FCC Part 90 RF TEST REPORT

For

Shenzhen Outfone Technology CO., LTD

Professional & Outdoor Support Phone

Model No.: S15

Additional Model No.: S15T, S15C, S15Q, S15L, S12, S19, Defender, RS61D Ultimate, PROCOM Director, ROVER, TITAN T1

Prepared for	:	Shenzhen Outfone Technology CO., LTD
Address	:	Room 408, Jianda Building, 10th Keyuan Road, Nanshan District, Shenzhen, China
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Date of receipt of test sample	:	December 12, 2013
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	December 12, 2013 – January 15, 2014
Date of Report	:	January 15, 2014

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FCC Part 90 RF TEST REPORT
FCC CFR 47 PART 2 AND PART 90

Report Reference No.	**:**	**LCS131212415TF**
Date of Issue	:	January 15, 2014
Testing Laboratory Name.....	**:**	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address	:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure.....	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name.....	**:**	**Shenzhen Outfone Technology CO., LTD**
Address	:	Room 408, Jianda Building, 10th Keyuan Road, Nanshan District, Shenzhen, China
Test Specification		
Standard	:	TIA-603-D, FCC CFR 47 PART 2 AND PART 90
Test Report Form No.....	**:**	LCSEMC-1.0
TRF Originator	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	:	Dated 2011-03

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Test Item Description.	**:**	**Professional & Outdoor Support Phone**
Trade Mark	:	RANGERFONE
Model/ Type reference.....	:	S15
Ratings	:	DC 3.7V by battery(2600mAh) Recharge Voltage: DC 5V/1A Adapter Parameters: Input AC 100~240V, 50/60Hz 0.15A Output: DC 5V/1A
Result	:	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Leo Lee	Fox Zhang	Gavin Liang
Leo Lee/ File administrators	Fox Zhang/ Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS131212415TF	January 15, 2014 Date of issue

Type / Model.....	: S15
EUT.....	: Professional & Outdoor Support Phone
Applicant.....	**: Shenzhen Outfone Technology CO., LTD**
Address.....	: Room 408, Jianda Building, 10th Keyuan Road, Nanshan District, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: Shenzhen Outfone Technology CO., LTD**
Address.....	: Room 408, Jianda Building, 10th Keyuan Road, Nanshan District, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Factory.....	**: Shenzhen Outfone Technology CO., LTD**
Address.....	: Room 408, Jianda Building, 10th Keyuan Road, Nanshan District, Shenzhen, China
Telephone.....	: /
Fax.....	: /

Test Result	Positive

The test report merely corresponds to the test sample.

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1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Professional & Outdoor Support Phone
Test Model	:	S15
Power Supply	:	DC 3.7V by battery(2600mAh) Recharge Voltage: DC 5V/1A Adapter Parameters: Input AC 100~240V, 50/60Hz 0.15A Output: DC 5V/1A
EUT Support Radios Application	:	GSM/GPRS/EDGE/WCDMA/HSDPA/WIFI/Bluetooth/ GPS(RX)/NFC/Two Way Radio
Operating Frequency	:	400.0250MHz~469.9750MHz
Channel Spacing	:	12.5KHz
Type Of Modulation	:	FM-F3E
Antenna Description	:	External Antenna, 0dBi
RF Output Power	:	28.14dBm For High Power Level 24.91dBm For Low Power Level

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1.2. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
Shenzhen cyclelong power-tech Co., ltd	Adapter	GAC-03-US	--	VOC

1.3. External I/O Cable

I/O Port Description	Quantity	Cable
USB Port	1	1.0m, unshielded
Earphone Port	1	1.2m, unshielded

1.4. Description of Test Facility

Site Description EMC Lab. : Accredited by CNAS, June 04, 2010

The Certificate Registration Number. is L4595.

Accredited by FCC, July 14, 2011

The Certificate Registration Number. is 899208.

Accredited by Industry Canada, May. 02, 2011

The Certificate Registration Number. is 9642A-1

1.5. Statement of The Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	±3.10dB	(1)
		30MHz~200MHz	±2.96dB	(1)
		200MHz~1000MHz	±3.10dB	(1)
		1GHz~26.5GHz	±3.80dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	±1.63dB	(1)
Power disturbance	:	30MHz~300MHz	±1.60dB	(1)

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

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1.7. Test environment

All tests were performed under the following environmental conditions:

Condition	**Minimum value**	**Maximum value**
Barometric pressure	86kPa	106kPa
Temperature	15°C	30°C
Relative Humidity	20 %	75 %
Power supply range	±5% of rated voltages	

2. TEST METHODOLOGY

All tests and measurements indicated in this document were performed in accordance with FCC CFR 47 part 2 and part 90.

Applicable Standards: TIA-603-D, ANSI C63.4-2003.The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen LCS Compliance Testing Laboratory Ltd..

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 that intends to maximize its emission characteristics in a continuous normal application.

2.2. Objective

This type approval report is prepared on behalf of **Shenzhen Outfone Technology CO., LTD** in accordance with FCC CFR 47 part 2 and part 90.

The objective is to determine compliance with FCC rules.

2.3. General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4

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2.4. Test Mode

Test Frequency List:

Test Channel	Frequency(MHz)	Power Level	
Low	400.0250	Low Level	High Level
Middle	435.0000	Low Level	High Level
High	469.9750	Low Level	High Level

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.

The EUT received DC 3.7V power by battery which is received DC 5V/1A charging power from the adapter.

All test modes were tested, only the result of the worst case was recorded in the report.

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3. SYSTEM TEST CONFIGURATION

3.1. Justification

The EUT had been tested under operating condition. EUT staying in continuous transmitting mode.

3.2. EUT Exercise Software

N/A.

3.3. Special Accessories

N/A.

3.4. Block Diagram/Schematics

Please refer to the related document

3.5. Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6. Test Setup

Please refer to the test setup photo.

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4. SUMMARY OF TEST RESULTS

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

No.	Section in CFR 47	Description	Result
1	2.1046, 90.205	RF Output Power	Compliant
2	2.1047, 90.207	Modulation Characteristics	Compliant
3	2.1049, 90.209, 90.210	Occupied Bandwidth And Emission Mask	Compliant
4	2.1051, 90.210	Spurious Emission at Antenna Terminal	Compliant
5	2.1053, 90.210	Radiated Spurious Emission	Compliant
6	2.1055, 90.213	Frequency Stability	Compliant
7	90.214	Transient Frequency Behavior	Compliant

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5. TEST RESUL

5.1. RF OUTPUT POWER AND SPURIOUS EMISSION AT ANTENNA TERMINAL

5.1.1. Standard Applicable

Per FCC §2.1046 and §90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area.

Per FCC §2.1051 and §90.210: For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

1) For any frequency removed from the center of the authorized bandwidth f0 to 5.625 kHz removed from f0, 0 dB.

2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.626 kHz but no more than 12.5 kHz, at least 7.27 (fd –2.88 kHz) dB.

3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz at least: 50+10logP=50+10log (P) dB

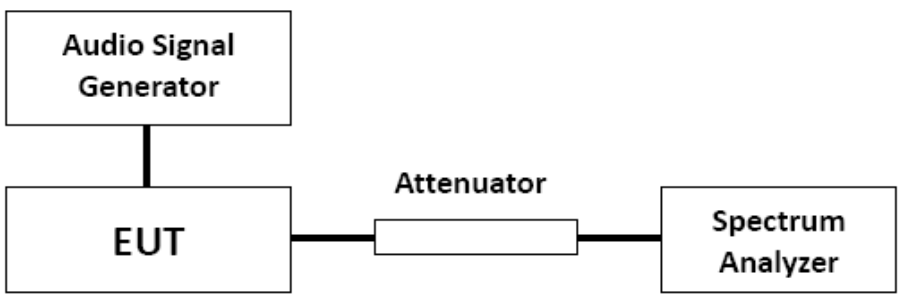
5.1.2. Measuring Instruments

Please refer to section 6 of equipments list in this report.

