FCC / IC Test Report

FOR:

3SI Security Systems
Model Name: AT140720US

Product Description:
Asset Tracking and Alert Device.

FCC ID: Q6KAT140720A
IC Certification Number: 5043A-AT140720A

47 CFR Part 22, 24
RSS-132 Issue 3
RSS-133 Issue 2

TEST REPORT #: EMC-3SISE-039-14001_RT _FCC_22_24_Rev1
DATE: 2015-1-27

FCC: Accredited

IC recognized # 3462B-1

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1 Assessment

The following equipment as further described in section 3 of this test report was evaluated against the applicable criteria specified in FCC CFR47 Parts 22 and 24 and Industry Canada Radio Standard Specifications RSS-132 Issue 3 and RSS-133 Issue 2. No deviations were ascertained during the course of the tests performed.

Company	Description	Model #
3SI Security Systems	Asset tracking and alert devices.	AT140720US

Report reviewed by:

Date	Section	Name	Signature
2014-1-27	Compliance	Franz Engert (Compliance Manager)	Digitally signed by Franz Engert DN: cn=Franz Engert, c=US, o=CETECOM, ou=Complience, email=franz.engert@cetecom.com Date: 2015.01.27 16:58:16 -08'00'

Responsible for the Report:

Date	Section	Name	Signature
2014-1-27	Compliance	James Donnellan (EMC Engineer)	James Donnellan Digitally signed by James Donnellan DN: cn=James Donnellan, c=US, o=Cetecom Inc., ou=Compliance, email=james.donnellan@cetecom.com Date: 2015.01.27 16:59:47 -08'00'

The test results of this test report relate exclusively to the test item specified in Section3.
CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	CETECOM Inc. 411 Dixon Landing Rd Milpitas, CA 95035
Telephone:	+1 (408) 586 6200
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Compliance Manager:	Franz Engert
Responsible Project Leader	James Donnellan

2.2 Identification of the Client

Applicant's Name:	3SI Security Systems
Street Address:	2055 N Brown Road, ste 225, Lawrenceville
City/Zip Code	GA 30043
Country	USA
Contact Person:	Waldemar Sierocinski
Phone No.	954-214-5398
Fax:	954-214-5398
e-mail:	Waldemar_Sierocinski@3sisecurity.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as client.
Manufacturers Address:	
City/Zip Code	
Country	

2.4 Dates of Testing:

2014-10-13 to 2014-12-20

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name / Description:	Asset Tracking and Alert Device
Model Number:	AT140720US
FCC-ID :	Q6KAT140720A
IC Cert Number:	5043A-AT140720A
Product Description:	Asset Tracking and Alert Device equipped with 3G cellular radio module, beacon radio and GPS
Technology / Type(s) of Modulation:	per incorporated 3G cellular radio module: Telit, model UE910-NAD, FCC-ID: RI7UE910NA, IC ID: 5131A-UE910NA GSM 850/1900MHz GPRS / EDGE multi-slot class 12/33 operation modulation: GSM&GPRS&EDGE(MCS-1-4): GMSK; EDGE&EPGRS(MCS-5-8): 8PSK; WCDMA / HSPA+ 850/1900/ MHz HSDPA Category 8 data rate – 7.2 Mbps; HSUPA Category 6 data rate - 5.76 Mbps; modulation: all QPSK, QAM
Operating Frequency Ranges (MHz) / Channels:	GSM 850: 824.2-848.8; 124 channels GSM 1900: 1850.2-1909.8; 299 channels FDD V: 826.4 - 846.6; 102 channels FDD II: 1852.4 -1907.6; 277 channels
Antenna info:	internal: inverted F Antenna, 850MHz: -6.8 dBi, 1900MHz: -1.9 dBi
Rated Operating Voltage Range:	Vmin: 3.4V - Vmax: 4.2V
Rated Operating Temperature Range:	Tmin: -20°C/ Tmax: 60°C
Test Sample Status:	Prototype
Other Radios contained in the device:	• 216.475 MHz beacon transmitter (default frequency) • 219.600 MHz beacon transmitter (optional frequency, enabled in USA only) • 1575.420 MHz GPS receiver

3.2 Identification of the Equipment under Test (EUT)

EUT #	Serial Number	Sample	HW/SW Version
1	IMEI: 354676050448264	Radiated	P2 7 / 12.0.14945
2	IMEI 354676050452894	Conducted	P2 8 / 12.0.14945

3.3 Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Serial Number / PN
1	Battery	3SI	3.7 V Li-ion Battery Pack	52010555 T

4 Summary of Measurement Results

GSM / FDDV 850MHz Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §22.913 (a) RSS-132 5.4	RF Output Power	Nominal	GSM/GPRS (GMSK) / FDD	■	☐	☐	☐	Complies
§2.1055 §22.355 RSS-132 5.3	Frequency Stability	Nominal	GSM/GPRS (GMSK) / FDD	☐	☐	☐	■	Note 1
§2.1049 §22.917(b) RSS-132 5.2	Occupied Bandwidth	Nominal	GSM/GPRS (GMSK) / FDD	☐	☐	☐	■	Note 1
§2.1051 §22.917 RSS-132 5.5	Band Edge Compliance	Nominal	GSM/GPRS (GMSK) / FDD	☐	☐	☐	■	Note 1
§2.1051 §22.917 RSS-132 5.5	Conducted Spurious Emissions	Nominal	GSM/GPRS (GMSK) / FDD	☐	☐	☐	■	Note 1
§2.1053 §22.917 RSS-132 5.5	Radiated Spurious Emissions	Nominal	GSM/GPRS (GMSK) / FDD	■	☐	☐	☐	Complies

Note: NA= Not Applicable; NP= Not Performed.
Note 1: Leveraged from module certification. See Section 5.4

GSM / FDD II 1900 MHz Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §24.232 (a) RSS-133 6.4	RF Output Power	Nominal	GSM/GPRS (GMSK) / FDD	■	□	□	□	Complies
§2.1055 §24.235 RSS-133 6.3	Frequency Stability	Nominal	GSM/GPRS (GMSK) / FDD	□	□	□	■	Note 1
§2.1049 §24.238(b) RSS-133 6.2	Occupied Bandwidth	Nominal	GSM/GPRS (GMSK) / FDD	□	□	□	■	Note 1
§2.1051 §24.238 RSS-133 6.5	Band Edge Compliance	Nominal	GSM/GPRS (GMSK) / FDD	□	□	□	■	Note 1
§2.1051 §24.238 RSS-133 6.5	Conducted Spurious Emissions	Nominal	GSM/GPRS (GMSK) / FDD	□	□	□	■	Note 1
§2.1053 §24.238 RSS-133 6.5	Radiated Spurious Emissions	Nominal	GSM/GPRS (GMSK) / FDD	■	□	□	□	Complies

Note: NA= Not Applicable; NP= Not Performed.
Note 1: Leveraged from module certification.

5 Measurements

5.1 Measurement Uncertainty

	Uncertainty in dB radiated <30MHz	Uncertainty in in dB radiated 30MHz - 1GHz	Uncertainty in dB radiated > 1GHz	Uncertainty in dB Conducted measurement
standard deviation k=1	2.48	1.94	2.16	0.64
95% confidence interval in dB	4.86	3.79	4.24	1.25
95% confidence interval in dB in delta to Result	+-2.5 dB	+-2.0 dB	+- 2.3dB	+-0.7dB

5.2 Nominal Environmental Conditions

- Ambient Temperature: 20-25 °C
- Relative humidity: 40-60%

5.3 Nominal Environmental Test Conditions

- Test Temperature: 20°C (nominal);
- Test Voltage: 3.7 VDC(nominal);

Deviating test conditions are indicated at individual test description where applicable.

5.4 Inheriting Test Results from Incorporated Module Certification:

The EUT integrates the certified module Telit UE910-NAD (details see EUT spec in section 3.1)

Taking into account guidance from FCC KDB 996369 (modular approval) and where relevant test procedures did not change conducted test results are leveraged.

This test report contains full radiated testing as per FCC 22H/24E and RSS-132 issue 3 / RSS-133 issue 6

5.5 Nominal Cellular Test Conditions

1. The different cellular operation modes of the EUT as required for testing are controlled through the link with the Digital Radio Communication Tester (R&S CMU200).
2. The EUT is tested on the low, mid and high channel of each of the supported cellular operation modes.

5.6 Additional Test Information.

Testing is performed according to the guidelines provided in FCC publication (KDB) 971168 D01 v02r02, *Measurement Guidance for Certification of Licensed Digital Transmitters* and according to relevant parts of TIA-603C 2004 as detailed below.

5.7 RF Power Output

5.7.1 References

FCC: CFR Part 2.1046, CFR Part 22.913, CFR Part 24.232
IC: RSS-Gen issue 4, section 6.12; RSS-132 issue 3, section 5.4; RSS-133 issue 6, section 6.4

5.7.2 Limits:

ERP/EIRP (850 MHz Band)

FCC Part 22.913 (a) & RSS-132 Section 5.4

FCC: ERP < 38.45 dBm (7W)
The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

IC: EIRP < 40.60 dBm (11.5W)
The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

EIRP (1900 MHz Band)

FCC Part 24.232 (c) (e) & RSS-133 Section 6.4/SRSP-510 Section 5.1.2

FCC: EIRP < 33 dBm (2W)
(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).
(c) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement over the full bandwidth of the channel.

IC: EIRP < 33 dBm (2W)
The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 2 watts.

5.7.4 RF Power Output
5.7.5 Conducted output power Measurement procedure

The CMU is used to communicate with the EUT and measures the output power levels of the transmitted signal. The external cable attenuation is accounted for on the CMU and in the Conducted Measured Power values below. The PCB attenuation (PA) is made up of 0.1dB for the connector +0.1dB for the onboard pcb trace +0.1dB for the on board PCB switch. Measurement uncertainty (σ) is 0.5 db.
Tune up tolerance (TUT) is the delta between the high and low tolerance from the tune up procedure Or 2dB, whichever is lowest.

By verifying that Conducted Measured Power
(CMP) is >Maximum module Rated Power (MRP) – Maximized Attenuations (TUT+ σ +PA)
and by verifying that CMP < MRP+ σ – PA as in

CMP > MRP- TUT- σ – PA and CMP < MRP + σ – PA
I validate that the measured values are in-line with module measurements.

