FCC RF Test Report

APPLICANT	: Motorola Mobility LLC
EQUIPMENT	: Mobile Cellular Phone
BRAND NAME	: Motorola
MODEL NAME	: XT2213-1,XT2213DL,XT2213-2,XT2213-3
FCC ID	: IHDT56AA3
STANDARD	: 47 CFR Part 2, 27
CLASSIFICATION	: PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S)	: Sep. 27, 2023

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG1D1722-03	Rev. 01	Initial issue of report	Sep. 28, 2023
FG1D1722-03	Rev. 02	Update SW Version	Oct. 12, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§27.50(h)(2)	Equivalent Isotropic Radiated Power (5G NR n41)	EIRP < 2Watt		
3.5	§2.1049	Occupied Bandwidth (5G NR n41)	Reporting Only	PASS	-
3.6	§27.53(m)(4)	Conducted Band Edge Measurement (5G NR n41)	§27.53(m)(4)	PASS	-
3.7	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (5G NR n41)	< $55+10\log_{10}$(P[Watts])	PASS	-
4.4	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (5G NR n41)	< $55+10\log_{10}$(P[Watts])	PASS	Under limit 35.30 dB at 10398.00 MHz

Note: This is a variant report for XT2213-1,XT2213DL,XT2213-2,XT2213-3, the difference is to add bandwidth 90MHz for 5G NR n41 by software. According to the change, only the related cases were tested, all the other test results were performed on original report which can be referred to Sporton Report Number FG1D1722K.

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account. 2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2213-1,XT2213DL,XT2213-2,XT2213-3
FCC ID	IHDT56AA3
IMEI Code	Conducted/Radiation : 353739480020169
HW Version	DVT2
SW Version	T1SA33.73-40-0-6
EUT Stage	Identical Prototype

Remark: The four models XT2213-1, XT2213DL, XT2213-2 and XT2213-3 are only for market differentiation, all the others are the same.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	5G NR n41 : 2496 MHz ~ 2690 MHz
Rx Frequency	5G NR n41 : 2496 MHz ~ 2690 MHz
Bandwidth	n41 : 10MHz / 15MHz / 20MHz / 30MHz / 40MHz / 50MHz / 60MHz / 70MHz / 80MHz / 90MHz / 100MHz
SCS	30kHz
Antenna Gain	n41 : -2.1 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Remark:

1. 5G NR n41 support SA and NSA mode. The whole testing has assessed SA mode by referring to the higher conducted power for conducted test items.
2. The EN-DC mode combination could be referred to the product spec.
3. The device supports HPUE mode for 5G NR n41.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum EIRP

5G NR n41		PI/2 BPSK / QPSK		16QAM / 64QAM / 256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
90	2541.00 ~ 2644.98	0.2443	87M8G7D	0.1892	87M6W7D

Note: All modulations have been tested, only the worst test results of PSK & QAM are shown in the report.

1.7 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS TH01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	TH01-KS	SPORTON	FCC_5GNR_China_2 01027	1.0
2.	03CH04-KS	AUDIX	E3	210616

1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 27
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

1.10 Specification of Accessory

Specification of Accessory				
AC Adapter 1	**Brand Name**	Motorola(Salcomp)	**Model Name**	MC-101
AC Adapter 2	**Brand Name**	Motorola(AOHAI)	**Model Name**	MC-101
AC Adapter 3	**Brand Name**	Motorola(Chenyang)	**Model Name**	MC-101
Battery 1	**Brand Name**	Motorola(SCUD)	**Model Name**	JK50
Battery 2	**Brand Name**	Motorola(ATL)	**Model Name**	JK50
USB Cable 1	**Brand Name**	Motorola(Saibao)	**Model Name**	SC18D22297
USB Cable 2	**Brand Name**	Motorola(Cabletech)	**Model Name**	SC18D22298
USB Cable 3	**Brand Name**	Motorola(Luxshare)	**Model Name**	SC18D22299

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

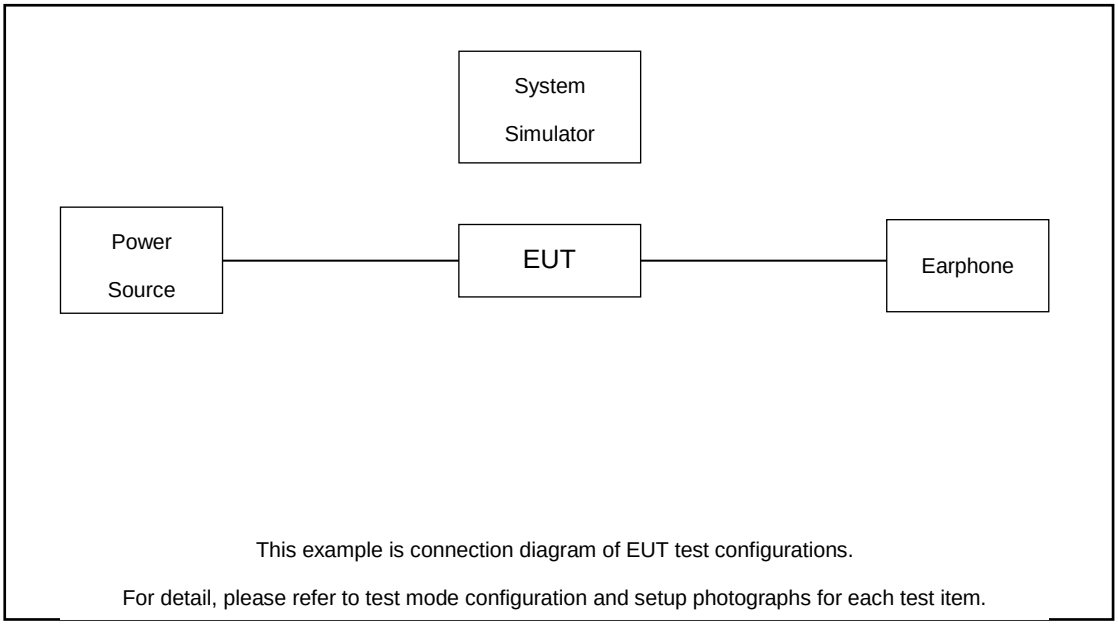
For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.

Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			

Test Items	5G NR	Bandwidth (MHz)							Modulation					RB #		Test Channel		
		5	10	15	20	30-80	90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Full	L	M	H
Max. Output Power	n41	-					v		v	v	v			v	v	v	v	v
26dB and 99% Bandwidth	n41	-					v			v	v	v	v		v		v	
Conducted Band Edge	n41	-					v		v	v				v	v	v		v
Conducted Spurious Emission	n41	-					v		v	v				v		v	v	v
E.I.R.P	n41	-					v		v	v	v			v	v	v	v	v
Radiated Spurious Emission	n41	Worst Case														v	v	v
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. For modulation of CP-OFDM and DFT-s-OFDM , the maximum power of CP-OFDM is lower than DFT-s-OFDM modulation, therefore, we chose higher power (DFT-s-OFDM modulation) to perform all tests and show in the report. 5. All modulations (BPSK/QPSK/16QAM/64QAM/256QAM) have been tested, and only the worst test results are shown in the report .																	

2.2 Connection Diagram of Test System



The EUT has been configuration operated in a manner tended to maximize its emission characteristics in a typical application.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
2.	NR Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m
3.	Earphone	N/A	N/A	N/A	N/A	N/A

2.4 Measurement Results Explanation Example

For all conducted test items:

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

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 6.2 dB.

