



TEST REPORT

Reference No. : WTX22X08156832W002
Manufacturer : Descartes Systems Group Inc.
Address : 105 Trafalgar Street, Floor 2, Nelson, Tasman 7011, New Zealand
Product Name : COREInsight® Reader
Model No. : RDR001
Standards : ETSI EN 301 908-1 V15.1.1 (2021-09)
ETSI EN 301 908-13 V13.2.1 (2022-02)
Date of Receipt sample : 2022-08-01
Date of Test : 2022-08-01 to 2022-08-28
Date of Issue : 2022-08-28
Test Report Form No. : WTX_ETSI EN 301 908_1_2019W
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.

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Report version

Version No.	Date of issue	Description
Rev.00	2022-08-28	Original
/	/	/

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	COREInsight® Reader
Trade Name:	/
Model No.:	RDR001
Adding Model(s):	/
Rated Voltage:	DC12V
Rated Current:	3A
Adapter Model:	Model:ATS036T-W120V Input:AC240V ~ 50-60Hz 1A MAX Output:DC12V,3A
Software Version:	/
Hardware Version:	/
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

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Technical Characteristics of EUT	
4G	
Support Bands:	FDD-LTE Band1, 3, 7, 8, 20 TDD-LTE Band 38, 40
Frequency Range:	FDD-LTE Band 1: Tx: 1920-1980MHz, Rx: 2110-2170MHz
	FDD-LTE Band 3: Tx: 1710-1785MHz, Rx: 1805-1880MHz
	FDD-LTE Band 7: Tx: 2500-2570MHz, Rx: 2620-2690MHz
	FDD-LTE Band 8: Tx: 880-915MHz, Rx: 925-960MHz
	FDD-LTE Band 20: Tx: 832-862MHz, Rx: 791-821MHz
	TDD-LTE Band 38: Tx: 2570-2620MHz, Rx: 2570-2620MHz
Max.RF Output Power:	TDD-LTE Band 40: Tx: 2300-2400MHz, Rx: 2300-2400MHz
	FDD-LTE Band 1: 23.95dBm, FDD-LTE Band 3: 23.97dBm, FDD-LTE Band 7: 24.41dBm, FDD-LTE Band 8: 24.16dBm, FDD-LTE Band 20: 23.82dBm, TDD-LTE Band 38: 24.25dBm, TDD-LTE Band 40: 23.87dBm
Modulation Type:	QPSK, 16QAM
Antenna Type:	Main : External Antenna DIV: FPC Antenna
Antenna Gain:	FDD-LTE Band 1: 1dBi, FDD-LTE Band 3: 1dBi, FDD-LTE Band 5: 1dBi, FDD-LTE Band 7: 1dBi, FDD-LTE Band 8: 1dBi, TDD-LTE Band 38: 1dBi, TDD-LTE Band 40: 1dBi,
<i>Note: The Antenna Gain is provided by the customer and can affect the validity of results.</i>	



1.2 Test Standards

The tests were performed according to following standards:

ETSI EN 301 908-1 V15.1.1 (2021-09): IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 1: Introduction and common requirements.

ETSI EN 301 908-13 V13.2.1 (2022-02): IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE).

ETSI TS 136 521-1 V14.3.0 (2017-08): LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing (3GPP TS 36.521-1 version 14.3.0 Release 14).

ETSI TS 136 508 V14.3.0 (2017-11): LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common test environments for User Equipment (UE) conformance testing (3GPP TS 36.508 version 14.3.0 Release 14).

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which maybe results in lowering the emission/immunity should be checked to ensure that compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 908-1, ETSI EN 301 908-13. The equipment under test (EUT) was configured to measure its highest possible emission level. For more detail refer 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.



1.5 EUT Setup and Test Mode

The EUT has been tested under typical operating condition. The Applicant provide software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Test Mode List		
Test Mode	Description	Remark
TM1	FDD Band 1	Transmitting/ Receiving/Idle
TM2	FDD Band 3	Transmitting/ Receiving/Idle
TM3	FDD Band 7	Transmitting/ Receiving/Idle
TM4	FDD Band 8	Transmitting/ Receiving/Idle
TM5	FDD Band 20	Transmitting/ Receiving/Idle
TM6	TDD Band 38	Transmitting/ Receiving/Idle
TM7	TDD Band 40	Transmitting/ Receiving/Idle
Note: The EUT only supports one SIM card.		

Test Conditions					
	NTNV	LTLV	LTHV	HTHV	HTLV
Temperature (°C)	20	-20	-20	55	55
Voltage (V)	12	10.8	13.2	13.2	10.8
Note: All the test conditions test have been done,only show the worst case in the test report.					
Temperature:	25 °C				
Relative Humidity:	45 %.				
ATM Pressure:	1019 mbar				

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

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

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/



1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Uncertainty	Notes
Conducted RF Output Power	$\pm 0.6\text{dB}$	(1)
Transmitter spectrum emission mask	$\pm 1.5\text{dB}$	(1)
Conducted Transmitter spurious emissions	$\pm 1.0\text{dB}$	(1)
Transmitter minimum output power	$\pm 1.0\text{dB}$	(1)
Receiver adjacent channel selectivity	$\pm 0.5\text{dB}$	(1)
Receiver blocking characteristics	$\pm 1.7\text{dB}$	(1)
Receiver spurious response	$\pm 1.7\text{dB}$	(1)
Receiver intermodulation characteristics	$\pm 1.3\text{dB}$	(1)
Conducted Receiver spurious emissions	$\pm 1.0\text{dB}$	(1)
Transmitter adjacent channel power leakage ratio	$\pm 0.8\text{dB}$	(1)
Receiver Reference Sensitivity level	$\pm 1.0\text{dB}$	(1)
Radiated Spurious Emissions	30-200MHz $\pm 4.52\text{dB}$	(1)
	0.2-1GHz $\pm 5.56\text{dB}$	(1)
	1-6GHz $\pm 3.84\text{dB}$	(1)
	6-18GHz $\pm 3.92\text{dB}$	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.



1.7 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Spectrum Analyzer	Agilent	N9020A	US47140102	2022-03-22	2023-03-21
Signal Generator	Agilent	83752A	3610A01453	2022-03-22	2023-03-21
Vector Signal Generator	Agilent	N5182A	MY47070202	2022-03-22	2023-03-21
Spectrum Analyzer	Agilent	E4407B	MY41440400	2022-03-25	2023-03-24
Communication Tester	HP	8921A	/	2022-03-22	2023-03-21
Temperature&Humidity Chamber	/	HTC-1	/	2022-03-22	2023-03-21
Universal Radio Communication Tester	Rohde & Schwarz	CMW500	148650	2022-03-22	2023-03-21
☒ Chamber A: Below 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-25	2023-03-24
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
Amplifier	Agilent	8447F	3113A06717	2022-03-22	2023-03-21
Loop Antenna	Schwarz beck	FMZB 1516	9773	2022-03-22	2023-03-21
Trilog Broadband Antenna	Schwarz beck	VULB9163	9163-333	2022-03-25	2023-03-24
☒ Chamber A: Above 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2022-03-22	2023-03-21
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-21	2023-03-20
Amplifier	C&D	PAP-1G18	2002	2022-03-21	2023-03-20
Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2021-04-27	2023-04-26
Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2022-03-25	2023-03-24
☐ Chamber B:Below 1GHz					
Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
Amplifier	Agilent	8447D	2944A10179	2022-03-21	2023-03-20
EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2022-03-25	2023-03-24
☐ Chamber C:Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2022-01-07	2023-01-06
Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2023-05-27
Amplifier	HP	8447F	2944A03869	2022-03-21	2023-03-20



Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
LTE Test System*	Tonscend	JS1120-1	V2.5

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

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2. SUMMARY OF TEST RESULTS

Test Item	Test Requirement EN301908-1		Test Conditions	Verdict	Note:
Radiated emissions (UE)	Section 4.2.2		NTNV	Pass	Reference to the section 3.12
Control and monitoring functions (UE)	Section 4.2.4		NTNV	Pass	Reference to the section 3.13
Test Item	Test Requirement EN301908-13	Test Method ETSI TS136521-1	Test Conditions	Verdict	Note:
Transmitter Maximum Output Power	Section 4.2.2	Clause 6.2.2	NTNV LTLV LTHV HTLV HTHV	Pass Pass Pass Pass Pass	Appendix
Transmitter Spectrum emission mask	Section 4.2.3	Clause 6.6.2.1	NTNV	Pass	Appendix
Transmitter Spurious Emissions	Section 4.2.4	Clause 6.6.3.2	NTNV	Pass	Appendix
Transmitter Minimum Output Power	Section 4.2.5	Clause 6.3.2	NTNV LTLV LTHV HTLV HTHV	Pass Pass Pass Pass Pass	Appendix
Receiver adjacent channel selectivity(ACS)	Section 4.2.6	Clause 7.5	NTNV	Pass	Appendix
Receiver Blocking Characteristics	Section 4.2.7	Clause 7.6.1	NT/NV	Pass	Appendix
Receiver Spurious Response	Section 4.2.8	Clause 7.7	NT/NV	Pass	Appendix
Receiver Intermodulation Characteristics	Section 4.2.9	Clause 7.8	NTNV	Pass	Appendix
Receiver Spurious Emissions	Section 4.2.10	Clause 7.9	NTNV	Pass	Appendix
Transmitter Adjacent Channel Leakage Power Ratio	Section 4.2.11	Clause 6.6.2.3	NTNV LTLV LTHV	Pass Pass Pass	Appendix



			HTLV HTHV	Pass Pass	
Receiver Reference Sensitivity Level	Section 4.2.12	Clause 7.3	NTNV LTLV LTHV HTLV HTHV	Pass Pass Pass Pass Pass	Appendix
Test Item	Test Requirement EN301908-13	Test Method ETSI TS 137 544	Test Conditions	Verdict	Note:
Receiver Total Radiated Sensitivity (TRS)	Section 4.2.13	clause 7.1.5.4.2 and clause 7.1.6.4.2	NT/NV	Pass	Appendix
Total Radiated Power (TRP)	Section 4.2.14	clause 7.1.5.4.2 and clause 7.1.6.4.2	NT/NV	Pass	Appendix

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3. Essential radio test suites

3.1 Transmitter maximum output power

Clause 6.2.2 of ETSI TS 136 521-1 applies.

RESULT: Pass

3.1.1 Definition and applicability

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

This test case applies to all types of E-UTRA UE release 8 and forward.

3.1.2 Conformance requirements

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH (see section 1.6).

Frequencies to be tested: low range, mid range, high range; as specified in TS 136 508 [2], clause 4.3.1.

Channel bandwidths to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect the SS to the UE antenna connectors.
- 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
- 4) The UL Reference Measurement channels are set according to TS 136 521-1 [1].
- 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The UE maximum output power shall be within the shown value in table 4.2.2.1.2-1.



E-UTRA Band	Power Class 3(dBm)	Tolerance(dB)
1	23	$\pm 2,7$
3	23	$\pm 2,7$ (see note)
7	23	$\pm 2,7$ (see note)
8	23	$\pm 2,7$ (see note)
20	23	$\pm 2,7$ (see note)
22	23	+3,0/-4,5
28	23	+2,7/-3,2
33	23	$\pm 2,7$
34	23	$\pm 2,7$
38	23	$\pm 2,7$
40	23	$\pm 2,7$
42	23	+3,0/-4,0
43	23	+3,0/-4,0

NOTE: For transmission bandwidths (ETSI TS 136 521-1 [1], clause 5) confined within FUL_low and FUL_low + 4 MHz or FUL_high - 4 MHz and FUL_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1,5 dB (tolerance = +2,7/-4,2).

NOTE 1: These requirements do not take into account the maximum power reductions allowed to the UE in subject to certain transmission conditions specified in TS 136 101 [4], clauses 6.2.3 and 6.2.4.

NOTE 2: The range of UE maximum output power for the various power classes are specified in TS 136 101 [4], clause 6.2.2. The values in table 4.2.2.1.2-1 correspond to the measurement limits taking into account the measurement uncertainty of measurement equipment (see clause 5.2).

3.1.3 Set up for testing

- 1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to table 6.2.2.1.4.1-1 of TS 136 521-1 [1]. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2) Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200 ms for the UE to reach PUMAX level.
- 3) Measure the mean power of the UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one sub-frame (1 ms). For TDD slots with transient periods are not under test.
- 4) Repeat for applicable test frequencies, channel bandwidths, operating band combinations and environmental conditions.

3.1.4 Test result

Please refer to the Appendix



Reference No.: WTX22X08156832W002

3.2 Transmitter spectrum emission mask

Clause 6.6.2.1 of ETSI TS 136 521-1 applies.

RESULT: Pass

3.2.1 Definition and applicability

Out of band emissions are unwanted emissions immediately outside the nominal channel resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a Spectrum Emission Mask and Adjacent Channel Leakage power Ratio.

This test case applies to all types of E-UTRA UE release 8 and forward.

3.2.2 Conformance requirements

Test environment: normal (see section 1.6).

Frequencies to be tested: low range, mid range and high range; as specified in TS 136 508 [2], clause 4.3.1.

Channel bandwidths to be tested: lowest, 5 MHz, 10 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect the SS to the UE antenna connectors.
- 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
- 4) The UL Reference Measurement channels are set according to TS 136 521-1 [1].
- 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

The power of any UE emission shall fulfil requirements in tables 4.2.3.1.2-1 and 4.2.3.1.2-2.



Table 4.2.3.1.2-1: General E-UTRA spectrum emission mask, E UTRA bands ≤ 3 GHz

Δf_{OoB} (MHz)	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth
0 to 1	-8.5	-11.5	-13.5	-16.5	-18.5	-19.5	30 kHz
1 to 2.5	-8.5	-8.5	-8.5	-8.5	-8.5	-8.5	1 MHz
2.5 to 2.8	-23.5	-8.5	-8.5	-8.5	-8.5	-8.5	1 MHz
2.8 to 5		-8.5	-8.5	-8.5	-8.5	-8.5	1 MHz
5 to 6		-23.5	-11.5	-11.5	-11.5	-11.5	1 MHz
6 to 10			-23.5	-11.5	-11.5	-11.5	1 MHz
10 to 15				-23.5	-11.5	-11.5	1 MHz
15 to 20					-23.5	-11.5	1 MHz
20 to 25						-23.5	1 MHz

NOTE 1: The first and last measurement position with a 30kHz filter is at Δf_{OoB} equals to 0.015MHz and 0.985MHz.

NOTE 2: The first and last measurement position with a 1MHz filter for 1MHz – 2.5MHz offset range is at Δf_{OoB} equals to 1.5MHz and 2.0MHz. Similarly for other Δf_{OoB} ranges.

NOTE 3: The measurements shall be performed above the upper edge of the channel and below the lower edge of the channel.

NOTE 4: For the 2.5MHz – 2.8MHz offset range with 1.4MHz channel bandwidth, the measurement position is at Δf_{OoB} equals to 3MHz.

Table 4.2.3.1.2-2: General E-UTRA spectrum emission mask, 3GHz < E-UTRA bands ≤ 4.2GHz

Δf_{OoB} (MHz)	Spectrum emission limit (dBm)/Channel bandwidth						Measurement bandwidth
	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
0 to 1	-8.2	-11.2	-13.2	-16.2	-18.2	-19.2	30kHz
1 to 2,5	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	1MHz
2.5 to 2.8	-23.2						1MHz
2.8 to 5							1MHz
5 to 6		-23.2	-11.2	-11.2	-11.2	-11.2	1MHz
6 to 10			-23.2				1MHz
10 to 15				-23.2			1MHz
15 to 20					-23.2		1MHz
20 to 25						-23.2	1MHz

NOTE 1: The first and last measurement position with a 30kHz filter is at Δf_{OoB} equals to 0.015MHz and 0.985MHz.

NOTE 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.

NOTE 3: The measurements shall be performed above the upper edge of the channel and below the lower edge of the channel.

NOTE 4: For the 2.5-2.8MHz offset range with 1.4 MHz channel bandwidth, the measurement position is at Δf_{OoB} equals to 3MHz.



3.2.3 Set up for testing

- 1) SS sends uplink scheduling information via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 6.6.2.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2) Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at PUMAX level.
- 3) Measure the power of the transmitted signal with a measurement filter of bandwidths according to tables 4.2.3.1.2-1 or 4.2.3.1.2-2, as applicable. The center frequency of the filter shall be stepped in continuous steps according to the same table. The measured power shall be recorded for each step. The measurement period shall capture the active TSs.
- 4) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

3.2.4 Test result

Please refer to the Appendix

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3.3 Transmitter spurious emissions

Clause 6.6.3 of ETSI TS 136 521-1 applies.

RESULT: Pass

3.3.1 Definition and applicability

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions. The spurious emission limits are specified in terms of general requirements in line with Recommendation ITU-R SM.329-12 [i.5] and E-UTRA operating band requirement to address UE co-existence. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

3.3.2 Conformance requirements

Test environment: normal condition (see section 1.6).

Frequencies to be tested: low range, mid range, high range; see TS 136 508 [2].

Channel bandwidth to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2].

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect the SS to the UE antenna connectors.
- 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
- 4) The UL Reference Measurement channels are set according to TS 136 521-1 [1]. 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The spurious emission limits in table 4.2.4.1.2-2 apply for the frequency ranges that are more than Δf_{OOB} (MHz) from the edge of the channel bandwidth shown in table 4.2.4.1.2-1.

The measured average power of spurious emission for general requirements shall not exceed the described values in table 4.2.4.1.2-2.

The measured average power of spurious emission for E-UTRA operating band specific requirements to protected bands shall not exceed the described values in tables 4.2.4.1.2-3 and 4.2.4.1.2-4.

Table 4.2.4.1.2-1:

Δf_{OOB} boundary between E-UTRA channel and spurious emission domain.



Channel bandwidth	1.4MHz	3.0MHz	5MHz	10MHz	15MHz	20MHz
Δf_{OOB} (MHz)	2.8	6	10	15	20	25

Table 4.2.4.1.2-2: General spurious emissions limits.

Frequency range	Maximum level	Measurement bandwidth	Comment
$9\text{kHz} \leq f < 150\text{kHz}$	-36dBm	1kHz	
$150\text{kHz} \leq f < 30\text{MHz}$	-36dBm	10kHz	
$30\text{MHz} \leq f < 1\,000\text{MHz}$	-36dBm	100kHz	
$1\text{GHz} \leq f < 12.75\text{GHz}$	-30dBm	1MHz	
12.75GHz $f < 5$ th harmonic of the upper frequency edge of the UL operating band in GHz	-30dBm	1MHz	See note
NOTE: Shall apply for Band 22, 42 and Band 43.			

NOTE 1: In order that the measurement of spurious emissions falls within the frequency ranges that are more than Δf_{OOB} (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be $\Delta f_{OOB} + \text{MBW}/2$. MBW denotes the measurement bandwidth defined in table 4.2.4.1.2-2.

The additional requirements in table 4.2.4.1.2-3 apply for the frequency ranges that are more and less than Δf_{OOB} (MHz) from the edge of the channel bandwidth shown in table 4.2.4.1.2-1.

3.3.3 Set up for testing

- 1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 6.6.3.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2) Send continuously Up power control commands in the uplink scheduling information to the UE until the UE transmits at PUMAX level.
- 3) For each applicable requirement in tables 4.2.4.1.2-2, 4.2.4.1.2-3 and 4.2.4.1.2-4; Measure the power of the transmitted signal with a measurement filter of bandwidths. The center frequency of the filter shall be stepped in contiguous steps according to the tables. The measured power shall be verified for each step. The measurement period shall capture the active time slots.
- 4) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

3.3.4 Test result

Please refer to the Appendix



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3.4 Transmitter minimum output power

Clause 4.2.5 of EN 301 908-13 applies.

RESULT: Pass

3.4.1 Definition and applicability

The minimum controlled output power of the UE is defined as the broadband transmit power of the UE, i.e. the power in the channel bandwidth for all transmit bandwidth configurations (resource blocks), when the power is set to a minimum value.

3.4.2 Conformance requirements

Test environment: normal, TL/VL, TL/VH, TH/VL, TH/VH (see section 1.6)

Frequencies to be tested: low range, mid range and high range; see TS 136 508 [2].

Channel bandwidths to be tested: lowest, 5 MHz and highest channel bandwidth, as specified in TS 136 508 [2], clause 4.3.1.

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect the SS to the UE antenna connectors.
- 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
- 4) The UL Reference Measurement channels are set according to TS 136 521-1 [1].
- 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The minimum output power measured shall not exceed the values specified in table 4.2.5.1.2-1.

Table 4.2.5.1.2-1: Minimum output power

	Channel bandwidth/minimum output power/measurement bandwidth					
	1.4MHz	3.0MHz	5MHz	10MHz	15MHz	20MHz
Minimum output power	For carrier frequency $f \leq 3.0\text{GHz}$: $\leq -39\text{dBm}$ For carrier frequency $3.0\text{GHz} < f \leq 4.2\text{GHz}$: $\leq -38.7\text{dBm}$					
Measurement bandwidth	1.08MHz	2.7MHz	4.5MHz	9.0MHz	13.5MHz	18MHz



3.4.3 Set up for testing

- 1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 6.3.2.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2) Send continuous uplink power control "down" commands in the uplink scheduling information to the UE to ensure that the UE transmits at its minimum output power.
- 3) Measure the mean power of the UE in the associated measurement bandwidth specified in table 4.5.2.1-1 for the specific channel bandwidth under test. The period of measurement shall be the continuous duration of one sub-frame (1 ms). For TDD slots with transient periods are not under test.
- 4) Repeat for applicable test frequencies, channel bandwidths, operating band combinations and environmental conditions.

Details of the test method can be found in TS 136 521-1 [1], clause 6.3.2.

3.4.4 Test result

Please refer to the Appendix

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Reference No.: WTX22X08156832W002

3.5 Receiver adjacent channel selectivity

Clause 7.5 of ETSI TS 136 521-1 applies.

RESULT: Pass

3.5.1 Definition and applicability

Adjacent Channel Selectivity (ACS) is a measure of a receiver's ability to receive an E-UTRA signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

3.5.2 Conformance requirements

Test environment: normal (see section 1.6).

Frequencies to be tested: mid range see TS 136 508 [2].

Channel bandwidth to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect the SS and interfering source to the UE antenna connectors.
- 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
- 4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1], table 7.5.4.1-1.
- 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The throughput R_{av} shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] under the conditions specified in table 4.2.6.2-2 and also under the conditions specified in table 4.2.6.2-3.

Table 4.2.6.1.2-1: Adjacent channel selectivity

Rx Parameter	Units	Channel bandwidth					
		1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
ACS	dB	33.0	33.0	33.0	33.0	30	27



Table 4.2.6.1.2-2: Test parameters for Adjacent channel selectivity, Case 1

Rx Parameter	Units	Channel bandwidth					
		1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + 14dB					
$P_{\text{Interferer}}$	dBm	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +42.5dB	REFSENS +39.5dB
$BW_{\text{Interferer}}$	MHz	1.4	3	5	5	5	5
$F_{\text{Interferer}}$ (offset)	MHz	1.4025	3.0075	5.0025	7.5075	10.0125	12.5025
NOTE 1: The transmitter shall be set to 4 dB below PCMAX_L or PCMAX_L_CA as defined in clause 6.2.5 in ETSI TS 136 101 [3].							
NOTE 2: The interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with set-up according to clause C.3.1 of ETSI TS 136 521-1 [1].							
NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].							

Table 4.2.6.1.2-3: Test parameters for Adjacent channel selectivity, Case 2.

Rx Parameter	Units	Channel bandwidth					
		1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
Power in Transmission Bandwidth Configuration	dBm	-56.5	-56.5	-56.5	-56.5	-53.5	-50.5
$P_{\text{Interferer}}$	dBm	-25					
$BW_{\text{Interferer}}$	MHz	1.4	3	5	5	5	5
$F_{\text{Interferer}}$ (offset)	MHz	1.4025	3.0075	5.0025	7.5075	10.0125	12.5025
NOTE 1: The transmitter shall be set to 24 dB below PCMAX_L or PCMAX_L_CA as defined in clause 6.2.5 in ETSI TS 136 101 [3].							
NOTE 2: The interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with set-up according to clause C.3.1 of ETSI TS 136 521-1 [1].							

3.5.3 Set up for testing

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.5.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.5.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.



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- 3) Set the Downlink signal level to the value as defined in table 4.2.6.2-2 (Case 1). Send Uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3, 4 dB of the target level in table 4.2.6.2-2 (Case 1) for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the Throughput measurement (obtain correct UE output power as specified in TS 136 521-1 [1]).
- 4) Set the Interferer signal level to the value as defined in table 4.2.6.2-2 (Case 1) and frequency below the wanted signal, using a modulated interferer as defined in TS 136 521-1 [1], annex D.
- 5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].
- 6) Set the Downlink signal level to the value as defined in table 4.2.6.2-3 (Case 2). Send Uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.6.2-3 (Case 2) for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement (obtain correct UE output power as specified in TS 136 521-1 [1]).
- 7) Set the Interferer signal level to the value as defined in table 4.2.6.2-3 (Case 2) and frequency below the wanted signal, using a modulated interferer as defined in TS 136 521-1 [1], annex D.
- 8) Measure the average throughput for a duration sufficient to achieve statistical significance according to TS 136 521-1 [1], annex G.
- 9) Repeat for applicable channel bandwidths in both Case 1 and Case 2.
- 10) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

3.5.4 Test result

Please refer to the Appendix



Reference No.: WTX22X08156832W002

3.6 Receiver blocking characteristics

Clause 7.6 of ETSI TS 136 521-1 applies.

RESULT: Pass

3.6.1 Definition and applicability

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.

3.6.2 Conformance requirements

Test environment: normal (see section 1.6).

For In-band blocking, the frequencies to be tested are mid range as defined in TS 136 508 [2].

For Out of band blocking, the frequency to be tested is low or high range as defined in TS 136 508 [2].

For Narrow-band blocking, the frequencies to be tested are mid range as defined in TS 136 508 [2].

Channel bandwidth to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1. Range 3 of out-of-band blocking is tested only with highest bandwidth.

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect the SS to the UE antenna connectors. 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.1 and uplink signals according to clauses H.1 and H.3.0.
- 4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1], table 7.6.2.4.1-1.
- 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

With parameters specified in tables 4.2.7.2-1 and 4.2.7.2-2, the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1].

With parameters specified in tables 4.2.7.2-3 and 4.2.7.2-4, the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1], except for the spurious response frequencies.

For table 4.2.7.2-4 in frequency range 1, 2 and 3, up to $\lfloor 0.6/6,24 \max RBN \rfloor$ exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size, where RBN is the number of resource blocks in the downlink transmission bandwidth configuration. For these exceptions the requirements of clause 4.2.8 Spurious response are applicable.



With parameters specified in table 4.2.7.2-5, the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1].

Table 4.2.7.1.2-1: In-band blocking parameters

Rx Parameter	Units	Channel bandwidth					
		1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
Power n Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
BWInterferer	MHz	1.4	3	5	5	5	5
Foffset, case 1	MHz	2.1125	4.5075	7.5125	7.5025	7.5075	7.5125
Foffset, case 2	MHz	3.5075	7.5075	12.5075	12.5125	12.5025	12.5075

NOTE 1: The transmitter shall be set to 4dB below $P_{\text{CMAX_L}}$ at the minimum uplink configuration specified in TSI TS 136 101 [3] (table 7.3.1-2 with $P_{\text{CMAX_L}}$ as defined in clause 6.2.5).

NOTE 2: The interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with a set-up according to clause C.3.1 of ETSI TS 136 521-1 [1].

NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].

Table 4.2.7.1.2-2: In-band blocking

E-UTRA band	Parameter	Units	Case 1	Case 2
	PInterferer	dBm	-56	-44
	F Interferer (Offset)	MHz	= -BW/2 - Foffset, case 1 and= +BW/2 + Foffset, case 1	$\leq -\text{BW}/2 - \text{Foffset, case 2}$ and $\geq +\text{BW}/2 + \text{Foffset, case 2}$
1, 3, 7, 8, 20, 22, 28, 33, 34, 38, 40, 42, 43	FInterferer	MHz	(note 2)	FDL_low - 15 to FDL_high + 15

NOTE 1: For certain bands, the unwanted modulated interfering signal may not fall inside the UE receive band, but within the first 15 MHz below or above the UE receive band.

NOTE 2: For each carrier frequency the requirement is valid for two frequencies:
a) the carrier frequency -BW/2 - Foffset, case 1; and
b) the carrier frequency + BW/2 + Foffset, case 1.

NOTE 3: FInterferer range values for unwanted modulated interfering signal are interferer centre frequencies.



Table 4.2.7.1.2-3: Out-of-band blocking parameters.

Rx Parameter	Units	Channel bandwidth					
		1,4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
NOTE 1: The transmitter shall be set to 4 dB below PCMAX_L at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with PCMAX_L as defined in clause 6.2.5).							
NOTE 2: Reference measurement channel is clause A.3.2 of ETSI TS 136 521-1 [1].							
NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].							

Table 4.2.7.1.2-4: Out-of-band blocking

E-UTRA band	Parameter		Frequency		
			Range 1	Range 2	Range 3
	P _{Interferer}	dBm	-44	-30	-15
1, 3, 7, 8, 20, 22, 28, 33, 34, 38, 40, 42 (NOTE 2), 43 (NOTE 2)	F _{Interferer} (CW)	MHz	F _{DL_low} - 15 to F _{DL_low} - 60	F _{DL_low} - 60 to F _{DL_low} - 85	F _{DL_low} - 85 to1 MHz
			F _{DL_high} ⁺ 15 to F _{DL_high} + 60	F _{DL_high} ⁺ 60 to F _{DL_high} + 85	F _{DL_high} ⁺ 85 to +12 750 MHz
NOTE 1: Range 3 shall be tested only with the highest channel bandwidth.					
NOTE 2: The power level of the interferer (P _{Interferer}) for Range 3 shall be modified to -20 dBm for F _{Interferer} > 2 800 MHz and F _{Interferer} < 4 400 MHz.					

Table 4.2.7.1.2-5: Narrow-band blocking

Parameter	Units	Channel Bandwidth					
		1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
P_w	dBm	PREFSENS + channel-bandwidth specific value below					
		22	18	16	13	14	16
$P_{w\text{ (CW)}}$	dBm	-55	-55	-55	-55	-55	-55
$F_{w\text{ (offset for } \Delta f = 15 \text{ kHz)}}$	MHz	0.9075	1.7025	2.7075	5.2125	7.7025	10.2075
NOTE 1: The transmitter shall be set 4 dB below PCMAX_L at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with PCMAX_L as defined in clause 6.2.5).							
NOTE 2: Reference measurement channel is in clause A.3.2 of ETSI TS 136 521-1 [1].							
NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].							