Two tables are needed as the Module Tune up procedure did not contain RMS values for EDGE measurements.
The declared antenna gains and Peak Conducted Measured Power are used to calculate the ERP/EIRP values for the device in an additional table.

5.7.6 Measured RMS Power comparison with Tune up Procedure

Frequency (MHz)	Maximum Rated Power (Average Per Tune up Procedure) dBm	Tune Up Tolerance (TUT) + (σ)Sigma + Pcb Attenuation (PA) dBm	Conducted Measured Power (CMP Average) dBm
GSM/GPRS 850			
824.2	33.5	2.0+0.5+0.3	31.21
836.6	33.5	2.0+0.5+0.3	31.21
848.8	33.5	2.0+0.5+0.3	31.31
GSM/GPRS 1900			
1850.2	30.5	2.0+0.5+0.3	28.56
1880	30.5	2.0+0.5+0.3	28.66
1909.8	30.5	2.0+0.5+0.3	28.56
UMTS FDD II			
1852.4	24	2.0+0.5+0.3	21.12
1880	24	2.0+0.5+0.3	21.65
1907.6	24	2.0+0.5+0.3	22.06
UMTS FDD V			
826.4	24	2.0+0.5+0.3	23.08
836.6	24	2.0+0.5+0.3	22.81
846.6	24	2.0+0.5+0.3	22.49

5.7.7 Measured Peak power comparison with Module Test Report

The Edge information was not available in the tune up procedure therefore the peak measurements from the module test report are used to access the EDGE bands. As this is an actual measurement from the integrated modules test report a Tune Up Tolerance (TUT) value of 1dB is used.
Note σ=0.71 is used in this case as 2 measurements uncertainties are in play.

Frequency (MHz)	Measured Peak Output Power from module's test report. dBm	Tune Up Tolerance + (σ)Sigma + Pcb Attenuation dBm	Conducted Measured Power (Peak) dBm
EDGE 850			
824.2	29.3	1.0+0.71+0.3	28.71
836.6	29.3	1.0+0.71+0.3	28.71
848.8	29.1	1.0+0.71+0.3	28.71
EDGE 1900			
1850.2	27.7	1.0+0.71+0.3	27.96
1880	27.8	1.0+0.71+0.3	27.96
1909.8	27.9	1.0+0.71+0.3	27.96

5.7.8 ERP / EIRP Calculations

Frequency (MHz)	Conducted Measured PeakPower. dBm	[ERP/]EIRP (dBm) with Declared Antenna gain for 850MHz: -6.8 dBi, 1900MHz: -1.9 dBi
GSM/GPRS 850		
824.2	31.41	22.46 / 24.61
836.6	31.41	22.46 / 24.61
848.8	31.51	22.56 / 24.71
EDGE 850		
824.2	28.71	19.76 / 21.91
836.6	28.71	19.76 / 21.91
848.8	28.71	19.76 / 21.91
GSM/GPRS 1900		
1850.2	28.76	26.86
1880	28.76	26.86
1909.8	28.66	26.76
EDGE 1900		
1850.2	27.96	26.06
1880	27.96	26.06
1909.8	27.96	26.06
UMTS FDD II		
1852.4	24.33	22.43
1880	25.26	23.36
1907.6	25.32	23.42
UMTS FDD V		
826.4	26.55	17.6 / 19.75
836.6	26.51	17.56 / 19.71
846.6	26.08	17.13 / 19.28

5.7.8.1 Verification Result

The measured conducted results are in-line with the integrated module documentation and the calculated ERP/EIRP values are in compliance.

5.8 Spurious Emissions Radiated

5.8.1 References

FCC: CFR Part 2.1053, CFR Part 22.917, CFR Part 24.238, CFR Part 27.53
IC: RSS-Gen issue 4, section 6.13; RSS-132 issue 3, section 5.5; RSS-133 issue 6, section 6.5

5.8.2 Limits:

(a) *Out of band emissions*. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
For all power levels +30dBm to 0dBm, this becomes a constant specification of -13dBm.

5.8.2.1 FCC 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5.8.2.2 FCC 24.238 Emission limitations for Broadband PCS equipment.

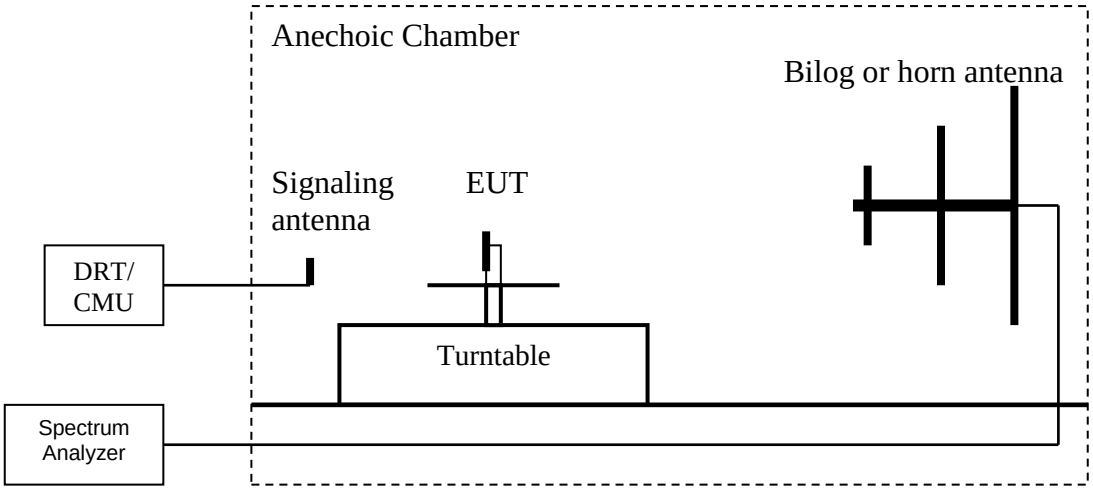
The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.
(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5.8.2.3 RSS-132 Section 5.5.1.1 and RSS-133 Section 6.5.1

In the first 1.0 MHz band immediately outside and adjacent to the licensee's frequency block, the power of emissions per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least $43 + 10 \log_{10}(P)$, dB. After the first 1.0 MHz, the power of emissions shall be attenuated below the transmitter output power by at least $43 + 10 \log_{10}(P)$, dB, in any 100 kHz bandwidth.
After the first 1.5 MHz, the power of emissions shall be attenuated below the transmitter output power by at least $43 + 10 \log_{10}(P)$, dB, in any MHz of bandwidth

Radiated out of band measurement procedure:

Ref: TIA-603C 2004- 2.2.12 Unwanted emissions: Radiated Spurious



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Digital Radio Communication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (**LVL**) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation: **Spurious** (dBm) = **LVL** (dBm) + **LOSS** (dB):
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation: **Spurious** (dBm) = **LVL** (dBm) + **LOSS** (dB):
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
    (N**ote:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

5.8.3 Sample Calculations for Radiated Measurements

Power Measurements using Substitution Procedure:

The measurement on the Spectrum Analyzer is used as a basis for the Substitution procedure.
The EUT is replaced with a Signal Generator and an antenna. The setting on the Signal Generator is varied until the Spectrum Analyzer displays the original reading. EIRP is calculated as-

EIRP (dBm)= Signal Generator setting (dBm)- Cable Loss (dB)+ Antenna Gain (dBi). Example below.

Frequency (MHz)	Measured SA (dBµV)	Signal Generator setting (dBm)	Antenna Gain (dBi)	Dipole Gain (dBd)	Cable Loss (dB)	EIRP (dBm)
1000	95.5	24.5	6.5	0	3.5	27.5

5.8.4 Spectrum Analyzer Settings

Settings for FCC 22

	30MHz – 1 GHz	1 – 1.58 GHz	1.58 – 9 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto

Settings for FCC 24

	30MHz – 1 GHz	1 – 2.7 GHz	2.7 – 18 GHz	18 – 19.1 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto	Auto

5.8.5 **Test Results**

5.8.5.1 Transmitter Spurious Emission GSM 850.

Harmonic	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)	Limit FCC and IC (dBm)
2	1648.4	-33	1673.2	-47	1697.6	-45	-13
3	2472.6	NF	2509.8	NF	2546.4	NF	
4	3296.8	NF	3346.4	NF	3395.2	NF	
5	4121	NF	4183	NF	4244	NF	
6	4945.2	NF	5019.6	NF	5092.8	NF	
7	5769.4	NF	5856.2	NF	5941.6	NF	
8	6593.6	NF	6692.8	NF	6790.4	NF	
9	7417.8	NF	7529.4	NF	7639.2	NF	
10	8242	NF	8366	NF	8488	NF	
NF = Noise Floor Measurement Uncertainty: ±3dB							

5.8.5.2 Test Results Transmitter Spurious Emission GSM -1900

Harmonic	Tx ch-512 Freq. (MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)	Limit FCC and IC (dBm)
2	3700.4	-56	3760	-57.5	3819.6	-56.5	-13
3	5550.6	NF	5640	NF	5729.4	NF	
4	7400.8	NF	7520	NF	7639.2	NF	
5	9251	NF	9400	NF	9549	NF	
6	11101.2	NF	11280	NF	11458.8	NF	
7	12951.4	NF	13160	NF	13368.6	NF	
8	14801.6	NF	15040	NF	15278.4	NF	
9	16651.8	NF	16920	NF	17188.2	NF	
10	18502	NF	18800	NF	19098	NF	
NF = Noise Floor Measurement Uncertainty: ±3dB							

