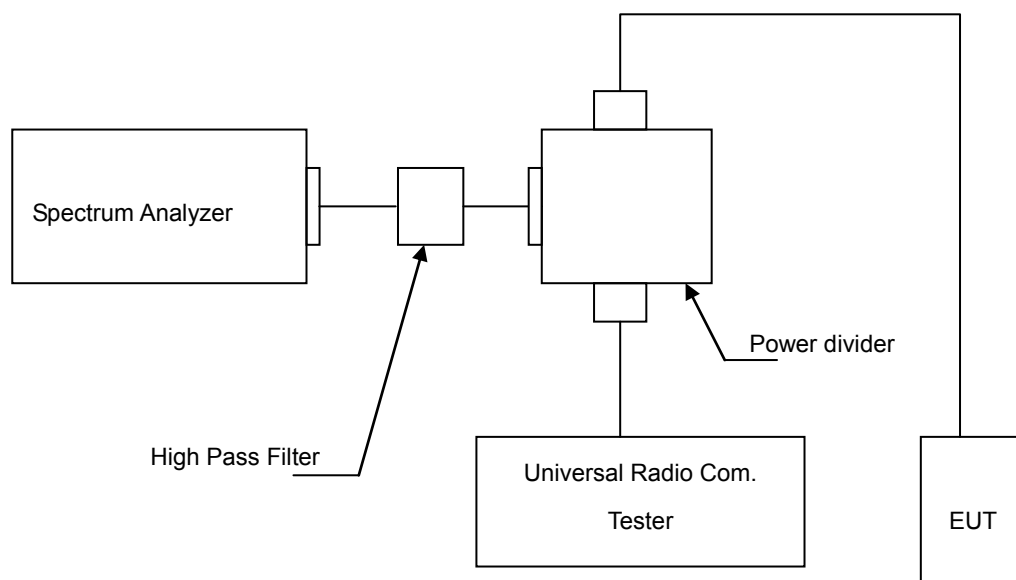
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

■ 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

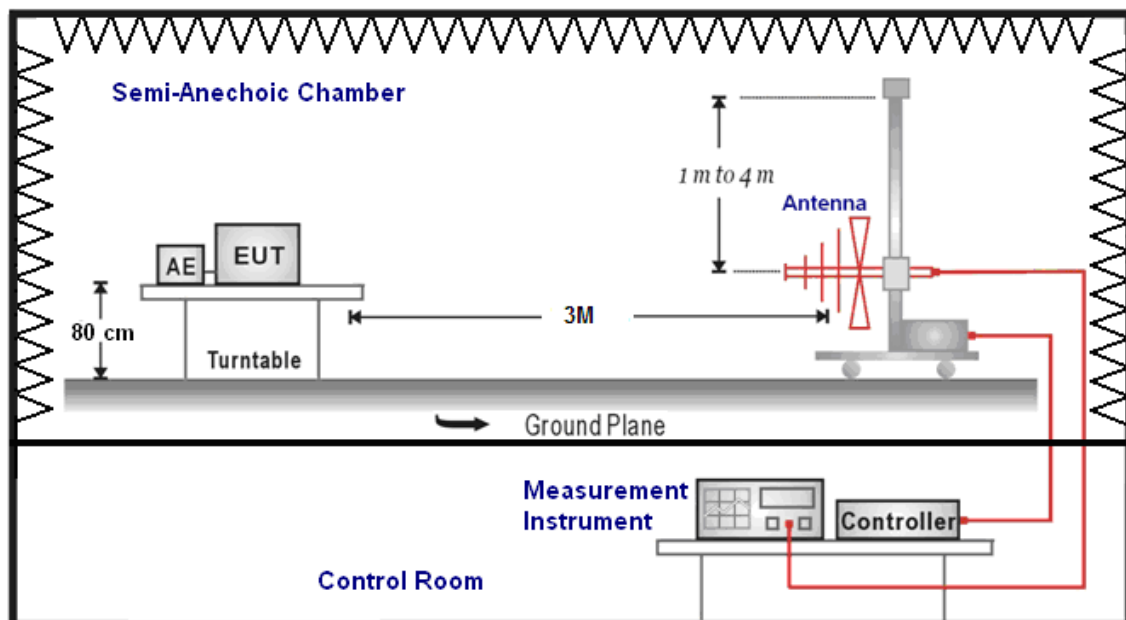
■ Limit

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.

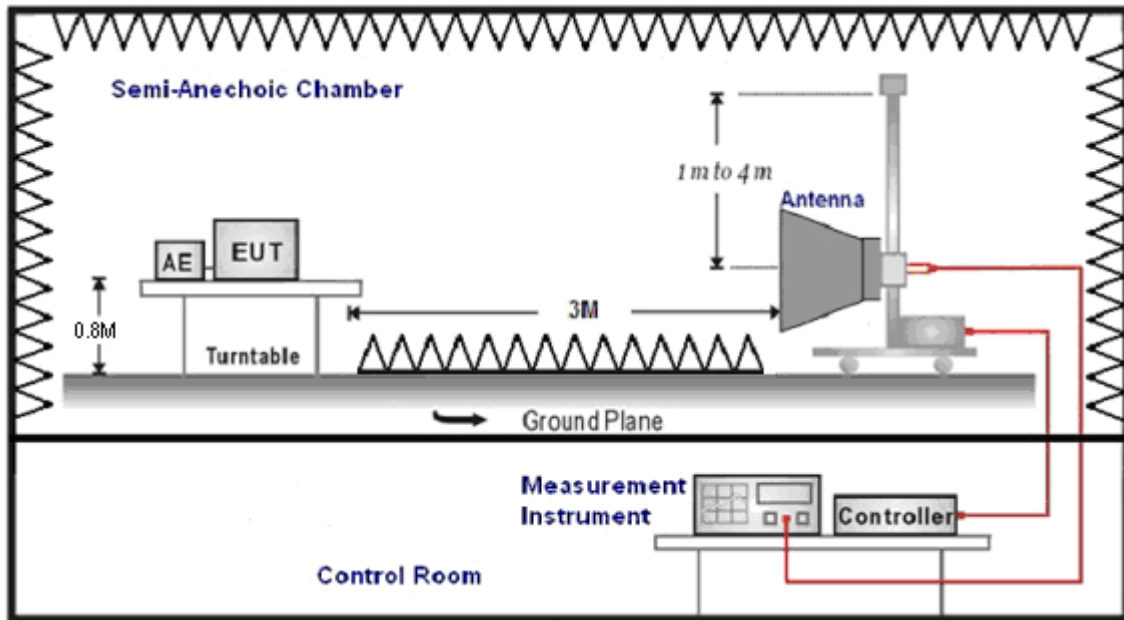
It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

■ Setup

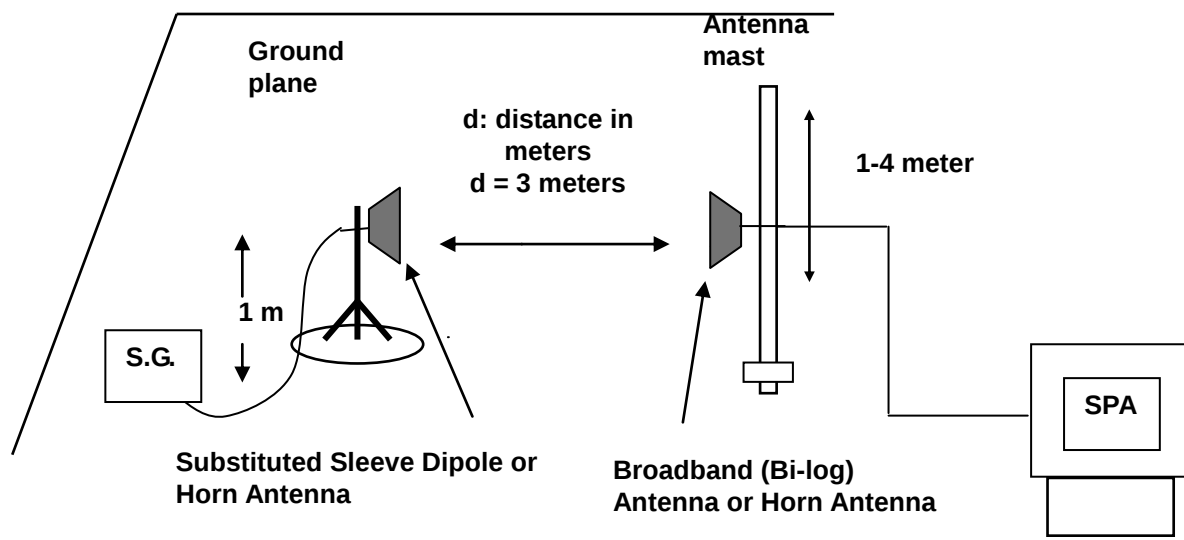
Below 1GHz



Above 1GHz



For Substituted Method Test Set-UP



■ Test Procedure

For FCC

- 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

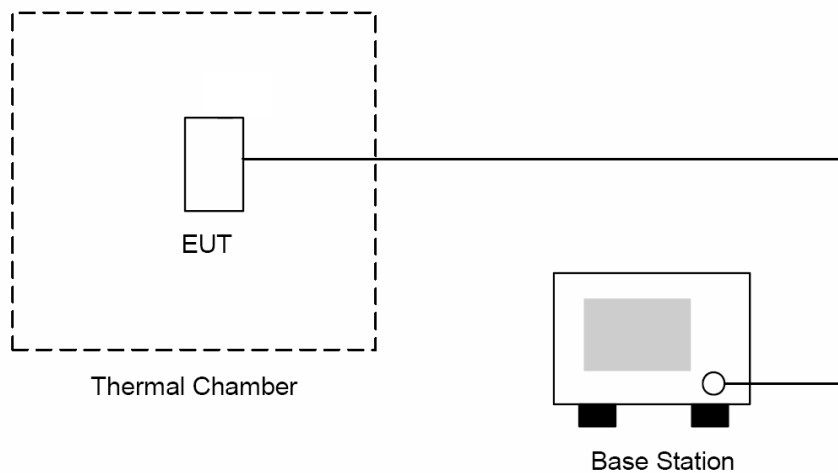
The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is ± 3.072 dB.

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 note 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

Test Mode	Test Modes description
UMTS/TM1	WCDMA system,QPSK modulation
UMTS/TM2	HSDPA system,QPSK modulation
UMTS/TM3	HSUPA system,QPSK modulation

Appendix A: Conducted Output Power

Bands	Modulation Type	Sub-Test	Frequency (MHz)	Burst Average Power		Peak Power	
				(dBm)	(W)	(dBm)	(W)
WCDMA Band II	QPSK	-----	1852.4	22.86	0.193	26.11	0.408
			1880.0	22.56	0.180	25.83	0.383
			1907.6	22.63	0.171	25.59	0.362
HSDPA Band II	QPSK	1	1852.4	22.11	0.163	25.34	0.342
			1880.0	21.82	0.152	25.06	0.321
			1907.6	21.59	0.144	24.83	0.304
		2	1852.4	21.61	0.145	24.84	0.305
			1880.0	21.32	0.136	24.53	0.284
			1907.6	21.09	0.129	24.30	0.269
		3	1852.4	21.57	0.144	24.80	0.302
			1880.0	21.26	0.134	24.49	0.281
			1907.6	21.06	0.128	24.31	0.270
		4	1852.4	21.99	0.158	25.24	0.334
			1880.0	21.71	0.148	24.95	0.313
			1907.6	21.52	0.142	24.78	0.301
HSUPA Band II	QPSK	1	1852.4	21.57	0.144	24.83	0.304
			1880.0	21.31	0.135	24.60	0.288
			1907.6	21.08	0.128	24.35	0.272
		2	1852.4	19.57	0.091	22.84	0.192
			1880.0	19.29	0.085	22.54	0.179
			1907.6	19.06	0.081	22.32	0.171
		3	1852.4	20.56	0.114	23.84	0.242
			1880.0	20.28	0.107	23.56	0.227
			1907.6	20.07	0.102	23.35	0.216
		4	1852.4	19.55	0.090	22.81	0.191
			1880.0	19.26	0.084	22.52	0.179
			1907.6	19.02	0.080	22.28	0.169
		5	1852.4	21.41	0.138	24.66	0.292
			1880.0	21.14	0.130	24.37	0.274
			1907.6	20.96	0.125	24.22	0.264

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

Bands	Modulation Type	Sub-Test	Frequency (MHz)	Burst Average Power		Peak Power	
				(dBm)	(W)	(dBm)	(W)
WCDMA Band V	QPSK	-----	826.4	23.65	0.232	26.92	0.492
			836.6	23.48	0.223	26.71	0.469
			846.6	23.49	0.223	26.76	0.474
HSDPA Band V	QPSK	1	826.4	22.82	0.191	26.05	0.403
			836.6	22.61	0.182	25.83	0.383
			846.6	22.63	0.183	25.89	0.388
		2	826.4	22.33	0.171	25.55	0.359
			836.6	22.09	0.162	25.30	0.339
			846.6	22.13	0.163	25.35	0.343
		3	826.4	22.26	0.168	25.49	0.354
			836.6	22.05	0.160	25.32	0.340
			846.6	22.09	0.162	25.33	0.341
		4	826.4	22.71	0.187	25.98	0.396
			836.6	22.49	0.177	25.73	0.374
			846.6	22.52	0.179	25.77	0.378
HSUPA Band V	QPSK	1	826.4	22.14	0.164	25.43	0.349
			836.6	21.94	0.156	25.21	0.332
			846.6	21.98	0.158	25.25	0.335
		2	826.4	20.14	0.103	23.39	0.218
			836.6	19.96	0.099	23.20	0.209
			846.6	19.99	0.100	23.24	0.211
		3	826.4	21.11	0.129	24.40	0.275
			836.6	20.92	0.124	24.21	0.264
			846.6	20.95	0.124	24.20	0.263
		4	826.4	20.11	0.103	23.35	0.216
			836.6	19.89	0.097	23.16	0.207
			846.6	19.95	0.099	23.20	0.209
		5	826.4	21.99	0.158	25.24	0.334
			836.6	21.77	0.150	25.02	0.318
			846.6	21.85	0.153	25.12	0.325

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

Appendix B: Effective Radiated Power / Equivalent Isotropic Radiated Power Test

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	61.73	-39.30	22.43	0.175	< 2
			V	59.71	-39.30	20.41	0.110	< 2
		1880.0	H	61.79	-39.34	22.45	0.176	< 2
			V	59.73	-39.34	20.39	0.109	< 2
		1907.6	H	61.54	-39.36	22.18	0.165	< 2
			V	59.66	-39.36	20.30	0.107	< 2

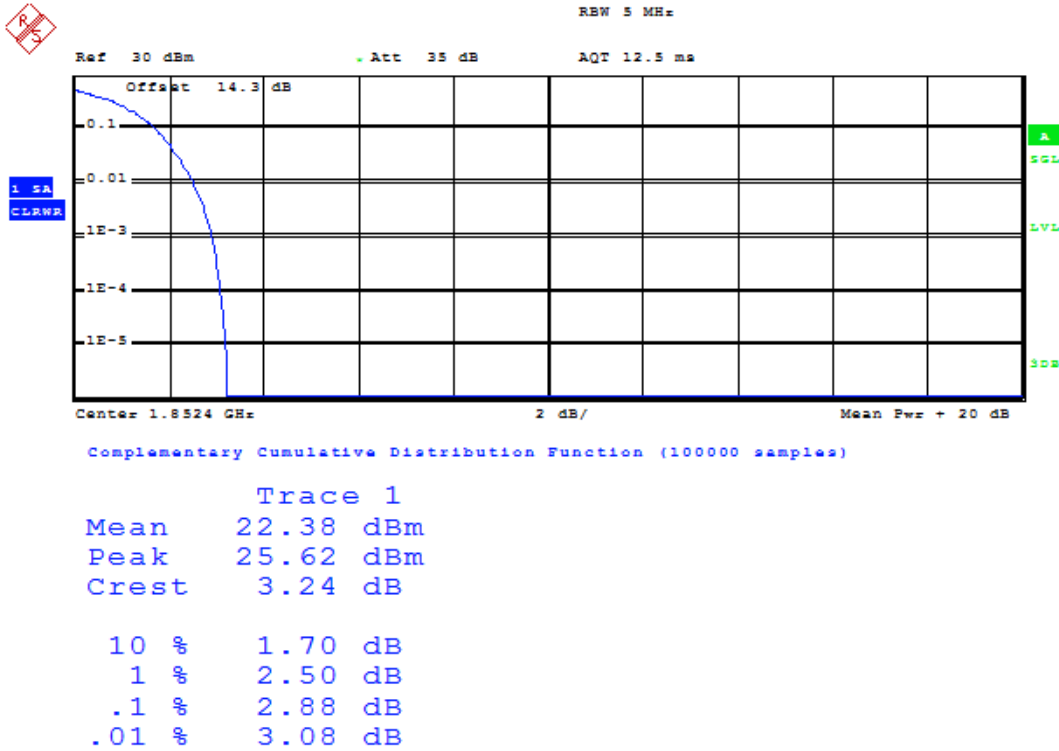
Band 5								
Band	Modulation	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction Factor (dBm)	E.R.P.		Limit (W)
						(dBm)	(W)	
WCDMA	QPSK	826.4	H	15.86	8.79	24.65	0.292	< 7
			V	13.89	8.78	22.67	0.185	< 7
		836.6	H	15.57	8.95	24.52	0.283	< 7
			V	13.57	8.95	22.52	0.179	< 7
		846.6	H	13.04	11.26	24.30	0.269	< 7
			V	13.13	9.09	22.22	0.167	< 7

**Appendix C: Peak to Average Ratio**

Test Band	Test Mode	Test Channel	Measured (db)	Limit (db)	Verdict
WCDMA1900	UMTS/TM1	LCH	2.88	13	PASS
		MCH	3.14	13	PASS
		HCH	3.08	13	PASS