Example :

Offset(dB) = RF cable loss(dB).

= 6.2 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G NR n41 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
100	Channel	509202	518598	528000
	Frequency	2546.01	2592.99	2640
90	Channel	508200	518598	528996
	Frequency	2541	2592.99	2644.98
80	Channel	507204	518598	529998
	Frequency	2536.02	2592.99	2649.99
70	Channel	506202	518598	531000
	Frequency	2531.01	2592.99	2655
60	Channel	505200	518598	531996
	Frequency	2526	2592.99	2659.98
50	Channel	504204	518598	532998
	Frequency	2521.02	2592.99	2664.99
40	Channel	503202	518598	534000
	Frequency	2516.01	2592.99	2670
30	Channel	502200	518598	534996
	Frequency	2511.0	2592.99	2674.98
20	Channel	501204	518598	535998
	Frequency	2506.02	2592.99	2679.99
15	Channel	500700	518598	536496
	Frequency	2503.5	2592.99	2682.48
10	Channel	500202	518598	537000
	Frequency	2501.01	2592.99	2685

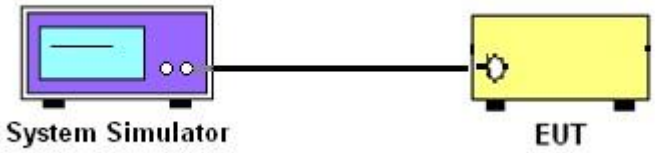
3 Conducted Test Items

3.1 Measuring Instruments

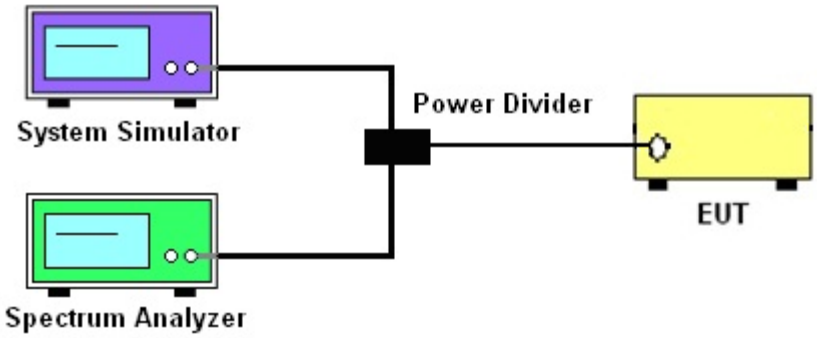
See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 Conducted Output Power



3.2.2 Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and EIRP

3.4.1 Description of the Conducted Output Power Measurement and EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The EIRP of mobile transmitters must not exceed 2 Watts for 5G NR n41.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.5 Occupied Bandwidth

3.5.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.6 Conducted Band Edge

3.6.1 Description of Conducted Band Edge Measurement

27.53(m)(4)

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used or a narrower RBW was used (generally limited to no less than 1% of the OBW) and the measured power was integrated over the full required measurement bandwidth.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.
   Example:
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.
9. For 5G NR n41, the other 40 dB, and 55 dB have additionally applied same calculation above.
10. When using the integration method, the starting frequency of the integration shall be centered at one-half of the RBW away from the band edge.

3.7 Conducted Spurious Emission

3.7.1 Description of Conducted Spurious Emission Measurement

For 5G NR n41:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. For 5G NR n41

    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

    = P(W)- [55+ 10log(P)] (dB)

    = [30+ 10log(P)] (dBm) - [55+ 10log(P)] (dB)

    = -25dBm.

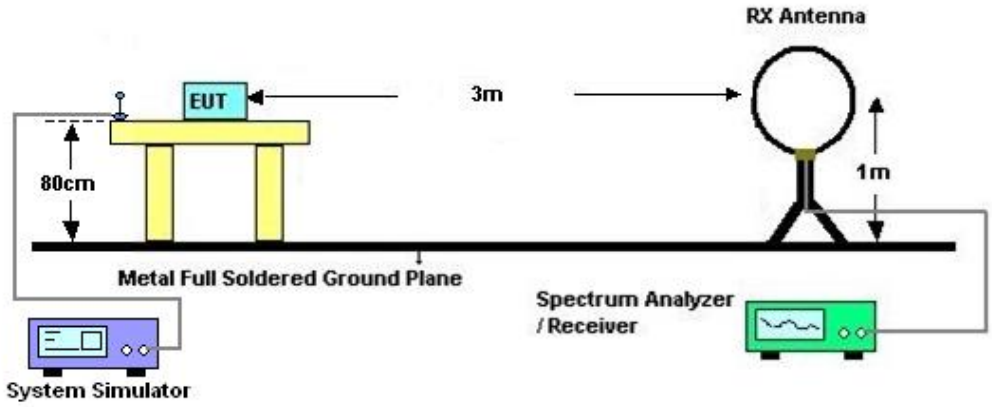
4 Radiated Test Items

4.1 Measuring Instruments

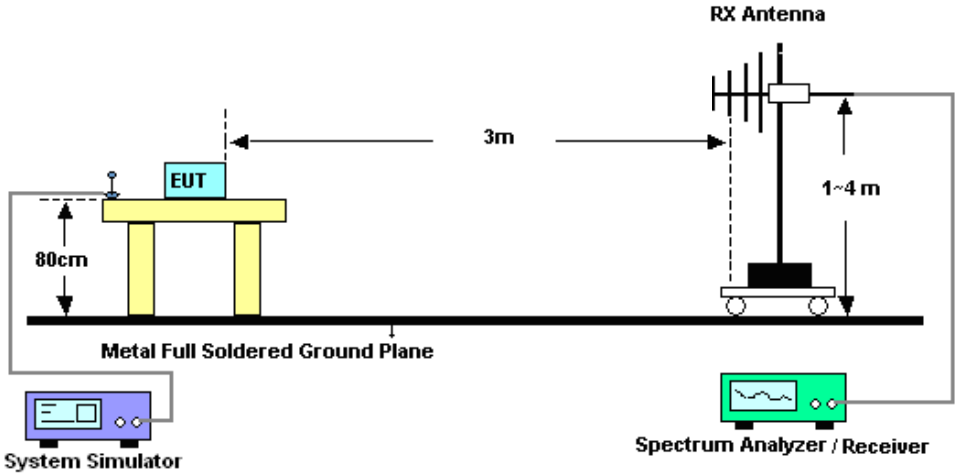
See list of measuring instruments of this test report.

4.2 Test Setup

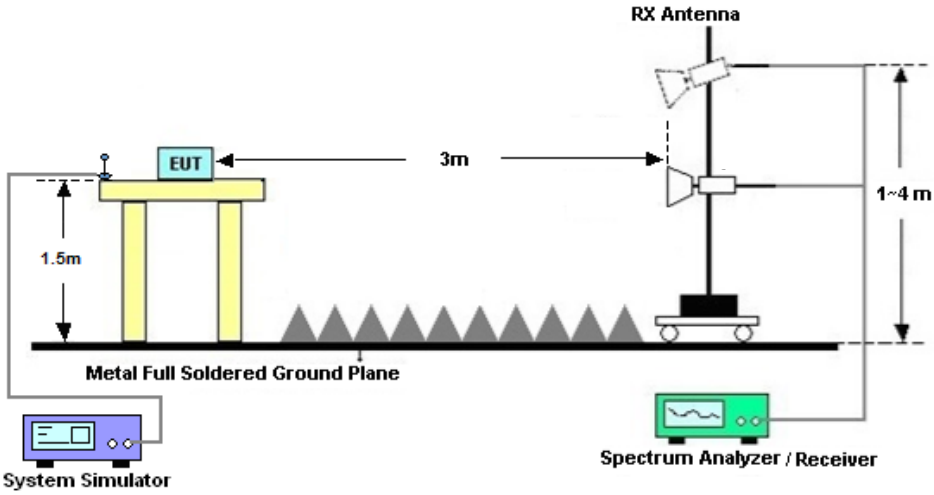
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26.