5.8.5.1 Transmitter Spurious Emission FDD V.

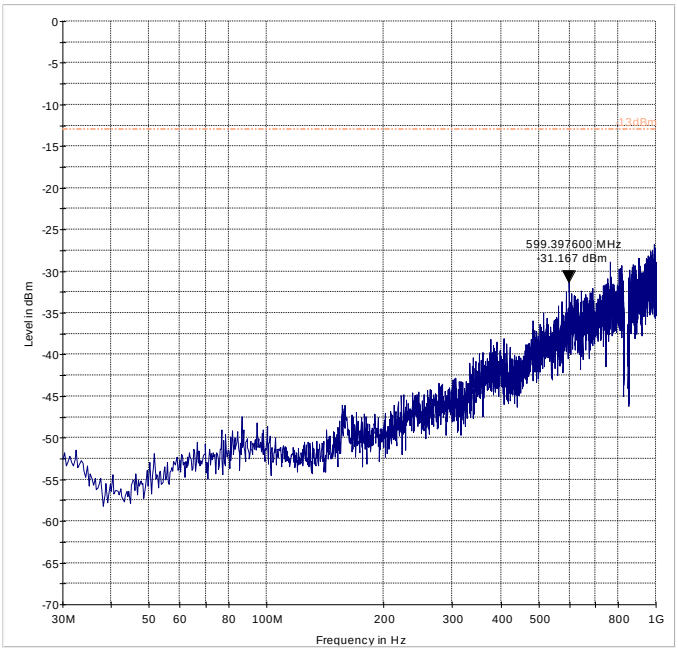
Harmonic	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)	Limit FCC and IC (dBm)
2	1652.8	-38.5	1673.2	-40	1693.2	-39.5	-13
3	2479.2	NF	2509.8	NF	2539.8	NF	
4	3305.6	NF	3346.4	NF	3386.4	NF	
5	4132	NF	4183	NF	4233	NF	
6	4958.4	NF	5019.6	NF	5079.6	NF	
7	5784.8	NF	5856.2	NF	5926.2	NF	
8	6611.2	NF	6692.8	NF	6772.8	NF	
9	7437.6	NF	7529.4	NF	7619.4	NF	
10	8264	NF	8366	NF	8466	NF	
NF = Noise Floor Measurement Uncertainty: ±3dB							

5.8.5.2 Test Results Transmitter Spurious Emission FDD II.

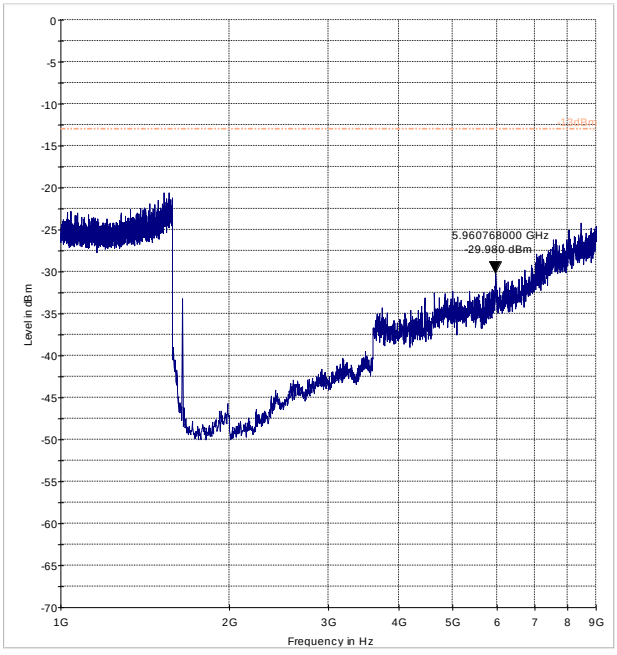
Harmonic	Tx ch-512 Freq. (MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)	Limit FCC and IC (dBm)
2	3704.8	-56	3760	-57	3815.2	-54.3	-13
3	5557.2	NF	5640	NF	5722.8	NF	
4	7409.6	NF	7520	NF	7630.4	NF	
5	9262	NF	9400	NF	9538	NF	
6	11114.4	NF	11280	NF	11445.6	NF	
7	12966.8	NF	13160	NF	13353.2	NF	
8	14819.2	NF	15040	NF	15260.8	NF	
9	16671.6	NF	16920	NF	17168.4	NF	
10	18524	NF	18800	NF	19076	NF	
NF = Noise Floor Measurement Uncertainty: ±3dB							

5.8.6 Radiated Emission Plots:

Radiated Spurious Emissions (GSM-850) Tx: Low Channel
Test results 30MHz-1GHz

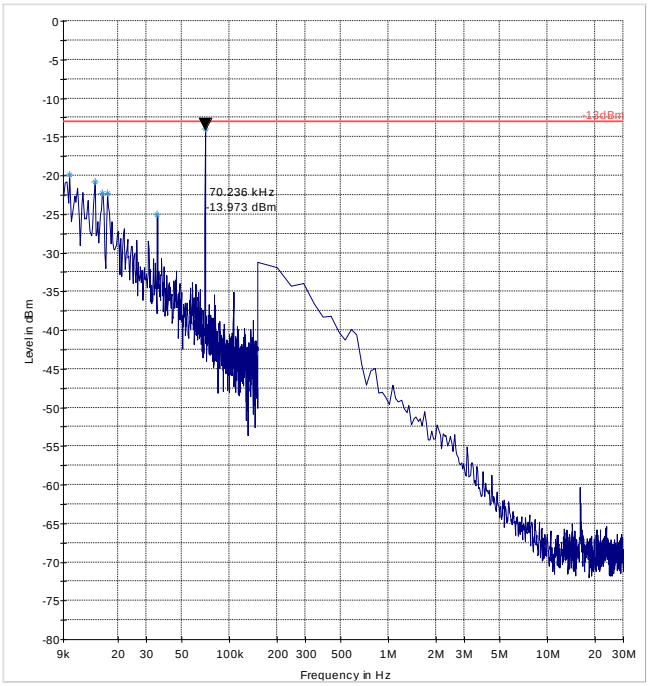


Test results 1GHz-9GHz



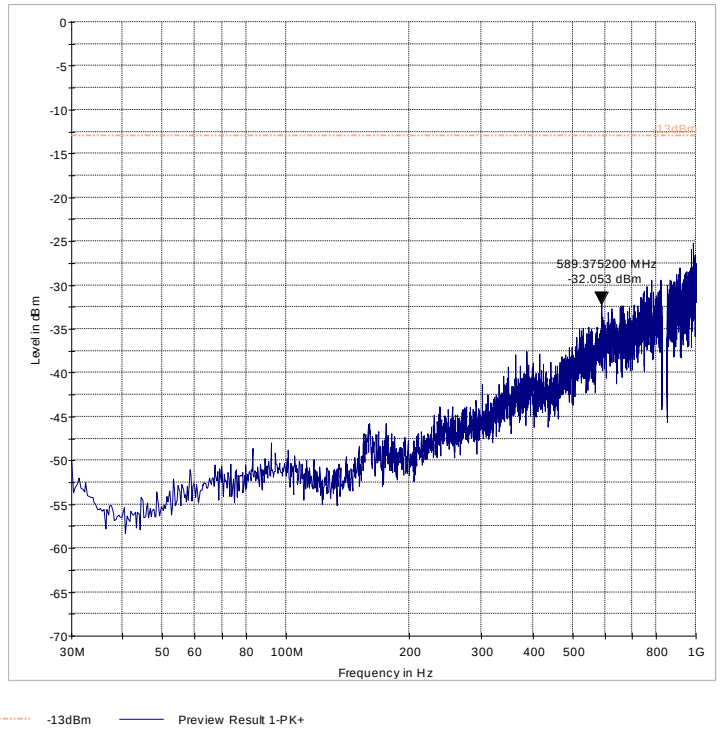
Radiated Spurious Emissions (GSM-850) Tx: Mid Channel

