



FCC RADIO TEST REPORT

FCC ID : QYLEM9190B
Equipment : Wireless Module
Brand Name : Getac
Model Name : EM9190
Applicant : Getac Technology Corporation.
5F., Building A, No. 209, Sec.1,
Nangang Rd., Nangang Dist., Taipei City
11568, Taiwan, R.O.C.
Standard : FCC 47 CFR Part 2, 27

The product was received on Sep. 01, 2023 and testing was performed from Sep. 13, 2023 to Oct. 03, 2023. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this partial report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Louis Wu

Sportun International Inc. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



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History of this test report



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
	§27.50 (k)(3)	Equivalent Isotropic Radiated Power (n77) (n78)	Pass	
-	§27.50 (k)(4)	Peak-to-Average Ratio	-	See Note
-	§2.1049	Occupied Bandwidth	-	See Note
-	§2.1051 §27.53 (n)(2)	Conducted Band Edge Measurement (n77) (n78)	-	See Note
-	§2.1051 §27.53 (n)(2)	Conducted Spurious Emission (n77) (n78)	-	See Note
-	§2.1055 §27.54	Frequency Stability Temperature & Voltage	-	See Note
4.2	§2.1053 §27.53 (n)(2)	Radiated Spurious Emission (n77) (n78)	Pass	-

Note:

1. For host device, Radiated Spurious Emission, Equivalent Isotropic Radiated Power are verified and complies with the limit in this test report.
2. For host device, the Conducted Output Power is no difference after compared to module (Model: EM9190)

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.

Reviewed by: William Chen

Report Producer: Rachel Hsieh



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
General Specs WCDMA/LTE/5G NR, and GNSS.	
Antenna Type WWAN: PIFA Antenna GPS/Glonass/BDS/Galileo/SBAS: PATCH Antenna	
Sample 1	EUT with Host 1
Sample 2	EUT with Host 2
Sample 3	EUT with Host 3
Sample 4	EUT with Host 4
Antenna Gain	0.12 dBi

Support Band and Evaluated Information	
Supported Band	n77
Evaluated and Tested Band	n77

TDD Band Power Class	
	PC3
N77	V

<Unit : dBi>

Antenna Information	
Band	Main
n77	0.12

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.



The product was installed into Notebook (Brand Name: Getac, Model Name: B360, B360 Pro, B360 G2, B360 Pro G2) during test, and the host information was recorded in the following table.

Host Information				
Host 1	Host with SKU A			
Host 2	Host with SKU B			
Host 3	Host with SKU C			
Host 4	Host with SKU D			
Host Sample Information				
B360	SKUA	SKUB	SKUC	SKUD
CPU	i7-10610U	i7-10710U	ADL-P i5-1250P vPro	ADL-P i7-1280P vPro
Memory(DDR4)	8G	8G	Kingston 16GB*2, 3200MHZ, DDR4 x2 (E-Die)	Kingston 32GB, 3200MHZ, DDR4 x2 (E-Die)
Storage(OPAL SSD)	Main:256GB	Main:256GB	Main:1TB	Main:256GB
	Second:256GB	Second:256GB	Second:1TB	Second:256GB
WLAN	AX200NGW	AX200NGW	AX211NGW	AX211NGW
WWAN	EM9190	EM9190	EM9190	EM9190
Camera FN20FF-679H (RGB)	N/A	v	N/A	v
Camera FN23FF-678H (RGB+IR)	v	N/A	v	N/A
FINGERPRINT	v	v	v	N/A
VGA	v	N/A	N/A	v
HDMI	v	v	v	v
RS232	v	v	v	v
LAN	v	v	v	v
USB	v	v	v	v
USB3.1 Type C	N/A	v	v	v
Smart Card	v	v	v	v
SD Card Reader	N/A	N/A	v	v
ODD(Expansion)	N/A	v	v	N/A
RS232(Expansion)	N/A	v	N/A	N/A
Touch Screen	v	v	N/A	N/A
PCMCIA	v	v	v	v
GPS	v	v	v	v

1.2 Modification of EUT

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



1.3 Testing Location

Test Site	Sportun International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sportun Site No. TH03-HY
Test Engineer	Hank Chen
Temperature (°C)	22.3~26.7
Relative Humidity (%)	49~57
Test Site	Sportun International Inc. Wensan Laboratory.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sportun Site No. 03CH21-HY (TAF Code: 3786)
Test Engineer	Jack Cheng, Ray Lung and Sky Chang
Temperature (°C)	18~26
Relative Humidity (%)	50~70
Remark	The Radiated Spurious Emission test item subcontracted to Sporton International Inc. Wensan Laboratory.