For 5G NR n41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    For 5G NR n41:
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 12, 2022	Sep. 27, 2023	Oct. 11, 2023	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Sep. 27, 2023	NCR	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 06, 2023	Sep. 27, 2023	Jul. 05, 2024	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	Sep. 27, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Apr. 09, 2023	Sep. 27, 2023	Apr. 08, 2024	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Oct. 16, 2022	Sep. 27, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	Sep. 27, 2023	Jan. 07, 2024	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	380827	9KHz-1GHz	Jul. 06, 2023	Sep. 27, 2023	Jul. 05, 2024	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2023	Sep. 27, 2023	Jan. 04, 2024	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 12, 2022	Sep. 27, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	Sep. 27, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 27, 2023	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB
Conducted Emissions	±2.26 dB
Occupied Channel Bandwidth	±0.1 %

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.82dB

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.56dB

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.54dB

---------- THE END ----------

Appendix A. Test Results of Conducted Test

Test Engineer :	Simle Wang	Temperature :	22~23℃
		Relative Humidity :	40~42%

Conducted Output Power(Average power) and EIRP

5G NR n41：

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power(dBm)	EIRP (dBm)	EIRP (W)
41	30	90	508200	2541	DFT-s-OFDM PI/2 BPSK	1@1	25.44	23.34	0.2158
41	30	90	508200	2541	DFT-s-OFDM QPSK	1@1	25.36	23.26	0.2118
41	30	90	508200	2541	DFT-s-OFDM 16 QAM	1@1	24.28	22.18	0.1652
41	30	90	508200	2541	DFT-s-OFDM 64 QAM	1@1	22.83	20.73	0.1183
41	30	90	508200	2541	DFT-s-OFDM 256 QAM	1@1	20.82	18.72	0.0745
41	30	90	508200	2541	CP-OFDM QPSK	1@1	23.9	21.8	0.1514
41	30	90	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@1	25.46	23.36	0.2168
41	30	90	518598	2592.99	DFT-s-OFDM QPSK	1@1	25.44	23.34	0.2158
41	30	90	518598	2592.99	DFT-s-OFDM 16 QAM	1@1	24.2	22.1	0.1622
41	30	90	518598	2592.99	DFT-s-OFDM 64 QAM	1@1	22.84	20.74	0.1186
41	30	90	518598	2592.99	DFT-s-OFDM 256 QAM	1@1	20.74	18.64	0.0731
41	30	90	518598	2592.99	CP-OFDM QPSK	1@1	23.98	21.88	0.1542
41	30	90	528996	2644.98	DFT-s-OFDM PI/2 BPSK	1@1	25.56	23.46	0.2218
41	30	90	528996	2644.98	DFT-s-OFDM QPSK	1@1	25.54	23.44	0.2208
41	30	90	528996	2644.98	DFT-s-OFDM 16 QAM	1@1	24.33	22.23	0.1671
41	30	90	528996	2644.98	DFT-s-OFDM 64 QAM	1@1	22.9	20.8	0.1202
41	30	90	528996	2644.98	DFT-s-OFDM 256 QAM	1@1	20.92	18.82	0.0762
41	30	90	528996	2644.98	CP-OFDM QPSK	1@1	23.96	21.86	0.1535
41	30	90	508200	2541	DFT-s-OFDM PI/2 BPSK	120@60	25.92	23.82	0.2410
41	30	90	508200	2541	DFT-s-OFDM QPSK	120@60	25.88	23.78	0.2388
41	30	90	508200	2541	DFT-s-OFDM 16 QAM	120@60	24.85	22.75	0.1884
41	30	90	508200	2541	DFT-s-OFDM 64 QAM	120@60	23.59	21.49	0.1409
41	30	90	508200	2541	DFT-s-OFDM 256 QAM	120@60	21.75	19.65	0.0923
41	30	90	518598	2592.99	DFT-s-OFDM PI/2 BPSK	120@60	25.98	23.88	0.2443
41	30	90	518598	2592.99	DFT-s-OFDM QPSK	120@60	25.97	23.87	0.2438
41	30	90	518598	2592.99	DFT-s-OFDM 16 QAM	120@60	24.83	22.73	0.1875

41	30	90	518598	2592.99	DFT-s-OFDM 64 QAM	120@60	23.54	21.44	0.1393
41	30	90	518598	2592.99	DFT-s-OFDM 256 QAM	120@60	21.69	19.59	0.0910
41	30	90	528996	2644.98	DFT-s-OFDM PI/2 BPSK	120@60	25.97	23.87	0.2438
41	30	90	528996	2644.98	DFT-s-OFDM QPSK	120@60	25.89	23.79	0.2393
41	30	90	528996	2644.98	DFT-s-OFDM 16 QAM	120@60	24.87	22.77	0.1892
41	30	90	528996	2644.98	DFT-s-OFDM 64 QAM	120@60	23.66	21.56	0.1432
41	30	90	528996	2644.98	DFT-s-OFDM 256 QAM	120@60	21.77	19.67	0.0927
41	30	90	508200	2541	DFT-s-OFDM PI/2 BPSK	1@243	25.6	23.5	0.2239
41	30	90	508200	2541	DFT-s-OFDM QPSK	1@243	25.57	23.47	0.2223
41	30	90	508200	2541	DFT-s-OFDM 16 QAM	1@243	24.36	22.26	0.1683
41	30	90	508200	2541	DFT-s-OFDM 64 QAM	1@243	23.06	20.96	0.1247
41	30	90	508200	2541	DFT-s-OFDM 256 QAM	1@243	21.25	19.15	0.0822
41	30	90	518598	2592.99	DFT-s-OFDM PI/2 BPSK	1@243	25.84	23.74	0.2366
41	30	90	518598	2592.99	DFT-s-OFDM QPSK	1@243	25.83	23.73	0.2360
41	30	90	518598	2592.99	DFT-s-OFDM 16 QAM	1@243	24.63	22.53	0.1791
41	30	90	518598	2592.99	DFT-s-OFDM 64 QAM	1@243	23.12	21.02	0.1265
41	30	90	518598	2592.99	DFT-s-OFDM 256 QAM	1@243	21.23	19.13	0.0818
41	30	90	528996	2644.98	DFT-s-OFDM PI/2 BPSK	1@243	25.85	23.75	0.2371
41	30	90	528996	2644.98	DFT-s-OFDM QPSK	1@243	25.82	23.72	0.2355
41	30	90	528996	2644.98	DFT-s-OFDM 16 QAM	1@243	24.71	22.61	0.1824
41	30	90	528996	2644.98	DFT-s-OFDM 64 QAM	1@243	23.08	20.98	0.1253
41	30	90	528996	2644.98	DFT-s-OFDM 256 QAM	1@243	21.2	19.1	0.0813