3.6.3 Set up for testing

In-Of-Band Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.6.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.6.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the parameters of the signal generator for an interfering signal below the wanted signal in Case 1 according to tables 4.2.7.2-1 and 4.2.7.2-2 as specified in TS 136 521-1 [1].
- 4) Set the downlink signal level according to the table 4.2.7.2-1. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.7.2-1 for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].
- 5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].
- 6) Repeat steps from 3 to 5, using an interfering signal above the wanted signal in Case 1 at step 3.
- 7) Repeat steps from 3 to 6, using interfering signals in Case 2 at step 3) and 6). The ranges of case 2 are covered in steps equal to the interferer bandwidth. The test frequencies are chosen in analogy to TS 136 521-1 [1], table 7.6.1.4.2-1. 8) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

Out-Of-Band Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.6.2.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.6.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the parameters of the CW signal generator for an interfering signal according to table 4.2.7.2-4 as specified in TS 136 521-1 [1]. The frequency step size is 1 MHz.
- 4) Set the downlink signal level according to the table 4.2.7.2-3. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.7.2-3 for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].
- 5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].
- 6) For table 4.2.7.2-4 record the frequencies for which the throughput does not meet the requirements. 7) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

Narrow-Band Procedure

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.6.3.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.



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- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.6.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the parameters of the CW signal generator for an interfering signal below the wanted signal according to table 4.2.7.2-5 as specified in TS 136 521-1 [1].
- 4) Set the downlink signal level according to the table 4.2.7.2-5. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.7.2-5 for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].
- 5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].
- 6) Repeat steps from 3 to 5, using an interfering signal above the wanted signal at step 3.
- 7) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

3.6.4 Test result

Please refer to the Appendix

WALTEK



Reference No.: WTX22X08156832W002

3.7 Receiver spurious response

Clause 7.7 of ETSI TS 136 521-1 applies.

RESULT: Pass

3.7.1 Definition and applicability

Spurious response is a measure of the receiver's ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the out-of-band blocking limit as specified in table 4.2.7.2-4 is not met.

3.7.2 Conformance requirements

Test environment: normal (see section 1.6).

Frequencies to be tested: mid range; see TS 136 508 [2].

Channel bandwidths to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect the SS and interfering sources to the UE antenna connectors.
- 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1, C.3.1 and uplink signals according to clauses H.1 and H.3.1.
- 4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1], table 7.8.4.1-1.
- 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] with parameters specified in tables 4.2.8.2-1 and 4.2.8.2-2.



Table 4.2.8.1.2-1: Spurious response parameters

Rx Parameter	Units	Channel bandwidth					
		1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
NOTE 1: The transmitter shall be set to 4 dB below PCMAX_L at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with PCMAX_L as defined in clause 6.2.5).							
NOTE 2: Reference measurement channel is clause A.3.2 of ETSI TS 136 521-1 [1]. NOTE 3: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].							

Table 4.2.8.1.2-2: Spurious Response

Parameter	Units	Level
$P_{\text{Interferer}}$ (CW)	dBm	-44
$F_{\text{Interferer}}$	MHz	Spurious response frequencies

3.7.3 Set up for testing

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.6.2.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.6.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the parameters of the CW signal generator for an interfering signal according to table 4.2.8.2-2. The spurious frequencies are taken from step 5) records in clause 5.3.6.1.2.
- 4) Set the downlink signal level according to the table 4.2.8.2-1. Send uplink power control commands to the UE (less or equal to 1 dB step size should be used), to ensure that the UE output power is within +0, -3,4 dB of the target level in table 4.2.8.2-1 for carrier frequency $f \leq 3,0$ GHz or within +0, -4,0 dB of the target level for carrier frequency $3,0 \text{ GHz} < f \leq 4,2 \text{ GHz}$, for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].
- 5) For the spurious frequency, measure the average throughput for a duration sufficient to achieve statistical significance.

3.7.3 Test result

Please refer to the Appendix



Reference No.: WTX22X08156832W002

3.8 Receiver intermodulation characteristics

Clause 6.7 of ETSI TS 136 521-1 applies.

RESULT: Pass

3.8.1 Definition and applicability

Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

3.8.2 Conformance requirements

Test environment: normal (see section 1.6).

Frequencies to be tested: mid range; see TS 136 508 [2].

Channel bandwidths to be tested: lowest, 5 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect the SS and interfering sources to the UE antenna connectors.
- 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1, C.3.1 and uplink signals according to clauses H.1 and H.3.1.
- 4) The UL and DL Reference Measurement channels are set according to TS 136 521-1 [1], table 7.8.4.1-1.
- 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in TS 136 521-1 [1] with parameters specified in table 4.2.9.2-1 for the specified wanted signal mean power in the presence of two interfering signals.



Table 4.2.9.1.2-1: Test parameters for Wide band intermodulation.

Rx Parameter	Units	Channel bandwidth					
		1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		12	8	6	6	7	9
$P_{\text{Interferer 1}}$ (CW)	dBm	-46					
$P_{\text{Interferer 2}}$	dBm	-46					
$BW_{\text{Interferer 2}}$		1.4	3	5			
$F_{\text{Interferer 1}}$ (Offset)	MHz	-BW/2 – 2.1 / +BW/2 + 2.1	-BW/2 – 4.5 / +BW/2 + 4.5	-BW/2 – 7.5 / +BW/2 + 7.5			
$F_{\text{Interferer 2}}$ (Offset)	MHz	$2 \times F_{\text{Interferer 1}}$					
NOTE 1: The transmitter shall be set to 4 dB below PCMAX_L at the minimum uplink configuration specified in ETSI TS 136 101 [3] (table 7.3.1-2 with PCMAX_L as defined in clause 6.2.5).							
NOTE 2: Reference measurement channel is clause A.3.2 of ETSI TS 136 521-1 [1].							
NOTE 3: The modulated interferer shall consist of the Reference measurement channel specified in clause A.3.2 of ETSI TS 136 521-1 [1] with set-up according to clause C.3.1 of ETSI TS 136 521-1 [1].The interfering modulated signal is 5MHz E-UTRA signal as described in annex C of ETSI TS 136 521-1 [1] for channel bandwidth ≥ 5 MHz.							
NOTE 4: REFSENS as defined in clause 7.3.3 in ETSI TS 136 521-1 [1].							

3.8.3 Set up for testing

- 1) SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to TS 136 521-1 [1], table 7.8.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 7.8.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3) Set the Downlink signal level to the value as defined in table 4.2.9.2-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, -3.4dB of the target level in table 4.2.9.2-1 for carrier frequency $f \leq 3.0$ GHz or within +0, -4.0dB of the target level for carrier frequency $3.0\text{GHz} < f \leq 4.2\text{GHz}$, for at least the duration of the throughput measurement as specified in TS 136 521-1 [1].
- 4) Set the Interfering signal levels to the values as defined in table 4.2.9.2-1, using a modulated interferer bandwidth as defined in annex D of TS 136 521-1 [1].
- 5) Measure the average throughput for a duration sufficient to achieve statistical significance according to clause G.2 of TS 136 521-1 [1].
- 6) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.



3.8.4 Test result

Please refer to the Appendix

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3.9 Receiver spurious emissions

Clause 7.9 of ETSI TS 136 521-1 applies.

RESULT: Pass

3.9.1 Definition and applicability

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the UE antenna connector.

3.9.2 Conformance requirements

Test Environment: normal (see section 1.6).

Frequencies to be tested: low range, mid range and high range; as specified in TS 136 508 [2], clause 4.3.1.

Channel bandwidth to be tested: highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect a spectrum analyzer (or other suitable test equipment) to the UE antenna connectors.
- 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.1.
- 4) The DL Reference Measurement channels are set according to TS 136 521-1 [1].
- 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

The power of any narrow band CW spurious emission shall not exceed the maximum level specified in Table 7.9.3-1

Frequency Band	Measurement	Maximum	Note
$30\text{MHz} \leq f < 1\text{GHz}$	100kHz	-57dBm	
$1\text{GHz} \leq f \leq 12.75\text{GHz}$	1MHz	-47dBm	
$12.75\text{GHz} \leq f \leq 5\text{th harmonic of the upper frequency edge of the DL operating band in GHz}$	1MHz	-47dBm	Note 1

NOTE 1: Shall apply only for Band 22, 42 and Band 43.

NOTE 2: Unused PDCCH resources are padded with resource element groups with power level given by PDCCH_RA/RB as defined in ETSI TS 136 101 [3], clause C.3.1.



3.9.3 Set up for testing

- 1) Sweep the spectrum analyser (or other suitable test equipment) over a frequency range from 30 MHz to 12,75 GHz and measure the average power of the spurious emissions.
- 2) Repeat step 1) for all E-UTRA Rx antennas of the UE. 3) Repeat for applicable test frequencies, channel bandwidths and operating band combinations.

Details of the test method can be found in TS 136 521-1 [1], clause 7.9.

3.9.4 Test result

Please refer to the Appendix

WALTEK



3.10 Transmitter adjacent channel power leakage ratio

Clause 4.2.11 of ETSI TS 136 521-1 applies.

RESULT: Pass

3.10.1 Definition and applicability

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the filtered mean power centred on the assigned channel frequency to the filtered mean power centred on an adjacent channel frequency

3.10.2 Conformance requirements

Test Environment: normal, TL/VL, TL/VH, TH/VL and TH/VH, as specified in (see section 1.6) .

Frequencies to be tested: low range, mid range and high range; see TS 136 508 [2].

Channel bandwidth to be tested: lowest, 5 MHz, 10 MHz and highest channel bandwidth as defined in TS 136 508 [2], clause 4.3.1.

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect the SS to the UE to the UE antenna connectors.
- 2) The parameter settings for the cell are set up according to TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.0.
- 4) The UL Reference Measurement channels are set according to TS 136 521-1 [1].
- 5) Propagation conditions are set according to TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in TS 136 521-1 [1], TS 136 508 [2] and TS 136 509 [i.11] respectively.

If the measured adjacent channel power is greater than -50 dBm then the measured E-UTRAACLR shall be higher than the limits in table 4.2.11.1.2-1.

Table 4.2.11.1.2-1: E-UTRA UE ACLR

	Channel bandwidth/E-UTRA _{ACLR1} /measurement bandwidth					
	1.4MHz	3.0MHz	5MHz	10MHz	15MHz	20MHz
E-UTRA _{ACLR1}	29.2dB	29.2dB	29.2dB	29.2dB	29.2dB	29.2dB
E-UTRA channel Measurement bandwidth	1.08MHz	2.7MHz	4.5MHz	9.0MHz	13.5MHz	18MHz
UE channel	+1.4MHz or -1.4MHz	+3MHz or -3MHz	+5MHz or -5MHz	+10MHz or -10MHz	+15MHz or -15MHz	+20MHz or -20MHz

If the measured UTRA channel power is greater than -50 dBm then the measured UTRAACLR1, UTRAACLR2 shall be higher than the limits in table 4.2.11.1.2-2.



Table 4.2.11.1.2-2: UTRA UE ACLR

	Channel bandwidth/UTRAACLR1/2/measurement bandwidth					
	1.4MHz	3.0MHz	5MHz	10MHz	15MHz	20MHz
UTRAACLR1	32.2dB	32.2dB	32.2dB	32.2dB	32.2dB	32.2dB
Adjacent channel centre frequency offset (in MHz)	$0.7 + BW_{UTRA}/2$ / $-0.7 - BW_{UTRA}/2$	$1.5 + BW_{UTRA}/2$ / $-1.5 - BW_{UTRA}/2$	$2.5 + BW_{UTRA}/2$ / $-2.5 - BW_{UTRA}/2$	$5 + BW_{UTRA}/2$ / $-5 - BW_{UTRA}/2$	$7.5 + BW_{UTRA}/2$ / $-7.5 - BW_{UTRA}/2$	$10 + BW_{UTRA}/2$ / $-10 - BW_{UTRA}/2$
UTRAACLR2	-	-	35.2dB	35.2dB	35.2dB	35.2dB
Adjacent channel centre frequency offset (in MHz)	-	-	$2.5 + 3 \times BW_{UTRA}/2$ / $-2.5 - 3 \times BW_{UTRA}/2$	$5 + 3 \times BW_{UTRA}/2$ / $-5 - 3 \times BW_{UTRA}/2$	$7.5 + 3 \times BW_{UTRA}/2$ / $-7.5 - 3 \times BW_{UTRA}/2$	$10 + 3 \times BW_{UTRA}/2$ / $-10 - 3 \times BW_{UTRA}/2$
E-UTRA channel Measurement bandwidth	1.08MHz	2.7MHz	4.5MHz	9.0MHz	13.5MHz	18MHz
UTRA 5 MHz channel Measurement bandwidth (see note 1)	3.84MHz	3.84MHz	3.84MHz	3.84MHz	3.84MHz	3.84MHz
UTRA 1,6 MHz channel measurement bandwidth (see note 2)	1.28MHz	1.28MHz	1.28MHz	1.28MHz	1.28MHz	1.28MHz
NOTE 1: Shall apply for E-UTRA FDD co-existence with UTRA FDD in paired spectrum. NOTE 2: Shall apply for E-UTRA TDD co-existence with UTRA TDD in unpaired spectrum. NOTE 3: BW_{UTRA} for UTRA FDD shall be 5 MHz and for UTRA TDD shall be 1,6 MHz.						

3.10.3 Set up for testing

- 1) SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to TS 136 521-1 [1], table 6.6.2.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2) Send continuous uplink power control "up" commands in the uplink scheduling information to the UE to ensure that the UE transmits at PUMAX level.



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- 3) Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in tables 4.2.11.1.2-1 and 4.2.11.1.2-2. The period of the measurement shall be at least the continuous duration of one sub-frame (1 ms). For TDD slots with transient periods are not under test.
- 4) Measure the filtered mean power for E-UTRA.
- 5) Measure the filtered mean power of the first E-UTRA adjacent channel.
- 6) Measure the RRC filtered mean power of the first and the second UTRA adjacent channel.
- 7) Calculate the ratio of the power between the values measured in step 4) over step 5) for E-UTRAACLR.
- 8) Calculated the ratio of the power between the values measured in step 4) over step 6) for UTRAACLR1, UTRAACLR2.
- 9) Repeat for applicable test frequencies, channel bandwidths, operating band combinations and environmental conditions.

Details of the test method can be found in TS 136 521-1 [1], clause 6.6.2.3.

3.10.4 Test result

Please refer to the Appendix

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Reference No.: WTX22X08156832W002

3.11 Receiver Reference Sensitivity Level

Clause 7.3 of ETSI TS 136 521-1 applies.

RESULT: Pass

3.11.1 Definition and applicability

Reference sensitivity measures the UE's ability to receive data with a given average throughput for a specified reference

measurement channel, under conditions of low signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the effective coverage area of an e-NodeB.

3.11.2 Conformance requirements

Test Environment: normal, TL/VL, TL/VH, TH/VL, TH/VH; as specified in annex B.

Frequencies to be tested: low range, mid range, high range see ETSI TS 136 508 [2].

Channel bandwidth to be tested: lowest, 5 MHz and highest channel bandwidth as defined in ETSI TS 136 508 [2], clause 4.3.1.

Uplink/Downlink configurations: as specified in TS 136 521-1 [1]:

- 1) Connect the SS and interfering source to the UE antenna connectors.
- 2) The parameter settings for the cell are set up according to ETSI TS 136 508 [2], clause 4.4.3.
- 3) Downlink signals are initially set up according to ETSI TS 136 521-1 [1], clauses C.0, C.1 and C.3.0 and uplink signals according to clauses H.1 and H.3.1.
- 4) The UL and DL Reference Measurement channels are set according to ETSI TS 136 521-1 [1], table 7.3.4.1-1.
- 5) Propagation conditions are set according to ETSI TS 136 521-1 [1], clause B.0.
- 6) Ensure the UE is in State 3A-RF according to ETSI TS 136 508 [2], clause 5.2A.2.

NOTE: When reference is made to test set up, call set up and test mode, guidance on the applicability of these can be found in ETSI TS 136 521-1 [1], ETSI TS 136 508 [2] and ETSI TS 136 509 [i.10] respectively.

The throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channels as specified in

ETSI TS 136 521-1 [1], clauses A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the

DL-signal as described in ETSI TS 136 521-1 [1], clauses A.5.1.1/A.5.2.1) with parameters specified in table 4.2.12.1.2-1 and table 7.3.3-2.



3.11.3 Set up for testing

- 1) Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.3.
- 2) The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3) Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4) The UL and DL Reference Measurement channels are set according to Table 7.3.4.1-1.
- 5) Propagation conditions are set according to Annex B.0.
- 6) Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.3.4.3.

3.11.4 Test result

Please refer to the Appendix

WALTEK



3.12 Radiated emissions

Clause 4.2.2 of ETSI EN 301 908-1 applies.

RESULT: Pass

3.12.1 Definition and applicability

This test assesses the ability of radio communications equipment and ancillary equipment to limit unwanted emissions from the enclosure port.

This test is applicable to radio communications equipment and ancillary equipment.

This test shall be performed on the radio communications equipment and/or a representative configuration of the ancillary equipment.

3.12.2 Conformance requirements

The frequency boundary and reference bandwidths for the detailed transitions of the limits between the requirements for out of band emissions and spurious emissions are based on ITU-R Recommendations SM.329-10 [3] and SM.1539-1 [4].

The requirements shown in the following table are only applicable for frequencies in the spurious domain.

Frequency	Minimum requirement (e.r.p.)/ reference bandwidth idle mode	Minimum requirement (e.r.p.)/ reference bandwidth traffic mode	Applicability
$30 \text{ MHz} \leq f < 1\,000 \text{ MHz}$	-57 dBm/100 kHz	-36 dBm/100 kHz	All
$1 \text{ GHz} \leq f < 12,75 \text{ GHz}$	-47 dBm/1 MHz	-30 dBm/1 MHz	All
$f_c - 2,5 \times 5 \text{ MHz} < f < f_c + 2,5 \times 5 \text{ MHz}$		Not defined	UTRA FDD, UTRA TDD, 3,84 Mcps option, cdma2000, spreading rate 3
$f_c - 2,5 \times BW_{\text{Channel}} \text{ MHz} < f < f_c + 2,5 \times BW_{\text{Channel}} \text{ MHz}$		Not defined	E-UTRA FDD, E-UTRA TDD, Mobile WiMAX™
$f_c - 2,5 \times 10 \text{ MHz} < f < f_c + 2,5 \times 10 \text{ MHz}$		Not defined	UTRA TDD, 7,68 Mcps option
$f_c - 4 \text{ MHz} < f < f_c + 4 \text{ MHz}$		Not defined	UTRA TDD, 1,28 Mcps option cdma2000, spreading rate 1

NOTE: f_c is the UE transmit centre frequency.



3.12.3 Set up for testing

Whenever possible the test site should be a fully anechoic chamber simulating the free-space conditions. EUT shall be placed on a non-conducting support. Mean power of any spurious components shall be detected by the test antenna and measuring receiver (e.g. a spectrum analyser).

At each frequency at which a component is detected, the EUT shall be rotated to obtain maximum response, and the effective radiated power (e.r.p.) of that component determined by a substitution measurement, which shall be the reference method. The measurement shall be repeated with the test antenna in the orthogonal polarization plane.

NOTE: Effective radiated power (e.r.p.) refers to the radiation of a half wave tuned dipole instead of an isotropic antenna. There is a constant difference of 2,15 dB between e.i.r.p. and e.r.p.

$\text{e.r.p. (dBm)} = \text{e.i.r.p. (dBm)} - 2,15$ (ITU-R Recommendation SM.329-10 [3], annex 1).

Measurements are made with a tuned dipole antenna or a reference antenna with a known gain referenced to an isotropic antenna. Unless otherwise stated, all measurements are done as mean power (RMS).

If a different test site or method is used, this shall be stated in the test report. The results shall be converted to the reference method values and the validity of the conversion shall be demonstrated.

3.12.4 Test result

Traffic Mode

Frequency range	Max. measure value (dBm)	Test result
30MHz to 1GHz	<-36	Pass
1GHz to 12.75GHz	<-30	Pass

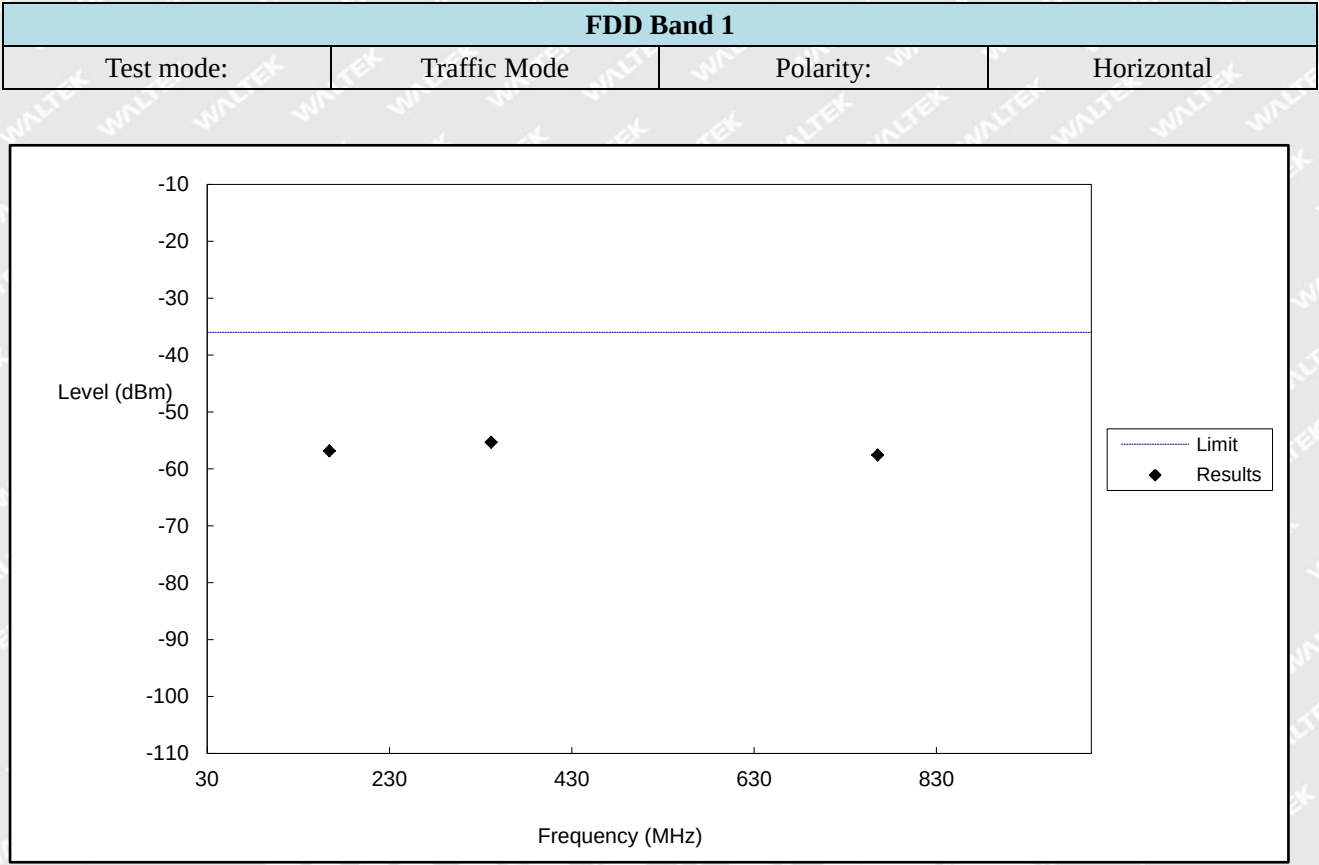
Idle Mode

Frequency range	Max. measure value (dBm)	Test result
30MHz to 1GHz	<-57	Pass
1GHz to 12.75GHz	<-47	Pass

Please refer to the following test plots and data



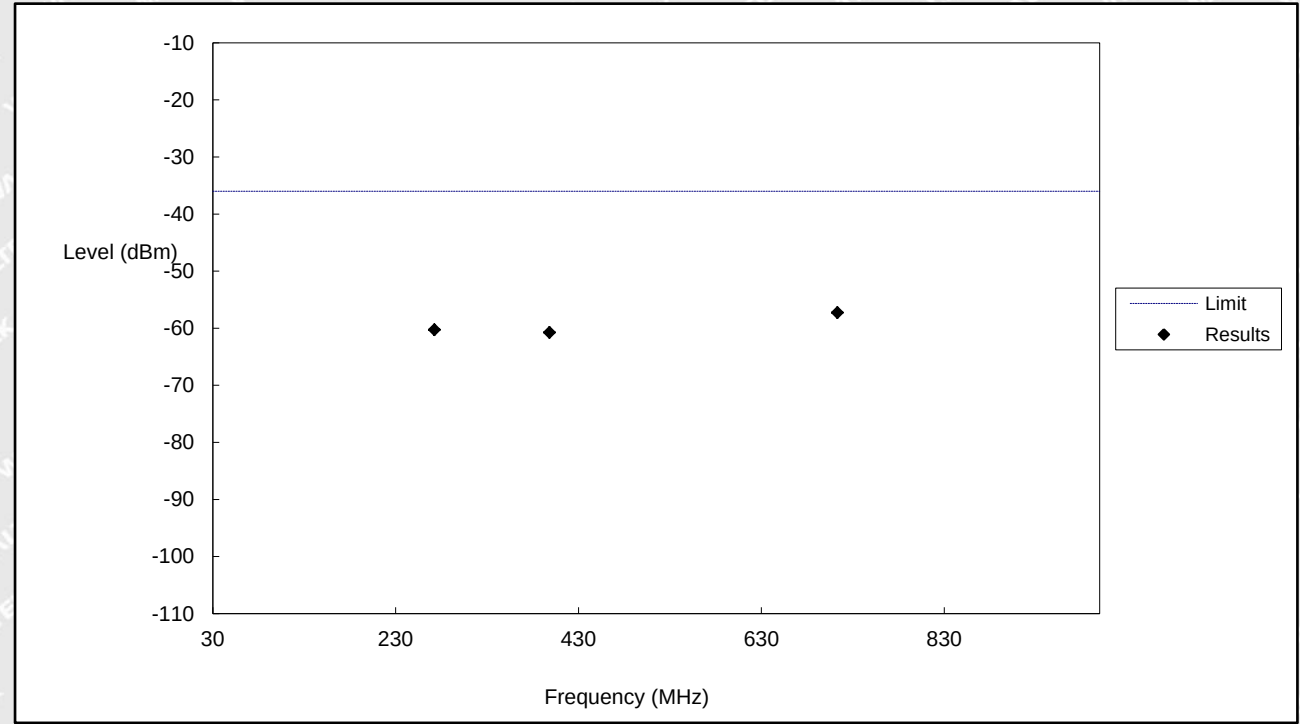
➤ Radiated Spurious Emissions(30MHz-1GHz)



No.	Frequency	Result	Limit	Margin	Remark
	(MHz)	(dBm)	(dBm)	(dB)	
1	164.09	-56.86	-36	-20.86	RMS
2	341.57	-55.34	-36	-19.34	RMS
3	765.63	-57.59	-36	-21.59	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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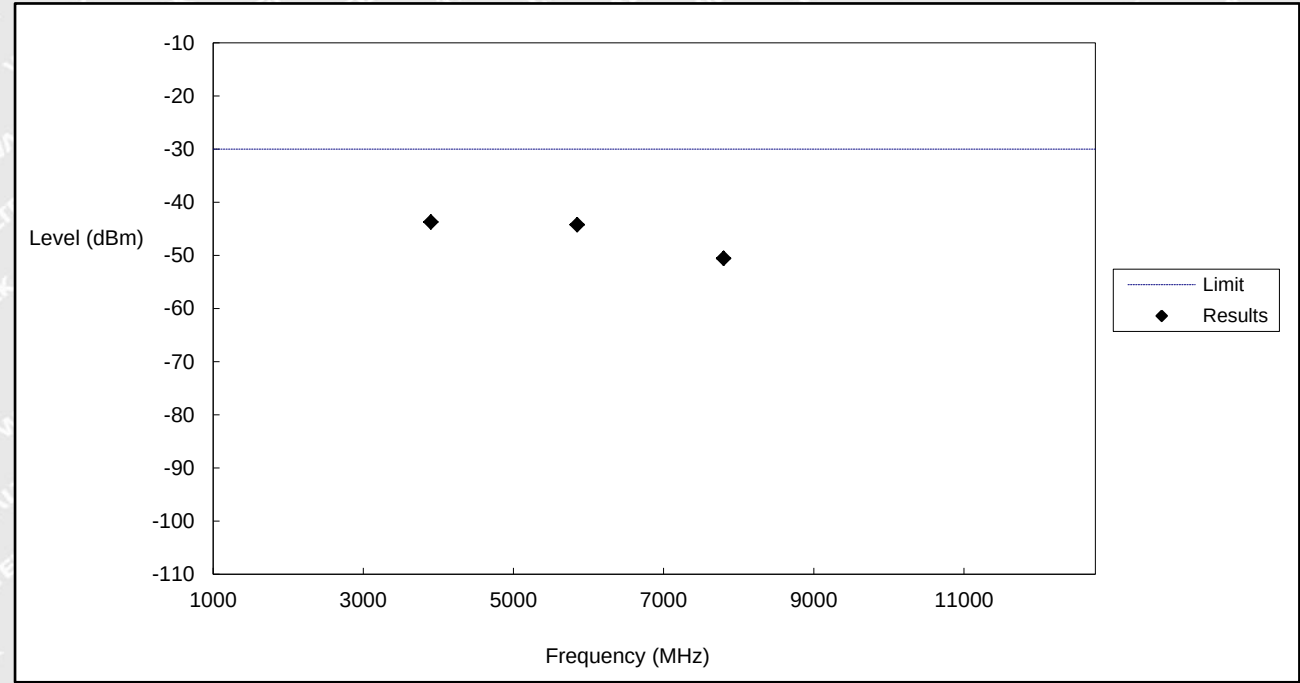


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	272.35	-60.26	-36	-24.26	RMS
2	398.24	-60.75	-36	-24.75	RMS
3	713.24	-57.26	-36	-21.26	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

