

TEST REPORT

Reference No..... : WTX22X12264635W001
FCC ID : 2A96I-UA100
Applicant : Shanghai UniOne Science&Technology CO., Ltd.
Address..... : Building 4, No.651 Wanfang Road, Pujiang Town, Minhang District, Shanghai
Manufacturer : The same as Applicant
Address..... : The same as Applicant
Product Name : Rugged Android Tablet
Model No..... : UA100 (Scan)
Standards : FCC Part 22H, FCC Part 24E
Date of Receipt sample : 2022-12-30
Date of Test..... : 2022-12-30 to 2023-05-09
Date of Issue : 2023-05-09
Test Report Form No. : WTX_Part 22_Part 24_Part 27W
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

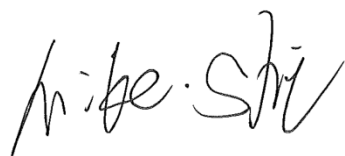
Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road,
Block 70 Bao'an District, Shenzhen, Guangdong, China
Tel.: +86-755-33663308 Fax.: +86-755-33663309 Email: sem@waltek.com.cn

Tested by:

Approved by:



Mike Shi



Silin Chen

TABLE OF CONTENTS

1. GENERAL INFORMATION.....	4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
1.2 TEST STANDARDS.....	6
1.3 TEST METHODOLOGY.....	6
1.4 TEST FACILITY	6
1.5 EUT SETUP AND TEST MODE.....	7
1.6 MEASUREMENT UNCERTAINTY	9
1.7 TEST EQUIPMENT LIST AND DETAILS	10
2. SUMMARY OF TEST RESULTS	14
3. RF OUTPUT POWER	15
3.1 STANDARD APPLICABLE.....	15
3.2 TEST PROCEDURE.....	15
3.3 SUMMARY OF TEST RESULTS/PLOTS	15
4. PEAK-TO-AVERAGE RATIO (PAR) OF TRANSMITTER.....	19
4.1 STANDARD APPLICABLE.....	19
4.2 TEST PROCEDURE.....	19
4.3 SUMMARY OF TEST RESULTS	19
5. EMISSION BANDWIDTH.....	20
5.1 STANDARD APPLICABLE.....	20
5.2 TEST PROCEDURE.....	20
5.3 SUMMARY OF TEST RESULTS/PLOTS	20
6. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL.....	21
6.1 STANDARD APPLICABLE.....	21
6.2 TEST PROCEDURE.....	21
6.3 SUMMARY OF TEST RESULTS/PLOTS	21
7. SPURIOUS RADIATED EMISSIONS.....	22
7.1 STANDARD APPLICABLE.....	22
7.2 TEST PROCEDURE.....	22
7.3 SUMMARY OF TEST RESULTS/PLOTS	22
8. FREQUENCY STABILITY	43
8.1 STANDARD APPLICABLE.....	43
8.2 TEST PROCEDURE.....	43
8.3 SUMMARY OF TEST RESULTS/PLOTS	43
9. MODULATION CHARACTERISTICS	44
9.1 STANDARD APPLICABLE.....	44
9.2 TEST PROCEDURE.....	44
9.3 SUMMARY OF TEST RESULTS/PLOTS	44
APPENDIX PHOTOGRAPHS.....	45

Report version

Version No.	Date of issue	Description
Rev.00	2023-05-09	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT:	
Product Name:	Rugged Android Tablet
Trade Name:	/
Model No.:	UA100 (Scan)
Adding Model(s):	UA100(Standard)
Rated Voltage:	DC3.8V
Battery:	9200mAh
Adapter Model:	/
Software Version:	R00.50.A6.53
Hardware Version:	V1.04
<i>Note: The Antenna Gain is provided by the customer and can affect the validity of results.</i> <i>The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model UA100 (Scan), but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT:	
2G	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 33.58dBm, GSM1900: 30.53dBm EDGE850: 27.59dBm, EDGE1900: 26.56dBm
Type of Emission:	GSM850: 244KGXW, GSM1900: 244KGXW EDGE850: 246KG7W, EDGE1900: 246KG7W
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	FPC Antenna
Antenna Gain:	GSM850: -3.09dBi; GSM1900: 0.38dBi
GPRS/EDGE Class:	Class 12
3G	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 5
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 5: 824~849MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 5: 869~894MHz
RF Output Power:	WCDMA Band 2: 22.45dBm, WCDMA Band 5: 24.56dBm
Type of Emission:	WCDMA Band 2: 4M18F9W WCDMA Band 5: 4M16F9W
Type of Modulation:	BPSK, QPSK, 16QAM
Antenna Type:	FPC Antenna
Antenna Gain:	WCDMA Band 2: 0.21dBi, WCDMA Band 5: -3.09dBi

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations.

FCC Rules Part 22: Private Land Mobile Radio Services.

FCC Rules Part 24: Public Mobile Services.

TIA/EIA 603 E March 2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

KDB 971168 D01 Power Meas License Digital Systems v03r01: Measurement Guidance for Certification of Licensed Digital Transmitters.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603 E/ KDB 971168/ ANSI C63.26. The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A and the CAB identifier is CN0057.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest

possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	GSM 850	Low, Middle, High Channels
TM2	GPRS 850	Low, Middle, High Channels
TM3	EDGE 850	Low, Middle, High Channels
TM4	GSM 1900	Low, Middle, High Channels
TM5	GPRS 1900	Low, Middle, High Channels
TM6	EDGE 1900	Low, Middle, High Channels
TM7	WCDMA Band 5	Low, Middle, High Channels
TM8	HSDPA Band 5	Low, Middle, High Channels
TM9	HSUPA Band 5	Low, Middle, High Channels
TM10	WCDMA Band 2	Low, Middle, High Channels
TM11	HSDPA Band 2	Low, Middle, High Channels
TM12	HSUPA Band 2	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency	Channel Number
GSM 850	GSM/GPRS/EDGE	824.2 MHz	128
		836.6 MHz	190
		848.8 MHz	251
PCS 1900	GSM/GPRS/EDGE	1850.2 MHz	512
		1880.0 MHz	661
		1909.8 MHz	810
WCDMA Band 5	WCDMA/HSDPA/HSUPA	826.4 MHz	4132
		836.6 MHz	4183
		846.6 MHz	4233
WCDMA Band 2	WCDMA/HSDPA/HSUPA	1852.4 MHz	9262
		1880.0 MHz	9400
		1907.6 MHz	9538
Note: the transmitter has been tested on the communications mode of GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA compliance test and record the worst case.			

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	50~55 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Type-C Cable	1.0	Shielded	With Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Computer	Lenovo	L13 Yoga	/
Adapter	/	ASUC71w-050912300	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Frequency Stability	Conducted	2.3%
Transmitter Spurious Emissions	Conducted	$\pm 0.42\text{dB}$
Transmitter Spurious Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2022-03-22	2023-03-21
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2022-03-22	2023-03-21
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2022-03-25	2023-03-24
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2022-03-22	2023-03-21
SMET-1313	Spectrum Analyzer	Agilent	N9020A	MY54320548	2022-03-22	2023-03-21
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2022-03-22	2023-03-21
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2022-03-22	2023-03-21
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2022-03-22	2023-03-21
SEMT-1132	Attenuator	HP	8491A	MY39264419	2022-03-22	2023-03-21
SEMT-1320	EXA Signal Analyzer	KEYSIGHT	N9010B	MY59070494	2022-01-07	2023-01-06
SEMT-1320	EXA Signal Analyzer	KEYSIGHT	N9010B	MY59070494	2022-12-30	2023-12-29
SEMT-1325	Band Reject Filter Group	Tonscend	JS0806-F	2018060319	2022-03-22	2023-03-21
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C004	Cable	Zheng DI	2M0RFC	/	/	/
SEMT-C005	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C006	Cable	Zheng DI	1M0RFC	/	/	/
☒ Chamber A: Below 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
SEMT-1008	Amplifier	HP	8447F	2805A03475	2022-01-07	2023-01-06
SEMT-1008	Amplifier	HP	8447F	2805A03475	2022-12-30	2023-12-29
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2023-03-19
SEMT-1068	Broadband	Schwarz beck	VULB9163	9163-333	2021-03-20	2023-03-19

	Antenna					
☒ Chamber A: Above 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2022-03-22	2023-03-21
SEMT-1042	Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA917058 2	2021-04-27	2023-04-26
SEMT-1216	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2022-03-25	2023-03-24
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2022-03-22	2023-03-21
☐ Chamber B: Below 1GHz						
SEMT-1068	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
SEMT-1067	Amplifier	Agilent	8447D	2944A10179	2022-03-22	2023-03-21
SEMT-1066	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2022-03-22	2023-03-21
☐ Chamber C: Below 1GHz						
SEMT-1319	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2022-01-07	2023-01-06
SEMT-1319	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2022-12-30	2023-12-29
SEMT-1343	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2023-05-27
SEMT-1333	Amplifier	HP	8447F	2944A03869	2022-03-22	2023-03-21
☒ Conducted Room 1#						
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2022-03-21	2023-03-20
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2022-03-25	2023-03-24
SEMT-1003	AC LISN	Schwarz beck	NSLK8126	8126-224	2022-03-22	2023-03-21
☐ Conducted Room 2#						
SEMT-1334	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2022-03-22	2023-03-21
SEMT-1336	LISN	Rohde & Schwarz	ENV 216	100097	2022-03-22	2023-03-21

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1041A 1001	Communication Tester	Rohde & Schwarz	CMW500	148650	2023-02-25	2024-02-24
WTXE1022A 1002	GSM Tester	Rohde & Schwarz	CMU200	114403	2023-02-25	2024-02-24
WTXE1104A 1001	MXG Vector Signal Generator	Agilent	N5182A	MY47420108	2023-02-25	2024-02-24
WTXE1104A 1002	DC Power Supply	Agilent	E3634A	MY40009294	2023-02-25	2024-02-24
WTXE1104A 1003	EXG Analog Signal Generator	KEYSIGHT	N5173B	MY61252892	2023-02-25	2024-02-24
WTXE1104A 1004	Spectrum Analyzer	Rohde&Schwarz	FSV40-N	101559	2023-02-25	2024-02-24
WTXE1104A 1005-2	Band Reject Filter Group	Tonscend	JS0806-F	23A806F0658	2023-02-25	2024-02-24
☒ Chamber A: Below 1GHz						
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-02-25	2024-02-24
WTXE1007A 1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
WTXE1007A 1001	Amplifier	HP	8447F	2805A03475	2023-02-25	2024-02-24
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
WTXE1010A 1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-20	2026-03-19
☒ Chamber A: Above 1GHz						
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-02-25	2024-02-24
WTXE1007A 1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
WTXE1065A 1001	Amplifier	C&D	PAP-1G18	14918	2023-02-25	2024-02-24
WTXE1010A 1005	Horn Antenna	ETS	3117	00086197	2021-03-19	2024-03-18
WTXE1010A 1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
WTXE1003A 1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24
WTXE1004A	Spectrum	Rohde &	FSP40	100612	2023-02-25	2024-02-24