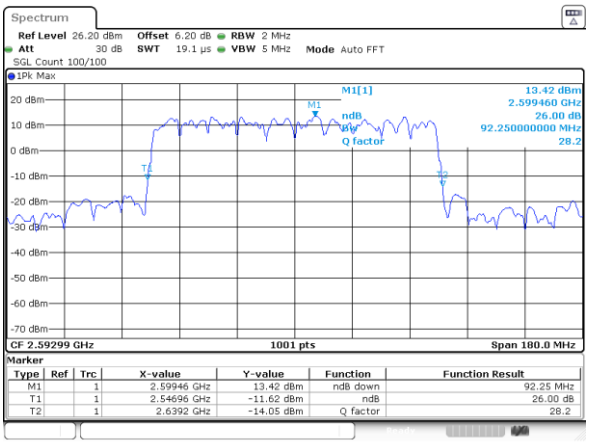
FR1 n41

26dB Bandwidth

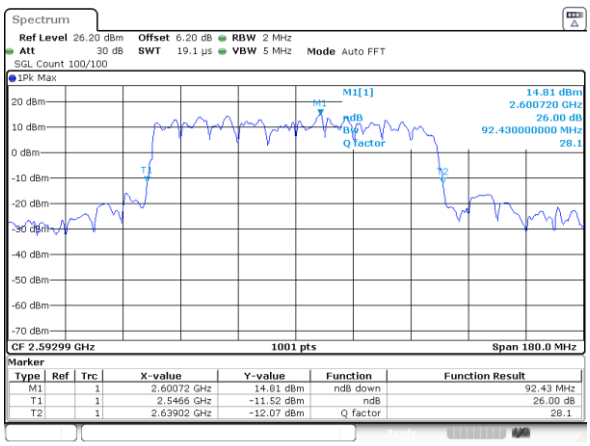
Mode	FR1 n41 : 26dB BW(90 MHz) /CP−OFDM			
BW	CP-OFDM			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	92.25	92.43	92.07	92.43

90MHz CP-OFDM

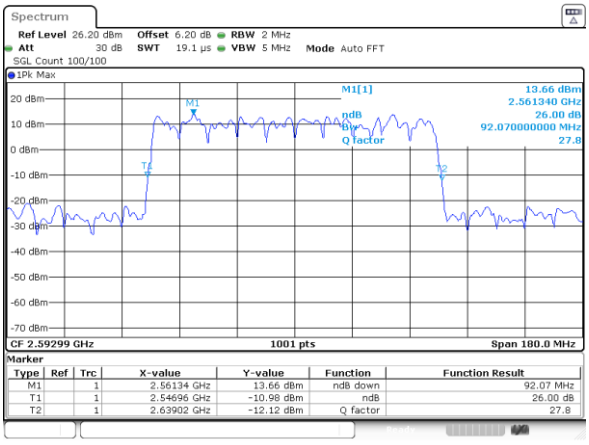
QPSK



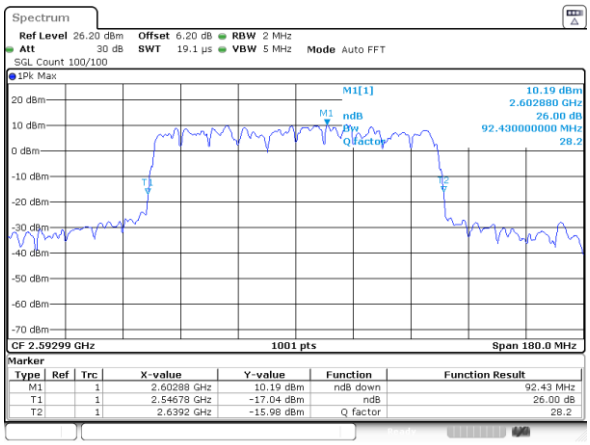
16QAM



64QAM



256QAM

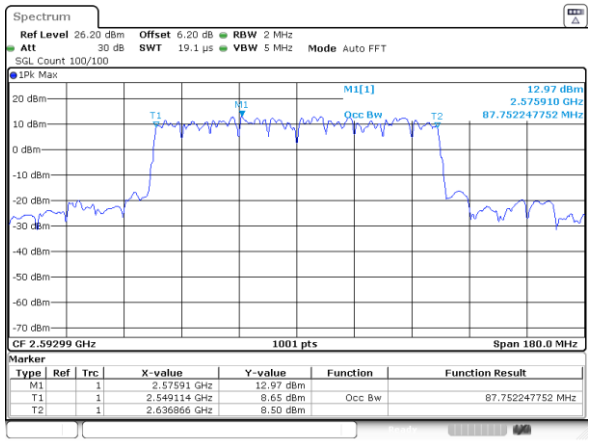


Occupied Bandwidth

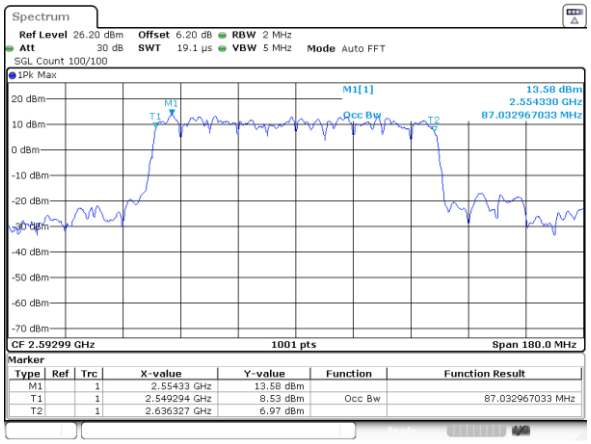
Mode	FR1 n41 : OB BW(90 MHz) /CP−OFDM			
BW	CP-OFDM			
Mod.	QPSK	16QAM	64QAM	256QAM
Middle CH	87.75	87.03	87.57	87.21