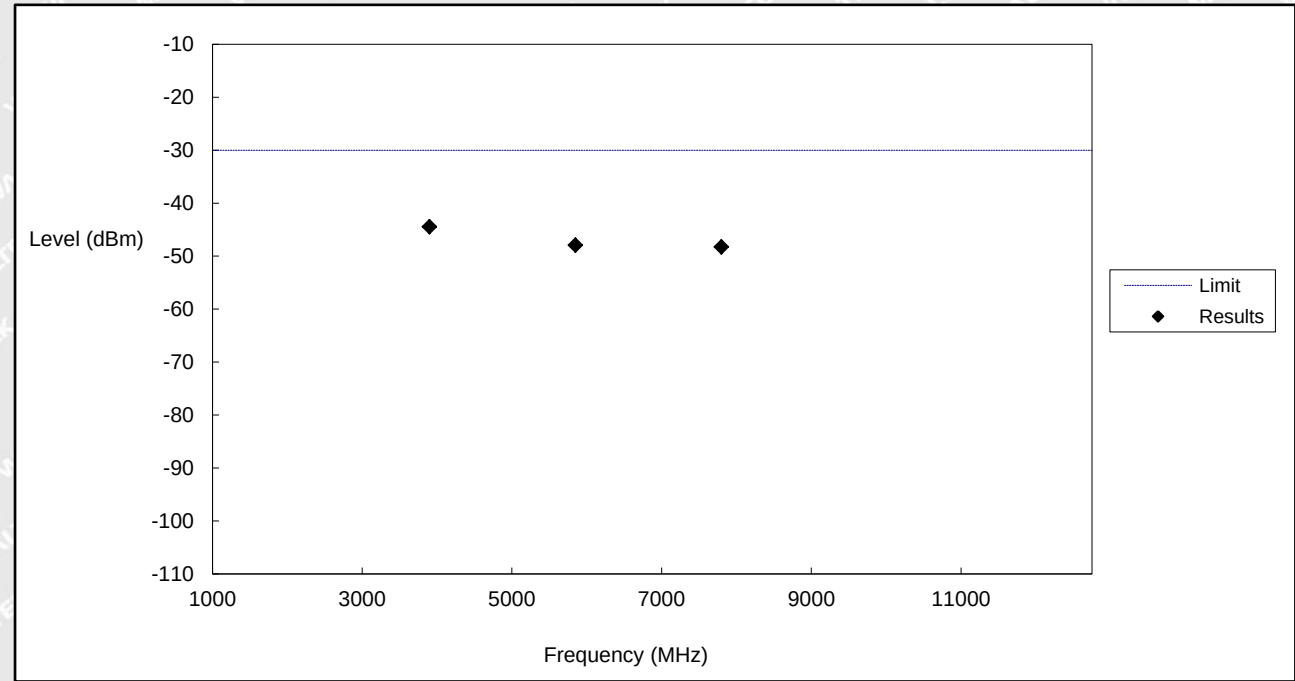
Test mode:	Traffic Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3900.00	-43.72	-30	-13.72	RMS
2	5850.00	-44.22	-30	-14.22	RMS
3	7800.00	-50.55	-30	-20.55	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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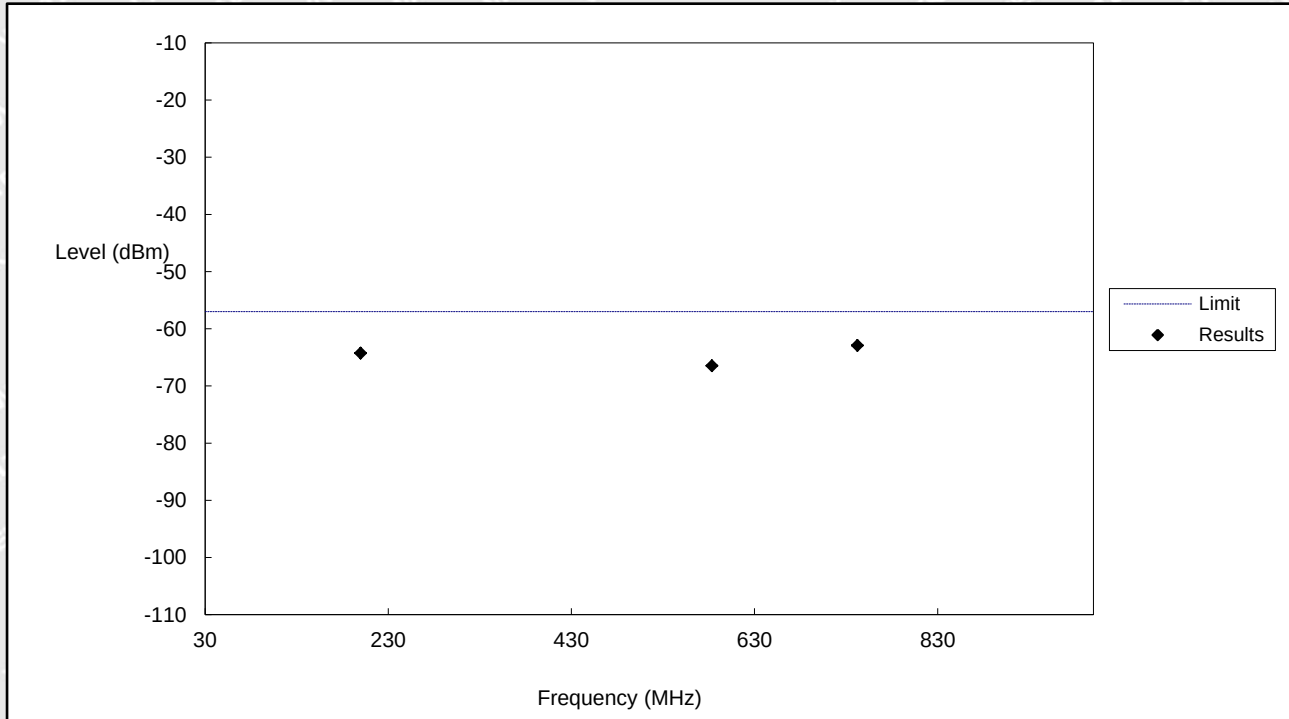


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3900.00	-44.48	-30	-14.48	RMS
2	5850.00	-47.94	-30	-17.94	RMS
3	7800.00	-48.29	-30	-18.29	RMS



➤ Radiated Spurious Emissions(30MHz-1GHz)

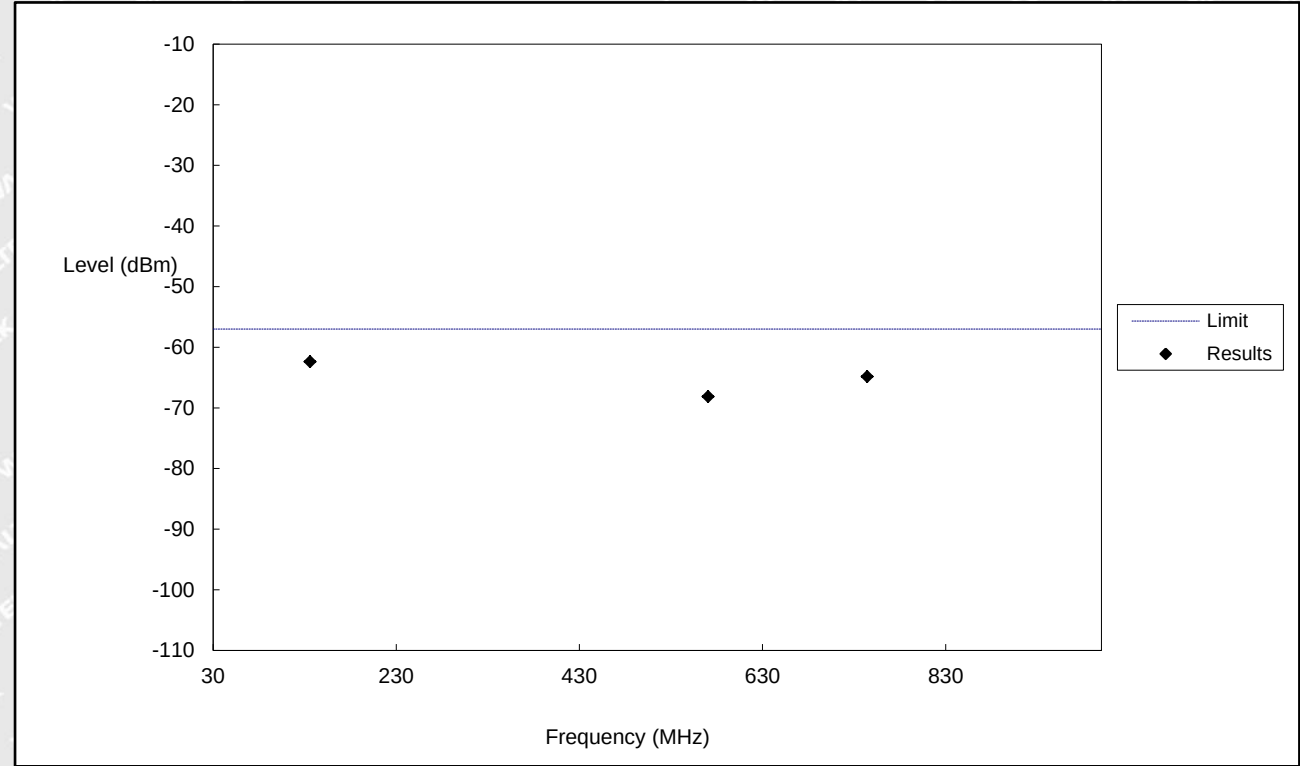
FDD Band 1			
Test mode:	Idle Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	199.94	-64.26	-57	-7.26	RMS
2	583.57	-66.48	-57	-9.48	RMS
3	742.31	-62.93	-57	-5.93	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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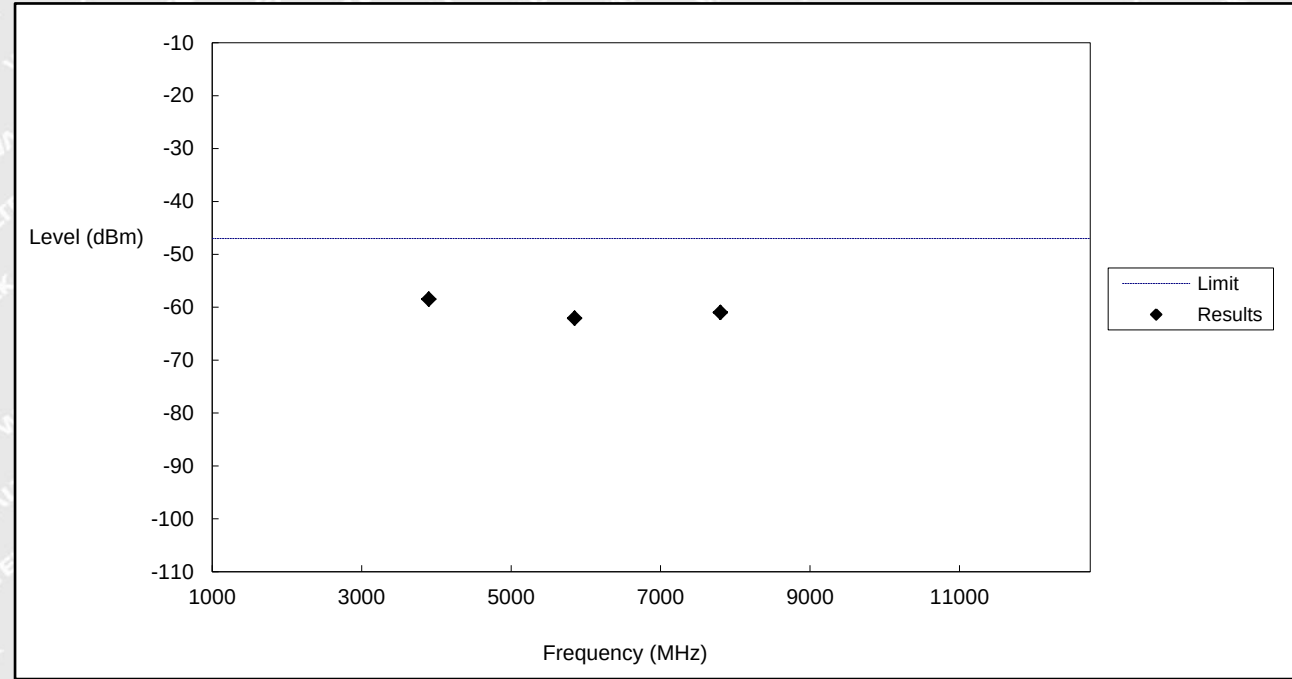


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	135.88	-62.39	-57	-5.39	RMS
2	570.51	-68.15	-57	-11.15	RMS
3	744.39	-64.86	-57	-7.86	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

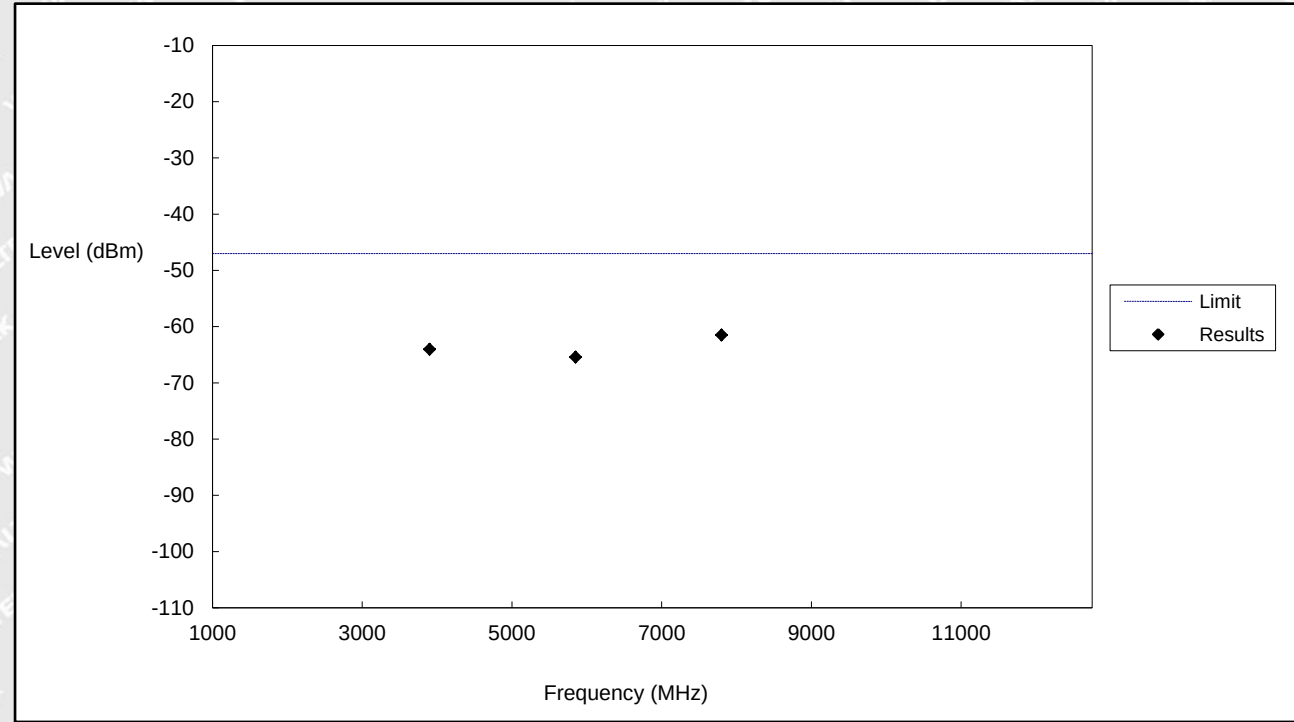
Test mode:	Idle Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3900.00	-58.50	-47	-11.50	RMS
2	5850.00	-62.09	-47	-15.09	RMS
3	7800.00	-61.00	-47	-14.00	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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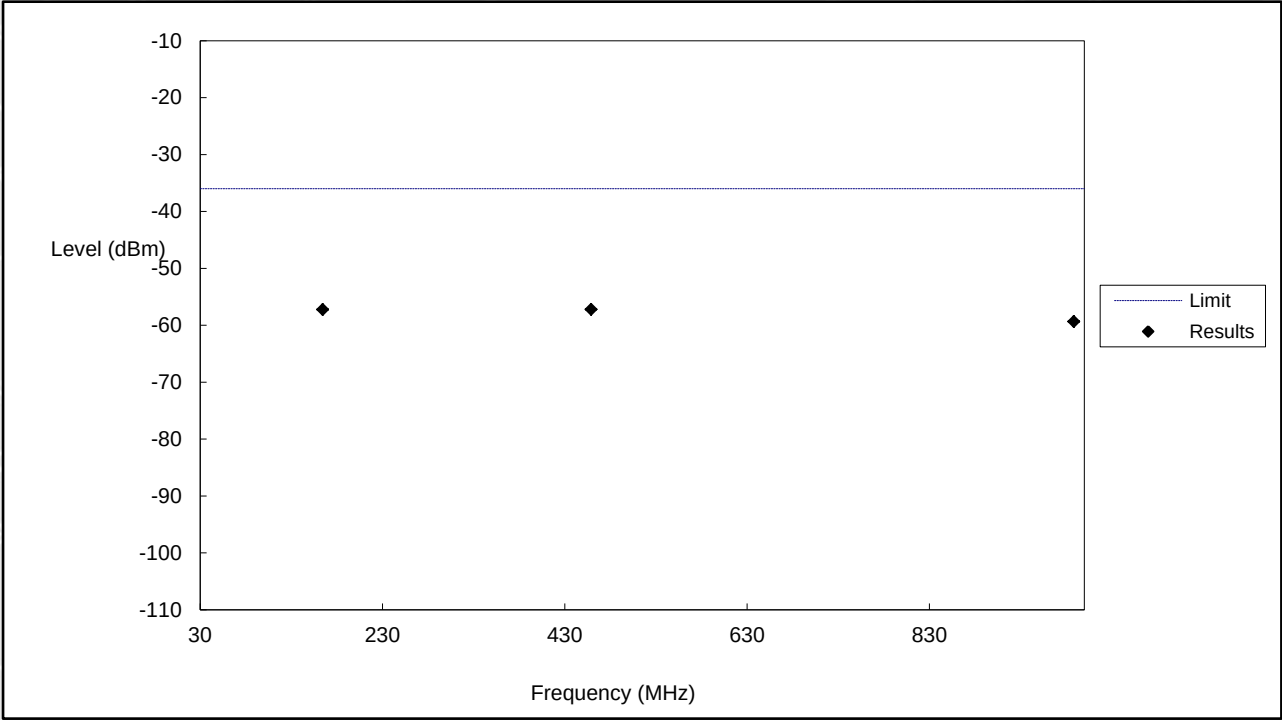


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3900.00	-64.04	-47	-17.04	RMS
2	5850.00	-65.43	-47	-18.43	RMS
3	7800.00	-61.51	-47	-14.51	RMS



Radiated Spurious Emissions(30MHz-1GHz)

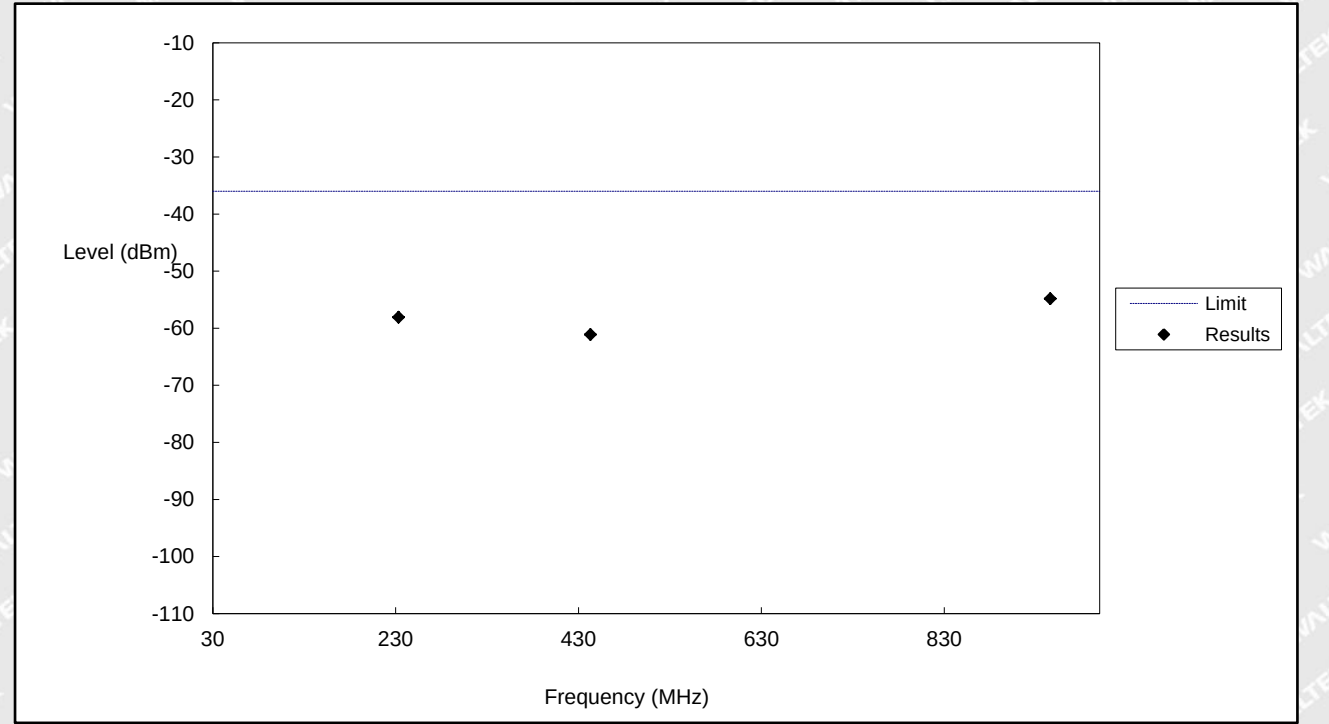
FDD Band 3			
Test mode:	Traffic Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	164.46	-57.25	-36	-21.25	RMS
2	458.97	-57.21	-36	-21.21	RMS
3	988.60	-59.36	-36	-23.36	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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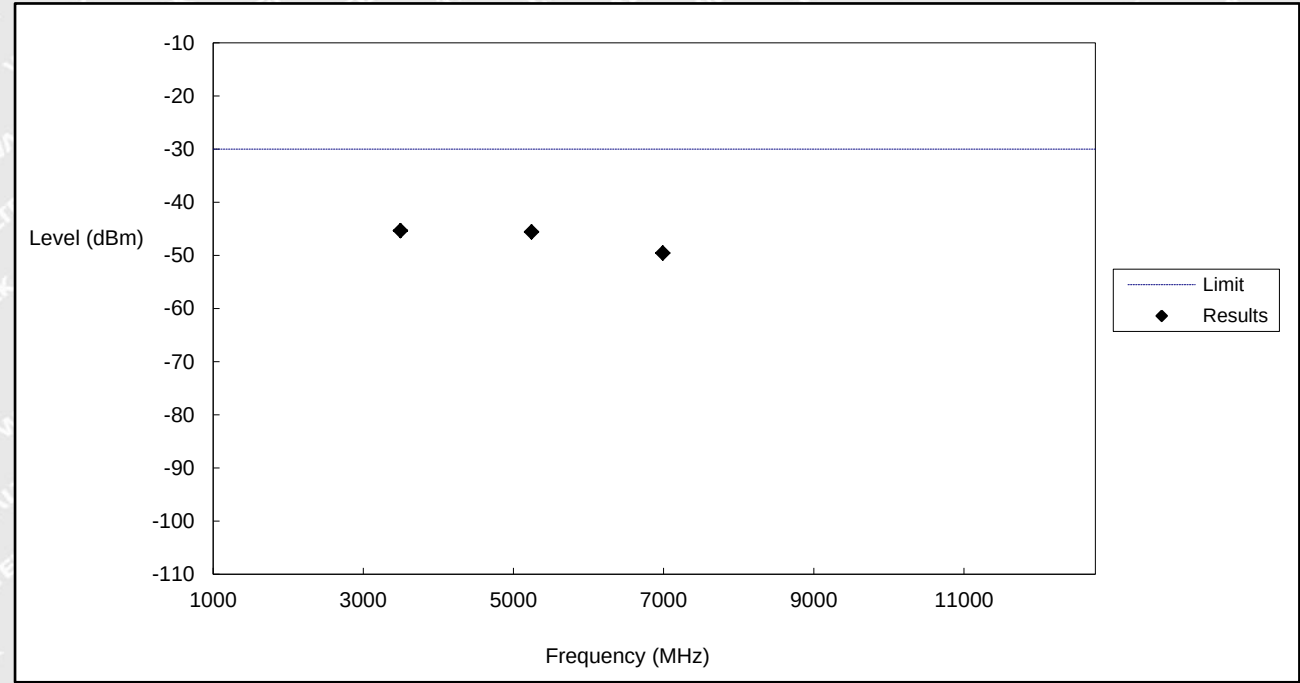


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	233.26	-58.08	-36	-22.08	RMS
2	443.14	-61.12	-36	-25.12	RMS
3	945.93	-54.83	-36	-18.83	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

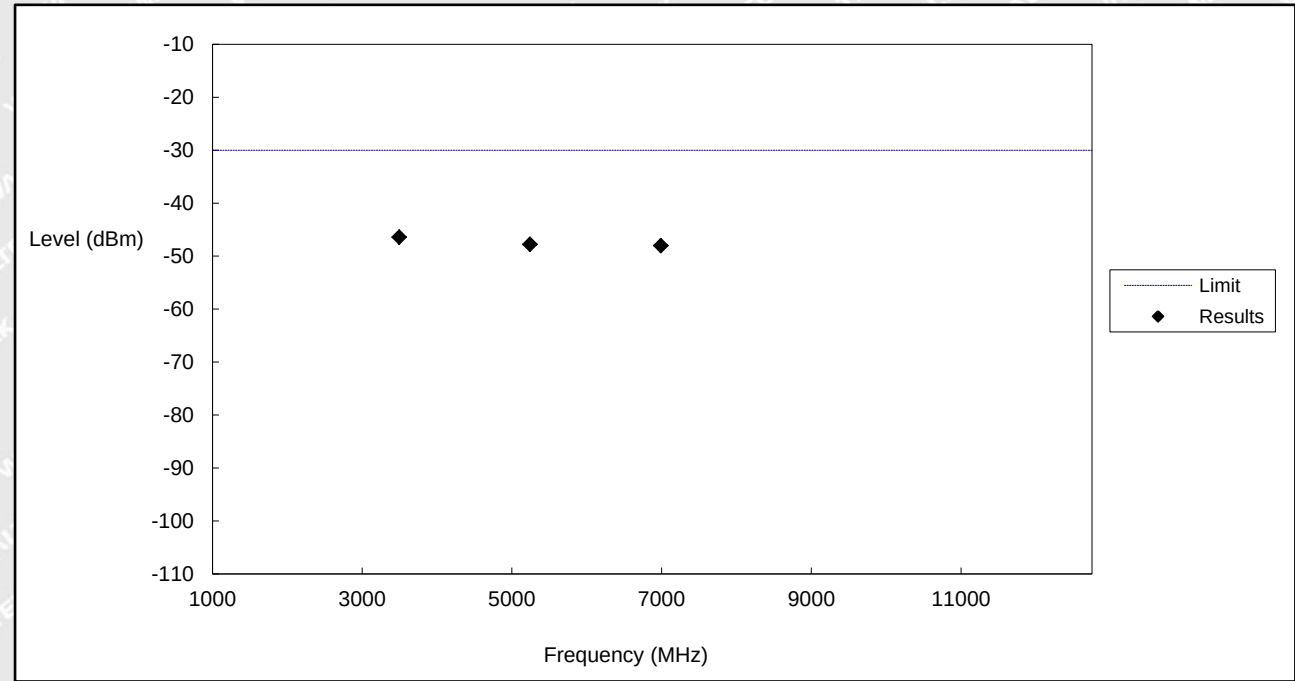
Test mode:	Traffic Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3495.00	-45.33	-30	-15.33	RMS
2	5242.50	-45.58	-30	-15.58	RMS
3	6990.00	-49.55	-30	-19.55	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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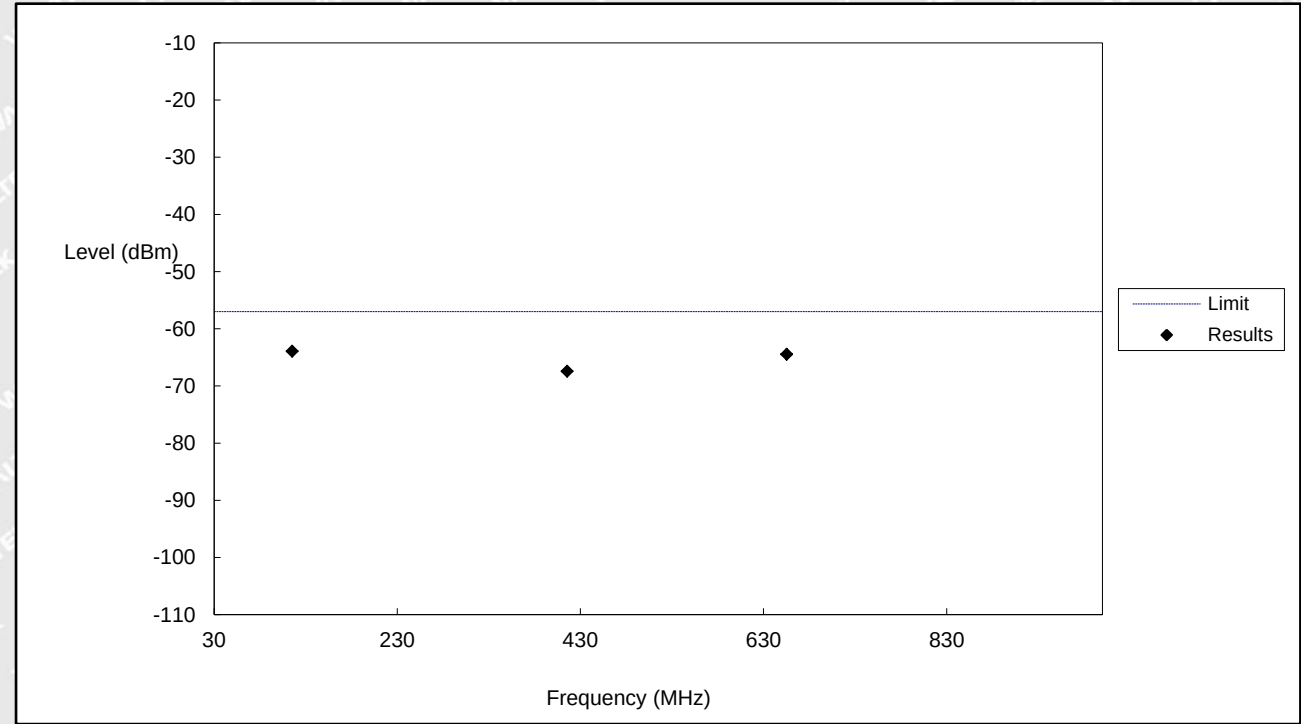