1-001	Analyzer	Schwarz				
☐ Chamber B:Below 1GHz						
WTXE1010A 1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2024-04-08
WTXE1038A 1001	Amplifier	Agilent	8447D	2944A101 79	2023-02-25	2024-02-24
WTXE1001A 1002	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2023-02-25	2024-02-24
☐ Chamber C:Below 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1010A 1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2024-05-27
WTXE1007A 1002	Amplifier	HP	8447F	2944A038 69	2023-02-25	2024-02-24
☐ Chamber C: Above 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1103A 1005	Horn Antenna	POAM	RTF-11A	LP228060 221	2023-03-10	2026-03-09
WTXE1103A 1006	Amplifier	Tonscend	TAP01018050	AP22E806 235	2023-02-25	2024-02-24

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§22.913(a), §24.232(c), §27.50(d)	RF Output Power	Compliant
§24.51, §27.50	Peak-to-average Ratio (PAR) of Transmitter	Compliant
§22.917(b), §24.238(b), §27.53	Emission Bandwidth	Compliant
§22.917(a), §24.238(a), §27.53(h)	Spurious Emissions at Antenna Terminal	Compliant
§22.917(a), §24.238(a), §27.53(h)	Spurious Radiation Emissions	Compliant
§22.917(a), §24.238(a), §27.53(h)	Out of Band Emissions	Compliant
§22.355, §24.235, §27.54	Frequency Stability	Compliant

3. RF Output Power

3.1 Standard Applicable

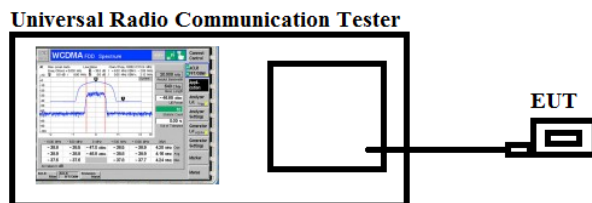
According to §22.913(a)(2), the ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1710-1755MHz band and mobile and portable stations operating in the 1695-1710MHz and 1755-1780MHz bands are limited to 1 watt EIRP.

3.2 Test Procedure

- Conducted output power test method:



- Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
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 tenth 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.

3.3 Summary of Test Results/Plots

➤ **Max. Radiated Power**

Mode	Channel	Antenna Polar	ERP (dBm)	Limit (dBm)	Result
GSM850	128	V	28.30	<38.45	Pass
		H	19.75		
	190	V	28.68		
		H	20.24		
	251	V	28.48		
		H	21.25		
GPRS850	128	V	28.16	<38.45	Pass
		H	20.26		
	190	V	27.71		
		H	21.80		
	251	V	26.92		
		H	21.17		
EGPRS850	128	V	24.33	<38.45	Pass
		H	18.68		
	190	V	23.83		
		H	19.62		
	251	V	24.61		
		H	19.62		

Mode	Channel	Antenna Polar	EIRP (dBm)	Limit (dBm)	Result
PCS1900	512	V	27.83	<33.00	Pass
		H	23.31		
	661	V	28.14		
		H	23.56		
	810	V	28.55		
		H	23.01		
GPRS1900	512	V	29.25	<33.00	Pass
		H	23.87		
	661	V	28.04		
		H	23.28		
	810	V	27.08		
		H	21.68		
EGPRS1900	512	V	21.96	<33.00	Pass
		H	17.43		
	661	V	22.72		
		H	16.95		
	810	V	23.05		
		H	16.41		

Mode	Channel	Antenna Polar	ERP	Limit (dBm)	Result
WCDMA Band V	4132	V	19.42	<38.45	Pass
		H	15.30		
	4183	V	19.37		
		H	15.07		
	4233	V	19.69		
		H	13.85		

Mode	Channel	Antenna Polar	EIRP	Limit (dBm)	Result
WCDMA Band II	9262	V	20.51	<33.00	Pass
		H	15.21		
	9400	V	20.76		
		H	14.75		
	9538	V	19.86		
		H	15.61		

➤ **Max. Conducted Power (Average power)**

Please refer to Appendix A

4. Peak-to-average Ratio (PAR) of Transmitter

4.1 Standard Applicable

According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51, in measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

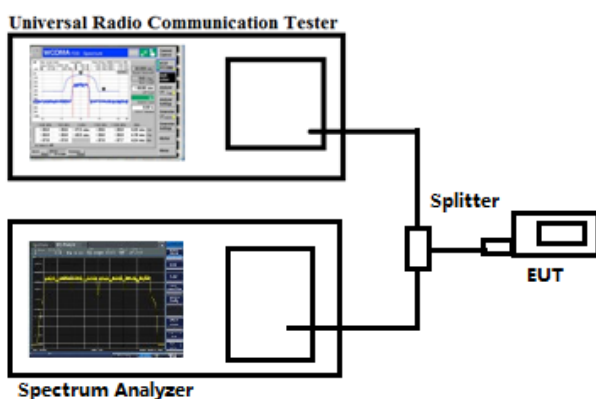
According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

4.2 Test Procedure

According with KDB 971168

1. The signal analyzer's CCDF measurement profile is enabled.
2. Frequency = carrier center frequency.
3. Measurement BW > Emission bandwidth of signal.
4. The signal analyzer was set to collect one million samples to generate the CCDF curve.
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power.

Test Configuration for the emission bandwidth testing:



4.3 Summary of Test Results

Please refer to Appendix B.

Waltek Testing Group (Shenzhen) Co., Ltd.

[Http://www.waltek.com.cn](http://www.waltek.com.cn)

5. Emission Bandwidth

5.1 Standard Applicable

According to §22.917(b), 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 26dB below the transmitter power.

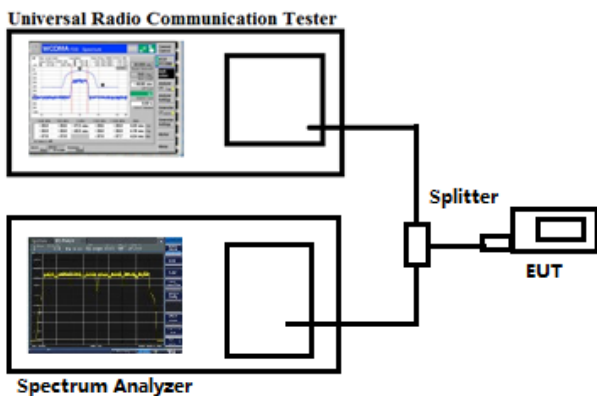
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

According to §27.53, 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 26dB below the transmitter power.

5.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 10kHz for GSM mode and 100kHz for WCDMA mode, VBW shall be at least 3 times the RBW, and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



5.3 Summary of Test Results/Plots

Please refer to Appendix C.

6. Out of Band Emissions at Antenna Terminal

6.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

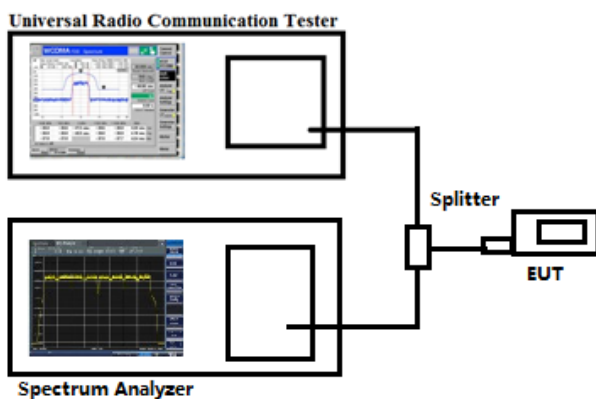
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10th harmonic.

Test Configuration for the out of band emissions testing:



6.3 Summary of Test Results/Plots

Please refer to Appendix D.

7. Spurious Radiated Emissions

7.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), the power of any emissions 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.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

7.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
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 tenth 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.

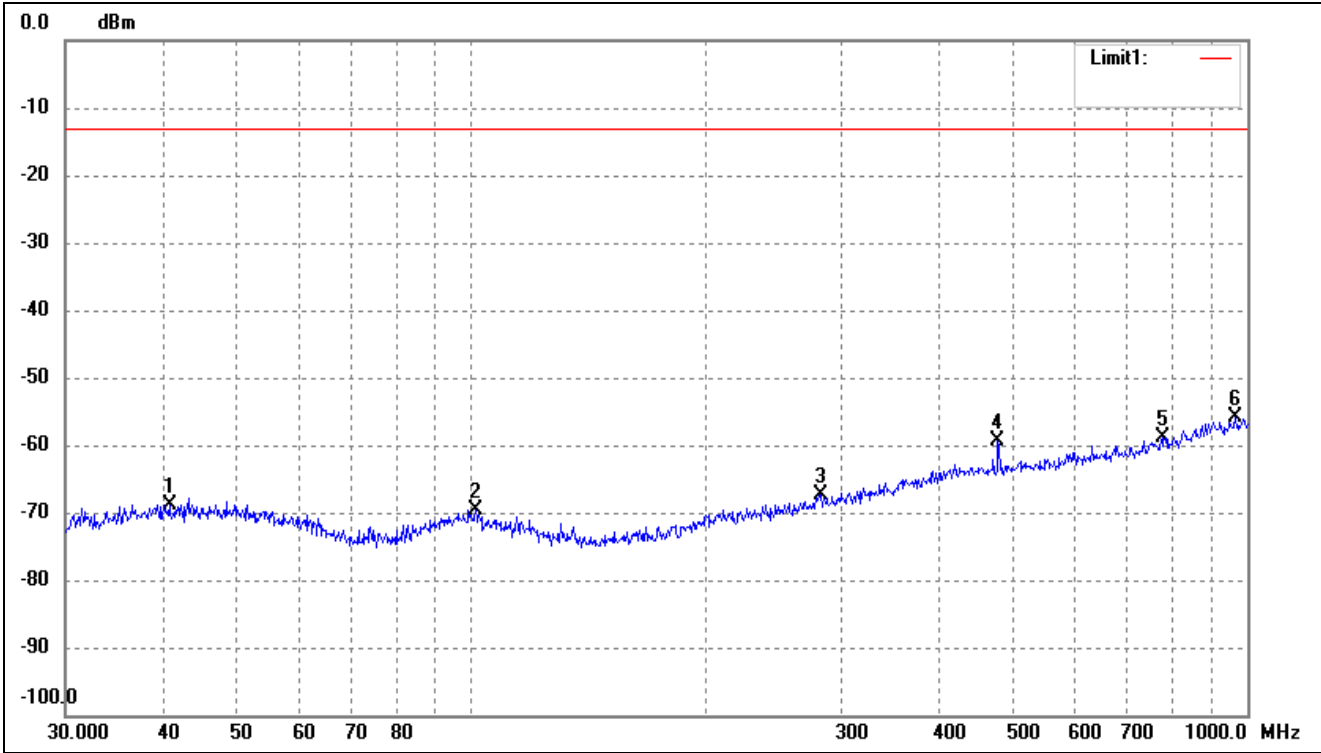
Spurious attenuation limit in dB = $43 + 10 \log_{10}(\text{power out in Watts})$

