

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO

FCC PART 22 SUBPART H, PART 24 SUBPART E and INDUSTRY

CANADA RSS-132 and RSS-133 REQUIREMENT

OF

Product Name:	Tablet
Brand Name:	TomTom
Model No.:	4FI76
Model Difference:	N/A
FCC ID:	S4L4FI76
IC:	5767A-4FI76
Report No.:	E2/2016/80016
Issue Date:	Aug. 31, 2016
FCC Rule Part:	2 , 22H & 24E
IC Rule Part:	RSS 132 Issue 3 Jan. 2013, RSS 133 Issue 6 Jan. 2013
Prepared for:	TomTom International B.V. De Ruijterterkade 154, 1011 AC Amsterdam, The Neth-erlands
Prepared by:	SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Tai- wan 333

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VERIFICATION OF COMPLIANCE

Applicant: TomTom International B.V.
De Ruijterterkade 154, 1011 AC Amsterdam, The Netherlands

Product Name: Tablet

Brand Name: TomTom

Model No.: 4FI76

Model Difference: N/A

FCC ID: S4L4FI76

IC : 5767A-4FI76

File Number: E2/2016/80016

Date of test: Aug. 01, 2016 ~ Aug. 26, 2016

Date of EUT Received: Aug. 01, 2016

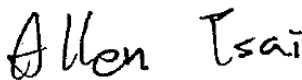
We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-D-2010 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Test By:**Date:**

Aug. 31, 2016

Jerry Lu / Sr.Engineer**Prepared By:****Date:**

Aug. 31, 2016

Allen Tsai / Engineer**Approved By:****Date:**

Aug. 31, 2016

Jim Chang / Asst. Manager

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Revision History

Report Number	Revision	Description	Issue Date
E2/2016/80016	Rev.00	Initial creation of document	Aug. 31, 2016

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1. GENERAL PRODUCT INFORMATION

1.1. Product Description

General:

Product Name:	Tablet	
Brand Name:	TomTom	
Model No.:	4FI76	
Model Difference:	N/A	
Hardware Version:	PR1.1	
Software Version:	14.451	
Car charger	Model No.: 4UFI0	Brand: TomTom
USB cable	Model No.: 4UUC.001.24	Brand: TomTom
MIC cable	Model No.: P7051-13	Brand: TomTom
MIC	Model No.: NEIM1100106	Brand: TomTom
Car cable	Model No.: NA	Brand: TomTom
Video cradle	Model No.: 4FI75	Brand: TomTom
Daimler cradle	Model No.: 4FI77	Brand: TomTom
Basic cradle	Model No.: 4FI74	Brand: TomTom
Power Supply:	3.8VDC from Rechargeable Li-ion battery, 5VDC from USB port	
	Battery:	Model No.: UZ6 Brand: TomTom

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GSM / WCDMA / LTE:

Cellular Phone Standards Frequency Range and Power	Operating Frequency		Rated Power
	GPRS 850	824.2 MHz– 848.8 MHz	33dBm
	EDGE 850	824.2 MHz– 848.8 MHz	27dBm
	GPRS 1900	1850.2MHz – 1909.8MHz	30dBm
	EDGE 1900	1850.2MHz – 1909.8MHz	26dBm
	WCDMA/HSUPA/HSDPA /HSPA+ Band II	1852.4MHz – 1907.6MHz	24dBm
	WCDMA/HSUPA/HSDPA /HSPA+ Band V	826.4MHz - 846.6MHz	24dBm
IMEI:	358884052893020		

Type of Emission:

Frequency Band	Type of Emission:
GPRS 850	245KGXW
EDGE 850	246KG7W
GPRS 1900	246KGXW
EDGE 1900	250KG7W
WCDMA Band II	4M07F9W
WCDMA Band V	4M06F9W
HSDPA Band II	4M07F9W
HSDPA Band V	4M05F9W
HSUPA Band II	4M06F9W
HSUPA Band V	4M04F9W

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Max ERP/EIRP Power Measurement Result:

	dBm		W
GPRS 850	28.68	ERP	0.738
EDGE 850	22.72	ERP	0.187
GPRS 1900	32.89	EIRP	1.945
EDGE 1900	32.85	EIRP	1.928
WCDMA Band II	28.22	EIRP	0.664
WCDMA Band V	22.29	ERP	0.169
HSDPA Band II	28.58	EIRP	0.721
HSDPA Band V	22.61	ERP	0.182
HSUPA Band II	27.11	EIRP	0.514
HSUPA Band V	23.34	ERP	0.216

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1.2. Product Feature of Equipment Under Test

The equipment under Test (Hereafter Called: EUT) is supporting below features.

Product Feature	
GSM Operating Band(s)	GSM 850/1900MHz
WCDMA Operating Band(s)	FDD Band II / V
Bluetooth Version	V4.0 dual mode
Wi-Fi- Specification	802.11a/b/g/n
NFC Specification	NFC

Note: The above EUT information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description

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1.3. Test Methodology of Applied Standards

FCC 47 CFR Part 2, 22, 24.

ANSI / TIA / EIA 603-D-2010

KDB971168 D01 Power Meas license Digital System

KDB941225 of the Output power Procedure of (SAR Measurement Procedures for 3G Devices, WCDMA / HSPA) was used for EUT and Base station setting.

TS 151 010-1 is used to set, and measure the output power.

RSS Gen Issue 4 Nov. 2015

RSS-132 Issue 3 Jan. 2013, RSS-133 Issue 6 Jan. 2013

Note: All test items have been performed and record as per the above standards.

1.4. Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd.,
Guishan District, Taoyuan City, Taiwan 333 (TAF code 0513)

FCC Registration Numbers are: 735305

Canada Registration Number: 4620A-5

1.5. Special Accessories

No special accessories were used during testing.

1.6. Equipment Modifications

There were no modifications incorporated into the EUT.

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2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

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

2.2. EUT Exercise

The EUT (Transmitter) was operated in the continuous transmission mode employed with the simulator of the Base Station that fixates at test default channels to fix the Tx frequency which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Measurement at Antenna Port

According to measurement procured TIA/EIA 603C, the EUT is placed on a turn table which is 0.8 m above ground plane. A low loss of RF cable was used to connect the antenna port of EUT to measurement equipment.

2.3.2 Radiated Emissions (ERP/EIRP)

According to measurement procured TIA/EIA 603C, The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13.

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2.4. Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Following shows an offset computation example with cable loss 1 dB for low band and 1 for high band with 10 dB attenuator and 3.2 splitter.

Low Band: Offset = RF cable loss (dB)+ attenuation factor(dB) =1+10+3.3=14.3(dB)

High Band: Offset = RF cable loss (dB)+ attenuation factor(dB) =1.2+10+3.3=14.5(dB)

2.5. Final Amplifier Voltage and Current Information:

Test Mode	DC voltage (V)	DC current (mA)
GPRS 850	3.8 Vdc	790
GPRS 1900	3.8 Vdc	780
EDGE 850	3.8 Vdc	780
EDGE 1900	3.8 Vdc	790
WCDMA B2	3.8 Vdc	1100
WCDMA B5	3.8 Vdc	1000
HSUPA B2	3.8 Vdc	1000
HSUPA B5	3.8 Vdc	1000
HSDPA B2	3.8 Vdc	1100
HSDPA B5	3.8 Vdc	1100

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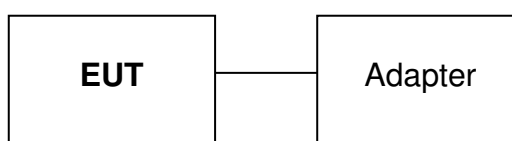
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2.6. Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed Channel-Conducted)



Fig. 2-2 Configuration of Tested System (Fixed Channel-Radiated)



Remote Side

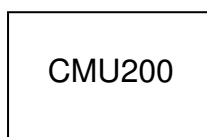


Table 2-1 Equipment Used in

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Universal Radio Communication Tester	R&S	CMU200	102189	shielded	Un-shielded
2.	Universal Radio Communication Tester	Anritsu	MT8820C	6200307563	shielded	Un-shielded
3.	DC Power Supply	Agilent	E3640A	MY53140006	N/A	Un-shielded

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3. SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§2.1046(a)	N/A	RF Power Output	Compliant
§2.1046(a) §22.913(a)(2) §24.232(c)	§4.8 (RSS-Gen Issue 4) §5.4 (RSS-132) §6.4 (RSS-133)	ERP/ EIRP measurement	Compliant
§2.1049(h)	§4.6.1 (RSS-Gen Issue 4) §2.3 (RSS-133)	99% & 26dB Occupied Bandwidth	Compliant
§2.1051 §22.917(a) §24.238(a)	§4.9 (RSS-Gen Issue 4) §5.5 (RSS-132) §6.5 (RSS-133)	Out of Band Emissions at Antenna Terminals and Band Edge / Emission mask requirements	Compliant
§2.1053 §22.917(a) §24.238(a)	§4.9 (RSS-Gen Issue 4) §5.5 (RSS-132) §6.5 (RSS-133)	Field Strength of Spurious Radiation	Compliant
§24.232(d)	§5.4 (RSS-132) §6.4 (RSS-133)	Peak to Average Ratio	Compliant
§2.1055(a)(1) §22.355 §24.235	§4.7 (RSS-Gen Issue 4) §5.3 (RSS-132) §6.3 (RSS-133)	Frequency Stability	Compliant

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4. DESCRIPTION OF TEST MODES

4.1. The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X(E1)Y(E2)Z(H) axis and antenna ports. The worst case was found as listed below. Following channel(s) was (were) selected for the final test as listed below:

BAND	ERP/EIRP	RADIATED EMISSION and Wireless charging Cover
GPRS/EDGE 850	H-plan	H-plan
GPRS/EDGE 1900	H-plan	H-plan
WCDMA/HSPA Band II	H-plan	H-plan
WCDMA/HSPA Band IV	H-plan	H-plan
WCDMA/HSPA Band V	H-plan	H-plan

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GSM/GPRS/EDGE MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
ERP	128 to 251	128, 190, 251	GSM/GPRS/EDGE 850
EIRP	512 to 810	512, 661, 810	GSM/GPRS/EDGE 1900
FREQUENCY STABILITY	128 to 251 512 to 810	190 661	GPRS 850 GPRS 1900
OCCUPIED BANDWIDTH	128 to 251 512 to 810	190 661	GSM/GPRS/EDGE 850 GSM/GPRS/EDGE 1900
PEAK TO AVERAGE RATIO	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GSM/GPRS/EDGE 850 GSM/GPRS/EDGE 1900
BAND EDGE	128 to 251 512 to 810	128, 251 512, 810	GSM/GPRS/EDGE 850 GSM/GPRS/EDGE 1900
CONDCUDED EMISSION	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GSM/GPRS/EDGE 850 GSM/GPRS/EDGE 1900
RADIATED EMISSION	128 to 251 512 to 810	128, 190, 251 512, 661, 810	GSM 850 GPRS 1900

WCDMA/HSPA MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
ERP	4132 to 4233	4132, 4183, 4233	WCDMA/HSPA Band V
EIRP	9262 to 9538 1312 to 1513	9262, 9400, 9583 1312, 1413, 1513	WCDMA/HSPA Band II WCDMA/HSPA Band IV
FREQUENCY STABILITY	4132 to 4233 1312 to 1513 9262 to 9538	4183 1413 9400	WCDMA Band II WCDMA Band IV WCDMA Band V
OCCUPIED BANDWIDTH	4132 to 4233 1312 to 1513 9262 to 9538	4183 1413 9400	WCDMA/HSPA Band II WCDMA/HSPA Band IV WCDMA/HSPA Band V
PEAK TO AVERAGE RATIO	4132 to 4233 1312 to 1513 9262 to 9538	4132, 4183, 4233 1312, 1413, 1513 9262, 9400, 9583	WCDMA/HSPA Band II WCDMA/HSPA Band IV WCDMA/HSPA Band V
BAND EDGE	4132 to 4233 1312 to 1513 9262 to 9538	4132, 4183, 4233 1312, 1413, 1513 9262, 9400, 9583	WCDMA Band II WCDMA Band IV WCDMA Band V
CONDCUDED EMISSION	4132 to 4233 1312 to 1513 9262 to 9538	4132, 4183, 4233 1312, 1413, 1513 9262, 9400, 9583	WCDMA Band II WCDMA Band IV WCDMA Band V
RADIATED EMISSION	4132 to 4233 1312 to 1513 9262 to 9538	4132, 4183, 4233 1312, 1413, 1513 9262, 9400, 9583	HSDPA Band II HSUPA Band IV WCDMA Band V

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5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
RF Power Output	+/- 1.10 dB
ERP/ EIRP measurement	Vertical Polarization = +/- 4.74dB Horizontal Polarization = +/- 4.62dB
99% Occupied Bandwidth	+/- 5.19 Hz
Out of Band Emissions at Antenna Terminals and Band Edge	+/- 0.70 dB
Peak to Average Ratio	+/- 0.70 dB
Frequency Stability vs. Temperature	+/- 5.19 Hz
Frequency Stability vs. Voltage	+/- 5.19 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : Vertical)	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : Horizontal)	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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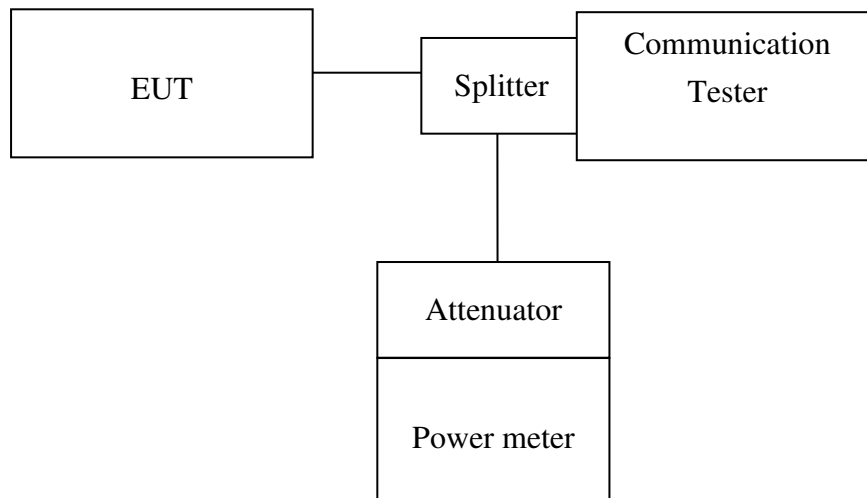
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6. RF CONDUCTED OUTPUT POWER MEASUREMENT

6.1. Standard Applicable

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals.

6.2. Test Set-up



Note: Measurement setup for testing on Antenna connector

6.3. Measurement Procedure

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading. TS 151 010-1 is reference to conduct the test measurement of output power.

The Procedure of KDB941225 (SAR Measurement Procedures for 3G devices, (WCDMA/HSPA) was used for EUT and Base station setting. RMC 12.2kps is used for this testing, and KDB 971168 D01 Power Meas License Digital System as the supplemental test methodology to adjust the proper setting obtaining the measurement results

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6.4. Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017
Communication Tester	Anritsu	MT8820C	6201107337	05/25/2016	05/24/2017
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2015	12/11/2016
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/16/2016	06/15/2017
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Splitter	RF-LAMBDA	RFLT2W1G18G	RF35	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017
Communication Tester	R&S	CMU200	120239	11/25/2015	11/24/2016

6.5. Measurement Result

RF Conducted Output Power

GPRS/EDGE (GMSK; 8-PSK) Result:

EUT Mode	Frequency (MHz)	CH	Peak Power (1DN 1UP) Class 8 (dBm)	Average Burst Power (1DN 1UP) Class 8 (dBm)	Peak Power (1DN 2UP) Class 10 (dBm)	Average Burst Power (1DN 2UP) Class 10 (dBm)
GPRS 850	824.2	128	31.40	31.10	30.50	30.40
	836.6	190	31.50	31.20	30.60	30.40
	848.8	251	31.50	31.20	30.50	30.30
GPRS 1900	1850.2	512	28.80	25.70	28.80	25.80
	1880.0	661	28.90	25.80	28.90	25.80
	1909.8	810	28.80	25.70	28.90	25.80
EDGE 850	824.2	128	28.80	28.60	27.90	27.80
	836.6	190	28.60	28.30	27.70	27.50
	848.8	251	28.30	28.10	27.40	27.20
EDGE 1900	1850.2	512	27.60	24.80	27.70	24.90
	1880.0	661	27.40	24.50	27.40	24.60
	1909.8	810	27.20	24.20	27.30	24.30

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WCDMA MODE:

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 V8.4.0 specification. The EUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7). RMC 12.2kps is used for this testing.

Results:

EUT Mode		WCDMA Band II		HSDPA Band II		HSUPA Band II	
Frequency (MHz)	CH	Peak Power (dBm)	Avg. Power (dBm)	Peak Power (dBm)	Avg. Power (dBm)	Peak Power (dBm)	Avg. Power (dBm)
1852.4	9262	25.84	22.98	25.61	22.38	25.49	22.37
1880.0	9400	25.73	22.85	25.83	22.45	25.77	22.42
1907.6	9538	25.31	22.50	25.17	21.74	25.22	21.73

EUT Mode		WCDMA Band V		HSDPA Band V		HSUPA Band V	
Frequency (MHz)	CH	Peak Power (dBm)	Avg. Power (dBm)	Peak Power (dBm)	Avg. Power (dBm)	Peak Power (dBm)	Avg. Power (dBm)
826.4	4132	26.11	22.75	25.93	22.06	25.98	22.07
836.6	4183	26.33	22.96	25.99	22.34	26.01	22.37
846.6	4233	26.25	22.82	25.96	22.29	26.05	22.34

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HSDPA Release 6 MODE:

The following 4 Sub-Tests were completed according to the test requirements outlined in section 5.2A of the 3GPP TS34.121-1 V8.4.0 specification. All TX RMS power requirements for Power Class 3 were met according to table 5.2AA.5 and 5.2B.5 All UE channels and power ratio's are set according to table C10.1.4 & C11.1.3 in the 3GPP TS34.121-1 V8.4.0. RMC 12.2kps is used for this testing.

HSDPA SUB-TEST Setting

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH(FOR HSDPA)

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)	RMC (Kbps)
1	2/15	15/15	64	2/15	4/15	0.0	0.0	12.2
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0	12.2
3	15/15	8/15	64	15/8	30/15	1.5	0.5	12.2
4	15/15	4/15	64	15/4	30/15	1.5	0.5	12.2

Note: The recommended HSDPA MPRs are implemented as per following sub-tests.

Results:

Mode	Sub-test	Avg. Power (dBm) Channel			Power Class 3 Lim- itation (dBm)	Comments
		9262	9400	9538		
HSDPA (B2)	1	23.15	22.74	22.36	20.3dBm – 25.7dBm	Pass
	2	22.86	22.71	22.35	20.3dBm – 25.7dBm	Pass
	3	22.67	22.29	21.83	19.8dBm – 25.7dBm	Pass
	4	22.74	22.30	21.95	19.8dBm – 25.7dBm	Pass

Mode	Sub-test	Avg. Power (dBm) Channel			Power Class 3 Lim- itation (dBm)	Comments
		4132	4183	4233		
HSDPA (B5)	1	22.54	22.82	22.94	20.3dBm – 25.7dBm	Pass
	2	22.68	22.85	22.69	20.3dBm – 25.7dBm	Pass
	3	22.08	22.34	22.45	19.8dBm – 25.7dBm	Pass
	4	22.13	22.38	22.51	19.8dBm – 25.7dBm	Pass

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HSPA (HSDPA & HSUPA) Release 6 MODE

The following 5 Sub-Tests were completed according to the test requirements outlined in section 5.2A of the 3GPP TS34.121-1 V8.4.0 specification. All TX RMS power requirements for Power Class 3 were met according to table 5.2AA.5 and 5.2B.5 All UE channels and power ratio's are set according to table C11.1.3 in the 3GPP TS34.121-1 V8.4.0. RMC 12.2kps is used for this testing

HSPA SUB-TEST Setting

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH(FOR HSUPA)

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS}	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (Code s)	CM (dB)	MPR (dB)	AG Index	E-TFCI	RMC (Kbps)
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75	12.2
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67	12.2
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4 4	2	2.0	1.0	15	92	12.2
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71	12.2
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81	12.2

Note: The recommended HSUPA MPRs are implemented as per following sub-tests.

Results:

Mode	Sub-test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)	Comments
		9262	9400	9538		
HSUPA(B2)	1	22.90	22.83	22.44	18.8dBm – 25.7dBm	Pass
	2	20.95	20.90	20.48	16.8dBm – 25.7dBm	Pass
	3	21.96	21.85	21.52	17.8dBm – 25.7dBm	Pass
	4	21.08	20.95	20.52	16.8dBm – 25.7dBm	Pass
	5	22.79	22.69	22.35	18.8dBm – 25.7dBm	Pass

Mode	Sub-test	Avg. Power (dBm) Channel			Power Class 3 Limitation (dBm)	Comments
		4132	4183	4233		
HSUPA(B5)	1	22.71	22.89	22.74	18.8dBm – 25.7dBm	Pass
	2	20.77	20.97	20.78	16.8dBm – 25.7dBm	Pass
	3	21.75	21.95	21.82	17.8dBm – 25.7dBm	Pass
	4	20.82	21.03	20.86	16.8dBm – 25.7dBm	Pass
	5	22.57	22.72	22.63	18.8dBm – 25.7dBm	Pass

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Minimum Communications Power Measurement

PCS 1900 band

PCL	0	1	2	3	4	5	6	7	8
Output power (dBm)	28.30	26.20	24.30	22.50	20.50	18.60	16.50	14.60	12.50

PCL	9	10	11	12	13	14	15
Output power (dBm)	10.40	8.40	6.30	4.50	2.30	0.60	-1.70

Note: The EUT output power was controlled by simulator. Set Communication Tester [CMU200](#) PCL as above, and get the mobile phone output power reading.

WCDMA/HSDPA/HSUPA band II, IV, V

The EUT output power was controlled by simulator. Set Communication Tester [CMU200](#) function key "UE Power Control" and enter max rated power 24dBm. The EUT is going to be set to max output power to 24dBm. Then record the read (see page 15 for measurement data). The min. power was measures by a function key "minimum power" then record the read. It is -52.3dBm. The power variation can be 0.1dB step by setting.

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7. EFFECTIVE RADIATED POWER AND EQUIVALENT ISOTROPIC RADIATED POWER MEASUREMENT

7.1. Standard Applicable

According to FCC §2.1046

FCC 22.913(a) Mobile station is limited to 7W ERP.

FCC 24.232(b) Mobile and portable stations are limited to 2 W EIRP.

According to RSS-132, section 5.4.

The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

According to RSS-133 §6.4

The peak e.i.r.p. for transmitters operating in the band 1850-1910 MHz shall not exceed the limits 2W given in SRSP-510.

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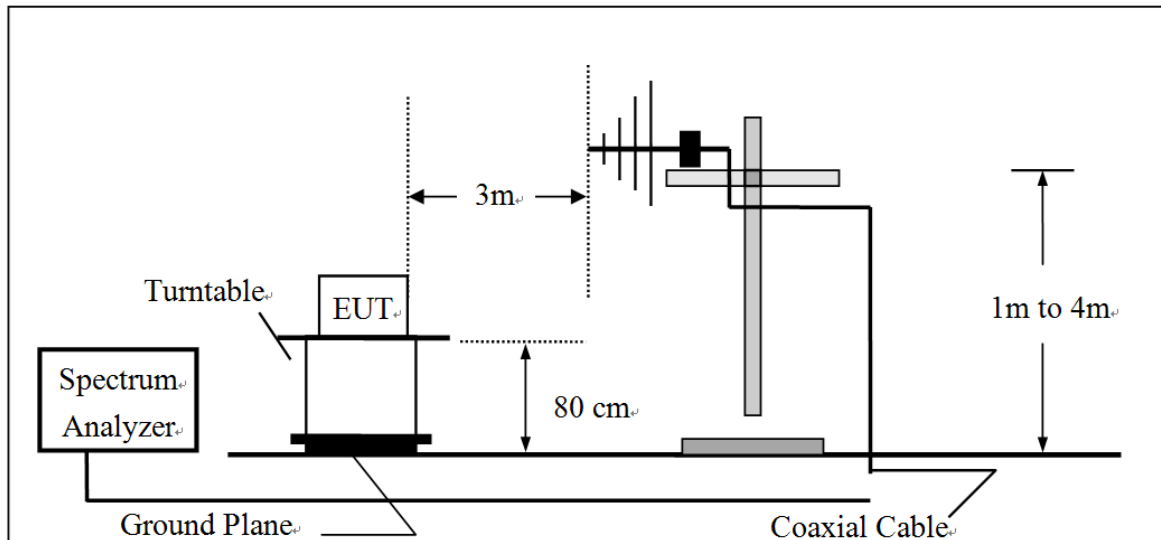
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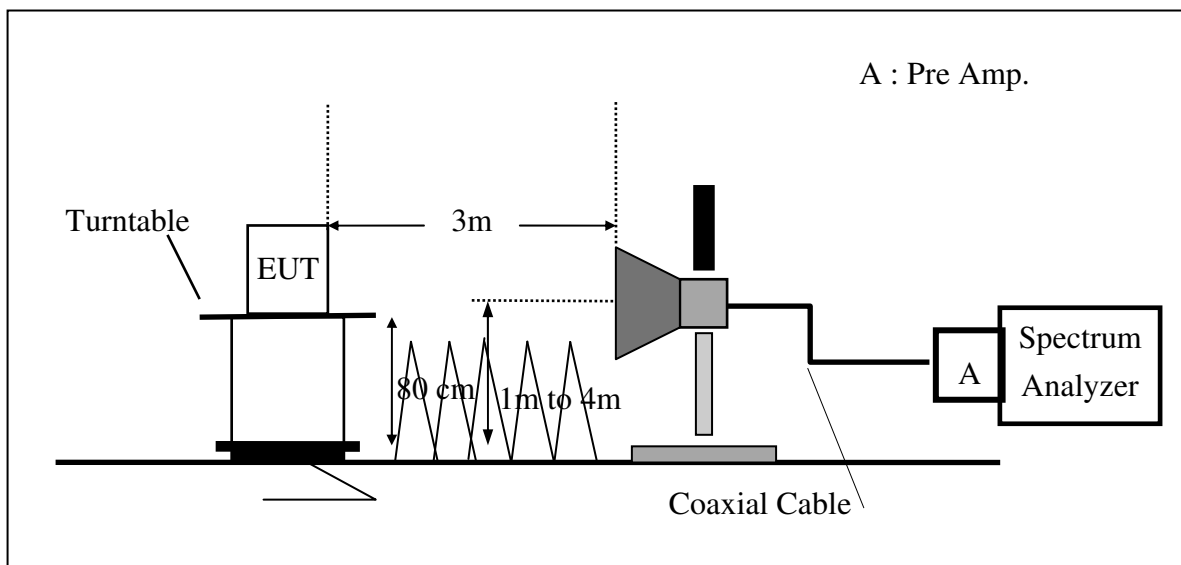
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7.2. Test SET-UP

(A) Radiated Power Test Set-Up, Frequency Below 1000MHz



(B) Radiated Power Test Set-UP Frequency Over 1 GHz



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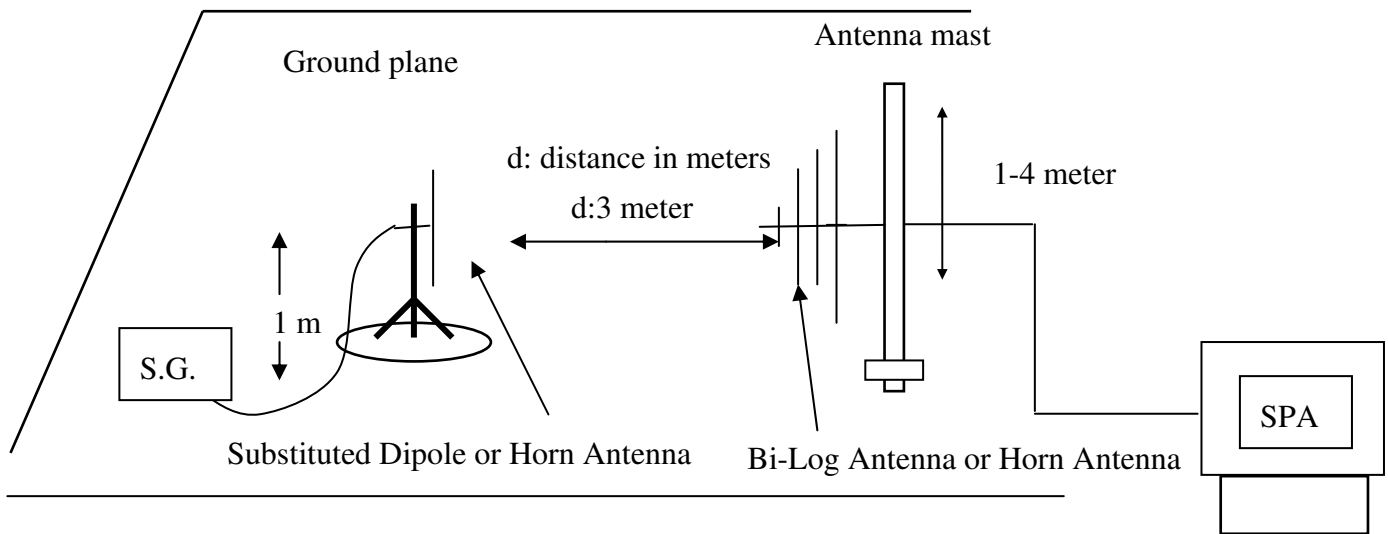
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(C) Substituted Method Test Set-UP



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7.3. Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 971168 D01
2. The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
3. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated
4. The testing follows the Measurement Procedure of FCC KDB 971168 D01
5. The substitution horn antenna 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 b. Record the power level of S.G.
6. $ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$
7. $ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$
8. Spectrum setting:
 - (1) Detector = Peak, marker the highest value of the detector by maximum hold, set RBW wide enough to capture the entire signal of emission, and $VBW \geq 3 \times RBW$.
 - (2) KDB 971168 D01 is adopted, and the procedure as lists under item 4, Measurement of the Average Power over the Fundamental Signal Bandwidth, is followed to set correspondingly for the acquisition of proper measurement data.

Set frequency = nominal signal center frequency;
Set span = 2 X occupied BW;
Set RBW $\approx 1 \sim 5\%$ of the span, not to exceed 1 MHz
Set VBW = 3 x RBW;
Select average power (RMS) detector
Set sweep time and number of measurement points to achieve a minimum of 1 millisecond/pt integration time (ex. Point = 601points, then sweep time = $601 \times 10^{-3} = 6s$).

Activate trace averaging routine over a minimum of 10 sweeps;

Activate marker/span pair and set span = signal or channel bandwidth;

Activate the band/interval power marker function;

Record the band power level;

Record adjusted value as the average signal power level. Then activate the occupied bandwidth measurement function.

The proper adjustment due to limitation of spectrum capability is given compensated to spectrum with conversion factor of $10 \times \log(TBW/RBW)$, where TBW is the transmission of UE exceeding the maximum BW UE can extends, and RBW is the resolution BW in UE.