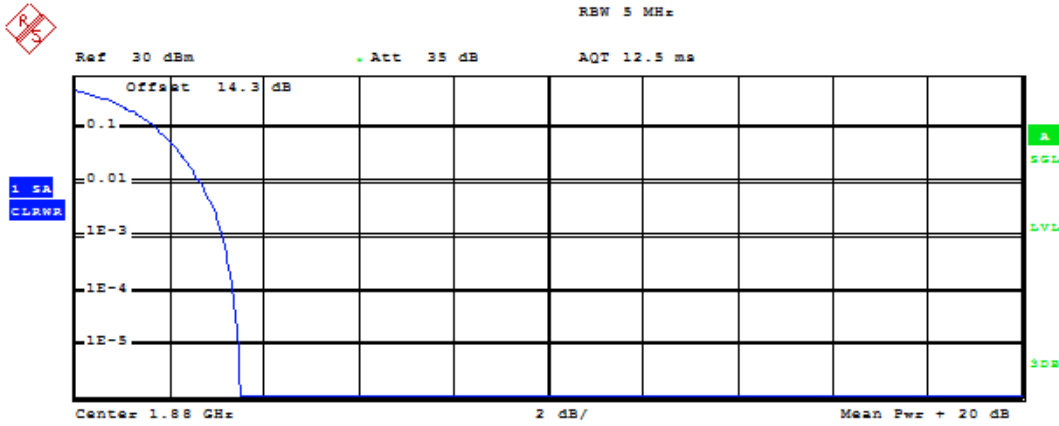
- 1 For WCDMA
 - 1.1 Test Band=WCDMA850
 - 1.1.1 Test Mode=UMTS/TM1
 - 1.1.1.1 Test Channel=LCH



Date: 5.OCT.2017 07:08:42



1.1.1.2 Test Channel=MCH



Complementary Cumulative Distribution Function (100000 samples)

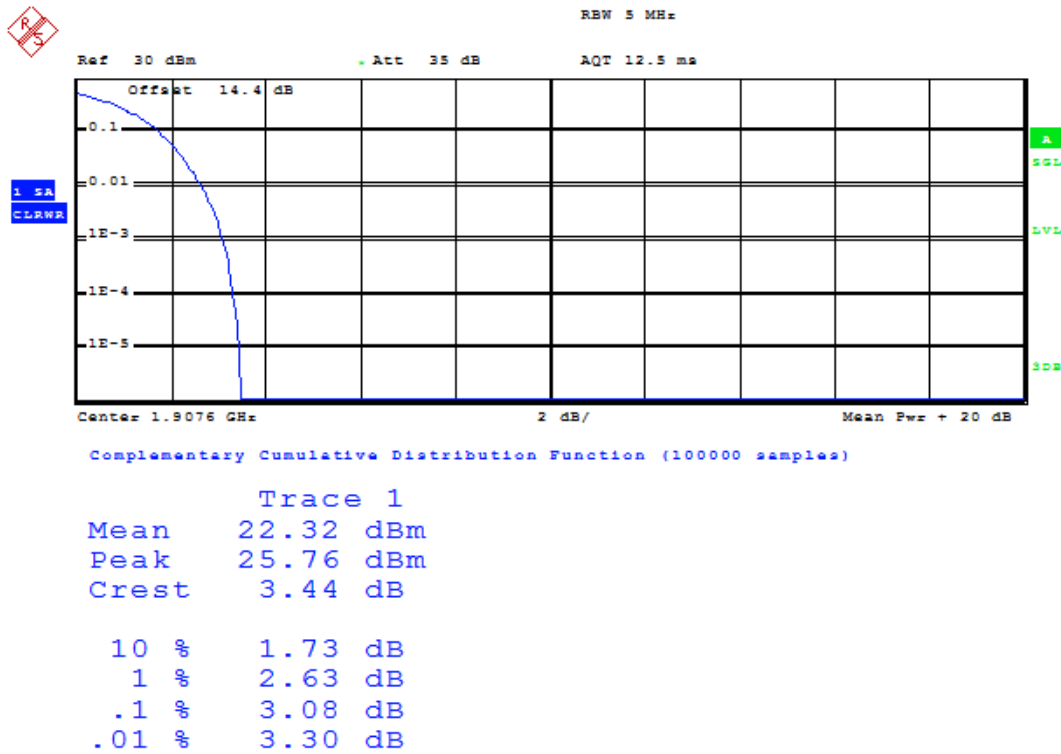
Trace 1

Mean	22.18 dBm
Peak	25.69 dBm
Crest	3.51 dB
10 %	1.73 dB
1 %	2.66 dB
.1 %	3.14 dB
.01 %	3.33 dB

Date: 5.OCT.2017 07:09:01



1.1.1.3 Test Channel=HCH



Date: 5.OCT.2017 07:09:20

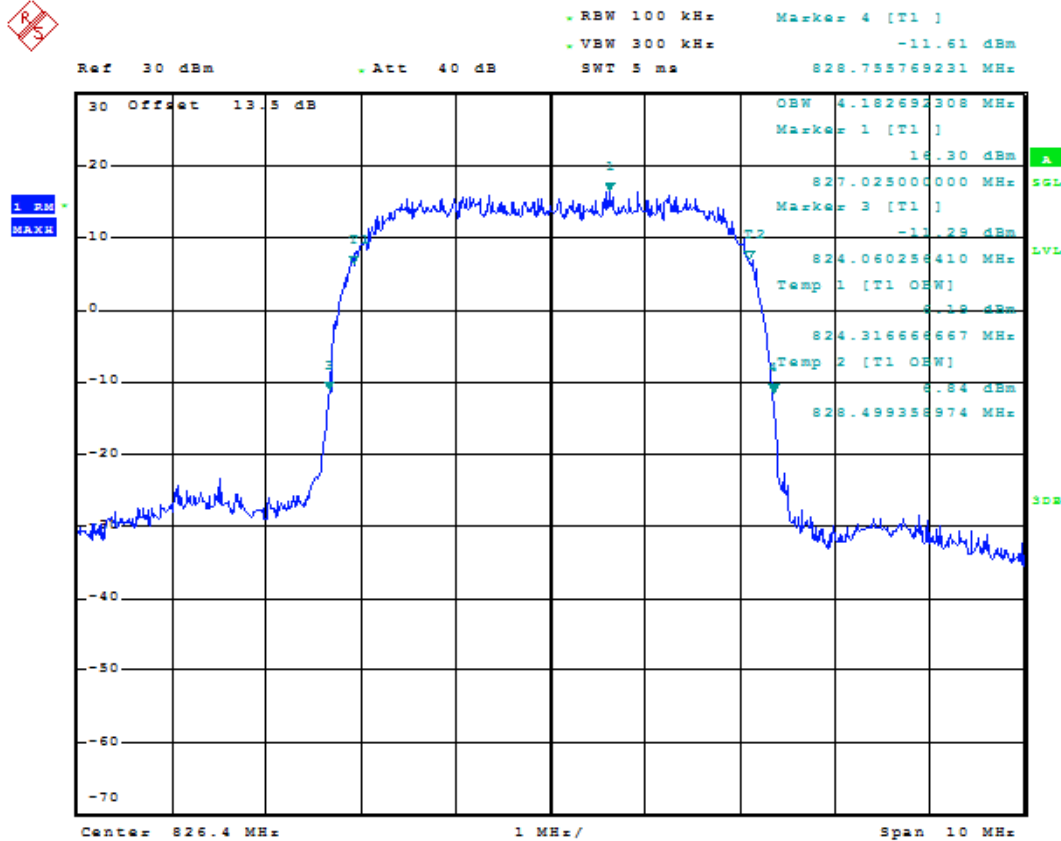
Appendix D: Emission Bandwidth & Occupied Bandwidth

Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
WCDMA850	UMTS/TM1	LCH	4182.7	4696	PASS
		MCH	4166.7	4696	PASS
		HCH	4166.7	4696	PASS

Test Band	Test Mode	Test Channel	Occupied Bandwidth (KHZ)	Emission Bandwidth (KHZ)	Verdict
WCDMA1900	UMTS/TM1	LCH	4182.7	4712	PASS
		MCH	4198.7	4712	PASS
		HCH	4182.7	4696	PASS