7.3 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

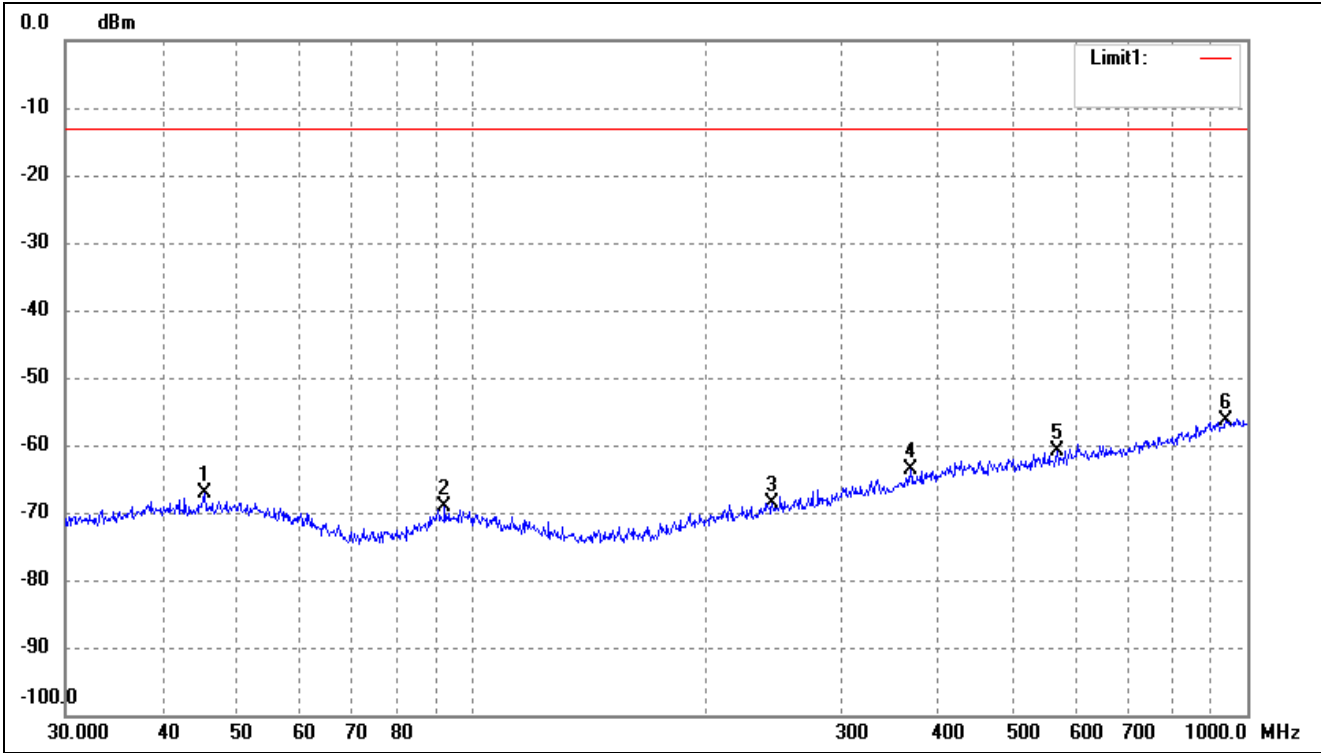
➤ Spurious Emissions Below 1GHz

For Cellular Band			
Test Channel	GSM850	Polarity:	Horizontal



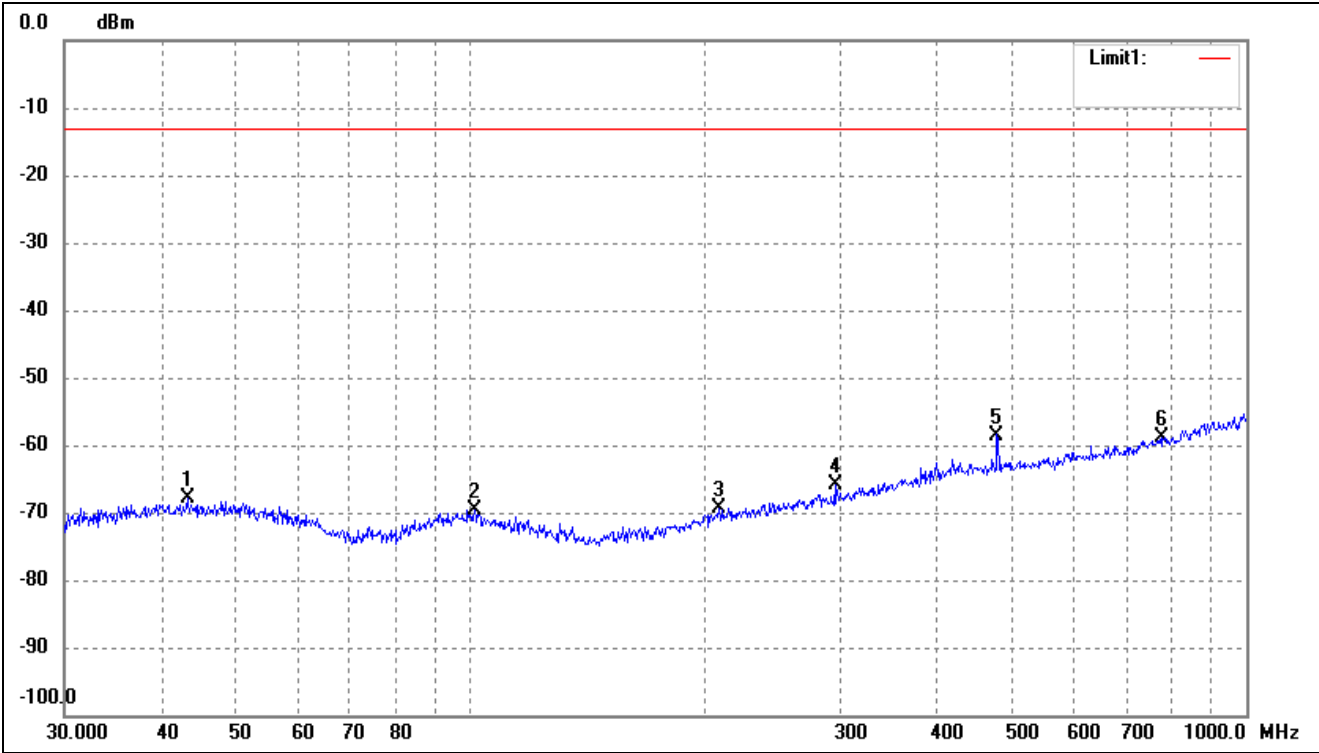
No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	40.8446	-69.65	0.89	-68.76	-13.00	-55.76	ERP
2	101.2885	-69.18	-0.35	-69.53	-13.00	-56.53	ERP
3	281.9946	-69.17	1.91	-67.26	-13.00	-54.26	ERP
4	477.1694	-65.94	6.54	-59.40	-13.00	-46.40	ERP
5	779.6068	-68.85	10.09	-58.76	-13.00	-45.76	ERP
6	965.5421	-68.70	12.87	-55.83	-13.00	-42.83	ERP

For Cellular Band			
Test Channel	GSM850	Polarity:	Vertical



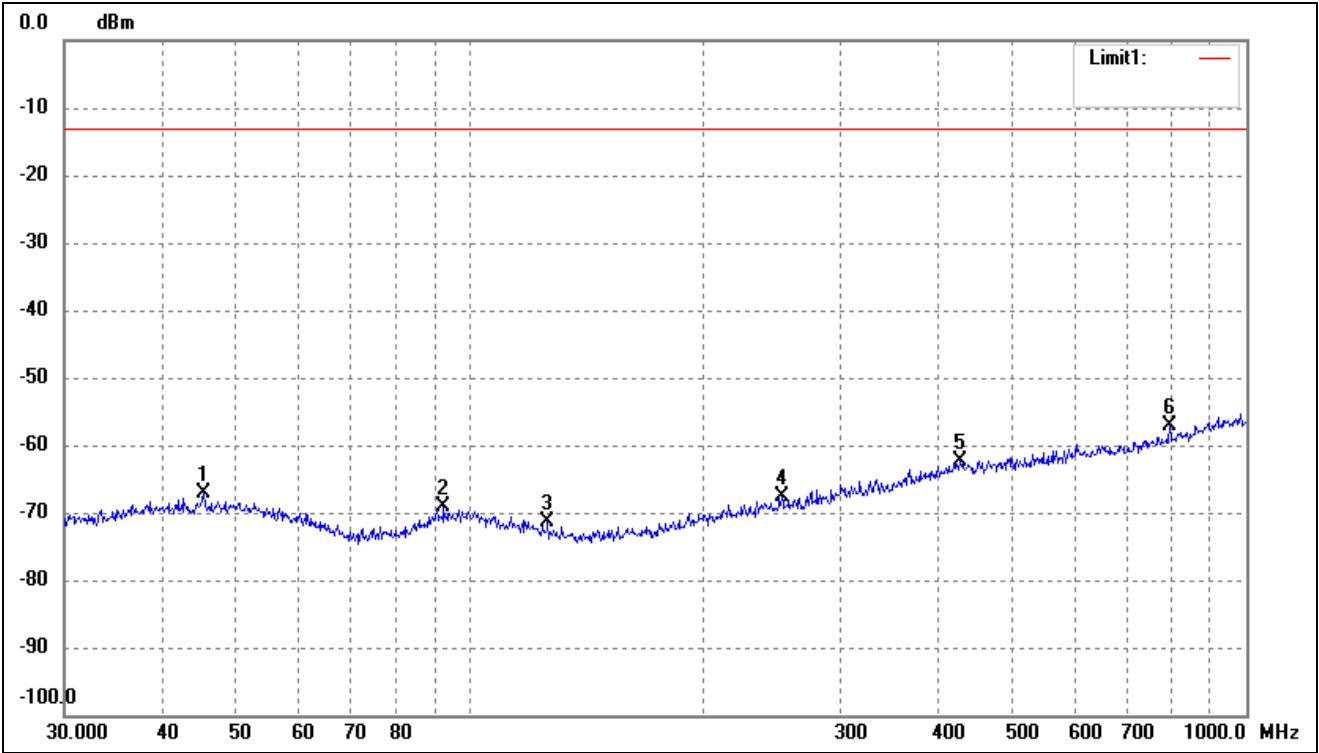
No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	45.3755	-68.02	0.91	-67.11	-13.00	-54.11	ERP
2	92.4624	-68.22	-0.83	-69.05	-13.00	-56.05	ERP
3	244.2321	-69.39	0.72	-68.67	-13.00	-55.67	ERP
4	368.1116	-68.27	4.58	-63.69	-13.00	-50.69	ERP
5	568.6127	-68.43	7.47	-60.96	-13.00	-47.96	ERP
6	938.8326	-68.96	12.62	-56.34	-13.00	-43.34	ERP

For Cellular Band			
Test Channel	GSM1900	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	43.2017	-68.84	0.90	-67.94	-13.00	-54.94	ERP
2	101.2885	-69.18	-0.35	-69.53	-13.00	-56.53	ERP
3	209.3129	-69.15	-0.33	-69.48	-13.00	-56.48	ERP
4	295.1469	-68.19	2.32	-65.87	-13.00	-52.87	ERP
5	477.1694	-65.04	6.54	-58.50	-13.00	-45.50	ERP
6	779.6068	-68.85	10.09	-58.76	-13.00	-45.76	ERP