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7.4. Measurement Equipment Used

ERP, EIRP MEASUREMENT EQUIPMENT List 966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESU 40	100363	04/12/2016	04/11/2017
Broadband Antenna	TESEQ	CBL 6112D	35240	10/28/2015	10/27/2016
Broadband Antenna	TESEQ	CBL 6112D	35243	11/09/2015	11/08/2016
Horn Antenna	ETS-Lindgren	3117	00143272	12/16/2015	12/15/2016
Horn Antenna	ETS-Lindgren	3117	00143279	11/05/2015	11/04/2016
Horn Antenna	Schwarzbeck	BBHA9170	184	12/11/2015	12/10/2016
Horn Antenna	Schwarzbeck	BBHA9170	185	07/18/2016	07/17/2017
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2015	12/11/2016
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2015	12/11/2016
Pre Amplifier	R&S	SCU-18	10204	12/12/2015	12/11/2016
Pre Amplifier	R&S	SCU-26	100780	12/12/2015	12/11/2016
Pre Amplifier	EMC Instruments	EMC184045B	980135	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF27	12/12/2015	12/11/2016
Communication Tester	Anritsu	MT8820C	6201107337	05/25/2016	05/24/2017
Site NSA	SGS	966 Chamber C	SAC-C	03/04/2016	03/03/2017
Site VSWR	SGS	966 Chamber C	SAC-C	03/04/2016	03/03/2017
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2016	05/03/2017
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

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7.5. Measurement Result: (Peak) –using option of peak measurement

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit

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EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit

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EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit

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EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit

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7.6. Measurement Result: (Average) –using option of average measurement

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit

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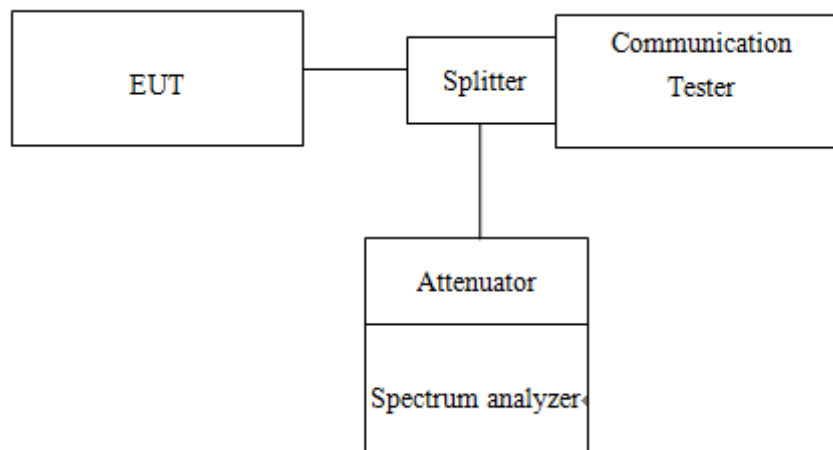
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8. OCCUPIED BANDWIDTH MEASUREMENT

8.1. Standard Applicable

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.

8.2. Test Set-up



8.3. Measurement Procedure

99% & 26dB Bandwidth with detector peak

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW= 3 times RBW, -26dBc display line was placed on the screen (or 26dB bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace. Then set RBW to 99% bandwidth, RBW= 1%, VBW= 3 RBW, with span > 2 * Signal BW, set % Power = 99%.

99% Bandwidth with detector sample

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% ~ 5% of emission BW, VBW= 3 times RBW, -20dBc display line was placed on the screen (or 20dB bandwidth). Set RBW to 99% bandwidth, RBW= 1% ~ 5%, VBW= 3 RBW, with span > 2 * Signal BW, set % Power = 99%.

NOTE: For the plot of bandwidth measurement, the marker of the 99% bandwidth is diamond-shape while the marker of the 20dB BW is arrow-mark

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8.4. Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017
Communication Tester	Anritsu	MT8820C	6201107337	05/25/2016	05/24/2017
Coaxial Cable 30cm	WOKEN	00100A1F1A 195C	RF01	12/12/2015	12/11/2016
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/16/2016	06/15/2017
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Splitter	RF-LAMBDA	RFLT2W1G1 8G	RF35	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017
Communication Tester	R&S	CMU200	120239	11/25/2015	11/24/2016

8.5. Measurement Result

99% Bandwidth (Detector Peak)

Frequency (MHz)	CH	99% Bandwidth (KHz)	99% Bandwidth (KHz)
		GPRS 850	EDGE 850
824.20	128	244.67	245.55
836.60	190	244.68	245.09
848.80	251	238.88	246.32

Frequency (MHz)	CH	99% Bandwidth (KHz)	99% Bandwidth (KHz)
		GPRS 1900	EDGE 1900
1850.20	512	244.88	250.63
1880.00	661	245.70	241.01
1909.80	810	241.20	249.51

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Frequency (MHz)	CH	99% Bandwidth (MHz)	99% Bandwidth (MHz)	99% Bandwidth (MHz)
		WCDMA II	HSDPA II	HSUPA II
1850.20	9262	4.0675	4.0569	4.0540
1880.00	9400	4.0670	4.0641	4.0604
1909.80	9538	4.0703	4.0642	4.0704

Frequency (MHz)	CH	99% Bandwidth (MHz)	99% Bandwidth (MHz)	99% Bandwidth (MHz)
		WCDMA V	HSDPA V	HSUPA V
826.40	4132	4.0556	4.0537	4.0429
836.60	4183	4.0457	4.0384	4.0380
846.60	4233	4.0508	4.0594	4.0385

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26dB Bandwidth

Frequency (MHz)	CH	26dB Band- width (KHz)	26dB Band- width (KHz)
		GPRS 850	EDGE 850
824.20	128	310.5	313.4
836.60	190	320.6	313.5
848.80	251	311.7	315.7

Frequency (MHz)	CH	26dB Band- width (KHz)	26dB Band- width (KHz)
		GPRS 1900	EDGE 1900
1850.20	512	321.0	314.9
1880.00	661	322.9	313.1
1909.80	810	317.1	313.3

Frequency (MHz)	CH	26dB Band- width (MHz)	26dB Band- width (MHz)	26dB Band- width (MHz)
		WCDMA II	HSDPA II	HSUPA II
1850.20	9262	4.639	4.617	4.621
1880.00	9400	4.633	4.608	4.619
1909.80	9538	4.673	4.623	4.659

Frequency (MHz)	CH	26dB Band- width (MHz)	26dB Band- width (MHz)	26dB Band- width (MHz)
		WCDMA V	HSDPA V	HSUPA V
826.40	4132	4.583	4.600	4.582
836.60	4183	4.583	4.586	4.571
846.60	4233	4.579	4.594	4.574

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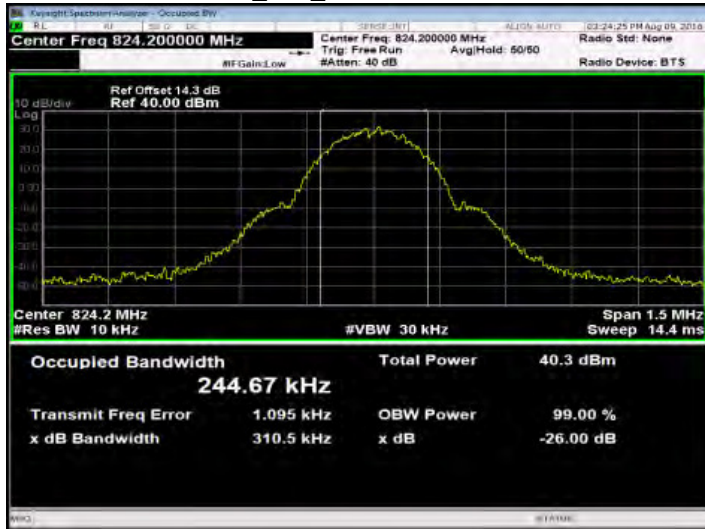
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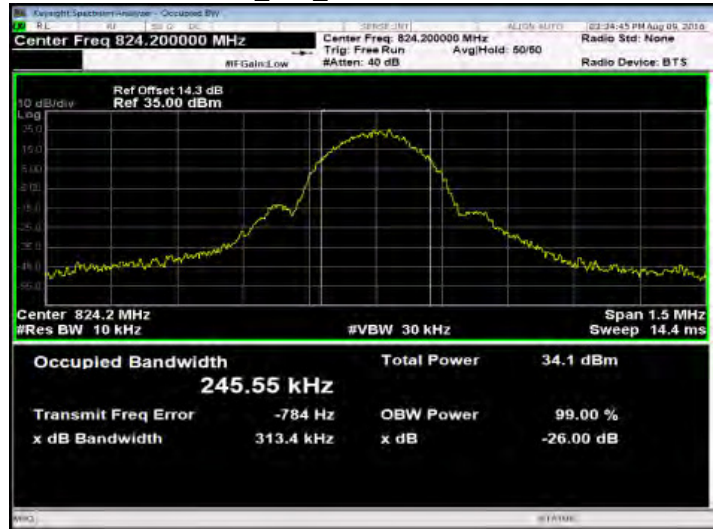
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99% & 26dB Bandwidth Test Data (Detector Peak)

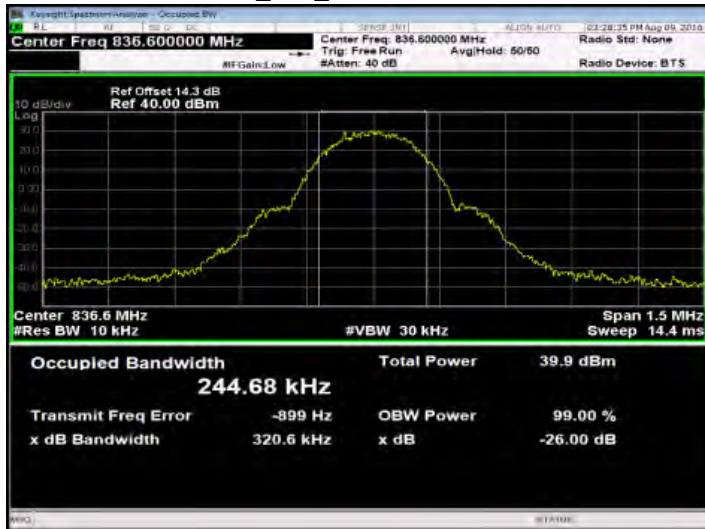
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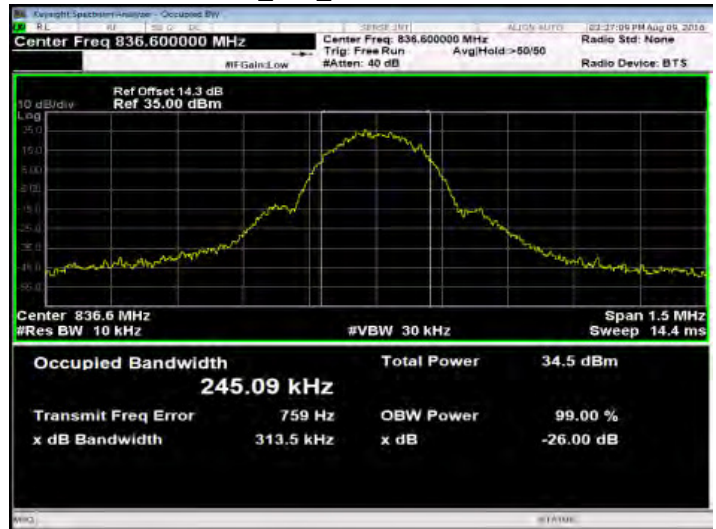
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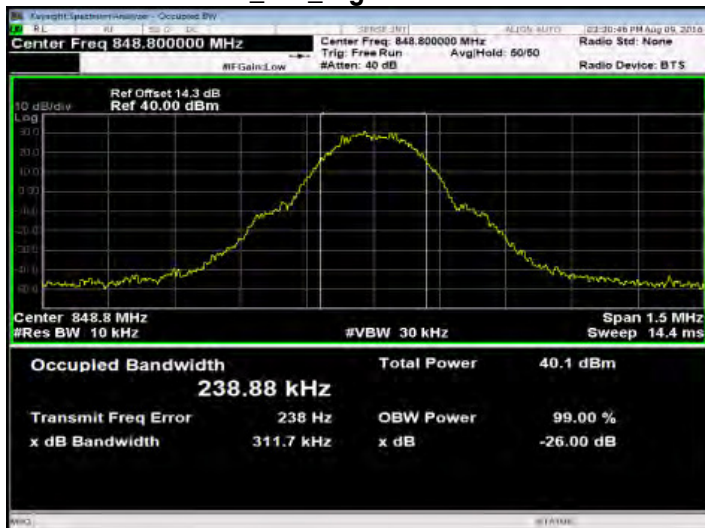
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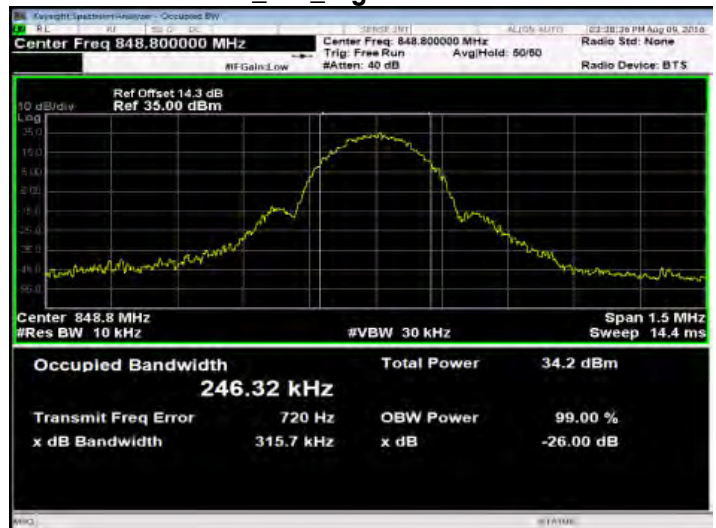
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GPRS_850_HighCH251-848.8



EDGE_850_HighCH251-848.8



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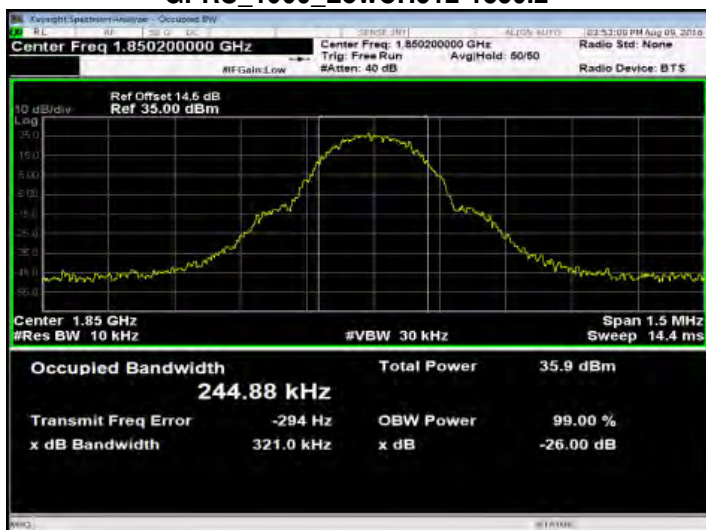
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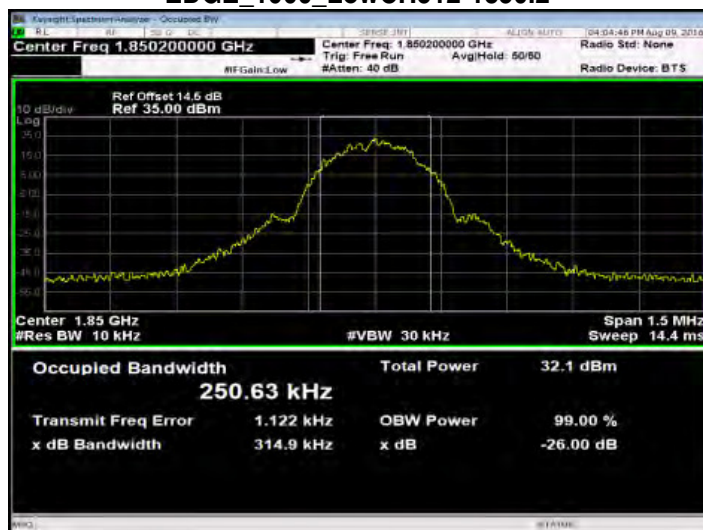
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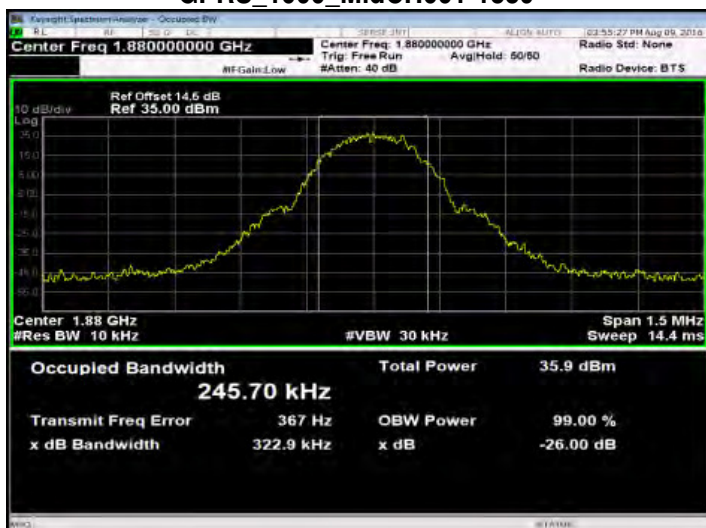
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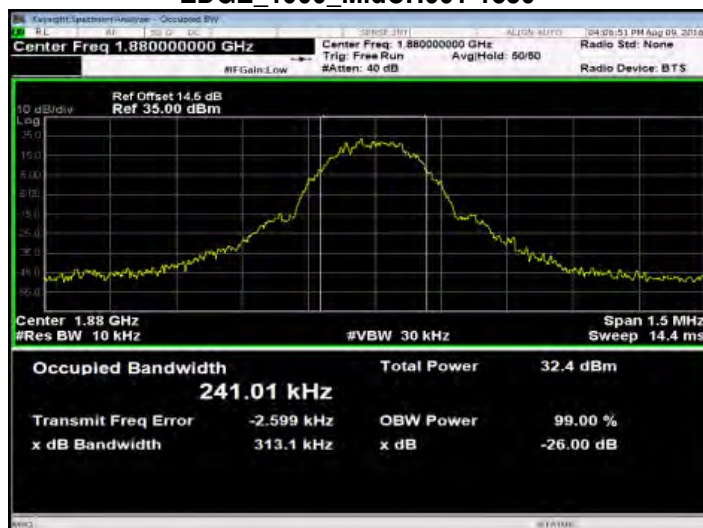
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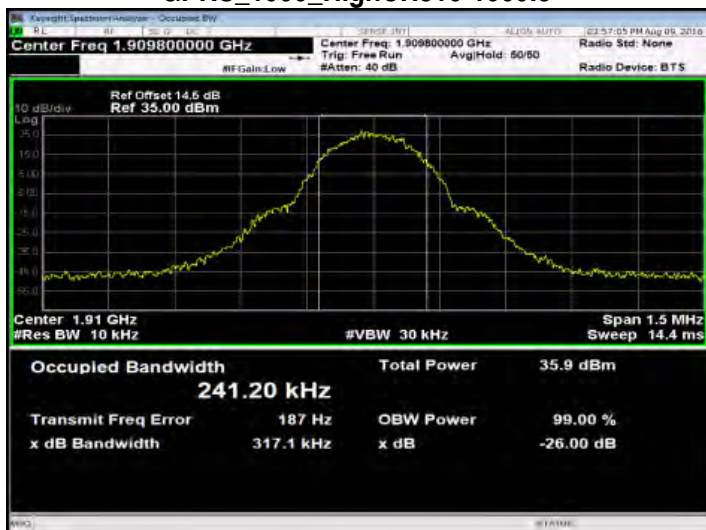
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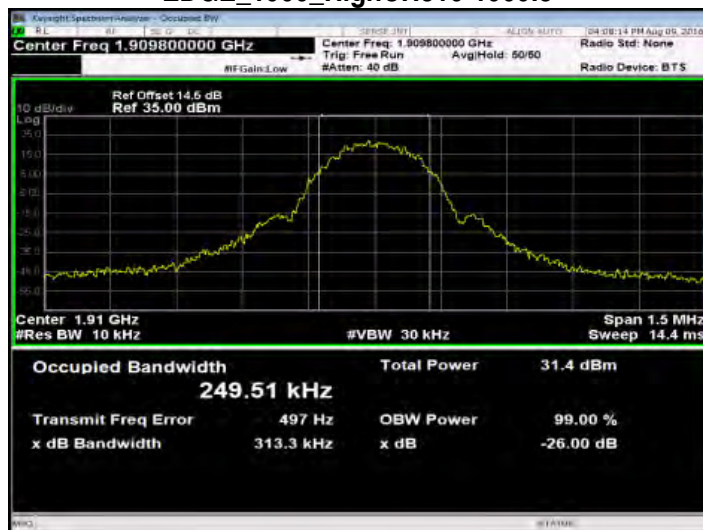
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GPRS_1900_HighCH810-1909.8



EDGE_1900_HighCH810-1909.8



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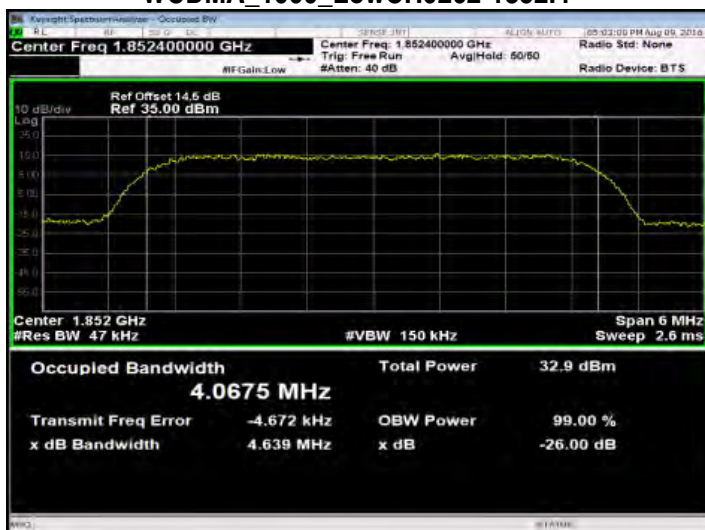
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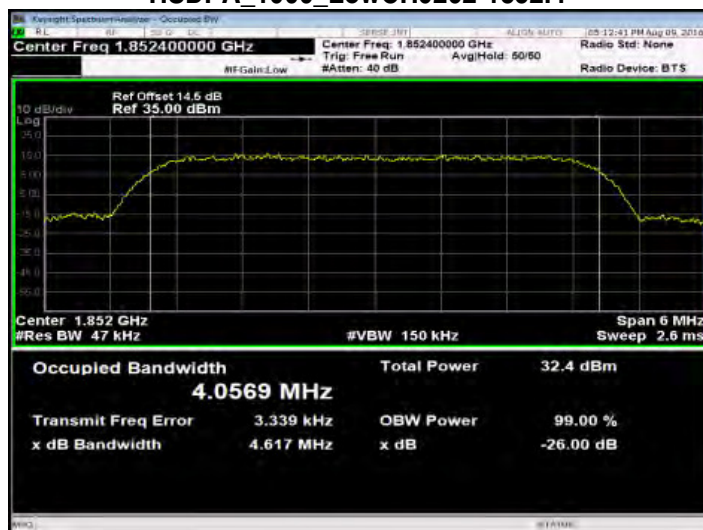
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WCDMA_1900_LowCH9262-1852.4



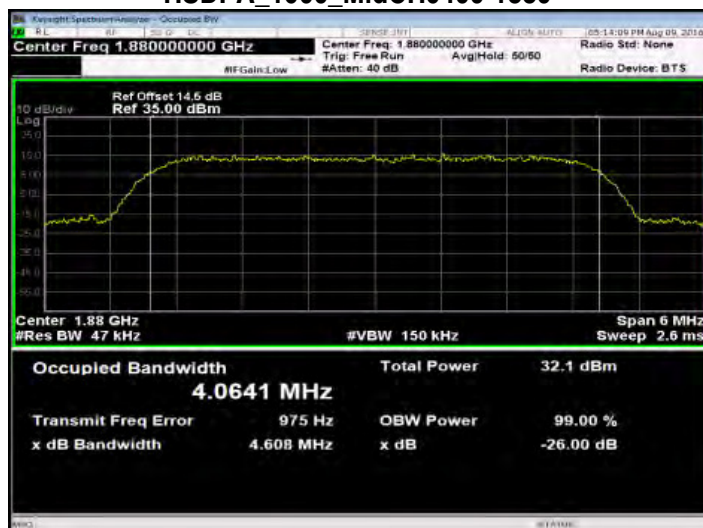
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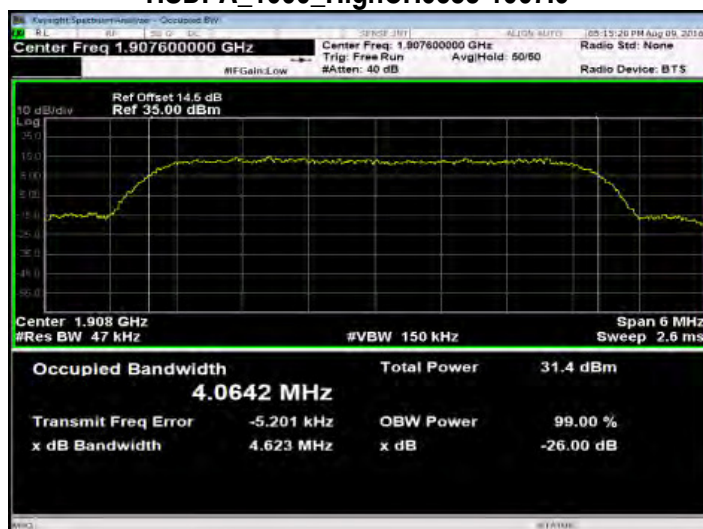
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WCDMA_1900_HighCH9538-1907.6



HSDPA_1900_HighCH9538-1907.6



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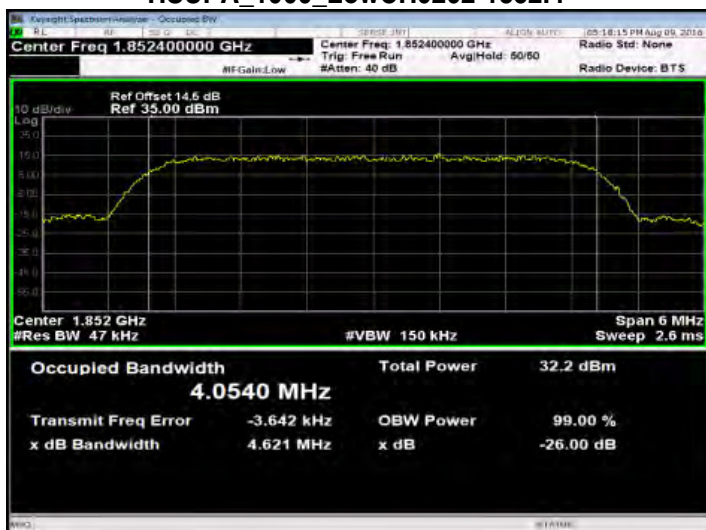
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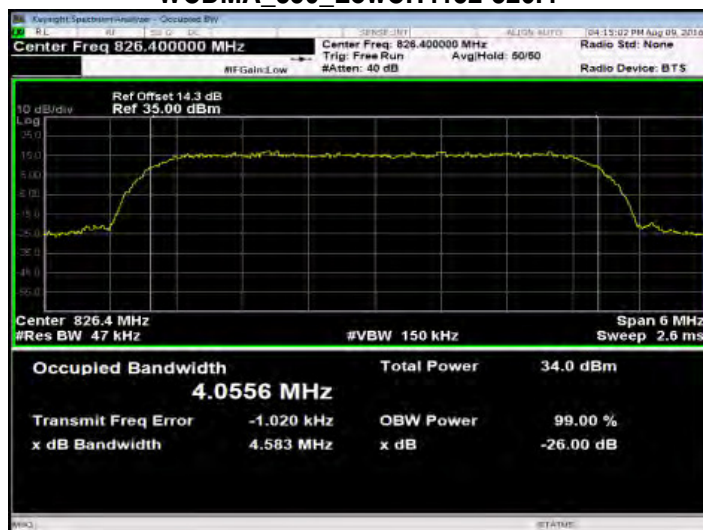
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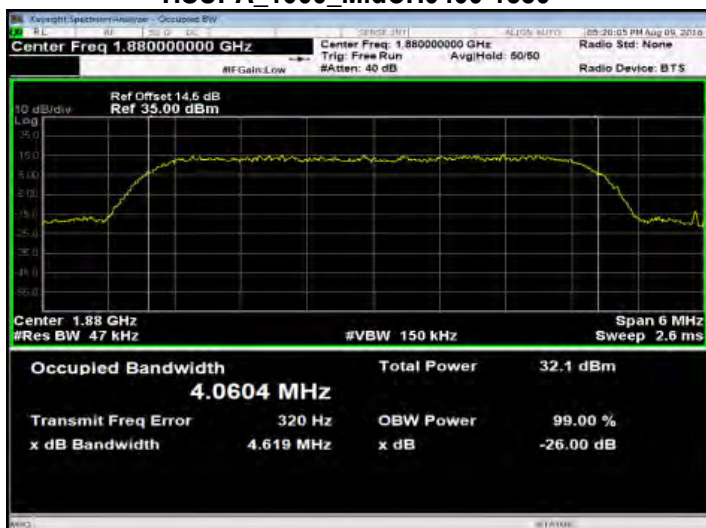
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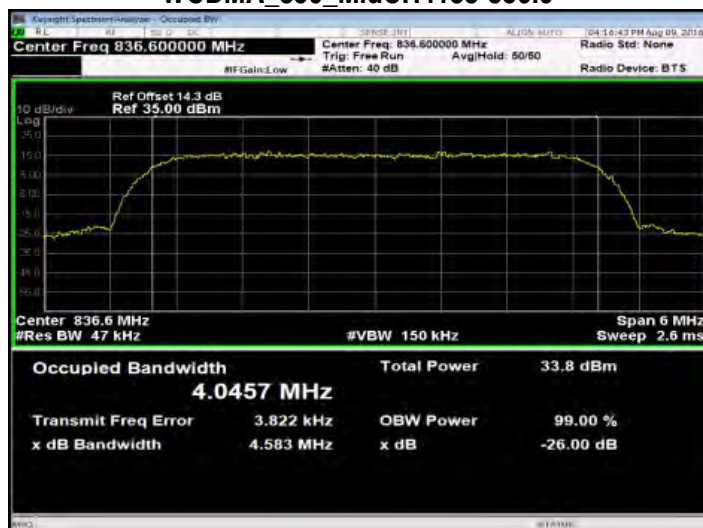
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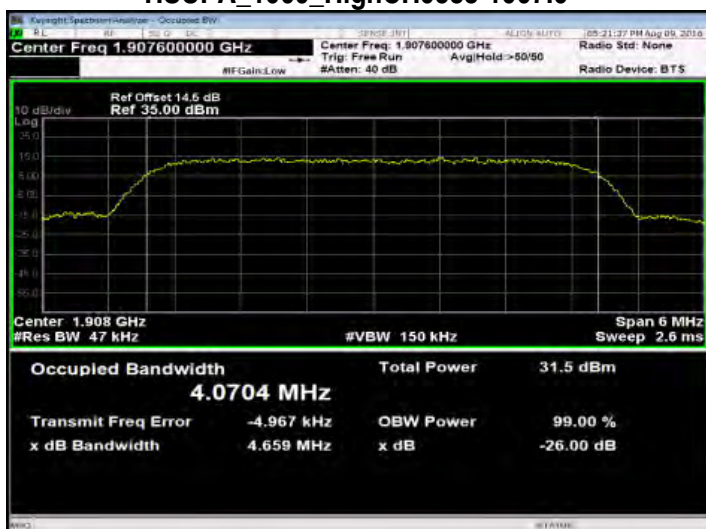
HSUPA_1900_MidCH9400-1880