90MHz CP-OFDM

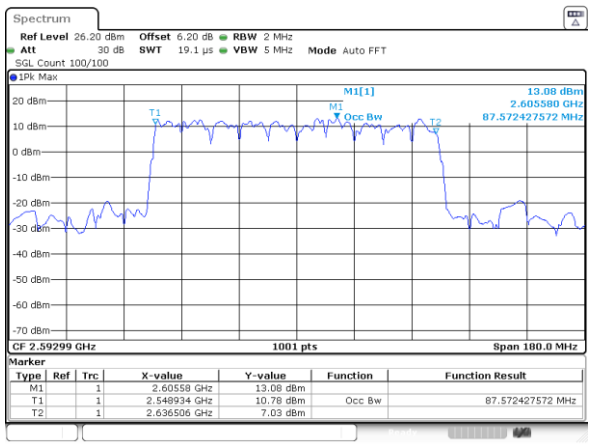
QPSK



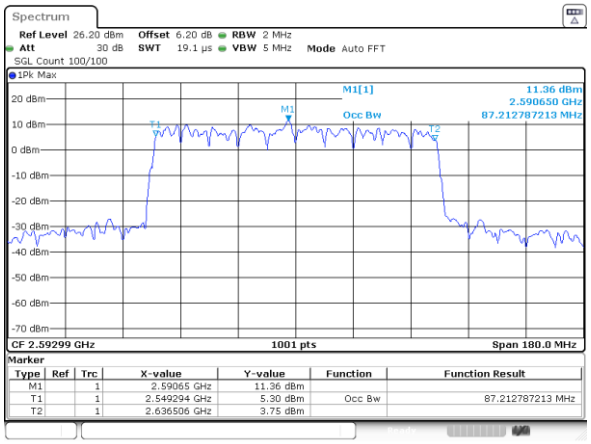
16QAM



64QAM

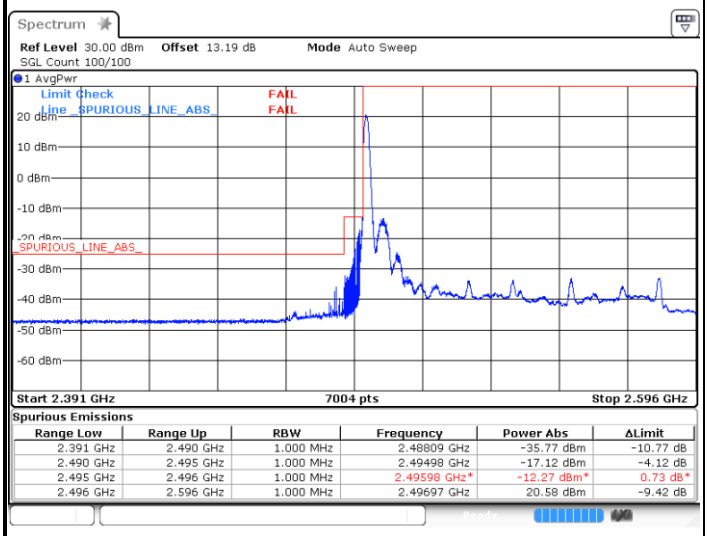


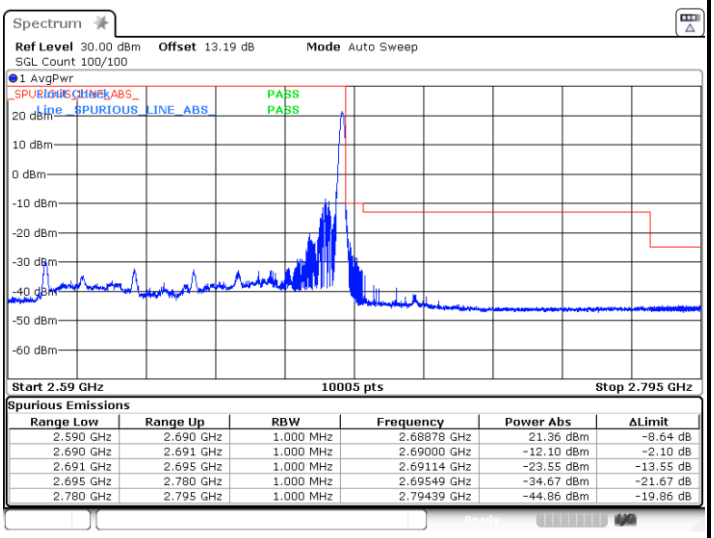
256QAM

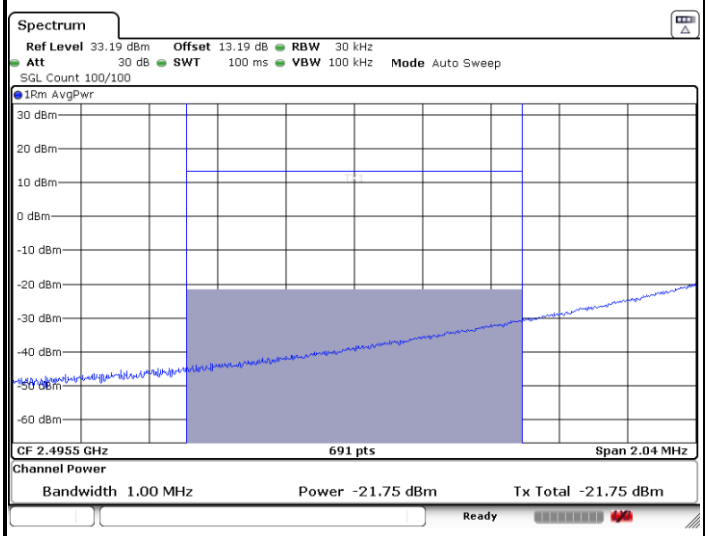


Conducted Band Edge

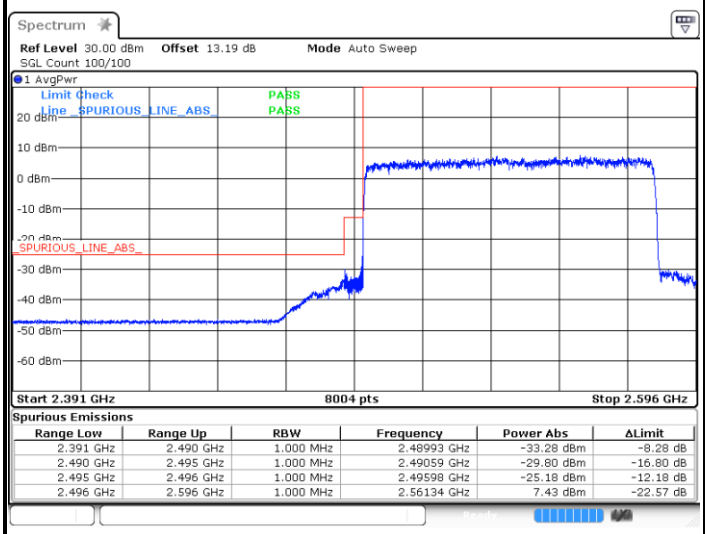
FR1 n41 / 90MHz / DFT-S OFDM / PI/2 BPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**