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190 and TW3786

1.4 Applicable Standards

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

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ FCC 47 CFR Part 2, 27
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.



2 Test Configuration of Equipment Under Test

2.1 Test Mode

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

Modulation Type	Modulation	Modulation Type	Modulation
A	DFT-s-OFDM pi/2 BPSK	N/A	N/A
B	DFT-s-OFDM QPSK	F	CP-OFDM QPSK
C	DFT-s-OFDM 16QAM	G	CP-OFDM 16QAM
D	DFT-s-OFDM 64QAM	H	CP-OFDM 64QAM
E	DFT-s-OFDM 256QAM	I	CP-OFDM 256QAM

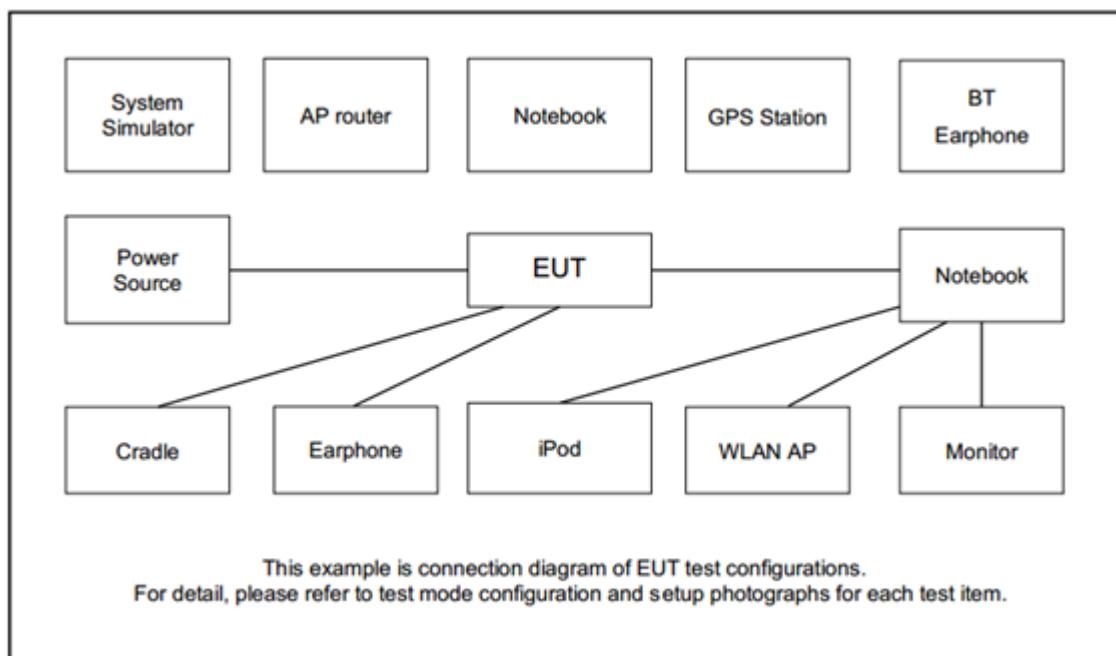
Test Item	Modulation Type	Bandwidth	RB Size	Channel
Conducted Power	A, B, C	30 MHz	1, Half, Full	L, M, H
EIRP	A, B, C	30 MHz	1, Half, Full	L, M, H
RSE	B	100 MHz	Inner_1RB	L, M, H

Remark:

1. Evaluated all the transmitter signal and reporting worst-case configuration among all modulation types.
2. 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.
3. Test combination is EN-DC 5A-n77A.
4. All the radiated test cases were performed with Adapter 1, Battery 1 and Sample 1.