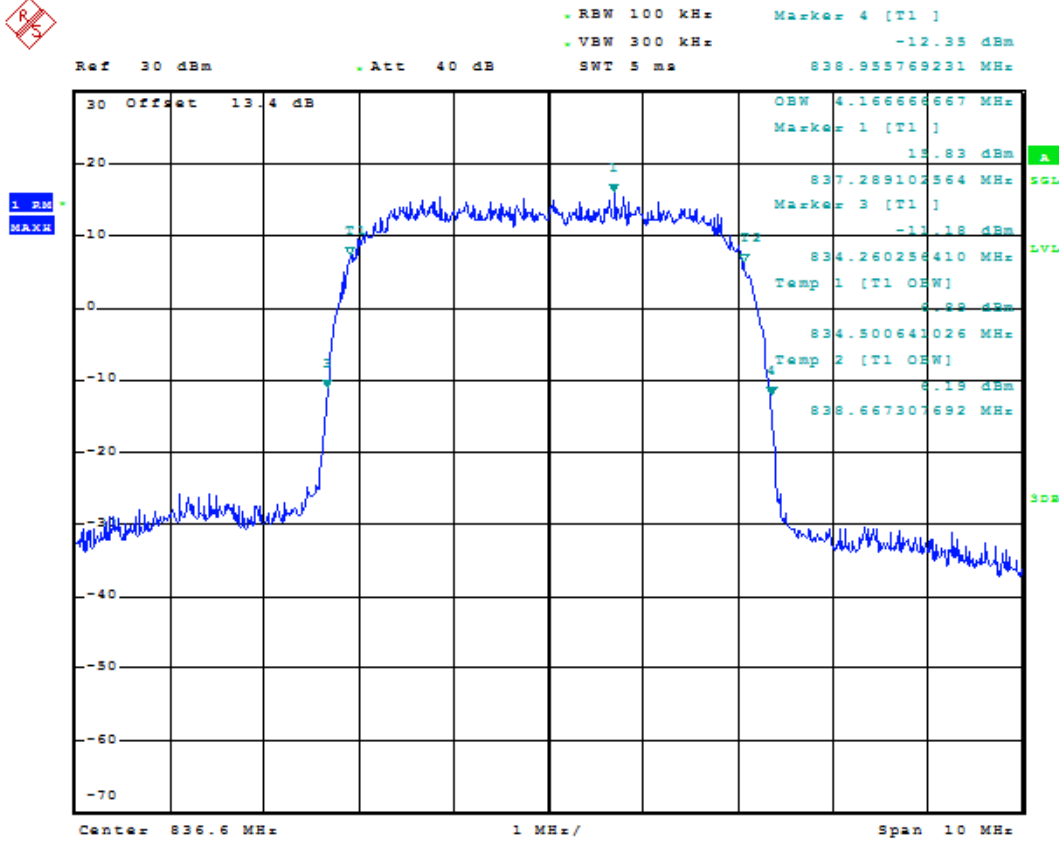


2 For WCDMA
2.1 Test Band=WCDMA850
2.1.1 Test Mode=UMTS/TM1
2.1.1.1 Test Channel=LCH



Date: 5.OCT.2017 06:54:45

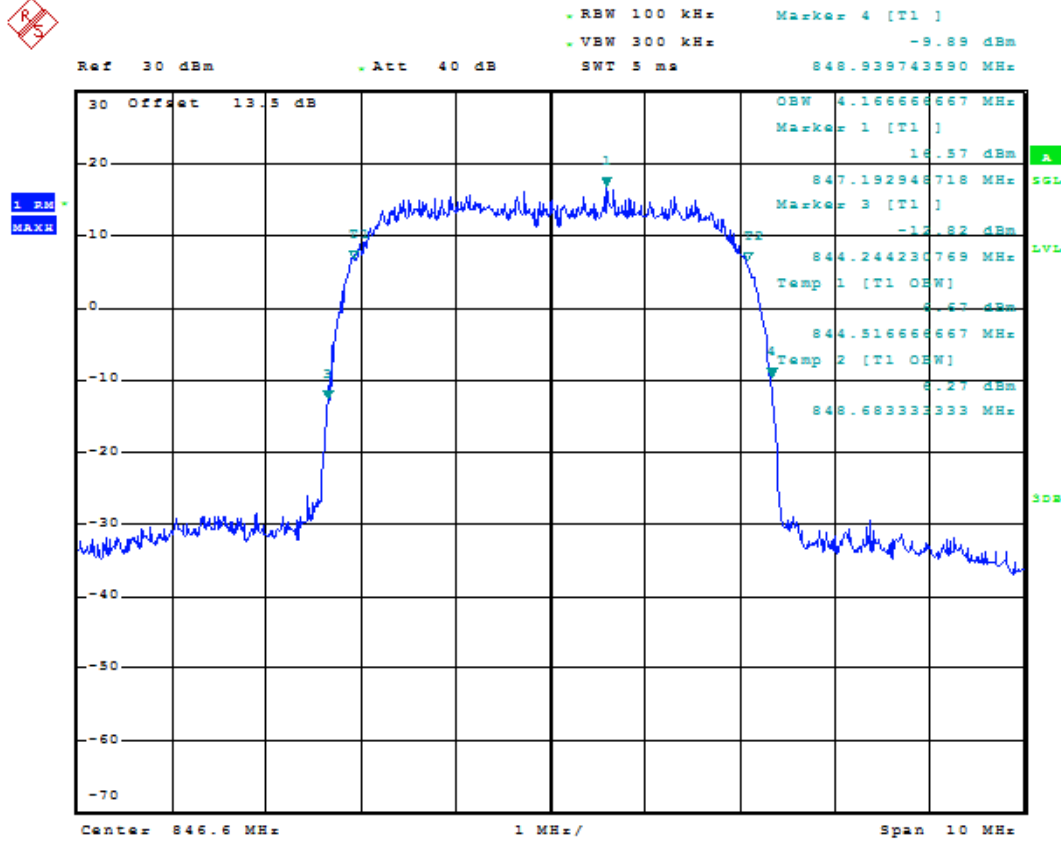
2.1.1.2 Test Channel=MCH



Date: 5.OCT.2017 06:55:08



2.1.1.3 Test Channel=HCH



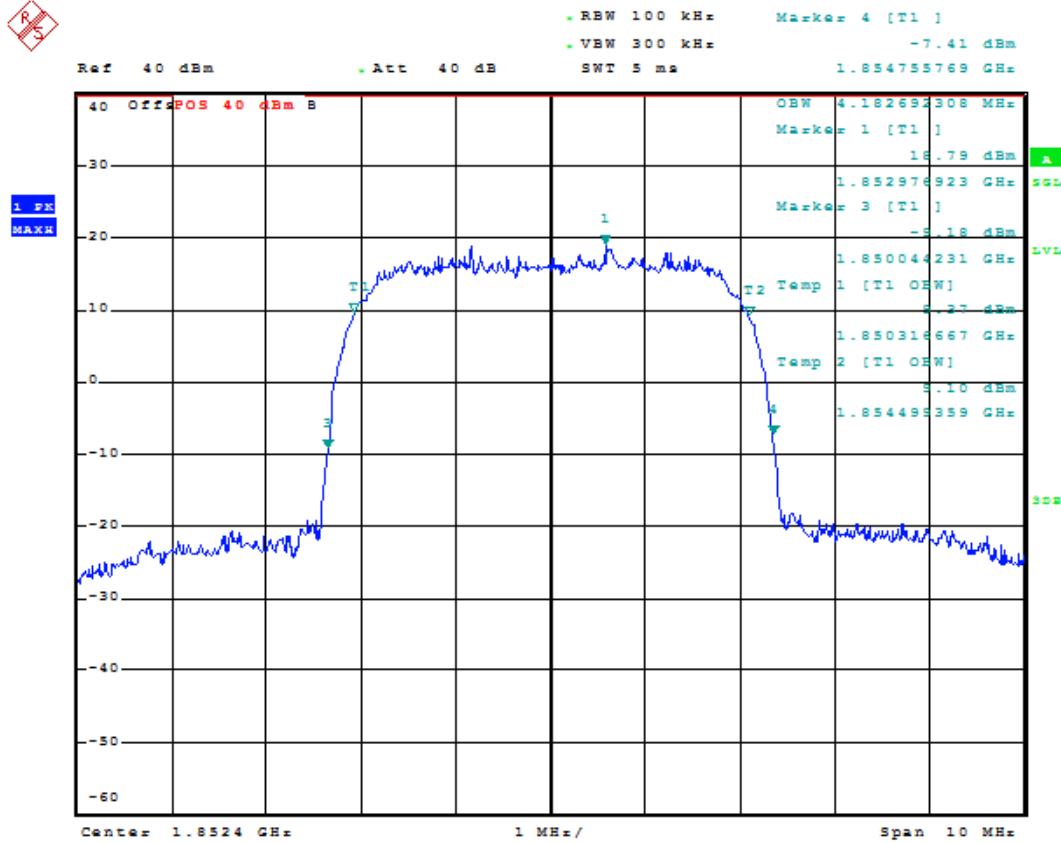
Date: 5.OCT.2017 06:55:30



2.2 Test Band=WCDMA1900

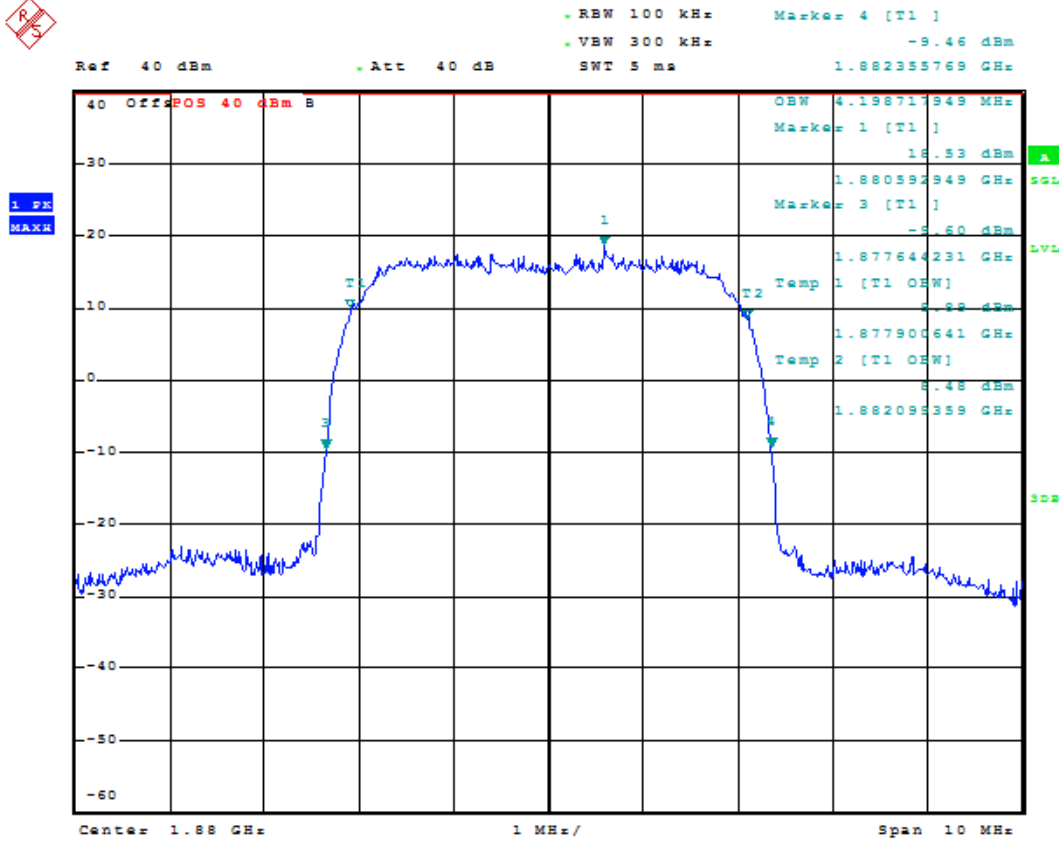
2.2.1 Test Mode=UMTS/TM1

2.2.1.1 Test Channel=LCH



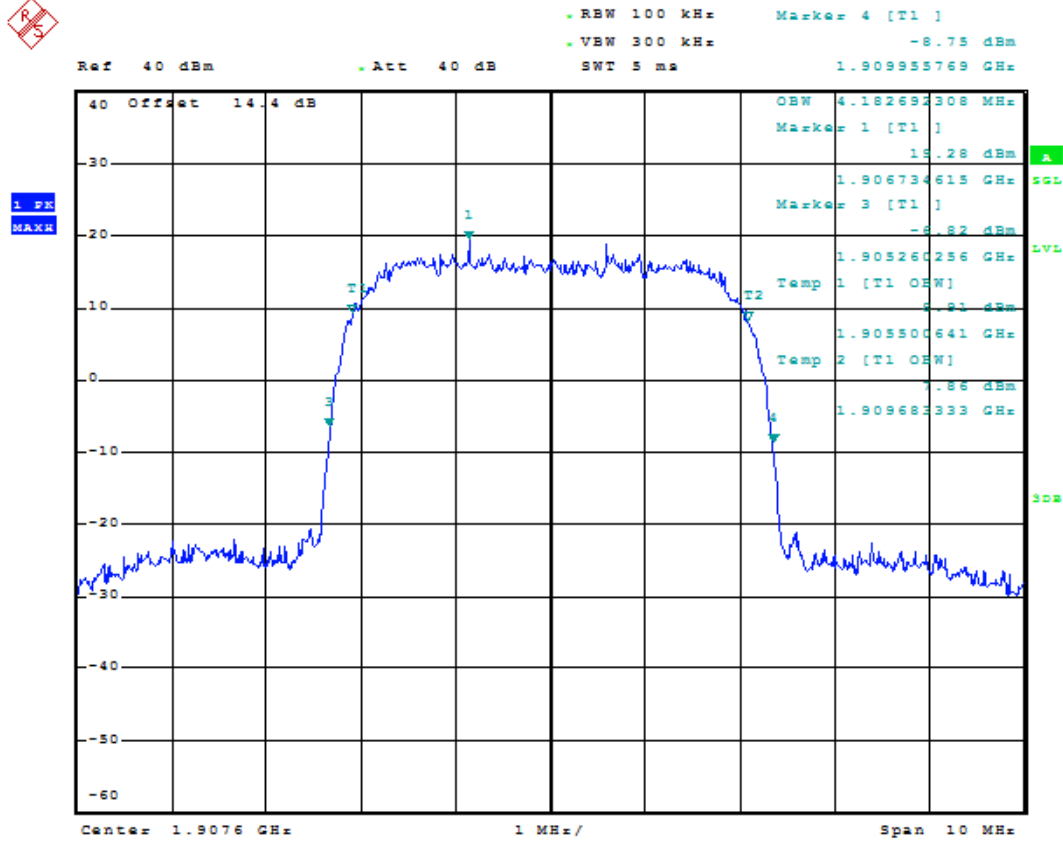
Date: 5.OCT.2017 07:10:08

2.2.1.2 Test Channel=MCH



Date: 5.OCT.2017 07:10:31

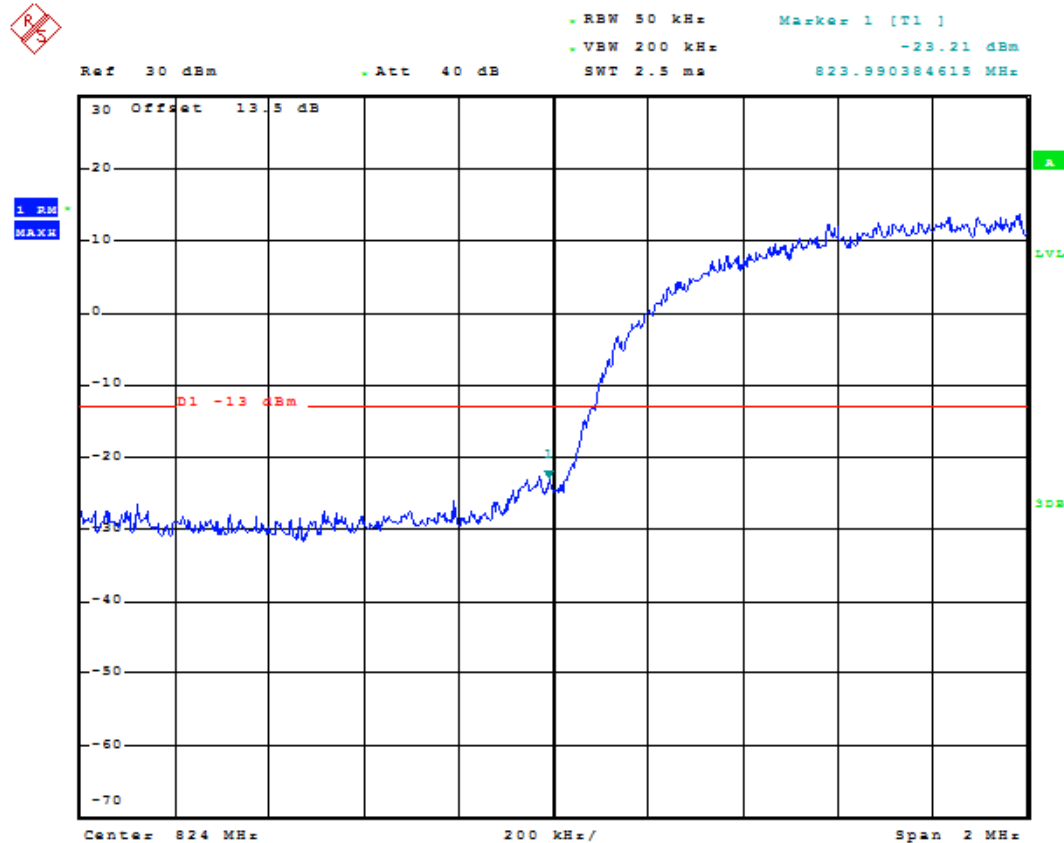
2.2.1.3 Test Channel=HCH



Date: 5.OCT.2017 07:10:54

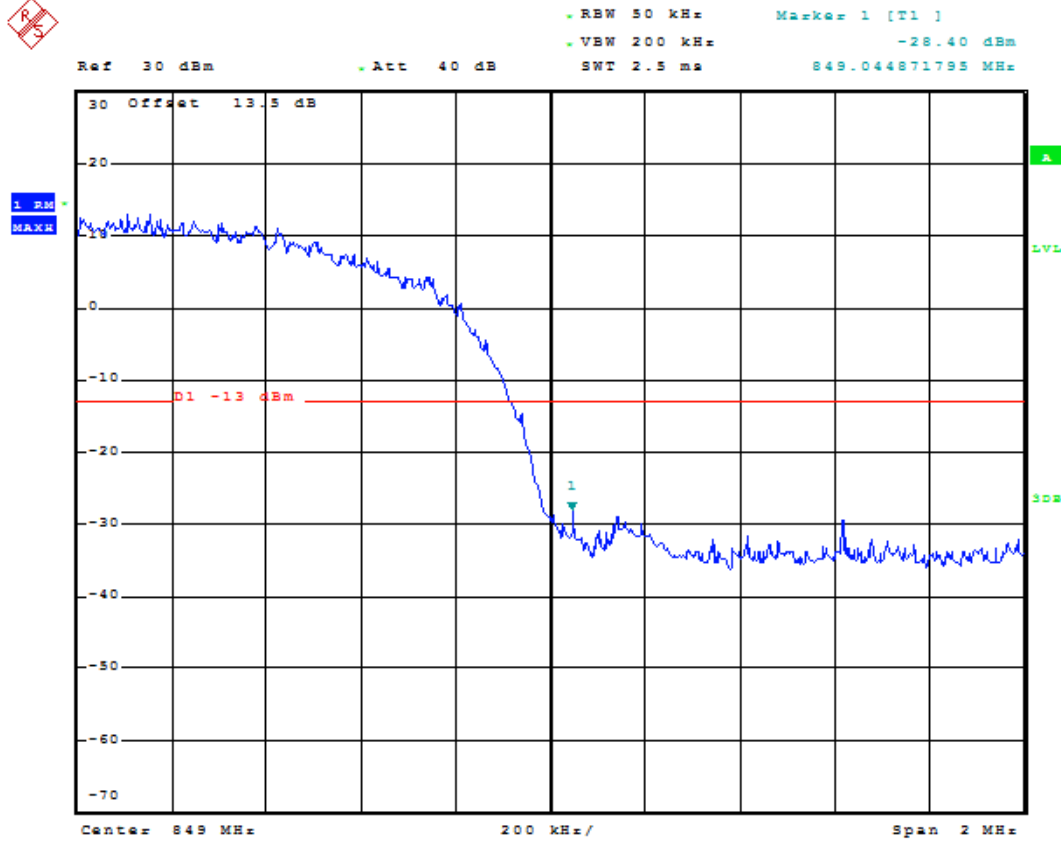
Appendix E: Band Edge Measurement

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



Date: 5.OCT.2017 06:56:00

1.1.1.2 Test Channel=HCH

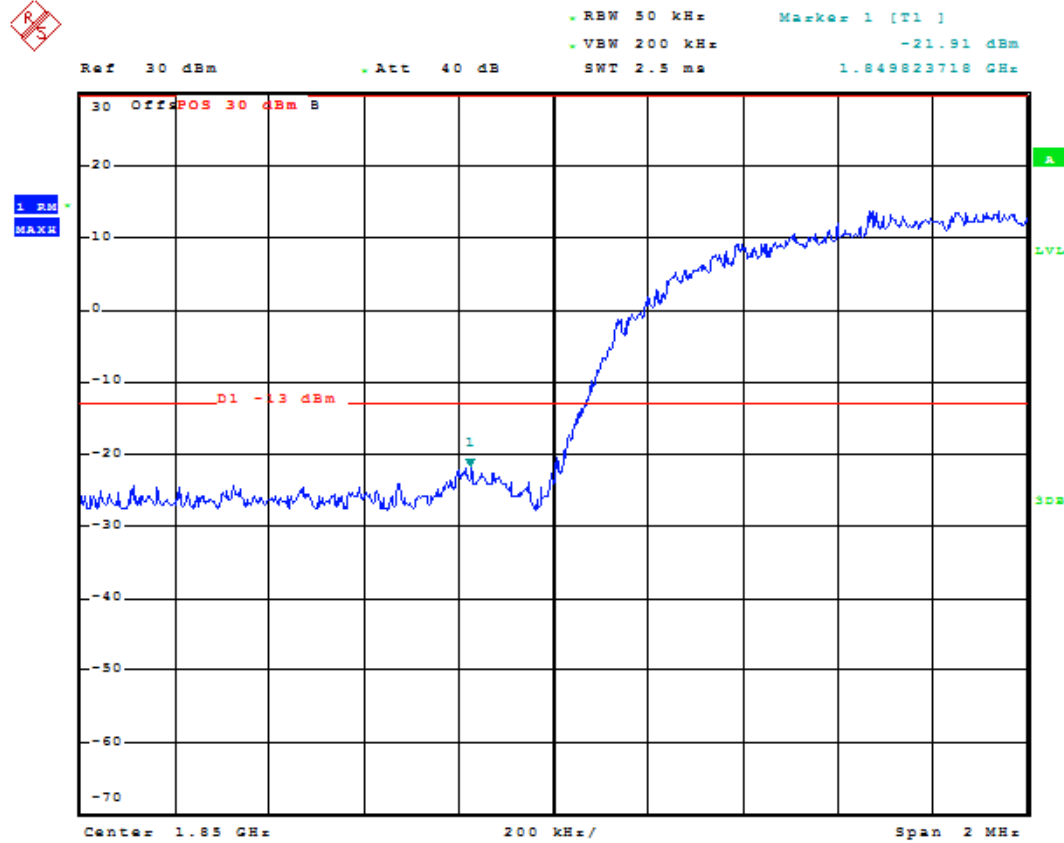


Date: 5.OCT.2017 06:56:15

1.2 Test Band=WCDMA1900

1.2.1 Test Mode=UMTSTM1

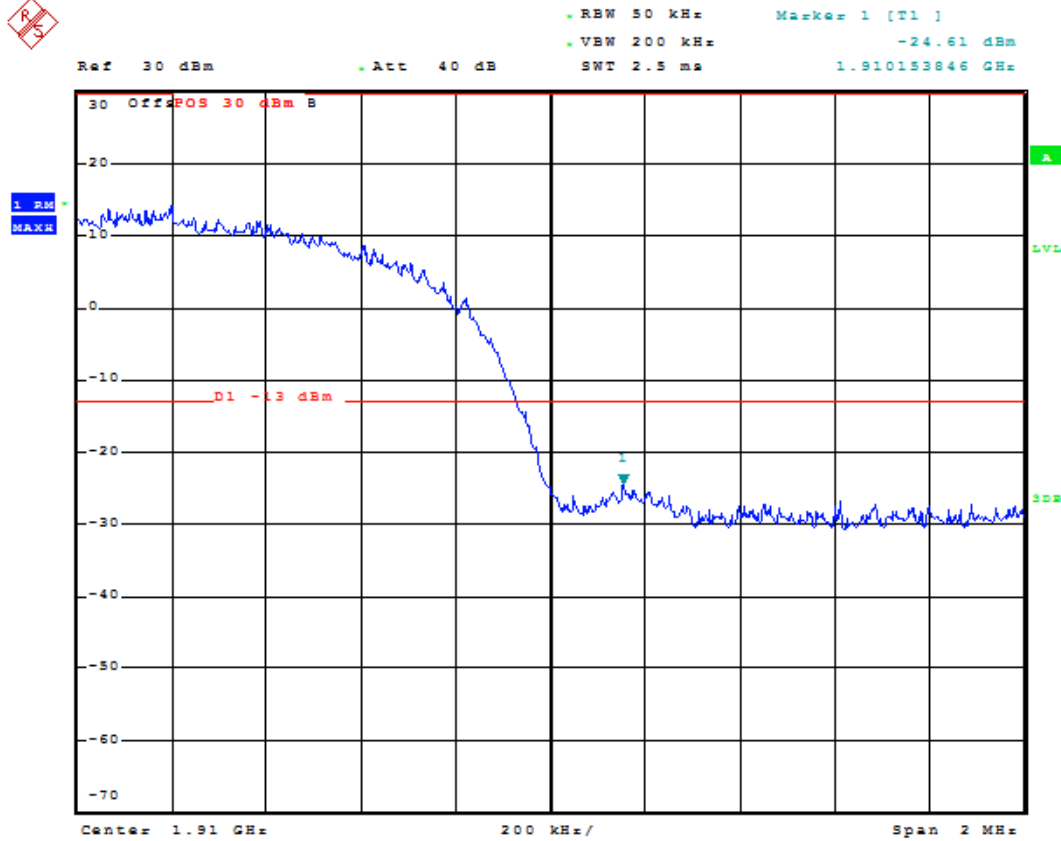
1.2.1.1 Test Channel=LCH



Date: 5.OCT.2017 07:11:23



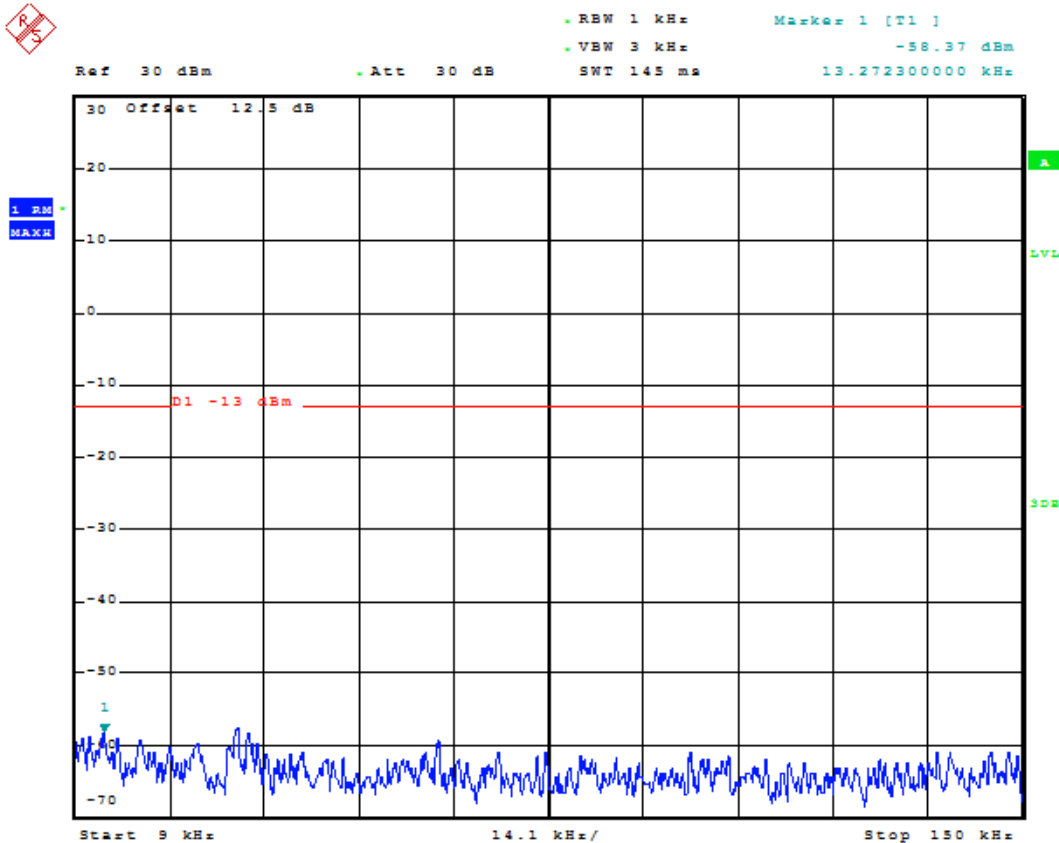
1.2.1.2 Test Channel=HCH



Date: 5.OCT.2017 07:11:38

Appendix F: Spurious Emission at Antenna Terminal

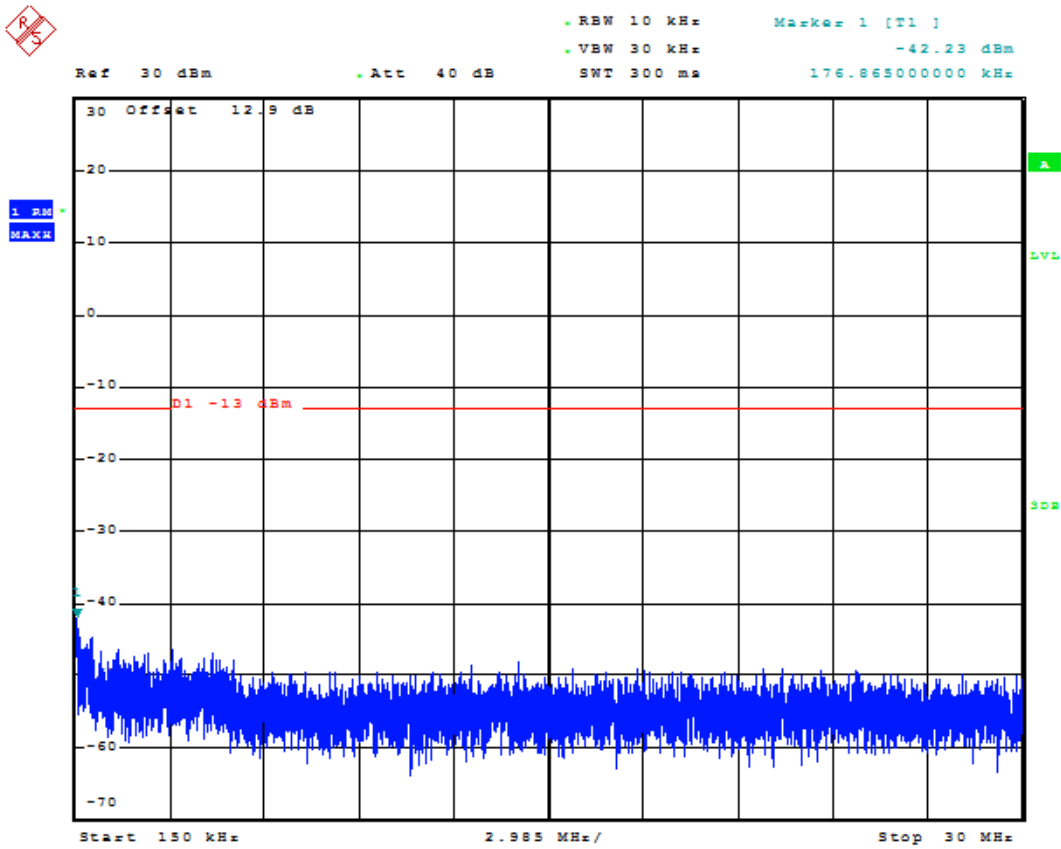
- 1 For WCDMA
- 1.1 Test Band=WCDMA850
- 1.1.1 Test Mode=UMTS/TM1
- 1.1.1.1 Test Channel=LCH