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3495.00	-46.44	-30	-16.44	RMS
2	5242.50	-47.79	-30	-17.79	RMS
3	6990.00	-48.05	-30	-18.05	RMS



Radiated Spurious Emissions(30MHz-1GHz)

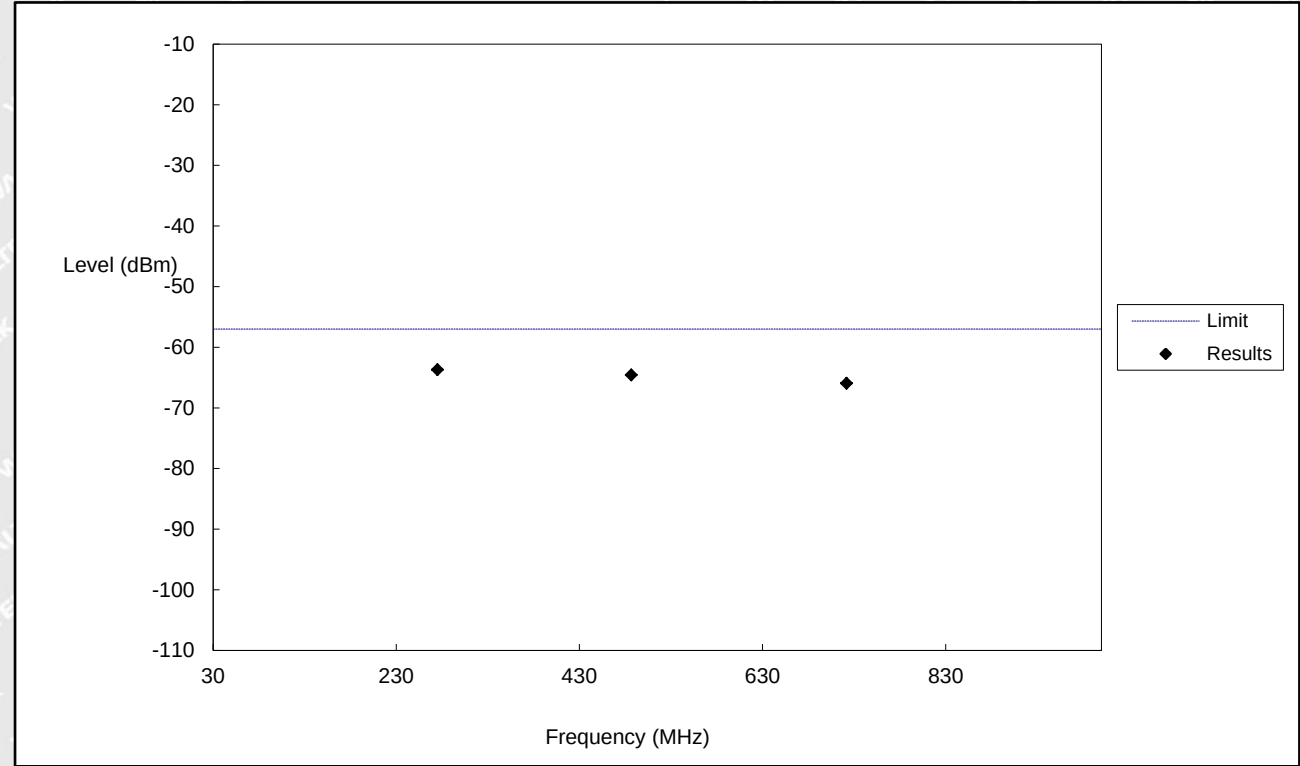
FDD Band 3			
Test mode:	Idle Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	115.25	-63.92	-57	-6.92	RMS
2	415.55	-67.43	-57	-10.43	RMS
3	655.39	-64.45	-57	-7.45	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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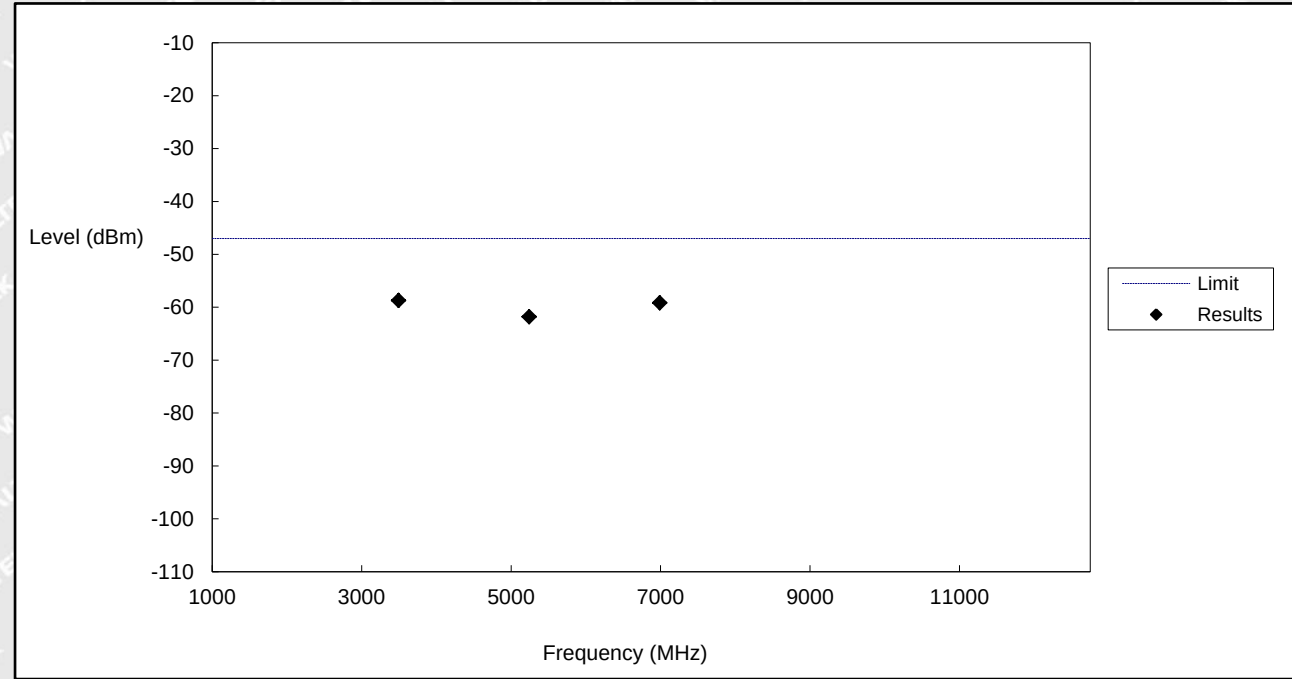


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	275.04	-63.71	-57	-6.71	RMS
2	486.76	-64.59	-57	-7.59	RMS
3	721.71	-65.97	-57	-8.97	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

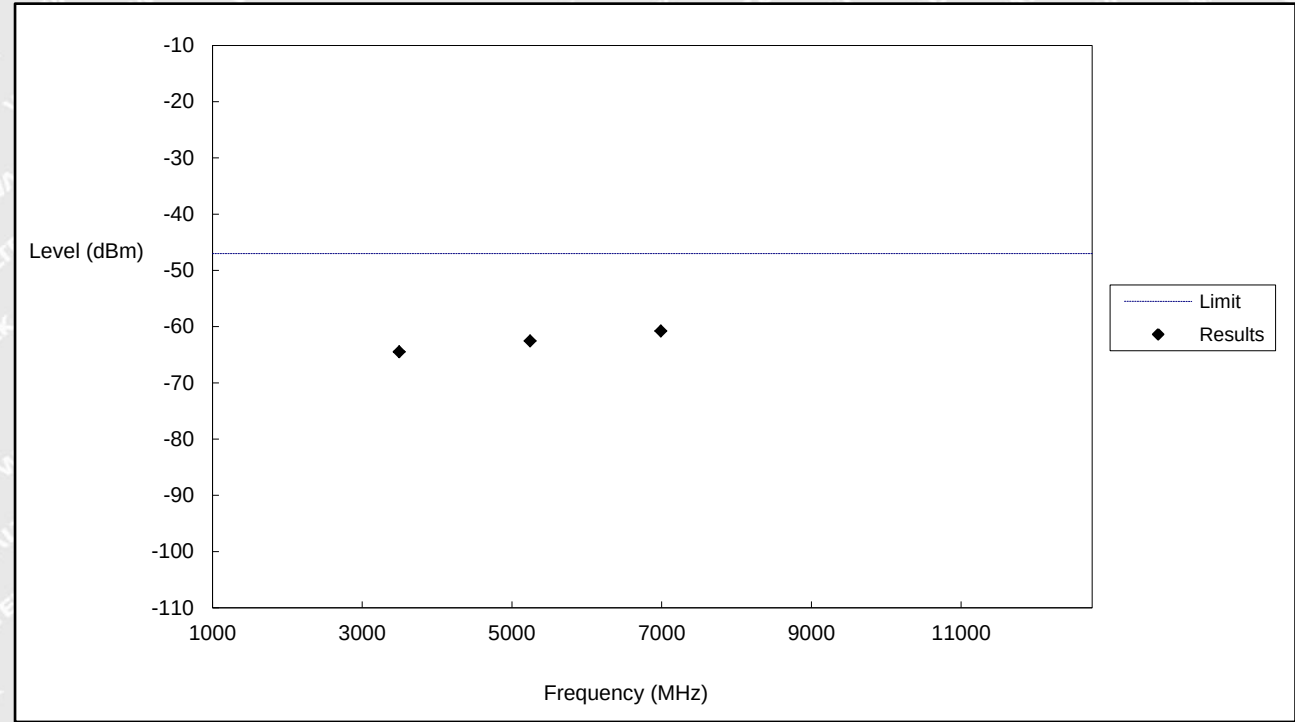
Test mode:	Idle Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3495.00	-58.74	-47	-11.74	RMS
2	5242.50	-61.82	-47	-14.82	RMS
3	6990.00	-59.17	-47	-12.17	RMS



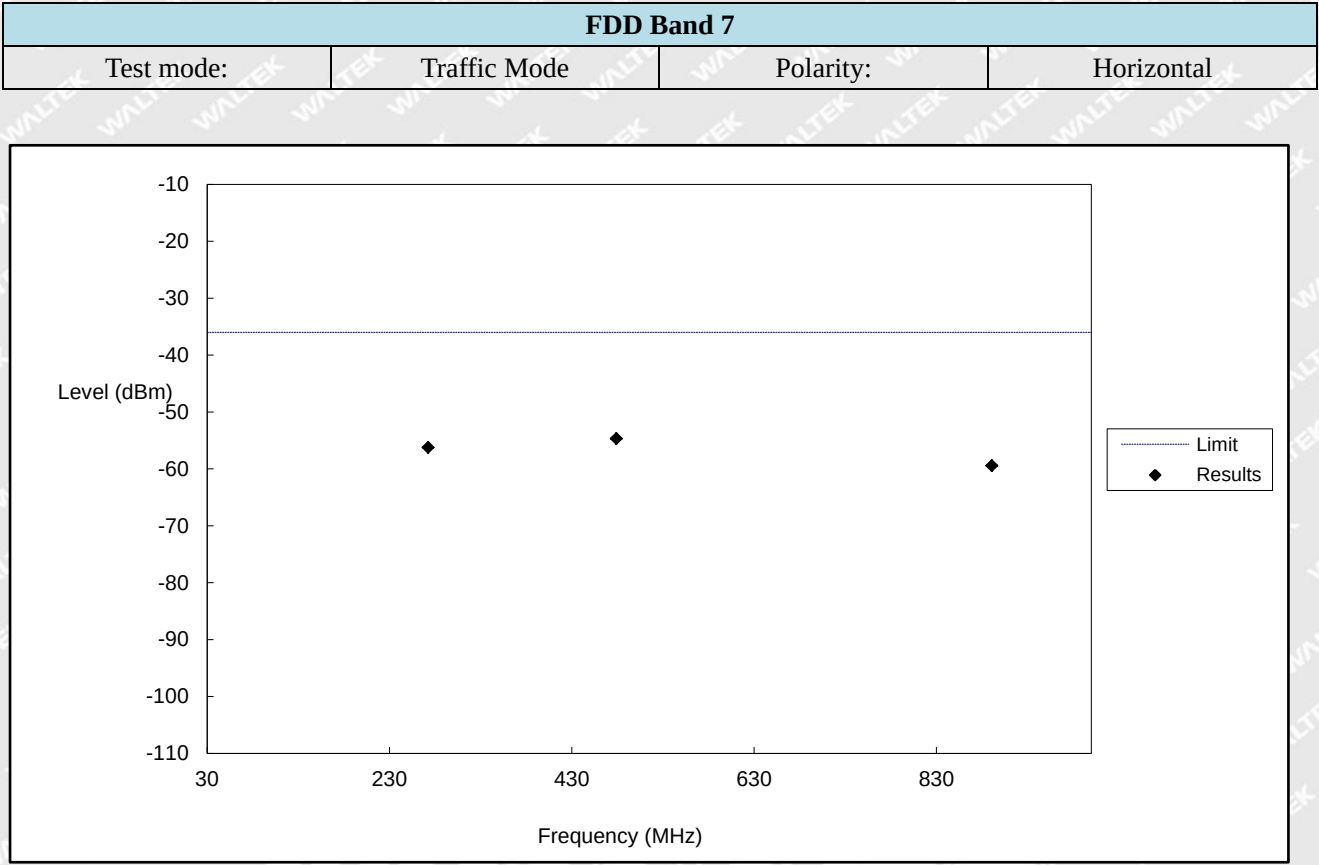
Test mode:	Idle Mode	Polarity:	Vertical
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3495.00	-64.51	-47	-17.51	RMS
2	5242.50	-62.56	-47	-15.56	RMS
3	6990.00	-60.80	-47	-13.80	RMS



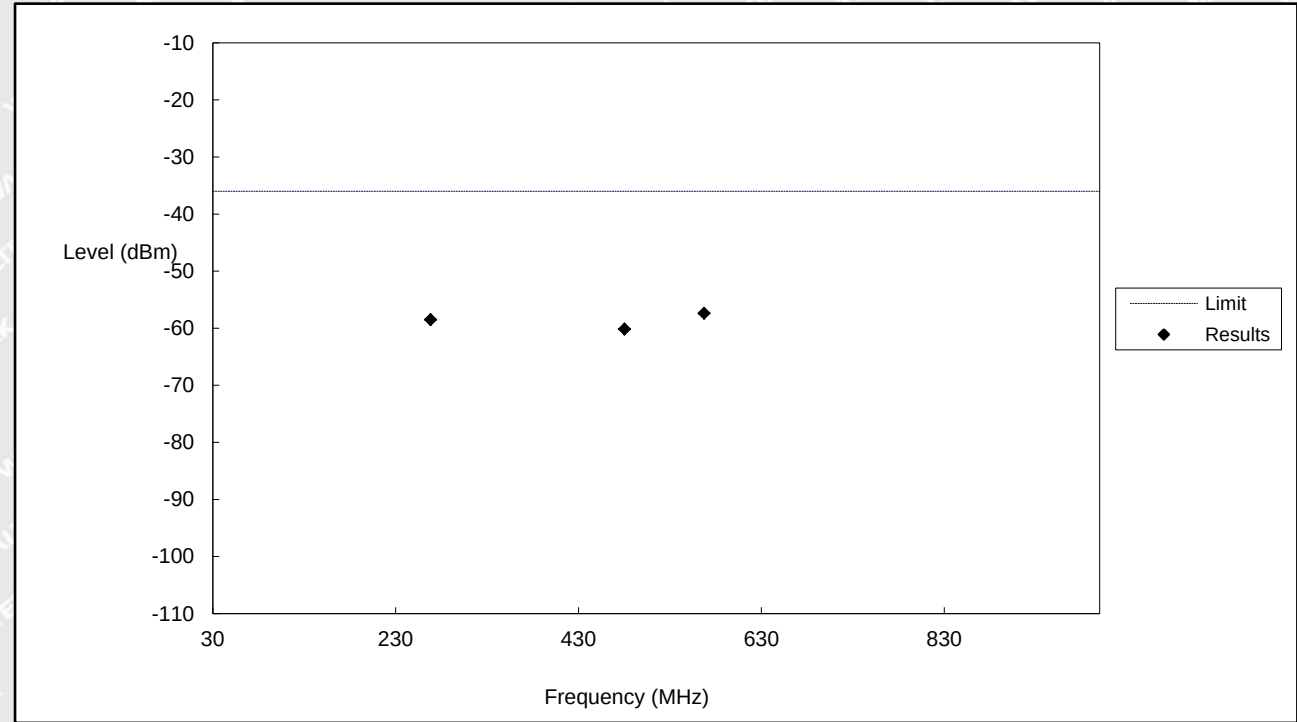
➤ Radiated Spurious Emissions(30MHz-1GHz)



No.	Frequency	Result	Limit	Margin	Remark
	(MHz)	(dBm)	(dBm)	(dB)	
1	272.51	-56.24	-36	-20.24	RMS
2	478.89	-54.70	-36	-18.70	RMS
3	890.98	-59.44	-36	-23.44	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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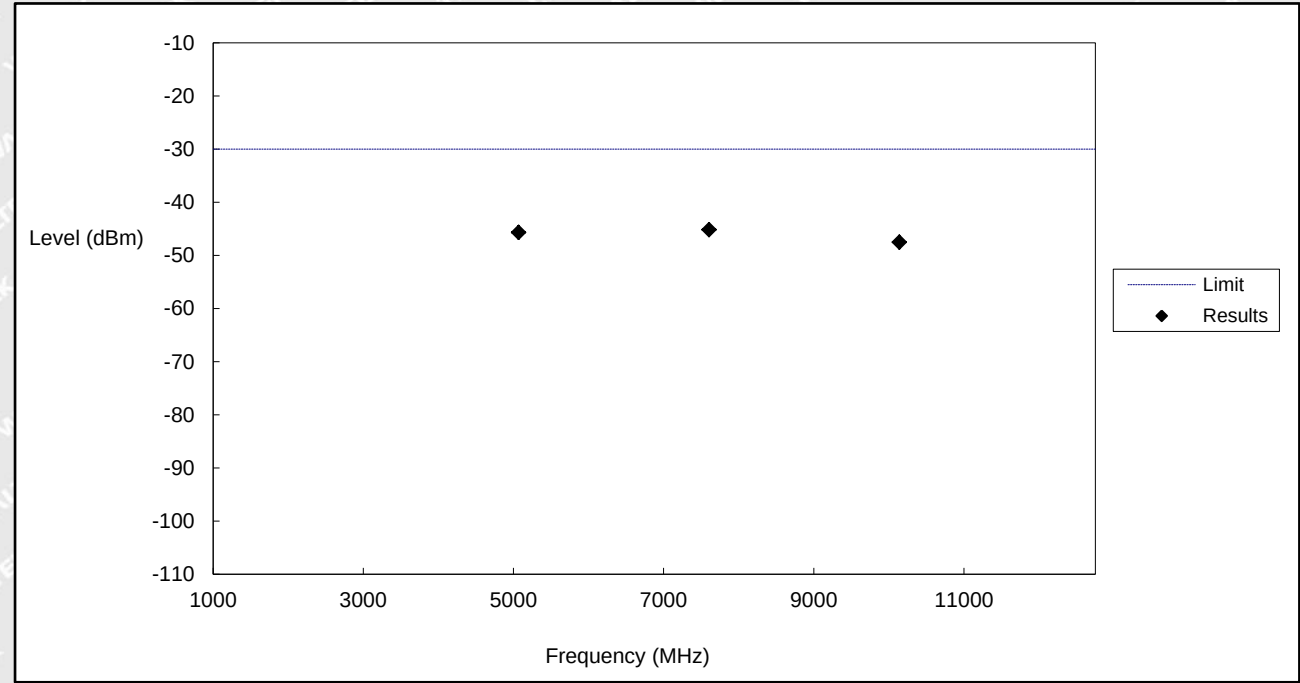


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	268.23	-58.51	-36	-22.51	RMS
2	480.43	-60.17	-36	-24.17	RMS
3	567.36	-57.37	-36	-21.37	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

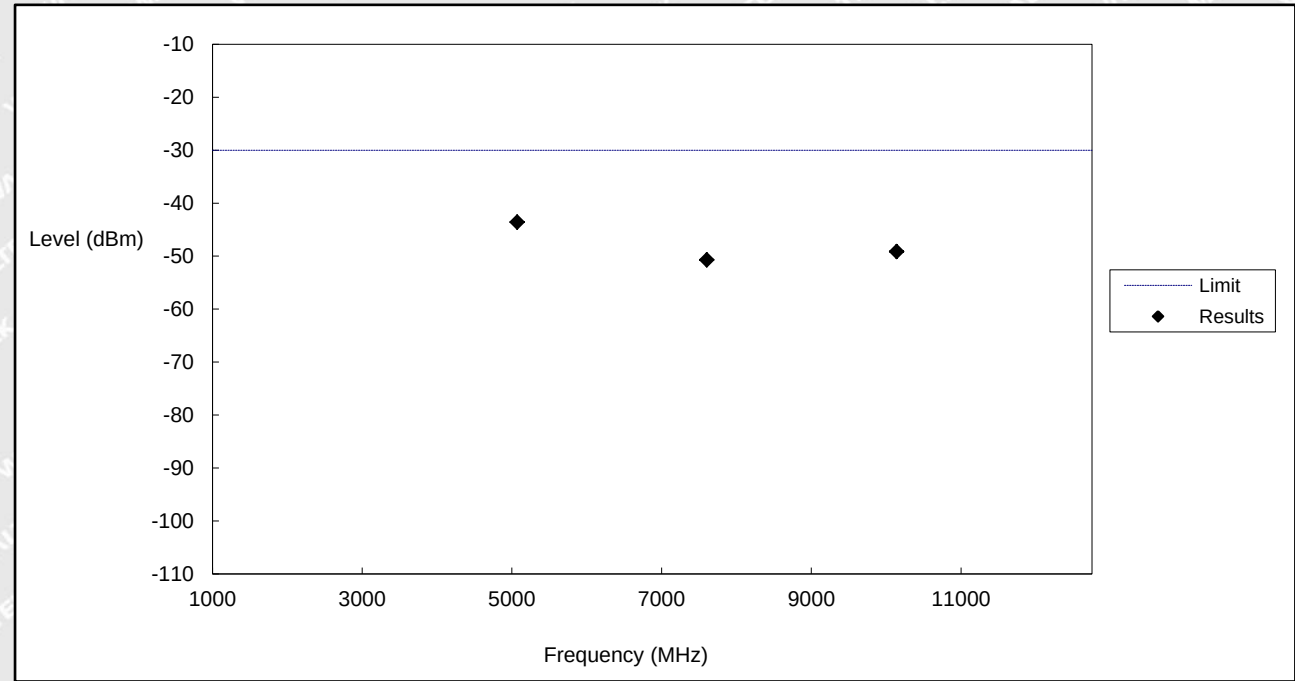
Test mode:	Traffic Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	5070.00	-45.67	-30	-15.67	RMS
2	7605.00	-45.16	-30	-15.16	RMS
3	10140.00	-47.51	-30	-17.51	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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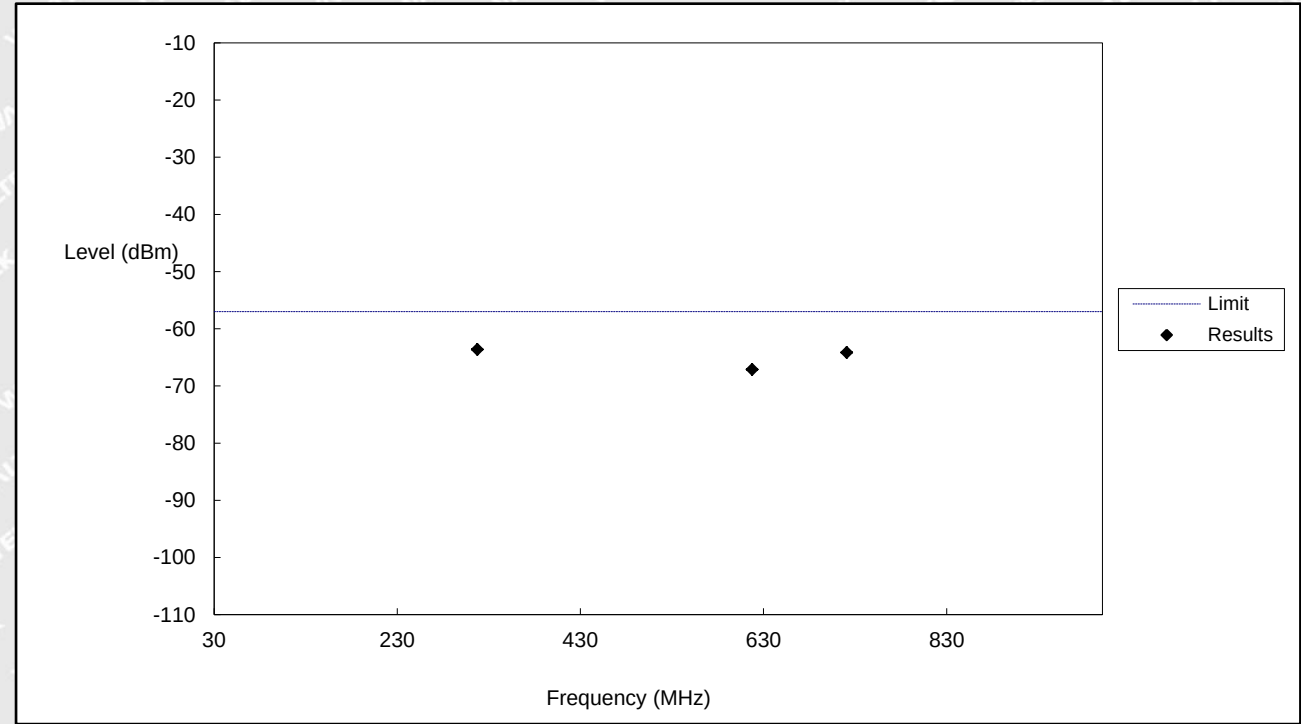


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	5070.00	-43.59	-30	-13.59	RMS
2	7605.00	-50.74	-30	-20.74	RMS
3	10140.00	-49.14	-30	-19.14	RMS



Radiated Spurious Emissions(30MHz-1GHz)

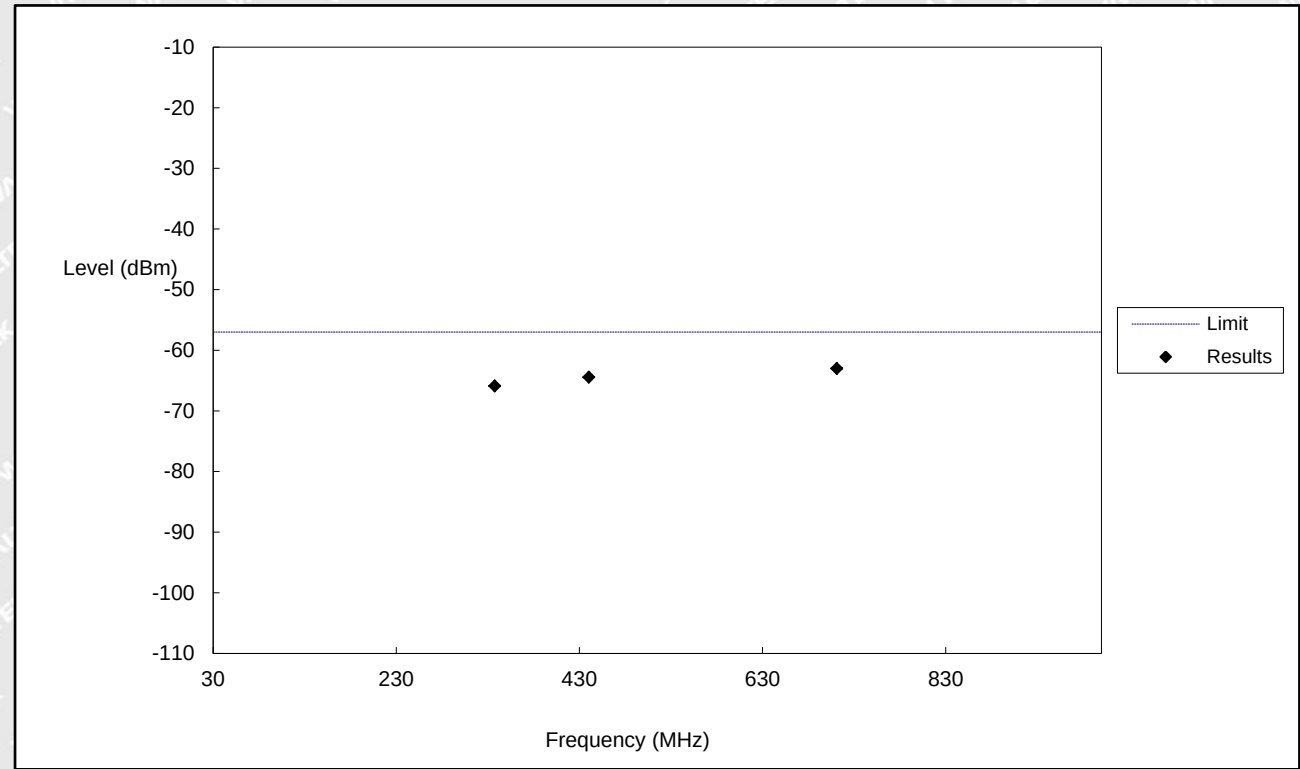
FDD Band 7			
Test mode:	Idle Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	317.57	-63.63	-57	-6.63	RMS
2	617.52	-67.11	-57	-10.11	RMS
3	720.96	-64.16	-57	-7.16	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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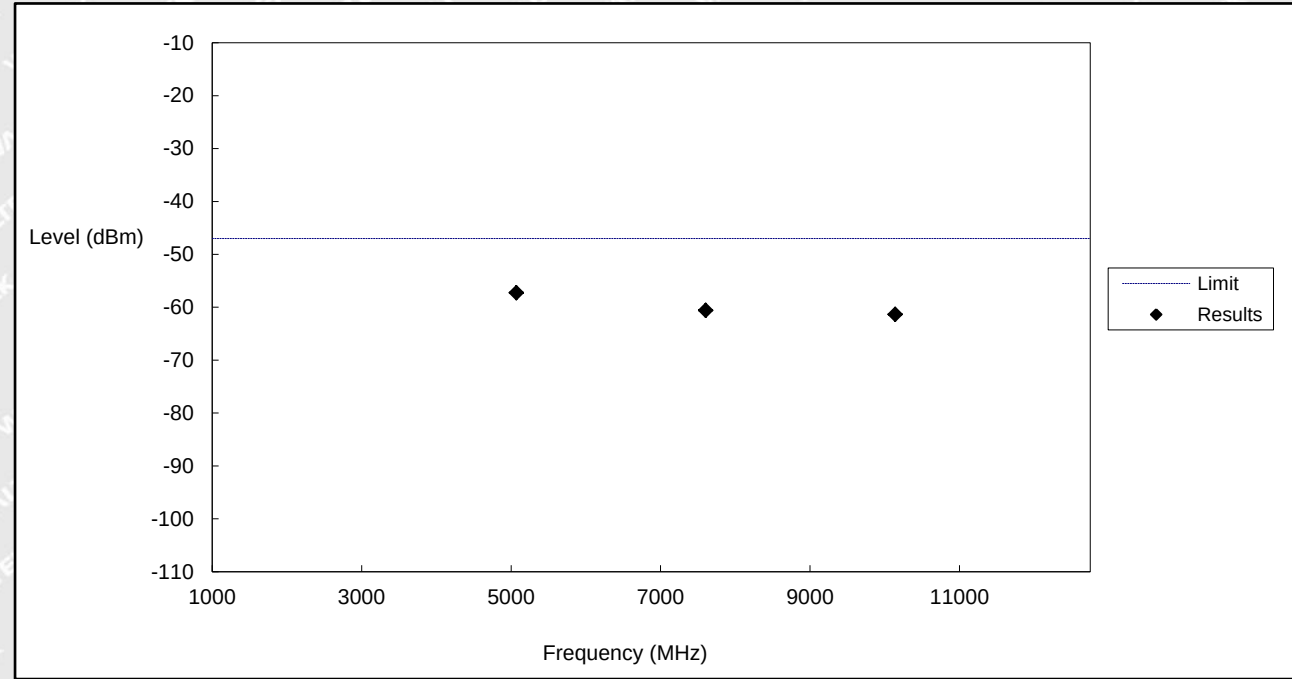