5.1.3. Test Procedures

1) For RF Output Power Measurement: The RF output of the EUT was connected to a spectrum analyzer through an appropriate attenuator. Measure and record the transmitter output power, using a measurement (resolution) bandwidth at least two to three times the occupied bandwidth for transmitters equipped to capture the true peak emission of the equipment under test.

2) For Spurious Emission At Antenna Measurement: The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



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5.1.4. Test Results of RF Output Power

Temperature	25℃	Humidity	60%
ATM Pressure:	101.4kPa	Test Engineer	Leo

Frequency (MHz)	RF Output Power (dBm)	RF Output Power (W)	Power Level
400.0250	24.58	0.2871	Low
400.0250	28.14	0.6516	High
435.0000	24.91	0.3097	Low
435.0000	28.05	0.6383	High
469.9750	24.58	0.2871	Low
469.9750	27.83	0.6067	High

Test Result: Pass

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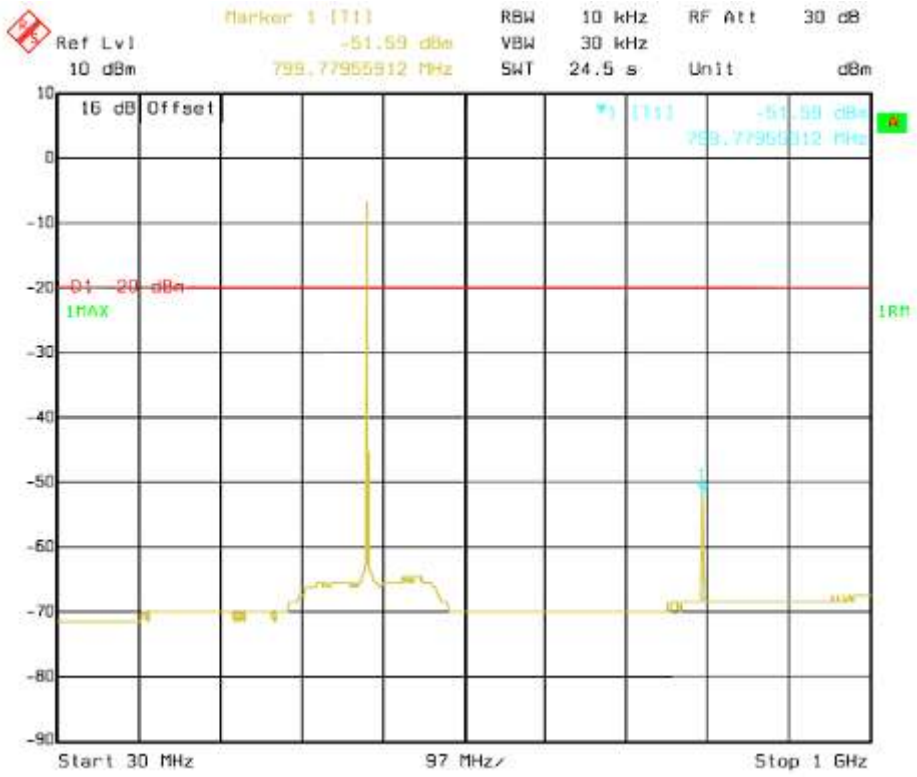
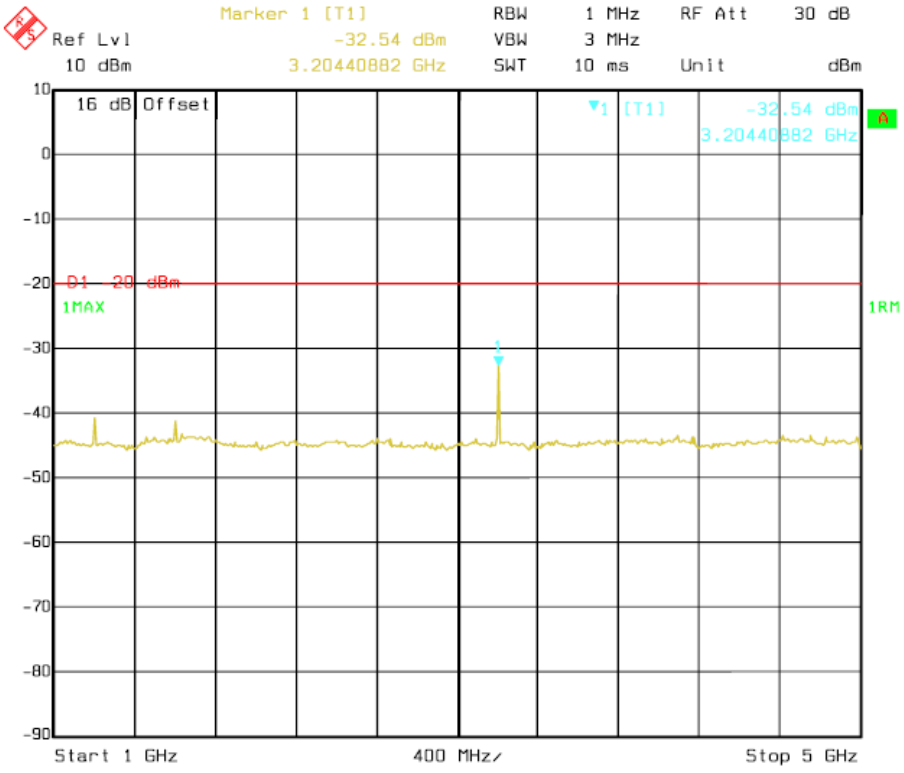
5.1.5. Test Results of Spurious Emission At Antenna