Test results 9KHz-30MHz

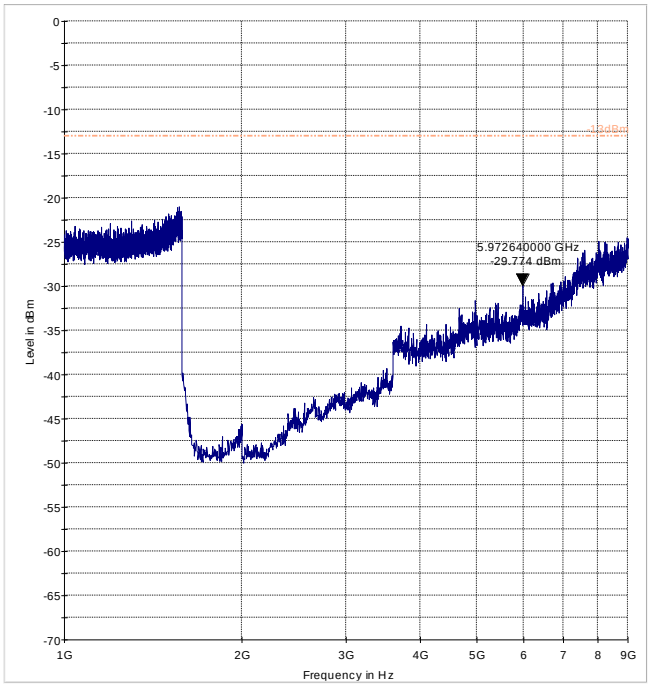


The 70.236 KHz is an ambient from lights

Test results 30MHz-1GHz

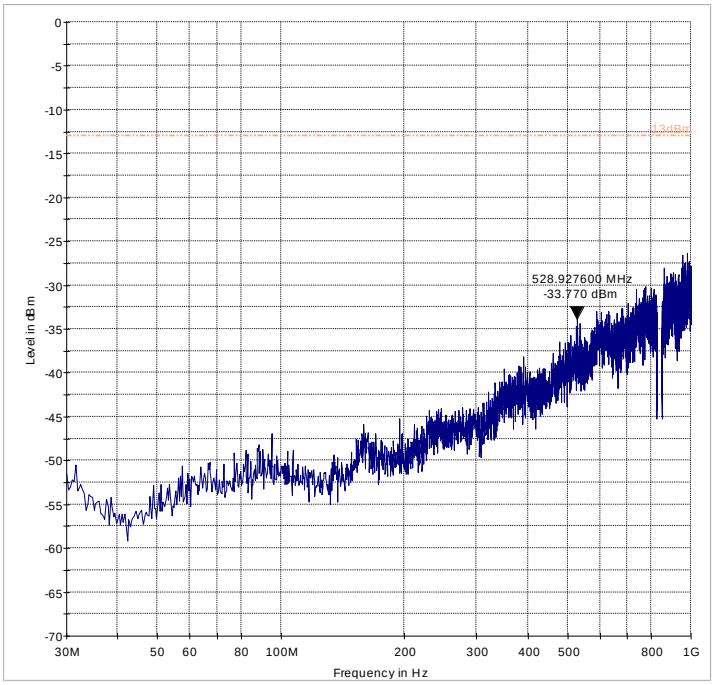


Test results 1GHz-9GHz

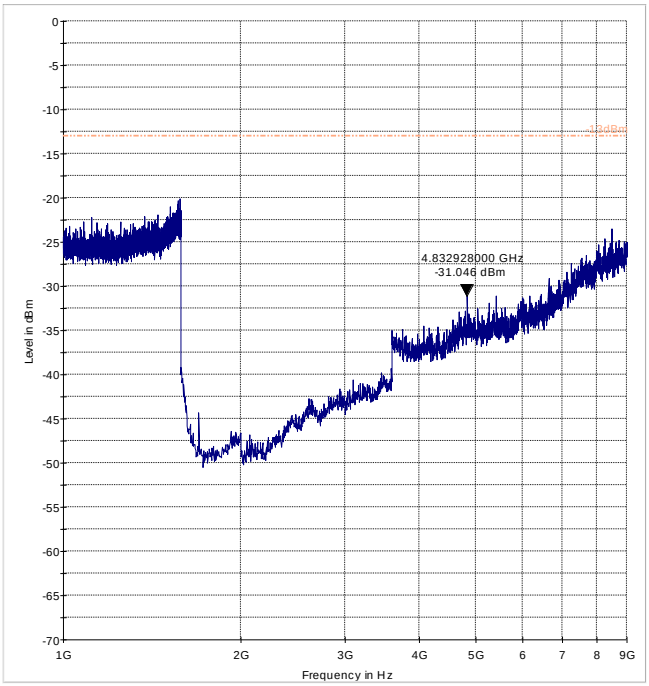


Radiated Spurious Emissions (GSM-850) Tx: High Channel

Test results 30MHz-1GHz

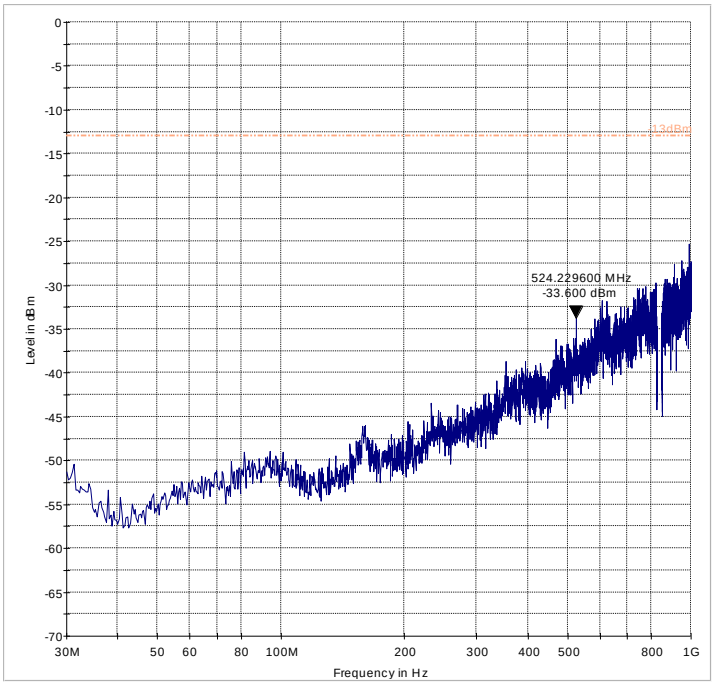


Test results 1GHz-9GHz

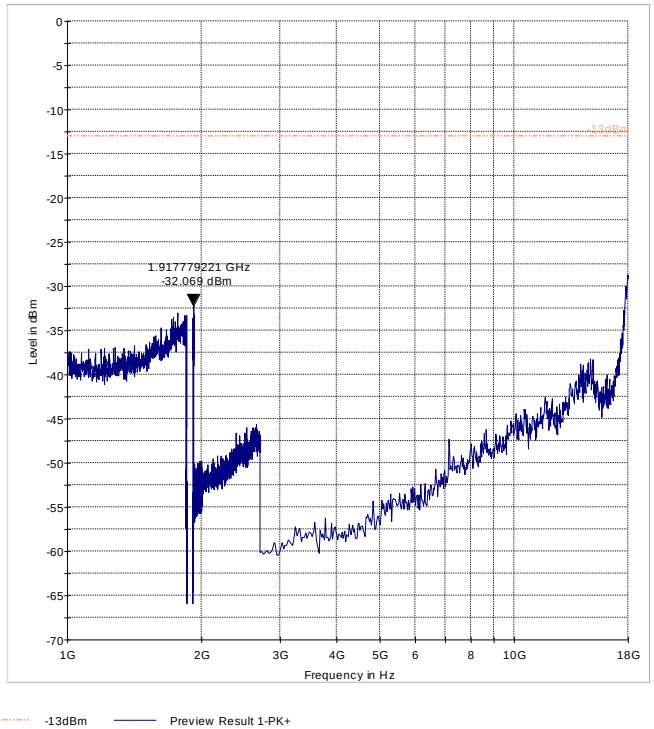


Radiated Spurious Emissions (GSM-1900) Tx: Low Channel

Test results 30MHz-1GHz

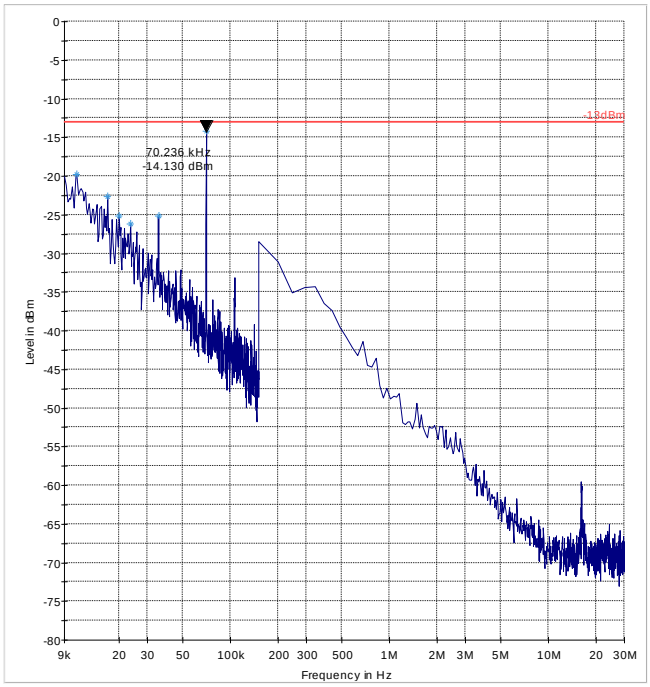


Test results 1GHz-18GHz

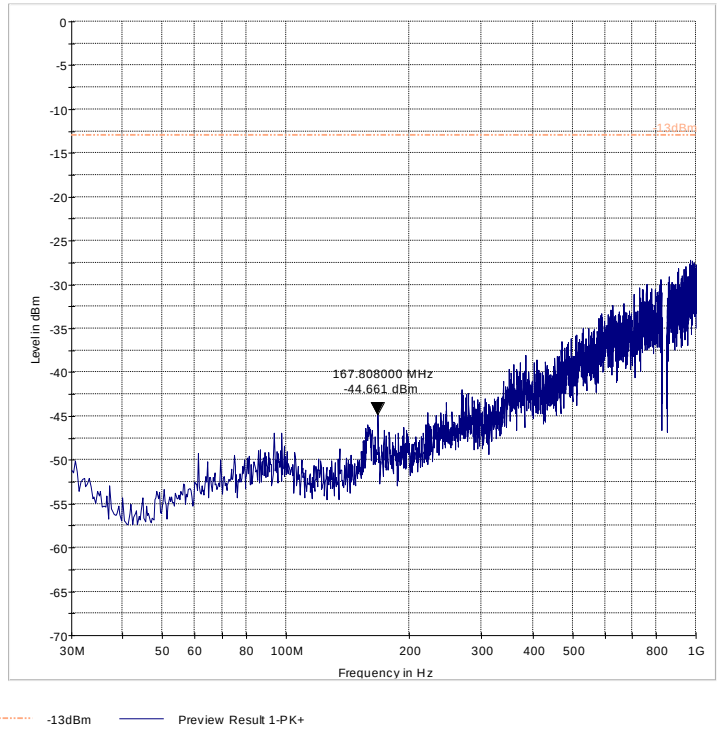


Radiated Spurious Emissions (GSM-1900) Tx Mid Channel

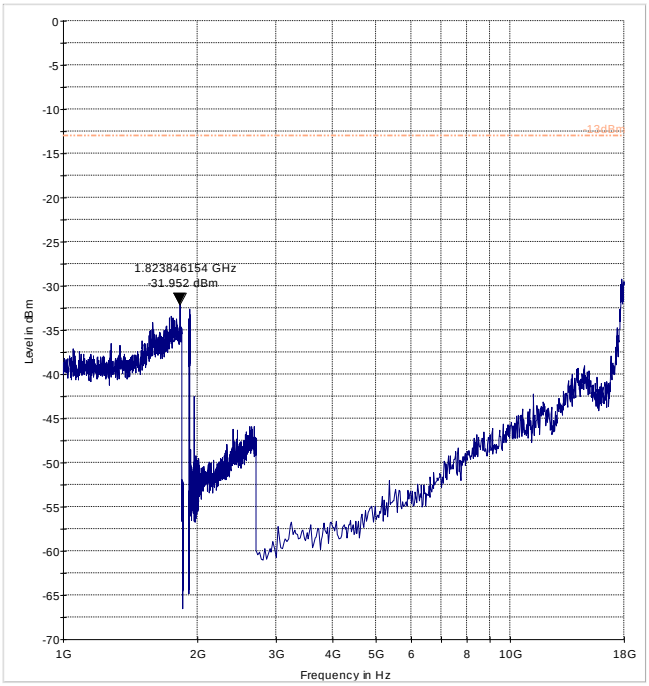
Test results 9KHz - 30MH



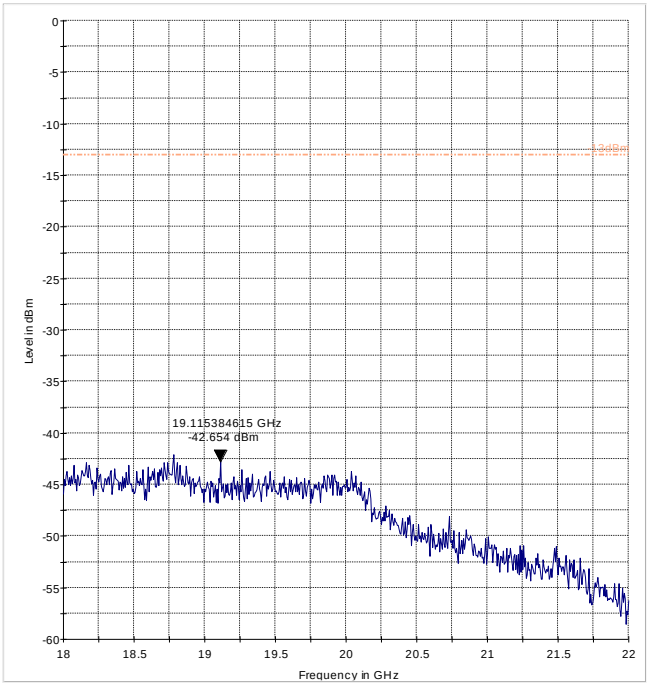
Test results 30MHz-1GHz