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	337.69	-65.91	-57	-8.91	RMS
2	440.31	-64.46	-57	-7.46	RMS
3	711.15	-63.02	-57	-6.02	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

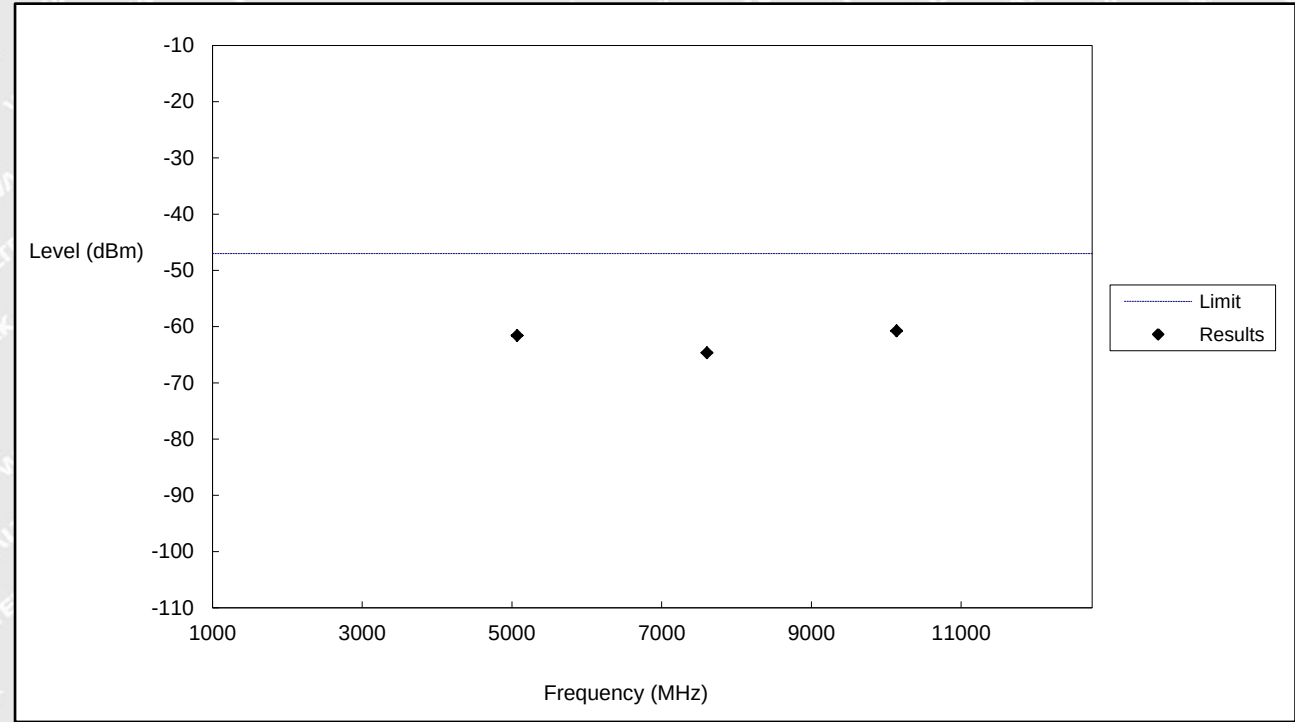
Test mode:	Idle Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	5070.00	-57.27	-47	-10.27	RMS
2	7605.00	-60.61	-47	-13.61	RMS
3	10140.00	-61.37	-47	-14.37	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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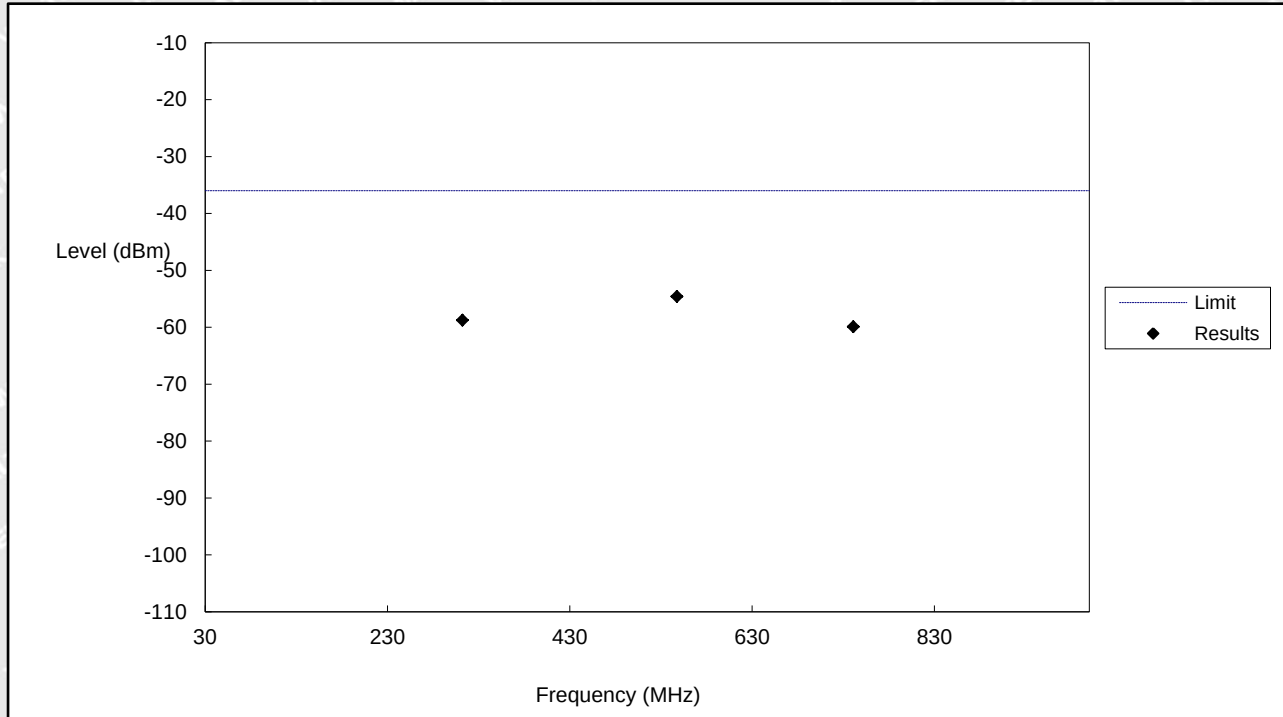


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	5070.00	-61.61	-47	-14.61	RMS
2	7605.00	-64.66	-47	-17.66	RMS
3	10140.00	-60.76	-47	-13.76	RMS



➤ Radiated Spurious Emissions(30MHz-1GHz)

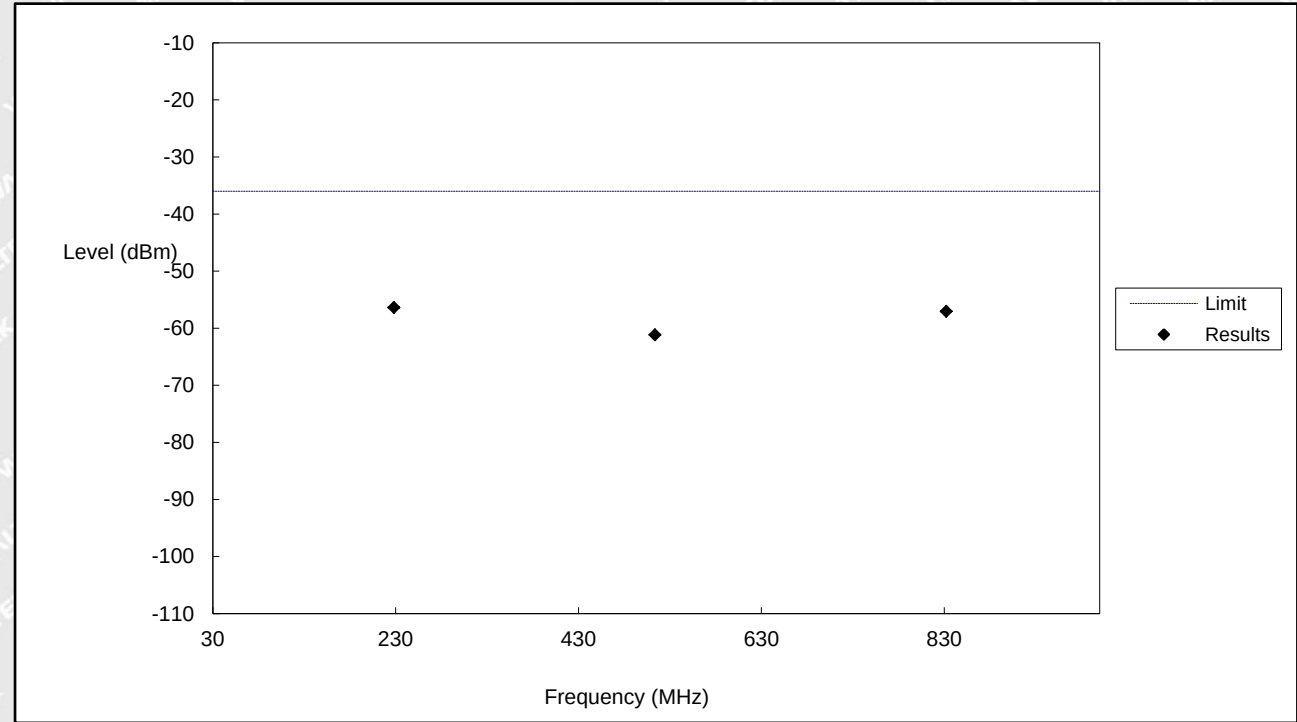
FDD Band 8			
Test mode:	Traffic Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	312.29	-58.76	-36	-22.76	RMS
2	547.66	-54.61	-36	-18.61	RMS
3	741.11	-59.91	-36	-23.91	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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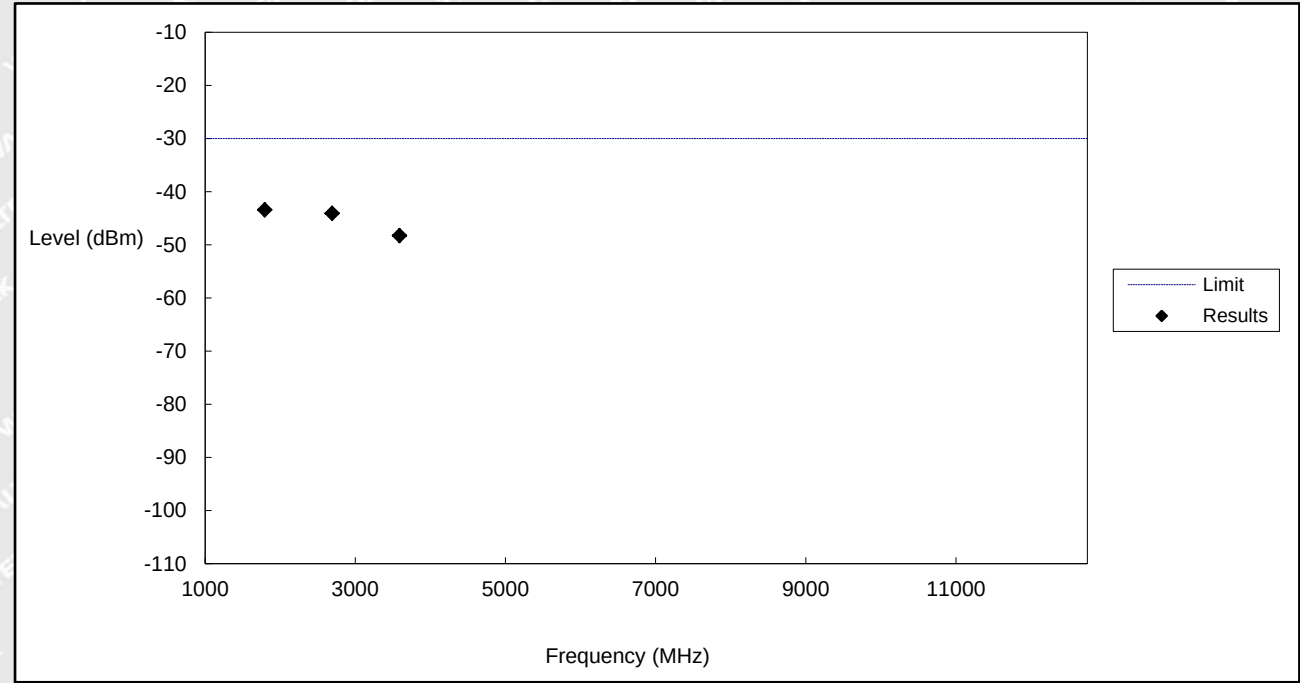


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	228.19	-56.38	-36	-20.38	RMS
2	513.63	-61.16	-36	-25.16	RMS
3	832.29	-57.04	-36	-21.04	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

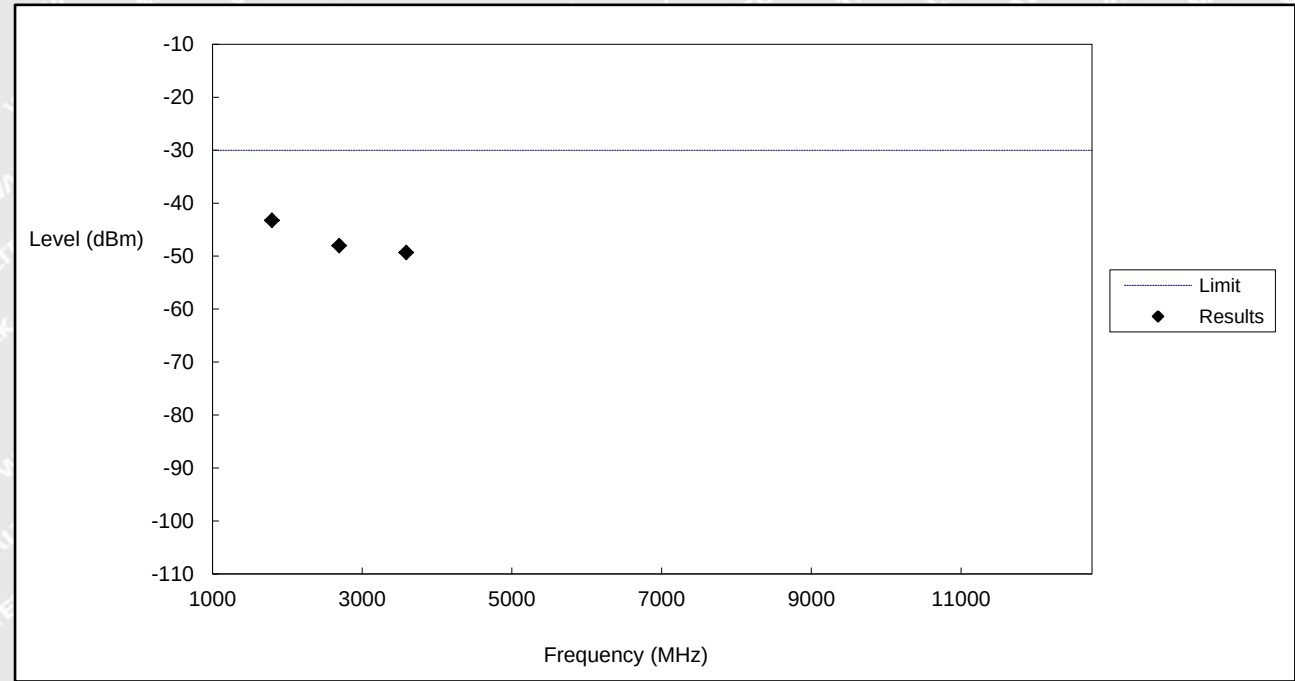
Test mode:	Traffic Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1795.00	-43.41	-30	-13.41	RMS
2	2692.50	-44.09	-30	-14.09	RMS
3	3590.00	-48.26	-30	-18.26	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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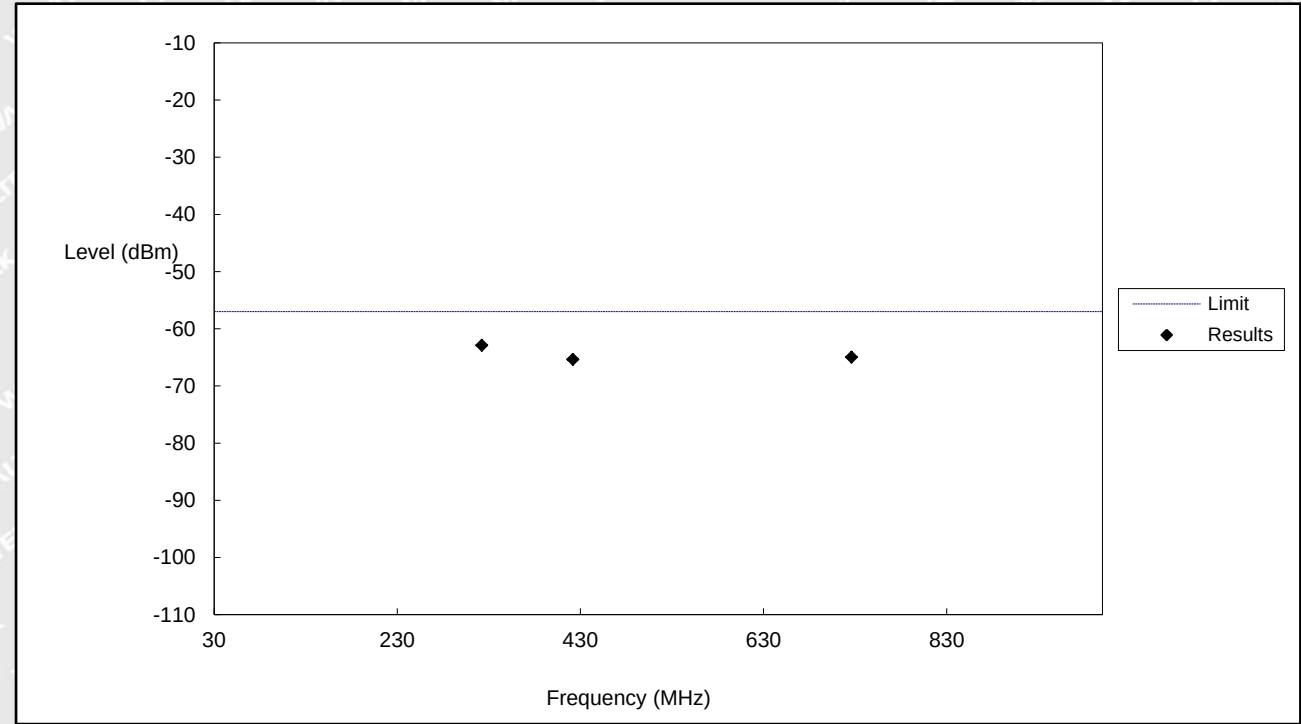


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1795.00	-43.26	-30	-13.26	RMS
2	2692.50	-48.03	-30	-18.03	RMS
3	3590.00	-49.35	-30	-19.35	RMS



Radiated Spurious Emissions(30MHz-1GHz)

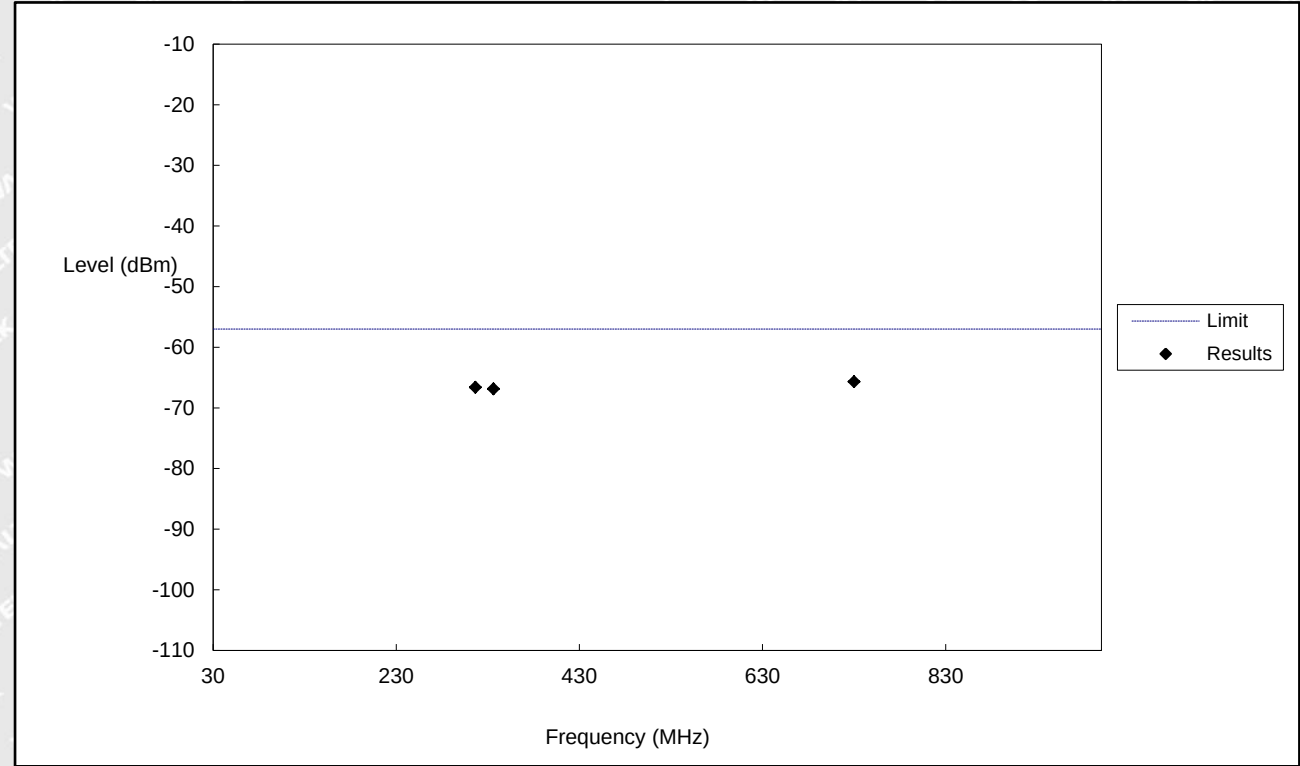
FDD Band 8			
Test mode:	Idle Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	322.48	-62.90	-57	-5.90	RMS
2	421.83	-65.35	-57	-8.35	RMS
3	726.07	-64.96	-57	-7.96	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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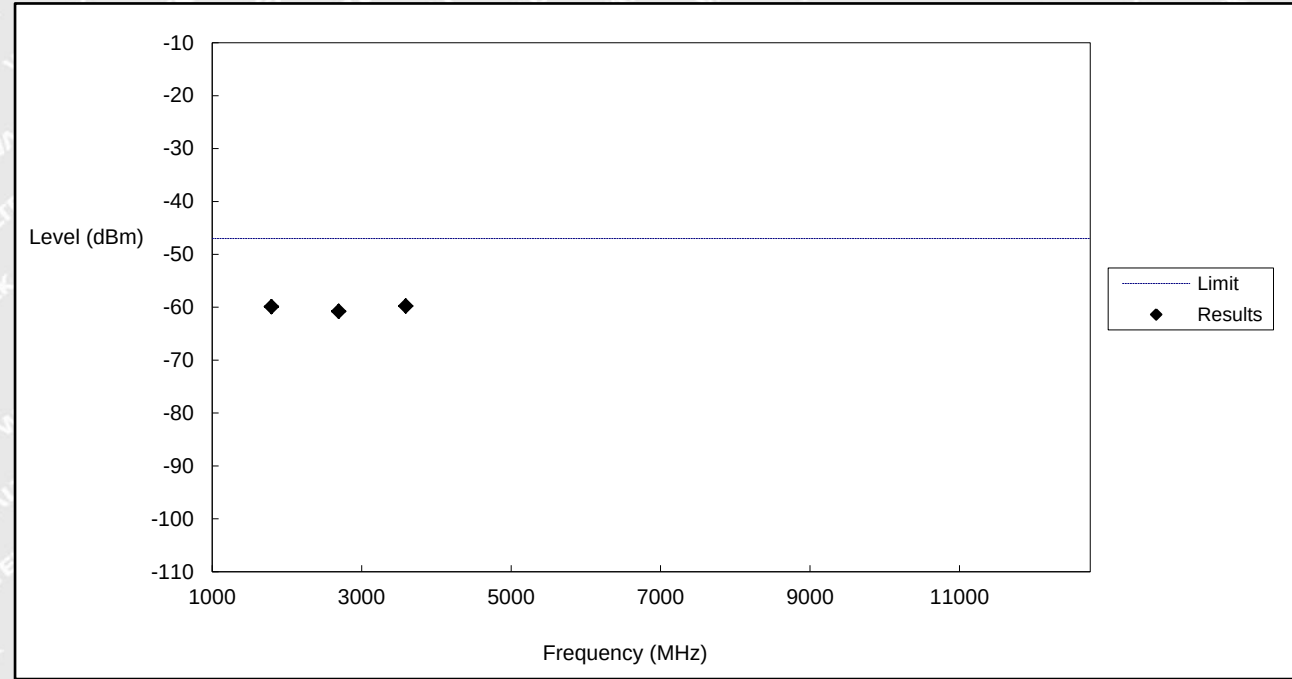


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	316.44	-66.61	-57	-9.61	RMS
2	336.12	-66.87	-57	-9.87	RMS
3	729.92	-65.70	-57	-8.70	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