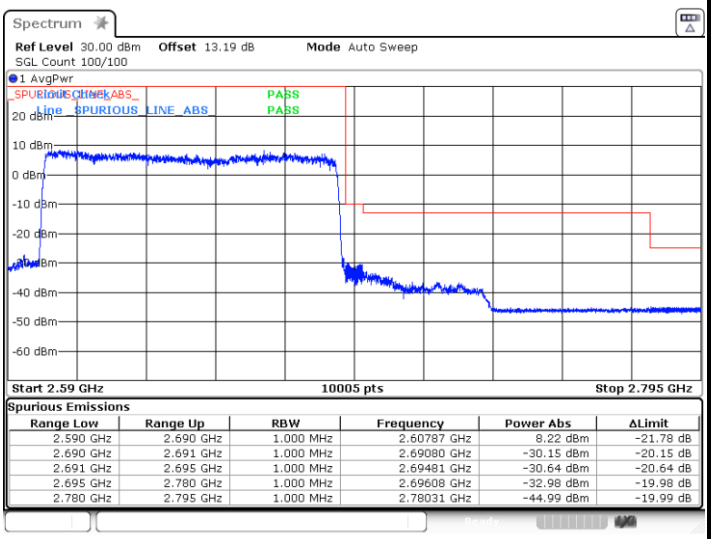


Lowest Band Edge / Full RB	Highest Band Edge / Full RB



Spurious Emissions

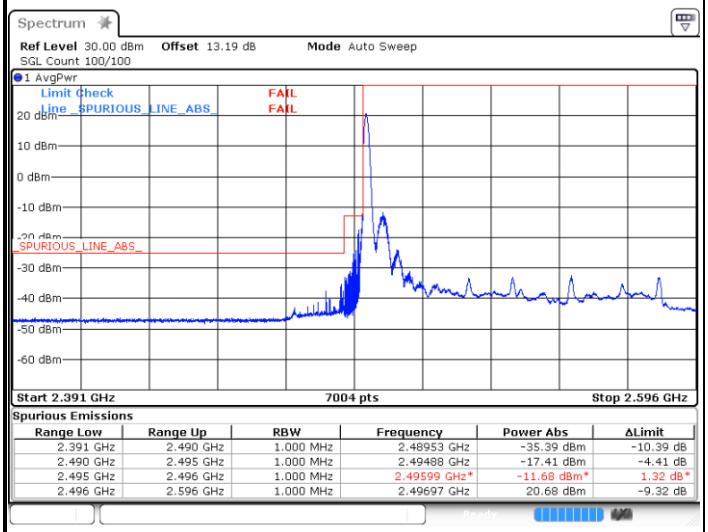
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.391 GHz	2.490 GHz	1.000 MHz	2.48993 GHz	-33.28 dBm	-8.28 dB
2.490 GHz	2.495 GHz	1.000 MHz	2.49059 GHz	-29.80 dBm	-16.80 dB
2.495 GHz	2.496 GHz	1.000 MHz	2.49598 GHz	-25.18 dBm	-12.18 dB
2.496 GHz	2.596 GHz	1.000 MHz	2.56134 GHz	7.43 dBm	-22.57 dB

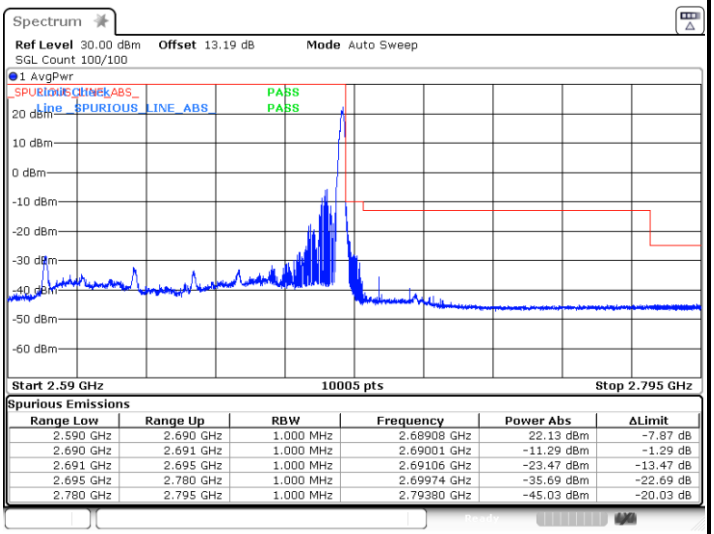


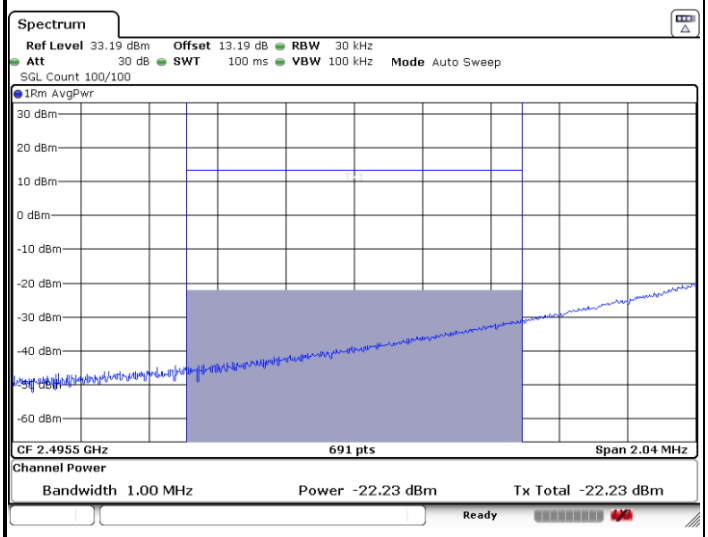
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.590 GHz	2.690 GHz	1.000 MHz	2.60787 GHz	8.22 dBm	-21.78 dB
2.690 GHz	2.691 GHz	1.000 MHz	2.69080 GHz	-30.15 dBm	-20.15 dB
2.691 GHz	2.695 GHz	1.000 MHz	2.69481 GHz	-30.64 dBm	-20.64 dB
2.695 GHz	2.780 GHz	1.000 MHz	2.69608 GHz	-32.98 dBm	-19.98 dB
2.780 GHz	2.795 GHz	1.000 MHz	2.78031 GHz	-44.99 dBm	-19.99 dB

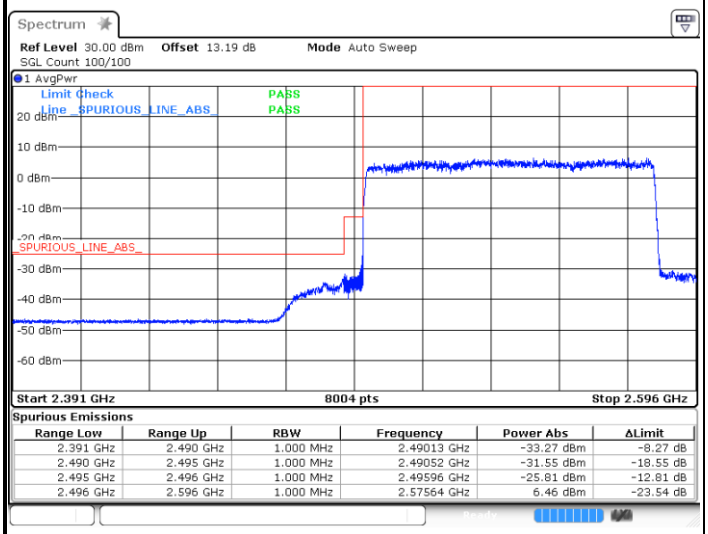
FR1 n41 / 90MHz / DFT-S OFDM / QPSK	
Lowest Band Edge / 1RB0	**Highest Band Edge / 1RBmax**