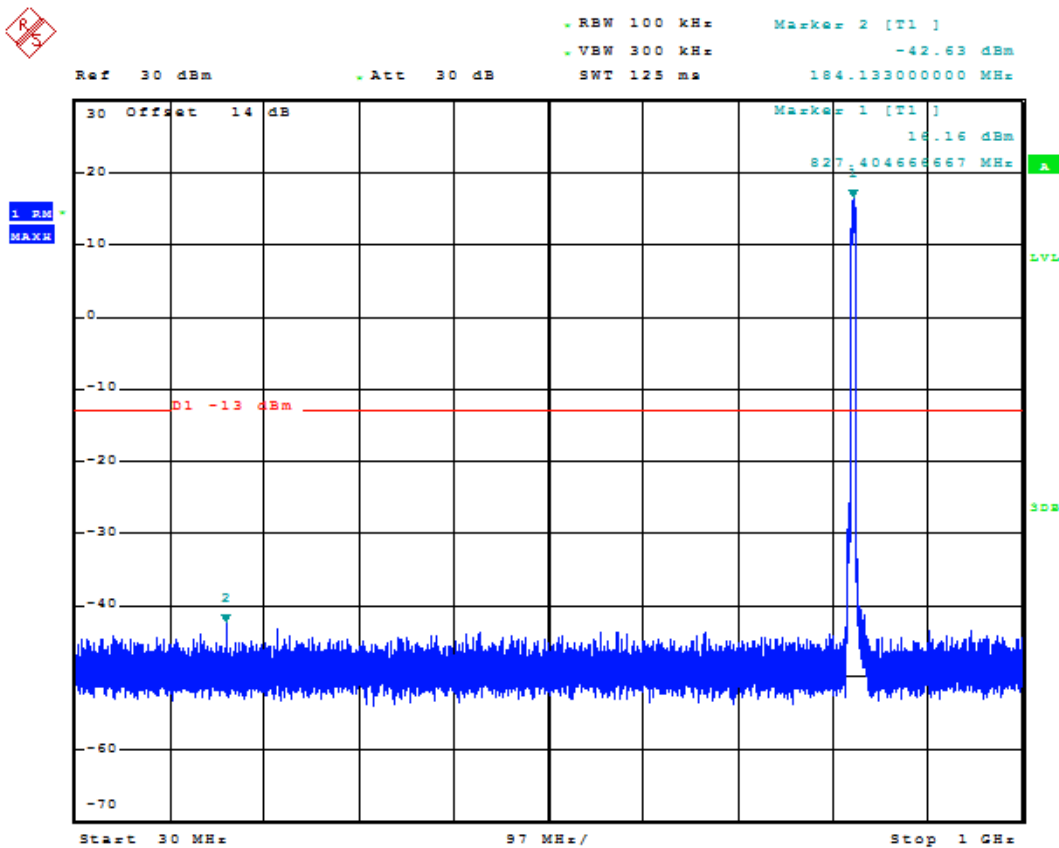
Date: 5.OCT.2017 06:56:42



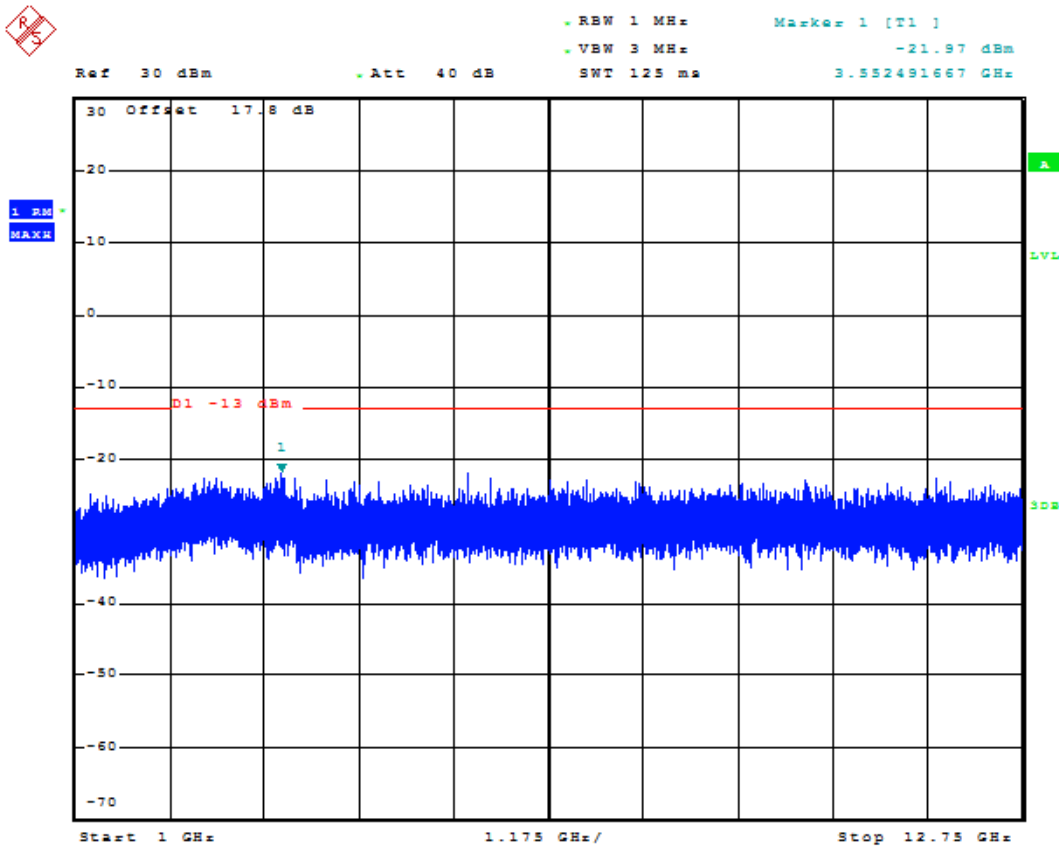
Report Number: 1709FR18-01



Date: 5.OCT.2017 06:57:05



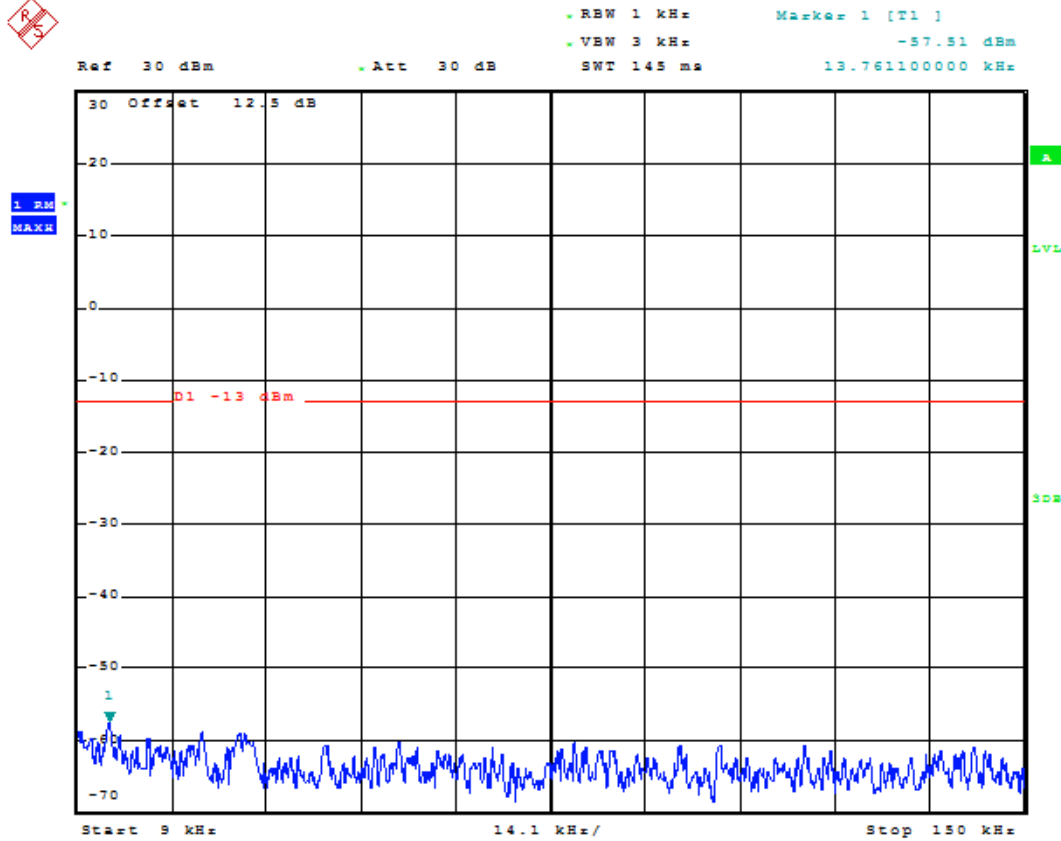
Date: 5.OCT.2017 06:57:15



Date: 5.OCT.2017 06:57:24



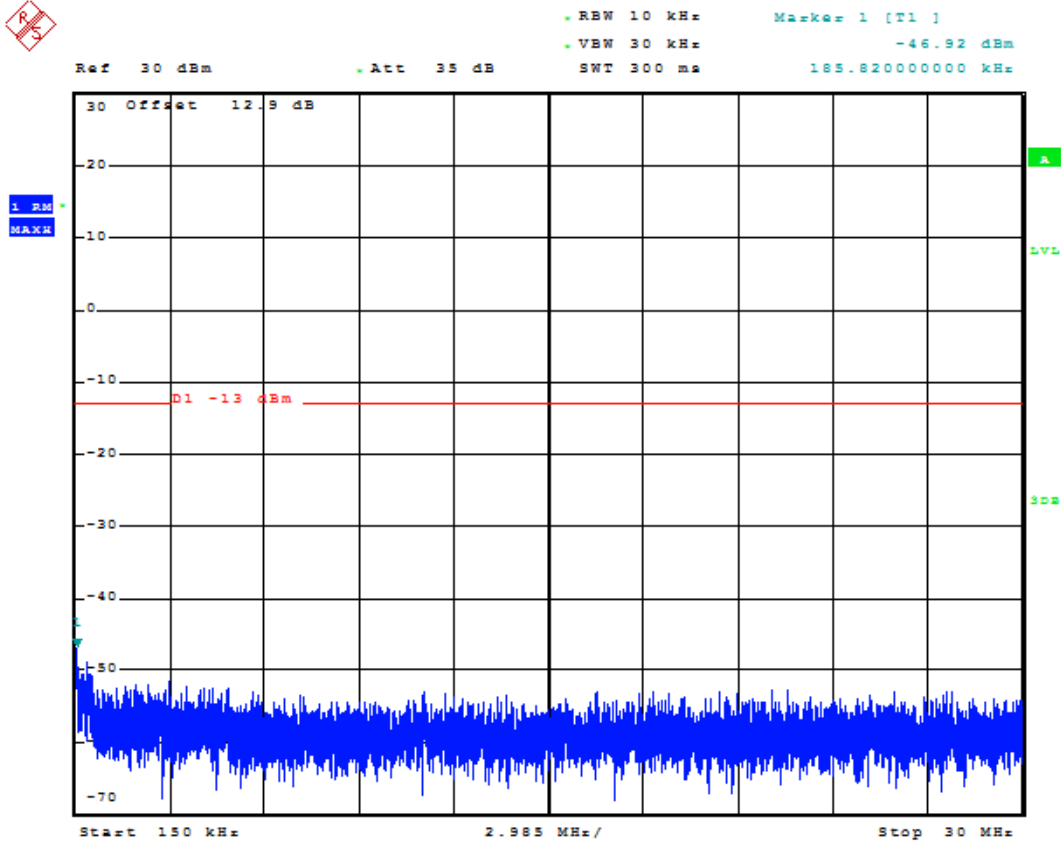
1.1.1.2 Test Channel=MCH



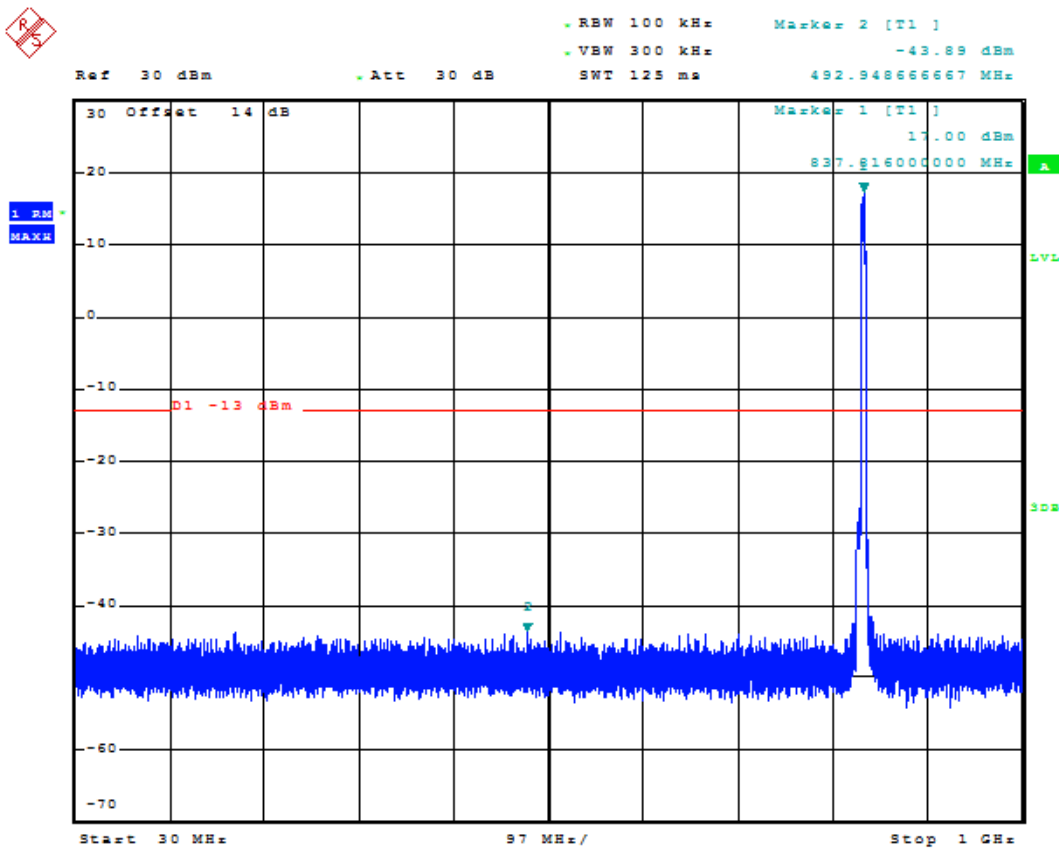
Date: 5.OCT.2017 06:57:36



Report Number: 1709FR18-01



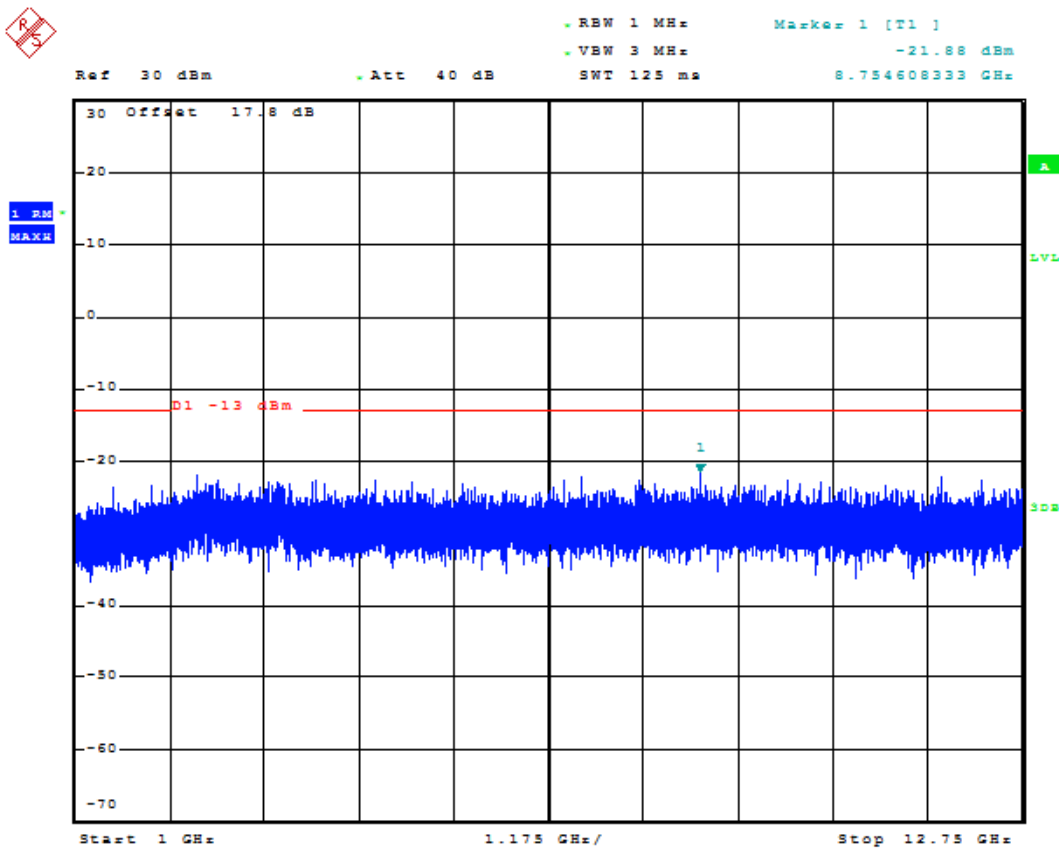
Date: 5.OCT.2017 06:57:52



Date: 5.OCT.2017 06:58:02



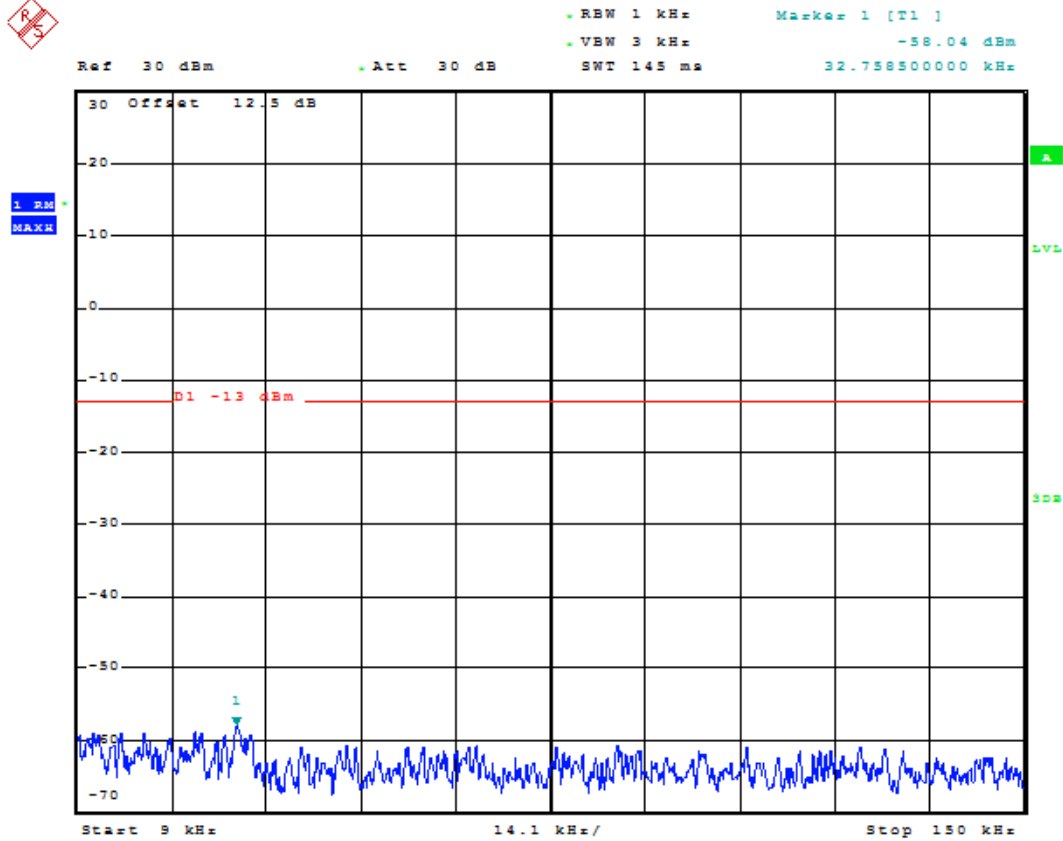
Report Number: 1709FR18-01



Date: 5.OCT.2017 06:58:10



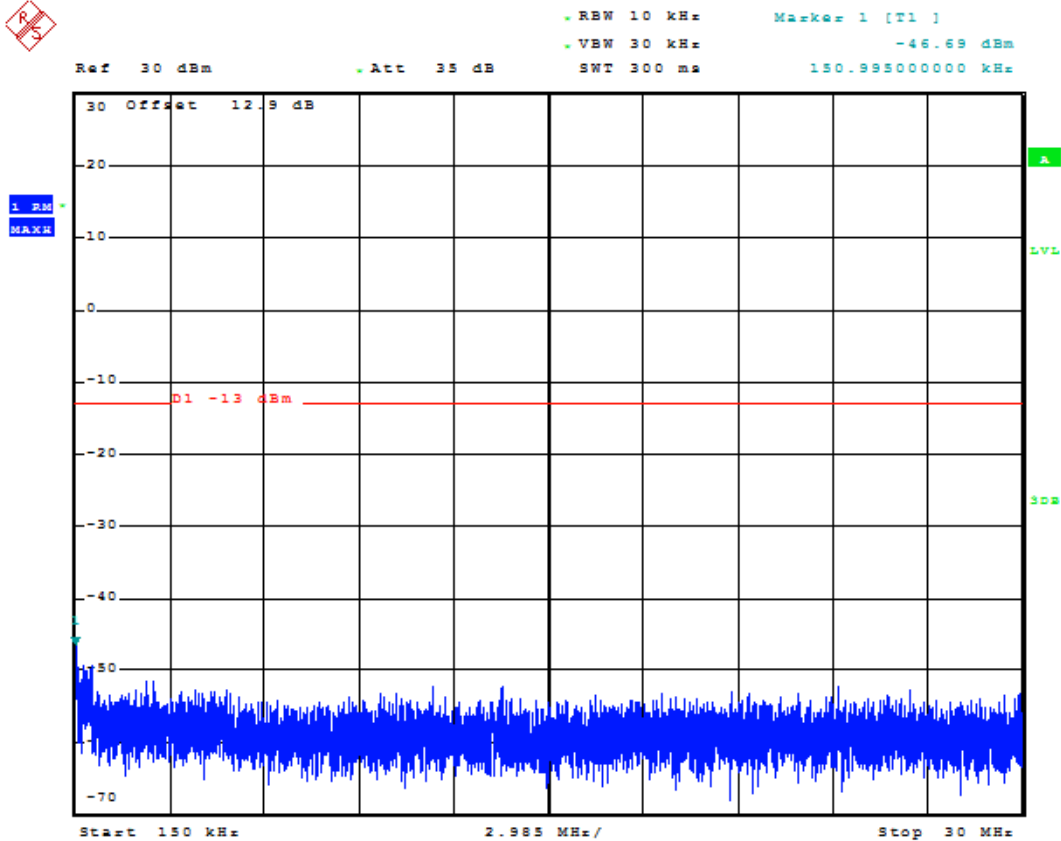
1.1.1.3 Test Channel=HCH



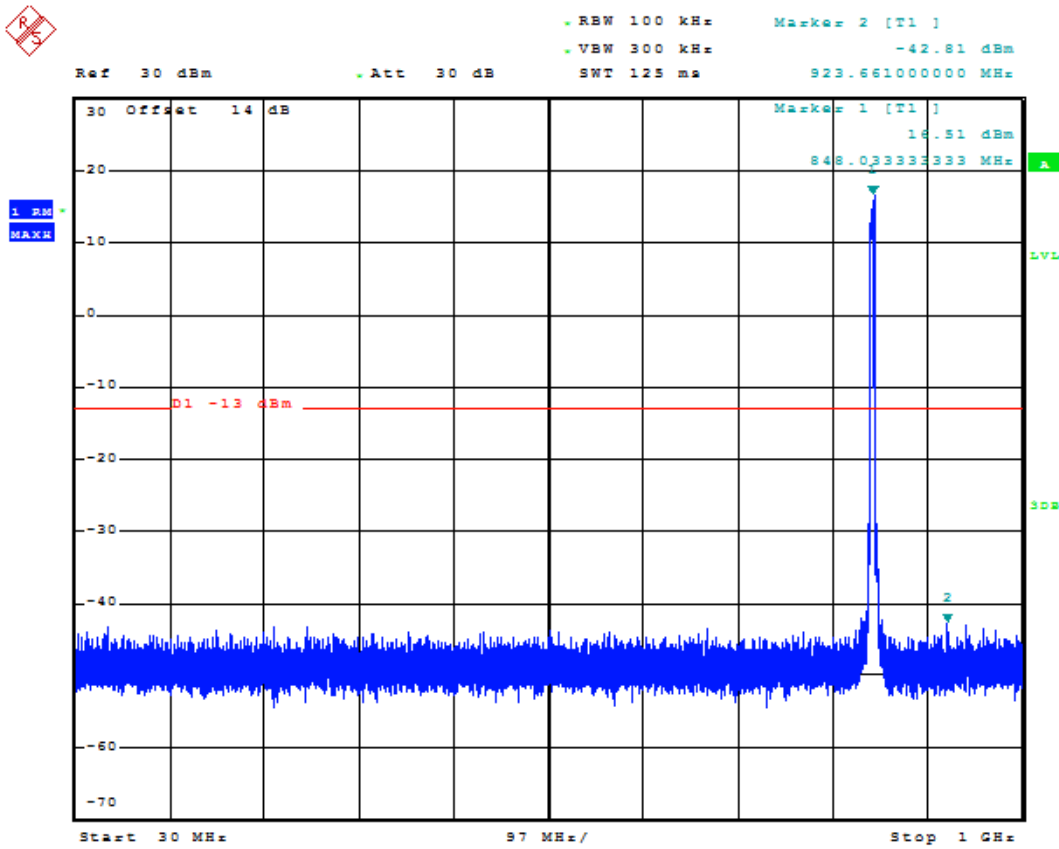
Date: 5.OCT.2017 06:58:23



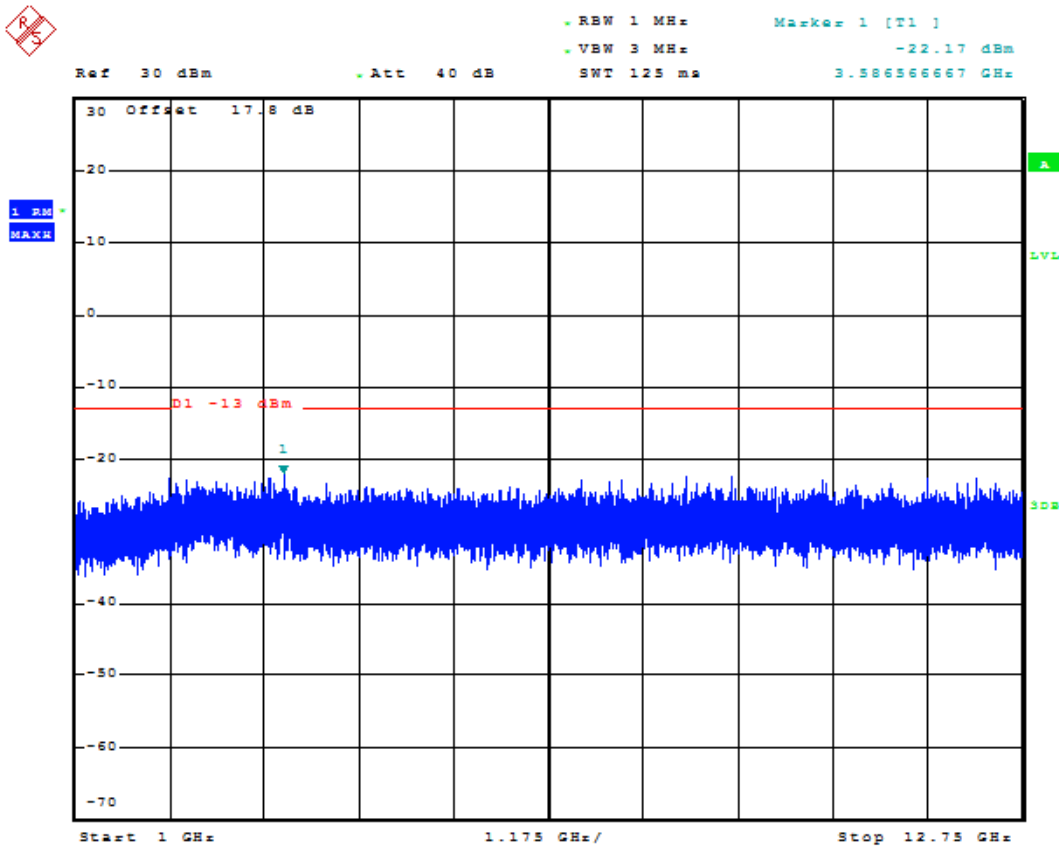
Report Number: 1709FR18-01



Date: 5.OCT.2017 06:58:39



Date: 5.OCT.2017 06:58:49



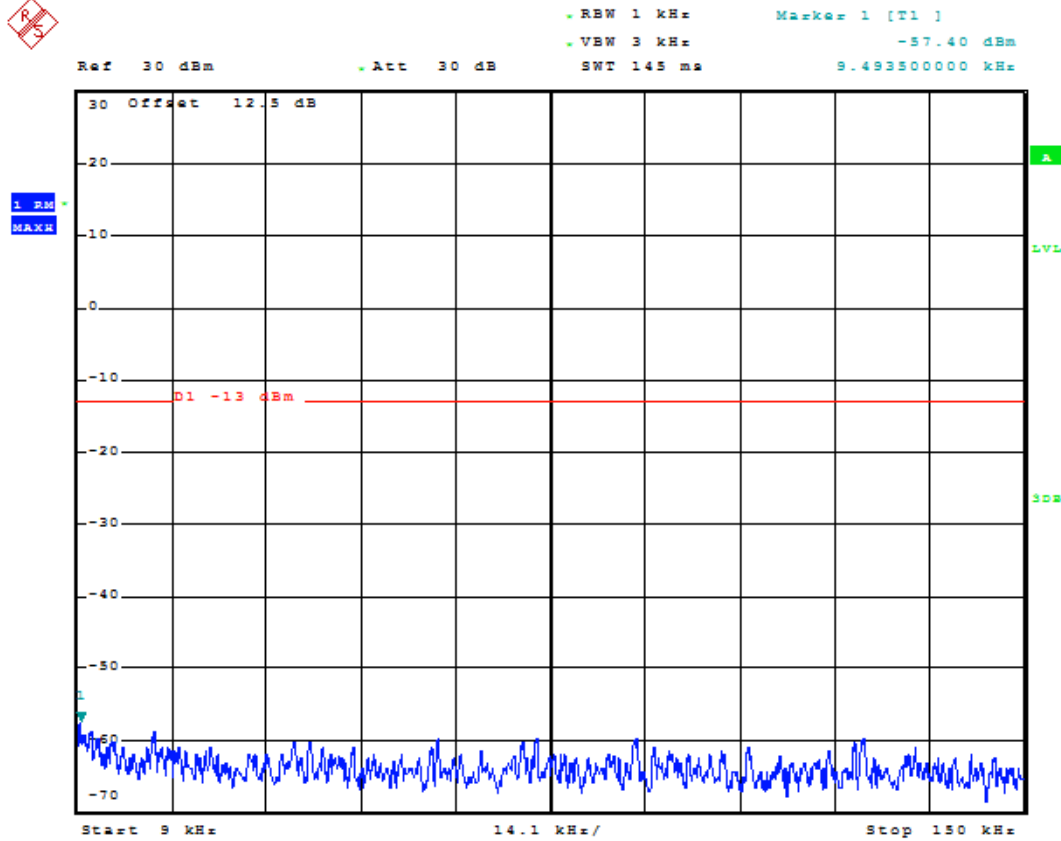
Date: 5.OCT.2017 06:58:57



1.2 Test Band=WCDMA1900

1.2.1 Test Mode=UMTS/TM1

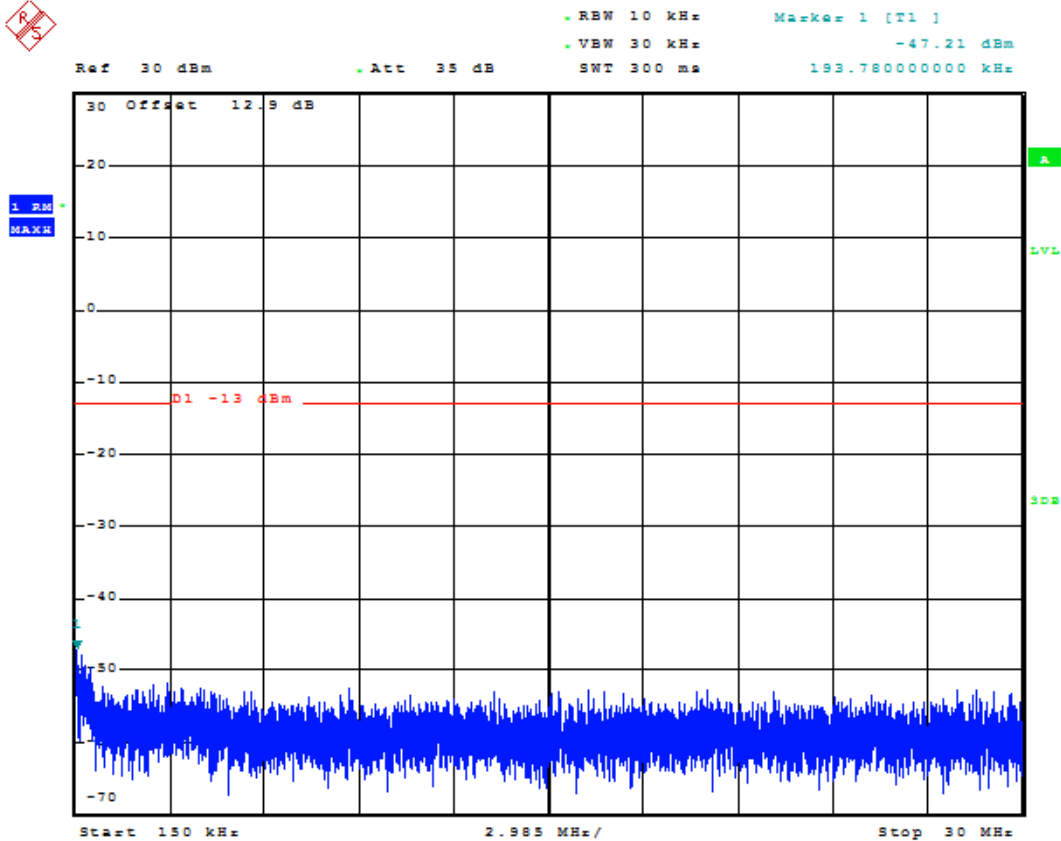
1.2.1.1 Test Channel=LCH



Date: 5.OCT.2017 07:12:05



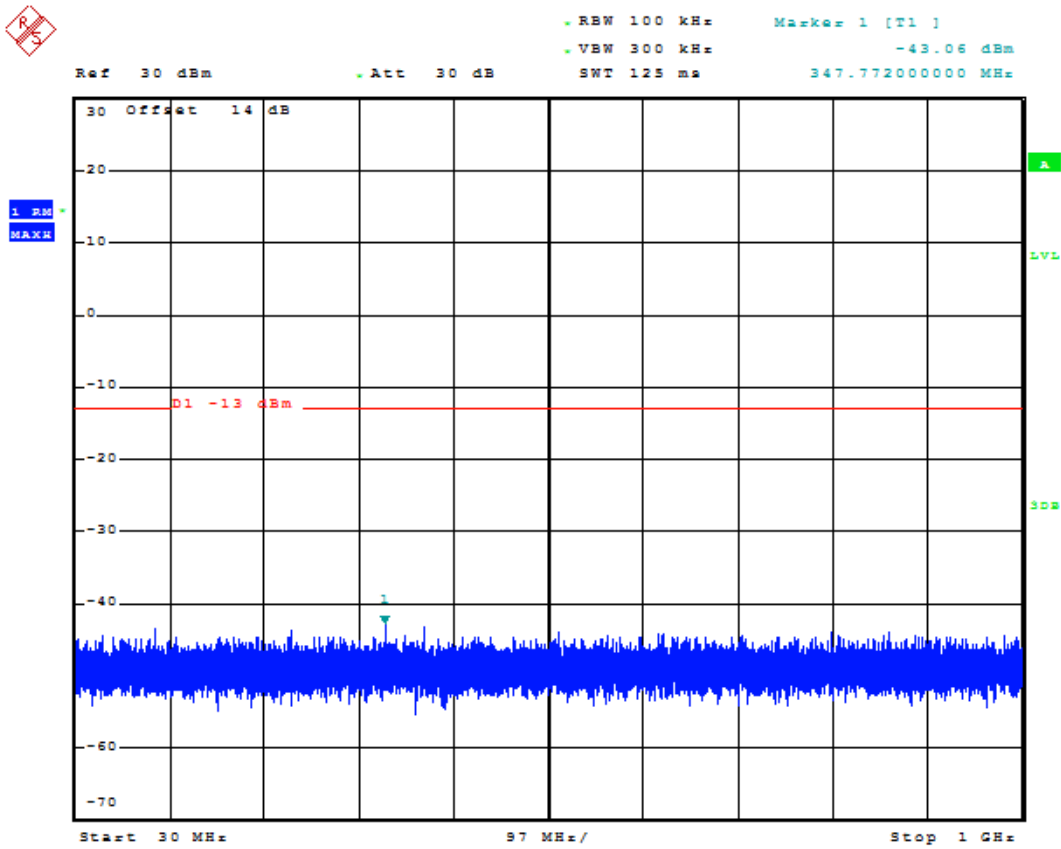
Report Number: 1709FR18-01



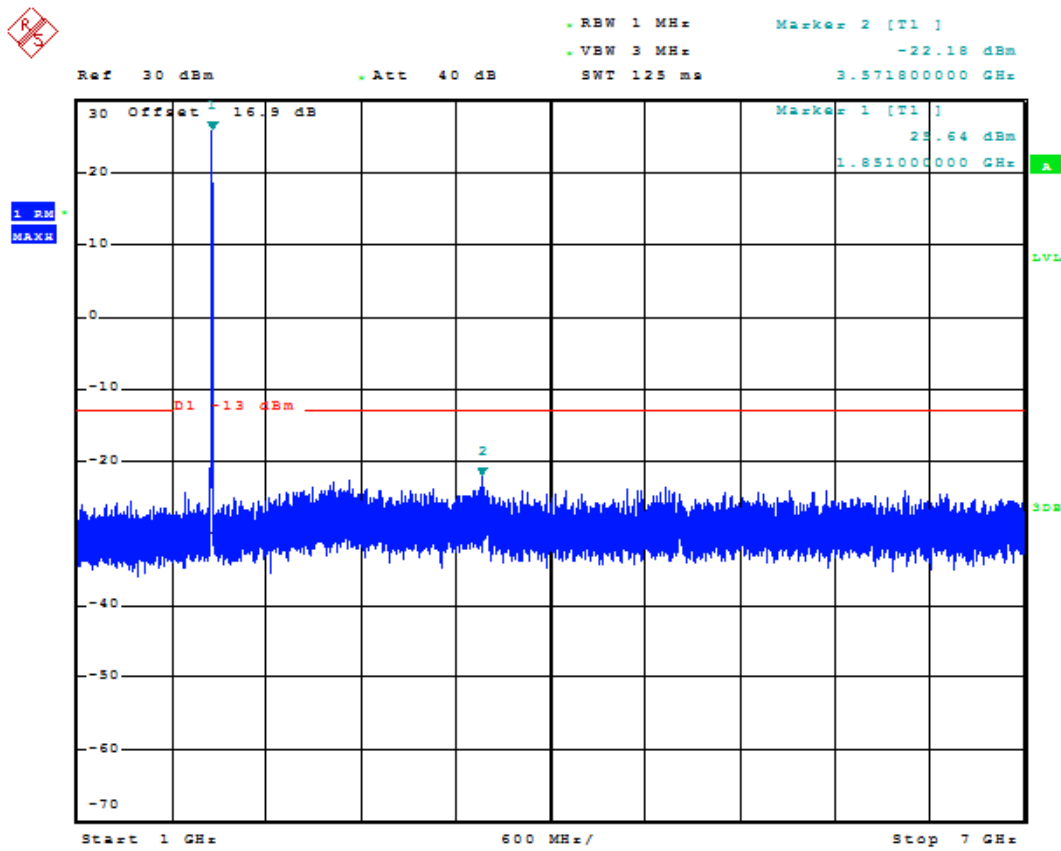
Date: 5.OCT.2017 07:12:21



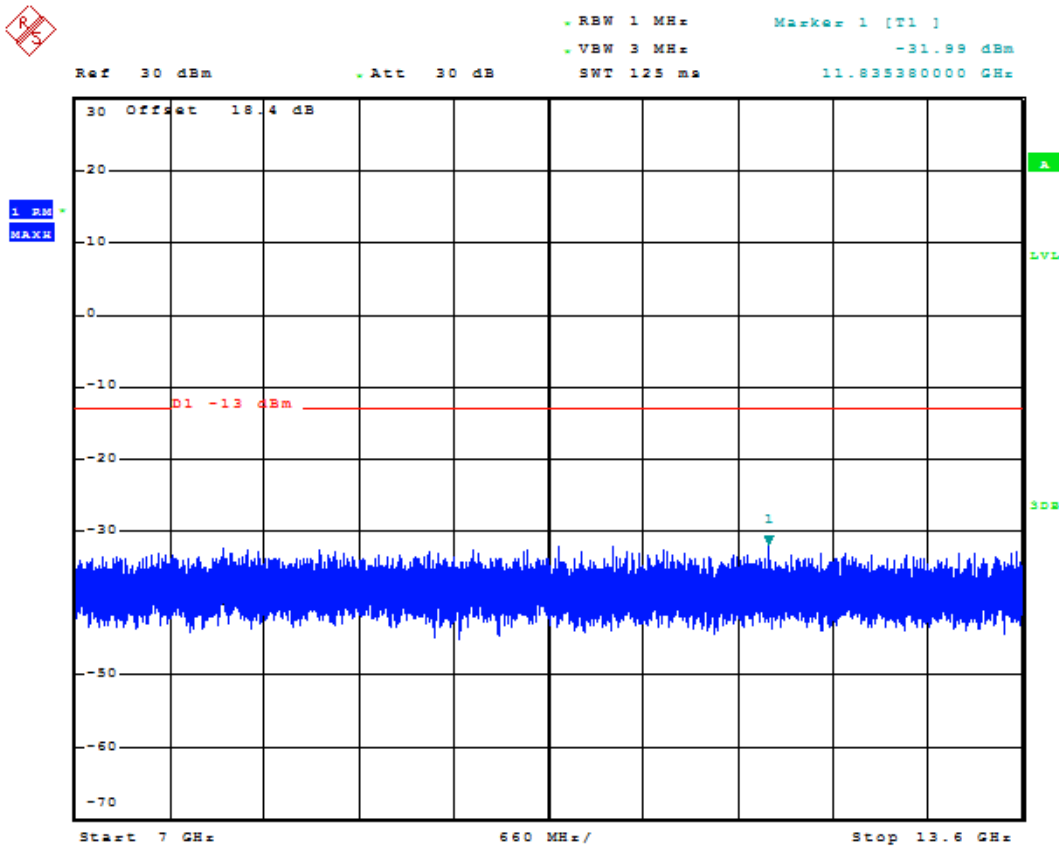
Report Number: 1709FR18-01



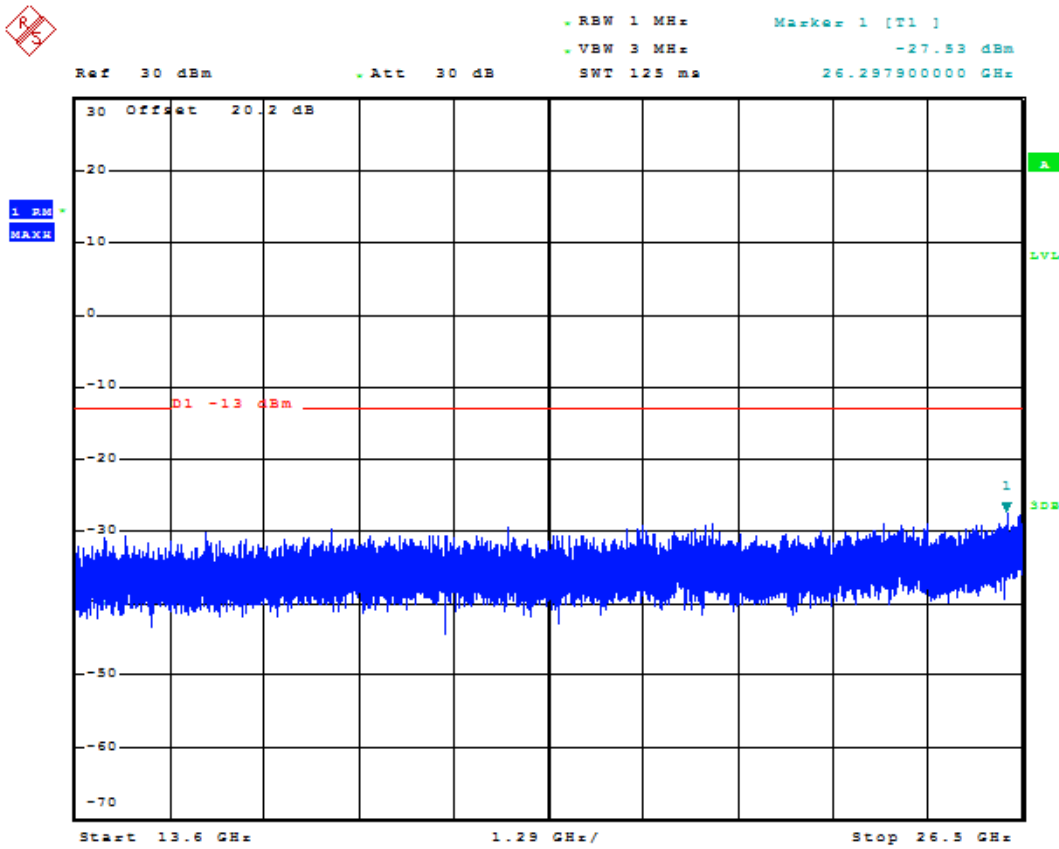
Date: 5.OCT.2017 07:12:29



Date: 5.OCT.2017 07:12:40



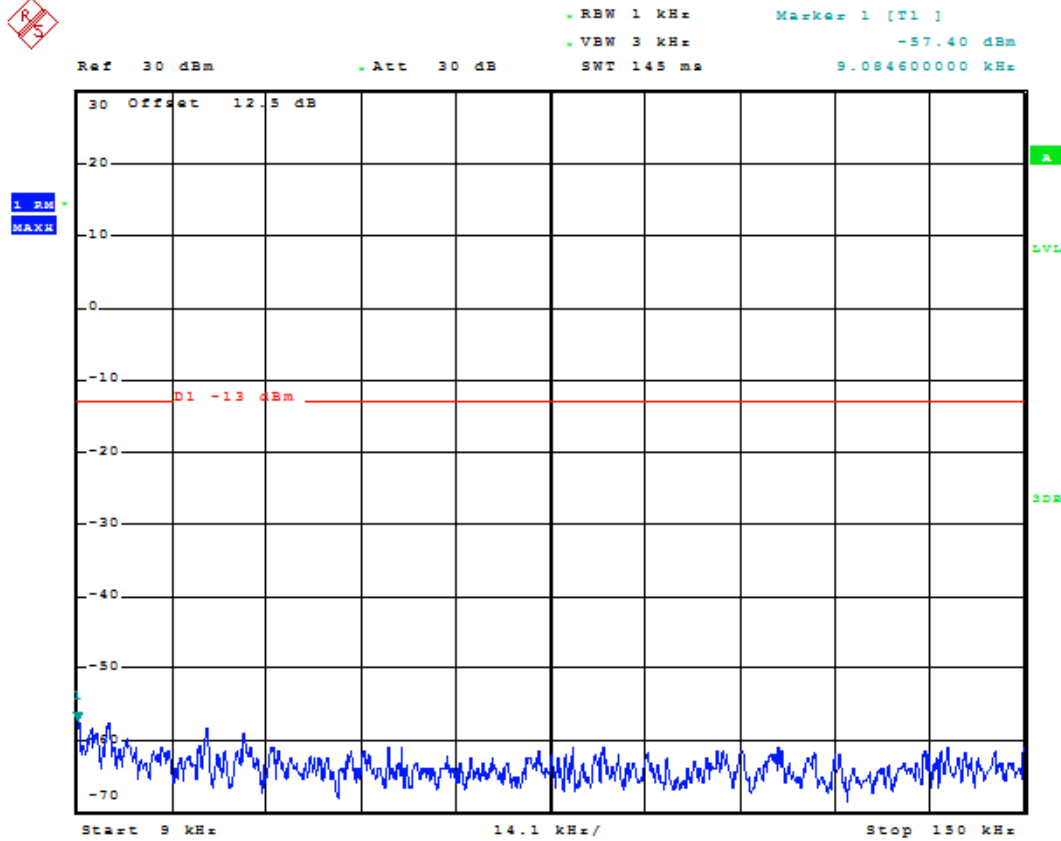
Date: 5.OCT.2017 07:12:48



Date: 5.OCT.2017 07:12:57



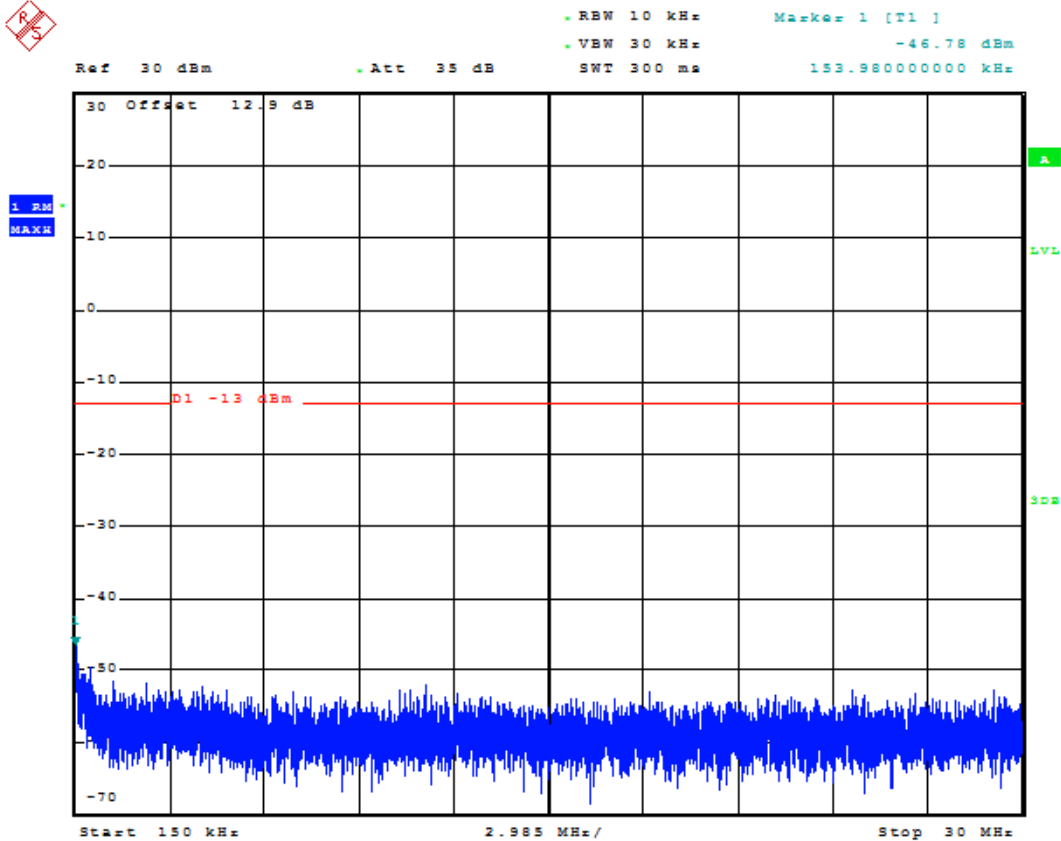
1.2.1.2 Test Channel=MCH



Date: 5.OCT.2017 07:13:09



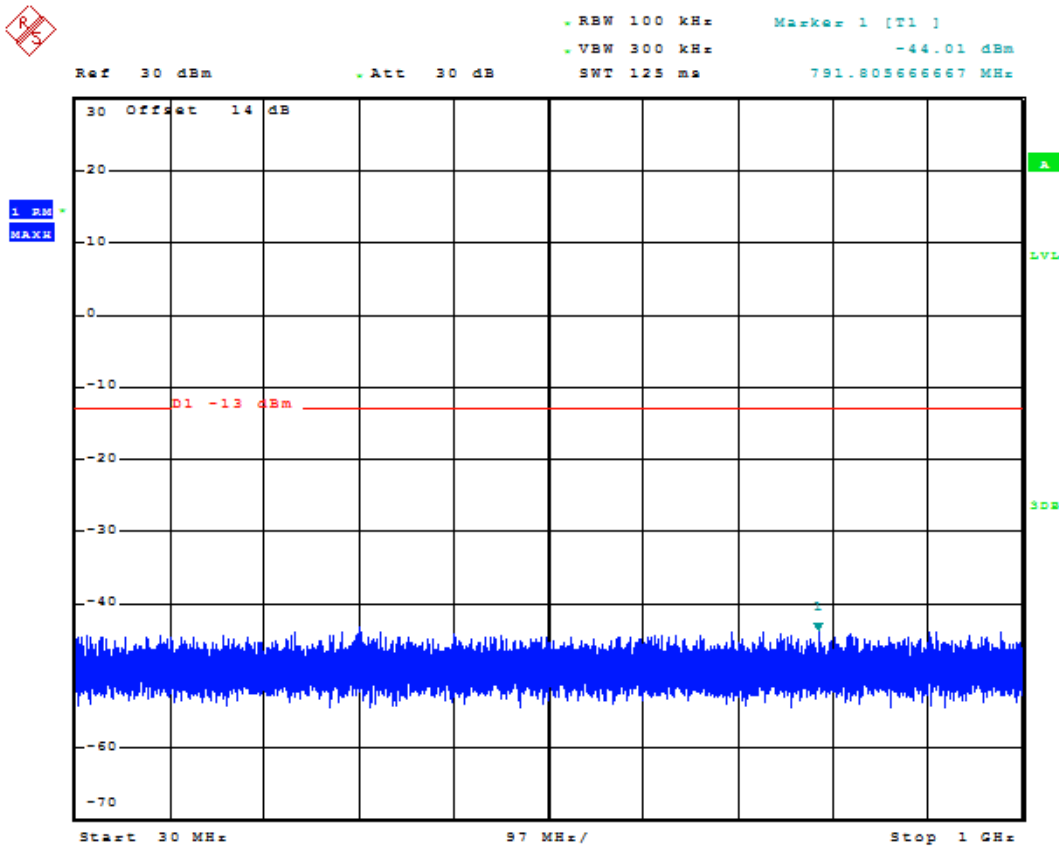
Report Number: 1709FR18-01