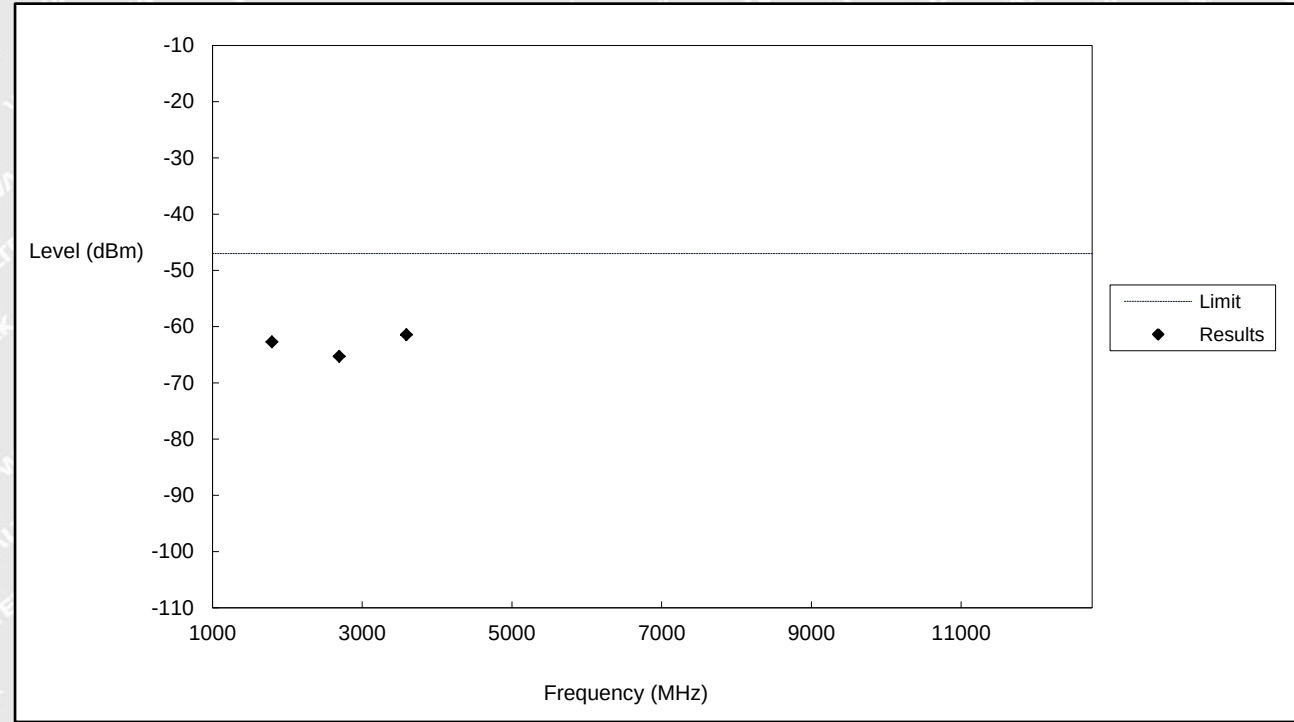
Test mode:	Idle Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1795.00	-59.91	-47	-12.91	RMS
2	2692.50	-60.79	-47	-13.79	RMS
3	3590.00	-59.79	-47	-12.79	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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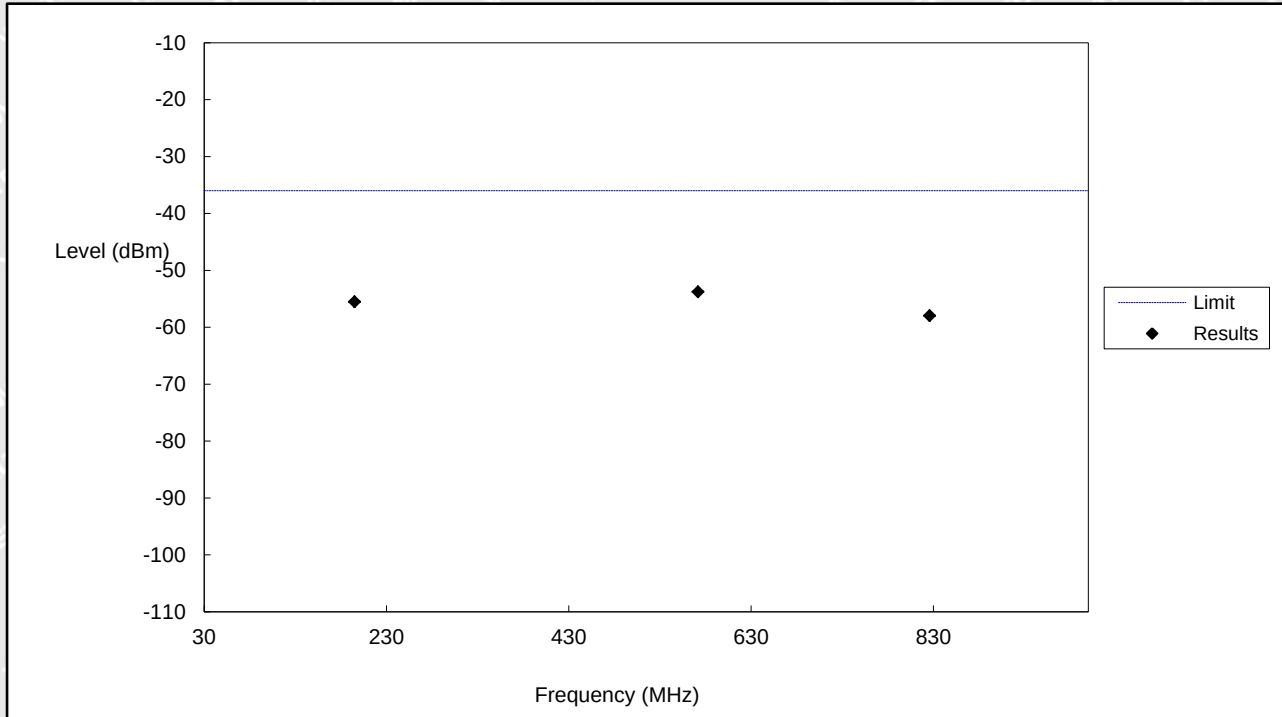


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1795.00	-62.74	-47	-15.74	RMS
2	2692.50	-65.30	-47	-18.30	RMS
3	3590.00	-61.45	-47	-14.45	RMS



➤ Radiated Spurious Emissions(30MHz-1GHz)

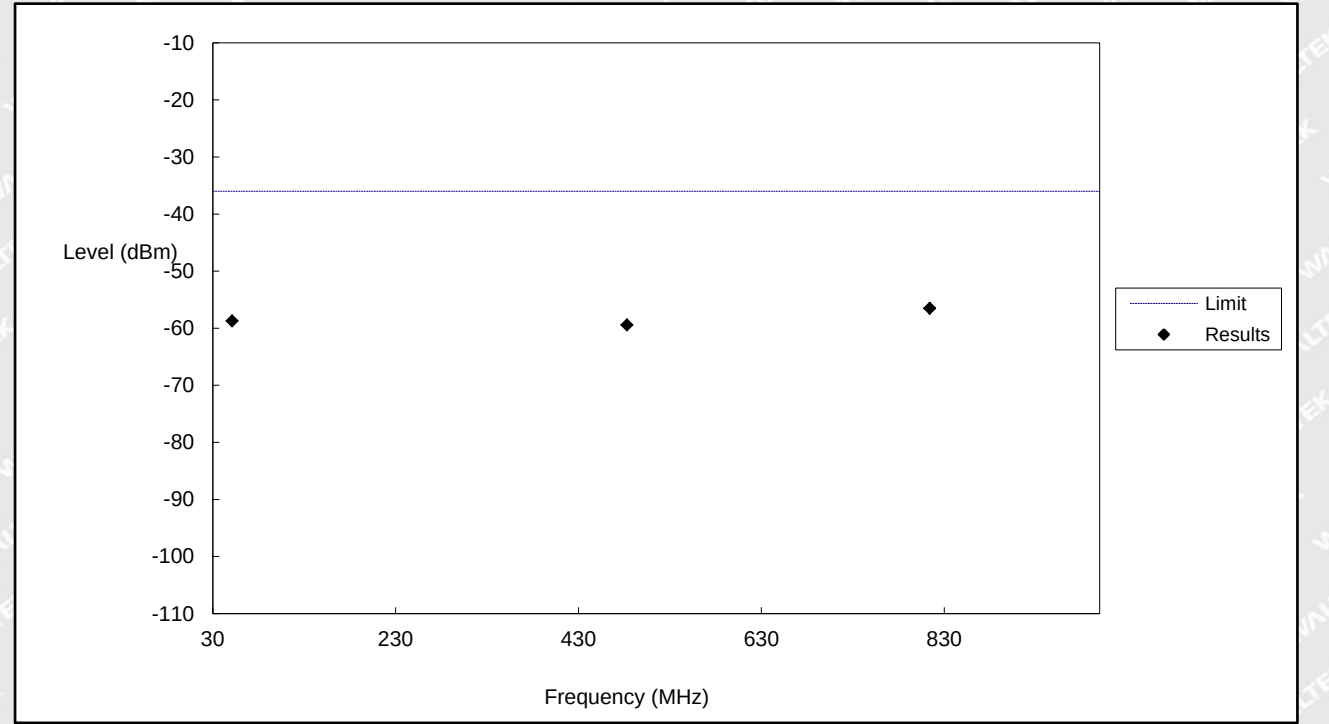
FDD Band 20			
Test mode:	Traffic Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	195.03	-55.53	-36	-19.53	RMS
2	571.87	-53.80	-36	-17.80	RMS
3	825.85	-57.98	-36	-21.98	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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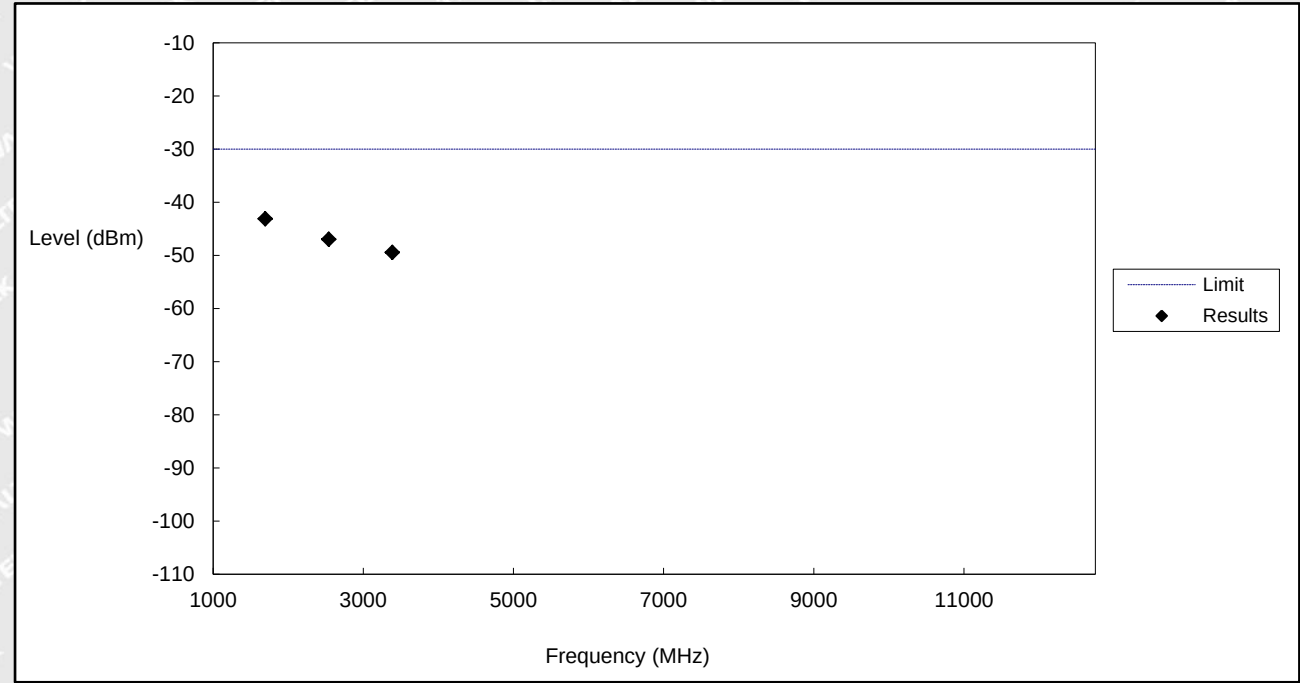


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	51.19	-58.74	-36	-22.74	RMS
2	483.03	-59.43	-36	-23.43	RMS
3	814.26	-56.52	-36	-20.52	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

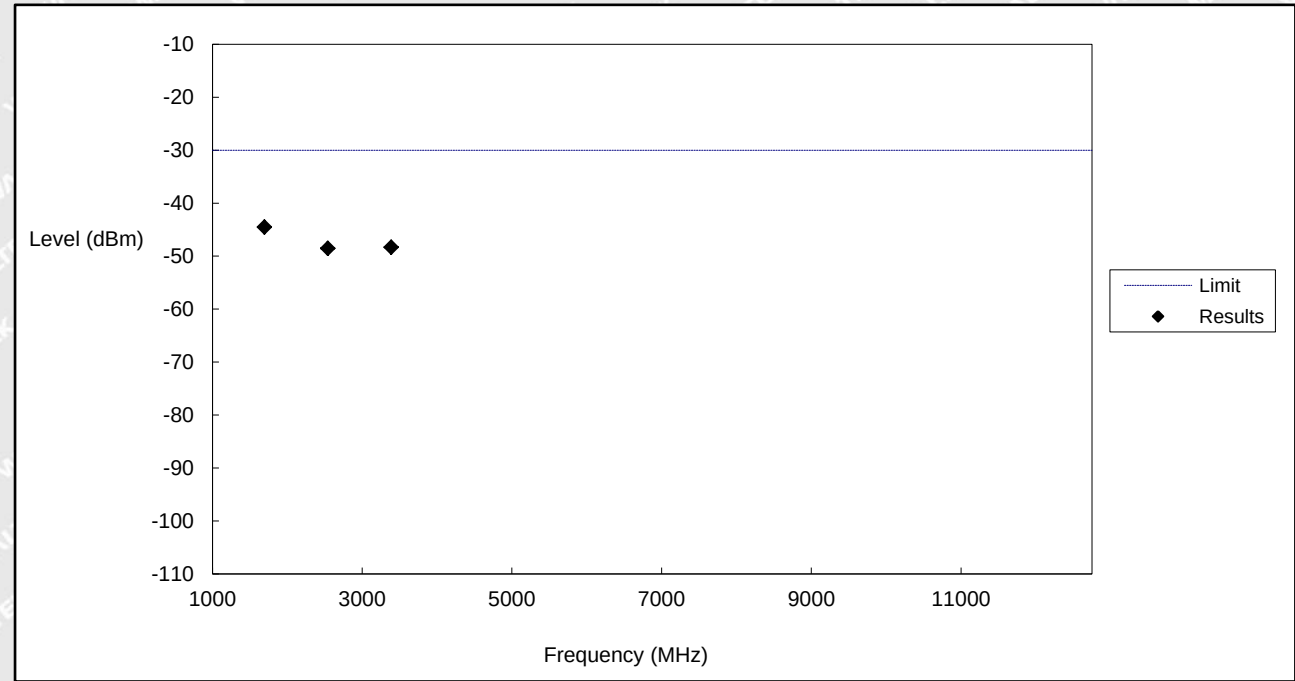
Test mode:	Traffic Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1694.00	-43.09	-30	-13.09	RMS
2	2541.00	-46.95	-30	-16.95	RMS
3	3388.00	-49.42	-30	-19.42	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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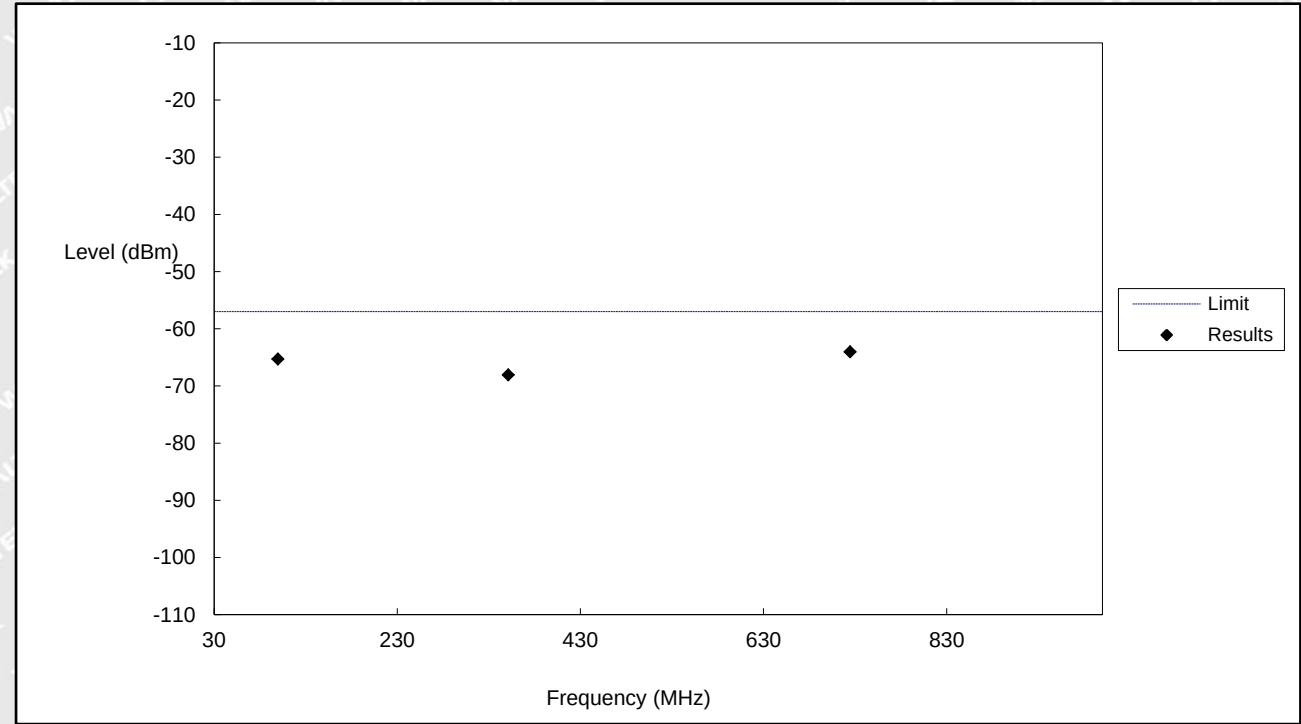


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1694.00	-44.54	-30	-14.54	RMS
2	2541.00	-48.56	-30	-18.56	RMS
3	3388.00	-48.34	-30	-18.34	RMS



Radiated Spurious Emissions(30MHz-1GHz)

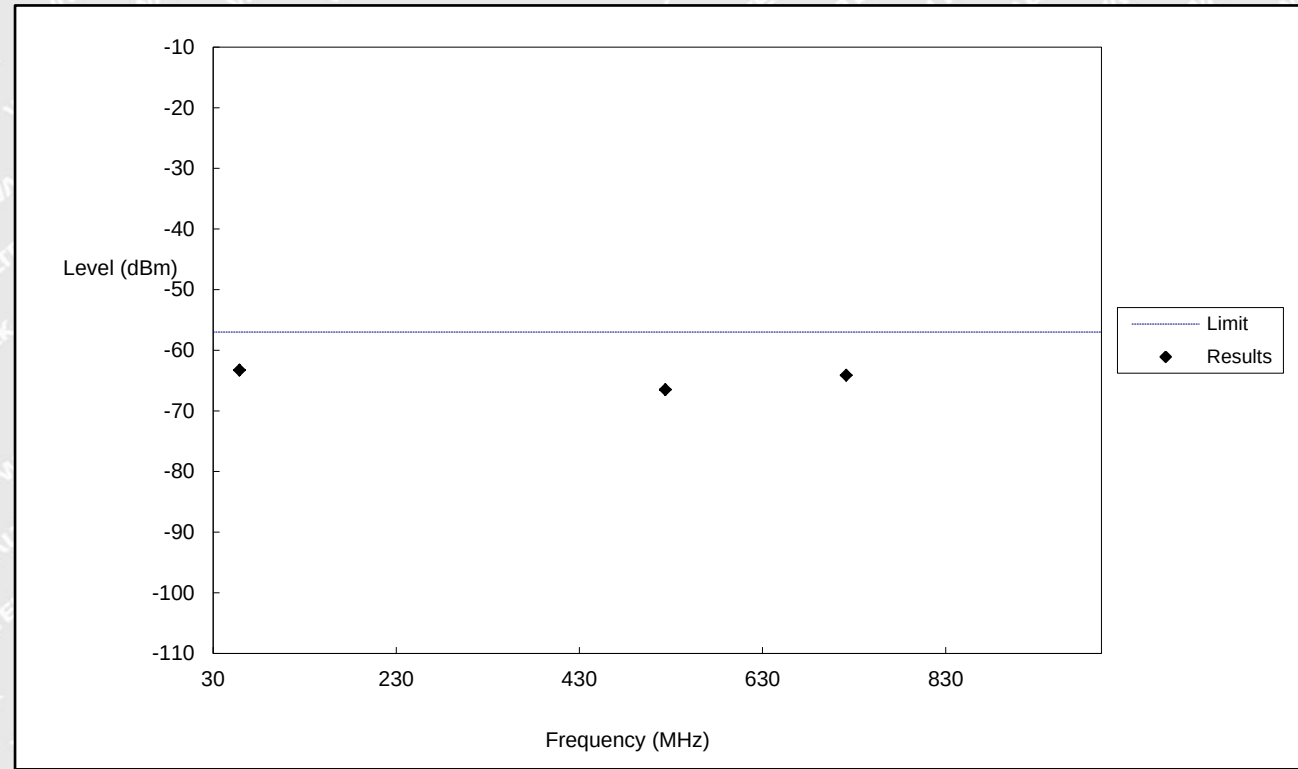
FDD Band 20			
Test mode:	Idle Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	99.68	-65.29	-57	-8.29	RMS
2	351.22	-68.07	-57	-11.07	RMS
3	724.50	-64.04	-57	-7.04	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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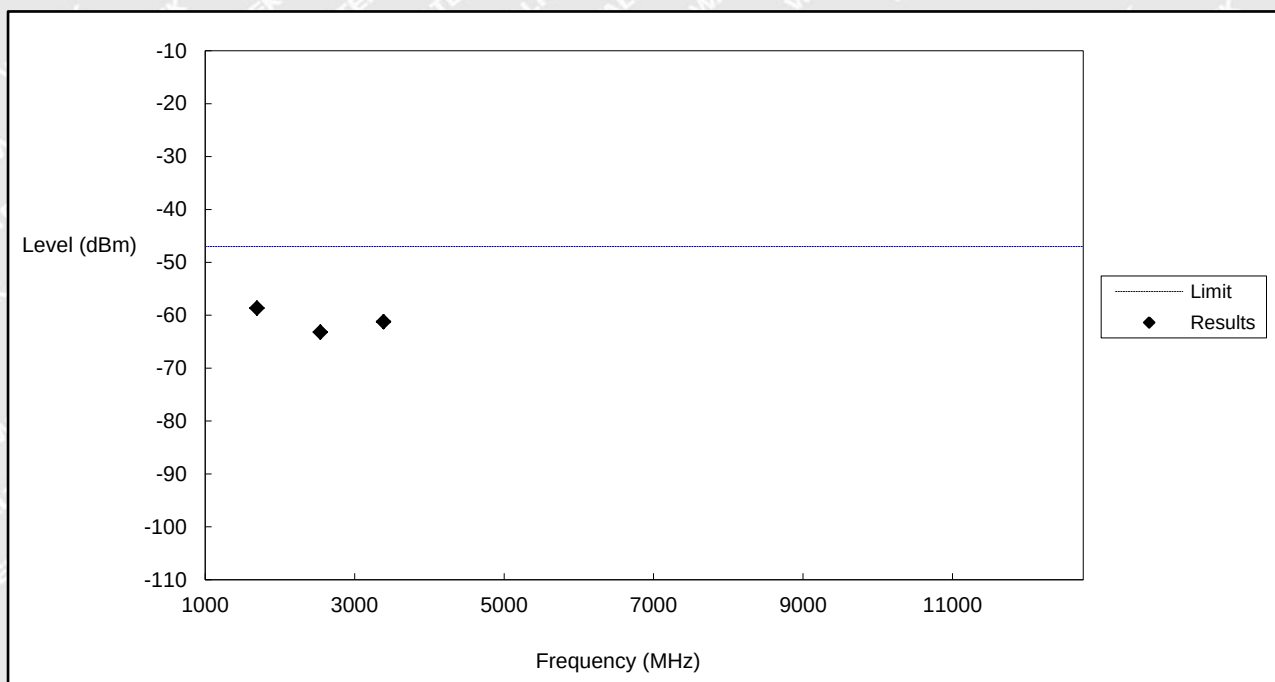
No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	58.78	-63.28	-57	-6.28	RMS
2	523.98	-66.52	-57	-9.52	RMS
3	721.47	-64.15	-57	-7.15	RMS



Reference No.: WTX22X08156832W002

➤ Radiated Spurious Emissions(Above 1GHz)

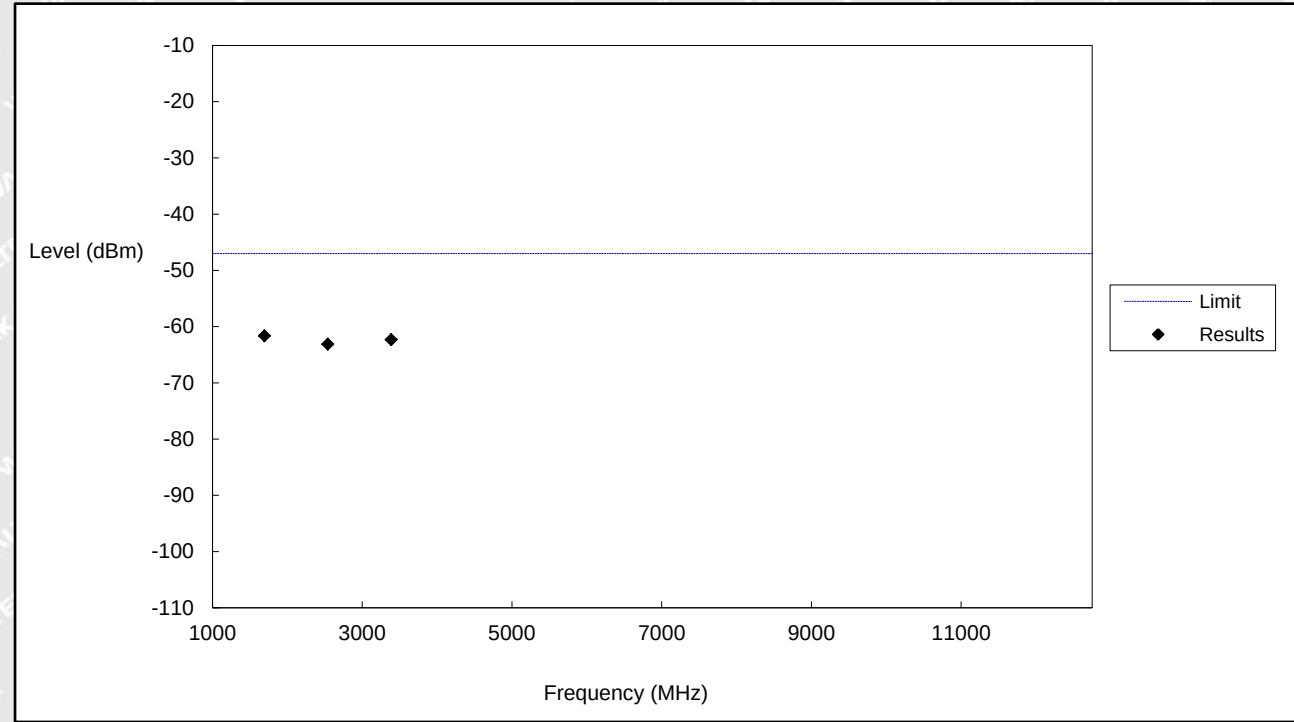
Test mode:	Idle Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1694.00	-58.66	-47	-11.66	RMS
2	2541.00	-63.20	-47	-16.20	RMS
3	3388.00	-61.25	-47	-14.25	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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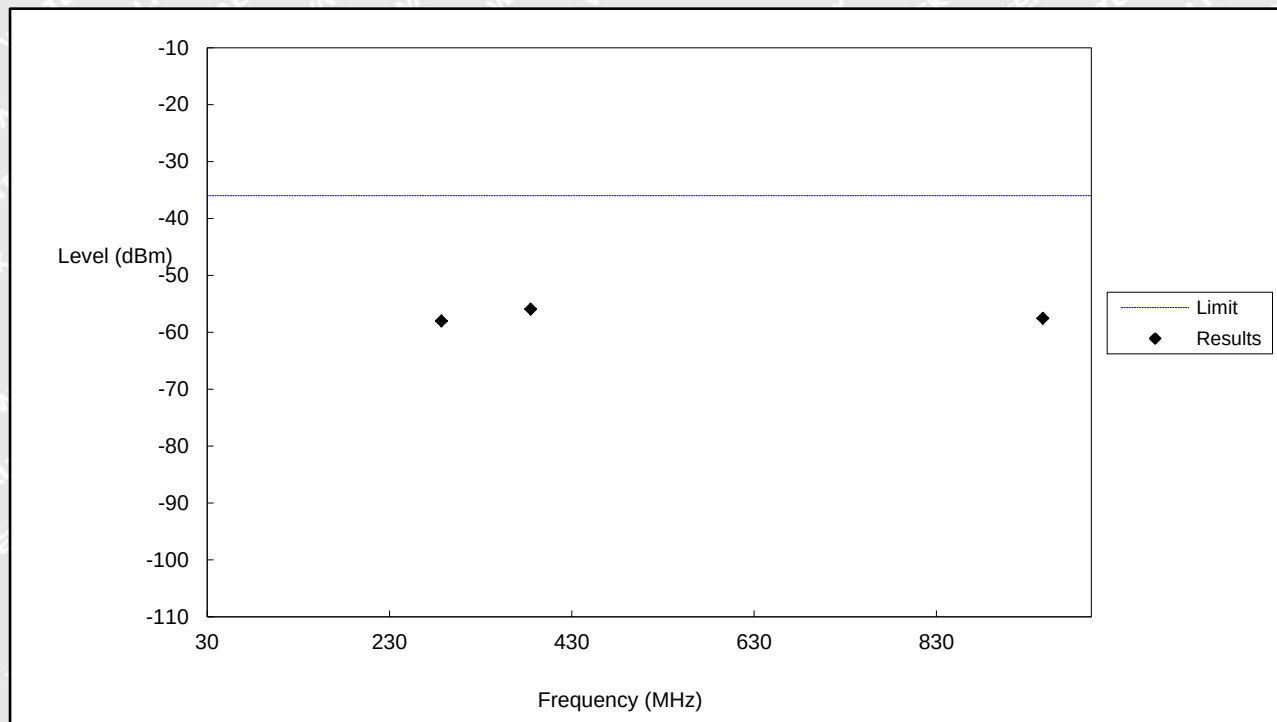
No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	1694.00	-61.67	-47	-14.67	RMS
2	2541.00	-63.15	-47	-16.15	RMS
3	3388.00	-62.33	-47	-15.33	RMS



Reference No.: WTX22X08156832W002

➤ Radiated Spurious Emissions(30MHz-1GHz)