2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m
2.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A

2.4 Frequency List of Low/Middle/High Channels

5G NR Band n77 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	-	633334	-
	Frequency	-	3500.01	-
30	Channel	631000	633334	635666
	Frequency	3465	3500.01	3534.99



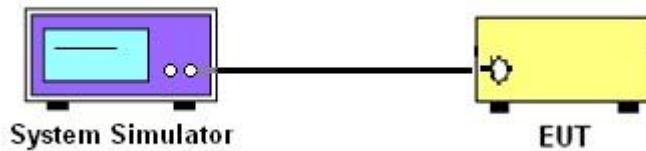
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Test Result of Conducted Test

Please refer to Appendix A.



3.2 Conducted Output Power and EIRP

3.2.1 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 1 Watts for 5G NR n77 and n78

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

3.2.2 Test Procedures

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

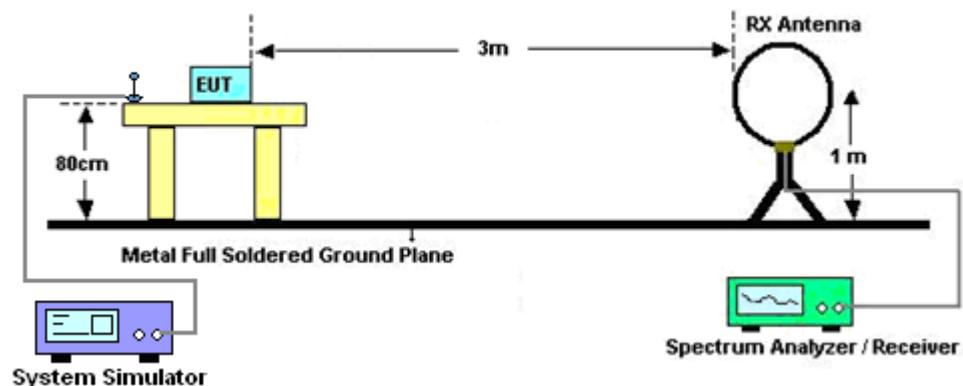
4 Radiated Test Items

4.1 Measuring Instruments

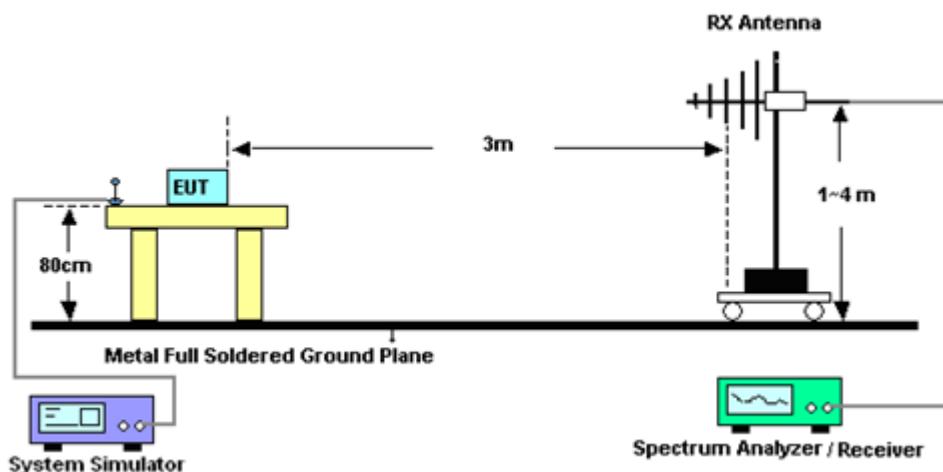
See list of measuring instruments of this test report.