Test results 1GHz-18GHz

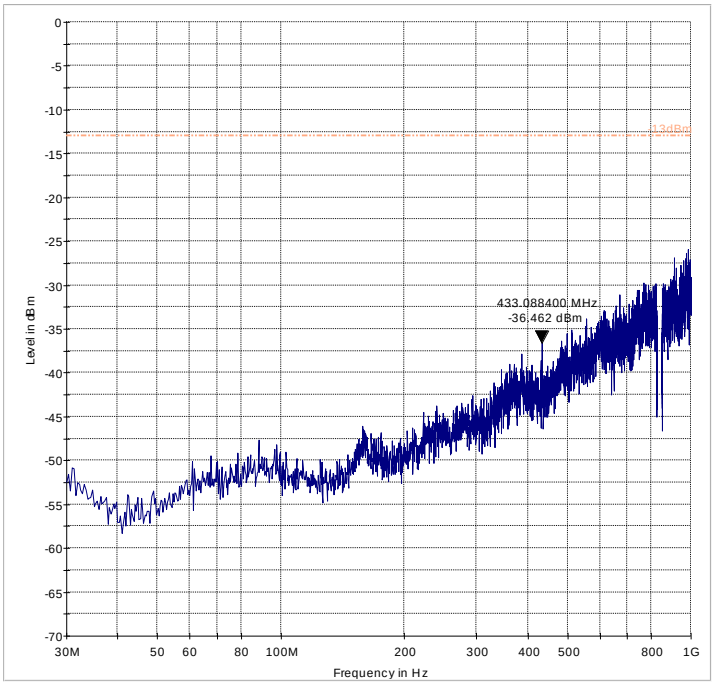


Test results 18GHz-22GHz

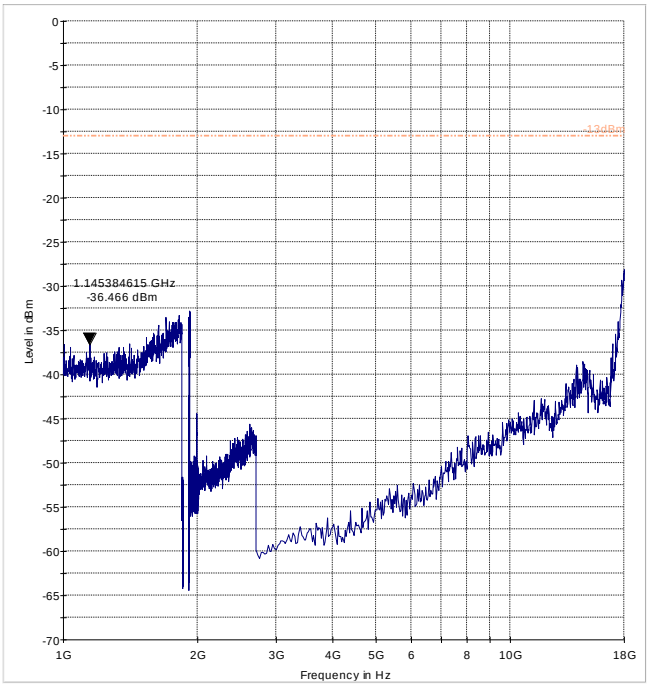


Radiated Spurious Emissions (GSM-1900) Tx: High Channel

Test results 30MHz-1GHz

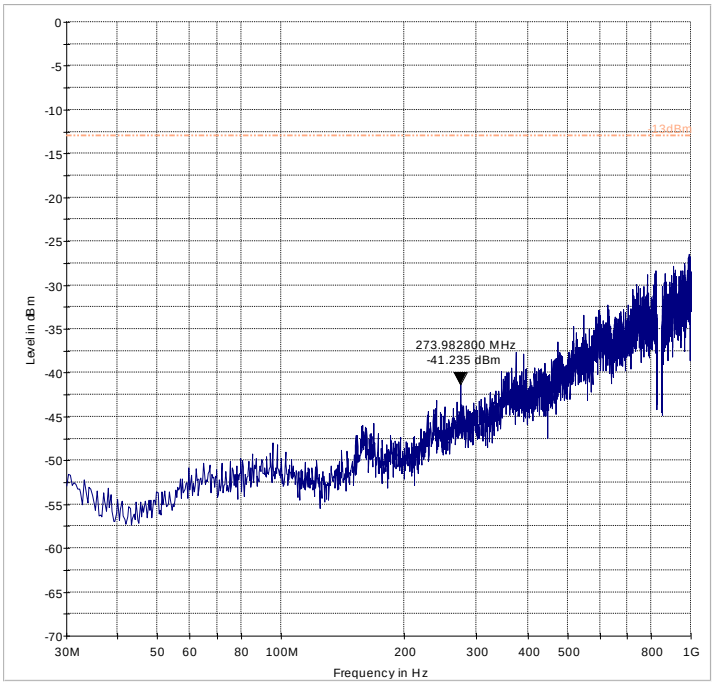


Test results 1GHz-18GHz

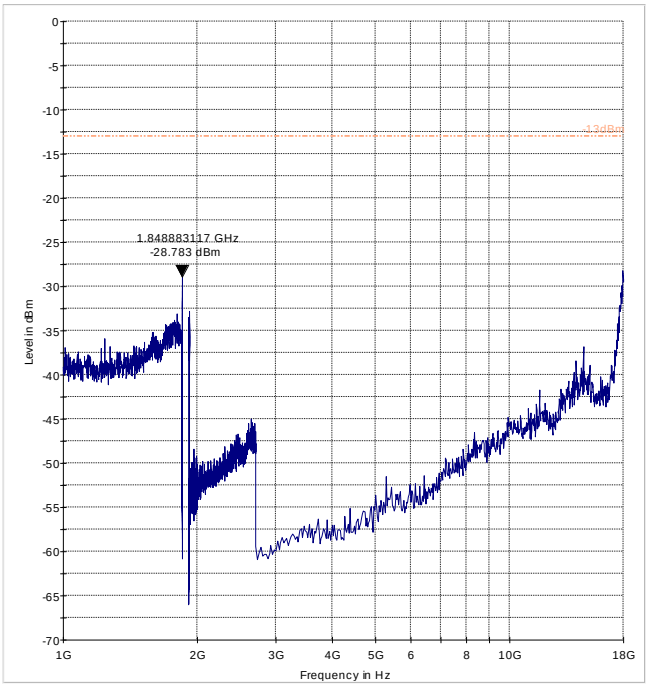


Radiated Spurious Emissions (UMTS FDD II) Tx Low Channel

Test results 30MHz-1GHz

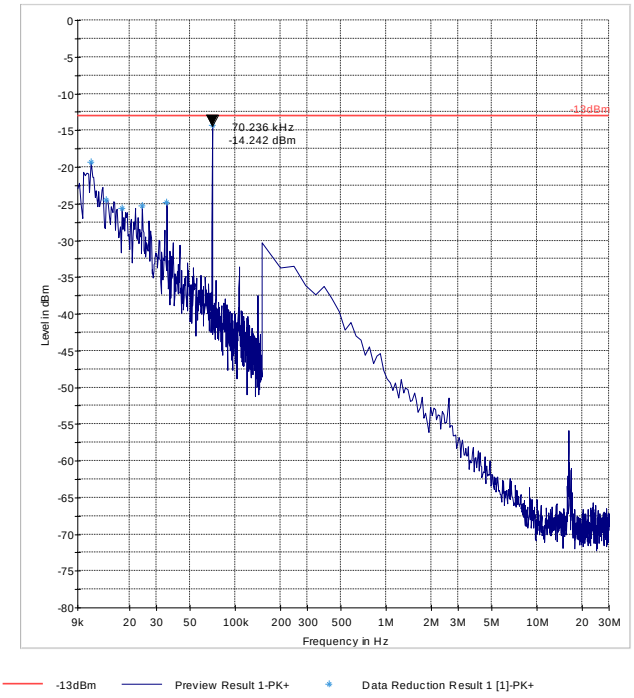


Test results 1GHz - 18GHz

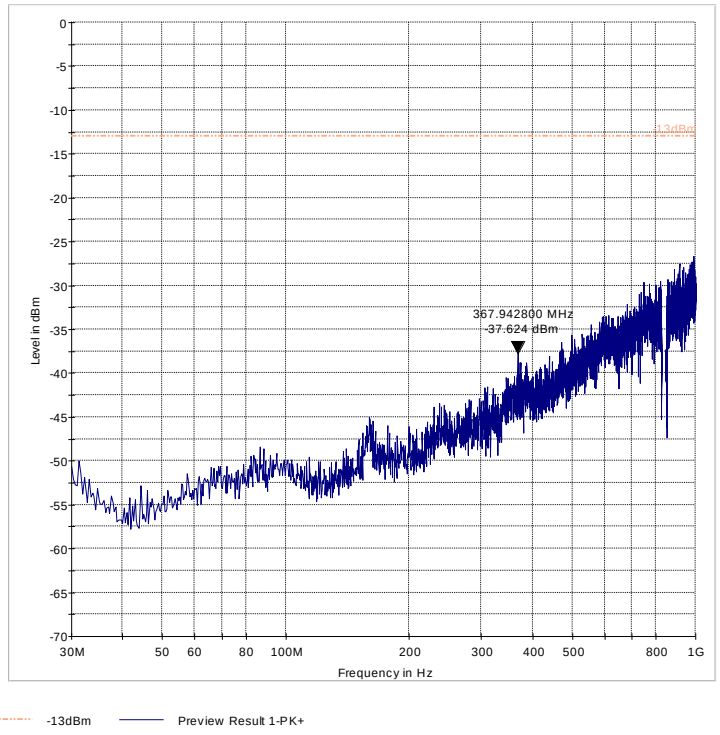


Radiated Spurious Emissions (UMTS FDD II) Mid Channel

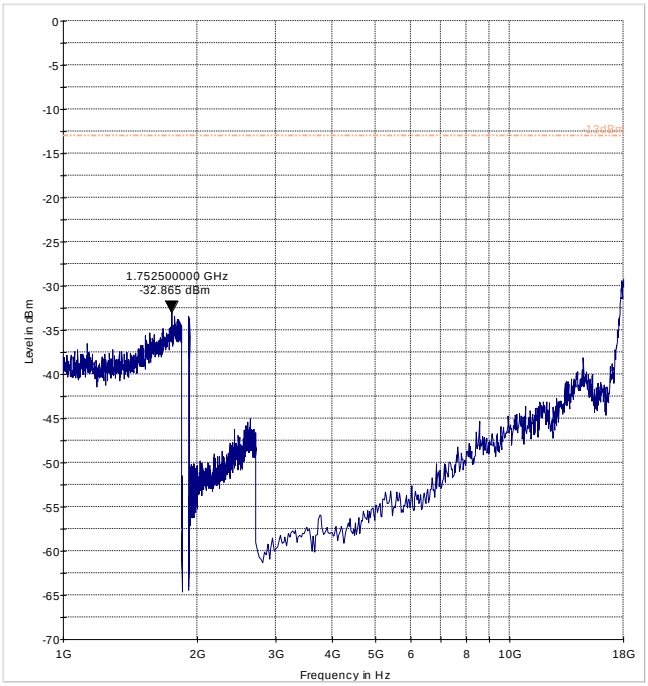
Test results 9KHz-30MHz



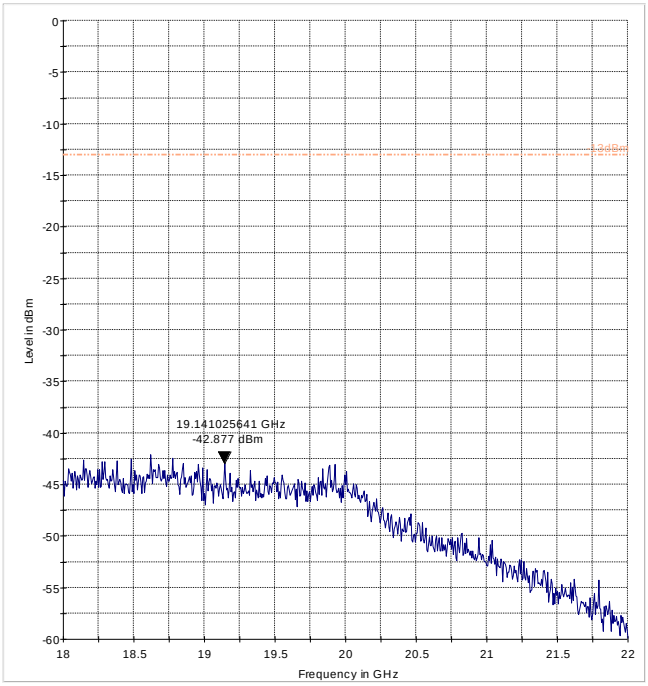
Test results 30MHz-1GHz



Test results 1GHz - 18GHz

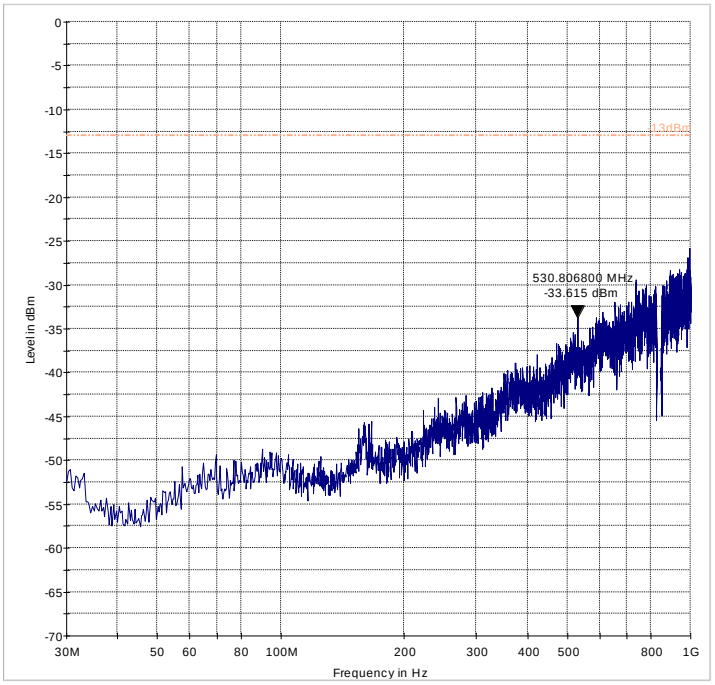


Test results18GHz-22GHz