WCDMA_850_MidCH4183-836.6



HSUPA_1900_HighCH9538-1907.6



WCDMA_850_HighCH4233-846.6



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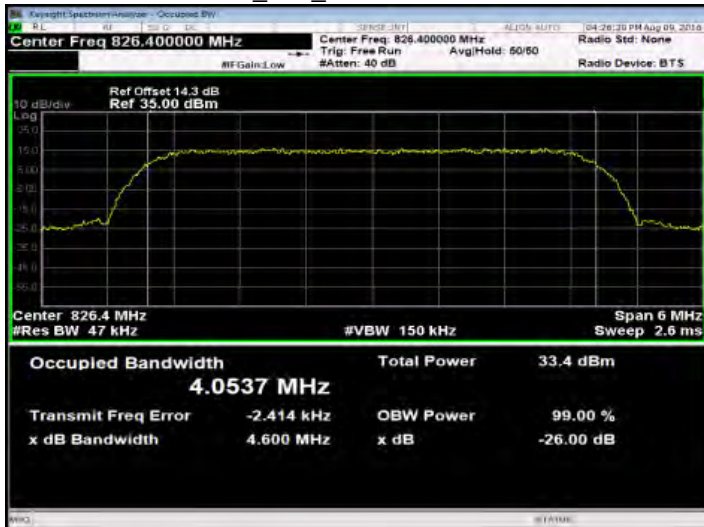
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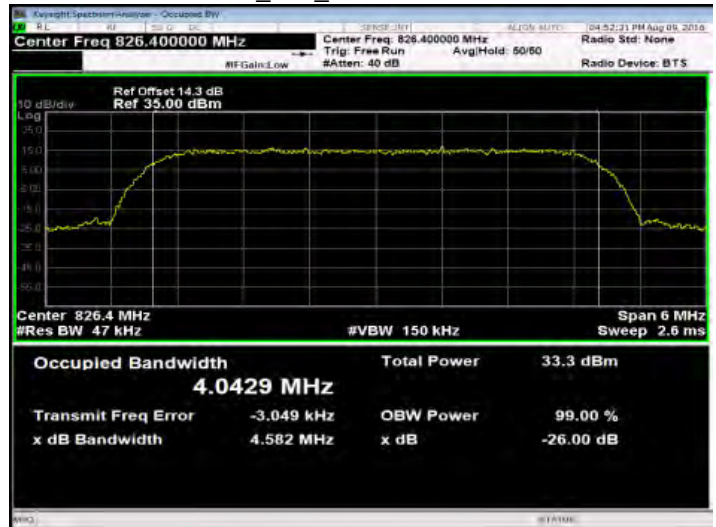
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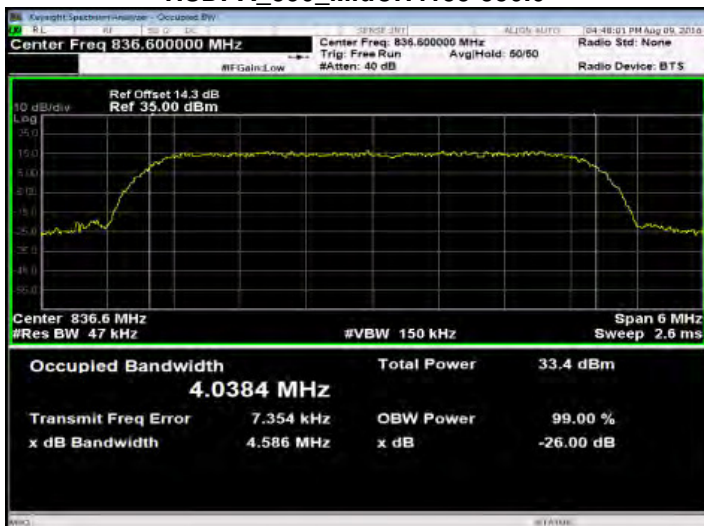
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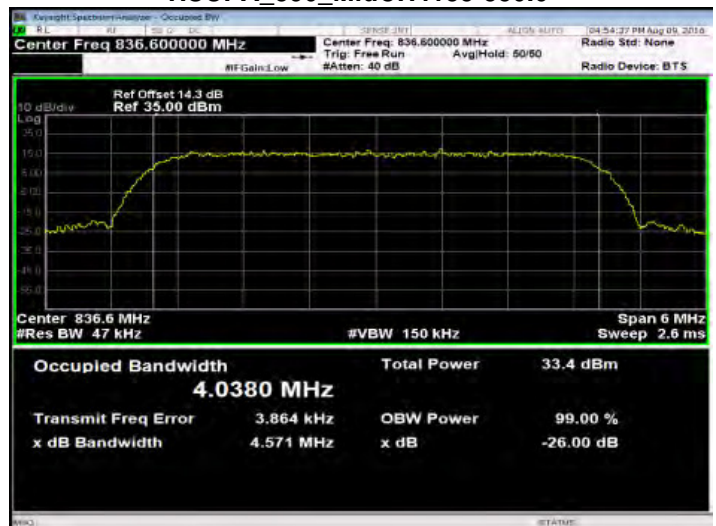
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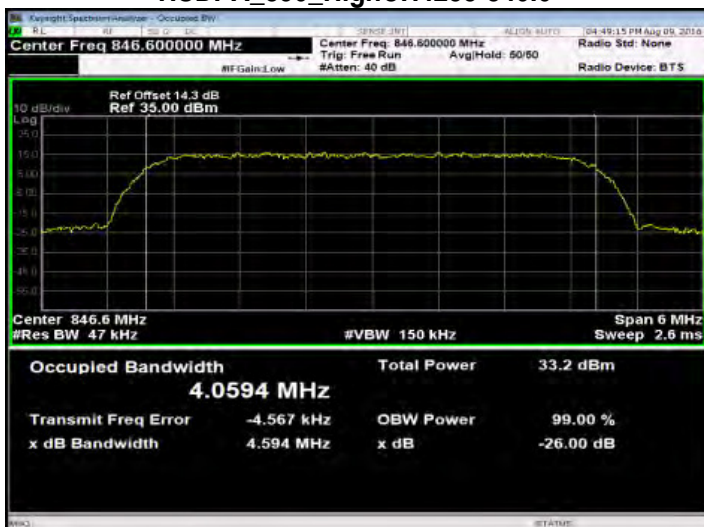
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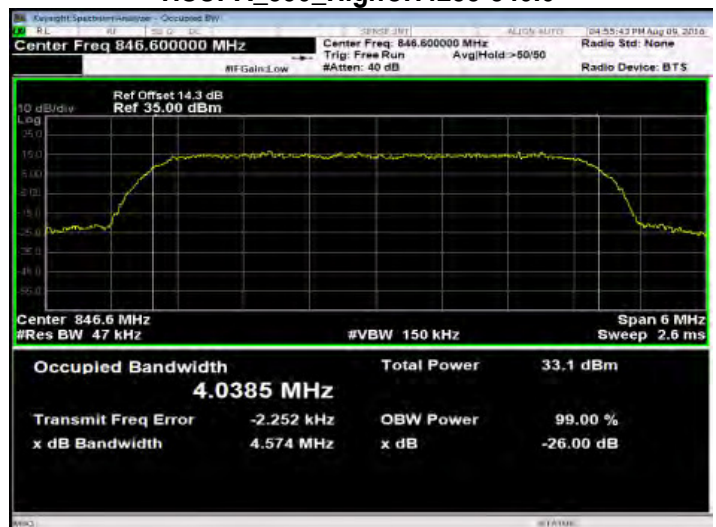
HSUPA_850_MidCH4183-836.6



HSDPA_850_HighCH4233-846.6



HSUPA_850_HighCH4233-846.6



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9. OUT OF BAND EMISSION AT ANTENNA TERMINALS

9.1. Standard Applicable

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

According to RSS-132 §5.5

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

According to RSS-133 §6.5

6.5.1 Out-of-Block Emissions

Equipment shall comply with the limits in (i) and (ii) below.

(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

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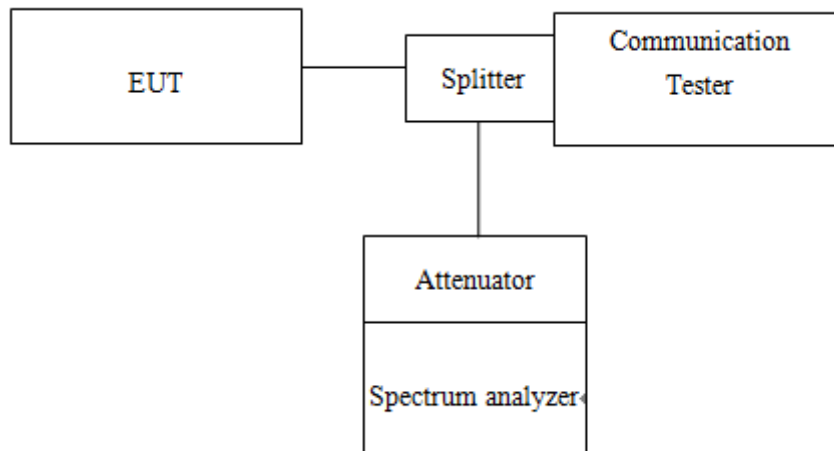
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9.2. Test SET-UP



9.3. Measurement Procedure

Conducted Emission

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 1MHz & VBW = 1MHz on Spectrum.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

Band Edge

1. To connect Antenna Port of EUT to Spectrum.
2. The band edge of low and high channels for the highest RF powers was measured. Setting $RBW \geq 1\% EBW$.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

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9.4. Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/09/2015	12/08/2016
Power Sensor	Anritsu	MA2411B	917032	12/09/2015	12/08/2016
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017
Coaxial Cable	HUBER+SUHNE R	SUCOFLEX 102	23670/2	01/02/2016	01/01/2017
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017
Splitter	Agilent	11636B	N/A	01/02/2016	01/01/2017
DC Power Supply	Agilent	E3640A	MY52410006	11/05/2015	11/04/2016
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017
Radio Communication Analyzer	R&S	CMU200	102189	02/11/2016	02/10/2017
Radio Communication Analyzer	Anritsu	MT8820C	6200995019	09/25/2015	09/24/2016
Radio Communication Analyer	Anritsu	MT8820C	6201465317	12/10/2015	12/09/2016

9.5. Measurement Result:

Refer to next pages.

NOTE: The occurrence of the spike on the conducted emission is the signal of the fundamental emission.

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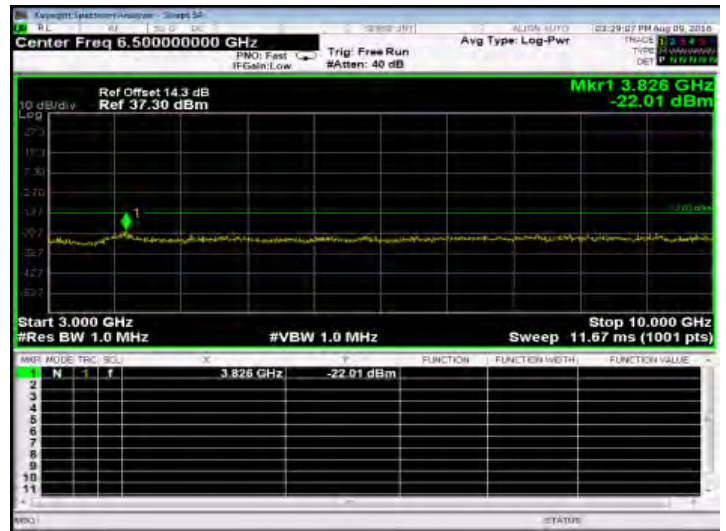
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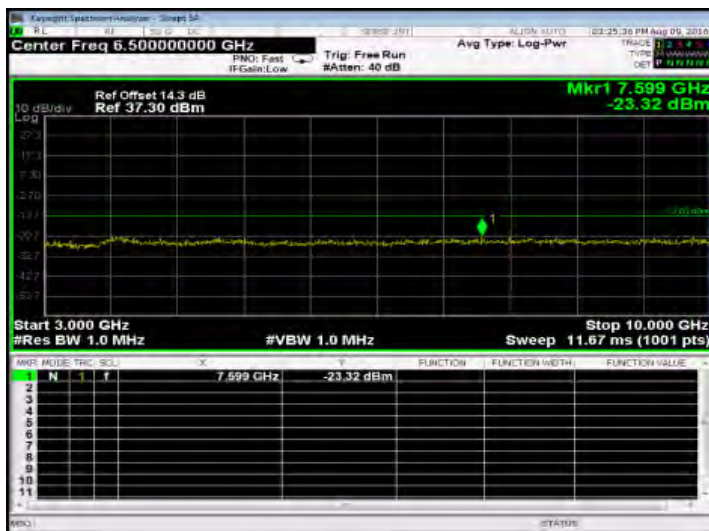
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3GHz~10GHz_GPRS_850MHz_MidCH190-836.6



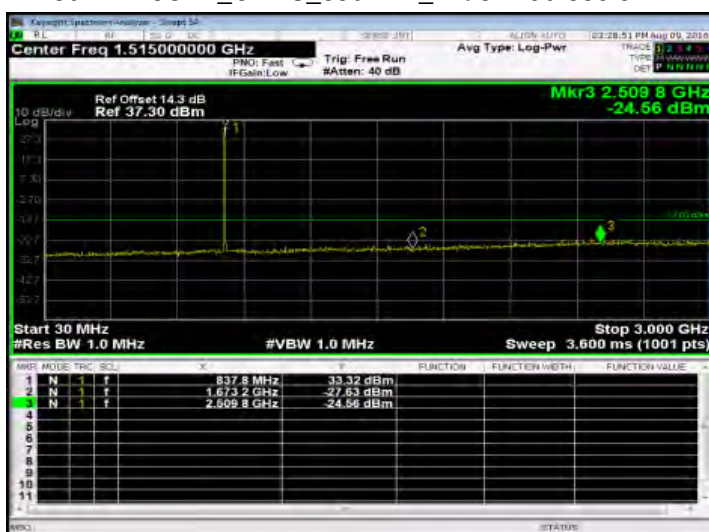
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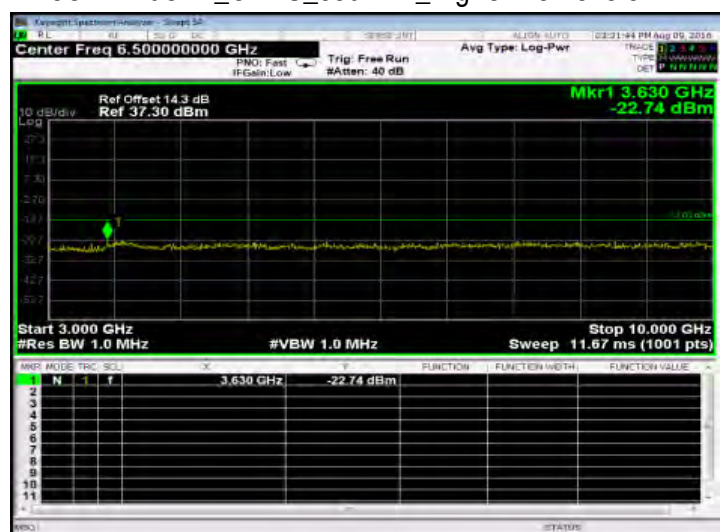
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30MHz~3GHz_GPRS_850MHz_MidCH190-836.6



3GHz~10GHz_GPRS_850MHz_HighCH251-848.8



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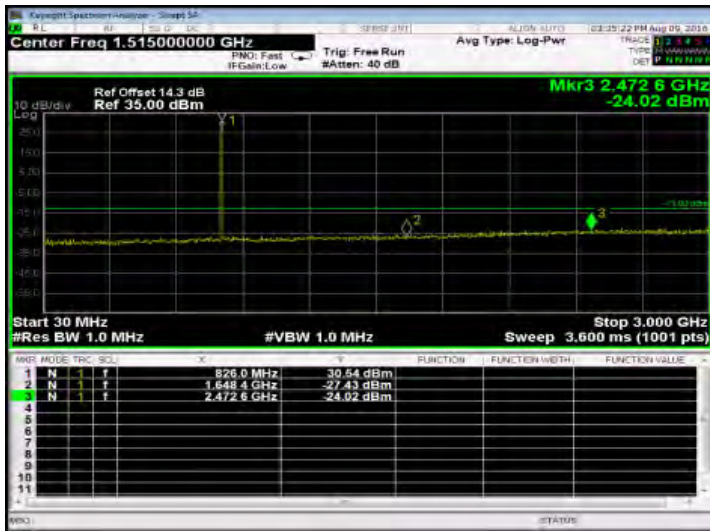
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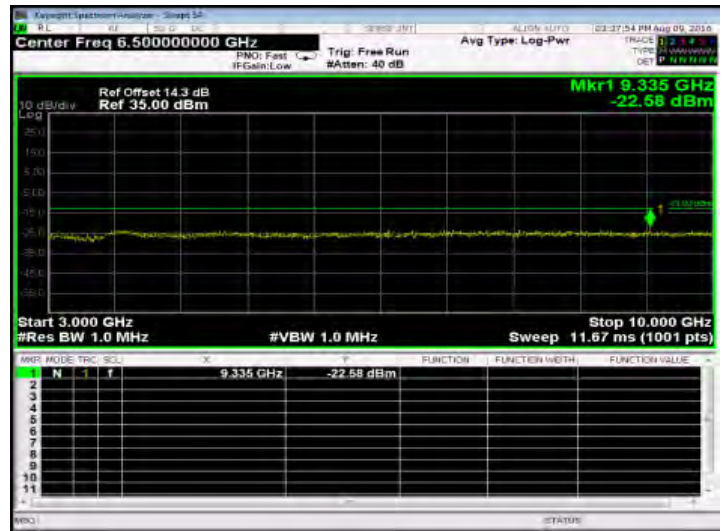
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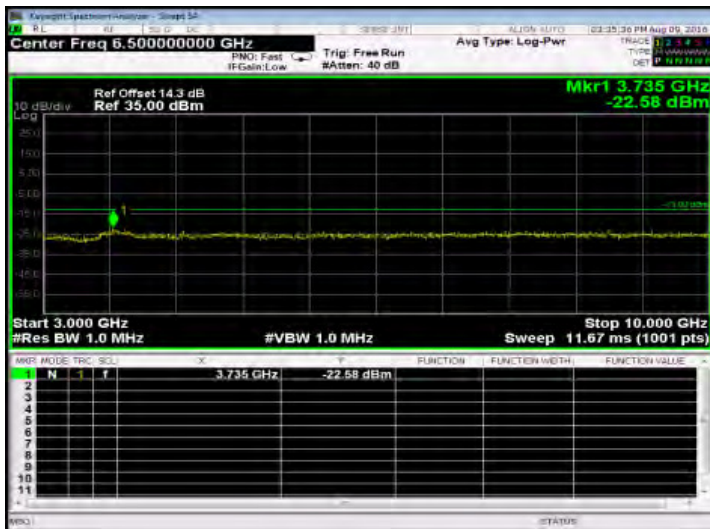
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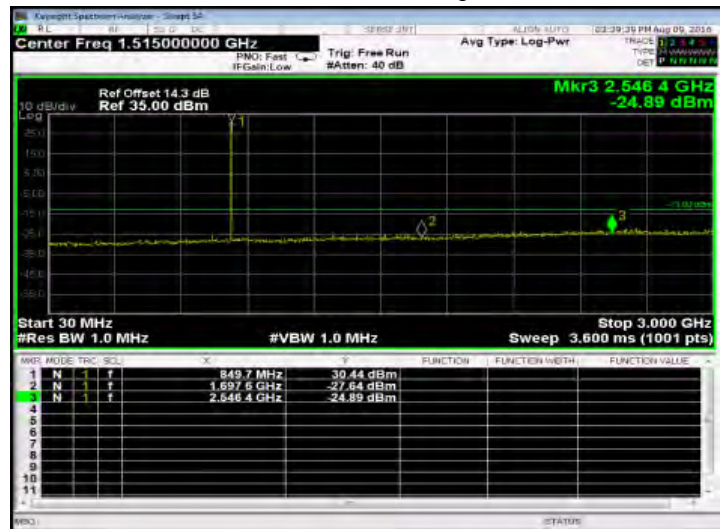
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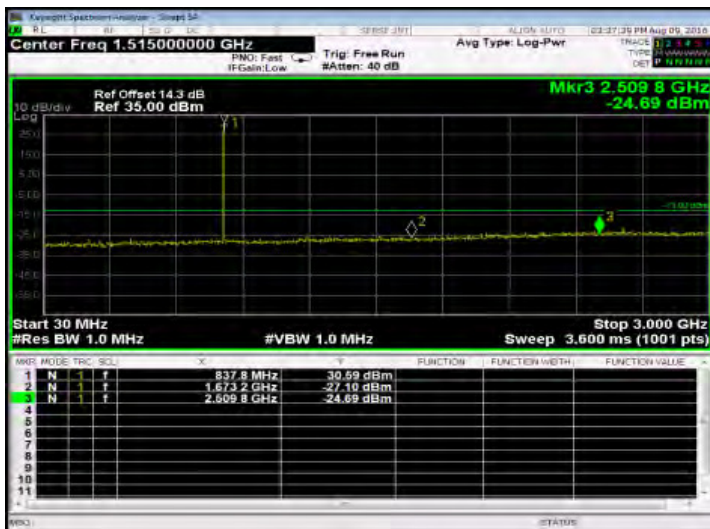
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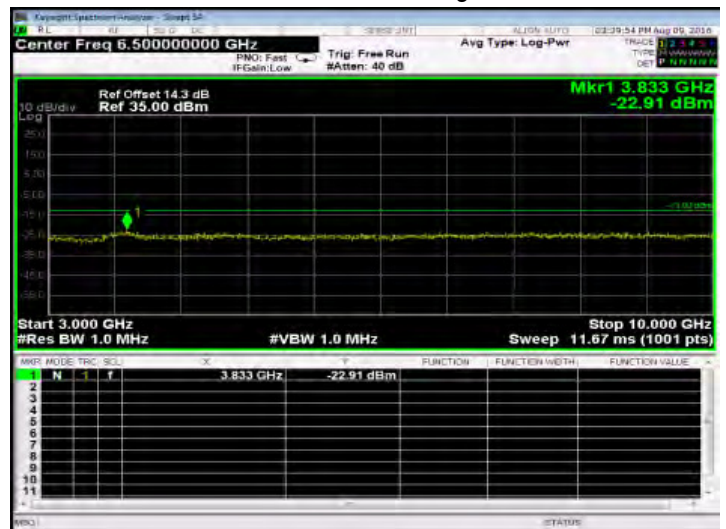
30MHz~3GHz_EDGE_850MHz_HighCH251-848.8



30MHz~3GHz_EDGE_850MHz_MidCH190-836.6



3GHz~10GHz_EDGE_850MHz_HighCH251-848.8



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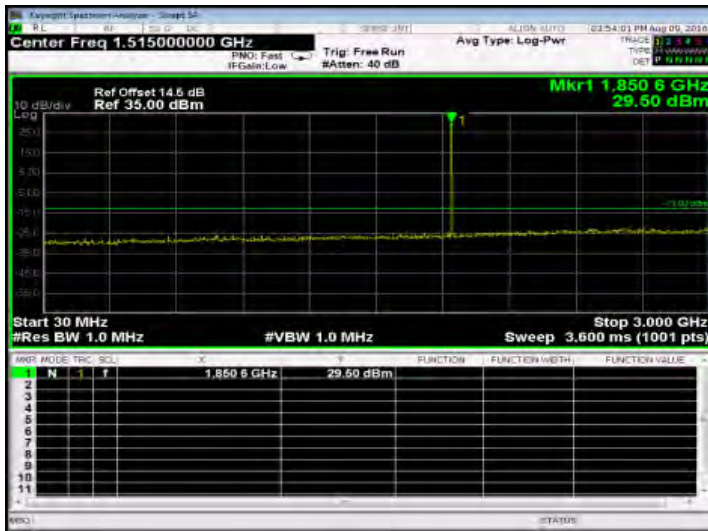
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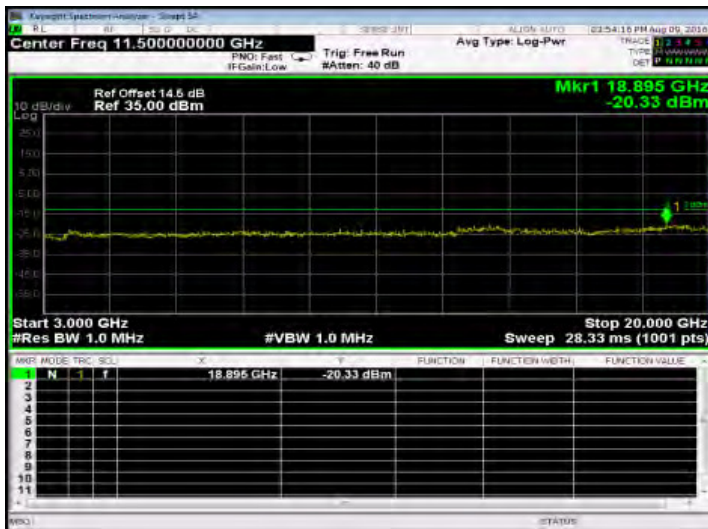
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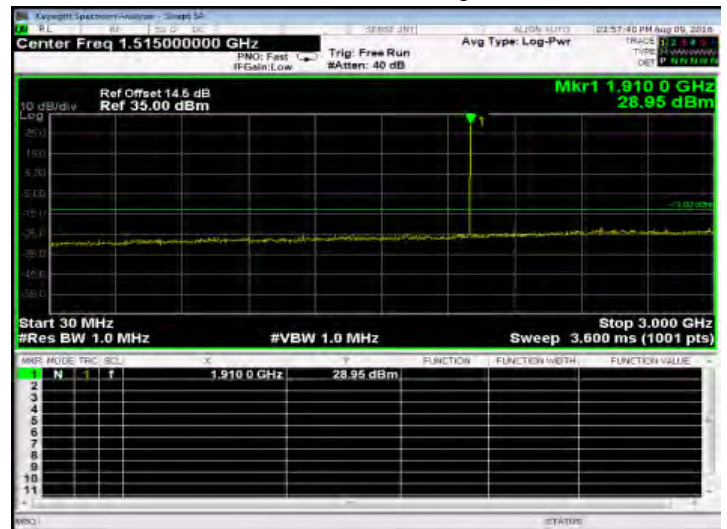
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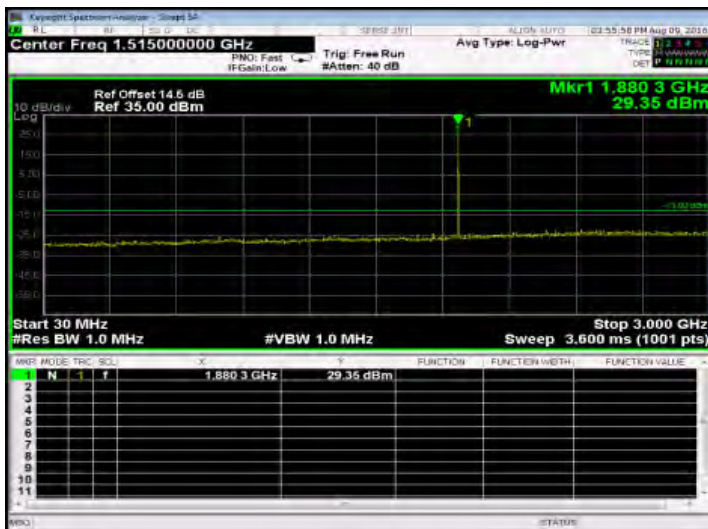
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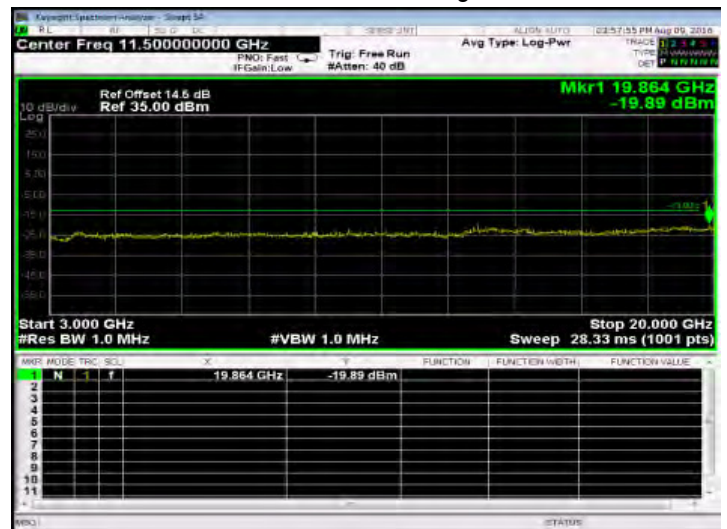
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30MHz~3GHz_GPRS_1900MHz_MidCH661-1880



3GHz~10GHz_GPRS_1900MHz_HighCH810-1909.8



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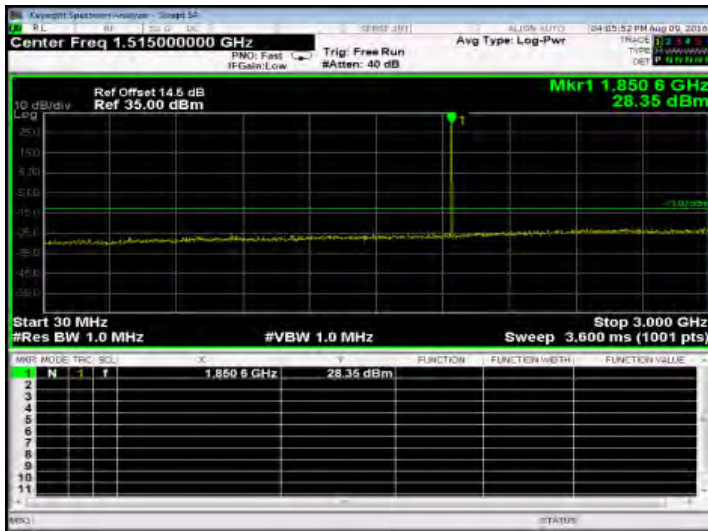
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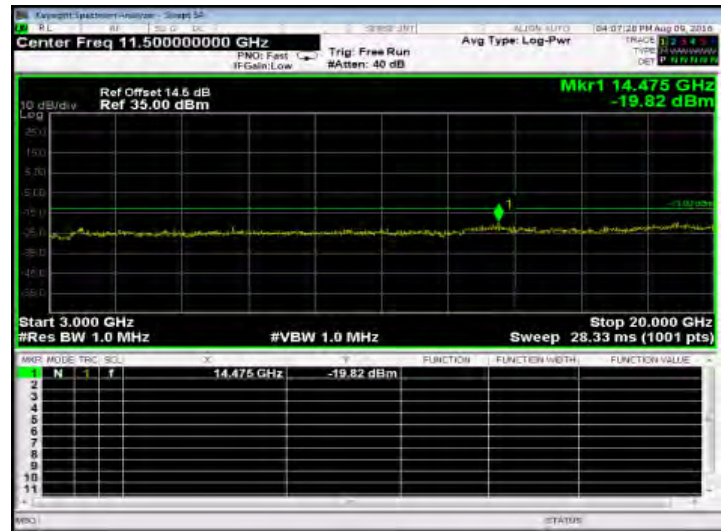
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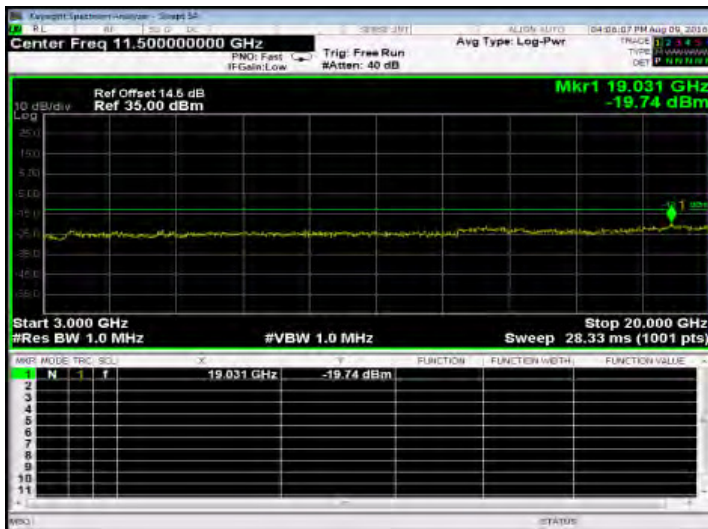
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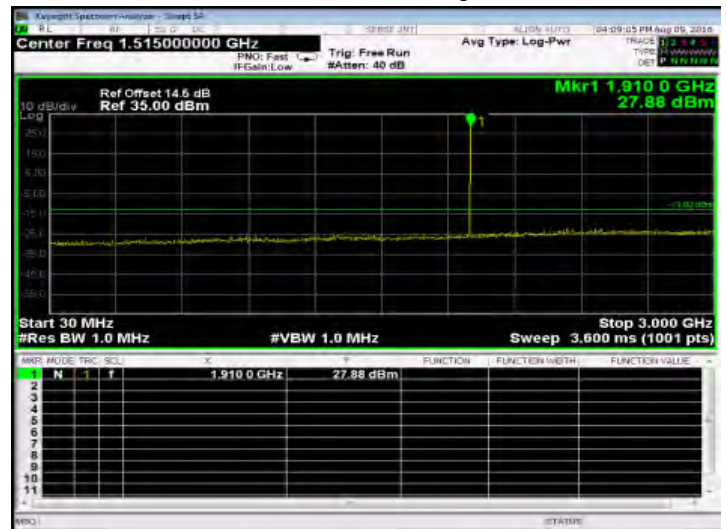
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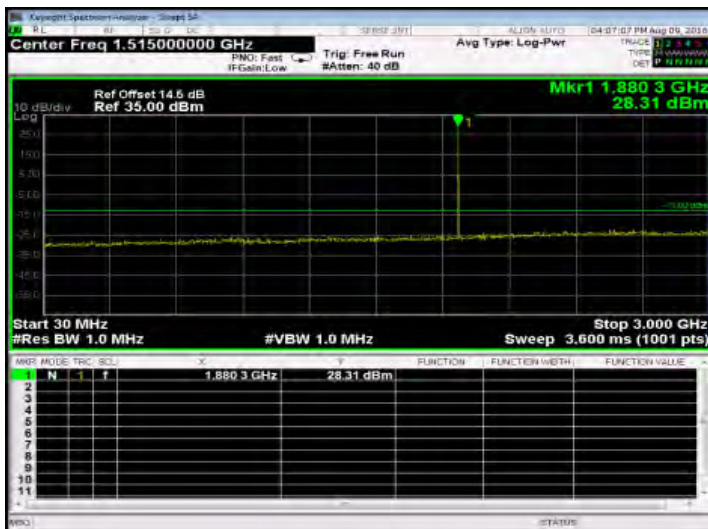
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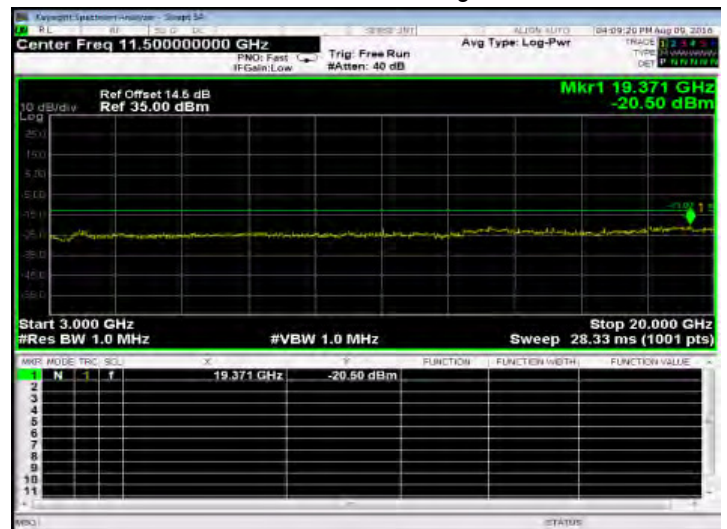
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30MHz~3GHz_EDGE_1900MHz_MidCH661-1880