4.1.1 Test Setup

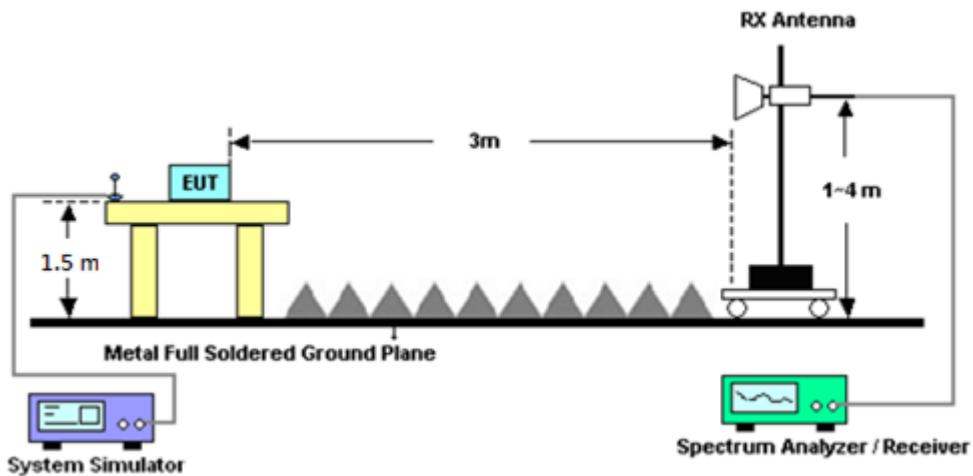
For radiated test below 30MHz



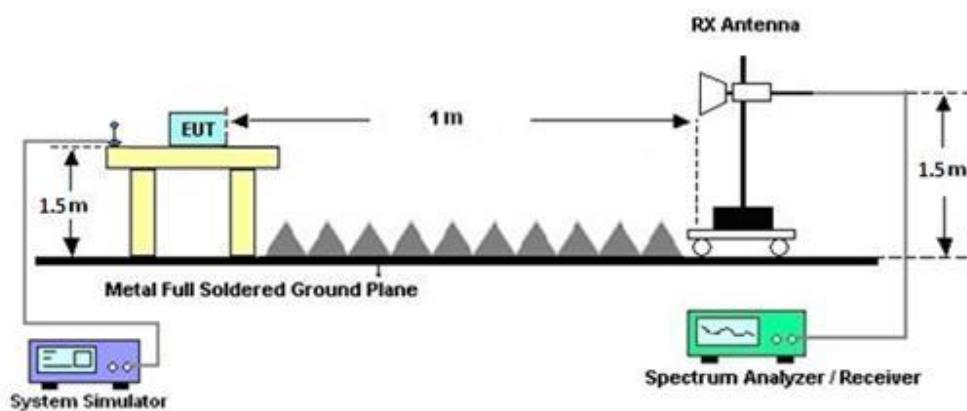
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

Note:

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.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.



4.2 Radiated Spurious Emission Measurement

4.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E.

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 $43 + 10 \log(P)$ dB.

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

4.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI C63.26-2015 section 5.5.4 Radiated measurement using the field strength method.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. To convert spectrum reading $E(\text{dBuV/m})$ to $\text{EIRP}(\text{dBm})$
$$\text{EIRP}(\text{dBm}) = \text{Level } (\text{dBuV/m}) + 20\log(d) - 104.77$$
, where d is the distance at which field strength limit is specified in the rules
7. Field Strength Level (dBm) = Spectrum Reading (dBm) + Antenna Factor + Cable Loss + Read Level - Preamp Factor.
8. $\text{ERP } (\text{dBm}) = \text{EIRP } (\text{dBm}) - 2.15$
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power $P(\text{Watts})$