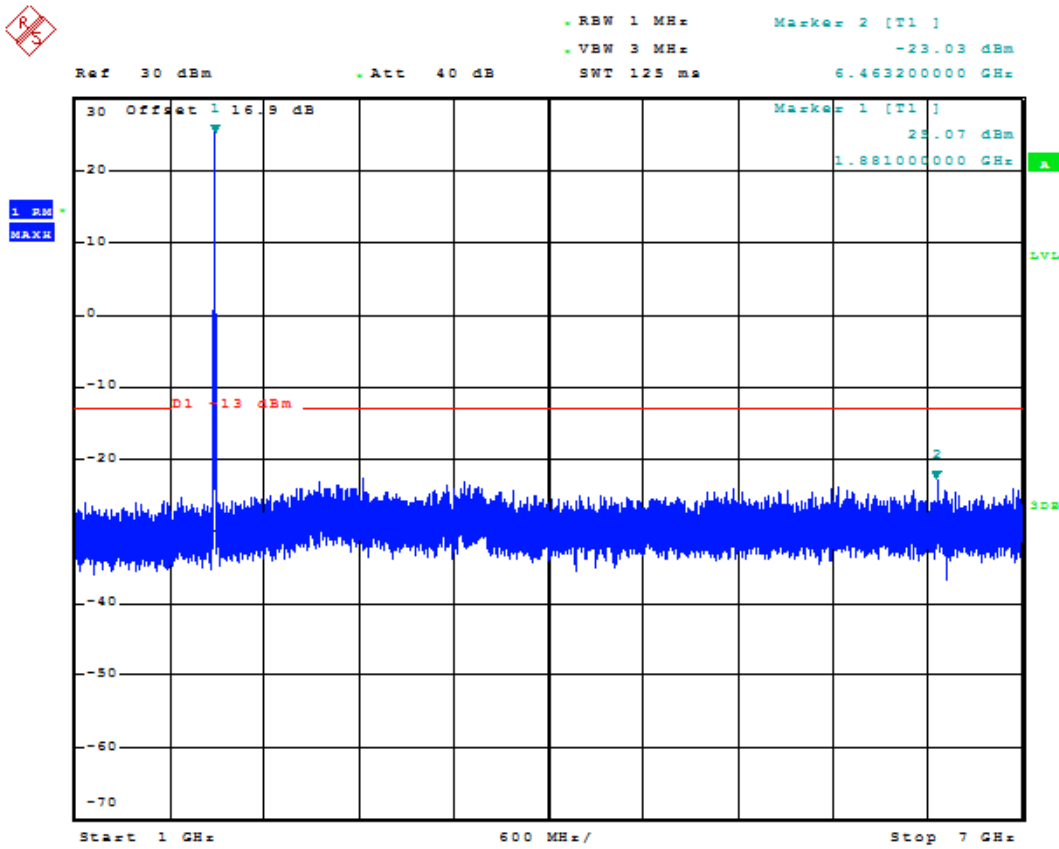
Date: 5.OCT.2017 07:13:25



Report Number: 1709FR18-01



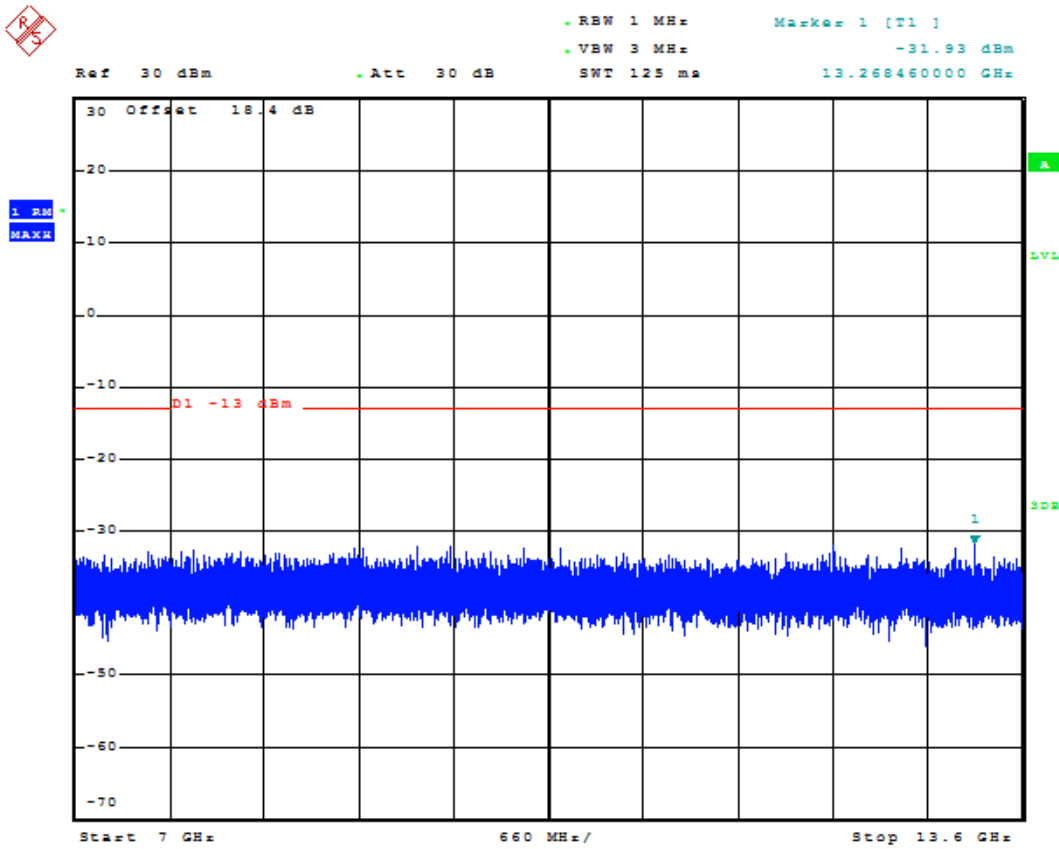
Date: 5.OCT.2017 07:13:34



Date: 5.OCT.2017 07:13:44



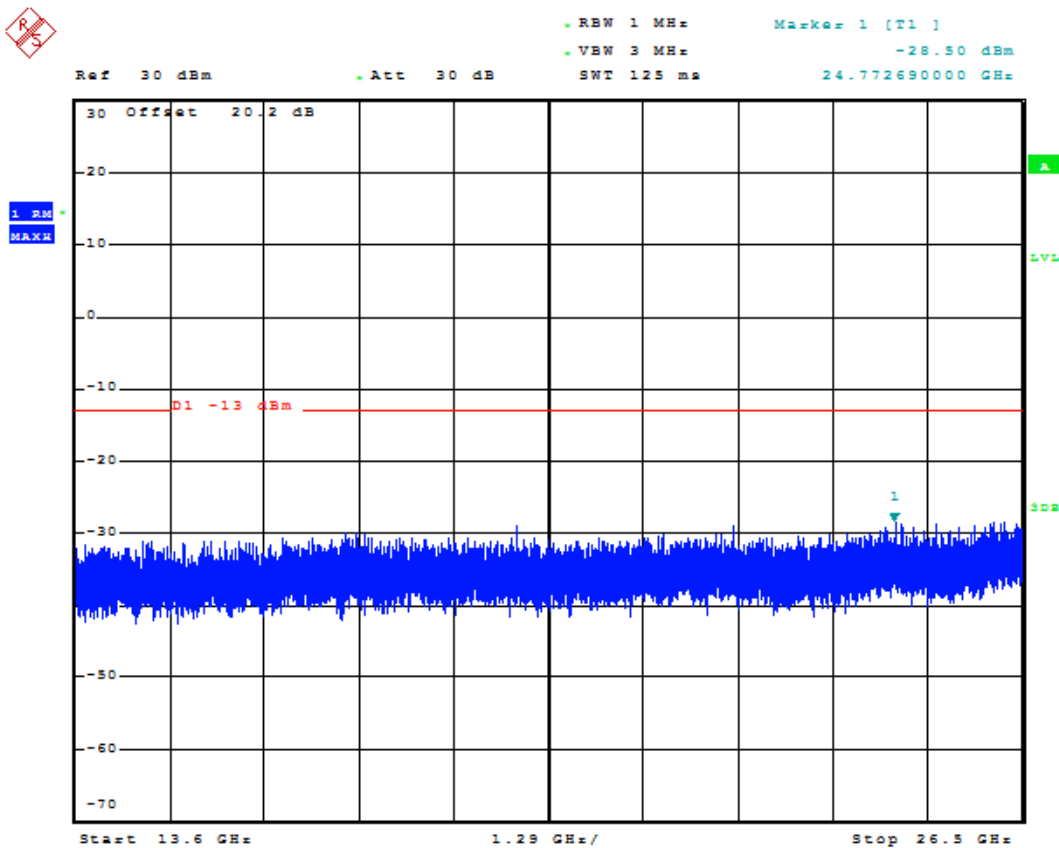
Report Number: 1709FR18-01



Date: 5.OCT.2017 07:13:53



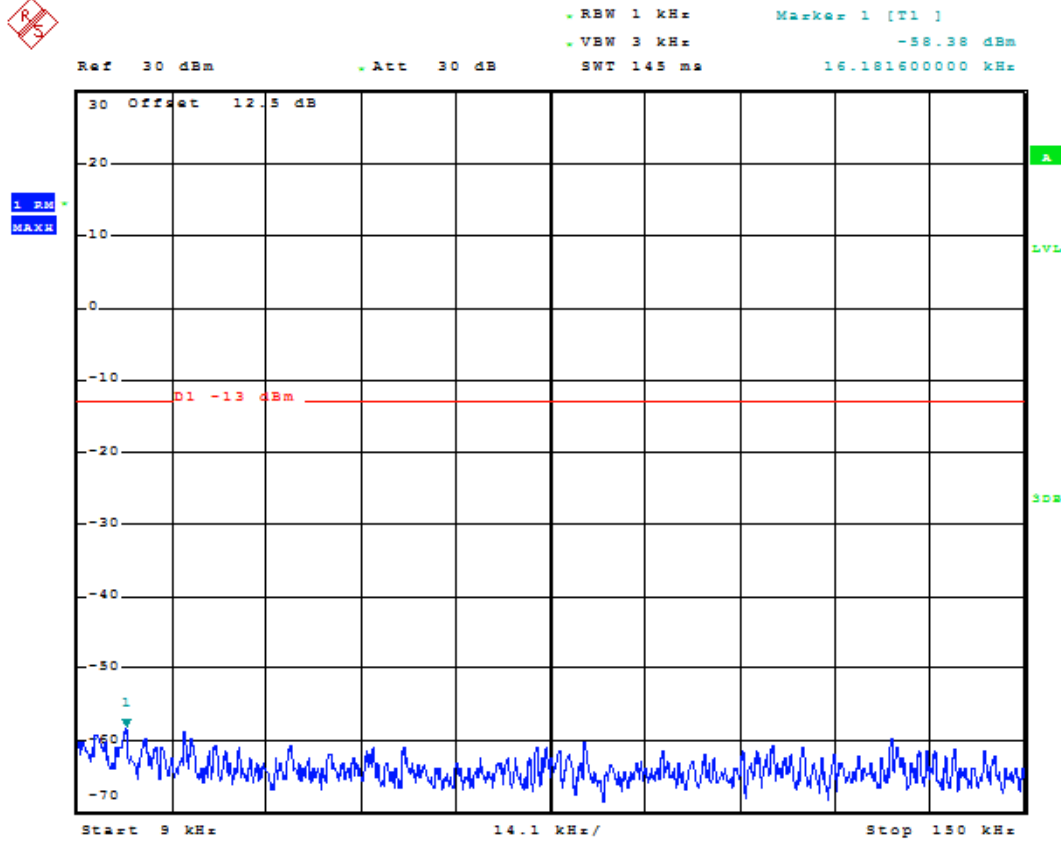
Report Number: 1709FR18-01



Date: 5.OCT.2017 07:14:01



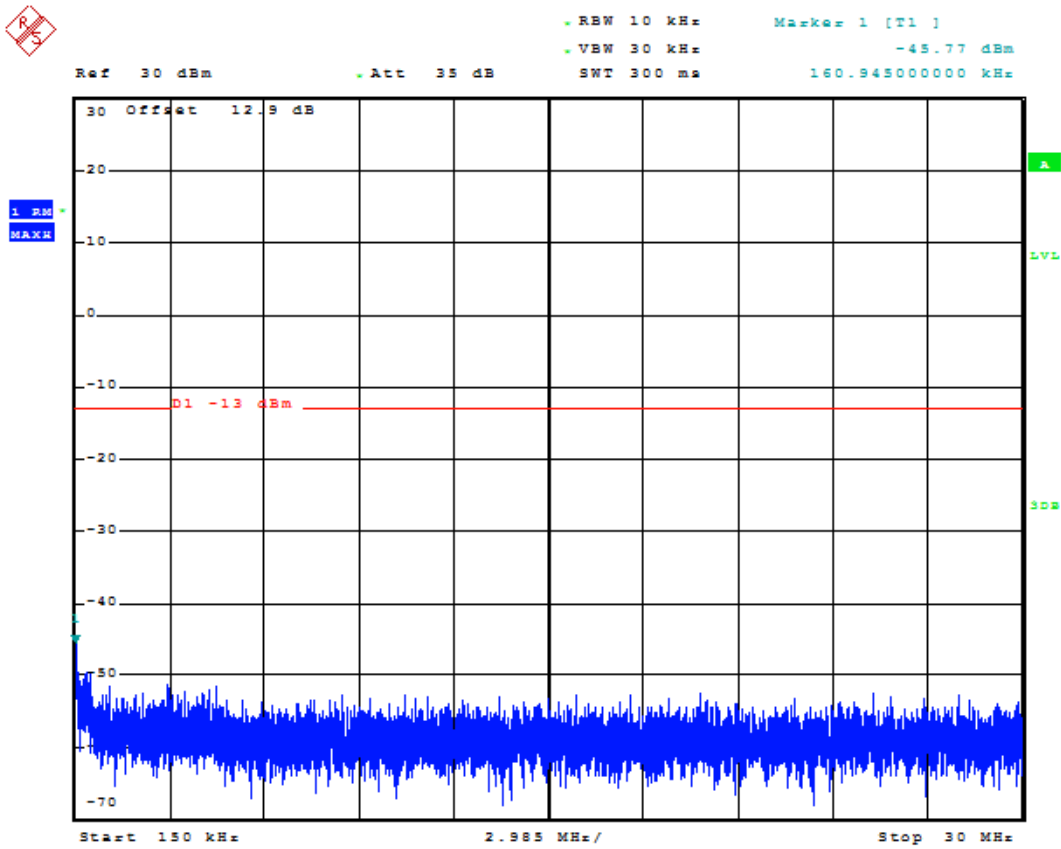
1.2.1.3 Test Channel=HCH



Date: 5.OCT.2017 07:14:13



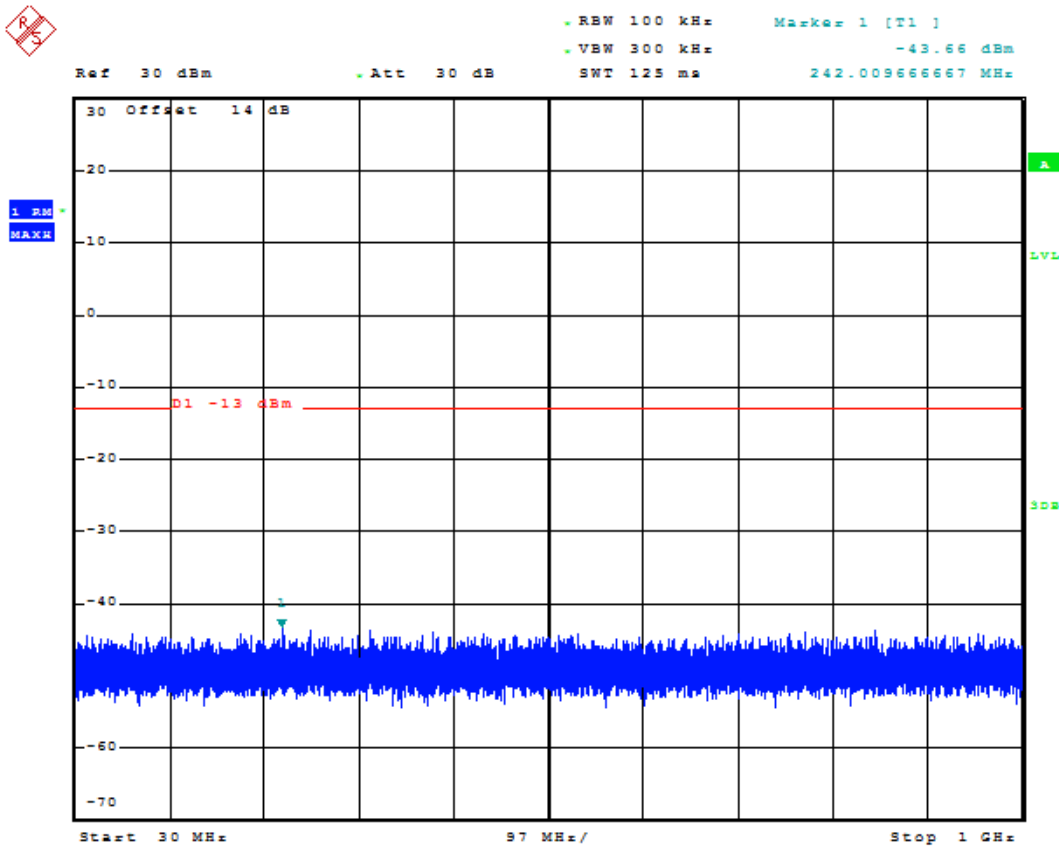
Report Number: 1709FR18-01



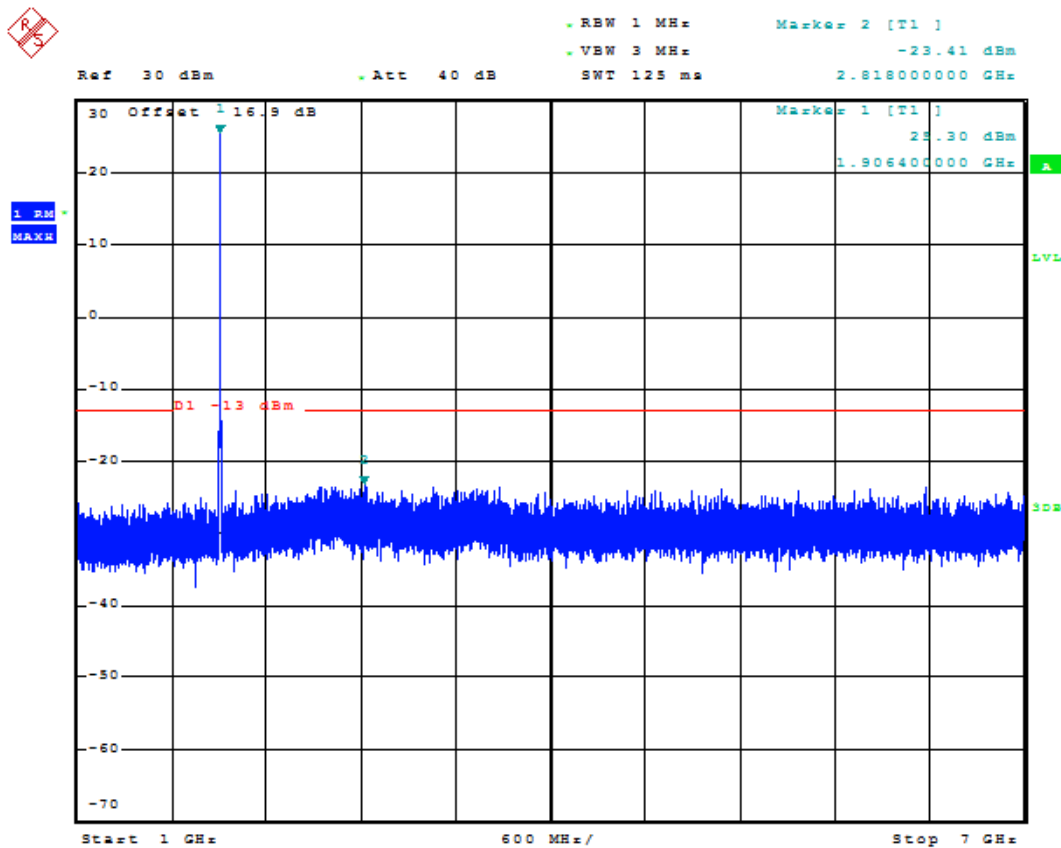
Date: 5.OCT.2017 07:14:29



Report Number: 1709FR18-01



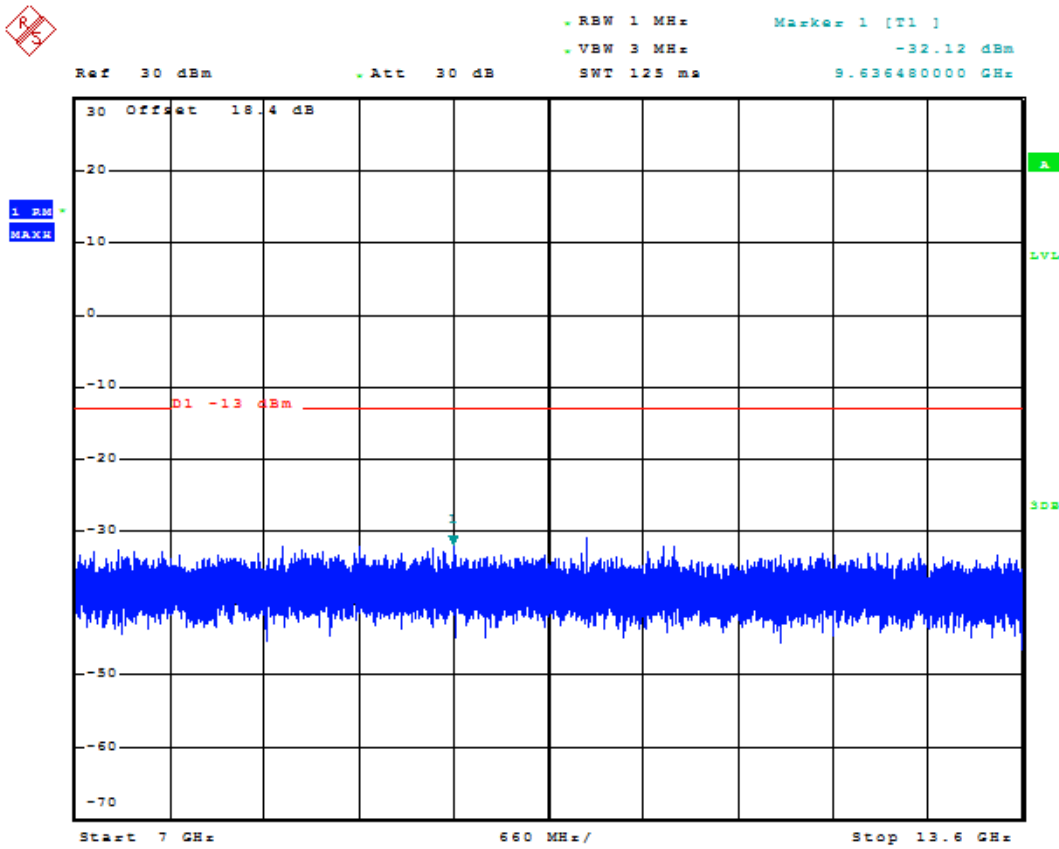
Date: 5.OCT.2017 07:14:38



Date: 5.OCT.2017 07:14:48



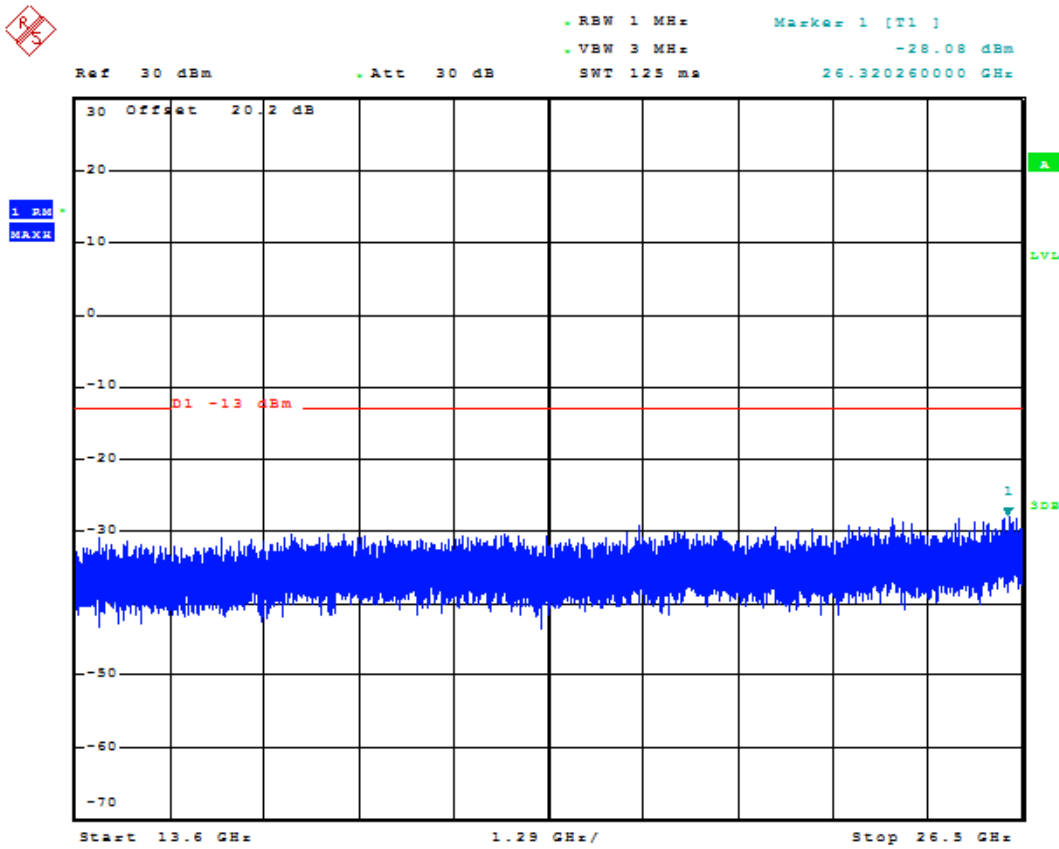
Report Number: 1709FR18-01



Date: 5.OCT.2017 07:14:57



Report Number: 1709FR18-01



Date: 5.OCT.2017 07:15:05

**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:	09/12/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3704.800	-36.65	-0.51	-37.16	-13.00	-24.16	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:	09/12/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3704.800	-37.14	-0.51	-37.65	-13.00	-24.65	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:	09/12/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3760.000	-40.73	-0.37	-41.10	-13.00	-28.10	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:	09/12/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3760.000	-45.61	-0.37	-45.98	-13.00	-32.98	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:	09/12/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3815.200	-35.68	-0.22	-35.90	-13.00	