3GHz~10GHz_EDGE_1900MHz_HighCH810-1909.8



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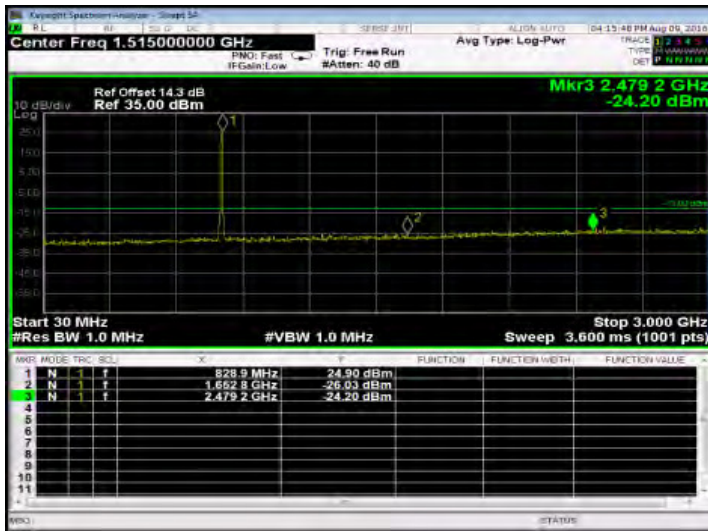
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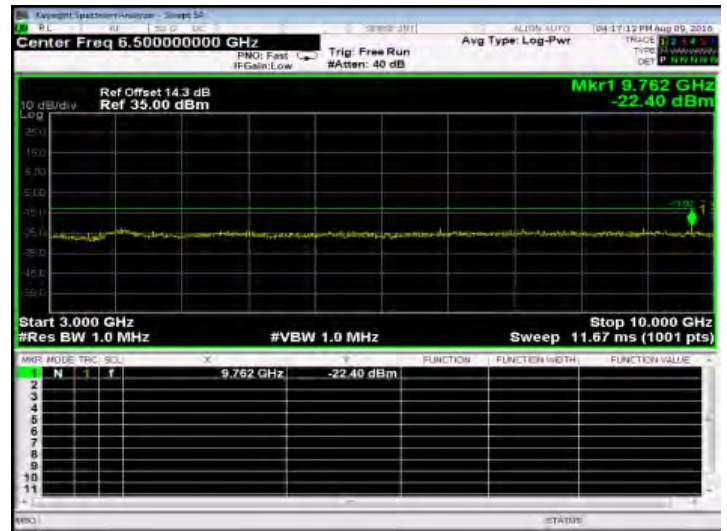
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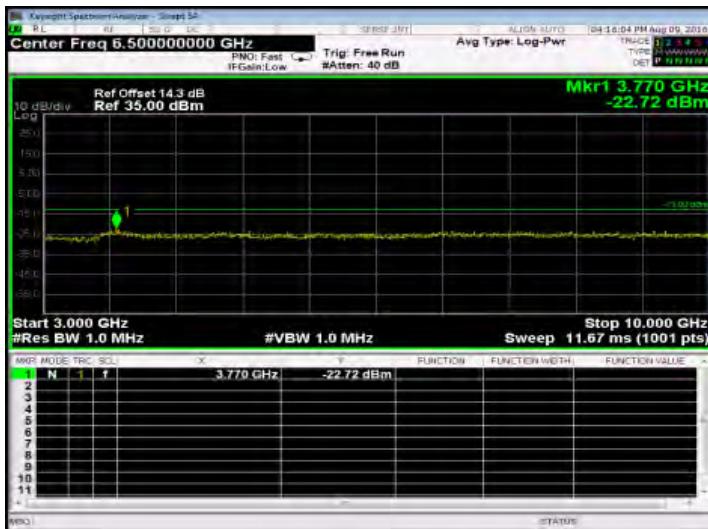
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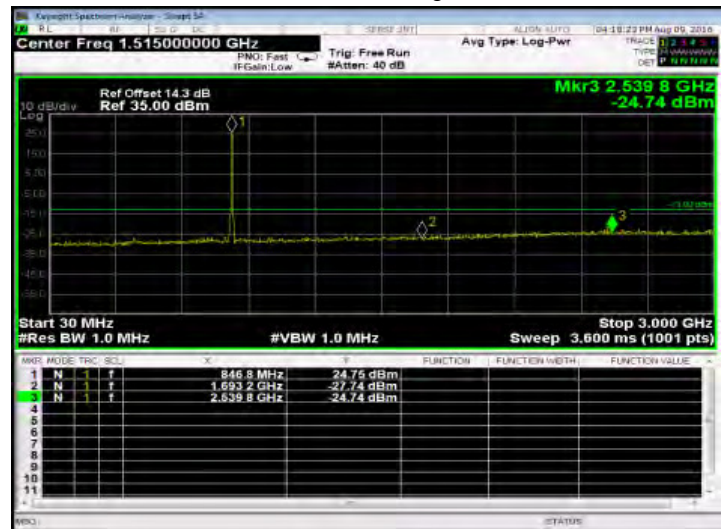
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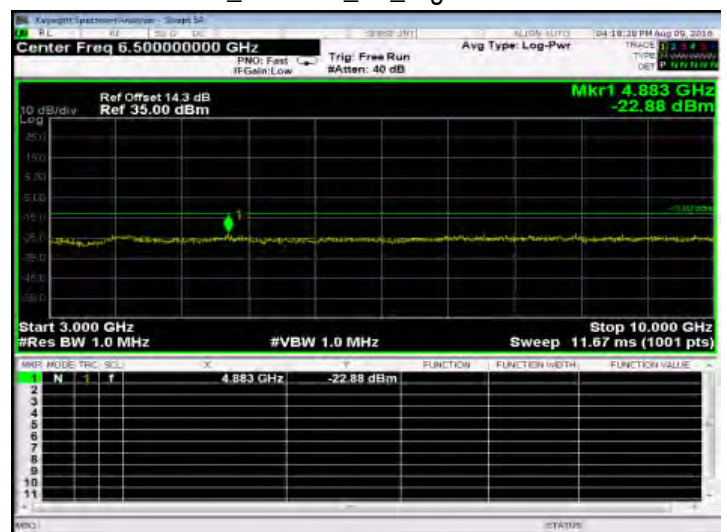
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3GHz~10GHz_WCDMA_B5_HighCH4233-846.6



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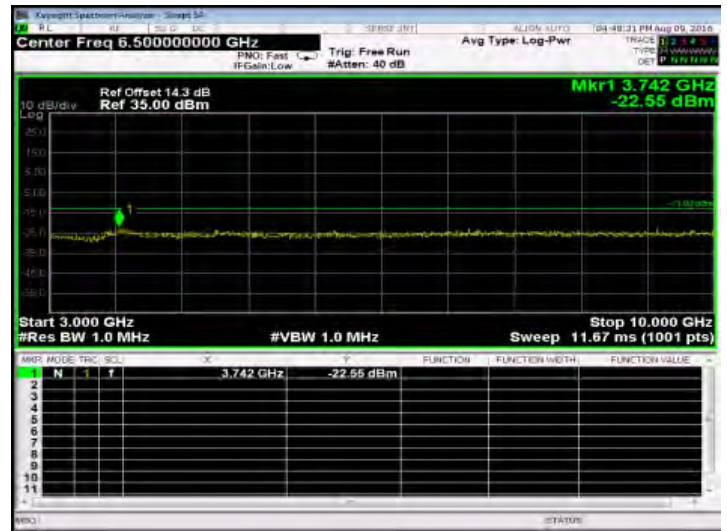
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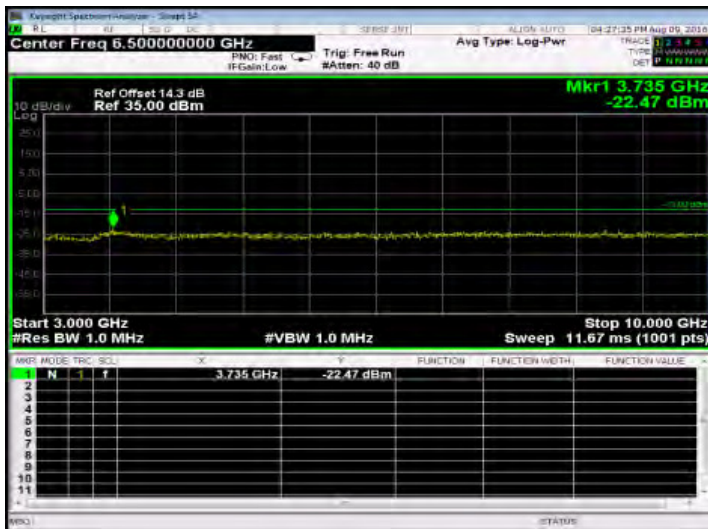
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3GHz~10GHz_HSDPA_B5_MidCH4183-836.6



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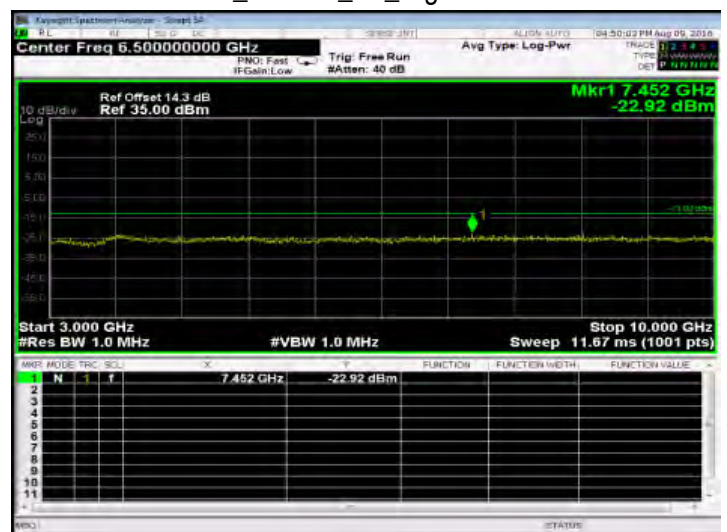
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30MHz~3GHz_HSDPA_B5_MidCH4183-836.6



3GHz~10GHz_HSDPA_B5_HighCH4233-846.6



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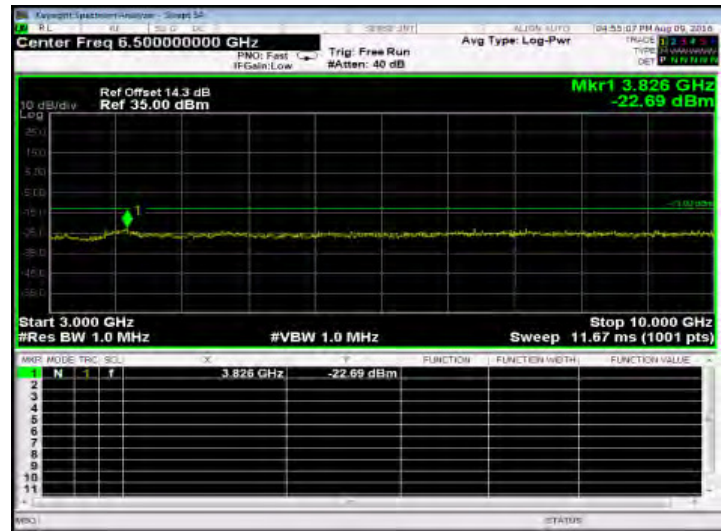
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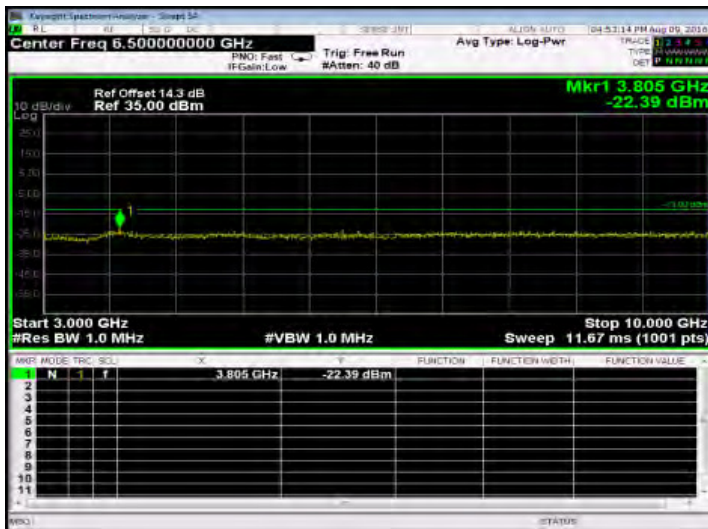
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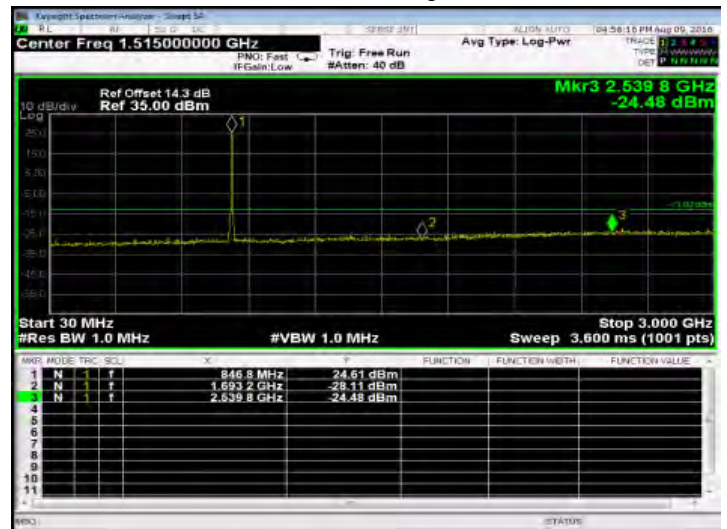
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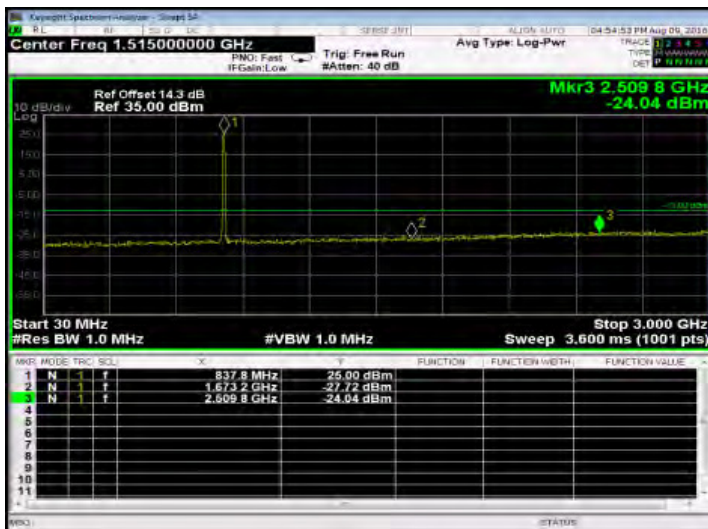
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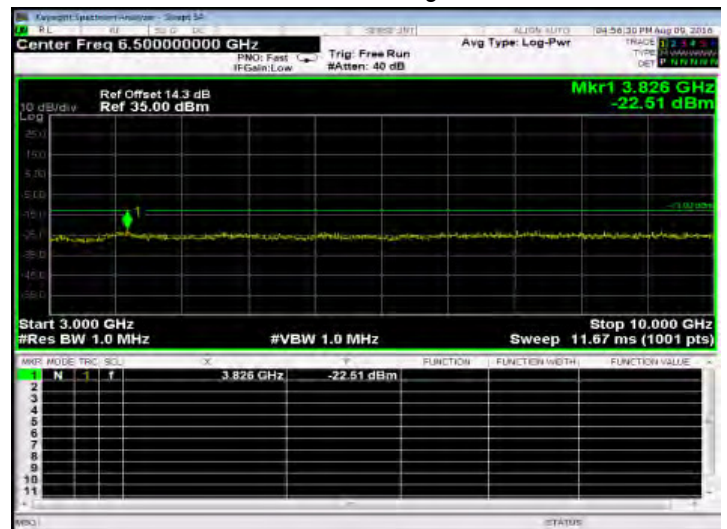
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30MHz~3GHz_HSUPA_B5_MidCH4183-836.6



3GHz~10GHz_HSUPA_B5_HighCH4233-846.6



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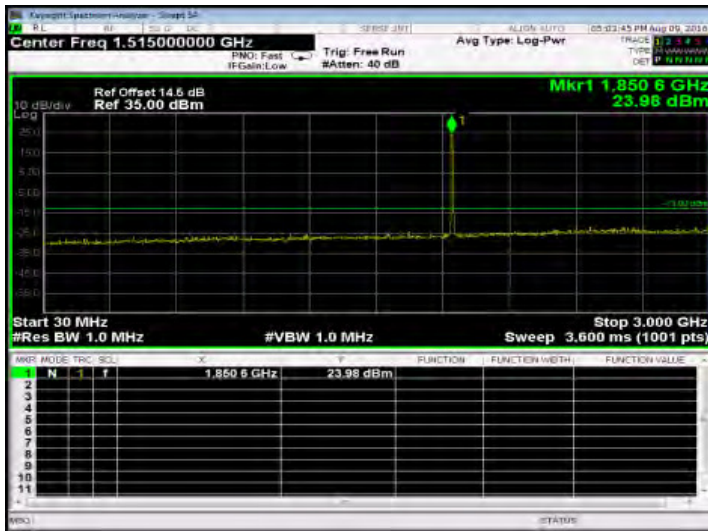
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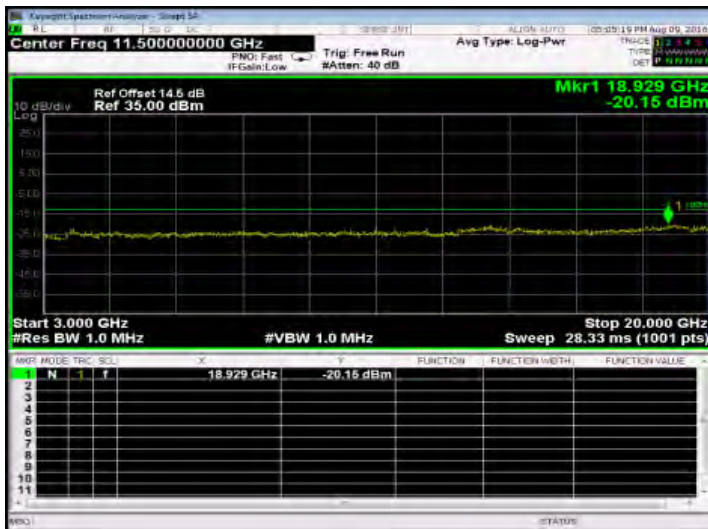
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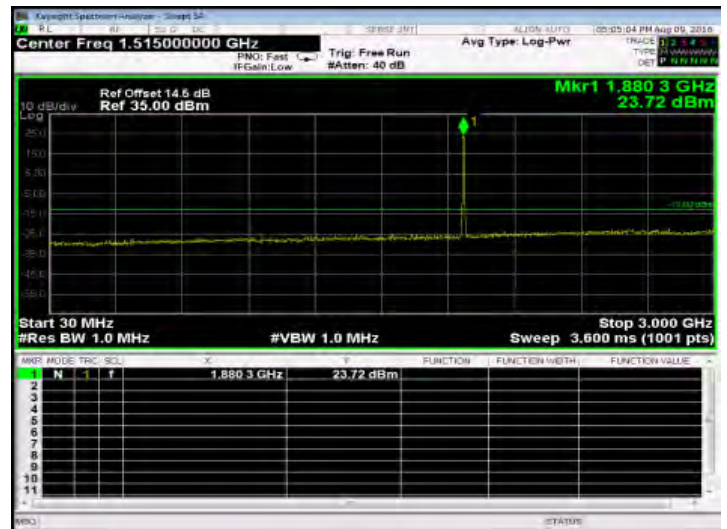
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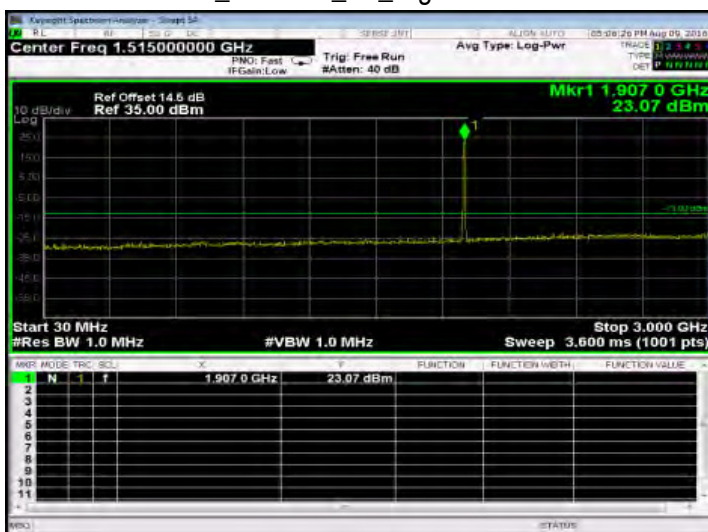
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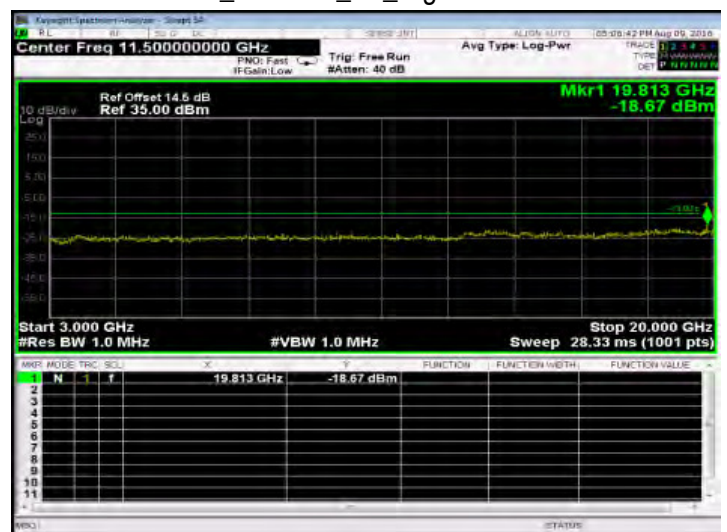
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30MHz~3GHz_WCDMA_B2_HighCH9538-1907.6



3GHz~10GHz_WCDMA_B2_HighCH9538-1907.6



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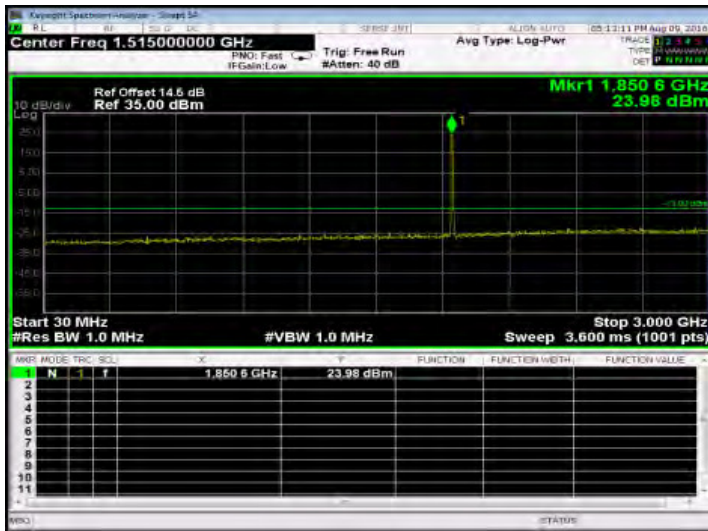
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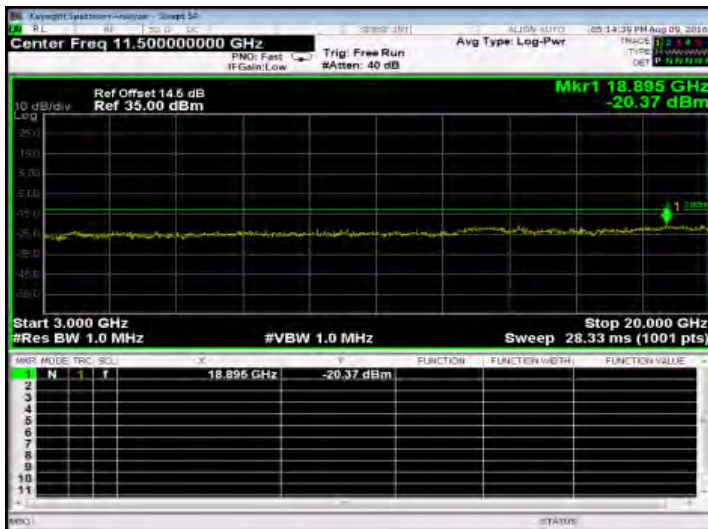
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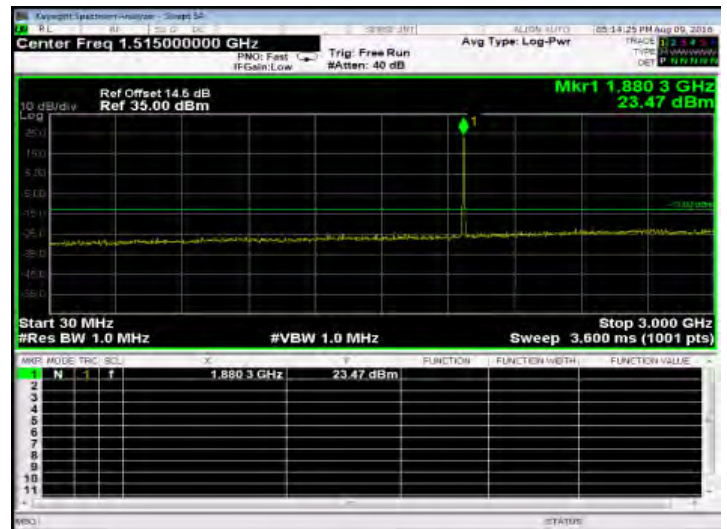
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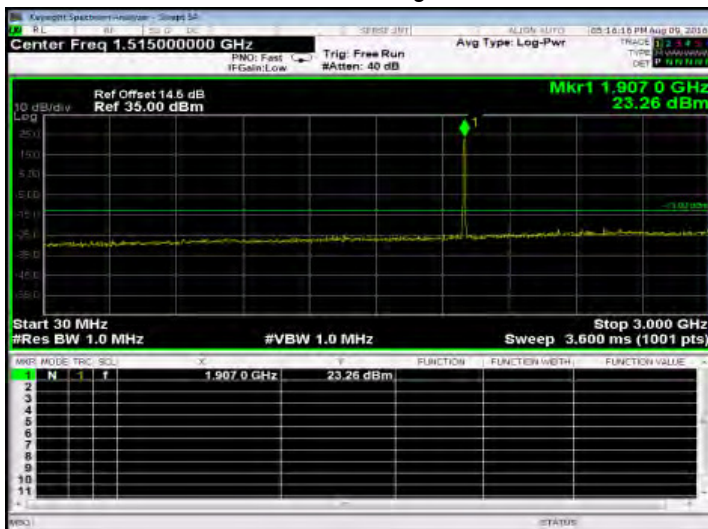
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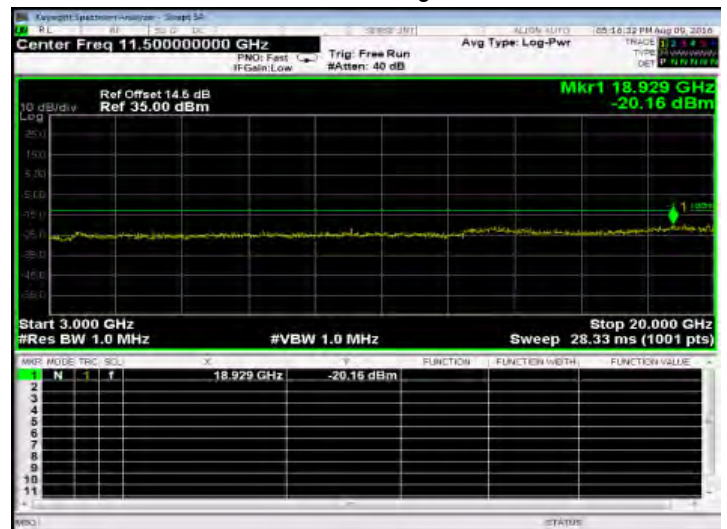
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30MHz~3GHz_HSDPA_B2_HighCH9538-1907.6