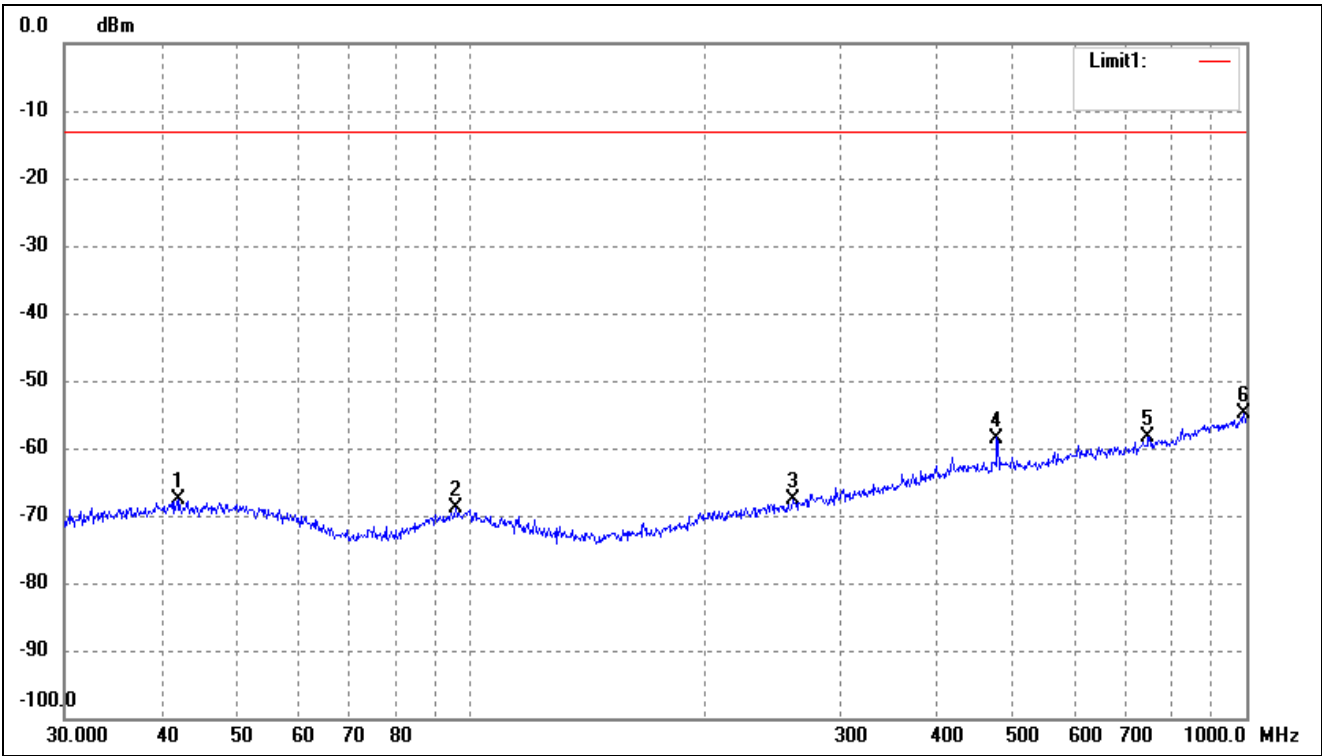
For Cellular Band			
Test Channel	GSM1900	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	45.3755	-68.02	0.91	-67.11	-13.00	-54.11	ERP
2	92.4624	-68.22	-0.83	-69.05	-13.00	-56.05	ERP
3	125.8864	-68.71	-2.65	-71.36	-13.00	-58.36	ERP
4	252.0627	-68.57	0.98	-67.59	-13.00	-54.59	ERP
5	428.0193	-68.79	6.37	-62.42	-13.00	-49.42	ERP
6	796.1830	-67.48	10.32	-57.16	-13.00	-44.16	ERP

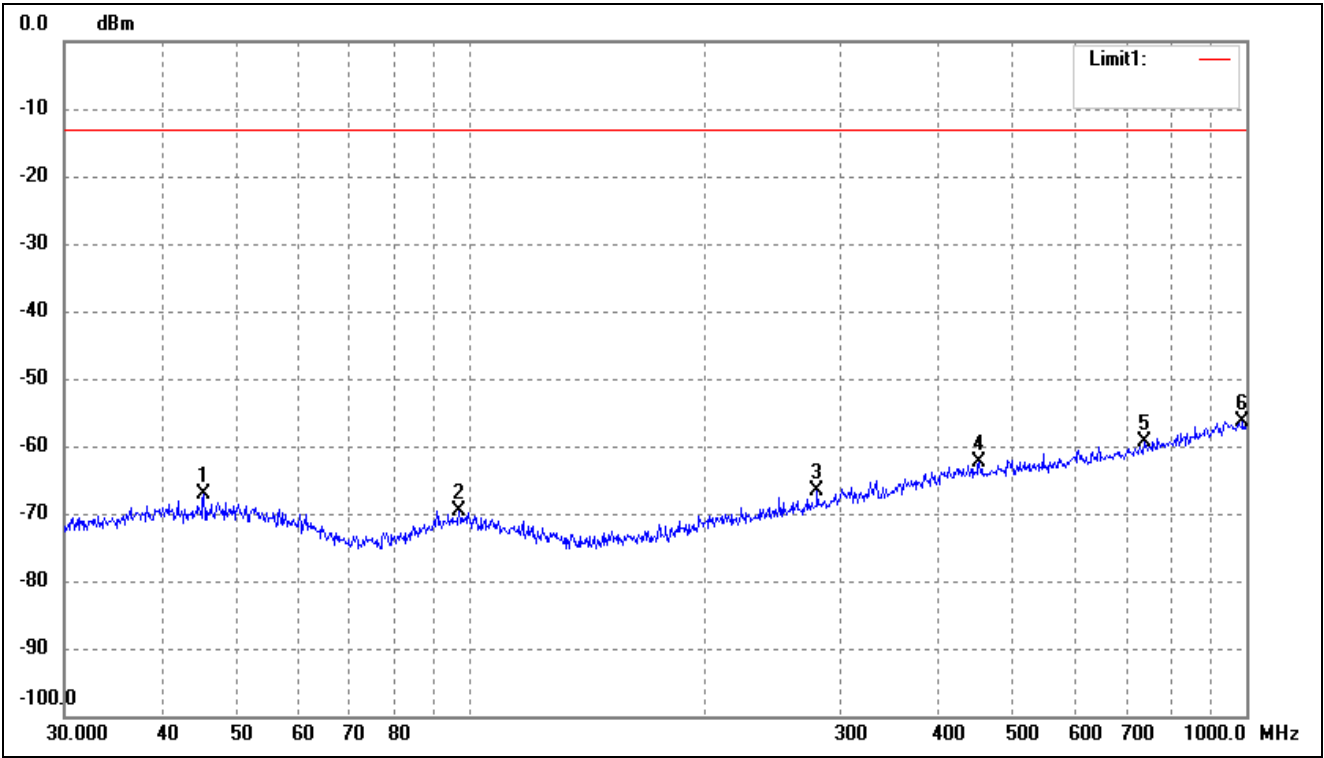
Note: Margin= (Reading+ Correct)- Limit

Test Channel	WCDMA Band V	Polarity:	Horizontal
--------------	--------------	-----------	------------



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	42.1542	-68.64	0.90	-67.74	-13.00	-54.74	ERP
2	95.7622	-68.22	-0.54	-68.76	-13.00	-55.76	ERP
3	260.1444	-68.79	1.22	-67.57	-13.00	-54.57	ERP
4	477.1694	-65.04	6.54	-58.50	-13.00	-45.50	ERP
5	747.4826	-68.05	9.61	-58.44	-13.00	-45.44	ERP
6	993.0114	-67.98	13.14	-54.84	-13.00	-41.84	ERP

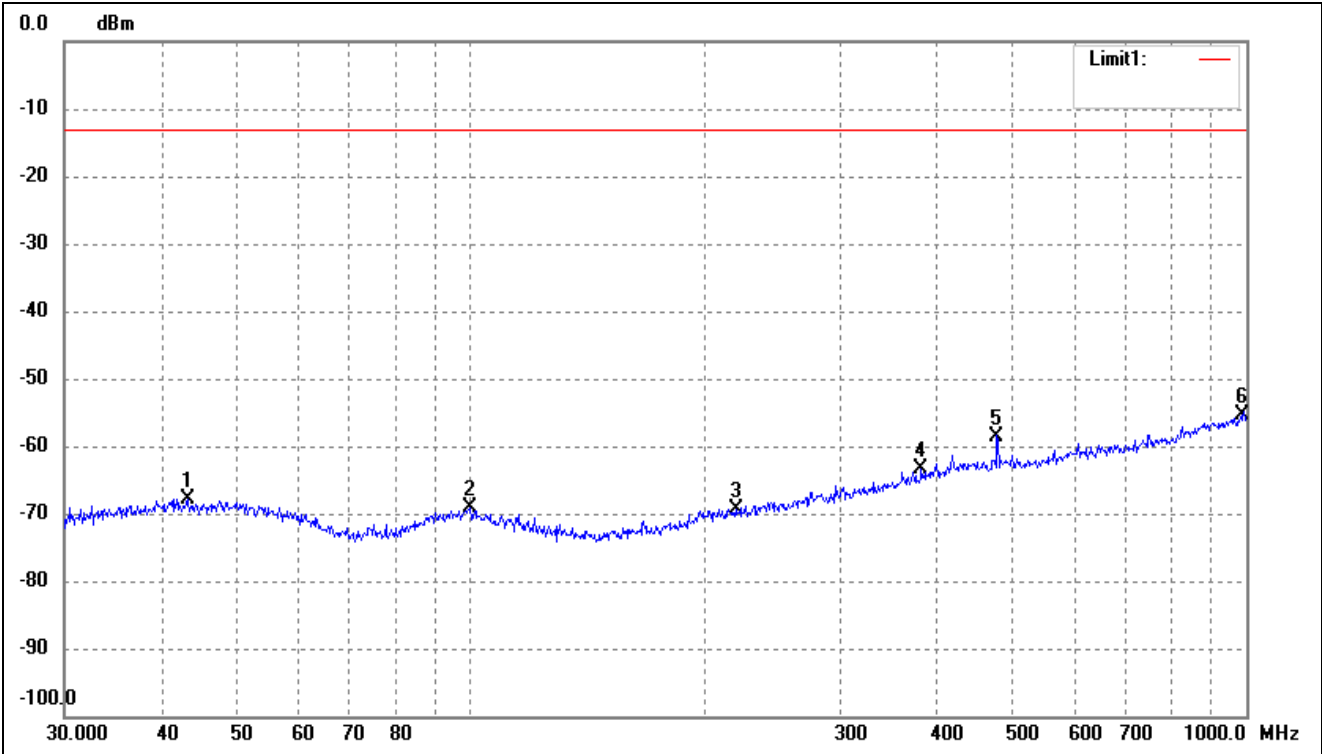
Test Channel	WCDMA Band V	Polarity:	Vertical
--------------	--------------	-----------	----------



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	45.3755	-68.02	0.91	-67.11	-13.00	-54.11	ERP
2	96.7749	-69.17	-0.47	-69.64	-13.00	-56.64	ERP
3	280.0238	-68.49	1.85	-66.64	-13.00	-53.64	ERP
4	452.7197	-68.73	6.34	-62.39	-13.00	-49.39	ERP
5	739.6605	-68.90	9.49	-59.41	-13.00	-46.41	ERP
6	989.5355	-69.41	13.10	-56.31	-13.00	-43.31	ERP