-22.90	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:	09/12/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3815.200	-42.48	-0.22	-42.70	-13.00	-29.70	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:	09/12/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1652.800	-25.68	-6.18	-31.86	-13.00	-18.86	peak
2	2479.200	-41.71	-3.28	-44.99	-13.00	-31.99	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:	09/12/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1652.800	-25.68	-6.18	-31.86	-13.00	-18.86	peak
2	2479.200	-36.82	-3.28	-40.10	-13.00	-27.10	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:	09/12/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1673.200	-26.10	-6.10	-32.20	-13.00	-19.20	peak
2	2509.800	-44.63	-3.17	-47.80	-13.00	-34.80	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:	09/12/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1673.200	-26.24	-6.10	-32.34	-13.00	-19.34	peak
2	2509.800	-42.65	-3.17	-45.82	-13.00	-32.82	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:	09/12/2017
Ant.Polar.:	Horizontal		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1693.200	-25.71	-6.04	-31.75	-13.00	-18.75	peak
2	2539.800	-42.75	-3.10	-45.85	-13.00	-32.85	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:	09/12/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1693.200	-25.77	-6.04	-31.81	-13.00	-18.81	peak
2	2539.800	-41.85	-3.10	-44.95	-13.00	-31.95	peak



Standard:	FCC Part 22H / 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Mode:	RX	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Ant.Polar.:	Horizontal	Date:	09/13/2017
Description:			

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2547.000	50.90	-13.38	37.52	74.00	-36.48	peak