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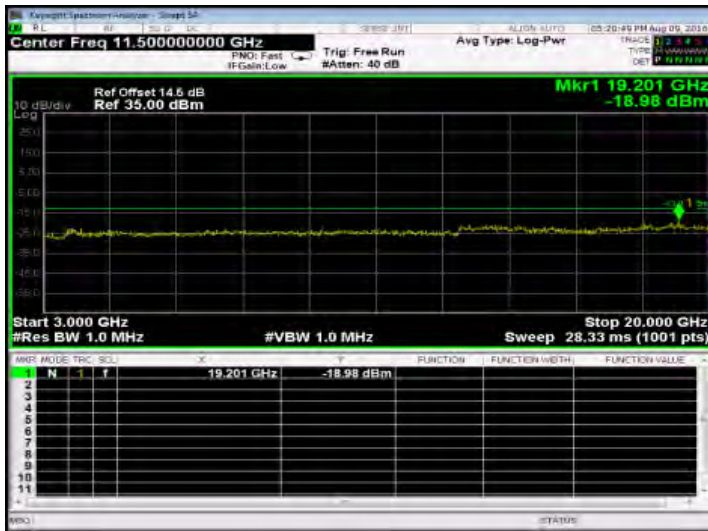
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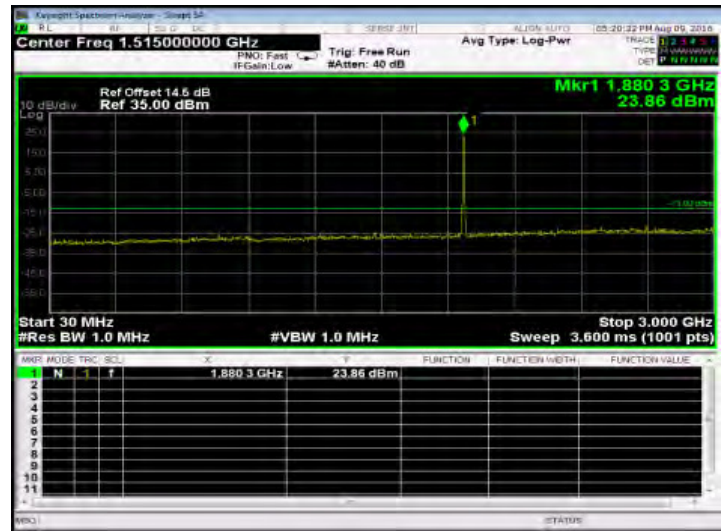
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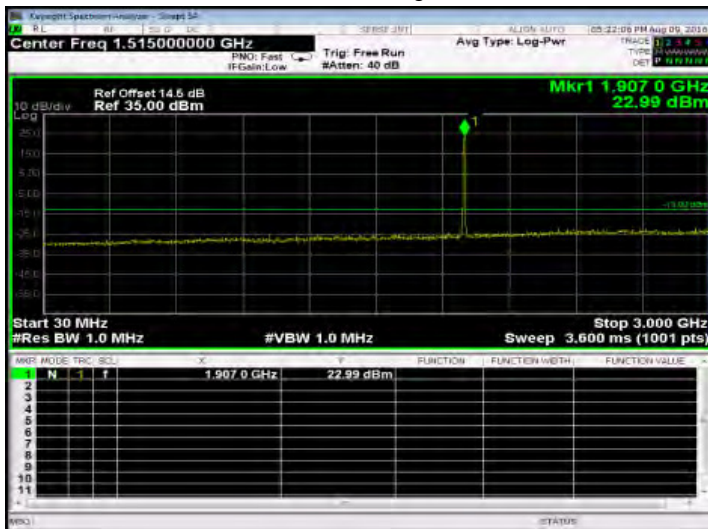
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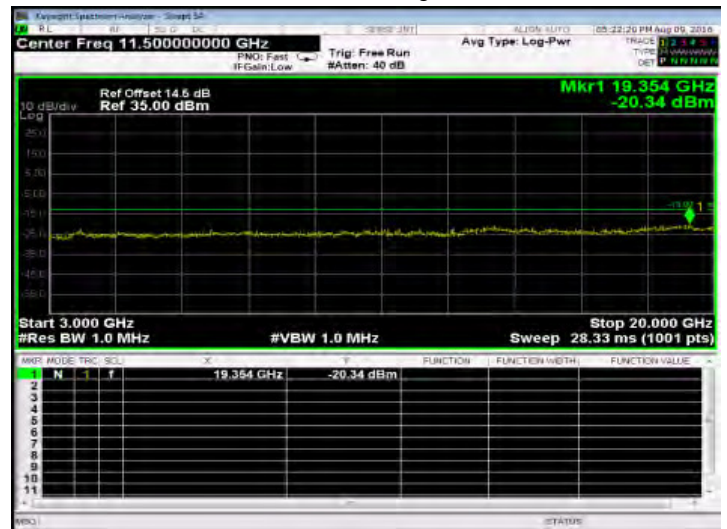
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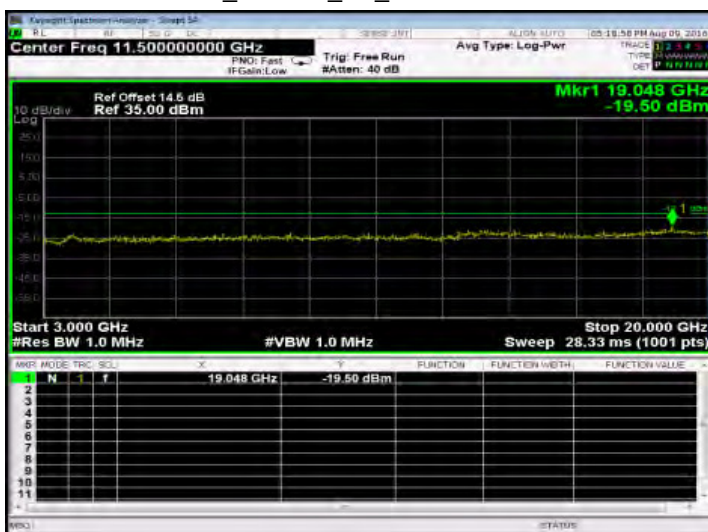
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3GHz~10GHz_HSUPA_B2_HighCH9538-1907.6



3GHz~10GHz_HSUPA_B2_LowCH9262-1852.4



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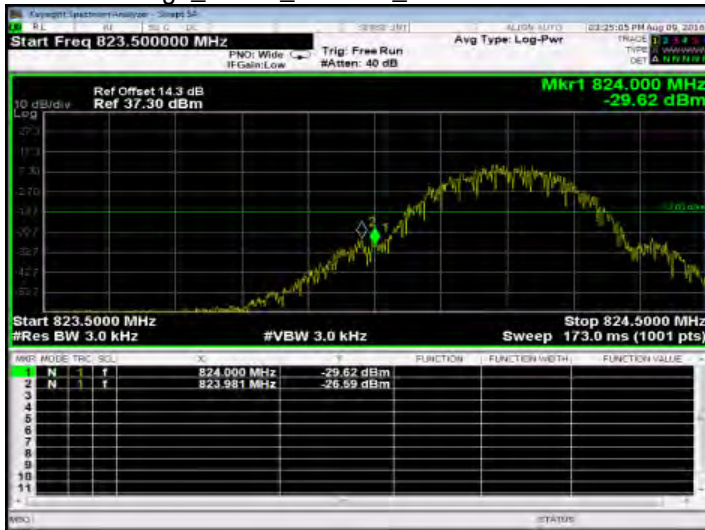
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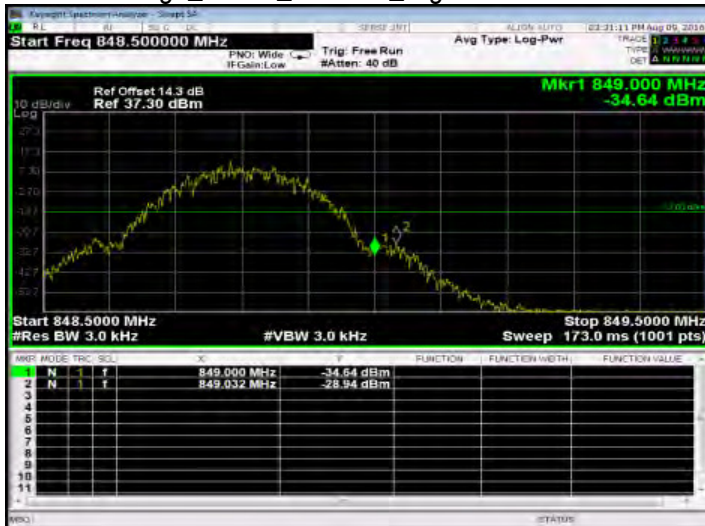
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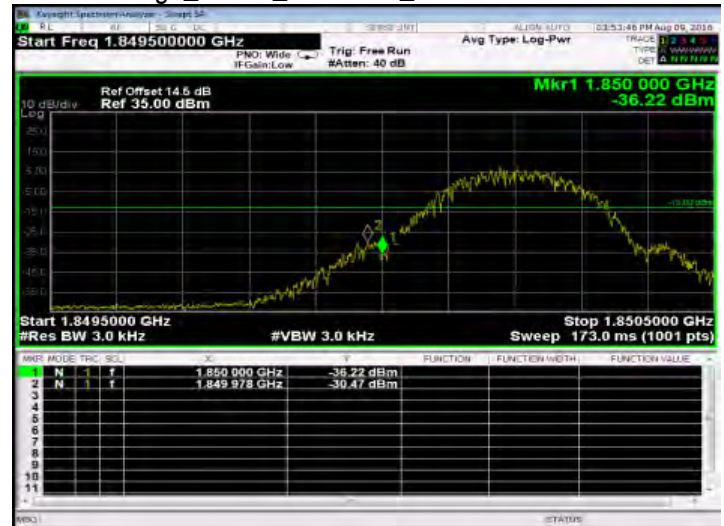
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Band Edge_GPRS_850MHz_HighCH251-848.8



Band Edge_GPRS_1900MHz_LowCH512-1850.2



Band Edge_EDGE_850MHz_LowCH128-824.2



Band Edge_GPRS_1900MHz_HighCH810-1909.8



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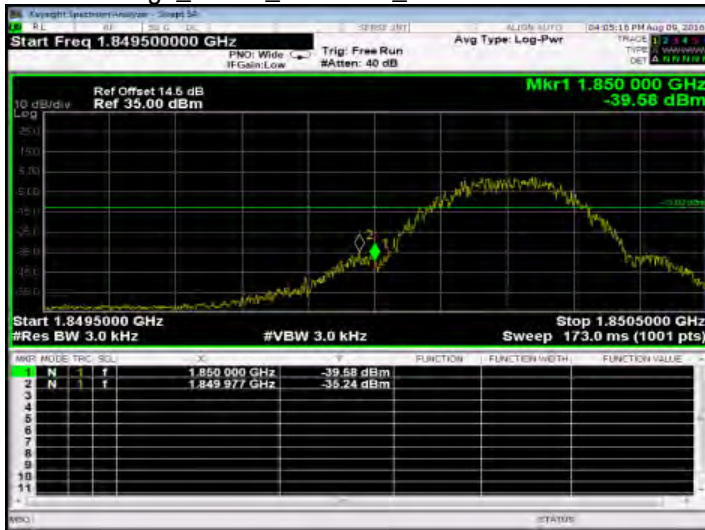
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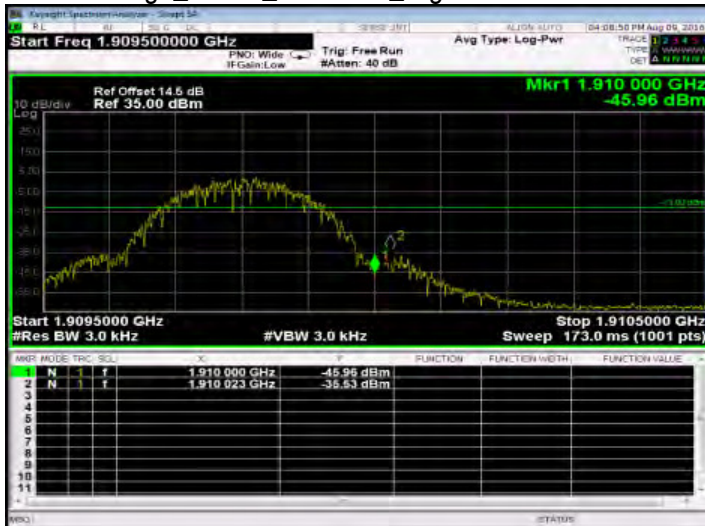
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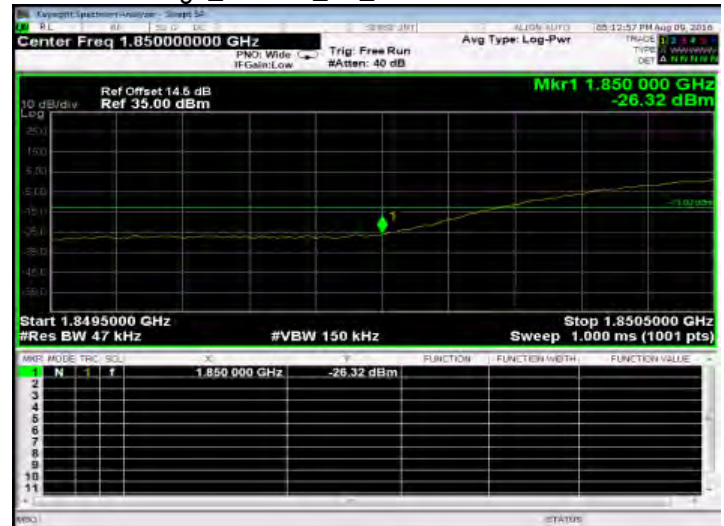
Band Edge_WCDMA_B2_HighCH9538-1907.6



Band Edge_EDGE_1900MHz_HighCH810-1909.8



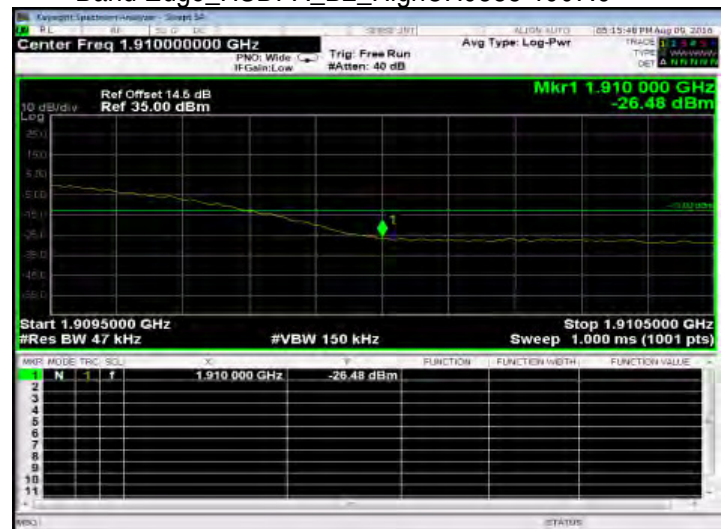
Band Edge_HSDPA_B2_LowCH9262-1852.4



Band Edge_WCDMA_B2_LowCH9262-1852.4



Band Edge_HSDPA_B2_HighCH9538-1907.6



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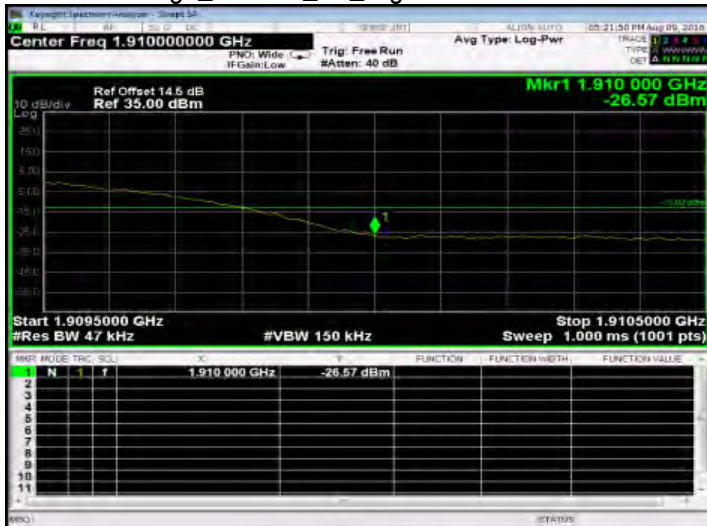
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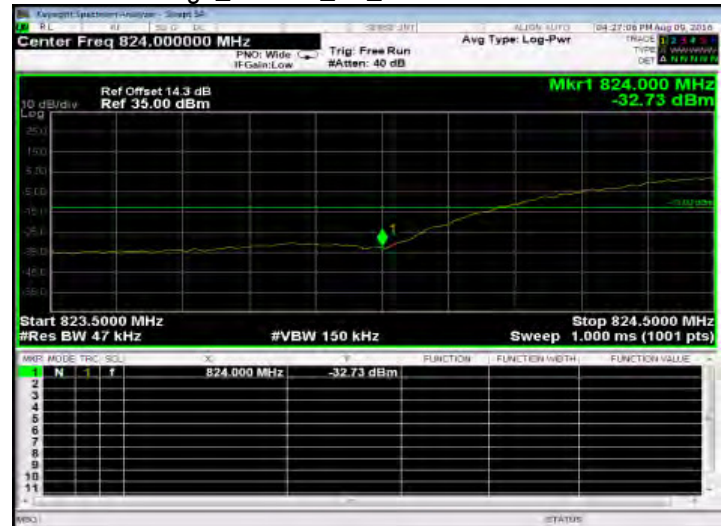
Band Edge_WCDMA_B5_HighCH4233-846.6



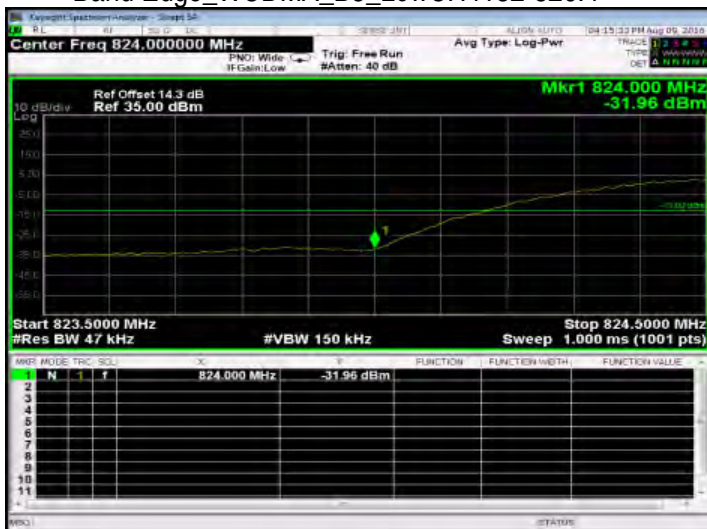
Band Edge_HSUPA_B2_HighCH9538-1907.6



Band Edge_HSDPA_B5_LowCH4132-826.4



Band Edge_WCDMA_B5_LowCH4132-826.4



Band Edge_HSDPA_B5_HighCH4233-846.6



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Band Edge_HSUPA_B5_LowCH4132-826.4



Band Edge_HSUPA_B5_HighCH4233-846.6



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10. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

10.1. Standard Applicable

According to FCC §2.1053,

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

According to RSS-132 §5.5

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

According to RSS-133 §6.5.1

Equipment shall comply with the limits in (i) and (ii) below.

(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

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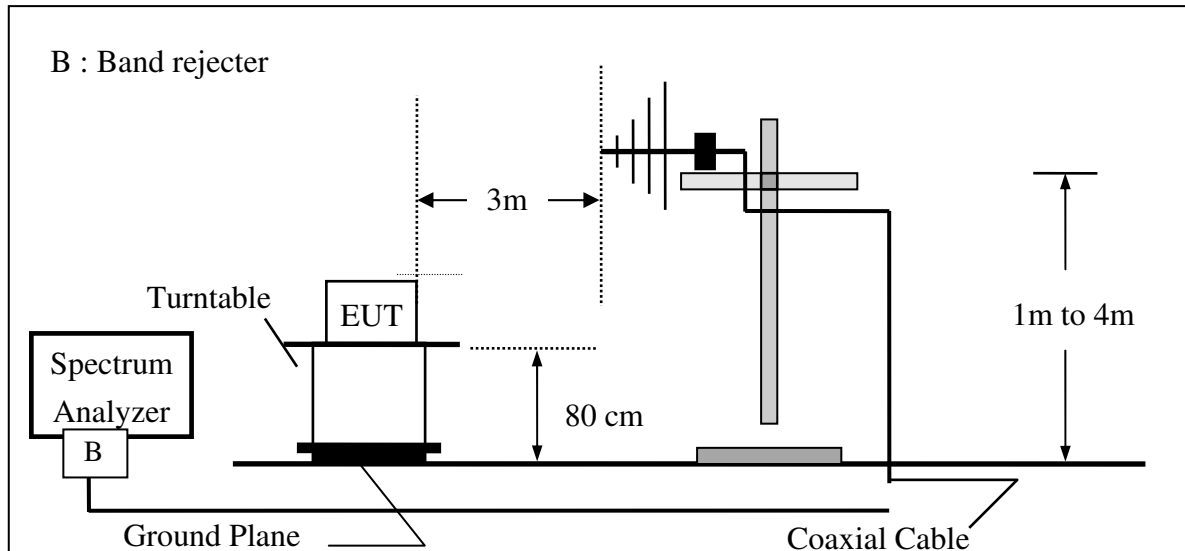
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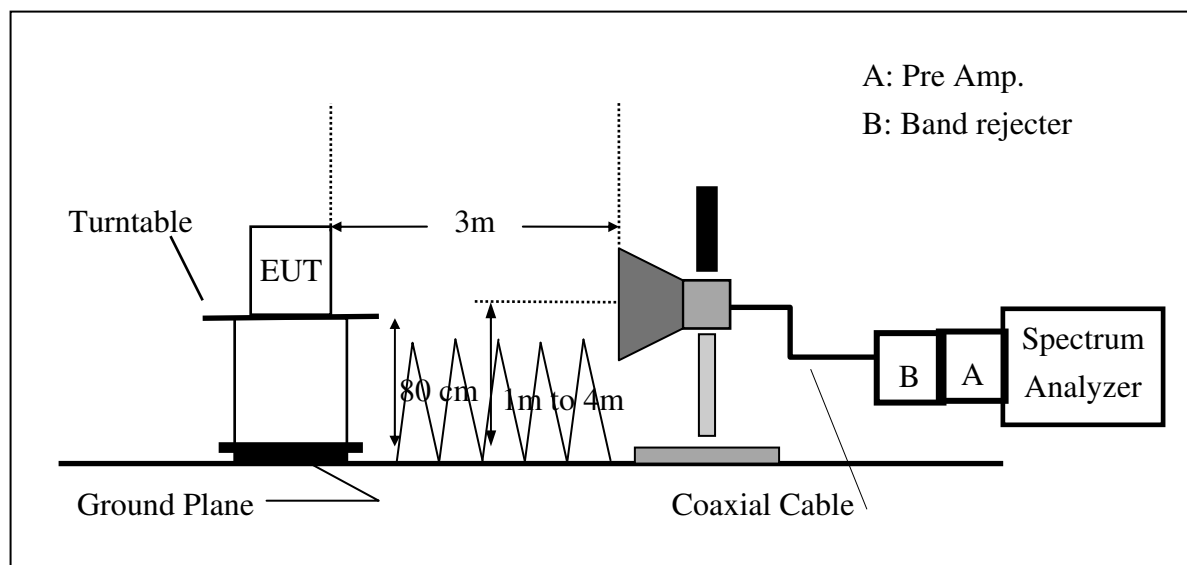
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10.2. EUT Setup

Radiated Emission Test Set-Up, Frequency Below 1000MHz



Radiated Emission Test Set-UP Frequency Over 1 GHz



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10.3. Measurement Procedure:

The EUT was placed on a non-conductive; the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

ERP (dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)

EIRP (dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---” : denotes Noise Floor.

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10.4. Measurement Equipment Used:

ERP, EIRP MEASUREMENT EQUIPMENT List 966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESU 40	100363	04/12/2016	04/11/2017
Broadband Antenna	TESEQ	CBL 6112D	35240	10/28/2015	10/27/2016
Broadband Antenna	TESEQ	CBL 6112D	35243	11/09/2015	11/08/2016
Horn Antenna	ETS-Lindgren	3117	00143272	12/16/2015	12/15/2016
Horn Antenna	ETS-Lindgren	3117	00143279	11/05/2015	11/04/2016
Horn Antenna	Schwarzbeck	BBHA9170	184	12/11/2015	12/10/2016
Horn Antenna	Schwarzbeck	BBHA9170	185	07/18/2016	07/17/2017
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2015	12/11/2016
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2015	12/11/2016
Pre Amplifier	R&S	SCU-18	10204	12/12/2015	12/11/2016
Pre Amplifier	R&S	SCU-26	100780	12/12/2015	12/11/2016
Pre Amplifier	EMC Instruments	EMC184045B	980135	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2015	12/11/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF27	12/12/2015	12/11/2016
Communication Tester	Anritsu	MT8820C	6201107337	05/25/2016	05/24/2017
Site NSA	SGS	966 Chamber C	SAC-C	03/04/2016	03/03/2017
Site VSWR	SGS	966 Chamber C	SAC-C	03/04/2016	03/03/2017
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2016	05/03/2017
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

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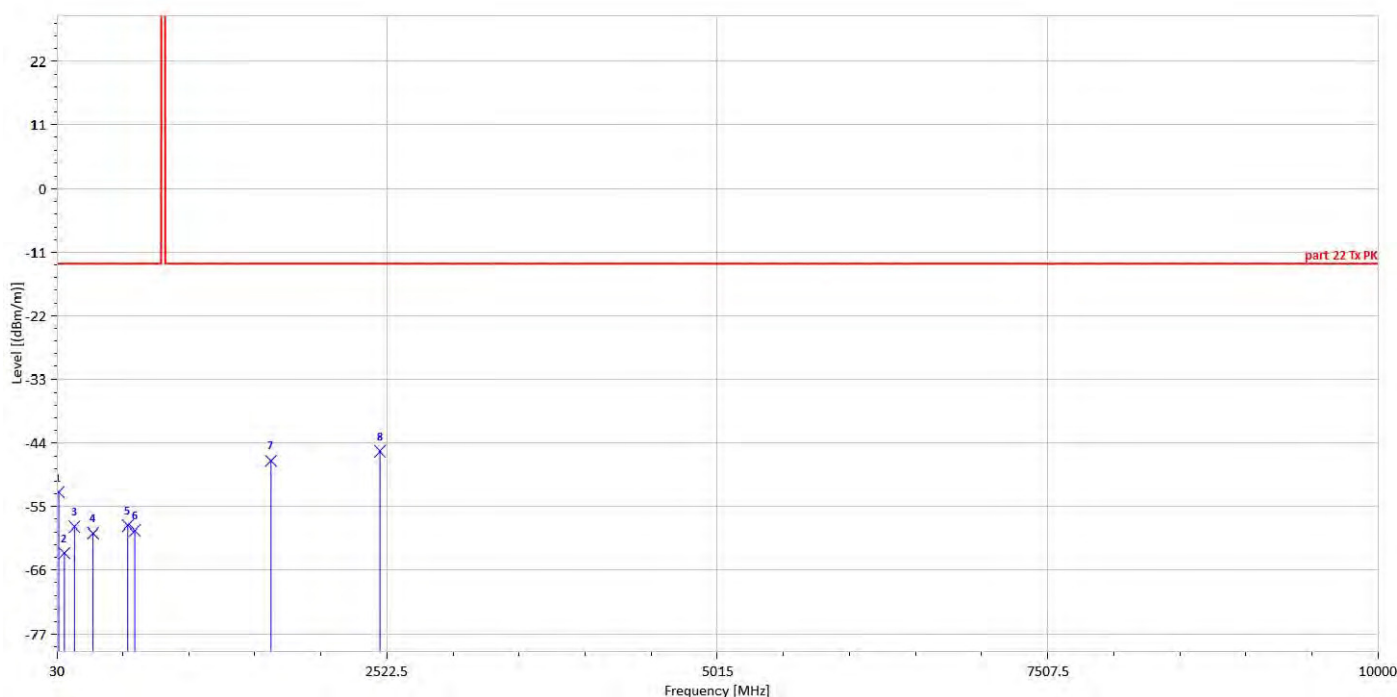
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10.5. Measurement Result:

Radiated Spurious Emission Measurement Result: GSM 850 Mode

Operation Mode :	GPRS_850	Test Date :	2016/8/5
Fundamental Frequency :	824.2 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
44.55	S	-52.49	-41.14	-10.52	-0.83	-13	-39.49
87.23	S	-63.00	-59.95	-1.97	-1.08	-13	-50.00
164.83	S	-58.48	-58.94	1.99	-1.52	-13	-45.48
306.45	S	-59.56	-61.30	3.79	-2.06	-13	-46.56
564.47	S	-58.30	-59.76	4.40	-2.94	-13	-45.30
618.79	S	-59.11	-61.13	4.80	-2.78	-13	-46.11
1644.00	H	-47.01	-49.04	6.74	-4.71	-13	-34.01
2470.00	H	-45.44	-47.83	8.23	-5.84	-13	-32.44

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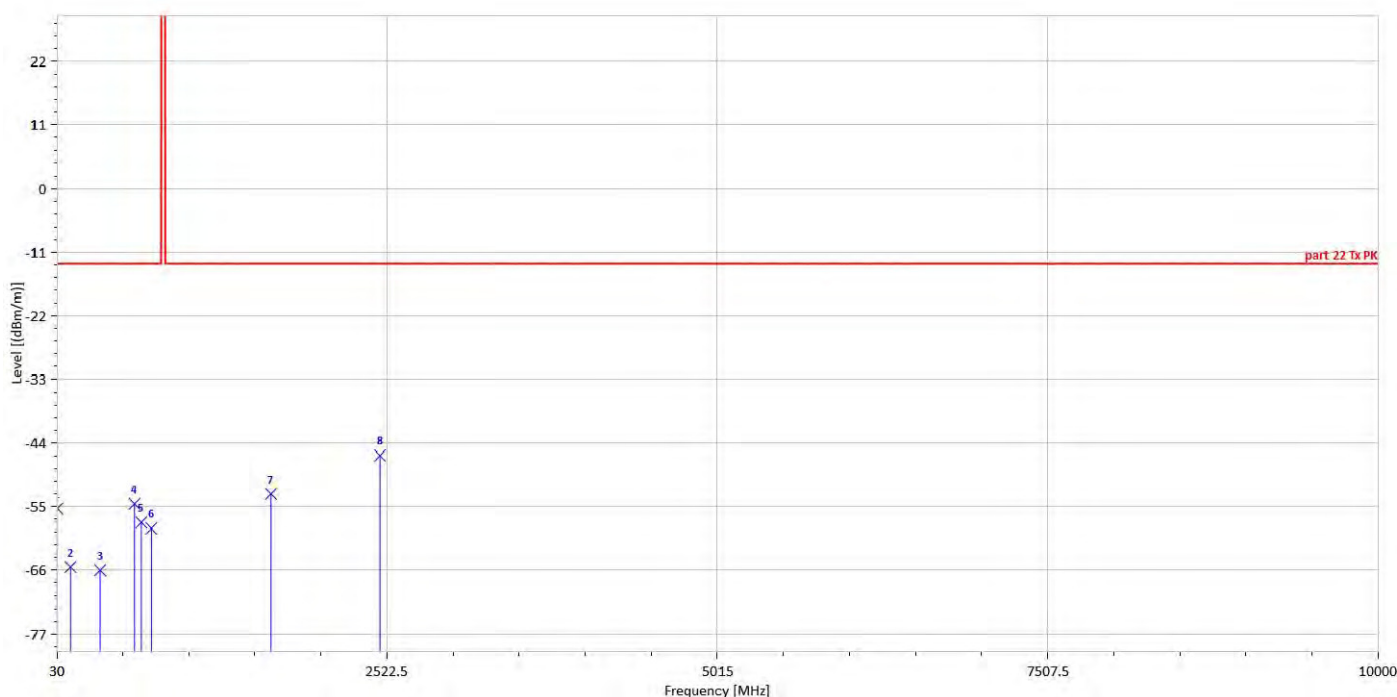
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Operation Mode : GPRS_850 Test Date : 2016/8/5
Fundamental Frequency : 824.2 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Low Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
32.91	S	-55.37	-34.83	-19.87	-0.67	-13	-42.37
134.76	S	-65.44	-62.40	-1.67	-1.38	-13	-52.44
360.77	S	-66.00	-67.52	3.71	-2.19	-13	-53.00
615.88	S	-54.53	-56.27	4.79	-3.05	-13	-41.53
668.26	S	-57.76	-59.91	5.12	-2.97	-13	-44.76
744.89	S	-58.78	-61.16	5.46	-3.08	-13	-45.78
1644.00	H	-52.80	-54.82	6.74	-4.71	-13	-39.80
2470.00	H	-46.16	-48.55	8.23	-5.84	-13	-33.16