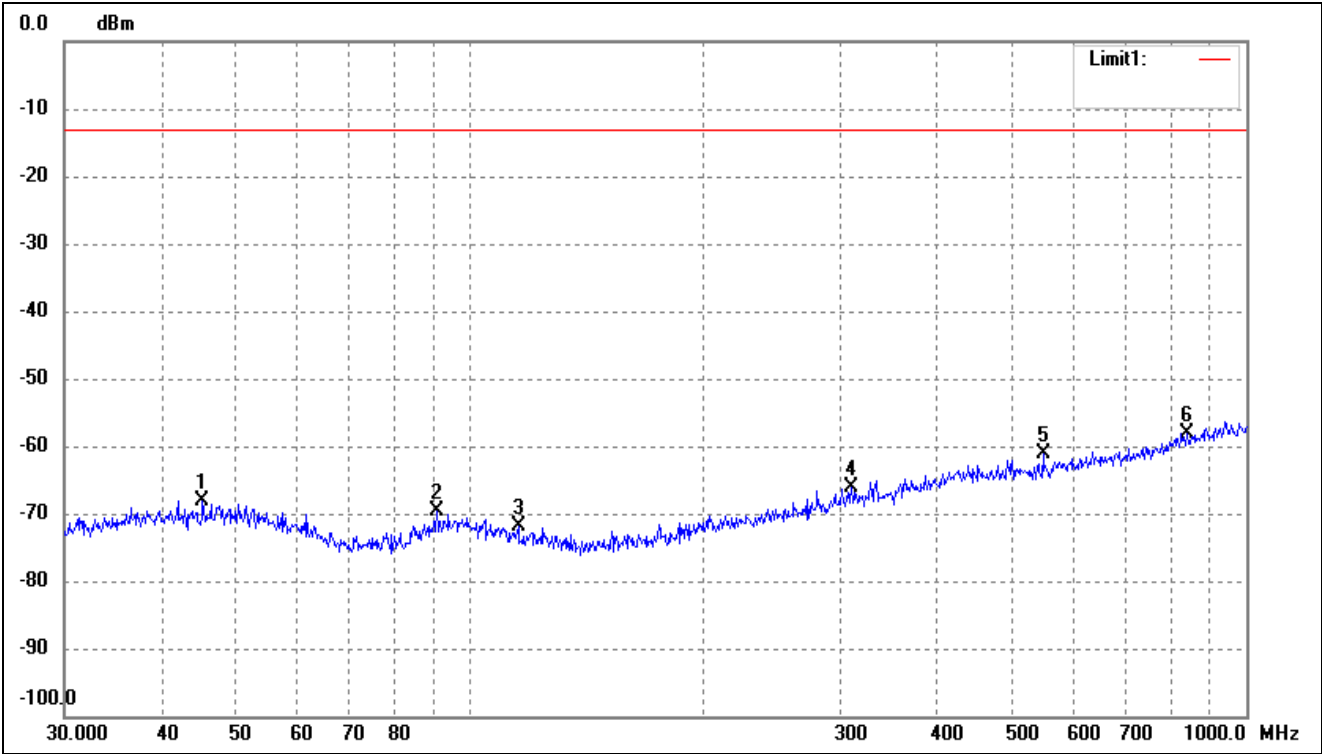
Note: $\text{Margin} = (\text{Reading} + \text{Correct}) - \text{Limit}$

Test Channel	WCDMA Band II	Polarity:	Horizontal
--------------	---------------	-----------	------------



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	43.2017	-68.84	0.90	-67.94	-13.00	-54.94	ERP
2	99.8777	-68.76	-0.29	-69.05	-13.00	-56.05	ERP
3	219.8449	-69.42	-0.01	-69.43	-13.00	-56.43	ERP
4	381.2487	-68.31	5.05	-63.26	-13.00	-50.26	ERP
5	477.1694	-65.04	6.54	-58.50	-13.00	-45.50	ERP
6	986.0717	-68.54	13.06	-55.48	-13.00	-42.48	ERP

Test Channel	WCDMA Band II	Polarity:	Vertical
--------------	---------------	-----------	----------

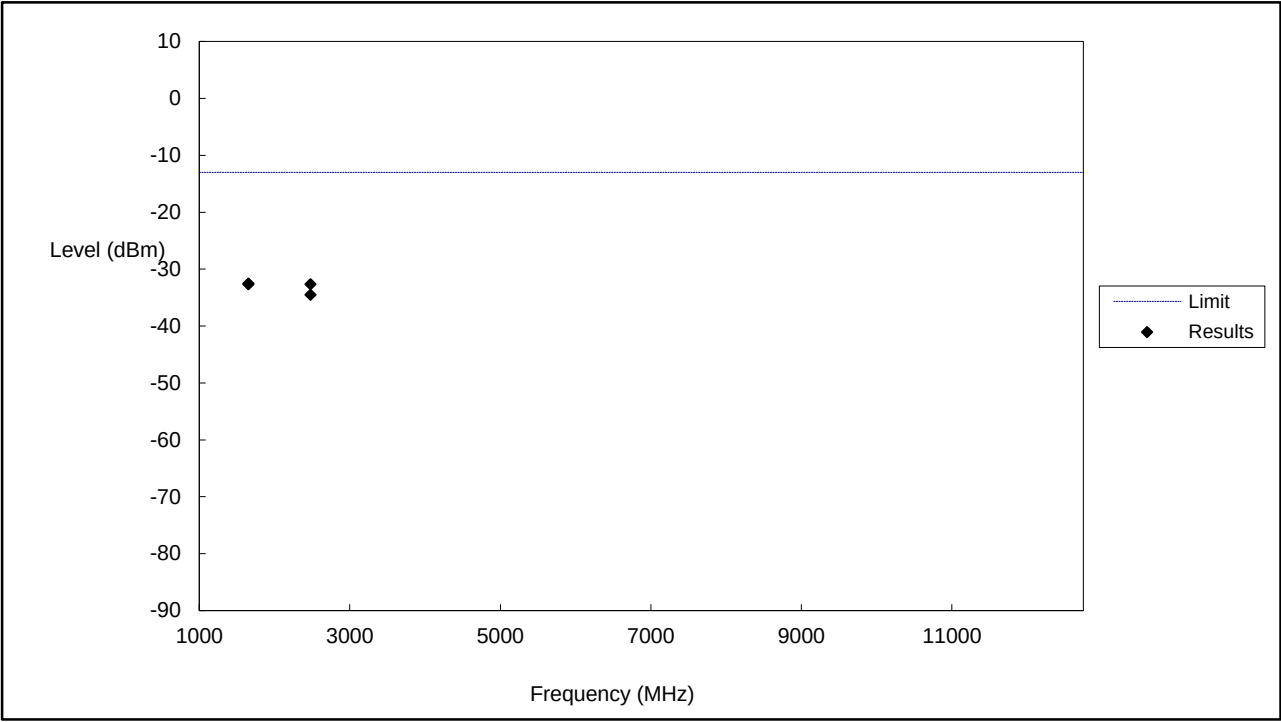


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	45.2166	-69.09	0.91	-68.18	-13.00	-55.18	ERP
2	90.5374	-68.71	-1.01	-69.72	-13.00	-56.72	ERP
3	115.3205	-70.33	-1.51	-71.84	-13.00	-58.84	ERP
4	309.9977	-68.75	2.75	-66.00	-13.00	-53.00	ERP
5	547.0977	-68.26	7.08	-61.18	-13.00	-48.18	ERP
6	839.1818	-69.19	11.12	-58.07	-13.00	-45.07	ERP

Note: Margin= (Reading+ Correct)- Limit

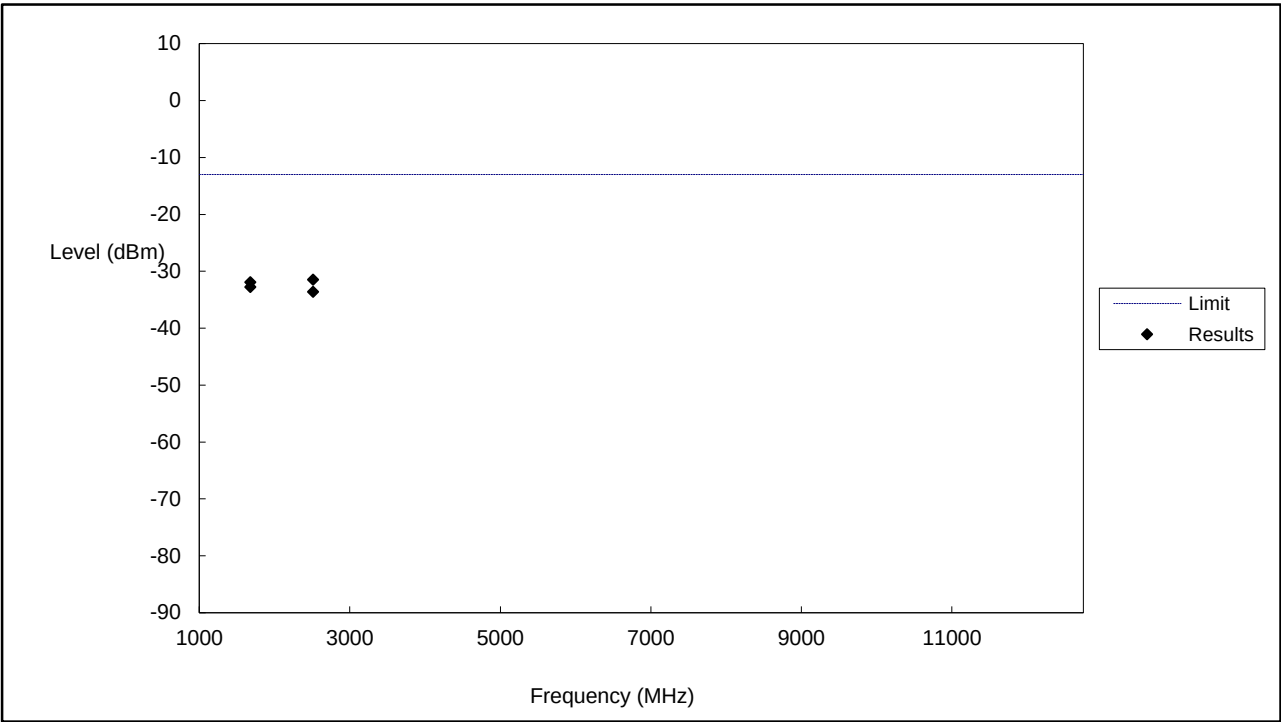
- Spurious Emissions Above 1GHz
- For Cellular Band_GSM850 Mode

Low Channel(824.2MHz)