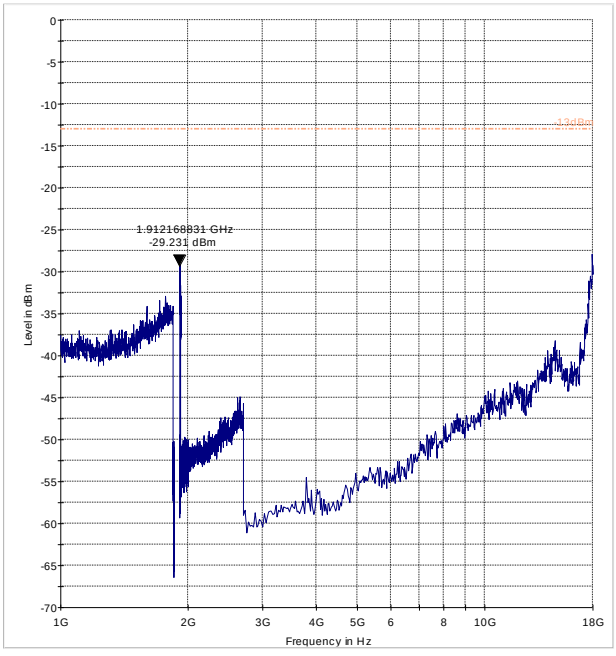


Radiated Spurious Emissions (UMTS FDD II) High Channel

Test results 30MHz-1GHz

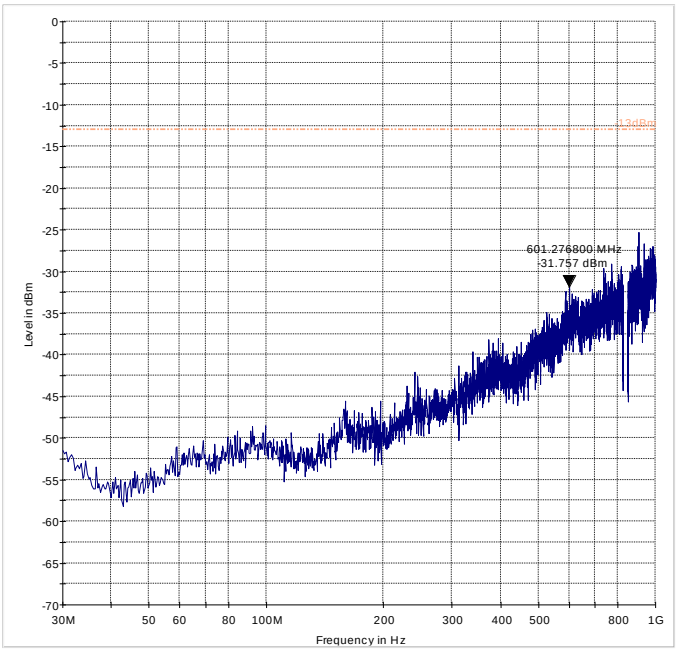


Test results 1GHz - 18GHz

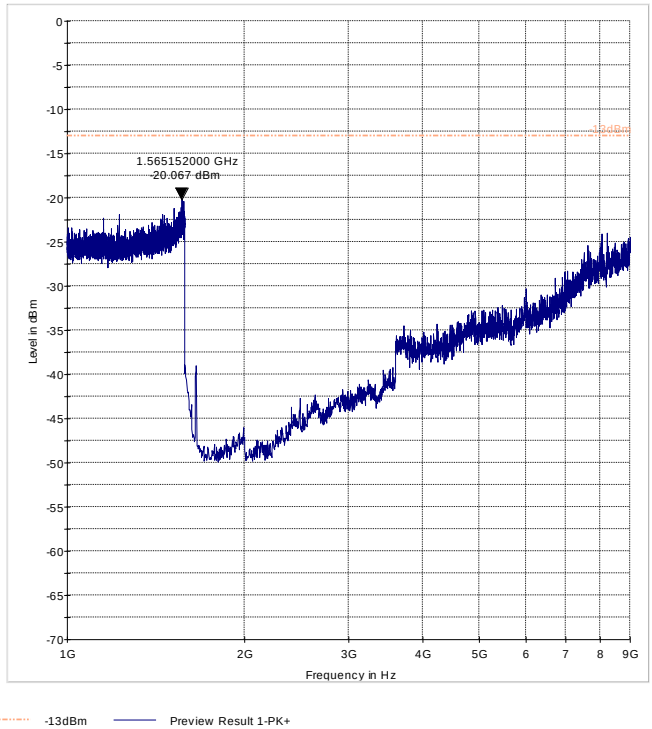


Radiated Spurious Emissions (UMTS FDD V) Tx Low Channel

Test results 30MHz-1GHz

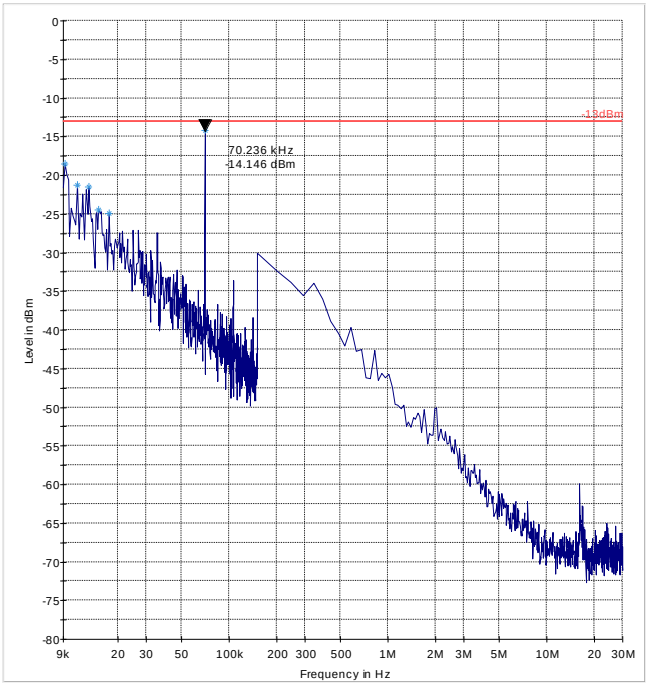


Test results 1GHz - 9GHz

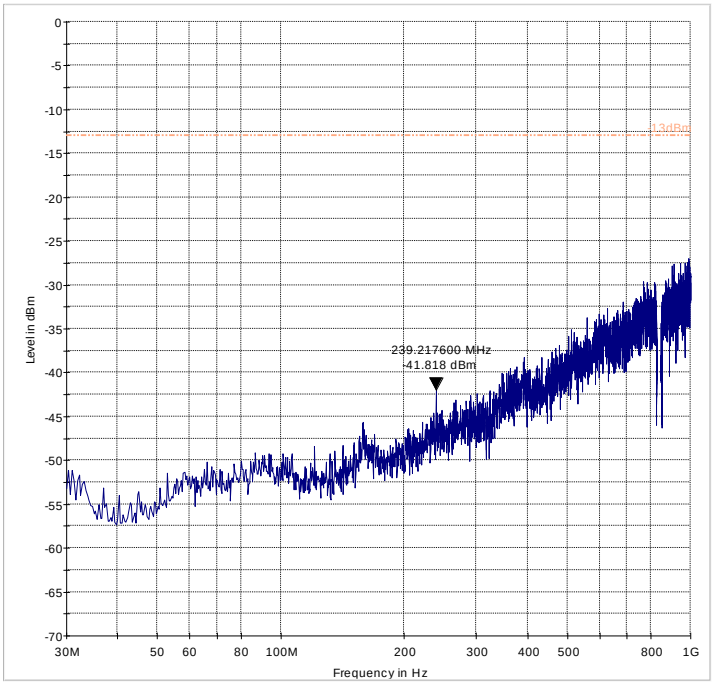


Radiated Spurious Emissions (UMTS FDD V) Mid Channel

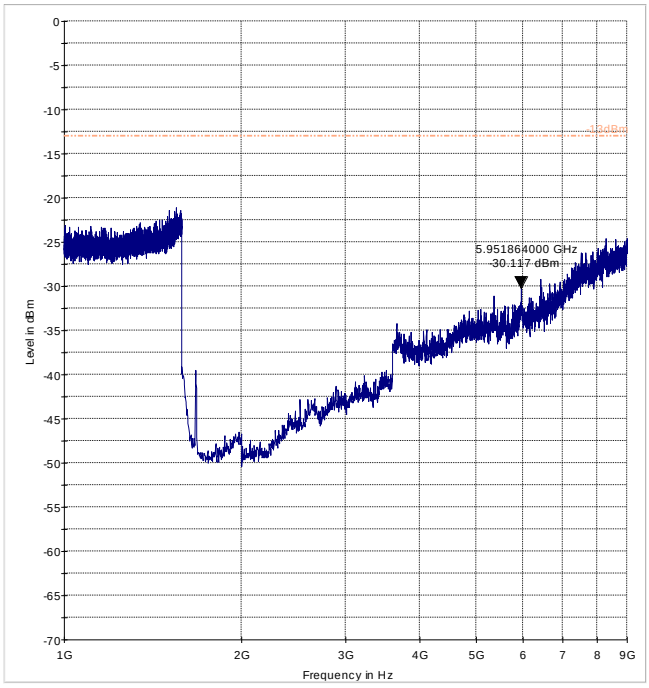
Test results 9KHz-30MHz



Test results 30MHz-1GHz

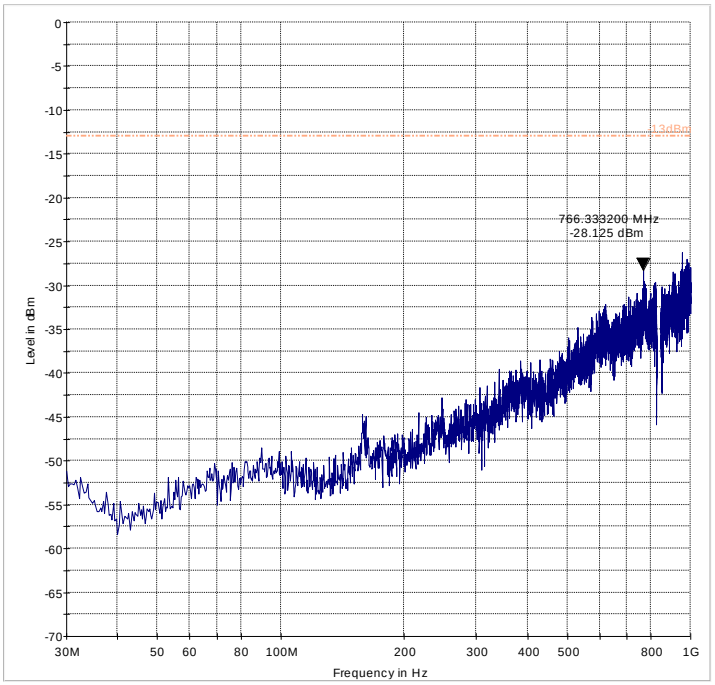


Test results 1GHz - 9GHz

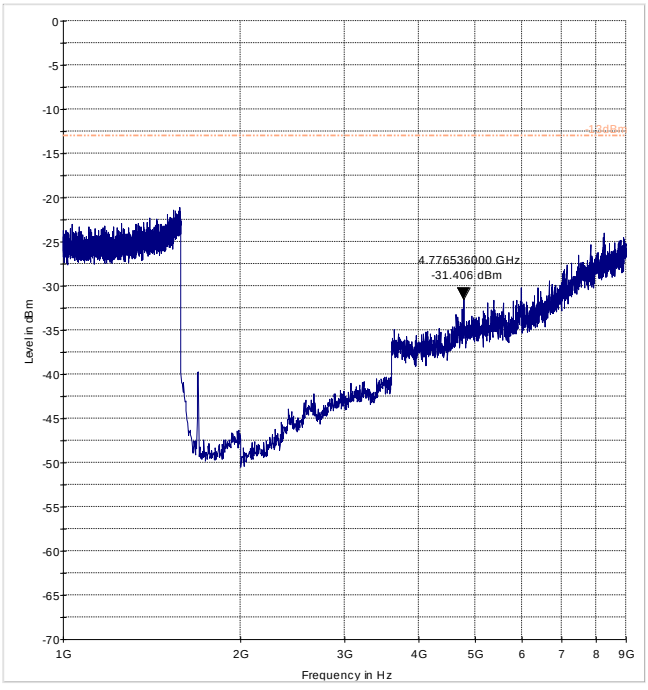


Radiated Spurious Emissions (UMTS FDD V) High Channel

Test results 30MHz-1GHz



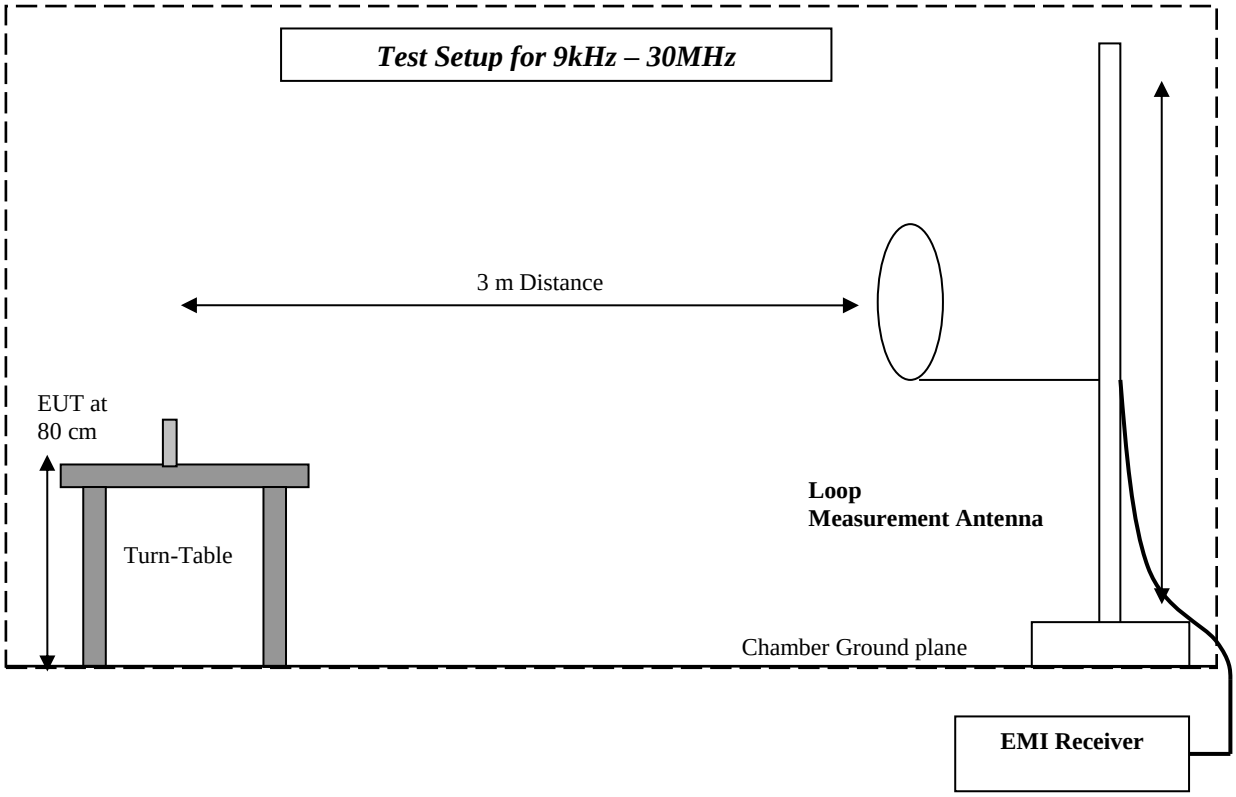
Test results 1GHz - 9GHz