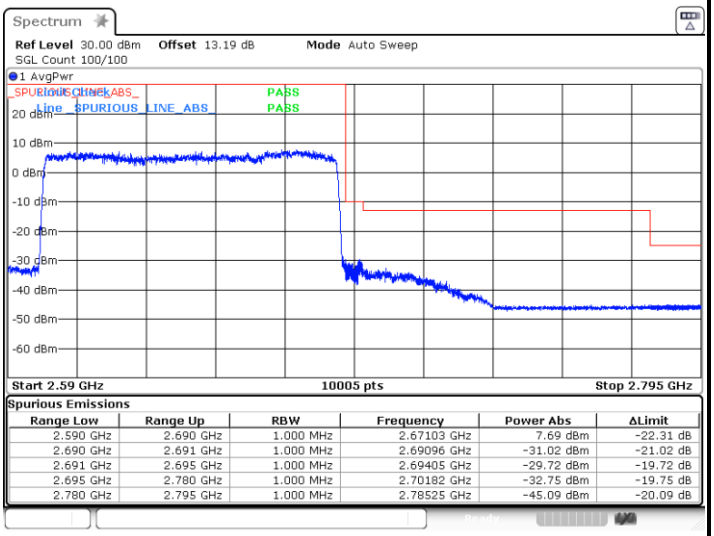






Lowest Band Edge / Full RB	Highest Band Edge / Full RB

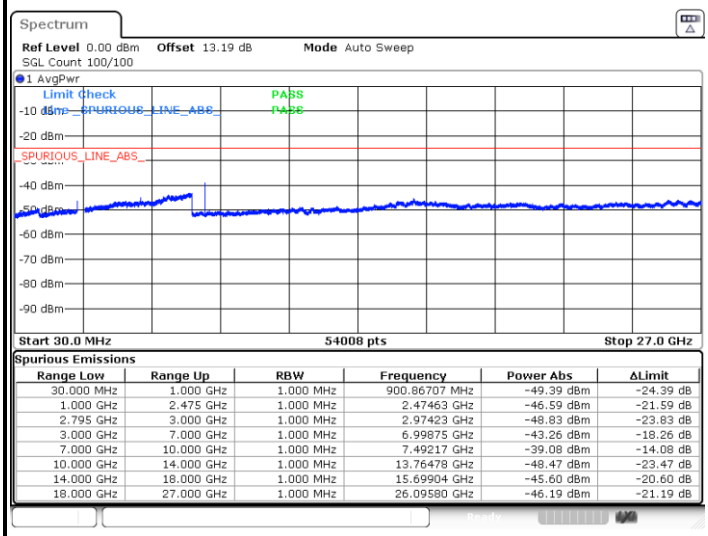




Conducted Spurious Emission

FR1 n41 /90MHz / DFT-S OFDM / BPSK

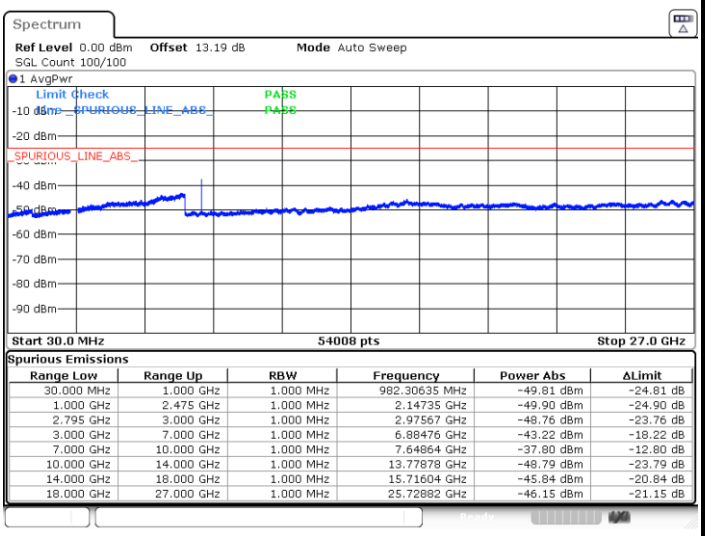
Lowest Channel / 1RB1



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	900.86707 MHz	-49.39 dBm	-24.39 dB
1.000 GHz	2.475 GHz	1.000 MHz	2.47463 GHz	-46.59 dBm	-21.59 dB
2.795 GHz	3.000 GHz	1.000 MHz	2.97423 GHz	-48.83 dBm	-23.83 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.99875 GHz	-43.26 dBm	-18.26 dB
7.000 GHz	10.000 GHz	1.000 MHz	7.49217 GHz	-39.08 dBm	-14.08 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.76478 GHz	-48.47 dBm	-23.47 dB
14.000 GHz	18.000 GHz	1.000 MHz	15.69904 GHz	-45.60 dBm	-20.60 dB
18.000 GHz	27.000 GHz	1.000 MHz	26.09580 GHz	-46.19 dBm	-21.19 dB

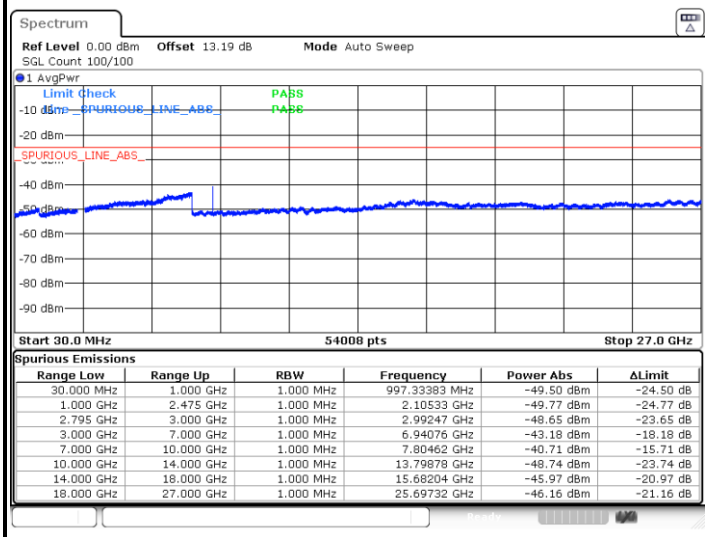
Middle Channel / 1RB1



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	982.30635 MHz	-49.81 dBm	-24.81 dB
1.000 GHz	2.475 GHz	1.000 MHz	2.14735 GHz	-49.90 dBm	-24.90 dB
2.795 GHz	3.000 GHz	1.000 MHz	2.97567 GHz	-48.76 dBm	-23.76 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.88476 GHz	-43.22 dBm	-18.22 dB
7.000 GHz	10.000 GHz	1.000 MHz	7.64864 GHz	-37.80 dBm	-12.80 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.77878 GHz	-48.79 dBm	-23.79 dB
14.000 GHz	18.000 GHz	1.000 MHz	15.71604 GHz	-45.84 dBm	-20.84 dB
18.000 GHz	27.000 GHz	1.000 MHz	25.72882 GHz	-46.15 dBm	-21.15 dB