The Worst Test Plots For Low Channel, High Power Level





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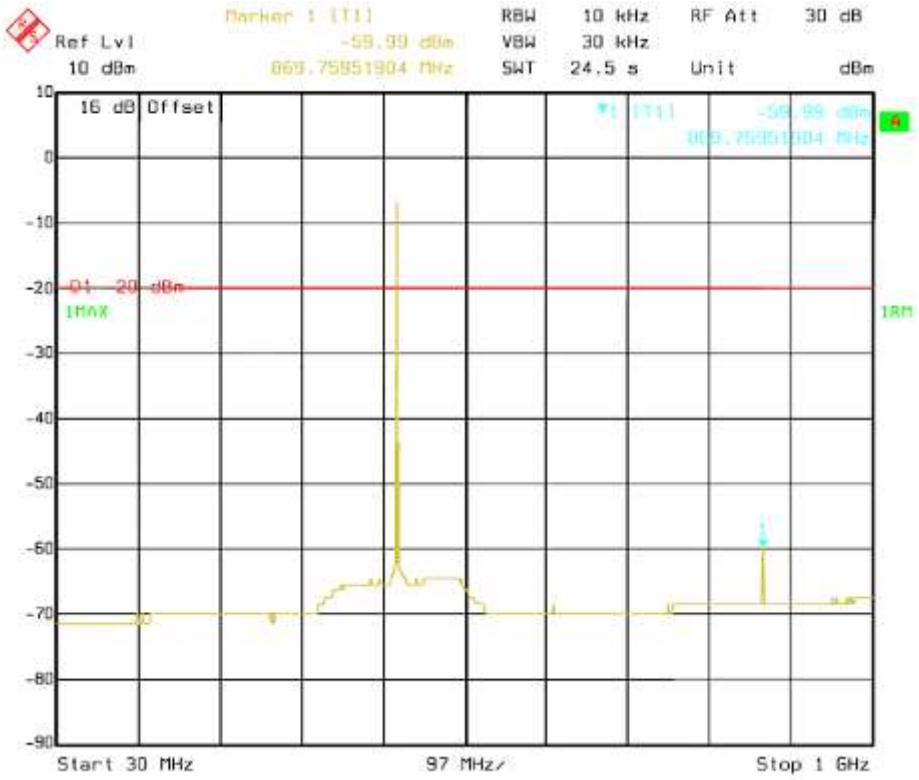
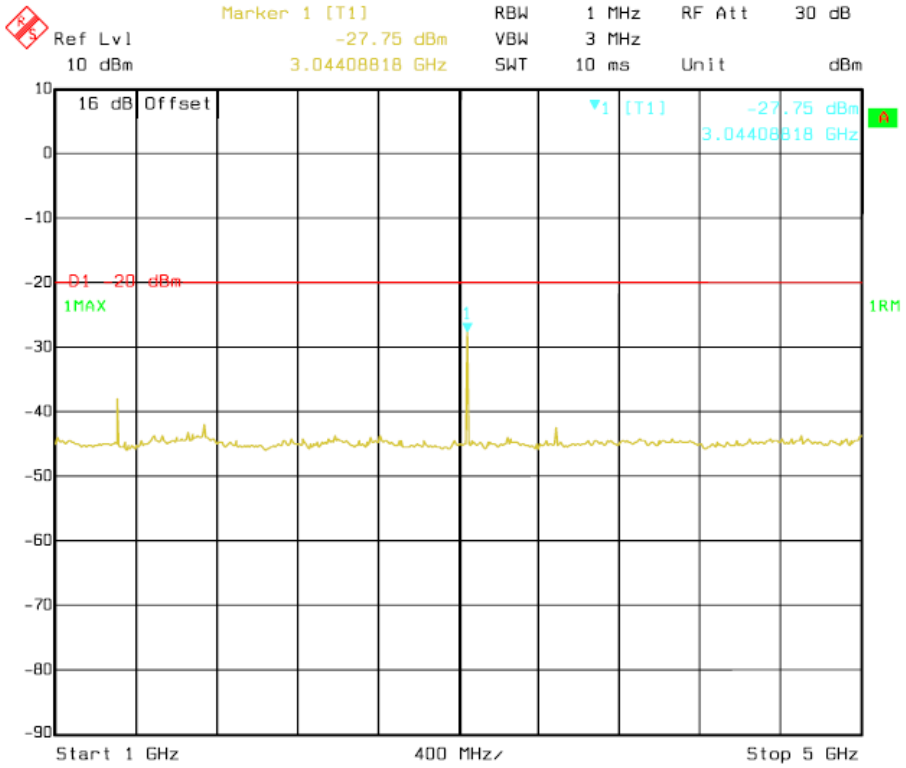
The Worst Test Plots For Middle Channel, High Power Level





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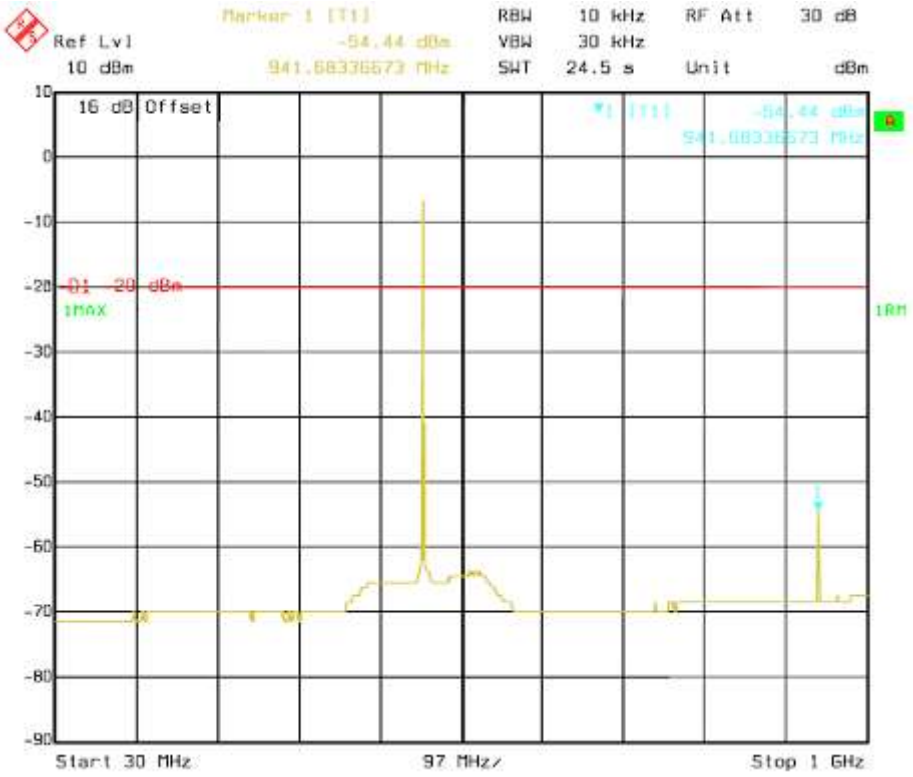
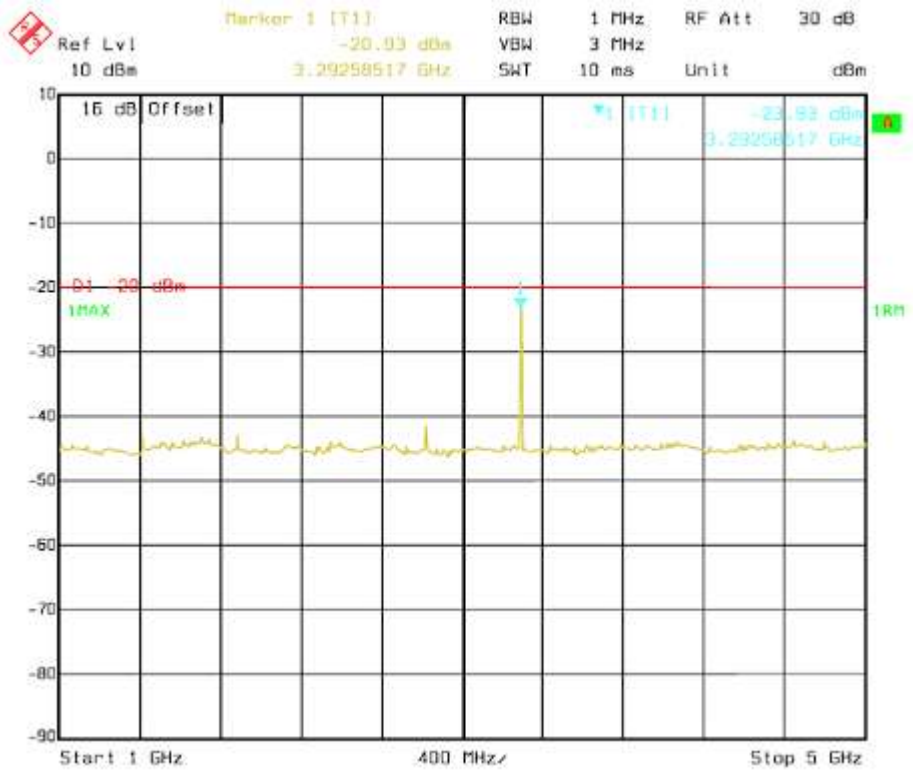
The Worst Test Plots For High Channel, High Power Level





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5.2. Modulation Characteristics

5.2.1. Standard Applicable

Per FCC§2.1047 & §90.207:

Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.

Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

5.2.2. Measuring Instruments

Please refer to section 6 of equipments list in this report.

5.2.3. Test Procedures

5.2.3.1. Modulation Limit

1) Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1KHz using this level as a reference (0dB) and vary the input level from –20 to +20dB. Record the frequency deviation obtained as a function of the input level.

2) Repeat step 1 with input frequency changing to 300, 1000 and 3000Hz in sequence.

5.2.3.2. Audio Frequency Response

1) Configure the EUT as shown in figure 1.

2) Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0dB).

3) Vary the Audio frequency from 100 Hz to 3 KHz and record the frequency deviation.

4) Audio Frequency Response =20log10 (Deviation of test frequency/Deviation of 1 KHz reference).

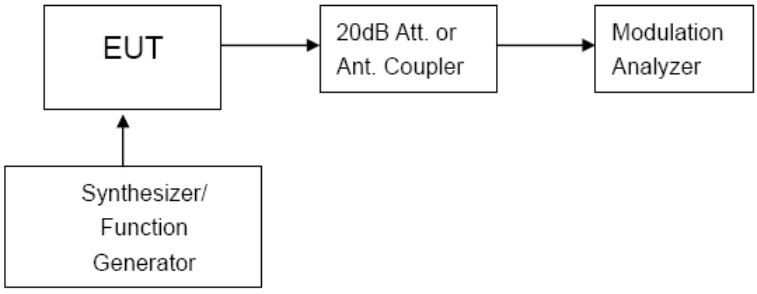


Figure 1: Modulation characteristic measurement configuration

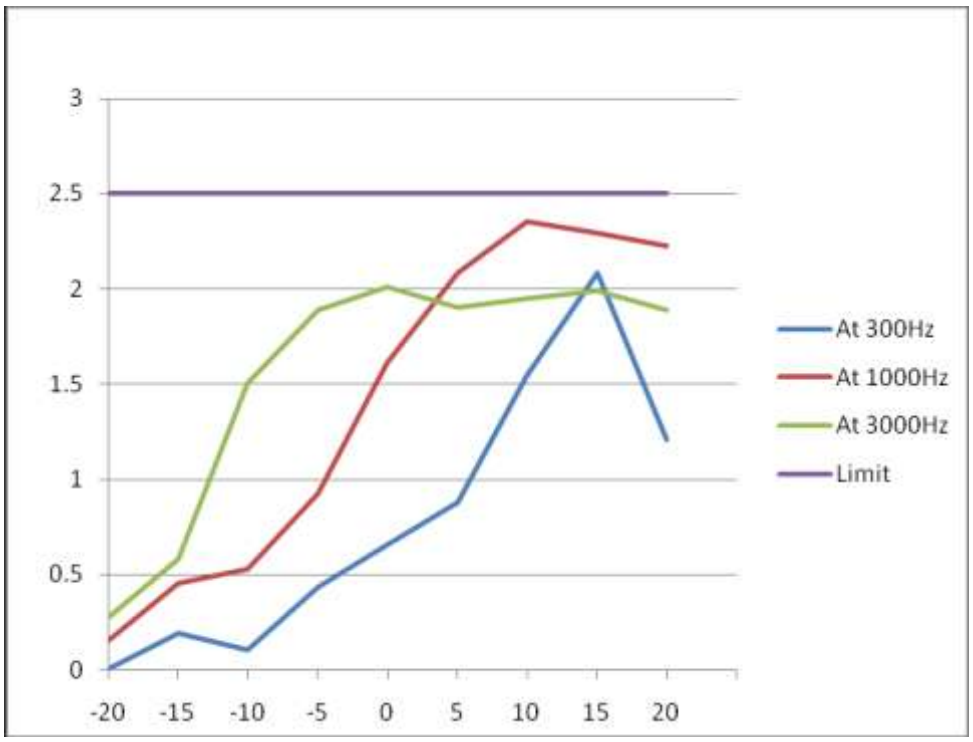
5.2.4. Test Results

Temperature	25℃	Humidity	60%
ATM Pressure:	101.4kPa	Test Engineer	Leo

The Worst Test Result of Modulation Limit

Middle Channel- Low Power Level:

Modulation Level (dB)	Peak Freq. Deviation (KHz) At 300Hz	Peak Freq. Deviation (KHz) At 1000Hz	Peak Freq. Deviation (KHz) At 3000Hz	FCC Limit (KHz)
-20	0.001	0.151	0.270	2.5
-15	0.189	0.453	0.581	2.5
-10	0.103	0.531	1.505	2.5
-5	0.432	0.929	1.89	2.5
0	0.653	1.612	2.010	2.5
+5	0.874	2.088	1.901	2.5
+10	1.541	2.356	1.947	2.5
+15	2.082	2.292	1.991	2.5
+20	1.207	2.228	1.889	2.5



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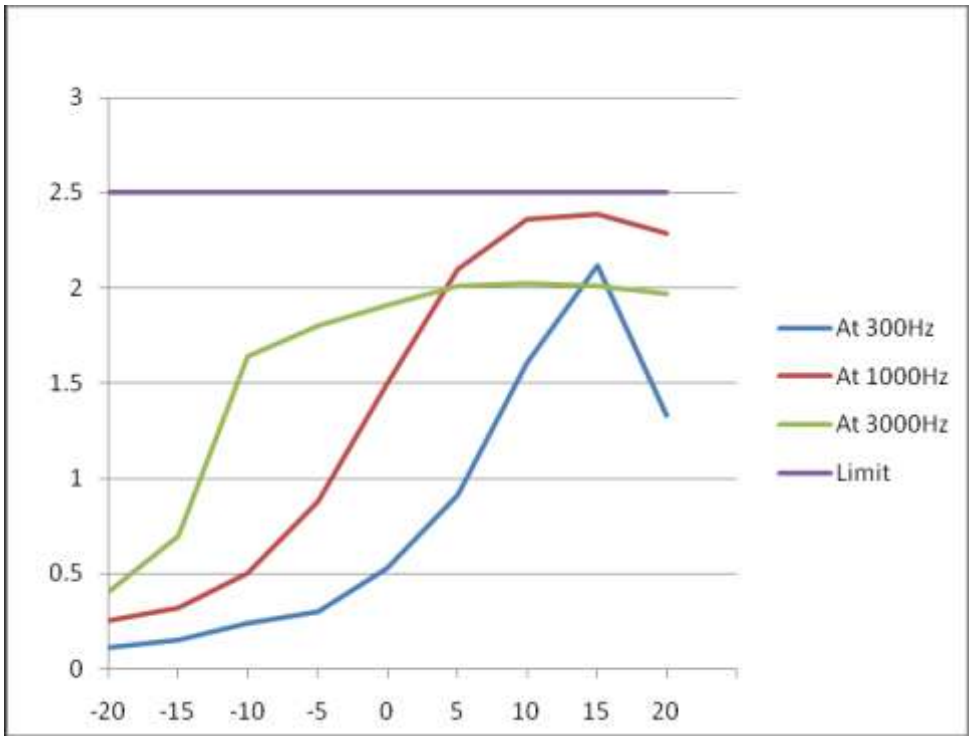
Middle Channel- High Power Level:

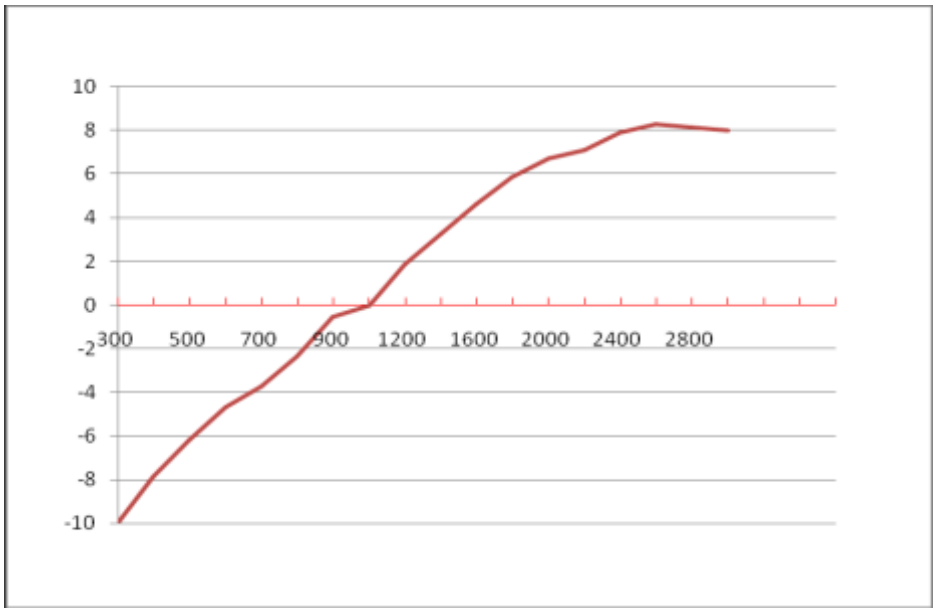
Modulation Level (dB)	Peak Freq. Deviation (KHz) At 300Hz	Peak Freq. Deviation (KHz) At 1000Hz	Peak Freq. Deviation (KHz) At 3000Hz	FCC Limit (KHz)
-20	0.112	0.251	0.399	2.5
-15	0.151	0.319	0.692	2.5
-10	0.239	0.5	1.64	2.5
-5	0.298	0.879	1.799	2.5
0	0.528	1.502	1.909	2.5
+5	0.91	2.101	2.009	2.5
+10	1.609	2.362	2.021	2.5
+15	2.118	2.389	2.008	2.5
+20	1.329	2.288	1.969	2.5



The Worst Test Result of Audio Frequency Response

Middle Channel- Low Power Level:

Frequency(Hz)	Response Attenuation (dB)
300	-10.00
400	-7.83
500	-6.19
600	-4.68
700	-3.73
800	-2.33
900	-0.52
1000	0.00
1200	1.89
1400	3.25
1600	4.62
1800	5.86
2000	6.73
2200	7.09
2400	7.89
2600	8.28
2800	8.16
3000	8.00



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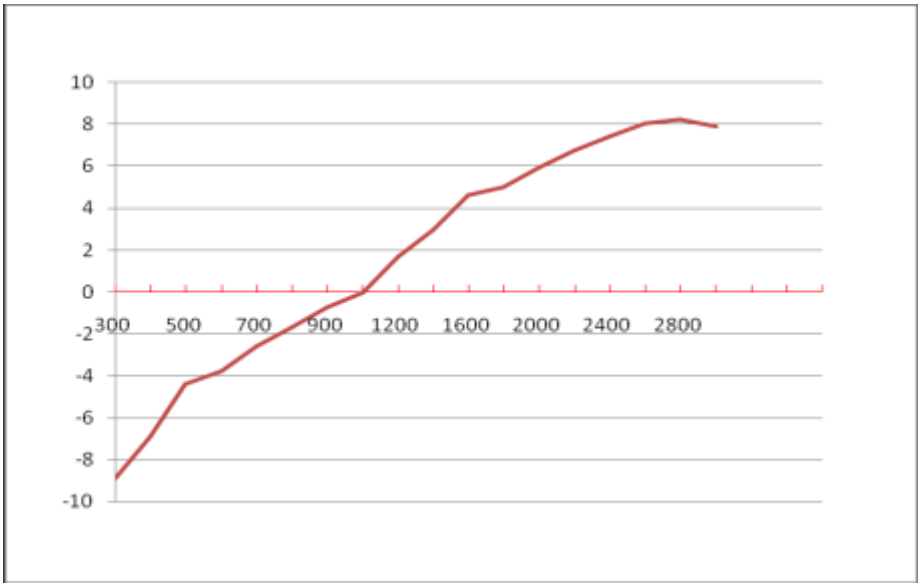
Middle Channel- High Power Level:

Frequency(Hz)	Response Attenuation (dB)
300	-8.91
400	-6.92
500	-4.40
600	-3.78
700	-2.56
800	-1.68
900	-0.73
1000	0.00
1200	1.68
1400	2.96
1600	4.61
1800	5.03
2000	5.98
2200	6.75
2400	7.45
2600	8.03
2800	8.22
3000	7.89



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5.3. Occupied Bandwidth And Emission Mask

5.3.1. Standard Applicable

Per FCC §2.1049, §90.209 and §90.210:

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

1) For any frequency removed from the center of the authorized bandwidth f0 to 5.625 kHz removed from f0, 0dB.
2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.626 kHz but no more than 12.5 kHz, at least 7.27 (fd –2.88 kHz) dB.
3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz at least: 50+10logP

5.3.2. Measuring Instruments

Please refer to section 6 of equipments list in this report.

5.3.3. Test Procedures

1) Setup the configuration per the following setup block diagram.
2) The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
3) The resolution bandwidth of the spectrum analyzer was set at 300 Hz and the spectrum was recorded in the frequency band ±35 kHz from the carrier frequency.