2	4570.000	49.69	-7.87	41.82	74.00	-32.18	peak
3	6338.000	47.19	-3.58	43.61	74.00	-30.39	peak

Standard:	FCC Part 22H / 24E	Test Distance:	3m
Test item:	Harmonic	Power:	AC 120V/60Hz
Mode:	RX	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Ant.Polar.:	Vertical	Date:	09/13/2017
Description:			

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2530.000	51.81	-13.42	38.39	74.00	-35.61	peak
2	4349.000	50.45	-8.47	41.98	74.00	-32.02	peak
3	6287.000	49.37	-3.76	45.61	74.00	-28.39	peak



Appendix H: Frequency Stability for Temperature & Voltage

Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA850	TM1	LCH	TN	VL	-1.88	-0.002271	±2.5	PASS
			TN	VN	2.55	0.003084	±2.5	PASS
			TN	VH	3.07	0.003711	±2.5	PASS
		MCH	TN	VL	0.63	0.000748	±2.5	PASS
			TN	VN	2.55	0.002918	±2.5	PASS
			TN	VH	-3.63	-0.004341	±2.5	PASS
		HCH	TN	VL	1.51	0.001784	±2.5	PASS
			TN	VN	2.55	0.002722	±2.5	PASS
			TN	VH	0.50	0.000595	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA850	TM1	LCH	TN	VL	1.46	0.000791	±2.5	PASS
			TN	VN	-3.31	-0.001787	±2.5	PASS
			TN	VH	-3.52	-0.001903	±2.5	PASS
		MCH	TN	VL	-3.60	-0.001915	±2.5	PASS
			TN	VN	-3.31	-0.000950	±2.5	PASS
			TN	VH	-1.85	-0.000982	±2.5	PASS
		HCH	TN	VL	-5.22	-0.002736	±2.5	PASS
			TN	VN	-3.31	-0.002232	±2.5	PASS
			TN	VH	-5.94	-0.003112	±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
WCDMA850	TM1	LCH	VN	-30	5.36	0.006481	±2.5	PASS
			VN	-20	-4.43	-0.005355	±2.5	PASS
			VN	-10	3.13	0.003785	±2.5	PASS
			VN	0	0.76	0.000923	±2.5	PASS
			VN	10	1.28	0.001551	±2.5	PASS
			VN	20	0.90	0.001089	±2.5	PASS
			VN	30	2.62	0.003176	±2.5	PASS
			VN	40	1.62	0.001957	±2.5	PASS
			VN	50	1.60	0.001939	±2.5	PASS