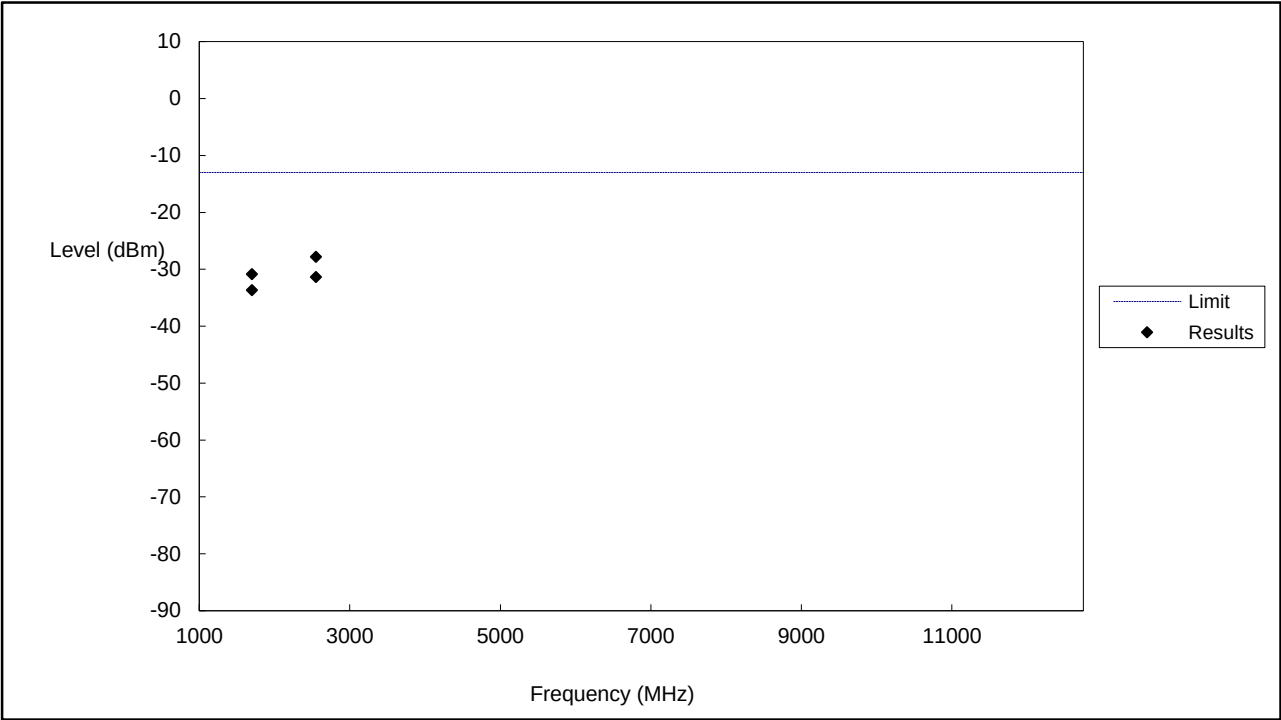
No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1648.4	-32.65	-13	-19.65	H	RMS
2	2472.6	-34.49	-13	-21.49	H	RMS
1	1648.4	-32.49	-13	-19.49	V	RMS
2	2472.6	-32.65	-13	-19.65	V	RMS

Middle Channel (836.6MHz)



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1673.2	-31.90	-13	-18.90	H	RMS
2	2509.8	-31.45	-13	-18.45	H	RMS
1	1673.2	-32.75	-13	-19.75	V	RMS
2	2509.8	-33.56	-13	-20.56	V	RMS

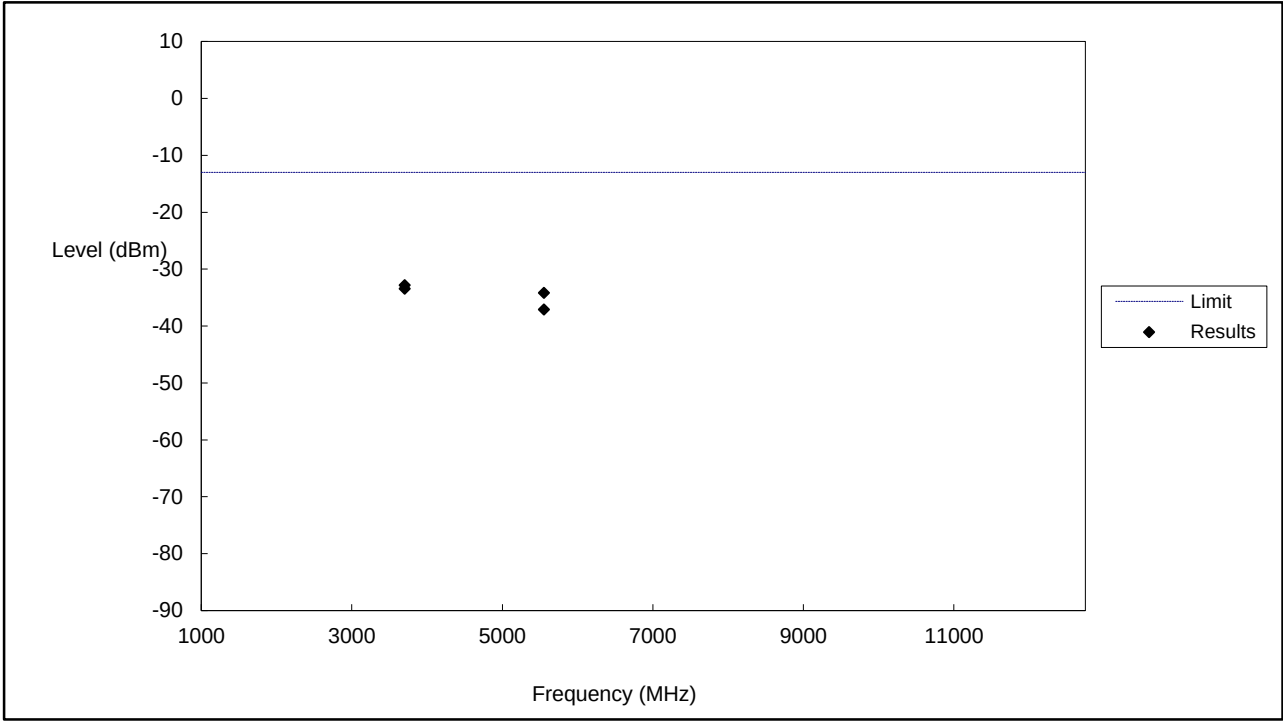
High Channel (848.8MHz)



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1697.6	-33.66	-13	-20.66	H	RMS
2	2546.4	-31.35	-13	-18.35	H	RMS
1	1697.6	-30.83	-13	-17.83	V	RMS
2	2546.4	-27.81	-13	-14.81	V	RMS

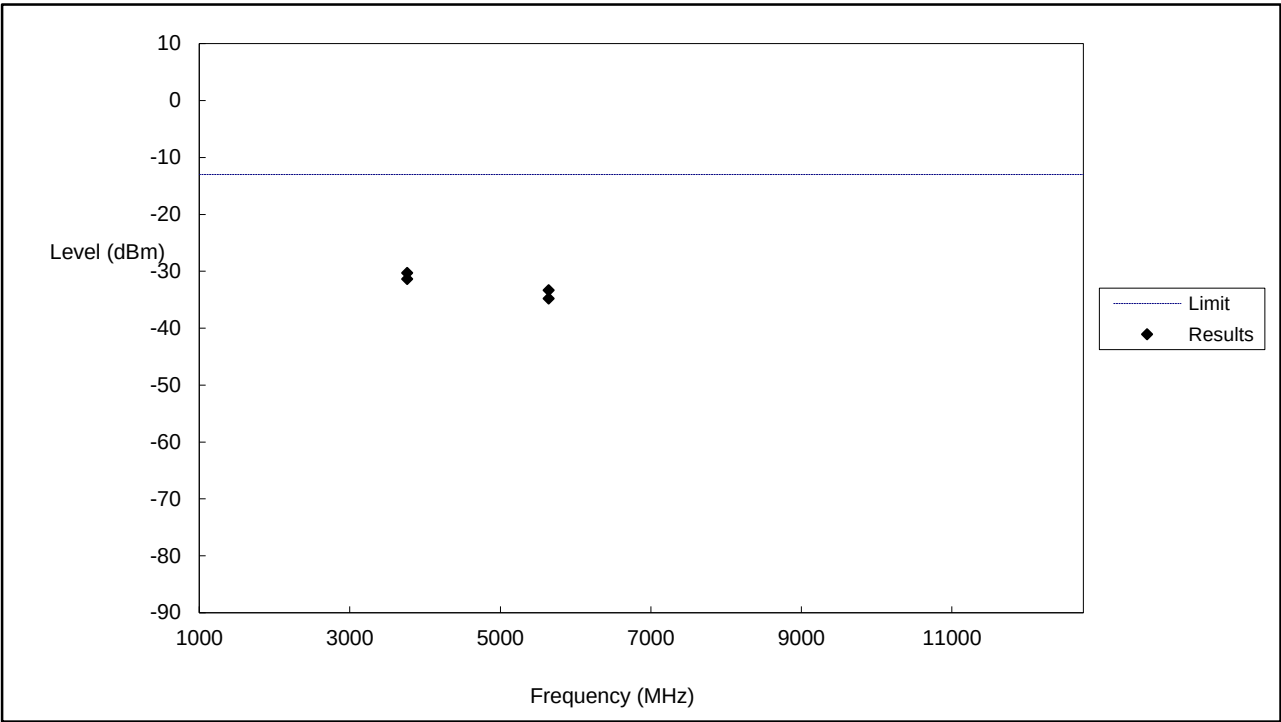
➤ For PCS Band_GSM1900 Mode

Low Channel (1850.2MHz)



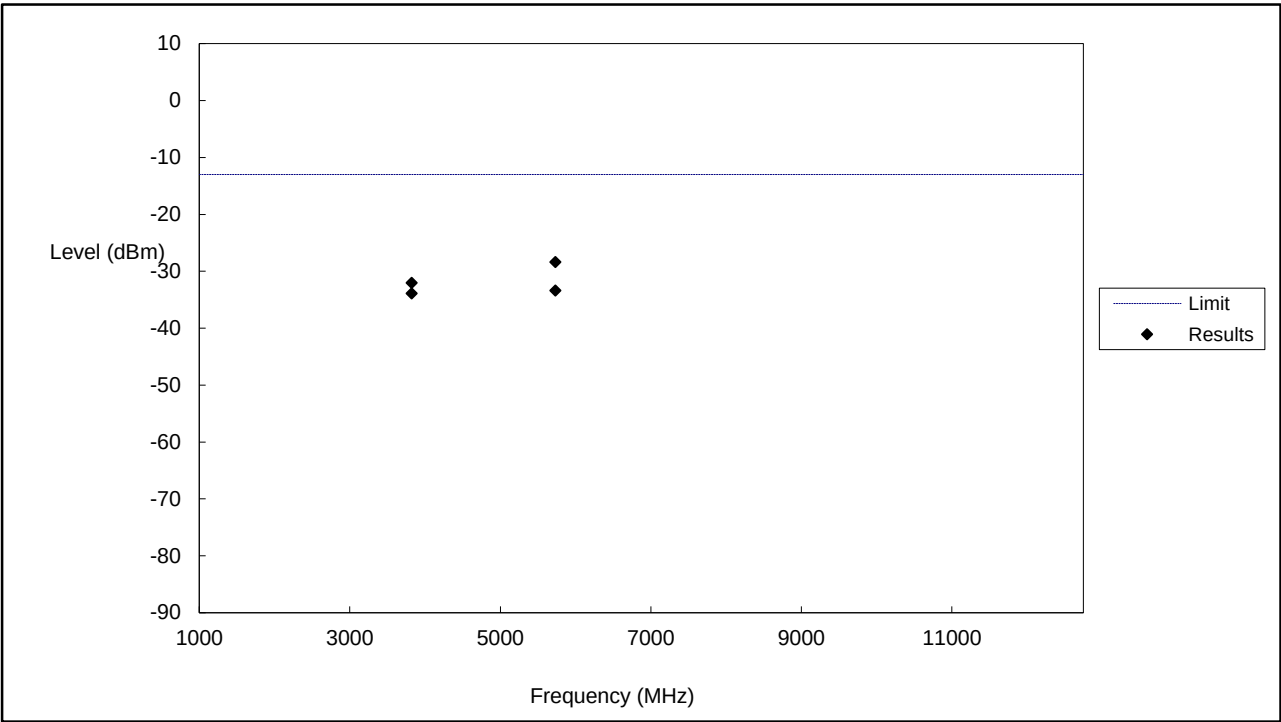
No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3700.4	-33.42	-13	-20.42	H	RMS
2	5550.6	-34.17	-13	-21.17	H	RMS
1	3700.4	-32.80	-13	-19.80	V	RMS
2	5550.6	-37.06	-13	-24.06	V	RMS