5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
LOOP Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 12, 2023	Sep. 25, 2023~Sep. 26, 2023	Sep. 11, 2024	Radiation (03CH21-HY)
Bilog Antenna	TESEQ & WOKEN	CBL 6111D & 00802N1D-06	63303 & 001	30MHz~1GHz	Oct. 04, 2022	Sep. 25, 2023~Sep. 26, 2023	Oct. 03, 2023	Radiation (03CH21-HY)
Double Ridged Guide Horn Antenna	RFSPIN	DRH18-E	LE2C03A18 EN	1GHz~18GHz	Jul. 12, 2023	Sep. 25, 2023~Sep. 26, 2023	Jul. 11, 2024	Radiation (03CH21-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	1223	18GHz~40GHz	Jul. 10, 2023	Sep. 25, 2023~Sep. 26, 2023	Jul. 09, 2024	Radiation (03CH21-HY)
Amplifier	SONOMA	310N	421580	30MHz~1GHz	Jul. 15, 2023	Sep. 25, 2023~Sep. 26, 2023	Jul. 14, 2024	Radiation (03CH21-HY)
Amplifier	EMEC	EM01G18GA	060876	1GHz~18GHz	Sep. 29, 2022	Sep. 25, 2023~Sep. 26, 2023	Sep. 28, 2023	Radiation (03CH21-HY)
Preamplifier	EMEC	EM18G40G	060871	18GHz~40GHz	Aug. 30, 2023	Sep. 25, 2023~Sep. 26, 2023	Aug. 29, 2024	Radiation (03CH21-HY)
Spectrum Analyzer	Keysight	N9010B	MY62170358	10Hz~44GHz	Aug. 28, 2023	Sep. 25, 2023~Sep. 26, 2023	Aug. 27, 2024	Radiation (03CH21-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9K~30M	Mar. 07, 2023	Sep. 25, 2023~Sep. 26, 2023	Mar. 06, 2024	Radiation (03CH21-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804397/2,80 4612/2,8046 14/2	30MHz~40GHz	Oct. 25, 2022	Sep. 25, 2023~Sep. 26, 2023	Oct. 24, 2023	Radiation (03CH21-HY)
Hygrometer	TECPEL	DTM-303A	TP211568	N/A	Nov. 17, 2022	Sep. 25, 2023~Sep. 26, 2023	Nov. 16, 2023	Radiation (03CH21-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Sep. 25, 2023~Sep. 26, 2023	N/A	Radiation (03CH21-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Sep. 25, 2023~Sep. 26, 2023	N/A	Radiation (03CH21-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Sep. 25, 2023~Sep. 26, 2023	N/A	Radiation (03CH21-HY)
Software	Audix	E3 6.2009-8-24	RK-001053	N/A	N/A	Sep. 25, 2023~Sep. 26, 2023	N/A	Radiation (03CH21-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101102	10Hz~44GHz	Feb. 02, 2023	Sep. 13, 2023~Oct. 03, 2023	Feb. 01, 2024	Conducted (TH03-HY)



6 Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.06 dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.31 dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.30 dB
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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power) and EIRP

Part 27Q NR n77 Maximum Average Power [dBm] (GT - LC = 0.12 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
30	1	1	PI/2 BPSK	22.72	22.78	22.74	23.01	0.2000
30	1	76		22.70	22.75	22.75		
30	36	18		22.66	22.70	22.78		
30	1	0		22.68	22.74	22.82		
30	1	77		22.66	22.75	22.76		
30	75	0		22.65	22.76	22.75		
30	1	1	QPSK	22.76	22.85	22.89		
30	1	76		22.73	22.81	22.86		
30	36	18		22.61	22.65	22.73		
30	1	0		22.71	22.81	22.85		
30	1	77		22.72	22.79	22.82		
30	75	0		22.63	22.73	22.76		
Limit	EIRP < 1W			Result			Pass	



Appendix B. Test Results of Radiated Test

B1. Summary of each worse mode

Part	Mode	Ch	Freq (MHz)	Level (dBm)	Detector	Ant Factor (dB/m)	Amp\Cbl (dB)	Filter (dB)	EIRP CF (dB)	Reading (dBuV)	Limit (dBm)	Margin (dB)	Pol	Ant
Part 27Q	1	M	13805.000	-49.83	RMS	40.32	-21.02	0.84	-95.23	25.26	-13.00	-36.83	V	Tx0Rx0