WCDMA850	TM1	MCH	VN	-30	0.85	0.001021	±2.5	PASS
			VN	-20	-0.53	-0.000638	±2.5	PASS
			VN	-10	0.24	0.000292	±2.5	PASS
			VN	0	3.71	0.004432	±2.5	PASS
			VN	10	2.78	0.003320	±2.5	PASS
			VN	20	0.92	0.001094	±2.5	PASS
			VN	30	1.68	0.002006	±2.5	PASS
			VN	40	4.76	0.005691	±2.5	PASS
			VN	50	-0.06	-0.000073	±2.5	PASS
WCDMA850	TM1	HCH	VN	-30	0.41	0.000487	±2.5	PASS
			VN	-20	-0.14	-0.000162	±2.5	PASS
			VN	-10	0.96	0.001135	±2.5	PASS
			VN	0	1.97	0.002325	±2.5	PASS
			VN	10	1.80	0.002127	±2.5	PASS
			VN	20	2.70	0.003190	±2.5	PASS
			VN	30	-1.05	-0.001244	±2.5	PASS
			VN	40	1.34	0.001586	±2.5	PASS
			VN	50	-1.46	-0.001730	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq.Error (Hz)	Freq.vs.rated (ppm)	Limit (ppm)	Verdict
WCDMA1900	TM1	LCH	VN	-30	-2.69	-0.001450	±2.5	PASS
			VN	-20	-0.81	-0.000437	±2.5	PASS
			VN	-10	-2.67	-0.001442	±2.5	PASS
			VN	0	-3.92	-0.002117	±2.5	PASS
			VN	10	-2.75	-0.001483	±2.5	PASS
			VN	20	-4.35	-0.002348	±2.5	PASS
			VN	30	1.97	0.001063	±2.5	PASS
			VN	40	1.43	0.000774	±2.5	PASS
			VN	50	-2.01	-0.001087	±2.5	PASS
WCDMA1900	TM1	MCH	VN	-30	-2.84	-0.001510	±2.5	PASS
			VN	-20	-7.02	-0.003734	±2.5	PASS
			VN	-10	-2.21	-0.001177	±2.5	PASS
			VN	0	0.05	0.000024	±2.5	PASS
			VN	10	-2.15	-0.001144	±2.5	PASS
			VN	20	-5.26	-0.002800	±2.5	PASS
			VN	30	-4.85	-0.002581	±2.5	PASS
			VN	40	-4.68	-0.002492	±2.5	PASS
			VN	50	-5.91	-0.003141	±2.5	PASS
WCDMA1900	TM1	HCH	VN	-30	-9.09	-0.004767	±2.5	PASS
			VN	-20	-5.08	-0.002664	±2.5	PASS
			VN	-10	-0.69	-0.000360	±2.5	PASS
			VN	0	-3.39	-0.001776	±2.5	PASS
			VN	10	-3.27	-0.001712	±2.5	PASS
			VN	20	-4.87	-0.002552	±2.5	PASS
			VN	30	-0.87	-0.000456	±2.5	PASS
			VN	40	-8.16	-0.004279	±2.5	PASS
			VN	50	-4.78	-0.002504	±2.5	PASS