Middle Channel (1880MHz)



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3760.0	-31.34	-13	-18.34	H	RMS
2	5640.0	-34.76	-13	-21.76	H	RMS
1	3760.0	-30.29	-13	-17.29	V	RMS
2	5640.0	-33.30	-13	-20.30	V	RMS

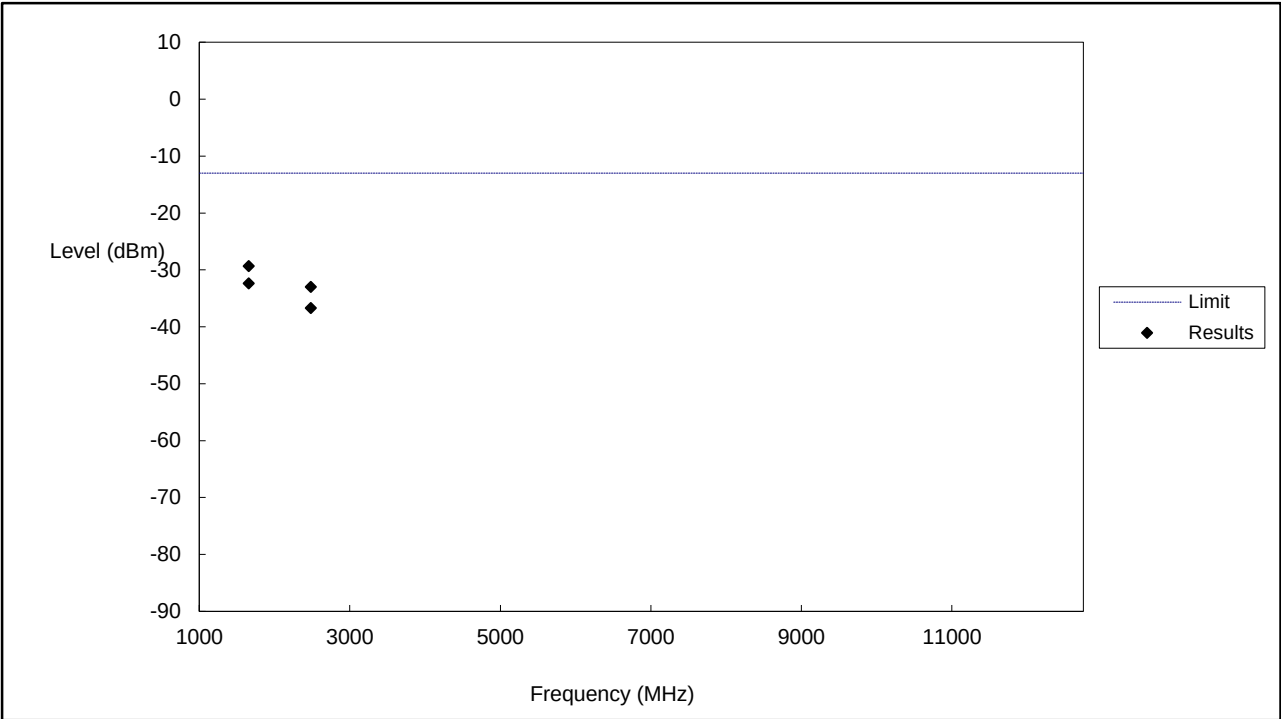
High Channel (1909.8MHz)



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3819.6	-32.02	-13	-19.02	H	RMS
2	5729.4	-33.35	-13	-20.35	H	RMS
1	3819.6	-33.89	-13	-20.89	V	RMS
2	5729.4	-28.37	-13	-15.37	V	RMS

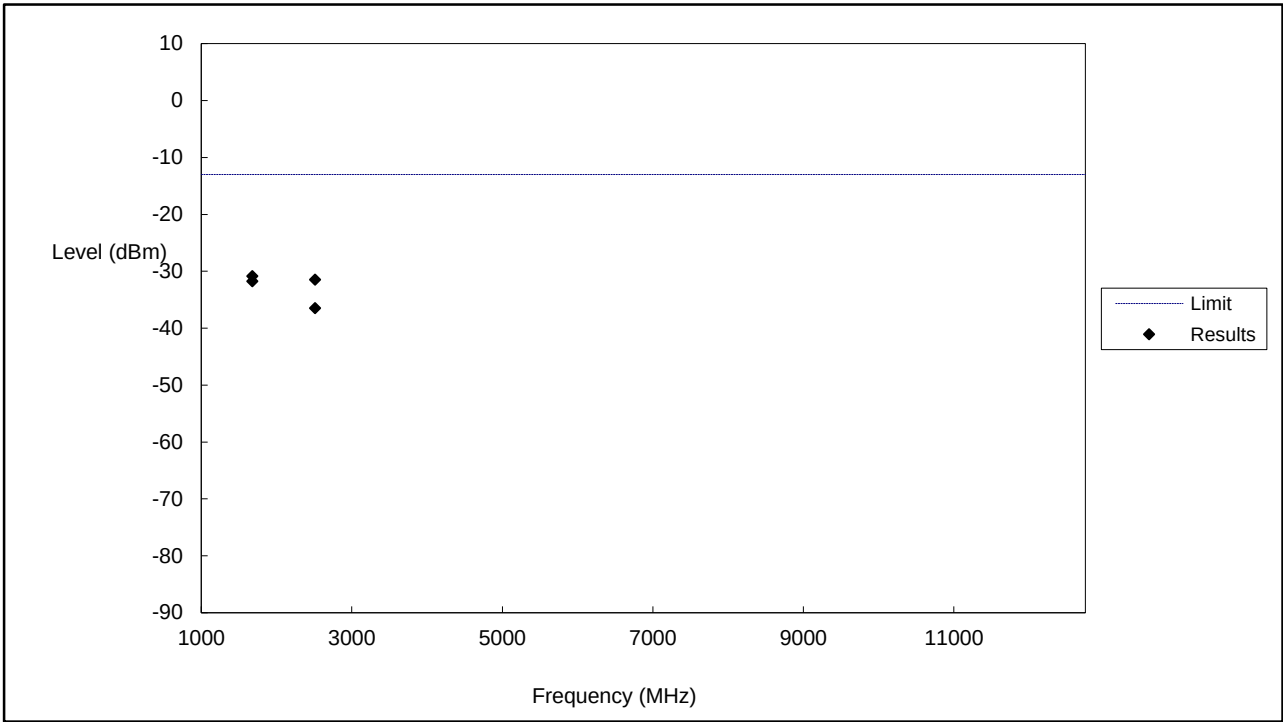
➤ For WCDMA Band V Mode

Low Channel (826.4MHz)



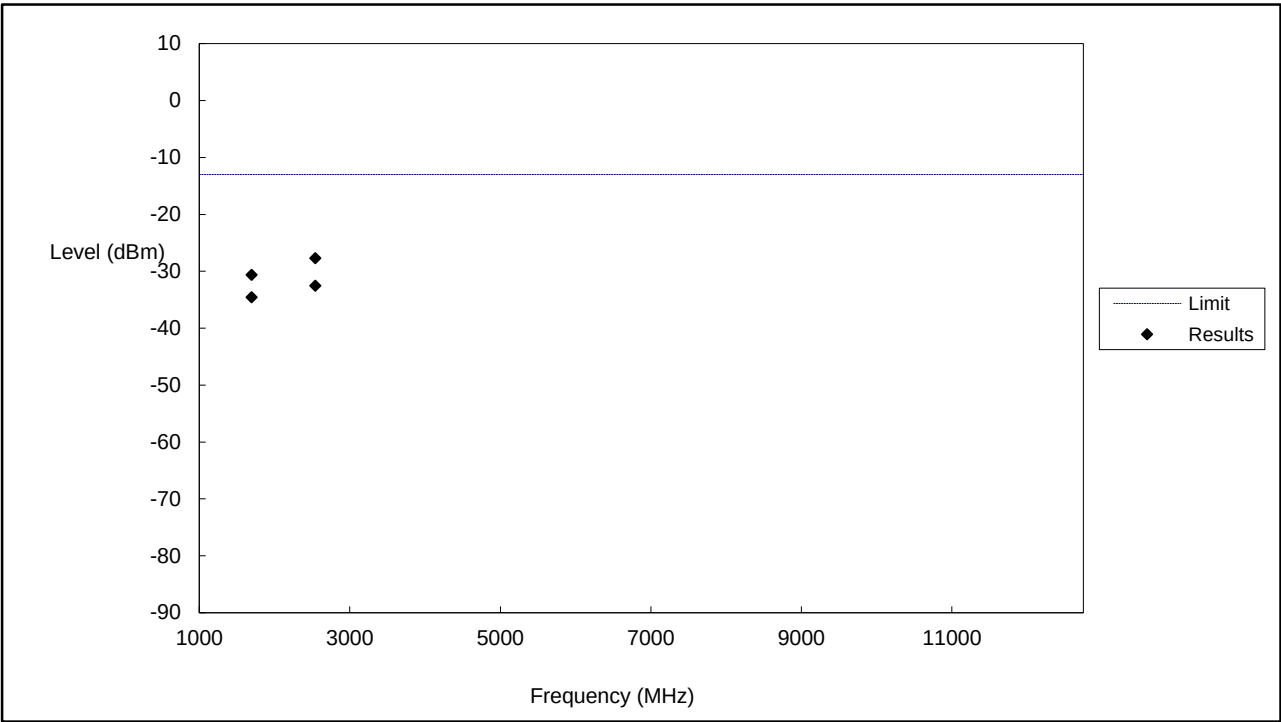
No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1652.8	-32.33	-13	-19.33	H	RMS
2	2479.2	-32.99	-13	-19.99	H	RMS
1	1652.8	-29.31	-13	-16.31	V	RMS
2	2479.2	-36.66	-13	-23.66	V	RMS

Middle Channel (836.6MHz)



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1672.8	-31.72	-13	-18.72	H	RMS
2	2509.2	-31.47	-13	-18.47	H	RMS
1	1672.8	-30.82	-13	-17.82	V	RMS
2	2509.2	-36.46	-13	-23.46	V	RMS