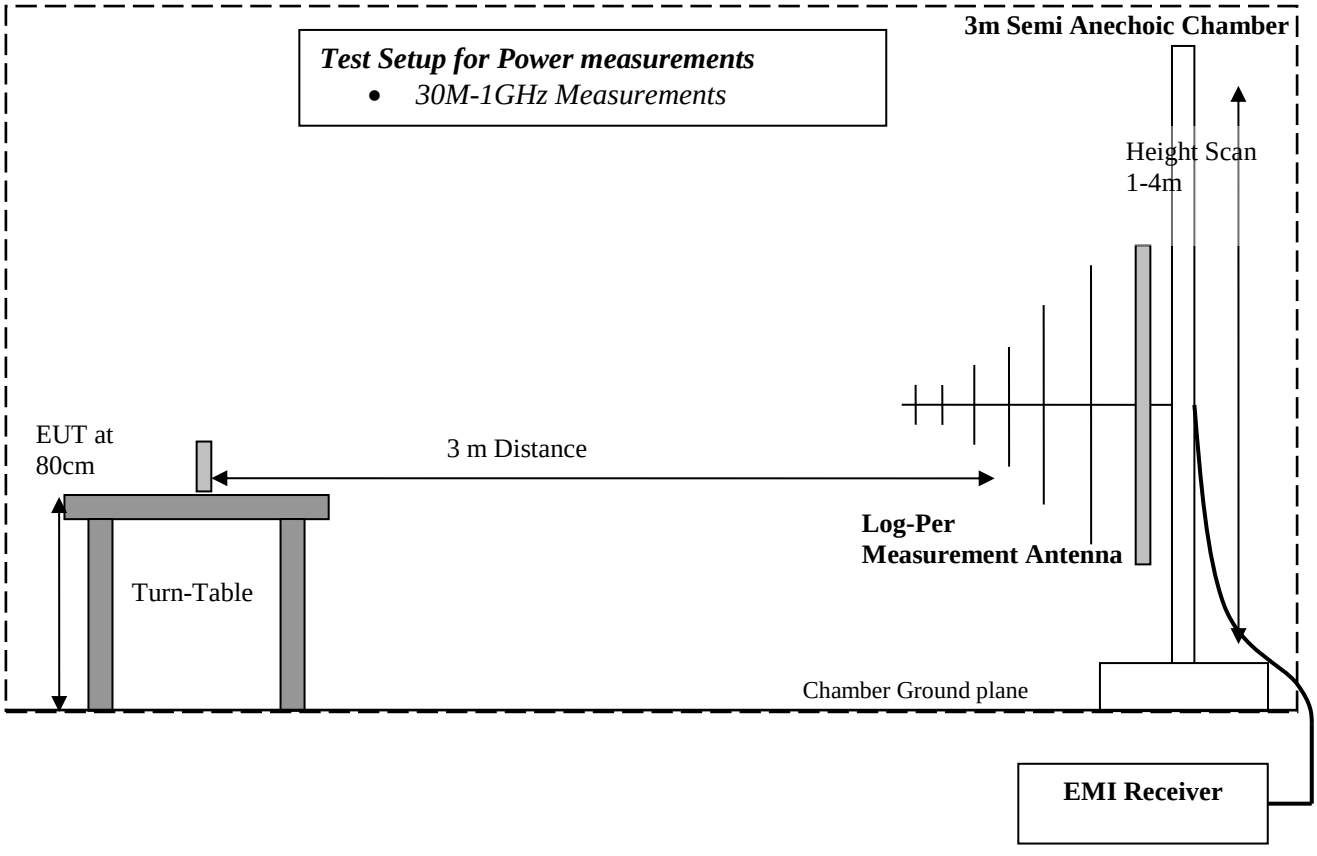


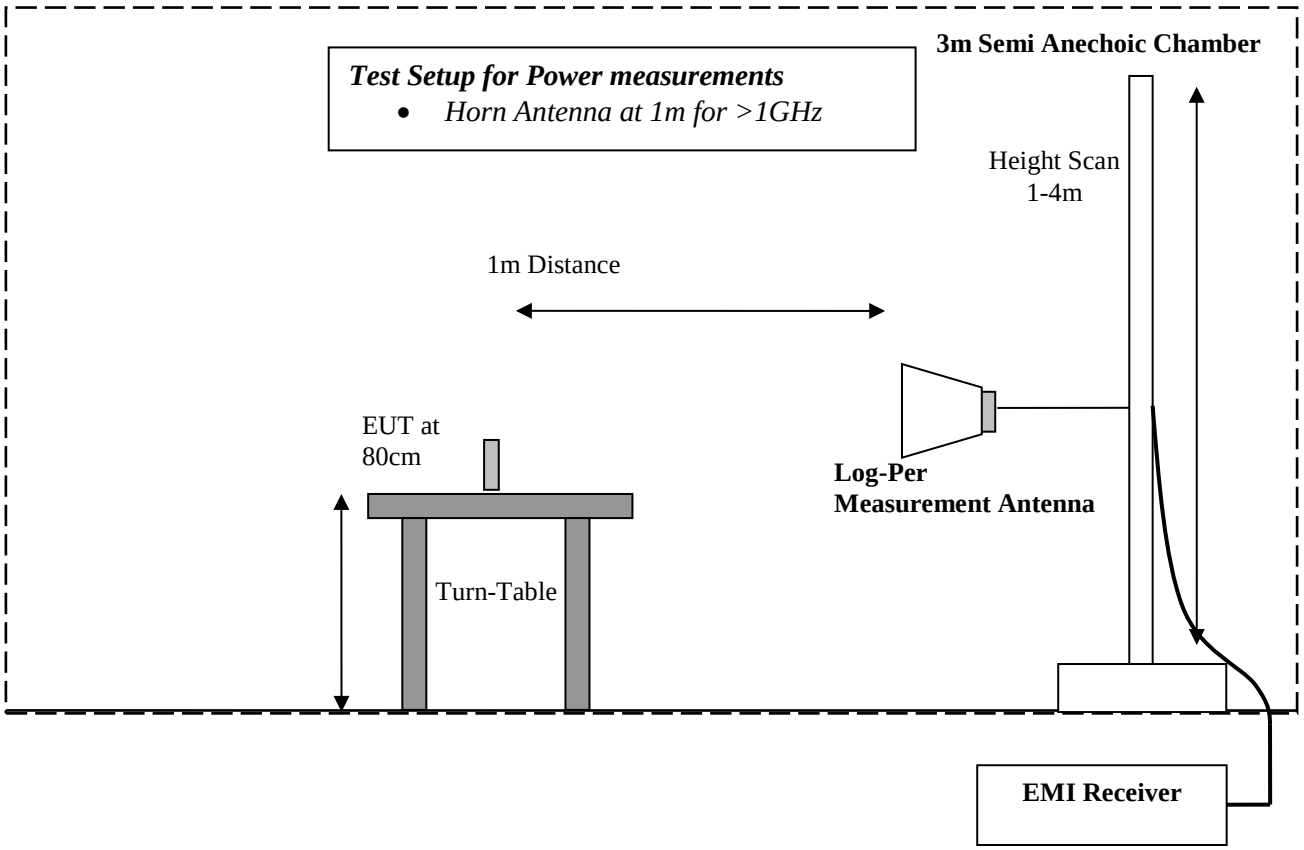
6 Test Equipment and Ancillaries used for tests.

No.	Equipment Name	Manufacturer	Type/model	Serial No.	Cal Date	Cal Interval
3m Semi- Anechoic Chamber:						
	Digital Radio Comm. Tester	Rohde&Schwarz	CMU 200	101821	Jun 2013	2 Years
	EMC32 Measurement Software	Rohde&Schwarz	8.52.0	N/A	N/A	N/A
	Turn table	EMCO	2075	N/A	N/A	N/A
	MAPS Position Controller	ETS Lindgren	2092	0004-1510	N/A	N/A
	Antenna Mast	EMCO	2075	N/A	N/A	N/A
	Relay Switch Unit	Rohde&Schwarz	RSU	338964/001	N/A	N/A
	EMI Receiver/Analyzer	Rohde&Schwarz	ESU 40	100251	Sep 2013	1 Year
	1500MHz HP Filter	Filtek	HP12/1700	14c48	N/A	N/A
	2800 MHz HP Filter	Filtek	HP12/2800	14C47	N/A	N/A
	Pre-Amplifier	Miteq	JS40010260	340125	N/A	N/A
	Binconilog Antenna	EMCO	3141	0005-1186	Apr 2012	3 Years
	Horn Antenna	EMCO	3115	35114	Mar 2012	3 Years
	Horn Antenna	ETS Lindgren	3116	70497	Mar 2012	3 Years
	Spectrum Analyzer	Rohde&Schwarz	FSU	100189	Jun 2013	2 Years
	Loop Antenna 6512	ETS Lindgren	6512	49838	Mar 2014	3 Years
Ancillary equipment						
	Humidity Temperature Logger	Dickson	TM320	03280063	Apr 2013	2 Year
	Communication Antenna	IBP5-900/1940	Kathrein	N/A	N/A	N/A

7 Block Diagrams






3m Semi Anechoic Chamber
Test Setup for Power measurements
Horn Antenna at 1m for >1GHz
Height Scan
1-4m
1m Distance
EUT at
80cm
Log-Per
Measurement Antenna
Turn-Table
EMI Receiver

8 Revision History

Date	Report Name	Changes to Report	Report prepared by
2015-1-21	EMC-3SISE-039-14001_RT_FCC _22_24	1st offical Version	James Donnellan
2015-1-27	EMC-3SISE-039-14001_RT_FCC _22_24_Rev1	Text changes to 5.7	James Donnellan