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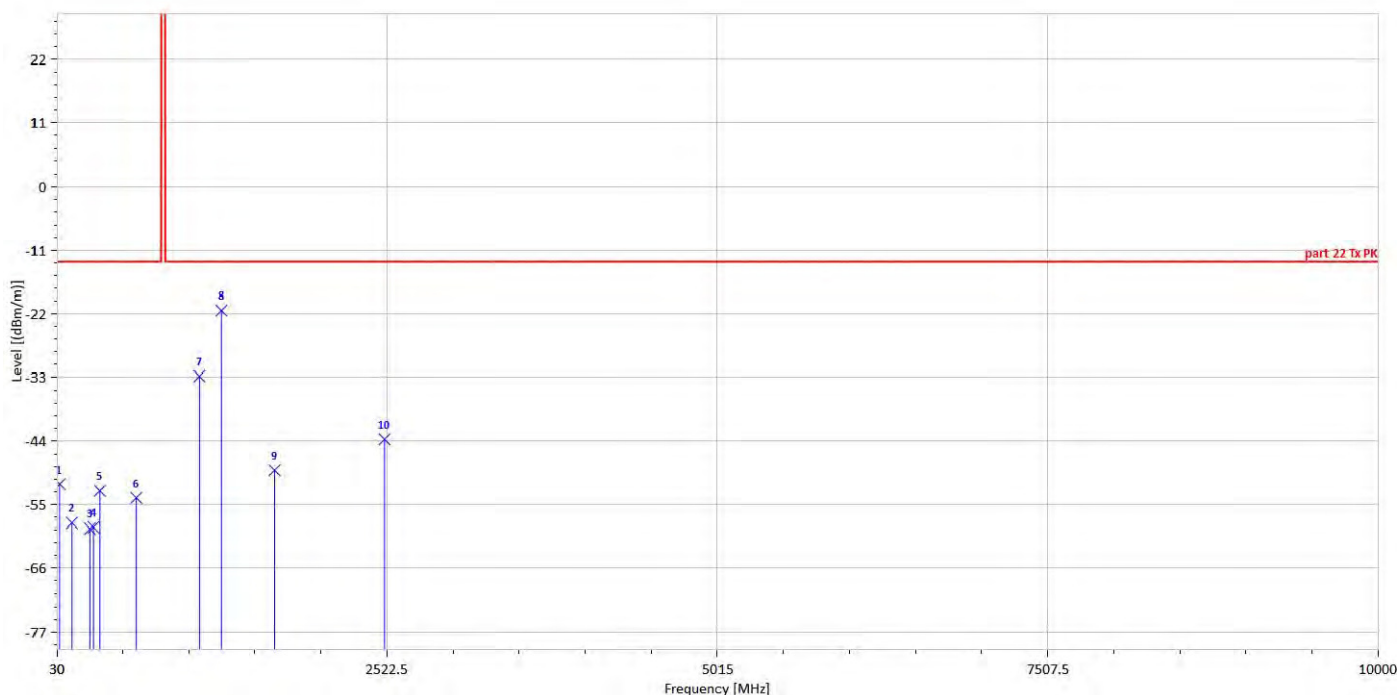
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Member of SGS Group

Operation Mode : GPRS_850 Test Date : 2016/8/5
Fundamental Frequency : 836.6 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit @3m dBm/m	Margin dB
51.34	S	-51.45	-44.09	-6.53	-0.83	-13	-38.45
145.43	S	-58.17	-56.37	-0.26	-1.54	-13	-45.17
282.20	S	-59.16	-60.82	3.63	-1.97	-13	-46.16
310.33	S	-58.91	-60.74	3.79	-1.96	-13	-45.91
358.83	S	-52.61	-54.22	3.72	-2.10	-13	-39.61
629.46	S	-53.84	-55.78	4.84	-2.89	-13	-40.84
1105.00	S	-32.78	-33.63	4.75	-3.90	-13	-19.78
1273.00	S	-21.39	-22.72	5.39	-4.06	-13	-8.39
1672.00	H	-49.02	-51.08	6.83	-4.78	-13	-36.02
2505.00	H	-43.77	-46.14	8.26	-5.89	-13	-30.77

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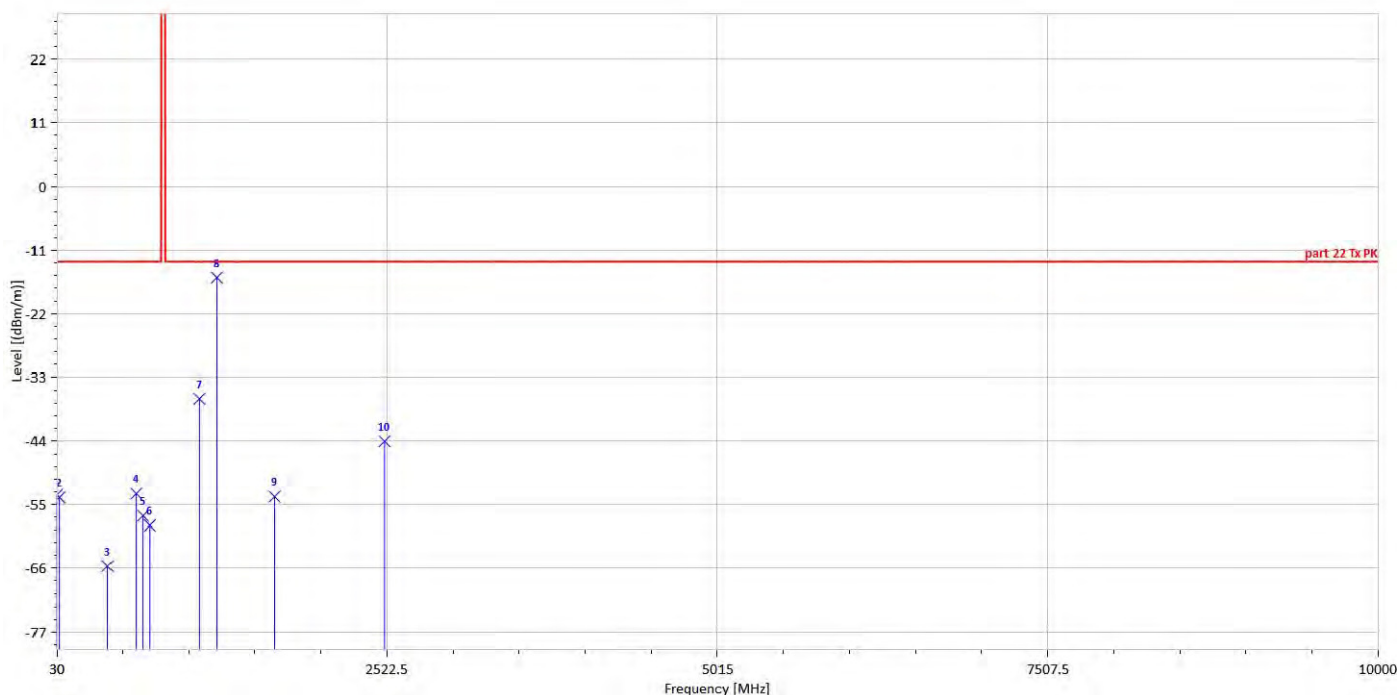
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Operation Mode : GPRS_850 Test Date : 2016/8/5
Fundamental Frequency : 836.6 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit @3m dBm/m	Margin dB
30.97	S	-53.30	-31.09	-21.56	-0.65	-13	-40.30
49.40	S	-53.77	-45.51	-7.43	-0.83	-13	-40.77
415.09	S	-65.64	-67.17	3.76	-2.23	-13	-52.64
629.46	S	-53.10	-55.05	4.84	-2.89	-13	-40.10
680.87	S	-56.96	-59.40	5.25	-2.81	-13	-43.96
733.25	S	-58.61	-61.17	5.46	-2.90	-13	-45.61
1105.00	S	-36.69	-37.54	4.75	-3.90	-13	-23.69
1238.00	S	-15.79	-16.84	5.25	-4.20	-13	-2.79
1672.00	H	-53.63	-55.69	6.83	-4.78	-13	-40.63
2505.00	H	-44.12	-46.49	8.26	-5.89	-13	-31.12

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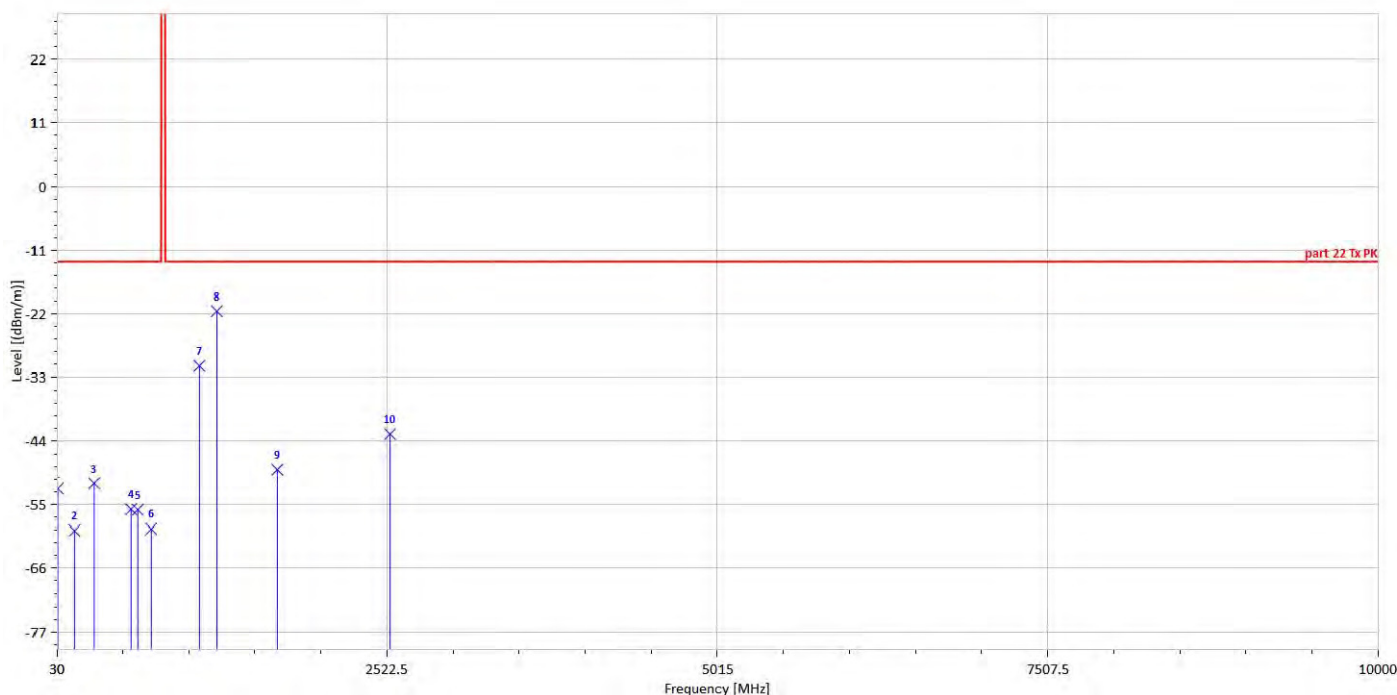
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Operation Mode : GPRS_850 Test Date : 2016/8/5
Fundamental Frequency : 848.8 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH High Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit @3m dBm/m	Margin dB
36.79	S	-52.21	-34.89	-16.61	-0.71	-13	-39.21
164.83	S	-59.47	-59.94	1.99	-1.52	-13	-46.47
315.18	S	-51.28	-52.97	3.78	-2.10	-13	-38.28
589.69	S	-55.82	-57.88	4.63	-2.57	-13	-42.82
641.10	S	-55.90	-58.20	4.88	-2.59	-13	-42.90
743.92	S	-59.19	-61.55	5.46	-3.11	-13	-46.19
1105.00	S	-31.05	-31.90	4.75	-3.90	-13	-18.05
1238.00	S	-21.50	-22.56	5.25	-4.20	-13	-8.50
1693.00	H	-48.92	-51.03	6.91	-4.80	-13	-35.92
2547.00	H	-42.85	-45.27	8.33	-5.91	-13	-29.85

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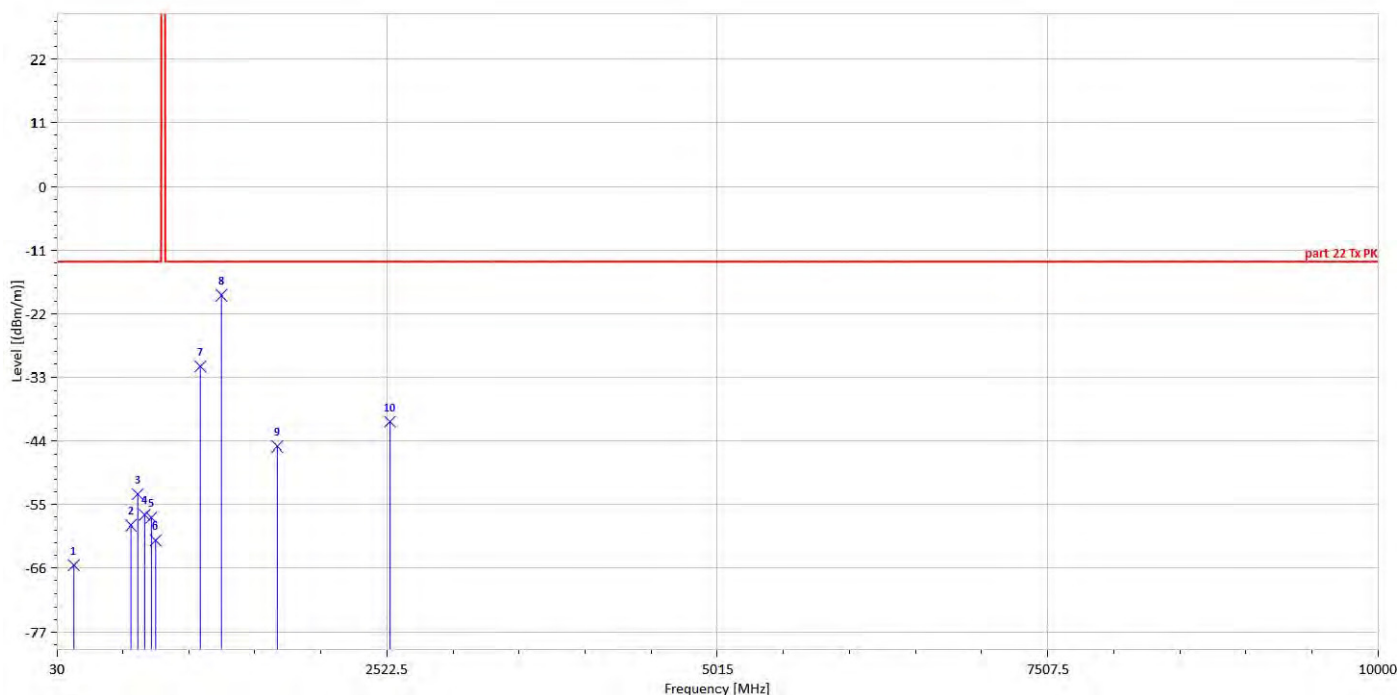
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Operation Mode : GPRS_850 Test Date : 2016/8/5
Fundamental Frequency : 848.8 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH High Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit @3m dBm/m	Margin dB
159.98	S	-65.47	-65.56	1.44	-1.35	-13	-52.47
588.72	S	-58.58	-60.57	4.62	-2.63	-13	-45.58
641.10	S	-53.19	-55.49	4.88	-2.59	-13	-40.19
693.48	S	-56.82	-59.21	5.39	-3.01	-13	-43.82
744.89	S	-57.31	-59.69	5.46	-3.08	-13	-44.31
776.90	S	-61.14	-63.52	5.49	-3.12	-13	-48.14
1112.00	S	-31.16	-32.06	4.78	-3.87	-13	-18.16
1273.00	S	-18.80	-20.13	5.39	-4.06	-13	-5.80
1693.00	H	-44.98	-47.09	6.91	-4.80	-13	-31.98
2547.00	H	-40.68	-43.11	8.33	-5.91	-13	-27.68

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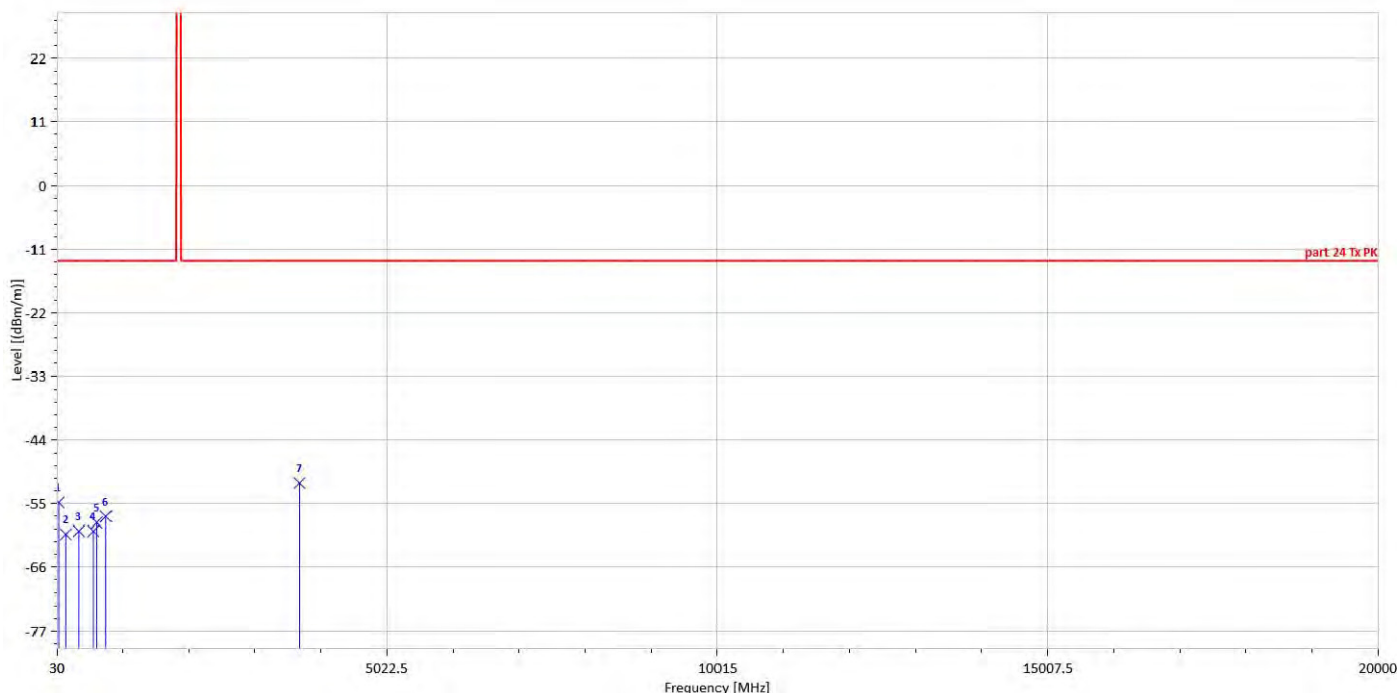
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Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

Operation Mode : GPRS_1900 Test Date : 2016/8/5
Fundamental Frequency : 1850.2 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Low Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit @3m dBm/m	Margin dB
59.10	S	-54.81	-52.66	-1.29	-0.87	-13.01	-41.80
166.77	S	-60.27	-63.06	4.36	-1.56	-13.01	-47.26
366.59	S	-59.72	-63.32	5.84	-2.25	-13.01	-46.71
588.72	S	-59.73	-63.87	6.77	-2.63	-13.01	-46.72
641.10	S	-58.29	-62.73	7.03	-2.59	-13.01	-45.28
776.90	S	-57.25	-61.78	7.64	-3.12	-13.01	-44.24
3700.40	H	-51.42	-56.57	12.30	-7.15	-13.01	-38.41

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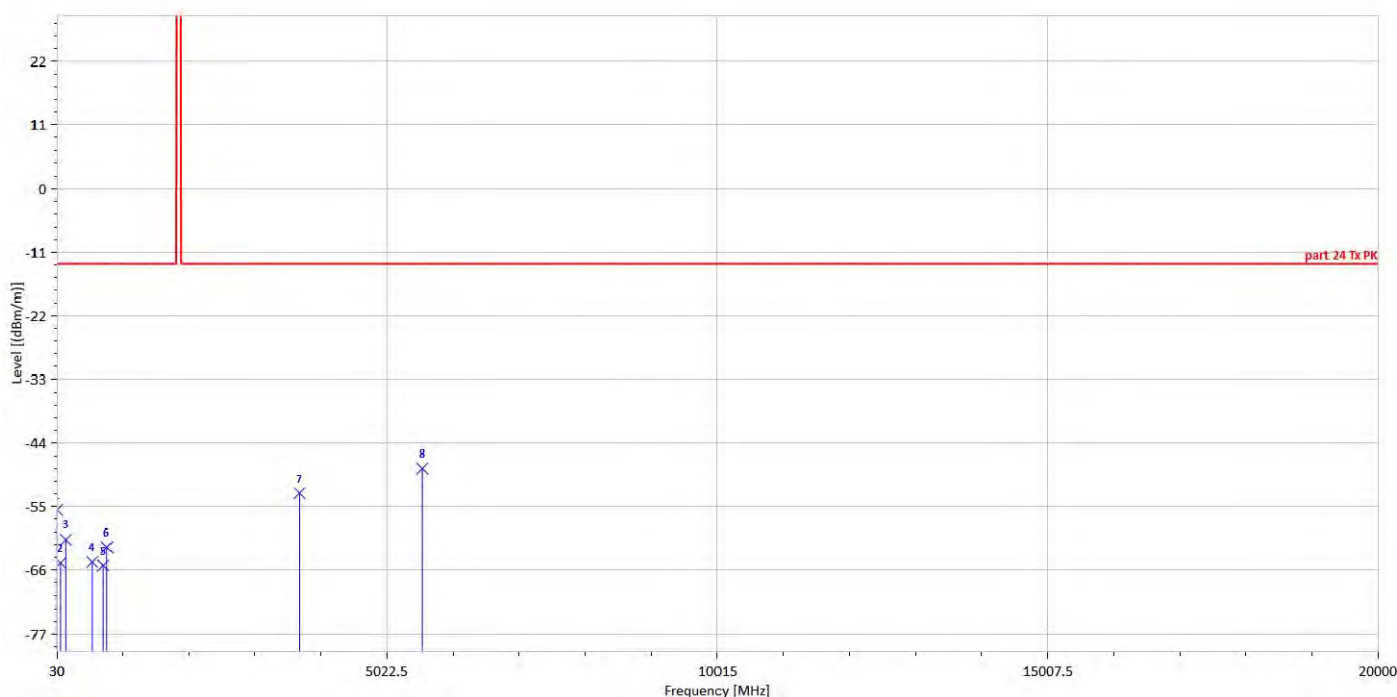
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Operation Mode :	GPRS_1900	Test Date :	2016/8/5
Fundamental Frequency :	1850.2 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
33.88	S	-55.60	-38.03	-16.88	-0.68	-13.01	-42.59
86.26	S	-64.72	-63.89	0.25	-1.07	-13.01	-51.71
167.74	S	-60.71	-63.65	4.46	-1.51	-13.01	-47.70
572.23	S	-64.55	-68.31	6.62	-2.86	-13.01	-51.54
738.10	S	-65.18	-69.57	7.61	-3.22	-13.01	-52.17
791.45	S	-62.00	-66.24	7.66	-3.42	-13.01	-48.99
3700.40	H	-52.67	-57.82	12.30	-7.15	-13.01	-39.66
5550.60	H	-48.38	-52.30	12.62	-8.70	-13.01	-35.37

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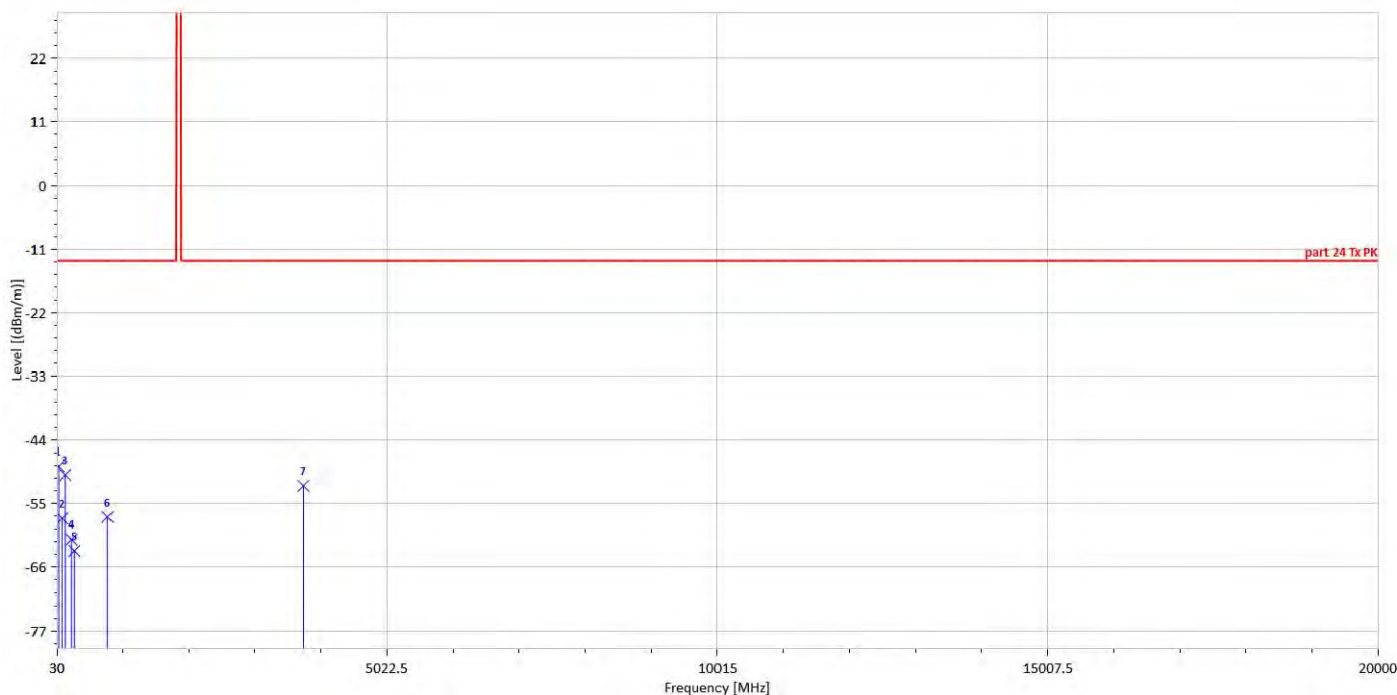
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Operation Mode : GPRS_1900 Test Date : 2016/8/5
Fundamental Frequency : 1880.0 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
58.13	S	-48.51	-45.96	-1.67	-0.88	-13.01	-35.50
112.45	S	-57.59	-55.21	-1.15	-1.23	-13.01	-44.58
159.01	S	-50.04	-52.08	3.49	-1.45	-13.01	-37.03
254.07	S	-61.18	-64.33	5.00	-1.85	-13.01	-48.17
297.72	S	-63.15	-67.07	5.93	-2.01	-13.01	-50.14
800.18	S	-57.36	-61.63	7.67	-3.40	-13.01	-44.35
3760.00	H	-51.93	-57.02	12.30	-7.21	-13.01	-38.92

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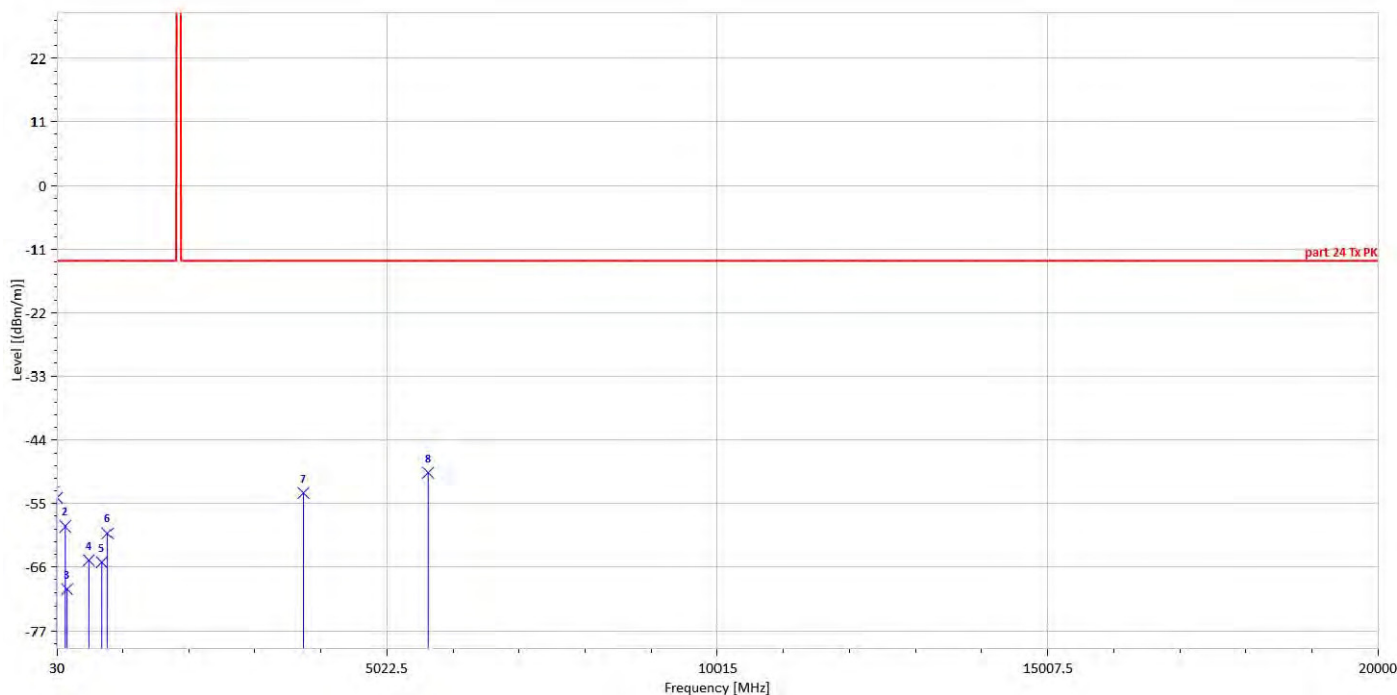
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Operation Mode : GPRS_1900 Test Date : 2016/8/5
Fundamental Frequency : 1880.0 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit @3m dBm/m	Margin dB
31.94	S	-54.02	-34.79	-18.56	-0.67	-13.01	-41.01
158.04	S	-58.96	-60.83	3.38	-1.52	-13.01	-45.95
186.17	S	-69.83	-74.25	6.01	-1.59	-13.01	-56.82
519.85	S	-64.80	-68.43	6.40	-2.78	-13.01	-51.79
716.76	S	-65.12	-69.49	7.61	-3.24	-13.01	-52.11
800.18	S	-60.08	-64.35	7.67	-3.40	-13.01	-47.07
3760.00	H	-53.17	-58.27	12.30	-7.21	-13.01	-40.16
5640.00	H	-49.63	-53.47	12.66	-8.81	-13.01	-36.62