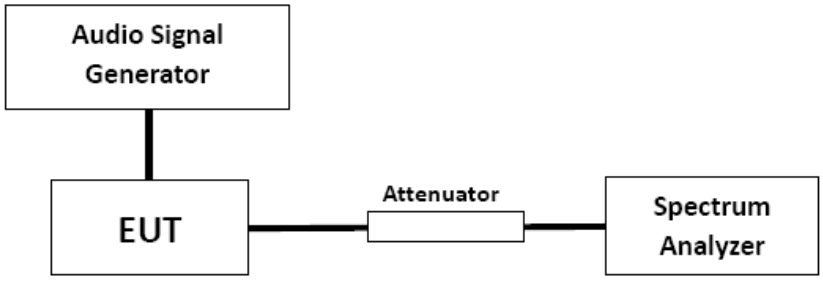


Fig. 1 Test Configuration

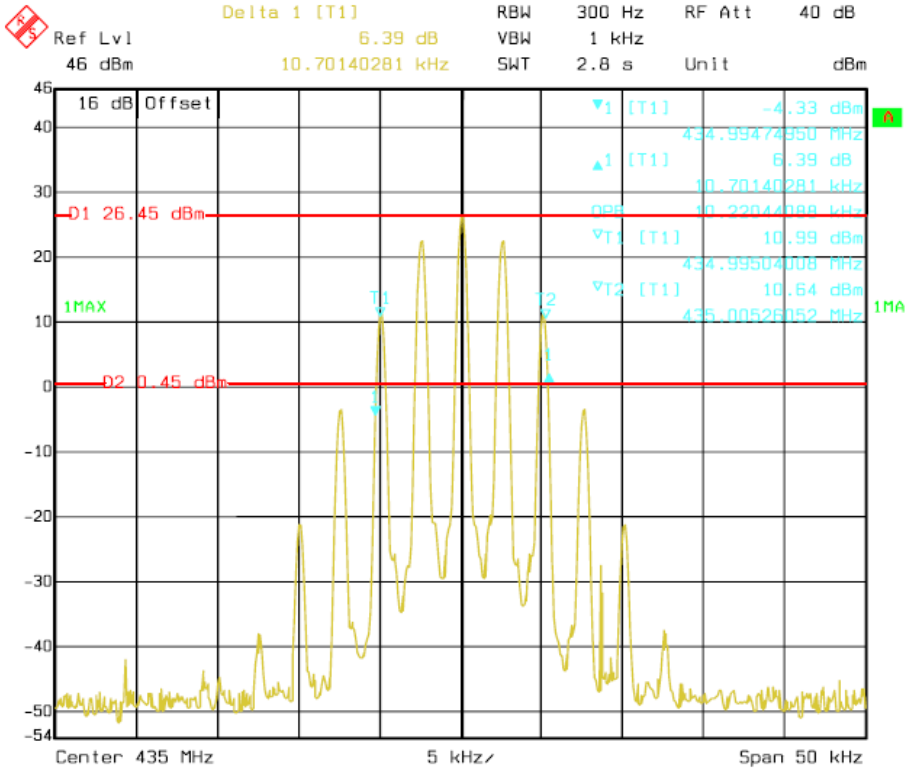
5.3.4. Test Results

Temperature	25℃	Humidity	60%
ATM Pressure:	101.4kPa	Test Engineer	Leo

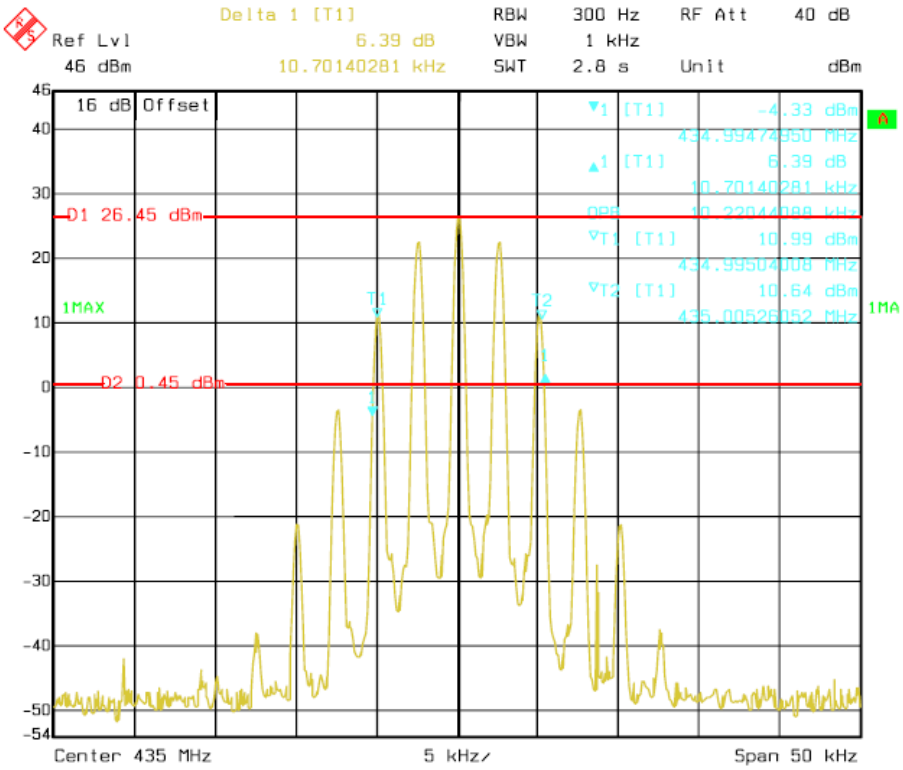
The Worst Test Result for Middle Channel:

Modulation	Frequency (MHz)	99% Occupied Bandwidth (KHz)	26dB Bandwidth (KHz)
FM	435.0000	10.22	10.70

The worst test plots(Occupied Bandwidth) as follow:
Middle Channel-High Power Level:



The worst test plots(Emission Mask) as follow:
Middle Channel-High Power Level:



5.4. Radiated Spurious Emission

5.4.1. Standard Applicable

According to the TIA/EIA 603 test method, and according to Section 90.210, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with 12.5 KHz channel bandwidth:

1) On any frequency removed from the center of the authorized bandwidth fo to 5.625 KHz removed from fo: Zero dB

2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency(fd in KHz)fo of more than 5.625 KHz but no more than 12.5 KHz: At least 7.27(fd-2.88 KHz) dB

3) On any frequency removed from the center of the authorized bandwidth by a displacement Frequency (fd in KHz)fo of more than 12.5 KHz: At least 50+10 log(P) dB or 70 dB, which ever is lesser attenuation.

5.4.2. Measuring Instruments

Please refer to section 6 of equipments list in this report.

5.4.3. Test Procedures

1) The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

2) The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT .The test was performed by placing the EUT on 3-orthogonal axis.

3) The frequency range up to teeth harmonic of the fundamental frequency was investigated.

4) Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

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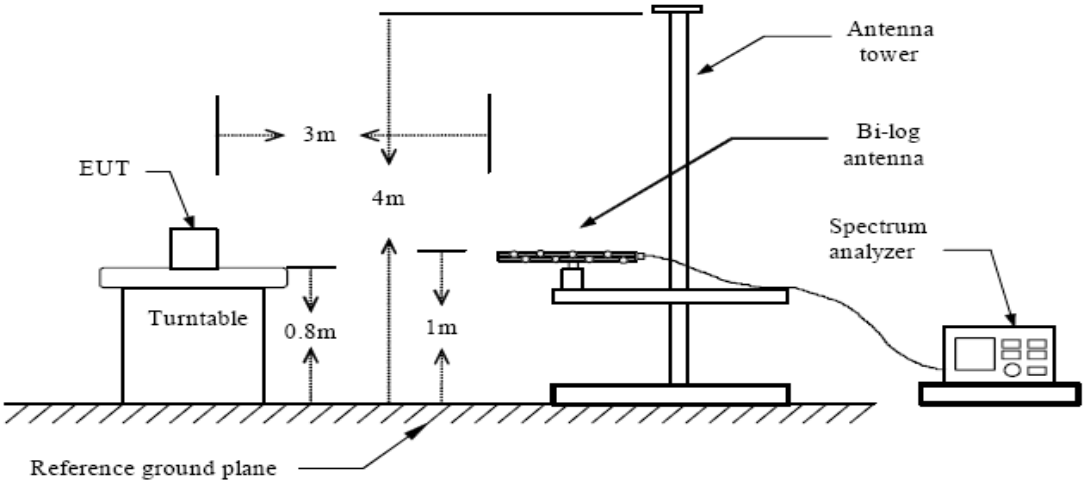
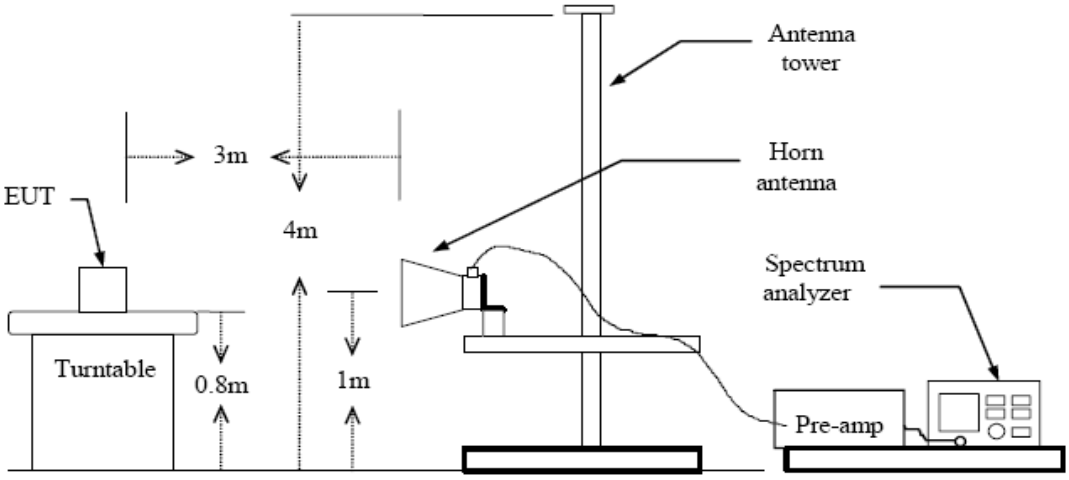
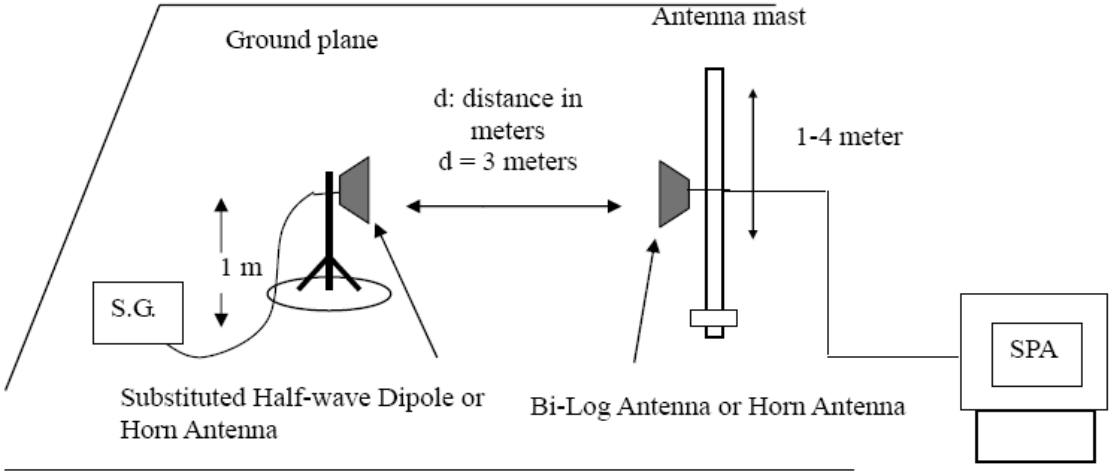
For radiated spurious emissions below 1GHz:



For radiated spurious emissions above 1GHz:



Substituted Method



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5.4.4. Test Results

Temperature	25°C	Humidity	60%
ATM Pressure:	101.4kPa	Test Engineer	Leo

Only reported the worst test data as follow:

Test Result of Tx spurious Emissions(Low Channel-High Power Level)

Frequency (MHz)	Antenna Polarity(H/V)	Measure Result (dBm)	Limit (dBm)	Margin (dB)
233.89	H	-76.46	-20	-56.46
233.89	V	-72.20	-20	-52.20
923.67	H	-58.48	-20	-38.48
923.67	V	-54.27	-20	-34.27
1390.49	H	-46.39	-20	-26.39
1390.49	V	-43.94	-20	-23.94
2312.92	H	-43.35	-20	-23.35
2312.92	V	-40.20	-20	-20.20
3703.56	H	-32.42	-20	-12.42
3703.56	V	-27.37	-20	-7.37

Test Result of Tx spurious Emissions(Middle Channel-High Power Level)

Frequency (MHz)	Antenna Polarity(H/V)	Measure Result (dBm)	Limit (dBm)	Margin (dB)
233.89	H	-74.07	-20	-54.07
233.89	V	-70.28	-20	-50.28
923.67	H	-56.55	-20	-36.55
923.67	V	-53.14	-20	-33.14
1390.49	H	-44.43	-20	-24.43
1390.49	V	-41.36	-20	-21.36
2312.92	H	-42.16	-20	-22.16
2312.92	V	-39.54	-20	-19.54
3703.56	H	-31.76	-20	-11.76
3703.56	V	-26.30	-20	-6.30

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Test Result of Tx spurious Emissions(High Channel-High Power Level)

Frequency (MHz)	Antenna Polarity(H/V)	Measure Result (dBm)	Limit (dBm)	Margin (dB)
233.89	H	-75.02	-20	-55.02
233.89	V	-72.63	-20	-52.63
923.67	H	-57.87	-20	-37.87
923.67	V	-54.00	-20	-34.00
1390.49	H	-45.72	-20	-25.72
1390.49	V	-42.39	-20	-22.39
2312.92	H	-42.53	-20	-22.53
2312.92	V	-40.11	-20	-20.11
3703.56	H	-33.14	-20	-13.14
3703.56	V	-27.40	-20	-7.40

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5.5. Frequency Stability

5.5.1. Standard Applicable

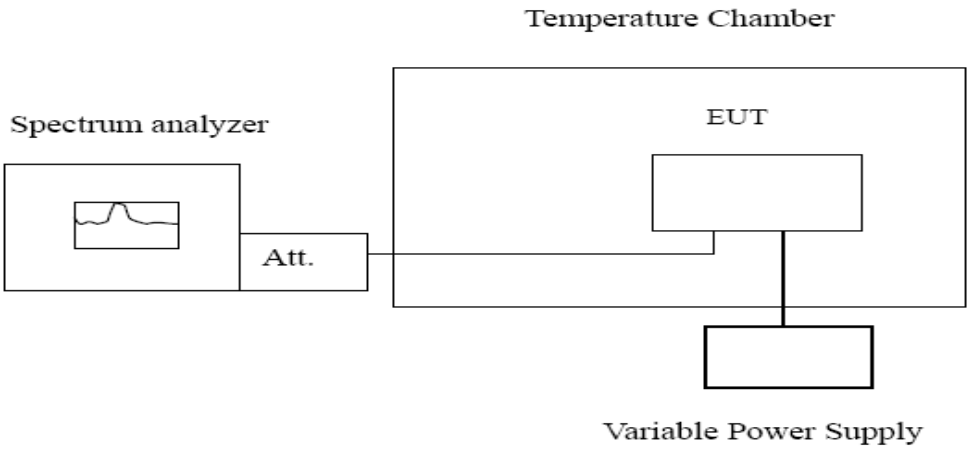
a) According to FCC Part 2 Section 2.1055(a)(1), the frequency stability shall be measured with variation of ambient temperature from －30℃ to +50℃ centigrade.

b) According to FCC Part 2 Section 2.1055(d)(2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacturer.

c) According to §90.213, the frequency stability limit is 2.5 ppm for 12.5KHz channel separation

5.5.2. Test Procedures

The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to Spectrum Analyzer. The coupling loss of the additional cables was recorded and taken in account for all the measurements. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. For Frequency stability Vs. Voltage the EUT was connected to a DC power supply and the voltage was adjusted in the required ranges. The result was recorded.