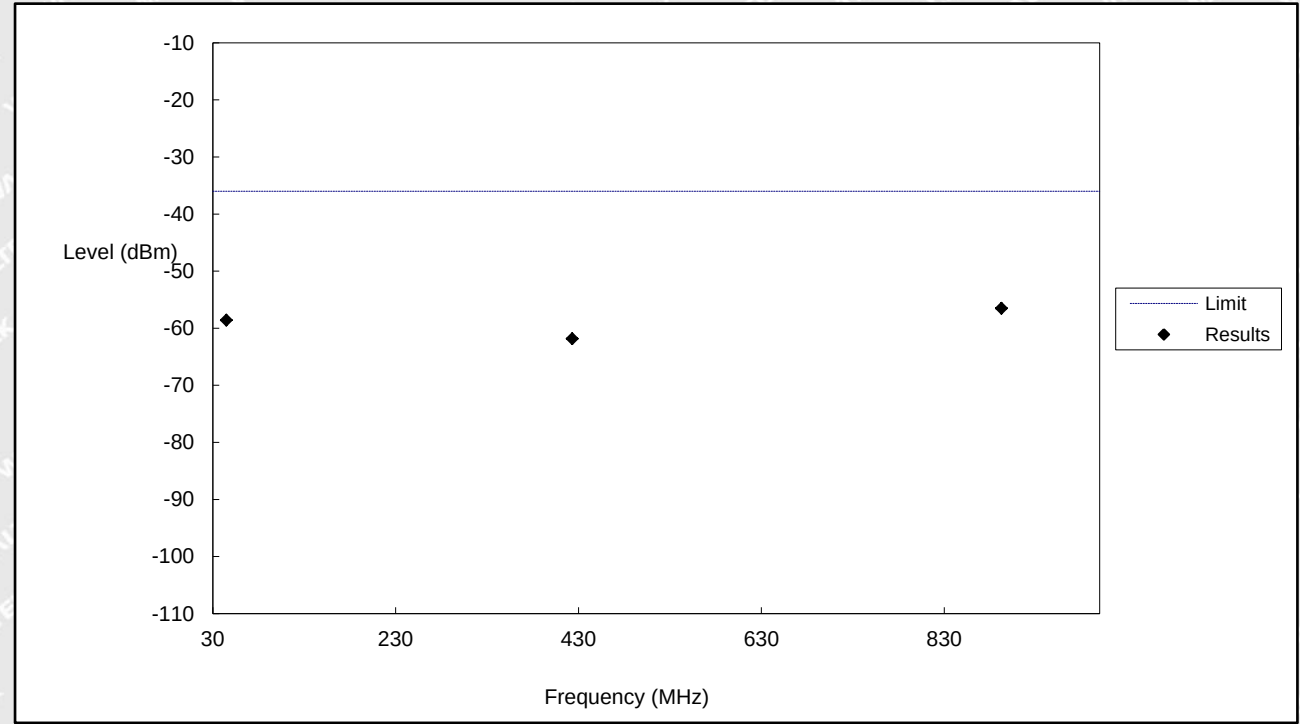
TDD Band 38			
Test mode:	Traffic Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	286.97	-58.03	-36	-22.03	RMS
2	385.08	-55.95	-36	-19.95	RMS
3	946.92	-57.55	-36	-21.55	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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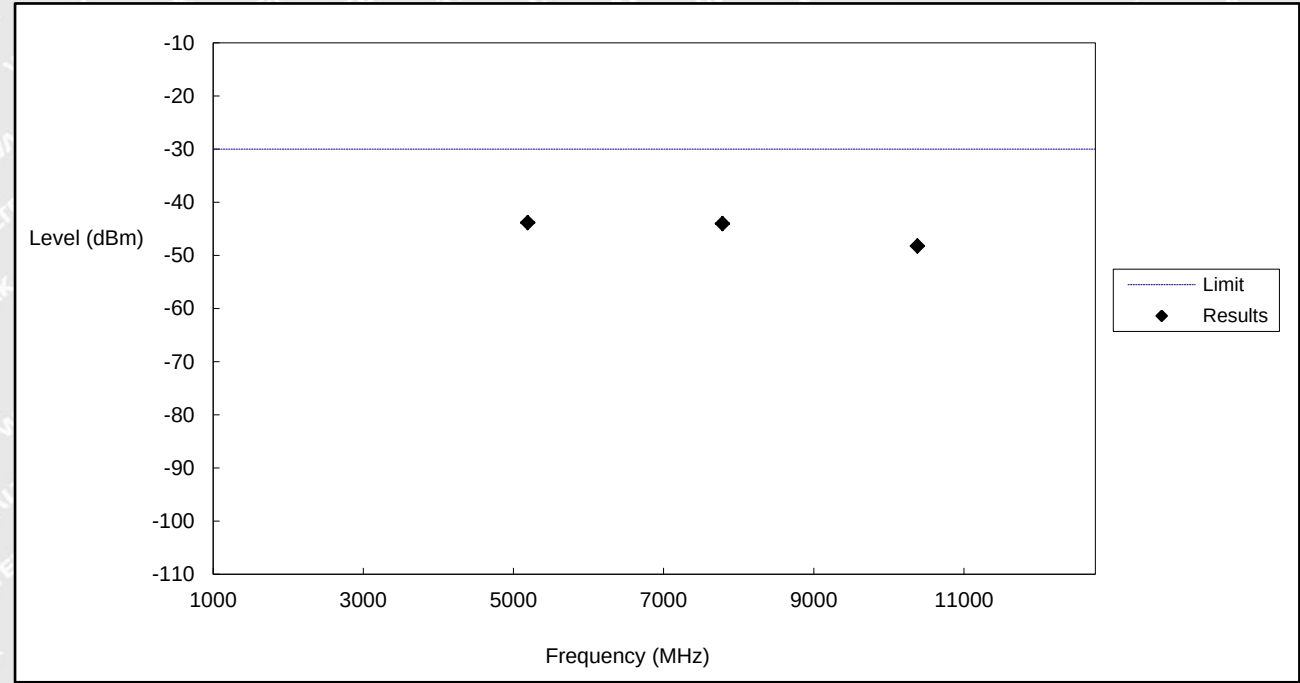


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	44.93	-58.58	-36	-22.58	RMS
2	423.18	-61.84	-36	-25.84	RMS
3	892.62	-56.51	-36	-20.51	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

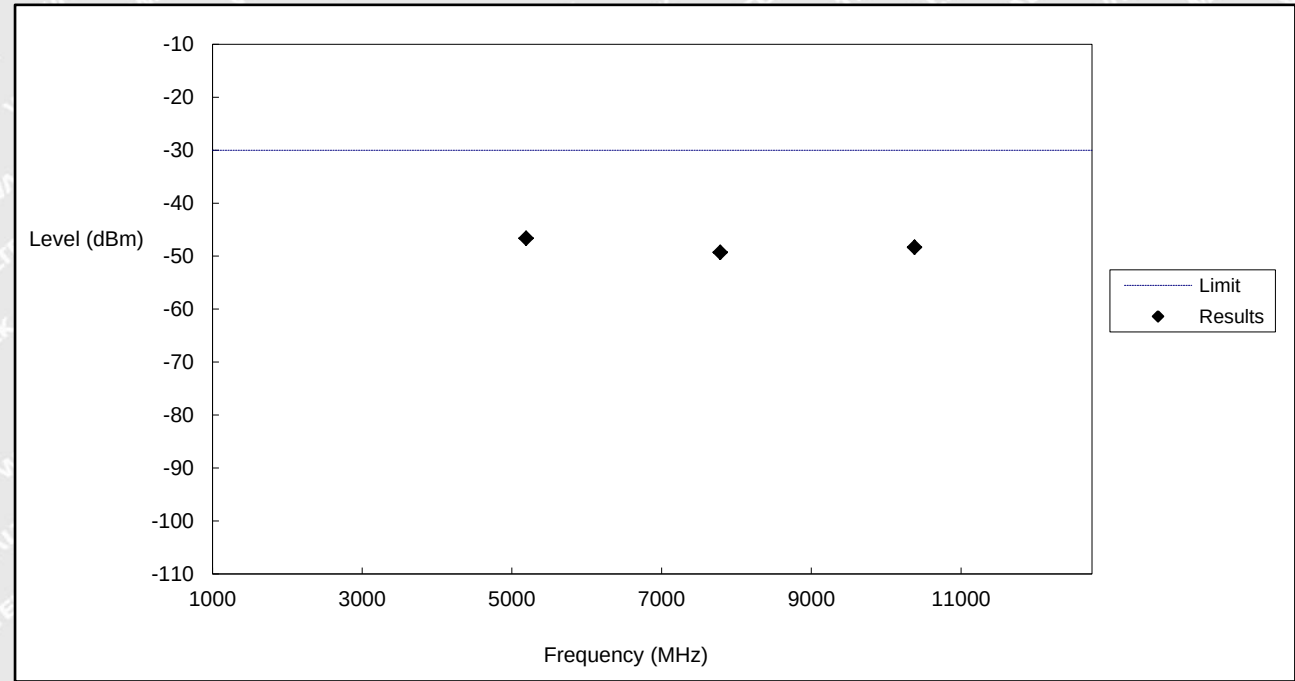
Test mode:	Traffic Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	5190.00	-43.83	-30	-13.83	RMS
2	7785.00	-44.02	-30	-14.02	RMS
3	10380.00	-48.23	-30	-18.23	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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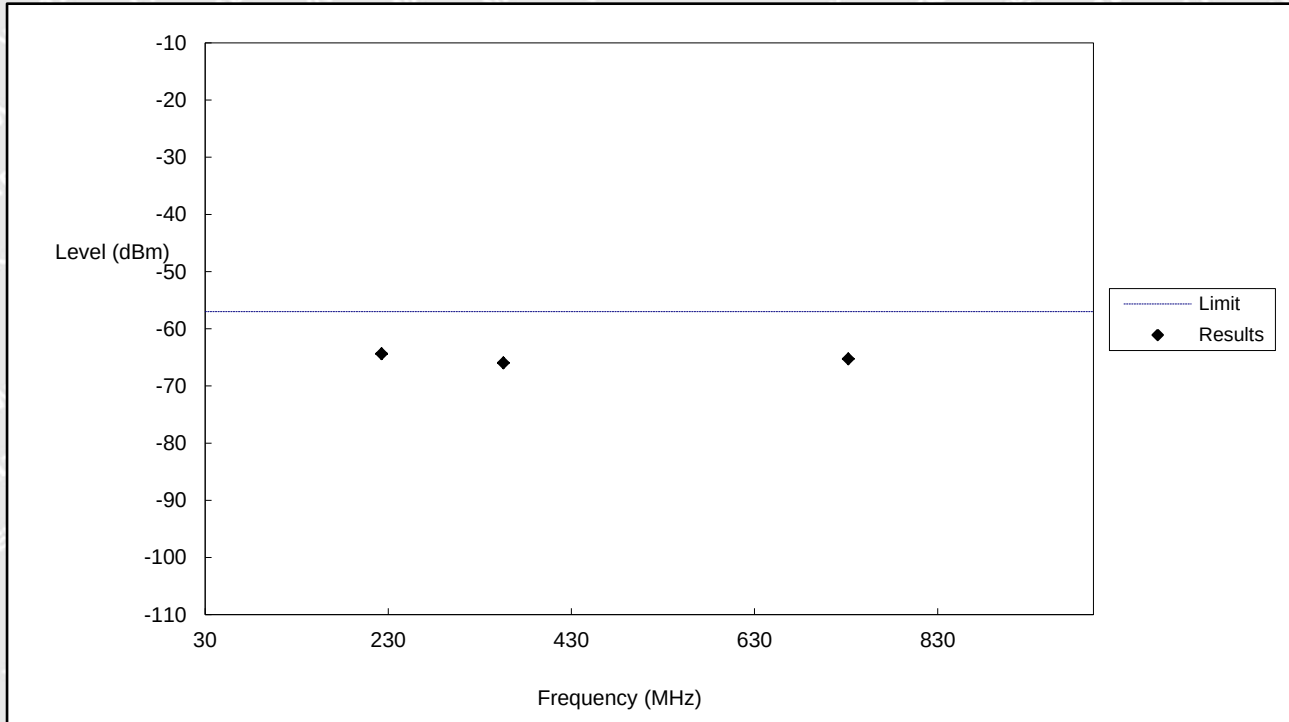


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	5190.00	-46.64	-30	-16.64	RMS
2	7785.00	-49.30	-30	-19.30	RMS
3	10380.00	-48.35	-30	-18.35	RMS



➤ Radiated Spurious Emissions(30MHz-1GHz)

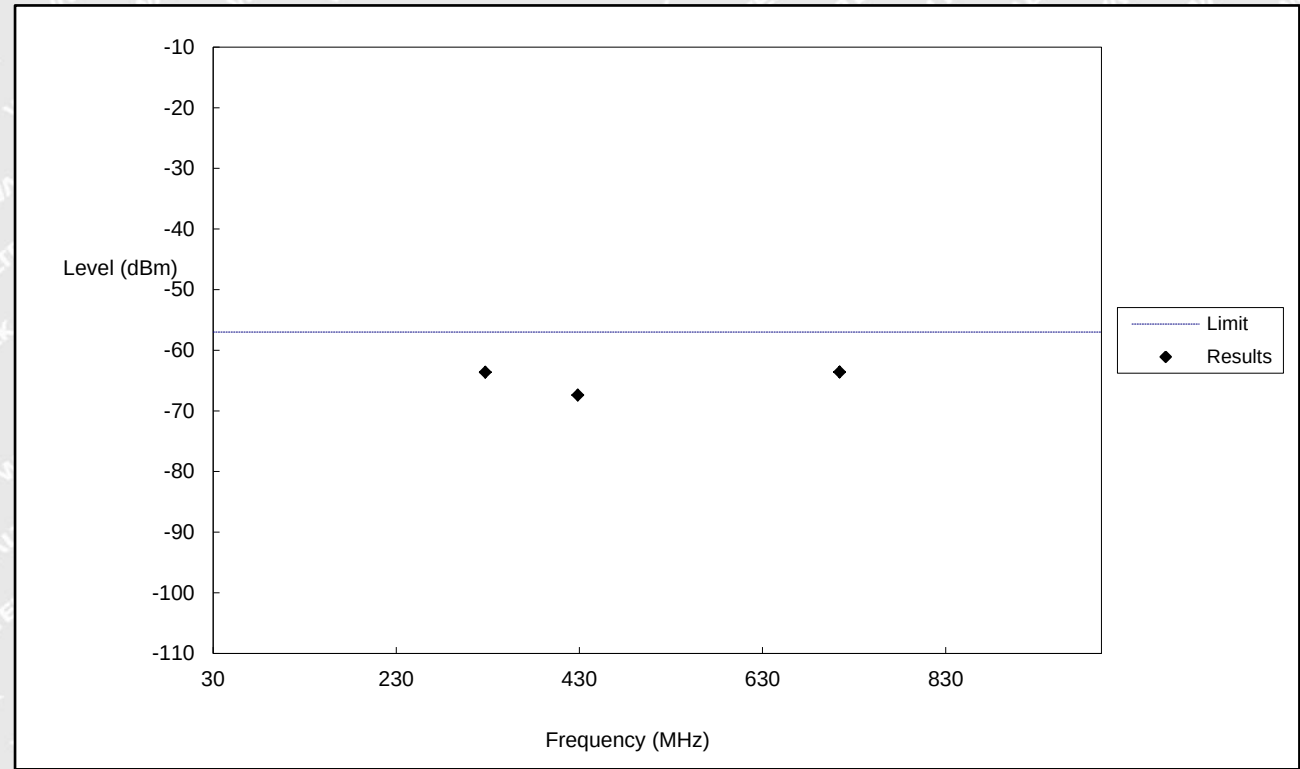
TDD Band 38			
Test mode:	Idle Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	222.73	-64.38	-57	-7.38	RMS
2	355.83	-65.97	-57	-8.97	RMS
3	732.50	-65.27	-57	-8.27	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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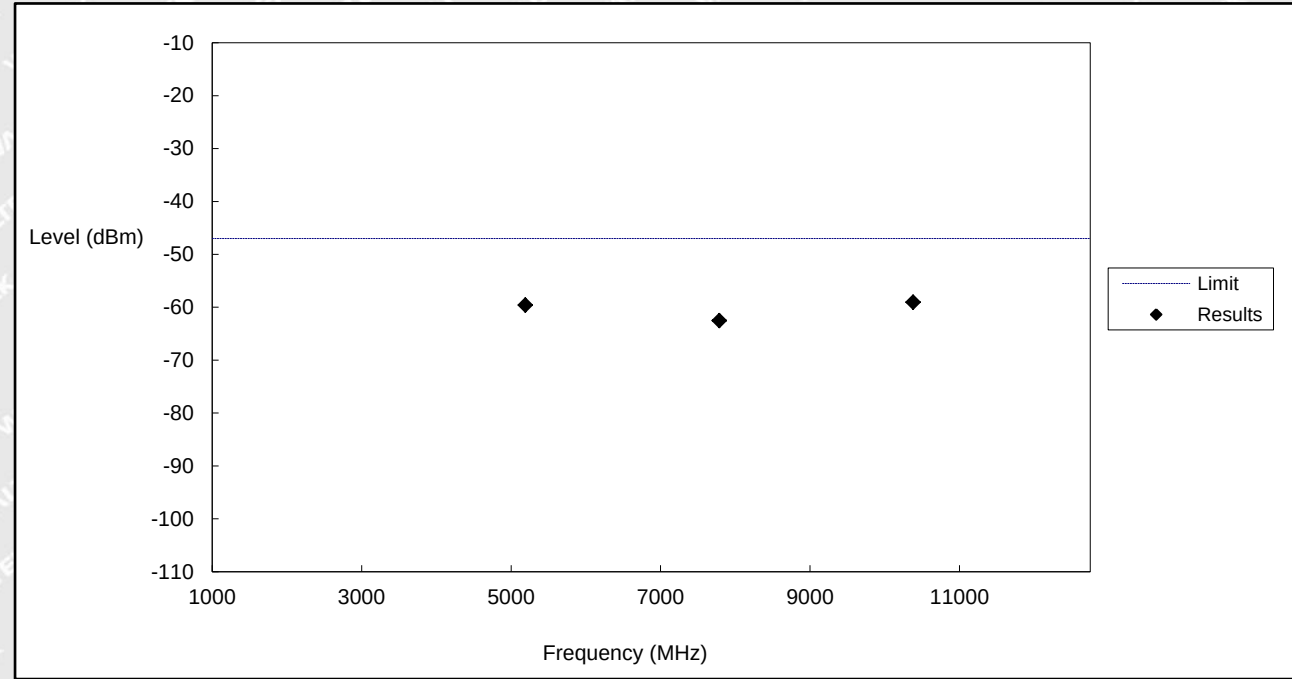


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	327.27	-63.64	-57	-6.64	RMS
2	428.33	-67.41	-57	-10.41	RMS
3	714.17	-63.61	-57	-6.61	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

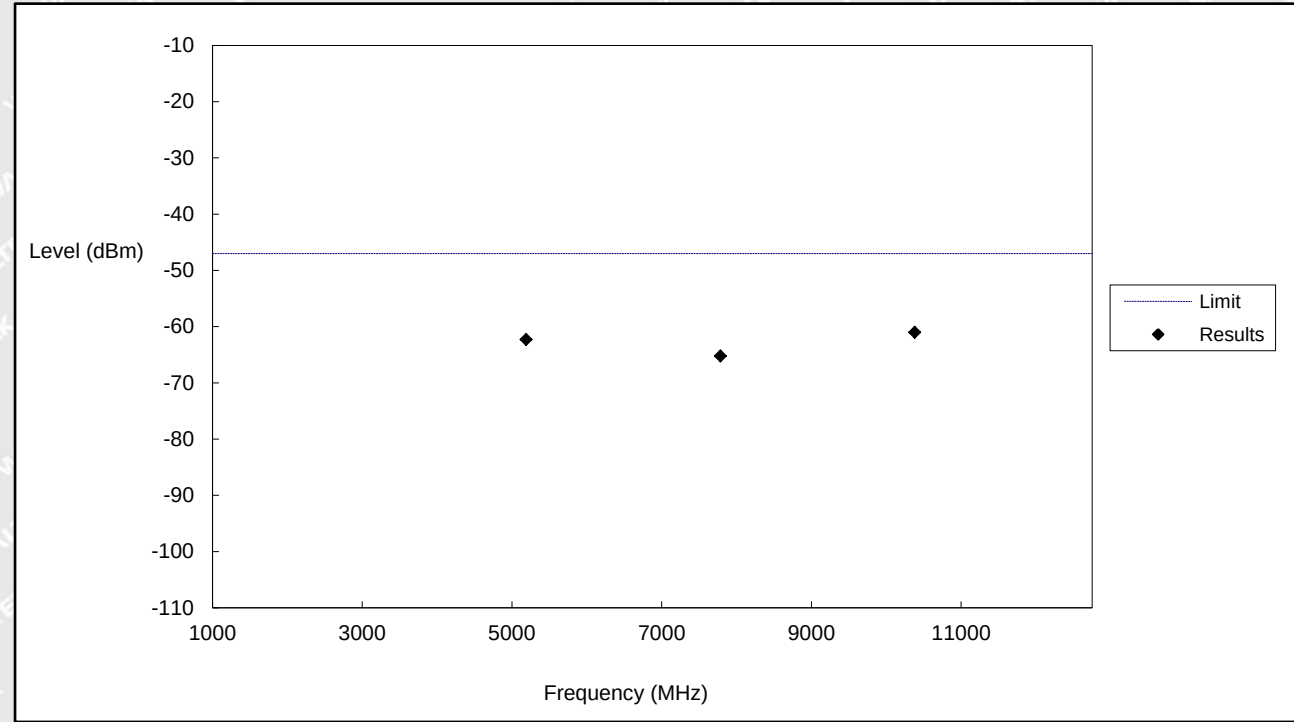
Test mode:	Idle Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	5190.00	-59.61	-47	-12.61	RMS
2	7785.00	-62.55	-47	-15.55	RMS
3	10380.00	-59.07	-47	-12.07	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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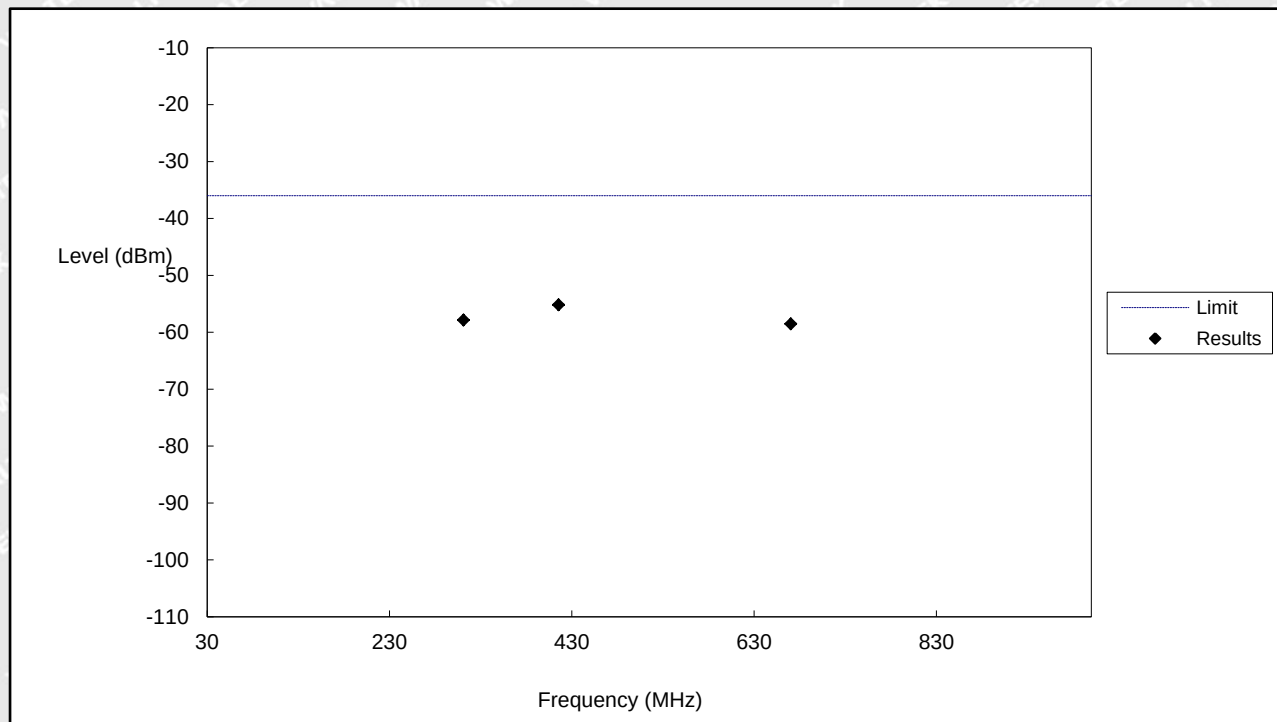


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	5190.00	-62.32	-47	-15.32	RMS
2	7785.00	-65.24	-47	-18.24	RMS
3	10380.00	-61.02	-47	-14.02	RMS



➤ Radiated Spurious Emissions(30MHz-1GHz)

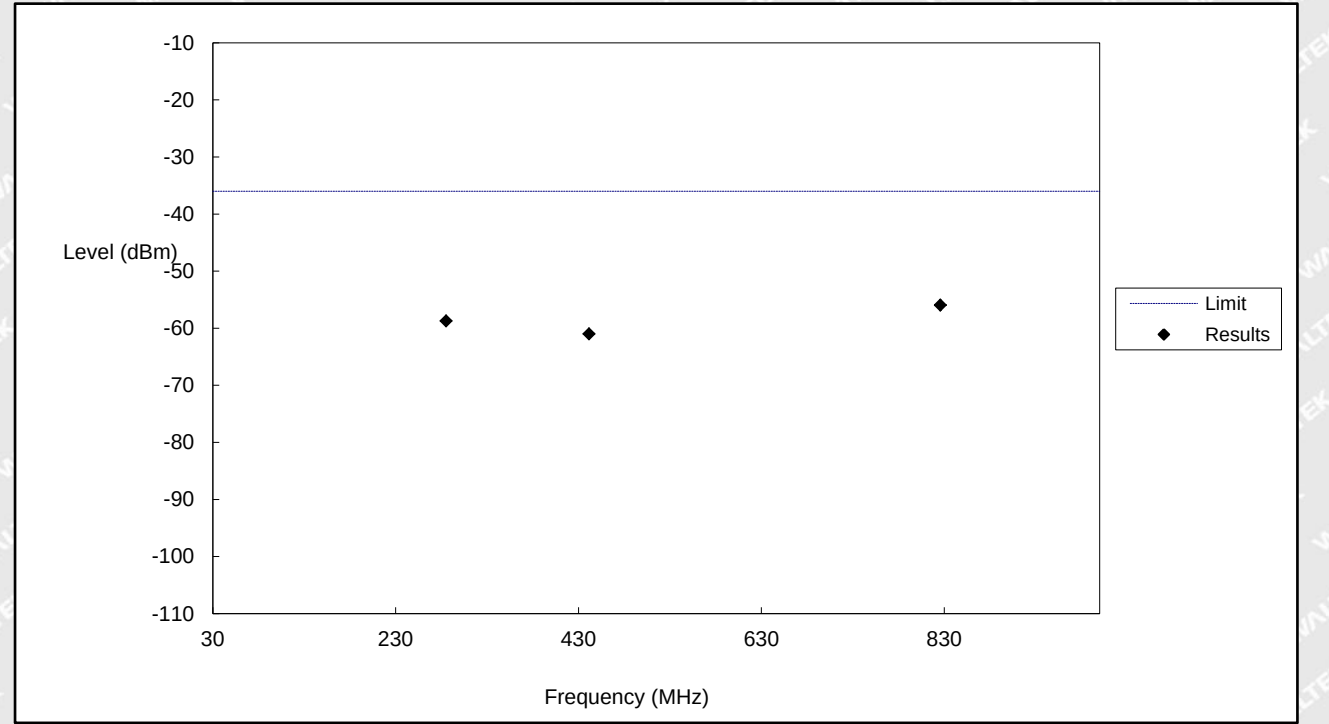
TDD Band 40			
Test mode:	Traffic Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	311.20	-57.87	-36	-21.87	RMS
2	415.55	-55.20	-36	-19.20	RMS
3	670.34	-58.53	-36	-22.53	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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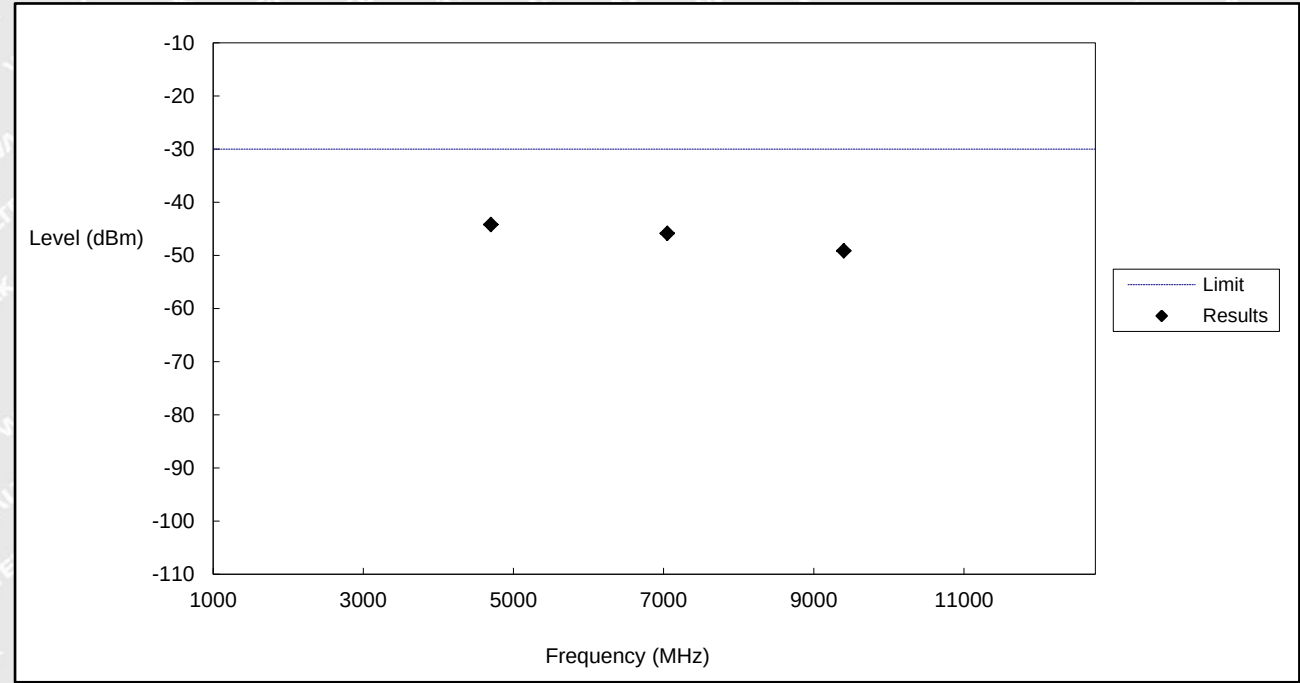


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	285.16	-58.74	-36	-22.74	RMS
2	441.53	-61.01	-36	-25.01	RMS
3	825.82	-55.94	-36	-19.94	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