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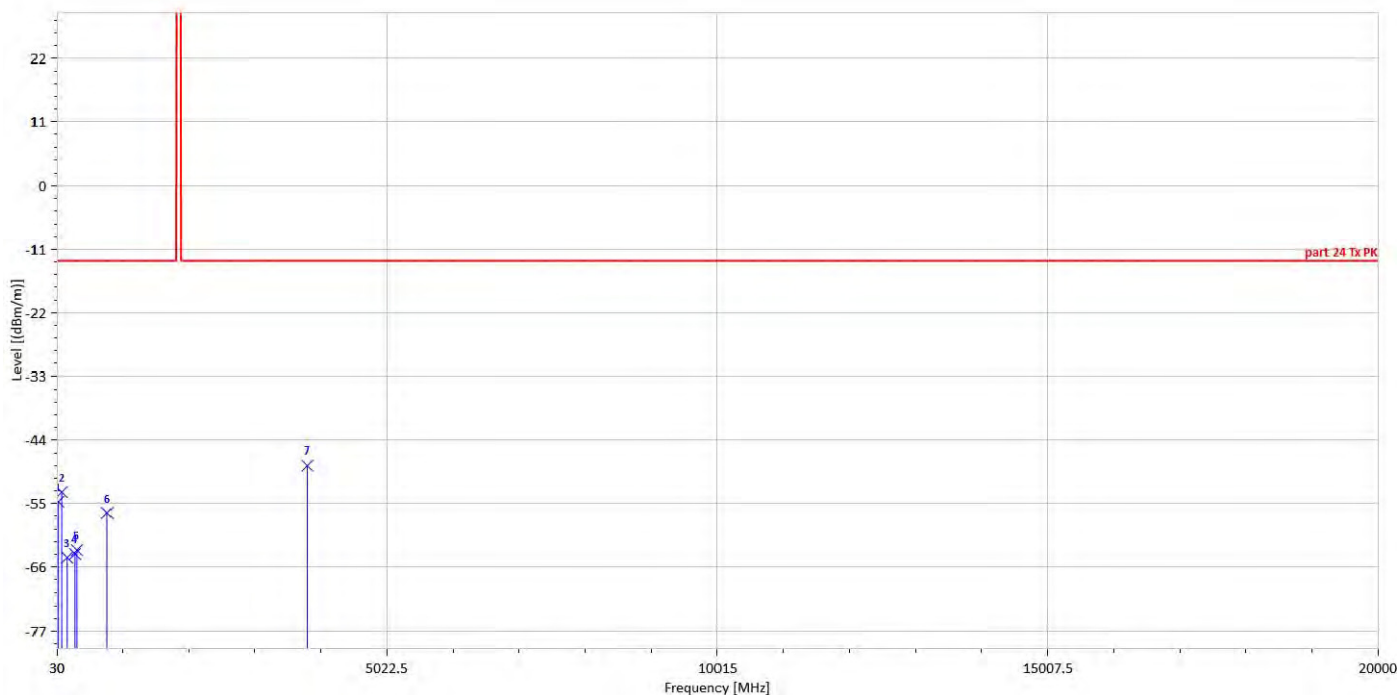
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Operation Mode : GPRS_1900 Test Date : 2016/8/5
Fundamental Frequency : 1909.8 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH High Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
53.28	S	-54.71	-50.19	-3.60	-0.92	-13.01	-41.70
104.69	S	-53.02	-50.75	-1.06	-1.20	-13.01	-40.01
187.14	S	-64.31	-68.81	6.05	-1.55	-13.01	-51.30
307.42	S	-63.68	-67.55	5.94	-2.08	-13.01	-50.67
336.52	S	-63.01	-66.84	5.91	-2.08	-13.01	-50.00
795.33	S	-56.67	-61.17	7.67	-3.16	-13.01	-43.66
3819.60	H	-48.40	-53.43	12.30	-7.27	-13.01	-35.39

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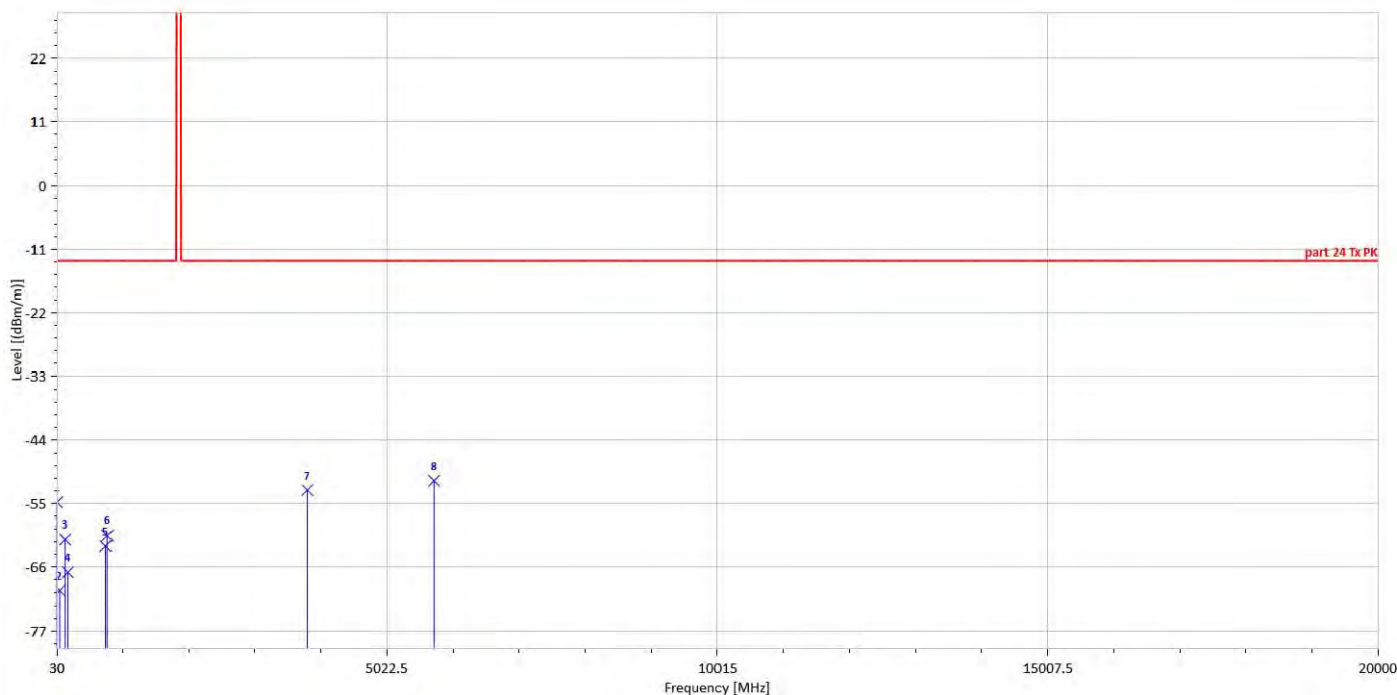
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Operation Mode : GPRS_1900 Test Date : 2016/8/5
Fundamental Frequency : 1909.8 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH High Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	EIRP dBm	SG Output Level dBm	Antenna Gain dBi	Cable Loss dB	Limit @3m dBm/m	Margin dB
31.94	S	-54.79	-35.56	-18.56	-0.67	-13.01	-41.78
73.65	S	-70.10	-69.61	0.51	-1.00	-13.01	-57.09
157.07	S	-61.15	-62.95	3.28	-1.49	-13.01	-48.14
198.78	S	-66.88	-71.12	5.87	-1.64	-13.01	-53.87
773.02	S	-62.30	-66.83	7.64	-3.11	-13.01	-49.29
798.24	S	-60.47	-64.89	7.67	-3.25	-13.01	-47.46
3819.60	H	-52.66	-57.69	12.30	-7.27	-13.01	-39.65
5729.40	H	-51.04	-54.83	12.69	-8.90	-13.01	-38.03

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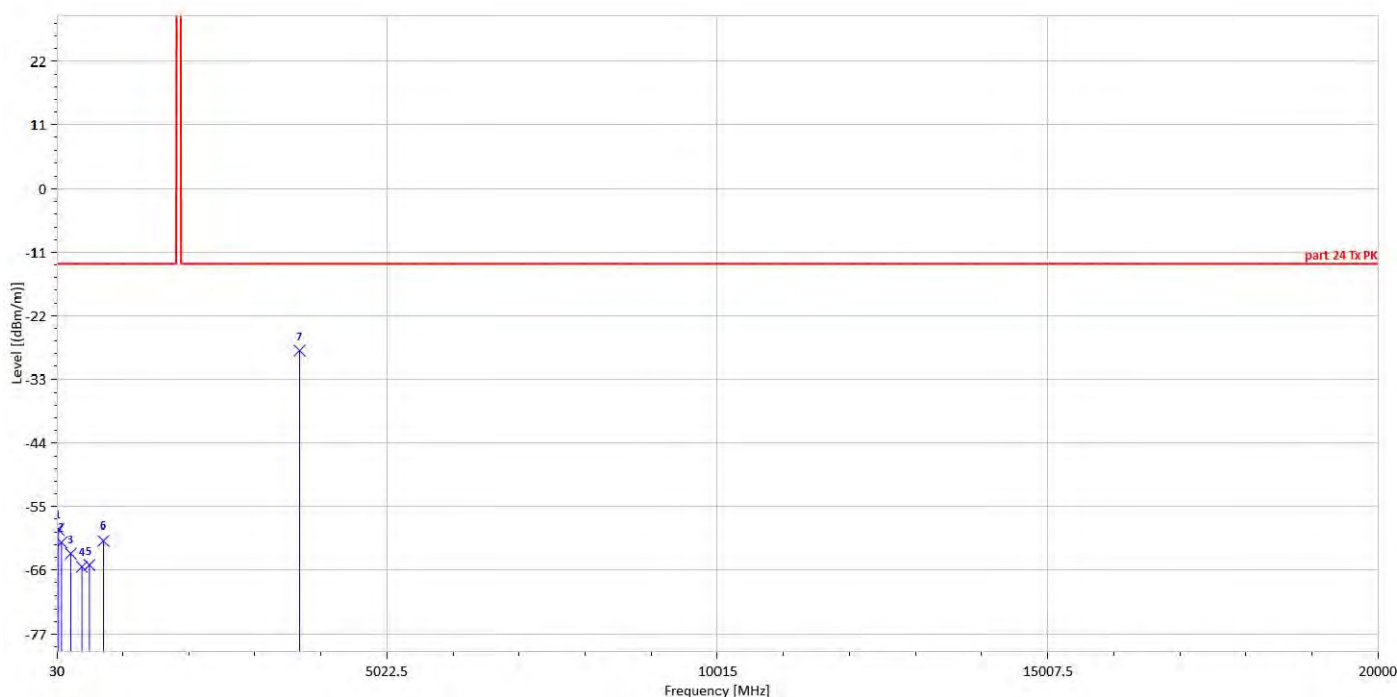
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Radiated Spurious Emission Measurement Result: WCDMA Band 2 Mode

Operation Mode :	HSDPA B2	Test Date :	2016/8/5
Fundamental Frequency :	1852.4 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
56.19	S	-58.92	-55.63	-2.44	-0.85	-13.01	-45.91
100.81	S	-61.12	-59.03	-0.92	-1.17	-13.01	-48.11
242.43	S	-63.09	-66.88	5.61	-1.81	-13.01	-50.08
413.15	S	-65.41	-69.02	5.89	-2.29	-13.01	-52.40
528.58	S	-65.09	-68.81	6.41	-2.68	-13.01	-52.08
742.95	S	-60.87	-65.45	7.61	-3.03	-13.01	-47.86
3702.00	H	-28.06	-33.21	12.30	-7.15	-13.01	-15.05

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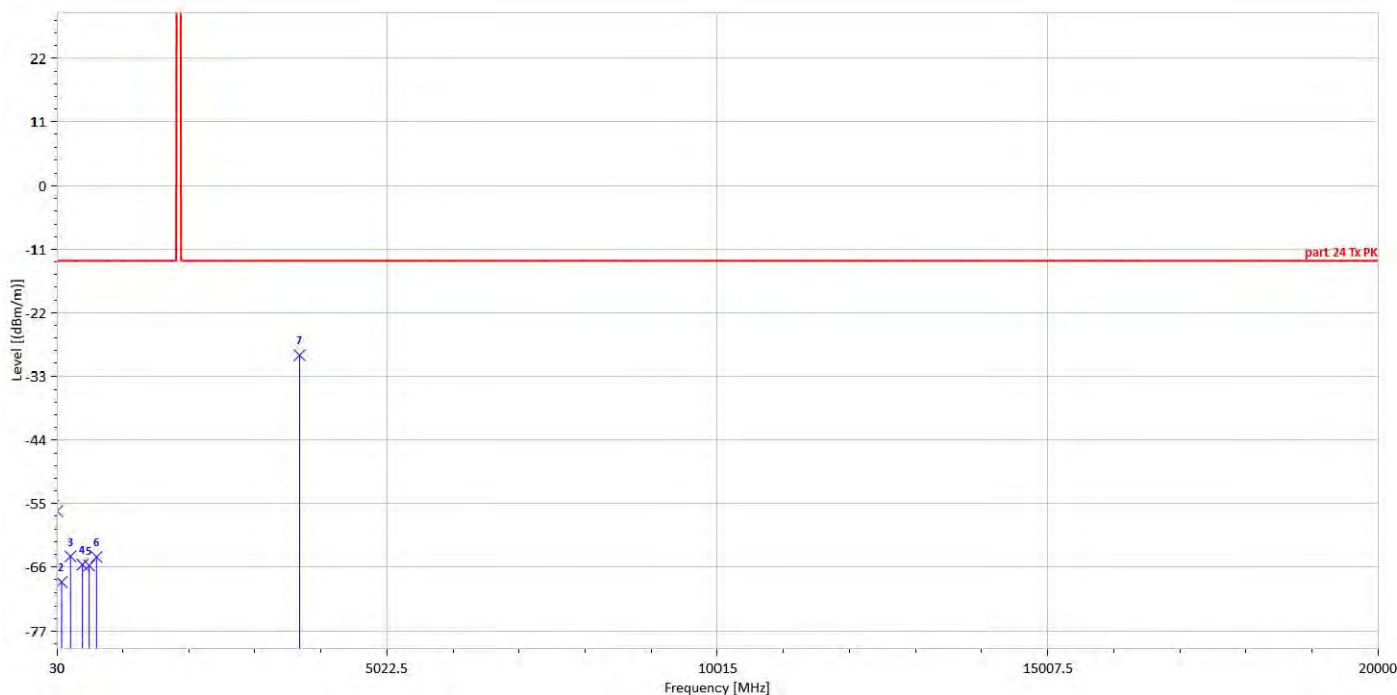
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Operation Mode : HSDPA B2 Test Date : 2016/8/5
Fundamental Frequency : 1852.4 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Low Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
34.85	S	-56.34	-39.60	-16.04	-0.71	-13.01	-43.33
102.75	S	-68.60	-66.42	-0.99	-1.19	-13.01	-55.59
239.52	S	-64.09	-68.01	5.74	-1.82	-13.01	-51.08
421.88	S	-65.56	-69.20	5.98	-2.33	-13.01	-52.55
523.73	S	-65.71	-69.41	6.40	-2.70	-13.01	-52.70
638.19	S	-64.22	-68.22	7.02	-3.02	-13.01	-51.21
3702.00	H	-29.38	-34.53	12.30	-7.15	-13.01	-16.37

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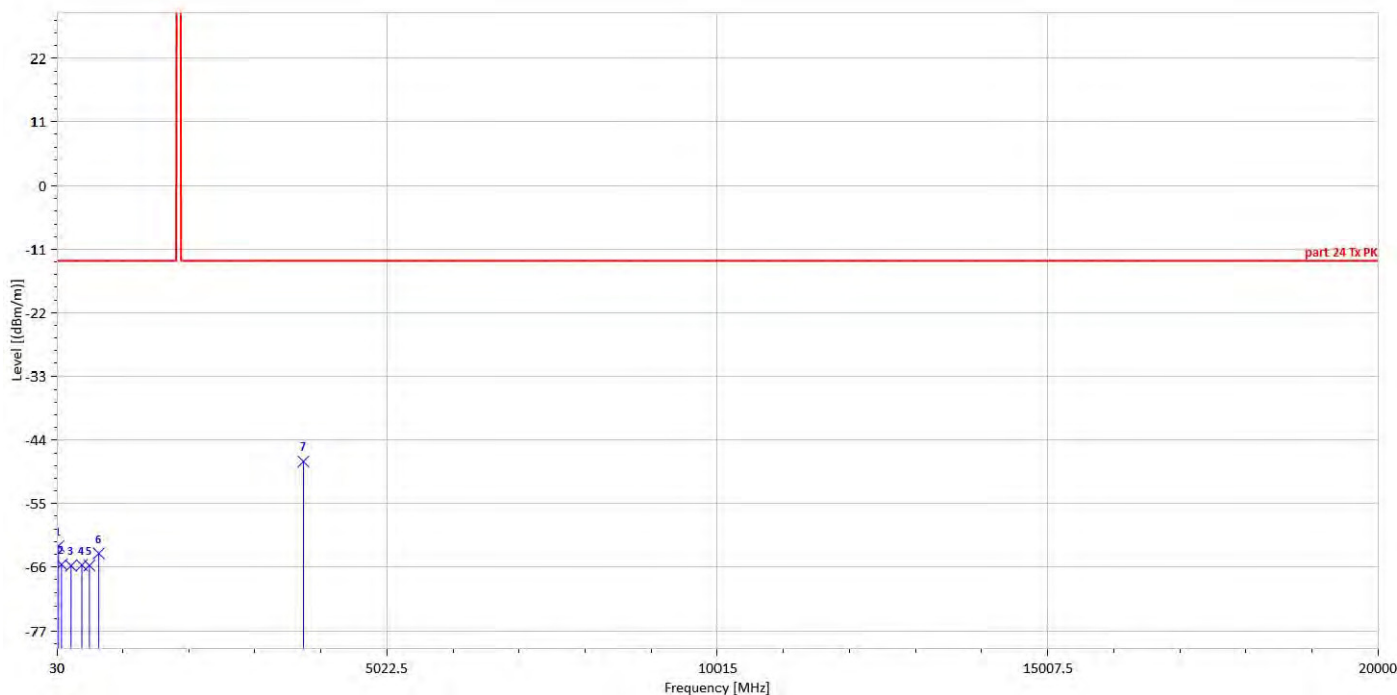
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Operation Mode : HSDPA B2 Test Date : 2016/8/5
Fundamental Frequency : 1880.0 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
56.19	S	-62.27	-58.98	-2.44	-0.85	-13.01	-49.26
100.81	S	-65.53	-63.44	-0.92	-1.17	-13.01	-52.52
246.31	S	-65.75	-69.32	5.43	-1.86	-13.01	-52.74
412.18	S	-65.63	-69.26	5.88	-2.24	-13.01	-52.62
528.58	S	-65.70	-69.42	6.41	-2.68	-13.01	-52.69
672.14	S	-63.58	-68.24	7.31	-2.65	-13.01	-50.57
3760.00	H	-47.67	-52.77	12.30	-7.21	-13.01	-34.66

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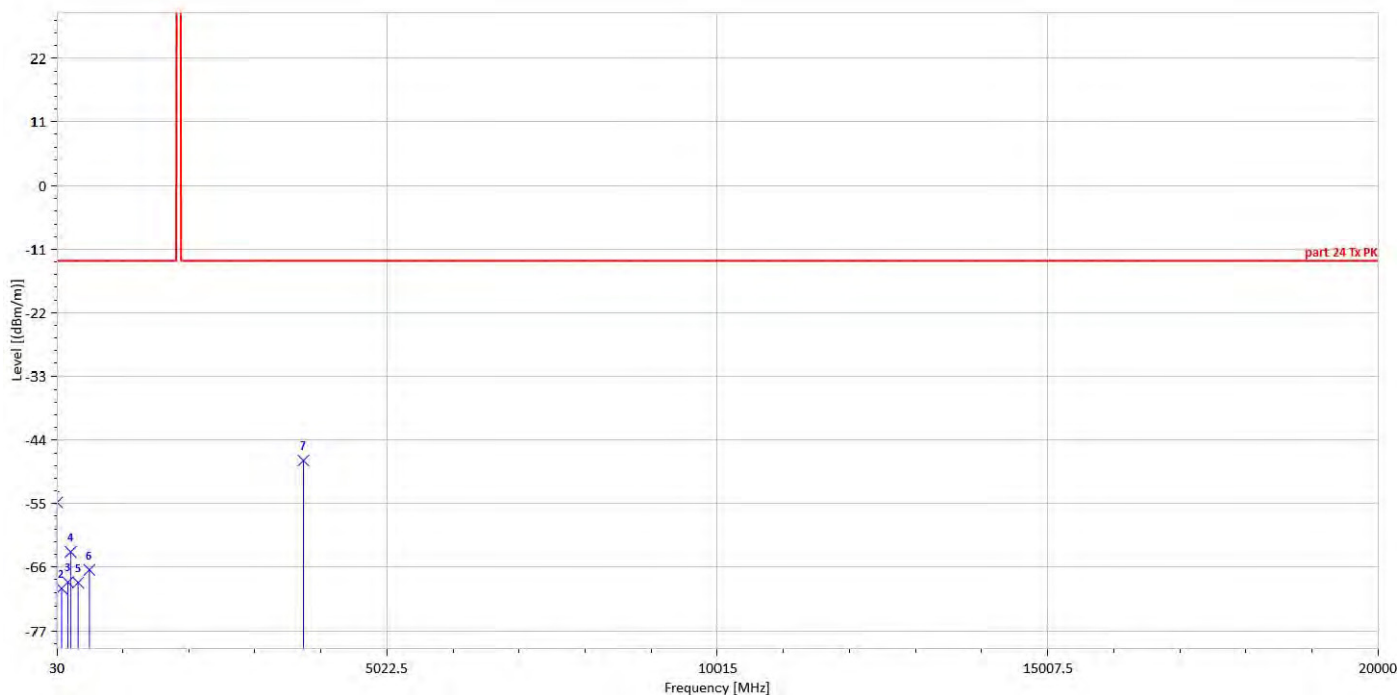
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Operation Mode : HSDPA B2 Test Date : 2016/8/5
Fundamental Frequency : 1880.0 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
33.88	S	-54.82	-37.26	-16.88	-0.68	-13.01	-41.81
102.75	S	-69.72	-67.54	-0.99	-1.19	-13.01	-56.71
198.78	S	-68.62	-72.85	5.87	-1.64	-13.01	-55.61
241.46	S	-63.32	-67.12	5.65	-1.86	-13.01	-50.31
355.92	S	-68.69	-72.32	5.87	-2.25	-13.01	-55.68
528.58	S	-66.47	-70.19	6.41	-2.68	-13.01	-53.46
3760.00	H	-47.49	-52.58	12.30	-7.21	-13.01	-34.48

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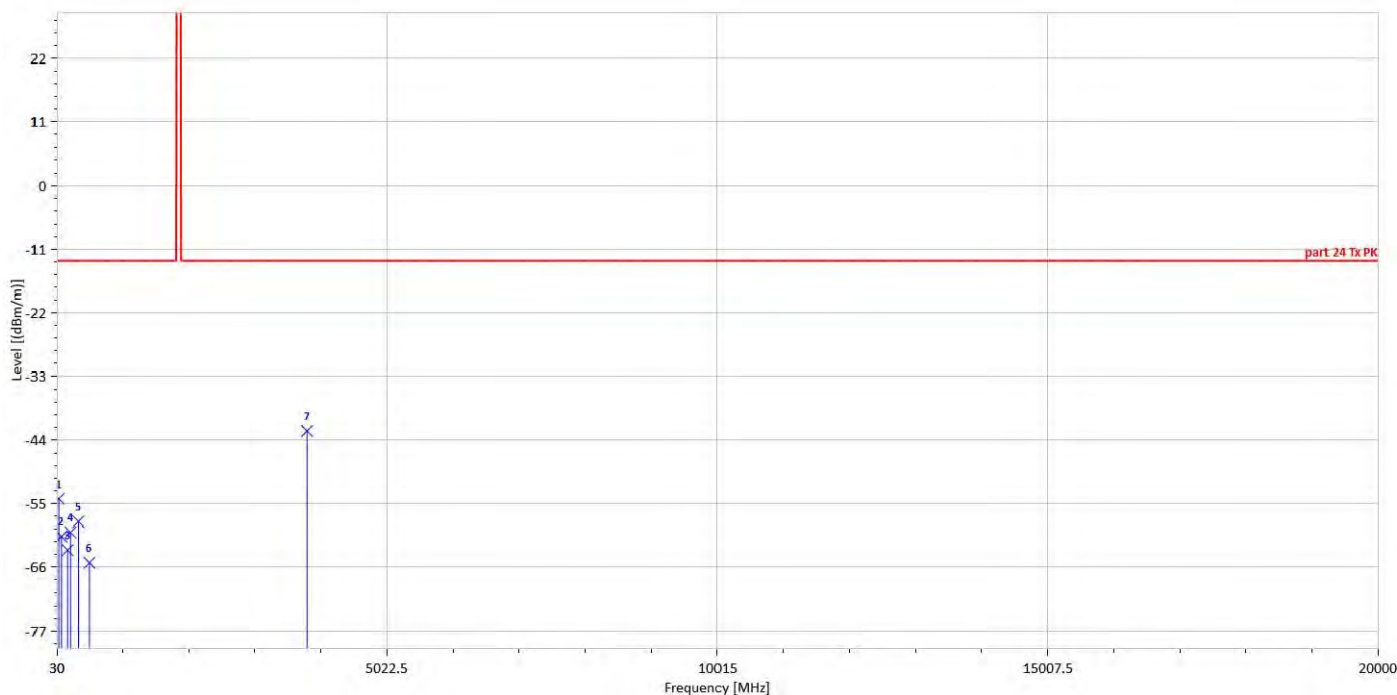
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Operation Mode : HSDPA B2 Test Date : 2016/8/5
Fundamental Frequency : 1907.6 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH High Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
61.04	S	-54.18	-52.45	-0.79	-0.95	-13.01	-41.17
100.81	S	-60.66	-58.57	-0.92	-1.17	-13.01	-47.65
194.90	S	-63.01	-67.38	6.01	-1.64	-13.01	-50.00
239.52	S	-59.94	-63.86	5.74	-1.82	-13.01	-46.93
359.80	S	-58.12	-61.87	5.86	-2.12	-13.01	-45.11
528.58	S	-65.22	-68.94	6.41	-2.68	-13.01	-52.21
3815.20	H	-42.48	-47.52	12.30	-7.25	-13.01	-29.47

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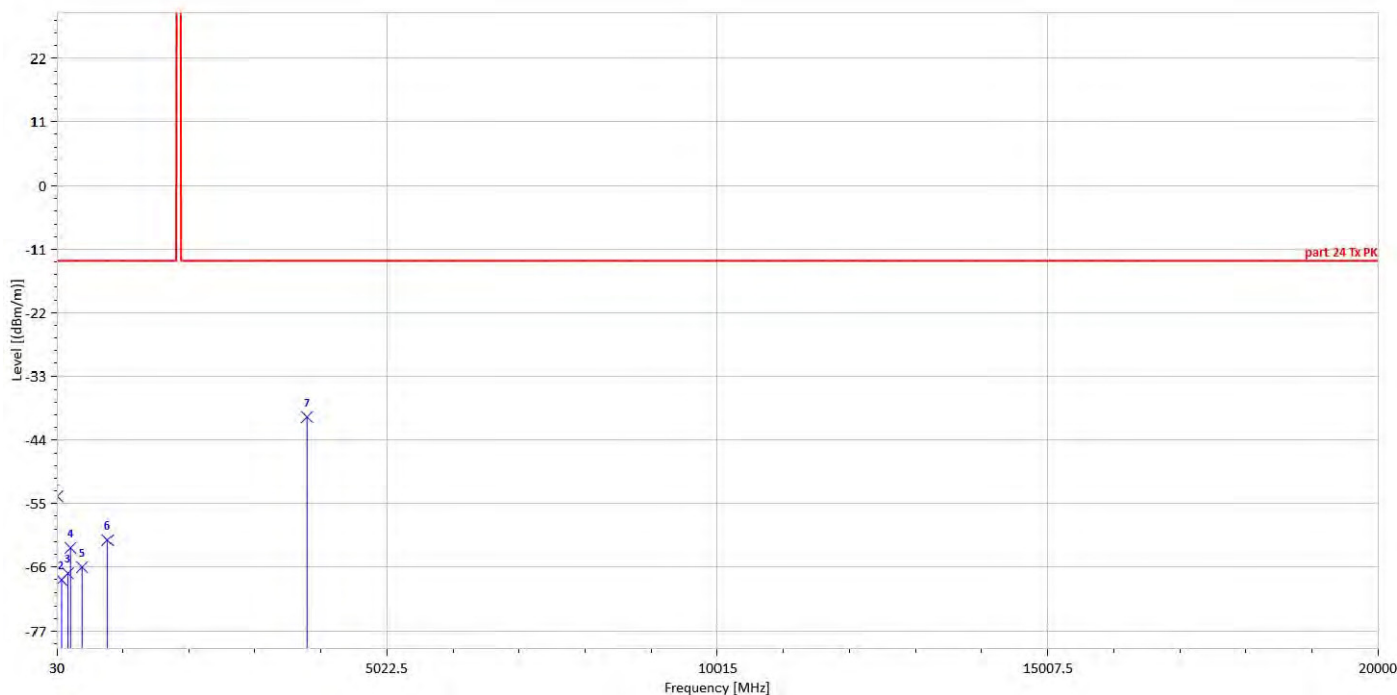
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Operation Mode : HSDPA B2 Test Date : 2016/8/5
Fundamental Frequency : 1907.6 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH High Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
36.79	S	-53.76	-38.59	-14.46	-0.71	-13.01	-40.75
102.75	S	-68.22	-66.04	-0.99	-1.19	-13.01	-55.21
199.75	S	-67.07	-71.26	5.84	-1.65	-13.01	-54.06
239.52	S	-62.61	-66.53	5.74	-1.82	-13.01	-49.60
416.06	S	-65.99	-69.51	5.92	-2.40	-13.01	-52.98
800.18	S	-61.26	-65.53	7.67	-3.40	-13.01	-48.25
3815.20	H	-40.04	-45.09	12.30	-7.25	-13.01	-27.03