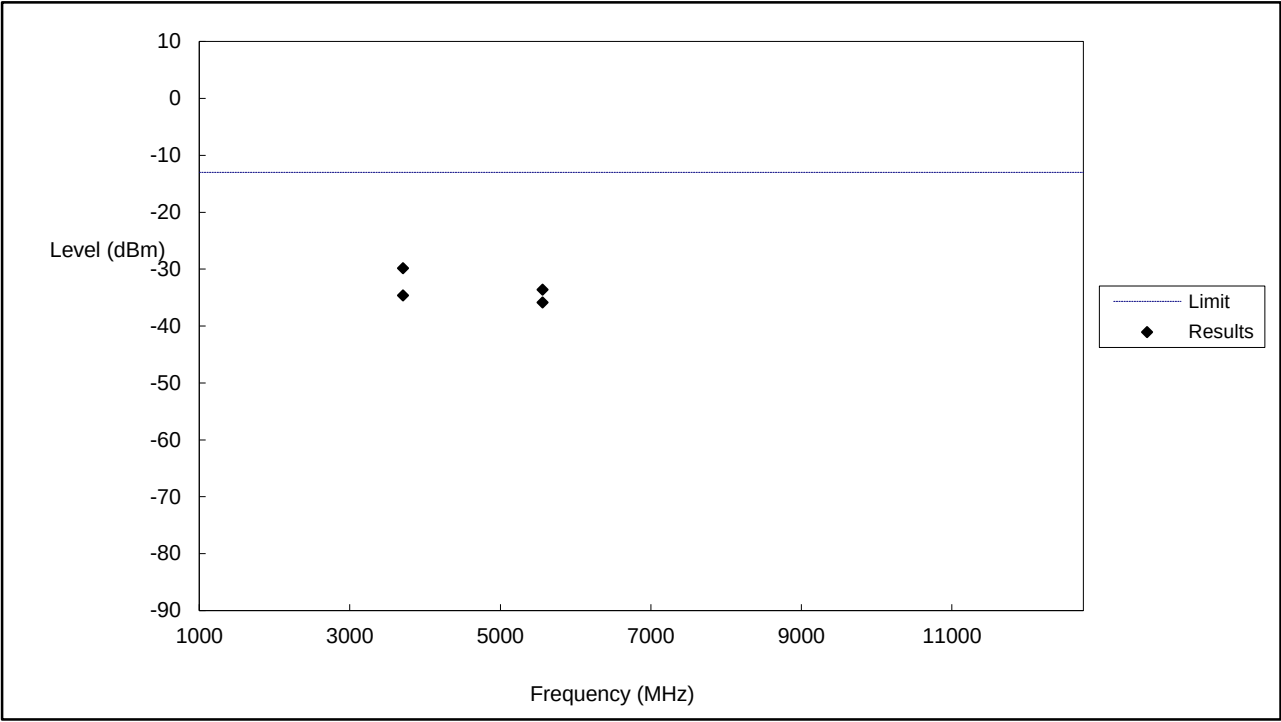
High Channel (846.6MHz)



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	1693.2	-34.55	-13	-21.55	H	RMS
2	2539.8	-32.54	-13	-19.54	H	RMS
1	1693.2	-30.62	-13	-17.62	V	RMS
2	2539.8	-27.66	-13	-14.66	V	RMS

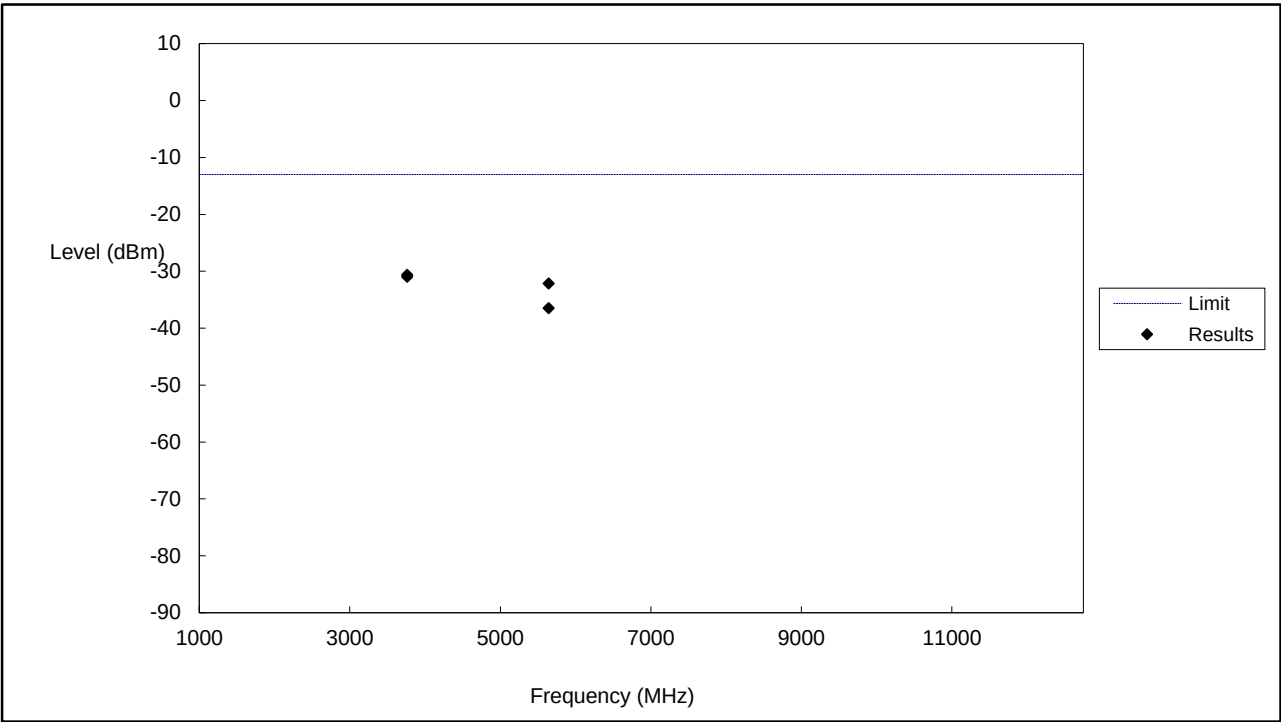
➤ For WCDMA Band II Mode

Low Channel (1852.4MHz)



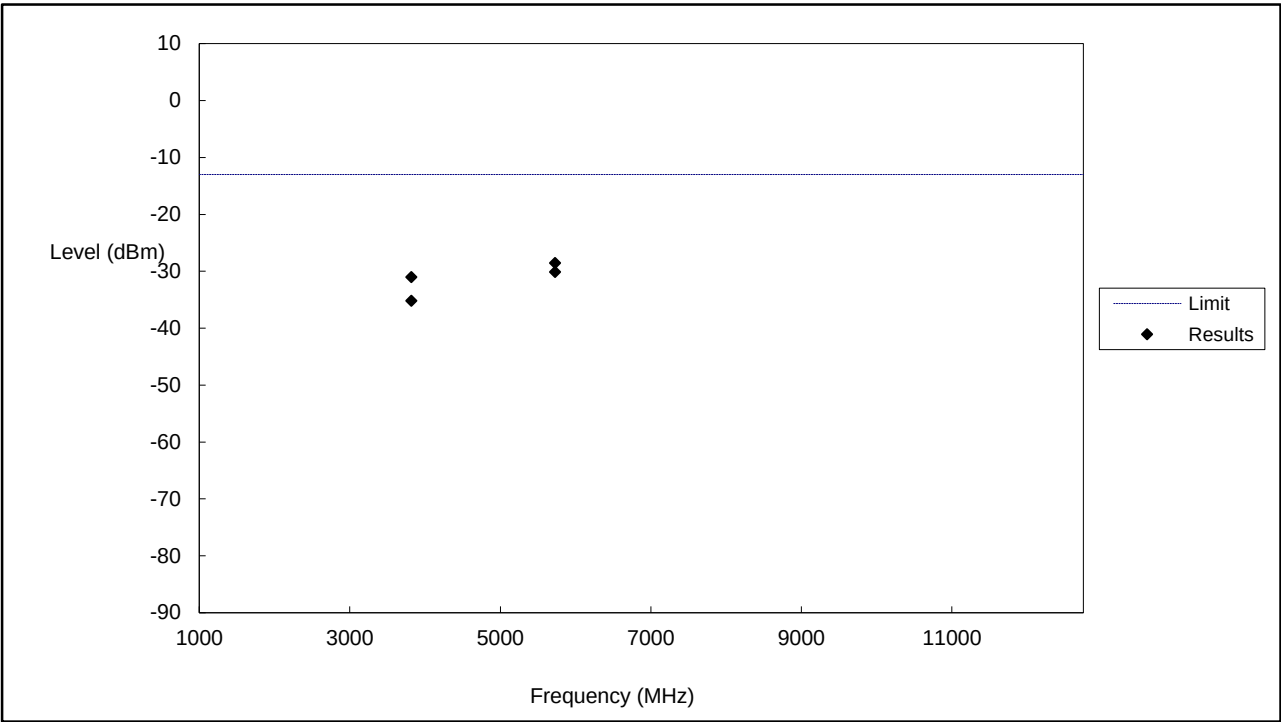
No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3704.8	-34.57	-13	-21.57	H	RMS
2	5557.2	-35.82	-13	-22.82	H	RMS
1	3704.8	-29.83	-13	-16.83	V	RMS
2	5557.2	-33.58	-13	-20.58	V	RMS

Middle Channel (1880MHz)



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3760.8	-30.58	-13	-17.58	H	RMS
2	5640.0	-32.14	-13	-19.14	H	RMS
1	3760.8	-30.96	-13	-17.96	V	RMS
2	5640.0	-36.44	-13	-23.44	V	RMS

High Channel (1907.6MHz)



No.	Frequency	Result	Limit	Margin	Polarity	Remark
	(MHz)	(dBm)	(dBm)	(dB)		
1	3815.2	-35.16	-13	-22.16	H	RMS
2	5722.8	-30.10	-13	-17.10	H	RMS
1	3815.2	-30.98	-13	-17.98	V	RMS
2	5722.8	-28.52	-13	-15.52	V	RMS

Note: Result=Reading+ Correct, Margin= Result- Limit

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

8. Frequency Stability

8.1 Standard Applicable

According to §22.355, §24.235, §27.54 the limit is 2.5ppm.

8.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.

8.3 Summary of Test Results/Plots

Please refer to Appendix E

9. Modulation characteristics

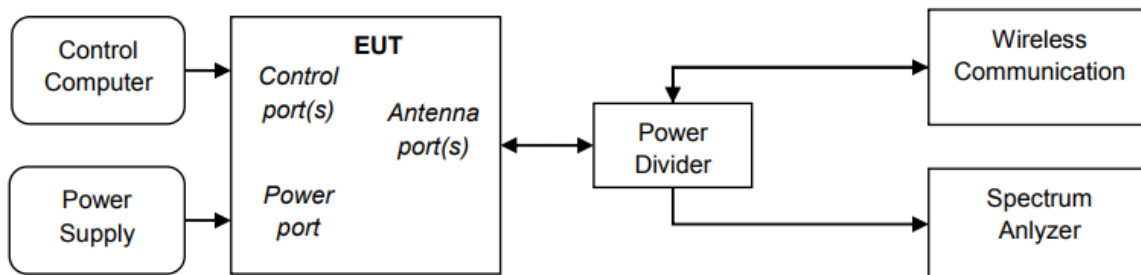
9.1 Standard Applicable

According to §2.1047, measurements required: Modulation characteristics is given below:

- (a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.
- (b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.
- (c) Single sideband and independent sideband radiotelephone transmitters which employ a device or circuit to limit peak envelope power. A curve showing the peak envelope power output versus the modulation input voltage shall be supplied. The modulating signals shall be the same in frequency as specified in paragraph (c) of §2.1049 for the occupied bandwidth tests.
- (d) Other types of equipment. A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

9.2 Test Procedure

According to ANSI C63.26-2015 section 5.3.2, the following test setup was performed.



9.3 Summary of Test Results/Plots

Please refer to Appendix F

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

***** END OF REPORT *****