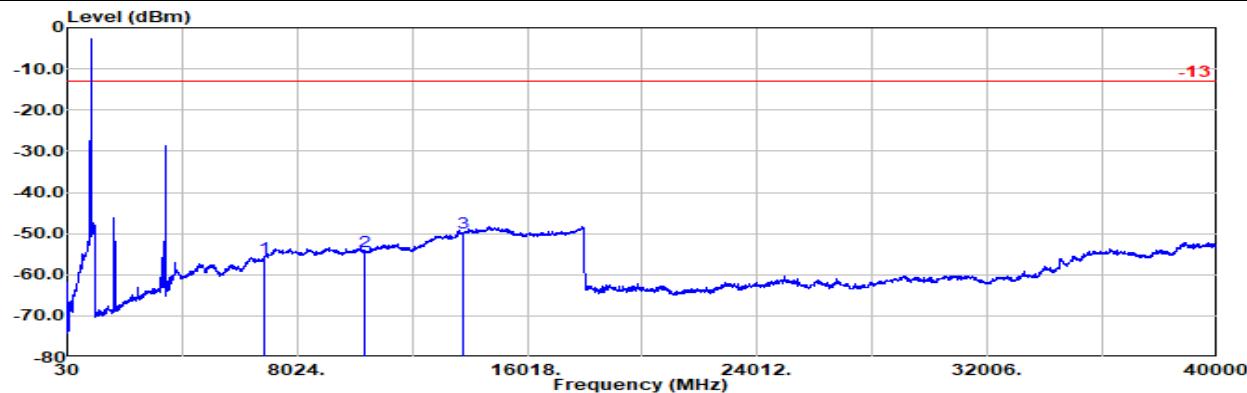


Tx0Rx0

Part 27Q Mode 1

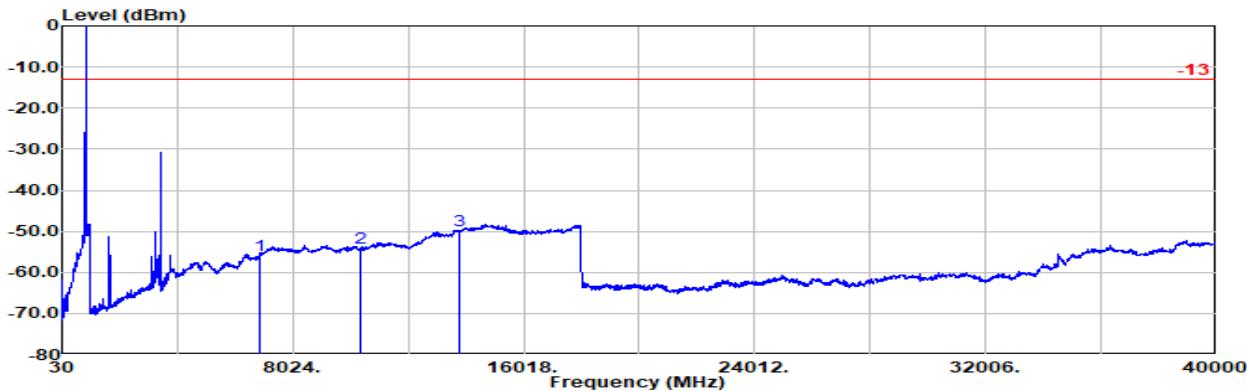
EN-DC B5+n77 10M + 100M Ch20525 1RB0 QPSK + Ch633334 1RB1 QPSK

M



Site : 03CH21-HY
Condition: -13 3m DRH18-E LE2C03A18EN_230712 Horizontal
Project : 0D2108-01
: LTE B5 10M Ch20525 1RB0 QPSK
: SA n77 100M Ch633334 1RB1 QPSK

Freq MHz	Level dBm	Detector	Ant Amp\Cb Factor			Filter 1	EIRPCF	Readin g	Limit	Margin dB	Pol
			dB/m	dB	dB						
1 6903.00	-56.00	RMS	36.31	-20.56	1.02	-95.23	22.46	-13.00	-43.00	Horizontal	
2 10354.00	-54.39	RMS	37.39	-20.57	0.56	-95.23	23.46	-13.00	-41.39	Horizontal	
3 13805.00	-49.84	RMS	40.32	-21.02	0.84	-95.23	25.25	-13.00	-36.84	Horizontal	



Site : 03CH21-HY
Condition: -13 3m DRH18-E LE2C03A18EN_230712 Vertical
Project : 0D2108-01
: LTE B5 10M Ch20525 1RB0 QPSK
: SA n77 100M Ch633334 1RB1 QPSK

Freq MHz	Level dBm	Detector	Ant Amp\Cb Factor			Filter 1	EIRPCF	Readin g	Limit	Margin dB	Pol
			dB/m	dB	dB						
1 6903.00	-55.97	RMS	36.31	-20.56	1.02	-95.23	22.49	-13.00	-42.97	Vertical	
2 10354.00	-54.11	RMS	37.39	-20.57	0.56	-95.23	23.74	-13.00	-41.11	Vertical	
3 13805.00	-49.83	RMS	40.32	-21.02	0.84	-95.23	25.26	-13.00	-36.83	Vertical	