5.5.3. Test Results

Pass

Test result of frequency stability versus environmental temperature

The worst test data as follow:

The Test Result For Low Channel-High Power Level, TX=400.0250MHz				
Temperature (℃)	Frequency (MHz)	Measured (MHz)	Deviation (%)	Limit (%)
-20	400.0250	400.025009	0.0002250	0.00025
-10	400.0250	400.025007	0.0001750	0.00025
0	400.0250	400.025006	0.0001500	0.00025
+10	400.0250	400.025007	0.0001750	0.00025
+20	400.0250	400.025006	0.0001500	0.00025
+30	400.0250	400.025003	0.0000750	0.00025
+40	400.0250	400.025004	0.0001000	0.00025
+50	400.0250	400.025007	0.0001750	0.00025

The Test Result For Middle Channel-High Power Level, TX=435.0000MHz				
Temperature (℃)	Frequency (MHz)	Measured (MHz)	Deviation (%)	Limit (%)
-20	430.0000	430.000006	0.0001395	0.00025
-10	430.0000	430.000005	0.0001163	0.00025
0	430.0000	430.000003	0.0000698	0.00025
+10	430.0000	430.000009	0.0002093	0.00025
+20	430.0000	430.000004	0.0000930	0.00025
+30	430.0000	430.000007	0.0001628	0.00025
+40	430.0000	430.000003	0.0000698	0.00025
+50	430.0000	430.000005	0.0001163	0.00025

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The Test Result For High Channel-High Power Level, TX=469.9750MHz				
Temperature (℃)	Frequency (MHz)	Measured (MHz)	Deviation (%)	Limit (%)
-20	469.9750	469.975008	0.0001702	0.00025
-10	469.9750	469.975005	0.0001064	0.00025
0	469.9750	469.975003	0.0000638	0.00025
+10	469.9750	469.975007	0.0001489	0.00025
+20	469.9750	469.975003	0.0000638	0.00025
+30	469.9750	469.975009	0.0001915	0.00025
+40	469.9750	469.975003	0.0000638	0.00025
+50	469.9750	469.975009	0.0001915	0.00025

Test worst result of frequency stability versus input voltage

Input Voltage (Vdc)	Frequency (MHz)	Measured (MHz)	Deviation (%)	Limit (%)
3.3	400.0250	400.025006	0.0001500	0.00025
3.3	430.0000	430.000007	0.0001628	0.00025
3.3	469.9750	469.975008	0.0001702	0.00025

Note: This EUT meets the frequency stability requirement: +/- 2.5ppm over temp range of -20 degrees C to +50 degrees C.

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5.6. Transient Frequency Behavior

5.6.1. Standard Applicable

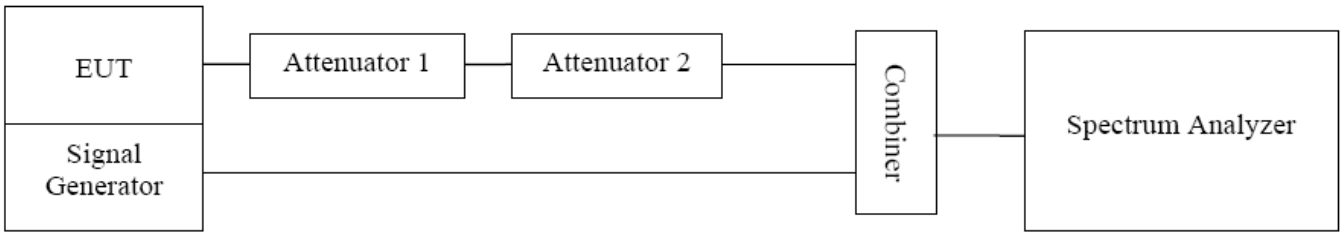
Section 90.214 Transient frequencies must be within the maximum frequency difference limits during the time intervals indicated:

Time intervals [1, 2]	Maximum frequency difference [3]	All equipment	
		150 to 174 MHz	421 to 512MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 KHz Channels			
t_1 [4]	± 25.0 KHz	5.0 ms	10.0 ms
t_2	± 12.5 KHz	20.0 ms	25.0 ms
t_3 [4]	± 25.0 KHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 KHz Channels			
t_1 [4]	± 12.5 KHz	5.0 ms	10.0 ms
t_2	± 6.25 KHz	20.0 ms	25.0 ms
t_3 [4]	± 12.5 KHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 6.25 KHz Channels			
t_1 [4]	±6.25 KHz	5.0 ms	10.0 ms
t_2	±3.125 KHz	20.0 ms	25.0 ms
t_3 [4]	±6.25 KHz	5.0 ms	10.0 ms

1. t_{on} is the instant when a 1 KHz test signal is completely suppressed, including any capture time due to phasing.
   t_1 is the time period immediately following t_{on}.
   t_2 is the time period immediately following t_1.
   t_3 is the time period from the instant when the transmitter is turned off until t_{off}.
   t_{off} is the instant when the 1 KHz test signal starts to rise.
2. During the time from the end of t_2 to the beginning of t_3, the frequency difference must not exceed the limits specified in § 90.213.
3. Difference between the actual transmitter frequency and the assigned transmitter frequency.
4. If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

5.6.2. Test Procedures

ANSI/TIA-603-D 2010, section 2.2.19.3



5.6.3. Test Results

Pass

Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation--Off to On

Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation--On to Off

6. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Cal Date	Due Date
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	June 18,2013	June 17,2014
Signal analyzer	Agilent	E4448A(External mixers to 40GHz)	US44300469	9kHz~40GHz	July 16,2013	July 15,2014
LISN	MESS Tec	NNB-2/16Z	99079	9KHz-30MHz	June 18,2013	June 17,2014
LISN (Support Unit)	EMCO	3819/2NM	9703-1839	9KHz-30MHz	June 18,2013	June 17,2014
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9KHz-30MHz	June 18,2013	June 17,2014
ISN	SCHAFFNER	ISN ST08	21653	9KHz-30MHz	June 18,2013	June 17,2014
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30M-1GHz 3m	June 18,2013	June 17,2014
Amplifier	SCHAFFNER	COA9231A	18667	9kHz-2GHzz	June 18,2013	June 17,2014
Amplifier	Agilent	8449B	3008A02120	1GHz-26.5GHz	July 16,2013	July 15,2014
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5GHz-40GHz	July 16,2013	July 15,2014
Spectrum Analyzer	Agilent	E4407B	MY41440292	9k-26.5GHz	July 16,2013	July 15,2014
Loop Antenna	R&S	HFH2-Z2	860004/001	9k-30MHz	June 18,2013	June 17,2014
By-log Antenna	SCHWARZBECK	VULB9163	9163-470	30MHz-1GHz	June 10,2013	June 09,2014
Horn Antenna	EMCO	3115	6741	1GHz-18GHz	June 10,2013	June 09,2014
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz-1GHz	June 18,2013	June 17,2014
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz-40GHz	June 18,2013	June 17,2014
Spectrum Meter	R&S	FSP 30	100023	9kHz-30GHz	July 16,2013	July 15,2014
Power Meter	R&S	NRVS	100444	DC-40GHz	June 18,2013	June 17,2014
Power Sensor	R&S	NRV-Z51	100458	DC-30GHz	June 18,2013	June 17,2014
Power Sensor	R&S	NRV-Z32	10057	30MHz-6GHz	June 18,2013	June 17,2014
AC Power Source	HPC	HPA-500E	HPA-9100024	AC 0~300V	June 18,2013	June 17,2014
DC power Soure	GW	GPC-6030D	C671845	DC 1V-60V	June 18,2013	June 17,2014
Temperature & Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-00	N/A	June 18,2013	June 17,2014
RF CABLE-1m	JYE Bao	RG142	CB034-1m	20MHz-7GHz	June 18,2013	June 17,2014
RF CABLE-2m	JYE Bao	RG142	CB)35-2m	20MHz-1GHz	June 18,2013	June 17,2014
Vector signal Generator	R&S	SMU200A	102098	100kHz~6GHz	June 18,2013	June 17,2014
Signal Generator	R&S	SMR40	10016	10MHz~40GHz	July 16,2013	July 15,2014
Anritu	Agilent	8920B	--	N/A	July 18,2013	July 17,2014

Note: All equipment through GRGT EST calibration

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7. MANUFACTURER/ APPROVAL HOLDER DECLARATION

The following identical model(s):

S15T	S15C	S15Q	S15L
S12	S19	Defender	RS61D Ultimate
PROCOM Director	ROVER	TITAN T1	--

Belong to the tested device:

Product description : Professional & Outdoor Support Phone

Model name : S15

Remark: PCB board, structure and internal of these model(s) are the same, So no additional models were tested.

----------THE END OF REPORT----------

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