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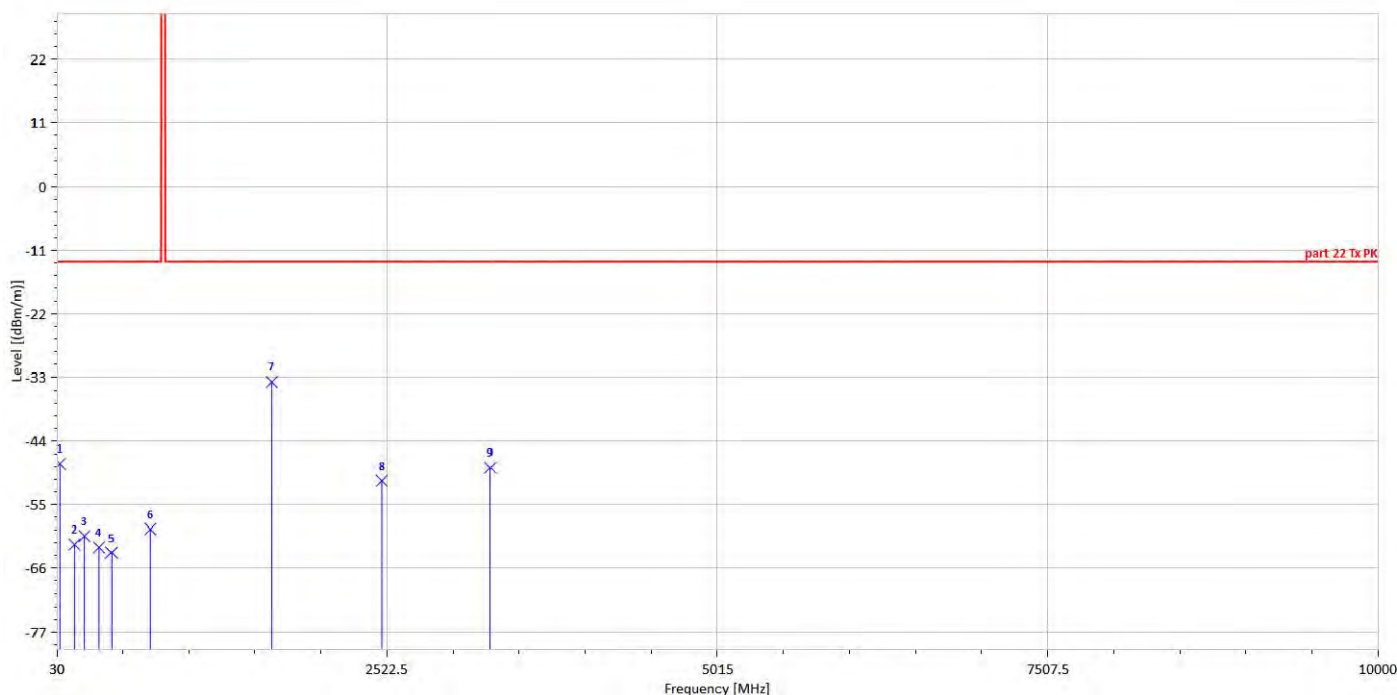
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Radiated Spurious Emission Measurement Result: WCDMA Band 5 Mode

Operation Mode :	HSUPA B5	Test Date :	2016/8/5
Fundamental Frequency :	826.4 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
53.28	S	-47.90	-41.23	-5.75	-0.92	-13	-34.90
164.83	S	-61.86	-62.33	1.99	-1.52	-13	-48.86
240.49	S	-60.40	-62.10	3.54	-1.85	-13	-47.40
352.04	S	-62.37	-63.84	3.74	-2.26	-13	-49.37
444.19	S	-63.26	-64.92	4.06	-2.40	-13	-50.26
737.13	S	-59.22	-61.60	5.46	-3.09	-13	-46.22
1651.00	H	-33.74	-35.78	6.76	-4.72	-13	-20.74
2484.00	H	-50.85	-53.24	8.24	-5.85	-13	-37.85
3303.00	H	-48.57	-51.55	9.76	-6.78	-13	-35.57

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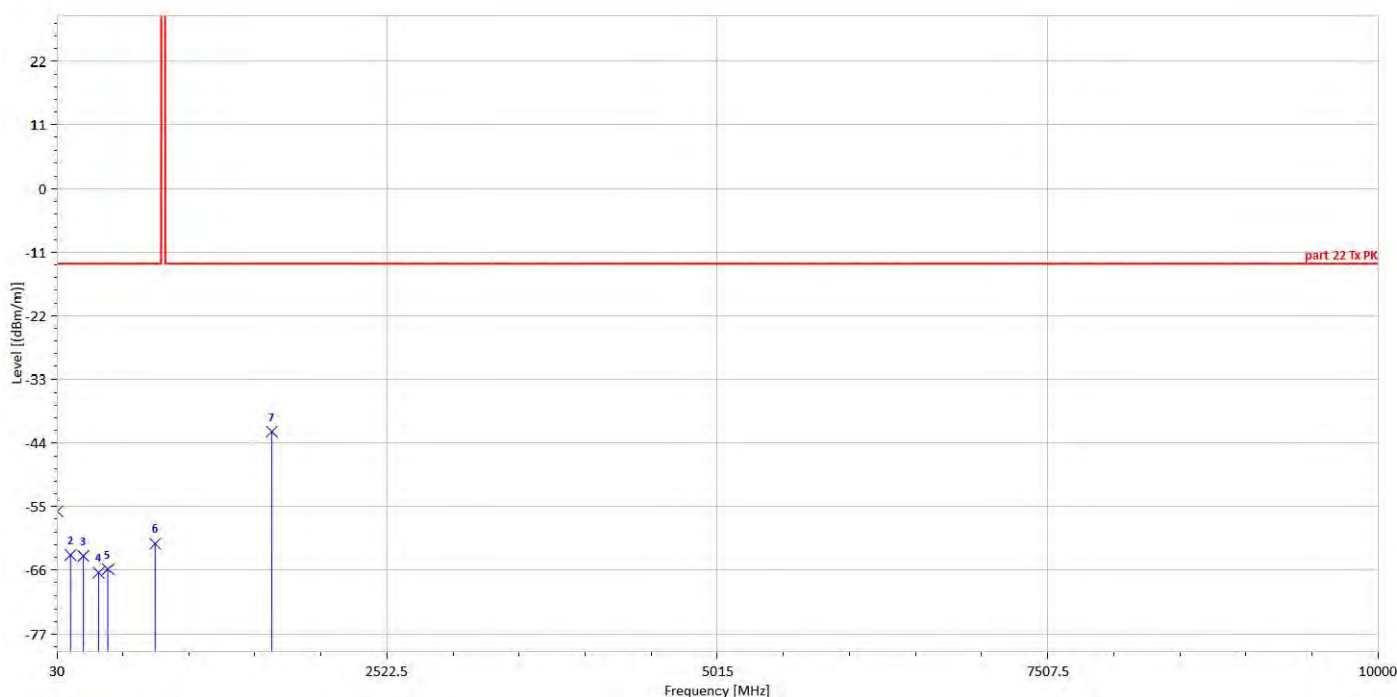
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Operation Mode :	HSUPA B5	Test Date :	2016/8/5
Fundamental Frequency :	826.4 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
33.88	S	-55.85	-36.13	-19.03	-0.68	-13	-42.85
134.76	S	-63.34	-60.29	-1.67	-1.38	-13	-50.34
232.73	S	-63.51	-65.66	3.95	-1.80	-13	-50.51
349.13	S	-66.43	-68.09	3.74	-2.08	-13	-53.43
418.97	S	-65.82	-67.17	3.80	-2.45	-13	-52.82
773.99	S	-61.36	-63.92	5.49	-2.93	-13	-48.36
1651.00	H	-42.06	-44.10	6.76	-4.72	-13	-29.06

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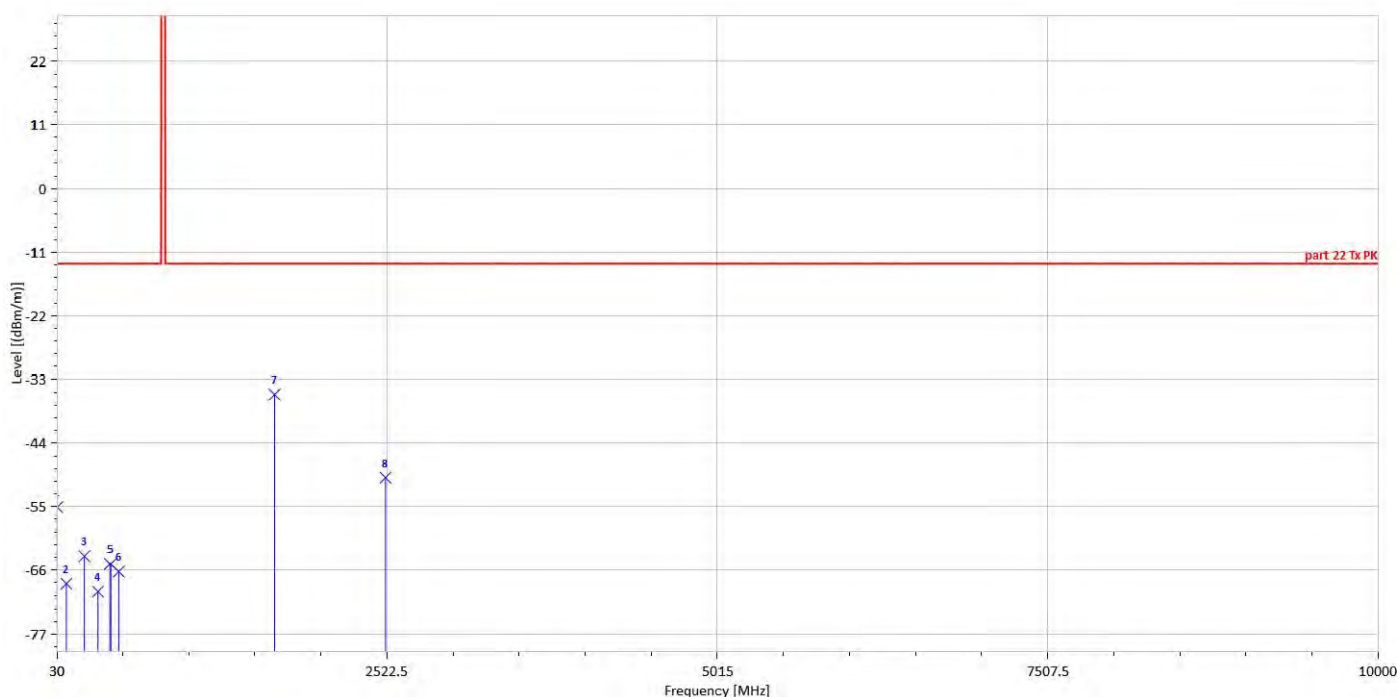
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Operation Mode : HSUPA B5 Test Date : 2016/8/5
Fundamental Frequency : 836.6 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
32.91	S	-55.13	-34.58	-19.87	-0.67	-13	-42.13
102.75	S	-68.36	-64.03	-3.14	-1.19	-13	-55.36
240.49	S	-63.56	-65.25	3.54	-1.85	-13	-50.56
344.28	S	-69.74	-71.23	3.75	-2.26	-13	-56.74
435.46	S	-64.91	-66.38	3.97	-2.50	-13	-51.91
495.60	S	-66.23	-67.92	4.23	-2.55	-13	-53.23
1672.00	H	-35.58	-37.63	6.83	-4.78	-13	-22.58
2512.00	H	-49.97	-52.35	8.27	-5.89	-13	-36.97

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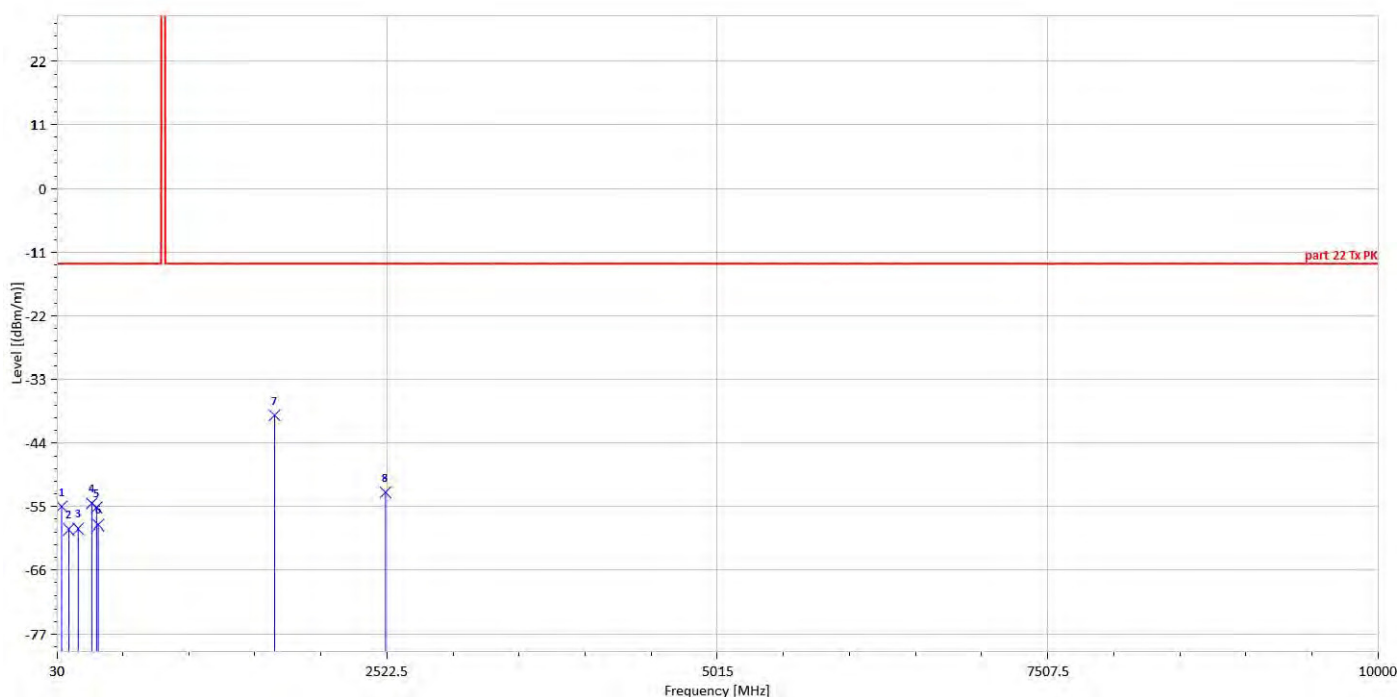
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Operation Mode : HSUPA B5 Test Date : 2016/8/5
Fundamental Frequency : 836.6 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
66.86	S	-55.02	-51.91	-2.16	-0.95	-13	-42.02
121.18	S	-58.95	-54.82	-2.87	-1.25	-13	-45.95
192.96	S	-58.83	-61.12	3.93	-1.64	-13	-45.83
296.75	S	-54.46	-56.22	3.77	-2.01	-13	-41.46
333.61	S	-55.18	-56.70	3.76	-2.24	-13	-42.18
346.22	S	-58.18	-59.77	3.75	-2.16	-13	-45.18
1672.00	H	-39.20	-41.26	6.83	-4.78	-13	-26.20
2512.00	H	-52.52	-54.90	8.27	-5.89	-13	-39.52

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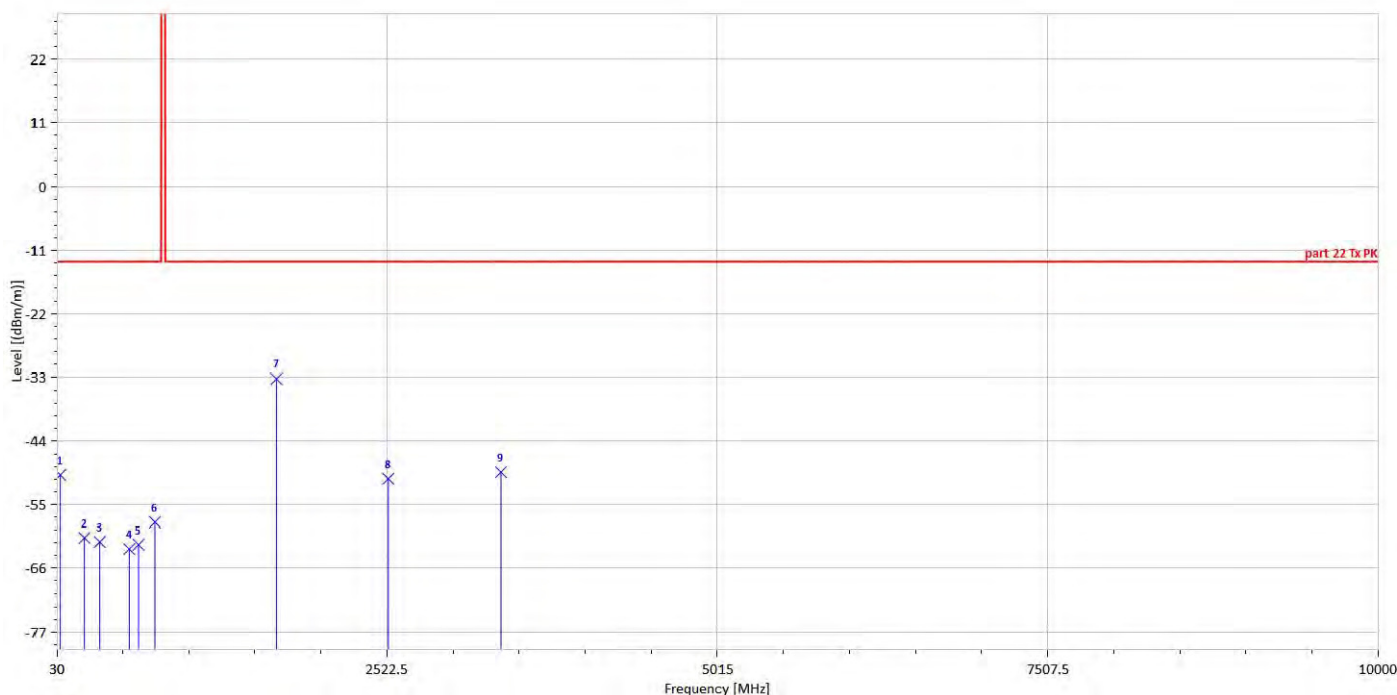
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Operation Mode : HSUPA B5 Test Date : 2016/8/5
Fundamental Frequency : 846.6 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH High Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Vertical



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
56.19	S	-49.85	-44.41	-4.59	-0.85	-13	-36.85
240.49	S	-60.72	-62.41	3.54	-1.85	-13	-47.72
357.86	S	-61.42	-62.97	3.72	-2.17	-13	-48.42
576.11	S	-62.67	-64.48	4.51	-2.69	-13	-49.67
646.92	S	-61.91	-63.62	4.91	-3.19	-13	-48.91
772.05	S	-58.06	-60.22	5.49	-3.33	-13	-45.06
1686.00	H	-33.21	-35.30	6.88	-4.80	-13	-20.21
2533.00	H	-50.50	-52.91	8.31	-5.90	-13	-37.50
3380.00	H	-49.35	-52.50	9.91	-6.75	-13	-36.35

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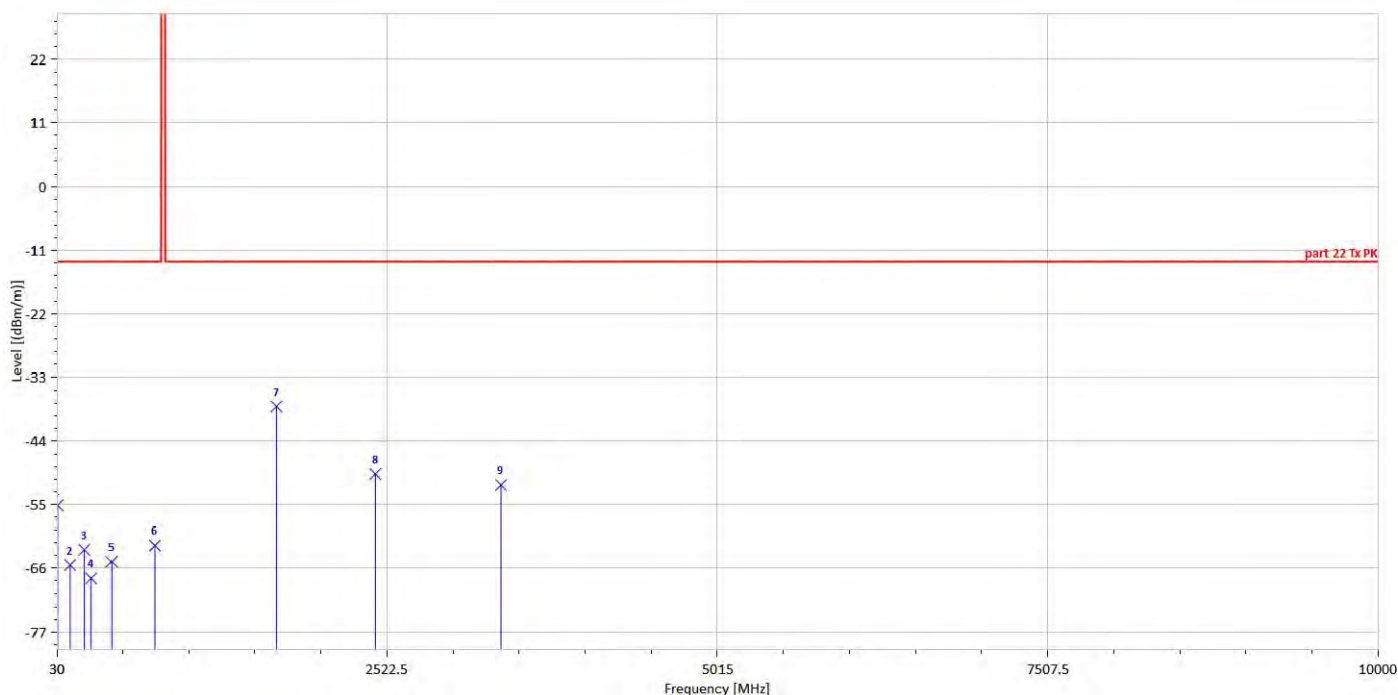
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Operation Mode : HSUPA B5 Test Date : 2016/8/5
Fundamental Frequency : 846.6 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH High Test Engineer : Ashton
EUT Pol. : H Measurement Antenna Pol. : Horizontal



Freq.	Note	EIRP	SG Output	Antenna	Cable	Limit	Margin
MHz	F/H/E/S	dBm	Level dBm	Gain dBi	Loss dB	@3m dBm/m	dB
35.82	S	-55.16	-37.04	-17.39	-0.73	-13	-42.16
131.85	S	-65.44	-62.07	-2.03	-1.34	-13	-52.44
239.52	S	-62.78	-64.55	3.59	-1.82	-13	-49.78
291.90	S	-67.77	-69.52	3.73	-1.98	-13	-54.77
444.19	S	-64.88	-66.54	4.06	-2.40	-13	-51.88
772.05	S	-62.05	-64.21	5.49	-3.33	-13	-49.05
1686.00	H	-38.01	-40.10	6.88	-4.80	-13	-25.01
2435.00	H	-49.67	-52.09	8.21	-5.79	-13	-36.67
3380.00	H	-51.60	-54.76	9.91	-6.75	-13	-38.60

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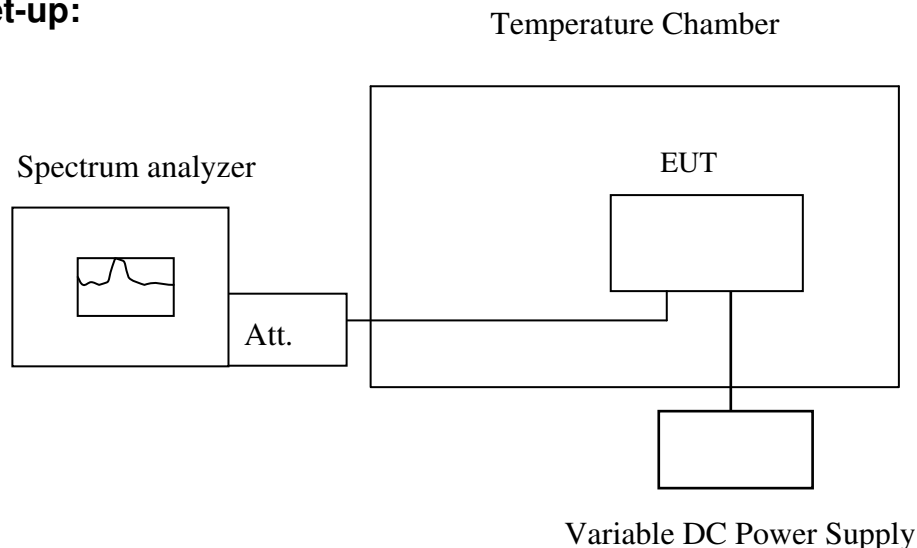
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11. FREQUENCY STABILITY MEASUREMENT

11.1. Standard Applicable:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

11.2. Test Set-up:



Note: Measurement setup for testing on Antenna connector

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11.3. Measurement Procedure:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Set chamber temperature to 25

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11.4. Measurement Equipment Used:

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017
Communication Tester	Anritsu	MT8820C	6201107337	05/25/2016	05/24/2017
Coaxial Cable 30cm	WOKEN	00100A1F1A 195C	RF01	12/12/2015	12/11/2016
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/16/2016	06/15/2017
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Splitter	RF-LAMBAD	RFLT2W1G1 8G	RF35	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017
Communication Tester	R&S	CMU200	120239	11/25/2015	11/24/2016

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11.5. Measurement Result:

FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: GPRS Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply Vdc	Environment Temperature (	Frequency	Delta (Hz)	Limit (Hz)

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FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: GPRS 1900 Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply	Environment	Frequency	Delta (Hz)	Limit (Hz)
Vdc	Temperature (			

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FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: WCDMA Mid Channel 1880 MHz				
Limit: +/- 2.5 ppm				
Power Supply Vdc	Environment Temperature (	Frequency	Delta (Hz)	Limit (Hz)

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FREQUENCY ERROR vs. VOLTAGE

Reference Frequency: WCDMA Mid Channel 836.6 MHz				
Limit: +/- 2.5 ppm				
Power Supply Vdc	Environment Temperature (	Frequency	Delta (Hz)	Limit (Hz)

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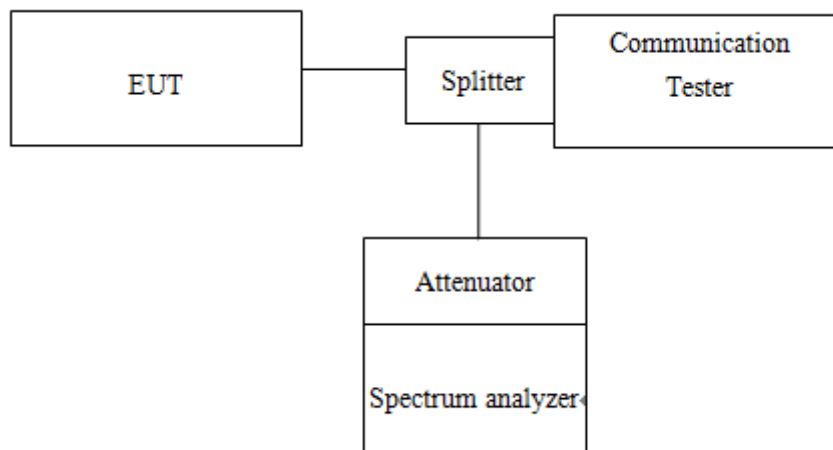
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12. PEAK TO AVERAGE RATIO

12.1. Standard Applicable

The peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

12.2. Test SET-UP



12.3. Measurement Procedure

1. KDB 971168 D01 is employed as the following procedure is proper adjusted accordingly:
2. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth; & internal = 1ms
3. Set the number of counts to a value that stabilizes the measured CCDF curve.

12.4. Measurement Equipment Used

Conducted Emission (measured at antenna port) Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017
Communication Tester	Anritsu	MT8820C	6201107337	05/25/2016	05/24/2017
Coaxial Cable 30cm	WOKEN	00100A1F1A 195C	RF01	12/12/2015	12/11/2016
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/16/2016	06/15/2017
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Splitter	RF-LAMBDA	RFLT2W1G1 8G	RF35	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017
Communication Tester	R&S	CMU200	120239	11/25/2015	11/24/2016

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12.5. Measurement Result

Tabular Results:

Frequency (MHz)	CH	Peak-to-Average Ratio (dB)	
		GPRS	EDGE
1850.20	9296	11.15	11.65
1880.00	9400	9.66	11.52
1909.80	9538	9.00	11.24

Frequency (MHz)	CH	Peak-to-Average Ratio (dB)		
		WCDMA II	HSDPA II	HSUPA II
1852.4	1312	2.60	3.49	3.38
1880.0	1413	2.70	3.72	3.60
1907.6	1513	2.47	3.28	3.37

Measurement Results:

Please refer to next page.

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GPRS 1900MHz_LowCH512-1850.2



EDGE 1900MHz_LowCH512-1850.2



GPRS 1900MHz_MidCH661-1880



EDGE 1900MHz_MidCH661-1880



GPRS 1900MHz_HighCH810-1909.8



EDGE 1900MHz_HighCH810-1909.8



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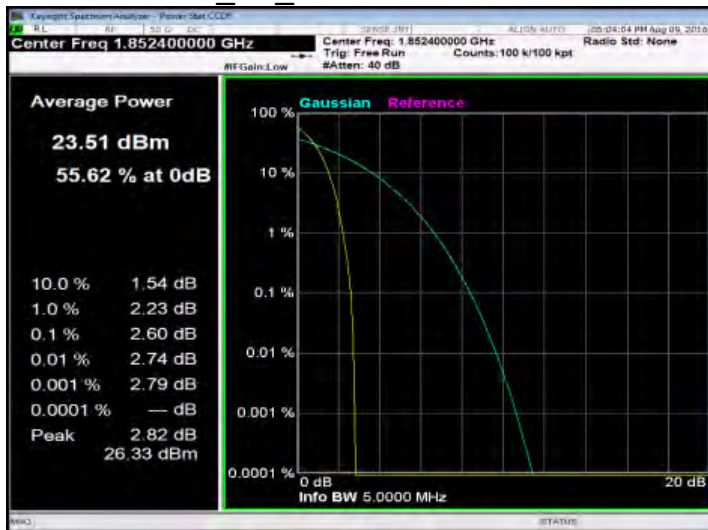
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WCDMA B2 LowCH9262-1852.4



HSDPA B2 LowCH9262-1852.4



WCDMA B2 MidCH9400-1880



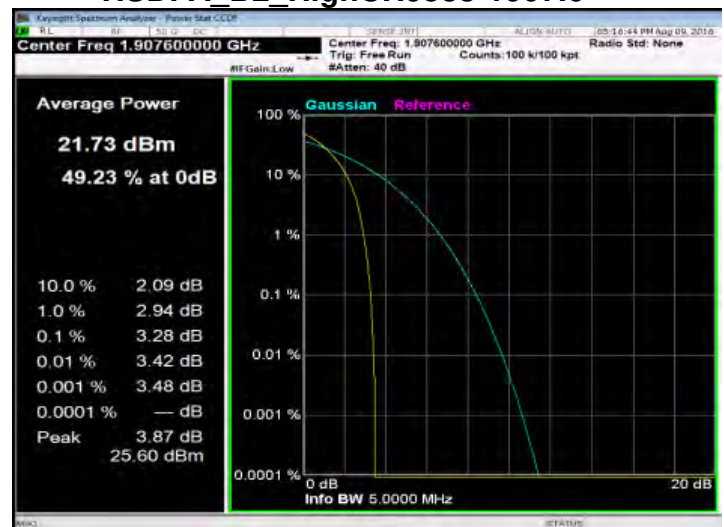
HSDPA B2 MidCH9400-1880



WCDMA B2_HighCH9538-1907.6



HSDPA B2_HighCH9538-1907.6



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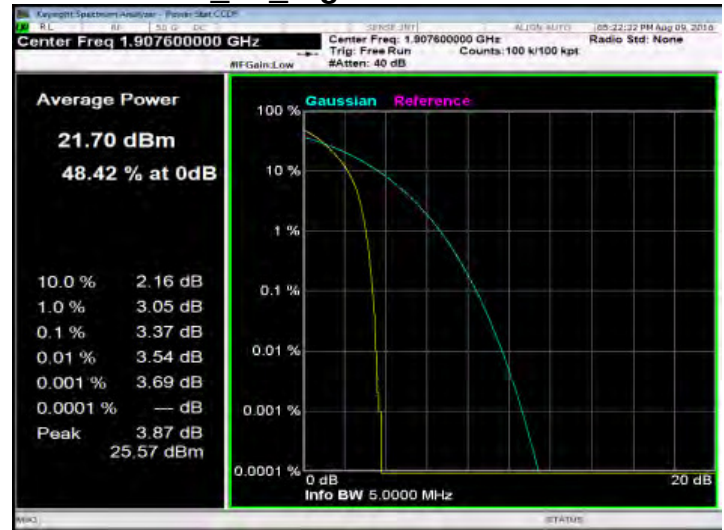
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HSUPA_B2_LowCH9262-1852.4



HSUPA_B2_HighCH9538-1907.6



HSUPA_B2_MidCH9400-1880



~ End of Report ~

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