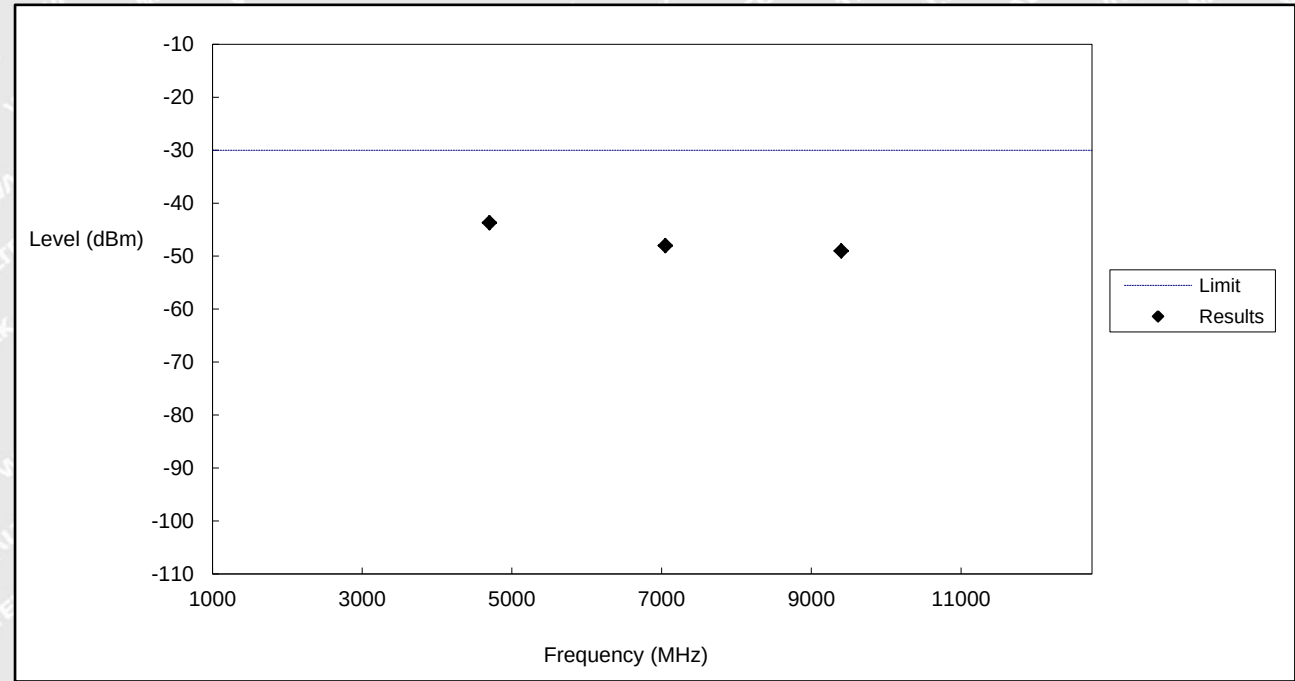
Test mode:	Traffic Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4700.00	-44.19	-30.00	-14.19	RMS
2	7050.00	-45.86	-30.00	-15.86	RMS
3	9400.00	-49.14	-30.00	-19.14	RMS



Test mode:	Traffic Mode	Polarity:	Vertical
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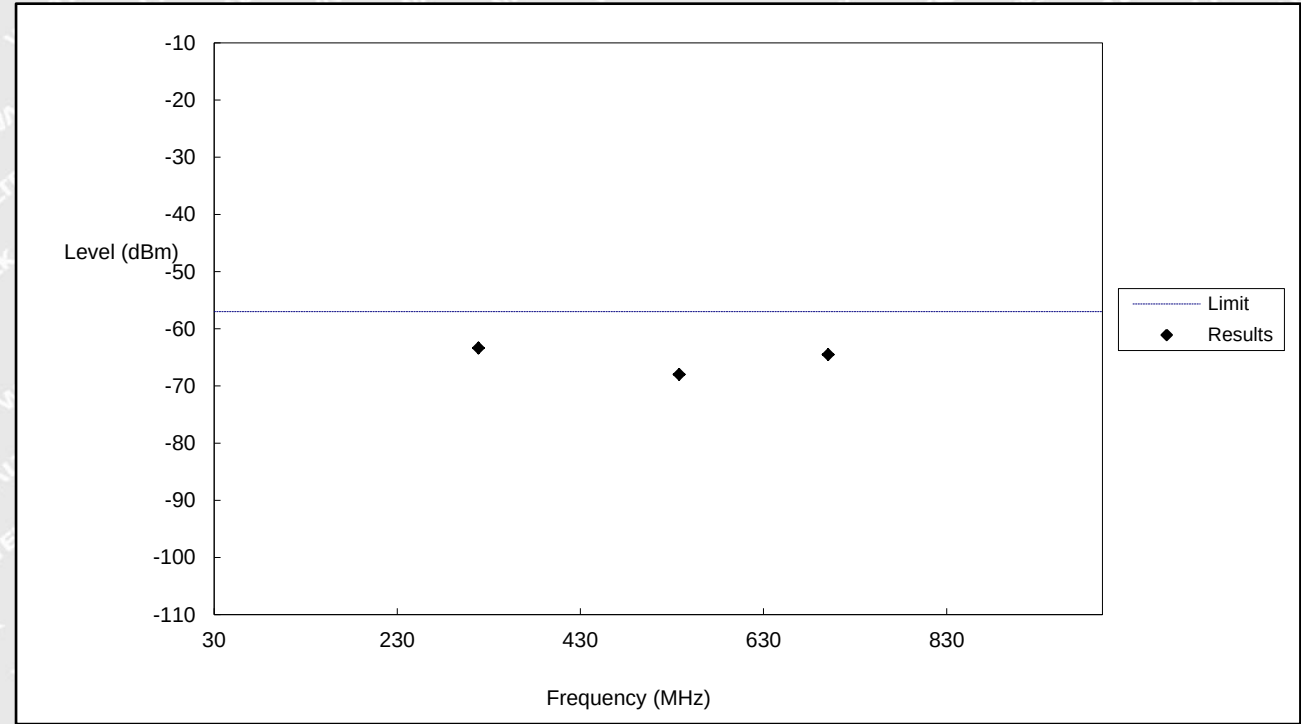


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4700.00	-43.73	-30.00	-13.73	RMS
2	7050.00	-48.04	-30.00	-18.04	RMS
3	9400.00	-49.02	-30.00	-19.02	RMS



Radiated Spurious Emissions(30MHz-1GHz)

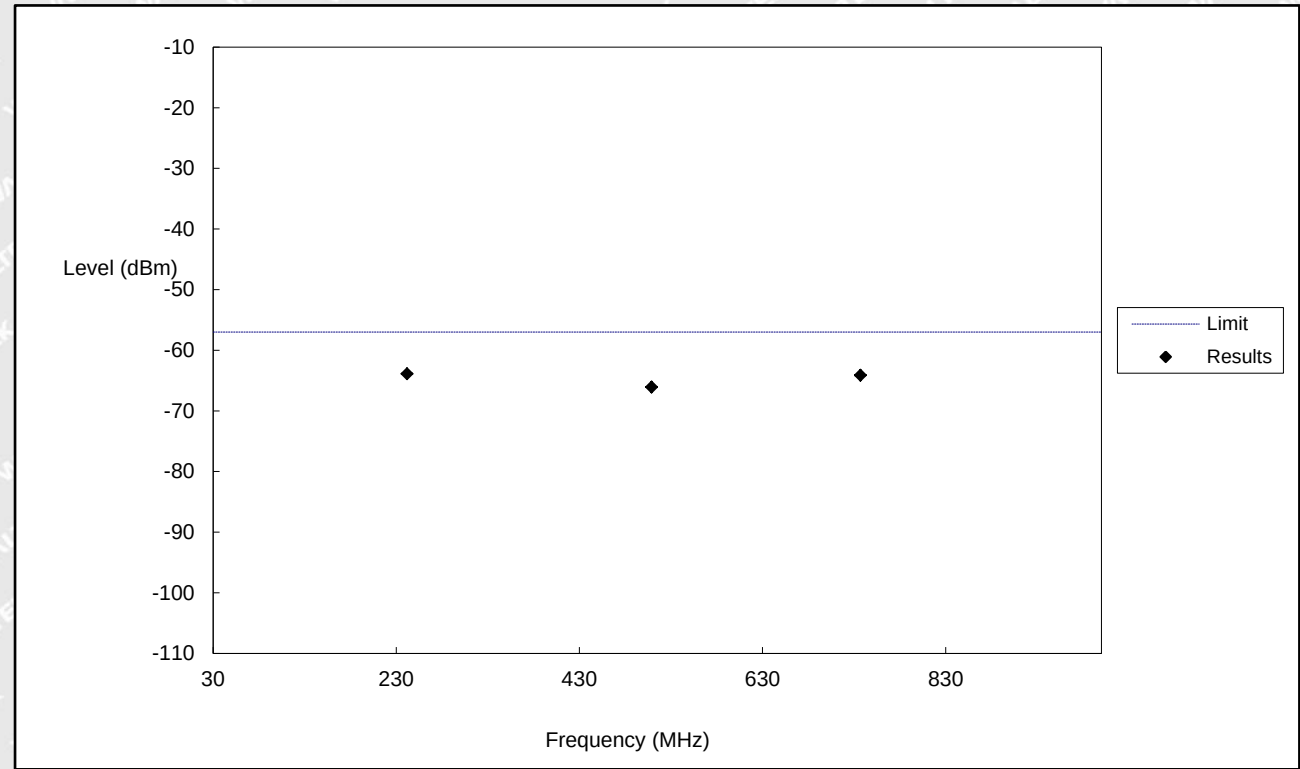
TDD Band 40			
Test mode:	Idle Mode	Polarity:	Horizontal



No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	318.66	-63.37	-57	-6.37	RMS
2	537.94	-68.00	-57	-11.00	RMS
3	700.60	-64.51	-57	-7.51	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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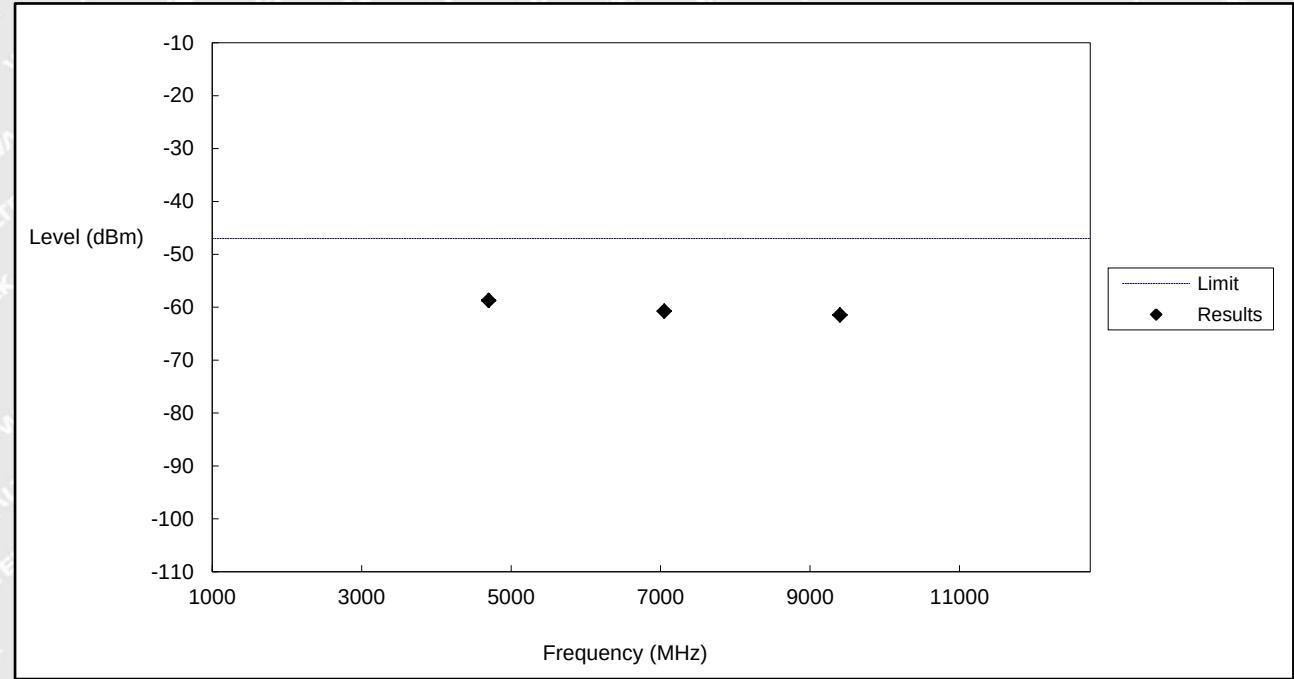


No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	241.78	-63.89	-57	-6.89	RMS
2	508.96	-66.08	-57	-9.08	RMS
3	736.99	-64.14	-57	-7.14	RMS



➤ Radiated Spurious Emissions(Above 1GHz)

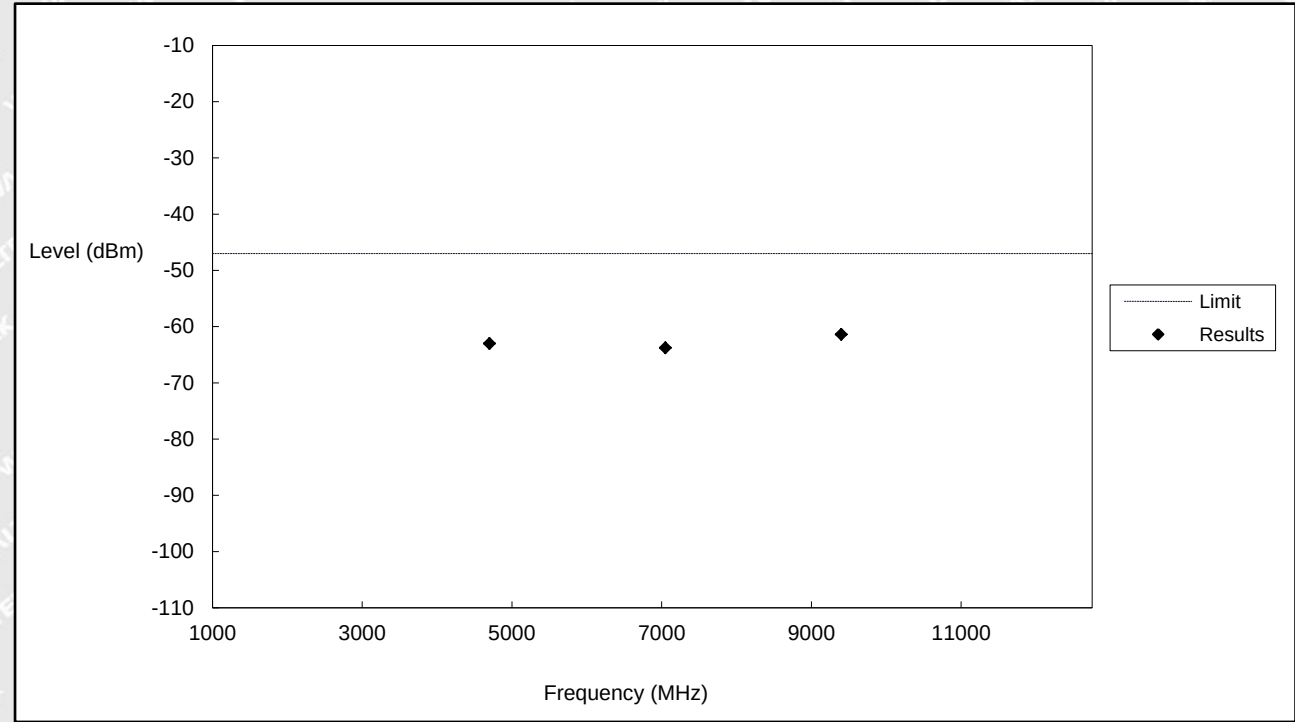
Test mode:	Idle Mode	Polarity:	Horizontal
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4700.00	-58.74	-47.00	-11.74	RMS
2	7050.00	-60.77	-47.00	-13.77	RMS
3	9400.00	-61.48	-47.00	-14.48	RMS



Test mode:	Idle Mode	Polarity:	Vertical
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No.	Frequency (MHz)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4700.00	-63.02	-47.00	-16.02	RMS
2	7050.00	-63.80	-47.00	-16.80	RMS
3	9400.00	-61.40	-47.00	-14.40	RMS

Note: Emissions attenuated more than 20 dB below the permissible value are not reported. There is only the base noise in frequency above 1GHz.



Reference No.: WTX22X08156832W002

3.13 Control and monitoring functions

Clause 4.2.4 of ETSI EN 301 908-1 applies.

RESULT: Pass

3.13.1 Definition and applicability

This requirement, together with other control and monitoring technical requirements identified in the table of cross references in the applicable part, verifies that the control and monitoring functions of the UE prevent it from transmitting in the absence of a valid network.

This test is applicable to radio communications equipment and ancillary equipment in the operating band defined in the applicable part of this multipart harmonized standard.

This test shall be performed on the radio communications equipment and/or a representative configuration of the ancillary equipment.

3.13.2 Conformance requirements

The maximum measured power during the duration of the test shall not exceed -30 dBm.

3.13.3 Set up for testing

a) At the start of the test, the UE shall be switched off. The UE antenna connector shall be connected to a power measuring equipment, with the following characteristics:

- the RF bandwidth shall exceed the total operating transmit frequency range of the UE for operation with an applicable part;
- the response time of the power measuring equipment shall be such that the measured power has reached within 1 dB of its steady state value within 100 μ s of a CW signal being applied;
- it shall record the maximum power measured.

NOTE: The equipment may include a video low pass filter to minimize its response to transients or Gaussian noise peaks.

b) The UE shall be switched on for a period of approximately fifteen minutes, and then switched off.

c) The EUT shall remain switched off for a period of at least thirty seconds, and shall then be switched on for a period of approximately one minute.

d) The maximum power emitted from the UE throughout the duration of the test shall be recorded. The results obtained shall be compared to the limits in clause 3.13.2 in order to prove compliance.



3.13.4 Test result

FDD-LTE Band 1 – Control and monitoring functions						
Measured range	Test data (dBm)				Limit (dBm)	Result
	1st	2nd	3rd	4th		
FDD-LTE Band 1 1920MHz to 1980MHz	-44.06	-43.94	-43.56	-43.30	-30	Pass

FDD-LTE Band 3 – Control and monitoring functions						
Measured range	Test data (dBm)				Limit (dBm)	Result
	1st	2nd	3rd	4th		
FDD-LTE Band 3 1710MHz to 1785MHz	-44.01	-43.87	-43.35	-43.88	-30	Pass

FDD-LTE Band 7 – Control and monitoring functions						
Measured range	Test data (dBm)				Limit (dBm)	Result
	1st	2nd	3rd	4th		
FDD-LTE Band 7 2500MHz to 2570MHz	-43.21	-42.93	-43.06	-43.79	-30	Pass

FDD-LTE Band8 – Control and monitoring functions						
Measured range	Test data (dBm)				Limit (dBm)	Result
	1st	2nd	3rd	4th		
FDD-LTE Band 8 880MHz to 915MHz	-42.27	-43.09	-42.12	-42.85	-30	Pass

FDD-LTE Band 20 – Control and monitoring functions						
Measured range	Test data (dBm)				Limit (dBm)	Result
	1st	2nd	3rd	4th		
FDD-LTE Band 20 832MHz to 862MHz	-42.16	-42.54	-41.68	-43.05	-30	Pass

TDD-LTE Band 38 – Control and monitoring functions						
Measured range	Test data (dBm)				Limit (dBm)	Result
	1st	2nd	3rd	4th		
TDD-LTE Band 38 2570MHz to 2620MHz	-45.35	-44.13	-43.02	-44.26	-30	Pass

TDD-LTE Band 40 – Control and monitoring functions						
Measured range	Test data (dBm)				Limit (dBm)	Result
	1st	2nd	3rd	4th		
TDD-LTE Band 40 2300MHz to 2400MHz	-43.29	-42.90	-43.06	-43.84	-30	Pass

The equipment complied with the requirement of this clause.



3.14 Receiver Total Radiated Sensitivity (TRS)

Clause 4.2.13 of ETSI EN 301 908-13 applies.

3.14.1 Definition and applicability

The present requirement applies to handheld phones/DUTs that are wider than or equal to 56 mm and narrower than or equal to 72 mm.

The Total Radiated Sensitivity is defined as:

$$TRS = \frac{4\pi}{\oint \left[\frac{1}{EIS_{\theta}(\Omega; f)} + \frac{1}{EIS_{\varphi}(\Omega; f)} \right] d\Omega}$$

Where the Effective Isotropic Sensitivity (EIS) is defined as the power available at the antenna output such as the sensitivity threshold is achieved for each polarization. Ω is the solid angle describing the direction, f is frequency. θ and φ are the orthogonal polarizations.

$$TRS \approx \frac{2NM}{\pi \sum_{n=0}^{N-1} \sum_{m=0}^{M-1} \left[\frac{1}{EIS_{\theta}(\theta_n, \varphi_m; f)} + \frac{1}{EIS_{\varphi}(\theta_n, \varphi_m; f)} \right] \sin(\theta_n)}$$

In these formulas, N and M are the number of sampling intervals for theta and phi. θ_n and φ_m are the measurement angles. The sampling intervals are discussed further in clause 4.4 of ETSI TS 137 544 [6].

The TRS can also be calculated from measurements in a Rayleigh fading 3 dimensional isotropic environment within average uniform elevation and azimuth distribution. The calculation of the TRS is in this case based on searching for the lowest power received by the UE/MS for a discrete number of field combinations in the chamber that gives a BER that is better than the specified target BER level. By calibrating the average power transfer function, an absolute value of the TRS can be obtained. The following expression can be used to find the TRS.

$$TRS \approx 2N \frac{\left(\sum_{n=1}^N (C_n (1 - R_n) P_{thres, n}) \right)^{-1}}{\sum_{n=1}^N P_{ref, n}}$$

where $P_{ref, n}$ is the reference power transfer function for fixed measurement antenna n , R_n is the reflection coefficient for fixed measurement antenna n and C_n is the path loss in the cables connecting the measurement receiver to fixed measurement antenna n . These parameters are calculated from the calibration measurement and are further discussed in clause B.2 of ETSI TS 137 544 [6]. $P_{thres, n}$ is calculated by using the following equation:

$$P_{thres, n} = \frac{\sum_{m=1}^M \frac{1}{|S_{21, n, m}^{thres}|^2}}{M}$$

where $S_{21, n, m}^{thres}$ is the m -th value of the transfer function for fixed measurement antenna n , which gives the BER threshold. M is the total number of values of the BER threshold power measured for each fixed measurement antenna.



3.14.2 Conformance requirements

The conformance tests for this requirement shall be as defined in clause 5.3.12 of the present document.

3.14.3 Set up for testing

Procedure is described in ETSI TS 137 544 [6], clause 7.1.5.4.2 for FDD and clause 7.1.6.4.2 for TDD systems.

In case devices support adaptive features that dynamically tune the RF front end and adjust TX power for optimum performance in its region of operation, the device being measured should be representative of the device configuration used by a consumer in that region. This could include setting the MCC value or another parameter to one used within the region.

3.14.4 Test result

Width greater than 72mm, not applicable.

WALTEK



Reference No.: WTX22X08156832W002

3.15 Total Radiated Power (TRP)

Clause 4.2.14 of ETSI EN 301 908-13 applies.

3.15.1 Definition and applicability

The present requirement applies to handheld phones/DUTs that are wider than or equal to 56 mm and narrower than or equal to 72 mm.

The Total Radiated Power (TRP) is a measure of how much power the DUT actually radiates. The TRP is defined as the integral of the power transmitted in different directions over the entire radiation sphere:

The Total Radiated Power (TRP) is a measure of how much power the DUT actually radiates. The TRP is defined as the integral of the power transmitted in different directions over the entire radiation sphere:

$$TRP = \frac{1}{4\pi} \oint (EIRP_{\theta}(\Omega, f) + EIRP_{\phi}(\Omega, f)) d\Omega$$

Where Ω is the solid angle describing the direction, f is frequency. θ and ϕ are the orthogonal polarizations.

$EIRP_{\theta}$ and $EIRP_{\phi}$ are the actually transmitted power-levels in corresponding polarizations.

Thus:

$$TRP \approx \frac{\pi}{2NM} \sum_{n=0}^{N-1} \sum_{m=0}^{M-1} [EIRP_{\theta}(\theta_n, \phi_m; f) + EIRP_{\phi}(\theta_n, \phi_m; f)] \sin(\theta_n)$$

In these formulas N and M are the number of sampling intervals for theta and phi. θ_n and ϕ_m are the measurement angles. The sampling intervals are discussed further in clause 4.4 of ETSI TS 137 544 [6].

The TRP can also be calculated from Rayleigh faded samples of the total power transmitted from the UE. The measurement of transmitter performance in an isotropic Rayleigh fading environment is based on sampling the radiated power of the UE for a discrete number of field combinations in the chamber. The average value of these statistically distributed samples is proportional to the TRP and by calibrating the average power transfer function, an absolute value of the TRP can be obtained.

Thus:

$$TRP \approx \frac{\sum_{n=1}^N \left(\frac{P_n}{C_n(1-R_n)} \right)}{\sum_{n=1}^N P_{ref,n}}$$

where $P_{ref,n}$ is the reference power transfer function for fixed measurement antenna n , R_n is the reflection coefficient for fixed measurement antenna n and C_n is the path loss in the cables connecting the measurement receiver to fixed measurement antenna n . These parameters are calculated from the calibration measurement and are further discussed in clause B.2 of ETSI TS 137 544 [6]. P_n is the average power measured by fixed measurement antenna n and can be calculated using the following expression:

$$P_n = \frac{\sum_{m=1}^M |S_{21,n,m}|^2}{M}$$

where $S_{21,n,m}$ is sample number m of the complex transfer function measured with fixed measurement antenna n and M is the total number of samples measured for each fixed measurement antenna.

NOTE 1: All averaging shall be performed using linear power values (e.g. measurements in Watts).

NOTE 2: The requirements and this test apply to all types of UTRA for the FDD UE for Release 7 and later releases.



3.15.2 Set up for testing

Procedure is described in ETSI TS 137 544 [6], clause 6.1.5.4.2.for FDD and clause 6.1.6.4.2 for TDD systems.

In case devices support adaptive features that dynamically tune the RF front end and adjust TX power for optimum performance in its region of operation, the device being measured should be representative of the device configuration used by a consumer in that region. This could include setting the MCC value or another parameter to one used within the region.

For devices supporting transmit antenna switching using multiple TX antennas, the TRP should be measured for each transmit antenna individually. The antenna with the greater TRP should be used to determine the pass/fail compliance.

3.15.3 Test result

Width greater than 72mm, not applicable.

WALTEK



EXHIBIT 1 - EUT PHOTOGRAPHS

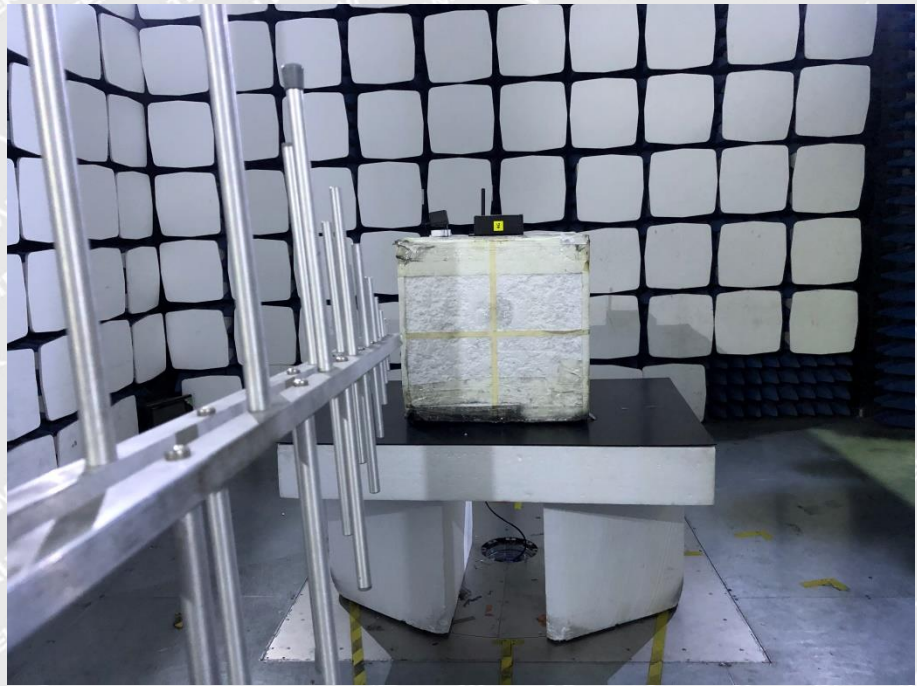
Please refer to “ANNEX”.

WALTEK

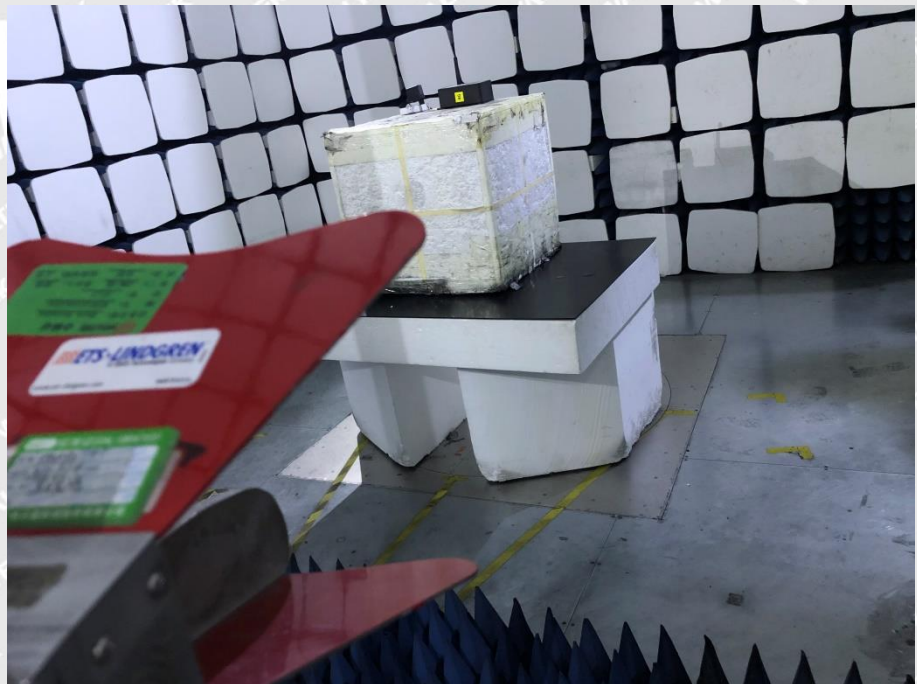


EXHIBIT 2 - TEST SETUP PHOTOGRAPHS

**Spurious Emission Test
Setup (Below 1GHz)**



**Spurious Emission Test
Setup (Above 1GHz)**



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