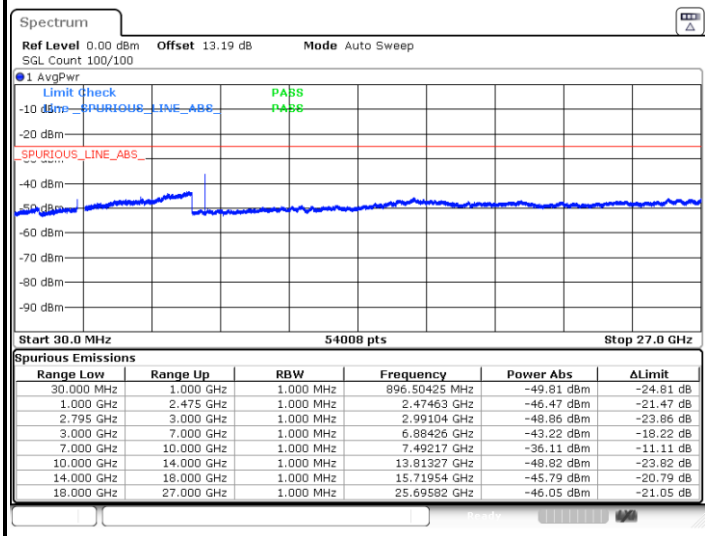
Highest Channel / 1RB1



Spurious Emissions

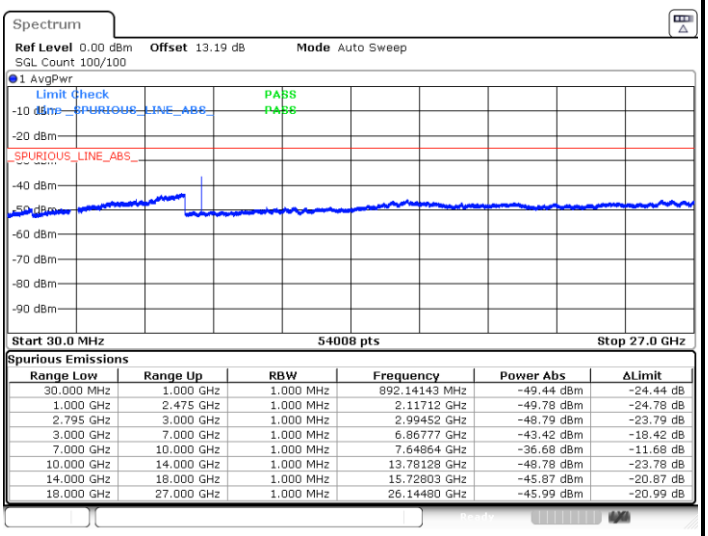
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	997.33383 MHz	-49.50 dBm	-24.50 dB
1.000 GHz	2.475 GHz	1.000 MHz	2.10533 GHz	-49.77 dBm	-24.77 dB
2.795 GHz	3.000 GHz	1.000 MHz	2.99247 GHz	-48.65 dBm	-23.65 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.94076 GHz	-43.18 dBm	-18.18 dB
7.000 GHz	10.000 GHz	1.000 MHz	7.80462 GHz	-40.71 dBm	-15.71 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.79878 GHz	-48.74 dBm	-23.74 dB
14.000 GHz	18.000 GHz	1.000 MHz	15.68204 GHz	-45.97 dBm	-20.97 dB
18.000 GHz	27.000 GHz	1.000 MHz	25.69732 GHz	-46.16 dBm	-21.16 dB

FR1 n41 /90MHz / DFT-S OFDM /QPSK	
Lowest Channel / 1RB1	**Middle Channel / 1RB1**



Spurious Emissions

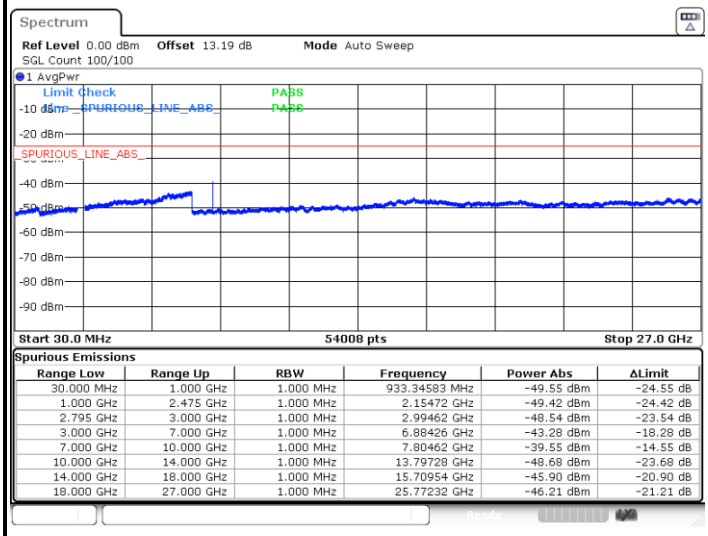
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	896.50425 MHz	-49.81 dBm	-24.81 dB
1.000 GHz	2.475 GHz	1.000 MHz	2.47463 GHz	-46.47 dBm	-21.47 dB
2.795 GHz	3.000 GHz	1.000 MHz	2.99104 GHz	-48.86 dBm	-23.86 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.88426 GHz	-43.22 dBm	-18.22 dB
7.000 GHz	10.000 GHz	1.000 MHz	7.49217 GHz	-36.11 dBm	-11.11 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.81327 GHz	-48.82 dBm	-23.82 dB
14.000 GHz	18.000 GHz	1.000 MHz	15.71954 GHz	-45.79 dBm	-20.79 dB
18.000 GHz	27.000 GHz	1.000 MHz	25.69582 GHz	-46.05 dBm	-21.05 dB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	892.14143 MHz	-49.44 dBm	-24.44 dB
1.000 GHz	2.475 GHz	1.000 MHz	2.11712 GHz	-49.78 dBm	-24.78 dB
2.795 GHz	3.000 GHz	1.000 MHz	2.99452 GHz	-48.79 dBm	-23.79 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.86777 GHz	-43.42 dBm	-18.42 dB
7.000 GHz	10.000 GHz	1.000 MHz	7.64864 GHz	-36.68 dBm	-11.68 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.78128 GHz	-48.78 dBm	-23.78 dB
14.000 GHz	18.000 GHz	1.000 MHz	15.72803 GHz	-45.87 dBm	-20.87 dB
18.000 GHz	27.000 GHz	1.000 MHz	26.14480 GHz	-45.99 dBm	-20.99 dB

Highest Channel / 1RB1	



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	933.34583 MHz	-49.55 dBm	-24.55 dB
1.000 GHz	2.475 GHz	1.000 MHz	2.15472 GHz	-49.42 dBm	-24.42 dB
2.795 GHz	3.000 GHz	1.000 MHz	2.99462 GHz	-48.54 dBm	-23.54 dB
3.000 GHz	7.000 GHz	1.000 MHz	6.88426 GHz	-43.28 dBm	-18.28 dB
7.000 GHz	10.000 GHz	1.000 MHz	7.80462 GHz	-39.55 dBm	-14.55 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.79728 GHz	-48.68 dBm	-23.68 dB
14.000 GHz	18.000 GHz	1.000 MHz	15.70954 GHz	-45.90 dBm	-20.90 dB
18.000 GHz	27.000 GHz	1.000 MHz	25.77232 GHz	-46.21 dBm	-21.21 dB

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

Test Engineer :	Chris Chen	Temperature :	22~23℃
		Relative Humidity :	41~42%

n41 SA / NR 90MHz / QPSK(ANT0)								
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	5008	-63.23	-25	-38.23	-73.44	3.03	13.24	H
	7514	-62.93	-25	-37.93	-72.38	3.56	13.01	H
	10020	-61.42	-25	-36.42	-70.94	3.92	13.44	H
	5008	-63.49	-25	-38.49	-73.70	3.03	13.24	V
	7514	-62.94	-25	-37.94	-72.39	3.56	13.01	V
	10020	-61.89	-25	-36.89	-71.41	3.92	13.44	V
Middle	5106	-63.46	-25	-38.46	-73.67	3.03	13.24	H
	7654	-62.52	-25	-37.52	-71.97	3.56	13.01	H
	10216	-62.23	-25	-37.23	-71.75	3.92	13.44	H
	5106	-63.31	-25	-38.31	-73.52	3.03	13.24	V
	7654	-62.10	-25	-37.10	-71.55	3.56	13.01	V
	10216	-62.16	-25	-37.16	-71.68	3.92	13.44	V
Highest	5204	-63.23	-25	-38.23	-73.44	3.03	13.24	H
	7794	-62.48	-25	-37.48	-71.93	3.56	13.01	H
	10398	-60.30	-25	-35.30	-69.82	3.92	13.44	H
	5204	-63.66	-25	-38.66	-73.87	3.03	13.24	V
	7794	-62.29	-25	-37.29	-71.74	3.56	13.01	V
	10398	-61.16	-25	-36.16	-70.68	3.92	13.44	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.